Environment Horticulture Program Research Summaries

IR-4 Environmental Horticulture Program
Thrips Efficacy:

Chilli Thrips (*Scirtothrips dorsalis*)
Gladiolus Thrips (*Thrips simplex*)
Privet Thrips (*Dendothrips ornatus*)
Weeping Fig Thrips (*Gynaikothrips uzeli*)
Western Flower Thrips (*Frankliniella occidentalis*)

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Date: May 15, 2020

Acknowledgements
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This material is based upon work that is supported by the National Institute of Food and Agriculture, U.S. Department of Agriculture, under award numbers 2015-34383-23710, 2017-34383-27100, and 2019-34383-29973 with substantial cooperation and support from the State Agricultural Experiment Stations and USDA-ARS.

Table of Contents

Table of Contents 2
Table of Tables 4
Abstract 10
Introduction 11
Materials and Methods 11
Results 16
- Efficacy by Thrips Genera 16
- Efficacy by Thrips Species 27
- Comparative Efficacy on Chili Thrips (Scirtothrips dorsalis) 27
- Comparative Efficacy on Gladiolus Bulb Thrips (Thrips simplex) 43
- Comparative Efficacy onPrivet Thrips (Dendothrips ornatus) 45
- Comparative Efficacy on Weeping Fig Thrips (Gynaikothrips uzeli) 45
- Comparative Efficacy on Western Flower Thrips (Frankliniella occidentalis) 49
  - Butterfly Bush 49
  - Cosmos 49
  - Chrysanthemum 49
  - Gardenia 49
  - Gerbera 54
  - Impatiens 67
  - Marigold 74
  - Petunia 133
  - Portulaca 136
  - Rose 138
  - Verbena 143
  - Zinnia 147
- Efficacy Summary by Product 150
  - A16901B 150
  - A20520/DPX-HGW86/Mainspring 150
  - Acelepryn / DPX-E2Y45 1.67SC 150
  - Allectus 150
  - Altus 150
  - Aria 50SG 150
  - Avid 0.15EC 150
  - AzaGuard / Aza-Direct / Azatin XL / Ornazin 3EC. 150
  - BAS 320i. 150
  - BCS 507. 150
  - BotaniGard ES/WP. 150
  - Celero 16WSG. 150
  - Conserve SC 150
  - Discus. 150
  - Flagship 25WG/0.22G, Meridian 25WG/0.33G. 150
  - GF-2860 / XXpire WG 151
  - Hachi-Hachi / Tolfenpyrad EC. 151
  - IKI-3106/Sarisa 151
  - IKI-3326 / Pradia 151

KOC 22018-8 151
Kontos (BYI-8330). 151
MBI 203 / Grandevo 151
MBI 206 / Venerate 151
Mesurol 75W 151
Met52 / Tick-Ex EC 151
MOI 201 151
NNI-0101 20% SC / SP3009 / Rycar 151
Overture 35WP 151
Proud 3. 151
Pylon. 151
QRD 400. 151
Safari 20SG/2G 151
SP3014. 151
Talstar F. 151
TetraCurb. 151
TriCon. 152
TriStar 30SG/70WSP. 152
V-10433. 152
Phytotoxicity 152
Label Suggestions 202
Appendix 1: Contributing Researchers 203

Table of Tables

Table 1. List of Products and Rates Tested from 1999 to 2019. 11
Table 2. General efficacy summary on western flower thrips (*Frankliniella occidentalis*) across infestation levels, crops, application types and application rates – Butterfly Bush, Cosmos, Chrysanthemum, Gardenia, and Geranium. 17
Table 3. General efficacy summary on western flower thrips (*Frankliniella occidentalis*) across infestation levels, crops, application types and application rates – Gerbera. 18
Table 4. General efficacy summary on western flower thrips (*Frankliniella occidentalis*) across infestation levels, crops, application types and application rates – Impatiens. 19
Table 5. General efficacy summary on western flower thrips (*Frankliniella occidentalis*) across infestation levels, crops, application types and application rates –Marigold. 20
Table 6. General efficacy summary on western flower thrips (Frankliniella occidentalis) across infestation levels, crops, application types and application rates –Marigold, continued. 21
Table 7. General efficacy summary on western flower thrips (Frankliniella occidentalis) across infestation levels, crops, application types and application rates –Marigold, continued. 22
Table 8. General efficacy summary on western flower thrips (*Frankliniella occidentalis*) across infestation levels, crops, application types and application rates – Petunia, Portulaca, Rose, Verbena, and Zinnia. 23
Table 9. General efficacy summary on *Scirtothrips*, *Thrips* and*Dendothrips* species across infestation levels, crops, application types and application rates. 24
Table 10. General efficacy summary on *Gynaikothrips* species across infestation levels, crops, application types and application rates. 26
Table 11. Efficacy of several insecticides for *Scirtothrips dorsalis* on ‘Knockout’ Rose – Experiment 1 – Application Rates and Dates, Ludwig, TX, 2007a. 28
Table 12. Efficacy of several insecticides for *Scirtothrips dorsalis* on ‘Knockout’ Rose – Experiment 1, Ludwig, TX, 2007a. 29
Table 13. Efficacy of several insecticides for *Scirtothrips dorsalis* on ‘Knockout’ Rose – Experiment 2 – Application Rates and Dates, Ludwig, TX, 2007b. 30
Table 14. Efficacy of several insecticides for *Scirtothrips dorsalis* on ‘Knockout’ Rose – Experiment 2, Ludwig, TX, 2007b. 31
Table 15. Efficacy of several insecticides for *Scirtothrips dorsalis* on ‘Knockout’ Rose – Experiment 3 – Application Rates and Dates, Ludwig, TX, 2008a. 33
Table 16. Efficacy of several insecticides for *Scirtothrips dorsalis* on ‘Knockout’ Rose – Experiment 3, Ludwig, TX, 2008a. 34
Table 17. Efficacy of several insecticides for *Scirtothrips dorsalis* on ‘Knockout’ Rose – Experiment 4 – Application Rates and Dates, Ludwig, TX, 2008b. 35
Table 18. Efficacy of several insecticides for *Scirtothrips dorsalis* on ‘Knockout’ Rose – Experiment 4, Ludwig, TX, 2008b. 36
Table 19 *Efficacy of several insecticides for *Scirtothrips dorsalis* on ‘Knockout’ Rose – Application Rates and Dates, Ludwig, TX, 2009. 38
Table 20 *Efficacy of several insecticides for *Scirtothrips dorsalis* on ‘Knockout’ Rose, Ludwig, TX, 2009. 39
Table 21 *Efficacy of several insecticides for *Scirtothrips dorsalis* on Plumbago (*Plumbago auriculata*) ‘Monott’, Arthurs, FL, 2010. 40
Table 22 Efficacy of several insecticides for *Scirtothrips dorsalis* on *Dystillium* ('Blue Cascade) – Application Rates and Dates, Chong, SC, 2017. 40

Table 23 Efficacy of several insecticides for *Scirtothrips dorsalis* on *Dystillium* ('Blue Cascade), Chong, SC, 2017. 41
Table 24. Efficacy of several insecticides for *Scirtothrips dorsalis* on Indian Hawthorn (*Raphiolepis indica*), Dale, FL, 2017. 42
Table 25. Efficacy of Gladiolus Bulb Dip Applications on Gladiolus Thrips (*Thrips simplex*), Smitley & Davis, MI, 2006. 43
Table 26. Privet Thrips Control on New Mexican Privet (*Foresteria neomexicana*), Cranshaw, CO, 2008. 45
Table 27. Efficacy of several insecticides for *Gynaikothrips uzeli* on Ficus – Experiment 1, Held, MS, 2005a. 46
Table 28. Efficacy of several insecticides for *Gynaikothrips uzeli* on Ficus – Experiment 2, Held, MS, 2005b. 46
Table 29. Efficacy of several insecticides for *Gynaikothrips uzeli* on Ficus – Experiment 3, Held, MS, 2005c. 47
Table 30. Mortality of *Gynaikothrips uzeli* inside galls on Ficus (*Ficus benjamina*) – Experiment 1, Held, MS, 2006a. 47
Table 31. Mortality of *Gynaikothrips uzeli* inside galls on Ficus (*Ficus benjamina*) –Experiment 2, Held, MS, 2006b. 48
Table 32. *Gynaikothrips uzeli* gall induction on Ficus (*Ficus benjamina*) after treatment with plant protectants –Experiment 3, Held,MS 2006c. 48
Table 33. *Gynaikothrips uzeli* gall induction on Ficus (*Ficus benjamina*) after ongoing treatments with plant protectants–Experiment 4, Held, MS, 2006c. 49
Table 34. Western Flower Thrips Control on Butterfly Bush (*Buddleia davidii*) 'Blueberry Cobbler' – Application Rates and Dates, Villavicencio, CA , 2012. 50
Table 35 Western Flower Thrips Control on Butterfly Bush (*Buddleia davidii*) 'Blueberry Cobbler', Villavicencio, CA, 2012. 51
Table 36. Western Flower Thrips Control on Cosmos (*Cosmos bipinnatus*) 'Picotee', Cranshaw, CO, 2008a. 52
Table 37. Western Flower Thrips Control on Cosmos (*Cosmos bipinnatus*) 'Picotee', Cranshaw, CO, 2008b. 53
Table 38. Western Flower Thrips Control on Chrysanthemum (*Dendranthemum x morifolium*) 'Bright Stephanie', Lindquist, OH, 1999. 53
Table 39. *Western Flower Thrips Control on Gardenia (*Gardenia jasminoides*) 'Veitchii', Bethke, CA, 2004. 53
Table 40. Western Flower Thrips Control on Geranium (*Pelargonium* sp.), – Application Rates and Dates, Frank, NC 2010. 54
Table 41. Western Flower Thrips Control on Geranium (*Pelargonium* sp.), Frank, NC 2010. 54
Table 42 *Western Flower Thrips Control on *Gerbera jamesonii*, 'Delight' Cloyd, KS, 2001. 55
Table 43. Western Flower Thrips Control on Gerbera (*Gerbera jamesonii*) 'Festival Dark Eye Golden Yellow' – Application Rates & Intervals, Canas, OH, 2006. 56
Table 44. Western Flower Thrips Control on Gerbera (*Gerbera jamesonii*) 'Festival Dark Eye Golden Yellow' – Leaves, Canas, OH, 2006. 57
Table 45. Western Flower Thrips Control on Gerbera 'Festival Dark Eye Golden Yellow' – Flowers, Canas, OH, 2006. 58
Table 46. Western Flower Thrips Control on Gerbera (*Gerbera jamesonii*) 'Festival Dark Eye Golden Yellow' – Cut Flowers, Canas, OH, 2006. 60
Table 47. Western Flower Thrips Control on Gerbera (*Gerbera jamesonii*) 'Festival Dark Eye Golden Yellow' – Application Rates & Intervals, Canas, OH, 2008. 61

Table 48. Western Flower Thrips Control on Gerbera (*Gerbera jamesonii*) 'Festival Dark Eye Golden Yellow' – Leaves, Canas, OH, 2008. 62
Table 49. Western Flower Thrips Control on Gerbera 'Festival Dark Eye Golden Yellow' – Flowers, Canas, OH, 2008. 63
Table 50. Efficacy of several insecticides for *Frankliniella occidentalis* on *Gerbera jamesonii* 'Royal' series with mixed colors – Application Rates and Dates, Parrella, CA, 2006a. 64
Table 51. Efficacy of several insecticides for *Frankliniella occidentalis* on *Gerbera jamesonii* 'Royal' series with mixed colors, Parrella, CA, 2006a. 64
Table 52. Efficacy of several insecticides for *Frankliniella occidentalis* on *Gerbera jamesonii* 'Royal' series with mixed colors – Application Rates and Dates, Parrella, CA, 2006b. 64
Table 53. Efficacy of several insecticides for *Frankliniella occidentalis* on *Gerbera jamesonii* 'Royal' series with mixed colors, Parrella, CA, 2006b. 65
Table 54. Western Flower Thrips Control on Gerbera (*Gerbera jamesonii*), Cloyd, KS, 2008. 65
Table 55. Western Flower Thrips Control on Gerbera (*Gerbera jamesonii*), Cloyd, KS, 2009. 66
Table 56. Western Flower Thrips Control on Gerbera (*Gerbera jamesonii*), Villavicencio, CA, 2013. 66
Table 57. WFT Control on Impatiens (*Impatiens hawkeri*) 'Riviera Deep Salmon' – Lindquist, OH, 1999. 68
Table 58. Western Flower Thrips Control on Impatiens (*Impatiens wallerana*) 'Super Elfin Cherry' – Experiment 1, Chen, LA, 2006a. 68
Table 59. Western Flower Thrips Control on Impatiens (*Impatiens wallerana*) 'Super Elfin Cherry' – Experiment 2, Chen, LA, 2006b. 69
Table 60. Western Flower Thrips Control on Impatiens (*Impatiens wallerana*) 'Super Elfin Cherry' – Experiment 3, Chen, LA, 2006c. 70
Table 61. Western Flower Thrips Control on Impatiens (*Impatiens wallerana*) 'Super Elfin Cherry' – Experiment 4, Chen, LA, 2006d. 71
Table 62. Western Flower Thrips Control on *Impatiens balsamina*, Reding and Anderson, OH, 2007. 72
Table 63. Western Flower Thrips Control on Impatiens (*Impatiens wallerana*) 'Super Elfin Red' – Trial 1, Chen, LA, 2012a. 73
Table 64. Western Flower Thrips Control on Impatiens (*Impatiens wallerana*) 'Super Elfin Red' – Trial 3, Chen, LA, 2012b. 74
Table 65. * Western Flower Thrips Control on Marigold (*Tagetes erecta*) 'Yellow Boy', Smitley, Davis & Newhouse, MI, 2005. 75
Table 66. Western Flower Thrips Control on Marigold (*Tagetes patula*) 'Yellow Boy' – Application Rates and Dates, Davis, MI, 2007. 75
Table 67. Western Flower Thrips Control on Marigold (*Tagetes patula*) 'Yellow Boy', Davis, MI, 2007. 76
Table 68. Western Flower Thrips Control on Marigold (*Tagetes patula*) 'Yellow Boy' – Application Rates and Dates, Davis, MI, 2008. 77
Table 69. Western Flower Thrips Control on Marigold (*Tagetes patula*) 'Yellow Boy', Davis, MI, 2008. 78
Table 70. Western Flower Thrips Control on Marigold (*Tagetes patula*) 'Jaguar', Gilrein, NY, 2008. 78
Table 71. Western Flower Thrips Control on Marigold 'Hero Mix'– Application Rates and Dates, Oetting, GA, 2008. 79
Table 72. Western Flower Thrips Control and Flower Damage Rating on Marigold 'Hero Mix', Oetting, GA, 2008. 80
Table 73. Western Flower Thrips Control on Marigold (*Tagetes patula*) 'Yellow Boy' – Application Rates and Dates, Davis, MI, 2009. 81

Table 74. Western Flower Thrips Control on Marigold (*Tagetes patula*) 'Yellow Boy', Davis, MI, 2009. 82
Table 75. Western Flower Thrips Control on Marigold (*Tagetes patula*) 'Yellow Boy' – Application Rates and Dates, Davis, MI, 2010. 83
Table 76. Western Flower Thrips Control on Marigold (*Tagetes patula*) 'Yellow Boy', Davis, MI, 2010. 85
Table 77. Western Flower Thrips Control on Marigold (*Tagetes patula*) 'Bonanza Yellow', Chong, SC, 2010. 87
Table 78. Western Flower Thrips Control on Marigold (*Tagetes patula*) 'Boy O Boy' – Application Rates and Dates, Ludwig, TX, 2010. 88
Table 79. Western Flower Thrips Control on Marigold (*Tagetes patula*) 'Boy O Boy', Ludwig, TX, 2010. 89
Table 80. Western Flower Thrips Control on Marigold (*Tagetes patula*) 'Boy O Boy' – Application Rates and Dates, Ludwig, TX, 2010. 90
Table 81. Western Flower Thrips Control on Marigold (*Tagetes patula*) 'Boy O Boy', Ludwig, TX, 2010. 91
Table 82. Western Flower Thrips Control on Marigold (*Tagetes erecta*) 'Vanilla', Damage Rating, Gilrein, NY, 2011. 92
Table 83. Western Flower Thrips Control on Marigold (*Tagetes erecta*) 'Vanilla', Gilrein, NY, 2011. 93
Table 84. Western Flower Thrips Control on Marigold (*Tagetes patula*) 'Yellow Bonanza', – Application Rates and Dates, Davis, MI, 2012. 95
Table 85. Western Flower Thrips Control on Marigold (*Tagetes patula*) 'Yellow Bonanza', Davis, MI, 2012. 96
Table 86. Western Flower Thrips Control on Marigold (*Tagetes erecta*) 'Vanilla', Gilrein, NY, 2013. 98
Table 87. Western Flower Thrips Control on Marigold (*Tagetes erecta*) 'Vanilla', Damage Rating, Gilrein, NY, 2013. 100
Table 88. Western Flower Thrips Control on Marigold (*Tagetes patula*) 'Boy O Boy', Heinz, TX, 2013. 100
Table 89. Western Flower Thrips Control on Marigold (*Tagetes patula*) 'Queen Sophia', – Application Rates and Dates, Davis, MI, 2014. 102
Table 90. Western Flower Thrips Control on Marigold (*Tagetes patula*) 'Queen Sophia', Davis, MI, 2014. 103
Table 91. Western Flower Thrips Control on Marigold (*Tagetes erecta*) 'Taishan Yellow', Population Counts, Gilrein, NY, 2014. 104
Table 92. Western Flower Thrips Control on Marigold (*Tagetes erecta*) 'Taishan Yellow', Percent Damage, Gilrein, NY, 2014. 106
Table 93. Western Flower Thrips Control on Marigold (*Tagetes erecta*) 'Discovery Yellow', Heinz, TX, 2014. 107
Table 94. Western Flower Thrips Control on Marigold (*Tagetes patula*) 'Yellow Boy', Davis, MI, 2015. 108
Table 95. Western Flower Thrips Control on Marigold (*Tagetes erecta*) 'Taishan Yellow', Population Counts, Gilrein, NY, 2015. 109
Table 96. Western Flower Thrips Control on Marigold (*Tagetes erecta*) 'Taishan Yellow', Percent Damage, Gilrein, NY, 2015. 111
Table 97. Western Flower Thrips Control on Marigold (*Tagetes erecta*) 'Safari Yellow', Vafaie, TX, 2015. 111
Table 98. Western Flower Thrips Control on Marigold (*Tagetes erecta*) 'Hero Orange' in Field Container, Davis, MI, 2016. 113

Table 99. Western Flower Thrips Control on Marigold (*Tagetes* sp.) 'Safari Yellow', – Application Rates and Dates, Nansen, CA, 2016. 114
Table 100. Western Flower Thrips Control on Marigold (*Tagetes* sp.) 'Safari Yellow', Nansen, CA, 2016. 115
Table 101. Western Flower Thrips Control on Marigold (*Tagetes* sp.) 'Safari Yellow', - Plant Size, Nansen, CA, 2016. 116
Table 102. Western Flower Thrips Control on Marigold (*Tagetes erecta*) 'Safari Bolero', Vafaie, TX, 2016. 117
Table 103. Western Flower Thrips Control on Marigold (*Tagetes* sp.) 'Small Bloom Orange', – Application Rates and Dates, Vafaie, TX, 2017. 118
Table 104. Western Flower Thrips Control on Marigold (*Tagetes* sp.) 'Small Bloom Orange', Vafaie, TX, 2017. 119
Table 105. Western Flower Thrips Control on Marigold (*Tagetes* sp.) 'Safari Yellow', Nansen, CA, 2017. 120
Table 106. Western Flower Thrips Control on Marigold (*Tagetes* sp.) 'Safari Yellow', - Plant Size, Nansen, CA, 2017. 122
Table 107. Western Flower Thrips Control on Marigold (*Tagetes erecta*) 'Taishan Yellow', Gilrein, NY, 2017. 123
Table 108. Western Flower Thrips Control on Marigold (*Tagetes erecta*) 'Taishan Yellow', - Plant Size, Gilrein, NY, 2017. 125
Table 109. Western Flower Thrips Control on Marigold (*Tagetes* sp.) 'Safari Yellow', Nansen, CA, 2018. 126
Table 110. Western Flower Thrips Control on Marigold (*Tagetes* sp.) 'Safari Yellow', - Plant Size, Nansen, CA, 2018. 128
Table 111. Western Flower Thrips Control on Marigold (*Tagetes patula*) 'Yellow Boy', Hotchkiss, MI 2018. 129
Table 112. Western Flower Thrips Control on Marigold (*Tagetes patula*) 'Yellow Boy', Hotchkiss, MI 2019. 131
Table 113. Western Flower Thrips Control on Petunia (*Petunia sp.*) 'Dreams Midnight', Chen, LA, 2006a. 133
Table 114. Western Flower Thrips Control on Petunia (*Petunia sp*) 'Dreams Midnight', Chen, LA, 2006b. 134
Table 115. Western Flower Thrips Control on Petunia (*Petunia sp.*) 'Dreams Midnight', Chen, LA, 2006d. 135
Table 116. Western Flower Thrips Control on Portulaca (*Portulaca grandiflora*), Ludwig, TX, 2006.136
Table 117. Western Flower Thrips Control on Portulaca (*Portulaca grandiflora*), Ludwig, TX, 2007.137
Table 118. Efficacy of several insecticides for *Frankliniella occidentalis* on Miniature Rose 'Red Sunblase', Walsh, WA, 2006. 139
Table 119. Western Flower Thrips Control on Rose (*Rosa* sp.) 'Rainbow Knockout', – Application Rates and Dates, Parella, CA, 2010. 140
Table 120. Western Flower Thrips Control on Rose (*Rosa* sp.) 'Rainbow Knockout', Parella, CA, 2010. 141
Table 121. Western Flower Thrips Control on Rose (*Rosa* sp.) 'Belinda's Dreams' and 'Caldwell Pink'– Application Rates and Dates, Heinz, TX, 2012. 141
Table 122. Western Flower Thrips Control on Rose (*Rosa* sp.) 'Belinda's Dreams' and 'Caldwell Pink', Heinz, TX, 2012. 142
Table 123. Western Flower Thrips Control on Verbena 'Lorgo Purple' – Application Rates and Dates, Oetting, GA, 2008. 144

Table 124. Western Flower Thrips Control on and Damage on Verbena ‘Lorgo Purple’, Oetting, GA, 2008. 145
Table 125. Western Flower Thrips Control on Verbena (*Verbena hybrida*) 'Quartz Blue’, Chong, SC, 2016. 146
Table 126. Western Flower Thrips Control on Zinnia (*Zinnia elegans*) ‘Short Stuff’, Parella, CA, 2008. 147
Table 127. Western Flower Thrips Control on Zinnia (*Zinnia elegans*) ‘Short Stuff’, Parella, CA, 2009. 148
Table 128. Western Flower Thrips Control on Zinnia (*Zinnia marylandica*) ‘Zahara Yellow’, Chen, LA, 2009. 149
Table 129. Summary of Efficacy by Product 153

Abstract

For the last 14 years, the IR-4 Environmental Horticulture Workshop has ranked developing efficacy data on new products to manage thrips as a High Priority Project either nationally or regionally. Thrips remain an important threat for several reasons: 1) the damage thrips cause to environmental horticulture plants, decreasing the value of the infested crops; 2) the tospoviruses (tomato spotted wilt, impatiens necrotic ringspot) they can vector; 3) the newly arrived invasive species which impact at least 250 different environmental horticulture species; and 4) growers lack the ability to rotate among 3 to 4 different modes of actions to effectively manage resistance development in the thrips populations they must control to maintain economic viability. From 2005 through 2019, 89 products representing 59 different active ingredients were tested for thrips management. These products represented both biological and chemical tools. Some products were already registered, but more data were needed particularly with the newly invasive thrips species or they were considered standards to measure the level of efficacy achieved with other materials. Other products were in development but have not yet been registered with the EPA. The five thrips species tested in the IR-4 program were Chilli Thrips (*Scirtothrips dorsalis*), Gladiolus Thrips (*Thrips simplex*), Privet Thrips (*Dendothrips ornatus*), Weeping Fig Thrips (*Gynaikothrips uzeli*), and Western Flower Thrips (*Frankliniella occidentalis*).

Introduction

Managing thrips populations can be challenging given that the most prevalent species for environmental horticulture crops is western flower thrips (*Frankliniella occidentalis*). With many products not performing now as well as in the past, Conserve (spinosad) and Mesurol (methiocarb) have become the standards to manage thrips. However, there have been recent anecdotal reports of some populations being more difficult to control with both products. As of this time, there is no other registered product of a different chemical class to be used in rotation that would consistently provide acceptable control levels. At the 2005 Annual Workshop, screening a number of products to manage thrips became one of the high priority projects in entomology. In addition to western flower thrips, a project for gladiolus bulb thrips was initiated along with examining two introduced thrips species impacting environmental horticulture plants. The following research was conducted during 2005 and 2019 amended with several historical studies. In addition to research collected through the IR-4 program, this summary includes a review of experiments conducted from 2001 to 2012 on environmental horticulture crops published in Arthropod Management Tests (AMT). The source of report is included under each data table.

Materials and Methods

Eighty-nine insecticides (Table 1) were tested against five species of thrips: Chilli Thrips (*Scirtothrips dorsalis*), Gladiolus Thrips (*Thrips simplex*), Privet Thrips (*Dendothrips ornatus*), Weeping Fig Thrips (*Gynaikothrips uzeli*), and Western Flower Thrips (*Frankliniella occidentalis*). However, not all products were tested against all five species. Depending upon product characteristics either foliar or drench applications were made. A minimum of four plants (replicate treatments) were required with most researchers exceeding this minimum. Insect counts were recorded pre-treatment and then 7, 14 (prior to 2nd application), 28 and 42 days after initial application. Phytotoxicity was recorded on a scale of 0 to 10 (0 = No phytotoxicity; 10 = Complete kill) at each rating date. For more detailed materials and methods, including application rates for various products, please visit https://www.ir4project.org/ehc/ehc-registration-support-research/env-hort-researcher-resources/#Protocols to view and download these protocols.

Products were supplied to researchers (See list of researchers in Appendix 2) by their respective manufacturers.

Table 1. List of Products and Rates Tested from 1999 to 2019.

Active Ingredient(s)	Product	Manufacturer	Application Method & Rate(s)*		# Trials
Abamectin	Avid 0.15EC	Syngenta	Bulb Dib	8 oz	1
			Foliar	7.7 fl oz	1
			Foliar	8 fl oz	18
			Foliar	16 fl oz	3
Abamectin+Bifenazate	OHP-929-8	OHP	Foliar	6 fl oz	1
Acephate	Orthene TTO 97	Valent	Bulb Dip	8 oz	1
			Foliar	16 oz	1
Acetamiprid	TriStar 30SG	Cleary	Foliar	3.4 oz (96 g)	2
			Foliar	5 oz (142 g)	1
			Foliar	8 oz (227 g)	1
	TriStar 70WSP		Bulb Dip	2.25 oz (64 g)	1
			Foliar	2.25 oz (64 g)	2
			Foliar	3.4 oz (96 g)	4
			Foliar	8 oz (227 g)	1
Azadirachtin	Aza-Direct	Gowan	Drench	27 oz	1
			Foliar	27 oz	1
Azadirachtin	AzaGuard	BioSafe	Foliar	8 fl oz	1
			Foliar	16 fl oz	7
			Foliar	26 fl oz	2

Active Ingredient(s)	Product	Manufacturer	Application Method & Rate(s)*		# Trials
			Foliar	32 fl oz	1
	Azatin XL	OHP	Bulb Dip	16 oz	
			Foliar	16 fl oz	
	Ornazin	SePro	Foliar	8 fl oz	1
BAS 320i	BAS 320i	BASF	Foliar	1.2 oz	1
BCS-507	BCS-507	Bayer	Foliar	2.4 oz	3
				4.4 oz	3
Beauveria bassiana	BotaniGard ES	BioWorks	Foliar	1 quart	4
			Foliar	2 quarts	1
	BotaniGard WP		Foliar	1 lb	2
			Foliar	2 lb	8
Bifenthrin	Talstar F	FMC	Bulb Dip	21.7 fl oz	1
			Foliar	12.5 fl oz	5
			Foliar	21.5 fl oz	1
			Foliar	160 fl oz	2
Botanical Oil Blend	KOC22018-8	Kemin	Foliar	64 fl oz	1
				128 fl oz	1
Burkholderia sp. strain A396	MBI-206 / Venerate	Marrone	Foliar	1 gal	9
			Foliar	2 gal	8
			Foliar	1 qt	10
			Foliar	2 qt	11
CA4803A	CA4803A		Foliar	32 fl oz	2
Carbaryl	Sevin SL	Bayer	Foliar	32 oz	1
Chlorantraniliprole	Acelepryn (DPX-E2Y45) 1.67SC	DuPont	Foliar	20 fl oz	11
Chlorfenapyr	Pylon	BASF	Bulb Dip	10 oz	1
			Foliar	2.6 fl oz	4
			Foliar	5 fl oz	16
			Foliar	10 fl oz	8
Chlorpyrifos	Dursban	Dow	Foliar	16 oz	1
Chromobacterium subtsugae strain PRAA4-1^{T}	Grandevo (MBI-203)	Marrone	Foliar	2 lb	4
			Foliar	3 lb	4
			Foliar	4 lb	7
Clothianidin	Arena 50WDG	Valent	Bulb Dip	4 oz	1
			Drench	2 oz	2
			Drench	4 oz	5
			Foliar	2 oz	3
			Foliar	4 oz	4
Clothianadin + Bifenthrin	Aloft SC	Arysta	Foliar	5 oz	1
			Foliar	10 oz	1
Cyantraniliprole	DPX-HGW86	DuPont	Foliar	6 fl oz	1
			Foliar	40 fl oz	1
	A20520 / Mainspring	Syngenta	Foliar	8 fl oz	10
			Foliar	16 fl oz	8
Cyantraniliprole + Thiamethoxam)	A16901B	Syngenta	Foliar	6.7 oz	8
			Foliar	13.4 oz	5
Cyclaniliprole	IKI-3106 / Sarisa	ISK	Foliar	22 fl oz	14
				27 fl oz	14
Cyclaniliprole + Flonicamid	IKI-3326 / Pradia	ISK	Foliar	12 fl oz	2
				16.5 fl oz	2
Cyfluthrin	Tempo SC Ultra	Bayer	Foliar	160 ml	1
Diazinon	Diazinon 4E	Gowan	Bulb Dip	3 pints	1

Active Ingredient(s)	Product	Manufacturer	Application Method & Rate(s)*		# Trials
Dinotefuran	Safari 2G	Valent	Media Incorp.	6.6 g per pot	1
			Soil Broadcast	22 lb per acre	1
	Safari 20SG		Bulb Dip	24 oz	1
			Drench	18 oz	1
			Drench	24 oz	2
			Foliar	8 oz	7
Flonicamid	Aria 50SG	FMC	Bulb Dip	100 g	1
			Foliar	90 g	1
			Foliar	105 g	1
			Foliar	120 g	9
Flupyradifurone	Altus	Bayer	Foliar	14 oz	2
Formetanate hydrochloride	Carzol SP	Gowan	Bulb Dip	1 lb	1
Imidacloprid	Marathon	OHP	Drench	2.7 g per pot	1
	Merit 75	Bayer	Bulb Dip	16 g	1
	Merit 2F		Drench	6 ml per ft ht	2
Imidacloprid + Bifenthrin	Allectus G	Bayer	Bulb Dip	21.3 oz	1
			Foliar	21.8 fl oz	2
Imidacloprid + cyfluthrin	Discus	OHP	Bulb Dip	25 oz	1
			Drench	206 fl oz	1
			Foliar	25 fl oz	1
	Marathon Ultra		Foliar	10 fl oz	1
			Foliar	25 fl oz	2
Insecticidal Soap	EcoSense Brand Insecticidal Soap	Scotts	Foliar	RTU	1
Kaolin Clay	Surround	BASF	Foliar	50 lb	2
			Foliar	100 lb	1
Lambda-cyhalothrin	Scimitar	Syngenta	Foliar	5 fl oz	4
Metaflumizone	BAS 320i	BASF	Foliar	8 fl oz	2
			Foliar	16 fl oz	3
Metarhizium anisopliae	Met52/Tick-Ex EC	Novozymes	Foliar	15 fl oz	2
			Foliar	29 fl oz	17
Methiocarb	Mesurol 75W	Gowan	Bulb Dip	1 lb	2
			Foliar	8 oz	2
			Foliar	16 oz	4
MOI 201	MOI 201	Marrone	Foliar	1:800	1
			Foliar	1:500	8
Novaluron	Pedestal 10SC	OHP	Bulb Dip	8 fl oz	1
			Foliar	3 fl oz	1
			Foliar	8 fl oz	1
			Foliar	12 fl oz	1
OHP-929-2	OHP-929-2	OHP	Foliar	6 fl oz	1
Potassium bicarbonate	Milstop	BioWorks	Foliar	40 oz	1
Pyridalyl	Overture 35WP	Valent	Bulb Dip	8 oz	1
			Foliar	4 oz	1
			Foliar	8 oz	15
			Foliar	12 oz	3
			Foliar	16 oz	2
	S-1812 4EC		Foliar	6 fl oz	1
			Foliar	8 fl oz	3
			Foliar	12 fl oz	4
Pyrifluquinazon	NNI-0101 20% SC	Nichino	Bulb Dip	9.5 oz	1

Active Ingredient(s)	Product	Manufacturer	Application Method & Rate(s)*		# Trials
			Foliar	3.19 fl oz	1
			Foliar	6.4 fl oz	12
			Foliar	8 fl oz	1
			Foliar	9.6 fl oz	1
	SP3009 / Rycar	SePRO	Foliar	3.2 fl oz	6
			Foliar	6.4 fl oz	7
QRD 400	QRD 400	AgraQuest	Foliar	32 fl oz	2
			Foliar	64 fl oz	2
			Foliar	130 fl oz	2
QRD 416	QRD 416	AgraQuest	Foliar	128 fl oz	2
Rosemary Oil	TetraCurb Concentrate	Kemin	Foliar	64 fl oz	1
				128 fl oz	1
Rosemary Oil	TetraCurb Organic	Kemin	Foliar	64 fl oz	1
				128 fl oz	1
Rosemary and Peppermint Oils	Ecotrol	EcoSmart	Foliar	4 pt	2
S-1761	S-1761 0.83 EW		Foliar	15.2 fl oz	1
			Foliar	30.4 fl oz	1
S-1783	S-1783 10 WP		Foliar	1 lb	1
			Foliar	2 lb	1
Sodium tetraborohydrate decahydrate	TriCon (BW 240)	BioWorks	Bulb Dip	100 oz	1
			Foliar	50 fl oz	5
			Foliar	80 fl oz	1
			Foliar	100 fl oz	1
SP3014	SP3014	SePro	Foliar	13 fl oz	3
				26 fl oz	3
Spinosad	Conserve SC	Dow	Bulb Dip	11 oz	1
			Foliar	6 fl oz	15
			Foliar	7 fl oz	1
			Foliar	8 fl oz	16
			Foliar	10 fl oz	2
			Foliar	11 fl oz	10
	Monterey Garden Insect Spray SC	Monterey	Foliar	2 fl oz per gal	1
Spinoteram+Sulfoxaflor	GF-2860 / XXpire	Dow	Foliar	2.0 oz	3
			Foliar	3.5 oz	7
Spirotetramat	BYI-8330 OD	Bayer	Foliar	8 oz	1
			Foliar	12 oz	1
	Kontos (BYI-8330)	OHP (Bayer)	Bulb Dip	1.7 fl oz	1
			Drench	6 ml per ft ht	2
			Drench	1.7 fl oz	6
			Foliar	1.7 fl oz	18
			Foliar	2.5 fl oz	1
Sucrose octanoate ester	SucraShield	Natural Forces	Foliar	3 qt	1
			Foliar	4 qt	1
Thiamethoxam	Flagship	Syngenta	Bulb Dip	2 oz	1
			Bulb Dip	8 oz	1
			Drench	4 oz	3
			Drench	8 oz	4
			Drench	12 oz	2
			Foliar	4 oz	5
			Foliar	8 oz	10

Active Ingredient(s)	Product	Manufacturer	Application Method & Rate(s)*		# Trials
	Meridian 0.33G		Soil Broadcast	80 lb per acre	1
	Meridian 25WG		Foliar	17 oz	1
Thyme Oil	Proud 3	Bio Huma Netics	Foliar	2 quart	2
			Foliar	4 quart	9
Tolfenpyrad	Hachi-Hachi / Tolfenpyrad	Nichino	Bulb Dip	10.5 oz	1
			Foliar	14 fl oz	7
			Foliar	21 fl oz	26
			Foliar	27 fl oz	1
V-10433	V-10433	Valent	Foliar	11 fl oz	3
				22 fl oz	3

* Rates per 100 gal.

Results

Efficacy by Thrips Genera

In the 79 experiments presented here, 89 products were tested. Some of these were tested in a single experiment and some were tested multiple times for different thrips on different crops (Table 2 – Table 10). While no one product performed consistently across the different thrips species and the different experiments, here are some general observations for the tested products. No one product seems to be suitable for all different thrips species in all situations. For those products tested in at least 4 experiments with the same rate and application method, all (A16901B,A20520 / DPX-HGW86 / Mainspring, Acelepryn/DPX-E2Y45, Aria, Avid, AzaGuard, Botanigard, Conserve, Flagship, Hachi-Hachi/Tolfenpyrad, IKI-3106/Sarisa, Kontos(BYI-8330), Overture, Proud 3, Pylon, and TriCon) provided excellent control (>95%) in at least one experiment. Conserve was the standard in 28 experiments. In half of the trials, Conserve provided excellent control, but in 13 trials it did not provide acceptable levels of control. Conserve managed both chilli thrips and gladiolus thrips well, but with western flower thrips, control seemed to fade under higher population pressures. For those products tested less than 4 times, those that performed well and may warrant additional testing include: IKI-3326/Pradia, KOC 22018-8, BCS-507, Allectus, Discus/Marathon Ultra, OHP-929-8, QRD 400, S-1761 and S-1783, TetraCurb and V-10433.

Table 2. General efficacy summary on western flower thrips (*Frankliniella occidentalis*) across infestation levels, crops, application types and application rates – Butterfly Bush, Cosmos, Chrysanthemum, Gardenia, and Geranium.

Product	Butterfly Bush	Cosmos		Mum	Gardenia	Geranium
	Villavicencio 2012	Cranshaw 2008a	Cranshaw 2008b	Lindquist 1999	Bethke 2004*	Frank 2010
Nontreated populations at 0 DAT - at table rating DAT	10.0 – 17.5	n/a -3.8	n/a -67.3	7.0 -8.3	26.8 –21.4	1.2 – 3.2
Portion of plant sampled	Panicles	Flowers	Flowers		Flowers	Flower
Population used for table rating	Immatures	Immatures	Total	Total	Total	Immatures
DAT used for table rating	21DAT	21 DAT	14 DAT	7 DAT	21 DAT	14 DAT
A16901B	+/-					
Acelepryn (DPX-E2Y45)			-			
Avid 0.15EC						++
AzaGuard	+/-					
BotaniGard						+/-
Conserve	+/-	+			+	++
Ecotrol		-				
Flagship		+/-				+
Hachi-Hachi	+/-					
Kontos (BYI-8330)		-				
Mesurol					++	
MBI-203	-					
MOI 201		-				
NNI-0101		-				
Overture						++
Pedestal					-	
Proud	+/-					
Pylon				+		++
QRD416			-			
Scimitar		++	-			
Talstar					-	
Tick-EX		-				-
Tolfenpyrad		+				
Tristar					+/-	

* Not an IR-4-sponsored experiment.

[1] Rating Scale: ++ = clearly statistically better than nontreated and greater than 95% control; + = statistically better than nontreated and between 85 and 95% control; +/- statistically better than nontreated with control between 70 and 85%; - = statistically equivalent to nontreated and/or efficacy less than 70%.

[2] Where more than one rate or application type for a product was included in the experiment and each performed statistically different, the better rating is provided in this table.

Table 3. General efficacy summary on western flower thrips (*Frankliniella occidentalis*) across infestation levels, crops, application types and application rates – Gerbera.

Product	Gerbera							
	Canas 2006	**Canas 2008**	**Parrella 2006a**	**Parrella 2006b**	**Cloyd 2001***	**Cloyd 2008**	**Cloyd 2009**	**Villavicencio 2012**
Nontreated populations at 0 DAT - at table rating DAT	20.5 -12.7	0.1 – 13.4	16.5 -30.1	2.3 - 21.5	n/a	n/a	n/a	8.4 – 5.1
Portion of plant sampled	Leaves	Leaves	Whole		Flowers			Flowers
Population used for table rating	Immatures		Adults		Adults			Immatures
DAT used for table rating	21 DAT	21 DAT	21 DAT	25 DAT	7 DAT	7 DAT	7 DAT	21 DAT
A20520A								+/-
Acelepryn (DPX-E2Y45)	-							
Arena, Celero	+/-		-					
Avid 0.15EC					-			-
Allectus				-				
Aria 50SG	+			-				
BAS 320i	-							
Conserve	++	++	+	-	-	++		-
Flagship			-	-				
GrandEvo (MBI-203)								-
Kontos (BYI-8330)	+/-	-	-				-	
Marathon Ultra		+/-						
Mesurol				+/-				
MBI-206								+
OHP-929-8							++	
Ornazin					-	-		
Overture	+/-	++				+/-	+/-	
Pedestal					-			
Pylon	+	++		++				
Safari 20SG		-				+		
Sucrashield						-		
S-1761						++		
S-1783						++		
S1812 35WP	+/-							
Tick-EX		-					-	
Tolfenpyrad	+/-			++				

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[2] Where more than one rate or application type for a product was included in the experiment and each performed statistically different, the better rating is provided in this table.

Table 4. General efficacy summary on western flower thrips (*Frankliniella occidentalis*) across infestation levels, crops, application types and application rates – Impatiens.

Product	Impatiens							
	Lindquist 1999	**Chen 2006a**	**Chen 2006b**	**Chen 2006c**	**Chen 2006d**	**Chen 2012a**	**Chen 2012a**	**Reding 2007**
Nontreated populations at 0 DAT - at table rating DAT	25.8 -1.3	n/a - 21.2	n/a -3.0	n/a -3.6	n/a -10.2	n/a -72.4	n/a -27.5	7.2 -16.8
Population used for table rating	Total	Immatures						
DAT used for table rating	7 DAT	21 DAT	7 DAT	15 DAT	10 DAT	31 DAT	9 DAT	14 DAT
A16901B							++	
Acelepryn (DPX-E2Y45)				++				
Arena, Celero					++			
Aria 50SG				++				
Avid								+
AzaGuard						++		
BAS 320i					-			
BotaniGard		++	-			++	-	
Conserve		+/-	++	++	+			
Flagship								+
GrandEvo (MBI-203)						+		
Kontos (BYI-8330)				++				
MBI-206						++		
Overture				++				
Proud 3		++					-	
Pylon	+				+			
QRD400		++						
Safari 20SG								+
Tolfenpyrad					+/-			+
TriCon		++	+/-					

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[2] Where more than one rate or application type for a product was included in the experiment and each performed statistically different, the better rating is provided in this table.

Table 5. General efficacy summary on western flower thrips (*Frankliniella occidentalis*) across infestation levels, crops, application types and application rates –Marigold.

Product	Marigold											
	Davis 2005 *	**Davis 2007**	**Davis 2008**	**Gilrein 2008**	**Oetting 2008**	**Davis 2009**	**Davis 2010**	**Davis 2012**	**Chong 2010**	**Ludwig 2010**	**Ludwig 2010**	**Heinz 2013**
Nontreated populations at 0 DAT - at table rating DAT	8.0 - 4.9	17.2 - 5.8	6.4 – 8.4	n/a – 3.4	5.0 – 7.3	9.8 – 9.1	0.9 – 44.7	2.13 – 7.13	41.1 – 43.0	48.0 – 55.3	59.7 – 55.2	18/0 – 77.3
Population used for table rating	Total		Immatures									
DAT used for table rating	12 DAT	22 DAT	3 DAT	28 DAT	7 DAT	21 DAT	35 DAT	20 DAT	28 DAT	21 DAT	21 DAT	21 DAT
A16901B								++		++		
A20520A												+
Acelepryn (DPX-E2Y45)				-	-							
Arena, Celero	++	-	+/-	+	+/-							
Aria 50SG							++			+		
Avid	++						++		-	++		+
AzaGuard								+				-
BAS 320i		++										
BotaniGard		-	-		-	+/-	-				-	
Conserve	++	-	+/-	+	-	+				-		++
DPX-HGW86						++						
Flagship					-				-			
Kontos			-	-	-							
Mesurol	+	+	+									
MBI-203								+/-				-
MBI-206								+/-				-
MOI 201			+		-							
NNI-0101			-	-	-	+/-	-			-		
Overture							++					
Proud 3												-
Pylon							+		-	++		
QRD416			-									
Safari 20SG		+/-										
Tick-EX		-	-		+/-	+/-			-		-	
Tolfenpyrad		++	-	++	-	+	++	+		+		
TriCon			-									
TriStar 30SG	++			+								

* Not an IR-4-sponsored experiment.

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[2] Where more than one rate or application type for a product was included in the experiment and each performed statistically different, the better rating is provided in this table.

Table 6. General efficacy summary on western flower thrips (Frankliniella occidentalis) across infestation levels, crops, application types and application rates –Marigold, continued.

Product	Marigold									
	Davis 2014	**Gilrein 2014**	**Gilrein 2015**	**Davis 2015**	**Gilrein 2011**	**Gilrein 2013**	**Heinz 2014**	**Heinz 2015**	**Heinz 2016**	**Nansen 2016**
Nontreated populations at 0 DAT - at table rating DAT	9.9 -13.7	3.6 - 4.5	2.8 - 6.6	11.0 -4.2	2.8 – 2.4	16.3 – 17.3	NA – 7.5	35 - 19	5 - 15	52 - 120
Population used for table rating	Total	Immatures								
DAT used for table rating	27 DAT	35 DAT	34 DAT	18 DAT	14 DAT	43 DAT	21 DAT	42 DAT	35 DAT	20 DAT
A16901B					++	++				
A20520A / Mainspring		++	+	+		++		++		
Avid								+	-	
Aza-Direct	-									
AzaGuard	-		+	-		+/-				
BotaniGard					-					
Conserve					-		+			+
Grandevo								+		
Hachi-Hachi	+/-	++		-						
IKI-3106			+	++				++		+
Kontos										
MBI-203						-				
Overture		++	++			++				
Proud 3						-				
Rycar			-	-	-				-	
Safari 20SG										
SP3009	-	++					-			
Tick-EX					-					
Venerate	-	-	-	-		-	-	+/-		-
XXpire	-	++	++	+			+/-		++	

[1] Rating Scale: ++ = clearly statistically better than nontreated and greater than 95% control; + = statistically better than nontreated and between 85 and 95% control; +/- statistically better than nontreated with control between 70 and 85%; - = statistically equivalent to nontreated and/or efficacy less than 70%.

[2] Where more than one rate or application type for a product was included in the experiment and each performed statistically different, the better rating is provided in this table.

Table 7. General efficacy summary on western flower thrips (Frankliniella occidentalis) across infestation levels, crops, application types and application rates –Marigold, continued.

Product	Marigold				
	Nansen 2017	Nansen 2018	Gilrein 2017	Hotchkiss 2018	Hotchkiss 2019
Nontreated populations at 0 DAT - at table rating DAT	50.0 – 15.0	22.0 – 23.0	1.5 – 26.6	20.2 – 13.2	4.5 – 11.3
Population used for table rating	Immatures				*Total*
DAT used for table rating	13 DAT	7 DAT	6 DAT	13 DAT	28 DAT
A20520A			+/-		
Acelepryn (DPX-E2Y45)					
Altus		-		-	
BCS-507		-		-	+/-
Conserve	-	+			
IKI-3106	+/-	-	+/-	+	+
IKI-3326					+
KOC 22018-8					+
Overture			+/-		
Pylon				++	-
SP3014		-		-	+/-
V-10433		+		+/-	+/-
Venerate	-		-		

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[2] Where more than one rate or application type for a product was included in the experiment and each performed statistically different, the better rating is provided in this table.

Table 8. General efficacy summary on western flower thrips (*Frankliniella occidentalis*) across infestation levels, crops, application types and application rates – Petunia, Portulaca, Rose, Verbena, and Zinnia.

Product	Petunia			Portulaca		Rose			Verbena	Zinnia		
	Chen 2006a	**Chen 2006b**	**Chen2006d**	**Ludwig 2006**	**Ludwig 2007**	**Walsh 2006**	**Parella 2010**	**Heinz 2012**	**Oetting 2008**	**Parella 2008**	**Parella 2009**	**Chen 2009**
Nontreated Populations at 0 DAT - at table rating DAT	n/a - 4.5	n/a - 2.0	n/a - 25.3	2.0 - 21.0	29.5 - 135.6	n/a - 65.9	67.1 – 6.9	0.83 – 4.33	n/a – 18.8	5.6 – 0.4	13.1 – 28.3	n/a – 2.3
Population used for table rating	Immatures			Immatures		Immatures			Total	Total		Immatures
DAT used for table rating	7 DAT	7 DAT	15 DAT	14 DAT	7 DAT	6 DAT	21 DAT	21 DAT	34 DAT	13 DAT	21 DAT	7 DAT
A16901B							++	+/-				
Acelepryn (DPX-E2Y45)				+/-	-				+/-	-		
Arena, Celero			++	+	+/-	+/-						
Aria 50SG				-			+					
Avid						-	+/-	-				+/-
AzaGuard								-				
BAS 320i			-									
BotaniGard	++	-										
Conserve	++	++	-	+/-	+/-	-	-	-	+	-	-	
Flagship				++	-	+/-			+	-	-	
Kontos (BYI-8330)				+	+/-	-			+	-	-	-
Mesurol										-	+/-	
MBI-203								-				
MBI-206								-				
MOI 201									+	-	-	
NNI-0101							+/-		+	-		
OHP 929-2												-
Overture				++	++						-	
Proud 3	++							+/-				
Pylon			+/-		+	+/-						++
QRD 400	++											
TickEx							-		-	-	-	+/-
Tolfenpyrad			+/-	++	++	+	+		+			
TriCon	++	++										
TriStar 30SG						-						
TriStar 70WSP				++	-							

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[2] Where more than one rate or application type for a product was included in the experiment and each performed statistically different, the better rating is provided in this table.

Table 9. General efficacy summary on *Scirtothrips*, *Thrips* and*Dendothrips* species across infestation levels, crops, application types and application rates.

Product	Chilli thrips (*Scirtothrips dorsalis*)							Gladiolus Thrips (*Thrips simplex*)	Privet Thrips (*Dendothrips ornatus*)
	Plumbago	Rose					*Dystillium*	Gladiolus	New Mexican Privet
	Arthurs 2010*	Ludwig 2007a	Ludwig 2007b	Ludwig 2008a	Ludwig 2008b	Ludwig 2009	Chong 2017	Davis 2005	Cranshaw 2008
Nontreated Populations at 0 DAT - at table rating DAT	24.9 – 7.8	126.5 - 41.5	9.3 - 75.5	12.3 – 12.2	14.3 – 15.3	0.2 – 15.3	4.2 - 3.0	23.8 - 12.4	n/a – 22.3
Population used for table rating	Adults	Immatures						Immatures	Total
DAT used for table rating	6 DAT	20 DAT	20 DAT	13 DAT	20 DAT	24 DAT	21 DAT	4 WAT	3 DAT
Allectus								++	
Aloft SC					++				
Arena, Celero								++	
Aria 50SG			+		- (but ++ for adults)			-	
Avid 0.15EC		+		++			++	++	
Azatin XL								-	
BotaniGard									
Carzol								+/-	
Conserve SC		++	++	+	++			++	+/-
Diazinon 4E								+	
Discus								++	
Ecotrol									-
Flagship			++		++			++	-
IKI-3106							-		
Insecticidal Soap						-			
Kontos (BYI-8330)	+/-		+		-	-		+	-
Mainspring							+/-		
Marathon								++	
Marathon Ultra			++		+				
Meridian 25WG						+/-			
Mesurol 75W								+/-	
Merit 2F	-					+		++	
MOI 201				+					-
NNI-0101, Rycar				++			-	-	-

Product	Chilli thrips (*Scirtothrips dorsalis*)							Gladiolus Thrips (*Thrips simplex*)	Privet Thrips (*Dendothrips ornatus*)
	Plumbago	**Rose**					***Dystillium***	**Gladiolus**	**New Mexican Privet**
	Arthurs 2010*	**Ludwig 2007a**	**Ludwig 2007b**	**Ludwig 2008a**	**Ludwig 2008b**	**Ludwig 2009**	**Chong 2017**	**Davis 2005**	**Cranshaw 2008**
Nontreated Populations at 0 DAT - at table rating DAT	24.9 – 7.8	126.5 - 41.5	9.3 - 75.5	12.3 – 12.2	14.3 – 15.3	0.2 – 15.3	4.2 - 3.0	23.8 - 12.4	n/a – 22.3
Population used for table rating	Adults	Immatures						Immatures	Total
DAT used for table rating	6 DAT	20 DAT	20 DAT	13 DAT	20 DAT	24 DAT	21 DAT	4 WAT	3 DAT
Orthene								+	
Overture		+/-		-				+/-	
Pedestal								+	
Pylon		++		++				+	
QRD400		-		+/-					
Safari 20SG			++		+	-		+	
Scimitar				-					++
Spinosad	+								
Talstar One				+/-				++	
Tick-EX									-
Tolfenpyrad		+/-		+					+/-
TriCon								-	
TriStar 70WSP			++		+			++	
XXpire							++		

* Not an IR-4-sponsored experiment.

[1] Rating Scale: ++ = clearly statistically better than nontreated and greater than 95% control; + = statistically better than nontreated and between 85 and 95% control; +/- statistically better than nontreated with control between 70 and 85%; - = statistically equivalent to nontreated and/or efficacy less than 70%.

[2] Where more than one rate or application type for a product was included in the experiment and each performed statistically different, the better rating is provided in this table.

Table 10. General efficacy summary on *Gynaikothrips* species across infestation levels, crops, application types and application rates.

Product	Weeping Fig Thrips (*Gynaikothrips uzeli*)						
	Ficus						
	Held 2005a	Held 2005b	Held 2005c	Held 2006a	Held 2006b	Held 2006c	Held 2006d
Nontreated Populations at 0 DAT - at table rating DAT	n/a	n/a	n/a	n/a	n/a	n/a	n/a
Population used for table rating	Adults	Adults	Adults	Total	Total	Galls	Galls
DAT used for table rating	7 DAT	7 DAT	7 DAT	7 DAT	7 DAT	7 DAT	35 DAT
Acelepryn (DPX-E2Y45)					-		
Allectus					++		
Arena, Celero			-				
Aria 50SG					-		
Avid 0.15EC		-					
Azatin XL		-				-	
BotaniGard				-			
Conserve SC		-					
Discus	++						
Dursban			-				
Flagship	+						
Kontos (BYI-8330)					-		
Marathon	-						
Milstop				-			
Orthene			-				
Overture			-				
Safari 20SG	++						
Safer Soap		-			-		
Sevin			-				
Surround						++	+
Talstar One		-	+	++	++		++
Tempo SC Ultra			-				
TriCon				-			
TriStar 30SG	+/-						

[1] Rating Scale: ++ = clearly statistically better than nontreated and greater than 95% control; + = statistically better than nontreated and between 85 and 95% control; +/- statistically better than nontreated with control between 70 and 85%; - = statistically equivalent to nontreated and/or efficacy less than 70%.

[2] Where more than one rate or application type for a product was included in the experiment and each performed statistically different, the better rating is provided in this table.

Efficacy by Thrips Species

IR-4 has sponsored research on several thrips species – chilli thrips (*Scirtothrips dorsalis*), gladiolus thrips (*Thrips simplex*), privet thrips (*Dendothrips ornatus*), weeping fig thrips (*Gynaikothrips uzeli*), and western flower thrips (*Frankliniella occidentalis*). The following discussions are organized by thrips species. Within each species the experiments are presented in groups based on crop and/or chronological order.

Comparative Efficacy on Chili Thrips (Scirtothrips dorsalis)

Chilli thrips (*Scirtothrips dorsalis*) is an exotic, invasive species to the United States. Since its introduction in 2006, chilli thrips has been moved throughout the southern U.S. on nursery stock. It has been found in commercial retail nurseries as well as established in landscapes. Chilli thrips is known to infest over 250 environmental horticulture plant species and can cause significant damage to food crops such as pepper and blueberry.

During 2007, two experiments were conducted to determine initial levels of efficacy. In the first experiment (Table 11), contact materials were tested with either two or three consecutive applications at weekly intervals. Both adult and immature thrips were counted on meristems and, when possible, flowers. Because Kelthane was applied on the second application date in addition to the weekly treatment applications, all thrips populations were suppressed on the 13 DAT reading date. Because the adult thrips are quite mobile, for the purposes of this discussion, control assessments refer to immature thrips. Conserve SC provided excellent control at 6 and 20 DAT on meristems, while Avid, Overture, Pylon, and the low rate of Tolfenpyrad all provided good to excellent control at 20 DAT (Table 12). On flowers at 7 DAT, Avid, Conserve and Pylon exhibited good levels of control.

In the second 2007 experiment (Table 13, Table 14), systemic products were tested to determine the length of efficacy after either two weekly foliar applications or a single soil drench. As in the previous experiment, both adult and immature thrips were counted on meristems and flowers. Because the adult thrips are quite mobile, for the purposes of this discussion, control assessments refer to immature thrips. While Aria did not provide good levels of initial control, by 20 and 27 DAT this product did exhibit good to excellent control. For BYI 8330 at 1.7 oz per 100 gal, the drench application suppressed populations better than the foliar applications; however, higher rates should be explored. Conserve provided excellent control throughout this experiment until the last reading date on 41 DAT. Flagship foliar applications far outperformed the drench application and provided excellent residual control through 27 DAT. Marathon Ultra, Safari 20SG, and TriStar 70WSP as foliar applications performed similarly to Conserve.

During 2008, two additional experiments were conducted examining contact products (Table 15, Table 16) or systemic products (Table 17, Table 18).By 13 DAT, Avid, Conserve, MOI 201, NNI 0101, Pylon, and Tolfenpyrad provided good to excellent control; Avid, MOI 201, NNI0101, and Pylon continued to provide good control through 20 DAT (Table 16). All the foliarly applied systemics provided good to excellent control except Kontos (Table 18). Safari 2G applied to the soil media demonstrated fast control which tapered off by 20 DAT.

In 2009, an experiment examined contact and systemic products applied as foliar or soil treatments (Table 19).The standard foliar rotation (Meridian/Avid/Conserve) provided good to excellent control of immature thrips; the insecticidal soap was ineffective (Table 20). Merit 2F and Meridian 0.33G treatments were the only two systemic treatments that had lower immature thrips populations compared to the nontreated control. There were no differences in adult thrips counts between the pesticide treatments and the nontreated control. Due to the lack of control by many of the treatments in this trial there were a large number of adult thrips moving between plants, this put increased pressure on the effective products.

In 2010, an experiment was conducted to determine efficacy of Kontos and Merit applied once as drenches and Monterey Garden Insect Spray (0.5 % Spinosad) applied once as foliar spray on plumbago (Table 21). High numbers of thrips pre-treatment declined in all plots, probably due to a heavy pruning by landscape crew that removed plant terminals where thrips were located shortly before treatments were applied. Spinosad provided effective but short residual activity and should have been reapplied during the duration of study. Merit drench significantly reduced thrips while Kontos drench was relatively ineffective.

In 2017, an experiment examined several products applied as foliar sprays with Capsil at 6 floz /100 gal (Table 22). Variability of thrips densities (0.8 to 4.2 thrips per 3 terminals) in the water check might have diminished statistical power in detecting significant differences among data.The results indicated that XXpire was the most efficacious product in managing a severe chilli thrips infestation on *Dystillium* (Table 23). Although the standard Avid was not effective in reducing chilli thrips densities, this product was effective in protecting crops from damage by chilli thrips. Overall, IKI-3106 applied at two applications and at two application frequencies did not achieve lower chilli thrips densities (except at 21 DAT) and damage severity than the water check. Mainspring provided significant reduction of chilli thrips, and lower damage severity only at 21 DAT. The results indicated that Rycar was not effective in reducing chilli thrips density and protecting the infested plants from damage. No phytotoxicity nor residue was observed on the treated *Dystillium* plants.

In 2017, an experiment examined several products applied as foliar sprays on Indian hawthorn. None of the pesticide treatments had a significant effect on chilli thrips damage (Table 24). A heavy aphid infestation during the experiment resulted in sooty mold on the leaves, obscuring previous chilli thrips damage and possibly obscuring and/or preventing additional damage; this might have affected results. No phytotoxicity from any of the treatments was observed. Because of the inconclusive data, this test was not included in the general efficacy summary 9.

Table 11. Efficacy of several insecticides for *Scirtothrips dorsalis* on 'Knockout' Rose – Experiment 1 – Application Rates and Dates, Ludwig, TX, 2007a.

Treatment	Application Method – Rate per 100 gal	Application Dates		
		6/13 0 DAT	6/20 7 DAT	6/27 14 DAT
Avid (abamectin)	Foliar – 8 fl oz	X	X	
Conserve SC (spinosad)	Foliar – 6 fl oz	X	X	
Overture 35WP (pyridalyl)	Foliar – 8 fl oz	X	X	
Pylon (chlorfenapyr)	Foliar – 5 fl oz	X	X	
QRD400	Foliar – 130 fl oz	X	X	X
Tolfenpyrad	Foliar – 14 fl oz	X	X	
Tolfenpyrad	Foliar – 21 fl oz	X	X	
Unsprayed Control				
Kelthane	Foliar on all treatments		X	

Table 12. Efficacy of several insecticides for *Scirtothrips dorsalis* on 'Knockout' Rose – Experiment 1, Ludwig, TX, 2007a.

Treatment	Population Counts [z], Means Separations [y], and Percent Control [x]					
	-1 DAT Meristems	6 DAT Meristems	13 DAT Meristems	20 DAT Meristems	-1 DAT Flowers	7 DAT Flowers
Adults						
Avid (8 fl oz)	51.5 a	17.2 a (0)	3.5 bc (76)	0.3 d (96)	24.7 ab	5.6 ab (61)
Conserve (6 fl oz)	31.0 a	9.8 a (5)	3.7 bc (58)	1.0 bcd (78)	26.7 ab	5.7 ab (63)
Overture (8 fl oz)	103.5 a	14.3 a (58)	3.8 abc (87)	0.8 cd (95)	22.6 ab	7.4 ab (44)
Pylon (5 fl oz)	47.5 a	15.8 a (0)	1.8 c (86)	0.2 d (98)	46.8 a	5.9 ab (78)
QRD400 (130 fl oz)	33.8 a	10.8 a (4)	5.3 abc (45)	0.8 cd (83)	26.1 ab	12.1 a (21)
Tolfenpyrad (14 fl oz)	35.5 a	21.7 a (0)	5.7 abc (44)	2.7 abc (49)	29.2 ab	3.8 b (77)
Tolfenpyrad (21 fl oz)	34.2 a	16.5 a (0)	17.8 a (0)	4.5 a (10)	32.4 a	4.7 ab (75)
Nontreated	37.5 a	12.5 a (0)	10.7 ab (0)	5.5 ab (0)	14.5 b	8.5 ab (0)
Nymphs						
Avid (8 fl oz)	200.8 a	27.7 ab (80)	2.2 a (18)	5.3 bc (92)	24.9 a	4.1 c (90)
Conserve (6 fl oz)	140.3 a	5.2 b (95)	1.0 a (46)	0.8 c (98)	20.5 a	3.9 c (88)
Overture (8 fl oz)	128.8 a	43.3 ab (50)	1.0 a (41)	7.2 bc (83)	14.1 b	16.1 ab (29)
Pylon (5 fl oz)	157.8 a	28.2 ab (74)	0.3 a (84)	0.7 c (99)	42.1 a	8.7 abc (87)
QRD400 (130 fl oz)	166.0 a	54.7 ab (51)	0.8 a (62)	17.7 ab (68)	38.2 a	25.1 a (59)
Tolfenpyrad (14 fl oz)	231.5 a	18.8 ab (88)	2.0 a (34)	12.7 abc (83)	23.8 a	6.9 bc (82)
Tolfenpyrad (21 fl oz)	146.7 a	49.3 a (50)	1.5 a (22)	26.5 a (45)	47.2 a	12.9 abc (83)
Nontreated	126.5 a	85.3 a (0)	1.7 a (0)	41.5 a (0)	15.4 a	25.0 a (0)
Total Population						
Avid (8 fl oz)	252.3	44.8 (70)	5.7 (70)	5.7 (92)	49.6	9.7 (82)
Conserve (6 fl oz)	171.3	15.0 (85)	4.7 (64)	1.8 (96)	47.2	9.7 (82)
Overture (8 fl oz)	232.3	57.7 (58)	4.8 (72)	8.0 (88)	36.6	23.5 (43)
Pylon (5 fl oz)	205.3	44.0 (64)	2.2 (86)	0.8 (99)	88.9	14.6 (85)
QRD400 (130 fl oz)	199.8	65.5 (45)	6.2 (59)	18.5 (68)	64.3	37.2 (48)
Tolfenpyrad (14 fl oz)	267.0	40.5 (75)	7.7 (62)	15.3 (80)	53.0	10.7 (82)
Tolfenpyrad (21 fl oz)	180.8	65.8 (39)	19.3 (0)	31.0 (40)	79.6	17.7 (80)
Nontreated	164.0	97.8 (0)	12.3 (0)	47.0 (0)	29.9	33.4 (0)

[z] Mean number of thrips were counted from alcohol extraction of 5 meristems or 5 flowers.
[y]Means within column followed by the same letter are not significantly different (P>0.05, Tukeys HSD).
[x] Henderson's percent control was calculated on the meristem and flower counts.

Table 13. Efficacy of several insecticides for *Scirtothrips dorsalis* on 'Knockout' Rose – Experiment 2 – Application Rates and Dates, Ludwig, TX, 2007b.

Treatment (Active Ingredient)	Application Method – Rate per 100 gal	Application Dates	
		7/11	7/25
Aria 50SG (flonicamid)	Foliar – 120 g	X	X
Conserve SC (spinosad)	Foliar – 6 fl oz	X	X
Flagship 25WP (thiamethoxam)	Drench – 8 oz	X	
Flagship 25WP (thiamethoxam)	Foliar – 8 oz	X	X
Kontos (BYI-8330) (spirotetramat)	Drench – 1.7 fl oz	X	
Kontos (BYI-8330) (spirotetramat)	Foliar – 1.7 fl oz	X	X
Marathon Ultra (imidacloprid + cyfluthrin)	Foliar – 25 fl oz	X	X
Safari 20SG (dinotefuran)	Foliar – 8 fl oz	X	X
TriStar 70WSP (acetamiprid)	Foliar – 96 g	X	X
Nontreated			

Table 14. Efficacy of several insecticides for *Scirtothrips dorsalis* on 'Knockout' Rose – Experiment 2, Ludwig, TX, 2007b.

Treatment	Population Counts [z], Means Separations [y], and Percent Control [x]									
	Henderson's Percent Control on Meristem Counts							Percent Control on Flower Counts		
	0 DAT	6 DAT	13 DAT	20 DAT	27 DAT	34 DAT	41 DAT	7 DAT	14 DAT	21 DAT
Adults										
Aria	23.3 a	7.5 ab (0)	3.2 cd (85)	14.8 ab (49)	41.8 a (0)	102.5 ab (0)	28.2 a (3)	0.9 cde (0)	2.3 bcd (71)	4.5 abc (53)
Conserve	15.8 a	2.7 abc (0)	5.2 cd (64)	2.7 c (87)	34.8 a (0)	90.5 ab (0)	40.7 a (0)	0.4 cd (51)	1.7 cde (78)	1.4 c (86)
Flagship Drench	17.0 a	3.7 abc (0)	20.8 ab (0)	10.7 abc (50)	19.8 a (24)	--	--	5.2 a (0)	7.3 ab (9)	6.9 ab (29)
Flagship Foliar	18.0 a	1.8 abc (24)	7.3 bc (55)	2.7 c (88)	40.5 a (0)	89.3 ab (0)	25.2 a (0)	0.6 de (32)	3.1 abc (61)	1.8 bc (82)
Kontos (BYI-8330) Drench	13.0 a	6.3 ab (0)	27.5 a (0)	13.3 ab (18)	83.3 a (0)	-- [w]	--	3.6 ab (0)	7.0 a (12)	8.4 a (14)
Kontos (BYI-8330) Foliar	10.5 a	1.8 abc (0)	16.3 ab (0)	21.0 a (0)	73.5 a (0)	--	--	1.6 bcd (0)	3.7 abc (54)	7.7 ab (21)
Marathon Ultra	14.8 a	0.3 c (83)	1.2 d (91)	3.2 bc (83)	23.8 a (0)	58.3 ab (0)	23.0 a (0)	0.2 e (77)	0.2 e (98)	2.4 abc (76)
Safari Foliar	19.5 a	1.7 abc (36)	3.7 cd (79)	7.0 abc (71)	40.8 a (0)	116.7 ab (0)	28.3 a (0)	0.1 bcd (91)	1.4 cde (83)	4.0 abc (59)
Tristar 70WSP	24.5 a	8.0 bc (0)	3.8 cd (83)	14.3 ab (54)	85.0 a (0)	139.8 a (0)	44.0 a (0)	2.5 e (0)	0.5 de (93)	1.7 c (82)
Nontreated	20.0 a	2.7 a (0)	18.2 ab (0)	25.2 a (0)	30.8 a (0)	38.7 b (0)	25.0 a (0)	0.9 abc (0)	8.0 a (0)	9.7 a (0)
Nymphs										
Aria	18.8 ab	5.7 abc (66)	6.2 a (75)	8.3 bc (95)	28.8 ab (92)	49.3 ab (48)	21.5 a (0)	1.4 cd (39)	1.6 c (86)	4.0 bc (88)
Conserve	29.0 ab	0.0 c (100)	1.0 a (97)	0.2 c (100)	28.2 b (95)	5.3 c (96)	38.0 a (0)	0.8 d (66)	0.2 c (98)	1.2 cd (96)
Flagship Drench	8.3 ab	10.8 a (0)	13.8 a (0)	44.2 a (34)	205.2 a (0)	--	--	9.2 a (0)	7.6 ab (34)	15.4 ab (54)
Flagship Foliar	25.3 ab	0.8 bc (96)	6.8 a (80)	1.3 c (99)	9.3 b (98)	59.7 a (53)	19.5 ab (0)	1.2 cd (47)	1.2 c (89)	0.3 d (99)
Kontos (BYI-8330) Drench	37.3 ab	8.8 ab (73)	18.3 a (63)	41.8 a (86)	169.2 a (76)	--	--	7.5 ab (0)	8.2 ab (28)	15.0 ab (56)
Kontos (BYI-8330) Foliar	8.0 b	5.2 abc (26)	12.0 a (0)	29.2 ab (55)	166.3 a (0)	--	--	4.1 abc (0)	2.5 bc (78)	10.5 ab (69)
Marathon Ultra	45.3 ab	0.8 bc (98)	3.3 a (94)	0.7 c (100)	25.5 b (97)	6.8 bc (97)	17.5 ab (0)	1.4 cd (39)	1.4 c (88)	0.4 d (99)
Safari Foliar	32.2 ab	0.7 ab (98)	2.0 a (95)	6.5 c (98)	79.8 a (87)	31.2 abc (81)	9.3 ab (0)	1.5 bcd (36)	1.1 c (91)	1.8 cd (95)
Tristar 70WSP	39.2 a	3.8 bc (89)	2.2 a (96)	0.5 c (100)	48.5 ab (93)	25.7 abc (87)	22.7 ab (0)	7.2 cd (0)	0.2 c (98)	1.9 cd (94)
Nontreated	9.3 ab	8.2 abc (0)	12.3 a (0)	75.5 a (0)	173.8 a (0)	46.7 abc (0)	2.0 b (0)	2.3 ab (0)	11.4 a (0)	33.8 a (0)

Treatment	Population Counts [z], Means Separations [y], and Percent Control [x]									
	Henderson's Percent Control on Meristem Counts							Percent Control on Flower Counts		
	0 DAT	6 DAT	13 DAT	20 DAT	27 DAT	34 DAT	41 DAT	7 DAT	14 DAT	21 DAT
Total Population										
Aria	42.2	13.2 (15)	9.3 (79)	23.2 (84)	70.7 (76)	151.8 (0)	49.7 (0)	2.3 (28)	3.9 (80)	8.5 (80)
Conserve	44.8	2.7 (84)	6.2 (87)	2.8 (98)	63.0 (80)	95.8 (27)	78.7 (0)	1.2 (61)	2.0 (90)	2.6 (94)
Flagship Drench	25.3	14.5 (0)	34.7 (0)	54.8 (37)	225.0 (0)	--	--	14.4 (0)	14.9 (23)	22.3 (49)
Flagship Foliar	43.3	2.7 (83)	14.2 (69)	4.0 (97)	49.8 (84)	149.0 (0)	44.7 (0)	1.8 (43)	4.3 (78)	2.1 (95)
Kontos (BYI-8330) Drench	50.3	15.2 (18)	45.8 (12)	55.2 (68)	252.5 (28)	--	--	11.1 (0)	15.2 (21)	23.4 (46)
Kontos (BYI-8330) Foliar	18.5	7.0 (0)	28.3 (0)	50.2 (21)	239.8 (0)	--	--	5.7 (0)	6.2 (68)	18.2 (58)
Marathon Ultra	60.2	1.2 (95)	4.5 (93)	3.8 (98)	49.3 (88)	65.2 (63)	40.5 (27)	1.6 (50)	1.6 (92)	2.7 (94)
Safari Foliar	51.7	2.3 (88)	5.7 (89)	13.5 (92)	120.7 (67)	147.8 (2)	37.7 (21)	1.6 (51)	2.5 (87)	5.8 (87)
Tristar 70WSP	63.7	11.8 (50)	6.0 (91)	14.8 (93)	133.5 (70)	165.5 (11)	66.7 (0)	9.7 (0)	0.8 (96)	3.6 (92)
Nontreated	29.3	10.8 (0)	30.5 (0)	100.7 (0)	204.7 (0)	85.3 (0)	27.0 (0)	3.2 (0)	19.4 (0)	43.5 (0)

[z] Mean number of thrips were counted from alcohol extraction of 5 meristems or 5 flowers.
[y]Means within column followed by the same letter are not significantly different (P>0.05, Tukeys HSD).
[x] Henderson's percent control was calculated on the meristem counts while Abbot's percent control was calculated on the flower counts.
[w]Due to lack of efficacy at previous reading data, no more data were collected on this treatment.

Table 15. Efficacy of several insecticides for *Scirtothrips dorsalis* on 'Knockout' Rose – Experiment 3 – Application Rates and Dates, Ludwig, TX, 2008a.

Treatment (Active Ingredient)	Application Method – Rate per 100 gal	Application Dates		
		6/10 0 DAT	6/17 7 DAT	6/24 14 DAT
Avid (abamectin)	Foliar – 8 fl oz	X	X	
Conserve SC (spinosad)	Foliar – 6 fl oz	X	X	
MOI 201	Foliar – 0.8 quarts	X	X	
NNI 0101	Foliar – 6.38 fl oz	X	X	
NNI 0101	Foliar – 3.19 fl oz	X	X	
Overture 35WP (pyridalyl)	Foliar – 8 fl oz	X	X	
Pylon (chlorfenapyr)	Foliar – 5 fl oz	X	X	
QRD400	Foliar – 130 fl oz	X	X	X
Scimitar	Foliar – 5 fl oz	X	X	
Talstar	Foliar – 21.5 fl oz	X	X	
Tolfenpyrad	Foliar – 21 fl oz	X	X	
Unsprayed Control				

Table 16. Efficacy of several insecticides for *Scirtothrips dorsalis* on 'Knockout' Rose – Experiment 3, Ludwig, TX, 2008a.

Treatment	Population Counts [z], Means Separations [y], and Percent Control [x]				
	-1 DAT Meristems	6 DAT Meristems	13 DAT Meristems	20 DAT Meristems	27 DAT Flowers
Adults					
Avid (8 fl oz)	7.7 cde	0.3 d (91)	0.0 f (100)	0.5 de (78)	0.2 d (65)
Conserve (6 fl oz)	4.2 e	3.0 cd (0)	0.7 cdef (55)	0.2 e (84)	0.5 cd (0)
MOI201 (0.8 quarts)	9.2 bcd	3.2 abcd (21)	1.0 cde (70)	0.8 cde (70)	0.2 d (70)
NNI 0101 (6.38 fl oz)	7.0 de	0.7 cd (0)	0.3 def (0)	1.3 cde (0)	2.3 bc (0)
NNI 0101 (3.19 fl oz)	9.2 bcd	1.8 cd (0)	0.3 ef (0)	0.2 e (0)	0.2 d (0)
Overture (8 fl oz)	7.7 cde	8.8 a (0)	2.0 abcd (0)	2.7 bc (0)	1.0 cd (0)
Pylon (5 fl oz)	9.7 bcd	3.2 abc (0)	1.5 bcde (0)	0.8 de (0)	0.2 d (0)
QRD400 (130 fl oz)	17.8 ab	2.0 bcd (75)	0.7 cdef (89)	1.5 cde (71)	3.5 ab (0)
Scimitar (5 fl oz)	13.0 abc	2.2 bcd (62)	3.2 a (33)	5.2 b (0)	7.0 a (0)
Talstar (21.5 fl oz)	24.7 a	4.5 abc (59)	3.0 ab (67)	8.0 a (0)	9.3 a (0)
Tolfenpyrad (21 fl oz)	11.5 bcd	6.2 ab (0)	0.5 cdef (88)	0.5 de (85)	0.8 cd (5)
Nontreated	6.8 de	3.0 abc (0)	2.5 abc (0)	2.0 bcd (0)	0.5 cd (0)
Nymphs					
Avid (8 fl oz)	18.8 abc	2.7 ef (78)	0.0 f (100)	0.0 e (100)	0.2 e (91)
Conserve (6 fl oz)	13.5 cd	2.0 f (78)	0.7 ed (95)	1.3 cde (85)	0.3 e (82)
MOI201 (0.8 quarts)	14.5 bcd	5.0 ef (48)	1.3 def (91)	0.3 de (97)	3.5 cd (0)
NNI 0101 (6.38 fl oz)	17.5 abc	3.0 ef (74)	1.8 def (90)	1.3 bcde (89)	5.3 cd (0)
NNI 0101 (3.19 fl oz)	17.0 abcd	5.5 def (51)	0.3 ef (98)	0.0 e (100)	0.0 e (100)
Overture (8 fl oz)	10.0 d	20.3 bc (0)	4.0 bcd (60)	15.0 a (0)	11.8 b (0)
Pylon (5 fl oz)	14.7 bcd	6.3 def (36)	0.0 f (100)	0.2 de (98)	0.7 de (61)
QRD400 (130 fl oz)	23.3 ab	15.8 bcd (0)	3.7 bcd (84)	4.0 bcd (74)	4.5 c (0)
Scimitar (5 fl oz)	27.5 a	27.3 ab (0)	9.0 ab (67)	11.5 a (36)	19.2 ab (0)
Talstar (21.5 fl oz)	30.2 a	42.2 a (0)	5.7 abc (81)	12.0 a (39)	30.0 a (0)
Tolfenpyrad (21 fl oz)	21.3 abc	13.3 bcd (6)	2.0 cde (91)	3.3 bc (76)	2.5 cd (4)
Nontreated	12.3 bcd	8.2 cde (0)	12.2 a (0)	8.0 b (0)	1.5 cde (0)
Total Population					
Avid (8 fl oz)	26.5	3.0 (81)	0.0 (100)	0.5 (96)	0.4 (86)
Conserve (6 fl oz)	17.7	5.0 (52)	1.4 (90)	1.5 (84)	0.8 (57)
MOI201 (0.8 quarts)	23.7	8.2 (41)	2.3 (87)	1.1 (91)	3.7 (0)
NNI 0101 (6.38 fl oz)	24.5	3.7 (74)	2.1 (89)	2.6 (80)	7.6 (0)
NNI 0101 (3.19 fl oz)	26.2	7.3 (52)	0.6 (97)	0.2 (99)	0.2 (93)
Overture (8 fl oz)	17.7	29.1 (0)	6.0 (56)	17.7 (0)	12.8 (0)
Pylon (5 fl oz)	24.4	9.5 (34)	1.5 (92)	1.0 (92)	0.9 (65)
QRD400 (130 fl oz)	41.1	17.8 (26)	4.4 (86)	5.5 (74)	8.0 (0)
Scimitar (5 fl oz)	40.5	29.5 (0)	12.2 (61)	16.7 (21)	26.2 (0)
Talstar (21.5 fl oz)	54.9	46.7 (0)	8.7 (79)	20.0 (30)	39.3 (0)
Tolfenpyrad (21 fl oz)	32.8	19.5 (0)	2.5 (90)	3.8 (78)	3.3 (4)
Nontreated	19.1	11.2 (0)	14.7 (0)	10.0 (0)	2.0 (0)

[z] Mean number of thrips were counted from alcohol extraction of 5 meristems or 5 flowers.
[y] Means within column followed by the same letter are not significantly different (P>0.05, Tukeys HSD).
[x] Henderson's percent control was calculated on the meristem and flower counts.

Table 17. Efficacy of several insecticides for *Scirtothrips dorsalis* on 'Knockout' Rose – Experiment 4 – Application Rates and Dates, Ludwig, TX, 2008b.

