UtahState University COOPERATIVE EXTENSION

Tree Fruit IPM Advisory

UTAH PESTS

Weekly Orchard Pest Update, Utah State University Extension, **November 4, 2013**

Production Information and News

The Role of Native Bees in Fruit Tree Pollination and Cautions on Pesticide Use

By David Biddinger, Tree Fruit Research Entomologist, Penn State Extension

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The recent decline of both wild and domestic honeybees (*Apis mellifera*) due to mites, viruses, and other issues have caused a rise in the cost of honey bee rentals for crop pollination. Prices have increased from $35 per hive in 2006 to over $100 per hive in 2013. These factors precipitated the need to investigate potential of other bee species as pollinators for fruit trees and other crops throughout the U.S.

In Utah, there are approximately 900 species of native bees, many of which visit orchard flowers. A 2007-09 survey conducted in Pennsylvania by David Biddinger and colleagues found a complex of 50 bee species visiting apple blossoms and over 150 species collected in pan traps placed in apple orchards. Apple orchards and edge habitat (woodlots, fence rows, streams, etc.) are important sources of food and shelter for these bees.

Bee species in the genus *Osmia* are solitary bees that have been shown to be more effective at pollinating apples than honey bees. One species, known as the Japanese orchard bee (JOB), is used for pollinating over 80% of all apples in Japan, and was introduced as a pollinator of eastern U.S. orchards. In the West, the blue orchard bee has been used to pollinate almonds in California and in smaller western orchards.

The Farm Bill of 2008 acknowledged the great importance of pollen bees for agriculture by providing funding through NRCS for farmers to increase and protect pollinator habitat on farm land. Farmers are encouraged to seed strips of wildflowers along their property to encourage bee visitation to their crops, or to leave part of their property fallow to increase pollinator habitat. Thus far, little information is known about the efficacy of these wildflower strips in increasing fruit yield, or how far plantings need to be spaced in relation to crop species in order to maximize crop pollination. Many


blue orchard bee

native bees do not forage for long distances (<200 yards). If wild populations only nest along orchard borders, then apple flowers in the interiors of large blocks may not be pollinated without the help of the longer range honey bees.

Biddinger is looking at the nesting and foraging habits of native bees in a USDA-Specialty Crop Research Initiative (SCRI) grant. They have found that the bees are mostly coming into orchards from the borders. Preliminary data is indicating that most species fly less than 100 yards into an orchard from nesting sites in the adjacent habitat. For those fruit growers relying on wild bees for their pollination needs, removal of this habitat or spraying it with broad spectrum insecticides could almost completely eliminate those populations.

At an international pollinator conference held at Penn State University in August 2013, the general consensus was that Colony Collapse Disorder (CCD) of honey bees is caused by multiple factors including: a) viruses and diseases; b) two species of mites;


honey bee larvae infested with mites

beeclubpellas.blogspot.com

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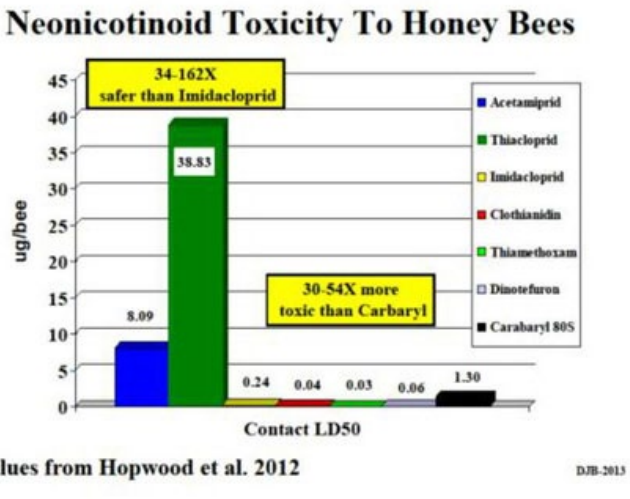

c) poor nutrition; d) the stress of interstate travel; and e) pesticide exposure. Despite these multiple causes, most of the research presented at the conference concentrated on effects of pesticide exposure. Banning a group of insecticides known as the neonicotinoids is popular with the public and many ecologists that have never worked with pesticides or IPM. Neonicotinoid insecticides have proven to be safer to most beneficial insects other than bees and promote the control of several pests such as aphids and western cherry fruit fly. A general ban of neonicotinoid insecticides would cause a reversion back to the use of carbamate and pyrethroid insecticides which would not only disrupt current IPM programs but cause growers an additional $50 to $100+ per acre in secondary pest sprays.

