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How To Use Pesticides Effectively

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K-STATE

THE Fred C. Gloeckner FOUNDATION, INC.

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Presentation Overview

- Pesticides
- Pesticide Applications
- Target Pest Life Stages
- Reasons For "Poor" Control With Pesticides
- Summary

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Pesticides

What Is A Pesticide?

- Chemical substance designed to kill pests such as insects and mites. Also, diseases, weeds, or rodents.
- Any chemical, substance, or mixture of substances used to control, prevent, destroy, disable, or repel a given pest (insect and/or mite) population.

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Application Types: Foliar Spray, or Drench or Granular to the Growing Medium.

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Factors Associated With Maximizing Pesticide Effectiveness

- Timing
- Coverage
- Frequency

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Egg->Larva (Nymph)->Pupa->Adult

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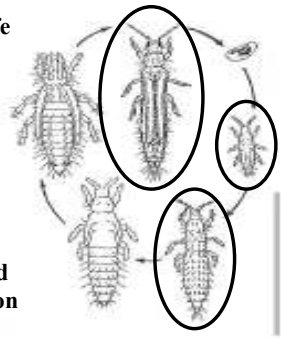
Western Flower Thrips Life Cycle

* Egg
* Nymphs (n=2)
* Pupae (n=2)
* Adult

Lifecycle may be completed in 18 to 24 days depending on temperature



Pesticides

Failure To Control Or Manage Insect And Mite Pest Populations Is Not Always Due To Resistance!

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Reasons Why Pesticides Fail To Regulate Insect And Mite Pest Populations

- Not using correct pesticide (insecticide or miticide).
- Not using correct label rate.
- Not using appropriate application method.
- Not thoroughly covering all plant parts with spray application.

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- Watering heavily after applying systemic insecticides: leaching material through container.
- Not adjusting the pH of the spray solution.
- Not applying pesticides when susceptible life stages (larvae/nymphs and adults) are predominantly present.

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- Not applying pesticides frequently enough; especially during spring through fall. Also, when dealing with multiple or over-lapping generations (with different age structures).
- Not routinely scouting crop to determine effectiveness of the pesticide application.
- Not storing pesticides properly.

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The life stages (eggs, larvae, nymphs, pupae, and adults) of most insect and mite pests are located on the underside of leaves including whiteflies and…

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…populations of the twospotted spider mite.

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Watering Heavily After Applying A Drench Or Granular Application Of A Systemic Insecticide May Leach-Out The Active Ingredient.

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Spray Solution pH

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Impact of Spray Solution pH

* pH (potential hydrogen): logarithmic scale from 1 to 14. A pH of 7 is considered neutral. A pH below 7 is acid and above 7 is basic (alkaline).
* Hydrolysis: chemical process in which molecules are cleaved into smaller compounds.
* Alkaline Hydrolysis: process in which a pH >7 causes some pesticides to endure chemical degradation.
* Alkaline water: breaks apart or fragments pesticide molecules that have no insecticidal or miticidal activity.
* Some pesticides may undergo acid hydrolysis (pH <7.0).
* Where do you think you can obtain information pertaining to alkaline or acid hydrolysis, or desirable water solution pH?

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Optimum Water pH of Certain Insecticides and Miticides Registered for Use in Greenhouses

Common Name	Trade Name	Optimal Water pH
Abamectin	Avid	6.0 to 7.0
Acephate	Orthene	5.5 to 6.5
Azadirachtin	Ornazin	5.5 to 6.5
Bacillus thuringienisis	Dipel/Gnatrol	5.0 to 8.0
Fluvalinate	Mavrik	5.0 to 7.0
Imidacloprid	Marathon II	5.0 to 7.0
Methiocarb	Mesurol	6.5 to 7.0
Pyriproxyfen	Distance	5.5 to 6.5
Pymetrozine	Endeavor	7.0 to 9.0
Spinosad	Conserve	6.5 to 7.5

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Ways To Avoid Water pH Issues

* Follow manufacturer label directions associated with appropriate water pH.
* Routinely test water pH since the pH of water can change during the growing season. Collect water samples in a glass jar. Determine the pH immediately after collection using pH paper.
* Apply spray solution as soon as possible after mixing. It is recommended to use a pesticide spray solution (or mixture) within 6 hours or less to avoid potential problems associated with pH.

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* Adjust water pH with buffers or water-conditioning agents, which are compounds that can alleviate problems with the process of alkaline hydrolysis and modify pH of the spray solution in order to maintain the pH within the desired range (5 to 7). Can use acetic acid (vinegar) to lower pH or household ammonia to raise pH.
* Websites:
http://floriculture.osu.edu/archive/apr04/SpraySolutionPH.html

http://www.griffins.com/tech_service/bulletins_2003_4_optimum pesticide_performance.asp

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Most Important: Scouting Your Crops Is Key In Avoiding Outbreaks Of Insect And/Or Mite Pest Populations.

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Improper Pesticide Storage May Impact Pesticide Effectiveness.

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Summary

- Timing, coverage, and frequency are important in using pesticides effectively.
- Failure to control or regulate insect and/or mite pest populations is not always due to resistance.
- Be sure to scout your crop to determine the effectiveness of your pesticide application whether it be foliar sprays, or drenches or granules applied to the growing medium.

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Thank You For Your Attention!