Just Picked

Newsletter of the
Upper Midwest Organic
Tree Fruit Growers Network

Volume 4, Issue 1, Winter 2008

Deirdre Birmingham, Network Coordinator
7258 Kelly Rd
Mineral Point, WI 53565
phone 608-967-2362 fax 608-967-2496
deirdreb@mindspring.com
www.mosesorganic.org/treefruit/intro.htm

Newsletter Layout by Jody Padgham, MOSES

Winter 2008 Issue

PAGE

2 Soil Biology Research... cont
3 Pigs and Apples
4 Keeping Wild Bees
5 Network List-serv
7 Rootstocks for Pears
8 Dormant Season Checklist
11 Network Retreat
12 New on the Web, Grants, Poetry
13 Research Symposium, The Net Ex

Welcome to our first issue of 2008

As I write this, the snowy landscape is giving way to a warm spell. While that enables more hospitable temperatures for outdoor work, I hope we get our insulating snow back.

Inside this issue you will find part 2 of research at Oregon State University that aims to find soil biological tests that commercial labs can use to help you assess the impacts of your orchard floor management decisions. Eric Mader starts a new series on maintaining wild bees. David Sliwa writes on his work in finding suitable pear rootstocks. Our first-ever advanced grower retreat is described, which takes place just before the Organic Farming Conference at the end of February. Also a new first will be the Midwest Organic Research Symposium held during the Conference. The Symposium's organic tree fruit topics are listed inside. You'll find some familiar names from previous issues of "Just Picked."

I always want your feedback on this issue and the Network in general, so please contact me. This is likely a transition year for us, at least from our current support organization, MOSES. So it will be important to hear from you.

--Deirdre Birmingham, Network Coordinator

Soil Biology Research – Part Two

-by Jennifer Moore Kucera

The following is part two of a three part series started in our Fall 2007 issue. Jennifer Moore Kucera, Ph.D. is a post-doc working with Professor Anita Azarenko in the Department of Horticulture at Oregon State University. Kucera can be reached at 541-737-8959 or jennifer.kucera@hort.oregonstate.edu. The articles have been edited by D. Birmingham. For information on the enzymes studied and other details, please contact Ms. Kucera.

Growers are interested in learning more about the biology of their soils and how their management decisions impact the important and varied functions carried out by soil organisms. Our research is to determine what biological soil properties and processes can be measured by not only research, but also by commercial labs so that growers can have a means by which they can monitor the affects of their management decisions.

continued on page two

Soil Research....from page one

In Part I, soil quality was defined as, "the capacity of a soil to function within ecosystem boundaries to sustain biological productivity, maintain environmental quality, and promote plant and animal health." I began a discussion on how to measure soil quality with a focus on soil biological and biochemical processes to help assess changes in soil quality because growers want tools to optimize soil biological functioning. This is particularly important when using organic amendments, which increase soil organic matter content, provide nutrients, increase biodiversity, and conserve water. Because over 90% of all nutrients in the food chain pass through microorganisms and because of the diverse ecological functions soil organisms perform, soil biological and biochemical properties are a key component of many soil quality tests. They have also been used as early indicators of environmental stress.

In Part I, I gave examples of two measures of soil quality. These were 1) the amount of carbon found in the particulate organic matter fraction and 2) the potentially mineralizable N released from the soil under two orchard floor management treatments in organic sweet cherry orchards.

In this article, I continue with the topic of soil quality in orchard systems with a focus on what makes up the soil microbial community, that is, its composition, and the functions that microbial community perform.

Soil Microbial Community. The composition of the soil microbial community can be thought of as the different 'groups' of microorganisms and the relative proportion of each. The functioning of the soil microbial community can be thought of as how well nutrients are moving through the microbes and to plants for uptake. Why is this important? This information is useful because shifts in the community composition and functioning can be related to how fast nutrients are turning over or being stored in the soil.

There are multiple ways to assess the composition and functions of the soil microbial community (SMC). One way to measure the SMC composition is to extract fatty acids from the soil and determine the type and quantity of these fatty acids. Certain types of fatty acid groups are specific to different microorganisms. The different groups that I look for include:

- gram positive (GM+)
- gram negative (GM-)
- actinomycetes
- general fungi and
- arbuscular mycorrhizal fungi (AMF).

I also use these values to calculate the fungal to bacterial ratio (F:B); the higher the value the greater the abundance of fungi relative to bacteria.