We have six types of neonicotinoids registered in apple that include Actara (thiacloprid), Assail (acetamiprid), Calypso (thiacloprid), Admire Pro (imidacloprid), Scorpion/Venom (dinotefuran), and Clutch (clothianidin), that are used post-bloom. Assail is the only product to attain EPA's Reduced Risk insecticide status and although the label allows spraying during bloom, this is NOT recommended in Utah.

Not all neonicotinoid insecticides are equally toxic to bees (see graph above). Using using Sevin (carbaryl) as a standard, it can be seen Assail and Calypso are much safer, but all of the other products are significantly more toxic. Lab assays at Penn State using formulated pesticides in water to simulate orchard applications found an 8 to 10-fold safety margin for the honey bee over the previous lab trials that used technical grade pesticide dissolved in acetone.

The toxicity of these products to the honey bee, however, does not correlate well with their toxicity to the Japanese orchard bee. JOB was 12 times more susceptible to Assail, but 26 times less susceptible to Admire Pro than the honey bee.

For those fruit growers relying mostly on native bees for pollination, no sprays should be applied until petal fall is completely over. Most pollen bees have only a single generation in the spring and spraying a toxic pesticide at 50% petal fall or even 80% petal fall can greatly reduce these bee populations.

Vole Management in Orchards

By Renae Moran, Extension Tree Fruit Specialist and Glen Koehler, Associate Scientist IPM, University of Maine Cooperative Extension, Orono, ME.

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Dr. Alan Eaton (University of New Hampshire) has updated his 1985 publication on vole control. The new edition includes more information on topics such as rodenticide safety and wildlife. You can download it by clicking here.

Meadow voles inhabit the sod in fruit orchards and damage trees by feeding on lower trunks. Most of the damage occurs in winter when other food sources become scarce. Trees with rough bark can be damaged, even killed outright, but voles prefer the younger trees with smooth bark. Trees planted this season are especially vulnerable and should be given

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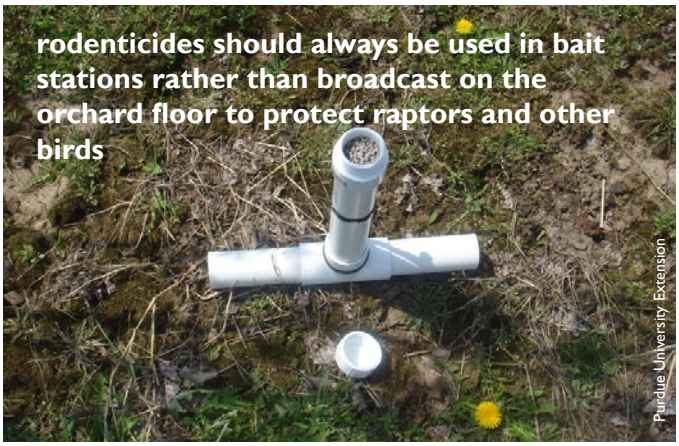
extra care this fall. After harvest is complete, rodenticide can be placed in bait stations. Zinc phosphide and chlorophacinone are both restricted use pesticides and can only be used by certified applicators or by someone under the supervision of a certified applicator.

Chlorophacinone products are less preferable than zinc phosphide because they require multiple feedings to be effective, and are slower acting, taking 1–2 weeks kill the host. A second application 1 month after the first may be needed if this product is used. With zinc-phosphide, a single application (in bait stations) after a close mowing should provide reasonable protection. The best timing is at the start of at least 3 days of fair weather. Be sure to use rubber gloves for protection.

Placing rodenticide in a bait station rather than broadcasting it over the orchard floor is safer for hawks, pheasants, turkeys, and other non-target species. Bait stations under every tree (for large trees) on the orchard perimeter can be a practical way to augment broadcast application, keeping within the limited total bait per acre. A bait station can be made from sections of 1.5 inch-diameter PVC pipe, or 15" square shingles, boards, etc. Shingles or boards should have been put in place at least two months prior to fall baiting so that voles will have established tunnels to feed in the station. If using bait stations, place 2.5 ounces of zinc phosphide pieces in/under each station.

Bait stations not only help keep rodenticide away from non-target species, they also focus vole activity at a specific spot, thus requiring less total bait, they keep the bait dry and active for a longer time, and they can be used as vole monitoring stations by placing a slice of fruit under a shingle and checking it 24 hours later for chew marks.

