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New York Berry News

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Special Spotted Wing Drosophila Edition

Originally from Asia, spotted wing drosophila (SWD) first showed up in California in about 2005 and has spread north into Oregon, Washington, and western Canada, south into Florida and recently was reported at significant numbers in North Carolina and Michigan. In 2011 SWD was reported throughout the Northeast. SWD looks superficially like your everyday Vinegar Fly Drosophila Melanogaster of genetics fame, but vinegar flies are generally not a serious economic threat to fruit growers. Female vinegar flies typically lay eggs in damaged and/or overripe fruit and hence, are mostly just a nuisance. On the other hand, female SWD have very robust ovipositors (the rear end portion of the fly used for egg laying) and lay their eggs in ripening and ripe, marketable fruit leading to damage and contamination with maggots.

The Current SWD Situation in NY

What follows is a summary of trap catches and other information to date regarding the presence of SWD in NY for the 2012 season. SWD has been positively identified in 8 counties in NY so far: Albany, Monroe, Orange, Orleans, Suffolk, Tompkins, Ulster and Yates. Adults have been observed in some raspberry plantings outside of traps; larvae reared out of infested raspberry, blackberry, strawberry fruit have been positively identified as SWD.

SWD in New York – 2012 First Alert! **July 6, 2012**. 1 male and 1 female adult SWD were caught in an apple cider vinegar trap in a **Yates County** cherry orchard (non-fruiting) during the past week. This first confirmed 2012 trap catch comes much earlier than last year's first confirmed catch on September 17, 2011, potentially placing summer raspberries and early blueberries at risk for possible infestations. Growers should be monitoring for adults in small fruit plantings and keeping plantings as clean harvested as possible.

Tompkins County

July 12, 2012. 1 male SWD was caught in an apple cider vinegar trap in Tompkins County near a wood where a wild host species (Twinberry) was present this week. No SWD larvae were found in the twinberry fruit nor any adults or larvae found in a nearby blueberry crop.

Orange County

July 16, 2012. 2 male SWD were caught in an apple cider vinegar trap in Orange County in a stone fruit orchard. No SWD larvae have been observed in fruit from this orchard.

Orleans County

July 16, 2012. 1 male and 1 female SWD were caught in an apple cider vinegar trap in Orleans County in a peach orchard. No SWD adults have been reared out of the peach fruit from the orchard.

July 31, 2012. Another male SWD trapped in a vinegar trap in the woods today from an Orleans County Fruit Farm. We also reared out a couple of adult SWD from summer raspberry from same farm.

Monroe County

July 16, 2012. 1 male Spotted Wing Drosophila (SWD) was caught over store-bought mushrooms in a sweep net in Monroe County in a wooded back yard. **June 27, 2012**. 3 female Spotted Wing Drosophila (SWD) were reared out of strawberries collected from a field in Monroe County. *From John Jaenike, Professor, Department of Biology, University of Rochester.*

Suffolk County

July 24, 2012. Spotted Wing Drosophila (SWD) numbers in traps are up in Suffolk County. Four apple cider vinegar traps in raspberry caught over thirty SWD in the past seven days (last checked on 7/24/12). A couple of SWD were also found in traps set on peach, blueberry, and grape. The numbers in raspberries at this time of the season are higher than the numbers we found in late September last year (2011). Last two week's high trap catches potentially placing raspberries and blackberries at risk for possible infestations. Most of the blueberries in Eastern Long Island will likely be harvested by this week, so there will be less chance of contamination in blueberries. Fruit damage assessment is in progress.

July 31, 2012. SWD numbers in Long Island are down. The other fruit flies in the traps are down too. Again the females outnumbered the males. This week we found a couple of pupae from blueberry rearing. Appears to be SWD, waiting for adult emergence.

Ulster County

July 23, 2012. 1 male SWD was caught at a farm in Ulster County this week in a vinegar trap in a blackberry planting.

July 31, 2012. Confirmed SWD oviposition was observed in Ulster County in unripened blackberry with significant injury to fruit.

Albany County

July 24, 2012. 2 male SWD caught at an Albany County farm - traps located in black raspberries and blueberries.