Treatment	Application Method – Rate per 100 gal	Application Dates	
		4/4 0 DAT	4/18 14 DAT
Aloft SC	Foliar – 10 fl oz	X	X
Aloft SC	Foliar – 5 fl oz	X	X
Aria 50SG	Foliar – 120 g	X	X
Conserve	Foliar – 7 oz	X	X
Flagship 25WG	Foliar – 8 oz	X	X
Kontos (BYI-8330)	Foliar – 50 ml	X	X
Marathon Ultra	Foliar – 25 fl oz	X	X
Safari 20SG	Foliar – 8 oz	X	X
Safari 2G	Media incorporation – 6.6 per pot	X	
TriStar 70WP	Foliar – 96 g	X	X
Unsprayed Control			

Table 18. Efficacy of several insecticides for *Scirtothrips dorsalis* on 'Knockout' Rose – Experiment 4, Ludwig, TX, 2008b.

Treatment	Population Counts [z], Means Separations [y], and Percent Control [x]							
	-1 DAT	6 DAT	13 DAT	20 DAT	27 DAT	34 DAT	41 DAT	48 DAT
Adults								
Aloft SC (10 fl oz)	1.5 bc	1.8 abc (57)	0.8 a (85)	0.7 ab (83)	1.0 abc (73)	1.5 b (90)	0.7 b (92)	6.0 abc (58)
Aloft SC (5 fl oz)	9.3 a	4.8 a (81)	2.2 a (93)	3.0 a (89)	4.0 a (83)	4.2 ab (95)	4.0 ab (93)	10.8 abc (88)
Aria 50SG (120 g)	6.3 ab	4.5 a (74)	1.7 a (92)	0.7 ab (96)	0.2 bc (99)	1.3 b (98)	1.8 b (95)	3.2 bc (95)
Conserve (7 oz)	1.3 abc	0.0 c (100)	0.5 a (89)	0.3 ab (92)	1.2 abc (63)	5.0 ab (61)	2.5 ab (68)	14.2 abc (0)
Flagship 25WG (8 oz)	0.8 bc	1.2 abc (46)	0.0 a (100)	0.0 b (100)	0.0 c (100)	0.3 b (96)	1.2 b (75)	3.3 abc (57)
Kontos (50 ml)	0.5 c	4.0 ab (0)	2.8 a (0)	2.3 ab (0)	2.0 abc (0)	5.8 ab (0)	13.0 a (0)	18.5 a (0)
Marathon Ultra (25 fl oz)	1.3 abc	0.0 c (100)	0.3 a (93)	0.0 b (100)	0.7 abc (78)	0.3 b (98)	0.2 b (97)	2.0 bc (84)
Safari 20SG (8 oz)	0.5 c	1.3 abc (6)	1.2 a (32)	0.0 b (100)	0.2 bc (84)	0.2 b (96)	0.5 b (83)	5.0 abc (0)
Safari 2G (6.6g per pot)	0.8 bc	2.0 abc (10)	1.7 a (40)	0.5 ab (78)	2.3 abc (0)	3.3 ab (58)	5.7 ab (0)	2.7 bc (65)
TriStar 70WP (96 g)	1.7 abc	0.0 c (100)	0.0 a (100)	0.5 ab (90)	0.0 c (100)	0.2 b (99)	0.3 b (97)	1.3 c (92)
Nontreated	1.5 bc	1.8 abc (57)	0.8 a (85)	0.7 ab (83)	1.0 abc (73)	1.5 b (90)	0.7 b (92)	6.0 abc (58)
Nymphs								
Aloft SC (10 fl oz)	24.8 a	1.2 ab (93)	0.2 b (99)	0.7 bc (97)	0.2 a (99)	0.2 b (99)	2.0 bc (96)	12.5 ab (86)
Aloft SC (5 fl oz)	21.2 a	2.2 ab (85)	2.0 b (91)	3.7 bc (83)	3.3 a (81)	4.5 ab (80)	7.7 abc (82)	21.0 ab (73)
Aria 50SG (120 g)	1.2 a	4.7 ab (0)	3.3 b (0)	1.2 bc (5)	0.0 a (100)	0.3 b (77)	6.7 abc (0)	9.0 b (0)
Conserve (7 oz)	13.3 a	1.5 ab (84)	0.0 b (100)	0.2 c (99)	1.0 a (91)	5.7 ab (60)	5.3 abc (80)	11.8 ab (76)
Flagship 25WG (8 oz)	0.8 a	3.2 ab (0)	0.0 b (100)	0.0 c (100)	0.0 a (100)	0.2 b (77)	0.8 c (51)	2.3 b (22)
Kontos (50 ml)	5.2 a	1.7 ab (54)	4.3 ab (23)	22.0 a (0)	2.8 a (34)	4.0 ab (28)	19.8 ab (0)	13.8 ab (28)
Marathon Ultra (25 fl oz)	3.5 a	0.0 b (100)	0.3 b (92)	0.3 c (92)	0.0 a (100)	0.2 b (95)	1.5 bc (79)	3.2 b (75)
Safari 20SG (8 oz)	2.2 a	0.8 ab (49)	1.3 b (45)	0.3 c (87)	0.0 a (100)	1.0 b (58)	0.3 c (93)	6.2 b (24)
Safari 2G (6.6g per pot)	10.5 a	1.3 ab (83)	0.8 b (93)	8.3 ab (25)	4.0 a (53)	0.8 b (93)	18.3 ab (14)	41.8 ab (0)
TriStar 70WP (96 g)	5.8 a	0.0 b (100)	0.0 b (100)	0.3 c (95)	0.0 a (100)	0.2 b (97)	1.2 bc (90)	3.8 b (82)
Nontreated	14.3 a	10.2 a (0)	15.3 a (0)	15.0 a (0)	11.7 a (0)	15.3 a (0)	29.0 a (0)	52.7 a (0)
Total Population								
Aloft SC (10 fl oz)	26.3	3.0 (88)	1.0 (97)	1.4 (96)	1.2 (95)	1.7 (97)	2.7 (96)	18.5 (84)
Aloft SC (5 fl oz)	30.5	7.0 (75)	4.2 (90)	6.7 (82)	7.3 (76)	8.7 (86)	11.7 (84)	31.8 (76)
Aria 50SG (120 g)	7.5	9.2 (0)	5.0 (50)	1.9 (80)	0.2 (97)	1.6 (89)	8.5 (54)	12.2 (62)
Conserve (7 oz)	14.6	1.5 (89)	0.5 (97)	0.5 (97)	2.2 (85)	10.7 (63)	7.8 (78)	26.0 (59)
Kontos (50 ml)	5.7	5.7 (0)	7.1 (6)	24.3 (0)	4.8 (15)	9.8 (14)	32.8 (0)	32.3 (0)
Flagship 25WG (8 oz)	1.6	4.4 (0)	0.0 (100)	0.0 (100)	0.0 (100)	0.5 (84)	2.0 (49)	5.6 (19)
Marathon Ultra (25 fl oz)	4.8	0.0 (100)	0.6 (91)	0.3 (95)	0.7 (85)	0.5 (95)	1.7 (86)	5.2 (75)
Safari 20SG (8 oz)	2.7	2.1 (16)	2.5 (30)	0.3 (91)	0.2 (93)	1.2 (78)	0.8 (88)	11.2 (4)

Treatment	Population Counts [z], Means Separations [y], and Percent Control [x]							
	-1 DAT	6 DAT	13 DAT	20 DAT	27 DAT	34 DAT	41 DAT	48 DAT
Safari 2G (6.6g per pot)	11.3	3.3 (69)	2.5 (83)	8.8 (37)	6.3 (44)	4.1 (82)	24.0 (14)	44.5 (9)
TriStar 70WP (96 g)	7.5	0.0 (100)	0.0 (100)	0.8 (91)	0.0 (100)	0.4 (97)	1.5 (92)	5.1 (84)
Nontreated	16.0	14.9 (0)	21.3 (0)	19.8 (0)	15.9 (0)	32.0 (0)	39.3 (0)	69.0 (0)

[z] Mean number of thrips were counted from alcohol extraction of 5 meristems or 5 flowers.
[y]Means within column followed by the same letter are not significantly different (P>0.05, Tukeys HSD).
[x] Henderson's percent control was calculated on the meristem and flower counts.

Table 19 *Efficacy of several insecticides for *Scirtothrips dorsalis* on 'Knockout' Rose – Application Rates and Dates, Ludwig, TX, 2009.

Treatment	Application Method – Rate per 100 gal	Application Dates
Ecosense Brand Insecticidal Soap	Foliar RTU	6/3, 6/19, 7/15, 7/31, 8/13, 8/28
Kontos SC	Drench – 6 ml/ft ht	6/3
Meridian 0.33G	Soil broadcast – 80 lb/A	6/3
Meridian 25WG	Drench – 17 oz	6/3
Merit 2F	Drench - 6 ml/ft ht	6/3
Rotation of Meridian 25WG, Avid 0.15EC and Conserve SC	Foliar - – 8.5 oz, 8 fl oz and 6 fl oz	6/3, 6/19 7/15, 7/31 8/13, 8/28
Safari 2G	Soil broadcast – 22 lb/A	6/3
Safari 20SG	Drench – 18 oz	6/3
Nontreated	-	-

Table 20 *Efficacy of several insecticides for *Scirtothrips dorsalis* on 'Knockout' Rose, Ludwig, TX, 2009.

Treatment	Population Counts [z], Means Separations [y], and Percent Control							
	0.5 WAT[x] 6/6	2 WAT 6/16	4 WAT 6/30	6 WAT 7/14	8 WAT 7/28	10 WAT 8/11	12 WAT 8/25	14WAT 9/8
Nymphs								
Ecosense Brand Insecticidal Soap	0.0 a	0.2 bc (94)	6.8 abc (56)	19.8 ab (11)	45.8 ab (0)	37.3 a (2)	55.0 a (0)	26.0 bcd (35)
Kontos SC	0.0 a	0.2 bc (94)	24.7 a (0)	38.5 a (0)	62.5 a (0)	28.3 ab (26)	21.8 ab (50)	69.2 a (0)
Meridian 0.33G	0.2 a	0.0 c (100)	4.3 bc (72)	21.6 ab (3)	29.3 bc (34)	43.3 a (0)	26.7 ab (39)	50.0 abc (0)
Meridian 25WG	0.0 a	0.0 c (100)	3.8 abc (75)	40.0 ab (0)	41.7 b (6)	59.8 a (0)	17.8 bc (60)	46.2 abc (0)
Merit 2F	0.0 a	0.0 c (100)	1.7 c (89)	11.0 b (51)	4.7 cd (89)	9.8 cd (74)	10.3 bc (77)	29.5 cd (26)
Rotation of Meridian 25WG, Avid 0.15EC and Conserve SC	0.0 a	0.0 c (100)	1.8 c (88)	18.3 ab (18)	2.8 d (94)	6.2 d (84)	4.4 c (90)	7.8 d (80)
Safari 2G	0.2a	1.8ab (49)	3.8a (75)	48.8ab (0)	38.5ab (13)	51.2a (0)	32.8ab (25)	18.5cd (54)
Safari 20SG	0.0 a	0.2 bc (94)	15.2 ab (1)	37.5 ab (0)	34.5 ab (22)	27.3 abc (28)	30.8 ab (30)	57.3 ab (0)
Nontreated	0.2 a	3.5 a (0)	15.3 a (0)	22.3 ab (0)	44.3 ab (0)	38.0 abc (0)	44.0 a (0)	39.8 abc (0)
Adults								
Ecosense Brand Insecticidal Soap	0.0 b	1.5 ab (63)	8.8 bcd (33)	53.5 a (0)	31.0 ab (0)	46.2 a (0)	40.8 ab (8)	48.7 a (0)
Kontos SC	0.0 b	2.8 ab (30)	23.4 a (0)	29.7 ab (34)	31.3 ab (0)	25.2 ab (25)	75.2 a (0)	27.2 a (35)
Meridian 0.33G	0.2 ab	2.3 ab (43)	11.8 abc (11)	25.2 ab (44)	29.8 ab (0)	31.8 ab (5)	35.3 ab (21)	21.8 a (48)
Meridian 25WG	0.3 ab	2.3 ab (43)	6.7 bcd (49)	32.5 ab (27)	28.5 abc (0)	18.3 b (46)	56.0 ab (0)	43.8 a (0)
Merit 2F	0.2 ab	0.5 ab (88)	3.1 d (77)	18.8 b (58)	12.3 c (50)	23.7 ab (29)	29.5 b (34)	34.5 a (18)
Rotation of Meridian 25WG, Avid 0.15EC and Conserve SC	0.2 ab	0.3 b (93)	5.7 cd (57)	14.0 b (69)	19.2 bc (22)	26.2 ab (22)	28.4 ab (36)	28.0 a (33)
Safari 2G	0.0b	3.5ab (13)	21.2ab (0)	26.7ab (40)	49.2a (0)	29.8ab (11)	20.8b (53)	55.5a (0)
Safari 20SG	0.0 b	0.3 b (93)	12.3 a-d (7)	27.8 ab (38)	39.8 ab (0)	30.7 ab (9)	46.0 ab (0)	43.5 a (0)
Nontreated	0.5 a	4.0 a (0)	13.2 bcd (0)	44.8 ab (0)	24.7 abc (0)	33.6 ab (0)	44.5 ab (0)	42.0 a (0)

* Not an IR-4 Experiment: AMT Vol 35:G20.
[z] Mean number of thrips were counted from alcohol extraction of 5 terminals.
[y]Means within column followed by the same letter are not significantly different (P<0.05, LSD).
[x] Weeks after 1st application on June 3.

Table 21 *Efficacy of several insecticides for *Scirtothrips dorsalis* on Plumbago (*Plumbago auriculata*) 'Monott', Arthurs, FL, 2010.

Treatment(Active Ingredient)	Rate	Population Counts [z], Means Separations [y], and Percent Control [x]					
		Pre	6 DAT	11 DAT	20 DAT	34 DAT	41 DAT
Kontos (spirotetramat) drench	6 ml/ft ht	36.3 a	3.3 a (70)	14.5 a (57)	17.7 a (69)	2.9 a (47)	3.2 a (33)
Merit 2F (imidacloprid) drench	6 ml/ft ht	34.0 a	4.5 a (58)	10.1 a (68)	8.6 b (71)	1.5 b (86)	2.1 a (53)
Monterey Garden Insect Spray (spinosad) foliar	2 fl oz/gal	26.1 a	1.1 b (87)	21.8 a (11)	17.5 a (23)	4.0 a (0)	4.6 a (0)
Nontreated	-	24.9 a	7.8 a (0)	23.3 a (0)	21.7 a (0)	3.7 a (0)	3.3 a (0)

* Not an IR-4 Experiment: AMT Vol 36:G17.
[z] Mean number of adult thrips counted from 3 beat samples.
[y]Means within column followed by the same letter are not significantly different (P<0.05, Fisher's ProtectedLSD).
[x] Henderson's percent control was calculated on the number of thrips from 3 beat samples.

Table 22 Efficacy of several insecticides for *Scirtothrips dorsalis* on *Dystillium* ('Blue Cascade) – Application Rates and Dates, Chong, SC, 2017.

Treatment (Active Ingredient)	Rate / 100 gal	Application Dates				
		9/8 0 DAT	9/13 5 DAT	9/20 12 DAT	9/27 19 DAT	10/3 25 DAT
Avid (abamectin)	8 floz	X	X			
IKI-3106 (cyclaniliprole)	22 floz	X		X		X
	22 floz	X	X	X	X	X
IKI-3106 (cyclaniliprole)	27 floz	X		X		X
	27 floz	X	X	X	X	X
Mainspring (cyantraniliprole)	8 floz	X		X		X
Rycar (pyrifluquinazone)	6.4 floz	X		X		X
XXpire (spinetoram + sulfoxaflor)	3.5 oz	X		X		X
Water Check	-	X	X	X	X	X

Table 23 Efficacy of several insecticides for *Scirtothrips dorsalis* on *Dystillium* ('Blue Cascade), Chong, SC, 2017.

Treatment	-6 8/30/17	3 9/8/17	7 9/14/17	14 9/20/17	21 9/27/17	28 10/3/17	35 10/10	44 10/19	50 10/25
Mean total density of Thrips at days after treatment (DAT) [x]*:*									
Avid	4.3 ± 1.8	2.0 ± 0.8 ab	3.3 ± 0.8 ab	0.5 ± 0.5	0 c	1.3 ± 0.8	2.2 ± 1.0 a	1.7 ± 1.2	4.5 ± 2.5
IKI-3106	4.2 ± 1.9	4.3 ± 1.5 a	4.7 ± 1.2 a	1.0 ± 0.5	1.8 ± 0.7 ab	3.0 ± 1.8	0.3 ± 0.3 b	1.2 ± 0.9	2.7 ± 1.3
IKI-3106	5.3 ± 2.5	3.2 ± 1.0 ab	2.7 ± 1.2 abc	1.7 ± 1.5	1.2 ± 0.3 bc	0	0 b	0.2 ± 0.2	0.3 ± 0.3
IKI-3106	4.0 ± 1.7	3.2 ± 1.8 ab	2.7 ± 2.1 abc	2.3 ± 1.2	0.7 ± 0.7 bc	1.2 ± 0.7	1.0 ± 0.5 ab	4.0 ± 2.3	3.8 ± 2.2
IKI-3106	4.5 ± 2.1	2.8 ± 0.9 ab	3.5 ± 0.8 ab	2.2 ± 0.8	1.2 ± 1.0 bc	0.3 ± 0.2	0.7 ± 0.4 b	1.3 ± 0.8	2.3 ± 1.5
Mainspring	4.0 ± 1.6	1.3 ± 0.8 ab	1.0 ± 0.6 bc	1.7 ± 0.6	1.2 ± 0.8 bc	0.2 ± 0.2	0.2 ± 0.2 b	0.3 ± 0.2	0.2 ± 0.2
Rycar	4.3 ± 1.6	1.8 ± 0.6 ab	1.0 ± 0.5 bc	2.0 ± 1.8	0.7 ± 0.7 bc	0.8 ± 0.5	0.8 ± 0.5 ab	0.7 ± 0.7	1.0 ± 0.5
XXpire	4.3 ± 1.6	0 b	0 c	0.7 ± 0.3	0 c	0	0 b	0.7 ± 0.5	0.2 ± 0.2
Water Check	4.2 ± 1.6	3.5 ± 1.5 a	1.8 ± 1.0 abc	0.5 ± 0.2	3.0 ± 0.9 a	1.3 ± 0.6	0.8 ± 0.7 ab	1.3 ± 0.8	2.2 ± 1.1
Mean Damage Rating [y]									
Avid	6.2 ± 0.9	5.3 ± 1.1 ab	5.3 ± 0.6	2.0 ± 0.5 c	2.2 ± 0.5 d	2.5 ± 0.8 d	3.0 ± 1.1	2.0 ± 0.8	5.5 ± 1.0
IKI-3106	5.3 ± 0.9	6.3 ± 1.0 ab	6.3 ± 0.9	4.2 ± 0.7 abc	5.0 ± 0.9 abc	3.2 ± 1.0 cd	4.8 ± 1.1	4.8 ± 1.0	5.7 ± 0.9
IKI-3106	6.0 ± 1.2	5.8 ± 1.6 ab	7.5 ± 0.9	4.0 ± 0.7 abc	3.5 ± 1.0 bcd	4.8 ± 0.7 abc	5.3 ± 0.6	4.3 ± 0.8	5.0 ± 0.7
IKI-3106	6.5 ± 1.1	4.2 ± 1.2 abc	6.0 ± 1.2	5.2 ± 1.1 a	4.3 ± 0.9 a-d	5.2 ± 1.2 abc	3.8 ± 1.4	4.2 ± 1.0	4.8 ± 1.0
IKI-3106	5.8 ± 1.3	5.8 ± 1.5 ab	6.2 ± 1.0	4.3 ± 1.0 ab	4.8 ± 1.0 abc	4.5 ± 0.7 bcd	4.0 ± 0.9	5.0 ± 1.2	5.0 ± 1.0
Mainspring	5.7 ± 1.0	2.2 ± 0.5 c	4.2 ± 0.8	3.5 ± 0.4 abc	2.7 ± 0.8 cd	6.2 ± 1.0 ab	5.5 ± 1.5	3.7 ± 1.0	4.7 ± 1.7
Rycar	6.2 ± 0.8	5.2 ± 1.0 abc	7.0 ± 0.9	5.7 ± 1.1 a	5.3 ± 1.0 ab	6.8 ± 0.5 a	5.8 ± 0.5	5.2 ± 1.1	6.2 ± 0.9
XXpire	5.5 ± 0.8	3.3 ± 0.5 bc	4.7 ± 0.9	2.3 ± 0.2 bc	5.2 ± 1.1 abc	5.8 ± 1.0 ab	4.5 ± 1.0	4.5 ± 0.9	4.5 ± 1.5
Water Check	5.8 ± 1.1	6.5 ± 0.9 a	7.8 ± 0.6	5.2 ± 1.1 a	6.3 ± 1.1 a	6.3 ± 1.1 ab	6.5 ± 1.3	6.3 ± 1.5	7.3 ± 1.2

[x] Mean number of thrips were counted from alcohol extraction of 3 terminals. Means within column followed by the same letter are not significantly different (Fisher's LSD, P=0.05).
[y] The number of damaged terminals (out of 10) was used for crop damage rating.

Table 24. Efficacy of several insecticides for *Scirtothrips dorsalis* on Indian Hawthorn (*Raphiolepis indica*), Dale, FL, 2017.

Treatment(Active Ingredient)	Rate Per 100 Gal	Application Dates	No. Damaged Leaves [x]			
			Week 0	Week 2	Week 4	Week 6
Conserve	8 fl oz	5/29; 9/5, 12, 19, 26; 10/10	13 ± 1	11.5 ± 1.6	11.3 ± 2.5	10.2 ± 1.6
IKI-3106 50SL (Cyclaniliprole) + NuFilm 17*	22 fl oz	5/29; 9/5, 12, 19, 26; 10/10	11.3 ± 1.8	9 ± 1.7	9.8 ± 1.8	9.8 ± 1.5
IKI-3106 50SL (Cyclaniliprole) + NuFilm 17	22 fl oz	8/29; 9/12, 26	7.5 ± 1.2	8.2 ± 2.2	10.8 ± 2.4	7.7 ± 1.6
IKI-3106 50SL (Cyclaniliprole) + NuFilm 17	27 fl oz	5/29; 9/5, 12, 19, 26; 10/10	10.2 ± 2.7	6.7 ± 2.1	9.5 ± 2	9.5 ± 1.8
IKI-3106 50SL (Cyclaniliprole) + NuFilm 17	27 fl oz	8/29; 9/12, 26	10.2 ± 2.2	11.2 ± 2.1	11.2 ± 2.5	9.8 ± 2
Rotation of IKI-3106 50SL (Cyclaniliprole) + NuFilm 17 and Venerate XC	22 fl oz rot. 2 qt	8/29; 9/12, 26 rot. 9/5, 19; 10/3	9.2 ± 3.3	11.3 ± 3.2	13.8 ± 2.7	11 ± 2.4
Rotation of IKI-3106 50SL (Cyclaniliprole) + NuFilm 17 and Venerate XC	27 fl oz rot. 2 qt	8/29; 9/12, 26 rot. 9/5, 19; 10/3	10.5 ± 1.7	8.8 ± 2	13.5 ± 1.2	10 ± 1.6
Venerate (MBI 206 F)	1 qt	5/29; 9/5, 12, 19, 26; 10/10	10.5 ± 2.2	9.2 ± 1.9	9.8 ± 1.4	9.8 ± 1.3
Venerate (MBI 206 F)	2 qt	5/29; 9/5, 12, 19, 26; 10/10	9.3 ± 2.4	8.3 ± 2.3	10 ± 1.7	8.7 ± 2
Water Check		5/29; 9/5, 12, 19, 26; 10/10	7.8 ± 1.2	7.2 ± 1.4	9.2 ± 0.7	7.7 ± 1

*NuFilm 17 applied at 30.7 fl oz per 100 gal.

[x] Mean change in number of leaves with chilli thrips damage on three marked branches. Week 0 began on Aug 31, 2017. There were no significant differences between treatments using an ANOVA analysis, as well as using the Wilcoxon/Kruskal-Wallis non-parametric test.

Comparative Efficacy on Gladiolus Bulb Thrips (Thrips simplex)

Gladiolus thrips (*Thrips simplex*) which overwinter in bulbs are problematic for the production of bulbs used for landscape and indoor pot plantings as well as bulbs grown for sale to produce cut flowers. One method of treatment can be to dip gladiolus bulbs in the application materials, similar to the methods used to treat bulbs for diseases. However, no thrips insecticides are currently registered for this use. This research was undertaken to provide some answers for a Michigan bulb grower to initiate 24c label registration(s) of suitable products.

In a single experiment conducted in 2005, 24 products with potential for controlling gladiolus thrips were tested as bulb dip applications (Table 25). Adult and immature thrips were counted on bulbs before treatment and at 1, 2, 4, and 8 weeks after treatment. Phytotoxicity due to the treatments was also assessed. In general, most products provided outstanding control of *Thrips simplex* adults and immature: Allectus, Avid, BYI 8330, Celero, Conserve, Diazinon, Discus, Flagship, NAI-2302, Orthene, Pedestal, Safari, Tristar 70WSP. Merit 75W, Pylon, and Talstar F, provided good efficacy initially, but they started to taper off by 8 WAT. Those that did not give acceptable control included Aria, NNI-0101 and Tricon. While Azatin and Carzol did not provide acceptable control of adults until 8 WAT, Azatin appeared to have little initial impact on immatures even though Carzol did.

Table 25. Efficacy of Gladiolus Bulb Dip Applications on Gladiolus Thrips (*Thrips simplex*), Smitley & Davis, MI, 2006.

Treatment	Rate / 100 gal	Population Counts [z], Means Separations [y], and Percent Control [x]				
		Pretreatment	1 WAT	2 WAT	4 WAT	8 WAT
Adults						
Allectus SC	21.3 oz	20.2 ghij	0.0 a (100)	0.0 a (100)	0.0 a (100)	0.0 a (100)
Aria	100 oz	15.0 cdefghi	4.0 ef (47)	4.4 de (0)	5.8 bc (0)	1.0 cd (0)
Avid	8 oz	28.8 j	0.2 a (99)	0.0 a (100)	0.0 a (100)	0.0 a (100)
Azatin	16 oz	9.6 abcdef	2.0 cde (58)	1.6 bc (37)	0.2 a (86)	0.0 a (100)
Carzol	1 lb	6.6 abc	3.0 def (9)	2.4 bc (0)	0.4 a (60)	0.0 a (100)
Celero 16 WSG	4 oz	12.6 bcdefgh	0.8 abc (87)	0.2 a (94)	0.0 a (100)	0.2 ab (66)
Conserve	11 oz	18.2 ghij	0.0 a (100)	0.0 a (100)	0.0 a (100)	0.0 a (100)
Diazinon 4E	3 pts	13.2 cdefghij	0.0 a (100)	0.0 a (100)	0.0 a (100)	0.0 a (100)
Discus	25 oz	26.2 ij	0.0 a (100)	0.0 a (100)	0.0 a (100)	0.0 a (100)
Flagship 25WG	2 oz	12.6 bcdefg	0.2 a (97)	0.0 a (100)	0.0 a (100)	0.0 a (100)
Flagship 25WG	8 oz	3.4 a	0.4 ab (76)	0.2 a (78)	0.0 a (100)	0.0 a (100)
Kontos (BYI-8330)	1.7 fl oz	6.2 abc	0.2 a (94)	0.0 a (100)	0.0 a (100)	0.0 a (100)
Merit 75	16 gr	17.4 fghij	1.2 abc (86)	0.0 a (100)	0.0 a (100)	0.4 abc (51)
Mesurol 75W	1 lb	9.4 abcd	0.2 a (96)	0.0 a (100)	0.0 a (100)	0.0 a (100)
NAI-2302	10.5 oz	11.0 bcdefgh	0.2 a (96)	0.0 a (100)	0.2 a (88)	0.0 a (100)
NNI-0101	9.5 oz	13.0 cdefghij	5.6 fg (14)	2.6 cd (24)	7.2 bc (0)	0.4 ab (35)
Orthene 97	8 oz	17.8 fghij	0.0 a (100)	0.0 a (100)	0.2 a (93)	0.0 a (100)
Overture	8 oz	20.8 hij	0.6 ab (94)	0.0 a (100)	0.0 a (100)	0.0 a (100)
Pedestal	8 oz	12.2 cdefghi	1.2 bcd (80)	0.2 a (94)	0.0 a (100)	0.0 a (100)
Pylon	10 oz	14.6 bcdefgh	1.0 ab (86)	0.2 a (95)	0.0 a (100)	0.0 a (100)
Safari	24 oz	12.4 cdefghij	0.4 ab (94)	0.4 a (88)	0.2 a (89)	0.0 a (100)
Talstar F	21.7 oz	17.0 efghij	0.4 ab (95)	0.0 a (100)	0.0 a (100)	0.0 a (100)
Tricon (BW 420)	100 oz	15.8 defghij	0.6 ab (92)	0.4 a (90)	6.2 c (0)	0.6 bc (19)
TriStar 70WSP	64 g	12.2 bcdefgh	0.4 ab (93)	0.4 a (88)	0.2 a (89)	0.0 a (100)
TriStar 70WSP + Capsil	64 g + 6 oz	5.4 ab	0.2 a (93)	0.0 a (100)	0.4 a (51)	0.0 a (100)
Clearys 3336 WP	24 oz	8.2 abcde	5.0 ef (0)	2.4 b (0)	5.0 bc (0)	1.2 d (0)
Water Control		21.2 efghij	10.6 g (0)	5.6 e (0)	3.2 b (0)	1.0 cd (0)

Treatment	Rate / 100 gal	Population Counts [z], Means Separations [y], and Percent Control [x]				
		Pretreatment	1 WAT	2 WAT	4 WAT	8 WAT
Immatures						
Allectus SC	21.3 oz	22.4 fgh	0.8 abcd (97)	0.4 a (97)	0.0 a (100)	0.0 a (100)
Aria	100 oz	13.0 bcdefgh	9.2 f (47)	17.2 d (0)	4.4 e (0)	0.8 bc (0)
Avid	8 oz	19.6 defgh	0.6 abc (98)	0.0 a (100)	0.2 ab (85)	0.2 ab (83)
Azatin	16 oz	7.2 abc	3.0 cde (69)	3.2 b (15)	1.2 bc (0)	0.0 a (100)
Carzol	1 lb	11.6 bcdefgh	1.8 bcde (88)	1.2 a (80)	0.0 a (100)	0.4 abc (41)
Celero 16 WSG	4 oz	9.8 abc	1.2 abcde (91)	0.2 a (96)	0.0 a (100)	0.0 a (100)
Conserve	11 oz	9.4 abcdefgh	1.2 abcd (90)	0.0 a (100)	0.0 a (100)	0.6 abc (0)
Diazinon 4E	3 pts	9.6 bcdefgh	0.6 abc (95)	0.6 a (88)	0.0 a (100)	0.0 a (100)
Discus	25 oz	18.4 gh	0.6 abc (98)	0.2 a (98)	0.2 ab (84)	0.0 a (100)
Flagship 25WG	2 oz	6.6 ab	1.0 abcd (89)	0.0 a (100)	0.0 a (100)	0.0 a (100)
Flagship 25WG	8 oz	12.6 bcdefgh	0.4 ab (98)	0.2 a (97)	0.0 a (100)	0.0 a (100)
Kontos (BYI-8330)	1.7 fl oz	8.2 abcde	0.2 a (98)	0.4 a (91)	1.2 ab (0)	0.0 a (100)
Merit 75	16 gr	16.6 efgh	0.4 abc (98)	0.2 a (98)	0.2 ab (82)	0.0 a (100)
Mesurol 75W	1 lb	5.4 a	0.4 abc (94)	0.6 a (79)	0.0 a (100)	0.2 ab (37)
NAI-2302	10.5 oz	7.2 abcde	0.8 abcd (92)	0.6 a (84)	1.0 abc (0)	0.2 ab (53)
NNI-0101	9.5 oz	9.4 abcdefgh	16.6 fg (0)	9.0 c (0)	4.2 de (0)	0.2 ab (64)
Othene 97	8 oz	11.8 bcdefgh	1.0 abcd (94)	0.4 a (93)	0.0 a (100)	0.0 a (100)
Overture	8 oz	6.2 abc	2.8 e (66)	0.8 a (75)	0.4 ab (4)	0.2 ab (45)
Pedestal	8 oz	7.8 abcd	2.6 de (75)	0.6 a (85)	0.0 a (100)	0.0 a (100)
Pylon	10 oz	8.0 abcdef	0.2 a (98)	0.4 a (90)	0.0 a (100)	0.8 bc (0)
Safari	24 oz	6.2 abc	0.4 abc (95)	0.4 a (88)	0.0 a (100)	0.0 a (100)
Talstar F	21.7 oz	9.4 abcdefg	1.0 abcde (92)	0.0 a (100)	0.0 a (100)	0.2 ab (64)
TriCon (BW 420)	100 oz	18.8 defgh	2.6 (90)	9.6 cd (2)	7.8 e (0)	2.6 d (0)
TriStar 70WSP	64 g	15.0 cdefgh	0.2 a (99)	0.0 a (100)	0.2 ab (80)	0.0 a (100)
TriStar 70WSP & Capsil	64 g + 6 oz	8.2 abcdefg	0.2 a (98)	0.4 a (91)	0.2 ab (64)	0.0 a (100)
Clearys 3336 WP	24 oz	12.2 bcdefgh	11.6 f (28)	14.0 cd (0)	6.0 e (0)	1.2 cd (0)
Water Control		23.8 h	31.6 g (0)	12.4 cd (0)	1.6 cd (0)	1.4 cd (0)
Total Population						
Allectus SC	21.3 oz	42.6 hij	0.8 a (98)	0.4 a (98)	0.0 a (100)	0.0 a (100)
Aria	100 oz	28.0 bcdefghi	13.2 e (50)	21.6 d (0)	10.2 cd (0)	1.8 bc (0)
Avid	8 oz	48.4 j	0.8 a (98)	0.0 a (100)	0.2 ab (96)	0.2 a (92)
Azatin	16 oz	16.8 abcd	5.0 cd (68)	4.8 b (29)	1.4 b (22)	0.0 a (100)
Carzol	1 lb	18.2 abcdefg	4.8 d (72)	3.6 b (51)	0.4 ab (79)	0.4 a (59)
Celero 16 WSG	4 oz	22.4 bcdefgh	2.0 abcd (90)	0.4 a (96)	0.0 a (100)	0.2 a (83)
Conserve	11 oz	27.6 defghij	1.2 ab (95)	0.0 a (100)	0.0 a (100)	0.6 ab (59)
Diazinon 4E	3 pts	22.8 bcdefgh	0.6 a (97)	0.6 a (93)	0.0 a (100)	0.0 a (100)
Discus	25 oz	44.6 ij	0.6 a (99)	0.2 a (99)	0.2 ab (96)	0.0 a (100)
Flagship 25WG	2 oz	19.2 bcdefg	1.2 ab (93)	0.0 a (100)	0.0 a (100)	0.0 a (100)
Flagship 25WG	8 oz	16.0 abcde	0.8 ab (95)	0.4 a (94)	0.0 a (100)	0.0 a (100)
Kontos (BYI-8330)	1.7 fl oz	14.4 abc	0.4 a (97)	0.4 a (93)	1.2 ab (22)	0.0 a (100)
Merit 75	16 gr	34.0 ghij	1.6 abc (95)	0.2 a (99)	0.2 ab (94)	0.4 a (78)
Mesurol 75W	1 lb	14.8 a	0.6 a (96)	0.6 a (90)	0.0 a (100)	0.2 a (75)
NAI-2302	10.5 oz	18.2 abcdefg	1.0 ab (94)	0.6 a (92)	1.2 ab (38)	0.2 a (79)
NNI-0101	9.5 oz	22.4 bcdefghi	22.2 ef (0)	11.6 c (0)	11.4 cd (0)	0.6 a (50)
Othene 97	8 oz	29.6 efghij	1.0 ab (96)	0.4 a (97)	0.2 ab (94)	0.0 a (100)
Overture	8 oz	27.0 cdefghij	3.4 cd (87)	0.8 a (93)	0.4 ab (86)	0.2 a (86)
Pedestal	8 oz	20.0 bcdefgh	3.8 cd (80)	0.8 a (90)	0.0 a (100)	0.0 a (100)
Pylon	10 oz	22.6 bcdefgh	1.2 a (94)	0.6 a (93)	0.0 a (100)	0.8 ab (34)
Safari	24 oz	18.6 abcdefg	0.8 ab (95)	0.8 a (89)	0.2 ab (90)	0.0 a (100)
Talstar F	21.7 oz	26.4 bcdefghij	1.4 abc (94)	0.0 a (100)	0.0 a (100)	0.2 a (86)

Treatment	Rate / 100 gal	Population Counts [z], Means Separations [y], and Percent Control [x]				
		Pretreatment	1 WAT	2 WAT	4 WAT	8 WAT
TriCon (BW 420)	100 oz	34.6 fghij	3.2 bcd (90)	10.0 c (28)	14.0 d (0)	3.2 c (0)
TriStar 70WSP	64 g	27.2 bcdefghij	0.6 a (98)	0.4 a (96)	0.4 ab (86)	0.0 a (100)
TriStar 70WSP & Capsil	64 g + 6 oz	13.6 ab	0.4 a (97)	0.4 a (93)	0.6 ab (59)	0.0 a (100)
Clearys 3336 WP	24 oz	20.4 abcdefg	16.6 e (13)	16.4 cd (0)	11.0 c (0)	2.4 c (0)
Water Control		45.0 efghij	42.2 f (0)	18.0 cd (0)	4.8 c (0)	2.4 c (0)

Comparative Efficacy onPrivet Thrips (Dendothrips ornatus)

Privet thrips (*Dendrothrips ornatus*) is known to attack privet, lilac and possibly ash, causing the leaves to become grey and even fall. In a single experiment conducted by a researcher in 2008, 9 products were tested as foliar treatments on 3-year old privet trees (Table 26). Adult and immature thrips were collected from leaflets at 3, 7 and 13 days after treament. Scimitar, the standard, provided good to excellent control. In general, BYI 8330, Conserve, Flagship, Tick-EX and Tolfenpyrad provided fair to good efficacy. Ecotrol, MOI 201 and NNI-0101 showed poor efficacy.

Table 26. Privet Thrips Control on New Mexican Privet (*Foresteria neomexicana*), Cranshaw, CO, 2008.

Treatment	Rate / 100 gal	Population Counts [x], Means Separations [y], and Percent Control		
		3 DAT	7 DAT	13 DAT
Conserve	11 fl oz	5.3 c (77)	4.8 a (66)	5.8 b (74)
Ecotrol	4 pt	16.3 b (31)	28.3 a (0)	14.5 ab (35)
Flagship 25WG	8 oz	4.5 c (81)	17.0 a (0)	10.3 b (54)
Kontos (BYI-8330)	1.7 fl oz	4.3 c (82)	19.3 a (0)	10.3 b (54)
MOI 201	1:500	12.8 bc (46)	23.5 a (0)	16.5 ab (26)
NNI-0101SC	6.38 fl oz	10.0 bc (57)	13.0 a (7)	7.3 b (67)
Scimitar SC	5 fl oz	3.0 c (87)	3.5 a(75)	1.0 b (96)
Tick-EX EC	29 fl oz	6.5 c (72)	8.8 a (37)	7.5 b (66)
Tolfenpyrad EC	21 fl oz	5.0 c (79)	12.8 a (9)	6.0 b (73)
Nontreated		23.5 a (0)	14.0 a (0)	22.3 a (0)

[x]Mean number of live thrips per 20 leaflets from plant and extracted with alcohol.
[y]Means followed by the same letter are not significantly different at p=0.05 (SNK).

Comparative Efficacy on Weeping Fig Thrips (Gynaikothrips uzeli)

Weeping fig thrips (*Gynaikothrips uzeli*), introduced to the United States in 2003, impacts *Ficus benjamina*. This thrips species forms galls on *F. benjamina* causing plants to be unattractive and unsalable. It is found throughout the southeast in nurseries and in landscape plantings.

During 2005 and 2006, IR-4 sponsored a series of trials to examine whether commonly used products for thrips would manage populations of weeping fig thrips. Efficacy was assessed in the experiments conducted during 2005 by applying the products to whole plants, taking cuttings, placing thrips on those cuttings, and counting live and dead thrips 24 h later (Table 27 - Table 33). In the first experiment, Discus, Flagship, Safari, and Tristar as foliar treatments exhibited good to excellent control at 7 DAT. In the second experiment, only Talstar provided acceptable control. In the third experiment, Celero foliar applications and Talstar gave good control. During 2006 treatments were applied with Capsil, an organosilicone surfactant, and the assessment methods varied. In the first experiment, where whole plants with already formed galls were treated and then 3 galls were assessed for live and dead thrips, only Talstar provided excellent control (Table 27). A similar technique was used in the second experiment and Allectus and Talstar provided >98% mortality (Table 28). For the third experiment in 2006,

prevention of gall formation was evaluated by placing treated uninfested cuttings with infested galls and then counting the number of galls that formed by 7 DAT. With this technique, cuttings treated with Surround at 60g per 100 gal had no galls, while the other treatments did (Table 29). In the fourth experiment, gall formation over time was examined (Table 30). A single application of Talstar completely inhibited gall formation through 35 DAT while galls formed on the Surround-treated cuttings at a rate of 0.44% or less.

Table 27. Efficacy of several insecticides for *Gynaikothrips uzeli* on Ficus – Experiment 1, Held, MS, 2005a.

Treatment	Rate	Percent Mortality		
		7 DAT	14 DAT	21 DAT
Discus Drench	11.2 ml per 700 ml	2.3	0.0	0.0
Discus Foliar	1.95 ml per liter	94.8	17.2	5.4
Flagship Drench	0.3 g per liter	3.3	4.7	5.2
Flagship Foliar	1.8 g per liter	86.7	43.2	1.7
Marathon Drench	2.7 g per pot	0.0	3.5	0.0
Safari Drench	1.8 g per liter	13.3	11.1	5.4
Safari Foliar	0.6 g per liter	96.7	29.1	10.7
TriStar Foliar	0.25 gper liter	79.3	30.2	5.0
Non-ionic Surfactant	0.1 ml per liter	9.3	3.5	0.0
Nontreated – Drench		0.0	1.9	0.0
Nontreated – Foliar		11.7	8.3	1.7

* Products applied as foliar applications to the point of run-off with the exception of the drench treatments which were applied to the soil media in 100 ml solution.

** Cuttings from treated plants were taken at the indicated intervals, infested with 10 adult thrips, and then destructively harvested at 24 h for adult counts.

Table 28. Efficacy of several insecticides for *Gynaikothrips uzeli* on Ficus – Experiment 2, Held, MS, 2005b.

Treatment	Rate	Percent Mortality			
		1 DAT	7 DAT	14 DAT	21 DAT
Avid 0.15 EC	8 fl oz per 100 gal	25.4	16.9	26.2	15.2
Azatin XL	16 fl oz per 100 gal	47.7	8.1	34.9	14.7
Conserve SC	10 fl oz per 100 gal	54.9	23.0	45.1	7.8
Safer Soap	250 fl oz per 100 gal	46.3	19.2	44.7	12.7
Non-ionic Surfactant	0.3 ml per liter	13.2	10.6	27.8	8.9
Talstar	12.5 oz per 100 gal	98.3	64.4	96.6	35.1
Nontreated		17.6	15.4	28.8	8.3

* Products applied as foliar applications to the point of run-off

Table 29. Efficacy of several insecticides for *Gynaikothrips uzeli* on Ficus – Experiment 3, Held, MS, 2005c.

Treatment	Rate	Percent Mortality			
		1 DAT	7 DAT	14 DAT	21 DAT
Celero 16WSG Foliar	4 oz per 100 gal	86.8	29.2	20.0	10.6
Celero 16WSG Drench	4 oz per 100 gal	5.0	5.0	16.7	7.0
Dursban	16 oz per 100 gal	30.0	16.7	45.0	0.0
Orthene	16 oz per 100 gal	68.3	12.9	18.7	13.2
Overture	8 oz per 100 gal	9.9	9.9	15.0	11.9
Sevin SL	32 oz per 100 gal	26.7	20.4	15.0	6.9
Talstar	12.5 oz per 100 gal	85.0	90.2	73.3	30.6
Tempo SC Ultra	160 ml per 100 gal	57.2	31.7	35.0	13.7
Non-ionic Surfactant	0.3 ml per liter	17.1	11.5	10.0	8.3
Nontreated		13.3	6.7	8.3	1.7

* Products applied as foliar applications to the point of run-off with the exception of the Celero 16WSG drench treatment which was applied to the soil media in 100 ml solution.

Table 30. Mortality of *Gynaikothrips uzeli* inside galls on Ficus (*Ficus benjamina*) – Experiment 1, Held, MS, 2006a.

Treatment [z]	Mean (±SE) percent mortality of *G. uzeli* inside galls [y]		
	1 DAT	3 DAT	7 DAT
Adults			
BotaniGard ES 5ml/L + Capsil [x]	17 ± 16.6b	9.9 ± 2.4b	29.9 ± 15.8b
Capsil0.94ml/L	14.3 ± 11.1b	23.3 ± 15.6b	42.6 ± 18.9ab
Milstop 3g/L + Capsil	39.3 ± 13.8b	42 ± 17.6b	46.1 ± 17.7ab
Talstar One 12.45 ml/L + Capsil	100a	100a	100a
Tricon 7.8 ml/L+ Capsil	13.7 ± 8.9b	15.1 ± 3.9b	37.4 ± 19.6ab
Nontreated	0.9 ± 0.9b	10.4 ± 7.2b	16.8 ± 12.7b
Immatures			
BotaniGard ES 5ml/L + Capsil [x]	4.9 ± 2.7bc	14.6 ± 8.8b	54.9 ± 19.7a
Capsil0.94ml/L	18.3 ± 10.4bc	44.8 ± 15.4ab	34.1 ± 23.6a
Milstop 3g/L + Capsil	45.8 ± 18.6b	60 ± 21.5ab	33.6 ± 17.2a
Talstar One 12.45 ml/L + Capsil	100a	100a	100a
Tricon 7.8 ml/L+ Capsil	20.8 ± 6.8bc	26.7 ± 10.2b	64.5 ± 18.4a
Nontreated	5.8 ± 5.8c	44.5 ± 10.4b	24.9 ± 15.5a
Both life stages			
BotaniGard ES 5ml/L + Capsil [x]	18 ± 16.4b	13.8 ± 4.6b	30.5 ± 15.6b
Capsil0.94ml/L	15.4 ± 10.3b	31 ± 15b	40.1 ± 19.8ab
Milstop 3g/L + Capsil	35.7 ± 9.8b	45.2 ± 16.3b	42.6 ± 17.3ab
Talstar One 12.45 ml/L + Capsil	100a	100a	100a
Tricon 7.8 ml/L+ Capsil	20.3 ± 7.9b	25.7 ± 7.3b	50.8 ± 18.1ab
Nontreated	3.98 ± 3.7b	25.1 ± 7.7b	19.6 ± 12.8b

[z] Treatments were applied on July 26.
[y] Data were arcsin(sqrt) transformed before analysis.Means presented are actual means. Means within a column in the same time interval followed by the same letter were not significantly different (Tukey's HSD, $P < 0.05$).
[x] Organosilicone surfactant.

5 ml per L = 64 fl oz per 100 gal
3 g per L = 40 oz per 100 gal
7.8 ml per L = 100 fl oz per 100 gal

Table 31. Mortality of *Gynaikothrips uzeli* inside galls on Ficus (*Ficus benjamina*) –Experiment 2, Held, MS, 2006b.

Treatment [z]	Mean (±SE) percent mortality of *G. uzeli* inside galls [y]		
	1 DAT	3 DAT	7 DAT
Adults			
Acelepryn (DPX-E2Y45) + Capsil	26.1 ± 15.2b	50 ± 17.8ab	32.5 ± 9.1bc
Allectus 1.7ml/L + Capsil [x]	96.3 ± 3.8a	98.9 ± 1.1a	100a
Aria 0.317g/L + Capsil	22.2 ± 4.5b	23.7 ± 15.5b	33.9 ± 16.9bc
Capsil 0.94ml/L	25.6 ± 9.7b	18.9 ± 9.1b	14.9 ± 8.7bc
Kontos (BYI-8330) 0.132ml/L + Capsil	21.4 ± 12.5b	32.7 ± 13.2b	1.9 ± 1.9c
Safer soap 7.8ml/L + Capsil	18.4 ± 6.2b	39.1 ± 16.1ab	56.8 ± 19.3ab
Talstar One 12.45ml/L + Capsil	100a	100a	100a
Immatures			
Acelepryn (DPX-E2Y45) + Capsil	13.9 ± 4.8b	22.2 ± 19.6c	49.4 ± 21.4abc
Allectus 1.7ml/L + Capsil [x]	91.2 ± 6.9a	97.7 ± 1.1a	98.8 ± 1.2ab
Aria 0.317g/L + Capsil	19.6 ± 13.1b	26.5 ± 18.9bc	64.4 ± 12.5abc
Capsil 0.94ml/L	7.5 ± 2.5b	20 ± 6.8c	26.9 ± 19.2bc
Kontos (BYI-8330) 0.132ml/L + Capsil	15.7 ± 13.6b	25.2 ± 8.4bc	12 ± 9.7c
Safer soap 7.8ml/L + Capsil	17.8 ± 8.3b	27.9 ± 18.4c	39.4 ± 19.3abc
Talstar One 12.45ml/L + Capsil	100a	90 ± 10ab	100a
Both life stages			
Acelepryn (DPX-E2Y45) + Capsil	24.9 ± 15.2b	46.3 ± 18.7ab	36.9 ± 11.9bc
Allectus 1.7ml/L + Capsil [x]	93.8 ± 5.3a	98.3 ± 0.7a	99.6 ± 0.4a
Aria 0.317g/L + Capsil	21.8 ± 6.9b	23.9 ± 15.5b	50.6 ± 14.7ab
Capsil 0.94ml/L	21 ± 10.4b	15 ± 3.8b	15.1 ± 10.4bc
Kontos (BYI-8330) 0.132ml/L + Capsil	24.5 ± 11.8b	25.3 ± 9.4b	5.5 ± 2.9c
Safer soap 7.8ml/L + Capsil	21.7 ± 6.5b	36.9 ± 17.4ab	42 ± 18.7bc
Talstar One 12.45ml/L + Capsil	100a	97.3 ± 2.7a	100a

[z] Treatments were applied on September 5.
[y] Data were arcsin(sqrt) transformed before analysis.Means presented are actual means. Means within a column in the same time interval followed by the same letter were not significantly different (Tukey's HSD, $P < 0.05$).
[x] Organosilicone surfactant.

Table 32. *Gynaikothrips uzeli* gall induction on Ficus (*Ficus benjamina*) after treatment with plant protectants –Experiment 3, Held,MS 2006c.

Treatment	Rate per liter	Mean (± SE) percent of cuttings with galls induced by adult *G. uzeli* [z]
Azatin XL + Capsil	1.25 ml	66.6 ± 4.3a
Capsil [y]	0.94 ml	55.6 ± 9.3a
Surround + Capsil	60 g	0b
Surround + Capsil	120 g	11.1 ± 5.6b

[z] Data arcsin(sqrt) transformed before analysis. Means presented are actual means.Means followed by the same letter were not significantly different (Tukey's HSD, $P < 0.05$).
[y] Organosilicone surfactant.

Table 33. *Gynaikothrips uzeli* gall induction on Ficus (*Ficus benjamina*) after ongoing treatments with plant protectants–Experiment 4, Held, MS, 2006c.

Treatment	Rate per liter	Mean (± SE) percent of cuttings with galls induced by adult *G. uzeli* [z]				
		7 DAT	14 DAT	21 DAT	28 DAT	35 DAT
Capsil [y]	0.94 ml	2.89 ± 0.33a	3.33 ± 0.39a	3.89 ± 0.31a	4.72 ± 0.36a	4.72 ± 0.36a
Surround + Capsil (once)	60 g	0.33 ± 0.14b	0.5 ± 0.15b	1.06 ± 0.3b	1.28 ± 0.34b	1.28 ±0.34b
Surround+ Capsil (weekly)	60 g	0.44 ± 0.15b	0.33 ± 0.18b	0.28 ± 0.18bc	0.28 ± 0.18c	0.28 ± 0.18c
Talstar One + Capsil	12.45 ml	0b	0b	0c	0c	0c

[z] Means within the same column followed by the same letter were not significantly different (Tukey's HSD, $P < 0.05$).
[y] Organosilicone surfactant.

Comparative Efficacy on Western Flower Thrips (Frankliniella occidentalis)

Western flower thrips (*Frankliniella occidentalis*) remains the major pest threat for environmental horticulture growers in the United States. The experiments below are organized by crop and then chronologically.

Butterfly Bush. In 2012, Villavicencio conducted a field experiment to examine the efficacy of various products to control western flower thrips on butterfly bush (Table 34). High variability in the numbers of adults and nymphs were observed in this study where thrips could move freely among plants,and migrate from neighboring areas. All products (A16901B, AzaGuard, Conserve, Hachi-Hachi, MBI 203 and Proud) generally provided poor to mediocre control of nymphs between 1 to 3 WAT; no product provided significant residual control.

Cosmos. In 2008, Cranshaw conducted two experiments to examine the efficacy of various products to control western flower thrips on cosmos (Table 36, Table 37). Unfortunately under the conditions of this trial, which involved field plantings subject to continuous reinvasion by migrant thrips, none of the treatments provided acceptable control.

Chrysanthemum. In 1999, a single experiment was conducted examining various rates of Pylon to control western flower thrips on chrysanthemum (*Dendranthemum x morifolium*). In this experiment, total adult and immature thrips were counted after the plants were tapped over white paper. Pylon, at all rates, reduced thrips populations through 14 days after treatment (Table 38). By 21 days, the populations for treated and nontreated were equivalent.

Gardenia. In 2004, Bethke examined several registered products for western flower thrips control on gardenia (*Gardenia jasminoides*). In this experiment, total adult and immature thrips were counted from alcohol extractions of 6 cut flowers. Treatments were sprayed twice at 2-week intervals. Conserve, Mesurol, and TriStar significantly reduced thrips population throughout the duration of trial (Table 39). Pedestal was less effective and Talstar was ineffective throughout the duration of trial.

Geranium. In 2010, Frank conducted an experiment to examine the efficacy of various products to control western flower thrips on geranium (*Pelargonium* sp.) In this experiment, larval and adult thrips were counted by beating a random flower per plant in a white plastic tray.Thrips abundance was significantly less than the nontreated control in all treatments (Avid, Botanigard, Conserve, Flagship, Overture, Pylon and Tick-Ex) by 7 DAT (Table 40, Table 41). Differences persisted although thrips abundance on all treatments declined to zero by the end of the experiment. This was due to extraordinarily high temperatures during the last weeks of the test.

Table 34. Western Flower Thrips Control on Butterfly Bush (*Buddleia davidii*) 'Blueberry Cobbler' – Application Rates and Dates, Villavicencio, CA , 2012.

Treatment[z] (Active Ingredient)	Rate per 100 gal	Application Dates				
		6/1 Week 0	6/8 Week 1	6/15 Week 2	6/21 Week 3	6/28 Week 4
A16901B	6.7 oz	X		X		X
	13.4 oz	X		X		X
	13.4 oz	X			X	
AzaGuard (azadirachtin)	16 fl oz	X	X	X	X	X
Conserve SC (spinosad)	8 fl oz	X		X		X
Hachi-Hachi (tolfenpyrad)	21 fl oz	X		X		X
MBI-203 (*Chromobacterium subtsugae*)	2 lb	X	X	X	X	X
	4 lb	X	X	X	X	X
Proud (thyme oil)	1 gal	X	X	X	X	X
Nontreated	-					

Table 35 Western Flower Thrips Control on Butterfly Bush (*Buddleia davidii*) 'Blueberry Cobbler', Villavicencio, CA, 2012.

Treatment (Rate per 100 gal)	Population Counts [z], Means Separations [y], and Henderson's Percent Control							
	0 WAT	1 WAT	2 WAT	3 WAT	4 WAT	5 WAT	6 WAT	7 WAT
Adults								
A16901B (6.7 oz)	8.5 a	8.3 a (0)	6.2 ab (5)	7.0 d (65)	7.2 bcd (0)	3.7 a (0)	3.5 a-e ()	2.2 a (19)
A16901B (13.4 oz x 2)	5.5 a	8.3 a (0)	3.8 bcd (10)	12.3 ab (0)	15.3 a (0)	4.2 a (0)	5.3 ab (0)	1.8 a (0)
A16901B (13.4 oz x 3)	3.0 a	8.5 a (0)	8.8 a (0)	5.8 d (2)	5.7 cde (0)	4.8 a (0)	5.5 a (0)	2.5 a (0)
AzaGuard (16 fl oz)	5.8 a	4.3 b (10)	5.2 abc (0)	12.0 abc (0)	5.8 cde (0)	2.0 a (0)	3.0 b-e (12)	1.8 a (2)
Conserve SC (8 fl oz)	4.0 a	8.2 a (0)	3.2 d (0)	10.0 (0)a-d	8.3 bc (0)	2.0 a (0)	4.3 a-d (0)	3.2 a (0)
Hachi-Hachi (21)	7.7 a	9.2 a (0)	3.0 cd (49)	7.5 cd (50)	5.8 cde (0)	2.7 a	2.7 de (40)	2.7 a (0)
MBI-203 DF (2 lb)	8.5 a	3.3 b (53)	5.8 abc (11)	8.5 a-d (49)	11.2 ab (0)	4.2 a (0)	2.7 cde (46)	3.2 a (0)
MBI-203 DF (4 lb)	5.0 a	5.8 ab (0)	2.3 d (40)	7.7 bcd (22)	5.5 cde (0)	3.3 a (0)	5.3 abc (0)	1.3 a (18)
Proud 3 (1 gal)	4.2 a	7.8 a (0)	4.5 bcd (0)	8.7 a-d (0)	3.7 de (0)	1.8 a (0)	1.7 e (31)	2.2 a (0)
Control	8.5 a	7.0 ab (0)	6.5 ab (0)	16.7 a (0)	2.8 e (0)	3.2 a (0)	5.0 a-d (0)	2.7 a (0)
Nymphs								
A16901B (6.7 oz)	17.8 a	24.0 ab (58)	8.7 abc (72)	9.8 a-d (69)	9.0 bc (64)	7.2 bc (68)	11.8 a (32)	23.5 a (20)
A16901B (13.4 oz x 2)	18.0 a	15.0 bc (74)	5.2 cd (84)	8.5 bcd (73)	13.2 ab (48)	6.2 c (72)	20.7 a (0)	28.2 a (5)
A16901B (13.4 oz x 3)	19.5 a	19.8 ab (68)	9.5 abc (72)	11.7 abc (66)	7.8 c (71)	12.8 a (47)	12.5 a (35)	26.5 a (18)
AzaGuard (16 fl oz)	14.7 a	19.0bc (60)	8.5 bc (84)	6.8 de (74)	16.0 a (22)	8.0 abc (56)	10.0 a (31)	25.5 a (0)
Conserve SC (8 fl oz)	14.5 a	11.3 cd (76)	6.5 bc (75)	6.7 cd (74)	14.2 a (30)	6.7 bc (63)	12.7 a (11)	23.3 a (3)
Hachi-Hachi (21)	13.8 a	8.3 d (81)	6.3 bc (74)	3.7 e (85)	14.8 a (23)	8.0 abc (54)	12.5 a (8)	32.7 a (0)
MBI-203 DF (2 lb)	16.0 a	16.8 bc (67)	10.7 ab (62)	16.0 ab (43)	11.0 abc (51)	11.0 ab (45)	12.7 a (19)	27.7 a (0)
MBI-203 DF (4 lb)	12.5 a	17.2 bc (57)	5.5 c (75)	6.7 cd (69)	7.3 c (58)	7.5 bc (52)	11.5 a (6)	30.8 a (0)
Proud 3 (1 gal)	16.0 a	15.5 bc (70)	7.8 bc (72)	6.3 cd (77)	15.0 a (33)	8.5 abc (47)	13.3 a (15)	15.2 a (42)
Control	10.0 a	32.2 a (0)	17.7 a (0)	17.5 a (0)	14.0 a (0)	12.5 a (0)	9.8 a (0)	16.5 a (0)

[z] Mean number of thripsextracted with alcohol from*Buddleia* 'Blueberry Cobbler' panicles.
[y] Means within columns followed by the same letter are not significantly different(P=0.05, Student's t-test).

Table 36. Western Flower Thrips Control on Cosmos (*Cosmos bipinnatus*) 'Picotee', Cranshaw, CO, 2008a.

Treatment	Rate Per 100 gal	Population Counts [x], Means Separations [y], and Percent Control					
		8/4/08	8/7/08	8/18/08	8/22/08	8/26/08	9/5/08
Conserve	11 fl oz	33.5 bc (31)	59.0 ab (0)	35.5 a (32)	16.0 b (77)	47.5 a (15)	36.3 a (0)
Ecotrol	4 pts	48.3 ab (0)	60.8 ab (0)	46.3 a (12)	62.3 ab (10)	42.0 a (25)	48.0 a (0)
Flagship 25WG	8 oz	58.3 a (0)	75.8 a (0)	40.0 a (24)	50.3 ab (27)	63.5 a (0)	36.3 a (0)
Kontos (BYI-8330)	1.7 fl oz	43.0 ab (11)	54.0 ab (0)	38.0 a (28)	47.0 ab (32)	41.0 a (27)	34.5 a (0)
MOI 201	25.6 fl oz (1:500)	57.5 ab (0)	36.5 ab (0)	30.8 a (41)	62.0 ab (11)	56.0 a (0)	40.0 a (0)
NNI-0101SC	6.38 fl oz	53.8 ab (0)	33.0 ab (0)	38.3 a (27)	59.0 ab (15)	56.8 a (0)	33.8 a (0)
Scimitar SC	5 fl oz	22.0 c (55)	28.3 b (11)	44.8 a (15)	26.5a ab (62)	31.8 a (43)	30.8 a (0)
Tick-EX EC	29 fl oz	46.8 ab (4)	45.8 a (0)	45.3 a (14)	79.5 a (0)	56.0 a (0)	47.0 a (0)
Tolfenpyrad EC	21 fl oz	41.5 ab (14)	42.8 ab (0)	36.5 a (30)	42.5 ab (39)	50.8 a (9)	39.0 a (0)
Nontreated Check		48.5 ab (0)	31.8 ab (0)	52.5 a (0)	69.3 ab (0)	56.0 a (0)	26.5 a (0)
Nymphs							
Conserve	11 fl oz	1.8 a (60)	5.3 a (0)	2.0 a (29)	0.3 c (92)	0.8 a (73)	1.8 a (0)
Ecotrol	4 pt	4.5 a (0)	3.3 a (31)	3.8 a (0)	2.5 ab (34)	3.3 a (0)	1.8 a (0)
Flagship 25WG	8 oz	7.0 a (0)	8.3 a (0)	2.8 a (0)	0.8 bc (79)	1.5 a (50)	1.8 a (0)
Kontos (BYI-8330)	1.7 fl oz	3.3 a (27)	2.0 a (58)	4.3 a (0)	4.8 a (0)	2.8 a (7)	1.8 a (0)
MOI 201	25.6 fl oz (1:500)	4.3 a (4)	5.0 a (0)	0.3 a (89)	4.0 ab (0)	2.8 a (7)	2.5 a (0)
NNI-0101SC	6.38 fl oz	3.8 a (16)	1.5 a (69)	2.3 a (18)	4.0 ab (0)	3.3 a (0)	1.5 a (0)
Scimitar SC	5 fl oz	3.3 a (27)	3.3 a (31)	2.3 a (18)	0.0 c (100)	1.8 a (40)	1.3 a (13)
Tick-EX EC	29 fl oz	5.3 a (0)	0.5 a(90)	2.8 a (0)	3.2 ab (16)	3.3 a (0)	1.5 a (0)
Tolfenpyrad EC	21 fl oz	4.3 a (4)	1.3 a (73)	1.3 a (54)	0.5 bc (87)	1.0 a (67)	2.0 a (0)
Nontreated Check		4.5 a (0)	4.8 a (0)	2.8 a (0)	3.8 bc (0)	3.0 a (0)	1.5 a (0)

[x] Mean number of live thrips per 25 blossoms cut from plant and extracted with alcohol.
[y] Means followed by the same letter are not significantly different at p=0.05 (SNK).
Treatments applied on 8/1/08; a second application of Kontos(BYI-8330), Ecotrol and Tick-EX made on 8/7/08.

Table 37. Western Flower Thrips Control on Cosmos (*Cosmos bipinnatus*) 'Picotee', Cranshaw, CO, 2008b.

Treatment	Rate Per 100 gal	Population Counts [x], Means Separations [y], and Percent Control	
		3 DAT	14 DAT
Acelepryn	20 fl oz	53.3 a (0)	57.8 a (14)
QRD 416	128 fl oz	61.5 a (0)	57.0 a (15)
Scimitar SC	5 fl oz	23.5 b (47)	21.8 a (68)
Nontreated		44.0 ab (0)	67.3 a (0)

[x] Mean number of live thrips per 25 blossoms cut from plant and extracted with alcohol.
[y] Means followed by the same letter are not significantly different at p=0.05 (SNK).

Table 38. Western Flower Thrips Control on Chrysanthemum (*Dendranthemum x morifolium*) 'Bright Stephanie', Lindquist, OH, 1999.

Treatment (Active Ingredient) – Rate per 100 gal	Population Counts [y] and Henderson's Percent Control				
	6/30/1999 0 DAT	7/3/1999 3 DAT	7/7/1999 7 DAT	7/14/1999 14 DAT	7/21/1999 21 DAT
Pylon (chlorfenapyr) – 2.6 oz	6.8	3.3 (76)	2.5 (69)	3.3 (4)	2.0 (0)
Pylon (chlorfenapyr) – 5.2 oz	7.0	2.3 (84)	1.3 (85)	4.5 (0)	1.0 (0)
Pylon (chlorfenapyr) – 10.4 oz	10.5	2.0 (91)	1.0 (92)	3.8 (29)	1.3 (0)
Nontreated	7.0	14.3 (0)	8.3 (0)	3.5 (0)	0.3 (0)

[z] Single foliar application using 200 gal per acre.
[y] Mean number of thrips counted on after plant was tapped 3 times over white paper. Thrips were replaced on plant.

Table 39. *Western Flower Thrips Control on Gardenia (*Gardenia jasminoides*) 'Veitchii', Bethke, CA, 2004.

Treatment (Active Ingredient)	Rate per 100 gal	Population Counts [z], Means Separations [y], and Henderson'sPercent Control			
		Pre	7 DAT	21 DAT	28 DAT
Conserve 1SC (spinosad)	6 fl oz	19.8 a	6.6 de (45)	1.4 d (91)	5.8 d (59)
Mesurol 75W (methiocarb)	8 oz	25.8 a	3.6 e (77)	0.4 d (98)	2.4 d (87)
Pedestal 10SC (novaluron)	8 fl oz	25.6 a	11.8 a-d (24)	8.8 cd (57)	12.4 cd (32)
Talstar 7.9NF (bifenthrin)	12 fl oz	19.2 a	11.8 a-d (0)	33.4 a (0)	58.6 a (0)
Tristar 70WSP (acetamiprid)	2.3 oz	25.8 a	9.0 cde (42)	5.0 d (76)	6.4 d (65)
Nontreated	-	26.8 a	16.2 ab (0)	21.4 b (0)	19.2 bc (0)

* Not an IR-4 Experiment: AMT Vol 30:G31. Not all products tested included in table.
[z] Mean number of thrips counted from 6 flowers cut from plants and extracted with alcohol.
[y] Means within column followed by the same letter are not significantly different (P=0.05, Fisher's ProtectedLSD).

Table 40. Western Flower Thrips Control on Geranium (*Pelargonium* sp.), – Application Rates and Dates, Frank, NC 2010.

Treatment (Active Ingredient)	Rate / 100 gal	Application Dates				
		8/24 0 WAT	9/2 1 WAT	9/7 2 WAT	9/14 3 WAT	9/21 4 WAT
Avid 0.15EC (abamectin)	8 fl oz	X	X			
BotaniGard 22 % WP (*Beauvaria bassiana*)	2 lb	X	X	X	X	X
Conserve (spinosad)	8 fl oz	X		X		X
Flagship (thiamethoxam)	8 oz	X	X			
Overture 35WP (pyridalyl)	16 oz	X		X		
Pylon(chlorfenapyr)	5.2 fl oz	X	X			
Tick-Ex (*Metarhizium anisopliae* strain F52)	29 oz	X	X	X	X	X
Nontreated						

Table 41. Western Flower Thrips Control on Geranium (*Pelargonium* sp.), Frank, NC 2010.

Treatment	Population Counts [z], Means Separations [y], and Henderson's Percent Control					
	Precount	7 DAT	14 DAT	21 DAT	28 DAT	35 DAT
Immatures						
Avid 0.15EC	0.7 a	0.0 b (100)	0.0 b 100)	0.0 a (100)	0.0 a	0.0 a
BotaniGard 22 % WP	1.3 a	1.3 b (79)	0.8 b (77)	0.0 a (100)	0.0 a	0.0 a
Conserve	0.7 a	0.0 b (100)	0.0 b (100)	0.0 a (100)	0.0 a	0.0 a
Flagship	1.2 a	0.3 b (95)	0.3 b (91)	0.0 a (100)	0.0 a	0.0 a
Overture 35WP	1.2 a	0.2 b (96)	0.0 b 100)	0.0 a (100)	0.0 a	0.0 a
Pylon	1.7 a	0.0 b (100)	0.0 b (100)	0.0 a (100)	0.0 a	0.0 a
Tick-Ex	1.3 a	1.8 b (71)	1.3 b (62)	0.0 a (100)	0.0 a	0.0 a
Nontreated	1.2 a	5.7 a (0)	3.2 a (0)	0.7 a (0)	0.0 a	0.0 a
Adults						
Avid 0.15EC	4.3 a	0.2 b (96)	0.0 c (100)	0.0 b (100)	0.0 b (100)	0.0 a
BotaniGard 22 % WP	3.2 a	0.5 b (88)	1.0 bc (75)	0.0 b (100)	0.0 b (100)	0.0 a
Conserve	5.5 a	0.0 b (100)	0.0 c (100)	0.0 b (100)	0.0 b (100)	0.0 a
Flagship	4.7 a	0.2 b (97)	0.0 c (100)	0.3 b (91)	0.0 b (100)	0.0 a
Overture 35WP	4.0 a	0.2 b (96)	0.0 c (100)	0.0 b (100)	0.0 b (100)	0.0 a
Pylon	4.0 a	0.0 b (100)	0.0 c (100)	0.0 b (100)	0.0 b (100)	0.0 a
Tick-Ex	4.0 a	1.5 b (72)	1.3 b (74)	0.0 b (100)	0.0 b (100)	0.0 a
Nontreated	4.0 a	5.3 a (0)	5.0 a (0)	3.0 a (0)	2.0 a (0)	0.0 a

[z] The number of larval and adult thrips were counted by beating a random flower per plant in a white plastic tray.
[y] Means followed by the same letter are not significantly different Student-Newman-Keuls (P=.05). Mean comparisons performed only when AOV Treatment P(F) is significant at mean comparison OSL.

Gerbera. In a 2001 trial, no product provided acceptable mortality (Table 42). The combination of Avid and Ornazin provided the highest mortality of 54%.

During 2006 to 2009, three researchers studied western flower thrips on gerbera (*Gerbera jamesonii*). Each researcher used a different method to collect efficacy information. In one set of data, live adult and immature thrips were counted on leaves, on intact flowers with CO_2 exhalation and at select dates from alcohol extractions of single cut flowers (Table 43 - Table 49). In another set of data, whole plants were placed into brown paper

bags, stored for 4 weeks with yellow sticky cards, and adult thrips on the sticky cards were counted (Table 50 - Table 53). In a third set of data, flowers were harvested, placed into plastic petri dishes with lids, emasculated under laboratory conditions, and live, dead, and total number of western flower thrips were counted (Table 54 - Table 55).

With counts of adults and immatures on leaves, intact flowers, and cut flowers, only the nymph data collected on leaves and on flowers through alcohol extraction provided statistically significant separations among treatments in most trials. Conserve and Pylon provided good to excellent early control through 28 DAT for nymphs on leaves and on 16 DAT with flowers extracted with alcohol. However, while not statistically significant, several products exhibited an increase in adult efficacy on intact flowers at 35 and 42 DAT: Aria, BYI 8330, Celero, and Overture. Also in a 2008 trial, Conserve and Pylon, provided good to excellent early control of nymphs on leaves and flowers; Kontos and Overture were less effective (Table 47 - Table 49). In two trials, Conserve, Safari, Scimitar, S-1761 and S-1783 provided excellent adult efficacy 7 days after treatment (Table 54, Table 55).

For the purposes of this summary, the brown bag technique is discussed similarly to other techniques. However, this technique, while presented as data collected on certain days after application, provides an insect management picture over time rather than a snapshot at a specific point in time, because the insects and products are continuing to be active during the collection period. Using the brown bag technique to collect adult thrips populations, only Conserve exhibited statistically significant levels of control in the first experiment (Table 50, Table 51); however, the level of control from week to week was quite variable and never exceeded 90%. In the second experiment (Table 52, Table 53), Conserve was also significantly different from the nontreated plants, and the best level of control was achieved 4 DAT (79%). Another commonly used product to manage thrips, Mesurol, only achieved 80% control 25 DAT and then control faded. Two products, Pylon and Tolfenpyrad, did not perform well initially but did exhibit excellent and statistically significant control greater than 90% on 25 DAT.

In 2013, Villavicencio compared three new materials to the standards Avid and Conserve (Table 56). The population counts among the treatments throughout this experiment were quite variable. By the end of the experiment, none of the materials provided effective management of adult thrips, and only A20520A at 8 oz per 100 gal and the two rates of MBI 206 provided acceptable efficacy according to Henderson's percent control calculations; however, the population counts were not statistically different.

Table 42 *Western Flower Thrips Control on *Gerbera jamesonii*, 'Delight' Cloyd, KS, 2001.

Treatment (Active Ingredient)	Rate Per 100 gal	Percent Mortality (mean ± SEM)[x]
Avid 10LC (abamectin)	8 fl oz	33.7 bc
Avid + Ornazin 3EC (azaridachtin)	8 + 8 fl oz	54.0 a
Conserve SC (spinosad)	10 fl oz	43.0 ab
Ornazin 3EC (azaridachtin)	8 fl oz	4.7 d
Pedestal 10SC (novaluron)	3 fl oz	11.2 d
	12 fl oz	11.2 d
S-1812 4EC (pyridalyl)	6 fl oz	35.7 abc
	12 fl oz	21.0 cd
Water Control		5.5 d
Nontreated Control		8.5 d

[x] Percent mortality was calculated by dividing the number of dead western flower thrips by the total number recovered per flower taken 7 days after treatment. Significant treatment means were separated using a Fisher's protected least significant difference (LSD) test at $P \leq 0.05$.

Table 43. Western Flower Thrips Control on Gerbera (*Gerbera jamesonii*) 'Festival Dark Eye Golden Yellow' – Application Rates & Intervals, Canas, OH, 2006.

Treatment (Active Ingredient)	Application Method – Rate per 100 gal	Application Dates		
		6/12/2006 0 DAT	6/19/2006 7 DAT	6/26/2006 14 DAT
Acelepryn (DPX-E2Y45)	Foliar – 20 fl oz	X		X
Aria 50SG (flonicamid)	Foliar – 3.7 oz (105 g)	X		X
BAS 320i	Foliar – 16 fl oz	X		X
Celero (clothianadin)	Drench – 4 oz	X		
Conserve SC (spinosad)	Foliar – 8 fl oz	X		X
Kontos (BYI-8330) (spirotetramat)	Drench – 1.7 fl oz	X		
Overture (pyridalyl)	Foliar – 8 oz	X		X
Pylon (chlorfenapyr)	Foliar – 10 fl oz	X	X	
S1812 (pyridalyl)	Foliar – 8 oz	X		X
S1812 (pyridalyl)	Foliar – 12 oz	X		X
Tolfenpyrad	Foliar – 21 fl oz	X		X
Nontreated				

Table 44. Western Flower Thrips Control on Gerbera (*Gerbera jamesonii*) 'Festival Dark Eye Golden Yellow' – Leaves, Canas, OH, 2006.

Treatment [z]	Population Counts [y], Means Separations [x], and Henderson's Percent Control								
	0 DAT	7 DAT	14 DAT	21 DAT	28 DAT	35 DAT	42 DAT	49 DAT	56 DAT
Adults									
Acelepryn (DPX-E2Y45)	7.8	0.7 (0)	1.2 (0)	1.8 (65)	1.5 (0)	3.5 (0)	4.8 (17)	2.3 (0)	1.8 (0)
Aria	6.7	0.3 (41)	2.2 (0)	2.8 (36)	1.7 (0)	2.7 (10)	4.3 (13)	7.0 (0)	1.7 (0)
BAS 320i	6.2	0.7 (0)	0.7 (0)	1.0 (75)	1.7 (0)	3.8 (0)	8.3 (0)	4.8 (0)	2.0 (0)
Celero	5.7	0.2 (65)	0.6 (0)	1.8 (51)	0.8 (14)	1.7 (34)	3.5 (17)	2.3 (0)	1.2 (0)
Conserve	5.2	0.5 (0)	0.2 (62)	1.2 (66)	0.3 (62)	2.3 (0)	5.7 (0)	2.3 (0)	1.2 (0)
Kontos (BYI-8330)	6.0	0.8 (0)	1.2 (0)	1.5 (62)	2.8 (0)	2.2 (19)	1.8 (59)	1.7 (0)	1.7 (0)
Overture	6.0	0.7 (0)	0.7 (0)	2.0 (49)	0.8 (18)	3.2 (0)	3.8 (14)	3.5 (0)	0.7 (35)
Pylon	6.0	0.3 (35)	0.5 (2)	0.5 (87)	0.2 (84)	2.5 (7)	11.8 (0)	1.8 (0)	2.2 (0)
S1812 35WP8 oz	4.8	0.2 (59)	0.7 (0)	1.7 (48)	1.2 (0)	2.5 (0)	5.8 (0)	1.3 (0)	0.5 (39)
S1812 35WP 12 oz	5.5	0.0 (100)	0.0 (100)	0.8 (77)	0.8 (11)	3.2 (0)	6.3 (0)	2.3 (0)	2.8 (0)
Tolfenpyrad	4.3	0.2 (55)	0.3 (10)	0.7 (77)	1.2 (0)	2.2 (0)	4.8 (0)	0.7 (44)	0.5 (32)
Nontreated	7.8	0.7 (0)	0.7 (0)	5.2 (0)	1.3 (0)	3.5 (0)	5.8 (0)	2.2 (0)	1.3 (0)
Nymphs									
Acelepryn (DPX-E2Y45)	17.0 a	18.8 ab (0)	3.3 abc (44)	4.0 bc (62)	2.3 a (63)	4.2 a (33)	5.0 a (0)	0.7 abcd (56)	0.0 a
Aria	18.8 a	15.3 ab (19)	3.2 abc (52)	1.5 bcd (87)	2.2 a (69)	6.8 a (1)	1.2 a (78)	1.5 cde (11)	0.0 a
BAS320i	13.5 a	17.2 ab (0)	6.5 abc (0)	6.2 ab (26)	2.5 a (50)	8.5 a (0)	2.5 a (35)	2.3 abcde (0)	0.7 a
Celero	15.7 a	6.2 cd (61)	3.2 bc (42)	2.8 bc (71)	3.2 a (46)	3.5 a (39)	5.5 a (0)	1.0 ab (29)	0.3 a
Conserve	24.0 a	1.8 ef (92)	0.0 d (100)	0.2 d (99)	0.3 a (96)	1.8 a (79)	1.3 a (80)	1.0 cde (53)	0.0 a
Kontos (BYI-8330)	28.5 a	9.7 bc (66)	3.0 abc (70)	4.3 ab (75)	6.5 a (39)	3.8 a (63)	0.3 a (96)	0.7 e (74)	0.3 a
Overture	21.0 a	10.8 bc (49)	2.2 abc (70)	3.8 ab (70)	3.3 a (58)	4.2 a (46)	1.8 a (69)	0.7 bcde (65)	0.2 a
Pylon	22.5 a	0.3 f (99)	1.0 cd (87)	0.8 cd (94)	2.7 a (68)	6.0 a (27)	4.2 a (35)	2.5 abcd (0)	0.3 a
S1812 35WP8 oz	15.5 a	10.5 bc (33)	2.5 bc (54)	2.5 bcd (74)	2.7 a (54)	7.7 a (0)	1.0 a (77)	1.5 de (0)	0.0 a
S1812 35WP 12 oz	15.5 a	9.5 bc (39)	1.2 cd (78)	1.8 bcd (81)	1.3 a (77)	3.5 a (38)	4.8 a (0)	0.5 abc (64)	0.0 a
Tolfenpyrad	13.3 a	3.7 de (73)	0.8 cd (82)	2.0 bcd (76)	2.7 a (47)	14.0 a (0)	7.5 a (0)	0.7 a (44)	0.2 a
Nontreated	20.5 a	20.7 a (0)	7.2 a (0)	12.7 a (0)	7.7 a (0)	7.5 a (0)	5.8 a (0)	1.8 abcd (0)	0.0 a

Treatment [z]	Population Counts [y], Means Separations [x], and Henderson's Percent Control								
	0 DAT	7 DAT	14 DAT	21 DAT	28 DAT	35 DAT	42 DAT	49 DAT	56 DAT
Total Population									
Acelepryn (DPX-E2Y45)	24.8 a	19.5 abc (0)	4.5 abc (34)	5.8 abc (63)	3.8 a (51)	7.7 a (20)	9.8 a (4)	3.0 a (14)	1.8 a (0)
Aria	25.5 a	15.7 abc (18)	5.3 abc (24)	4.3 bcd (73)	3.8 a (53)	9.5 a (4)	5.5 ab (48)	8.5 a (0)	1.7 a (0)
BAS 320i	19.7 a	17.8 ab (0)	7.2 ab (0)	7.2 abc (42)	4.2 a (33)	12.3 a (0)	10.8 a (0)	7.2 a (0)	2.7 a (0)
Celero	21.3 a	6.3 de (61)	3.8 cd (36)	4.7 bcd (65)	4.0 a (41)	5.2 a (38)	9.0 a (0)	3.3 a (0)	1.5 a (0)
Conserve	29.2 a	2.3 f (89)	0.2 e (98)	1.3 cd (93)	0.7 a (93)	4.2 a (63)	7.0 ab (42)	3.3 a (19)	1.2 a (15)
Kontos (BYI-8330)	34.5 a	10.5 bcd (60)	4.2 abc (56)	5.8 bcd (73)	9.3 a (15)	6.0 a (55)	2.2 b (85)	2.3 a (52)	2.0 a (0)
Overture	27.0 a	11.5 cde (43)	2.8 abcd (62)	5.8 ab (66)	4.2 a (51)	7.3 a (30)	5.7 ab (49)	4.2 a (0)	0.8 a (34)
Pylon	28.5 a	0.7 g (97)	1.5 de (81)	1.3 d (93)	2.8 a (69)	8.5 a (23)	16.0 a (0)	4.3 a (0)	2.5 a (0)
S1812 35WP8 oz	20.3 a	10.7 bcd (30)	3.2 bcd (44)	4.2 bcd (67)	3.8 a (41)	10.2 a (0)	6.8 ab (18)	2.8 a (1)	0.5 a (48)
S1812 35WP 12 oz	21.0 a	9.5 abcd (40)	1.2 de (80)	2.7 bcd (80)	2.2 a (68)	6.7 a (18)	11.2 a (0)	2.8 a (4)	2.8 a (0)
Tolfenpyrad	17.7 a	3.8 ef (71)	1.2 de (76)	2.7 bcd (76)	3.8 a (32)	16.2 a (0)	12.3 a (0)	1.3 a (47)	0.7 a (20)
Nontreated	28.3 a	21.3 a (0)	7.8 a (0)	17.8 a (0)	9.0 a (0)	11.0 a (0)	11.7 a (0)	4.0 a (0)	1.3 a (0)

[z] SeeTable 43 for details on application rates and intervals.
[y] Mean number of thrips counted on 5 leaves.
[x] For the statistical analysis data were transformed using the function ln (x + 1). Original data are presented here. Means within a column followed by the same letter are not significantly different by the Duncan-Waller's test (P = 0.05).