Meadow voles like tall grass because it shields them from their predators. Unmowed fields near the orchard can create vole problems. Keeping the orchard mowed through the summer is more effective than letting tall grass stand for weeks at a time, thus encouraging voles to establish feeding routes in the orchard. Regular mowing, combined with physical trunk guards (hardware cloth or perforated white plastic guards that sit several inches away from the trunk) can provide adequate protection in many cases. For organic orchards, regular mowing and trunk guards are the only rodent management options since no rodenticides are allowed with organic certification.



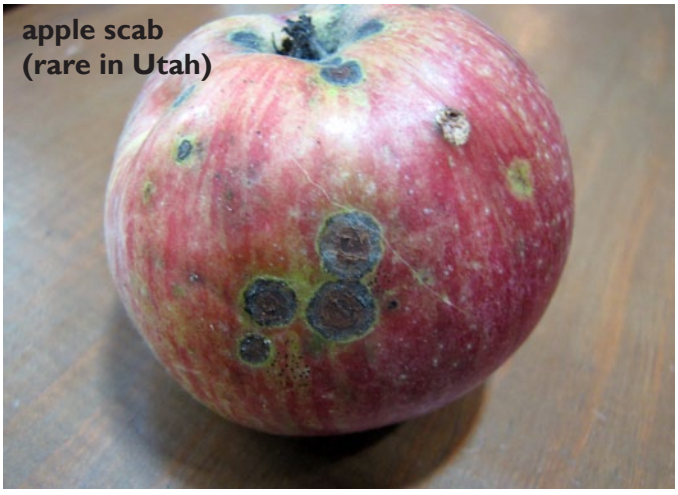
Fruit Tree Management - JUST THE BASICS

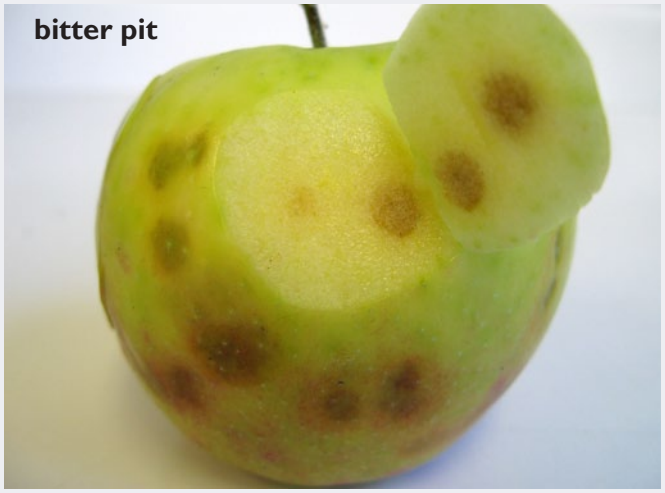
GENERAL

- For young or thin-skinned trees, apply white tree paint or tree wrap from December through early April to prevent sun scald (death of bark)
- Clean up all fallen fruit to reduce pest pressure for next year
- Install vole guards on young trees
- Mow the orchard floor to a low height and remove tall, dead weeds and grass from around the base of trees
- Prune apple and pear trees this winter
- Prune peach and cherry (if needed) in early spring

Examples of Apple Injury and Disorders

Examples of Apple Injury Seen During Harvest





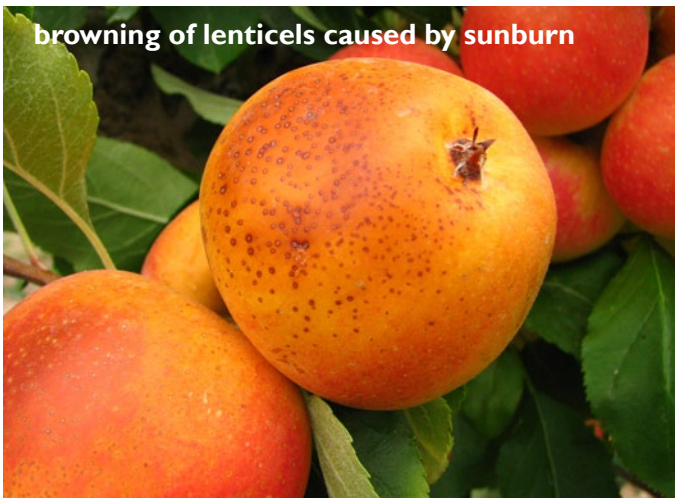
Bitter pit and late-season stinkbug injury look similar. Bitter pit lesions are usually distributed on the sides and bottom of the apple, are circular in shape, and turn the flesh brown to black. Stink bug injury is usually located higher on the fruit, is conical or rectangular in shape, and turns the flesh light tan to dark brown.