Funding for research and extension efforts for this pest in NY and the NE has been applied for but so far has not been forthcoming. Voluntary monitoring efforts have been undertaken by Dr. Greg Loeb, who is leading SWD effort for NY and the NE, along with Juliet Carroll from the NY IPM program and various regional fruit program members. Many thanks to those who have traps deployed and are reporting weekly trap counts and positive SWD larvae reared to maturity out of fruit. Thanks also to the Hudson Valley Fruit Program's Mike Fargione for constructing and maintaining a SWD map for the state: (http://hudsonvf.cce.cornell.edu/NY%20SWD%20Monitoring.html) and Peter Jentsch for providing the blackberry SWD photo plate that appears as part of this special issue.

Spotted Wing Drosophila Fact Sheets Completed and On-line - *Kathy Demchak (kdemchak@psu.edu) and Dave Biddinger (djb134@psu.edu), Penn State University; and Bryan Butler (bbutlers@umd.edu), University of Maryland*

Thanks to receiving funding from the NE-IPM Center, we were able to complete a set of 4 full-color factsheets on spotted wing drosophila (SWD), and they are now available on-line. These fact sheets were written with northeastern U.S. growers of the most susceptible crops (raspberries, blackberries, day-neutral strawberries, and cherries) in mind.

"Spotted Wing Drosophila, Part 1: Overview and Identification" is available at http://goo.gl/ZQLTO and briefly summarizes the concern surrounding spotted wing drosophila. The factsheet contains photographs that illustrate in detail the differences between SWD adults and other local fruit fly species that could be mistaken for SWD.

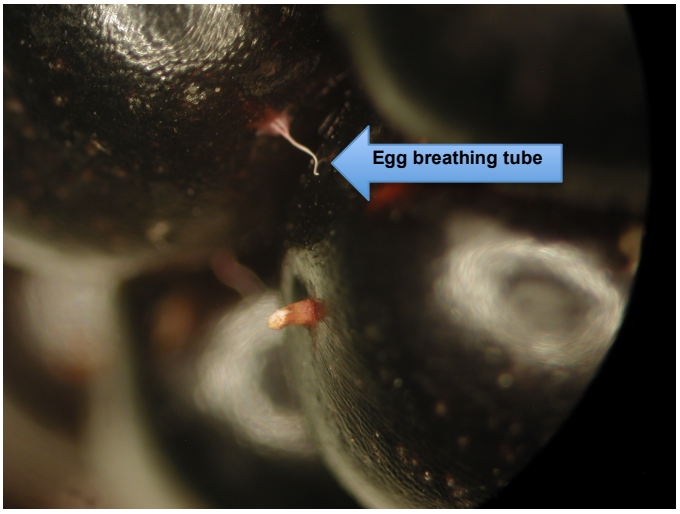
"Spotted Wing Drosophila, Part 2: Natural History" is available at http://goo.gl/wSA82. This factsheet discusses the life cycle of SWD in detail, along with explaining how environmental conditions and nearby crops can affect presence and numbers of SWD.

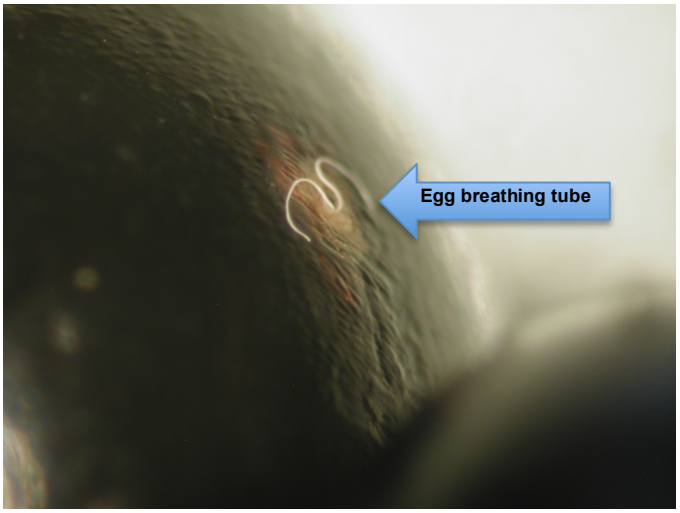
"Spotted Wing Drosophila, Part 3: Monitoring", at http://goo.gl/7t7kU covers how to monitor for SWD adults in fields, and SWD larvae is fruit. The fact sheet also provides details on how to store and ship samples should identification from others be needed.