Table 45. Western Flower Thrips Control on Gerbera 'Festival Dark Eye Golden Yellow' – Flowers, Canas, OH, 2006.

Treatment [z]	Population Counts [y], Means Separations [x], and Henderson's Percent Control								
	0 DAT	7 DAT	14 DAT	21 DAT	28 DAT	35 DAT	42 DAT	49 DAT	56 DAT
Adults									
Acelepryn (DPX-E2Y45)	1.8 a	3.8 a (0)	4.8 a (43)	5.3 a (0)	11.2 a (0)	6.7 a (51)	2.7 a (74)	8.3 a (0)	4.2 a
Aria	4.3 a	2.7 a (66)	13.7 a (32)	6.2 a (40)	9.5 a (11)	3.8 a (88)	6.7 a (73)	9.2 a (20)	2.3 a
BAS 320i	4.0 a	3.8 a (47)	6.7 a (64)	5.5 a (42)	6.7 a (32)	7.2 a (76)	7.0 a (69)	13.0 a (0)	2.2 a
Celero	2.8 a	5.0 a (3)	11.0 a (16)	3.8 a (43)	7.8 a (0)	4.3 a (79)	0.0 a (100)	7.7 a (0)	2.0 a
Conserve	1.8 a	0.7 a (80)	6.5 a (24)	2.3 a (46)	6.7 a (0)	8.3 a (39)	8.3 a (19)	7.2 a (0)	4.2 a
Kontos (BYI-8330)	2.8 a	3.8 a (26)	5.7 a (57)	8.0 a (0)	11.2 a (0)	1.0 a (95)	0.0 a (100)	0.7 a (91)	2.3 a
Overture	3.5 a	0.7 a (90)	17.5 a (0)	5.5 a (34)	7.2 a (17)	0.2 a (99)	0.0 a (100)	6.0 a (35)	1.0 a
Pylon	3.7 a	0.3 a (95)	5.3 a (69)	6.2 a (29)	11.8 a (0)	23.2 a (15)	11.2 a (46)	8.7 a (10)	6.7 a
S1812 35WP8 oz	2.2 a	1.2 a (70)	5.7 a (44)	6.8 a (0)	11.2 a (0)	5.0 a (69)	15.5 a (0)	5.7 a (1)	1.5 a
S1812 35WP 12 oz	2.2 a	1.2 a (70)	4.5 a (55)	3.0 a (41)	3.0 a (44)	1.8 a (89)	6.0 a (51)	1.2 a (80)	8.3 a
Tolfenpyrad	2.8 a	1.2 a (77)	3.8 a (71)	5.0 a (25)	4.3 a (38)	10.8 a (49)	4.2 a (74)	2.2 a (71)	0.0 a
Nontreated	1.8 a	3.3 a (0)	8.5 a (0)	4.3 a (0)	4.5 a (0)	13.7 a (0)	10.3 a (0)	4.8 a (0)	0.0 a

Treatment [z]	Population Counts [y], Means Separations [x], and Henderson's Percent Control								
	0 DAT	7 DAT	14 DAT	21 DAT	28 DAT	35 DAT	42 DAT	49 DAT	56 DAT
Nymphs									
Acelepryn (DPX-E2Y45)	0.0 b	0.0 a	0.2 a	2.0 a	0.8 a	0.0 b	0.0 a	0.2 a	0.0 a
Aria	0.7 a	0.0 a	0.0 a	1.0 a	0.3 a	0.3 b	0.0 a	0.0 a	0.0 a
BAS 320i	0.0 b	0.0 a	0.2 a	1.5 a	0.3 a	1.8 a	0.3 a	0.2 a	0.0 a
Celero	0.0 b	0.0 a	0.4 a	2.2 a	2.8 a	0.0 b	0.0 a	0.2 a	0.0 a
Conserve	0.2 ab	0.0 a	0.0 a	0.3 a	0.2 a	0.0 b	0.0 a	0.2 a	0.0 a
Kontos (BYI-8330)	0.0 b	0.0 a	0.2 a	2.7 a	1.5 a	0.0 b	0.0 a	0.2 a	0.0 a
Overture	0.0 b	0.0 a	0.0 a	0.3 a	0.0 a	0.0 b	0.0 a	0.0 a	0.0 a
Pylon	0.0 b	0.0 a	0.3 a	3.2 a	0.5 a	0.7 ab	0.2 a	0.2 a	0.3 a
S1812 35WP8 oz	0.0 b	0.0 a	0.5 a	1.2 a	0.5 a	0.3 b	0.7 a	0.3 a	0.5 a
S1812 35WP 12 oz	0.0 b	0.0 a	0.0 a	0.2 a	0.0 a	1.2 ab	0.2 a	0.0 a	0.0 a
Tolfenpyrad	0.0 b	0.0 a	0.0 a	0.2 a	0.5 a	0.0 b	0.5 a	0.0 a	0.0 a
Nontreated	0.0 b	0.0 a	0.5 a	0.3 a	0.0 a	0.2 b	0.0 a	0.0 a	0.2 a
Total Population									
Acelepryn (DPX-E2Y45)	1.8 a	3.8 abc (0)	5.0 a (44)	7.3 a (0)	12.0 a (0)	6.7 b (52)	2.7 a (74)	8.5 a (0)	4.2 abc (0)
Aria	5.0 a	2.7 abc (71)	13.7 a (44)	7.2 a (44)	9.8 a (20)	4.2 ab (89)	6.7 a (76)	9.2 a (30)	2.3 abc (0)
BAS 320i	4.0 a	3.8 ab (47)	6.8 a (65)	7.0 a (31)	7.0 a (29)	9.0 ab (70)	7.3 a (67)	13.2 a (0)	2.2 abc (0)
Celero	2.8 a	5.0 a (3)	11.4 a (18)	6.0 a (17)	10.7 a (0)	4.3 b (80)	0.0 a (100)	7.8 a (0)	2.0 bc (0)
Conserve	2.0 a	0.7 cd (82)	6.5 a (34)	2.7 a (48)	6.8 a (0)	8.3 b (45)	8.3 a (26)	7.3 a (0)	4.2 abc (0)
Kontos (BYI-8330)	2.8 a	3.8 abcd (26)	5.8 a (58)	10.7 a (0)	12.7 a (0)	1.0 b (95)	0.0 a (100)	0.8 a (89)	2.3 bc (0)
Overture	3.5 a	0.7 cd (90)	17.5 a (0)	5.8 a (35)	7.2 a (17)	0.2 b (99)	0.0 a (100)	6.0 a (35)	1.0 bc (0)
Pylon	3.7 a	0.3 d (95)	5.7 a (69)	9.3 a (0)	12.3 a (0)	23.8 a (14)	11.3 a (45)	8.8 a (9)	7.0 ab (0)
S1812 35WP8 oz	2.2 a	1.2 abcd (70)	6.2 a (42)	8.0 a (0)	11.7 a (0)	5.3 ab (67)	16.2 a (0)	6.0 a (0)	2.0 abc (0)
S1812 35WP 12 oz	2.2 a	1.2 bcd (70)	4.5 a (58)	3.2 a (43)	3.0 a (44)	3.0 b (82)	6.2 a (50)	1.2 a (80)	8.3 a (0)
Tolfenpyrad	2.8 a	1.2 abcd (77)	3.8 a (72)	5.2 a (28)	4.8 a (31)	10.8 ab (49)	4.7 a (71)	2.2 a (71)	0.0 c (100)
Nontreated	1.8 a	3.3 abc (0)	9.0 a (0)	4.7 a (0)	4.5 a (0)	13.8 ab (0)	10.3 a (0)	4.8 a (0)	0.2 c (0)

[z] See Table 43for details on application rates and intervals.

[y] Mean number of thrips

[x] For the statistical analysis data were transformed using the function ln (x + 1). Original data are presented here. Means within a column followed by the same letter are not significantly different by the Duncan-Waller's test (P = 0.05).

Table 46. Western Flower Thrips Control on Gerbera (*Gerbera jamesonii*) 'Festival Dark Eye Golden Yellow' – Cut Flowers, Canas, OH, 2006.

Treatment [z]	Population Counts [y], Means Separations [x], and Percent Control	
	16 DAT	23 DAT
Adults		
Acelepryn (DPX-E2Y45)	15.7 (9)	14.5 (0)
Aria	9.2 (47)	16.0 (0)
BAS320i	9.7 (44)	19.8 (0)
Celero	20.5 (0)	20.3 (0)
Conserve	5.2 (70)	2.7 (81)
Kontos (BYI-8330)	12.2 (29)	17.8 (0)
Overture	20.5 (0)	34.5 (0)
Pylon	13.0 (24)	20.5 (0)
S1812 35WP8 oz	17.7 (0)	12.2 (13)
S1812 35WP 12 oz	16.7 (3)	14.3 (0)
Tolfenpyrad	8.8 (49)	8.5 (39)
Nontreated	17.2 (0)	14.0 (0)
Nymphs		
Acelepryn (DPX-E2Y45)	23.2 abc (63)	4.5 bcde (29)
Aria	18.7 abcd (70)	21.7 abc (0)
BAS320i	28.3 abc (55)	56.5 a (0)
Celero	41.5 abc (34)	13.3 bcde (0)
Conserve	1.8 e (97)	0.8 e (87)
Kontos (BYI-8330)	62.5 a (0)	7.7 cde (0)
Overture	40.7 abc (35)	34.3 ab (0)
Pylon	6.3 de (90)	17.8 abcd (0)
S1812 35WP8 oz	18.8 bcd (70)	7.3 abcd (0)
S1812 35WP 12 oz	17.2 cde (73)	3.2 de (49)
Tolfenpyrad	22.8 abc (64)	2.8 de (56)
Nontreated	62.8 ab (0)	6.3 cde (0)
Total Population		
Acelepryn (DPX-E2Y45)	38.8 a (52)	19.0 abc (6)
Aria	27.8 a (65)	37.7 ab (0)
BAS320i	38.0 a (53)	76.3 a (0)
Celero	62.0 a (23)	33.7 ab (0)
Conserve	7.0 b (91)	3.5 c (83)
Kontos (BYI-8330)	74.7 a (7)	25.5 abc (0)
Overture	61.2 a (24)	68.8 a (0)
Pylon	19.3 ab (76)	38.3 ab (0)
S1812 35WP8 oz	36.5 ab (54)	19.5 ab (4)
S1812 35WP 12 oz	33.8 ab (58)	17.5 bc (14)
Tolfenpyrad	31.7 a (60)	11.3 bc (44)
Nontreated	80.0 a (0)	20.3 bc (0)

[z] See Table 43 for details on application rates and intervals.
[y] Mean number of thrips collected from single flower cut from plant and extracted with alcohol.
[x] For the statistical analysis data were transformed using the function ln (x + 1). Original data are presented here. Means within a column followed by the same letter are not significantly different by the Duncan-Waller's test (P = 0.05).

Table 47. Western Flower Thrips Control on Gerbera (*Gerbera jamesonii*) 'Festival Dark Eye Golden Yellow' – Application Rates & Intervals, Canas, OH, 2008.

Treatment*(Active Ingredient)	Rate per 100 Gal	Application Dates		
		2/29/2008 0 DAT	3/7/2008 7 DAT	3/14/2008 14 DAT
Conserve (spinosad)	8 fl oz	X		X
Kontos (BYI-8330) (spirotetramat)	1.7 fl oz	X		X
Marathon Ultra (imidacloprid+cyfluthrin)	10 fl oz	X		X
Overture (pyridalyl)	8 oz	X		X
Pylon (chlorfenapyr)	5 fl oz	X	X	
Safari (dinotefuran)	8 oz	X		X
Tick-Ex (*Metarhizium anisopliae* strain F52)	29 oz	X	X	X
Nontreated				

* All treatments applied foliar at dates shown above except Tick-Ex which was appied 10 times at 7 day intervals from 2/29/08 to 5/2/08.

Table 48. Western Flower Thrips Control on Gerbera (*Gerbera jamesonii*) 'Festival Dark Eye Golden Yellow' – Leaves, Canas, OH, 2008.

Treatment[z]	Population Counts [y], Means Separations [x], and Henderson's Percent Control										
	0 DAT	3 DAT	7 DAT	14 DAT	21 DAT	28 DAT	35 DAT	42 DAT	49 DAT	56 DAT	63 DAT
Adults											
Conserve	0.0a	0.0c (100)	0.0d (100)	0.0b (100)	0.0d (100)	0.4d(99)	0.4d (99)	0.9c (98)	1.3b (94)	2.7c (93)	7.4c (90)
Kontos	0.3 a	12.1 a (69)	14.3 a (0)	8.3 a (81)	15.0 b (86)	32.1 ab (73)	16.7 bc (75)	35.7 a (4)	9.9 a (84)	57.9a (0)	92.1 a (59)
M-Ultra	1.6 a	9.1 a (96)	4.3 ab (94)	6.0 a (97)	24.6 b (96)	51.9 bc (92)	23.6 bc (93)	21.1 ab (89)	26.7 a (92)	15.9 b (97)	88.9 a (93)
Overture	0.3 a	4.9 b (87)	2.6 bc (82)	5.3 a (91)	4.1 c (96)	8.3 c (93)	14.0 c (79)	9.9 b (73)	12.6 a (80)	35.3 ab (68)	29.1 b (87)
Pylon	0.4a	0.6c (99)	0.3cd (98)	0.4b (99)	0.4d (100)	0.3d(100)	0.7d (99)	1.0c (98)	0.7b (99)	0.0c (100)	4.7c (98)
Safari	0.1a	4.1b (68)	5.3ab (0)	7.4a (49)	29.1ab (21)	76.4a (0)	42.7ab(0)	32.4a (0)	24.4a (0)	48.1a (0)	55.0a (27)
Tick-Ex	0.0a	10.3a (20)	9.0a (0)	13.4a (7)	42.4a (0)	70.1ab (0)	52.1a (0)	29.1a (0)	23.4a (0)	33.7ab (3)	61.6a (18)
Nontreated	0.1a	12.9a (0)	4.7ab (0)	14.4a (0)	37.0ab (0)	39.1ab (0)	22.3abc (0)	12.4ab (0)	21.1a (0)	36.9ab (0)	75.0a (0)
Nymphs											
Conserve	0.0a	0.0a (100)	0.0b (100)	0.0d (100)	0.0c (100)	0.0c (100)	0.1e (99)	0.0c (100)	0.1b (99)	0.1b (3)	5.4c (0)
Kontos	0.1 a	0.4 a (69)	10.1 ab (0)	3.9 bc (61)	5.7 b (57)	4.3 b (92)	31.9 abc (0)	18.7 a (25)	5.9 a (47)	6.9 a (39)	143.6 a (0)
M-Ultra	0.3 a	2.6 a (33)	5.1 a (15)	12.0 ab (60)	7.1 b (82)	59.7 a (62)	18.6 bcd (67)	15.1 ab (80)	4.4 a (87)	4.9 a (86)	79.6 a (72)
Overture	1.1 a	0.3 a (98)	1.4 ab (94)	0.4 cd (100)	0.6 c (100)	7.9 b (99)	7.1 cd (97)	14.7 b (95)	17.4 a (86)	7.6 a (94)	24.0 b (98)
Pylon	0.0a	0.0a (100)	0.0b (100)	0.0d (100)	0.0c (100)	0.1c (99)	8.1de (57)	0.7c (97)	0.4b (96)	0.0b (100)	2.4c (97)
Safari	0.3a	0.0a (100)	1.1 ab (82)	4.3ab (86)	18.6ab (54)	70.9a (55)	67.3ab(0)	16.3ab (78)	3.6a (89)	6.3a (82)	68.0a (76)
Tick-Ex	0.0a	0.3a (77)	6.9a (0)	10.7ab (0)	30.0a (0)	83.0a (0)	45.4ab (0)	21.9ab (12)	18.7a (0)	11.3a (1)	88.0a (7)
Nontreated	0.1a	1.3a (0)	2.0ab (0)	10.0a (0)	13.4ab (0)	52.1a (0)	18.9abc (0)	25.0a (0)	11.1a (0)	11.4a (0)	95.1a (0)

[z] See Table 47 for details on application rates and intervals.

[y] Mean number of thrips counted on 3 leaves.

[x] For the statistical analysis data were transformed using the function ln (x + 1). Original data are presented here. Means within a column followed by the same letter are not significantly different by the Duncan-Waller's test (P = 0.05).

Table 49. Western Flower Thrips Control on Gerbera 'Festival Dark Eye Golden Yellow' – Flowers, Canas, OH, 2008.

Treatment [z]	Population Counts [y], Means Separations [x], and Percent Control								
	7 DAT	14 DAT	21 DAT	28 DAT	35 DAT	42 DAT	49 DAT	56 DAT	63 DAT
Nymphs and Adults									
Conserve	4.0 d (94)	0.7c (98)	0.9d (99)	5.4c (98)	1.6e (99)	13.6d (84)	10.8b (86)	6.1b (93)	4.1bc (89)
Kontos	23.0 c (63)	88.9 a (0)	45.2 bc (30)	77.8 b (75)	179.7 bc (0)	66.8 bc (23)	93.0 a (0)	121.2 a (0)	39.9 ab(0)
M-Ultra	55.9 ab (11)	43.1 a (0)	43.7 ab (32)	254.8 a (17)	131.1 abc (26)	136.8 abc (0)	66.8 a (16)	51.7 a (45)	34.1 ab (13)
Overture	62.7 ab (0)	10.3 b (0)	9.7 cd (85)	46.4 b (85)	90.8 cd (49)	73.7 c (15)	96.9 a (0)	70.1 a (25)	22.1 abc (43)
Pylon	8.2d (87)	0.6c (98)	1.3d (98)	0.9c (100)	16.3cd (91)	3.2d (96)	2.3b (97)	1.1b (99)	0.2c (99)
Safari	34.9bc (44)	84.9a (0)	79.7a (0)	238.0 a (22)	349.1a (0)	202.5a (0)	84.2a (0)	111.8a (0)	46.1ab (0)
Tick-Ex	64.4a (0)	81.9ab (0)	170.3a (0)	243.5a (21)	140.8abc (21)	165.4ab (0)	83.3a (0)	59.3a (37)	13.5abc (65)
Nontreated	62.7a (0)	36.8a (0)	64.3a (0)	306.3a (0)	178.3ab (0)	87.1abc (0)	79.3a (0)	93.7a (0)	39.0 a (0)

[z] See Table 47for details on application rates and intervals.
[y] Mean number of thrips on one flower.
[x] For the statistical analysis data were transformed using the function ln (x + 1). Original data are presented here. Means within a column followed by the same letter are not significantly different by the Duncan-Waller's test (P = 0.05).

Table 50. Efficacy of several insecticides for *Frankliniella occidentalis* on *Gerbera jamesonii* 'Royal' series with mixed colors – Application Rates and Dates, Parrella, CA, 2006a.

Treatment[z] (Active Ingredient)	Application Method – Rate / 100 gal	Application Dates	
		3/7 0 DAT	3/14 7 DAT
Celero 16WSG (clothianidin)	Drench – 2 oz(300 mL per 6" pot)	X	X
Celero 16WSG (clothianidin)	Drench – 4 oz(300 mL per 6" pot)	X	X
Conserve (spinosad)	Foliar – 11 oz	X	X
Flagship 25WP (thiamethoxam)	Drench – 12 oz(300 mL per 6" pot)	X	X
Kontos (BYI-8330) (spirotetramat)	Drench – 1.7 oz (300 mL per 6" pot)	X	X
Nontreated			

Table 51. Efficacy of several insecticides for *Frankliniella occidentalis* on *Gerbera jamesonii* 'Royal' series with mixed colors, Parrella, CA, 2006a.

Treatment	Population Counts, Means Separations, and Henderson's % Control [y]					
	PreCount	7 DAT	14 DAT	21 DAT	28 DAT	35 DAT
Celero 2 oz	17.8 a	34.5 b (0)	22.1 a (12)	17.6 ab (46)	16.6 a (0)	12.4 b (12)
Celero 4 oz	10.8 a	11.4 ab (34)	23.1 a (0)	50.0 b (0)	17.8 a (0)	12.6 b (0)
Conserve	10.5 a	8.6 a (48)	16.9 a (0)	2.1 a (89)	13.1 a (0)	1.5 a (82)
Flagship	12.4 a	30.6 ab (0)	23.4 a (0)	24.0 ab (0)	19.3 a (0)	10.7 b (0)
Kontos (BYI-8330)	10.4 a [x]	16.3 ab (2)	21.0 a (0)	17.4 ab (8)	67.3 a (0)	11.3 b (0)
Nontreated	16.5 a	26.3 ab	23.4 a	30.1 ab	15.1 a	13.0 a

[y] Populations of all adults found on yellow sticky cards with 8 plants in brown paper bags after 4 weeks.
[x] All letters following numbers within a column, that are different, are significantly different at the <0.05 level according to Tukey-Kramer HSD.

Table 52. Efficacy of several insecticides for *Frankliniella occidentalis* on *Gerbera jamesonii* 'Royal' series with mixed colors – Application Rates and Dates, Parrella, CA, 2006b.

Treatment[z] (Active Ingredient)	Application Method – Rate / 100 gal	Application Dates			
		3/12 0 DAT	3/19 7 DAT	3/21 9 DAT	3/26 14 DAT
Allectus (bifenthrin + imidacloprid)	Foliar – 21.3 oz	X			X
Aria 50SG (flonicamid)	Foliar – 120 g	X			X
Conserve (spinosad)	Foliar – 11 oz	X			X
Flagship 25WG (thiamethoxam)	Foliar – 4 oz	X			X
Mesurol (methiocarb)	Foliar – 16 oz	X		X	
Pylon (chlorfenapyr)	Foliar – 5 oz	X	X		
Pylon (chlorfenapyr)	Foliar – 10 oz	X	X		
Tolfenpyrad	Foliar – 14 oz	X			X
Tolfenpyrad	Foliar – 21 oz	X			X
Tricon (sodium tetraborohydrate decahydrate)	Foliar – 80 oz	X			X
TriStar (acetamiprid)	Foliar – 8 oz (227 g)	X			X
Nontreated					

Table 53. Efficacy of several insecticides for *Frankliniella occidentalis* on *Gerbera jamesonii* 'Royal' series with mixed colors, Parrella, CA, 2006b.

Treatment	Population Counts [z], Means Separations [y], and Henderson's % Control					
	PreCount	4 DAT	11 DAT	25 DAT	46 DAT	59 DAT
Allectus	1.0 a	5.9 b (0)	10.2 de (0)	27.3 d (0)	12.4 d (0)	10.5 ab (0)
Aria	0.8 a	2.8 ab (0)	4.5 abcd (0)	15.8 bc (0)	11.1 cd (0)	6.4 ab (0)
Conserve	1.5 a	1.0 a (72)	--	9.7 ab (29)	5.4 abc (28)	6.1 a (16)
Flagship	0.9 a	2.4 ab (0)	13.9 e (0)	20.5 cd (0)	5.4 abc (0)	8.9 ab (0)
Mesurol	1.2 a	3.5 ab (0)	2.2 abc (50)	2.3 a (80)	9.2 bcd (0)	4.5 a (27)
Pylon 5 oz	1.2 a	3.2 ab (0)	3.8 abcd (9)	0.9 a (91)	4.5 ab (23)	7.4 ab (0)
Pylon 10 oz	1.2 a	3.0 ab (0)	1.5 ab (67)	0.4 a (97)	2.1 a (67)	5.2 a (15)
Tolfenpyrad 14 oz	1.5 a	3.0 ab (20)	1.4 ab (75)	0.9 a (94)	4.5 ab (43)	10.8 ab (0)
Tolfenpyrad 21 oz	1.4 a	4.5 ab (0)	0.3 a (94)	0.5 a (96)	2.3 a (67)	10.9 ab (0)
Tricon	1.8 a	3.6 ab (19)	9.9 cde (0)	6.8 ab (60)	6.0 abcd (36)	16.8 b (0)
Tristar	1.9 a	2.5 ab (46)	7.0 abcde (0)	12.6 bc (29)	7.7 abcd (22)	9.7 ab (0)
Nontreated	2.3 a	5.6 b	8.3 bcde	21.5 cd	11.8 cd	11.5 ab

[z] Populations of all adults found on yellow sticky cards with 13 plants in brown paper bags after 4 weeks.
[y] All letters following numbers within a column, that are different, are significantly different at the <0.05 level according to Tukey-Kramer HSD.

Table 54. Western Flower Thrips Control on Gerbera (*Gerbera jamesonii*), Cloyd, KS, 2008.

Treatment(Active Ingredient)	Rate Per 100 gal	Percent Mortality (mean ± SEM)[x]
Conserve SC (spinosad)	8 fl oz	100 ± 0a
Ornazin 3% EC (azadirachtin)	8 fl oz	49 ± 15c
Overture 35WP (pyridalyl)	8 oz	80 ± 14b
Safari 20SG (dinotefuran)	8 oz	95 ± 3ab
SucraShield (Sucrose octanoate ester)	3 qt	52 ± 16c
	4 qt	44 ± 17c
S-1761 0.83EW	15.2 fl oz	100 ± 0a
	30.4 fl oz	100 ± 0a
S-1783 10WP	1 lb	100 ± 0a
	2 lb	100 ± 0a
Water Control		4 ± 3d
Nontreated Control		0 ± 0d

[x] Percent mortality was calculated by dividing the number of dead western flower thrips adults by the total number recovered per flower taken 7 days after treatment. Significant treatment means were separated using a Fisher's protected least significant difference (LSD) test at $P \leq 0.05$.

Table 55. Western Flower Thrips Control on Gerbera (*Gerbera jamesonii*), Cloyd, KS, 2009.

Treatment(Active Ingredient)	Rate Per 100 gal	Percent Mortality (mean ± SEM)[x]
Kontos(spirotetramat)	1.7 fl oz	19 ± 5 d
	2.5 fl oz	17 ± 6 d
OHP-929-8 (abamectin+bifenazate)	6 fl oz	96 ± 3 a
Overture (pyridalyl)	4 oz	52 ± 9 c
	8 oz	71 ± 10 b
Tick-EX (*Metarhizium anisopliae*	29 fl oz	16 ± 3 d
Nontreated		0 ± 0 d

[x] Percent mortality was calculated by dividing the number of dead western flower thrips adults by the total number recovered per flower taken 7 days after treatment. Significant treatment means were separated using a Fisher's protected least significant difference (LSD) test at $P \leq 0.05$.

Table 56. Western Flower Thrips Control on Gerbera (*Gerbera jamesonii*), Villavicencio, CA, 2013.

Treatment	Population Counts [z], Means Separations [y], and Henderson's % Control					
	Pre Count	7 DAT	14 DAT	21 DAT	28 DAT	35 DAT
Adults						
Avid (8 oz)	5.6 a	6.4 c (58)	14.3 a (0)	8.4 a (0)	8.6 a (0)	10.3 a (0)
Conserve (8 oz)	5.4 a	8.1 c (45)	8.1 a (0)	5.3 a (0)	8.7 a (0)	8.6 a (0)
A20520A (8 oz)	8.3 a	15.3 ab (32)	9.0 a (7)	13.4 a (0)	8.8 a (0)	2.9 a (55)
A20520A (16 oz)	6.7 a	9.3 c (49)	13.9 a (0)	11.7 a (0)	11.6 a (0)	9.7 a (0)
MBI 203DF (3 lb)	7.0 a	19.7 a (0)	10.1 a (0)	5.9 a (0)	5.4 a (0)	9.7 a (0)
MBI 203DF (4 lb)	3.6 a	14.6 ab (0)	18.4 a (0)	6.1 a (0)	11.0 a (0)	5.5 a (0)
MBI 206 (1 gal)	5.9 a	20.3 a (0)	8.7 a (0)	6.9 a (0)	8.5 a (0)	4.8 a (0)
MBI 206 (2 gal)	5.3 a	10.0 bc (30)	21.3 a (0)	5.9 a (0)	4.0 a (0)	2.5 a (39)
Nontreated	7.0 a	19.0 a (0)	8.2 a (0)	5.0 a (0)	3.9 a (0)	5.4 a (0)
Immatures						
Avid (8 oz)	20.9 a	22.0 a (79)	22.1 a (0)	18.7 ab (0)	4.2 a (35)	2.0 abc (65)
Conserve (8 oz)	9.9 a	13.7 a (72)	18.0 a (0)	15.0 ab (0)	2.8 a (9)	12.2 a (0)
A20520A (8 oz)	50.6 a	27.3 a (89)	20.3 a (56)	5.0 abc (84)	1.8 a (89)	2.0 bc (86)
A20520A (16 oz)	13.9 a	22.3 a (68)	34.1 a (0)	8.3 abc (2)	4.0 a (7)	7.0 a (0)
MBI 203DF (3 lb)	18.0 a	15.0 a (83)	35.1 a (0)	4.0 bc (63)	2.2 a (61)	3.1 abc (37)
MBI 203DF (4 lb)	5.1 a	16.6 a (34)	36.7 a (0)	19.1 ab (0)	5.7 a (0)	13.3 ab (0)
MBI 206 (1 gal)	30.9 a	15.0 a (90)	19.1 a (32)	1.6 c (91)	2.8 a (71)	0.5 c (94)
MBI 206 (2 gal)	10.4 a	22.5 a (56)	4.4 a (53)	26.3 a (0)	1.3 a (60)	0.8 c (72)
Nontreated	8.4 a	41.6 a (0)	7.6 a (0)	5.1 abc (0)	2.6 a (0)	2.3 abc (0)
Total Population						
Avid (8 oz)	26.5 a	28.4 a (73)	36.4 a (0)	27.1 a (0)	12.8 a (0)	12.3 abc (7)
Conserve (8 oz)	15.3 a	21.8 a (64)	26.1 a (0)	20.3 a (0)	11.5 a (0)	20.8 a (0)
A20520A (8 oz)	58.9 a	42.6 a (82)	29.3 a (52)	18.4 a (52)	10.6 a (57)	4.9 cd (83)
A20520A (16 oz)	20.6 a	31.6 a (61)	48.0 a (0)	20.0 a (0)	15.6 a (0)	16.7 ab (0)
MBI 203DF (3 lb)	25.0 a	34.7 a (65)	45.2 a (0)	9.9 a (40)	7.6 a (28)	12.8 abcd (0)
MBI 203DF (4 lb)	8.7 a	31.2 a (9)	55.1 a (0)	25.2 a (0)	16.7 a (0)	18.8 abcd (0)
MBI 206 (1 gal)	36.8 a	35.3 a (76)	27.8 a (26)	8.5 a (65)	11.3 a (27)	5.3 bcd (71)
MBI 206 (2 gal)	15.7 a	32.5 a (47)	25.7 a (0)	32.2 a (0)	5.3 a (20)	3.3 d (58)
Nontreated	15.4 a	60.6 a (0)	15.8 a (0)	10.1 a (0)	6.5 a (0)	7.7 abcd (0)

[z] Population counts per flower.
[y] Numbers in columns followed by different letters are significantly different (α=0.05).

Impatiens. Several experiments were conducted in 2006 and 2007 (Table 57 - Table 62) using either combination of thrips knocked off plants, emasculation of flowers and plants, and alcohol extraction of meristems or alcohol extraction of leaves and flowers. The level of thrips populations varied among these experiments from very low to medium infestations.

In the first experiment (Table 57), Pylon was examined at several rates and thrips were counted after three taps over white paper. Efficacy was variable in this experiment, but the 5.2 oz rate gave 100% control 7 DAT.

In the second experiment (Table 58) using 'Super Elfin Cherry', several biologically based control tools were compared with Conserve, one of the products considered a standard by growers. Thrips populations in this test were moderate, averaging 17.0 to 31.0 total adult and immature thrips per plant. All products (BotaniGard, Proud 3, QRD 400 and TriCon) exhibited good to excellent control equivalent or better than Conserve.

In the next experiment (Table 59) with the same impatiens cultivar, thrips populations were very light with only 4.0 thrips per plant by 7 DAT. While Conserve and TriCon performed well, Botanigard did not exhibit the same level of control as seen in the previous experiment. This could have been due to the shorter time frame for this experiment, which ended 7 DAT.

In the fourth experiment (Table 60), several unregistered control products were evaluated in comparison to Conserve. Thrips populations in this experiment were low, averaging 3.9 to 5.2 total adult and immature thrips per plant. All products (Aria, BYI 8330, Acelepryn (DPX-E2Y45), Overture, and S1812) provided excellent control equivalent to Conserve.

In the fifth experiment (Table 61) with 'Super Elfin Cherry', Celero and Pylon provided excellent control equivalent to or better than Conserve at 10 DAT, but by 15 DAT BAS 320i provided excellent control and the level of efficacy dropped for the other products. Tolfenpyrad, in the experiment, did not perform well.

In the sixth experiment (Table 62), alcohol extractions of impatiens leaves and flowers were used to assess populations. Since western flower thrips feeds on pollen, the management on flowers is a good indicator of success. In this experiment, Avid exhibited the best control on flowers and on leaves. On flowers 28 DAT, foliar applications of Flagship performed better than drench applications, while both provided equivalent control on leaves. Safari drench applications provided better control than foliar applications on flowers, while both were similar on leaves. Tolfenpyrad provided equivalent immature control on thrips as Avid.

Two experiments were conducted in 2012 to determine efficacy of new active ingredient formulations and new biopesticides applied as foliar sprays for managing thrips (Table 63, Table 64). In the first experiment, the biological standard Botanigard provided excellent control of a population that was well established at the beginning of the trial. AzaGuard, MBI-203 and MBI-206 also provided good to excellent control. In the second experiment, thrips population was relatively low, and declined by 16 DAT probably because of the presence of high ant and aphid infestations. A16901B provided excellent control by 2 DAT; it was the best product in this experiment.

Table 57. WFT Control on Impatiens (*Impatiens hawkeri*) 'Riviera Deep Salmon' – Lindquist, OH, 1999.

Treatment– Rate per 100 gal	Population Counts [y] and Henderson's Percent Control				
	6/30/1999 0 DAT	7/3/1999 3 DAT	7/7/1999 7 DAT	7/14/1999 14 DAT	7/21/1999 21 DAT
Pylon (chlorfenapyr) – 2.6 oz	15.8	2.0 (50)	0.3 (67)	0.8 (81)	3.3 (0)
Pylon (chlorfenapyr) – 5.2 oz	21.3	3.0 (44)	0.0 (100)	2.3 (58)	2.5 (0)
Pylon (chlorfenapyr) – 10.4 oz	19.3	3.5 (28)	0.5 (46)	1.3 (74)	3.0 (0)
Nontreated	25.8	6.5 (0)	1.3 (0)	6.5 (0)	3.0 (0)

[z] Single foliar application using 200 gal per acre.
[y] Mean number of thrips counted on after plant was tapped 3 times over white paper. Thrips were replaced on plant.

Table 58. Western Flower Thrips Control on Impatiens (*Impatiens wallerana*) 'Super Elfin Cherry' – Experiment 1, Chen, LA, 2006a.

Treatment Rate per 100 gal [z]	Population Counts [y], Means Separations [x], and % Control		
	7 DAT	14 DAT	21 DAT
Adults			
BotaniGard 1 app	1.2 cd (72)	1.3 b (74)	0.3 b (97)
BotaniGard 2 app	3.8 a (12)	0.2 b (96)	0.7 b (93)
Conserve 6 oz	0.0 d (100)	0.0 b (100)	0.3 b (97)
Proud3 2 qt	1.2 cd (72)	1.0 b (80)	0.3 b (97)
Proud3 4 qt	2.8 abc (35)	0.8 b (84)	0.0 b (100)
QRD400 0.25%	1.5 bcd (65)	0.0 b (100)	0.0 b (100)
QRD400 0.5%	3.2 ab (26)	0.8 b (84)	0.0 b (100)
Tricon + Conserve	0.3 d (93)	0.2 b (96)	0.0 b (100)
Tricon 50 oz	0.0 d (100)	0.2 b (96)	0.0 b (100)
Nontreated	4.3 a (0)	5.0 a (0)	9.8 a (0)
Nymphs			
BotaniGard 1 app	2.0 b (88)	3.3 b (73)	0.0 c (100)
BotaniGard 2 app	5.8 b (66)	9.0 a (25)	4.5 b (79)
Conserve 6 oz	1.7 b (90)	1.7 b (86)	3.3 b (84)
Proud3 2 qt	1.8 b (90)	0.8 b (93)	0.3 c (99)
Proud3 4 qt	12.7 a (26)	1.8 b (85)	0.0 c (100)
QRD400 0.25%	3.7 b (78)	0.0 b (100)	0.3 c (99)
QRD400 0.5%	4.8 b (72)	1.2 b (90)	0.2 c (99)
Tricon + Conserve	2.8 b (84)	1.0 b (92)	0.2 c (99)
Tricon 50 oz	1.3 b (92)	1.5 b (88)	0.0 c (100)
Nontreated	17.2 a (0)	12.0 a (0)	21.2 a (0)
Total Population			
BotaniGard 1 app	3.2 cd (85)	4.6 bc (73)	0.3 b (99)
BotaniGard 2 app	9.6 bc (55)	9.2 bc (46)	5.2 b (83)
Conserve 6 oz	1.7 cd (92)	1.7 c (90)	3.6 b (88)
Proud3 2 qt	3.0 cd (86)	1.8 c (89)	0.6 b (98)
Proud3 4 qt	15.5 ab (28)	2.6 c (85)	0.0 b (100)
QRD400 0.25%	5.2 cd (76)	0.0 c (100)	0.3 b (99)
QRD400 0.5%	8.0 cd (63)	2.0 c (88)	0.2 b (99)
Tricon + Conserve	3.1 cd (86)	1.2 c (93)	0.2 b (99)
Tricon 50 oz	1.3 d (94)	1.7 c (90)	0.0 b (100)
Nontreated	21.5 a (0)	17.0 a (0)	31.0 a (0)

[z] All treatments were foliar sprays applied on April 25; repeat applications of BotaniGard were applied as a drench on May 2.
[y] Mean number of thrips were counted three ways: 1) the number shaken from plant samples 2) destructively harvesting flowers and buds, and 3) alcohol extraction of meristems.

Table 59. Western Flower Thrips Control on Impatiens (*Impatiens wallerana*) 'Super Elfin Cherry' – Experiment 2, Chen, LA, 2006b.

Treatment Rate per 100 gal [z]	Population Counts [y], Means Separations [x], and % Control	
	3 DAT	7 DAT
Adults		
BotaniGard 1 qt. 1 foliar	2.0 (60)	0.0 (100)
BotaniGard 1 qt. tank mix with TriCon 50 oz, 1 foliar	1.0 (80)	0.0 (100)
TriCon 50 oz	0.0 (100)	0.0 (100)
Conserve 6 oz	0.0 (100)	0.0 (100)
Nontreated	5.0 (0)	1.0 (0)
Nymphs		
BotaniGard 1 qt. 1 foliar	4.0 (33)	2.0 (33)
BotaniGard 1 qt. tank mix with TriCon 50 oz, 1 foliar	0.0 (100)	0.0 (100)
TriCon 50 oz	0.0 (100)	0.5 (83)
Conserve 6 oz	1.0 (83)	0.0 (100)
Nontreated	6.0 (0)	3.0 (0)
Total Population		
BotaniGard 1 qt. 1 foliar	6.0 a (45)	2.0 a (50)
BotaniGard 1 qt. tank mix with TriCon 50 oz, 1 foliar	1.0 b (91)	0.0 b (100)
TriCon 50 oz	0.0 b (100)	0.5 b (88)
Conserve 6 oz	1.0 b (91)	0.0 b (100)
Nontreated	11.0 a (0)	4.0 a (0)

[z] All treatments were foliar sprays applied on April 25; repeat applications of BotaniGard were applied as a drench on May 2.
[y] Mean number of thrips were counted three ways: 1) the number shaken from plant samples 2) destructively harvesting flowers and buds, and 3) alcohol extraction of meristems.

Table 60. Western Flower Thrips Control on Impatiens (*Impatiens wallerana*) 'Super Elfin Cherry' – Experiment 3, Chen, LA, 2006c.

Treatment Rate per 100 gal [z]	Population Counts [y], Means Separations [x], and % Control		
	1 DAT	10 DAT	15 DAT
Adults			
Acelepryn (DPX-E2Y45) 20	0.3 (25)	1.6 (0)	0.8 (27)
Aria 90 (g)	0.0 (100)	0.0 (100)	0.0 (100)
Conserve 6 fl oz	0.3 (25)	0.0 (100)	0.0 (100)
Kontos (BYI-8330) drench: 50 ml/100 gal (2.5oz/4" pot)	0.7 (0)	0.7 (42)	0.0 (100)
Kontos (BYI-8330) foliar: 50 ml/100 gal	0.6 (0)	0.6 (50)	0.1 (91)
Overture 12	0.3 (25)	0.4 (67)	0.1 (91)
Overture 8	0.4 (0)	1.0 (17)	0.2 (82)
S1812 12	0.3 (25)	0.1 (92)	0.0 (100)
S1812 8	0.2 (50)	1.3 (0)	0.1 (91)
Nontreated	0.4 (0)	1.2 (0)	1.1 (0)
Nymphs			
Acelepryn (DPX-E2Y45) 20	2.3 (52)	1.7 (37)	0.0 (100)
Aria 90 (g)	0.2 (96)	0.6 (78)	0.1 (97)
Conserve 6 fl oz	1.0 (79)	0.7 (74)	0.0 (100)
Kontos (BYI-8330) drench: 50 ml/100 gal (2.5oz/4" pot)	1.1 (77)	1.0 (63)	0.2 (94)
Kontos (BYI-8330) foliar: 50 ml/100 gal	1.3 (73)	0.7 (74)	0.0 (100)
Overture 12	1.9 (60)	0.3 (89)	0.2 (94)
Overture 8	1.9 (60)	0.3 (89)	0.0 (100)
S1812 12	0.7 (85)	0.0 (100)	0.0 (100)
S1812 8	2.0 (58)	0.3 (89)	0.2 (94)
Nontreated	4.8 (0)	2.7 (0)	3.6 (0)
Total Population			
Acelepryn (DPX-E2Y45) 20	2.6 b (50)	3.3 ab (15)	0.8 b (83)
Aria 90 (g)	0.2 c (96)	0.6 c (85)	0.1 b (98)
Conserve 6 fl oz	1.3 bc (75)	0.7 c (82)	0.0 b (100)
Kontos (BYI-8330) drench: 50 ml/100 gal (2.5oz/4" pot)	1.8 bc (65)	1.7 bc (56)	0.2 b (96)
Kontos (BYI-8330) foliar: 50 ml/100 gal	1.9 bc (63)	1.3 c (67)	0.1 b (98)
Overture Original 12	2.2 b (58)	0.7 c (82)	0.3 b (94)
Overture Original 8	2.3 b (56)	1.3 c (67)	0.2 b (96)
Overture S1812 12	1.0 bc (81)	0.1 c (97)	0.0 b (100)
Overture S1812 8	2.2 b (58)	1.6 bc (59)	0.3 b (94)
Nontreated	5.2 a (0)	3.9 a (0)	4.7 a (0)

[z] All treatments were foliar sprays applied on June 18, 2007.

[y] Mean number of thrips were counted three ways: 1) the number shaken from plant samples 2) destructively harvesting flowers and buds, and 3) alcohol extraction of meristems.

Table 61. Western Flower Thrips Control on Impatiens (*Impatiens wallerana*) 'Super Elfin Cherry' – Experiment 4, Chen, LA, 2006d.

Treatment Rate per 100 gal [z]	Population Counts [y], Means Separations [x], and % Control	
	10 DAT	15 DAT
Adults		
BAS320i 8 fl oz	0.5 d (80)	0.0 b (100)
BAS320i 16 fl oz	0.3 d (88)	0.5 b (17)
Celero 2 oz	0.3 d (88)	0.2 b (67)
Celero 4 oz	0.0 d (100)	0.2 b (67)
Pylon 5 fl oz	2.0 bcd (20)	0.3 b (50)
Pylon 10 fl oz	0.2 d (92)	0.2 b (67)
Tolfenpyrad 14 fl oz	2.7 b (0)	1.3 b (0)
Tolfenpyrad 21 fl oz	4.8 a (0)	3.3 a (0)
Std. (Conserve 6 oz)	0.8 cd (68)	0.0 b (100)
Nontreated	2.5 bc (0)	0.6 b (0)
Nymphs		
BAS320i 8 fl oz	4.0 b (61)	0.0 b (100)
BAS320i 16 fl oz	4.7 b (54)	1.3 b (24)
Celero 2 oz	0.2 c (98)	0.5 b (71)
Celero 4 oz	1.5 bc (85)	0.7 b (59)
Pylon 5 fl oz	0.8 c (92)	0.5 b (71)
Pylon 10 fl oz	0.7 c (93)	0.2 b (88)
Tolfenpyrad 14 fl oz	1.7 bc (83)	4.3 b (0)
Tolfenpyrad 21 fl oz	11.8 a (0)	16.0 (0)
Std. (Conserve 6 oz)	0.7 c (93)	1.3 b (24)
Nontreated	10.2 a (0)	1.7 b (0)
Total Population		
BAS320i 8 fl oz	4.5 (65)	0.0 (100)
BAS320i 16 fl oz	5.0 (61)	1.8 (22)
Celero 2 oz	0.5 (96)	0.7 (70)
Celero 4 oz	1.5 (88)	0.9 (61)
Pylon 5 fl oz	2.8 (78)	0.8 (65)
Pylon 10 fl oz	0.9 (93)	0.4 (83)
Tolfenpyrad 14 fl oz	4.4 (65)	5.6 (0)
Tolfenpyrad 21 fl oz	16.6 (0)	19.3 (0)
Std. (Conserve 6 oz)	1.5 (88)	1.3 (43)
Nontreated	12.7 (0)	2.3 (0)

[z] All treatments were foliar sprays applied on June 18, 2007.

[y] Mean number of thrips were counted three ways: 1) the number shaken from plant samples 2) destructively harvesting flowers and buds, and 3) alcohol extraction of meristems.

Table 62. Western Flower Thrips Control on *Impatiens balsamina*, Reding and Anderson, OH, 2007.

Treatment Rate per 100 gal	Population Counts [z], Means Separations [y], and Henderson's Percent Control							
	0 DAT Leaves	7 DAT Leaves	14 DAT Leaves	28 DAT Leaves	0 DAT Flowers	7 DAT Flowers	14 DAT Flowers	28 DAT Flowers
Adults								
Avid (8 fl oz)	0.9	1.3 (59)	0.9 (90)	2.7 (85)	0.9	2.0 (0)	0.7 (61)	2.5 (70)
Flagship (D) 25WG (8 oz)	0.3	0.9 (14)	0.4 (87)	4.0 (33)	0.2	2.1 (0)	1.5 (0)	5.2 (0)
Flagship (F) 25WG (8 oz)	0.1	0.5 (0)	1.7 (0)	3.3 (0)	0.6	1.6 (0)	2.0 (0)	4.1 (26)
Safari (D) 20SG (24 oz)	0.1	0.2 (43)	0.2 (80)	1.3 (35)	0.9	1.3 (16)	1.1 (39)	3.0 (64)
Safari (F) 20SG (8 oz)	0.2	0.7 (0)	0.9 (55)	4.6 (0)	0.3	0.6 (0)	1.4 (0)	5.5 (0)
Tolfenpyrad (14 oz)	0.2	0.2 (71)	0.6 (70)	3.5 (13)	0.2	0.4 (0)	1.1 (0)	4.0 (0)
Tolfenpyrad (21 oz)	0.1	0.2 (43)	0.3 (70)	3.4 (0)	0.3	0.8 (0)	0.8 (0)	2.4 (13)
Nontreated	0.2	0.7 (0)	2.0 (0)	4.0 (0)	1.1	1.9 (0)	2.2 (0)	10.1 (0)
Nymphs								
Avid (8 fl oz)	10.8	1.1 (83)	2.6 (90)	2.0 (95)	11.4	2.1 (29)	3.5 (69)	1.0 (96)
Flagship (D) 25WG (8 oz)	16.6	0.8 (92)	6.1 (84)	17.3 (71)	14.2	1.6 (56)	3.3 (76)	11.6 (61)
Flagship (F) 25WG (8 oz)	6.4	1.0 (74)	7.6 (49)	4.6 (80)	14.2	1.8 (51)	4.8 (66)	2.7 (91)
Safari (D) 20SG (24 oz)	5.8	0.4 (88)	1.7 (87)	4.2 (80)	6.6	1.7 (0)	1.8 (72)	3.3 (76)
Safari (F) 20SG (8 oz)	11.4	0.8 (88)	3.5 (87)	9.1 (78)	6.9	1.6 (10)	3.6 (47)	9.9 (31)
Tolfenpyrad (14 oz)	6.4	2.2 (42)	1.3 (91)	14.8 (35)	9.2	1.8 (24)	2.3 (75)	11.6 (40)
Tolfenpyrad (21 oz)	8.8	1.0 (81)	2.4 (88)	8.1 (74)	7.7	2.0 (0)	4.5 (41)	3.3 (79)
Nontreated	7.2	4.3 (0)	16.8 (0)	25.6 (0)	12.8	3.3 (0)	12.6 (0)	26.7 (0)
Total Population								
Avid (8 fl oz)	11.7 a	2.4 a (70)	3.5 a (88)	4.7 a (90)	12.3 a	4.1 a (11)	4.2 a (68)	3.5 a (89)
Flagship (D) 25WG (8 oz)	16.9 a	1.7 a (85)	6.5 a (85)	21.3 cd (68)	14.4 a	3.7 a (31)	4.8 a (69)	16.8 c (56)
Flagship (F) 25WG (8 oz)	6.5 a	1.5 a (66)	9.3 a (44)	7.9 ab (70)	14.8 a	3.4 a (39)	6.8 a (57)	6.8 bc (83)
Safari (D) 20SG (24 oz)	5.9 a	0.6 a (85)	1.9 a (87)	5.5 a (77)	7.5 a	3.0 a (0)	2.9 a (64)	6.3 bc (68)
Safari (F) 20SG (8 oz)	11.6 a	1.5 a (81)	4.4 a (85)	13.7 abc (70)	7.2 a	2.2 a (18)	5.0 a (35)	15.4 c (19)
Tolfenpyrad (14 oz)	6.6 a	2.4 a (46)	1.9 a (89)	18.3 bcd (31)	9.4 a	2.2 a (37)	3.4 a (66)	15.6 c (37)
Tolfenpyrad (21 oz)	8.9 a	1.2 a (80)	2.7 a (88)	11.5 abc (68)	8.0 a	2.8 a (6)	5.3 a (38)	5.7 bc (73)
Nontreated	7.4 a	5.0 b (0)	18.8 b (0)	29.6 d (0)	13.9 a	5.2 a (0)	14.8 b (0)	36.8 d (0)

[z] Mean number of thrips were counted from alcohol extraction of 3 leaves or 3 flowers.

[y] Means within columns followed by the same letter are not significantly different ANOVA (P =0.05), means separated by LSD (α = 0.05).

Table 63. Western Flower Thrips Control on Impatiens (*Impatiens wallerana*) 'Super Elfin Red' – Trial 1, Chen, LA, 2012a.

Treatment (Active Ingredient)	Rate per 100 gal	Population Counts [y], Means Separations [x], and % Control				
		3 DAT	10 DAT	17 DAT	24 DAT	31 DAT
Adults						
AzaGuard (azadirachtin)	16 fl oz	6.7 a (0)	5.8 b (48)	2.0 b (87)	1.6 b (86)	0.0 b (100)
AzaGuard	32 fl oz	3.7 ab (0)	2.3 c (79)	4.2 b (72)	0.2 b (98)	0.2 b (98)
BotaniGard WP (*Beauveria bassiana*)	1 lb	2.2 b (0)	0.0 c (100)	0.5 b (97)	0.0 b (100)	0.0 b (100)
MBI-203 (*Chromobacterium subtsugae*)	2 lb	1.0 b (44)	1.8 c (84)	1.2 b (92)	4.0 b (64)	0.0 b (100)
MBI-203	4 lb	1.2 b (33)	2.3 c (79)	2.3 b (85)	2.3 b (79)	0.0 b (100)
MBI-206 (*Burkholderia* sp.)	1 gal	3.5 ab (0)	2.3 c (79)	3.7 b (76)	1.3 b (88)	0.0 b (100)
MBI-206	2 gal	3.5 ab (0)	2.3 c (79)	3.3 b (78)	1.2 b (89)	0.0 b (100)
Proud (thyme oil)	**	1.7 b (6)	1.0 c (91)	0.3 b (98)	-	-
Water Check	-	3.5 ab (0)	2.3 c (79)	4.8 b (68)	10.2 a (9)	15.8 a (0)
Nontreated	-	1.8 b (0)	11.2 a (0)	15.2 a (0)	11.2 a (0)	11.0 a (0)
Nymphs						
AzaGuard (azadirachtin)	16 fl oz	37.8 a (0)	24.8 b (48)	25.3 cd (81)	4.4 b (96)	0.0 b (100)
AzaGuard	32 fl oz	17.8 bcd (53)	8.0 def (83)	32.0 c (76)	0.2 b (100)	0.0 b (100)
BotaniGard WP (*Beauveria bassiana*)	1 lb	8.0 cd (79)	0.5 f (99)	1.5 d (99)	1.0 b (99)	0.0 b (100)
MBI-203 (*Chromobacterium subtsugae*)	2 lb	19.5 a-d (48)	18.3 bcd (61)	11.5 cd (92)	14.2 b (88)	8.4 b (88)
MBI-203	4 lb	15.5 bcd (59)	12.5 cde (74)	15.5 cd (89)	15.8 b (86)	10.4 b (86)
MBI-206 (*Burkholderia* sp.)	1 gal	26.7 abc (29)	10.7 c-f (77)	23.7 cd (83)	14.3 b (88)	3.0 b (96)
MBI-206	2 gal	24.3 a-d (36)	12.8 cde (73)	11.2 cd (92)	12.8 b (89)	2.6 b (96)
Proud (thyme oil)	**	7.5 d (80)	4.2 ef (91)	1.2 d (99)	-	-
WaterCheck	-	32.8 ab (13)	20.8 bc (56)	65.0 b (52)	102.7 a (11)	72.6 a (0)
Nontreated	-	37.7 a (0)	47.5 a (0)	135.8 a (0)	115.8 a (0)	72.4 a (0)
Total Population						
AzaGuard (azadirachtin)	16 fl oz	44.5 a (0)	30.7 b (48)	27.3 cd (82)	6.0 b (95)	0.0 b (100)
AzaGuard	32 fl oz	21.5 bcd (46)	10.3 def (82)	36.2 c (76)	0.3 b (100)	0.2 b (100)
BotaniGard WP (*Beauveria bassiana*)	1 lb	10.2 d (74)	0.5 f (99)	2.0 d (99)	1.0 b (99)	0.0 b (100)
MBI-203 (*Chromobacterium subtsugae*)	2 lb	20.5 bcd (48)	20.2 bcd (66)	12.7 cd (92)	18.2 b (86)	8.4 b (90)
MBI-203	4 lb	16.7 cd (58)	14.8 cde (75)	17.8 cd (88)	18.2 b (88)	10.4 b (88)
MBI-206 (*Burkholderia* sp.)	1 gal	30.2 a-d (24)	13.0 cde (78)	27.3 cd (82)	15.7 b (88)	3.0 b (96)
MBI-206	2 gal	27.8 a-d (30)	15.2 cde (74)	14.5 cd (90)	14.0 b (89)	2.6 b (97)
Proud (thyme oil)	**	9.2 d (77)	5.2 ef (91)	1.5 d (99)	-	-
Water Check	-	36.3 abc (8)	23.2 bc (60)	69.8 b (54)	112.8 a (11)	88.4 a (0)
Nontreated	-	39.5 ab (0)	58.7 a (0)	151.0 a (0)	127.0 a (0)	83.4 a (0)

* All treatments were foliar sprays applied on 4/10, 4/17, 4/25, 5/3 and 5/11; DAT = days after first application.
** Wrong rate was applied in this trial, and plants exhibited severe injury from the first application, and most died by 24 DAT.
[y] Mean number of thrips per plant counted from destructive sampling.

Table 64. Western Flower Thrips Control on Impatiens (*Impatiens wallerana*) 'Super Elfin Red' – Trial 3, Chen, LA, 2012b.

Treatment	Rate per 100 gal	Application Times (Days)	Population Counts [y], Means Separations [x], and % Control				
			2 DAT	9 DAT	16 DAT	22 DAT	27 DAT
Adults							
A16901B	6.7 oz	1, 14	0.0 b (100)	0.0 b (100)	0.0 b (100)	0.0 b (100)	0.0 a
A16901B	12.4 oz	1, 14	0.0 b (100)	0.0 b (100)	0.0 b (100)	0.0 b (100)	0.0 a
BotaniGard WP	1 lb	1, 7, 16, 21	0.0 b (100)	0.2 b (91)	0.5 b (80)	0.0 b (100)	0.0 a
Proud	4 qt	1, 7, 16, 21	0.3 b (70)	0.0 b (100)	0.7 b (72)	0.0 b (100)	0.0 a
Water	-	1, 7, 16, 21	0.0 b (100)	0.0 b (100)	0.0 b (100)	0.0 b (100)	0.0 a
Nontreated	-	-	1.0 a (0)	2.3 a (0)	2.5 a (0)	2.5 a (0)	0.0 a
Nymphs							
A16901B	6.7 oz	1, 14	1.0 b (94)	0.0 b (100)	0.0 b (100)	0.0 b (100)	0.0 a
A16901B	12.4 oz	1, 14	0.0 b (100)	0.0 b (100)	0.0 b (100)	0.0 b (100)	0.0 a
BotaniGard WP	1 lb	1, 7, 16, 21	3.0 b (81)	19.3 ab (30)	1.7 ab (23)	1.8 b (60)	0.0 a
Proud	4 qt	1, 7, 16, 21	4.0 b (75)	9.0 b (67)	0.3 b (86)	0.5 b (89)	0.0 a
Water	-	1, 7, 16, 21	3.2 b (80)	11.3 ab (59)	0.0 b (100)	0.5 b (89)	0.0 a
Nontreated	-	-	15.7 a (0)	27.5 a (0)	2.2 a (0)	4.5 a (0)	0.0 a
Total Population							
A16901B	6.7 oz	1, 14	1.0 b (94)	0.0 c (100)	0.0 b (100)	0.0 b (100)	0.0 a
A16901B	12.4 oz	1, 14	0.0 b (100)	0.0 c (100)	0.0 b (100)	0.0 b (100)	0.0 a
BotaniGard WP	1 lb	1, 7, 16, 21	3.0 b (82)	19.5 ab (35)	2.2 b (53)	1.8 b (74)	0.0 a
Proud	4 qt	1, 7, 16, 21	4.3 b (74)	9.0 bc (70)	1.0 b (79)	0.5 b (93)	0.0 a
Water	-	1, 7, 16, 21	3.2 b (81)	11.3 bc (62)	0.0 b (100)	0.5 b (93)	0.0 a
Nontreated	-	-	16.7 a (0)	29.8 a (0)	4.7 a (0)	7.0 a (0)	0.0 a

[y] Mean number of thrips per plant counted from destructive sampling.

Marigold. Between 2005 and 2017, IR-4 researchers conducted 24 experiments for WFT on marigold (*Tagetes sp.*). The experiments are discussed in chronological order.

2005.
Davis assessed thrips populations on foliage rather than flowers. Flower buds were routinely removed to encourage feeding on foliage. To collect thrips, leaves were removed and all thrips were counted after alcohol extraction. In this experiment, by 12 days after the first application all treatments (Avid, Conserve, Mesurol, and TriStar) provided good to excellent control (Table 65).

Table 65. * Western Flower Thrips Control on Marigold (*Tagetes erecta*) 'Yellow Boy', Smitley, Davis & Newhouse, MI, 2005.

Treatment Rate per 100 gal [z]	Population Counts [y], Means Separations [x], and Henderson's % Control					
	Precount	8 DAT June 23	12 DATJune 27	29 DATJuly 5	35 DAT July 11	39 DAT July 15
Avid 0.15EC (abamectin) 7.7 fl oz	9.1 a	1.1 a (0)	0.0 a (100)	0.3 a (96)	0.6 a (75)	0.3 a (89)
Conserve 1SC (spinosad) 6 fl oz	10.0 a	0.9 a(0)	0.0 a(100)	0.0 a(100)	0.3 a(88)	0.6 a(80)
Mesurol 75W (methiocarb) 1 lb	9.1 a	0.6 a (12)	0.9 a (85)	0.6 a (92)	1.1 a (50)	0.0 a (100)
Tristar 70WSP (acetamiprid) 64 g	7.7 a	0.3 a (47)	0.0 a (100)	0.6 a (90)	0.6 a (70)	0.1 a (94)
Tristar 70WSP (acetamiprid) 96 g	9.7 a	0.6 a (18)	0.3 a (95)	0.3 a (96)	0.0 a (100)	0.4 a (85)
Nontreated	8.0 a	0.6 a (0)	4.9 b (0)	6.0 b (0)	2.0 a (0)	2.3 b (0)

[*] Not an IR-4 sponsored experiment but the data were shared
[z] All treatments were foliar sprays applied on June 15 and June 22.
[y] Mean number of thrips per six leaves, counted after alcohol extraction.
[x] Means within a column followed by the same letter are not significantly different by Fisher's LSD (P > 0.05). Data transformed prior to ANOVA log (x+1); untransformed means presented in table.

2007.
Using the same technique as in 2005, Davis compared 8 products for efficacy (Table 66). By 22 DAT, Conserve did not provide adequate control levels, while Mesurol, Safari, and Hachi-Hachi provided good to excellent control (Table 67).

Table 66. Western Flower Thrips Control on Marigold (*Tagetes patula*) 'Yellow Boy' – Application Rates and Dates, Davis, MI, 2007.

Treatment[z]	Application Method – Rate / 100 gal	Application Dates			
		6/27 0 DAT	7/5 8 DAT	7/13 16 DAT	7/23 26 DAT
Acelepryn (DPX-E2Y45)	Foliar – 20 oz/100 gal	X		X	
BAS350i	Foliar – 1.2 oz	X	X	X	
Conserve SC (spinosad)	Foliar – 6 oz/100 gal	X	X	X	
Kontos foliar (spirotetramat)	Foliar– 1.7 oz	X	X	X	
Kontos drench (spirotetramat)	Drench – 1.7 oz(200 mL per 6" pot)	X			
Mesurol 75WP (methiocarb)	Foliar – 0.5-1.0lb/100 gal	X	X	X	
Safari 20SG (dinotefuran)	Foliar – 8 oz	X		X	
Tick-EX (*Metarhizium anisopliae* Strain 52)	Foliar – 15 oz/100 gal	X	X	X	X
Tick-EX (*Metarhizium anisopliae* Strain 52)	Foliar – 29 oz/100gal	X	X	X	X
Hachi Hachi EC (tolfenpyrad)	Foliar – 14 oz/100 gal	X		X	
Hachi Hachi EC (tolfenpyrad)	Foliar – 21 oz/100 gal	X		X	
Nontreated					

Table 67. Western Flower Thrips Control on Marigold (*Tagetes patula*) 'Yellow Boy', Davis, MI, 2007.

Treatment	Population Counts [z], Means Separations [y], and Henderson's Percent Control						
	0 DAT	6 DAT	15 DAT	22 DAT	29 DAT	37 DAT	41 DAT
Total Population							
Acelepryn (DPX-E2Y45)	12.8 a	7.3 c (0)	13.7 f (0)	5.6 d (0)	3.2 cde (0)	3.9 a (0)	3.9 bcd (0)
BAS350i	25.2 a	0.6 a (96)	0.3 a (99)	0.0 a (100)	0.2 a (96)	2.0 a (72)	1.2 d (80)
Conserve	16.0 a	2.9 b (68)	6.5 de (56)	5.0 d (7)	5.5 e (0)	6.4 a (0)	4.8 bcd (0)
Kontos foliar	12.8 a	15.0 c (0)	2.5 bc (79)	5.0 cd (0)	0.6 ab (79)	7.8 a (0)	4.0 bcd (0)
Kontos drench	12.0 a	12.3 c (0)	2.8 cd (75)	1.9 bc (53)	2.4 ab (9)	5.8 a (0)	6.1 cd (0)
Mesurol	14.1 a	1.1 ab (86)	0.1 a (99)	0.7 ab (85)	0.6 ab (81)	5.4 a (0)	6.3 cd (0)
Safari 20SG	12.8 a	3.0 b (58)	5.5 cd (54)	0.7 ab (84)	1.5 bc (47)	5.9 a (0)	7.0 bcd (0)
Tick-EX 15 oz	12.9 a	8.9 c (0)	8.8 ef (26)	6.0 cd (0)	5.3 cde (0)	4.4 a (0)	3.4 b (0)
Tick-EX 29 oz	15.1 a	7.4 c (12)	5.8 de (58)	4.6 cd (10)	3.3 cde (1)	3.2 a (26)	3.2 bc (13)
Hachi Hachi EC 14 oz	12.3 a	3.0 b (56)	1.2 ab (89)	0.9 ab (78)	0.7 ab (74)	9.3 a (0)	8.4 cd (0)
Hachi Hachi EC21 oz	11.3 a	2.7 b (57)	0.7 a (93)	0.1 a (97)	0.3 a (88)	4.2 a (0)	9.3 d (0)
Nontreated	17.2 a	9.6 c (0)	15.9 f (0)	5.8 d (0)	3.8 de (0)	4.9 a (0)	4.2 bcd (0)

[z] Flowers were removed prior to opening throughout the experiment. Mean number of thrips were counted from alcohol extraction of 5 leaves.

[y] Means followed by the same letter are not significantly different Fisher's LSD ($p < 0.05$). Data transformed prior to ANOVAlog (x+1). Untransformed means presented in table.

2008.

Using the same techniques as before to collect thrips on leaves, Davis assessed efficacy of 10 different products (Table 68). In this experiment, effective treatments 21 d after first application included Mesurol and Tolfenpyrad EC, but at this point in time the nontreated populations were dropping (Table 69).In looking at the 14 d results, Mesurol, Kontos,Tolfenpyrad, BotaniGard + BW130, Conserve and MOI 201 provided good to adequate control.

Gilrein in 2008 screened 6 products for efficacy (Table 70) but utilized a different method to collect thrips. Leaves were tapped over a white board and all stages of live thrips counted. By 18 DAT none of the treatments managed total populations well, but at 28 DAT, when just immature thrips are examined, Conserve, Tolfenpyrad and Tristar provided good to excellent efficacy.

During 2008, Oetting collected efficacy from two flowers by tapping them five times over a styrifoam bowl 15 cm diameterby 5 cm deep, and then counting the moving adults and immatures; thrips were dumped back on the plant. Adult counts were not of much use to determine efficacy because of the movement of adults among treatments (Table 72). The immature counts and overall damage rating were the best estimate of thrips control.Generally, Conserve was the most effective treatment followed by NAI 2302 and BYI 8330. Other treatments were less effective.

Table 68. Western Flower Thrips Control on Marigold (*Tagetes patula*) 'Yellow Boy' – Application Rates and Dates, Davis, MI, 2008.

Treatment (Active Ingredient)	Rate / 100 gal	Application Dates		
		6/17 0 DAT	6/24 7 DAT	7/1 14 DAT
BotaniGard 22 % WP (*Beauvaria bassiana*)	2 lb	X	X	X
BotaniGard 22 % WP (*Beauvaria bassiana*) + BW130 (unknown)	2 lb /100 gal + 325 ml/100 liters	X	X	X
Conserve SC (spinosad)	11floz	X	X	X
Kontos 240SC (spirotetramat)	1.7 fl oz	X		X
Mesurol 75WP (methiocarb)	0.5 lb	X		X
MOI 201 (unknown)	0.8 qt	X	X	X
Rycar SC (pyrifluquinazon)	9.6 fl oz	X		X
QRD 416 (unknown)	128 fl oz	X	X	X
Tick-EX (*Metarhizium anisopliae* Strain 52)	29 fl oz/100gal	X	X	X
Hachi Hachi EC (tolfenpyrad)	21 fl oz/100 gal	X		X
TriCon (Sodium Tetraborohydrate Decahydrate)	50 fl oz	X	X	X
Nontreated				

Table 69. Western Flower Thrips Control on Marigold (*Tagetes patula*) 'Yellow Boy', Davis, MI, 2008.

Treatment	Population Counts [z], Means Separations [y], and Henderson's Percent Control						
	Precount	3 DAT	7 DAT	14 DAT	21 DAT	28 DAT	35 DAT
Total Population							
BotaniGard 22 % WP (*Beauvaria bassiana*)	6.3 a	5.3 ef (35)	6.8 de (15)	2.1 cde (59)	1.0 bcd (28)	1.6 c (0)	2.1 bc (0)
BotaniGard 22 % WP (*Beauvaria bassiana*) + BW130 (unknown)	6.1 a	2.6 bcd (68)	2.3 ab (71)	1.2 abc (76)	0.5 abc (63)	0.4 ab (52)	1.6 abc (17)
Conserve SC (spinosad)	6.0 a	5.8 ef (26)	6.2 ab (19)	1.3 bc (72)	0.7 abcd (50)	0.4 a (51)	1.2 ab (40)
Kontos 240SC (spirotetramat)	6.4 a	1.8 ab (78)	1.6 ab (81)	0.9 ab (82)	0.5 abc (65)	0.8 abc (18)	1.7 bc (20)
Mesurol 75WP (methiocarb)	6.3 a	0.9 a (89)	0.5 e (94)	0.3 a (95)	0.2 a (88)	0.4 a (59)	1.9 bc (6)
MOI 201 (unknown)	6.3 a	1.0 a (88)	1.4 bc (82)	1.4 bcd (72)	0.6 abcd (58)	0.8 abc (16)	2.3 bc (0)
Rycar SC (pyrifluquinazon)	6.4 a	5.4 ef (36)	4.5 de (45)	3.4 def (34)	1.1 cde (24)	0.4 ab (55)	2.3 bc (0)
QRD 416 (unknown)	6.1 a	5.6 de (30)	6.8 cd (12)	6.5 g (0)	1.2 bcde (12)	1.2 bc (0)	0.6 a (70)
Tick-EX (*Metarhizium anisopliae* Strain 52)	6.3 a	5.4 de (34)	6.1 de (24)	4.9 efg (2)	2.0 ef (0)	1.1 abc (0)	2.9 c (0)
Hachi HachiEC (tolfenpyrad)	6.3 a	2.4 bc (71)	1.3 a (84)	1.1 abc (78)	0.3 ab (82)	0.3 a (63)	0.6 a (71)
TriCon (Sodium Tetraborohydrate Decahydrate)	6.9 a	4.0 cde (0)	6.8 de (0)	5.8 fg (0)	3.0 f (0)	1.4 c (0)	2.3 bc (0)
Nontreated	6.4 a	8.4 f (0)	8.2 de (0)	5.2 fg (0)	1.4 de (0)	0.9 abc (0)	2.1 bc (0)

[z] Flowers were removed prior to opening throughout the experiment. Mean number of thrips were counted from alcohol extraction of 5 leaves.

[y] Means followed by the same letter are not significantly different Fisher's LSD ($p < 0.05$). Data transformed prior to ANOVA log (x+1). Untransformed means presented in table.

Table 70. Western Flower Thrips Control on Marigold (*Tagetes patula*) 'Jaguar', Gilrein, NY, 2008.

Treatment	Rate Per 100 gals	Population Counts [z], Means Separations [y], and Henderson's Percent Control				Immatures % Control
		9/5/08 (precount)	9/15/08 (7 DAT)	9/23/08* (15 DAT)	9/26/08* (18 DAT)	10/6/08* (29 DAT)
Acelepryn 1.67SC	20 fl oz	4.0 a	3.8 bcd (33)	5.1 bc (0)	6.5 abc (3)	2.9 cd (15)
Conserve 1SC	6 fl oz	4.4 a	2.1 ab (66)	1.6 a (42)	3.5 a (0)	0.5 ab (85)
Kontos (BYI-8330) 2SC (240SC)	1.7 fl oz	4.6 a	6.1 cd (6)	8.3 cd (0)	10.9 c (0)	1.5 bc (56)
Rycar 20SC	8 fl oz	3.6 a	4.6 cd (10)	5.0 b (18)	6.1 ab (7)	2.5 cd (26)
Hachi Hachi 15EC	27 fl oz	3.5 a	1.9 a (62)	2.6 a (0)	3.1 a (9)	0.0 a (100)
Tristar 30SG	8 oz	3.5 a	3.6 abc (27)	6.0 bcd (0)	8.4 bc (0)	0.4 ab (88)
Nontreated		4.6 a	6.5 d (0)	8.6 d (0)	11.3 c (0)	3.4 d (0)

[z] Flowers were continuously removed during experiment. Plants tapped over white board and all stagescounted.Mean number of live thrips per 8 plants.

[y] Means followed by the same letter are not significantly different at p=0.05 (Fisher's LSD).

*Data were transformed prior to analysis using ln (y+1)

Treatments applied on 9/8/08, 9/19 and 10/3.

Table 71. Western Flower Thrips Control on Marigold 'Hero Mix'– Application Rates and Dates, Oetting, GA, 2008.

Treatment (Active Ingredient)	Rate / 100 gal	Application Dates		
		0 DAT	7 DAT	14 DAT
Acelepryn (DPX-E2Y45) (chlorantraniliprole)	20 fl oz	X		X
Conserve (spinosad)	8 fl oz	X		X
Flagship (thiamethoxam)	8 oz	X		X
Kontos (BYI-8330) (spirotetramat)	1.7 fl oz	X		X
MOI 201	1:500	X	X	X
MOI 201	1:800	X	X	X
NNI-0101 (pyrifluquinazon)	6.3 fl oz	X		X
Tick-EX (*Metarhizium anisophiae)*	29 fl oz	X	X	X
Tolfenpyrad	21 fl oz	X		X
Nontreated				

Treatments applied on Apr 24, May 1, and May 8, 2008.

Table 72. Western Flower Thrips Control and Flower Damage Rating on Marigold 'Hero Mix', Oetting, GA, 2008.

Treatment	Population Counts [x], Means Separations [y], and Percent Control					Damage Rating (0-100) 34 DAT
	7 DAT	14 DAT	21 DAT	28 DAT[z]	34 DAT[z]	
	Adults					
Acelepryn (DPX-E2Y45)	2.9 a (22)	4.1 a (0)	1.7 b (0)	2.2 a	7.2 ab	52.6 b
Conserve	1.4 a (62)	6.0 a (0)	3.7 ab (0)	2.6 a	16.3 a	23.3 c
Flagship	2.8 a (24)	6.4 a (0)	6.0 a (0)	5.0 a	17.2 a	52.4 b
Kontos (BYI-8330)	1.6 a (57)	3.0 a (25)	3.6 ab (0)	3.6 a	15.1 a	31.4 bc
MOI 201	2.9 a(22)	4.9 a (0)	3.6 ab (0)	3.6 a	14.6 a	37.6 bc
MOI 201	2.7 a (27)	5.6 a (0)	1.7 b (0)	3.6 a	15.4 a	55.1 b
NNI-0101	4.6 a (0)	7.0 a (0)	1.4 b (0)	4.1 a	11.6 ab	53.0 b
Tick-EX	3.0 a (19)	2.7 a (33)	1.6 b (0)	2.0 a	9.2 ab	38.3 bc
Tolfenpyrad	2.3 a (38)	4.7 a (0)	2.7 b (0)	3.3 a	9.3 ab	28.9 bc
Nontreated	3.7 a (0)	4.0 a (0)	1.1 b (0)	2.4 a	4.0 b	98.0 a
	Immatures					
Acelepryn (DPX-E2Y45)	4.6 ab (8)	8.1bcd (29)	4.3 bc (41)	3.2 a	11.0 a	
Conserve	1.3 c (74)	6.1 cd (46)	3.3 bcd (55)	1.9 a	9.1 a	
Flagship	4.0 ab (20)	9.0 a-d (21)	4.6 bc (37)	3.0a	11.2 a	
Kontos (BYI-8330)	3.3 bc (34)	11.6ab (0)	5.1 ab (30)	3.0 a	8.7 a	
MOI 201	3.9 b (22)	8.7 a-d (24)	3.6 bcd (51)	3.3 a	8.7 a	
MOI 201	3.4 bc (32)	11.3abc (1)	4.7 bc (36)	2.1 a	10.2 a	
NNI-0101	4.7 ab (6)	5.3 d (54)	3.4 bcd (53)	2.9 a	9.2 a	
Tick-EX	6.3 a (0)	13.7a (0)	1.6 d (78)	1.4 a	14.7 a	
Tolfenpyrad	3.7 b (26)	6.0d (47)	2.7 cd (63)	5.1 a	10.3 a	
Nontreated	5.0 ab (0)	11.4 ab (0)	7.3 a (0)	1.1 a	1.5 b	

[x] Mean number of immature thrips per 2 flowers knocked five times over a styrifoam bowl 15 cm diam x 5 cm deep .
[y] Means followed by the same letter are not significantly different at p=0.05 (ANOVA and mean separation test).
[z] Check flowers at 28 and 34 DAT were dead or of poor quality.

2009.

Using the same techniques as before to collect thrips on leaves, Davis assessed efficacy of 7 different treatments (Table 73). All treatments (Botanigard, Conserve, DPX-HGW86, Tolfenpyrad, NNI-0101, and Tick-Ex) reduced thrips numbers significantly 3 and 4 weeks after treatments were initiated (Table 74). DPX-HGW86, Tolfenpyrad and the Botanigard + BW533/Botanigard rotation provided good to excellent control.

Table 73. Western Flower Thrips Control on Marigold (*Tagetes patula*) 'Yellow Boy' – Application Rates and Dates, Davis, MI, 2009.

Treatment (Active Ingredient)	Rate / 100 gal	Application Dates			
		6/19 0 WAT	6/26 1 WAT	7/1 2 WAT	7/8 3 WAT
BotaniGard 22 % WP (*Beauvaria bassiana*)	2 lb	X	X	X	X
BotaniGard 22 % WP + SuffOil X / Botanigard	2 lb / 2 lb	X		X	
			X		X
Conserve (spinosad)	11 fl oz	X	X	X	X
DPX-HGW86 (cyantraniliprole)	6 fl oz	X		X	
Hachi-Hachi EC (tolfenpyrad) + NIS	21 fl oz	X		X	
Rycar 20% SC (pyrifluquinazon) + NIS	6.38 fl oz	X		X	
Tick-Ex	29 fl oz	X	X	X	X
Nontreated					

Table 74. Western Flower Thrips Control on Marigold (*Tagetes patula*) 'Yellow Boy', Davis, MI, 2009.

