

Radiant[®]

SC

Western Flower Thrips Management in Strawberries

INSECTICIDE



Western Flower Thrip damage to a strawberry

The Problem

- Western flower thrips (*Frankliniella occidentalis*), or WFT have become a major pest in strawberries and other crops.
- WFT populations can build up on a number of crops or weed species and then migrate into strawberries when these other plants stop flowering, are harvested or dry down.
- Larvae and adults feed on flowers, buds, terminals, leaves and fruit.
- They feed by rasping open plant cells and sucking up the cell contents. The damaged cells then collapse, leaving either bronze- or silver-colored streaks or blotches.
- Early signs of damage include discolored stigmas and anthers in the flowers.
- WFT begin feeding on the developing seeds within the flowers and then feed on the surface of the fruit as it expands.
- The scar tissue that forms is not as elastic as healthy tissue, so cracks develop as the fruit expands. WFT also can cause discolored seeds on the strawberry fruit.
- The bronzing or russetting that results from WFT feeding is usually worse around the cap (calyx) end of the fruit.

Field Identification

- WFT are difficult to detect and control because of their small size and tendency to hide in protected plant parts. Regular field scouting is essential for early detection of WFT.
- WFT are small (1 to 2 mm), slender, soft-bodied insects that may be yellow to light brown in color. Adults have distinctive fringed wings.
- WFT can develop from egg to adult in as little as two weeks in favorable temperatures.
- Adult females insert eggs into plant tissue under the epidermis.
- Second-stage larvae drop to the soil to go through prepupal and pupal stages, and finally return to the plants as adults.
- Adults can move long distances on air currents to find new food. Adults and larvae also can be transported on transplants.

Natural Predators

- Natural enemies, such as minute pirate bugs (*Orius* spp.), lacewings and predatory mites (*Amblyseius* spp.), can provide significant control of WFT populations.



(Clockwise from Top Left, Adult WFT, Larval WFT, Minute Pirate Bug)



Resistance Management is Key

- The key to managing resistance is to reduce selection pressure by rotating between insecticides with different modes of action and reducing the number of insecticide applications.
- It may be necessary to use nonchemical control methods and rotate to insecticides that may not provide the highest level of control.
- The back page provides information that can help reduce selection pressure and determine whether resistance develops and how quickly it develops.

Best Management Practices for Western Flower Thrips

1. **Identify the thrips in the field.** Make sure they are WFT and not a different, less damaging thrips species. Fruit bronzing can be caused by several factors other than WFT. Do not base treatment decisions only on the presence of bronzed fruit. Make sure WFT are present.
2. **Make applications when really needed.** Use economic thresholds, where they exist, to make spray decisions. Example: The University of California Integrated Pest Management recommendation is to treat only if populations reach 10 thrips per blossom.
3. **Make predators welcome.** Regardless of the target pest (armyworms, leafrollers, thrips), choose insecticides that preserve WFT predators as much as possible. Where *Lygus* spp. are NOT a problem, maximize the number of alternative host plants at field edges (such as sunflower and certain weeds), which can harbor natural enemies of WFT. Do not treat these alternative hosts with herbicides or insecticides.
4. **Use recommended label rates.** Control may be improved with the use of a surfactant. Consult your local Extension agent, university, consultant, pest control adviser or Dow AgroSciences representative for recommendations.



NOTE: If poor WFT control is encountered after an insecticide application, **DO NOT** simply apply the same product again at a higher rate or shorter spray interval and hope for better control. Determine if poor control resulted from application error, equipment failure or unfavorable environmental conditions during or after application. If none of these occurred, contact your local agricultural adviser and the product manufacturer so they can determine if the WFT population is becoming resistant.

For more information about the biology of WFT, visit www.ThripsManagement.com

5. **Rotate insecticides that have different modes of action** (are in different insecticide groups). See Table A for rotation options.
6. **Maintain good sanitation** by destroying crop material immediately after final harvest. This can be accomplished by removing plastic and disking under the crop.
7. **Avoid sequential sprays on sequential plantings** or on double-cropped plantings of other host crops. Use an areawide treatment approach to reduce continuous spraying of WFT populations that move from one planting to the next.
8. **Consider using UV-reflective/metallized plastic mulch.** This will reduce the number of WFT adults that move into planted fields.
9. **Time applications for optimum effectiveness.** Make insecticide applications only when larvae or adults are present — sprays will not reach eggs inside plant tissue or pupae at the base of plants. Scout fields to monitor WFT and natural enemy populations, and time sprays to conserve natural enemies.



Rotate Products Used for Western Flower Thrips Control

- Spinetoram (Radiant™ SC insecticide) and spinosad (Success® Naturallyte®, SpinTor® 2SC Naturallyte and Entrust® Naturallyte insect control) have been very effective for controlling WFT.
- Spinetoram and spinosad share the same mode of action (MOA) and are classified by the Insecticide Resistance Action Committee (IRAC) as Group 5 insecticides.
- Overuse of any insecticide MOA (increased frequency of use and/or increased rate of application) will lead to increased selection pressure in WFT. This may result in resistance development in some areas.
- For Group 5 insecticides to remain effective against WFT, it is absolutely necessary to follow resistance management requirements listed on the product labels.
- Do not make more than two consecutive applications of Group 5 insecticides. If treatment is required after two applications of Group 5 insecticides, rotate to another class of effective insecticides for at least two applications.
- Alternate products for control of WFT are listed in the table. These products may not be as effective as spinetoram or spinosad, but by using these in rotation with Group 5 insecticides, the effectiveness of all products against WFT will be prolonged.
- **Do not rotate products that are in the same MOA group.**



Product(s)	Active Ingredient	Mode of Action* or Group	Rate	Special Consideration
Dibrom 8 Emulsive	Naled	1B	1 pt./A	Not for use in AK or AZ.
Malathion 5	Malathion	1B	1B 1.5-3.0 pt./A	
Malathion 8	Malathion	1B	1B 1.5-2.0 pt./A	
M-Pede®	Sodium salts of fatty acids	Insecticidal soap	1%-2% v/v	Registered for organic use. Good mix partner for other MOA.

*Established by the Insecticide Resistance Action Committee (IRAC).

The product suggestions in the table are based on the results of WFT efficacy trials reported in Arthropod Management Tests, published by the Entomological Society of America. Other information in the tables comes from the product labels as reported by CDMS (www.cdms.net). These suggestions are consistent with the resistance management recommendations developed by IRAC. Dow AgroSciences is a member of IRAC International and IRAC-US.

For more information, visit www.irc-online.org.

For more information about additional Insect Resistance Management options, visit
www.ThripsManagement.com

www.dowagro.com



Solutions for the Growing World