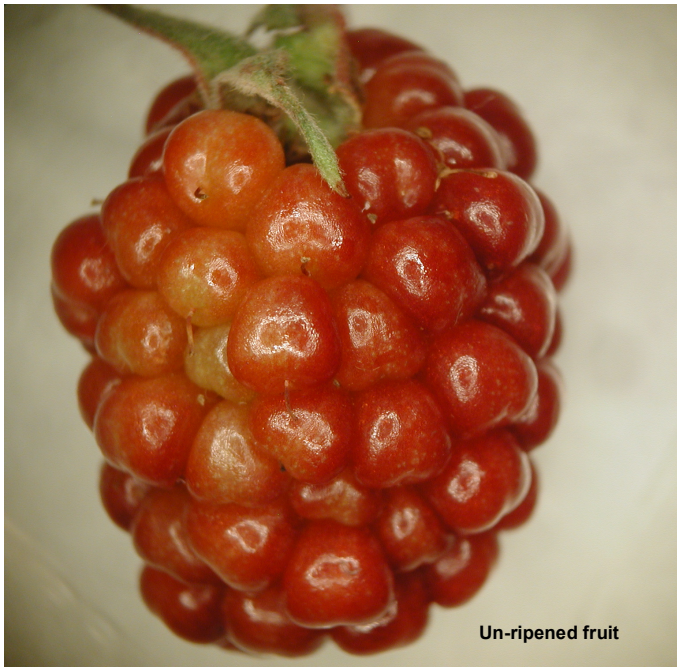
"Spotted Wing Drosophila, Part 4: Management" at http://goo.gl/13WsR discusses cultural practices for minimizing populations, and chemical options that will provide effective control for growers of susceptible crops.

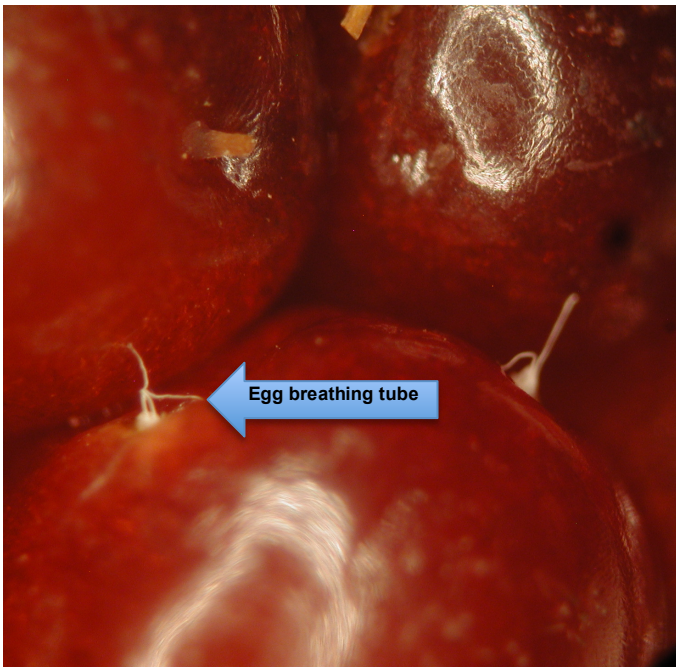
Hudson Valley Small Fruit – July 30, 2012 (Marlboro, NY)

The first SWD trap detections at this site occurred on 23 July with < 2 flies per trap observed. Blackberries infested with eggs, are believed to be spotted wing drosophila (SWD), were found on 30 July. Egg-laying and egg 'respiratory horns' in 'green' fruit with newly hatched larva observed within near-ripen fruit.