Treatment	Population Counts [z], Means Separations [y], and Henderson's Percent Control[x]					
	Precount	1 WAT	2 WAT	3 WAT	4 WAT	5 WAT
TotalPopulation						
BotaniGard 22 % WP	3.88 a	5.63 bc (46)	3.13 bc (59)	2.88 ab (73)	3.75 ab (73)	7.88 bc (0)
BotaniGard 22 % WP + SuffOil X / BotaniGard	5.13 a	3.75 bc (73)	0.13 a (99)	0.75 ab (95)	2.29 ab (88)	8.00 bc (0)
Conserve	3.63 a	4.38 bc (55)	1.00 ab (86)	1.50 ab (85)	3.43 b (74)	8.00 c (0)
DPX-HGW86	6.75 a	0.13 a (99)	1.00 a (92)	0.38 a (98)	0.75 a (97)	1.13 a (85)
Hachi-Hachi EC + NIS	4.50 a	1.75 ab (85)	0.38 a (96)	1.13 a (91)	1.38 ab (92)	7.88 bc (0)
Rycar 20% SC + NIS	3.88 a	4.75 b (54)	4.38 c (43)	2.25 ab(79)	2.38 ab (83)	9.38 c (0)
Tick-Ex	3.75 a	3.88 b (61)	6.00 cd (19)	2.38 ab (77)	7.00 ab (49)	4.88 b (0)
Nontreated	3.88 a	10.38 c (0)	7.63 d (0)	10.63 c (0)	14.13 c (0)	4.38 bc (0)
Adults						
BotaniGard 22 % WP		0.50 abc	0.25 a	0.25 a	0.38 a	1.00 a
BotaniGard 22 % WP + SuffOil X/ BotaniGard		0.13 ab	0.13 a	0.25 a	0.43 a	0.71 a
Conserve		0.25 bc	0.38 a	0.25 a	0.57 a	0.57 a
DPX-HGW86		0.00 a	0.13 a	0.13 a	0.50 a	0.38 a
Hachi-Hachi EC + NIS		0.63 c	0.13 a	0.38 a	0.63 a	1.13 a
Rycar 20% SC + NIS		0.00 a	0.75 a	0.38 a	0.50 a	0.88 a
Tick-Ex		0.13 ab	0.38 a	0.13 a	0.25 a	0.25 a
Nontreated		0.63 a	0.75 a	1.50 b	1.13 a	0.25 a
Immatures						
BotaniGard 22 % WP		5.13 b (47)	2.88 cd (58)	2.63 b (71)	3.38 bc (74)	6.88 bc (0)
BotaniGard 22 % WP + SuffOil X/ BotaniGard		3.63 bc (63)	0.00 a (100)	0.50 a (95)	1.86 abc (86)	7.29 bc (0)
Conserve		4.13 bc (58)	0.63 ab (91)	1.25 ab (86)	2.86 bc (78)	7.43 c (0)
DPX-HGW86		0.13 a (99)	0.88 abc (87)	0.25 a (97)	0.25 a (98)	0.75 a (82)
Hachi-Hachi EC + NIS		1.13 a (88)	0.25 a (96)	0.75 ab (92)	0.75 ab (94)	6.75 bc (0)
Rycar 20% SC + NIS		4.75 b (51)	3.63 bcd (47)	1.88 ab (79)	1.88 abc (86)	8.50 c (0)
Tick-Ex		3.75 b (62)	5.63 d (18)	2.25 b (75)	6.75 c (48)	4.63 bc (0)
Nontreated		9.75 c (0)	6.88 d (0)	9.13 c (0)	13.00 d (0)	4.13 bc (0)

[z] Flowers were removed prior to opening throughout the experiment. Mean number of thrips were counted after alcohol extraction.
[y] Means followed by the same letter are not significantly different Fisher's LSD ($p < 0.05$). Data transformed prior to ANOVA log (x+1). Actual treatment means presented in table.
[x] Percent control for immatures.

2010.
Using the same techniques as before to collect thrips on leaves, Davis assessed efficacy of 7 different treatments Table 75, Table 76). Pylon and Overture provided excellent control with only two weekly applications the first 2 weeks. Aria, Avid and Hachi-Hachi (tolfenpyrad) applied every other week also provided excellent control. Botanigard, NNI-0101, Molt-X, SuffOil and Tick-Ex were not effective.

In 2010, two researchers conducted three studies on marigold flowers (Table 77 - Table 81). In one experiment, thrips were dislodged from three flowers and data collected using alcohol extraction method. All treatments (Avid and Pylon applied once, Flagship applied twice and Tick-Ex applied 4 times) provided no significant reduction of adults and immatures. In the second and third studies, 2 or 3 flowers were collected into alcohol solution and thrips counted after alcohol extraction. In these studies, immature counts provided the best estimate

of thrips control because of the movement of adults among treatments. In the second study, A16901B Aria, Avid, Hachi-Hachi and Pylon provided excellent control. The three-way rotation of Aria or Conserve with Hachi-Hachi and Pylon also provided good control whileConserve and NNI-0101 were ineffective. In the third study, BotaniGard WP and Tick-EX had little impact on immature thrips. Rotations with Aria and Hachi-Hachi with BotaniGard and Tick-Ex provided good control only after application of Aria and Hachi-Hachi.

Table 75. Western Flower Thrips Control on Marigold (*Tagetes patula*) 'Yellow Boy' – Application Rates and Dates, Davis, MI, 2010.

Treatment (Active Ingredient)	Rate / 100 gal	Application Dates				
		11/11 0 WAT	11/18 1WAT	11/25 2WAT	12/2 3 WAT	12/10 4WAT
Aria 50SG (flonicamid)	120 g	X		X		X
Aria 50SG + NNI-0101 20% SC (pyrifluquinazon)	120 g + 6.38 fl oz	X		X		X
Avid 0.15EC (abamectin)	8 fl oz	X		X		X
BotaniGard 22 % WP (*Beauvaria bassiana*)	2 lb	X	X	X	X	X
BotaniGard 22 % WP / Hachi-Hachi (tolfenpyrad)	2 lb / 21 fl oz	X	X		X	X
				X		
BotaniGard 22 % WP + Tick-Ex (*Metarhizium anisopliae* strain F52)	2 lb + 29 oz	X	X		X	X
BotaniGard 22 % WP + Molt X (azadirachtin) / BotaniGard	2 lb + 8 oz / 2 lb	X	X		X	X
				X		
Botanigard 22 % WP + SuffOil / BotaniGard	2 lb + 1 gal / 2 lb	X	X		X	X
				X		
Hachi-Hachi EC (tolfenpyrad)	21 fl oz	X		X		X
Rycar 20% SC (pyrifluquinazon)	6.38 fl oz	X		X		X
Overture 35WP (pyridalyl)	16 oz	X	X			
Pylon(chlorfenapyr)	5.2 fl oz	X	X			
Tick-Ex / Hachi-Hachi	29 fl oz 21 fl oz	X	X		X	X
				X		
Nontreated						

Table 76. Western Flower Thrips Control on Marigold (*Tagetes patula*) 'Yellow Boy', Davis, MI, 2010.

Treatment	Population Counts [z], Means Separations [y], and Henderson's Percent Control						
	Precount	1 WAT	2 WAT	3 WAT	4 WAT	5 WAT	6 WAT
Total Population							
Aria 50SG	0.9 a	2.1 cde (0)	2.8 cde (51)	2.0 ab (92)	3.8 b (92)	1.3 ab (99)	2.2 abc (94)
Aria 50SG + NNI-0101 20% SC	1.0 a	1.8 a-d (11)	2.2 bcd (65)	2.1 ab (92)	2.3 ab (96)	2.1 ab (96)	1.6 abc (96)
Avid 0.15EC	1.0 a	0.4 ab (78)	0.9 abc (86)	2.9b (89)	2.6 ab (95)	1.4 b (97)	1.8 abc (96)
BotaniGard 22 % WP	0.9 a	7.1 e (0)	2.8 cde(51)	15.3 de (35)	24.0 cd (50)	23.0 e (53)	20.1fg(45)
BotaniGard 22 % WP / Hachi-Hachi	0.9 a	5.3 de (0)	6.6 f (0)	3.7 bc (84)	2.7 ab (94)	2.0 b (96)	5.2cd (86)
Botanigard 22 % WP + Tick-Ex	0.9 a	1.4 a-d (22)	7.8 ef (0)	39.3 e (0)	15.7 c (67)	23.6 de (52)	17.7 fg (51)
BotaniGard 22 % WP + Molt X / BotaniGard	0.9 a	3.6 de (0)	7.3 def (0)	20.9 de (11)	16.6 c (66)	11.6 cd (76)	8.1de (78)
BotaniGard 22 % WP + SuffOil / BotaniGard	0.9 a	1.0 abc (44)	5.0 def (12)	9.9 cd (58)	36.3 d (25)	8.2 c (83)	11.2ef (69)
Hachi-Hachi EC	0.9 a	2.0 b-e (0)	1.1 abc (81)	2.7 ab (89)	1.6 a (97)	0.2 ab (100)	0.6 a (98)
NNI-0101 20% SC	1.0 a	4.1 cde (0)	5.3 def (16)	14.9 de (43)	27.6 cd(48)	29.4 de (46)	44.7 h (0)
Overture 35WP	0.9 a	0.4 ab (78)	0.8 ab (86)	0.4 a (98)	1.1 a (98)	0.4 ab (99)	2.1 abc (94)
Pylon	1.8 a	0.1 a (97)	0.1 a (99)	0.7 a (99)	3.1 ab (97)	6.6 c (93)	3.8 bc (95)
Tick-Ex / Hachi-Hachi	1.7 a	2.9 de (16)	8.0 ef (26)	3.6 b (92)	2.2 ab (98)	0.9 ab (99)	1.3 ab (98)
Nontreated	0.9 a	1.8 a-d (0)	5.7 def (0)	23.6 e (0)	48.2 d (0)	49.3 f (0)	36.4 gh (0)
Immatures							
Aria 50SG	0.7 a	2.0 b-e (0)	1.3 abc (62)	0.3 a (98)	1.6 a (95)	0.7 a (98)	1.3 abc (95)
Aria 50SG + NNI-0101 20% SC	0.9 a	1.6 a-d (0)	0.7 ab (84)	1.2 ab (94)	1.1 a (98)	1.0 a (98)	0.7 ab (98)
Avid 0.15EC	0.9 a	0.4 ab (72)	0.2 ab (95)	1.8 ab (91)	1.8 a (96)	0.7 a (98)	1.0 abc (97)
BotaniGard 22 % WP	0.9 a	6.8 e (0)	1.8 bcd (59)	14.3de (30)	22.2 cde(51)	20.3 e (55)	18.3 fg (55)
BotaniGard 22 % WP / Hachi-Hachi	0.9 a	4.6 de (0)	6.2 e (0)	3.1 bc (85)	1.7 a (96)	1.0 a (98)	3.8cd (89)
BotaniGard 22 % WP + Tick-Ex	0.8 a	1.3 a-d (3)	7.2 e (0)	37.7 e (0)	13.1 b (67)	21.9 e (45)	16.4 f (45)
BotaniGard 22 % WP + Molt X / BotaniGard	0.8 a	3.4 de (0)	6.7 e (0)	19.9 de(0)	15.1 bc(62)	10.2 cd (74)	6.7 de (77)
BotaniGard 22 % WP + SuffOil / BotaniGard	0.7 a	1.0 abc (15)	4.4 de (0)	9.0 cd (43)	34.6 de (2)	7.0 c (80)	10.2 e (61)
Hachi-Hachi EC	0.9 a	1.8 bcd (0)	0.7 ab (84)	2.3 ab (89)	1.2 a (97)	0.2 a (100)	0.2 a (99)
NNI-0101 20 % SC	1.0 a	4.0 cde (0)	3.9 cde (20)	12.0 de(47)	22.8 bcd(55)	26.8 de (46)	39.1 g (0)
Overture 35WP	0.6 a	0.4 ab (55)	0.7 ab (76)	0.2 a (99)	1.0 a (97)	0.0 a (100)	1.2 abc (95)
Pylon	1.6 a	0.1 a (96)	0.1 a (99)	0.2 a (99)	1.9 a (98)	5.1 b (94)	2.3 bc (96)
Tick-Ex / Hachi-Hachi	1.7 a	2.8 de (0)	7.2 e (13)	2.8 b (93)	1.4 a (98)	0.7 a (99)	0.8 ab (99)
Nontreated	0.9 a	1.6 a-d (0)	4.4 de (0)	20.3 e (0)	45.2 e (0)	44.7 f (0)	33.3 fg (0)

Treatment	Population Counts [z], Means Separations [y], and Henderson's Percent Control						
	Precount	1 WAT	2 WAT	3 WAT	4 WAT	5 WAT	6 WAT
Adults							
Aria 50SG	0.2 a	0.1 a	1.4 f	1.7 def	2.2 def	0.7 abc	0.9 ab
Aria 50SG + NNI-0101 20% SC	0.1 a	0.2 a	1.6 e	0.9 a-e	1.2 b-e	1.1 a-d	0.9 ab
Avid 0.15EC	0.1 a	0.0 a	0.7 a	1.1 a-f	0.8 a-d	0.8 a-d	0.8 ab
BotaniGard 22 % WP	0.0 a	0.3 a	1.0 cf	1.0 b-f	1.8 c-f	2.7 ef	1.8 bc
BotaniGard 22 % WP / Hachi-Hachi	0.0 a	0.8 a	0.3 abc	0.6 abc	1.0 a-e	1.0 bcd	1.4 ab
BotaniGard 22 % WP + Tick-Ex	0.1 a	0.1 a	0.6 a-e	1.7 c-f	2.6 ef	1.7 de	1.2 ab
BotaniGard 22 % WP + Molt X / BotaniGard	0.1 a	0.1 a	0.7 a-f	1.0 a-e	1.4 b-f	1.3 cde	1.4 bc
BotaniGard 22 % WP + SuffOil / BotaniGard	0.2 a	0.0 a	0.6 a-e	0.9 a-e	1.8 ef	1.2 cd	1.0 ab
Hachi-Hachi EC	0.0 a	0.2 a	0.4 a-d	0.3 ab	0.3 ab	0.0 a	0.3 a
NNI-0101 20 % SC	0.0 a	0.1 a	1.4 def	2.9 f	4.8 f	2.7 de	5.6 d
Overture 35WP	0.3 a	0.0 a	0.1 ab	0.2 a	0.1 a	0.4 abc	0.9 ab
Pylon	0.2 a	0.0 a	0.0 a	0.4 abc	1.2 b-e	1.4 cde	1.4 ab
Tick-Ex / Hachi-hachi	0.0 a	0.1 a	0.8 b-f	0.8 a-d	0.8 abc	0.2 ab	0.6 ab
Nontreated	0.0 a	0.2 a	1.2 c-f	3.2 ef	3.0 ef	4.7 f	3.1 cd

[z] A clump of foliage was cut off from each plant throughout the experiment and mean number of thrips were counted from alcohol extraction.
[y] Means followed by the same letter are not significantly different Fisher's LSD ($p < 0.05$). Data transformed prior to ANOVA log (x+1). Actual treatment means presented in table.

Table 77. Western Flower Thrips Control on Marigold (*Tagetes patula*) 'Bonanza Yellow', Chong, SC, 2010.

Treatment (Active Ingredient)	Rate / 100 gal	Population Counts [z], Means Separations [y], and Henderson's Percent Control				
		Pretreatment	7 DAT	14 DAT	28 DAT	42 DAT
Adults						
Avid 0.15EC (abamectin)	16 fl oz	9.7 ± 4.5 a	13.2 ± 3.3 a (0)	16.0 ± 4.6 a (0)	13.8 ± 1.9 a (0)	18.8 ± 1.8 a (0)
Flagship 25WG (thiamethoxam)	8 oz	14.7 ± 5.6 a	8.0 ± 1.9 a (45)	13.0 ± 3.7 a (25)	14.3 ± 1.9 a (57)	19.7 ± 2.3 a (4)
Pylon(chlorfenapyr)	5.2 fl oz	13.2 ± 3.5 a	17.8 ± 7.0 a (0)	19.5 ± 5.1 a (0)	18.2 ± 2.9 a (0)	20.7 ± 2.8 a (0)
Tick-Ex (*Metarhizium anisopliae* strain F52)	29 fl oz	13.7 ± 3.4 a	7.5 ± 1.1 a (44)	15.7 ± 3.5 a (10)	14.5 ± 3.1 a (3)	22.2 ± 3.8 a (0)
Nontreated	-	12.2 ± 3.4 a	12.0 ± 1.9 a (0)	14.3 ± 3.5 a (0)	13.3 ± 2.1 a (0)	17.0 ± 1.9 a (0)
Immatures						
Avid 0.15EC (abamectin)	16 fl oz	50.2 ± 7.2 a	38.0 ± 8.8 a (0)	54.2 ± 14.4 a (0)	55.3 ± 6.1 a (0)	60.3 ± 5.8 a (0)
Flagship 25WG (thiamethoxam)	8 oz	54.7 ± 3.9 a	34.2 ± 10.6 a (0)	42.7 ± 14.6 a (9)	45.5 ± 8.1 a (21)	48.5 ± 8.4 a (22)
Pylon(chlorfenapyr)	5.2 fl oz	47.5 ± 3.8 a	21.7 ± 3.3 a (26)	50.2 ± 14.5 a (0)	41.0 ± 6.7 a (18)	50.5 ± .5 a (6)
Tick-Ex (*Metarhizium anisopliae* strain F52)	29 fl oz	48.5 ± 7.5 a	63.3 ± 17.8 a (0)	28.0 ± 8.9 a (33)	32.8 ± 5.2 a (36)	42.3 ± 5.8 a (23)
Nontreated	-	41.0 ± 4.0 a	25.3 ± 5.7 a (0)	35.3 ± 9.5 a (0)	43.0 ± 6.6 a (0)	46.5 ± 6.4 a (0)
Total Population						
Avid 0.15EC (abamectin)	16 fl oz	59.8 ± 5.8 a	51.2 ± 7.5 a (0)	70.2 ± 12.4 a (0)	69.2 ± 6.2 a (0)	79.2 ± 6.0 a (0)
Flagship 25WG (thiamethoxam)	8 oz	69.3 ± 4.8 a	42.2 ± 10.6 a (13)	56.7 ± 14.1 a (12)	59.8 ± 7.8 a (18)	68.2 ± 8.5 a (18)
Pylon(chlorfenapyr)	5.2 fl oz	60.7 ± 4.0 a	39.5 ± 8.9 a (7)	69.7 ± 12.7 a (0)	59.2 ± 7.5 a (8)	71.2 ± 3.9 a (2)
Tick-Ex (*Metarhizium anisopliae* strain F52)	29 fl oz	62.2 ± 8.7 a	70.8 ± 17.5 a (0)	43.7 ± 10.8 a (25)	47.3 ± 6.6 a (28)	64.5 ± 8.8 a (13)
Nontreated	-	53.2 ± 3.7 a	37.3 ± 6.0 a (0)	49.7 ± 9.3 a (0)	56.3 ± 5.5 a (0)	63.5 ± 5.9 a (0)

[z] Mean number of thrips were counted after alcohol extraction.
[y] Means within a column followed by the same letter are not significantly different based on LSD test (P=0.05).

Table 78. Western Flower Thrips Control on Marigold (*Tagetes patula*) 'Boy O Boy' – Application Rates and Dates, Ludwig, TX, 2010.

Treatment (Active Ingredient)	Rate / 100 gal	Application Dates			
		21/1 0 WAT	12/9 1 WAT	12/17 2 WAT	12/30 4 WAT
A16901B	6.7 oz	X	X	X	
A16901B + CA4803A	6.7 oz + 32 fl oz	X	X	X	
Aria 50SG (flonicamid)	120 g	X		X	X
Aria 50SG + NNI-0101 20% SC (pyrifluquinazon)	120 g + 6.38 fl oz	X		X	X
Aria (flonicamid) / Hachi-Hachi (tolfenpyrad) / Pylon (chlorfenapyr)	120 g / 21 fl oz / 5.2 fl oz	X		X	X
Avid 0.015EC (abamectin)	8 fl oz	X	X		
Conserve (spinosad)	8 fl oz				
Conserve (spinosad) / Hachi-Hachi (tolfenpyrad) / Pylon (chlorfenapyr)	8 fl oz/ 21 fl oz / 5.2 fl oz	X		X	X
Hachi-Hachi EC (tolfenpyrad)	21 fl oz	X		X	X
NNI-0101 20% SC (pyrifluquinazon)	6.38 fl oz	X		X	X
Pylon(chlorfenapyr)	5.2 fl oz	X	X		
Nontreated					

Table 79. Western Flower Thrips Control on Marigold (*Tagetes patula*) 'Boy O Boy', Ludwig, TX, 2010.

Treatment	Population Counts [z], Means Separations [y], and Henderson's Percent Control						
	Precount	7 DAT	14 DAT	21 DAT	28 DAT	35 DAT	42 DAT
Immatures							
A16901B	29.5±8.1 a	21.8±3.8 ab (24)	3.7±1.3 cd (86)	1.3±0.5 b (96)	2.5±1.6 bc (94)	8.2±2.9 d (84)	18.3±4.0 bc (52)
A16901B + CA4803A	41.2±8.6 a	15.8±3.2 b (61)	4.7±2.3 cd (87)	0.8±0.4 b (98)	0.3±0.3 c (99)	4.7±2.0 d (94)	10.8±3.9 c (80)
Aria 50SG	59.2±9.4 a	19.0±4.5 c (67)	25.3±10.1 ab (53)	3.8±1.7 c (94)	4.8±2.8 b (94)	18.5±4.9 cd (82)	36.8±17.1 bc (52)
Aria 50SG + NNI-0101	55.8±15.1 a	27.3±3.7 abc (50)	27.5±12.3 ab (45)	1.5±0.6 c (98)	2.8±1.1 b (96)	10.0±4.1 d (90)	12.5±3.1 c (83)
Aria / Hachi-Hachi / Pylon	75.7±8.1 a	41.0±6.6 ab (44)	28.8±7.8 ab (58)	3.3±2.2 b (96)	1.3±1.0 b (99)	1.8±0.5 c (99)	1.2±0.5 c (99)
Avid 0.015EC	34.3±6.5 a	22.3±7.4 c (33)	10.2±3.2 b (67)	1.5±0.9 c (96)	2.0±0.7 b (96)	26.2±8.8 bcd (57)	29.5±9.1 bc (33)
Conserve	49.2±8.3 a	26.7±6.6 bc (44)	21.8±5.9 ab (51)	33.3±13.9 ab (41)	39.8±11.7 a (43)	45.8±9.1 ab (48)	44.5±11.8 ab (30)
Conserve / Hachi-Hachi / Pylon	51.8±9.1 ab	39.7±9.4 ab (21)	16.8±7.2 bc (64)	2.8±1.1 b (95)	2.3±1.2 b (97)	4.2±1.6 c (95)	1.7±0.8 c (97)
Hachi-Hachi EC	40.7±9.3 a	20.7±4.3 ab (48)	16.3±6.3 b (56)	2.5±1.4 b (95)	2.3±1.3 b (96)	4.2±2.0 c (94)	4.3±1.9 c (92)
NNI-0101 20% SC	54.2±6.9 a	49.3±1.3 a (9)	22.5±4.7 ab (55)	20.3±5.2 b (67)	24.5±5.9 a (68)	41.7±13.4 bc (57)	43.5±7.4 ab (38)
Pylon	40.3±10.1 a	19.0±4.8 c (52)	1.8±0.7 c (95)	0.8±0.4 c (98)	7.5±4.6 b (87)	22.0±6.5 bcd (69)	37.2±6.9 ab (28)
Nontreated	48.0±11.0 a	46.7±9.7 ab (0)	43.3±10.6 a (0)	55.3±10.3 a (0)	68.0±15.7 a (0)	85.7±5.5 a (0)	61.7±4.1 a (0)
Adults							
A16901B	8.0±1.8 a	8.8±2.9 abc (26)	6.5±0.8 b (71)	3.0±0.7 bcd (69)	2.5±1.8 cd (46)	8.7±0.8 a (0)	0.8±0.4 d (68)
A16901B + CA4803A	7.0±1.9 ab	4.2±0.9 c (60)	12.8±3.1 ab (34)	2.3±0.9 d (72)	0.8±0.4 d (80)	3.8±0.9 b-e (16)	1.2±0.4 cd (46)
Aria 50SG	5.3±1.9 a	10.7±3.7 abc (0)	15.5±5.3 ab (0)	7.2±1.6 a (0)	3.2±0.8 bc (0)	6.0±1.4 abc (0)	4.8±1.0 a (0)
Aria 50SG + NNI-0101	4.7±1.6 a	10.7±2.8 ab (0)	12.5 ±4.6 ab (3)	10.5±1.5 a (0)	6.7±1.1 a (0)	8.3±1.8 ab (0)	3.7±1.2 abc (0)
Aria / Hachi-Hachi / Pylon	6.2±1.5 ab	14.8±1.3 a (0)	20.5±5.6 a (0)	1.3±0.5 d (82)	1.3±0.3 cd (64)	2.7±1.1 def (33)	0.8±0.4d (59)
Avid 0.015EC	4.0±0.8 a	8.0±3.8 bc (0)	9.0±2.0 ab (18)	4.2±2.0 bcd (12)	2.8±0.5 bc (0)	7.3±1.8 abc (0)	1.8±0.7 bcd (0)
Conserve	6.8±2.0 ab	9.8±3.5 abc (3)	7.5±2.3 b (60)	5.8±0.9 ab (29)	1.5±0.8 cd (62)	1.2±0.2 f (73)	1.8±0.8 bcd (16)
Conserve / Hachi-Hachi / Pylon	12.7±2.3 a	8.3±2.8 abc (56)	8.3±2.2 ab (76)	3.3±1.1 bcd (78)	2.0±0.4 bcd (73)	4.5±1.6 b-f (45)	3.2±1.1 abc (20)
Hachi-Hachi EC	6.8±4.0 a	8.0±3.0 bc (21)	10.0±3.0 ab (47)	2.7±0.8 cd (67)	1.5±0.5 cd (62)	2.7±0.8 def (39)	1.8±0.7 bcd (16)
NNI-0101 20% SC	7.7±1.4 ab	10.8±2.7 ab (6)	18.8±4.4 a (11)	7.3±3.2 abc (21)	5.2±1.6 ab (0)	5.5±1.4 a-d (0)	3.3±0.7 ab (0)
Pylon	14.8±4.5 a	10.0±3.3 abc (55)	12.5±4.1 ab (69)	2.3±0.8 cd (87)	1.0±0.5 d (88)	2.2±0.9 ef (77)	0.4±0.2 d (91)
Nontreated	5.7±2.6 b	8.5±2.1 abc (0)	15.7±2.9 ab (0)	6.8±1.2 a (0)	3.3±0.8 abc (0)	3.7±0.9 c-f (0)	1.8±0.6 bc (0)

[z] Mean number of thrips were counted after alcohol extraction.

[y] Means within a column followed by the same letter are not significantlydifferent based on LSD test (P<0.05).

Table 80. Western Flower Thrips Control on Marigold (*Tagetes patula*) 'Boy O Boy' – Application Rates and Dates, Ludwig, TX, 2010.

Treatment (Active Ingredient)	Rate / 100 Gal	Application Dates				
		2/28 0 WAT	3/6 1 WAT	3/14 2 WAT	3/21 3 WAT	3/28 4 WAT
Aria (flonicamid)	120 g	X		X		X
/ BotaniGard 22 % WP	2 lb		X		X	
Aria (flonicamid)	120 g	X		X		X
/ Tick-Ex	29 fl oz		X		X	
BotaniGard 22 % WP (*Beauvaria bassiana*)	2 lb	X	X	X	X	X
BotaniGard 22 % WP + Molt X (azadirachtin)	2 lb + 8 oz	X		X		X
/ BotaniGard	/ 2 lb		X		X	
BotaniGard 22 % WP + SuffOil	2 lb + 1 gal	X		X		X
/ BotaniGard	/ 2 lb		X		X	
BotaniGard 25 % WP	2 lb	X	X		X	X
/ Hachi-Hachi (tolfenpyrad)	21 fl oz			X		
BotaniGard 22 % WP + Tick-Ex	2 lb + 29 fl oz	X	X	X	X	X
Tick-Ex (*Metarhizium anisopliae* strain F52)	29 fl oz	X	X	X	X	X
Tick-Ex EC	29 fl oz	X	X		X	X
/ Hachi-Hachi	21 fl oz			X		
Nontreated						

Table 81. Western Flower Thrips Control on Marigold (*Tagetes patula*) 'Boy O Boy', Ludwig, TX, 2010.

Treatment	Population Counts [z], Means Separations [y], and Henderson's Percent Control					
	Precount	6 DAT	14 DAT	21 DAT	28 DAT	35 DAT
Immatures						
Aria (flonicamid) / BotaniGard 22 % WP	36.0±4.6 a	12.3±2.8 b (55)	13.7±3.8 a (41)	7.0±1.5 b (79)	13.2±3.9 d (66)	8.0±3.5 b (76)
Aria (flonicamid) / Tick-Ex EC	49.5±8.8 a	31.3±6.6 ab (16)	9.2±3.3 a (71)	18.5±4.8 ab (60)	12.3±4.1 d (77)	10.8±4.0 b (76)
BotaniGard 22 % WP	57.0±10.9 a	42.8±8.5 ab (0)	34.0±7.9 a (4)	38.3±10.8 ab (27)	40.8±4.5 a-d (34)	66.3±18.4 a (0)
BotaniGard 22 % WP + Molt X / BotaniGard	36.5±5.3 a	25.7±7.2 ab (7)	34.0±1.0 a (0)	31.0±8.7 ab (8)	27.3±6.7 bcd (31)	27.6±9.2 ab (18)
BotaniGard 22 % WP + SuffOil X / BotaniGard	50.7±11.0 a	22.0±5.1 ab (42)	28.5±7.1 a (14)	34.2±10.8 ab (27)	58.0±6.3 ab (0)	36.7±10.0 ab (21)
BotaniGard 25 % WP / Hachi-Hachi	46.8±5.5 a	23.2±5.4 ab (34)	31.5±9.5 a (0)	18.3±7.3 ab (58)	8.0±5.6 d (84)	7.4±2.4 b (83)
BotaniGard 22 % WP + Tick-Ex	37.8±12.1 a	36.8±12.0 ab (0)	17.4±4.8 a (29)	32.8±5.2 ab (6)	49.8±10.3 abc (0)	34.3±9.8 ab (1)
Tick-Ex (*Metarhizium anisopliae* strain F52)	49.3±3.8 a	33.7±4.2 ab (9)	28.2±4.1 a (12)	47.0±17.0 ab (0)	69.8±9.7 a (0)	33.6±9.0 ab (26)
Tick-Ex / Hachi-Hachi	52.7±11.2 a	45.5±10.7 a (0)	27.4±5.5 a (20)	11.8±3.9 b (76)	21.7±6.3 cd (62)	11.2±3.1 b (77)
Nontreated	59.7±6.6 a	45.0±3.7 a (0)	38.8±8.8 a (0)	55.2±10.5 a (0)	64.7±11.4 a (0)	54.8±10.2 a (0)
Adults						
Aria (flonicamid) / BotaniGard 22 % WP	2.2±0.5 a	5.0±1.7 a (0)	4.7±1.4 ab (0)	5.0±0.8 a (0)	2.5±1.0 a (0)	3.3±1.3 a (52)
Aria (flonicamid) / Tick-Ex EC	2.8±1.0 a	5.5±1.3 a (0)	9.3±3.6 a (0)	3.8±1.5 a (0)	2.0±0.4 a (0)	5.3±1.6 a (40)
BotaniGard 22 % WP	2.2±0.5 a	2.5±0.8 a (0)	2.8±1.1 ab (0)	1.3±0.7 a (47)	1.4±1.2 a (43)	3.0±1.5 a (57)
BotaniGard 22 % WP + Molt X / BotaniGard	3.2±0.5 a	3.5±1.8 a (0)	3.2±0.8 ab (0)	2.3±0.9 a (36)	0.7±0.3 a (67)	5.8±1.9 a (42)
BotaniGard 22 % WP + SuffOil X / BotaniGard	3.7±1.2 a	3.5±1.3 a (0)	1.3±0.6 b (57)	1.8±0.3 a (57)	1.5±0.6 a (39)	2.8±1.0 a (76)
BotaniGard 25 % WP / Hachi-Hachi	1.8±0.9 a	1.2±0.5 a (4)	3.5±1.0 ab (0)	1.8±0.5 a (11)	1.3±0.8 a (0)	4.6±2.9 a (19)
BotaniGard 22 % WP + Tick-Ex	3.5±1.1 a	1.3±0.4 a (47)	1.8±0.4 b (37)	1.3±0.5 a (67)	1.5±0.8 a (36)	3.8±0.9 a (66)
Tick-Ex (*Metarhizium anisopliae* strain F52)	3.7±0.9 a	1.7±0.7 a (39)	2.2±0.9 b (27)	6.3±3.1 a (0)	1.8±1.5 a (27)	5.6±1.9 a (52)
Tick-Ex / Hachi-Hachi	2.2±0.9 a	6.0±1.7 a (0)	3.0±1.1 ab (0)	2.0±0.9 a (19)	2.5±0.9 a (0)	4.6±1.1 a (3)
Nontreated	3.3±1.0 a	2.3±0.7 a (0)	2.7±0.6 ab (0)	3.7±0.7 a (0)	2.2±0.9 a (0)	10.4±0.9 a (0)

[z] Mean number of thrips were counted after alcohol extraction.
[y] Means within a column followed by the same letter are not significantly different based on Tukey's HSD test (P<0.05).

2011.
In 2011, A16901B and A16901B + CA4803A were the only treatments that provided effective control of both immature and adult WFT on marigold flowers with weekly applications (Table 82). BotaniGard, Conserve and NNI-0101 were inconsistent, and Tick-Ex was generally ineffective. All products did significantly reduce a very low thrips injury, with A16901B and A16901B + CA4803A providing the best reduction.

Table 82. Western Flower Thrips Control on Marigold (*Tagetes erecta*) 'Vanilla', Damage Rating, Gilrein, NY, 2011.

Treatment	Rate per 100 Gal	Application Dates	Damage Rating [x]	
			5/25 (Pre)	6/23
A16901B (cyantraniliprole+thiamethoxam)	6.7 oz	5/25, 6/1, 6/8, 6/15	0.0 a	0.3 c
A16901B + CA4803A	6.7 oz + 32 fl oz	5/25, 6/1, 6/8, 6/15	0.3 a	0.3 c
BotaniGard 22 % WP + Molt X (azadirachtin) / BotaniGard	2 lb + 8 fl oz / 2 lb	5/25, 6/8, / 6/1, 6/15	0.1 a	1.0 b
BotaniGard 22 % WP + SuffOil / BotaniGard	2 lb + 1 gal / 2 lb	5/25, 6/8, / 6/1, 6/15	0.0 a	1.1 b
Conserve 1SC (spinosad)	6 fl oz	5/25, 6/1, 6/8, 6/15	0.0 a	1.1 b
NNI-0101 20% SC (pyrifluquinazon)	6.38 fl oz	5/25, 6/8	0.3 a	1.1 b
Tick-Ex (*Metarhizium anisopliae* strain F52)	29 fl oz	5/25, 6/1, 6/8, 6/15	0.1 a	1.1 b
Nontreated	-	-	0.3 a	1.9 a

[x] Thrips damage on foliage was rated on a scale of 0 – 10 with 0 = no injury and 10 = dead plant. Means within a column followed by the same letter are not significantly different based on Tukey's HSD test (P=0.05).

Table 83. Western Flower Thrips Control on Marigold (*Tagetes erecta*) 'Vanilla', Gilrein, NY, 2011.

Treatment	Rate per 100 Gal	Application Dates	Population Counts [y], Means Separations [x], and Henderson's % Control				
			5/25 (Pre)	5/31	6/8	6/14	6/23
Immatures							
A16901B (cyantraniliprole+thiamethoxam)	6.7 oz	5/25, 6/1, 6/8, 6/15	1.9 a	4.8 ab (0)	0.0 c (100)	2.3 bc (52)	1.5 b (91)
A16901B + CA4803A	6.7 oz + 32 fl oz	5/25, 6/1, 6/8, 6/15	1.6 a	2.8 ab (8)	0.1 bc (93)	0.8 c (80)	1.5 b (89)
BotaniGard 22 % WP + Molt X (azadirachtin) / BotaniGard	2 lb + 8 fl oz / 2 lb	5/25, 6/8, / 6/1, 6/15	2.6 a	4.1 ab (17)	1.6 abc (28)	3.4 b (48)	10.0 a (56)
BotaniGard 22 % WP + SuffOil / BotaniGard	2 lb + 1 gal / 2 lb	5/25, 6/8, / 6/1, 6/15	2.5 a	3.6 ab (24)	2.7 a (0)	5.5 ab (13)	13.1 a (40)
Conserve 1SC (spinosad)	6 fl oz	5/25, 6/1, 6/8, 6/15	1.3 a	6.4 a (0)	1.4 abc (0)	4.3 ab (0)	10.5 a (7)
NNI-0101 20% SC (pyrifluquinazon)	6.38 fl oz	5/25, 6/8	1.8 a	2.5 b (27)	2.0 ab (0)	5.5 ab ()	10.4 a (33)
Tick-Ex (*Metarhizium anisopliae* strain F52)	29 fl oz	5/25, 6/1, 6/8, 6/15	2.0 a	4.4 ab (0)	1.9 abc (0)	7.0 a (0)	15.8 a (9)
Nontreated	-	-	2.8 a	5.3 ab 0()	2.4 a (0)	7.1 a (0)	24.3 a (0)
Adults							
A16901B (cyantraniliprole+thiamethoxam)	6.7 oz	5/25, 6/1, 6/8, 6/15	3.3 a	4.9 ab (32)	14.1 ab (63)	7.0 a (72)	7.4 bc (77)
A16901B + CA4803A	6.7 oz + 32 fl oz	5/25, 6/1, 6/8, 6/15	3.1 a	1.8 ab (73)	6.8 b (81)	3.1 b (87)	5.1 c (83)
BotaniGard 22 % WP + Molt X (azadirachtin) / BotaniGard	2 lb + 8 fl oz / 2 lb	5/25, 6/8, / 6/1, 6/15	2.8 a	5.4 a (12)	14.4 a (55)	8.5 a (60)	12.6 ab (54)
BotaniGard 22 % WP + SuffOil / BotaniGard	2 lb + 1 gal / 2 lb	5/25, 6/8, / 6/1, 6/15	2.5 a	1.3 b (76)	15.4 a (46)	16.1 a (15)	17.0 a (30)
Conserve 1SC (spinosad)	6 fl oz	5/25, 6/1, 6/8, 6/15	4.0 a	1.1 b (87)	22.5 a (51)	8.9 a (71)	12.4 ab (68)
NNI-0101 20% SC (pyrifluquinazon)	6.38 fl oz	5/25, 6/8	3.6 a	2.0 ab (75)	18.1 a (56)	10.0 a (63)	14.3 ab (59)
Tick-Ex (*Metarhizium anisopliae* strain F52)	29 fl oz	5/25, 6/1, 6/8, 6/15	3.1 a	3.0 ab (56)	24.6 a (31)	14.9 a (37)	15.6 ab (48)
Nontreated	-	-	2.1 a	4.6 ab (0)	24.1 a (0)	15.9 a (0)	20.5 a (0)

Total Population							
A16901B (cyantraniliprole+thiamethoxam)	6.7 oz	5/25, 6/1, 6/8, 6/15	5.1 a	9.6 ab (7)	14.1 bc (49)	9.3 b (61)	8.9 b (81)
A16901B + CA4803A	6.7 oz + 32 fl oz	5/25, 6/1, 6/8, 6/15	4.8 a	4.5 c (54)	6.9 c (73)	3.9 c (83)	6.6 b (85)
BotaniGard 22 % WP + Molt X (azadirachtin) / BotaniGard	2 lb + 8 fl oz / 2 lb	5/25, 6/8, / 6/1, 6/15	5.4 a	9.5 ab (13)	16.0 abc (45)	11.9 ab (53)	22.6 a (54)
BotaniGard 22 % WP + SuffOil / BotaniGard	2 lb + 1 gal / 2 lb	5/25, 6/8, / 6/1, 6/15	5.0 a	4.9 bc (51)	18.1 ab (33)	21.6 a (8)	30.1 a (34)
Conserve 1SC (spinosad)	6 fl oz	5/25, 6/1, 6/8, 6/15	5.3 a	7.5 abc (30)	23.9 ab (17)	13.1 ab (47)	22.9 a (53)
NNI-0101 20% SC (pyrifluquinazon)	6.38 fl oz	5/25, 6/8	5.4 a	4.5 c (59)	20.1 ab (51)	15.5 ab (71)	24.6 a (50)
Tick-Ex (*Metarhizium anisopliae* strain F52)	29 fl oz	5/25, 6/1, 6/8, 6/15	5.1 a	7.4 abc (28)	26.5 a (4)	21.9 a (9)	31.4 a (33)
Nontreated	-	-	4.9 a	9.9 a (0)	26.5 a (0)	23.0 a (0)	44.8 a (0)

[y] Mean number of thrips per plant.
[x] Means within a column followed by the same letter are not significantly different based on Tukey's HSD test (P=0.05).

2012.

In 2012, Davis collected thrips on marigold foliage, removing flower buds as they formed. Treatments were applied weekly or biweekly (Table 84). A16901B provided excellent control with only two weekly applications the first 2 weeks; it was better than AzaGuard, MBI 206 at the high rate, and the standard Hachi-Hachi (Table 85). Both rates of MBI-203, the low rate of MBI-206 and Proud 3 were not effective.

Table 84. Western Flower Thrips Control on Marigold (*Tagetes patula*) 'Yellow Bonanza', – Application Rates and Dates, Davis, MI, 2012.

Treatment[z] (Active Ingredient)	Rate Per 100 Gal	Application Dates			
		6/6 Week 0	6/13 Week 1	6/19 Week 2	6/26 Week 3
A16901B	6.7 oz	X		X	
	13.4 oz	X		X	
Azaguard (azadirachtin)	16 fl oz	X	X	X	X
Hachi-Hachi (tolfenpyrad)	21 fl oz	X		X	
MBI-203 (*Chromobacterium subtsugae*)	2 lb	X	X	X	X
	4 lb	X	X	X	X
MBI-206 (*Burkholderia* sp.)	1 gal	X	X	X	X
	2 gal	X	X	X	X
Proud 3 (thyme oil)	1 gal	X		X	
Water Check	-	X	X	X	X
Nontreated	-				

Table 85. Western Flower Thrips Control on Marigold (*Tagetes patula*) 'Yellow Bonanza', Davis, MI, 2012.

Treatment (Rate per 100 gal)	Population Counts [z], Means Separations [y], and Henderson's Percent Control					
	Pretrt	1 WAT	2 WAT	3 WAT	4 WAT	5 WAT
Total Population						
A16901B (6.7 oz)	2.50 a	0.25 a (95)	0.63 a (87)	0.13 a (98)	0.50 a (90)	0.57 a (88)
A16901B (13.4 oz)	4.25 a	0.25 a (97)	1.00 ab (88)	0.25 a (98)	0.63 ab (93)	0.50 ab (94)
AzaGuard (16 fl oz)	2.63 a	2.13 a-d (76)	1.88 ab (63)	1.13 ab (85)	1.00 ab (82)	1.00 abc (80)
Hachi-Hachi (21 fl oz)	2.75 a	0.75 ab (87)	3.13 bcd (42)	0.38 a (95)	1.13 ab (80)	0.75 ab (86)
MBI-203 DF (2 lb)	3.50 a	4.50 de (37)	6.50 d (5)	4.63 b (54)	3.25 cd (56)	4.25 e (36)
MBI-203 DF (4 lb)	2.13 a	1.38 abc (68)	4.00 bcd (4)	1.38 ab (78)	2.29 bcd (49)	2.17 b-e (46)
MBI-206 (1 gal)	3.25 a	1.63 bcd (76)	2.13 abc (66)	2.88 b (69)	2.38 bcd (65)	1.40 a-d (77)
MBI-206 (2 gal)	2.25 a	1.00 abc (78)	2.50 abc (43)	3.00 b (54)	1.13 ab (76)	1.13 abc (74)
Proud 3 (1 gal)	2.00 a	5.00 e (0)	4.14 bcd (0)	2.71 b (53)	5.00 d (0)	2.43 cde (36)
Water Check	2.25 a	3.50 cde (24)	4.38 cd (0)	3.50 b (46)	2.00 abc (58)	3.13 de (27)
Nontreated	2.50 a	5.13 e (0)	4.88 cd (0)	7.25 c (0)	5.25 d (0)	4.75 e (0)
Immatures						
A16901B (6.7 oz)	2.38 a	0.25 ab (95)	0.38 a (92)	0.13 a (98)	0.38 a (93)	0.00 a (100)
A16901B (13.4 oz)	4.00 a	0.00 a (100)	0.75 ab (91)	0.25 a (98)	0.38 ab (96)	0.50 ab (94)
AzaGuard (16 fl oz)	2.25 a	2.13 bcd (58)	1.25 abc (74)	1.00 ab (87)	1.00 abc (82)	1.00abc (78)
Hachi-Hachi (21 fl oz)	2.50 a	0.75 abc (87)	2.38 b-e (55)	0.38 a (95)	1.00 abc (83)	0.50 ab (57)
MBI-203 DF (2 lb)	3.13 a	4.50 ef (36)	5.88 e (11)	4.63 b (56)	3.13 def (58)	4.13 e (34)
MBI-203 DF (4 lb)	2.13 a	1.38 bcd (71)	3.63 cde (19)	1.13 ab (84)	2.14 cde (58)	2.17 cde (49)
MBI-206 (1 gal)	3.25 a	1.63 cde (78)	2.13 a-d (69)	2.75 b (75)	2.00 cde (74)	1.40 bcd (79)
MBI-206 (2 gal)	2.00 a	0.75 abc (83)	2.25 a-d (47)	2.88 b (57)	0.88 abc (82)	1.13 bc (72)
Proud 3 (1 gal)	1.75 a	4.75 ef (0)	3.43 cde (7)	2.43 b (58)	4.71 ef (0)	2.29 cde (34)
Water Check	2.00 a	3.38 def (24)	3.38 de (20)	3.38 b (50)	1.88 bcd (61)	2.75 de (31)
Nontreated	2.13 a	4.75 f (0)	4.50 de (0)	7.13 c (0)	5.13 f (0)	4.25 de (0)
Adults						
A16901B (6.7 oz)	0.13 a	0.00 a	0.25 a	0.00 a	0.13 a	0.57 a
A16901B (13.4 oz)	0.25 a	0.25 a	0.25 a	0.00 a	0.25 a	0.00 a
AzaGuard (16 fl oz)	0.38 a	0.38 a	0.63 a	0.13 a	0.00 a	0.00 a
Hachi-Hachi (21 fl oz)	0.25 a	0.00 a	0.75 a	0.00 a	0.13 a	0.25 a
MBI-203 DF (2 lb)	0.38 a	0.00 a	0.63 a	0.25 a	0.13 a	0.13 a
MBI-203 DF (4 lb)	0.00 a	0.00 a	0.38 a	0.13 a	0.14 a	0.00 a
MBI-206 (1 gal)	0.25 a	0.00 a	0.00 a	0.13 a	0.38 a	0.00 a
MBI-206 (2 gal)	0.25 a	0.25 a	0.25 a	0.13 a	0.25 a	0.00 a
Proud 3 (1 gal)	0.25 a	0.25 a	0.71 a	0.29 a	0.29 a	0.14 a
Water Check	0.25 a	0.13 a	1.00 a	0.13 a	0.25 a	0.38 a
Nontreated	0.38 a	0.38 a	0.38 a	0.13 a	0.13 a	0.50 a

[z] Mean number of thrips from 4 leaves were counted from alcohol extraction.

[y] Means followed by the same letter are not significantly different Fisher's LSD ($p < 0.05$). Data transformed prior to ANOVA log (x+1). Actual treatment means presented in table.

2013.

In 2013, two researchers conducted two studies on marigold (Table 86 - Table 88). In one experiment, Overture provided effective control of both immature and adult WFT over the period of the trial; A20520A and A16901 provided good control but efficacy of these products last for only one week (Table 87).AzaGuard provided significant control from later applications, while MBI-203, MBI-206 and Proud 3 were ineffective. Overall plant quality was significantly lower in plants treated with AzaGuard, MBI-203, MBI-206 and Proud 3 due to poor thrips control. In the second trial, Conserve was extremely effective at controlling both immature and adult WFT on marigold while Avid, A20520 (8 oz), and A20520 (16 oz) was effective at reducing immature WFT populations but had marginal success in reducing adult WFT populations (Table 88).

Table 86. Western Flower Thrips Control on Marigold (*Tagetes erecta*) 'Vanilla', Gilrein, NY, 2013.

Treatment [y]	Rate per 100 Gal	Population Counts [y], Means Separations [x], and Henderson's % Control								
		8/12 (Pre)	8/19	8/26	9/3	9/9	9/15	9/25	9/30	10/10
Immatures										
A16901B (cyantraniliprole + thiamethoxam)	6.7 oz	10.1 a	3.0 b-e (45)	0.3 ab (83)	1.0 bc (75)	3.3 abc (27)	0.2 d (95)	0.3 d (97)	4.5 efg (40)	6.2 ef (55)
	13.4 oz	8.0 a	3.8 b-e (12)	0.2 b (85)	1.0 bc (69)	2.2 bc (39)	0.0 d (100)	0.2 d (98)	4.3 g (28)	5.7 f (47)
A-20520 (cyantraniliprole)	8 fl oz	8.3 a	2.7 cde (40)	0.3 ab (79)	0.7 bc (79)	1.0 c (73)	0.0 d (100)	0.5 d (94)	5.5 d-g (11)	11.8 a-e (0)
	16 fl oz	11.2 a	1.7e (72)	0.3 ab (84)	0.2 c (96)	3.2 abc (36)	0.5 d (88)	0.0 d (100)	3.8 fg (55)	8.0 def (47)
AzaGuard (azadirachtin)	16 fl oz	13.0 a	13.2 a (0)	2.2 ab ()	1.5 bc (71)	1.3 bc (78)	1.7 cd (66)	2.2 c (84)	7.5 c-g (23)	10.0 b-f (43)
MBI-203 DF (*Chromobacterium subtsugae*)	3 lb	8.5 a	6.5a-d (0)	3.2 a (0)	6.2 a (0)	5.5 ab (0)	6.8 ab (0)	12.0 b (0)	11.8 b-f (0)	18.0 ab (0)
	4 lb	8.7 a	8.8 abc (0)	2.0 ab (0)	7.8 a (0)	7.5 a (0)	10.0 ab (0)		12.5 bcd (0)	19.8 a (0)
MBI-206 F (*Burkholderia* sp.)	1 gal	8.0 a	6.8a-d (0)	1.5 ab (0)	6.5 a (0)	6.5 a (0)	11.5 a (0)	25.0 a (0)	24.5 a (0)	17.5 abc (0)
	2 gal	7.5 a	7.8 abc (0)	1.8 ab (0)	7.7 a (0)	4.0 abc (0)	6.5 ab (0)	10.7 b (0)	20.0 ab (0)	17.2 abc (0)
Proud 3 (thyme oil)	4 qt	8.3 a	5.5 a-e (0)	0.8 ab (44)	3.3 ab (0)	3.3 abc (11)	4.5 bc (0)	15.3 ab (0)	16.5 abc (0)	14.5 a-d (0)
Overture 35WP (pyridalyl)	8 oz	9.8 a	2.3 de (57)	0.0 b (100)	1.3 bc (67)	2.2 abc (50)	0.3 d (92)	0.0 d (100)	4.3 fg (41)	9.7 c-f (27)
Control	water only	16.3 a	8.8 ab (0)	2.8 ab (0)	6.5 a (0)	7.3 a (0)	6.2 ab (0)	17.3 ab (0)	12.2 b-e (0)	22.0 a (0)
Adults										
A16901B (cyantraniliprole + thiamethoxam)	6.7 oz	6.3 a	1.8 abc (71)	6.7 a (0)	0.0 b (100)	0.2 c (97)	3.0 b-e (72)	3.8 de (63)	0.5 c (97)	0.7 de (96)
	13.4 oz	5.8 a	0.3 bc (94)	6.2 a (0)	0.0 b (100)	0.2 c (97)	2.7 de (73)	2.0 e (79)	0.2 c (99)	0.5 de (97)
A-20520 (cyantraniliprole)	8 fl oz	7.5 a	0.2 c (97)	3.8 a (0)	0.2 b (98)	1.0 c (89)	2.5 cde (81)	5.5 cde (55)	1.5 bc (93)	0.3 e (99)
	16 fl oz	6.2 a	0.2 c (96)	2.3 a (23)	0.3 b (98)	1.0 bc (86)	3.2 b-e (70)	3.4 de (66)	0.2 c (99)	1.0 de (95)
AzaGuard (azadirachtin)	16 fl oz	7.0 a	2.2 abc (63)	2.5 a (26)	0.2 b (98)	1.2 bc (85)	4.2 b-e (65)	5.7 cde (50)	4.3 b (78)	6.0 bc (71)
MBI-203 DF (*Chromobacterium subtsugae*)	3 lb	9.8 a	7.3 ab (11)	3.3 a (30)	4.8 a (65)	4.8 ab (58)	9.2 abc (46)	7.6 bcd (60)	17.2 a (38)	20.6 a (28)
	4 lb	6.5 a	3.5 abc (36)	5.3 a (0)	5.8 a (37)	7.7 a (0)	12.5 a (0)		20.3 a (0)	23.8 a (0)
MBI-206 F (*Burkholderia* sp.)	1 gal	8.3 a	3.8 abc (44)	2.7 a (33)	5.5 a (53)	12.8 a (0)	7.5 a-d (48)	12.5 a (7)	24.0 a (0)	22.2 a (9)
	2 gal	7.8 a	6.0 a (8)	2.8 a (26)	4.5 a (59)	5.7 a (38)	9.7 ab (28)	10.9 ab (13)	19.8 a (10)	21.7 a (5)
Proud 3 (thyme oil)	4 qt	7.8 a	2.0 abc (69)	4.3 a (0)	3.8 a (66)	1.2 c (87)	7.3 a-d (46)	11.2 ab (11)	20.2 a (8)	31.2 a (0)
Overture 35WP (pyridalyl)	8 oz	5.8 a	1.0 abc (79)	4.0 a (0)	0.0 b (100)	0.7 c (92)	0.8 e (92)	3.3 de (65)	0.3 c (98)	2.8 cd (84)

Control	water only	6.2 a	5.2 ab (0)	3.0 a (0)	8.8 a (0)	7.3 a (0)	10.7 a (0)	10.0 abc (0)	17.5 a (0)	18.2 ab (0)
Total Population										
A16901B (cyantraniliprole + thiamethoxam)	6.7 oz	17.0 a	4.8 b-e (55)	7.0 a (0)	1.0 c (91)	3.5 bc (68)	3.2 bcd (75)	4.2 cd (80)	5.0 e (78)	6.8 d (73)
	13.4 oz	13.8 a	4.2 cde (51)	6.3 a (0)	1.0 c (89)	2.3 c (74)	2.7 d (74)	2.2 de (87)	4.5 e (75)	6.2 d (70)
A-20520 (cyantraniliprole)	8 fl oz	15.8 a	2.8 de (72)	4.2 a (0)	0.8 c (93)	2.0 c (81)	2.5 cd (79)	6.0 cd (69)	7.0 de (66)	12.2 cd (48)
	16 fl oz	17.3 a	1.8 e (83)	2.7 a (39)	0.5 c (96)	4.2 bc (63)	3.7 bcd (71)	2.8 de (87)	3.3 e (86)	7.5 d (71)
AzaGuard (azadirachtin)	16 fl oz	20.0 a	15.3 a (0)	4.7 a (9)	1.7 bc (88)	2.5 c (81)	5.8 bcd (61)	7.8 cd (68)	11.8 cde (55)	16.0 bcd (46)
MBI-203 DF (*Chromobacterium subtsugae*)	3 lb	18.3 a	13.8 abc (0)	6.5 a (0)	11.0 a (12)	10.3 ab (14)	13.3 abc (3)	16.3 bc (27)	24.2 bcd (0)	32.2 abc (0)
	4 lb	15.2 a	12.3 ab (0)	7.3 a (0)	13.7 a (0)	15.2 a (0)	22.5 a (0)		32.8 ab (0)	43.7 a (0)
MBI-206 F (*Burkholderia* sp.)	1 gal	16.3 a	10.7 abc (0)	4.2 a (0)	12.0 a (0)	19.3 a (0)	19.0 a (0)	37.8 a (0)	48.5 a (0)	39.7 ab (0)
	2 gal	15.3 a	13.8 abc (0)	4.7 a (0)	12.2 a (0)	9.7 ab (3)	16.2 a (0)	21.5 ab (0)	39.8 ab (0)	38.8 ab (0)
Proud 3 (thyme oil)	4 qt	16.2 a	7.5 a-d (26)	5.2 a (0)	7.2 ab (35)	4.5 bc (57)	11.8 ab (2)	26.5 ab (0)	36.7 ab (0)	45.7 a (0)
Overture 35WP (pyridalyl)	8 oz	15.7 a	3.3 de (66)	4.0 a (1)	1.3 c (88)	2.8 c (73)	1.2 d (90)	3.3 de (83)	4.7 e (77)	12.5 cd (47)
Control	water only	22.5 a	14.0 a (0)	5.8 a (0)	15.3 a (0)	14.7 a (0)	16.8 a (0)	27.3 ab (0)	29.7 abc (0)	33.5 abc (0)

[y] Mean number of thrips per plant.
[x] Means within a column followed by the same letter are not significantly different based on Tukey's HSD test (P=0.05).
[z] All treatments except A-20520 applied weekly (8/13, 8/20, 8/27, 9/4, 9/10); A-20520 applied biweekly (8/13, 8/27, 9/10).

Table 87. Western Flower Thrips Control on Marigold (*Tagetes erecta*) 'Vanilla', Damage Rating, Gilrein, NY, 2013.

Treatment	Rate per 100 Gal	Damage Rating [x]					
		8/12	8/19	8/26	9/3	9/15	10/10
A-20520 (cyantraniliprole)	8 fl oz	1.3 a	1.0 b	1.0 b	1.3 bc	0.8 c	1.0 e
	16 fl oz	1.3 a	1.2 ab	1.0 b	1.2 c	1.0 c	1.0 e
A16901B (cyantraniliprole+thiamethoxam)	6.7 oz	2.2 a	1.2 ab	1.0 b	1.2 c	1.0 c	1.1 e
	13.4 oz	1.7 a	1.0 b	1.0 b	1.2 c	1.0 c	1.1 e
AzaGuard (azadirachtin)	16 fl oz	1.3 a	2.0 a	2.0 a	2.3 a	1.8 bc	2.0 d
MBI-203 DF (*Chromobacterium subtsugae*)	3 lb	1.2 a	1.7 ab	1.5 ab	2.5 a	2.6 ab	4.4 abc
	4 lb	1.5 a	1.5 ab	1.2 ab	2.7 a	3.2 a	5.2 a
MBI-206 F (*Burkholderia* sp.)	1 gal	1.2 a	1.7 ab	1.7 ab	2.2 ab	3.2 a	5.2 a
	2 gal	1.2 a	2.0 a	2.0 ab	2.2 ab	2.8 ab	3.7 c
Proud 3 (thyme oil)	4 qt	1.7 a	1.3 ab	1.8 ab	2.5 a	2.3 ab	4.8 ab
Overture 35WP (pyridalyl)	8 oz	1.3 a	1.0 b	1.0 b	1.0 c	1.0 c	1.0 e
Control	water only	2.2 a	1.2 ab	2.0 a	2.3 a	3.0 a	3.8 bc

[x] Overall thrips damage ratings: 1 excellent, 1-3 light damage, 4-5 moderate damage, 6-8 heavy damage, 9-10 dead plant. Means within a column followed by the same letter are not significantly different based on Tukey's HSD test (P=0.05).
[y] All treatments except A-20520 applied weekly (8/13, 8/20, 8/27, 9/4, 9/10); A-20520 applied biweekly (8/13, 8/27, 9/10).

Table 88. Western Flower Thrips Control on Marigold (*Tagetes patula*) 'Boy O Boy', Heinz, TX, 2013.

Treatment	Population Counts [z], Means Separations [y], and Henderson's Percent Control					
	0 DAT	WAT2	WAT 3	WAT 4	WAT5	WAT 6
Adults						
A20520A (8 oz)	4.2	3.3 (55)	4.0 (59)	1.8 z d (80)	4.4 (46)	2.7 z d (74)
A20520A (16 oz)	4.5	3.7 (54)	2.7 z d (75)	3.0 z d (69)	5.0 (43)	3.0 z d (73)
Avid (8 fl oz)	3.8	4.8 (29)	5.5 (38)	3.3 z d (60)	5.2 (31)	6.8 (27)
AzaGuard (16 fl oz)	3.2	9.3 (0)	10.2 (0)	6.8 (0)	9.7 (0)	7.5 (3)
Conserve (8 fl oz)	3.8	1.2 z d (83)	0.5 z d (94)	1.2 z d (86)	0.8 z d (89)	1.2 z d (88)
MBI 203DF (3 lb)	3.5	7.7 (0)	10.0 (0)	9.5 (0)	9.3 (0)	10.2 (0)
MBI 203DF (4 lb)	4.5	7.3 (8)	10.3 (2)	7.0 (28)	10.5 (0)	16.3 (0)
MBI 206 1 gal	3.7	5.8 (11)	11.8 (0)	12.2 (0)	21.0 (0)	12.7 (0)
MBI 206 2 gal	4.8	6.3 (26)	7.7 (32)	8.7 (16)	16.8 (0)	13.2 (0)
Proud 3	4.0	5.0 (30)	7.7 (18)	4.0 (53)	12.5 (0)	14.8 (0)
Water Spray	3.8	5.7 (17)	6.5 (27)	9.5 (0)	14.2 (0)	8.8 (6)
No Spray	4.5	8.0 (0)	10.5 (0)	9.7 (0)	8.8 (0)	11.0 (0)
Immatures						
A20520A (8 oz)	15.7	19.7 (33)	8.2 z d (88)	5.8 z d (83)	7.4 z d (85)	5.5 z d (92)
A20520A (16 oz)	17.0	22.8 (28)	8.7 z d (88)	5.2 z d (86)	4.2 z d (92)	5.7 z d (93)
Avid (8 fl oz)	16.5	13.1 z d (57)	7.5 z d (89)	4.0 z d (89)	7.0 z d (86)	13.3 z d (82)
AzaGuard (16 fl oz)	15.2	20.5 (27)	37.3 (43)	22.2 (33)	33.8 (29)	46.3 (32)
Conserve (8 fl oz)	17.8	6.5 z d (80)	3.3 z d (96)	5.2 z d (87)	2.7 z d (95)	2.5 z d (97)
MBI 203DF (3 lb)	18.0	41.2 (0)	46.2 (40)	46.2 (0)	61.7 (0)	107.0 (0)
MBI 203DF (4 lb)	19.2	35.2 (1)	48.5 (41)	37.3 (11)	73.2 (0)	97.8 (0)
MBI 206 1 gal	16.0	37.7 (0)	54.0 (21)	42.2 (0)	111.7 (0)	86.2 (0)

MBI 206 2 gal	18.2	31.3 (7)	80.3 (0)	34.2 (14)	78.7 (0)	79.2 (4)
Proud 3	18.9	40.0 (0)	40.0 (51)	36.5 (11)	60.0 (0)	57.0 (33)
Water Spray	17.0	28.2 (11)	46.8 (36)	33.3 (10)	61.7 (0)	75.5 (2)
No Spray	18.0	33.5 (0)	77.3 (0)	39.3 (0)	56.2 (0)	81.3 (0)
Total Population						
A20520A (8 oz)	19.8	23.0 (37)	12.2 (84)	7.7 (82)	11.8 (79)	8.2 (90)
A20520A (16 oz)	21.5	26.5 (33)	11.3 (86)	8.2 (83)	9.2 (85)	8.7 (90)
Avid (8 fl oz)	20.3	17.9 (52)	13.0 (84)	7.3 (83)	12.2 (79)	20.2 (76)
AzaGuard (16 fl oz)	18.3	29.8 (12)	47.5 (34)	29.0 (27)	43.5 (18)	53.8 (28)
Conserve (8 fl oz)	21.7	7.7 (81)	3.8 (95)	6.3 (87)	3.5 (94)	3.7 (96)
MBI 203DF (3 lb)	21.5	48.8 (0)	56.2 (33)	55.7 (0)	71.0 (0)	117.2 (0)
MBI 203DF (4 lb)	23.7	42.5 (3)	58.8 (36)	44.3 (14)	83.7 (0)	114.2 (0)
MBI 206 1 gal	19.7	43.5 (0)	65.8 (14)	54.3 (0)	132.7 (0)	98.8 (0)
MBI 206 2 gal	23.0	37.7 (11)	88.0 (2)	42.8 (14)	95.5 (0)	92.3 (2)
Proud 3	22.9	45.0 (0)	47.7 (47)	40.5 (19)	72.5 (0)	71.8 (23)
Water Spray	20.8	33.8 (12)	53.3 (34)	42.8 (6)	75.8 (0)	84.3 (1)
No Spray	22.5	41.5 (0)	87.8 (0)	49.0 (0)	65.0 (0)	92.3 (0)

[z] Mean number of thrips were counted after alcohol extraction.
[y] Means within a column followed by the same letter are not significantly different according to Dunnett's Test ($P<0.05$).

2014.

Davis assessed total thrips population on foliage after foliar or drench (single product, Azaguard) applications. Flower buds were removed throughout the experiment to maintain populations on foliage. Mainspring at both rates was the superior treatment; it reduced populations more than AzaGuard, GF 2860 and Venerate at the high rates, and the standard Hachi-Hachi.SP3009 at both rates, and the low rates of GF 2860 and Venerate,were not effective.

Gilrein assessed both immature and adult populations and thrips feeding damage after application of , Overture, Hachi–Hachi, XXpire/GF-2860, and Mainspring were the best treatments providing good to excellent control of immatures and adults; SP 3009 also provided excellent control of immatures, while Venerate was not effective (Table 91). Overall plant quality (based on % leaf damage by thrips) was significantly lower in Venerate, water and unsprayed treatments due to poor thrips control (Table 92).

During 2014, Heinze assessed number of immature and adult thrips in marigold flowers.Control of adults was inconsistent as is the case in many experiments. Mainspring, GF-2860, and Conserve resulted in consistent reductions of immature WFT, while Venerate and SP 3009 did not (Table 93).

Table 89. Western Flower Thrips Control on Marigold (*Tagetes patula*) 'Queen Sophia', – Application Rates and Dates, Davis, MI, 2014.

Treatment[z] (Active Ingredient)	Rate Per 100 Gal	Application Dates			
		6/13 Week 0	6/20 Week 1	6/27 Week 2	7/8 Week 3
Aza-Direct (azadirachtin) - drench	27 oz	X	X	X	X
Aza-Direct (azadirachtin) - foliar	27 oz	X	X	X	X
AzaGuard (azadirachtin)	8 fl oz	X	X	X	X
	16 fl oz	X	X	X	X
GF-2860 (spinoteram+sulfoxaflor) + Capsil	2.0 oz + 6 oz	X		X	
	3.5 oz + 6 oz	X		X	
Hachi-Hachi (tolfenpyrad)	21 fl oz	X		X	
Mainspring (cyantraniliprole)	8 oz	X		X	
	16 oz	X		X	
SP3009 (pyrifluquinazon)	3.2 oz	X		X	
	6.4 oz	X		X	
Venerate (*Burkholderia* sp.))	1 gal	X	X	X	X
	2 gal	X	X	X	X
Water Check	-	X	X	X	X
Nontreated	-				

Table 90. Western Flower Thrips Control on Marigold (*Tagetes patula*) 'Queen Sophia', Davis, MI, 2014.

Treatment	Population Counts [z], Means Separations [y], and Henderson's Percent Control						
	Precount	6/16	6/19	6/26	7/2	7/10	7/17
Aza-Direct - drench (27 oz)	9.1 a	11.7 def (0)	6.7 bcd (58)	3.3 abc (51)	3.6 a-d (0)	7.3 abc (42)	18.0 a (0)
Aza-Direct - foliar (27 oz)	10.4 a	11.4 f (0)	5.4 b (70)	8.4 bcd (0)	7.9 d-g (0)	10.4 b-e (28)	14.4 a (27)
AzaGuard (8 fl oz)	6.7 a	7.0 b-f (7)	6.1 bc (48)	16.6 ef (0)	6.4 b-g (0)	6.0 a-d (35)	10.7 a (15)
AzaGuard (16 fl oz)	10.7 a	9.3 b-f (22)	7.3 b-e (61)	15.1 def (0)	4.9 b-f (0)	7.3 a-d (51)	13.6 a (33)
GF-2860 + Capsil (2 oz + 6 oz)	10.7 a	5.6 bcd (53)	10.4 c-f (45)	23.3 f (0)	6.0 d-g (0)	8.6 b-e (42)	19.1 a (6)
GF-2860 + Capsil (3.5 oz + 6 oz)	9.7 a	3.9 abc (64)	6.7 b-e (61)	18.0 f (0)	4.9 b-g (0)	13.1 b-e (2)	19.3 a (0)
Hachi-Hachi (21 fl oz)	10.6 a	5.1 bcd (57)	7.9 b-e (58)	16.3 ef (0)	2.1 ab (46)	3.4 ab (77)	10.4 a (48)
Mainspring (8 oz)	12.6 a	1.3 a (91)	1.3 a (94)	2.6 ab (72)	2.1 ab (54)	2.7 a (85)	11.6 a (51)
Mainspring (16 oz)	10.0 a	4.3 ab (62)	1.0 a (94)	2.0 a (73)	1.4 a (61)	3.6 ab (74)	4.6 a (76)
SP3009 (3.2 oz)	11.3 a	8.1 b-f (36)	7.4 b-e (63)	25.9 f (0)	6.1 c-g (0)	8.1 a-d (48)	17.7 a (17)
SP3009 (6.4 oz)	11.6 a	6.9 b-f (47)	8.9 b-f (56)	16.9 ef (0)	14.7 fg (0)	14.0 e (13)	20.0 a (9)
Venerate (1 gal)	10.9 a	8.4 b-f (31)	19.3 f (0)	15.6 def (0)	9.9 efg (0)	16.9 cde (0)	8.3 a (60)
Venerate (2 gal)	9.7 a	7.0 b-e (36)	7.1 bc (58)	15.9 b-e (0)	7.3 c-g (0)	10.7 a-d (20)	9.1 a (50)
Water Check	9.4 a	13.0 c-f (0)	17.9 def (0)	7.9 cdef (0)	5.0 b-f (0)	4.7 abc (36)	18.6 a (0)
Nontreated	9.9 a	11.1 def (0)	17.4 ef (0)	7.3 bcd (0)	3.6 a-e (0)	13.7 de (0)	18.7 a (0)

[z] A clump of foliage was cut off from each plant throughout the experiment and mean number of thrips were counted from alcohol extraction.
[y] Means followed by the same letter are not significantly different Fisher's LSD ($p < 0.05$). Data transformed prior to ANOVA log (x+1). Actual treatment means presented in table.

Table 91. Western Flower Thrips Control on Marigold (*Tagetes erecta*) 'Taishan Yellow', Population Counts, Gilrein, NY, 2014.

Treatment [x]	Rate per 100 Gal	Population Counts [z], Means Separations [y], and Henderson's Percent Control				
		5/21 Pre	5/29**	6/12**	6/19*	6/26**
Immatures						
GF-2860/XXpire 40WG	2.0 oz	4.5 a	1.5 b-e (76)	0.1 c (97)	0.0 d (100)	0.0 c (100)
GF-2860/XXpire 40WG	3.5 oz	5.0 a	1.0 e (85)	0.0 c (100)	0.0 d (100)	0.1 bc (98)
Hachi-Hachi SC	21.0 fl oz	5.3 a	1.4 de (81)	0.4 c (91)	0.0 d (100)	0.1 bc (98)
Mainspring SC	8.0 fl oz	4.1 a	1.6 cde (71)	0.3 c (91)	0.4 c (92)	0.0 c (100)
Mainspring SC	16.0 fl oz	4.6 a	1.6 b-e (74)	0.5 c (87)	0.5 cd (91)	0.0 c (100)
Overture 35WP	8.0 oz	4.9 a	0.9 de (87)	0.5 c (93)	0.0 d (100)	0.0 c (100)
SP3009	3.2 fl oz	4.9 a	3.4 a-d (49)	0.8 bc (88)	0.9 cd (85)	0.0 c (100)
SP3009	6.4 fl oz	5.9 a	3.1 a-e (61)	0.9 bc (81)	1.8 bc (74)	0.8 b (89)
Venerate XC	1.0 gal	4.5 a	4.6 ab (25)	2.3 ab (37)	5.0 a (7)	2.8a (50)
Venerate XC	2.0 gal	3.9 a	3.9 abc (27)	4.3 a (0)	4.0 a (14)	4.3a (12)
Water Check	-	3.6 a	4.9 abc (0)	2.9 a (0)	4.3 ab (0)	4.5 a (0)
Nontreated	-	5.4 a	7.0 a (0)	4.4 a (0)	4.3 a (0)	4.0 a (0)
Adults						
GF-2860/XXpire 40WG	2.0 oz	10.3 a	4.1 e (76)	1.0 ef (95)	1.9 ef (90)	0.4 g (97)
GF-2860/XXpire 40WG	3.5 oz	8.1 a	2.8 e (79)	0.5 f (97)	0.6 f (96)	0.9 fg (91)
Hachi-Hachi SC	21.0 fl oz	8.6 a	3.5 e (75)	3.0 cde (81)	3.1 def (80)	0.6 fg (94)
Mainspring SC	8.0 fl oz	8.4 a	5.9 cde (58)	1.3 ef (92)	6.4 cd (57)	2.4 def (77)
Mainspring SC	16.0 fl oz	10.4 a	9.9 bcd (42)	5.3 cd (73)	4.4 cde (76)	1.5 efg (88)
Overture 35WP	8.0 oz	8.1 a	4.3 de (68)	2.5 de (83)	3.5 de (75)	0.3 g (97)
SP3009	3.2 fl oz	8.0 a	9.3 bcd (30)	7.4 bc (50)	10.1 bc (28)	4.1 cde (59)
SP3009	6.4 fl oz	10.0 a	13.5ab (18)	7.3 bc (61)	10.1 bc (43)	5.9 bcd (53)
Venerate XC	1.0 gal	8.4 a	12.1 abc (13)	13.9 ab (11)	14.0 ab (5)	8.8 abc (16)
Venerate XC	2.0 gal	10.4 a	20.1 a (0)	15.5a (20)	17.0 ab (7)	9.9 ab (24)
Water Check	-	8.4 a	13.9 ab (0)	15.6 a (0)	14.8 ab (0)	10.5 ab (0)
Nontreated	-	8.9 a	13.8 ab (0)	18.9 a (0)	22.5 a (0)	12.5 a (0)
Total Population						
GF-2860/XXpire 40WG	2.0 oz	14.8 a	5.6 ef (95)	1.1 de (95)	1.9 ef (92)	0.4 f (98)
GF-2860/XXpire 40WG	3.5	13.1 a	3.8 f (81)	0.5 e (98)	0.6 f (97)	1.0 ef (94)
Hachi-Hachi SC	21.0 fl oz	13.9 a	4.9 f (77)	3.4 bcd (84)	3.1 def (86)	0.8 ef (95)
Mainspring SC	8.0 fl oz	12.5 a	7.5 def (61)	1.5 de (92)	6.8 cd (66)	2.4 de (85)

Mainspring SC	16.0 fl oz	15.0 a	11.5 cde (50)	5.8 bc (75)	4.9 cde (79)	1.5 def (92)
Overture 35WP	8.0 oz	13.0 a	5.1 f (74)	3.0 cd (85)	3.5 de (83)	0.3 f (98)
SP3009	3.2 fl oz	12.9 a	12.6 bcd (36)	8.1 b (59)	11.0 bc (46)	4.1 cd (75)
SP3009	6.4 fl oz	15.9 a	16.6 abc (36)	8.1 bc (67)	11.9 bc (53)	6.6 bc (67)
Venerate XC	1.0 gal	11.8 a	16.8 abc (7)	16.1a (11)	19.1 ab (0)	11.5ab (22)
Venerate XC	2.0 gal	11.9 a	24.0 a (0)	19.8a (0)	21.0 a (0)	14.1a (5)
Water Check	-	12.0 a	18.3 abc(0)	18.5a (0)	19.0 ab (0)	15.0a (0)
Nontreated	-	14.3 a	20.8 ab (0)	23.3a (0)	26.8 a (0)	16.0a (0)

[z] Thrips numbers were counted by tapping entire plants sharply over a white surface.
[y] Means within columns followed by the same letter are not significantly different at p=0.05 (LS Means Tukey's HSD).
*Data were transformed prior to analysis using log(y+1)
**Data were transformed prior to analysis using sqrt(y)
[x] GF-2860 / XXpire mixed with Capsil at 6 fl oz.

Table 92. Western Flower Thrips Control on Marigold (*Tagetes erecta*) 'Taishan Yellow', Percent Damage, Gilrein, NY, 2014.

Treatment[y]	Rate per 100 Gal	Percent Leaf Area With Thrips Damage [x]				
		5/29	6/5**	6/12**	6/19*	6/26**
GF-2860/XXpire 40WG	2.0 oz	4.1 c	2.5 b	2.5 c	2.5 e	3.1 cd
GF-2860/XXpire 40WG	3.5 oz	3.4 c	2.2 b	2.9 c	3.0 de	1.8 d
Hachi-Hachi SC	21.0 fl oz	3.3 c	2.3 b	2.6 c	2.5 e	1.8 d
Mainspring SC	8.0 fl oz	4.6 bc	4.1 b	2.6 c	3.3 de	1.9 d
Mainspring SC	16.0 fl oz	2.8 c	2.3 b	2.9 c	2.8 e	1.4 d
Overture 35WP	8.0 oz	5.0 bc	2.1 b	3.3 c	3.0 de	2.4 d
SP3009	3.2 fl oz	4.6 bc	2.6 b	2.4 c	3.9 cde	2.5 d
SP3009	6.4 fl oz	5.1 bc	2.9 b	3.1 c	3.6 cde	2.5 d
Venerate XC	1.0 gal	3.8 c	3.6 b	6.1 b	6.1 cd	3.5 cd
Venerate XC	2.0 gal	9.4 ab	11.4 a	11.6 a	12.4 ab	13.5 ab
Water Check	-	5.1 bc	4.1 b	4.4 bc	7.5 bc	7.5 bc
Nontreated	-	13.5a	16.6a	16.3a	18.8a	19.3a

[x] Means within columns followed by the same letter are not significantly different at p=0.05 (LS Means Tukey's HSD).
*Data were transformed prior to analysis using log(y+1).
**Data were transformed prior to analysis using sqrt(y).
[y] GF-2860 / XXpire mixed with Capsil at 6 fl oz.

Table 93. Western Flower Thrips Control on Marigold (*Tagetes erecta*) 'Discovery Yellow', Heinz, TX, 2014.

Treatment [z]	Rate Per 100 Gal	Population Counts [y], Means Separations*, and Percent Control				
		7/8	7/15	7/22	7/29	8/5
Immatures						
Conserve (spinosad)	8 fl oz	3.2 (42)	3.0* (62)	0.8* (89)	2.2* (65)	0.3* (91)
GF-2860 (spinetoram + sulfoxaflor) + Capsil	2.0 oz + 6 oz	3.2 (42)	3.0* (62)	2.3* (69)	3.7 (41)	0.7* (80)
	3.5 oz + 6 oz	2.5 (55)	2.3* (71)	2.0* (73)	1.5* (76)	1.7 (51)
Mainspring (cyantraniliprole)	8 fl oz	1.3* (76)	3.0* (62)	1.5* (80)	1.6* (75)	1.2 (66)
	16 fl oz	0.8* (85)	1.0* (87)	0.7* (91)	1.5* (76)	0.3* (91)
SP3009 (pyrifluquinazon)	3.2 fl oz	6.2 (0)	7.7 (1)	10.7 (0)	17.3* (0)	12.5* (0)
	6.4 fl oz	6.5 (0)	6.8 (13)	11.5 (0)	11.2 (0)	20.5* (0)
Venerate XC (*Burkholderia* sp.) + Hyperactive	0.5 gal + 32 oz	5.5 (0)	6.0 (23)	13.2* (0)	8.2 (0)	4.3 (0)
	1 gal + 32 oz	7.2 (0)	5.7 (27)	7.3 (3)	14.5* (0)	8.5* (0)
Nontreated	-	5.5 (0)	7.8 (0)	7.5 (0)	6.3 (0)	3.5 (0)
Adults						
Conserve (spinosad)	8 fl oz	0.2*	0.5	()0.2	0.5	0.2
GF-2860 (spinetoram + sulfoxaflor) + Capsil	2.0 oz + 6 oz	0.8	0.0	0.2	0.2	0.3
	3.5 oz + 6 oz	0.2*	0.2	0.3	0.3	1.2
Mainspring (cyantraniliprole)	8 fl oz	0.7	0.2	0.2	0.2	0.2
	16 fl oz	0.2*	0.2	0.2	0.3	0.2
SP3009 (pyrifluquinazon)	3.2 fl oz	0.7	0.5	1.5	2.3	1.3
	6.4 fl oz	2.2*	0.3	1.2	1.3	4.2*
Venerate XC (*Burkholderia* sp.) + Hyperactive	0.5 gal + 32 oz	0.8	1.0	1.5	1.3	1.2
	1 gal + 32 oz	2.0	0.2	0.8	1.3	1.3
Nontreated	-	0.3	0.5	1.0	1.3	0.2

[y] Mean number of thrips per plant were counted after alcohol extraction.
*Means within a column significantly different from nontreated according to Dunnett's Test (P<0.05).
[z] All treatments, except Venerate, applied biweekly (7/1, 7/15, 7/29); Venerate applied weekly (7/1, 7/8, 7/15, 7/22, 7/29).

2015.

Davis examined seven insecticides plus the surfactant Capsil for thrips on marigold foliage. Both rates of IKI-3106 and Mainspring applied weekly gave significant population reductions throughout the experiment (Table 94). Xxpire gave significant reductions at the 1 week sampling. The remaining treatments were not effective. However, the nontreated populations were declining rapidly as were the plants.

Gilrein compared weekly or biweekly applications of several products for managing thrips. The bi-weekly applications of Overture, Xxpire, Mainspring, and weekly application of IKI-3106 provided most effective control of both immature and adult thrips over the period of the trial (Table 95. Western Flower Thrips Control on Marigold (*Tagetes erecta*) 'Taishan Yellow', Population Counts, Gilrein, NY, 2015.). Weekly application of AzaGuard provided moderate control of immature WFT but appeared to be less effective for adults, while Rycar and Venerate provided poor control. Leaf damage by thrips generally reflected effectiveness of products in controlling the population (Table 96).

A study was conducted by Vafaie in Texas on marigold .IKI-3106, Avid and Mainspring consistently had a significantly reduced number of immature WFT, while Grandevo and Venerate were ineffective. While IKI-3106, Avid, and Mainspring significantly reduced adult and immature WFT populations, Grandevo significantly reduced only adult WFT populations (Table 97).

