Organic Apple IPM

Lorraine P. Berkett
Department of Plant & Soil Science
105 Carrigan Drive, Hills Building
University of Vermont, Burlington, VT 05405
Phone: 802-656-0972
lorraine.berkett@uvm.edu

OrganicA website…a resource for organic apple production: http://www.uvm.edu/organica/

Integrated pest management (IPM) has been described as "a sustainable approach to managing pests that integrates biological, cultural, physical, and chemical tools in a way that minimizes economic, health, and environmental risks (National Coalition on IPM). It involves planning, monitoring, and the application of knowledge and information about the crop, the pests, and the beneficial organisms in the apple ecosystem, and how they interact, to reduce the risks of production. One of the goals of IPM is for the application of knowledge in the development and management of the orchard to prevent the need for pesticide intervention. How does 'organic' IPM differ from 'standard' IPM? In my opinion, the major difference is that in organic IPM, only organically-certifiable practices and tools are used.

The University of Vermont (UVM) is part of a multi-disciplinary, multi-state research and education project (i.e., the OrganicA Project) examining the opportunities and challenges of organic apple production in the region given the shift to 'newer' apple cultivars. As part of this project, research was initiated in 2006 in two apple orchards at the UVM Horticultural Research Center where organic IPM is being implemented and studied. Both orchards contain the apple cultivars 'Honeycrisp', 'Ginger Gold', 'Liberty', 'Macoun', and 'Zestar!'. One of the orchards (Orchard 1) was planted with young trees obtained from a nursery in 2006; all cultivars are on Budagovsky 9 rootstock except 'Honeycrisp' which is on M.26. The other orchard (Orchard 2) was an eighteen year-old orchard of 'McIntosh' and 'Liberty' trees on M.26 rootstock that was top-grafted to the five cultivars in that same spring.

The long-term goal for the two apple orchards is to develop agroecosystems in which pest populations reach an equilibrium below economic threshold levels through emphasis (i) on building 'healthy soils' where earthworms recycle leaves harboring overwintering leafminer pupae and the apple scab fungus and where microorganisms would suppress soil-inhabiting stages of the European apple sawfly and apple maggot; (ii) on providing proper nutrition and water to the trees for balanced growth (since overly vigorous or stressed trees are more susceptible to arthropod and disease problems); (iii) on pruning and training trees to enhance air circulation (important in managing disease) and to strengthen tree structure (injured or broken limbs provide entry ways for pathogens); (iv) on using physical tactics to reduce pest pressure (shredding fallen leaves to reduce overwintering apple scab fungus and leafminers; using traps to "trap-out" apple maggot flies; disrupting mating, etc.).

Since in the first two years of orchard establishment fruit production is restricted (by removal of flowers) to concentrate plant energy on developing good root systems and tree structure, pest management has focused on those organisms that affect tree growth and development through their impact on foliage and other vegetative parts of the tree (e.g., European red mite, two-spotted spider mite, leafminers, aphids, leafhoppers, apple scab, fire blight, etc.); in subsequent years, organisms that affect fruit also will be managed.

In each growing season, monitoring of population levels of both pests and natural predators and parasites by using traps or by direct observation on the plant is occurring. Weather-driven models have been used for determining peak risk periods for apple scab infection; infection risk of fire blight bacterial infection and for determining when to look for fire blight symptoms in order to quickly remove infected sites to prevent further spread; and for identifying the optimal time to manage 'flyspeck' disease (a summer disease that can be a problem during wet summers). The objective of the monitoring is to minimize spraying by determining when it is absolutely necessary to spray and the most effective time to spray based on stage of arthropod or pathogen development. This approach also will help to minimize potential non-target impacts of spray material on beneficial organisms. Suppressive tactics such as application of oil to suffocate overwintering stages of European red mites and aphids during the early part of the growing season and seeding of the predacious mite, *Typhlodromus pyri* to help replace the need of miticides have been implemented. If a spray is deemed necessary, the goal is to select the most appropriate organic material based on the target arthropod or pathogen and on most recent information on organic alternatives. Sprays have been applied uniformly within each orchard to all cultivars. Initial observations and data on the effectiveness of the organic IPM practices that have been implemented in the last two growing seasons in each orchard will be presented and discussed during the oral presentation.

On-Line OrganicA Resources:

- Organic Apple IPM: http://www.uvm.edu/organica/OrganicOrchardInformation/OrganicIPM/organicIPM.html
- An Organic IPM Checklist for Vermont: http://www.uvm.edu/~organica/OrganicOrchardInformation/OrganicIPM/checklist.html

Acknowledgement of Funding for the OrganicA Project:

- The USDA Integrated Organic Program
- The Universities of Vermont, Maine, and Arkansas
- The Vermont Tree Fruit Growers' Association