Recent 2(ee) recommendation Approvals – Spotted Wing Drosophila

The NYS Department of Environmental Conservation recently approved 2(ee) recommendations for the unlabeled pest spotted wing drosophila for the following insecticides and crops:

- Malathion 8 Aquamul (EPA Reg. No. 34704-474) – for use on blackberries, boysenberries, dewberries, loganberries, raspberries, and strawberries;
- Brigade WSB Insecticide (EPA Reg. No. 279-3108) – for use on caneberries;
- Brigade 2EC Insecticide/Miticide (EPA Reg. No. 279-3313) – for use on caneberries;
- Entrust (EPA Reg. No. 62719-282) – for use on strawberries;
- Entrust SC (EPA Reg. No. 62719-621) – for use on strawberries.

Users must have a copy of the appropriate 2(ee) recommendation in their possession at the time of use. Copies of the above 2(ee) recommendations have been posted to the "NYS 2(ee) Recommendations and Categories" section of our web site. (Direct link to find the recommendations: http://pmep.cce.cornell.edu/regulation/2ee/index.html.) They should also be available on PIMS (http://pims.psur.cornell.edu) shortly.

When using a 2(ee) recommendation, remember to follow any applicable directions, restrictions, and precautions on the primary product label.

Spotted Wing Drosophila, New Threat to Some Small Fruit Crops - *Greg Loeb, Dept. Entomology & Cathy Heidenreich, Dept. Horticulture, Cornell University*

As many of you have probably learned, spotted wing drosophila (SWD) *Drosophila suzukii* has started showing up in New York and other Northeastern states. Recall this invasive insect fruit pest was first detected in the Northeast in late summer of 2011. It is particularly a threat to soft-skinned fruit crops such as raspberries, blackberries, blueberries, and day-neutral strawberries (so far June-bearing strawberries in the Northeast have mostly escaped infestation). Since the spring of 2012 a number of us have been monitoring traps for adult SWD at fruit farms throughout New York. In addition, we have been examining ripe fruit for fruit fly larvae and if found, rearing the larvae out to determine species (remember there are several native species of fruit flies that will lay eggs in overripe fruit).

Starting in early July of 2012 we have been finding low numbers of adult SWD in our apple cider vinegar traps in upstate NY and Hudson Valley. Until very recently, we have not been finding fruit fly larvae in ripe and overripe fruit, although this is starting to change. Hence, NY growers are reviewing what control options are available. Note that an important cultural control practice is keeping fields as clean picked as possible. But if SWD shows up at your fruit farm, insecticides are likely to be necessary to keep susceptible fruit clean. The good news here is that adult SWD appear quite susceptible to a number of classes of insecticides (e.g. organophosphates such as malathion and pyrethroids such as bifenthrin). The not so good news for NY growers is that there are relatively few products that are legal to use because SWD, or fruit flies more generally, are not included on many pesticide labels. However, this is changing. We very recently received DEC approval 2(ee) label recommendations for several insecticides for use against SWD and hopefully we will have additional options soon. Below we summarize what is currently legal to use for suppression or control of SWD for bushberries, caneberries and strawberries.

Bushberries:

1. *Spinetoram* [Delegate WG) (EPA # 62719-541) with 2(ee) recommendation. Recommended rate is 3-6 oz/A. Restrictions: Preharvest interval = 3 d; Do not apply more than a total of 19.5 oz/A per year; Do not make more than 2 consecutive applications of Group 5 insecticides (spinetoram, spinosad). If additional applications are necessary, rotate to a different class of material; Do not make more than 6 applications per calendar year; Minimum treatment interval is 6 d. **IRAC group: 5**

2. *Spinosad* [Entrust, Entrust SC] (EPA # 62719-282, 62719-621) with 2(ee) recommendations. OMRI listed. Recommended rate 1.25-2 oz/A for Entrust and 4-6 fl oz/A for Entrust SC. Restrictions: Preharvest interval = 3 d; Do not apply more than a total of 9 oz/A of Entrust or 29 fl oz/A Entrust SC per year; Do not make more than 2 consecutive applications of Group 5 insecticides (spinetoram, spinosad). If additional applications are necessary, rotate to a different class; Do not make more than 6 applications per calendar year or more than 3 applications per crop; Minimum treatment interval is 6 d. **IRAC group: 5**

