2 Organic Tree Fruit Production In New England

2.1 Introduction

There is more interest in organic tree fruit production than the actual number of certified orchards reflect and some growers are taking a new look at organic production, particularly organic apple production, given some recent research advances that address long-standing obstacles.

In the past, very few growers in the northeast have attempted to produce apples and other tree fruits organically because of the practical difficulties involved in managing pests in this region with organically-approved pesticides. Wet weather in the spring and summer coupled with the predominant apple cultivar grown in New England, 'McIntosh', present significant challenges in disease management, particularly apple scab. A large number of both native and introduced pest species attack apples and other tree fruits grown in commercial orchards.

Management of this pest complex is particularly challenging in New England, because unlike more arid production regions in the country, fruit orchards in New England are commonly in close proximity to semi-wooded areas with an abundance of naturalized and wild host species that can harbor populations of certain tree fruit pests. However, during the last 10-15 years studies have been conducted to develop management tactics that address key pests that can be incorporated into an organic program. For example recent studies have shown that the predaceous mite, *Typhlodromus pyri*, which is native to apple production regions in western New York and New England, can successfully manage populations of the key mite pest, European red mite, in commercial apple orchards so that no applications of miticides are required..

Recent research in New York state and elsewhere has shown that pheromones can be deployed in orchards to disrupt mating of key lepidopteran species such as oriental fruit moth, and borer species, and substantially reduce damage from these pests. In addition, traditional management methods such as selective fruit thinning, pruning, sanitation (frequent removal of pest infested dropped fruit), removal of wild hosts near commercial plantings, and exclusion of pests, have been shown to reduce populations of some types of pests.. Also, the trend of planting apple cultivars less susceptible to disease than 'McIntosh', may make organic production more feasible.

2.2 What is Organic Agriculture?

In 1995, the USDA National Organic Standards Board (NOSB) defined organic agriculture as "an ecological production management system that promotes and enhances biodiversity, biological cycles, and soil biological activity. It is based on minimal use of off-farm inputs and on management practices that restore, maintain, or enhance ecological harmony. The primary goal of organic agriculture is to optimize the health and productivity of interdependent communities of soil life, plants, animals and people." Before a product can be labeled "organic," a Government-approved certifier must inspect the farm where the food is grown to make sure the farmer is following all the rules necessary to meet the USDA organic standards. Detailed records are required and reviewed by the certifier. It takes three years of organic management before a farm product can be "certified" as organic. Please note that the labels "natural" and "eco-friendly" which have been used to describe agricultural products may imply that some organic methods were used in the production of the product, but this labeling does not guarantee complete adherence to organic practices as defined by law.

General Information on organic production can be found on the following websites:

- The National Organic Program: http://www.ams.usda.gov/nop/IndexIE.htm
- The National List of Allowed and Prohibited Substances: http://www.ams.usda.gov/nop/NationalList/ListHome.html
- The Organic Materials Review Institute (OMRI) Products List: http://www.omri.org/OMRI_brand_name_list.html
- Organic Food Production. Alternative Farming Systems Information Center: http://www.nal.usda.gov/afsic/ofp/

IMPORTANT: It is the grower's responsibility to ensure that any crop production practice or material used in the orchard is acceptable in their particular state's organic certification program. Some materials deemed organically acceptable on the National List may not be acceptable in some states. *Contact your certifier to know what is acceptable and to ensure compliance with regulations in your state.*

Federally accredited certifying agencies for the New England states include the following:

Maine
MOFGA Certification Services, LLC
294 Crosby Brook Rd.
P.O. Box 170
Unity, ME 04988-0170
Contact: Mary Yurlina
207-568-4142
E-mail: certification@mofga.org
Scope: crop, livestock, wild crop, handling

Connecticut and Massachusetts
Baystate Organic Certifiers
683 River St.
Winchendon, MA 01475
Contact: Don Franczyk
978-297-4171
E-mail: baystateorganic@earthlink.net
Scope: crop, livestock, wild crop, handling

New Hampshire
NH Dept. Agriculture Markets, & Food
25 Capitol St.
P.O. Box 2042
Concord, NH 03302-2042
Contact: Victoria M. Smith
603-271-3685
E-mail: vsmith@agr.state.nh.us
Scope: crop, livestock, wild crop, handling

Rhode Island
Rhode Island Department of Environmental Management
Division of Agricultural and Resource Marketing
235 Promenade St.
Providence, RI 02908
Contact: Matt Green
401-222-2781
E-mail: matt.green@dem.ri.gov
Scope: crop and handling

Vermont
Vermont Organic Farmers, LLC
NOFA Vermont
P.O. Box 697
Richmond, VT 05477
Contact: Nicole Dehne
802-434-4122
E-mail: nicdehne@hotmail.com
Website: www.nofavt.org
Scope: crop, livestock, wild crop, handling

Detailed recordkeeping is critical in organic production to receive certification and to maintain it. Contact your state certifier to find out what is required.

Organic apple production guidelines for New England have yet to be established. This publication uses the symbol **"§"** to indicate materials that are considered organic options under at least *some* state certifying programs. Again, before using any product or production practice, consult with your certifying agency. Look for remarks or estimates of potential levels of efficacy in the footnoted comments associated with these materials, located in the "General Pest Management Considerations" sections preceding the Pesticide Spray Tables, and also in the respective tables giving the activity spectrums for the different pesticide classes (e.g., Tables 6.1.1, 7.1.1 and 7.1.2).