Table 94. Western Flower Thrips Control on Marigold (*Tagetes patula*) 'Yellow Boy', Davis, MI, 2015.

Treatment[z] (Active Ingredient)	Rate Per 100 Gal	Application Dates	Population Counts [z], Means Separations [y], and Henderson's Percent Control			
			6/2 Pretrt	6/9 1 WAT	6/15 2 WAT	6/23 3 WAT
Total Population						
AzaGuard (azadirachtin)	25.8 fl oz	6/5, 6/12, 6/19	11.3 a	38.5 bc (19)	24.3 cde (0)	7.4 efg (0)
Hachi-Hachi (tolfenpyrad)	21 fl oz	6/5, 6/19	8.7 a	27.5 b (25)	15.7 bc (8)	3.0 cde (12)
IKI-3106 (cyclaniliprole) + Capsil	22 + 6 fl oz	6/5, 6/12, 6/19	9.2 a	10.0 a (74)	1.0 a (91)	0.5 ab (86)
	28 + 6 fl oz	6/5, 6/12, 6/19	13.0 a	8.7 a (84)	2.3 ab (94)	0.8 abc (84)
Mainspring (cyantraniliprole)	16 fl oz	6/5, 6/12, 6/19	9.0 a	11.0 a (71)	4.7 ab (73)	0.3 a (91)
Rycar (pyrifluquinazon)	3.2oz	6/5, 6/19	9.2 a	43.0 bc (0)	19.0 cde (0)	13.0 g (0)
	6.4 oz	6/5, 6/19	9.3 a	36.2 bc (8)	29.5 de (0)	16.0 g (0)
Venerate (*Burkholderia* sp.))	1 qt	6/5, 6/12, 6/19	11.5 a	41.8 bc (14)	22.7 cde (0)	4.0 def (11)
	2 qtl	6/5, 6/12, 6/19	9.3 a	36.5 bc (7)	12.5 cd (3)	4.3 def (0)
XXpire (spinoteram+sulfoxaflor) + Capsil	3.5 oz + 6 oz	6/5, 6/19	11.8 a	8.7 a (82)	10.7 cd (54)	2.0 bcd (57)
Capsil	6 fl oz	6/5, 6/12, 6/19	11.3 a	35.2 bc (23)	33.0 e (0)	10.6 fg (0)
Nontreated	-	-	12.3 a	51.8 c (0)	24.0 cde (0)	4.8 de (0)
Immatures						
AzaGuard (azadirachtin)	25.8 fl oz	6/5, 6/12, 6/19	10.7 a	35.8 b (24)	20.7 ef (0)	6.4 def (0)
Hachi-Hachi (tolfenpyrad)	21 fl oz	6/5, 6/19	8.3 a	26.7 b (27)	11.1 bcd (27)	2.4 cd (24)
IKI-3106 (cyclaniliprole) + Capsil	22 + 6 fl oz	6/5, 6/12, 6/19	8.3 a	9.2 a (75)	0.7 a (95)	0.0 a (100)
	28 + 6 fl oz	6/5, 6/12, 6/19	12.2	7.8 a (85)	1.2 ab (95)	0.3 ab (94)
Mainspring (cyantraniliprole)	16 fl oz	6/5, 6/12, 6/19	7.7 a	9.3 a (72)	2.7 abc (81)	0.3 ab (90)
Rycar (pyrifluquinazon)	3.2oz	6/5, 6/19	8.0 a	40.0 b (0)	17.2 def (0)	12.2 fg (0)
	6.4 oz	6/5, 6/19	8.7 a	34.7 b (9)	28.0 f (0)	15.3 g (0)
Venerate (*Burkholderia* sp.))	1 qt	6/5, 6/12, 6/19	10.7 a	40.7 b (13)	22.3 ef (0)	3.8 cde (7)
	2 qtl	6/5, 6/12, 6/19	8.2 a	34.0 b (5)	11.0 de (26)	3.2 cd (0)
Xxpire (spinoteram+sulfoxaflor) + Capsil	3.5 oz + 6 oz	6/5, 6/19	10.7 a	7.8 a (72)	6.3 cd (68)	1.8 bc (90)
Capsil	6 fl oz	6/5, 6/12, 6/19	10.8	33.0 b (30)	28.8 f (0)	9.6 efg (0)
Nontreated	-	-	11.0	48.2 b (0)	20.2 def (0)	4.2 cd (0)
Adults						
AzaGuard (azadirachtin)	25.8 fl oz	6/5, 6/12, 6/19	0.7 a	2.7 a	3.7 de	1.0 a
Hachi-Hachi (tolfenpyrad)	21 fl oz	6/5, 6/19	0.3 a	0.8 a	4.5 cde	0.6 a
IKI-3106 (cyclaniliprole) + Capsil	22 + 6 fl oz	6/5, 6/12, 6/19	0.8 a	0.8 a	0.3 a	0.5 a
	28 + 6 fl oz	6/5, 6/12, 6/19	0.8 a	0.8 a	1.2 abc	0.5 a
Mainspring (cyantraniliprole)	16 fl oz	6/5, 6/12, 6/19	1.3 a	1.7 a	2.0 abc	0.0 a

Rycar (pyrifluquinazon)	3.2oz	6/5, 6/19	1.2 a	3.0 a	1.8 a-e	0.8 a
	6.4 oz	6/5, 6/19	0.7 a	1.5 a	1.5 a-d	0.7 a
Venerate (*Burkholderia* sp.))	1 qt	6/5, 6/12, 6/19	8.3 a	1.2 a	0.3 a	0.2 a
	2 qtl	6/5, 6/12, 6/19	1.2a	2.5 a	1.5 ab	1.2 a
XXpire (spinoteram+sulfoxaflor) + Capsil	3.5 oz + 6 oz	6/5, 6/19	1.2 a	0.8 a	4.3 e	0.2 a
Capsil	6 fl oz	6/5, 6/12, 6/19	0.5 a	2.2 a	4.2 bcde	1.0 a
Nontreated	-	-	1.3 a	3.7 a	3.8 de	0.6 a

[z] A clump of foliage was cut off from each plant throughout the experiment and mean number of thrips were counted from alcohol extraction.
[y] Means followed by the same letter are not significantly different Fisher's LSD ($p < 0.05$). Data transformed prior to ANOVA log (x+1). Actual treatment means presented in table.

Table 95. Western Flower Thrips Control on Marigold (*Tagetes erecta*) 'Taishan Yellow', Population Counts, Gilrein, NY, 2015.

Treatment[x]	Rate per 100 Gal	Population Counts [z], Means Separations [y], and Henderson's Percent Control					
		5/6 Pre	5/13**	5/21*	5/28**	6/4**	6/11**
Immatures							
IKI-3106 50SL	22.0 fl oz	3.3 a	6.8 b (60	2.1 de (82)	1.3 de (62)	0.9 de (83)	0.4 e (95)
IKI-3106 50SL	28.0 fl oz	2.4 a	9.5 ab (24)	2.9 cde (66)	0.5 def (80)	1.1 cde (71)	0.6 e (89)
Rycar SC	3.2 fl oz	2.8 a	8.6 ab (41)	6.5 abc (34)	2.1 cde (28)	2.4 bcd (45)	2.3 cd (65)
Rycar SC	6.4 fl oz	3.5 a	10.0 ab (45)	4.5 a-d (64)	2.4 bcd (34)	2.5 bcd (55)	2.6 cd (68)
Venerate XC	1.0 qt	3.8 a	11.0 ab (44)	7.3 abc (46)	5.4ab (0)	5.1 ab (15)	7.8 ab (13)
Venerate XC	2.0 qt	3.1 a	10.9 ab (33)	8.3 ab (24)	3.6 abc (0)	3.3 bc (32)	4.4 bc (40)
AzaGuard	25.8 fl oz	3.1 a	9.3 ab (42)	4.0 bcd (64)	0.5 def (84)	1.6 cde (67)	1.0 de (86)
Mainspring SC	16.0 fl oz	3.3 a	8.8 ab (49)	2.0 de (83)	0.1 f (97)	0.9 de (83)	0.4 e (95)
XXpire 40WG	3.5 fl oz	3.0 a	5.5 b (65)	0.9 ef (92)	0.4 def (87)	0.6 e (87)	0.1 e (99)
Overture 35WP	8.0 oz	3.5 a	5.8 b (68)	0.0 f (100)	0.3 ef (92)	0.9 de (84)	0.0 d (100)
Water Check	-	2.8 a	14.6 a (0)	9.9 a (0)	2.9 abc (0)	4.4 ab (0)	6.6 abc (0)
Nontreated	-	1.8 a	15.5 a (0)	11.6 a (0)	6.4 a (0)	9.6 a (0)	1.1 a (0)
Adults							
IKI-3106 50SL	22.0 fl oz	11.0 a	4.9 abc (52)	8.4 cde (54)	9.4 def (57)	10.3 cd (50)	7.9 efg (63)
IKI-3106 50SL	28.0 fl oz	9.3 a	5.0 abc (42)	8.1 de (48)	10.8 def (41)	10.3 cd (40)	11.0 def (39)
Rycar SC	3.2 fl oz	10.1 a	3.8 bc (59)	18.5 a-d (0)	12.5 c-f (38)	25.3 ab (0)	16.3 b-e (16)
Rycar SC	6.4 fl oz	12.0 a	6.3 abc (43)	21.1 abc (0)	16.6 a-d (30)	23.3 ab (0)	17.1 bcd (26)
Venerate XC	1.0 qt	12.3 a	7.4 abc (35)	29.4 a (0)	21.3 abc (13)	32.5 a (0)	29.6 a (0)
Venerate XC	2.0 qt	10.9 a	4.9 abc (51)	23.8 ab (0)	29.6 ab (0)	24.5 ab (0)	26.8 ab (0)
AzaGuard	25.8 fl oz	9.9 a	4.0 abc (56)	9.9 b-e (40)	14.1 b-e (28)	17.1 bc (7)	15.0 c-f (22)

Mainspring SC	16.0 fl oz	9.8 a	3.1 cd (66)	12.5 b-e (24)	8.1 ef (58)	10.9 cd (40)	7.1 fg (63)
XXpire 40WG	3.5 fl oz	8.8 a	1.1 e (86)	5.1 e (65)	6.5 f (63)	8.6 d (47)	7.1 fg (58)
Overture 35WP	8.0 oz	13.1 a	1.0 de (92)	7.3 de (67)	7.9 def (70)	8.3 d (66)	3.6 g (86)
Water Check	-	11.8 a	10.9 ab (0)	19.8 ab (0)	23.4 abc (0)	21.9 ab (0)	22.8 abc (0)
Nontreated	-	11.1 a	8.6 a (0)	34.1 a (0)	29.9 a (0)	32.0 ab (0)	28.1 ab (0)
Total Population							
IKI-3106 50SL	22.0 fl oz	14.3 a	11.6 cde (54)	10.5 de (64)	10.6 de (59)	11.1 de (57)	8.3 efg (71)
IKI-3106 50SL	28.0 fl oz	11.6 a	14.5 a-d (29)	11.0 cde (54)	11.3 de (46)	11.4 de (46)	11.6 def (51)
Rycar SC	3.2 fl oz	12.9 a	12.4 cde (45)	25.0 abc (5)	14.6 cde (38)	27.6 abc (0)	18.5 cd (29)
Rycar SC	6.4 fl oz	15.5 a	16.3 abc (40)	25.6 abc (19)	19.0 cd (32)	25.8 bc (8)	19.8 bcd (37)
Venerate XC	1.0 qt	16.0 a	18.4 abc (35)	36.6 a (0)	26.6 abc (8)	37.6 ab (0)	37.4 a (0)
Venerate XC	2.0 qt	14.0 a	15.8 a-d (36)	32.0 a (0)	33.3 ab (0)	27.8 abc (0)	31.1 ab (0)
AzaGuard	25.8 fl oz	13.1 a	13.3 b-e (42)	13.9 bcd (48)	14.6 de (39)	18.8 cd (21)	16.0 de (40)
Mainspring SC	16.0 fl oz	12.8 a	11.9 cde (47)	14.5 cde (45)	8.3 e (64)	11.8 de (49)	7.5 fg (71)
XXpire 40WG	3.5 fl oz	12.3 a	6.6 de (69)	6.0 e (76)	6.8 e (70)	9.3 e (58)	7.3 fg (71)
Overture 35WP	8.0 oz	15.9 a	6.8 e (76)	7.3 de (78)	8.1 e (72)	9.1 e (68)	3.6 g (89)
Water Check	-	14.5 a	25.5 a (0)	29.6 ab (0)	26.3 abc (0)	26.3 bc (0)	29.4 abc (0)
Nontreated	-	12.9 a	24.1 ab (0)	45.8 a (0)	36.3 a (0)	41.6 a (0)	39.3 ab (0)

[z] Thrips numbers were counted by tapping entire plants sharply over a white surface.
[y] Means within columns followed by the same letter are not significantly different at p=0.05 (LS Means Tukey's HSD).
* Data were transformed prior to analysis using log(y+1)
** Data were transformed prior to analysis using sqrt(y)
[x] IKI-3106, Rycar and XXpire mixed with Capsil at 6 fl oz.

Table 96. Western Flower Thrips Control on Marigold (*Tagetes erecta*) 'Taishan Yellow', Percent Damage, Gilrein, NY, 2015.

Treatment[y]	Rate Per 100 Gal	Percent Leaf Area With Thrips Damage [x]
IKI-3106 50SL	22.0 fl oz	1.1 ef
IKI-3106 50SL	28.0 fl oz	0.0 f
Rycar SC	3.2 fl oz	7.9 d
Rycar SC	6.4 fl oz	10.6 cd
Venerate XC	1.0 qt	28.3 ab
Venerate XC	2.0 qt	22.3 bc
AzaGuard	25.8 fl oz	4.25 de
Mainspring SC	16.0 fl oz	2.0 def
XXpire 40WG	3.5 fl oz	0.0 f
Overture 35WP	8.0 oz	10.7 cd
Water Check	-	31.0 ab
Nontreated	-	45.6 a

[x] Means within columns followed by the same letter are not significantly different at p=0.05 (LS Means Tukey's HSD).
* Data were transformed prior to analysis using log(y+1)
** Data were transformed prior to analysis using sqrt(y)
[y] IKI-3106, Rycar and XXpire mixed with Capsil at 6 fl oz.

Table 97. Western Flower Thrips Control on Marigold (*Tagetes erecta*) 'Safari Yellow', Vafaie, TX, 2015.

Treatment[z]	Rate Per 100 Gal	Population Counts [y], Means Separations*, and Henderson's Percent Control						
		6/29 Pre	7/6	7/13	7/20	7/27	8/3	8/10
Immatures								
Avid	8 fl oz	39	0 (100)	0* (100)	3 (33)	1 (70)	3 (76)	3 (86)
Grandevo	3lb	38	16 (0)	11 (64)	7 (0)	1 (69)	4 (67)	5 (86)
IKI-3106	22 fl oz	52	0* (100)	0* (100)	0* (100)	0* (100)	0* (100)	0* (100)
	28 fl oz	46	0* (100)	0* (100)	0* (100)	0* (100)	0* (100)	0* (100)
Mainspring	8 fl oz	49	0 (100)	4 (90)	0* (100)	2 (52)	1* (94)	1 (96)
Venerate	32 fl oz	32	12 (0)	14 (45)	23 (0)	7 (0)	1 (90)	10 (42)
	64 fl oz	33	14 (0)	5 (81)	4 (0)	37 (0)	4 (61)	3 (83)
Nontreated	-	42	15 (0)	82 (0)	35 (0)	29 (0)	7 (0)	20 (0)
Water Spray	-	35	6 (0)	28 (0)	4 (0)	3 (0)	11 (0)	19 (0)
Treatment effect p-value		0.9995	0.0053	<0.0001	0.0002	<0.0001	0.0008	0.0138
Adults								
Avid	8 fl oz	5	7	3	1	2	1	4
Grandevo	3lb	2	3	2*	2	1	3	2
IKI-3106	22 fl oz	4	2	1*	0	0*	0	0*
	28 fl oz	6	1	1*	0	0*	1*	0*
Mainspring	8 fl oz	10	4	3	1	1*	2	0*
Venerate	32 fl oz	4	3	2	6	1	1	2
	64 fl oz	6	4	2	3	3	3	2
Nontreated	-	6	1	8	6	1	5	5
Water Spray	-	6	3	7	2	3	3	5
Treatment effect p-value		0.4561	0.1841	0.0013	0.0057	0.0050	0.0354	0.0021

[y] Mean number of thrips per plant were counted after alcohol extraction.
* Indicates treatments that are significantly different than the water spray treatment within column (Wilcoxon's test, p<05).
[z]IKI-3106 and Grandevo mixed with Preference surfactant.

2016.

Davis studied impacts of several insecticides on thrips populations on foliage of marigolds grown in field containers. In this experiment, the population fell off rapidly in the nontreated control most likely due to predation having a major impact on the results of the trial. The chemical treatments apparently suppressed the predators and allowed the thrips populations to remain high. Mainspring was the only treatment that actually impactedthrips populations. Because of the inconclusive data, this test was not included in the general efficacy summary Table 6.

Nansen applied the same treatments as Davis, but this experiment was conducted within a greenhouse where natural enemies were not observed (Table 99). Overall, the results suggest that IKI-3106 alone was most effective in reducing thrips numbers. Treatments with various concentrations and weekly as well as biweekly sprays were as effective as the industry standard Conserve (Table 100. Venerate XC was not effective, and did not increase effectiveness of IKI-3106 in rotation. No obvious differences in thrips damage rating between treatments were observed (data not shown).

Vafaie conducted a similar experiment also inside the greenhouse where natural enemies were not observed. In this experiment, XXpire provided the most consistent control of immature thrips when compared to a water only control, followed by Avid and Rycar at 6.4 fl oz (Table 102). Numbers of adult WFT on Avid, Rycar, and XXpire treated marigolds remained relatively constant when compared to the median number of adult WFT on the water only control.

Table 98. Western Flower Thrips Control on Marigold (*Tagetes erecta*) 'Hero Orange' in Field Container, Davis, MI, 2016.

Treatment [x]	Rate Per 100 Gal	Application Dates	Population Counts [y], Means Separations*, and Henderson's Percent Control					
			6/13 Pre	6/20	6/27	7/5	7/11	7/18
Immatures								
IKI-3106 50SL	22 fl oz	6/14, 21, 28, 7/5, 7/12	45.2 a	44.5 bc (8)	26.7 bc (28)	45.0 cd (0)	38.5 f (0)	22.8 e (0)
IKI-3106 50SL	22 fl oz	6/14, 28, 7/12	44.2 a	38.3 b (11)	27.0 bc (25)	117.7 f (0)	20.7 def (0)	11.5 de (0)
IKI-3106 50SL	27 fl oz	6/14, 21, 28, 7/5, 7/12	46.3 a	55.3 c (0)	26.5 bc (30)	23.5 ab (0)	26.8 ef (0)	16.3 de (0)
IKI-3106 50SL	27 fl oz	6/14, 28, 7/12	46.2 a	35.7 bc (21)	28.5 bc (25)	60.7 de (0)	24.8 f (0)	9.3 d (0)
IKI-3106 50SL / Venerate	22 fl oz 2 qt	6/14, 28, 7/12 5/21, 7/5	45.2 a	52.8 bc (0)	25.0 b (32)	70.2 def (0)	11.2 cd (0)	4.7 bc (0)
IKI-3106 50SL / Venerate	27 fl oz 2 qt	6/14, 28, 7/12 5/21, 7/5	47.8 a	52.0 bc (0)	31.5 bc (19)	90.0 ef (0)	13.0 cde (0)	11.7 ab (0)
Mainspring	8 fl oz	6/14, 28, 7/12	43.8 a	20.5 a (52)	12.0 a (66)	40.2 bcd (0)	18.3 def (0)	8.3 bc (0)
Venerate	1 qt	6/14, 21, 28, 7/5, 7/12	46.3a	45.0 bc (0)	64.0 de (0)	31.5abc (0)	4.3ab (0)	3.5 ab (0)
Venerate	2 qt	6/14, 21, 28, 7/5, 7/12	46.3a	48.2bc (0)	61.5 e (0)	34.5 bc (0)	6.0 bc (0)	2.7 a (20)
Nontreated	-	-	48.2 a	47.0 bc (0)	39.4 cd (0)	19.9 a (0)	2.3 a (0)	3.5 ab (0)
Adults								
IKI-3106 50SL	22 fl oz	6/14, 21, 28, 7/5, 7/12	13.7 a	15.8 a (44)	16.2 a (0)	18.5 d (0)	11.0 e (0)	20.2 ab (0)
IKI-3106 50SL	22 fl oz	6/14, 28, 7/12	14.8 a	21.7 abc (29)	13.8 a (3)	10.0 abc (0)	4.3 abc (0)	19.2 c (0)
IKI-3106 50SL	27 fl oz	6/14, 21, 28, 7/5, 7/12	15.3 a	29.8 c (5)	15.8 a (0)	21.7 d (0)	8.7 de (0)	10.0 ab (0)
IKI-3106 50SL	27 fl oz	6/14, 28, 7/12	8.7 a	16.2 a (9)	14.2 a (0)	8.5 ab (0)	6.0 bcd (0)	10.8 c (0)
IKI-3106 50SL / Venerate	22 fl oz 2 qt	6/14, 28, 7/12 5/21, 7/5	13.8 a	18.0 ab (36)	13.7 a (0)	18.2 cd (0)	7.3 cde (0)	8.8 ab (0)
IKI-3106 50SL / Venerate	27 fl oz 2 qt	6/14, 28, 7/12 5/21, 7/5	10.8 a	24.7 abc (0)	11.5 a (0)	15.7 bcd (0)	5.8 a-d (0)	8.0 ab (0)
Mainspring	8 fl oz	6/14, 28, 7/12	13.3 a	23.3 abc (15)	14.2 a (0)	17.5 bcd (0)	9.7 de (0)	15.3 bc (0)
Venerate	1 qt	6/14, 21, 28, 7/5, 7/12	14.2 a	26.0 bc (11)	18.5 a (0)	9.0 a (0)	4.7 abc (0)	8.7 ab (2)
Venerate	2 qt	6/14, 21, 28, 7/5, 7/12	14.7 a	16.8 a (44)	11.5 a (19)	11.3 abc (0)	3.3 ab (10)	6.3 a (31)
Nontreated	-	-	13.3 a	27.3 bc (0)	12.8 a (0)	8.3 ab (0)	3.3 a (0)	8.3 a (0)
Total Population								
IKI-3106 50SL	22 fl oz	6/14, 21, 28, 7/5, 7/12	58.8 a	60.3 ab (15)	42.8 b (15)	63.5 cde (0)	49.5 e (0)	43.0 d (0)
IKI-3106 50SL	22 fl oz	6/14, 28, 7/12	59.0 a	60.0 ab (16)	40.8 b (19)	127.7 f (0)	25.0 d (0)	30.7 cd (0)
IKI-3106 50SL	27 fl oz	6/14, 21, 28, 7/5, 7/12	61.7 a	85.2 c (0)	42.8 b (19)	45.2 bc (0)	35.5 de (0)	26. 3 c (0)

IKI-3106 50SL	27 fl oz	6/14, 28, 7/12	54.8 a	51.8 bc (22)	42.7 b (9)	69.2 cde (0)	30.8 de (0)	20.2 bc(0)
IKI-3106 50SL or Venerate	22 fl oz 2 qt	6/14, 28, 7/12 5/21, 7/5	59.0 a	70.8 bc (1)	38.7 ab (23)	88.3 def (0)	18.5 cd (0)	13.5 ab (0)
IKI-3106 50SL or Venerate	27 fl oz 2 qt	6/14, 28, 7/12 5/21, 7/5	58.7 a	76.7 bc (0)	43.0 b (14)	105.7 ef (0)	18.8 cd (0)	19. (0)7
Mainspring	8 fl oz	6/14, 28, 7/12	57.2 a	43.8 a (37)	26.2 a (46)	57.7 bcd (0)	28.0 de (0)	23.7 c (0)
Venerate	1 qt	6/14, 21, 28, 7/5, 7/12	60.5 a	71.0 bc (3)	82.5 c (0)	40.5 ab (0)	9.0 ab (0)	12. 2 ab (0)
Venerate	2 qt	6/14, 21, 28, 7/5, 7/12	61.0 a	65.0 bc (12)	73.0 c (0)	45.8 bc (0)	9.3 bc (0)	9.0 a (23)
Nontreated	-	-	61.4 a	74.3 bc (0)	52.3 bc (0)	28.3 a (0)	5.6 a (0)	11.8 a (0)

[z] Mean number of thrips from 5 flowers were counted from alcohol extraction.
[y] Means followed by the same letter are not significantly different Fisher's LSD ($p < 0.05$). Data transformed log (x+1)prior to ANOVA. Actual treatment means presented in table.
[x] Capsil (6 fl oz/100 gal) was added to all IKI-3106 solutions.

Table 99. Western Flower Thrips Control on Marigold (*Tagetes* sp.) 'Safari Yellow', – Application Rates and Dates, Nansen, CA, 2016.

Treatment (Active Ingredient)	Rate / 100 gal	Application Dates				
		5/11 0 WAT	5/18 1 WAT	5/25 2 WAT	6/1 3 WAT	6/8 4 WAT
Conserve	8 fl oz	X		X		X
IKI-3106 + Capsil	22 fl oz + 6 fl oz	X		X		X
IKI-3106 + Capsil	22 fl oz + 6 fl oz	X	X	X	X	X
IKI-3106 +	27 fl oz + 6 fl oz	X		X		X
IKI-3106 +	27 fl oz + 6 fl oz	X	X	X	X	X
IKI-3106 + Capsil rotated w/ Venerate XC	22 fl oz + 6 fl oz 2 qt	X	 X	X	 X	X
IKI-3106 + Capsil rotated w/ Venerate XC	27 fl oz + 6 fl oz 2 qt	X	 X	X	 X	X
Venerate XC	1 qt	X	X	X	X	X
Venerate XC	2 qt	X	X	X	X	X
Water check	-	X	X	X	X	X

Table 100. Western Flower Thrips Control on Marigold (*Tagetes* sp.) 'Safari Yellow', Nansen, CA, 2016.

Treatment	Rate / 100 gal	Population Counts [x]						
		Pre-count	6 DAT[1]	13 DAT	20 DAT	27 DAT	34 DAT	41 DAT
Immatures								
Conserve	8 fl oz	57 ±19.4a	16 ±3.2c	23 ± 9.8cd	16 ± 6.0bc	14 ± 2.3bcd	7 ± 2.1cd	19 ± 11.2a
IKI-3106 + Capsil biweekly	22 fl oz + 6 fl oz	49 ± 17.5a	35 ±9.9abc	35 ±10.2a-d	21 ± 5.9bc	27 ± 5.8abc	17 ± 4.7abcd	17 ± 4.3a
IKI-3106 + Capsil weekly	22 fl oz + 6 fl oz	60 ± 9.3a	27 ±5.6bc	11 ±3.5cd	10 ± 2.7c	17 ± 7.6cd	8 ± 4.1d	26 ± 8.9a
IKI-3106 + Capsil biweekly	27 fl oz + 6 fl oz	65 ± 16.1a	16 ±3.3c	22 ±6.0bcd	8 ± 2.3c	20 ± 7.6cd	15 ± 7.6cd	21 ± 6.5a
IKI-3106 + Capsil weekly	27 fl oz + 6 fl oz	42 ± 9.4a	30 ±5.8abc	11 ±7.7d	14 ± 4.7bc	5 ± 1.4d	18 ± 7.2abcd	18 ± 5.6a
IKI-3106 + Capsil rotated w/ Venerate XC	22 fl oz + 6 fl oz 2 qt	59 ±18.5a	39 ±11.0abc	17 ±3.0bcd	16 ± 5.9c	12 ± 5.8cd	15 ± 5.8abcd	25 ± 8.3a
IKI-3106 + Capsil rotated w/ Venerate XC	27 fl oz + 6 fl oz 2 qt	85 ±16.2a	43 ±10.0abc	17 ±4.7cd	13 ± 4.2bc	19 ± 4.2bcd	21 ± 10.0bcd	30 ± 8.6a
Venerate XC	1 qt	68 ± 14.5a	135 ±24.3a	84 ±31.5abc	43 ± 8.9ab	41 ± 14.1abc	18 ± 5.1abcd	17 ± 8.0a
Venerate XC	2 qt	74 ±10.9a	128 ±29.6ab	68 ±13.7abc	83 ± 18.7a	45 ± 13.0abc	23 ± 4.6abc	29 ± 9.0a
Water check	-	55 ±11.2a	136 ±35.9ab	140 ± 13.9a	134 ± 31.3a	66 ± 7.8ab	40 ± 3.6a	29 ± 8.2a
Nontreated	-	52 ±10.8a	102 ±21.6ab	126 ± 25.7ab	120 ± 29.9a	80 ± 11.8a	47 ± 12.5ab	25 ± 6.6a
Adults								
Conserve	8 fl oz	18 ± 2.1a	16 ± 5.3a	9 ± 2.5a	7 ± 2.6b	5 ± 1.3c	5 ± 1.4a	3 ± 1.0a
IKI-3106 + Capsil biweekly	22 fl oz + 6 fl oz	21 ± 2.6a	14 ± 2.3a	8 ± 2.9a	12 ± 4.2ab	5 ± 1.6c	9 ± 1.9a	3 ± 0.8a
IKI-3106 + Capsil weekly	22 fl oz + 6 fl oz	26 ± 5.5a	14 ± 4.7a	8 ± 2.7a	6 ± 1.2ab	7 ± 2.0c	8 ± 2.7a	3 ± 1.3a
IKI-3106 + Capsil biweekly	27 fl oz + 6 fl oz	24 ± 6.9a	11 ± 2.2a	7 ± 1.3a	11 ± 2.2ab	9 ± 3.1abc	7 ± 1.5a	3 ± 0.7a
IKI-3106 + Capsil weekly	27 fl oz + 6 fl oz	34 ± 17.0a	17 ± 4.2a	7 ± 1.8a	9 ± 1.9ab	7 ± 1.4abc	7 ± 0.7a	3 ± 0.6a
IKI-3106 + Capsil rotated w/ Venerate XC	22 fl oz + 6 fl oz 2 qt	24 ± 4.5a	16 ± 5.9a	8 ± 1.5a	10 ± 2.2ab	5 ± 0.7c	11 ± 2.4a	3 ± 1.1a
IKI-3106 + Capsil rotated w/ Venerate XC	27 fl oz + 6 fl oz 2 qt	28 ± 4.1a	17 ± 2.5a	9 ± 2.5a	6 ± 0.4ab	7 ± 1.8bc	10 ± 3.4a	5 ± 1.6a
Venerate XC	1 qt	30 ± 8.5a	36 ± 11.2a	15 ± 1.9a	17 ± 2.2a	12 ± 2.4abc	9 ± 2.1a	2 ± 0.8a
Venerate XC	2 qt	17 ± 1.5a	24 ± 4.8a	17 ± 3.2a	21 ± 6.8a	12 ± 3.1abc	7 ± 1.4a	3 ± 0.8a
Water check	-	17 ± 2.9a	17 ± 4.9a	19 ± 2.4a	13 ± 3.3ab	19 ± 3.3ab	7 ± 1.8a	5 ± 1.0a
Nontreated	-	20 ± 3.6a	20 ± 5.3a	14 ± 1.7a	18 ± 2.4a	21 ± 2.9a	18 ± 5.5a	3 ± 0.6a

Data were log(x+1)-transformed to improve normality and equality of variance and analyzed using Repeated Measures Two Way ANOVA with treatment and time (DAT) as factors, followed by the Holm-Sidak all pairwise multiple comparison procedure.Non-transformed values are presented. Within each column, different letters indicate statistically significant differences.

[x] Mean number of thrips per plant.

[y] Days after 1st application on May 11.

Table 101. Western Flower Thrips Control on Marigold (*Tagetes* sp.) 'Safari Yellow', - Plant Size, Nansen, CA, 2016.

Treatment	Rate / 100 gal	6 DAT[y]	13 DAT	20 DAT	27 DAT	34 DAT	41 DAT
Plant Height							
Conserve	8 fl oz	22 ± 1.0a	24 ± 0.8a	27 ± 0.6b	28 ± 0.8abc	29 ± 0.8	30 ± 0.8ab
IKI-3106 + Capsil biweekly	22 fl oz + 6 fl oz	23 ± 1.0a	26 ± 1.0a	28 ± 0.7ab	29 ± 0.8ab	31 ± 0.9ab	34 ± 1.2a
IKI-3106 + Capsil weekly	22 fl oz + 6 fl oz	24 ± 1.2a	27 ± 1.3a	31 ± 1.7a	31 ± 1.5a	32 ± 1.4a	34 ± 1.1a
IKI-3106 + Capsil biweekly	27 fl oz + 6 fl oz	23 ± 0.8a	25 ± 0.9a	27 ± 0.8b	28 ± 0.7abc	28 ± 0.8bc	30 ± 0.9b
IKI-3106 + Capsil weekly	27 fl oz + 6 fl oz	22 ± 0.5a	24 ± 0.9a	27 ± 0.8b	28 ± 0.8abc	29 ± 0.7	31 ± 1.0ab
IKI-3106 + Capsil rotated w/Venerate XC	22 fl oz + 6 fl oz / 2 qt	21 ± 0.7a	25 ± 0.8a	28 ± 0.8ab	28 ± 0.9abc	29 ± 0.4	30 ± 0.6ab
IKI-3106 + Capsil rotated w/Venerate XC	27 fl oz + 6 fl oz / 2 qt	22 ± 0.5a	24 ± 0.7a	26 ± 0.6b	25 ± 0.8bc	27 ± 0.7bc	29 ± 0.6b
Venerate XC	1 qt	21 ± 0.7a	25 ± 0.8a	28 ± 0.8ab	28 ± 0.9abc	29 ± 0.4	30 ± 0.6ab
Venerate XC	2 qt	22 ± 0.5a	24 ± 0.7a	26 ± 0.6b	25 ± 0.8bc	27 ± 0.7bc	29 ± 0.6b
Water check	-	22 ± 0.9a	24 ± 0.7a	25 ± 0.7b	25 ± 0.9c	26 ± 1.1c	29 ± 0.8b
Nontreated	-	23 ± 1.2a	24 ± 1.0a	25 ± 0.7b	25 ± 0.9bc	27 ± 0.8bc	29 ± 0.6b
Plant Width							
Conserve	8 fl oz	24 ± 1.9a	31 ± 1.0a	35 ± 1.6ab	41 ± 1.1a	41 ± 1.0a	40 ± 1.5a
IKI-3106 + Capsil biweekly	22 fl oz + 6 fl oz	26 ± 1.2a	33 ± 1.3a	36 ± 1.8ab	40 ± 1.5a	41 ± 0.8ab	41 ± 1.1a
IKI-3106 + Capsil weekly	22 fl oz + 6 fl oz	27 ± 0.9a	32 ± 1.1a	35 ± 0.9ab	40 ± 1.5a	42 ± 1.4a	41 ± 1.1a
IKI-3106 + Capsil biweekly	27 fl oz + 6 fl oz	25 ± 1.2a	32 ± 0.8a	37 ± 1.1a	41 ± 1.2a	40 ± 1.1abcd	40 ± 1.0a
IKI-3106 + Capsil weekly	27 fl oz + 6 fl oz	25 ± 0.9a	31 ± 0.9a	35 ± 1.2ab	38 ± 0.7ab	40 ± 1.8abc	40 ± 0.5a
IKI-3106 + Capsil rotated w/Venerate XC	22 fl oz + 6 fl oz / 2 qt	23 ± 1.2a	31 ± 0.7a	35 ± 1.5ab	38 ± 1.2ab	40 ± 0.9abcd	41 ± 0.9a
IKI-3106 + Capsil rotated w/Venerate XC	27 fl oz + 6 fl oz / 2 qt	25 ± 1.6a	31 ± 0.9a	36 ± 1.5ab	39 ± 2.1ab	41 ± 0.8ab	42 ± 1.1a
Venerate XC	1 qt	24 ± 1.0a	29 ± 1.0a	30 ± 1.7b	32 ± 1.7c	35 ± 1.5cd	37 ± 1.1a
Venerate XC	2 qt	23 ± 1.3a	30 ± 1.7a	31 ± 1.2b	33 ± 1.3bc	34 ± 1.4d	37 ± 1.0a
Water check	-	24 ± 1.8a	30 ± 0.9a	31 ± 1.5b	33 ± 1.7bc	35 ± 1.6cd	36 ± 1.1a
Nontreated	-	25 ± 1.5a	31 ± 0.8a	32 ± 1.2ab	34 ± 1.4bc	35 ± 1.2bcd	36 ± 0.7a

Data were analyzed using Repeated Measures Two Way ANOVA with treatment and time (DAT) as factors, followed by the Holm-Sidak all pairwise multiple comparison procedure. Within each column, different letters indicate statistically significant differences.

[y] Days after 1st application on May 11.

Table 102. Western Flower Thrips Control on Marigold (*Tagetes erecta*) 'Safari Bolero', Vafaie, TX, 2016.

Treatment [z]	Rate Per 100 Gal	Population Counts [y], Means Separations*, and Henderson's Percent Control							
		3/10 Pre	3/17	3/24	3/31	4/7	4/14	4/21	4/28
Immatures									
Avid	8 fl oz	5	0*† (100)	0*† (100)	2* (60)	4 (50)	5 (62)	4† (0)	22 (0)
Rycar	3.2 fl oz	5	1 (75)	4 (20)	4 (20)	3 (62)	3 (80)	4† (0)	71 (0)
Rycar	6.4 fl oz	5	2 (50)	3 (40)	2* (60)	6 (25)	5 (62)	2 (50)	3 (77)
XXpire	3.5 fl oz	5	2 (50)	0*† (100)	0*† (100)	1*† (87)	0*† (100)	0*† (100)	9 (31)
Nontreated	-	4	5 (0)	4 (0)	4 (0)	6 (0)	12 (0)	19* (0)	14 (0)
Water Spray	-	5	4 (0)	5 (0)	5 (0)	8 (0)	15 (0)	4 (0)	13 (0)
Treatmenteffectp-value		0.9781	0.0202	0.0129	0.0017	0.0999	0.0045	0.0009	0.2605
Adults									
Avid	8 fl oz	0	0	1	0	0†	1†	2	6
Rycar	3.2 fl oz	0	0	0	0	2	1†	3	4
Rycar	6.4 fl oz	0	1	0	1	2	5	6	3
XXpire	3.5 fl oz	0	0	0	0	0	0†	5	4
Nontreated	-	0	0	1	1	2	4	5	3
Water Spray	-	1	0	0	0	1	2	5	8
Treatmenteffectp-value		0.4049	0.2247	0.8202	0.4402	0.1885	0.0385	0.8083	0.8606

[y] Mean number of thrips per plant were counted after alcohol extraction.
* Indicates treatments that are significantly different than the water spray treatment within column (Wilcoxon's test, p<05).
†Indicates treatments that are significantly different than the non-treated control within columns (Wilcoxon's Test, p<0.05).
[z] XXpire and Rycar mixed with Capsil surfactant.

2017.

Vafaie repeated the 2016 treatments in 2017 but the marigolds were planted in container outdoors (Table 103). No treatments reduced immature thrips numbers compared to the nontreated check (Table 104). Several treatments had significantly lower thrips adults compared to the nontreated check at 49 DAT (p = 0.0263), but no treatments were significantly different from the nontreated check on any other sampling dates. No obvious differences in thrips damage rating between treatments were observed (data not shown). Because of the inconclusive data, this trial was not included in the general efficacy summary Table 6.

Nansen repeated the 2016 treatments in 2017 but the marigolds were planted outdoors in 6-inch pots and placed in individual dome cages. Overall, the results are similar to those in 2016, with IKI-3106 alone providing the most effective control of thrips (Table 105). Treatments with various concentrations and weekly as well as biweekly sprays were as effective as the industry standard Conserve. Venerate XC was not as effective and did not increase effectiveness of IKI-3106 in rotation. No obvious differences in thrips damage rating between treatments were observed (data not shown). No phytotoxicity symptoms as a result of treatment with any of the products were observed.

Gilrein compared weekly or biweekly applications of several products for managing western flower thrips in a greenhouse trial. Treatments were applied on weekly interval on Jun 30, Jul 7, 14, 21, 28, and on a 2-week interval on Jun 30, Jul 14, and 28. Bi-weekly applications of Overture, Mainspring, and weekly application of IKI-3106 provided some level of control against immature thrips after the first application. However, immature populations were very low in all plants including control during the rest of the trial period (Table 107). Adult thrips were significantly higher in all treatments until the 2nd applications were made. Thrips numbers were low on Overture treated plants for the rest of the trial period. None of the other treatments have shown significant

control of the mature thrips over the rest of the trial period. Thrips feeding injury to leaves were not significantly different among the treatments because of several less effective treatments in the area and adult thrips were constantly moving from the less effective to the moderately effective treatment area (Table 108). Also, there were noticeable two spotted spider mite presence on the plants. No phytotoxicity symptoms as a result of treatment with any of the products were observed.

Table 103. Western Flower Thrips Control on Marigold (*Tagetes* sp.) 'Small Bloom Orange', – Application Rates and Dates, Vafaie, TX, 2017.

Treatment (Active Ingredient)	Rate / 100 gal	Application Dates				
		5/4 0 WAT	5/11 1 WAT	5/18 2 WAT	5/25 3 WAT	6/1 4 WAT
Avid 0.15EC	8 fl oz	X		X		X
IKI-3106 + Capsil	22 fl oz + 6 fl oz	X		X		X
IKI-3106 + Capsil	22 fl oz + 6 fl oz	X	X	X	X	X
IKI-3106 +	27 fl oz + 6 fl oz	X		X		X
IKI-3106 +	27 fl oz + 6 fl oz	X	X	X	X	X
IKI-3106 + Capsil rotated w/ Venerate XC	22 fl oz + 6 fl oz 1 qt	X	X	X	X	X
IKI-3106 + Capsil rotated w/ Venerate XC	27 fl oz + 6 fl oz 1 qt	X	X	X	X	X
Venerate XC	1 qt	X	X	X	X	X
Venerate XC	2 qt	X	X	X	X	X
Water check	-	X	X	X	X	X

Table 104. Western Flower Thrips Control on Marigold (*Tagetes* sp.) 'Small Bloom Orange', Vafaie, TX, 2017.

Treatment	Rate / 100 gal	Population Counts [x]							
		0 DAT [y]	7 DAT	14 DAT	21 DAT	28 DAT	35 DAT	42 DAT	49 DAT
Nymphs									
Avid 0.15EC	8 fl oz	66.33	62.50	44.17	10.33	9.33	5.17	4.33	26.00
IKI-3106 + Capsil biweekly	22 fl oz + 6 fl oz	30.83	3.50	14.83	11.00	2.17	3.83	11.50	30.67
IKI-3106 + Capsil weekly	22 fl oz + 6 fl oz	20.50	3.17	14.50	10.17	9.17	4.50	4.00	28.67
IKI-3106 + Capsil biweekly	27 fl oz + 6 fl oz	16.33	47.00	9.67	6.83	8.17	5.83	8.83	11.50
IKI-3106 + Capsil weekly	27 fl oz + 6 fl oz	31.33	28.67	9.33	15.17	9.17	.67	1.17	16.83
IKI-3106 + Capsil rotated w/Venerate XC	22 fl oz + 6 fl oz / 1 qt	54.33	5.67	37.17	12.67	7.33	2.83	7.50	10.33
IKI-3106 + Capsil rotated w/Venerate XC	27 fl oz + 6 fl oz / 1 qt	22.67	28.33	39.50	21.00	7.50	8.17	17.33	32.00
Venerate XC	1 qt	32.83	42.33	6.50	26.17	5.00	13.00	0.50	16.17
Venerate XC	2 qt	21.00	43.33	7.33	13.17	20.00	5.67	17.17	36.50
Water check	-	41.00	37.17	20.00	28.33	12.33	3.17	4.83	20.50
Nontreated	-	37.50	52.00	20.50	19.00	9.00	3.50	.83	5.67
ANOVA	*p-value*	*0.7752*	*0.0363*	*0.7142*	*0.7718*	*0.6452*	*0.8100*	*0.6849*	*0.3204*
Adults									
Avid 0.15EC	8 fl oz	2.33	3.17	6.83	9.17	1.50	1.17	0.83	0.50*
IKI-3106 + Capsil biweekly	22 fl oz + 6 fl oz	1.33	6.50	7.00	2.00	1.67	3.33	1.00	0.50*
IKI-3106 + Capsil weekly	22 fl oz + 6 fl oz	1.00	5.33	8.00	6.00	2.17	2.00	0.83	0.67
IKI-3106 + Capsil biweekly	27 fl oz + 6 fl oz	0.50	3.50	6.00	3.83	3.50	1.83	1.50	0.00*
IKI-3106 + Capsil weekly	27 fl oz + 6 fl oz	1.00	2.50	8.67	5.50	2.83	0.67	0.83	0.67*
IKI-3106 + Capsil rotated w/Venerate XC	22 fl oz + 6 fl oz / 2 qt	2.00	3.17	5.00	2.83	1.00	1.33	0.50	0.67*
IKI-3106 + Capsil rotated w/Venerate XC	27 fl oz + 6 fl oz / 2 qt	0.33	4.83	3.67	2.33	0.67	2.67	1.33	1.17
Venerate XC	1 qt	0.83	6.50	3.83	3.33	3.17	2.00	1.00	1.17
Venerate XC	2 qt	0.33	6.67	6.50	1.83	0.17	1.67	2.33	0.50*
Water check	-	1.17	4.17	4.50	3.17	0.67	2.83	1.17	0.83
Nontreated	-	0.50	5.67	3.67	3.50	0.50	1.83	1.00	2.33
ANOVA	*p-value*	*0.1813*	*0.8901*	*0.3935*	*0.6951*	*0.4584*	*0.7524*	*0.9724*	*0.0263*

*significantly different compared to nontreated check ($p < 0.05$) using Dunnett's Method log(x + 1)

[x] Mean number of thrips persample (1 flower + 5 leaves).

[y] Days after 1st application on May 4.

Table 105. Western Flower Thrips Control on Marigold (*Tagetes* sp.) 'Safari Yellow', Nansen, CA, 2017.

Treatment	Rate / 100 gal	Population Counts [x]						
		-1 DAT	6 DAT	13 DAT	20 DAT	27 DAT	34 DAT	41 DAT
Immatures								
Conserve biweekly	8 fl oz	23 ± 5.5 a	19 ± 10.1 a	11 ± 9.3 ab	1 ± 0.5 a	0 ± 0.0 b	0 ± 0.0 b	1 ± 0.3 b
IKI-3106 + Capsil biweekly	22 fl oz + 6 fl oz	38 ± 14.1 a	49 ± 17.1 a	3 ± 1.0 b	2 ± 1.2 a	1 ± 1.0 ab	0 ± 0.2 b	1 ± 0.7 b
IKI-3106 + Capsil weekly	22 fl oz + 6 fl oz	46 ± 14.8 a	27 ± 6.9 a	3 ± 1.5 b	4 ± 1.9 a	2 ± 0.8 ab	1 ± 1.3 b	0 ± 0.2 b
IKI-3106 + Capsil biweekly	27 fl oz + 6 fl oz	72 ± 33.7 a	39 ± 29.9 a	14 ± 6.9 ab	1 ± 1.0 a	1 ± 0.3 ab	0 ± 0.2 b	2 ± 2.2 b
IKI-3106 + Capsil weekly	27 fl oz + 6 fl oz	34 ± 8.4 a	36 ± 14.5 a	11 ± 8.9 ab	1 ± 0.2 a	1 ± 0.6 ab	1 ± 0.5 b	0 ± 0.2 b
IKI-3106 + Capsil rotated w/ Venerate XC weekly	22 fl oz + 6 fl oz 2 qt	18 ± 4.0 a	25 ± 11.2 a	5 ± 3.7 b	13 ± 13.0 a	1 ± 0.5 ab	0 ± 0.0	1 ± 0.2 b
IKI-3106 + Capsil rotated w/ Venerate XC weekly	27 fl oz + 6 fl oz 2 qt	56 ± 21.7 a	23 ± 13.0 a	6 ± 1.5 ab	1 ± 0.5 a	2 ± 0.8 ab	1 ± 0.7	2 ± 0.7 ab
Venerate XC weekly	1 qt	48 ± 18.5 a	27 ± 15.2 a	35 ± 17.9 a	1 ± 0.6 a	1 ± 0.4 ab	0 ± 0.2 b	1 ± 0.2 b
Venerate XC weekly	2 qt	53 ± 26.4 a	33 ± 12.8 a	6 ± 1.7 ab	2 ± 0.5 a	4 ± 1.8 ab	1 ± 0.6 a	3 ± 0.8 ab
Water check	-	32 ± 10.9 a	54 ± 27.4 a	21 ± 8.1 ab	14 ± 6.4 a	10 ± 3.5 a	14 ± 6.5 a	27 ± 12.0 a
Nontreated	-	50 ± 22.2 a	32 ± 9.5 a	15 ± 2.4 ab	16 ± 8.5 a	5 ± 1.0 ab	10 ± 4.2 a	12 ± 1.6 a
Adults								
Conserve biweekly	8 fl oz	10 ± 3.7	8 ± 1.9	2 ± 1.1	4 ± 1.4	5 ± 1.9	2 ± 0.7	2 ± 0.6
IKI-3106 + Capsil biweekly	22 fl oz + 6 fl oz	19 ± 7.0	24 ± 11.6	4 ± 1.7	6 ± 3.0	10 ± 4.9	5 ± 2.5	8 ± 4.0
IKI-3106 + Capsil weekly	22 fl oz + 6 fl oz	8 ± 2.4	12 ± 3.5	4 ± 2.0	4 ± 2.0	4 ± 1.1	2 ± 1.8	2 ± 0.7
IKI-3106 + Capsil biweekly	27 fl oz + 6 fl oz	6 ± 0.6	21 ± 7.6	8 ± 1.8	5 ± 1.5	9 ± 5.1	3 ± 1.2	3 ± 1.1
IKI-3106 + Capsil weekly	27 fl oz + 6 fl oz	4 ± 1.4	11 ± 3.8	6 ± 3.5	3 ± 0.6	4 ± 1.3	2 ± 0.9	3 ± 1.3
IKI-3106 + Capsil rotated w/ Venerate XC weekly	22 fl oz + 6 fl oz 2 qt	4 ± 1.2	16 ± 5.9	4 ± 1.6	5 ± 2.8	3 ± 0.9	3 ± 1.5	3 ± 1.8
IKI-3106 + Capsil rotated w/ Venerate XC weekly	27 fl oz + 6 fl oz 2 qt	11 ± 4.2	27 ± 15.7	5 ± 1.7	4 ± 1.4	6 ± 2.2	3 ± 0.9	5 ± 1.0
Venerate XC weekly	1 qt	11 ± 3.3	12 ± 3.4	10 ± 3.3	4 ± 1.0	6 ± 1.4	7 ± 2.9	5 ± 1.7
Venerate XC weekly	2 qt	9 ± 2.1	17 ± 4.0	11 ± 5.5	6 ± 1.8	9 ± 3.8	9 ± 3.1	7 ± 3.1
Water check	-	6 ± 2.3	9 ± 3.9	7 ± 1.7	8 ± 3.9	15 ± 7.8	9 ± 5.2	16 ± 10.1
Nontreated	-	8 ± 1.6	13 ± 7.0	10 ± 3.3	18 ± 8.4	13 ± 4.6	12 ± 8.8	9 ± 3.3
Total								
Conserve biweekly	8 fl oz	33 ± 6.4 a	27 ± 11.7 a	13 ± 10.1 ab	5 ± 1.6 a	5 ± 1.9 a	2 ± 0.7 c	3 ± 0.7 abc
IKI-3106 + Capsil biweekly	22 fl oz + 6 fl oz	58 ± 18.1 a	73 ± 26.2 a	6 ± 2.1 ab	8 ± 3.6 a	11 ± 5.7 a	5 ± 2.7 abc	8 ± 4.5 abc
IKI-3106 + Capsil weekly	22 fl oz + 6 fl oz	53 ± 16.0 a	39 ± 8.8 a	7 ± 2.9 b	7 ± 3.5 a	5 ± 0.9 a	4 ± 3.1 c	2 ± 0.7 c
IKI-3106 + Capsil biweekly	27 fl oz + 6 fl oz	78 ± 33.8 a	60 ± 37.5 a	22 ± 7.9 ab	6 ± 2.4 a	9 ± 5.2 a	3 ± 1.2 abc	5 ± 3.2 abc
IKI-3106 + Capsil weekly	27 fl oz + 6 fl oz	38 ± 9.3 a	47 ± 13.5 a	17 ± 11.3 ab	3 ± 0.6 a	5 ± 1.7 a	2 ± 1.2 bc	3 ± 1.3 bc

Treatment	Rate / 100 gal	Population Counts [x]						
		-1 DAT	6 DAT	13 DAT	20 DAT	27 DAT	34 DAT	41 DAT
IKI-3106 + Capsil rotated w/ Venerate XC weekly	22 fl oz + 6 fl oz 2 qt	22 ± 4.5 a	41 ± 11.7 a	9 ± 4.3 ab	18 ± 15.6 a	3 ± 0.7 a	3 ± 1.5 abc	4 ± 1.9 bc
IKI-3106 + Capsil rotated w/ Venerate XC weekly	27 fl oz + 6 fl oz 2 qt	67 ± 23.5 a	49 ± 20.3 a	10 ± 3.1 ab	5 ± 1.2 a	8 ± 1.8 a	4 ± 1.1 abc	7 ± 1.5 abc
Venerate XC weekly	1 qt	59 ± 17.5 a	39 ± 15.4 a	45 ± 17.9 a	6 ± 1.2 a	7 ± 1.6 a	7 ± 2.8 abc	5 ± 1.9 abc
Venerate XC weekly	2 qt	62 ± 27.5 a	50 ± 11.6 a	17 ± 6.3 ab	8 ± 2.0 a	13 ± 5.1 a	10 ± 3.1 abc	9 ± 3.3 abc
Water check	-	38 ± 13.1 a	63 ± 31.0 a	28 ± 9.1 ab	22 ± 9.4 a	25 ± 9.1 a	23 ± 11.2 ab	44 ± 20.0 ab
Nontreated	-	58 ± 22.8 a	44 ± 14.8 a	25 ± 4.5 ab	33 ± 13.1 a	17 ± 5.4 a	22 ± 12.8 a	20 ± 4.2 a

Data were log(x+1)-transformed to improve normality and equality of variance and analyzed using Repeated Measures Two Way ANOVA with treatment and time (DAT) as factors, followed by the Holm-Sidak all pairwise multiple comparison procedure.Non-transformed values are presented. Within each column, different letters indicate statistically significant differences.

[x] Mean number of thrips per plant.

Table 106. Western Flower Thrips Control on Marigold (*Tagetes* sp.) 'Safari Yellow', - Plant Size, Nansen, CA, 2017.

Treatment	Rate / 100 gal	Plant Size [x]						
		-1 DAT	6 DAT	13 DAT	20 DAT	27 DAT	34 DAT	41 DAT
Height								
Conserve biweekly	8 fl oz	36 ± 4.4	38 ± 4.9	41 ± 2.3	43 ± 2.8	45 ± 2.1	47 ± 1.9	45 ± 2.4
IKI-3106 + Capsil biweekly	22 fl oz + 6 fl oz	42 ± 2.9	44 ± 2.8	44 ± 2.9	46 ± 2.4	47 ± 2.3	48 ± 1.9	48 ± 2.0
IKI-3106 + Capsil weekly	22 fl oz + 6 fl oz	39 ± 2.8	40 ± 2.6	41 ± 2.9	42 ± 2.8	42 ± 2.8	44 ± 3.1	43 ± 3.2
IKI-3106 + Capsil biweekly	27 fl oz + 6 fl oz	40 ± 1.7	43 ± 1.8	40 ± 2.1	45 ± 1.8	44 ± 2.2	46 ± 2.5	45 ± 2.3
IKI-3106 + Capsil weekly	27 fl oz + 6 fl oz	41 ± 1.5	43 ± 1.5	43 ± 2.9	44 ± 2.8	46 ± 2.3	48 ± 1.6	47 ± 1.8
IKI-3106 + Capsil rotated w/ Venerate XC weekly	22 fl oz + 6 fl oz 2 qt	41 ± 2.7	43 ± 2.5	44 ± 3.1	45 ± 2.8	45 ± 2.1	47 ± 1.7	45 ± 2.1
IKI-3106 + Capsil rotated w/ Venerate XC weekly	27 fl oz + 6 fl oz 2 qt	43 ± 1.4	44 ± 0.4	44 ± 2.1	45 ± 1.9	45 ± 1.7	47 ± 1.7	45 ± 2.3
Venerate XC weekly	1 qt	43 ± 1.2	46 ± 1.3	46 ± 1.3	46 ± 1.5	47 ± 1.7	49 ± 1.1	48 ± 1.0
Venerate XC weekly	2 qt	44 ± 2.0	46 ± 2.0	47 ± 1.7	48 ± 1.7	48 ± 2.0	50 ± 0.6	47 ± 1.9
Water check	-	41 ± 3.3	43 ± 3.7	43 ± 3.4	45 ± 3.7	44 ± 3.7	46 ± 4.0	45 ± 3.8
Nontreated	-	42 ± 2.6	44 ± 2.7	42 ± 2.8	45 ± 3.2	45 ± 3.2	48 ± 2.6	47 ± 3.3
Width								
Conserve biweekly	8 fl oz	32 ± 0.9	35 ± 1.0	32 ± 1.0	33 ± 1.9	32 ± 1.1	34 ± 2.0	36 ± 2.7
IKI-3106 + Capsil biweekly	22 fl oz + 6 fl oz	36 ± 1.5	37 ± 1.2	34 ± 1.7	34 ± 1.2	34 ± 1.4	39 ± 0.9	38 ± 0.9
IKI-3106 + Capsil weekly	22 fl oz + 6 fl oz	32 ± 1.8	34 ± 1.9	34 ± 1.5	33 ± 1.8	34 ± 1.4	33 ± 2.4	34 ± 1.5
IKI-3106 + Capsil biweekly	27 fl oz + 6 fl oz	35 ± 2.0	37 ± 1.7	34 ± 1.3	33 ± 0.8	36 ± 1.6	37 ± 2.1	36 ± 2.3
IKI-3106 + Capsil weekly	27 fl oz + 6 fl oz	34 ± 1.3	35 ± 1.5	33 ± 2.2	35 ± 1.5	35 ± 1.8	35 ± 1.9	34 ± 1.7
IKI-3106 + Capsil rotated w/ Venerate XC weekly	22 fl oz + 6 fl oz 2 qt	34 ± 2.9	36 ± 2.5	34 ± 1.5	33 ± 0.7	36 ± 1.6	35 ± 1.7	34 ± 1.8
IKI-3106 + Capsil rotated w/ Venerate XC weekly	27 fl oz + 6 fl oz 2 qt	35 ± 1.6	36 ± 1.8	34 ± 1.8	35 ± 1.8	36 ± 2.0	35 ± 1.9	36 ± 2.6
Venerate XC weekly	1 qt	35 ± 1.4	37 ± 1.1	34 ± 1.4	36 ± 1.1	36 ± 1.3	38 ± 1.0	37 ± 1.5
Venerate XC weekly	2 qt	35 ± 1.5	35 ± 1.4	35 ± 1.0	34 ± 0.7	37 ± 2.3	37 ± 1.9	38 ± 2.5
Water check	-	33 ± 1.6	37 ± 1.7	35 ± 1.3	36 ± 1.6	34 ± 1.8	34 ± 1.7	34 ± 1.2
Nontreated	-	34 ± 1.6	35 ± 1.5	31 ± 0.7	34 ± 1.5	34 ± 1.6	37 ± 1.9	36 ± 1.7

Data were analyzed using Repeated Measures Two Way ANOVA with treatment and time (DAT) as factors, followed by the Holm-Sidak all pairwise multiple comparison procedure. There were no significant differences between treatments.

Table 107. Western Flower Thrips Control on Marigold (*Tagetes erecta*) 'Taishan Yellow', Gilrein, NY, 2017.

Treatment	Rate / 100 gal	Population Counts [x]					
		6/29	7/6	7/12	7/20	7/27	8/4
Immatures							
IKI-3106 + Capsil weekly	22 fl oz + 6 fl oz	2.1 a	6.7 bc	3.4 ab	2.4 ab	0.9 a	0.2 a
IKI-3106 + Capsil biweekly	22 fl oz + 6 fl oz	3.5 a	5.6 c	2.0 ab	1.5 b	0.4 a	0.5 a
IKI-3106 + Capsil weekly	27 fl oz + 6 fl oz	4.5 a	7.7 bc	1.4 ab	2.0 ab	1.0 a	0.0 a
IKI-3106 + Capsil biweekly	27 fl oz + 6 fl oz	3.7 a	4.1 c	3.8 a	1.7 ab	1.4 a	0.6 a
IKI-3106 + Capsil rotated w/ Venerate XC weekly	22 fl oz + 6 fl oz 2 qt	3.2 a	11.0 bc	1.2 ab	1.6 b	0.9 a	0.8 a
IKI-3106 + Capsil rotated w/ Venerate XC weekly	27 fl oz + 6 fl oz 2 qt	2.4 a	13.5 bc	2.5 ab	2.9 ab	0.7 a	0.1 a
Mainspring biweekly	8 fl oz	4.2 a	8.6 bc	3.7 a	4.9 a	1.7 a	0.0 a
Overture biweekly	8 oz	2.1 a	8.2 bc	2.6 a	0.5 b	0.5 a	0.1 a
Venerate XC weekly	1 qt	5.0 a	41.0a	0.5 b	1.9 ab	1.2 a	0.2 a
Venerate XC weekly	2 qt	3.1 a	44.5a	3.7 a	1.6 b	1.0 a	1.0 a
Water check	-	1.5 a	26.6ab	2.9 a	1.6 b	0.9 a	0.9 a
Adults							
IKI-3106 + Capsil weekly	22 fl oz + 6 fl oz	7.87 a	23.2ab	17.0 ab	23.1 abc	9.6 ab	1.2 cd
IKI-3106 + Capsil biweekly	22 fl oz + 6 fl oz	10.25 a	14.7 b	22.5 ab	17.5 bc	7.5 ab	8.1 a
IKI-3106 + Capsil weekly	27 fl oz + 6 fl oz	6.75 a	19.7 b	13.7 ab	15.9 bc	8.4 ab	2.0 bcd
IKI-3106 + Capsil biweekly	27 fl oz + 6 fl oz	7.00 a	23.9 ab	25.2 ab	19.4 bc	10.0 ab	6.1 ab
IKI-3106 + Capsil rotated w/ Venerate XC weekly	22 fl oz + 6 fl oz 2 qt	7.37 a	34.5 ab	15.7 ab	18.6 bc	5.7 ab	3.5 bcd
IKI-3106 + Capsil rotated w/ Venerate XC weekly	27 fl oz + 6 fl oz 2 qt	7.75 a	46.4 ab	27.6 a	25.9 ab	5.0 ab	1.5 cd
Mainspring biweekly	8 fl oz	8.62 a	33.0 ab	24.7 ab	35.0 a	11.0 a	3.4 bcd
Overture biweekly	8 oz	10.37 a	57.7 a	19.5ab	8.2 c	3.6 b	0.2 d
Venerate XC weekly	1 qt	6.37 a	57.7 a	10.7 b	22.5 abc	6.7 ab	5.1 abc
Venerate XC weekly	2 qt	7.50 a	56.5 a	14.6 ab	16.1 bc	5.1 ab	5.9 ab
Water check	-	9.50 a	29.5 ab	16.5ab	21.4 abc	5.9 ab	3.6 bcd
Total							
IKI-3106 + Capsil weekly	22 fl oz + 6 fl oz	10.8 a	31.1 c	21.5 ab	25.5 abc	11.4 ab	1.5 cd
IKI-3106 + Capsil biweekly	22 fl oz + 6 fl oz	14.5 a	21.5 c	25.8 ab	19.0 bc	10.1 ab	8.6 a
IKI-3106 + Capsil weekly	27 fl oz + 6 fl oz	12.0 a	28.7 c	16.2 ab	17.9 bc	10.3 ab	2.0 cd
IKI-3106 + Capsil biweekly	27 fl oz + 6 fl oz	11.5 a	29.3 c	30.4 ab	21.1 bc	12.3 a	6.7 ab

Treatment	Rate / 100 gal	Population Counts [x]					
		6/29	7/6	7/12	7/20	7/27	8/4
IKI-3106 + Capsil rotated w/ Venerate XC weekly	22 fl oz + 6 fl oz 2 qt	11.4 a	47.0 bc	18.1 ab	20.2 bc	7.3 ab	4.2 abcd
IKI-3106 + Capsil rotated w/ Venerate XC weekly	27 fl oz + 6 fl oz 2 qt	11.0 a	61.5 abc	31.5 a	28.7 ab	8.7 ab	1.6 cd
Mainspring biweekly	8 fl oz	13.7 a	43.0 c	29.9 ab	39.8 a	13.7 a	3.4 bcd
Overture biweekly	8 oz	13.4 a	43.1 c	23.4 ab	8.7 c	4.5 b	0.4 d
Venerate XC weekly	1 qt	12.1 a	100.4 ab	12.1 b	24.4 abc	10.1 ab	5.4 abc
Venerate XC weekly	2 qt	11.4 a	102.6 a	19.5 ab	17.7 bc	6.8 ab	6.9 ab
Water check	-	11.7 a	57.5 abc	20.5 ab	23.0 abc	7.5 ab	4.5 abcd

[x] Mean number of thrips per plant. Means within columns followed by the same letter are not significantly different at p=0.05 (LS Means Tukey's HSD).

Table 108. Western Flower Thrips Control on Marigold (*Tagetes erecta*) 'Taishan Yellow', - Plant Size, Gilrein, NY, 2017.

Treatment[y]	Rate Per 100 Gal	Height (in) [x]	Width (in)	Plant Injury [y]
IKI-3106 + Capsil weekly	22 fl oz + 6 fl oz	19.87 a	16.12 a	4.37 ab
IKI-3106 + Capsil biweekly	22 fl oz + 6 fl oz	19.75 a	17.37 a	2.12 c
IKI-3106 + Capsil weekly	27 fl oz + 6 fl oz	20.06 a	18.00 a	3.25 bc
IKI-3106 + Capsil biweekly	27 fl oz + 6 fl oz	19.81 a	18.37 a	3.50 abc
IKI-3106 + Capsil rotated w/ Venerate XC weekly	22 fl oz + 6 fl oz 2 qt	19.5 a	18.12 a	3.00 bc
IKI-3106 + Capsil rotated w/ Venerate XC weekly	27 fl oz + 6 fl oz 2 qt	19.50 a	17.75 a	4.12 abc
Mainspring biweekly	8 fl oz	19.62 a	17.06 a	2.12c
Overture biweekly	8 oz	19.31 a	16.87 a	5.62 a
Venerate XC weekly	1 qt	20.43 a	17.18 a	4.12 abc
Venerate XC weekly	2 qt	19.87 a	17.18 a	3.25 bc
Water check	-	19.68 a	17.81 a	3.37 bc

[x] Means within columns followed by the same letter are not significantly different at p=0.05 (LS Means Tukey's HSD).
[y] Plant injury was estimated from feeding by both thrips and two spotted spider mite.

2018.

Nansen compared the efficacy of several products for managing western flower thrips in a greenhouse trial. Treatments were applied once, weekly, or biweekly starting Jul 5, and then, Jul 12, 19, 27, and Aug 2. Across time points (weekly for 1-6 weeks after first treatment), results showed no significant effects of treatments, including the industry standard, on either counts of thrips immatures and adults or plant biomass (height and/or width) (Table 109, Table 110). Western flower thrips resistance to the industry standard Conserve, has been documented; this could, at least partially, explain its non-significant effect in this trial. No obvious differences in thrips damage rating between treatments were observed (data not shown). No phytotoxicity symptoms as a result of treatment with any of the products were observed.

Hotchkiss studied the efficacy of several insecticides for managing western flower thrips in a greenhouse trial. Treatments were applied once, weekly, or biweekly starting Aug 9, and then, Aug 15, 22, 28, and Sep 6. The standard Pylon, IKI-3106 and IKI-3326 provided effective control of immatures (Table 111). V10433 looks promising, although variation amoung the thrips numbers per plant obscured significant differences.

2019.

Hotchkiss studied the efficacy of several insecticides for managing western flower thrips in a greenhouse trial. Treatments were applied once, weekly, or biweekly starting Jul 11, then 18 and 26, and Aug 2 and 9. As in the 2018 trial, IKI-3106, IKI-3326 and KOC22018-8 at the high rate provided effective control of immatures, and were superior to the standard Pylon (Table 112). IKI-3106 and KOC22018-8 at the high rate also provided effective control of adults. Based on the data for total thrips control, the products BCS- 507, KOC22018-8, SP3014 and V-10433 look promising.

Table 109. Western Flower Thrips Control on Marigold (*Tagetes* sp.) 'Safari Yellow', Nansen, CA, 2018.

Treatment	Rate / 100 gal	Population Counts [x]						
		0 WAT	1 WAT	2 WAT	3 WAT	4 WAT	5 WAT	6 WAT
Immatures								
Altus biweekly	14 oz	13 ± 1.5 a	10 ± 3.1 abc	12 ± 10.4 a	5 ± 1.8 a	4 ± 1.7 a	13 ± 3.4 ab	8 ± 2.7 b
BCS-507 once	2.4 oz	12 ± 1.8 a	11 ± 5.3 abc	14 ± 8.1 a	15 ± 5.2 a	12 ± 2.5 a	28 ± 9.0 a	13 ± 5.3 ab
BCS-507 once	4.4 oz	10 ± 2.4 a	15 ± 4.1 abc	9 ± 3.7 a	11 ± 3.7 a	14 ± 3.8 a	11 ± 4.2 ab	12 ± 4.2 ab
Conserve biweekly	8 fl	11 ± 2.9 a	2 ± 0.6 c	4 ± 1.0 a	5 ± 1.9 a	8 ± 4.0 a	5 ± 2.8 b	10 ± 5.0 ab
IKI-3106 + Capsil weekly	22 fl oz + 6 fl oz	13 ± 2.7 a	13 ± 5.6 abc	2 ± 1.6 a	4 ± 2.3 a	4 ± 1.3 a	21 ± 9.3 ab	4 ± 1.8 b
IKI-3106 + Capsil weekly	27 fl oz + 6 fl oz	19 ± 5.4 a	18 ± 5.3 abc	3 ± 1.9 a	0 ± 0.3 a	4 ± 1.8 a	11 ± 3.7 ab	9 ± 5.0 ab
SP3014 + Capsil weekly	13 fl oz + 6 fl oz	18 ± 3.2 a	11 ± 5.8 abc	6 ± 4.2 a	13 ± 4.4 a	10 ± 3.4 a	12 ± 6.7 ab	12 ± 4.1 ab
SP3014 + Capsil weekly	26 fl oz + 6 fl oz	15 ± 3.8 a	11 ± 6.1 abc	11 ± 4.5 a	11 ± 3.4 a	15 ± 5.5 a	14 ± 6.0 ab	14 ± 5.1 ab
V-10433 weekly	11 fl oz	13 ± 0.9 a	5 ± 2.3 b	7 ± 3.4 a	8 ± 4.7 a	12 ± 3.8 a	12 ± 4.2 ab	29 ± 7.5 a
V-10433 weekly	22 fl oz	14 ± 4.0 a	3 ± 1.8 b	4 ± 2.4 a	6 ± 2.3 a	6 ± 2.9 a	14 ± 4.2 ab	20 ± 6.4 ab
Water weekly	-	17 ± 4.2 a	25 ± 4.3 a	13 ± 2.8 a	14 ± 6.6 a	22 ± 4.8 a	14 ± 2.1 ab	9 ± 3.2 ab
Untreated control	-	22 ± 2.5 a	23 ± 4.9 ab	17 ± 3.1 a	8 ± 2.4 a	12 ± 3.6 a	18 ± 8.5 ab	8 ± 4.9 b
Adults								
Altus biweekly	14 oz	6 ± 2.0 a	2 ± 0.7 a	2 ± 0.5 a	2 ± 0.7 a	2 ± 0.8 a	1 ± 0.2 a	4 ± 2.0 a
BCS-507 once	2.4 oz	4 ± 1.6 a	4 ± 0.9 a	2 ± 0.8 a	3 ± 1.7 a	2 ± 0.9 a	5 ± 1.6 a	5 ± 2.2 a
BCS-507 once	4.4 oz	8 ± 5.0 a	5 ± 1.2 a	1 ± 0.7 a	3 ± 1.0 a	2 ± 0.9 a	4 ± 1.3 a	3 ± 0.6 a
Conserve biweekly	8 fl	4 ± 1.6 a	2 ± 0.6 a	1 ± 0.3 a	1 ± 0.3 a	3 ± 1.6 a	2 ± 0.5 a	3 ± 1.1 a
IKI-3106 + Capsil weekly	22 fl oz + 6 fl oz	5 ± 0.9 a	5 ± 2.4 a	0 ± 0.3 a	1 ± 0.3 a	1 ± 0.4 a	2 ± 0.6 a	2 ± 0.6 a
IKI-3106 + Capsil weekly	27 fl oz + 6 fl oz	11 ± 6.5 a	2 ± 0.8 a	1 ± 0.4 a	1 ± 0.5 a	2 ± 1.3 a	2 ± 0.5 a	4 ± 0.9 a
SP3014 + Capsil weekly	13 fl oz + 6 fl oz	10 ± 6.7 a	3 ± 1.0 a	1 ± 0.4 a	1 ± 0.5 a	2 ± 0.6 a	2 ± 0.5 a	3 ± 1.2 a
SP3014 + Capsil weekly	26 fl oz + 6 fl oz	11 ± 5.1 a	5 ± 1.6 a	3 ± 0.9 a	3 ± 0.6 a	1 ± 0.4 a	2 ± 0.7 a	6 ± 1.8 a
V-10433 weekly	11 fl oz	4 ± 1.2 a	5 ± 1.0 a	2 ± 0.8 a	1 ± 0.5 a	2 ± 0.6 a	2 ± 0.9 a	5 ± 1.3 a
V-10433 weekly	22 fl oz	13 ± 7.0 a	2 ± 0.5 a	2 ± 0.6 a	3 ± 1.0 a	2 ± 1.0 a	2 ± 0.8 a	3 ± 1.2 a
Water weekly	-	14 ± 2.6 a	5 ± 1.0 a	1 ± 0.4 a	3 ± 1.3 a	8 ± 2.5 a	3 ± 1.5 a	3 ± 0.7 a
Untreated control	-	12 ± 1.8 a	7 ± 1.5 a	0 ± 0.3 a	2 ± 0.8 a	5 ± 1.8 a	2 ± 0.7 a	2 ± 0.6 a
Total								
Altus biweekly	14 oz	18 ± 3.1 a	13 ± 3.6 ab	14 ± 10.7 a	7 ± 1.7 a	6 ± 2.0 b	14 ± 3.5 ab	12 ± 3.7 ab
BCS-507 once	2.4 oz	17 ± 2.1 a	15 ± 5.7 ab	16 ± 8.5 a	18 ± 5.6 a	14 ± 2.5 ab	33 ± 10.1 a	19 ± 5.0 ab
BCS-507 once	4.4 oz	18 ± 6.1 a	19 ± 3.6 ab	11 ± 4.3 a	13 ± 3.7 a	17 ± 4.5 ab	15 ± 4.1 ab	15 ± 4.6 ab
Conserve biweekly	8 fl	15 ± 4.3 a	4 ± 0.7 b	4 ± 0.9 a	6 ± 1.9 a	11 ± 5.2 ab	6 ± 2.7 b	13 ± 5.4 ab
IKI-3106 + Capsil weekly	22 fl oz + 6 fl oz	18 ± 3.1 a	18 ± 7.1 ab	3 ± 1.6 a	5 ± 2.5 a	5 ± 1.6 b	23 ± 9.6 ab	6 ± 1.9 b

Treatment	Rate / 100 gal	Population Counts [x]						
		0 WAT	1 WAT	2 WAT	3 WAT	4 WAT	5 WAT	6 WAT
IKI-3106 + Capsil weekly	27 fl oz + 6 fl oz	30 ± 9.9 a	20 ± 5.0 ab	4 ± 2.1 a	1 ± 0.5 a	6 ± 2.8 b	13 ±3.5 ab	13 ±5.5 ab
SP3014 + Capsil weekly	13 fl oz + 6 fl oz	28 ± 7.9 a	14 ± 6.6 ab	7 ± 4.5 a	14 ± 4.3 a	11 ± 3.6 ab	14 ± 6.8 ab	15 ±4.0 ab
SP3014 + Capsil weekly	26 fl oz + 6 fl oz	26 ± 8.8 a	16 ± 7.3 ab	14 ± 5.2 a	13 ± 3.5 a	17 ± 5.6 ab	16 ± 6.2 ab	19 ± 5.3 ab
V-10433 weekly	11 fl oz	17 ± 1.3 a	10 ± 3.1 ab	9 ± 3.4 a	9 ± 5.1 a	14 ± 4.0 ab	15 ± 4.6 ab	35 ± 7.2 a
V-10433 weekly	22 fl oz	27 ± 6.9 a	5 ± 1.5 b	6 ± 2.7 a	9 ± 2.8 a	8 ± 3.2 ab	16 ±4.5 ab	23 ± 6.6 ab
Water weekly	-	32 ± 3.7 a	30 ± 4.5 a	14 ± 2.8 a	17 ± 7.4 a	30 ± 4.3 a	18 ± 2.4 ab	13 ± 3.5 ab
Untreated control	-	34 ± 3.2 a	30 ± 5.7 a	17 ± 3.0 a	10 ± 2.8 a	17 ± 4.3 ab	20 ± 8.8 ab	11 ± 5.1 b

Plants were repeatedly infested with thrips 2-4 weeks before the start of the treatments, and additional thrips infestations were performed between week 3 and 4. Thrips numbers of week 0 represent a pre-count, before treatment applications. Data were analyzed using RM two-way ANOVA with treatment and time as factors, followed by Tukey test. Different letters indicate significant differences between treatments ($P < 0.05$).

[x] Mean number of thrips per plant

Table 110. Western Flower Thrips Control on Marigold (*Tagetes* sp.) 'Safari Yellow', - Plant Size, Nansen, CA, 2018.

Treatment	Rate / 100 gal	Plant Size [x]						
		0 WAT	1 WAT	2 WAT	3 WAT	4 WAT	5 WAT	6 WAT
Height								
Altus biweekly	14 oz	34 ± 1.0	42 ± 1.7	47 ± 1.5	50 ± 1.0	53 ± 0.8	53 ± 0.7	45 ± 1.3
BCS-507 once	2.4 oz	34 ± 1.3	45 ± 1.8	46 ± 1.5	50 ± 1.3	50 ± 1.2	50 ± 1.7	43 ± 1.3
BCS-507 once	4.4 oz	33 ± 1.4	45 ± 1.1	47 ± 1.4	54 ± 0.9	52 ± 0.8	52 ± 0.8	44 ± 0.6
Conserve biweekly	8 fl	32 ± 1.1	44 ± 1.2	46 ± 1.6	51 ± 0.7	53 ± 0.6	53 ± 0.7	44 ± 1.5
IKI-3106 + Capsil weekly	22 fl oz + 6 fl oz	32 ± 1.1	43 ± 0.9	47 ± 1.1	52 ± 0.6	53 ± 0.6	53 ± 0.7	46 ± 0.6
IKI-3106 + Capsil weekly	27 fl oz + 6 fl oz	34 ± 1.5	43 ± 0.8	47 ± 0.9	51 ± 0.7	52 ± 0.8	53 ± 0.5	44 ± 1.5
SP3014 + Capsil weekly	13 fl oz + 6 fl oz	34 ± 1.3	44 ± 0.7	47 ± 0.9	51 ± 0.7	52 ± 0.7	53 ± 0.6	43 ± 0.5
SP3014 + Capsil weekly	26 fl oz + 6 fl oz	34 ± 1.4	42 ± 1.1	47 ± 0.6	51 ± 0.7	52 ± 1.1	53 ± 0.6	44 ± 1.5
V-10433 weekly	11 fl oz	33 ± 0.6	47 ± 0.7	49 ± 0.9	52 ± 1.1	53 ± 0.8	53 ± 0.8	44 ± 1.0
V-10433 weekly	22 fl oz	33 ± 1.2	44 ± 1.3	46 ± 1.0	51 ± 0.7	51 ± 1.5	53 ± 1.0	44 ± 1.4
Water weekly	-	34 ± 0.9	43 ± 1.9	46 ± 1.3	50 ± 1.4	53 ± 0.7	54 ± 0.8	45 ± 0.9
Untreated control	-	33 ± 1.4	45 ± 0.6	47 ± 1.3	51 ± 1.4	52 ± 1.0	54 ± 0.8	45 ± 1.7
Width								
Altus biweekly	14 oz	30 ± 2.3	31 ± 1.7	38 ± 1.6	41 ± 1.8	42 ± 0.7	42 ± 0.4	39 ± 1.7
BCS-507 once	2.4 oz	32 ± 0.7	34 ± 1.3	39 ± 1.2	42 ± 0.8	42 ± 0.7	42 ± 0.4	39 ± 1.0
BCS-507 once	4.4 oz	32 ± 2.3	35 ± 1.5	39 ± 1.2	43 ± 0.8	43 ± 0.7	42 ± 0.6	41 ± 1.9
Conserve biweekly	8 fl	30 ± 1.3	33 ± 0.7	36 ± 1.0	40 ± 1.3	43 ± 0.9	42 ± 0.8	43 ± 2.1
IKI-3106 + Capsil weekly	22 fl oz + 6 fl oz	32 ± 1.8	34 ± 1.4	38 ± 1.1	43 ± 0.7	42 ± 0.8	42 ± 0.7	42 ± 1.9
IKI-3106 + Capsil weekly	27 fl oz + 6 fl oz	34 ± 2.6	33 ± 1.1	39 ± 1.2	42 ± 0.7	44 ± 0.6	43 ± 0.5	42 ± 1.5
SP3014 + Capsil weekly	13 fl oz + 6 fl oz	31 ± 1.1	34 ± 0.4	36 ± 0.7	44 ± 2.0	45 ± 0.2	42 ± 1.3	39 ± 0.9
SP3014 + Capsil weekly	26 fl oz + 6 fl oz	31 ± 2.2	32 ± 0.9	35 ± 0.6	39 ± 0.8	42 ± 1.1	42 ± 0.8	43 ± 1.4
V-10433 weekly	11 fl oz	30 ± 1.7	35 ± 0.9	38 ± 2.3	41 ± 1.7	42 ± 1.3	42 ± 0.5	41 ± 1.3
V-10433 weekly	22 fl oz	30 ± 0.9	34 ± 0.9	38 ± 1.1	40 ± 0.4	43 ± 0.7	42 ± 0.6	41 ± 1.2
Water weekly	-	31 ± 1.7	33 ± 1.0	38 ± 1.2	42 ± 0.4	41 ± 0.8	42 ± 0.6	40 ± 1.3
Untreated control	-	31 ± 1.9	34 ± 0.7	38 ± 0.6	41 ± 1.8	44 ± 2.1	43 ± 0.8	42 ± 1.7

Plants were repeatedly infested with thrips 2-4 weeks before the start of the treatments, and additional thrips infestations were performed between week 3 and 4. Plant measurements of week 0 were performed before treatment applications. Data were analyzed using RM two-way ANOVA with treatment and time as factors, followed by Tukey test. There were no significant differences between treatments ($P > 0.05$)

Table 111. Western Flower Thrips Control on Marigold (*Tagetes patula*) 'Yellow Boy', Hotchkiss, MI 2018.