3. *Azadirachtin* [AzaSol, Molt-X] (EPA # 81899-4, 68539-11). Recommended rate is 6 oz/A in 50 gallons of water/A for AzaSol and 10 fl oz/A for Molt-X. Restrictions: Preharvest interval 0 d. **IRAC group: UN (unknown)**

4. *Bifenthrin* [specifically Triple Crown] (EPA NO 279-3440). This product is a mixture of three active ingredients including bifenthrin, zeta-cypermethrin and imidacloprid. Bifenthrin is a synthetic pyrethroid and is the same active as is found in Brigade. Recommended rate is 6.4-10.6 fl oz/A. Restrictions: Triple Crown is a Restricted Use Pesticide; Preharvest interval is 3 d; Minimum application interval is 7 d; Maximum amount of Triple Crown allowed per crop season is 31.0 fl oz/A. See maximum usage table on label when applying more than one of these active ingredients. Minimum spray volume is 20 gal/A of water by ground or 5 gal/A by air. **IRAC groups: 3A,** (bifenthrin and zeta-cypermethrin) **and 4A** (imidacloprid)

5. *Bifenthrin* [specifically Brigade WSB] (EPA #279-3108) with 2(ee) recommendation. Recommended rate 5.3 to 16 oz/A. Restrictions: Brigade WSB is a restricted use pesticide. Preharvest interval is 1 d; Do not make applications less than 7 d apart. Do not apply more than 0.5 lb active ingredient per acre per season. **IRAC group: 3A**

6. *Fenpropathrin* [Danitol 2.4EC] (EPA #59639-35). Recommended rate 16 fl oz/A. Restrictions: Danitol is a restricted use Pesticide; Preharvest interval is 3 d; No not exceed 32 fl oz/A per season. **IRAC group: 3A**

7. *Phosmet* [Imidan 70-W] (EPA # 10163-169). Recommended rate 1.33 lb/A. Preharvest interval = 3 d. Do not apply more than 7 1/8 lb/A per year. Do not make more than 5 applications per year. **IRAC group: 1B**

Caneberries:

1. *Spinetoram* [Delegate WG) (EPA # 62719-541) with 2(ee) recommendation. Recommended rate is 3-6 oz/A. Restrictions: Preharvest interval = 1 d; Do not apply more than a total of 19.5 oz/A per year; Do not make more than 2 consecutive applications of Group 5 insecticides (spinetoram, spinosad). If additional applications are necessary, rotate to a different class of material; Do not make more than 6 applications per calendar year; Minimum treatment interval is 4 d. **IRAC group: 5**

2. *Spinosad* [Entrust, Entrust SC] (EPA # 62719-282, 62719-621) with 2(ee) recommendations. OMRI listed. Recommended rate 1.25-2 oz/A for Entrust and 4-6 fl oz/A for Entrust SC. Restrictions: Preharvest interval = 1 d; Do not apply more than a total of 9 oz/A of Entrust or 29 fl oz/A Entrust SC per year; Do not make more than 2 consecutive applications of Group 5 insecticides (spinetoram, spinosad). If additional applications necessary, rotate to a different class; Do not make more than 6 applications per calendar year; Minimum treatment interval is 5 d. **IRAC group: 5**

3. *Azadirachtin* [AzaSol, Molt-X] (EPA # 81899-4, 68539-11). Recommended rate is 6 oz/A in 50 gallons of water/A for AzaSol and 10 fl oz/A for Molt-X. Restrictions: Preharvest interval 0 d. **IRAC group: UN (unknown)**

4. *Bifenthrin* [specifically Triple Crown] (EPA # 279-3440). This product is a mixture of three active ingredients including bifenthrin, zeta-cypermethrin and imidacloprid. Bifenthrin is a synthetic pyrethroid and is the same active as is found in Brigade. Recommended rate is 6.4 – 10.3 fl oz/A. Restrictions: Triple Crown is a Restricted Use Pesticide; Preharvest interval is 3 d; Minimum application interval is 7 d; Maximum amount of Triple Crown allowed per season is 10.3 fl oz/A. See maximum usage table on label when applying more than one of these active ingredients. Minimum spray volume is 50 gal/A by ground or 10 gal/A by air. **IRAC group: 3A**