2.3 Fungicide Options in Organic Apple Production

Ideally, organic fruit production involves a whole systems approach not just a substitution of materials. Research is currently underway in New England to examine the challenges and opportunities of organic apple production. Information from this and other research will be incorporated into future extension publications. The following information on organically acceptable fungicides is based on observations by researchers and extension specialists in New York.

Sulfur is effective for controlling many fruit diseases, but it must be applied prior to infection. Sulfur is easily removed by rain. Thus, coverage must be renewed much more frequently than is required with conventional fungicides with better rain resistance. Sulfur is not very effective for controlling rust diseases on apples. Rust diseases in organic apple orchards can be minimized if cedars within 500 ft can be removed or if new orchards are established in areas isolated from existing or potential cedar habitat. In more southern areas of the region, sulfur is also relatively ineffective for controlling flyspeck, bitter rot, black rot and white rot on apples during July and August, but sulfur may provide adequate suppression of these diseases in more northern areas. Liquid lime sulfur applied at 2 qt/100 gal on a 21-day interval or at 1 qt/100 gal on a 10-day interval provided good control of flyspeck in a 2006 trial in New York's Hudson Valley. However, the liquid-lime sulfur sprays did not control summer fruit decays. Copper fungicides applied once or twice during late July or August should help to control both flyspeck and summer fruit decays, but this strategy needs further evaluation under New England conditions.

Whereas wettable sulfur has no post-infection activity, liquid lime sulfur provides 60–70 hours of post-infection activity against apple scab (counting from the beginning of an infection period). Liquid lime sulfur is also useful to "burn out" scab infections when they appear on leaves, but it has no activity against scab during the incubation period between 70 hours post-infection and appearance of symptoms. Unfortunately, research has shown that both sulfur and lime sulfur can suppress photosynthesis which can reduce yield. Therefore, the number of sprays should be kept to a minimum.

Copper fungicides also control many tree fruit diseases, but copper causes phytotoxicity under certain conditions. Copper is extremely phytotoxic to foliage on sweet cherries. On apples, copper applied between half-inch green and bloom usually causes fruit russetting. Copper applied between bloom and roughly July 4 will cause blackening at the lenticels. Copper applied later in July will provide excellent control of sooty blotch and flyspeck on red apple cultivars, but July applications may still cause severe fruit discoloration of yellow cultivars. Note: Very few copper

fungicides have labels that allow application to apples after bloom.

Summer applications of copper fungicides have been used effectively to control bacterial leaf spot on peaches, but care is required to avoid a build-up of copper residues that can result in severe leaf injury on peaches. Repeated summer applications of copper on peaches should be avoided unless rainfall has removed the residue from the previous application. Copper has also been used to control cherry leaf spot on tart cherry.

Many of the fungicides registered for use in organic tree fruit production have proven ineffective for controlling apple fungal diseases in replicated trials conducted at Cornell University's Hudson Valley Lab. Serenade and OxiDate failed to control the common fungal diseases of apples in those field trials.

In a review of biocontrols labeled for use against **fire blight**, University of Massachusetts research showed that overall, biocontrols were not as effective as streptomycin against blossom blight. Biocontrols were effective in far fewer tests, and if effective, generally controlled blossom blight half as well as streptomycin.

2.4 Insecticide Options in Organic Apple Production

Surround, a processed form of kaolin clay, when used properly, has proven an effective organic option to deter pear psylla on pears, and plum curculio and first generation codling moth damage on apples. Later season use can suppress apple maggot damage and second generation codling moth, but when used past early July when apple maggot becomes a threat, the increased chance of a bothersome amount of Surround residue remaining on apples at harvest becomes a limitation.

There are several ***Bacillus thuringiensis*** **(Bt)** insecticide formulations allowed for use in organic orchards. Bt can provide effective control of lepidopteran larval pests such as leaf roller and codling moth. Compared to conventional insecticides used against these pests, Bt insecticide coverage should begin earlier and requires shorter intervals between spray applications.

Entrust is an organically accepted formulation of spinosad, the same active ingredient in the conventional insecticide SpinTor. Entrust can provide good control of codling moth, leafollers, and fair control of apple maggot and spotted tentiform leafminer.

Pyganic is a pyrethrin formulation that has been used against European apple sawfly and for short term (relative to conventional insecticides) control of plum curculio, codling moth and apple maggot. For the duration of control it provides, Pyganic would be more expensive than conventional insecticides or other organic options as the foundation for an insect pest management program.

Aza-Direct and **Neemix** are formulations of the active ingredient azadirachtin. New York guidelines rate these materials as having good efficacy against spotted tenitofrm leafminer, and fair efficacy against aphids, codling moth and leafhoppers.

Horticultural oil is an effective tool against mite pests, San Jose scale, and pear psylla, and can contribute to suppression of codling moth and spotted tentiform leafminer. M-Pede, an insecticidal soap, is also useful against pear psylla, and can contribute to control of aphids, leafhoppers, redbanded leafroller, and San Jose scale.

While the organically accepted insecticides individually do not offer the same degree of efficacy or longevity as their conventional counterparts, used in concert with each other along with conservation of biological control agents, it is possible to produce a high percentage of fruit free of insect damage within organic certification restriction on allowable materials.

2.5 New England Organic Apple Production Resources:

- OrganicA Project: http://www.uvm.edu/organica/index.html
- 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