Treatment	Rate / 100 gal	Population Counts [x]						
		0 WAT	1 WAT	2 WAT	3 WAT	4 WAT	5 WAT	6 WAT
Immatures								
Altus 2x biweekly	14 oz	21.33 a	6.00 b-e	6.33 abc	10.33 abc	4.17 a-d	5.67 ab	8.50 a
BCS-507 once	2.4 oz	18.17 a	16.17 abc	12.17 ab	14.83 a	8.33 ab	5.33 a	7.50 a
BCS-507 once	4.4 oz	19.00 a	19.83 abc	9.33 abc	11.33 ab	9.00 abc	5.17 ab	7.50 a
IKI-3106 + Capsil 5x weekly	22 fl oz + 6 fl oz	18.50 a	6.00 b-e	**1.33 cde**	1.00 cd	**0.50 d**	0.33 b	0.83 a
IKI-3106 + Capsil 5x weekly	27 fl oz + 6 fl oz	20.83 a	**2.50 de**	**1.33 cde**	**0.17 d**	**0.83 cd**	0.83 ab	2.83 a
IKI-3326 + Capsil 5x weekly	12 fl oz + 6 fl oz	18.67 a	**3.67 cde**	**0.17 e**	**0.50 d**	**0.33 d**	1.00 ab	2.33 a
IKI-3326 + Capsil 5x weekly	16.5 fl oz + 6 fl oz	20.33 a	5.50 b-e	**0.8 de**	**0.33 d**	**0.50 d**	0.33 b	0.67 a
Pylon 2x weekly	2.6 fl oz	19.17 a	**1.83 e**	**0.00 e**	**0.00 d**	**0.33 d**	1.67 ab	7.33 a
SP3014 + Capsil weekly	13 fl oz + 6 fl oz	21.50 a	24.00 abc	13.83 ab	13.67 ab	7.00 a-d	4.83 ab	4.17 a
SP3014 + Capsil weekly	26 fl oz + 6 fl oz	19.17 a	31.00 a	13.17 a	17.33 a	9.00 ab	5.83 ab	8.33 a
V-10433 weekly	11 fl oz	19.17 a	11.83 a-d	3.17 b-e	2.17 bcd	1.50 a-d	1.50 ab	9.33 a
V-10433 weekly	22 fl oz	20.00 a	15.17 a-d	4.5 a-d	4.17 a-d	**1.50 bcd**	2.33 ab	2.33 a
Untreated control		20.17 a	26.83 ab	13.17 ab	12.50 abc	9.67 a	5.83 ab	8.00 a
Adults								
Altus 2x biweekly	14 oz	0.50	1.33	1.00	1.83	0.67	0.50	1.50
BCS-507 once	2.4 oz	0.67	1.00	1.83	3.33	0.33	0.83	2.50
BCS-507 once	4.4 oz	1.33	0.50	1.17	1.00	1.50	0.17	4.00
IKI-3106 + Capsil 5x weekly	22 fl oz + 6 fl oz	1.17	0.83	0.50	1.33	0.83	0.33	1.00
IKI-3106 + Capsil 5x weekly	27 fl oz + 6 fl oz	1.00	1.00	1.17	1.00	0.17	0.67	1.67
IKI-3326 + Capsil 5x weekly	12 fl oz + 6 fl oz	2.00	0.50	0.50	1.67	0.50	0.83	2.17
IKI-3326 + Capsil 5x weekly	16.5 fl oz + 6 fl oz	1.50	1.17	1.00	0.67	1.17	0.50	0.50
Pylon 2x weekly	2.6 fl oz	1.83	0.17	0.17	1.00	1.00	0.67	3.50
SP3014 + Capsil weekly	13 fl oz + 6 fl oz	0.50	1.67	1.17	2.17	1.17	1.00	0.67
SP3014 + Capsil weekly	26 fl oz + 6 fl oz	1.33	1.50	1.00	1.33	2.50	0.83	1.00
V-10433 weekly	11 fl oz	2.17	1.33	1.00	1.17	1.17	0.83	2.17
V-10433 weekly	22 fl oz	1.33	2.67	0.50	1.33	1.33	0.00	0.83
Untreated control		1.17	2.83	1.67	2.33	0.67	1.00	3.33
Total								
Altus 2x biweekly	14 oz	21.83 a	7.33 b-e	7.33 ab	12.17 a-d	4.83 a-d	6.17 a	10.00 a
BCS-507 once	2.4 oz	18.83 a	17.17a-d	14.00 a	18.17 a	8.67 abc	6.17 a	10.00 a
BCS-507 once	4.4 oz	20.33 a	20.33 abc	10.50 ab	12.33 abc	10.50 abc	5.33 a	11.50 a

Treatment	Rate / 100 gal	Population Counts [x]						
		0 WAT	1 WAT	2 WAT	3 WAT	4 WAT	5 WAT	6 WAT
IKI-3106 + Capsil 5x weekly	22 fl oz + 6 fl oz	19.67 a	6.83 b-e	**1.83 bc**	2.33 bcd	**1.33 cd**	0.67 a	1.83 a
IKI-3106 + Capsil 5x weekly	27 fl oz + 6 fl oz	21.83 a	**3.50 de**	**2.50 bc**	1.17 cd	**1.00 d**	1.50 a	4.50 a
IKI-3326 + Capsil 5x weekly	12 fl oz + 6 fl oz	20.67 a	**4.17 cde**	**0.67 c**	2.17 bcd	**0.83 d**	1.83 a	4.50 a
IKI-3326 + Capsil 5x weekly	16.5 fl oz + 6 fl oz	21.83 a	6.67 a-e	**1.83 bc**	**1.00 d**	1.17 bcd	0.83 a	1.17 a
Pylon 2x weekly	2.6 fl oz	21.00 a	**2.00 e**	**0.17 c**	**1.00 d**	**1.33 cd**	2.33 a	10.83 a
SP3014 + Capsil weekly	13 fl oz + 6 fl oz	22.00 a	25.67 abc	15.00 a	15.83 ab	8.1 a-d	5.83 a	4.83 a
SP3014 + Capsil weekly	26 fl oz + 6 fl oz	20.5 a	32.50a	14.17 a	18.67 a	11.50 a	6.67 a	9.33 a
V-10433 weekly	11 fl oz	21.33 a	13.17 a-e	4.17 abc	3.33 a-d	2.67 a-dd	2.33 a	11.50 a
V-10433 weekly	22 fl oz	21.33 a	17.83 a-d	5.00 abc	5.50 a-d	2.83 a-d	2.33 a	3.17 a
Untreated control		21.33 a	29.67 ab	14.83 a	14.83 abc	10.33 ab	6.83 a	11.33 a

Data were analyzed using A 2-Way ANOVA with a post hoc Tukey test set at 95% confidence interval was run on the Log(x+1) of the data to normalize the thrips counts.. Different letters indicate significant differences between treatments (P = 0.05).

[x] Mean number per plant; thrips sampled from leaves.

Table 112. Western Flower Thrips Control on Marigold (*Tagetes patula*) 'Yellow Boy', Hotchkiss, MI 2019.

Treatment	Rate / 100 gal	Population Counts [x]								
		0 WAT	1 WAT	2 WAT	3 WAT	4 WAT	5 WAT	6 WAT	7 WAT	8 WAT
Immatures										
BCS-507 once	2.4 oz	4.60 a	0.40 a	3.20 a	2.00 a	2.00 abc	2.20 a	2.60 a	0.40 a	1.80 a
BCS-507 once	4.4 oz	5.20 a	0.60 a	1.60 a	0.20 a	4.60 abc	1.20 a	1.60 a	2.00 a	0.60 a
IKI-3106 + Capsil 5x weekly	22 fl oz + 6 fl oz	4.60 a	1.00 a	0.40 a	0.20 a	**0.60 c**	0.00 a	1.60 a	1.60 a	0.80 a
IKI-3106 + Capsil 5x weekly	27 fl oz + 6 fl oz	4.40 a	0.20 a	0.40 a	0.20 a	**0.60 c**	0.40 a	0.80 a	1.00 a	1.60 a
IKI-3326 + Capsil 5x weekly	12 fl oz + 6 fl oz	4.00 a	0.40 a	0.60 a	0.40 a	**0.80 bc**	0.80 a	0.00 a	0.00 a	0.80 a
IKI-3326 + Capsil 5x weekly	16.5 fl oz + 6 fl oz	4.20 a	0.40 a	1.00 a	0.00 a	**0.20 c**	0.00 a	0.20 a	0.40 a	0.00 a
KOC22018-8 5x weekly	64 fl oz	4.40 a	0.60 a	3.20 a	0.25 a	5.75 abc	1.25 a	1.75 a	0.75 a	2.00 a
KOC22018-8 5x weekly	128 fl oz	5.20 a	0.80 a	0.40 a	1.80 a	**0.60 c**	0.20 a	0.60 a	1.00 a	1.40 a
Pylon 2x weekly	2.6 fl oz	7.40 a	0.20 a	0.00 a	0.20 a	3.00 abc	0.60 a	2.20 a	0.80 a	3.20 a
SP3014 + Capsil weekly	13 fl oz + 6 fl oz	6.40 a	1.40 a	2.20 a	4.20 a	9.20 ab	0.40 a	4.40 a	1.60 a	1.40 a
SP3014 + Capsil weekly	26 fl oz + 6 fl oz	5.40 a	3.20 a	2.60 a	1.80 a	1.80 abc	1.60 a	6.80 a	1.40 a	3.40 a
TetraCurb Conc .5x weekly	64 fl oz	3.00 a	3.00 a	1.00 a	2.20 a	2.20 abc	2.40	1.60 a	1.60 a	2.20 a
TetraCurb Conc. 5x weekly	128 fl oz	5.20 a	1.20 a	2.20 a	1.40 a	2.80 abc	1.40 a	1.20 a	1.20 a	0.80 a
TetraCurb Organic 5x weekly	64 fl oz	4.80 a	2.80 a	1.00 a	4.00 a	2.40 abc	0.60 a	1.00 a	2.20 a	1.40 a
TetraCurb Organic 5x weekly	128 fl oz	6.60 a	3.80 a	2.80 a	2.40 a	3.60 abc	1.60 a	1.80 a	0.40 a	1.00 a
V-10433 weekly	11 fl oz	4.80 a	1.20 a	1.00 a	2.60 a	3.20 abc	0.60 a	2.80 a	3.40 a	1.60 a
V-10433 weekly	22 fl oz	4.40 a	0.60 a	0.80 a	1.60 a	2.00 abc	0.40 a	1.60 a	2.80 a	2.00 a
Untreated control	-	4.20 a	4.60 a	2.00 a	4.10 a	9.00 a	3.30 a	2.10 a	1.30 a	1.20 a
Adults										
BCS-507 once	2.4 oz	0.00 a	0.20 a	1.00 a	0.80 a	0.80 ab	0.40 a	0.40 a	0.60 a	0.40 a
BCS-507 once	4.4 oz	0.20 a	0.20 a	1.00 a	0.80 a	1.40 ab	0.60 a	0.20 a	0.60 a	0.80 a
IKI-3106 + Capsil 5x weekly	22 fl oz + 6 fl oz	0.20 a	0.40 a	0.60 a	0.20 a	**0.20 b**	0.00 a	0.80 a	0.80 a	0.40 a
IKI-3106 + Capsil 5x weekly	27 fl oz + 6 fl oz	0.20 a	0.20 a	0.20 a	0.00 a	**0.20 b**	0.00 a	0.40 a	0.20 a	1.20 a
IKI-3326 + Capsil 5x weekly	12 fl oz + 6 fl oz	0.20 a	0.20 a	0.60 a	0.80 a	1.00 ab	0.20 a	0.20 a	0.20 a	0.20 a
IKI-3326 + Capsil 5x weekly	16.5 fl oz + 6 fl oz	0.20 a	0.20 a	0.20 a	0.00 a	0.60 ab	0.00 a	1.20 a	0.60 a	0.40 a
KOC22018-8 5x weekly	64 fl oz	0.40 a	0.20 a	1.60 a	0.25 a	1.00 ab	0.00 a	1.00 a	1.50 a	0.50 a
KOC22018-8 5x weekly	128 fl oz	0.60 a	0.00 a	0.20 a	0.00 a	**0.20 b**	0.60 a	0.20 a	0.40 a	0.80 a
Pylon 2x weekly	2.6 fl oz	0.40 a	0.00 a	0.20 a	0.40 a	0.80 ab	0.80 a	0.20 a	0.60 a	1.20 a
SP3014 + Capsil weekly	13 fl oz + 6 fl oz	0.20 a	0.40 a	1.60 a	0.80 a	1.80 ab	1.20 a	0.60 a	0.60 a	0.20 a
SP3014 + Capsil weekly	26 fl oz + 6 fl oz	0.00 a	0.60 a	0.80 a	0.60 a	0.40 ab	0.40 a	0.40 a	0.80 a	0.40 a
TetraCurb Conc .5x weekly	64 fl oz	0.60 a	0.20 a	0.20 a	0.80 a	1.00 ab	0.00 a	0.60 a	0.40 a	0.40 a

Treatment	Rate / 100 gal	Population Counts [x]								
		0 WAT	1 WAT	2 WAT	3 WAT	4 WAT	5 WAT	6 WAT	7 WAT	8 WAT
TetraCurb Conc. 5x weekly	128 fl oz	0.20 a	0.40 a	0.40 a	0.20 a	1.20 ab	0.20 a	0.00 a	0.40 a	0.20 a
TetraCurb Organic 5x weekly	64 fl oz	0.40 a	0.20 a	0.20 a	0.60 a	1.60 ab	0.00 a	0.60 a	1.20 a	0.20 a
TetraCurb Organic 5x weekly	128 fl oz	0.00 a	0.00 a	0.40 a	0.60 a	0.80 ab	0.00 a	0.80 a	1.20 a	0.80 a
V-10433 weekly	11 fl oz	0.00 a	0.80 a	0.00 a	0.20 a	1.00 ab	0.20 a	0.80 a	2.00 a	1.40 a
V-10433 weekly	22 fl oz	0.40 a	0.00 a	0.60 a	0.40 a	0.40 ab	0.20 a	0.40 a	1.00 a	0.40 a
Untreated control		0.30 a	0.80 a	0.50 a	0.60 a	2.30 a	0.40 a	0.20 a	0.60 a	0.30 a
Total										
BCS-507 once	2.4 oz	4.60 a	0.60 a	4.20 a	2.80 a	**2.80 bc**	2.60 a	3.00 a	1.00 a	2.20 a
BCS-507 once	4.4 oz	5.40 a	0.80 a	2.60 a	1.00 a	6.00 abc	1.80 a	1.80 a	2.60 a	1.40 a
IKI-3106 + Capsil 5x weekly	22 fl oz + 6 fl oz	4.80 a	1.40 a	1.00 a	0.40 a	**0.80 c**	0.00 a	2.40 a	2.40 a	1.20 a
IKI-3106 + Capsil 5x weekly	27 fl oz + 6 fl oz	4.60 a	0.40 a	0.60 a	0.20 a	**0.80 c**	0.40 a	1.20 a	1.20 a	2.80 a
IKI-3326 + Capsil 5x weekly	12 fl oz + 6 fl oz	4.20 a	0.60 a	1.20 a	1.20 a	**1.80 bc**	1.00 a	0.20 a	0.20 a	1.00 a
IKI-3326 + Capsil 5x weekly	16.5 fl oz + 6 fl oz	4.40 a	0.60 a	1.20 a	0.00 a	**0.80c**	0.00 a	1.40 a	1.00 a	0.40 a
KOC22018-8 5x weekly	64 fl oz	4.80 a	0.80 a a	4.80 a	0.50 a	6.75 abc	1.25 a	2.75 a	2.25 a	2.50 a
KOC22018-8 5x weekly	128 fl oz	5.80 a	0.80 a	0.60 a	1.80 a	**0.80 c**	0.80 a	0.80 a	1.40 a	2.20 a
Pylon 2x weekly	2.6 fl oz	7.80 a	0.20 a	0.20 a	0.60 a	3.80 abc	1.40 a	2.40 a	1.40 a	4.40 a
SP3014 + Capsil weekly	13 fl oz + 6 fl oz	6.60 a	1.80 a	3.80 a	5.00 a	11.00 ab	1.60 a	5.00 a	2.20 a	1.60 a
SP3014 + Capsil weekly	26 fl oz + 6 fl oz	5.40 a	3.80 a	3.40 a	2.40 a	**2.20 bc**	2.00 a	7.20 a	2.20 a	3.80 a
TetraCurb Conc .5x weekly	64 fl oz	3.60 a	3.20 a	1.20 a	3.00 a	**3.20 bc**	2.40 a	2.20 a	2.00 a	2.60 a
TetraCurb Conc. 5x weekly	128 fl oz	5.40 a	1.60 a	2.60 a	1.60 a	4.00 abc	1.60 a	1.20 a	1.60 a	1.00 a
TetraCurb Organic 5x weekly	64 fl oz	5.20 a	3.00 a	1.20 a	4.60 a	4.00 abc	0.60 a	1.60 a	3.40 a	1.60 a
TetraCurb Organic 5x weekly	128 fl oz	6.60 a	3.80 a	3.20 a	3.00 a	4.40 abc	1.60 a	2.60 a	1.60 a	1.80 a
V-10433 weekly	11 fl oz	4.80 a	2.00 a	1.00 a	2.80 a	4.20 abc	0.80 a	3.60 a	5.40 a	3.00 a
V-10433 weekly	22 fl oz	4.80 a	0.60 a	1.40 a	2.00 a	**2.40 bc**	0.60 a	2.00 a	3.80 a	2.40 a
Untreated control		4.50 a	5.40 a	2.50 a	4.70 a	11.30 a	3.70 a	2.30 a	1.90 a	1.50 a

Data were analyzed using A 2-Way ANOVA with a post hoc Tukey test set at 95% confidence interval was run on the Log(x+1) of the data to normalize the thrips counts.. Different letters indicate significant differences between treatments (P = 0.05).

[x] Mean number per plant; thrips sampled from leaves.

Petunia. In 2006, three experiments were conducted examining various products on petunia 'Dreams Midnight' for western flower thrips management (Table 113 - Table 115). In all three, thrips adults and immatures were counted by the number shaken from plant samples, those visibly seen in destructively harvested flowers and buds, and those extracted from meristems with alcohol extraction. All were counted as either immatures or adults. In the first and second experiments, the infestation level was fairly low. All treatments provided statistical reductions in adult and immature populations from the nontreated. In the third experiment, infestation levels were higher and efficacy levels were able to be separated statistically with biological significance. Celero at 2 and 4 oz per 100 gal provided excellent control of adults with the higher rate also providing excellent control of immatures. Pylon and Tolfenpyrad provided good to excellent control of adults and/or immatures depending on rate. Conserve and BAS 320i did not exhibit adequate levels of thrips management.

Table 113. Western Flower Thrips Control on Petunia (*Petunia sp.*) 'Dreams Midnight', Chen, LA, 2006a.

Treatment Rate per 100 gal [z]	Population Counts [y], Means Separations [x], and % Control		
	7 DAT	14 DAT	21 DAT
Adults			
BotaniGard 1 app	1.0 a (50)	1.2 b (70)	1.7 bc (70)
BotaniGard 2 app	0.0 a (100)	3.0 a (25)	1.2 bc (79)
Conserve 6 oz	1.0 a (50)	3.3 a (18)	2.5 b (56)
QRD400 0.5%	2.0 a (0)	0.7 b (83)	0.2 c (96)
QRD400 0.25%	1.0 a (50)	0.5 b (88)	0.0 c (100)
Proud3 4 qt	0.0 a (100)	0.2 b (95)	0.3 c (95)
Proud3 2 qt	0.0 a (100)	0.0 b (100)	0.2 b (96)
Tricon 50 oz	0.0 a (100)	0.2 b (95)	0.3 c (95)
Tricon + Conserve	0.0 a (100)	0.5 b (88)	0.8 bc (86)
Nontreated	2.0 a (0)	4.0 a (0)	5.7 a (0)
Nymphs			
BotaniGard 1 app	0.2 b (96)	0.0 a (100)	0.0 a (100)
BotaniGard 2 app	0.0 b (100)	0.0 a (100)	0.0 a (100)
Conserve 6 oz	0.0 b (100)	1.0 a (0)	0.0 a (100)
QRD400 0.5%	0.5 b (89)	0.0 a (100)	0.0 a (100)
QRD400 0.25%	0.0 b (100)	0.0 a (100)	0.0 a (100)
Proud3 4 qt	0.3 b (93)	0.0 a (100)	0.0 a (100)
Proud3 2 qt	0.0 b (100)	0.0 a (100)	0.0 a (100)
Tricon 50 oz	0.0 b (100)	0.0 a (100)	0.0 a (100)
Tricon + Conserve	0.0 b (100)	0.0 a (100)	0.0 a (100)
Nontreated	4.5 a (0)	1.0 a (0)	0.2 a (0)
Total Population			
BotaniGard 1 app	1.2 (82)	1.2 (76)	1.7 (71)
BotaniGard 2 app	0.0 (100)	3.0 (40)	1.2 (80)
Conserve 6 oz	1.0 (85)	4.3 (14)	2.5 (58)
QRD400 0.5%	2.5 (62)	0.7 (86)	0.2 (97)
QRD400 0.25%	1.0 (85)	0.5 (90)	0.0 (100)
Proud3 4 qt	0.3 (95)	0.2 (96)	0.3 (95)
Proud3 2 qt	0.0 (100)	0.0 (100)	0.2 (97)
Tricon 50 oz	0.0 (100)	0.2 (96)	0.3 (95)
Tricon + Conserve	0.0 (100)	0.5 (90)	0.8 (86)
Nontreated	6.5 (0)	5.0 (0)	5.9 (0)

[z] All treatments were foliar sprays applied on April 25; repeat applications of BotaniGard were applied as a drench on May 2.
[y] Mean number of thrips were counted three ways: 1) the number shaken from plant samples 2) destructively harvesting flowers and buds, and 3) alcohol extraction of meristems.

Table 114. Western Flower Thrips Control on Petunia (*Petunia sp*) 'Dreams Midnight', Chen, LA, 2006b.

Treatment Rate per 100 gal [z]	Population Counts [y], Means Separations [x], and % Control	
	3 DAT	7 DAT
Adults		
BotaniGard 1 qt. 1 foliar	2.0 (0)	0.0 (100)
BotaniGard 1 qt. tank mix with TriCon 50 oz, 1 foliar	0.5 (50)	0.0 (100)
Conserve 6 oz	0.5 (50)	0.0 (100)
TriCon 50 oz	1.0 (0)	0.0 (100)
Nontreated	1.0 (0)	0.5 (0)
Immatures		
BotaniGard 1 qt. 1 foliar	6.0 (0)	1.0 (50)
BotaniGard 1 qt. tank mix with TriCon 50 oz, 1 foliar	3.0 (25)	2.0 (0)
Conserve 6 oz	1.0 (75)	0.0 (100)
TriCon 50 oz	1.0 (75)	0.0 (100)
Nontreated	4.0 (0)	2.0 (0)
Total Population		
BotaniGard 1 qt. 1 foliar	8.0 a (0)	1.0 b (60)
BotaniGard 1 qt. tank mix with TriCon 50 oz, 1 foliar	3.5 ab (30)	2.0 ab (20)
Conserve 6 oz	1.5 b (70)	0.0 b (100)
TriCon 50 oz	2.0 b (60)	0.0 b (100)
Nontreated	5.0 a (0)	2.5 a (0)

[z] All treatments were foliar sprays applied on April 25; repeat applications of BotaniGard were applied as a drench on May 2.

[y] Mean number of thrips were counted three ways: 1) the number shaken from plant samples 2) destructively harvesting flowers and buds, and 3) alcohol extraction of meristems.

Table 115. Western Flower Thrips Control on Petunia (*Petunia sp.*) 'Dreams Midnight', Chen, LA, 2006d.

Treatment Rate per 100 gal [z]	Population Counts [y], Means Separations [x], and % Control	
	10 DAT	15 DAT
Adults		
BAS320i 8 fl oz	25.7 a (0)	14.7 a (0)
BAS320i 16 fl oz	19.2 abc (2)	4.5 b (20)
Celero 2 oz	1.2 cd (94)	0.8 b (86)
Celero 4 oz	0.3 d (98)	0.0 b (100)
Conserve 6 oz	14.7 abc (25)	3.2 b (43)
Pylon 5 fl oz	1.0 d (95)	4.3 b (23)
Pylon 10 fl oz	3.8 bcd (81)	1.3 b (77)
Tolfenpyrad 14 fl oz	0.5 d (97)	0.8 b (86)
Tolfenpyrad 21 fl oz	3.0 cd (85)	3.7 b (34)
Nontreated	19.5 ab (0)	5.6 b (0)
Immatures		
BAS320i 8 fl oz	45.5 a (0)	40.7 a (0)
BAS320i 16 fl oz	32.7 a (0)	15.0 bcd (41)
Celero 2 oz	0.8 b (88)	6.5 d (74)
Celero 4 oz	0.0 b (100)	0.8 d (97)
Conserve 6 oz	6.8 b (0)	24.5 ab (3)
Pylon 5 fl oz	0.3 b (96)	7.7 cd (70)
Pylon 10 fl oz	2.3 b (66)	6.0 d (76)
Tolfenpyrad 14 fl oz	2.0 b (71)	6.3 d (75)
Tolfenpyrad 21 fl oz	2.2 b (68)	16.7 bcd (34)
Nontreated	6.8 b (0)	25.3 ab (0)
Total Population		
BAS320i 8 fl oz	71.2 (0)	55.4 (0)
BAS320i 16 fl oz	51.9 (0)	19.5 (37)
Celero 2 oz	2.0 (92)	7.3 (76)
Celero 4 oz	0.3 (99)	0.8 (97)
Conserve 6 oz	21.5 (18)	27.7 (10)
Pylon 5 fl oz	1.3 (95)	12.0 (61)
Pylon 10 fl oz	6.1 (77)	7.3 (76)
Tolfenpyrad 14 fl oz	2.5 (90)	7.1 (77)
Tolfenpyrad 21 fl oz	5.2 (80)	20.4 (34)
Nontreated	26.3 (0)	30.9 (0)

[z] All treatments were foliar sprays applied on June 18, 2007.

[y] Mean number of thrips were counted three ways: 1) the number shaken from plant samples 2) destructively harvesting flowers and buds, and 3) alcohol extraction of meristems.

Portulaca. During 2006 and 2007, two experiments were conducted for western flower thrips control on portulaca. In both experiments, adult and immature thrips were counted after alcohol extraction of flowers. In the first experiment (Table 116), infestation levels were moderate, but the population dramatically decreased by 21 DAT so no more meaningful data could be collected. By 14 DAT all treatments except Aria and Conserve provided statistically significantly control of immature thrips. In the second experiment (Table 117), infestation levels were quite high with the initial populations ranging from 51.5 to 122.3 adults and 17.5 to 69.0 immatures per 5 flowers. At 7 DAT, DPX-HGW86, Overture, Pylon, and Tolfenpyrad provided good to excellent control of immatures; however, this control appeared to be short-lived perhaps because infestation levels were quite high and because portulaca is constantly blooming and flowers assessed later had not been treated. The best product for residual control of immatures in this experiment was Kontos(BYI-8330) with 91% control 28 days after the initial foliar application.

Table 116. Western Flower Thrips Control on Portulaca (*Portulaca grandiflora*), Ludwig, TX, 2006.

Treatment Rate per 100 gal [z]	Population Counts [y], Means Separations [x], and % Control		
	0 DAT	7 DAT	14 DAT
Adults			
Acelepryn (DPX-E2Y45)	2.7	24.8 (0)	4.0 (0)
Aria 120 g	9.8	22.8 (0)	4.0 (25)
Celero (drench) 4 oz	7.2	25.8 (0)	5.3 (0)
Conserve 11 fl oz	6.7	32.2 (0)	11.3 (0)
Flagship (drench) 4 oz	8.3	9.3 (39)	1.7 (63)
Flagship 4 oz	7.7	17.7 (0)	10.2 (0)
Kontos (BYI-8330) 1.7 fl oz	10.0	30.3 (0)	9.0 (0)
Overture 8 oz	9.2	23.0 (0)	7.3 (0)
Overture 12 oz	4.2	16.2 (0)	7.2 (0)
Tolfenpyrad 21 oz	12.2	19.3 (13)	5.5 (16)
TriStar 30SG 96g	5.5	5.7 (44)	4.2 (0)
Nontreated	12.3	22.5 (0)	6.7 (0)
Immatures			
Acelepryn (DPX-E2Y45)	3.7 a	2.0 a (87)	6.5 b (83)
Aria 120 g	2.5 a	4.8 a (55)	11.7 ab (56)
Celero (drench) 4 oz	1.5 a	1.3 a (79)	1.7 b (89)
Conserve 11 fl oz	2.3 a	1.3 a (87)	6.2 ab (75)
Flagship (drench) 4 oz	2.8 a	0.8 a (93)	0.5 b (98)
Flagship 4 oz	5.2 a	1.7 a (92)	1.0 b (98)
Kontos (BYI-8330) 1.7 fl oz	3.2 a	4.7 a (65)	2.2 b (93)
Overture 8 oz	3.5 a	1.5 a (90)	0.7 b (98)
Overture 12 oz	4.2 a	1.0 a (94)	1.2 b (97)
Tolfenpyrad 21 oz	2.3 a	7.3 a (26)	0.5 b (98)
TriStar 30SG 96g	4.0 a	1.0 a (94)	0.8 b (98)
Nontreated	2.0 a	8.5 a (0)	21.0 b (0)

[z] All treatments were applied on June 30.
[y] Mean number of thrips were counted after alcoholextraction.
[x] Means within a column followed by the same letter are not significantly different Scheffe All-Pairwise Comparisons Test at the $P<0.05$ level.

Table 117. Western Flower Thrips Control on Portulaca (*Portulaca grandiflora*), Ludwig, TX, 2007.

Treatment Rate per 100 gal [z]	Population Counts [y], Means Separations [x], and Henderson's Percent Control				
	0 DAT	7 DAT	14 DAT	21 DAT	28 DAT
Adults					
Acelepryn (20 fl oz)	81.5 a	54.2 a (3)	34.2 a (44)	19.7 a (17)	34.0 a (0)
Celero (2 oz - drench)	99.3 a	32.2 ab (53)	38.2 a (49)	20.7 a (28)	28.2 a (0)
Celero (4 oz – drench)	53.3 a	24.0 ab (34)	31.0 a (22)	27.8 a (0)	21.8 a (0)
Conserve (11 fl oz)	61.0 a	25.0 ab (40)	41.8 a (9)	40.3 a (0)	28.5 a (0)
DPX-HGW86 (40 fl oz)	119.8 a	10.0 b (88)	24.8 a (72)	12.8 a (63)	20.3 a (38)
Flagship (4 oz – drench)	44.0 a	32.2 ab (0)	35.0 a (0)	13.0 a (0)	32.8 a (0)
Flagship (4 oz)	69.2 a	26.4 ab (44)	36.2 a (30)	19.5 a (3)	30.8 a (0)
Kontos (BYI-8330) (1.7 fl oz)	122.3 a	44.8 a (46)	35.3 a (62)	19.0 a (47)	33.2 a (1)
Overture (12 oz)	73.0 a	12.6 b (75)	18.7 a (66)	9.8 a (54)	23.0 a (0)
Overture (8 oz)	118.2 a	11.2 b (86)	23.3 a (74)	9.0 a (74)	17.5 a (46)
Pylon (10 fl oz)	51.5 a	11.6 b (67)	24.7 a (36)	13.3 a (11)	41.5 a (0)
Pylon (5 fl oz)	140.2 a	16.8 ab (82)	19.7 a (81)	9.5 a (77)	16.8 a (56)
S1812 (12 oz)	102.5 a	19.2 ab (73)	47.3 a (39)	17.8 a (40)	37.2 a (0)
S1812 (8 oz)	57.8 a	26.6 ab (33)	33.7 a (22)	8.3 a (51)	21.3 a (0)
Tolfenpyrad (14 fl oz)	108.5 a	17.8 ab (76)	28.7 a (65)	11.2 a (64)	42.7 a (0)
Tolfenpyrad (21 fl oz)	83.0 a	14.8 ab (74)	31.3 a (50)	12.2 a (49)	23.2 a (0)
TriStar 30SG (96 g)	71.7 a	36.4 ab (26)	34.7 a (36)	12.3 a (41)	27.5 a (0)
Nontreated	63.7 a	43.6 a (0)	47.8 a (0)	18.5 a (0)	17.5 a (0)
Nymphs					
Acelepryn (20 fl oz)	34.0 a	180.8 a (0)	25.5 ab (33)	26.5 ab (0)	26.5 abc (0)
Celero (2 oz - drench)	69.0 a	76.4 abc (76)	24.0 ab (69)	23.8 abcd (41)	15.0 abcde (67)
Celero (4 oz – drench)	38.7 a	73.6 abc (59)	29.2 ab (32)	36.5 a (0)	17.8 abcde (30)
Conserve (11 fl oz)	51.7 a	48.0 abcd (80)	27.0 ab (53)	31.2 abc (0)	11.7 abcde (65)
DPX-HGW86 (40 fl oz)	36.2 a	6.2 fg (96)	33.5 ab (17)	7.5 bcdef (64)	6.2 cde (74)
Flagship (4 oz – drench)	30.7 a	62.8 abc (55)	27.8 ab (19)	14.8 abcde (17)	12.2 bcde (39)
Flagship (4 oz)	21.0 a	87.0 abc (10)	24.2 ab (0)	24.3 ab (0)	13.3 abcde (3)
Kontos (BYI-8330) (1.7 fl oz)	66.0 a	63.8 bcd (79)	5.2 b (93)	2.7 def (93)	4.0 de (91)
Overture (12 oz)	17.5 a	1.8 g (98)	19.2 ab (1)	2.7 f (74)	7.5 cde (34)
Overture (8 oz)	34.0 a	1.4 g (99)	12.0 ab (68)	5.2 cdef (74)	2.5 e (89)
Pylon (10 fl oz)	26.8 a	19.4 cdef (84)	50.2 ab (0)	5.3 abcdef (66)	10.3 abcde (41)
Pylon (5 fl oz)	32.7 a	14.6 def (90)	17.0 ab (53)	3.5 cdef (82)	3.6 de (83)
S1812 (12 oz)	34.7 a	30.4 cde (81)	65.5 a (0)	4.5 def (78)	3.3 de (85)
S1812 (8 oz)	19.7 a	17.4 cdef (81)	26.8 ab (0)	5.7 bcdef (50)	11.0 cde (15)
Tolfenpyrad (14 fl oz)	76.3 a	11.8 def (97)	48.3 a (43)	6.7 bcdef (85)	44.2 ab (11)
Tolfenpyrad (21 fl oz)	16.8 a	5.8 efg (92)	51.3 a (0)	3.2 ef (67)	51.0 a (0)
TriStar 30SG (96 g)	37.8 a	49.6 abcd (71)	26.3 ab (37)	17.3 abcdef (22)	12.0 abcde (51)
Nontreated	29.5 a	135.6 ab (0)	32.8 ab (0)	17.2 abcde (0)	19.3 abcd (0)

[z] All treatments were applied on June 11; all foliar applications were repeated on June 25.
[y] Mean number of thrips were counted from 5 flowers per plant after alcohol extraction.
[x] Means separation was accomplished by using Tukeys HSD test (LSD) at the $P<0.05$ level. Data transformed prior to ANOVA log (x+1); untransformed means presented in table

Rose. In 2006, one experiment was conducted to examine various treatments to manage western flower thrips on miniature rose ‘Red Sunblase’ (Table 118). Thrips adults and immatures were counted on two blossoms from each treated plant at each reading date. In this experiment, infestation levels were fairly high with an average of 79.0 adult and immature thrips per two flowers. While all products had significantly reduced population levels from the control, none of the treatments provided outstanding percent control; however, the infestation levels were high and it is difficult for materials to fully penetrate flowers structured like roses. The best treatment was Tolfenpyrad at 21 fl oz which provided good control of both adults and immatures. The next best were Celero at 4 oz and thiamethoxam drenched at 4 oz. Conserve, acetamiprid, imidacloprid, and Pylon did not provide adequate levels of control in this experiment.

In 2010, another experiment was conducted to examine various treatments to manage western flower thrips on rose ‘Rainbow Knockout’ (Table 119 - Table 120). Thrips adults and immatures were counted after alcohol extraction from five flowers. Unfortunately, populations were declining during the study, and thrips had to be released from infested rose flowers after the week 3 count to supplement the declining population. This resulted in large population variations that made it difficult to obtain significant differences between treatments. However, the data indicate good control provided by A16901B, Aria and Hachi-Hachi.

In 2012, Heinz conducted an experiment to examine various treatments to manage western flower thrips on 2 rose varieties ‘Belinda’s Dreams’ and ‘Caldwell Pink’ in potted containers outdoors (Table 122). Thrips adults and immatures were counted after alcohol extraction from three flowers. No significant differences were found between treatments within weeks sampled and overall mean across all weeks sampled (excluding precounts). However, the data indicate better control provided by A16901B and Proud when compared to the standards Avid and Converse.

Table 118. Efficacy of several insecticides for *Frankliniella occidentalis* on Miniature Rose 'Red Sunblase', Walsh, WA, 2006.

Treatment (Active Ingredient)	Rate	Population Counts [z], Means Separations [y], Percent Control [x]	
		6 DAT	12 DAT
Adults			
Assail 30G (acetamiprid)	5 oz dry rate/100 gal	4.0 a (69)	2.7 a (68)
Avid (abamectin)	8 fluid oz/ 100 gal	3.7 a (71)	5.5 a (36)
Celero 16 WSG (clothianadin)	2 oz/100 gal	4.2 a (68)	3.8 a (55)
Celero 16 WSG (clothianadin)	4 oz/100 gal	2.6 a (80)	3.0 a (65)
Conserve SC (spinosad)	11 fluid oz/ 100 gal	4.2 a (68)	4.3 a (49)
Movento OD (spirotetramat) + OSS	8 oz/100 gal	8.0 a (39)	3.5 a (59)
Movento OD (spirotetramat) + OSS	12 oz/ 100 gal	7.0 a (46)	6.1 a (29)
Pylon (chlorfenapyr)	5 fl oz/ 100 gal	3.4 a (74)	3.5 a (59)
Pylon (chlorfenapyr)	10 fl oz/ 100 gal	5.7 a (57)	4.2 a (51)
Thiamethoxam	4 oz per 100 gal	3.3 a (75)	3.3 a (62)
Thiamethoxam	4 oz per 100 gal Drench	3.8 a (71)	3.6 a (58)
Tolfenpyrad	14 fl oz/ 100 gal	3.8 a (71)	3.5 a (59)
Tolfenpyrad	21 fl oz/ 100 gal	1.5 a (88)	1.3 a (84)
Nontreated		13.1 b (0)	8.5 b (0)
Immatures			
Assail 30G (acetamiprid)	5 oz dry rate/100 gal	37.1 a (44)	23.0 a (59)
Avid (abamectin)	8 fluid oz/ 100 gal	65.9 b (0)	65.3 b (0)
Celero 16 WSG (clothianadin)	2 oz/100 gal	21.8 a (67)	34.6 a (39)
Celero 16 WSG (clothianadin)	4 oz/100 gal	14.9 a (77)	31.9 a (44)
Conserve SC (spinosad)	11 fluid oz/ 100 gal	39.6 a (40)	33.9 a (40)
Movento OD (spirotetramat) + OSS	8 oz/100 gal	38.3 a (42)	34.7 a (39)
Movento OD(spirotetramat) + OSS	12 oz/ 100 gal	37.7 a (43)	38.6 a (32)
Pylon (chlorfenapyr)	5 fl oz/ 100 gal	26.2 a (60)	28.7 a (49)
Pylon (chlorfenapyr)	10 fl oz/ 100 gal	36.3 a (45)	31.7 a (44)
Thiamethoxam	4 oz per 100 gal	31.9 a (52)	33.9 a (40)
Thiamethoxam	4 oz per 100 gal Drench	16.6 a (75)	18.4 a (68)
Tolfenpyrad	14 fl oz/ 100 gal	17.9 a (73)	30.4 a (46)
Tolfenpyrad	21 fl oz/ 100 gal	8.5 a (87)	14.2 a (75)
Nontreated		65.9 b (0)	56.7 b (0)

[z] Populations were counted on two blossoms per plant at each reading
[y] All letters following numbers within a column, that are different, are significantly different at the <0.05 level
[x] Percent control was calculated as follows (Nontreated – Treatment)/Nontreated * 100.

Table 119. Western Flower Thrips Control on Rose (*Rosa* sp.) 'Rainbow Knockout', – Application Rates and Dates, Parella, CA, 2010.

Treatment (Active Ingredient)	Rate / 100 gal	Application Dates				
		11/11 0 WAT	11/18 1 WAT	11/25 2 WAT	12/2 3 WAT	12/9 4 WAT
A16901B	6.7 oz	X	X	X		
Aria 50SG (flonicamid)	120 g	X		X		X
Aria 50SG + NNI-0101 20% SC (pyrifluquinazon)	120 g + 6.38 fl oz	X		X		X
Aria (flonicamid) / Hachi-Hachi (tolfenpyrad) / Pylon (chlorfenapyr)	120 g / 21 fl oz / 5.2 fl oz	X		X		X
Avid 0.15EC (abamectin)	16 fl oz	X	X			
BotaniGard 22 % WP + Molt X (azadirachtin) / BotaniGard	2 lb + 8 oz / 2 lb	X		X		X
			X		X	
BotaniGard 22 % WP + SuffOil / BotaniGard	2 lb + 1 gal / 2 lb	X		X		X
			X		X	
BotaniGard 22 % WP + Tick-Ex (*Metarhizium anisopliae* strain F52)	2 lb + 29 fl oz	X	X	X	X	X
Conserve (spinosad)	8 fl oz	X		X		X
Hachi-Hachi EC (tolfenpyrad)	21 fl oz	X		X		X
NNI-0101 20% SC (pyrifluquinazon)	6.38 fl oz	X		X		X
Tick-Ex	29 fl oz	X		X		X
Nontreated						

Table 120. Western Flower Thrips Control on Rose (*Rosa* sp.) 'Rainbow Knockout', Parella, CA, 2010.

Treatment	Population Counts [z], Means Separations [y], and Henderson's Percent Control					
	Precount	1 WAT	2 WAT	3 WAT	4 WAT	5 WAT
Total Population						
A16901B	94.56 a	3.44c (86)	2.56 a (85)	0.33 a (97)	38.11 a	23.56a (57)
Aria 50SG	97.11 a	6.44abc (75)	3.22 a (82)	1.22 a (88)	49.89 a	25.11a (21)
Aria 50SG + NNI-0101	89.56 a	5.89abc (75)	5.22 a 68)	0.67 a (93)	63.67 a	24.22a (41)
Aria / Hachi-Hachi / Pylon	91.67 a	5.78 abc (76)	12.67 a (25)	0.33 a (96)	47.00 a	21.50 a (29)
Avid 0.15EC	89.00 a	4.44bc (81)	3.33 a (80)	1.56 a (83)	86.67 a	46.33a (17)
BotaniGard 22 % WP + Molt X / BotaniGard	78.00 a	12.89abc (37)	5.56 a (61)	1.33 a (83)	51.44 a	32.67a (1)
BotaniGard 22 % WP + SuffOil / BotaniGard	69.00 a	12.22ab (32)	7.78 a (39)	2.00 a (72)	46.22 a	38.67a (0)
BotaniGard 22 % WP + Tick-Ex	89.88 a	6.78abc (71)	4.33 a (74)	6.22 a (33)	55.89 a	53.22a (0)
Conserve	89.56 a	5.13abc (78)	3.78 a (77)	4.56 a (50)	73.25 a	37.13a (21)
Hachi-Hachi EC	82.13 a	8.67 abc (60)	7.22 a (52)	0.56 a (93)	33.44 a	19.00 a (11)
NNI-0101 20% SC	81.56 a	7.56abc (65)	10.11 a (33)	2.33 a (72)	97.67 a	41.44a (34)
Tick-Ex	44.22 a	11.33abc (2)	5.78 a (29)	3.89 a (14)	59.78 a	55.11a (0)
Nontreated	67.11 a	17.56 a (0)	12.33 a (0)	6.89 a (0)	61.38 a	39.33 a (0)

[z] Mean number of thrips were counted after alcohol extraction.
[y] Means within a column followed by the same letter are not significantly different based on Tukey's and Dunnett's tests (P=0.05). Significant treatment effect only at 1 WAT.

Table 121. Western Flower Thrips Control on Rose (*Rosa* sp.) 'Belinda's Dreams' and 'Caldwell Pink'– Application Rates and Dates, Heinz, TX, 2012.

Treatment[z] (Active Ingredient)	Rate per 100 gal	Application Dates				
		10/26 Week 0	11/2 Week 1	11/8 Week 2	11/16 Week 3	11/26 Week 3
A16901B	6.7 oz	X		X		X
	13.4 oz	X		X		X
Avid (abamectin)	16 fl oz	X	X			
AzaGuard (azadirachtin)	16 fl oz	X	X	X	X	X
Conserve (spinosad)	8 fl oz	X		X		X
MBI-203 (*Chromobacterium subtsugae*)	2 lb	X	X	X	X	X
	4 lb	X	X	X	X	X
MBI-206 (*Burkholderia* sp.)	1 gal	X	X	X	X	X
	2 gal	X	X	X	X	X
Proud (thyme oil)	1 gal	X	X	X	X	X
Water Check	-	X	X	X	X	X
Nontreated	-					

Table 122. Western Flower Thrips Control on Rose (*Rosa* sp.) 'Belinda's Dreams' and 'Caldwell Pink', Heinz, TX, 2012.

Treatment	Population Counts [z] and Means Separations [y] and Hendreson's Percent Control						
	Precount	1 WAT	2 WAT	3 WAT	4 WAT	5 WAT	Average[w]
Immatures							
A16901B (6.7 oz)	1.67	6.50 (0)	2.33 (65)	3.00 (66)	10.67 (56)	3.00 (61)	5.10 (53)
A16901B (13.4 oz)	2.33	3.67 (54)	3.33 (64)	2.17 (82)	3.67 (89)	1.83 (83)	2.93 (80)
Avid (16 fl oz)	0.83	3.67 (0)	3.50 (0)	3.33 (23)	5.50 (55)	3.83 (0)	3.97 (26)
AzaGuard (16 fl oz)	0.50	4.00 (0)	1.83 (9)	5.00 (0)	12.33 (0)	3.80 (0)	5.45 (0)
Conserve (8 fl oz)	0.33	1.67 (0)	2.83 (0)	2.83 (0)	7.17 (0)	3.50 (0)	3.60 (0)
MBI-203 DF (2 lb) [*]	0.67	3.67 (0)	3.17 (0)	4.50 (0)	8.67 (12)	3.67 (0)	4.73 (0)
MBI-203 DF (4 lb) [*]	0.17	6.17 (0)	3.67 (0)	3.67 (0)	8.83 (0)	2.00 (0)	4.87 (0)
MBI-206 (1 gal) [*]	0.17	5.50 (0)	5.00 (0)	4.67 (0)	7.00 (0)	5.00 (0)	5.45 (0)
MBI-206 (2 gal) [*]	1.00	5.67 (0)	10.00 (0)	7.83 (0)	4.83 (67)	2.83 (38)	6.23 (3)
Proud 3 (1 gal)	1.67	4.67 (18)	2.83 (58)	2.50 (71)	8.50 (65)	1.17 (85)	3.93 (63)
Water Check	0.50	10.50 (0)	5.17 (0)	3.67 (0)	3.17 (57)	2.33 (0)	4.97 (0)
Nontreated	0.83	2.83 (0)	3.33 (0)	4.33 (0)	12.17 (0)	3.80 (0)	5.34 (0)
Adults							
A16901B (6.7 oz)	19.17	31.50 (25)	34.50 (21)	47.67 (49)	68.17 (18)	51.17 (36)	46.60 (20)
A16901B (13.4 oz)	18.17	40.50 (0)	37.67 (9)	44.83 (0)	57.83 (26)	44.33 (41)	45.03 (18)
Avid (16 fl oz)	15.67	27.17 (21)	30.83 (14)	31.83 (17)	52.83 (22)	56.67 (13)	39.87 (16)
AzaGuard (16 fl oz)	16.50	23.50 (35)	17.17 (54)	56.50 (0)	64.17 (10)	44.20 (36)	41.00 (18)
Conserve (8 fl oz)	15.83	40.17 (0)	21.50 (41)	39.17 (0)	56.33 (18)	85.17 (0)	48.47 (0)
MBI-203 DF (2 lb)	17.50	29.17 (24)	32.67 (18)	66.33 (0)	79.00 (0)	71.50 (2)	55.73 (0)
MBI-203 DF (4 lb)	16.83	34.83 (6)	43.33 (0)	63.67 (0)	79.67 (0)	55.17 (21)	55.33 (0)
MBI-206 (1 gal)	19.17	31.17 (26)	25.50 (42)	64.67 (0)	47.50 ()43	50.00 (37)	43.55 (25)
MBI-206 (2 gal)	16.17	28.67 (19)	58.17 (0)	59.83 (0)	44.83 (26)	49.50 (26)	48.20 (2)
Proud 3 (1 gal)	16.50	42.00 (0)	35.33 (6)	78.33 (0)	53.67 (25)	46.33 (33)	51.13 (0)
Water Check	16.17	45.17 (0)	28.67 (22)	37.67 (5)	70.83 (0)	87.33 (0)	53.93 (0)
Nontreated	15.67	34.50 (0)	35.83 (0)	38.33 (0)	67.67 (0)	65.20 (0)	47.72 (0)

[z] Mean number of thrips from 3 flowers were counted from alcohol extraction.
[y] No significant differences were found within columns based onWilcoxon Rank Sum Test ($p < 0.05$).
[w] Mean across weeks, excluding precount.
[*] Hyper-Active spray adjuvant used at 2 pint/100 gallon.

Verbena. In 2008, Oetting conducted an experiment to examine various treatments to manage western flower thrips on verbena ‘Lorgo Purple' (Table 123 - Table 124). Counts were made of live thrips and feeding scars on leaves, and damage rating (0-100) taken at the end of experiment. Conserve, Flagship, BYI 8330, NAI 2302 and MOI 201 were effective in reducing the number of thrips and feeding damage. The standard Conserve was consistently the best treatment. Data indicated that Tick-EX has less residual activity.

In 2016, Chong studied the use of insecticides in outdoor production to manage western flower thrips on verbena ‘Quartz Blue' (Table 125). However, low and great variations in the numbers of nymphs, and a constant influx of adult thrips (a commonly observed phenomenon in outdoor production) rendered the detection of significant differences between treatments difficult. Because of the inconclusive data, this test was not included in the general efficacy summary Table 7. General efficacy summary on western flower thrips (Frankliniella occidentalis) across infestation levels, crops, application types and application rates –Marigold, continued.

Product	**Marigold**				
	Nansen 2017	**Nansen 2018**	**Gilrein 2017**	**Hotchkiss 2018**	**Hotc**
Nontreated populations at 0 DAT - at table rating DAT	50.0 – 15.0	22.0 – 23.0	1.5 – 26.6	20.2 – 13.2	4.
Population used for table rating	Immatures				
DAT used for table rating	13 DAT	7 DAT	6 DAT	13 DAT	2
A20520A			+/-		
Acelepryn (DPX-E2Y45)					
Altus		-		-	
BCS-507		-		-	
Conserve	-	+			
IKI-3106	+/-	-	+/-	+	
IKI-3326					
KOC 22018-8					
Overture			+/-		
Pylon				++	
SP3014		-		-	
V-10433		+		+/-	
Venerate	-		-		

[1] Rating Scale: ++ = clearly statistically better than nontreated and greater than 95% control; + = statistically better than nontreated and between 85 and 95% control; +/- statistically better than nontreated with control between 70 and 85%; - = statistically equivalent to nontreated and/or efficacy less than 70%.

[2] Where more than one rate or application type for a product was included in the experiment and each performed statistically different, the better rating is provided in this table.

Table 8.

Table 123. Western Flower Thrips Control on Verbena 'Lorgo Purple' – Application Rates and Dates, Oetting, GA, 2008.

Treatment (Active Ingredient)	Rate / 100 gal	Application Dates		
		0 DAT	6 DAT	13 DAT
Acelepryn (DPX E2Y45) (chlorantraniliprole)	20 fl oz	X		X
Conserve (spinosad)	8 fl oz	X		X
Flagship (thiamethoxam)	8 oz	X		X
Kontos (BYI 8330) (spirotetramat)	1.7 fl oz	X		X
MOI 201	1:500	X	X	X
MOI 201	1:800	X	X	X
NAI 2302 (tolfenpyrad)	21 fl oz	X		X
NNI-0101 (pyrifluquinazon)	6.3 fl oz	X		X
Tick-EX (*Metarhizium anisopliae)*	29 fl oz	X	X	X
Nontreated	-	-	-	-

Treatments applied on April 11, 17, and 24, 2008.

Table 124. Western Flower Thrips Control on and Damage on Verbena 'Lorgo Purple', Oetting, GA, 2008.

Treatment	Population Counts [x], Means Separations [y], and Percent Control				Number of Feeding Scars[x], Means Separations [y], and Percent Reduction				Damage Rating (0-100) 34 DAT
	6 DAT	13 DAT	27 DAT	34 DAT	6 DAT	13 DAT	27 DAT	34 DAT	
Acelepryn	2.0 a (5)	2.0 b (59)	4.7 c (80)	4.0 bc (79)	37.7 a (0)	25.6 ab (23)	23.3 c (65)	28.1 c (67)	34.3 bcd (55)
Conserve	0.1 b (95)	0.0 c (100)	2.3 c (90)	1.9 c (90)	16.4 cd (50)	4.4 e (87)	10.3 d (84)	10.0 d (88)	24.3 de (68)
Flagship	0.4 b (81)	1.4 bc (71)	4.3 c (81)	1.3 c (93)	21.3 bcd (36)	10.0 de (70)	13.6 cd (79)	17.3 cd (80)	17.9 e (77)
Kontos	1.4 ab (33)	2.1 b (57)	3.4 c (85)	2.4 c (87)	26.1 a-d (21)	20.9 bc (37)	21.7 c (67)	26.9 c (69)	28.6 cde (63)
MOI 201 (1:500)	0.9 ab (57)	0.0 c (100)	2.0 c (91)	3.4 bc (82)	13.3 d (60)	3.9 e (88)	15.3 de (77)	23.1 c (73)	27.1 cde (65)
MOI 201 (1:800)	1.1 ab (48)	0.6 bc (88)	5.6 c (76)	2.7 c (86)	18.0 cd (46)	8.0 e (76)	20.9 cd (68)	24.3 c (72)	31.4 cde (59)
NAI 2302	0.4 b (81)	1.4 bc (71)	3.1 c (87)	1.3 c (93)	27.3 abc (18)	12.1 de (64)	14.4 cd (78)	17.7 cd (79)	25.0 de (67)
NNI-0101	1.1 ab (48)	1.1 bc (78)	6.9 bc (70)	2.3 c (88)	17.4 cd (47)	10.4 de (69)	17.9 cd (73)	17.1 cd (80)	41.1 bc (47)
Tick-EX	1.1 ab (48)	1.4 bc (71)	11.4 b (50)	7.0 b (63)	20.1 bcd (39)	16.7 cd (50)	42.0 b (36)	46.9 b (45)	48.3 b (37)
Nontreated	2.1 a (0)	4.9 a (0)	23.0 a (0)	18.8 a (0)	33.1 ab (0)	33.3 a (0)	66.0 a (0)	85.8 a (0)	76.9 a (0)

[x] Mean number of live thrips and feeding scars on 18 leaves (6 most fully developed leaves each on 3 stems).
[y] Means followed by the same letter are not significantly different at p=0.05 (ANOVA and mean separation test).

Table 125. Western Flower Thrips Control on Verbena (*Verbena hybrida*) 'Quartz Blue', Chong, SC, 2016.

Treatment [x]	Rate / 100 gal	Applic Freq	Population Counts [z], Means Separations [y], and Henderson's Percent Control					
			Pre	1 WAT	2 WAT	3 WAT	4 WAT	8 WAT
Avid 0.15EC	8 fl oz	2x; 0 and 1 WAT	6.8 ± 1.9 a	2.5 ± 0.6c (26)	3.4 ± 0.6 a (17)	2.9 ± 0.8 abc (10)	2.2 ± 0.9 a (15)	1.9 ± 0.6 a (12)
IKI-3106 50SL	22 fl oz	3x, biweekly	7.5 ± 2.6 a	6.0 ± 1.4ab (0)	4.0 ± 1.6 a (12)	3.3 ± 1.4 abc (7)	2.8 ± 0.8 a (2)	2.2 ± 0.5 a (7)
IKI-3106 50SL	22 fl oz	5x, weekly	5.8 ± 1.5 a	5.5 ± 0.8ab (0)	4.2 ± 1.1 a (0)	2.8 ± 0.6 abc (0)	2.8 ± 0.9 a (0)	2.1 ± 0.6 a (0)
IKI-3106 50SL	27 fl oz	3x,biweekly	6.8 ± 2.0 a	5.4 ± 0.8ab (0)	3.9 ± 0.6 a (5)	2.2 ± 0.5bc (32)	2.9 ± 0.7 a (0)	1.9 ± 0.6 a (12)
IKI-3106 50SL	27 fl oz	5x, weekly	6.9 ± 1.2 a	3.4 ± 1.1bc (1)	3.9 ± 0.8 a (7)	1.2 ± 0.4 c (63)	1.9 ± 0.4 a (28)	2.2 ± 0.6 a (0)
Venerate	1 qt	5x, weekly	6.3 ± 2.8 a	5.9 ± 0.9ab (0)	6.6 ± 1.1 a (0)	4.4 ± 0.9 ab (0)	3.9 ± 0.8 a (0)	2.3 ± 0.6 a (0)
Venerate	2 qt	5x, weekly	6.7 ± 2.1 a	6.1 ± 0.5a (0)	5.7 ± 0.7 a (0)	4.7 ± 0.8 a (0)	3.6 ± 1.1 a (0)	2.8 ± 0.5 a (0)
KI-3106 / Venerate	22 fl oz, 2 qt	Alternate, weekly	5.7 ± 1.4 a	3.5 ± 1.2bc (0)	5.4 ± 0.8 a (0)	3.9 ± 0.5 ab (0)	3.3 ± 0.8 a (0)	2.6 ± 0.7 a (0)
KI-3106 / Venerate	27 fl oz, 2 qt	Alternate, weekly	7.5 ± 1.2 a	3.6 ± 0.8abc (4)	5.4 ± 1.4 a (0)	2.9 ± 0.8 abc (18)	3.1 ± 0.9 a (0)	2.3 ± 0.4 a (3)
Nontreated	-	-	7.6 ± 3.0 a	3.8 ± 0.9abc (0)	4.6 ± 0.9 a (0)	3.6 ± 0.6 ab (0)	2.9 ± 0.6 a (0)	2.4 ± 0.5 a (0)
Avid	8 fl oz	2x; 0 and 1 WAT	2.1 ± 0.7 a	1.1 ± 0.3 a	0.5 ± 0.2 a	0.9 ± 0.3 a	0.5 ± 0.3 a	0.2 ± 0.1 a
IKI-3106 50SL	22 fl oz	3x, biweekly	0.3 ± 0.2 a	0.6 ± 0.5 a	1.5 ± 0.5 a	0.9 ± 0.5 a	0.5 ± 0.2 a	0.1 ± 0.1 a
IKI-3106 50SL	22 fl oz	5x, weekly	1.2 ± 0.7 a	1.1 ± 0.5 a	1.1 ± 0.5 a	0.5 ± 0.2 a	0.4 ± 0.2 a	0.0 a
IKI-3106 50SL	27 fl oz	3x, biweekly	0.4 ± 0.2 a	1.0 ± 0.6 a	0.1 ± 0.1 a	0.9 ± 0.2 a	0.4 ± 0.2 a	0.1 ± 0.1 a
IKI-3106 50SL	27 fl oz	5x, weekly	1.4 ± 0.4 a	1.2 ± 0.6 a	1.1 ± 0.3 a	1.7 ± 0.3 a	0.6 ± 0.4 a	0.3 ± 0.2 a
Venerate	1 qt	5x, weekly	1.9 ± 1.1 a	1.0 ± 0.4 a	1.0 ± 0.4 a	1.0 ± 0.4 a	0.7 ± 0.3 a	0.3 ± 0.2 a
Venerate	2 qt	5x, weekly	1.0 ± 0.4 a	0.9 ± 0.5 a	0.8 ± 0.3 a	0.8 ± 0.3 a	0.4 ± 0.3 a	0.4 ± 0.3 a
KI-3106 / Venerate	22 fl oz, 2 qt	Alternate, weekly	1.7 ± 0.8 a	2.1 ± 1.0 a	0.6 ± 0.2 a	0.3 ± 0.2 a	1.0 ± 0.6 a	0.0 a
IKI-3106 / Venerate	27 fl oz, 2 qt	Alternate, weekly	1.3 ± 0.6 a	2.1 ± 1.0 a	0.6 ± 0.3 a	1.2 ± 0.4 a	0.0 a	0.0 a
Nontreated	-	-	0.8 ± 0.4 a	2.1 ± 0.7 a	1.1 ± 0.5 a	1.4 ± 0.5 a	1.0 ± 0.3 a	0.2 ± 0.1 a

[z] Mean number of thrips were counted after alcohol extraction at weeks after initial treatment (WAT).
[y] Means within a column followed by the same letter are not significantly different based on Kruskal-Wallis test (P=0.05).
[x] Capsil (6 fl oz/100 gal) was added to all IKI-3106 solutions.

Zinnia. In 2008 and 2009, three experiments were conducted to examine various treatments to manage western flower thrips on zinnia (Table 126 - Table 128). In the first and second experiments, plants were placed into brown paper bags, stored for 4 weeks with yellow sticky cards, and adult and immature thrips on the sticky cards were counted. In these experiments, low thrips density or high variablility resulted in no significant differences between treatments and nontreated (Table 126 - Table 127). In the third experiment, thrips counts showed very low populations, with no significant differences in adult counts. Avid, Pylon and the Botanigard + BW533 or + SuffoilX rotation with Botanigard provided significant control at 7 DAT but not at 14 DAT. Kontos, Met 52 and OHP 929-2 were not significantly different from nontreated (Table 128).

Table 126. Western Flower Thrips Control on Zinnia (*Zinnia elegans*) 'Short Stuff', Parella, CA, 2008.

Treatment	Rate / 100 gal	Population Counts [z], Means Separations [y], and Henderson's Percent Control					
		0 DAT	6 DAT	13 DAT	21 DAT	26 DAT	32 DAT
Acelepryn (DPX-E2Y45)	20 fl oz	7.3 a	4.3 ab (0)	1.8 a (0)	0.8 a (0)	2.1 b (0)	1.8 a (67)
Conserve	11 fl oz	1.9 a	2.2 ab (0)	2.5 a (0)	0.4 a (0)	0.1 a (58)	2.0 a (0)
Flagship	8 oz	5.2 a	0.8 a (4)	2.2 a (0)	0.1 a (73)	0.7 ab (0)	1.3 a (28)
Kontos (BYI-8330)	1.7 fl oz	5.1 a	3.4 ab (0)	1.9 a (0)	0.9 a (0)	0.7 ab (0)	2.2 a (0)
MOI-201	1:500	9.4 a	5.7 b (0)	2.7 a (0)	0.5 a (26)	1.1 ab (6)	1.0 a (65)
Mesurol	1 lb	4.9 a	1.5 a (0)	2.7 a (0)	0.0 a (100)	0.6 ab (2)	1.5 a (3)
NNI-0101	6.38 fl oz	7.2 a	2.9 ab (0)	2.6 a (0)	0.0 a (100)	0.2 a (75)	2.8 a (0)
Tick-Ex	15 fl oz	3.7 a	3.3 ab (0)	2.9 a (0)	0.2 a (24)	1.1 ab (0)	3.4 a (0)
Tick-Ex	29 fl oz	3.8 a	4.1 ab (0)	2.9 a (0)	0.2 a (26)	1.3 ab (0)	1.9 a (43)
Nontreated		5.6 a	0.9 a (0)	0.3 a (0)	0.4 a (0)	0.7 ab (0)	1.8 a (0)

[z] Populations of adults and nymphs found on yellow sticky cards with 10 plants in brown paper bags after 4 weeks.
[y] All letters following numbers within a column, that are different, are significantly different at the <0.05 level according to the nonparametric Wilcoxon 1-way chi-square test.
Treatments applied October 15 and 29, 2008.

Table 127. Western Flower Thrips Control on Zinnia (*Zinnia elegans*) 'Short Stuff', Parella, CA, 2009.

Treatment	Rate / 100 Gal	Population Counts [z], Means Separations [y], and Henderson's Percent Control					
		0 DAT	3DAT	7DAT	15DAT	21DAT	28DAT
Conserve SC	11 fl oz	5.8 a	7.08 ab (0)	18.8 a-d (0)	67.9 cd (0)	27.0 ab (0)	63.2 ab (0)
Flagship 25WG foliar	8 oz	6.58 a	11.3 abc (0)	27.8 a-d (0)	77.9 de (0)	30.2 ab (0)	59.5 ab (0)
Flagship 25WG drench	8 oz	5.75 a	11.1 abc (0)	8.08 ab (0)	17.5 ab (0)	9.50 ab (24)	53.8 ab (0)
Kontos (BYI-8330) SC foliar	1.7 fl oz	11.7 a	12.6 abc (0)	17.8 a-d (0)	47.8 bcd (0)	8.58 a (66)	57.8 ab (0)
Kontos (BYI 8330) SC drench	1.7 fl oz/1500 4" pots	6.25 a	25.2 c (0)	29.3 cd (0)	29.2 ab (0)	31.5 ab (0)	84.4 b (0)
Mesurol 75W	1 lb	8.67 a	8.33 ab (9)	11.6 abc (0)	4.92 a (58)	3.50 a (81)	23.4 a (35)
MOI 201	1:500	5.67 a	5.25 a (12)	7.42 a (0)	8.67 a (0)	11.8 ab (4)	42.2 ab (0)
NNI-0101/ Tolfenpyrad	6.38 fl oz / 14 fl oz	9.67 a	23.4 bc (0)	29.5 bcd (0)	17.8 ab (0)	6.42 a (69)	45.7 ab (0)
NNI-0101/ Tolfenpyrad	6.38 fl oz / 21 fl oz	5.50 a	20.3 abc (0)	23.2 a-d (4)	11.3 a (0)	9.58 ab (0)	38.0 ab (0)
Overture 25WP	8 oz	6.58 a	12.7 abc (0)	33.3 d (0)	34.5 abc (0)	39.7 b (0)	68.1 ab (0)
Tick-Ex	29 fl oz	11.9 a	11.5 abc (8)	26.8 a-d (0)	109 e (0)	30.6 ab (0)	49.5 ab (0)
Nontreated		13.1 a	13.8 abc (0)	16.5 a-d (0)	17.7 ab (0)	28.3 ab (0)	54.3 ab (0)

[z] Populations of adults and nymphs found on yellow sticky cards with 10 plants in brown paper bags after 4 weeks.
[y] All letters following numbers within a column, that are different, are significantly different at the <0.05 level according to the nonparametric Wilcoxon 1-way chi-square test.
All treatments applied February 17 and March 3, 2009 except NNI-0101 applied only on February 17 and Tolfenpyrad applied only on March 3.

Table 128. Western Flower Thrips Control on Zinnia (*Zinnia marylandica*) 'Zahara Yellow', Chen, LA, 2009.

Treatment*(Active Ingredient)	Rate per 100 Gal	Number of Thrips[x] (% Control)	
		7 DAT	14 DAT
Adults			
Avid (abamectin)	8 oz, 14-day interval	0.0 a (100)	0.5 a (0)
BotaniGard WP + BW533 / BotaniGard WP (*Beauveria bassiana*)	2 lb + 8 oz / 2 lb, 7-day interval	0.0 a (100)	0.2 a (60)
BotaniGard WP + SuffOil-X / BotaniGard WP	2 lb + 1 gal / 2 lb, 14-day interval	0.0 a (100)	0.2 a (60)
Kontos (spirotetramat)	1.7 fl oz, 14-day interval	0.2 a (80)	0.2 a (60)
Met 52 (*Metarhizium anisopliae)*	29 fl oz, 7-day interval	1.0 a (0)	0.7 a (0)
Met52	29 fl oz, 14-day interval	0.5 a (50)	0.3 a (40)
OHP 929-2	6 fl oz, 14-day interval	0.8 a (20)	1.5 a (0)
Pylon (chlorfenapyr)	5 fl oz, 14-day interval	0.2 a (80)	0.8 a (0)
Nontreated		1.0 a (0)	0.5 a (0)
Immatures			
Avid (abamectin)	8 oz, 14-day interval	0.7 bc (70)	0.5 b (62)
BotaniGard WP + BW533 / BotaniGard WP (*Beauveria bassiana*)	2 lb + 8 oz / 2 lb, 7-day interval	0.0 c (100)	0.2 b (85)
BotaniGard WP + SuffOil-X / BotaniGard WP	2 lb + 1 gal / 2 lb, 14-day interval	0.0 c (100)	0.2 b (85)
Kontos (spirotetramat)	1.7 fl oz, 14-day interval	1.3 ab (43)	1.2 ab (8)
Met 52 (*Metarhizium anisopliae)*	29 fl oz, 7-day interval	1.5 ab (35)	2.5 a (0)
Met52	29 fl oz, 14-day interval	0.7 bc (70)	0.5 b (62)
OHP 929-2	6 fl oz, 14-day interval	1.3 ab(43)	2.5 a (0)
Pylon (chlorfenapyr)	5 fl oz, 14-day interval	0.0 c (100)	1.2 ab (8)
Nontreated		2.3 a (0)	1.3 ab (0)

* All treatments were foliar sprays applied on August 6; trial terminated 14 days later.
[x] Means followed by the same letter are not significantly different LSD 0.05.

Efficacy Summary by Product

A16901B. In general, this product provided excellent control ofwestern flower thrips, equal to or better than standards.

A20520/DPX-HGW86/Mainspring. In general, this product provided good to excellent control of western flower thrips, equal to or better than standards.

Acelepryn / DPX-E2Y45 1.67SC. This material was generally ineffective for western flower thrips or gladiolus thrips control.

Allectus. In the single trial for western flower thrips, Allectus did not provide good control. However, it was very effective for weeping fig thrips and gladiolus thrips.

Altus. This product provided poor control of western flower thrips in 2 trials.

Aria 50SG. For western flower thrips, Aria generally provided good to excellent control, performing as well as Avid and Pylon. It provided excellent control of chilli thrips but insufficient control of weeping fig thrips or gladiolus bulb thrips.

Avid 0.15EC. Avid provided good to excellent efficacy on chilli thrips and gladiolus thrips, and variable efficacy on western flower thrips. It did not exhibit good efficacy against weeping fig thrips.

AzaGuard / Aza-Direct / Azatin XL / Ornazin 3EC. In two experiments, Azatin did not provide adequate control for weeping fig thrips, but in another experiment it did provide good control of gladiolus thrips. Ornazin provided no control of western flower thrips in one trial while AzaGuard provided no to excellent efficacy in 7 trials.

BAS 320i. This material was not known for thrips control in the food crop area. The tests IR-4 conducted for environmental horticulture uses verified this finding.

BCS 507. This active ingredient provided promising efficacy in one, and poor efficacy in 2 trials for western flower thrips.

BotaniGard ES/WP. For western flower thrips control, BotaniGard ES provided good control; however Botanigard WP was generally ineffective. Little impact was observed for weeping fig thrips.

Celero 16WSG. This product exhibited variable efficacy for western flower thrips and weeping fig thrips, but it was effective for gladiolus thrips.

Conserve SC. Although considered a standard product for thrips efficacy, Conserve in this series of experiments exhibited variable control of western flower thrips. Conserve did provide good to excellent control of chilli thrips and gladiolus thrips but had little impact on weeping fig thrips.

Discus. Foliar application of Discus gave excellent control of weeping fig thrips, but drench applications were not effective. Discus also gave excellent control of gladiolus thrips.

Flagship 25WG/0.22G, Meridian 25WG/0.33G. In general Flagship provided good to excellent control of western flower thrips, however there were a few experiments where little impact on populations was observed. Flagship as foliar applications exhibited good control of weeping fig thrips and chilli thrips, but drench applications were not as effective. It provided excellent control of gladiolus thrips.

GF-2860 / XXpire WG. This product provided good to excellent efficacy for western flower thrips in 4 out of 6 trials, and excellent efficacy on chilli thrips in one trial..

Hachi-Hachi / Tolfenpyrad EC. On most crops, Tolfenpyrad generally gave good to excellent control of western flower thrips, but on impatiens control was variable and phytotoxicity occurred. This material also gave excellent control of gladiolus thrips.

IKI-3106/Sarisa. This product provided good to excellent efficacy for western flower thrips in 8 trials, but poor efficacy on chilli thrips in one trial , and inconclusive data in a second trial.

IKI-3326 / Pradia. This product provided good to excellent efficacy for western flower thrips in 2 trials.

KOC 22018-8. This active ingredient provided good efficacy for western flower thrips in one trial.

Kontos (BYI-8330). This material exhibited variable efficacy for western flower thrips, and little impact on weeping fig thrips or chilli thrips.

MBI 203 / Grandevo. This product exhibited variable efficacy (no to excellent control) for western flower thrips in 16 trials. Inconclusive data were obtained in a second chilli thrips trial.

MBI 206 / Venerate. This product exhibited variable efficacy (no to excellent control) for western flower thrips in 14 trials.

Mesurol 75W. Mesurol provided good to excellent control of western flower thrips and gladiolus thrips.

Met52 / Tick-Ex EC. This product was ineffective on western flower thrips.

MOI 201. For western flower thrips, MOI 201 provided variable control, and it was not effective on privet thrips.

NNI-0101 20% SC / SP3009 / Rycar. This product was generally ineffective for western flower thrips, gladiolus thrips and privet thrips control. It provided variable control of chilli thrips in two trials.

Overture 35WP. This product consistently exhibited good to excellent control of western flower thrips. Overture also gave good control of gladiolus thrips and chilli thrips but did not sufficiently impact weeping fig thrips.

Proud 3. This product exhibited variable efficacy (no to excellent control) for western flower thrips in 6 trials.

Pylon. For western flower thrips, this product consistently provided good to excellent control. Pylon also gave good control of chilli thrips and gladiolus thrips.

QRD 400. This material provided good control of low infestations of western flower thrips but did not sufficiently impact chilli thrips in the single experiment conducted in 2007.

Safari 20SG/2G. This product typically provided excellent control of western flower thrips, chilli thrips, and weeping fig thrips (with foliar applications only for the last species).

SP3014. This active ingredient provided poor efficacy for western flower thrips in 2 trials.

Talstar F. Talstar was one of the best control tools for weeping fig thrips. It also provided excellent control of gladiolus thrips.

TetraCurb. In a single trial, this product provided promising efficacy for western flower thrips with the Concentrate formulation but poor efficacy with the Organic formulation.

TriCon. This product provided variable control of western flower thrips and damaged impatiens flowers. It was ineffective for weeping fig thrips and gladiolus thrips.

TriStar 30SG/70WSP. This product provided variable control of western flower thrips. It was, however, very effective for weeping fig thrips and gladiolus thrips.

V-10433. This active ingredient provided promising efficacy for western flower thrips in 3 trials.

Phytotoxicity

In general, most products did not exhibit damage to the treated crops. However, there were a couple that did cause injury to impatiens: Tolfenpyrad and TriCon. Several products used for bulb dip applications did cause stunting or chlorosis: Celero, Conserve, Tolfenpyrad, Aria, Merit, and Carzol. Please refer to the reports submitted by Drs. Chen and Reding, and Mr. Davis for more details.

Table 129. Summary of Efficacy by Product

Note: Table entries are sorted by product, target thrips species, then crop Latin name. Only those trials received by 4/22/2020 are included in the table below.

PR#	Product (Active Ingredient)	Target	Crop	Production Site	Researcher	State	Year	Application Type	Results
31292	A16901B 45WG (Thiamethoxam + cyantraniliprole)	Western Flower Thrips (Frankliniella occidentalis)	Butterfly Bush (Buddleia davidii) 'Blueberry Cobbler'	Field Container	Villavicencio	LA	2012	Foliar	No to poor control of immatures with 6.7 and 13.4 oz per 100 gal applied 3 times biweekly.
31606	A16901B 45WG (Thiamethoxam + cyantraniliprole)	Western Flower Thrips (Frankliniella occidentalis)	Impatiens, New Guinea (Impatiens hawkeri) 'Super Elfin Red'	Greenhouse	Chen	LA	2012	Foliar	Data not reliable due to low infestation.
30481	A16901B 45WG (Thiamethoxam + cyantraniliprole)	Western Flower Thrips (Frankliniella occidentalis)	Rose (Rosa sp.) 'Belinda's Dream' and 'Caldwell Pink'	Greenhouse	Heinz	TX	2012	Foliar	No significant differences found between treatments including untreated and standards in this trial.
30481	A16901B 45WG (Thiamethoxam + cyantraniliprole)	Western Flower Thrips (Frankliniella occidentalis)	Rose (Rosa sp.) 'Rainbow Knockout'	Greenhouse	Parrella	CA	2010	Foliar	Significantly reduced adults and immatures with 6.7 oz per 100 gal at 4 days after 1st applic; no significant treatment effects after 1st applic due to high population variability.
30307	A16901B 45WG (Thiamethoxam + cyantraniliprole)	Western Flower Thrips (Frankliniella occidentalis)	Marigold (Tagetes sp.) 'Boy O Boy'	Greenhouse	Ludwig	TX	2010	Foliar	Experiment 1: Good control of immatures with 6.7 oz per 100 gal applied 3 times weekly; comparable to Avid and Pylon.
30307	A16901B 45WG (Thiamethoxam + cyantraniliprole)	Western Flower Thrips (Frankliniella occidentalis)	Marigold (Tagetes sp.) T. erecta 'Vanilla'	Greenhouse	Gilrein	NY	2011	Foliar	Excellent control of immatures with 6.7 oz per 100 gal applied weekly; better than Conserve applied weekly.
30307	A16901B 45WG (Thiamethoxam + cyantraniliprole)	Western Flower Thrips (Frankliniella occidentalis)	Marigold (Tagetes sp.) T. erecta 'Vanilla'	Greenhouse	Gilrein	NY	2013	Foliar	Excellent control of immatures with 6.7 and 13.4 oz per 100 gal applied weekly; comparable to Overture.
30307	A16901B 45WG (Thiamethoxam + cyantraniliprole)	Western Flower Thrips (Frankliniella occidentalis)	Marigold (Tagetes sp.) T. patula 'Yellow Bonanza'	Greenhouse	Davis	MI	2012	Foliar	Good to excellent control of immatures with 6.7 and 13.4 oz per 100 gal applied twice biweekly; best treatment.
27979	Acelepryn (Dupont) (Chlorantraniliprole)	Western Flower Thrips (Frankliniella occidentalis)	Cosmos (Cosmos sp.) C. binnatus 'Picotee'	Field In-Ground	Cranshaw	CO	2008	Foliar	Under continuous reinvasion by migrant thrips in this trial, no treatment provided significant control

PR#	Product (Active Ingredient)	Target	Crop	Production Site	Researcher	State	Year	Application Type	Results
26122	Acelepryn (Dupont) (Chlorantraniliprole)	Western Flower Thrips (Frankliniella occidentalis)	Transvaal Daisy (Gerbera sp.) G. jamesonii 'Festival Dark Eye Golden Yellow'	Greenhouse	Canas	OH	2006	Foliar	Mediocre, variable control of nymph populations on leaves at 20 fl oz per 100 gal.
27002	Acelepryn (Dupont) (Chlorantraniliprole)	Western Flower Thrips (Frankliniella occidentalis)	Impatiens, New Guinea (Impatiens hawkeri) I. wallerana 'Super Elfin Cherry'	Greenhouse	Chen	LA	2006	Foliar	Poor control of adults, but good control of immatures (low infestation) with 20 fl oz per 100 gal; almost equal to standard
26113	Acelepryn (Dupont) (Chlorantraniliprole)	Western Flower Thrips (Frankliniella occidentalis)	Purslane (Portulaca sp.)	Greenhouse	Ludwig	TX	2007	Foliar	No efficacy at 20 fl oz per 100 gal
26113	Acelepryn (Dupont) (Chlorantraniliprole)	Western Flower Thrips (Frankliniella occidentalis)	Purslane (Portulaca sp.) P. grandiflora	Greenhouse	Ludwig	TX	2006	Foliar	No significant efficacy 14 DAT at 20 fl oz per 100 gal; trial ended prematurely
26059	Acelepryn (Dupont) (Chlorantraniliprole)	Western Flower Thrips (Frankliniella occidentalis)	Marigold (Tagetes sp.) 'Hero Mix'	Greenhouse	Oetting	GA	2008	Foliar	Significantly reduced immatures on flowers and damage to flowers and foliage at 20 fl oz per 100 gal; inferior to standard
26059	Acelepryn (Dupont) (Chlorantraniliprole)	Western Flower Thrips (Frankliniella occidentalis)	Marigold (Tagetes sp.) 'Jaguar'	Greenhouse	Gilrein	NY	2008	Foliar	Some reduction of adult and immature populations with 20 fl oz per 100 gal.
26059	Acelepryn (Dupont) (Chlorantraniliprole)	Western Flower Thrips (Frankliniella occidentalis)	Marigold (Tagetes sp.) T. patula 'Yellow Boy'	Greenhouse	Davis	MI	2007	Foliar	No control at 20 oz per 100 gal
28243	Acelepryn (Dupont) (Chlorantraniliprole)	Western Flower Thrips (Frankliniella occidentalis)	Vervain (Verbena sp.) 'Lorgo Purple'	Greenhouse	Oetting	GA	2008	Foliar	Significantly reduced immatures on and damage to foliage at 20 fl oz per 100 gal; equal to standard
28046	Acelepryn (Dupont) (Chlorantraniliprole)	Western Flower Thrips (Frankliniella occidentalis)	Zinnia (Zinnia sp.) Z. elegans	Greenhouse	Parrella	CA	2006	Foliar	Low thrips density; no significant difference from untreated check at 20 fl oz per 100 gal
26052	Acelepryn (Dupont) (Chlorantraniliprole)	Gynaikothrips uzeli (Gynaikothrips uzeli)	Weeping Fig (Ficus benjamina)	Greenhouse	Held (MSU)	MS	2006	Foliar	Experiment 2: Ineffective at 0.053 ml per liter.