In general GM- bacteria populations can increase quickly in response to nutrient enrichment but can 'die off' quickly as these labile (more active) nutrients are consumed. In contrast, GM+ bacteria tend to grow more slowly and steadily and are capable of living on 'lower quality' substances.

Actinomycetes are a specialized group of GM+ bacteria that are resistant to drought and can degrade cellulose and chitin.

Fungi are the most drought resistant and are capable of degrading difficult to decompose materials such as chitin and lignin. Arbuscular mycorrhizal fungi (AMF) are a type of mycorrhizal fungi that form an association with a plant (usually herbaceous). The fungi benefits by obtaining carbon from the plant and the plant benefits by enhanced water and nutrient uptake (particularly phosphorus and organic nitrogen).

In general, systems that result in higher fungi to bacteria (F:B) ratios are considered beneficial to overall plant productivity and health. However, it is difficult to determine an absolute F:B value because differences in soil type, crop growth, local climate patterns, and management impact the F:B value. Rather than compare one orchard to another, it is better to compare different managements on the same soil and under the same crop to determine if the differences are improving the soil system.

Enzymes. Measuring enzyme activities can assess soil microbial functioning. Soil enzymes are responsible for biochemical reactions involved in numerous important functions related to fertility. Enzymes are proteins that accelerate a chemical reaction. They are generally named by adding the ending "-ase" to the name of the substance on which the enzyme acts (For example, protease is an enzyme that acts on proteins). So, enzymes released by plant roots and microorganisms catalyze the breakdown of complex organic material bound in plant residues into forms that can be taken up by plants. Although soil enzymes

continued on page 9

A project of the Midwest Organic and Sustainable Education Service Funded by the USDA Risk Management Agency

Integrating Organic Apple and Pork Production to Benefit Pest Management and Grower Profitability

by David Epstein, Michigan State University
IPM Program Tree Fruit Integrator
517-432-4766; epstei10@msu.edu
edited by D. Birmingham

We launched a study in spring 2007 at Jim Koan's Al-Mar Orchards in Flushing, Michigan, at Jim's urging to investigate the feasibility of integrating organic swine with organic apple production. This is a report on our first year's findings, a one-year pilot study that was funded by the USDA Integrated Organic Program. We are seeking additional funding to continue the study after seeing quite encouraging results from this pilot study.

Why livestock? Integrating livestock into orchard agroecosystems could provide organic producers with opportunities to enhance their farm diversity and profitability while reducing off-farm inputs for pest and nutrient management. An additional benefit to smaller organic fruit producers with on-farm markets would be alternative income potential from locally produced organic meat products.

Pigs enjoying the orchard

Reincorporating animals into pest and nutrient management programs provides a unique opportunity to integrate farm management enterprises that were once commonly practiced in single operations, but are rarely combined on today's farms. The prospect of reduced inputs for pest and nutrient management may be significant.

What pigs can do. Our 2007 study showed that hogs do effectively consume June-drop apples. Twenty-seven, two-month old, Berkshire hogs consumed over 98% of the dropped apples in one-acre plots within a three-day period.

Importantly, we also found that the plum curculio (PC) larvae do not survive the hog digestive system.

Subsequent summer feeding by the PC on apples decreased five-fold where hogs were grazed even in this first year of study. When the hogs ate the June-drop apples, they interrupted the PC life cycle. If the aborted apples were not consumed, larvae in the aborted fruit would have emerged and moved into the soil. They would have re-emerged during the summer to feed on the fruit still on the tree. Whether long-term, annual grazing of hogs to feed on June-drop apples will significantly reduce PC populations will be studied in the next phase.

Our first year of work showed that hog size is an important factor in integrating hogs into an orchard system. The young hogs (under ~60 lbs) readily ranged throughout the one-acre plots, rooting shallowly in the tree row as they foraged. The larger hogs (larger than ~ 60 lbs.) did not range throughout the one-acre plots, preferring shadier areas. They rooted more deeply, actually exposed tree roots and destroyed some of the sod in the drive lanes.

Anecdotally, we noted that hogs grazing and rooting provided superior weed control and improved nutrient availability. With subsequent funding we will continue to research the benefits of hog rooting on weed control and soil fertility.

Swine health and sex. Jim Koan purchased three gilts and one boar in late 2006. The pigs mated in December and farrowed in April of 2007. Twenty-seven piglets were weaned in May.