5. *Bifenthrin* [specifically Brigade WSB, Brigade 2EC] (EPA #279-3108, EPA #279-3313) with 2(ee) recommendations. Recommended rate 8.0 to 16 oz/A for Brigade WSB and 3.2-6.4 fl oz per/A for Brigade 2EC. Restrictions: Brigade WSB and Brigade 2EC are restricted use pesticides. Preharvest interval is 3 d; Only one application may be made postbloom. Do not apply more than 0.2 lb active per acre per season. **IRAC groups: 3A,** (bifenthrin and zeta-cypermethrin) **and 4A** (imidacloprid)

6. *Fenpropathrin* [Danitol 2.4EC] (EPA #59639-35). Recommended rate 16 fl oz/A. Restrictions: Danitol is a restricted use Pesticide; Preharvest interval is 3 d; No not exceed 32 fl oz/A per season. **IRAC group: 3A**

7. *Malathion* [Malathion 8 Aquamul] (EPA #34704-474) for raspberries, blackberries, boysenberries, dewberries, and loganberries only with 2(ee) recommendation. Recommended rate 2 pts/A. Restrictions: Preharvest interval is 1 d. **IRAC group: 1B**

Strawberries:

1. *Spinetoram* [Radiant SC) (EPA # 62719-545) with 2(ee) recommendation. Recommended rate is 6-10 fl oz/A. Restrictions: Preharvest interval = 1 d; Do not apply more than a total of 39 fl oz/A per year; Do not make more than 2 consecutive applications of Group 5 insecticides (spinetoram, spinosad). If additional applications are necessary, rotate to a different class of material; Do not make more than 5 applications per calendar year; Minimum treatment interval is 4 days. **IRAC group: 5**

2. *Azadirachtin* [AzaSol, Molt-X] (EPA # 81899-4, 68539-11). Recommended rate is 6 oz/A in 50 gallons of water/A for AzaSol and 10 fl oz/A for Molt-X. Restrictions: Preharvest interval 0 d. **IRAC group: UN (unknown)**

3. *Fenpropathrin* [Danitol 2.4EC] (EPA #59639-35). Recommended rate 16 – 21.33 fl oz/A. Restrictions: Danitol is a restricted use Pesticide; Preharvest interval is 2 d; No not make more than 2 applications totaling 42.67 fl oz/A to the same planting in 12 consecutive months. **IRAC group: 3A**

4. *Bifenthrin* [specifically Brigade WSB] (EPA #279-3108) with 2(ee) recommendation. Recommended rate 8.0 to 16 oz/A. Restrictions: Brigade WSB is a restricted use pesticide. Preharvest interval is 0 d; Do not apply more than 0.5 lb active per acre per season. For ground application, apply full cover spray in minimum of 50 gallons of finished spray per acre. **IRAC group: 3A**

5. *Spinosad* [Entrust, Entrust SC] (EPA # 62719-282, 62719-621) with 2(ee) recommendations. OMRI listed. Recommended rate 1.25-2 oz/A for Entrust and 4-6 fl oz/A for Entrust SC. Restrictions: Preharvest interval = 1 d; Do not apply more than a total of 9 oz/A of Entrust or 29 fl oz/A Entrust SC per year; Do not make more than 2 consecutive applications of Group 5 insecticides (spinetoram,

spinosad). If additional applications are necessary, rotate to a different class; Do not make more than 5 applications per calendar year; Minimum treatment interval is 5 d. **IRAC group: 5**

6. *Malathion* [Malathion 8 Aquamul] (EPA #34704-474) only with 2(ee) recommendation. Recommended rate 2 pts/A. Restrictions: Preharvest interval is 3 d. **IRAC group: 1B**

Where to go for more SWD information

Cornell Fruit Resources Spotted Wing Drosophila page: http://www.fruit.cornell.edu/berry/pestalerts/drosophilapestalert.html

Where to go for information on other invasive berry pests

Cornell Fruit Resources Pest Alert page: http://www.fruit.cornell.edu/berry/pestalerts/index.html.