PR#	Product (Active Ingredient)	Target	Crop	Production Site	Researcher	State	Year	Application Type	Results
26689	Allectus SC (Bifenthrin + Imidacloprid)	Western Flower Thrips (Frankliniella occidentalis)	Transvaal Daisy (Gerbera sp.) G. jamesonii 'Royal'	Greenhouse	Parrella	CA	2006	Foliar	No efficacy at 21.3 oz per 100 gal as assessed by adult populations on yellow sticky cards after plants placed into paper bags.
26709	Allectus SC (Bifenthrin + Imidacloprid)	Gynaikothrips uzeli (Gynaikothrips uzeli)	Weeping Fig (Ficus benjamina)	Greenhouse	Held (MSU)	MS	2006	Foliar	Experiment 2: Excellent efficacy with 1.7 ml per liter.
25561	Allectus SC (Bifenthrin + Imidacloprid)	Gladiolus Thrips (Thrips simplex)	Gladiolus (Gladiolus sp.)	Cold Storage	Davis	MI	2006	Dipped in solution	Excellent efficacy at 21.3 oz per 100 gal.
27835	Aloft SC (Clothianadin + bifenthrin)	Chilli Thrips, Yellow Tea Thrips (Scirtothrips dorsalis)	Rose (Rosa sp.) 'Knockout'	Greenhouse	Ludwig	TX	2008	Foliar	Significantly reduced immature thrips at 5 and 10 oz per 100 gal; higher rate more active
33571	Altus (Flupyradifurone)	Western Flower Thrips (Frankliniella occidentalis)	Marigold (Tagetes sp.) 'Safari Yellow'	Greenhouse	Nansen	CA	2018	Foliar	Overall results showed no significant differences in thrips numbers and plant biomass between treatments including the standard Conserve and Untreated.
33571	Altus (Flupyradifurone)	Western Flower Thrips (Frankliniella occidentalis)	Marigold (Tagetes sp.) 'Yellow Boy'	Greenhouse	Hotchkiss	MI	2018	Foliar	No significant control of immatures with 14 fl oz per 100 gal applied twice biweekly.
26125	Aria 50SG (Flonicamid)	Western Flower Thrips (Frankliniella occidentalis)	Transvaal Daisy (Gerbera sp.)	Greenhouse	Nielsen	OH	2002	Foliar	Poor efficacy with 60 and 120 g per 100 gal; no thrips present with 240 g per 100 gal; no injury at any tested rate.
26125	Aria 50SG (Flonicamid)	Western Flower Thrips (Frankliniella occidentalis)	Transvaal Daisy (Gerbera sp.) G. jamesonii 'Festival Dark Eye Golden Yellow'	Greenhouse	Canas	OH	2006	Foliar	Mediocre, variable control of nymph populations on leaves at 3.7 oz per 100 gal.
26125	Aria 50SG (Flonicamid)	Western Flower Thrips (Frankliniella occidentalis)	Transvaal Daisy (Gerbera sp.) G. jamesonii 'Royal'	Greenhouse	Parrella	CA	2006	Foliar	No efficacy at 120 g per 100 gal as assessed by adult populations on yellow sticky cards after plants placed into paper bags.
26998	Aria 50SG (Flonicamid)	Western Flower Thrips (Frankliniella occidentalis)	Impatiens, New Guinea (Impatiens hawkeri) I. wallerana 'Super Elfin Cherry'	Greenhouse	Chen	LA	2006	Foliar	Great control of a low infestation at 90 g per 100 gal; equal to standard

PR#	Product (Active Ingredient)	Target	Crop	Production Site	Researcher	State	Year	Application Type	Results
26111	Aria 50SG (Flonicamid)	Western Flower Thrips (Frankliniella occidentalis)	Purslane (Portulaca sp.) P. grandiflora	Greenhouse	Ludwig	TX	2006	Foliar	No efficacy at 120 g per 100 gal
29923	Aria 50SG (Flonicamid)	Western Flower Thrips (Frankliniella occidentalis)	Rose (Rosa sp.) 'Rainbow Knockout'	Greenhouse	Parrella	CA	2010	Foliar	Did not significantly reduce adults and immatures with 120 g per 100 gal at 4 days after 1st application; no significant treatment effects after 1st application due to high population variability.
26060	Aria 50SG (Flonicamid)	Western Flower Thrips (Frankliniella occidentalis)	Marigold (Tagetes sp.) 'Boy O Boy'	Greenhouse	Ludwig	TX	2010	Foliar	Experiment 1: Good control of immatures with 120 g per 100 gal applied 3 times biweekly; comparable to Avid and Pylon.
26060	Aria 50SG (Flonicamid)	Western Flower Thrips (Frankliniella occidentalis)	Marigold (Tagetes sp.) T. patula 'Yellow Boy'	Greenhouse	Davis	MI	2010	Foliar	Excellent control of immatures at 120 g per 100 gal applied 3 times biweekly.
26049	Aria 50SG (Flonicamid)	Gynaikothrips uzeli (Gynaikothrips uzeli)	Weeping Fig (Ficus benjamina)	Greenhouse	Held (MSU)	MS	2006	Foliar	Experiment 2: Poor control with 0.317 g per liter.
27755	Aria 50SG (Flonicamid)	Chilli Thrips, Yellow Tea Thrips (Scirtothrips dorsalis)	Rose (Rosa sp.) 'Knockout'	Greenhouse	Ludwig	TX	2007	Foliar	Significantly reduced adult and immature thrips on flowers and terminals at 120 g per 100 gal
27755	Aria 50SG (Flonicamid)	Chilli Thrips, Yellow Tea Thrips (Scirtothrips dorsalis)	Rose (Rosa sp.) 'Knockout'	Greenhouse	Ludwig	TX	2008	Foliar	Significantly reduced immature thrips on terminals at 120 g per 100 gal
25565	Aria 50SG (Flonicamid)	Gladiolus Thrips (Thrips simplex)	Gladiolus (Gladiolus sp.)	Cold Storage	Davis	MI	2006	Dipped in solution	Virtually no efficacy at 100 oz per 100 gal; significant stunting.
31541	Avid 0.15EC (Abamectin)	Western Flower Thrips (Frankliniella occidentalis)	Transvaal Daisy (Gerbera sp.) 'Festival Orange'	Greenhouse	Villavicencio	CA	2013	Foliar	No significant differences between treatments, including untreated check, mainly due to high population variability.
32999	Avid 0.15EC (Abamectin)	Western Flower Thrips (Frankliniella occidentalis)	Mock Vervain, Hybrid (Glandularia X hybrida) 'Quartz Blue'	Greenhouse	Chong	SC	2016	Foliar	No significant differences between treatments due to low and very variable numbers of thrips in this study.

PR#	Product (Active Ingredient)	Target	Crop	Production Site	Researcher	State	Year	Application Type	Results
27719	Avid 0.15EC (Abamectin)	Western Flower Thrips (Frankliniella occidentalis)	Impatiens, New Guinea (Impatiens hawkeri) I. balsamina	Greenhouse	Reding	OH	2007	Foliar	Great control of thrips on leaves and flowers with 8 oz per 100 gal.
30521	Avid 0.15EC (Abamectin)	Western Flower Thrips (Frankliniella occidentalis)	Geranium (Pelargonium sp.)	Greenhouse	Frank	NC	2010	Foliar	Significantly reduced adults and immatures with 16 fl oz per 100 gal applied twice weekly.
26684	Avid 0.15EC (Abamectin)	Western Flower Thrips (Frankliniella occidentalis)	Rose (Rosa sp.) 'Belinda's Dream' and 'Caldwell Pink'	Greenhouse	Heinz	TX	2012	Foliar	No significant differences found between treatments including untreated and standards in this trial.
26684	Avid 0.15EC (Abamectin)	Western Flower Thrips (Frankliniella occidentalis)	Rose (Rosa sp.) 'Rainbow Knockout'	Greenhouse	Parrella	CA	2010	Foliar	Significantly reduced adults and immatures with 16 oz per 100 gal at 4 days after 1st applic; no significant treatment effects after 1st applic due to high population variability.
26684	Avid 0.15EC (Abamectin)	Western Flower Thrips (Frankliniella occidentalis)	Rose (Rosa sp.) 'Red Sunblase'	Greenhouse	Walsh	WA	2006	Foliar	Significantly reduced adult, but not immature thrips at 8 fl oz per 100 gal
27528	Avid 0.15EC (Abamectin)	Western Flower Thrips (Frankliniella occidentalis)	Marigold (Tagetes sp.) 'Safari Bolero'	Greenhouse	Vafaie	TX	2015	Foliar	Excellent control of immatures with 8 fl oz per 100 gal applied weekly.
27528	Avid 0.15EC (Abamectin)	Western Flower Thrips (Frankliniella occidentalis)	Marigold (Tagetes sp.) 'Boy O Boy'	Greenhouse	Ludwig	TX	2010	Foliar	Experiment 1: Good control of immatures with 16 fl oz per 100 gal applied twice weekly.
27528	Avid 0.15EC (Abamectin)	Western Flower Thrips (Frankliniella occidentalis)	Marigold (Tagetes sp.) 'Discovery Yellow'	Greenhouse	Heinz	TX	2013	Foliar	Good control of immatures, mediocre control of adults with 8 fl oz per 100 gal.
27528	Avid 0.15EC (Abamectin)	Western Flower Thrips (Frankliniella occidentalis)	Marigold (Tagetes sp.) 'Safari Yellow'	Greenhouse	Vafaie	TX	2015	Foliar	Excellent control of immatures with 8 fl oz per 100 gal applied twice weekly.
33162	Avid 0.15EC (Abamectin)	Western Flower Thrips (Frankliniella occidentalis)	Marigold (Tagetes sp.) 'Small Bloom Orange'	Field Container	Vafaie	TX	2017	Foliar	No significant reduction of thrips population and damage with 8 oz per 100 gal; data showed no differences between treatments including Check.

PR#	Product (Active Ingredient)	Target	Crop	Production Site	Researcher	State	Year	Application Type	Results
27528	Avid 0.15EC (Abamectin)	Western Flower Thrips (Frankliniella occidentalis)	Marigold (Tagetes sp.) T. patula 'Bonanza Yellow'	Greenhouse	Chong	SC	2010	Foliar	Did not reduce adults and immatures at 16 fl oz per 100 gal applied once.
27528	Avid 0.15EC (Abamectin)	Western Flower Thrips (Frankliniella occidentalis)	Marigold (Tagetes sp.) T. patula 'Yellow Boy'	Greenhouse	Davis	MI	2010	Foliar	Excellent control of immatures at 8 fl oz per 100 gal applied 3 times biweekly.
29541	Avid 0.15EC (Abamectin)	Western Flower Thrips (Frankliniella occidentalis)	Zinnia (Zinnia sp.) 'Zahara Yellow'	Greenhouse	Chen	LA	2009	Foliar	Good control of a low population of immatures at 8 oz per 100 gal. Trial terminated 14 days after 1st application.
25466	Avid 0.15EC (Abamectin)	Gynaikothrips uzeli (Gynaikothrips uzeli)	Weeping Fig (Ficus benjamina)	Greenhouse	Held (MSU)	MS	2005	Foliar	Experiment 2: Poor control with foliar application of 8 fl oz per 100 gal as assessed by counts of infested cuttings.
27751	Avid 0.15EC (Abamectin)	Chilli Thrips, Yellow Tea Thrips (Scirtothrips dorsalis)	Rose (Rosa sp.) 'Knockout'	Greenhouse	Ludwig	TX	2007	Foliar	Significantly reduced immature thrips on flowers and terminals at 8 fl oz per 100 gal
25560	Avid 0.15EC (Abamectin)	Gladiolus Thrips (Thrips simplex)	Gladiolus (Gladiolus sp.)	Cold Storage	Davis	MI	2006	Dipped in solution	Excellent efficacy at 8 oz per 100 gal.
31295	AzaGuard (Azadirachtin)	Western Flower Thrips (Frankliniella occidentalis)	Butterfly Bush (Buddleia davidii) 'Blueberry Cobbler'	Field Container	Villavicencio	LA	2012	Foliar	Significantly reduced immatures with 16 fl oz per 100 gal applied 5 times weekly; comparable to Conserve and Hachi-Hachi.
31610	AzaGuard (Azadirachtin)	Western Flower Thrips (Frankliniella occidentalis)	Impatiens, New Guinea (Impatiens hawkeri) 'Super Elfin Red'	Greenhouse	Chen	LA	2012	Foliar	Significantly reduced number of nymphs with 16 and 32 oz per 100 gal; inferior to Botanigard.
31496	AzaGuard (Azadirachtin)	Western Flower Thrips (Frankliniella occidentalis)	Rose (Rosa sp.) 'Belinda's Dream' and 'Caldwell Pink'	Greenhouse	Heinz	TX	2012	Foliar	No significant differences found between treatments including untreated and standards in this trial.
31430	AzaGuard (Azadirachtin)	Western Flower Thrips (Frankliniella occidentalis)	Marigold (Tagetes sp.) 'Discovery Yellow'	Greenhouse	Heinz	TX	2013	Foliar	Poor control of immatures and adults with 16 fl oz per 100 gal.
31430	AzaGuard (Azadirachtin)	Western Flower Thrips (Frankliniella occidentalis)	Marigold (Tagetes sp.) T. erecta 'Vanilla'	Greenhouse	Gilrein	NY	2013	Foliar	Good control of immatures with 16 fl oz per 100 gal applied weekly; inferior to Overture.

PR#	Product (Active Ingredient)	Target	Crop	Production Site	Researcher	State	Year	Application Type	Results
31430	AzaGuard (Azadirachtin)	Western Flower Thrips (Frankliniella occidentalis)	Marigold (Tagetes sp.) T. patula 'Yellow Bonanza'	Greenhouse	Davis	MI	2012	Foliar	Good control of immatures with 16 fl oz per 100 gal applied 4 times weekly.
31430	AzaGuard (Azadirachtin)	Western Flower Thrips (Frankliniella occidentalis)	Marigold (Tagetes sp.) T. patula 'Yellow Boy'	Greenhouse	Davis	MI	2015	Foliar	Poor control with 26 fl oz per 100 gal applied weekly; comparable to the standard Hachi-Hachi applied biweekly.
31430	AzaGuard (Azadirachtin)	Western Flower Thrips (Frankliniella occidentalis)	Marigold (Tagetes sp.) 'Taishan Yellow'	Greenhouse	Gilrein	NY	2015	Foliar	Moderate control of immatures but poor control adults with 25.8 fl oz per 100 gal applied 5 times weekly.
25468	Azatin XL (Azadirachtin)	Gynaikothrips uzeli (Gynaikothrips uzeli)	Weeping Fig (Ficus benjamina)	Greenhouse	Held (MSU)	MS	2005	Foliar	Experiment 2: Poor control with foliar application of 16 fl oz per 100 gal as assessed by counts of infested cuttings.
25468	Azatin XL (Azadirachtin)	Gynaikothrips uzeli (Gynaikothrips uzeli)	Weeping Fig (Ficus benjamina)	Greenhouse	Held (MSU)	MS	2006	Foliar	Experiment 3: Poor prevention of gall formation using 1.25 ml per liter.
25562	Azatin XL (Azadirachtin)	Gladiolus Thrips (Thrips simplex)	Gladiolus (Gladiolus sp.)	Cold Storage	Davis	MI	2006	Dipped in solution	Good efficacy at 16 oz per 100 gal.
26121	BAS 320i (Metaflumizone)	Western Flower Thrips (Frankliniella occidentalis)	Transvaal Daisy (Gerbera sp.) G. jamesonii 'Festival Dark Eye Golden Yellow'	Greenhouse	Canas	OH	2006	Foliar	Poor control of nymph populations on leaves at 16 fl oz per 100 gal.
26183	BAS 320i (Metaflumizone)	Western Flower Thrips (Frankliniella occidentalis)	Impatiens, New Guinea (Impatiens hawkeri) I. wallerana 'Super Elfin Cherry'	Greenhouse	Chen	LA	2006	Foliar	Poor to good control of a low infestation at 8 and 16 fl oz per 100 gal; inferior to standard.
27365	BAS 320i (Metaflumizone)	Western Flower Thrips (Frankliniella occidentalis)	Petunia (Petunia sp.) 'Dreams Midnight'	Greenhouse	Chen	LA	2006	Foliar	Poor control of a high infestation at 8 and 16 fl oz per 100 gal; positive rate response
26109	BAS 320i (Metaflumizone)	Western Flower Thrips (Frankliniella occidentalis)	Purslane (Portulaca sp.) P. grandiflora	Greenhouse	Ludwig	TX	2006	Foliar	No efficacy at 16 fl oz per 100 gal
27723	BAS 350i (Fipronil)	Western Flower Thrips (Frankliniella occidentalis)	Marigold (Tagetes sp.) T. patula 'Yellow Boy'	Greenhouse	Davis	MI	2007	Foliar	Good control at 1.2 oz per 100 gal; best treatment

PR#	Product (Active Ingredient)	Target	Crop	Production Site	Researcher	State	Year	Application Type	Results
33572	BCS-507 (BCS-507)	Western Flower Thrips (Frankliniella occidentalis)	Marigold (Tagetes sp.)	Greenhouse	Hotchkiss	MI	2019	Foliar	Non-significant control of nymphs and adults with 2.4 and 4.4 oz per 100 gal applied 5 times weekly.
33572	BCS-507 (BCS-507)	Western Flower Thrips (Frankliniella occidentalis)	Marigold (Tagetes sp.) 'Safari Yellow'	Greenhouse	Nansen	CA	2018	Foliar	Overall results showed no significant differences in thrips numbers and plant biomass between treatments including the standard Conserve and Untreated.
33572	BCS-507 (BCS-507)	Western Flower Thrips (Frankliniella occidentalis)	Marigold (Tagetes sp.) 'Yellow Boy'	Greenhouse	Hotchkiss	MI	2018	Foliar	No significant control of immatures with 4.5 and 8.2 oz per 100 gal applied once.
28009	Botanigard 22WP (Beauveria bassiana GHA)	Western Flower Thrips (Frankliniella occidentalis)	Marigold (Tagetes sp.) T. patula 'Yellow Boy'	Greenhouse	Davis	MI	2008	Foliar	Mediocre control after 2nd application at 2 lb per 100 gal; inferior to Conserve and Mesurol.
28009	Botanigard 22WP (Beauveria bassiana GHA)	Western Flower Thrips (Frankliniella occidentalis)	Marigold (Tagetes sp.) T. patula 'Yellow Boy'	Greenhouse	Davis	MI	2010	Foliar	No significant control of immatures at 2 lb per 100 gal applied 5 times weekly.
31607	BotaniGard ES (BioWorks) (Beauveria bassiana Strain GHA)	Western Flower Thrips (Frankliniella occidentalis)	Impatiens, New Guinea (Impatiens hawkeri) 'Super Elfin Red'	Greenhouse	Chen	LA	2012	Foliar	Excellent control of nymphs with 1 lb per 100 gal.
29304	BotaniGard ES (BioWorks) (Beauveria bassiana Strain GHA)	Western Flower Thrips (Frankliniella occidentalis)	Marigold (Tagetes sp.) 'Boy O Boy'	Greenhouse	Ludwig	TX	2010	Foliar	Experiment 2: No significant reduction of immatures with 2 lb per 100 gal applied 5 times weekly.
29304	BotaniGard ES (BioWorks) (Beauveria bassiana Strain GHA)	Western Flower Thrips (Frankliniella occidentalis)	Marigold (Tagetes sp.) T. patula 'Yellow Boy'	Greenhouse	Davis	MI	2009	Foliar	Poor control of immatures at 2 lb per 100 gal.
26710	BotaniGard ES (BioWorks) (Beauveria bassiana Strain GHA)	Gynaikothrips uzeli (Gynaikothrips uzeli)	Weeping Fig (Ficus benjamina)	Greenhouse	Held (MSU)	MS	2006	Foliar	Experiment 1: Ineffective at 5 ml per liter.
27375	BotaniGard ES (Laverlam International) (Beauveria bassiana)	Western Flower Thrips (Frankliniella occidentalis)	Impatiens, New Guinea (Impatiens hawkeri) I. wallerana 'Super Elfin Cherry'	Greenhouse	Chen	LA	2006	Foliar	Experiment 1: Delayed, but excellent control at 21 DAT with single foliar application of 2 qt per gal.

PR#	Product (Active Ingredient)	Target	Crop	Production Site	Researcher	State	Year	Application Type	Results
27375	BotaniGard ES (Laverlam International) (Beauveria bassiana)	Western Flower Thrips (Frankliniella occidentalis)	Impatiens, New Guinea (Impatiens hawkeri) I. wallerana 'Super Elfin Cherry'	Greenhouse	Chen	LA	2006	Foliar + Drench	Experiment 1: Delayed, but excellent control at 14 DAT with foliar application followed by drench at 2 qt per 100 gal foliar; equal to standard; not as good applied foliar + drench
27376	BotaniGard ES (Laverlam International) (Beauveria bassiana)	Western Flower Thrips (Frankliniella occidentalis)	Petunia (Petunia sp.) 'Dreams Midnight'	Greenhouse	Chen	LA	2006	Foliar	Experiment 1: Excellent control of nymphs; good management of adults (low infestation) with foliar application of 2 qt per 100 gal foliar; at least equal to standard.
27376	BotaniGard ES (Laverlam International) (Beauveria bassiana)	Western Flower Thrips (Frankliniella occidentalis)	Petunia (Petunia sp.) 'Dreams Midnight'	Greenhouse	Chen	LA	2006	Foliar	Experiment 2: Excellent control of adults 7 DAT (very low infestation) with foliar application of 1 qt per 100 gal foliar.
27376	BotaniGard ES (Laverlam International) (Beauveria bassiana)	Western Flower Thrips (Frankliniella occidentalis)	Petunia (Petunia sp.) 'Dreams Midnight'	Greenhouse	Chen	LA	2006	Foliar + Drench	Experiment 1: Excellent control of nymphs; mediocre management of adults with combination foliar followed by drench at 2 qt per 100 gal.
27846	Capsil (Blend of polyether-and polymethylsiloxane copolymer and nonionic surfactants)	Gynaikothrips uzeli (Gynaikothrips uzeli)	Weeping Fig (Ficus benjamina)	Greenhouse	Held (MSU)	MS	2006	Foliar	Experiment 1: Ineffective at 0.94 ml per liter. Used as untreated standard.
27846	Capsil (Blend of polyether-and polymethylsiloxane copolymer and nonionic surfactants)	Gynaikothrips uzeli (Gynaikothrips uzeli)	Weeping Fig (Ficus benjamina)	Greenhouse	Held (MSU)	MS	2006	Foliar	Experiment 2: Ineffective at 0.94 ml per lter. Used as untreated standard.
27846	Capsil (Blend of polyether-and polymethylsiloxane copolymer and nonionic surfactants)	Gynaikothrips uzeli (Gynaikothrips uzeli)	Weeping Fig (Ficus benjamina)	Greenhouse	Held (MSU)	MS	2006	Foliar	Experiment 3: Ineffective at 0.94 ml per lter. Used as untreated standard.
26674	Carzol SP (Formetanate hydrochloride)	Gladiolus Thrips (Thrips simplex)	Gladiolus (Gladiolus sp.)	Cold Storage	Davis	MI	2006	Dipped in solution	Good efficacy at 1 lb per 100 gal; significant stunting.

PR#	Product (Active Ingredient)	Target	Crop	Production Site	Researcher	State	Year	Application Type	Results
26124	Celero 16WSG (Clothianidin)	Western Flower Thrips (Frankliniella occidentalis)	Transvaal Daisy (Gerbera sp.) G. jamesonii 'Festival Dark Eye Golden Yellow'	Greenhouse	Canas	OH	2006	Foliar	Mediocre control of nymph populations on leaves at 4 oz per 100 gal.
26124	Celero 16WSG (Clothianidin)	Western Flower Thrips (Frankliniella occidentalis)	Transvaal Daisy (Gerbera sp.) G. jamesonii 'Royal'	Greenhouse	Parrella	CA	2006	Drench	No efficacy at 2 and 4 oz per 100 gal drenched 300 ml per 6" pot as assessed by adult populations on yellow sticky cards after plants placed into paper bags.
26184	Celero 16WSG (Clothianidin)	Western Flower Thrips (Frankliniella occidentalis)	Impatiens, New Guinea (Impatiens hawkeri) I. wallerana 'Super Elfin Cherry'	Greenhouse	Chen	LA	2006	Drench	Good initial control of a low infestation at 2 and 4 oz per 100 gal; equal to standard.
27366	Celero 16WSG (Clothianidin)	Western Flower Thrips (Frankliniella occidentalis)	Petunia (Petunia sp.) 'Dreams Midnight'	Greenhouse	Chen	LA	2006	Drench	Good control of a high infestation at 2 and 4 oz per 100 gal; better than standard
26112	Celero 16WSG (Clothianidin)	Western Flower Thrips (Frankliniella occidentalis)	Purslane (Portulaca sp.)	Greenhouse	Ludwig	TX	2007	Drench	No efficacy at 2 and 4 oz per 100 gal
26112	Celero 16WSG (Clothianidin)	Western Flower Thrips (Frankliniella occidentalis)	Purslane (Portulaca sp.) P. grandiflora	Greenhouse	Ludwig	TX	2006	Drench	Great efficacy on nymphs 14 DAT at 4 oz per 100 gal; trial ended prematurely
26042	Celero 16WSG (Clothianidin)	Western Flower Thrips (Frankliniella occidentalis)	Rose (Rosa sp.) 'Red Sunblase'	Greenhouse	Walsh	WA	2006	Foliar	Significantly reduced adult and immature thrips at 2 and 4 oz per 100 gal
25472	Celero 16WSG (Clothianidin)	Gynaikothrips uzeli (Gynaikothrips uzeli)	Weeping Fig (Ficus benjamina)	Greenhouse	Held (MSU)	MS	2005	Drench	Experiment 3: Poor control with foliar application of 4 fl oz per 100 gal as assessed by counts of infested cuttings.
25472	Celero 16WSG (Clothianidin)	Gynaikothrips uzeli (Gynaikothrips uzeli)	Weeping Fig (Ficus benjamina)	Greenhouse	Held (MSU)	MS	2005	Foliar	Experiment 3: Good initial control with foliar application of 4 fl oz per 100 gal as assessed by counts of infested cuttings.
25550	Celero 16WSG (Clothianidin)	Gladiolus Thrips (Thrips simplex)	Gladiolus (Gladiolus sp.)	Cold Storage	Davis	MI	2006	Dipped in solution	Excellent efficacy at 4 oz per 100 gal; significant stunting.
28761	Conserve SC (Spinosad)	Privet Thrips (Dendrothrips ornatus)	New Mexico Privet, Desert Olive (Forestiera neomexicana)	Field In-Ground	Cranshaw	CO	2008	Foliar	Trial was sprinkler irrigated 3 hours after treatment. Good control at 11 fl oz per 100 gal

PR#	Product (Active Ingredient)	Target	Crop	Production Site	Researcher	State	Year	Application Type	Results
31297	Conserve SC (Spinosad)	Western Flower Thrips (Frankliniella occidentalis)	Butterfly Bush (Buddleia davidii) 'Blueberry Cobbler'	Field Container	Villavicencio	CA	2012	Foliar	Significantly reduced immatures with 8 fl oz per 100 gal applied 3 times biweekly.
28758	Conserve SC (Spinosad)	Western Flower Thrips (Frankliniella occidentalis)	Cosmos (Cosmos sp.) C. binnatus 'Picotee'	Field In-Ground	Cranshaw	CO	2008	Foliar	Under continuous reinvasion by migrant thrips in this trial, no treatment provided significant control
26128	Conserve SC (Spinosad)	Western Flower Thrips (Frankliniella occidentalis)	Transvaal Daisy (Gerbera sp.) 'Festival Orange'	Greenhouse	Villavicencio	CA	2013	Foliar	No significant differences between treatments, including untreated check, mainly due to high population variability.
26128	Conserve SC (Spinosad)	Western Flower Thrips (Frankliniella occidentalis)	Transvaal Daisy (Gerbera sp.) G. jamesonii 'Festival Dark Eye Golden Yellow'	Greenhouse	Canas	OH	2006	Foliar	Excellent control of nymph populations on leaves at 8 fl oz per 100 gal.
26128	Conserve SC (Spinosad)	Western Flower Thrips (Frankliniella occidentalis)	Transvaal Daisy (Gerbera sp.) G. jamesonii 'Festival Dark Eye Golden Yellow'	Greenhouse	Canas	OH	2007	Foliar	Excellent control of nymphs and adults at 8 fl oz per 100 gal.
26128	Conserve SC (Spinosad)	Western Flower Thrips (Frankliniella occidentalis)	Transvaal Daisy (Gerbera sp.) G. jamesonii 'Royal'	Greenhouse	Parrella	CA	2006	Foliar	No to good efficacy at 11 fl oz per 100 gal as assessed by adult populations on yellow sticky cards after plants placed into paper bags.
26128	Conserve SC (Spinosad)	Western Flower Thrips (Frankliniella occidentalis)	Transvaal Daisy (Gerbera sp.) G. jamesonii 'Royal'	Greenhouse	Parrella	CA	2006	Foliar	Poor efficacy at 11 fl oz per 100 gal as assessed by adult populations on yellow sticky cards after plants placed into paper bags.
27428	Conserve SC (Spinosad)	Western Flower Thrips (Frankliniella occidentalis)	Impatiens, New Guinea (Impatiens hawkeri) I. wallerana 'Super Elfin Cherry'	Greenhouse	Chen	LA	2006	Foliar	Experiment 1: Good control at 6 fl oz per 100 gal
27428	Conserve SC (Spinosad)	Western Flower Thrips (Frankliniella occidentalis)	Impatiens, New Guinea (Impatiens hawkeri) I. wallerana 'Super Elfin Cherry'	Greenhouse	Chen	LA	2006	Foliar	Experiment 2: Good control of a low infestation at 6 fl oz per 100 gal
27428	Conserve SC (Spinosad)	Western Flower Thrips (Frankliniella occidentalis)	Impatiens, New Guinea (Impatiens hawkeri) I. wallerana 'Super Elfin Cherry'	Greenhouse	Chen	LA	2006	Foliar	Experiment 3: Good control of a low infestation at 6 fl oz per 100 gal

PR#	Product (Active Ingredient)	Target	Crop	Production Site	Researcher	State	Year	Application Type	Results
27428	Conserve SC (Spinosad)	Western Flower Thrips (Frankliniella occidentalis)	Impatiens, New Guinea (Impatiens hawkeri) I. wallerana 'Super Elfin Cherry'	Greenhouse	Chen	LA	2006	Foliar	Experiment 4: Good control at 6 fl oz per 100 gal
30522	Conserve SC (Spinosad)	Western Flower Thrips (Frankliniella occidentalis)	Geranium (Pelargonium sp.)	Greenhouse	Frank	NC	2010	Foliar	Significantly reduced adults and immatures with 8 fl oz per 100 gal applied 3 times biweekly.
27429	Conserve SC (Spinosad)	Western Flower Thrips (Frankliniella occidentalis)	Petunia (Petunia sp.) 'Dreams Midnight'	Greenhouse	Chen	LA	2006	Foliar	Experiment 1: Inconsistent control of a low infestation at 6 oz per 100 gal.
27429	Conserve SC (Spinosad)	Western Flower Thrips (Frankliniella occidentalis)	Petunia (Petunia sp.) 'Dreams Midnight'	Greenhouse	Chen	LA	2006	Foliar	Experiment 2: Excellent control at 7 DAT of a low infestation at 6 oz per 100 gal.
27429	Conserve SC (Spinosad)	Western Flower Thrips (Frankliniella occidentalis)	Petunia (Petunia sp.) 'Dreams Midnight'	Greenhouse	Chen	LA	2006	Foliar	Experiment 3: Poor control of a high infestation at 6 fl oz per 100 gal
27527	Conserve SC (Spinosad)	Western Flower Thrips (Frankliniella occidentalis)	Purslane (Portulaca sp.)	Greenhouse	Ludwig	TX	2007	Foliar	Virually no efficacy at 11 fl oz per 100 gal
27527	Conserve SC (Spinosad)	Western Flower Thrips (Frankliniella occidentalis)	Purslane (Portulaca sp.) P. grandiflora	Greenhouse	Ludwig	TX	2006	Foliar	Good control of nymphs 14DAT at 11 oz per 100 gal.
26685	Conserve SC (Spinosad)	Western Flower Thrips (Frankliniella occidentalis)	Rose (Rosa sp.) 'Belinda's Dream' and 'Caldwell Pink'	Greenhouse	Heinz	TX	2012	Foliar	No significant differences found between treatments including untreated and standards in this trial.
26685	Conserve SC (Spinosad)	Western Flower Thrips (Frankliniella occidentalis)	Rose (Rosa sp.) 'Rainbow Knockout'	Greenhouse	Parrella	CA	2010	Foliar	Did not significantly reduce adults and immatures with 8 fl oz per 100 gal at 4 days after 1st application; no significant treatment effects after 1st applic due to high population variability.
26685	Conserve SC (Spinosad)	Western Flower Thrips (Frankliniella occidentalis)	Rose (Rosa sp.) 'Red Sunblase'	Greenhouse	Walsh	WA	2006	Foliar	Significantly reduced adult and immature thrips at 11 fl oz per 100 gal

PR#	Product (Active Ingredient)	Target	Crop	Production Site	Researcher	State	Year	Application Type	Results
27529	Conserve SC (Spinosad)	Western Flower Thrips (Frankliniella occidentalis)	Marigold (Tagetes sp.) 'Boy O Boy'	Greenhouse	Ludwig	TX	2010	Foliar	Experiment 1: No control of immatures with 8 fl oz per 100 gal applied 3 times biweekly.
27529	Conserve SC (Spinosad)	Western Flower Thrips (Frankliniella occidentalis)	Marigold (Tagetes sp.) 'Discovery Yellow'	Greenhouse	Heinz	TX	2013	Foliar	Excellent control of immatures, good control of adults with 8 fl oz per 100 gal; best treatment.
27529	Conserve SC (Spinosad)	Western Flower Thrips (Frankliniella occidentalis)	Marigold (Tagetes sp.) 'Hero Mix'	Greenhouse	Oetting	GA	2008	Foliar	Standard treatment; significantly reduced immatures on flowers and damage to flowers and foliage at 8 fl oz per 100 gal
27529	Conserve SC (Spinosad)	Western Flower Thrips (Frankliniella occidentalis)	Marigold (Tagetes sp.) 'Jaguar'	Greenhouse	Gilrein	NY	2008	Foliar	Good to excellent control throughout trial using 6 fl oz per 100 gal.
27529	Conserve SC (Spinosad)	Western Flower Thrips (Frankliniella occidentalis)	Marigold (Tagetes sp.) 'Safari Yellow'	Greenhouse	Nansen	CA	2017	Foliar	Standard treatment. Excellent control of immatures with 8 fl oz per 100 gal + Capsil sprayed 3 times biweekly.
27529	Conserve SC (Spinosad)	Western Flower Thrips (Frankliniella occidentalis)	Marigold (Tagetes sp.) T. erecta 'Discovery Yellow'	Greenhouse	Heinz	TX	2014	Foliar	Good control of immatures with 8 fl oz per 100 gal applied 3 times.
27529	Conserve SC (Spinosad)	Western Flower Thrips (Frankliniella occidentalis)	Marigold (Tagetes sp.) T. erecta 'Vanilla'	Greenhouse	Gilrein	NY	2011	Foliar	Poor control of immatures with 6 fl oz per 100 gal applied weekly.
27529	Conserve SC (Spinosad)	Western Flower Thrips (Frankliniella occidentalis)	Marigold (Tagetes sp.) T. patula 'Yellow Boy'	Greenhouse	Davis	MI	2007	Foliar	Fair control at 6 oz per 100 gal
27529	Conserve SC (Spinosad)	Western Flower Thrips (Frankliniella occidentalis)	Marigold (Tagetes sp.) T. patula 'Yellow Boy'	Greenhouse	Davis	MI	2008	Foliar	Good control at 11 fl oz per 100 gal.
27529	Conserve SC (Spinosad)	Western Flower Thrips (Frankliniella occidentalis)	Marigold (Tagetes sp.) 'Yellow Boy'	Greenhouse	Davis	MI	2009	Foliar	Good control of immatures at 11 fl oz per 100 gal.
28237	Conserve SC (Spinosad)	Western Flower Thrips (Frankliniella occidentalis)	Vervain (Verbena sp.) 'Lorgo Purple'	Greenhouse	Oetting	GA	2008	Foliar	Standard treatment; significantly reduced immatures on and damage to foliage at 8 fl oz per 100 gal

PR#	Product (Active Ingredient)	Target	Crop	Production Site	Researcher	State	Year	Application Type	Results
28053	Conserve SC (Spinosad)	Western Flower Thrips (Frankliniella occidentalis)	Zinnia (Zinnia sp.) 'Sunny Time'	Greenhouse	Parrella	CA	2008	Foliar	Poor control; thrips population may be resistant to Conserve.
28053	Conserve SC (Spinosad)	Western Flower Thrips (Frankliniella occidentalis)	Zinnia (Zinnia sp.) Z. elegans 'Short Stuff'	Greenhouse	Parrella	CA	2007	Foliar	Low thrips density; no significant difference from untreated check at 11 fl oz per 100 gal
28053	Conserve SC (Spinosad)	Western Flower Thrips (Frankliniella occidentalis)	Zinnia (Zinnia sp.) Z. elegans 'Short Stuff'	Greenhouse	Parrella	CA	2008	Foliar	Did not significantly reduce number of thrips at 11 fl oz per 100 gal.
25041	Conserve SC (Spinosad)	Gynaikothrips uzeli (Gynaikothrips uzeli)	Weeping Fig (Ficus benjamina)	Greenhouse	Held (MSU)	MS	2005	Foliar	Experiment 2: Poor control with foliar application of 300 ml per 100 gal as assessed by counts of infested cuttings.
33535	Conserve SC (Spinosad)	Chilli Thrips, Yellow Tea Thrips (Scirtothrips dorsalis)	Indian Hawthorn (Rhaphiolepis indica)	Greenhouse	Dale	FL	2017	Foliar	No significant differences in damaged leaves between treatments, including untreated check. A heavy aphid infestation and sooty molds might have affected results.
27752	Conserve SC (Spinosad)	Chilli Thrips, Yellow Tea Thrips (Scirtothrips dorsalis)	Rose (Rosa sp.) 'Knockout'	Greenhouse	Ludwig	TX	2007	Foliar	Experiment 1: Significantly reduced immature thrips on on flowers and terminals at 6 fl oz per 100 gal
27752	Conserve SC (Spinosad)	Chilli Thrips, Yellow Tea Thrips (Scirtothrips dorsalis)	Rose (Rosa sp.) 'Knockout'	Greenhouse	Ludwig	TX	2007	Foliar	Experiment 2: Significantly reduced adult and immature thrips on flowers and terminals at 6 oz per 100 gal
27752	Conserve SC (Spinosad)	Chilli Thrips, Yellow Tea Thrips (Scirtothrips dorsalis)	Rose (Rosa sp.) 'Knockout'	Greenhouse	Ludwig	TX	2008	Foliar	Significantly reduced immature thrips on terminals at 7 oz per 100 gal
25688	Conserve SC (Spinosad)	Gladiolus Thrips (Thrips simplex)	Gladiolus (Gladiolus sp.)	Cold Storage	Davis	MI	2006	Dipped in solution	Excellent efficacy at 11 oz per 100 gal; significant stunting.
25568	Diazinon 50W (Diazinon)	Gladiolus Thrips (Thrips simplex)	Gladiolus (Gladiolus sp.)	Cold Storage	Davis	MI	2006	Dipped in solution	Diazinon 4E at 3 pt per 100 gal - excellent efficacy.
30588	Dimethoate 4EC (Drexel) (Dimethoate)	Orchid Thrips (Chaetanaphothrips orchidii)	Flamingo Lily, Painters Palette (Anthurium andraeanum) A. andreanum	Shadehouse/ Lath House	Hara	HI	1984	Foliar	Excellent efficacy with repeat sprays of 0.5 lb ai per 100 gal.

PR#	Product (Active Ingredient)	Target	Crop	Production Site	Researcher	State	Year	Application Type	Results
30588	Dimethoate 4EC (Drexel) (Dimethoate)	Orchid Thrips (Chaetanaphothrips orchidii)	Flamingo Lily, Painters Palette (Anthurium andraeanum) A. andreanum 'Ozaki'	Shadehouse/ Lath House	Hara	HI	1983	Foliar	About a 50% reduction in thrips injury on flowers using 0.5 lb ai per 100 gal with curative applications.
25464	Discus (Imidacloprid + cyfluthrin)	Gynaikothrips uzeli (Gynaikothrips uzeli)	Weeping Fig (Ficus benjamina)	Greenhouse	Held (MSU)	MS	2005	Drench	Experiment 1: Poor control with drench of 11.2 ml/700 ml as assessed by counts on infested cuttings.
25464	Discus (Imidacloprid + cyfluthrin)	Gynaikothrips uzeli (Gynaikothrips uzeli)	Weeping Fig (Ficus benjamina)	Greenhouse	Held (MSU)	MS	2005	Foliar	Experiment 1: Excellent initial control with foliar spray of 1.95 ml per liter as assessed by counts on infested cuttings.
25691	Discus (Imidacloprid + cyfluthrin)	Gladiolus Thrips (Thrips simplex)	Gladiolus (Gladiolus sp.)	Cold Storage	Davis	MI	2006	Dipped in solution	Excellent efficacy at 25 oz per 100 gal.
26114	DPX-HGW86 (Cyantraniliprole)	Western Flower Thrips (Frankliniella occidentalis)	Purslane (Portulaca sp.)	Greenhouse	Ludwig	TX	2007	Foliar	At 1.7 fl oz per 100 gal, population decreased after the 2nd application and stayed low throughout duration of trial
26114	DPX-HGW86 (Cyantraniliprole)	Western Flower Thrips (Frankliniella occidentalis)	Purslane (Portulaca sp.) P. grandiflora	Greenhouse	Ludwig	TX	2006	Foliar	Excellent and good efficacy 14 DAT at 40 fl oz per 100 gal with and w/o surfactant; trial ended prematurely
29973	DPX-HGW86 (Cyantraniliprole)	Western Flower Thrips (Frankliniella occidentalis)	Marigold (Tagetes sp.) T. patula 'Yellow Boy'	Greenhouse	Davis	MI	2009	Foliar	Excellent control of immatures at 6 fl oz per 100 gal applied 2 times; best treatment, better than Conserve applied 4 times.
25470	Dursban 50 W (Chlorpyrifos)	Gynaikothrips uzeli (Gynaikothrips uzeli)	Weeping Fig (Ficus benjamina)	Greenhouse	Held (MSU)	MS	2005	Foliar	Experiment 3: Poor control with foliar application of 16 oz per 100 gal as assessed by counts of infested cuttings.
28760	EcoTrol (Rosemary Oil)	Privet Thrips (Dendrothrips ornatus)	New Mexico Privet, Desert Olive (Forestiera neomexicana)	Field In-Ground	Cranshaw	CO	2008	Foliar	Trial was sprinkler irrigated 3 hours after treatment. Poor control at 4 pt per 100 gal
28757	EcoTrol (Rosemary Oil)	Western Flower Thrips (Frankliniella occidentalis)	Cosmos (Cosmos sp.) C. binnatus 'Picotee'	Field In-Ground	Cranshaw	CO	2008	Foliar	Under continuous reinvasion by migrant thrips in this trial, no treatment provided significant control
28766	Flagship 25WG (Thiamethoxam)	Privet Thrips (Dendrothrips ornatus)	New Mexico Privet, Desert Olive (Forestiera neomexicana)	Field In-Ground	Cranshaw	CO	2008	Foliar	Trial was sprinkler irrigated 3 hours after treatment. Mediocre control at 8 oz per 100 gal; equal to Conserve

PR#	Product (Active Ingredient)	Target	Crop	Production Site	Researcher	State	Year	Application Type	Results
27981	Flagship 25WG (Thiamethoxam)	Western Flower Thrips (Frankliniella occidentalis)	Cosmos (Cosmos sp.) C. binnatus 'Picotee'	Field In-Ground	Cranshaw	CO	2008	Foliar	Under continuous reinvasion by migrant thrips in this trial, no treatment provided significant control
26055	Flagship 25WG (Thiamethoxam)	Western Flower Thrips (Frankliniella occidentalis)	Transvaal Daisy (Gerbera sp.) G. jamesonii 'Royal'	Greenhouse	Parrella	CA	2006	Foliar	No efficacy at 12 oz per 100 gal drenched 300 ml per 6" pot as assessed by adult populations on yellow sticky cards after plants placed into paper bags.
26055	Flagship 25WG (Thiamethoxam)	Western Flower Thrips (Frankliniella occidentalis)	Transvaal Daisy (Gerbera sp.) G. jamesonii 'Royal'	Greenhouse	Parrella	CA	2006	Foliar	No efficacy at 4 oz per 100 gal as assessed by adult populations on yellow sticky cards after plants placed into paper bags.
26821	Flagship 25WG (Thiamethoxam)	Western Flower Thrips (Frankliniella occidentalis)	Impatiens, New Guinea (Impatiens hawkeri) I. balsamina	Greenhouse	Reding	OH	2007	Drench	Significantly reduced thrips (adults and nymphs) at 8 oz per 100 gal; did not reduce Impatiens Necrotic Spot Virus infection
26821	Flagship 25WG (Thiamethoxam)	Western Flower Thrips (Frankliniella occidentalis)	Impatiens, New Guinea (Impatiens hawkeri) I. balsamina	Greenhouse	Reding	OH	2007	Foliar	Significantly reduced thrips (adults and nymphs) at 8 oz per 100 gal; did not reduce Impatiens Necrotic Spot Virus infection
26821	Flagship 25WG (Thiamethoxam)	Western Flower Thrips (Frankliniella occidentalis)	Impatiens, New Guinea (Impatiens hawkeri) I. wallerana 'Super Elfin Cherry'	Greenhouse	Chen	LA	2006	Drench	Poor control as a drench at 8 oz per 100 gal with 1.5 oz solution per 4 inch pot.
26821	Flagship 25WG (Thiamethoxam)	Western Flower Thrips (Frankliniella occidentalis)	Impatiens, New Guinea (Impatiens hawkeri) I. wallerana 'Super Elfin Cherry'	Greenhouse	Chen	LA	2006	Foliar	Good control at 8 oz per 100 gal applied foliar.
30523	Flagship 25WG (Thiamethoxam)	Western Flower Thrips (Frankliniella occidentalis)	Geranium (Pelargonium sp.)	Greenhouse	Frank	NC	2010	Foliar	Significantly reduced adults and immatures with 8 oz per 100 gal applied twice weekly.
26115	Flagship 25WG (Thiamethoxam)	Western Flower Thrips (Frankliniella occidentalis)	Purslane (Portulaca sp.)	Greenhouse	Ludwig	TX	2007	Drench	Virtually no efficacy at 4 oz per 100 gal
26115	Flagship 25WG (Thiamethoxam)	Western Flower Thrips (Frankliniella occidentalis)	Purslane (Portulaca sp.)	Greenhouse	Ludwig	TX	2007	Foliar	Virtually no efficacy at 4 oz per 100 gal

PR#	Product (Active Ingredient)	Target	Crop	Production Site	Researcher	State	Year	Application Type	Results
26115	Flagship 25WG (Thiamethoxam)	Western Flower Thrips (Frankliniella occidentalis)	Purslane (Portulaca sp.) P. grandiflora	Greenhouse	Ludwig	TX	2006	Drench	Excellent efficacy on nymphs 14 DAT at 4 oz per 100 gal; trial ended prematurely
26115	Flagship 25WG (Thiamethoxam)	Western Flower Thrips (Frankliniella occidentalis)	Purslane (Portulaca sp.) P. grandiflora	Greenhouse	Ludwig	TX	2006	Foliar	Excellent efficacy on nymphs 14 DAT at 4 oz per 100 gal; trial ended prematurely
26043	Flagship 25WG (Thiamethoxam)	Western Flower Thrips (Frankliniella occidentalis)	Rose (Rosa sp.) 'Red Sunblase'	Greenhouse	Walsh	WA	2006	Drench	Significantly reduced adult and immature thrips at 4 oz per 100 gal; drench application better on immatures
26043	Flagship 25WG (Thiamethoxam)	Western Flower Thrips (Frankliniella occidentalis)	Rose (Rosa sp.) 'Red Sunblase'	Greenhouse	Walsh	WA	2006	Foliar or Drench	Significantly reduced adult and immature thrips at 4 oz per 100 gal; drench application better on immatures
28011	Flagship 25WG (Thiamethoxam)	Western Flower Thrips (Frankliniella occidentalis)	Marigold (Tagetes sp.) 'Hero Mix'	Greenhouse	Oetting	GA	2008	Foliar	Significantly reduced immatures on flowers and damage to flowers and foliage at 8 oz per 100 gal; inferior to standard
28011	Flagship 25WG (Thiamethoxam)	Western Flower Thrips (Frankliniella occidentalis)	Marigold (Tagetes sp.) T. patula 'Bonanza Yellow'	Greenhouse	Chong	SC	2010	Foliar	Did not reduce adults and immatures at 8 oz per 100 gal applied twice at 14-day intervals.
28238	Flagship 25WG (Thiamethoxam)	Western Flower Thrips (Frankliniella occidentalis)	Vervain (Verbena sp.) 'Lorgo Purple'	Greenhouse	Oetting	GA	2008	Foliar	Significantly reduced immatures on and damage to foliage at 8 oz per 100 gal; equal to standard
28049	Flagship 25WG (Thiamethoxam)	Western Flower Thrips (Frankliniella occidentalis)	Zinnia (Zinnia sp.) Z. elegans 'Short Stuff'	Greenhouse	Parrella	CA	2007	Foliar	Low thrips density; no significant difference from untreated check at 8 oz per 100 gal
28049	Flagship 25WG (Thiamethoxam)	Western Flower Thrips (Frankliniella occidentalis)	Zinnia (Zinnia sp.) Z. elegans 'Short Stuff'	Greenhouse	Parrella	CA	2008	Drench	Did not significantly reduce number of thrips at 8 oz per 100 gal.
28049	Flagship 25WG (Thiamethoxam)	Western Flower Thrips (Frankliniella occidentalis)	Zinnia (Zinnia sp.) Z. elegans 'Short Stuff'	Greenhouse	Parrella	CA	2008	Foliar	Did not significantly reduce number of thrips at 8 oz per 100 gal.
25038	Flagship 25WG (Thiamethoxam)	Gynaikothrips uzeli (Gynaikothrips uzeli)	Weeping Fig (Ficus benjamina)	Greenhouse	Held (MSU)	MS	2005	Drench	Experiment 1: Poor control with drench of 0.3 g per liter as assessed by counts on infested cuttings.

PR#	Product (Active Ingredient)	Target	Crop	Production Site	Researcher	State	Year	Application Type	Results
25038	Flagship 25WG (Thiamethoxam)	Gynaikothrips uzeli (Gynaikothrips uzeli)	Weeping Fig (Ficus benjamina)	Greenhouse	Held (MSU)	MS	2005	Foliar	Experiment 1: Good initial control with foliar application of 0.25 g per liter as assessed by counts on infested cuttings.
25038	Flagship 25WG (Thiamethoxam)	Gynaikothrips uzeli (Gynaikothrips uzeli)	Weeping Fig (Ficus benjamina)	Greenhouse	Held (MSU)	MS	2005	Foliar	Experiment 1: Good mortality initially with foliar spray of 1.8 g per liter as assessed by counts on infested cuttings.
26677	Flagship 25WG (Thiamethoxam)	Chilli Thrips, Yellow Tea Thrips (Scirtothrips dorsalis)	Rose (Rosa sp.) 'Knockout'	Greenhouse	Ludwig	TX	2007	Drench	Did not significantly reduce adult and immature thrips with drench at 6 oz per 100 gal
26677	Flagship 25WG (Thiamethoxam)	Chilli Thrips, Yellow Tea Thrips (Scirtothrips dorsalis)	Rose (Rosa sp.) 'Knockout'	Greenhouse	Ludwig	TX	2007	Foliar	Significantly reduced adult and immature thrips on flowers and terminals with foliar applications at 8 oz per 100 gal
26677	Flagship 25WG (Thiamethoxam)	Chilli Thrips, Yellow Tea Thrips (Scirtothrips dorsalis)	Rose (Rosa sp.) 'Knockout'	Greenhouse	Ludwig	TX	2008	Foliar	Significantly reduced immature thrips on terminals at 8 oz per 100 gal
25551	Flagship 25WG (Thiamethoxam)	Gladiolus Thrips (Thrips simplex)	Gladiolus (Gladiolus sp.)	Cold Storage	Davis	MI	2006	Dipped in solution	Excellent efficacy at 2 oz per 100 gal.
31293	Grandevo (MBI 203 DF) (Chromobacterium subtsugae NRRL B-30655)	Western Flower Thrips (Frankliniella occidentalis)	Butterfly Bush (Buddleia davidii) 'Blueberry Cobbler'	Field Container	Villavicencio	LA	2012	Foliar	Significantly reduced immatures only with the higher rate (4 lb per 100 gal) applied 5 times weekly; comparable to Conserve and Hachi-Hachi.
31537	Grandevo (MBI 203 DF) (Chromobacterium subtsugae NRRL B-30655)	Western Flower Thrips (Frankliniella occidentalis)	Transvaal Daisy (Gerbera sp.) 'Festival Orange'	Greenhouse	Villavicencio	CA	2013	Foliar	No significant differences between treatments, including untreated check, mainly due to high population variability.
31608	Grandevo (MBI 203 DF) (Chromobacterium subtsugae NRRL B-30655)	Western Flower Thrips (Frankliniella occidentalis)	Impatiens, New Guinea (Impatiens hawkeri) 'Super Elfin Red'	Greenhouse	Chen	LA	2012	Foliar	Significantly reduced number of nymphs with 2 and 4 lb per 100 gal; inferior to Botanigard.
31498	Grandevo (MBI 203 DF) (Chromobacterium subtsugae NRRL B-30655)	Western Flower Thrips (Frankliniella occidentalis)	Rose (Rosa sp.) 'Belinda's Dream' and 'Caldwell Pink'	Greenhouse	Heinz	TX	2012	Foliar	No significant differences found between treatments including untreated and standards in this trial.

PR#	Product (Active Ingredient)	Target	Crop	Production Site	Researcher	State	Year	Application Type	Results
31431	Grandevo (MBI 203 DF) (Chromobacterium subtsugae NRRL B-30655)	Western Flower Thrips (Frankliniella occidentalis)	Marigold (Tagetes sp.) 'Discovery Yellow'	Greenhouse	Heinz	TX	2013	Foliar	Poor control of immatures and adults with 3 and 4 lb per 100 gal.
31431	Grandevo (MBI 203 DF) (Chromobacterium subtsugae NRRL B-30655)	Western Flower Thrips (Frankliniella occidentalis)	Marigold (Tagetes sp.) 'Safari Yellow'	Greenhouse	Vafaie	TX	2015	Foliar	Poor control of immatures with 3 lb per 100 gal + Preference applied 5 times weekly.
31431	Grandevo (MBI 203 DF) (Chromobacterium subtsugae NRRL B-30655)	Western Flower Thrips (Frankliniella occidentalis)	Marigold (Tagetes sp.) T. erecta 'Vanilla'	Greenhouse	Gilrein	NY	2013	Foliar	Did not significantly reduce immatures with 3 and 4 lb per 100 gal applied weekly.
31431	Grandevo (MBI 203 DF) (Chromobacterium subtsugae NRRL B-30655)	Western Flower Thrips (Frankliniella occidentalis)	Marigold (Tagetes sp.) T. patula 'Yellow Bonanza'	Greenhouse	Davis	MI	2012	Foliar	No control of immature or adult populations with 2 and 4 lb per 100 gal applied 4 times weekly.
28768	Hachi-Hachi EC (Tolfenpyrad)	Privet Thrips (Dendrothrips ornatus)	New Mexico Privet, Desert Olive (Forestiera neomexicana)	Field In-Ground	Cranshaw	CO	2008	Foliar	Trial was sprinkler irrigated 3 hours after treatment. Good control at 21 fl oz per 100 gal; equal to Conserve
31298	Hachi-Hachi EC (Tolfenpyrad)	Western Flower Thrips (Frankliniella occidentalis)	Butterfly Bush (Buddleia davidii) 'Blueberry Cobbler'	Field Container	Villavicencio	CA	2012	Foliar	Significantly reduced immatures with 21 fl oz per 100 gal applied 3 times biweekly.
27983	Hachi-Hachi EC (Tolfenpyrad)	Western Flower Thrips (Frankliniella occidentalis)	Cosmos (Cosmos sp.) C. binnatus 'Picotee'	Field In-Ground	Cranshaw	CO	2008	Foliar	Under continuous reinvasion by migrant thrips in this trial, no treatment provided significant control
26130	Hachi-Hachi EC (Tolfenpyrad)	Western Flower Thrips (Frankliniella occidentalis)	Transvaal Daisy (Gerbera sp.) G. jamesonii 'Festival Dark Eye Golden Yellow'	Greenhouse	Canas	OH	2006	Foliar	Good initial control of nymph populations on leaves at 21 oz per 100 gal.
26130	Hachi-Hachi EC (Tolfenpyrad)	Western Flower Thrips (Frankliniella occidentalis)	Transvaal Daisy (Gerbera sp.) G. jamesonii 'Royal'	Greenhouse	Parrella	CA	2006	Foliar	Delayed excellent efficacy at 14 and 21 oz per 100 gal as assessed by adult populations on yellow sticky cards after plants placed into paper bags.

PR#	Product (Active Ingredient)	Target	Crop	Production Site	Researcher	State	Year	Application Type	Results
26185	Hachi-Hachi EC (Tolfenpyrad)	Western Flower Thrips (Frankliniella occidentalis)	Impatiens, New Guinea (Impatiens hawkeri) I. balsamina	Greenhouse	Reding	OH	2007	Foliar	Significantly reduced thrips (adults and nymphs) but caused high injury at 14 and 21 fl oz per 100 gal; higher Impatiens Necrotic Spot Virus infection vs. Untreated
26185	Hachi-Hachi EC (Tolfenpyrad)	Western Flower Thrips (Frankliniella occidentalis)	Impatiens, New Guinea (Impatiens hawkeri) I. wallerana 'Super Elfin Cherry'	Greenhouse	Chen	LA	2006	Foliar	Inconsistent control of a low infestation at 14 and 21 fl oz per 100 gal; inferior to standard
26185	Hachi-Hachi EC (Tolfenpyrad)	Western Flower Thrips (Frankliniella occidentalis)	Impatiens, New Guinea (Impatiens hawkeri) I. wallerana 'Super Elfin Cherry'	Greenhouse	Chen	LA	2006	Foliar	Poor control at 14 and 21 fl oz per 100 gal; minor flower injury.
27367	Hachi-Hachi EC (Tolfenpyrad)	Western Flower Thrips (Frankliniella occidentalis)	Petunia (Petunia sp.) 'Dreams Midnight'	Greenhouse	Chen	LA	2006	Foliar	Good control of a high infestation at 14 and 21 fl oz per 100 gal; better than standard
26118	Hachi-Hachi EC (Tolfenpyrad)	Western Flower Thrips (Frankliniella occidentalis)	Purslane (Portulaca sp.)	Greenhouse	Ludwig	TX	2007	Foliar	Short residual activity at 14 and 21 fl oz per 100 gal
26118	Hachi-Hachi EC (Tolfenpyrad)	Western Flower Thrips (Frankliniella occidentalis)	Purslane (Portulaca sp.) P. grandiflora	Greenhouse	Ludwig	TX	2006	Foliar	Excellent efficacy on nymphs 14 DAT at 21 fl oz per 100 gal; trial ended prematurely
26045	Hachi-Hachi EC (Tolfenpyrad)	Western Flower Thrips (Frankliniella occidentalis)	Rose (Rosa sp.) 'Rainbow Knockout'	Greenhouse	Parrella	CA	2010	Foliar	Did not significantly reduce adults and immatures at 21 fl oz per 100 gal at 4 days after 1st applic; no significant treatment effects after 1st applic due to high population variability.
26045	Hachi-Hachi EC (Tolfenpyrad)	Western Flower Thrips (Frankliniella occidentalis)	Rose (Rosa sp.) 'Red Sunblase'	Greenhouse	Walsh	WA	2006	Foliar	Significantly reduced adult and immature thrips at 14 and 21 fl oz per 100 gal; higher rate more effective
26057	Hachi-Hachi EC (Tolfenpyrad)	Western Flower Thrips (Frankliniella occidentalis)	Marigold (Tagetes sp.) 'Boy O Boy'	Greenhouse	Ludwig	TX	2010	Foliar	Experiment 1: Good control of immatures with 21 fl oz per 100 gal applied 3 times weekly; comparable to Avid and Pylon.
26057	Hachi-Hachi EC (Tolfenpyrad)	Western Flower Thrips (Frankliniella occidentalis)	Marigold (Tagetes sp.) 'Hero Mix'	Greenhouse	Oetting	GA	2008	Foliar	Significantly reduced immatures on flowers and damage to flowers and foliage at 21 fl oz per 100 gal; equal to standard

PR#	Product (Active Ingredient)	Target	Crop	Production Site	Researcher	State	Year	Application Type	Results
26057	Hachi-Hachi EC (Tolfenpyrad)	Western Flower Thrips (Frankliniella occidentalis)	Marigold (Tagetes sp.) 'Jaguar'	Greenhouse	Gilrein	NY	2008	Foliar	Great to excellent control of adults and immatures using 27 fl oz per 100 gal.
26057	Hachi-Hachi EC (Tolfenpyrad)	Western Flower Thrips (Frankliniella occidentalis)	Marigold (Tagetes sp.) T. patula 'Yellow Bonanza'	Greenhouse	Davis	MI	2012	Foliar	Great control of immatures with 21 fl oz per 100 gal applied twice biweekly.
26057	Hachi-Hachi EC (Tolfenpyrad)	Western Flower Thrips (Frankliniella occidentalis)	Marigold (Tagetes sp.) T. patula 'Yellow Boy'	Greenhouse	Davis	MI	2007	Foliar	Good control at 14 and 21 oz per 100 gal
26057	Hachi-Hachi EC (Tolfenpyrad)	Western Flower Thrips (Frankliniella occidentalis)	Marigold (Tagetes sp.) T. patula 'Yellow Boy'	Greenhouse	Davis	MI	2008	Foliar	Good control at 21 fl oz per 100 gal; equal to Conserve and Mesurol.
26057	Hachi-Hachi EC (Tolfenpyrad)	Western Flower Thrips (Frankliniella occidentalis)	Marigold (Tagetes sp.) T. patula 'Yellow Boy'	Greenhouse	Davis	MI	2009	Foliar	Excellent control of immatures at 21 fl oz + NIS per 100 gal applied 2 times; better than Conserve applied 4 times
26057	Hachi-Hachi EC (Tolfenpyrad)	Western Flower Thrips (Frankliniella occidentalis)	Marigold (Tagetes sp.) T. patula 'Yellow Boy'	Greenhouse	Davis	MI	2010	Foliar	Excellent control of immatures at 21 fl oz per 100 gal applied 3 times biweekly.
32371	Hachi-Hachi EC (Tolfenpyrad)	Western Flower Thrips (Frankliniella occidentalis)	Marigold (Tagetes sp.) T. patula 'Yellow Boy'	Greenhouse	Davis	MI	2015	Foliar	Poor control with 21 fl oz per 100 gal applied biweekly.
28241	Hachi-Hachi EC (Tolfenpyrad)	Western Flower Thrips (Frankliniella occidentalis)	Vervain (Verbena sp.) 'Lorgo Purple'	Greenhouse	Oetting	GA	2008	Foliar	Significantly reduced immatures on and damage to foliage at 21 fl oz per 100 gal; equal to standard
26679	Hachi-Hachi EC (Tolfenpyrad)	Chilli Thrips, Yellow Tea Thrips (Scirtothrips dorsalis)	Rose (Rosa sp.) 'Knockout'	Greenhouse	Ludwig	TX	2007	Foliar	Significantly reduced immature thrips on flowers at 14, but not at 21 fl oz per 100 gal
25555	Hachi-Hachi EC (Tolfenpyrad)	Gladiolus Thrips (Thrips simplex)	Gladiolus (Gladiolus sp.)	Cold Storage	Davis	MI	2006	Dipped in solution	Excellent efficacy at 9.29 ml per 3 gal.
32673	Hachi-Hachi SC (Tolfenpyrad)	Western Flower Thrips (Frankliniella occidentalis)	Marigold (Tagetes sp.) T. erecta 'Taishan Yellow'	Greenhouse	Gilrein	NY	2014	Foliar	Excellent control of immatures and adults with 21 fl oz per 100 gal applied 3 times biweekly.

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34220	KOC22018-8 (Botanical Oil Blend)	Western Flower Thrips (Frankliniella occidentalis)	Marigold (Tagetes sp.)	Greenhouse	Hotchkiss	MI	2019	Foliar	Effective control of nymphs and adults with 128 fl oz per 100 gal applied 5 times weekly, 64 fl oz not effective; better than the standard Pylon.
28765	Kontos (BYI 8330 240SC) (Spirotetramat)	Privet Thrips (Dendrothrips ornatus)	New Mexico Privet, Desert Olive (Forestiera neomexicana)	Field In-Ground	Cranshaw	CO	2008	Foliar	Trial was sprinkler irrigated 3 hours after treatment. Mediocre control at 1.7 fl oz per 100 gal; equal to Conserve
27978	Kontos (BYI 8330 240SC) (Spirotetramat)	Western Flower Thrips (Frankliniella occidentalis)	Cosmos (Cosmos sp.) C. binnatus 'Picotee'	Field In-Ground	Cranshaw	CO	2008	Foliar	Trial 1: Under continuous reinvasion by migrant thrips in this trial, no treatment provided significant control
26129	Kontos (BYI 8330 240SC) (Spirotetramat)	Western Flower Thrips (Frankliniella occidentalis)	Transvaal Daisy (Gerbera sp.) G. jamesonii	Greenhouse	Cloyd	KS	2008	Foliar	Limited efficacy at 1.7 and 2.5 fl oz per 100 gal on gerbera cut flowers.
26129	Kontos (BYI 8330 240SC) (Spirotetramat)	Western Flower Thrips (Frankliniella occidentalis)	Transvaal Daisy (Gerbera sp.) G. jamesonii 'Festival Dark Eye Golden Yellow'	Greenhouse	Canas	OH	2006	Drench	Mediocre control of nymph populations on leaves at 1.7 fl oz per 100 gal.
26129	Kontos (BYI 8330 240SC) (Spirotetramat)	Western Flower Thrips (Frankliniella occidentalis)	Transvaal Daisy (Gerbera sp.) G. jamesonii 'Festival Dark Eye Golden Yellow'	Greenhouse	Canas	OH	2007	Foliar	Mediocre control of nymphs, poor on adults at 1.7 fl oz per 100 gal.
26129	Kontos (BYI 8330 240SC) (Spirotetramat)	Western Flower Thrips (Frankliniella occidentalis)	Transvaal Daisy (Gerbera sp.) G. jamesonii 'Royal'	Greenhouse	Parrella	CA	2006	Drench	No efficacy at 1.7 fl oz per 100 gal drenched 300 ml per 6" pot as assessed by adult populations on yellow sticky cards after plants placed into paper bags.
27001	Kontos (BYI 8330 240SC) (Spirotetramat)	Western Flower Thrips (Frankliniella occidentalis)	Impatiens, New Guinea (Impatiens hawkeri) I. wallerana 'Super Elfin Cherry'	Greenhouse	Chen	LA	2006	Drench	Great control of a low infestation with drench of 50 ml per 100 gal at 15 DAT; equal to standard
27001	Kontos (BYI 8330 240SC) (Spirotetramat)	Western Flower Thrips (Frankliniella occidentalis)	Impatiens, New Guinea (Impatiens hawkeri) I. wallerana 'Super Elfin Cherry'	Greenhouse	Chen	LA	2006	Foliar	Great control of a low infestation at 50 ml per 100 gal applied foliar at 15 DAT; equal to standard
26110	Kontos (BYI 8330 240SC) (Spirotetramat)	Western Flower Thrips (Frankliniella occidentalis)	Purslane (Portulaca sp.)	Greenhouse	Ludwig	TX	2007	Foliar	At 1.7 fl oz per 100 gal, slow to reduce population but residual activity relatively long

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26110	Kontos (BYI 8330 240SC) (Spirotetramat)	Western Flower Thrips (Frankliniella occidentalis)	Purslane (Portulaca sp.) P. grandiflora	Greenhouse	Ludwig	TX	2006	Foliar	Good control of nymphs 14 DAT at 1.7 fl oz per 100 gal; trial ended prematurely
26686	Kontos (BYI 8330 240SC) (Spirotetramat)	Western Flower Thrips (Frankliniella occidentalis)	Rose (Rosa sp.) 'Red Sunblase'	Greenhouse	Walsh	WA	2006	Foliar	Significantly reduced adult and immature thrips at 8 and 12 oz per 100 gal
26058	Kontos (BYI 8330 240SC) (Spirotetramat)	Western Flower Thrips (Frankliniella occidentalis)	Marigold (Tagetes sp.) 'Hero Mix'	Greenhouse	Oetting	GA	2008	Foliar	Significantly reduced immatures on flowers and damage to flowers and foliage at 1.7 fl oz per 100 gal; equal to standard
26058	Kontos (BYI 8330 240SC) (Spirotetramat)	Western Flower Thrips (Frankliniella occidentalis)	Marigold (Tagetes sp.) 'Jaguar'	Greenhouse	Gilrein	NY	2008	Foliar	Some reduction of immatures by 30 days after treatment with 1.7 fl oz per 100 gal.
26058	Kontos (BYI 8330 240SC) (Spirotetramat)	Western Flower Thrips (Frankliniella occidentalis)	Marigold (Tagetes sp.) T. patula 'Yellow Boy'	Greenhouse	Davis	MI	2007	Drench	Good control at 1.7 fl oz per 1000 6-inch pots; slower-acting
26058	Kontos (BYI 8330 240SC) (Spirotetramat)	Western Flower Thrips (Frankliniella occidentalis)	Marigold (Tagetes sp.) T. patula 'Yellow Boy'	Greenhouse	Davis	MI	2007	Foliar	Good control at 1.7 fl oz per 100 gal
26058	Kontos (BYI 8330 240SC) (Spirotetramat)	Western Flower Thrips (Frankliniella occidentalis)	Marigold (Tagetes sp.) T. patula 'Yellow Boy'	Greenhouse	Davis	MI	2008	Foliar	Fair control after 2nd application at 1.7 fl oz per 100 gal; inferior to Conserve and Mesurol
28242	Kontos (BYI 8330 240SC) (Spirotetramat)	Western Flower Thrips (Frankliniella occidentalis)	Vervain (Verbena sp.) 'Lorgo Purple'	Greenhouse	Oetting	GA	2008	Foliar	Significantly reduced immatures on and damage to foliage at 1.7 fl oz per 100 gal; equal to standard
28045	Kontos (BYI 8330 240SC) (Spirotetramat)	Western Flower Thrips (Frankliniella occidentalis)	Zinnia (Zinnia sp.) Z. elegans 'Short Stuff'	Greenhouse	Parrella	CA	2007	Foliar	Low thrips density; no significant difference from untreated check at 1.7 fl oz per 100 gal
28045	Kontos (BYI 8330 240SC) (Spirotetramat)	Western Flower Thrips (Frankliniella occidentalis)	Zinnia (Zinnia sp.) Z. elegans 'Short Stuff'	Greenhouse	Parrella	CA	2008	Drench	Did not significantly reduce number of thrips at 1.y oz per pot.
28045	Kontos (BYI 8330 240SC) (Spirotetramat)	Western Flower Thrips (Frankliniella occidentalis)	Zinnia (Zinnia sp.) Z. elegans 'Short Stuff'	Greenhouse	Parrella	CA	2008	Foliar	Did not significantly reduce number of thrips at 1.7 oz per 100 gal.

PR#	Product (Active Ingredient)	Target	Crop	Production Site	Researcher	State	Year	Application Type	Results
28045	Kontos (BYI 8330 240SC) (Spirotetramat)	Western Flower Thrips (Frankliniella occidentalis)	Zinnia (Zinnia sp.) 'Zahara Yellow'	Greenhouse	Chen	LA	2009	Foliar	No control of a low population of immatures at 1.7 fl oz per 100 gal at 14 DAT. Trial terminated 14 days after 1st application.
26051	Kontos (BYI 8330 240SC) (Spirotetramat)	Gynaikothrips uzeli (Gynaikothrips uzeli)	Weeping Fig (Ficus benjamina)	Greenhouse	Held (MSU)	MS	2006	Foliar	Experiment 2: Poor control with 0.132 ml per liter.
26676	Kontos (BYI 8330 240SC) (Spirotetramat)	Chilli Thrips, Yellow Tea Thrips (Scirtothrips dorsalis)	Rose (Rosa sp.) 'Knockout'	Greenhouse	Ludwig	TX	2007	Drench	Did not significantly reduce adult and immature thrips at 1.7 fl oz per 100 gal
26676	Kontos (BYI 8330 240SC) (Spirotetramat)	Chilli Thrips, Yellow Tea Thrips (Scirtothrips dorsalis)	Rose (Rosa sp.) 'Knockout'	Greenhouse	Ludwig	TX	2007	Foliar	Did not significantly reduce adult and immature thrips at 1.7 fl oz per 100 gal
26676	Kontos (BYI 8330 240SC) (Spirotetramat)	Chilli Thrips, Yellow Tea Thrips (Scirtothrips dorsalis)	Rose (Rosa sp.) 'Knockout'	Greenhouse	Ludwig	TX	2008	Foliar	Did not significantly reduce immature thrips at 1.7 fl oz per 100 gal
25692	Kontos (BYI 8330 240SC) (Spirotetramat)	Gladiolus Thrips (Thrips simplex)	Gladiolus (Gladiolus sp.)	Cold Storage	Davis	MI	2006	Dipped in solution	Excellent efficacy at 1.7 oz per 100 gal
31536	Mainspring GNL 200SC (Cyantraniliprole)	Western Flower Thrips (Frankliniella occidentalis)	Transvaal Daisy (Gerbera sp.) 'Festival Orange'	Greenhouse	Villavicencio	CA	2013	Foliar	No significant differences between treatments, including untreated check, mainly due to high population variability.
31954	Mainspring GNL 200SC (Cyantraniliprole)	Western Flower Thrips (Frankliniella occidentalis)	Marigold, African (Tagetes erecta) 'Discovery Yellow'	Greenhouse	Heinz	TX	2013	Foliar	Good control of immatures, mediocre control of adults with 8 and 16 fl oz per 100 gal.
32126	Mainspring GNL 200SC (Cyantraniliprole)	Western Flower Thrips (Frankliniella occidentalis)	Marigold (Tagetes sp.) 'Safari Yellow'	Greenhouse	Vafaie	TX	2015	Foliar	Excellent control of immatures with 8 fl oz per 100 gal applied 3 times biweekly.
32126	Mainspring GNL 200SC (Cyantraniliprole)	Western Flower Thrips (Frankliniella occidentalis)	Marigold (Tagetes sp.) T. erecta 'Discovery Yellow'	Greenhouse	Heinz	TX	2014	Foliar	Good control of immatures with 8 and 16 fl oz per 100 gal applied 3 times.
32126	Mainspring GNL 200SC (Cyantraniliprole)	Western Flower Thrips (Frankliniella occidentalis)	Marigold (Tagetes sp.) T. erecta 'Taishan Yellow'	Greenhouse	Gilrein	NY	2014	Foliar	Excellent control of immatures with 6 and 8 fl oz per 100 gal applied 3 times biweekly; less effective on adults.

PR#	Product (Active Ingredient)	Target	Crop	Production Site	Researcher	State	Year	Application Type	Results
32126	Mainspring GNL 200SC (Cyantraniliprole)	Western Flower Thrips (Frankliniella occidentalis)	Marigold (Tagetes sp.) T. erecta 'Vanilla'	Greenhouse	Gilrein	NY	2013	Foliar	Excellent control of immatures with 8 and 16 fl oz per 100 gal applied biweekly; comparable to Overture applied weekly.
33131	Mainspring GNL 200SC (Cyantraniliprole)	Western Flower Thrips (Frankliniella occidentalis)	Marigold (Tagetes sp.) T. patula 'Hero Orange'	Field Container	Davis	MI	2016	Foliar	Significantly reduced population with 8 fl oz per 100 gal 1 and 2 weeks after initial application. Subsequent data not reliable due to effects of predators.
32126	Mainspring GNL 200SC (Cyantraniliprole)	Western Flower Thrips (Frankliniella occidentalis)	Marigold (Tagetes sp.) T. patula 'Queen Sophia'	Greenhouse	Davis	MI	2014	Foliar	Excellent control with 8 and 16 fl oz per 100 gal applied twice; best treatment, better than the standard Hachi-Hachi.
32126	Mainspring GNL 200SC (Cyantraniliprole)	Western Flower Thrips (Frankliniella occidentalis)	Marigold (Tagetes sp.) T. patula 'Yellow Boy'	Greenhouse	Davis	MI	2015	Foliar	Good control with 16 fl oz per 100 gal applied weekly; better than the standard Hachi-Hachi applied biweekly.
32126	Mainspring GNL 200SC (Cyantraniliprole)	Western Flower Thrips (Frankliniella occidentalis)	Marigold (Tagetes sp.) 'Taishan Yellow'	Greenhouse	Gilrein	NY	2015	Foliar	Effective control of immatures and adults with 16 fl oz per 100 gal applied 3 times biweekly.
25465	Marathon 1% granular (Imidacloprid)	Gynaikothrips uzeli (Gynaikothrips uzeli)	Weeping Fig (Ficus benjamina)	Greenhouse	Held (MSU)	MS	2005	Soil applied broadcast	Experiment 1: Poor efficacy with 2.7 g placed in each pot as assess by infestations on cuttings.
26675	Marathon II (Imidacloprid)	Gladiolus Thrips (Thrips simplex)	Gladiolus (Gladiolus sp.)	Cold Storage	Davis	MI	2006	Dipped in solution	Merit 75WP at 16 gram per 100 gal - excellent efficacy.
29834	Marathon Ultra (Imidacloprid + cyfluthrin)	Western Flower Thrips (Frankliniella occidentalis)	Transvaal Daisy (Gerbera sp.) G. jamesonii 'Festival Dark Eye Golden Yellow'	Greenhouse	Canas	OH	2007	Foliar	No significant control of nymphs and adults at 25 fl oz per 100 gal.
26747	Marathon Ultra (Imidacloprid + cyfluthrin)	Chilli Thrips, Yellow Tea Thrips (Scirtothrips dorsalis)	Rose (Rosa sp.) 'Knockout'	Greenhouse	Ludwig	TX	2007	Foliar	Significantly reduced adult and immature thrips on flowers and terminals at 25 fl oz per 100 gal
26747	Marathon Ultra (Imidacloprid + cyfluthrin)	Chilli Thrips, Yellow Tea Thrips (Scirtothrips dorsalis)	Rose (Rosa sp.) 'Knockout'	Greenhouse	Ludwig	TX	2008	Foliar	Significantly reduced immature thrips on terminals at 25 fl oz per 100 gal
26975	Mesurol 75-W (Methicarb)	Western Flower Thrips (Frankliniella occidentalis)	Transvaal Daisy (Gerbera sp.) G. jamesonii 'Royal'	Greenhouse	Parrella	CA	2006	Foliar	No to good efficacy at 16 oz per 100 gal as assessed by adult populations on yellow sticky cards after plants placed into paper bags.