Apple Injury, continued from previous page


russeting caused by powdery mildew


bird pecking


sunburn


browning of lenticels caused by sunburn


internal flesh browning caused by sunburn


apple maggot puncture wounds on skin and brown tunnelling in flesh

Whitney Cranshaw, Colorado State University, Bugwood.org

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pansy spot caused by thrips egg-laying


earwig feeding


San Jose scale

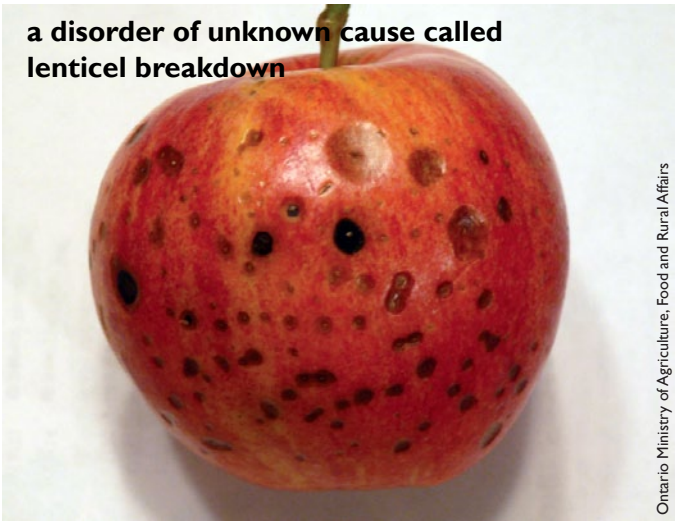

russeting of skin caused by pesticide spray

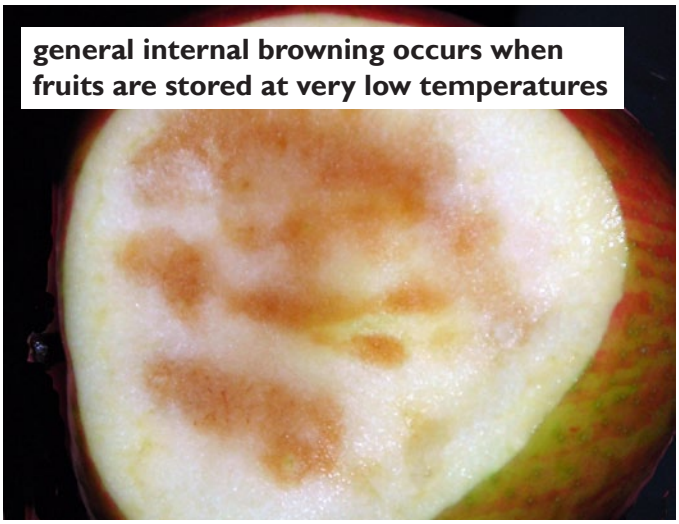

Dimpled, misshapen fruit caused by rosy apple aphid

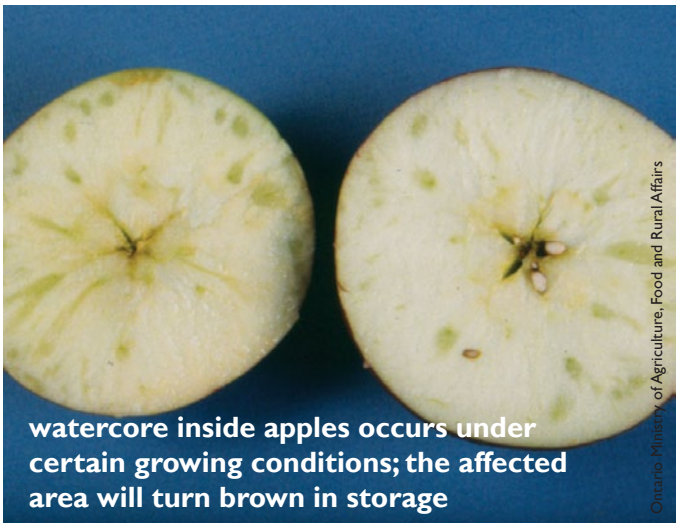

cat-facing on apple (injury occured on lower right area of apple several weeks prior)

Apple Injury, continued from previous page

Examples of Post-Harvest Apple Disorders







core flush occurs late in the storage process due to a combination of high CO2 and low storage temperature

Apple Injury, continued from previous page

snowflake-like patches on skin and internal browning (fermentation) of fruit is caused by high CO2 during storage

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