Resistance Management in Insect Populations – Why is it Important to My Berry Operation? – *Cathy Heidenreich, Department of Horticulture*

The arsenal of pest management products for berry crops in the US (and New York in particular) is relatively small compared to other large acreage crops such as wheat, corn, soybeans, potatoes, etc. Chemical companies looking to capture markets for these commodities are often reluctant to go through the extra effort and expense to develop additional product labels for berry crops even though the products often have efficacy against pests for both the larger commodities and berries.

Given the smaller compliment of products available for best insect management, it is imperative for growers to use them wisely to prevent development of resistance in berry insect and mite populations.

What is Resistance?

Resistance to insecticides may be defined as '*a heritable change in the sensitivity of a pest population that is reflected in the repeated failure of a product to achieve expected level of pest control when used according to the label recommendation for that pest species.*' Resistance occurs when an insecticide or acaricide (miticide) is over- or miss-used against a particular pest species. These improper usages lead to selection of resistant forms of the pest which then dominate the population over time, shifting it from susceptible to resistant. Not only does resistance develop to the specific product that has been over or miss-used; it also develops for other products with the same mode of action (effect on the pest species).

Insecticide Resistance Management and the IRAC MoA Classification

The IRAC Mode of Action (MoA) classification system is an international insecticide classification system used in resistance management. It was developed by the International Resistance Action Committee (IRAC). This classification system was developed to provide growers, advisors, extension staff, consultants and crop protection professionals with a guide to the selection of insecticides or acaricides (miticides) for use in an effective and sustainable insecticide or acaricide resistance management strategy.

To prevent or delay the development of resistance in pest populations it is advisable to use alternations, sequences or rotations of products from different IRAC MoA groups. In all cases, be sure to follow label instructions.

Insect Resistance Management (IRM) Principles Recommended and Endorsed by IRAC

• Consult a local agricultural advisor or extension services in the area for up-to-date recommendations and advice on IPM and IRM programs.

• Consider options for minimizing insecticide use by selecting early-maturing or pest-tolerant varieties of crop plants.

• Include effective cultural and biological control practices that work in harmony with effective IRM programs. Adopt all non-chemical techniques known to control or suppress pest populations, including biological sprays such as Bt's, resistant varieties, within-field refugia (untreated areas) and crop rotation.

• Where possible select insecticides and other pest management tools, which preserve beneficial insects.

• Use products at their full, recommended doses. Reduced (sub-lethal) doses quickly select populations with average levels of tolerance, whilst doses that are too high may impose excessive selection pressures.

• Appropriate, well-maintained equipment should be used to apply insecticides. Recommended water volumes, spray pressures and optimal temperatures should be used to obtain optimal coverage.

• Where larval stages are being controlled, target younger larval instars where possible because these are usually much more susceptible and therefore much more effectively controlled by insecticides than older stages.

• Use appropriate local economic thresholds and spray intervals.

• Follow label recommendations or local expert advice for use of alternations or sequences of different classes of insecticide with differing modes of action as part of an IRM strategy.

• Where there are multiple applications per year or growing season, alternate products of different MoA classes.

• In the event of a control failure, do not reapply the same insecticide but change the class of insecticides to one having a different MoA and to which there is no [locally] known cross-resistance.

• Mixtures may offer a short-term solution to resistance problems, but it is essential to ensure that each component of a mixture belongs to a different insecticide MoA class, and that each component is used at its full rate.

• Consideration should be given to monitoring for the incidence of resistance in the most commercially important situations and gauge levels of control obtained.

• Withholding use of a product to which resistance has developed until susceptibility returns may be a valid tactic if sufficient alternative chemical classes remain to provide effective control.

References:

IRAC MoA Classification Scheme Version 7.2 April 2012: http://www.irac-online.org/content/uploads/MoA-classification.pdf)

Questions or comments about the New York Berry News?

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