PR#	Product (Active Ingredient)	Target	Crop	Production Site	Researcher	State	Year	Application Type	Results
27530	Mesurol 75-W (Methicarb)	Western Flower Thrips (Frankliniella occidentalis)	Marigold (Tagetes sp.) T. patula 'Yellow Boy'	Greenhouse	Davis	MI	2007	Foliar	Good control at 0.5 lb per 100 gal
27530	Mesurol 75-W (Methicarb)	Western Flower Thrips (Frankliniella occidentalis)	Marigold (Tagetes sp.) T. patula 'Yellow Boy'	Greenhouse	Davis	MI	2008	Foliar	Good control at 0.5 lb per 100 gal; the best treatment.
28054	Mesurol 75-W (Methicarb)	Western Flower Thrips (Frankliniella occidentalis)	Zinnia (Zinnia sp.) Z. elegans 'Short Stuff'	Greenhouse	Parrella	CA	2007	Foliar	Low thrips density; no significant difference from untreated check at 1 lb per 100 gal
28054	Mesurol 75-W (Methicarb)	Western Flower Thrips (Frankliniella occidentalis)	Zinnia (Zinnia sp.) Z. elegans 'Short Stuff'	Greenhouse	Parrella	CA	2008	Foliar	Did not significantly reduce number of thrips at1 lb per 100 gal.
25689	Mesurol 75-W (Methicarb)	Gladiolus Thrips (Thrips simplex)	Gladiolus (Gladiolus sp.)	Cold Storage	Davis	MI	2006	Dipped in solution	Excellent efficacy at 1 lb per 100 gal.
29536	Met52 (Metarhizium anisopliae strain F52)	Western Flower Thrips (Frankliniella occidentalis)	Zinnia (Zinnia sp.) 'Zahara Yellow'	Greenhouse	Chen	LA	2009	Foliar	Fair control of a low population of immatures at 29 fl oz per 100 gal applied once. Trial terminated 14 days after 1st application.
29536	Met52 (Metarhizium anisopliae strain F52)	Western Flower Thrips (Frankliniella occidentalis)	Zinnia (Zinnia sp.) 'Zahara Yellow'	Greenhouse	Chen	LA	2009	Foliar	No control of a low population of immatures at 29 fl oz per 100 gal applied at 7-day intervals. Trial terminated 14 days after 1st application.
26711	MilStop (Potassium bicarbonate)	Gynaikothrips uzeli (Gynaikothrips uzeli)	Weeping Fig (Ficus benjamina)	Greenhouse	Held (MSU)	MS	2006	Foliar	Experiment 1: Ineffective at 3 g per liter.
27845	MilStop (Potassium bicarbonate)	Gynaikothrips uzeli (Gynaikothrips uzeli)	Weeping Fig (Ficus benjamina)	Greenhouse	Held (MSU)	MS	2006	Foliar	Experiment 1: Ineffective using 3 g per liter.
28763	MOI 201 (MOI 201)	Privet Thrips (Dendrothrips ornatus)	New Mexico Privet, Desert Olive (Forestiera neomexicana)	Field In-Ground	Cranshaw	CO	2008	Foliar	Trial was sprinkler irrigated 3 hours after treatment. Poor control at 1:500 dilution (25.6 fl oz per 100 gal)
27984	MOI 201 (MOI 201)	Western Flower Thrips (Frankliniella occidentalis)	Cosmos (Cosmos sp.) C. binnatus 'Picotee'	Field In-Ground	Cranshaw	CO	2008	Foliar	Under continuous reinvasion by migrant thrips in this trial, no treatment provided significant control

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27810	MOI 201 (MOI 201)	Western Flower Thrips (Frankliniella occidentalis)	Marigold (Tagetes sp.) 'Hero Mix'	Greenhouse	Oetting	GA	2008	Foliar	Significantly reduced immatures on flowers and damage to flowers and foliage at 1:500 and 1:800 dilution; equal to standard at 1:500
27810	MOI 201 (MOI 201)	Western Flower Thrips (Frankliniella occidentalis)	Marigold (Tagetes sp.) T. patula 'Yellow Boy'	Greenhouse	Davis	MI	2008	Foliar	Good control at 0.8 qt per 100 gal; slightly inferior to Conserve and Mesurol.
28239	MOI 201 (MOI 201)	Western Flower Thrips (Frankliniella occidentalis)	Vervain (Verbena sp.) 'Lorgo Purple'	Greenhouse	Oetting	GA	2008	Foliar	Significantly reduced immatures on and damage to foliage at 1:500 and 1:800 dilution; equal to standard
28051	MOI 201 (MOI 201)	Western Flower Thrips (Frankliniella occidentalis)	Zinnia (Zinnia sp.) 'Sunny Time'	Greenhouse	Parrella	CA	2008	Foliar	Good control at 1:500 (0.8 qt per 100 gal).
28051	MOI 201 (MOI 201)	Western Flower Thrips (Frankliniella occidentalis)	Zinnia (Zinnia sp.) Z. elegans 'Short Stuff'	Greenhouse	Parrella	CA	2008	Foliar	Experiment 1: Low thrips density; no significant difference from untreated check at 1:500 concentration
28051	MOI 201 (MOI 201)	Western Flower Thrips (Frankliniella occidentalis)	Zinnia (Zinnia sp.) Z. elegans 'Short Stuff'	Greenhouse	Parrella	CA	2008	Foliar	Experiment 2: Did not significantly reduce number of thrips at 1:500 concentration.
29119	OHP 929-2 (OHP 929-2)	Western Flower Thrips (Frankliniella occidentalis)	Transvaal Daisy (Gerbera sp.) G. jamesonii	Greenhouse	Cloyd	KS	2007	Foliar	Excellent control at 6 fl oz per 100 gal 7 days after treatment on gerbera cut flowers.
29537	OHP 929-2 (OHP 929-2)	Western Flower Thrips (Frankliniella occidentalis)	Zinnia (Zinnia sp.) 'Zahara Yellow'	Greenhouse	Chen	LA	2007	Foliar	No control of a low population of immatures at 6 fl oz per 100 gal. Trial terminated 14 days after 1st application.
25473	Orthene TTO 97 (Valent) (Acephate)	Gynaikothrips uzeli (Gynaikothrips uzeli)	Weeping Fig (Ficus benjamina)	Greenhouse	Held (MSU)	MS	2005	Foliar	Experiment 3: Mediocre initial control with foliar application of 16 oz per 100 gal as assessed by counts of infested cuttings.
25567	Orthene TTO 97 (Valent) (Acephate)	Gladiolus Thrips (Thrips simplex)	Gladiolus (Gladiolus sp.)	Cold Storage	Davis	MI	2006	Dipped in solution	Excellent efficacy at 8 oz per 100 gal.
26126	Overture 35WP (Pyridalyl)	Western Flower Thrips (Frankliniella occidentalis)	Transvaal Daisy (Gerbera sp.) G. jamesonii	Greenhouse	Cloyd	KS	2007	Foliar	Mediocre to good efficacy at 4 and 8 oz per 100 gal 7 days after treatment on gerbera cut flowers.

PR#	Product (Active Ingredient)	Target	Crop	Production Site	Researcher	State	Year	Application Type	Results
26126	Overture 35WP (Pyridalyl)	Western Flower Thrips (Frankliniella occidentalis)	Transvaal Daisy (Gerbera sp.) G. jamesonii 'Festival Dark Eye Golden Yellow'	Greenhouse	Canas	OH	2006	Foliar	Mediocre control of nymph populations on leaves at 8 and 12 oz per 100 gal.
26126	Overture 35WP (Pyridalyl)	Western Flower Thrips (Frankliniella occidentalis)	Transvaal Daisy (Gerbera sp.) G. jamesonii 'Festival Dark Eye Golden Yellow'	Greenhouse	Canas	OH	2007	Foliar	Good control of nymphs, poor on adults at 10 oz per 100 gal; inferior to Conserve and Pylon.
27000	Overture 35WP (Pyridalyl)	Western Flower Thrips (Frankliniella occidentalis)	Impatiens, New Guinea (Impatiens hawkeri) I wallerana 'Super Elfin Cherry'	Greenhouse	Chen	LA	2006	Foliar	Excellent control of a low infestation at 8 and 12 oz per 100 gal; equal to standard
30524	Overture 35WP (Pyridalyl)	Western Flower Thrips (Frankliniella occidentalis)	Geranium (Pelargonium sp.)	Greenhouse	Frank	NC	2010	Foliar	Significantly reduced adults and immatures with 8 oz per 100 gal applied twice biweekly.
26116	Overture 35WP (Pyridalyl)	Western Flower Thrips (Frankliniella occidentalis)	Purslane (Portulaca sp.)	Greenhouse	Ludwig	TX	2007	Foliar	At 8 and 12 oz per 100 gal, population decreased after the 2nd application and stayed low throughout duration of trial
26116	Overture 35WP (Pyridalyl)	Western Flower Thrips (Frankliniella occidentalis)	Purslane (Portulaca sp.) P. grandiflora	Greenhouse	Ludwig	TX	2006	Foliar	Excellent efficacy on nymphs 14 DAT at 8 and 12 oz per 100 gal; trial ended prematurely
30308	Overture 35WP (Pyridalyl)	Western Flower Thrips (Frankliniella occidentalis)	Marigold (Tagetes sp.) T. erecta 'Taishan Yellow'	Greenhouse	Gilrein	NY	2014	Foliar	Excellent control of immatures and adults with 8 oz per 100 gal applied 3 times biweekly.
30308	Overture 35WP (Pyridalyl)	Western Flower Thrips (Frankliniella occidentalis)	Marigold (Tagetes sp.) T. erecta 'Vanilla'	Greenhouse	Gilrein	NY	2013	Foliar	Excellent control of immatures with 8 oz per 100 gal applied weekly.
30308	Overture 35WP (Pyridalyl)	Western Flower Thrips (Frankliniella occidentalis)	Marigold (Tagetes sp.) T. patula 'Yellow Boy'	Greenhouse	Davis	MI	2010	Foliar	Excellent control of immatures at 16 oz per 100 gal applied twice weekly.
30308	Overture 35WP (Pyridalyl)	Western Flower Thrips (Frankliniella occidentalis)	Marigold (Tagetes sp.) 'Taishan Yellow'	Greenhouse	Gilrein	NY	2015	Foliar	Effective control of immatures and adults with 8 oz per 100 gal applied 3 times biweekly.
28052	Overture 35WP (Pyridalyl)	Western Flower Thrips (Frankliniella occidentalis)	Zinnia (Zinnia sp.) Z. elegans 'Short Stuff'	Greenhouse	Parrella	CA	2007	Foliar	Did not significantly reduce number of thrips at 8 oz per 100 gal.

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25040	Overture 35WP (Pyridalyl)	Gynaikothrips uzeli (Gynaikothrips uzeli)	Weeping Fig (Ficus benjamina)	Greenhouse	Held (MSU)	MS	2005	Foliar	Experiment 3: Poor control with foliar application of 8 oz per 100 gal as assessed by counts of infested cuttings.
26680	Overture 35WP (Pyridalyl)	Chilli Thrips, Yellow Tea Thrips (Scirtothrips dorsalis)	Rose (Rosa sp.) 'Knockout'	Greenhouse	Ludwig	TX	2007	Foliar	Significantly reduced immature thrips on terminals at 8 oz per 100 gal
25558	Overture 35WP (Pyridalyl)	Gladiolus Thrips (Thrips simplex)	Gladiolus (Gladiolus sp.)	Cold Storage	Davis	MI	2006	Dipped in solution	Excellent efficacy at 8 oz per 100 gal.
25559	Pedestal (Novaluron)	Gladiolus Thrips (Thrips simplex)	Gladiolus (Gladiolus sp.)	Cold Storage	Davis	MI	2006	Dipped in solution	Excellent efficacy at 8 oz per 100 gal.
34219	Pradia (Cyclaniliprole + Flonicamid)	Western Flower Thrips (Frankliniella occidentalis)	Marigold (Tagetes sp.)	Greenhouse	Hotchkiss	MI	2019	Foliar	Effective control of nymphs and adults with 12 and 16.5 fl oz per 100 gal applied 5 times weekly; better than the standard Pylon.
34219	Pradia (Cyclaniliprole + Flonicamid)	Western Flower Thrips (Frankliniella occidentalis)	Marigold (Tagetes sp.) 'Yellow Boy'	Greenhouse	Hotchkiss	MI	2018	Foliar	Excellent control of immatures with 12 and 16.5 fl oz per 100 gal applied 5 times weekly; comparable to the standard Pylon.
31296	Proud 3 (Thyme oil (5.6%))	Western Flower Thrips (Frankliniella occidentalis)	Butterfly Bush (Buddleia davidii) 'Blueberry Cobbler'	Field Container	Villavicencio	LA	2012	Foliar	Significantly reduced immatures with 4 qt per 100 gal applied 5 times weekly; comparable to Conserve and Hachi-Hachi.
27371	Proud 3 (Thyme oil (5.6%))	Western Flower Thrips (Frankliniella occidentalis)	Impatiens, New Guinea (Impatiens hawkeri) I. wallerana 'Super Elfin Cherry'	Greenhouse	Chen	LA	2006	Foliar	Good control at 2 qt per 100 gal; equal to standard; not as good at 4 qt
27371	Proud 3 (Thyme oil (5.6%))	Western Flower Thrips (Frankliniella occidentalis)	Impatiens, New Guinea (Impatiens hawkeri) 'Super Elfin Red'	Greenhouse	Chen	LA	2012	Foliar	Data not reliable due to low infestation.
27372	Proud 3 (Thyme oil (5.6%))	Western Flower Thrips (Frankliniella occidentalis)	Petunia (Petunia sp.) 'Dreams Midnight'	Greenhouse	Chen	LA	2006	Foliar	Good control of a low infestation at 2 and 4 qu per 100 gal; equal to standard
31497	Proud 3 (Thyme oil (5.6%))	Western Flower Thrips (Frankliniella occidentalis)	Rose (Rosa sp.) 'Belinda's Dream' and 'Caldwell Pink'	Greenhouse	Heinz	TX	2012	Foliar	No significant differences found between treatments including untreated and standards in this trial.

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31433	Proud 3 (Thyme oil (5.6%))	Western Flower Thrips (Frankliniella occidentalis)	Marigold (Tagetes sp.) 'Discovery Yellow'	Greenhouse	Heinz	TX	2013	Foliar	Poor control of immatures and adults with 1 gal per 100 gal.
31433	Proud 3 (Thyme oil (5.6%))	Western Flower Thrips (Frankliniella occidentalis)	Marigold (Tagetes sp.) T. erecta 'Vanilla'	Greenhouse	Gilrein	NY	2013	Foliar	Did not significantly reduce immatures with 4 qt per 100 gal applied weekly.
31433	Proud 3 (Thyme oil (5.6%))	Western Flower Thrips (Frankliniella occidentalis)	Marigold (Tagetes sp.) T. patula 'Yellow Bonanza'	Greenhouse	Davis	MI	2012	Foliar	No control of immature or adult populations with 4 qt per 100 gal applied once biweekly.
25275	Pylon (Chlorfenapyr)	Western Flower Thrips (Frankliniella occidentalis)	Hardy Mum (Chrysanthemum/Dendranthema x morifolium) 'Bright Stephanie'	Greenhouse	Lindquist	OH	1999	Foliar	Good to excellent control using 2.6 to 10.4 oz per 100 gal.
26123	Pylon (Chlorfenapyr)	Western Flower Thrips (Frankliniella occidentalis)	Transvaal Daisy (Gerbera sp.) G. jamesonii 'Festival Dark Eye Golden Yellow'	Greenhouse	Canas	OH	2006	Foliar	Excellent control of nymph populations on leaves at 10 fl oz per 100 gal.
26123	Pylon (Chlorfenapyr)	Western Flower Thrips (Frankliniella occidentalis)	Transvaal Daisy (Gerbera sp.) G. jamesonii 'Festival Dark Eye Golden Yellow'	Greenhouse	Canas	OH	2007	Foliar	Excellent control of nymphs and adults at 5 fl oz per 100 gal.
26123	Pylon (Chlorfenapyr)	Western Flower Thrips (Frankliniella occidentalis)	Transvaal Daisy (Gerbera sp.) G. jamesonii 'Royal'	Greenhouse	Parrella	CA	2006	Foliar	Delayed excellent efficacy at 5 and 10 fl oz per 100 gal as assessed by adult populations on yellow sticky cards after plants placed into paper bags.
25276	Pylon (Chlorfenapyr)	Western Flower Thrips (Frankliniella occidentalis)	Impatiens, New Guinea (Impatiens hawkeri) I. wallerana 'Super Elfin Cherry'	Greenhouse	Chen	LA	2006	Foliar	Good control of a low infestation at 5 and 10 fl oz per 100 gal; equal to standard
25276	Pylon (Chlorfenapyr)	Western Flower Thrips (Frankliniella occidentalis)	Impatiens, New Guinea (Impatiens hawkeri) 'Riviera Deep Salmon'	Greenhouse	Lindquist	OH	1999	Foliar	Variable efficacy using 2.6 to 10.4 oz per 100 gal.
30525	Pylon (Chlorfenapyr)	Western Flower Thrips (Frankliniella occidentalis)	Geranium (Pelargonium sp.)	Greenhouse	Frank	NC	2010	Foliar	Significantly reduced adults and immatures with 5.2 fl oz per 100 gal applied twice weekly.

PR#	Product (Active Ingredient)	Target	Crop	Production Site	Researcher	State	Year	Application Type	Results
27368	Pylon (Chlorfenapyr)	Western Flower Thrips (Frankliniella occidentalis)	Petunia (Petunia sp.) 'Dreams Midnight'	Greenhouse	Chen	LA	2006	Foliar	Good initial control of a high infestation at 5 and 10 fl oz per 100 gal; better than standard
26117	Pylon (Chlorfenapyr)	Western Flower Thrips (Frankliniella occidentalis)	Purslane (Portulaca sp.)	Greenhouse	Ludwig	TX	2007	Foliar	At 5 and 10 fl oz per 100 gal, population decreased after the 2nd application and stayed low throughout duration of trial
26044	Pylon (Chlorfenapyr)	Western Flower Thrips (Frankliniella occidentalis)	Rose (Rosa sp.) 'Red Sunblase'	Greenhouse	Walsh	WA	2006	Foliar	Significantly reduced adult and immature thrips at 5 and 10 fl oz per 100 gal
26056	Pylon (Chlorfenapyr)	Western Flower Thrips (Frankliniella occidentalis)	Marigold (Tagetes sp.)	Greenhouse	Hotchkiss	MI	2019	Foliar	Non-significant control of nymphs and adults with 5.2 fl oz per 100 gal applied twice weekly.
26056	Pylon (Chlorfenapyr)	Western Flower Thrips (Frankliniella occidentalis)	Marigold (Tagetes sp.) 'Boy O Boy'	Greenhouse	Ludwig	TX	2010	Foliar	Experiment 1: Good control of immatures with 5.2 fl oz per 100 gal applied twice weekly.
26056	Pylon (Chlorfenapyr)	Western Flower Thrips (Frankliniella occidentalis)	Marigold (Tagetes sp.) T. patula 'Bonanza Yellow'	Greenhouse	Chong	SC	2010	Foliar	Did not reduce adults and immatures at 5.2 fl oz per 100 gal applied once.
26056	Pylon (Chlorfenapyr)	Western Flower Thrips (Frankliniella occidentalis)	Marigold (Tagetes sp.) T. patula 'Yellow Boy'	Greenhouse	Davis	MI	2010	Foliar	Excellent control of immatures at 5.2 fl oz per 100 gal applied twice weekly.
26056	Pylon (Chlorfenapyr)	Western Flower Thrips (Frankliniella occidentalis)	Marigold (Tagetes sp.) 'Yellow Boy'	Greenhouse	Hotchkiss	MI	2018	Foliar	Excellent control of immatures with 2.6 fl oz per 100 gal applied twice biweekly.
29538	Pylon (Chlorfenapyr)	Western Flower Thrips (Frankliniella occidentalis)	Zinnia (Zinnia sp.) 'Zahara Yellow'	Greenhouse	Chen	LA	2007	Foliar	Excellent control of a low population of immatures, but short residual activity, at 5 fl oz per 100 gal. Trial terminated 14 days after 1st application.
26746	Pylon (Chlorfenapyr)	Chilli Thrips, Yellow Tea Thrips (Scirtothrips dorsalis)	Rose (Rosa sp.) 'Knockout'	Greenhouse	Ludwig	TX	2007	Foliar	Significantly reduced immature thrips on terminals at 5 fl oz per 100 gal
25552	Pylon (Chlorfenapyr)	Gladiolus Thrips (Thrips simplex)	Gladiolus (Gladiolus sp.)	Cold Storage	Davis	MI	2006	Dipped in solution	Excellent efficacy at 10 oz per 100 gal.

PR#	Product (Active Ingredient)	Target	Crop	Production Site	Researcher	State	Year	Application Type	Results
27369	QRD 400 (Extract of Chenopodium ambrosioides)	Western Flower Thrips (Frankliniella occidentalis)	Impatiens, New Guinea (Impatiens hawkeri) I. wallerana 'Super Elfin Cherry'	Greenhouse	Chen	LA	2006	Foliar	Good control at 0.25 and 0.5 %; at least equal to standard; moderate flower injury at 0.5 %
27370	QRD 400 (Extract of Chenopodium ambrosioides)	Western Flower Thrips (Frankliniella occidentalis)	Petunia (Petunia sp.) 'Dreams Midnight'	Greenhouse	Chen	LA	2006	Foliar	Good control of a low infestation at 0.25 and 0.5 %; at least equal to standard; moderate flower injury at 0.5 %
26682	QRD 400 (Extract of Chenopodium ambrosioides)	Chilli Thrips, Yellow Tea Thrips (Scirtothrips dorsalis)	Rose (Rosa sp.) 'Knockout'	Greenhouse	Ludwig	TX	2007	Foliar	Did not significantly reduce immature thrips at 130 fl oz per 100 gal
28756	QRD 416 (Extract of Chenopodium ambrosioides)	Western Flower Thrips (Frankliniella occidentalis)	Cosmos (Cosmos sp.) C. binnatus 'Picotee'	Field In-Ground	Cranshaw	CO	2008	Foliar	Under continuous reinvasion by migrant thrips in this trial, no treatment provided significant control
27870	QRD 416 (Extract of Chenopodium ambrosioides)	Western Flower Thrips (Frankliniella occidentalis)	Marigold (Tagetes sp.) T. patula 'Yellow Boy'	Greenhouse	Davis	MI	2008	Foliar	Poor control at 128 oz per 100 gal
30509	Rotation: Aria / Botanigard (Flonicamid + Beauveria bassiana)	Western Flower Thrips (Frankliniella occidentalis)	Marigold (Tagetes sp.) 'Boy O Boy'	Greenhouse	Ludwig	TX	2010	Foliar	Experiment 2: Significant reduction of immatures with 120 g / 2 lb per 100 gal applied weekly.
30508	Rotation: Aria / TickEx (Flonicamid + Metarhizium anisophliae)	Western Flower Thrips (Frankliniella occidentalis)	Marigold (Tagetes sp.) 'Boy O Boy'	Greenhouse	Ludwig	TX	2010	Foliar	Experiment 2: Significant reduction of immatures with 120 g / 29 fl oz per 100 gal applied weekly.
29925	Rotation: Aria / Tolfenpyrad / Pylon (Flonicamid / tolfenpyrad / chlorfenapyr)	Western Flower Thrips (Frankliniella occidentalis)	Rose (Rosa sp.) 'Rainbow Knockout'	Greenhouse	Parrella	CA	2010	Foliar	Did not significantly reduce adults and immatures at 120 g/21 fl oz/5.2 fl oz per 100 gal at 4 days after 1st applic; no significant treatment effects after 1st app due to high population variability
30505	Rotation: Aria / Tolfenpyrad / Pylon (Flonicamid / tolfenpyrad / chlorfenapyr)	Western Flower Thrips (Frankliniella occidentalis)	Marigold (Tagetes sp.) 'Boy O Boy'	Greenhouse	Ludwig	TX	2010	Foliar	Experiment 1: Good control of immatures with 120 g / 21 fl oz / 5.2 fl oz per 100 gal applied biweekly; comparable to Avid and Pylon.

PR#	Product (Active Ingredient)	Target	Crop	Production Site	Researcher	State	Year	Application Type	Results
30313	Rotation: Botanigard / Hachi-Hachi (Beauveria bassiana / tolfenpyrad)	Western Flower Thrips (Frankliniella occidentalis)	Marigold (Tagetes sp.) 'Boy O Boy'	Greenhouse	Ludwig	TX	2010	Foliar	Experiment 2: Significant reduction of immatures with 2 lb / 21 fl oz per 100 gal after Hachi-Hachi application.
30313	Rotation: Botanigard / Hachi-Hachi (Beauveria bassiana / tolfenpyrad)	Western Flower Thrips (Frankliniella occidentalis)	Marigold (Tagetes sp.) T. patula 'Yellow Boy'	Greenhouse	Davis	MI	2010	Foliar	Excellent control of immatures (from tolfenpyrad) at 2 lb/21 fl oz per 100 gal applied at weekly intervals.
29927	Rotation: Botanigard + MoltX / Botanigard (Beauveria bassiana + BW533)	Western Flower Thrips (Frankliniella occidentalis)	Rose (Rosa sp.) 'Rainbow Knockout'	Greenhouse	Parrella	CA	2010	Foliar	Did not significantly reduce adults and immatures with 2 lb / 8 oz per 100 gal at 4 days after 1st applic; no significant treatment effects after 1st applic due to high population variability.
30309	Rotation: Botanigard + MoltX / Botanigard (Beauveria bassiana + BW533)	Western Flower Thrips (Frankliniella occidentalis)	Marigold (Tagetes sp.) 'Boy O Boy'	Greenhouse	Ludwig	TX	2010	Foliar	Experiment 2: No significant reduction of immatures with 2 lb + 8 oz / 2 lb per 100 gal applied weekly.
30309	Rotation: Botanigard + MoltX / Botanigard (Beauveria bassiana + BW533)	Western Flower Thrips (Frankliniella occidentalis)	Marigold (Tagetes sp.) T. erecta 'Vanilla'	Greenhouse	Gilrein	NY	2011	Foliar	Poor control of immatures with 2 lb + 8 fl oz per 100 gal applied weekly; comparable to Conserve applied weekly.
30309	Rotation: Botanigard + MoltX / Botanigard (Beauveria bassiana + BW533)	Western Flower Thrips (Frankliniella occidentalis)	Marigold (Tagetes sp.) T. patula 'Yellow Boy'	Greenhouse	Davis	MI	2010	Foliar	Poor overall control of immatures at 2 lb per 100 gal applied at weekly intervals.
29539	Rotation: Botanigard + MoltX / Botanigard (Beauveria bassiana + BW533)	Western Flower Thrips (Frankliniella occidentalis)	Zinnia (Zinnia sp.) 'Zahara Yellow'	Greenhouse	Chen	LA	2009	Foliar	Good to excellent control of a low population of immatures at 2 lb + 8 oz / 2 lb per 100 gal; at least equal to Avid. Trial terminated 14 days after 1st application.

PR#	Product (Active Ingredient)	Target	Crop	Production Site	Researcher	State	Year	Application Type	Results
29928	Rotation: Botanigard + SuffOil-X / Botanigard (Beauveria bassiana + paraffin oil)	Western Flower Thrips (Frankliniella occidentalis)	Rose (Rosa sp.) 'Rainbow Knockout'	Greenhouse	Parrella	CA	2010	Foliar	Did not significantly reduce adults and immatures with 2 lb / 1 gal per 100 gal at 4 days after 1st applic; no significant treatment effects after 1st applic due to high population variability.
30310	Rotation: Botanigard + SuffOil-X / Botanigard (Beauveria bassiana + paraffin oil)	Western Flower Thrips (Frankliniella occidentalis)	Marigold (Tagetes sp.) 'Boy O Boy'	Greenhouse	Ludwig	TX	2010	Foliar	Experiment 2: No significant reduction of immatures with 2 lb + 1 gal / 2 lb per 100 gal applied weekly.
30310	Rotation: Botanigard + SuffOil-X / Botanigard (Beauveria bassiana + paraffin oil)	Western Flower Thrips (Frankliniella occidentalis)	Marigold (Tagetes sp.) T. erecta 'Vanilla'	Greenhouse	Gilrein	NY	2011	Foliar	Poor control of immatures with 2 lb + 1 gal per 100 gal applied weekly; comparable to Conserve applied weekly.
30310	Rotation: Botanigard + SuffOil-X / Botanigard (Beauveria bassiana + paraffin oil)	Western Flower Thrips (Frankliniella occidentalis)	Marigold (Tagetes sp.) T. patula 'Yellow Boy'	Greenhouse	Davis	MI	2009	Foliar	Good control of immatures at 2 lb + oils per 100 gal; at least equal to Conserve.
30310	Rotation: Botanigard + SuffOil-X / Botanigard (Beauveria bassiana + paraffin oil)	Western Flower Thrips (Frankliniella occidentalis)	Marigold (Tagetes sp.) T. patula 'Yellow Boy'	Greenhouse	Davis	MI	2010	Foliar	Poor overall control of immatures at 2 lb per 100 gal applied at weekly intervals.
29540	Rotation: Botanigard + SuffOil-X / Botanigard (Beauveria bassiana + paraffin oil)	Western Flower Thrips (Frankliniella occidentalis)	Zinnia (Zinnia sp.) 'Zahara Yellow'	Greenhouse	Chen	LA	2009	Foliar	Good to excellent control of a low population of immatures at 2 lb + 1 gal / 2 lb per 100 gal; at least equal to Avid. Trial terminated 14 days after 1st application.
30506	Rotation: Conserve / Tolfenpyrad / Pylon (Spinosad / tolfenpyrad / chlorfenapyr)	Western Flower Thrips (Frankliniella occidentalis)	Marigold (Tagetes sp.) 'Boy O Boy'	Greenhouse	Ludwig	TX	2010	Foliar	Experiment 1: Good control of immatures with 8 fl oz / 21 fl oz / 5.2 fl oz per 100 gal applied biweekly; comparable to Avid and Pylon.

PR#	Product (Active Ingredient)	Target	Crop	Production Site	Researcher	State	Year	Application Type	Results
33002	Rotation: IKI-3106 / Venerate XC (Cyclaniliprole / Burkholderia sp. strain A 396)	Western Flower Thrips (Frankliniella occidentalis)	Mock Vervain, Hybrid (Glandularia X hybrida) 'Quartz Blue'	Field Container	Chong	SC	2016	Foliar	No significant differences between treatments due to low and very variable numbers of thrips in this study.
29082	Rotation: IKI-3106 / Venerate XC (Cyclaniliprole / Burkholderia sp. strain A 396)	Western Flower Thrips (Frankliniella occidentalis)	Marigold (Tagetes sp.) 'Safari Yellow'	Greenhouse	Nansen	CA	2016	Foliar	Significantly reduced thrips population with 22 and 27 fl oz per 100 gal applied weekly in rotation with Venerate; comparable to the standard Conserve.
33128	Rotation: IKI-3106 / Venerate XC (Cyclaniliprole / Burkholderia sp. strain A 396)	Western Flower Thrips (Frankliniella occidentalis)	Marigold (Tagetes sp.) 'Safari Yellow'	Field Container	Nansen	CA	2017	Foliar	Excellent control of immatures with 22 and 27 fl oz + 2 qt per 100 gal sprayed 5 times weekly; comparable to Conserve + Capsil.
33128	Rotation: IKI-3106 / Venerate XC (Cyclaniliprole / Burkholderia sp. strain A 396)	Western Flower Thrips (Frankliniella occidentalis)	Marigold (Tagetes sp.) 'Small Bloom Orange'	Field Container	Vafaie	TX	2017	Foliar	No significant reduction of thrips population and damage with 22 and 27 fl oz per 100 gal + Capsil rotated with 2 qt per 100 gal; data showed no differences between treatments including Check.
29082	Rotation: IKI-3106 / Venerate XC (Cyclaniliprole / Burkholderia sp. strain A 396)	Western Flower Thrips (Frankliniella occidentalis)	Marigold (Tagetes sp.) T. patula 'Hero Orange'	Greenhouse	Davis	MI	2016	Foliar	Did not significantly reduce population with 22 and 27 fl oz per 100 gal / 2 qt per 100 gal 1 and 2 weeks after initial application. Subsequent data not reliable due to effects of predators.
29082	Rotation: IKI-3106 / Venerate XC (Cyclaniliprole / Burkholderia sp. strain A 396)	Western Flower Thrips (Frankliniella occidentalis)	Marigold (Tagetes sp.) T. patula 'Yellow Boy'	Greenhouse	Davis	MI	2017	Foliar	No consistent reduction of adult and immature thrips with 22 and 27 fl oz per 100 gal in rotation with 2 qt per 100 gal Venerate.
29082	Rotation: IKI-3106 / Venerate XC (Cyclaniliprole / Burkholderia sp. strain A 396)	Western Flower Thrips (Frankliniella occidentalis)	Marigold (Tagetes sp.) 'Taishan Yellow'	Greenhouse	Gilrein	NY	2017	Foliar	Mediocre control of a very low immature population with 22 and 27 fl oz + 2 qt per 100 gal + Capsil applied weekly; comparable to Overture.

PR#	Product (Active Ingredient)	Target	Crop	Production Site	Researcher	State	Year	Application Type	Results
33143	Rotation: IKI-3106 / Venerate XC (Cyclaniliprole / Burkholderia sp. strain A 396)	Chilli Thrips, Yellow Tea Thrips (Scirtothrips dorsalis)	Indian Hawthorn (Rhaphiolepis indica)	Greenhouse	Dale	FL	2017	Foliar	No significant differences in damaged leaves between treatments, including untreated check. A heavy aphid infestation and sooty molds might have affected results.
29503	Rotation: NNI-0101 / Tolfenpyrad (NNI-0101 / tolfenpyrad)	Western Flower Thrips (Frankliniella occidentalis)	Zinnia (Zinnia sp.) Z. elegans 'Short Stuff'	Greenhouse	Parrella	CA	2008	Foliar	Did not significantly reduce number of thrips at 6.38 oz NNI / 14 or 21 oz Tolfenpyrad per 100 gal.
30314	Rotation: Tick-Ex / Hachi-Hachi (Metarhizium anisophliae / tolfenpyrad)	Western Flower Thrips (Frankliniella occidentalis)	Marigold (Tagetes sp.) 'Boy O Boy'	Greenhouse	Ludwig	TX	2010	Foliar	Experiment 2: Significant reduction of immatures with 29 fl oz / 21 fl oz per 100 gal after Hachi-Hachi application.
30314	Rotation: Tick-Ex / Hachi-Hachi (Metarhizium anisophliae / tolfenpyrad)	Western Flower Thrips (Frankliniella occidentalis)	Marigold (Tagetes sp.) T. patula 'Yellow Boy'	Greenhouse	Davis	MI	2010	Foliar	Excellent control of immatures (from tolfenpyrad) at 29 oz/21 fl oz per 100 gal applied at weekly intervals.
28764	Rycar (Pyrifluquinazon)	Privet Thrips (Dendrothrips ornatus)	New Mexico Privet, Desert Olive (Forestiera neomexicana)	Field In-Ground	Cranshaw	CO	2008	Foliar	Trial was sprinkler irrigated 3 hours after treatment. Fair control at 6.38 fl oz per 100 gal; inferior to Conserve
27980	Rycar (Pyrifluquinazon)	Western Flower Thrips (Frankliniella occidentalis)	Cosmos (Cosmos sp.) C. binnatus 'Picotee'	Field In-Ground	Cranshaw	CO	2008	Foliar	Under continuous reinvasion by migrant thrips in this trial, no treatment provided significant control
29924	Rycar (Pyrifluquinazon)	Western Flower Thrips (Frankliniella occidentalis)	Rose (Rosa sp.) 'Rainbow Knockout'	Greenhouse	Parrella	CA	2010	Foliar	Did not significantly reduce adults and immatures with 6.38 fl oz per 100 gal at 4 days after 1st applic; no significant treatment effects after 1st applic due to high population variability.
28012	Rycar (Pyrifluquinazon)	Western Flower Thrips (Frankliniella occidentalis)	Marigold (Tagetes sp.) 'Boy O Boy'	Greenhouse	Ludwig	TX	2010	Foliar	Experiment 1: Poor control of immatures with 6.38 fl oz per 100 gal applied 3 times biweekly.
28012	Rycar (Pyrifluquinazon)	Western Flower Thrips (Frankliniella occidentalis)	Marigold (Tagetes sp.) 'Hero Mix'	Greenhouse	Oetting	GA	2008	Foliar	Significantly reduced immatures on flowers and damage to flowers and foliage at 6.4 fl oz per 100 gal; inferior to standard

PR#	Product (Active Ingredient)	Target	Crop	Production Site	Researcher	State	Year	Application Type	Results
28012	Rycar (Pyrifluquinazon)	Western Flower Thrips (Frankliniella occidentalis)	Marigold (Tagetes sp.) 'Jaguar'	Greenhouse	Gilrein	NY	2008	Foliar	Some reduction of adult and immature populations with 8 fl oz per 100 gal.
28012	Rycar (Pyrifluquinazon)	Western Flower Thrips (Frankliniella occidentalis)	Marigold (Tagetes sp.) 'Safari Bolero'	Greenhouse	Vafaie	TX	2015	Foliar	Mediocre and good control of immatures with 3.2 and 6.4 fl oz per 100 gal + Capsil applied biweekly
28012	Rycar (Pyrifluquinazon)	Western Flower Thrips (Frankliniella occidentalis)	Marigold (Tagetes sp.) T. erecta 'Discovery Yellow'	Greenhouse	Heinz	TX	2014	Foliar	No control of immatures with 3.2 and 6.4 fl oz per 100 gal applied 3 times.
28012	Rycar (Pyrifluquinazon)	Western Flower Thrips (Frankliniella occidentalis)	Marigold (Tagetes sp.) T. erecta 'Taishan Yellow'	Greenhouse	Gilrein	NY	2014	Foliar	Excellent control of immatures with 3.2 and 6.4 fl oz per 100 gal applied 3 times biweekly; poor control of adults.
28012	Rycar (Pyrifluquinazon)	Western Flower Thrips (Frankliniella occidentalis)	Marigold (Tagetes sp.) T. erecta 'Vanilla'	Greenhouse	Gilrein	NY	2011	Foliar	Poor control of immatures with 6.38 8 fl oz per 100 gal applied biweekly; comparable to Conserve applied weekly.
28012	Rycar (Pyrifluquinazon)	Western Flower Thrips (Frankliniella occidentalis)	Marigold (Tagetes sp.) T. patula 'Queen Sophia'	Greenhouse	Davis	MI	2014	Foliar	Poor control with 3.4 and 6.8 fl oz per 100 gal applied twice; inferior to the standard Hachi-Hachi.
28012	Rycar (Pyrifluquinazon)	Western Flower Thrips (Frankliniella occidentalis)	Marigold (Tagetes sp.) T. patula 'Yellow Boy'	Greenhouse	Davis	MI	2008	Foliar	Poor control at 9.6 fl oz per 100 gal.
28012	Rycar (Pyrifluquinazon)	Western Flower Thrips (Frankliniella occidentalis)	Marigold (Tagetes sp.) T. patula 'Yellow Boy'	Greenhouse	Davis	MI	2009	Foliar	Fair control of immatures at 6.38 fl oz + NIS per 100 gal applied 2 times; almost equal to Conserve applied 4 times
28012	Rycar (Pyrifluquinazon)	Western Flower Thrips (Frankliniella occidentalis)	Marigold (Tagetes sp.) T. patula 'Yellow Boy'	Greenhouse	Davis	MI	2010	Foliar	No significant control of immatures at 6.38 fl oz per 100 gal applied 3 times biweekly.
28012	Rycar (Pyrifluquinazon)	Western Flower Thrips (Frankliniella occidentalis)	Marigold (Tagetes sp.) T. patula 'Yellow Boy'	Greenhouse	Davis	MI	2015	Foliar	Poor control with 3.2 and 6.4 fl oz per 100 gal + Capsil applied biweekly; comparable to the standard Hachi-Hachi applied biweekly.

PR#	Product (Active Ingredient)	Target	Crop	Production Site	Researcher	State	Year	Application Type	Results
28012	Rycar (Pyrifluquinazon)	Western Flower Thrips (Frankliniella occidentalis)	Marigold (Tagetes sp.) 'Taishan Yellow'	Greenhouse	Gilrein	NY	2015	Foliar	Poor control of immatures and adults with 3.2 and 6.4 fl oz per 100 gal + Capsil applied 3 times biweekly.
28047	Rycar (Pyrifluquinazon)	Western Flower Thrips (Frankliniella occidentalis)	Zinnia (Zinnia sp.) Z. elegans 'Short Stuff'	Greenhouse	Parrella	CA	2008	Foliar	Low thrips density; no significant difference from untreated check at 6.38 fl oz per 100 gal
25556	Rycar (Pyrifluquinazon)	Gladiolus Thrips (Thrips simplex)	Gladiolus (Gladiolus sp.)	Cold Storage	Davis	MI	2006	Dipped in solution	No efficacy at 8.41 ml per 3 gal until the last rate 8 weeks after treatment where very few thrips were observed.
26127	S1812 35WP VC1638 (Pyridalyl)	Western Flower Thrips (Frankliniella occidentalis)	Transvaal Daisy (Gerbera sp.) G. jamesonii 'Festival Dark Eye Golden Yellow'	Greenhouse	Canas	OH	2006	Foliar	Mediocre control of nymph populations on leaves at 8 and 12 oz per 100 gal.
26999	S1812 35WP VC1638 (Pyridalyl)	Western Flower Thrips (Frankliniella occidentalis)	Impatiens, New Guinea (Impatiens hawkeri) I. wallerana 'Super Elfin Cherry'	Greenhouse	Chen	LA	2006	Foliar	Good control of a low infestation at 8 and 12 oz per 100 gal; equal to standard
26120	S1812 35WP VC1638 (Pyridalyl)	Western Flower Thrips (Frankliniella occidentalis)	Purslane (Portulaca sp.)	Greenhouse	Ludwig	TX	2007	Foliar	At 8 and 12 oz per 100 gal, population decreased after the 2nd application and stayed low throughout duration of trial
26120	S1812 35WP VC1638 (Pyridalyl)	Western Flower Thrips (Frankliniella occidentalis)	Purslane (Portulaca sp.) P. grandiflora	Greenhouse	Ludwig	TX	2006	Foliar	Excellent efficacy 14 DAT at 8 and 12 oz per 100 gal; trial ended prematurely
29833	Safari 20SG (Dinotefuran)	Western Flower Thrips (Frankliniella occidentalis)	Transvaal Daisy (Gerbera sp.) G. jamesonii 'Festival Dark Eye Golden Yellow'	Greenhouse	Canas	OH	2007	Foliar	No significant control of nymphs and adults at 8 oz per 100 gal.
26822	Safari 20SG (Dinotefuran)	Western Flower Thrips (Frankliniella occidentalis)	Impatiens, New Guinea (Impatiens hawkeri) I. balsamina	Greenhouse	Reding	OH	2007	Drench	Significantly reduced thrips (adults and nymphs) at 24 oz per 100 gal; did not reduce Impatiens Necrotic Spot Virus infection
26822	Safari 20SG (Dinotefuran)	Western Flower Thrips (Frankliniella occidentalis)	Impatiens, New Guinea (Impatiens hawkeri) I. balsamina	Greenhouse	Reding	OH	2007	Foliar	Significantly reduced thrips (adults and nymphs) at 8 oz per 100 gal; did not reduce Impatiens Necrotic Spot Virus infection
27725	Safari 20SG (Dinotefuran)	Western Flower Thrips (Frankliniella occidentalis)	Marigold (Tagetes sp.) T. patula 'Yellow Boy'	Greenhouse	Davis	MI	2007	Foliar	Fair control at 8 oz per 100 gal.

PR#	Product (Active Ingredient)	Target	Crop	Production Site	Researcher	State	Year	Application Type	Results
25037	Safari 20SG (Dinotefuran)	Gynaikothrips uzeli (Gynaikothrips uzeli)	Weeping Fig (Ficus benjamina)	Greenhouse	Held (MSU)	MS	2005	Drench	Experiment 1: Poor control with drench of 1.8 g per liter as assessed by counts on infested cuttings.
25037	Safari 20SG (Dinotefuran)	Gynaikothrips uzeli (Gynaikothrips uzeli)	Weeping Fig (Ficus benjamina)	Greenhouse	Held (MSU)	MS	2005	Foliar	Experiment 1: Excellent initial control with foliar spray of 0.6 g per liter as assessed by counts on infested cuttings.
26681	Safari 20SG (Dinotefuran)	Chilli Thrips, Yellow Tea Thrips (Scirtothrips dorsalis)	Rose (Rosa sp.) 'Knockout'	Greenhouse	Ludwig	TX	2007	Foliar	Significantly reduced adult and immature thrips on flowers and terminals at 8 oz per 100 gal
26681	Safari 20SG (Dinotefuran)	Chilli Thrips, Yellow Tea Thrips (Scirtothrips dorsalis)	Rose (Rosa sp.) 'Knockout'	Greenhouse	Ludwig	TX	2008	Foliar	Significantly reduced immature thrips at 8 oz per 100 gal
25557	Safari 20SG (Dinotefuran)	Gladiolus Thrips (Thrips simplex)	Gladiolus (Gladiolus sp.)	Cold Storage	Davis	MI	2006	Dipped in solution	Excellent efficacy at 24 oz per 100 gal.
27812	Safari 2G (Dinotefuran)	Chilli Thrips, Yellow Tea Thrips (Scirtothrips dorsalis)	Rose (Rosa sp.) 'Knockout'	Greenhouse	Ludwig	TX	2008	Soil incorporation	Significantly reduced immature thrips on terminals at 6.6 g per 3-gal pot
25475	Safer Soap (Potassium Salts of Fatty Acids)	Gynaikothrips uzeli (Gynaikothrips uzeli)	Weeping Fig (Ficus benjamina)	Greenhouse	Held (MSU)	MS	2005	Foliar	Experiment 2: Poor control with foliar application of 250 fl oz per 100 gal as assessed by counts of infested cuttings.
25475	Safer Soap (Potassium Salts of Fatty Acids)	Gynaikothrips uzeli (Gynaikothrips uzeli)	Weeping Fig (Ficus benjamina)	Greenhouse	Held (MSU)	MS	2006	Foliar	Experiment 2: Ineffective at 7.8 ml per liter.
33000	Sarisa 50SL (Cyclaniliprole)	Western Flower Thrips (Frankliniella occidentalis)	Mock Vervain, Hybrid (Glandularia X hybrida) 'Quartz Blue'	Field Container	Chong	SC	2016	Foliar	No significant differences between treatments due to low and very variable numbers of thrips in this study.
32370	Sarisa 50SL (Cyclaniliprole)	Western Flower Thrips (Frankliniella occidentalis)	Marigold (Tagetes sp.) 'Safari Yellow'	Greenhouse	Nansen	CA	2016	Foliar	Significantly reduced immature thrips population with 22 and 27 fl oz per 100 gal applied weekly or biweekly comparable to the standard Conserve.
32172	Sarisa 50SL (Cyclaniliprole)	Western Flower Thrips (Frankliniella occidentalis)	Marigold (Tagetes sp.) 'Safari Yellow'	Field Container	Nansen	CA	2017	Foliar	Excellent control of immatures with 22 and 27 fl oz per 100 gal sprayed 3 times biweekly or 5 times weekly; comparable to Conserve +Capsil.

PR#	Product (Active Ingredient)	Target	Crop	Production Site	Researcher	State	Year	Application Type	Results
32370	Sarisa 50SL (Cyclaniliprole)	Western Flower Thrips (Frankliniella occidentalis)	Marigold (Tagetes sp.) 'Safari Yellow'	Greenhouse	Nansen	CA	2018	Foliar	Overall results showed no significant differences in thrips numbers and plant biomass between treatments including the standard Conserve and Untreated.
32370	Sarisa 50SL (Cyclaniliprole)	Western Flower Thrips (Frankliniella occidentalis)	Marigold (Tagetes sp.) 'Safari Yellow'	Greenhouse	Vafaie	TX	2015	Foliar	100 % control of immatures with 22 and 28 fl oz per 100 gal + Preference applied 5 times weekly.
32172	Sarisa 50SL (Cyclaniliprole)	Western Flower Thrips (Frankliniella occidentalis)	Marigold (Tagetes sp.) 'Small Bloom Orange'	Field Container	Vafaie	TX	2017	Foliar	No significant reduction of thrips population and damage with 22 and 27 fl oz per 100 gal + Capsil; data showed no differences between treatments including Check.
32172	Sarisa 50SL (Cyclaniliprole)	Western Flower Thrips (Frankliniella occidentalis)	Marigold (Tagetes sp.) T. patula 'Hero Orange'	Field Container	Davis	MI	2016	Foliar	Did not significantly reduce population with 22 and 27 fl oz per 100 gal + Capsil 1 and 2 weeks after initial application. Subsequent data not reliable due to effects of predators.
32370	Sarisa 50SL (Cyclaniliprole)	Western Flower Thrips (Frankliniella occidentalis)	Marigold (Tagetes sp.) T. patula 'Yellow Boy'	Greenhouse	Davis	MI	2015	Foliar	Excellent control with 22 and 28 fl oz per 100 gal + Capsil applied weekly; much better than the standard Hachi-Hachi applied biweekly.
32370	Sarisa 50SL (Cyclaniliprole)	Western Flower Thrips (Frankliniella occidentalis)	Marigold (Tagetes sp.) T. patula 'Yellow Boy'	Greenhouse	Davis	MI	2017	Foliar	No consistent reduction of adult and immature thrips with 22 and 27 fl oz per 100 gal applied 5 times weekly or 3 times biweekly.
32370	Sarisa 50SL (Cyclaniliprole)	Western Flower Thrips (Frankliniella occidentalis)	Marigold (Tagetes sp.) 'Taishan Yellow'	Greenhouse	Gilrein	NY	2015	Foliar	Effective control of immatures and adults with 22 and 28 fl oz per 100 gal + Capsil applied 5 times weekly.
32370	Sarisa 50SL (Cyclaniliprole)	Western Flower Thrips (Frankliniella occidentalis)	Marigold (Tagetes sp.) 'Taishan Yellow'	Greenhouse	Gilrein	NY	2017	Foliar	Mediocre control of a very low immature population with 22 and 27 fl oz per 100 gal + Capsil applied weekly or biweekly; comparable to Overture.

PR#	Product (Active Ingredient)	Target	Crop	Production Site	Researcher	State	Year	Application Type	Results
32370	Sarisa 50SL (Cyclaniliprole)	Western Flower Thrips (Frankliniella occidentalis)	Marigold (Tagetes sp.) 'Yellow Boy'	Greenhouse	Hotchkiss	MI	2018	Foliar	Excellent control of immatures with 22 and 27 fl oz per 100 gal applied 5 times weekly; comparable to the standard Pylon.
32370	Sarisa 50SL (Cyclaniliprole)	Western Flower Thrips (Frankliniella occidentalis)	Marigold (Tagetes sp.) 'Yellow Boy'	Greenhouse	Hotchkiss	MI	2019	Foliar	Effective control of nymphs and adults with 22 and 27 fl oz per 100 gal applied 5 times weekly; better than the standard Pylon.
33142	Sarisa 50SL (Cyclaniliprole)	Chilli Thrips, Yellow Tea Thrips (Scirtothrips dorsalis)	Indian Hawthorn (Rhaphiolepis indica)	Greenhouse	Dale	FL	2017	Foliar	No significant differences in damaged leaves between treatments, including untreated check. A heavy aphid infestation and sooty molds might have affected results.
28762	Scimitar CS (Lambda-cyhalothrin)	Privet Thrips (Dendrothrips ornatus)	New Mexico Privet, Desert Olive (Forestiera neomexicana)	Field In-Ground	Cranshaw	CO	2008	Foliar	Trial was sprinkler irrigated 3 hours after treatment. Good control at 5 fl oz per 100 gal; equal to Conserve
28759	Scimitar CS (Lambda-cyhalothrin)	Western Flower Thrips (Frankliniella occidentalis)	Cosmos (Cosmos sp.) C. binnatus 'Picotee'	Field In-Ground	Cranshaw	CO	2008	Foliar	Trial 1: Under continuous reinvasion by migrant thrips in this trial, no treatment provided significant control
28759	Scimitar CS (Lambda-cyhalothrin)	Western Flower Thrips (Frankliniella occidentalis)	Cosmos (Cosmos sp.) C. binnatus 'Picotee'	Field In-Ground	Cranshaw	CO	2008	Foliar	Trial 2: Under continuous reinvasion by migrant thrips in this trial, no treatment provided significant control
25469	Sevin SL (Carbaryl)	Gynaikothrips uzeli (Gynaikothrips uzeli)	Weeping Fig (Ficus benjamina)	Greenhouse	Held (MSU)	MS	2005	Foliar	Experiment 3: Poor control with foliar application of 32 oz per 100 gal as assessed by counts of infested cuttings.
33573	SP3014 (SP3014)	Western Flower Thrips (Frankliniella occidentalis)	Marigold (Tagetes sp.)	Greenhouse	Hotchkiss	MI	2019	Foliar	Non-significant control of nymphs and adults with 13 and 26 fl oz per 100 gal applied 5 times weekly; numerically better than the standard Pylon at the higher rate.
33573	SP3014 (SP3014)	Western Flower Thrips (Frankliniella occidentalis)	Marigold (Tagetes sp.) 'Safari Yellow'	Greenhouse	Nansen	CA	2018	Foliar	Overall results showed no significant differences in thrips numbers and plant biomass between treatments including the standard Conserve and Untreated.

PR#	Product (Active Ingredient)	Target	Crop	Production Site	Researcher	State	Year	Application Type	Results
33573	SP3014 (SP3014)	Western Flower Thrips (Frankliniella occidentalis)	Marigold (Tagetes sp.) 'Yellow Boy'	Greenhouse	Hotchkiss	MI	2018	Foliar	No significant control of immatures with 13 and 26 fl oz per 100 gal applied 5 times weekly.
26713	Surround WP (Kaolin Clay)	Gynaikothrips uzeli (Gynaikothrips uzeli)	Weeping Fig (Ficus benjamina)	Greenhouse	Held (MSU)	MS	2006	Foliar	Experiment 3: Good to excellent reduction in gall formation when used as protectant pre-infestation.
25566	Talstar Flowable Insecticide/Miticide (Bifenthrin)	Gladiolus Thrips (Thrips simplex)	Gladiolus (Gladiolus sp.)	Cold Storage	Davis	MI	2006	Dipped in solution	Excellent efficacy at 21.7 oz per 100 gal.
25467	Talstar NF (Bifenthrin)	Gynaikothrips uzeli (Gynaikothrips uzeli)	Weeping Fig (Ficus benjamina)	Greenhouse	Held (MSU)	MS	2005	Foliar	Experiment 2: Excellent control with foliar application of 12.5 fl oz per 100 gal as assessed by counts of infested cuttings.
25467	Talstar NF (Bifenthrin)	Gynaikothrips uzeli (Gynaikothrips uzeli)	Weeping Fig (Ficus benjamina)	Greenhouse	Held (MSU)	MS	2005	Foliar	Experiment 3: Great control with foliar application of 12.5 fl oz per 100 gal as assessed by counts of infested cuttings.
25467	Talstar NF (Bifenthrin)	Gynaikothrips uzeli (Gynaikothrips uzeli)	Weeping Fig (Ficus benjamina)	Greenhouse	Held (MSU)	MS	2006	Foliar	Experiment 1: Excellent control at 12.45 ml/liter
25467	Talstar NF (Bifenthrin)	Gynaikothrips uzeli (Gynaikothrips uzeli)	Weeping Fig (Ficus benjamina)	Greenhouse	Held (MSU)	MS	2006	Foliar	Experiment 1: Excellent control at 12.45 ml/liter.
30507	Tank Mix: A16901B + CA4803A (A169091B + CA4803A)	Western Flower Thrips (Frankliniella occidentalis)	Marigold (Tagetes sp.) 'Boy O Boy'	Greenhouse	Ludwig	TX	2010	Foliar	Experiment 1: Good control of immatures with 6.7 oz + 32 fl oz per 100 gal applied 3 times weekly; comparable to Avid and Pylon.
30507	Tank Mix: A16901B + CA4803A (A169091B + CA4803A)	Western Flower Thrips (Frankliniella occidentalis)	Marigold (Tagetes sp.) T. erecta 'Vanilla'	Greenhouse	Gilrein	NY	2011	Foliar	Excellent control of immatures with 6.7 oz + 32 fl oz per 100 gal applied weekly; better than Conserve applied weekly.
29929	Tank Mix: Aria + Rycar (Flonicamid + pyrfluquinazon)	Western Flower Thrips (Frankliniella occidentalis)	Rose (Rosa sp.) 'Rainbow Knockout'	Greenhouse	Parrella	CA	2010	Foliar	Did not significantly reduce adults and immatures at 120 g + 6.38 fl oz per 100 gal at 4 days after 1st applic; no significant treatment effects after 1st applic due to high population variability.

PR#	Product (Active Ingredient)	Target	Crop	Production Site	Researcher	State	Year	Application Type	Results
30311	Tank Mix: Aria + Rycar (Flonicamid + pyrfluquinazon)	Western Flower Thrips (Frankliniella occidentalis)	Marigold (Tagetes sp.) 'Boy O Boy'	Greenhouse	Ludwig	TX	2010	Foliar	Experiment 1: Good control of immatures with 120 g + 6.38 fl oz per 100 gal applied biweekly; comparable to Avid and Pylon.
30311	Tank Mix: Aria + Rycar (Flonicamid + pyrfluquinazon)	Western Flower Thrips (Frankliniella occidentalis)	Marigold (Tagetes sp.) T. patula 'Yellow Boy'	Greenhouse	Davis	MI	2010	Foliar	Excellent control of immatures (from flonicamid) at 120 gr + 6.38 fl oz per 100 gal applied 3 times biweekly.
29930	Tank Mix: BotaniGard + Tick-Ex (Beauveria bassiana + Metarhizium anisophliae)	Western Flower Thrips (Frankliniella occidentalis)	Rose (Rosa sp.) 'Rainbow Knockout'	Greenhouse	Parrella	CA	2010	Foliar	Did not significantly reduce adults and immatures with 2 lb + 29 fl oz per 100 gal at 4 days after 1st applic; no significant treatment effects after 1st applic due to high population variability.
30312	Tank Mix: BotaniGard + Tick-Ex (Beauveria bassiana + Metarhizium anisophliae)	Western Flower Thrips (Frankliniella occidentalis)	Marigold (Tagetes sp.) 'Boy O Boy'	Greenhouse	Ludwig	TX	2010	Foliar	Experiment 2: No significant reduction of immatures with 2 lb + 29 fl oz per 100 gal applied 5 times weekly.
30312	Tank Mix: BotaniGard + Tick-Ex (Beauveria bassiana + Metarhizium anisophliae)	Western Flower Thrips (Frankliniella occidentalis)	Marigold (Tagetes sp.) T. patula 'Yellow Boy'	Greenhouse	Davis	MI	2010	Foliar	Poor overall control of immatures at 2 lb + 29 oz per 100 gal applied at weekly intervals.
28010	Tank Mix: Botanigard 22WP + BW130 (Beauveria bassiana + BW130)	Western Flower Thrips (Frankliniella occidentalis)	Marigold (Tagetes sp.) T. patula 'Yellow Boy'	Greenhouse	Davis	MI	2008	Foliar	Good control after 2nd application at 2 lb per 100 gal + 325 ml per 100 L; inferior to Conserve and Mesurol.
25471	Tempo Ultra (Cyfluthrin)	Gynaikothrips uzeli (Gynaikothrips uzeli)	Weeping Fig (Ficus benjamina)	Greenhouse	Held (MSU)	MS	2005	Foliar	Experiment 3: Mediocre initial control with foliar application of 160 per 100 gal as assessed by counts of infested cuttings.
34221	TetraCURB Concentrate (Rosemary Oil)	Western Flower Thrips (Frankliniella occidentalis)	Marigold (Tagetes sp.)	Greenhouse	Hotchkiss	MI	2019	Foliar	Non-significant control of nymphs and adults with 64 and 128 fl oz per 100 gal applied 5 times weekly; numerically better than the standard Pylon at the lower rate.

PR#	Product (Active Ingredient)	Target	Crop	Production Site	Researcher	State	Year	Application Type	Results
34222	TetraCURB Organic (Rosemary Oil)	Western Flower Thrips (Frankliniella occidentalis)	Marigold (Tagetes sp.)	Greenhouse	Hotchkiss	MI	2019	Foliar	Non-significant control of nymphs and adults with 64 and 128 fl oz per 100 gal applied 5 times weekly.
28767	TickEx EC (Metarhizium anisophliae)	Privet Thrips (Dendrothrips ornatus)	New Mexico Privet, Desert Olive (Forestiera neomexicana)	Field In-Ground	Cranshaw	CO	2008	Foliar	Trial was sprinkler irrigated 3 hours after treatment. Good control at 29 fl oz per 100 gal; equal to Conserve
27982	TickEx EC (Metarhizium anisophliae)	Western Flower Thrips (Frankliniella occidentalis)	Cosmos (Cosmos sp.) C. binnatus 'Picotee'	Field In-Ground	Cranshaw	CO	2008	Foliar	Under continuous reinvasion by migrant thrips in this trial, no treatment provided significant control
26976	TickEx EC (Metarhizium anisophliae)	Western Flower Thrips (Frankliniella occidentalis)	Transvaal Daisy (Gerbera sp.) G. jamesonii	Greenhouse	Cloyd	KS	2007	Foliar	Limited effectiveness 7 days after treatment with 29 fl oz per 100 gal to gerbera cut flowers.
26976	TickEx EC (Metarhizium anisophliae)	Western Flower Thrips (Frankliniella occidentalis)	Transvaal Daisy (Gerbera sp.) G. jamesonii 'Festival Dark Eye Golden Yellow'	Greenhouse	Canas	OH	2007	Foliar	No significant control of nymphs and adults at 29 fl oz per 100 gal.
30520	TickEx EC (Metarhizium anisophliae)	Western Flower Thrips (Frankliniella occidentalis)	Geranium (Pelargonium sp.)	Greenhouse	Frank	NC	2010	Foliar	Significantly reduced adults and immatures with 29 fl oz per 100 gal applied 5 times weekly.
29931	TickEx EC (Metarhizium anisophliae)	Western Flower Thrips (Frankliniella occidentalis)	Rose (Rosa sp.) 'Rainbow Knockout'	Greenhouse	Parrella	CA	2010	Foliar	Did not significantly reduce adults and immatures with 29 fl oz per 100 gal at 4 days after 1st applic; no significant treatment effects after 1st applic due to high population variability.
27724	TickEx EC (Metarhizium anisophliae)	Western Flower Thrips (Frankliniella occidentalis)	Marigold (Tagetes sp.) 'Boy O Boy'	Greenhouse	Ludwig	TX	2010	Foliar	Experiment 2: No significant reduction of immatures with 29 fl oz per 100 gal applied 5 times weekly.
27724	TickEx EC (Metarhizium anisophliae)	Western Flower Thrips (Frankliniella occidentalis)	Marigold (Tagetes sp.) 'Hero Mix'	Greenhouse	Oetting	GA	2008	Foliar	Slow-acting but significantly reduced immatures on flowers and damage to flowers and foliage at 29 fl oz per 100 gal; equal to standard
27724	TickEx EC (Metarhizium anisophliae)	Western Flower Thrips (Frankliniella occidentalis)	Marigold (Tagetes sp.) T. erecta 'Vanilla'	Greenhouse	Gilrein	NY	2011	Foliar	Poor control of immatures with 29 fl oz per 100 gal applied weekly; comparable to Conserve applied weekly.

PR#	Product (Active Ingredient)	Target	Crop	Production Site	Researcher	State	Year	Application Type	Results
27724	TickEx EC (Metarhizium anisophliae)	Western Flower Thrips (Frankliniella occidentalis)	Marigold (Tagetes sp.) T. patula 'Bonanza Yellow'	Greenhouse	Chong	SC	2010	Foliar	Did not significantly reduce adults and immatures at 29 fl oz per 100 gal applied weekly.
27724	TickEx EC (Metarhizium anisophliae)	Western Flower Thrips (Frankliniella occidentalis)	Marigold (Tagetes sp.) T. patula 'Yellow Boy'	Greenhouse	Davis	MI	2007	Foliar	Virtually no control at 15 and 29 oz per 100 gal
27724	TickEx EC (Metarhizium anisophliae)	Western Flower Thrips (Frankliniella occidentalis)	Marigold (Tagetes sp.) T. patula 'Yellow Boy'	Greenhouse	Davis	MI	2008	Foliar	Poor control at 29 fl oz per 100 gal.
27724	TickEx EC (Metarhizium anisophliae)	Western Flower Thrips (Frankliniella occidentalis)	Marigold (Tagetes sp.) T. patula 'Yellow Boy'	Greenhouse	Davis	MI	2009	Foliar	Poor control of immatures at 29 fl oz per 100 gal.
28240	TickEx EC (Metarhizium anisophliae)	Western Flower Thrips (Frankliniella occidentalis)	Vervain (Verbena sp.) 'Lorgo Purple'	Greenhouse	Oetting	GA	2008	Foliar	Significantly reduced immatures on and damage to foliage at 29 fl oz per 100 gal; inferior to standard
28048	TickEx EC (Metarhizium anisophliae)	Western Flower Thrips (Frankliniella occidentalis)	Zinnia (Zinnia sp.) Z. elegans 'Short Stuff'	Greenhouse	Parrella	CA	2007	Foliar	Low thrips density; no significant difference from untreated check at 15 and 29 oz per 100 gal
28048	TickEx EC (Metarhizium anisophliae)	Western Flower Thrips (Frankliniella occidentalis)	Zinnia (Zinnia sp.) Z. elegans 'Short Stuff'	Greenhouse	Parrella	CA	2008	Foliar	Did not significantly reduce number of thrips at 29 oz per 100 gal.
26688	TriCon (BW 420) (Sodium tetraborahydrate decahydrate)	Western Flower Thrips (Frankliniella occidentalis)	Transvaal Daisy (Gerbera sp.) G. jamesonii 'Royal'	Greenhouse	Parrella	CA	2006	Foliar	Poor efficacy at 80 oz per 100 gal as assessed by adult populations on yellow sticky cards after plants placed into paper bags.
27373	TriCon (BW 420) (Sodium tetraborahydrate decahydrate)	Western Flower Thrips (Frankliniella occidentalis)	Impatiens, New Guinea (Impatiens hawkeri) I. wallerana 'Super Elfin Cherry'	Greenhouse	Chen	LA	2006	Foliar	Experiment 1: Good control at 50 oz per 100 gal; at least equal to standard; moderate flower injury
27373	TriCon (BW 420) (Sodium tetraborahydrate decahydrate)	Western Flower Thrips (Frankliniella occidentalis)	Impatiens, New Guinea (Impatiens hawkeri) I. wallerana 'Super Elrin Cherry'	Greenhouse	Chen	LA	2006	Foliar	Experiment 2: Excellent efficacy with 50 oz per 100 gal.
27374	TriCon (BW 420) (Sodium tetraborahydrate decahydrate)	Western Flower Thrips (Frankliniella occidentalis)	Petunia (Petunia sp.) 'Dreams Midngiht'	Greenhouse	Chen	LA	2006	Foliar	Experiment 2: Excellent control of a low infestation with 50 oz per 100 gal.

PR#	Product (Active Ingredient)	Target	Crop	Production Site	Researcher	State	Year	Application Type	Results
27374	TriCon (BW 420) (Sodium tetraborahydrate decahydrate)	Western Flower Thrips (Frankliniella occidentalis)	Petunia (Petunia sp.) 'Dreams Midnight'	Greenhouse	Chen	LA	2006	Foliar	Experiment 1: Good control of a low infestation at 50 oz per 100 gal; at least equal to standard; minor flower injury
28705	TriCon (BW 420) (Sodium tetraborahydrate decahydrate)	Western Flower Thrips (Frankliniella occidentalis)	Marigold (Tagetes sp.) T. patula 'Yellow Boy'	Greenhouse	Davis	MI	2008	Foliar	Poor control at 50 fl oz per 100 gal.
26712	TriCon (BW 420) (Sodium tetraborahydrate decahydrate)	Gynaikothrips uzeli (Gynaikothrips uzeli)	Weeping Fig (Ficus benjamina)	Greenhouse	Held (MSU)	MS	2006	Foliar	Experiment 1: Ineffective at 7.8 ml per liter.
25690	TriCon (BW 420) (Sodium tetraborahydrate decahydrate)	Gladiolus Thrips (Thrips simplex)	Gladiolus (Gladiolus sp.)	Cold Storage	Davis	MI	2006	Dipped in solution	Poor to fair efficacy at 1 oz per gal.
26061	TriStar 30SG (Acetamiprid)	Western Flower Thrips (Frankliniella occidentalis)	Transvaal Daisy (Gerbera sp.) G. jamesonii 'Royal'	Greenhouse	Parrella	CA	2006	Foliar	Poor efficacy at 8 oz per 100 gal as assessed by adult populations on yellow sticky cards after plants placed into paper bags.
26119	TriStar 30SG (Acetamiprid)	Western Flower Thrips (Frankliniella occidentalis)	Purslane (Portulaca sp.)	Greenhouse	Ludwig	TX	2007	Foliar	Virtually no efficacy at 96 g per 100 gal
26119	TriStar 30SG (Acetamiprid)	Western Flower Thrips (Frankliniella occidentalis)	Purslane (Portulaca sp.) P. grandiflora	Greenhouse	Ludwig	TX	2006	Foliar	Excellent efficacy on nymphs 7 and 14 DAT at 8 oz per 100 gal; trial ended prematurely
26048	TriStar 30SG (Acetamiprid)	Western Flower Thrips (Frankliniella occidentalis)	Rose (Rosa sp.) 'Red Sunblase'	Greenhouse	Walsh	WA	2006	Foliar	Significantly reduced adult and immature thrips at 5 oz per 100 gal
28906	TriStar 30SG (Acetamiprid)	Western Flower Thrips (Frankliniella occidentalis)	Marigold (Tagetes sp.) 'Jaguar'	Greenhouse	Gilrein	NY	2008	Foliar	Some reduction of adults, but excellent control of immatures by 30 days after treatment using 8 oz per 100 gal.
26751	TriStar 30SG (Acetamiprid)	Chilli Thrips, Yellow Tea Thrips (Scirtothrips dorsalis)	Rose (Rosa sp.) 'Knockout'	Greenhouse	Ludwig	TX	2007	Foliar	Significantly reduced adult and immature thrips on flowers and terminals at 96 g per 100 gal
26751	TriStar 30SG (Acetamiprid)	Chilli Thrips, Yellow Tea Thrips (Scirtothrips dorsalis)	Rose (Rosa sp.) 'Knockout'	Greenhouse	Ludwig	TX	2008	Foliar	Significantly reduced immature thrips at 96 g per 100 gal

PR#	Product (Active Ingredient)	Target	Crop	Production Site	Researcher	State	Year	Application Type	Results
25554	TriStar 30SG (Acetamiprid)	Gladiolus Thrips (Thrips simplex)	Gladiolus (Gladiolus sp.)	Cold Storage	Davis	MI	2006	Dipped in solution	Excellent efficacy at 64 gram per 100 gal with or without Capsil.
33574	V-10433 (V-10433)	Western Flower Thrips (Frankliniella occidentalis)	Marigold (Tagetes sp.)	Greenhouse	Hotchkiss	MI	2019	Foliar	Non-significant control of nymphs and adults with 11 and 22 fl oz per 100 gal applied 5 times weekly; numerically better than the standard Pylon at the higher rate.
33574	V-10433 (V-10433)	Western Flower Thrips (Frankliniella occidentalis)	Marigold (Tagetes sp.) 'Safari Yellow'	Greenhouse	Nansen	CA	2018	Foliar	Overall results showed no significant differences in thrips numbers and plant biomass between treatments including the standard Conserve and Untreated.
33574	V-10433 (V-10433)	Western Flower Thrips (Frankliniella occidentalis)	Marigold (Tagetes sp.) 'Yellow Boy'	Greenhouse	Hotchkiss	MI	2018	Foliar	No significant control of immatures with 11 and 22 fl oz per 100 gal applied twice biweekly.
31538	Venerate CG (Burkholderia rinojensis strain A396)	Western Flower Thrips (Frankliniella occidentalis)	Transvaal Daisy (Gerbera sp.) 'Festival Orange'	Greenhouse	Villavicencio	CA	2013	Foliar	No significant differences between treatments, including untreated check, mainly due to high population variability.
33001	Venerate CG (Burkholderia rinojensis strain A396)	Western Flower Thrips (Frankliniella occidentalis)	Mock Vervain, Hybrid (Glandularia X hybrida) 'Quartz Blue'	Field Container	Chong	SC	2016	Foliar	No significant differences between treatments due to low and very variable numbers of thrips in this study.
31609	Venerate CG (Burkholderia rinojensis strain A396)	Western Flower Thrips (Frankliniella occidentalis)	Impatiens, New Guinea (Impatiens hawkeri) 'Super Elfin Red'	Greenhouse	Chen	LA	2012	Foliar	Significantly reduced number of nymphs with 16 and 32 oz per 100 gal; inferior to Botanigard.
31499	Venerate CG (Burkholderia rinojensis strain A396)	Western Flower Thrips (Frankliniella occidentalis)	Rose (Rosa sp.) 'Belinda's Dream' and 'Caldwell Pink'	Greenhouse	Heinz	TX	2012	Foliar	No significant differences found between treatments including untreated and standards in this trial.
31432	Venerate CG (Burkholderia rinojensis strain A396)	Western Flower Thrips (Frankliniella occidentalis)	Marigold (Tagetes sp.) 'Discovery Yellow'	Greenhouse	Heinz	TX	2013	Foliar	Poor control of immatures and adults with 16 fl oz per 100 gal.
31432	Venerate CG (Burkholderia rinojensis strain A396)	Western Flower Thrips (Frankliniella occidentalis)	Marigold (Tagetes sp.) 'Safari Yellow'	Greenhouse	Nansen	CA	2016	Foliar	Did not significantly reduce immature thrips population with 1 and 2 qt per 100 gal applied weekly.

PR#	Product (Active Ingredient)	Target	Crop	Production Site	Researcher	State	Year	Application Type	Results
29081	Venerate CG (Burkholderia rinojensis strain A396)	Western Flower Thrips (Frankliniella occidentalis)	Marigold (Tagetes sp.) 'Safari Yellow'	Field Container	Nansen	CA	2017	Foliar	Excellent control of immatures with 1 and 2 qt per 100 gal sprayed 5 times weekly; comparable to Conserve + Capsil.
31432	Venerate CG (Burkholderia rinojensis strain A396)	Western Flower Thrips (Frankliniella occidentalis)	Marigold (Tagetes sp.) 'Safari Yellow'	Greenhouse	Vafaie	TX	2015	Foliar	Poor control of immatures with 32 and 64 fl oz per 100 gal applied 5 times weekly.
29081	Venerate CG (Burkholderia rinojensis strain A396)	Western Flower Thrips (Frankliniella occidentalis)	Marigold (Tagetes sp.) 'Small Bloom Orange'	Field Container	Vafaie	TX	2017	Foliar	No significant reduction of thrips population and damage with 1 and 2 qt per 100 gal; data showed no differences between treatments including Check.
31432	Venerate CG (Burkholderia rinojensis strain A396)	Western Flower Thrips (Frankliniella occidentalis)	Marigold (Tagetes sp.) T. erecta 'Discovery Yellow'	Greenhouse	Heinz	TX	2014	Foliar	No control of immatures with 0.5 and 1 gal per 100 gal + Hyperactive applied 5 times.
31432	Venerate CG (Burkholderia rinojensis strain A396)	Western Flower Thrips (Frankliniella occidentalis)	Marigold (Tagetes sp.) T. erecta 'Taishan Yellow'	Greenhouse	Gilrein	NY	2014	Foliar	Poor control of immatures and adults with 1 and 2 gal per 100 gal applied 5 times weekly.
31432	Venerate CG (Burkholderia rinojensis strain A396)	Western Flower Thrips (Frankliniella occidentalis)	Marigold (Tagetes sp.) T. erecta 'Vanilla'	Greenhouse	Gilrein	NY	2013	Foliar	Did not significantly reduce immatures with 1 and 2 gal per 100 gal applied weekly.
29081	Venerate CG (Burkholderia rinojensis strain A396)	Western Flower Thrips (Frankliniella occidentalis)	Marigold (Tagetes sp.) T. patula 'Hero Orange'	Field Container	Davis	MI	2016	Foliar	Did not significantly reduce population with 1 and 2 qt per 100 gal 1 and 2 weeks after initial application. Subsequent data not reliable due to effects of predators.
31432	Venerate CG (Burkholderia rinojensis strain A396)	Western Flower Thrips (Frankliniella occidentalis)	Marigold (Tagetes sp.) T. patula 'Queen Sophia'	Greenhouse	Davis	MI	2014	Foliar	Poor control with 1 and 2 gal per 100 gal applied 4 times; inferior to the standard Hachi-Hachi.
31432	Venerate CG (Burkholderia rinojensis strain A396)	Western Flower Thrips (Frankliniella occidentalis)	Marigold (Tagetes sp.) T. patula 'Yellow Bonanza'	Greenhouse	Davis	MI	2012	Foliar	Poor and mediocre control of immatures with 1 and 2 gal per 100 gal applied 4 times weekly.
31432	Venerate CG (Burkholderia rinojensis strain A396)	Western Flower Thrips (Frankliniella occidentalis)	Marigold (Tagetes sp.) T. patula 'Yellow Boy'	Greenhouse	Davis	MI	2015	Foliar	Poor control with 1 and 2 qt per 100 gal applied weekly; comparable to the standard Hachi-Hachi applied biweekly.

PR#	Product (Active Ingredient)	Target	Crop	Production Site	Researcher	State	Year	Application Type	Results
31432	Venerate CG (Burkholderia rinojensis strain A396)	Western Flower Thrips (Frankliniella occidentalis)	Marigold (Tagetes sp.) T. patula 'Yellow Boy'	Greenhouse	Davis	MI	2017	Foliar	No consistent reduction of adult and immature thrips with 1 and 2 qt per 100 gal applied 5 times weekly.
31432	Venerate CG (Burkholderia rinojensis strain A396)	Western Flower Thrips (Frankliniella occidentalis)	Marigold (Tagetes sp.) 'Taishan Yellow'	Greenhouse	Gilrein	NY	2015	Foliar	Poor control of immatures and adults with 1 and 2 qt per 100 gal applied 5 times weekly.
31432	Venerate CG (Burkholderia rinojensis strain A396)	Western Flower Thrips (Frankliniella occidentalis)	Marigold (Tagetes sp.) 'Taishan Yellow'	Greenhouse	Gilrein	NY	2017	Foliar	No control of a very low immature population with 1 and 2 qt per 100 gal applied weekly.
33144	Venerate CG (Burkholderia rinojensis strain A396)	Chilli Thrips, Yellow Tea Thrips (Scirtothrips dorsalis)	Indian Hawthorn (Rhaphiolepis indica)	Greenhouse	Dale	FL	2017	Foliar	No significant differences in damaged leaves between treatments, including untreated check. A heavy aphid infestation and sooty molds might have affected results.
32125	Xxpire 40WG (Spinetoram + sulfoxaflor)	Western Flower Thrips (Frankliniella occidentalis)	Marigold (Tagetes sp.) 'Safari Bolero'	Greenhouse	Vafaie	TX	2015	Foliar	Excellent control of immatures with 3.5 fl oz per 100 gal + Capsil applied biweekly.
32125	Xxpire 40WG (Spinetoram + sulfoxaflor)	Western Flower Thrips (Frankliniella occidentalis)	Marigold (Tagetes sp.) T. erecta 'Discovery Yellow'	Greenhouse	Heinz	TX	2014	Foliar	Mediocre control of immatures with 2 and 3.5 fl oz per 100 gal + Capsil applied 3 times.
32125	Xxpire 40WG (Spinetoram + sulfoxaflor)	Western Flower Thrips (Frankliniella occidentalis)	Marigold (Tagetes sp.) T. erecta 'Taishan Yellow'	Greenhouse	Gilrein	NY	2014	Foliar	Excellent control of immatures and adults with 2.0 and 3.5 oz per 100 gal + Capsil applied 3 times biweekly.
32125	Xxpire 40WG (Spinetoram + sulfoxaflor)	Western Flower Thrips (Frankliniella occidentalis)	Marigold (Tagetes sp.) T. patula 'Queen Sophia'	Greenhouse	Davis	MI	2014	Foliar	Mediocre control with 2.0 and 3.5 fl oz + Capsil per 100 gal applied twice; comparable to the standard Hachi-Hachi.
32125	Xxpire 40WG (Spinetoram + sulfoxaflor)	Western Flower Thrips (Frankliniella occidentalis)	Marigold (Tagetes sp.) T. patula 'Yellow Boy'	Greenhouse	Davis	MI	2015	Foliar	Mediocre control with 3.5 fl oz + Capsil per 100 gal applied biweekly; comparable to the standard Hachi-Hachi applied biweekly.
32125	Xxpire 40WG (Spinetoram + sulfoxaflor)	Western Flower Thrips (Frankliniella occidentalis)	Marigold (Tagetes sp.) 'Taishan Yellow'	Greenhouse	Gilrein	NY	2015	Foliar	Effective control of immatures and adults with 3.5 oz per 100 gal + Capsil applied 3 times biweekly.

Label Suggestions

Based upon data accumulated through the IR-4 research program in 2006-2015, we suggest that registrants consider the following updates to their current product labels:

- For the following listed products, adding bulb dip applications for gladiolus thrips would benefit growers primarily in Michigan and the Pacific Northwest:
    - Allectus
    - Avid
    - Celero
    - Conserve
    - Discus
    - EcoTrol
    - Flagship
    - Marathon
- For weeping fig thrips, it is recommended that the flowable formulations of Talstar be updated for this pest.

For western flower thrips, given the variable control achieved with the standards (Avid, Conserve, Mesurol) it is highly recommended that the materials not yet registered be done so quickly to provide growers the ability to employ sound resistance management practices.

Appendix 1: Contributing Researchers

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