Overall, the health of all the pigs was acceptable and did not require the use of any pharmaceuticals. Adult animals did not show any illness. Two of the 27 pigs, however, grew substantially slower than the others from October to December of 2007. Although they did not show any disease symptoms, they were cared for separately from the group.

For all animals, no external parasites were found.

Internal parasites were monitored by fecal samples. Samples from adult sows tested positive for Balantid-

Continued on page 5

A project of the Midwest Organic and Sustainable Education Service Funded by the USDA Risk Management Agency

Keeping Wild Bees: A System for Small Farms and Orchards: Part 1

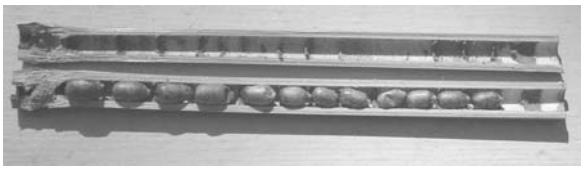
By Eric Mader, Midori Horticultural Services 608-445-3572, Info@MidoriHorticultural.com

In previous issues of Just Picked (Spring and Summer 2007) I discussed the current honey bee health crisis (dubbed Colony Collapse Disorder), as well as habitat conservation for wild pollinators. In this issue we turn our attention to actually maintaining populations of wild cavity nesting bees, such as leafcutter and mason bees.

My past recommendations have warned against using commercially available nest blocks and mail order mason bees. Those recommendations still stand. Both practices can result in the spread of disease, and parasites, and both can harm local bee populations. However, it is possible to create simple nest systems for attracting and managing your resident native population of these excellent pollinators.

First some background. The majority of wild bees are solitary rather than social insects. Honey bees and bumble bees, which form complex family colonies, are the exception rather than the rule. Despite this, many solitary bees are gregarious, meaning they like to nest near one another. In some cases this gregarious nature can be capitalized on by supplying abundant and concentrated nesting materials.

Since the majority of our bee species nest underground this is difficult to do. However, one family of bees called the Megachilidae, or "large-jawed bees" prefer to nest in tubular above ground cavities, such as hollow stems. The Megachilid bees include the alfalfa leafcutter bee (Megachile rotundata), an excellent pollinator of summer blooming fruits and vegetables, and the Blue Orchard Bee (Osmia lignaria), a highly publicized pollinator of fruit trees, as well as many other lesser-known species.



The cocoons in this picture contain mature bees that will soon hatch. *

The lifecycle of Megachilid bees is remarkably similar across species. Female bees select a tubular cavity of favorable dimensions and lay a series of eggs within the cavity. Each egg is provisioned with a mixture of pollen and nectar. The individual eggs within the cavity are separated into distinct cells by walls fashioned out of mud or leaf pieces. Within the cells, the eggs hatch and the bee larvae feed on the stored food source. The developing bees have no contact with their mother who may only live for several weeks. After feeding, the larvae undergo metamorphosis inside the cell, changing from a white, maggot-like grub into an adult bee. Upon reaching adulthood, the bees chew through their cell walls, exit the cavity, mate, and repeat the cycle. Depending on the species, Megachilid bees may have a single or multiple generations per year.

Currently most bee keeping books and informational websites describe methods for managing single species of Megachild bees. However, using the following system, multiple bee species can be managed together throughout the growing season. This is particularly useful to small, diversified growers who require ongoing pollination of various crops.

Getting Started

This system consists of short sections of bamboo tubes housed in square plastic pails. Because of the low cost, and common materials, this system is deceptively simple. The management process is actually somewhat complex, however, and the materials and methods described here should not be deviated from—doing so can negatively impact the health of your wild bee population!

To construct the nests you will need the following materials:

1. A building, such as a barn, shed or garage close to your orchard, with overhanging eaves.
2. Several square plastic buckets with tight fitting lids. (I use 2-gallon cat litter pails).
3. 4-foot long, ½ inch diameter bamboo garden stakes. These are sold in bales of several hundred by landscape supply companies. You want the natural, non-dyed ones.
4. Flat black and fluorescent blue (optional) spray paint.
5. Deck screws

Continued on page 6

** Megachilid bees such as leafcutter and mason bees lay their eggs inside tubular cavities such as this bamboo tube. The eggs are provisioned with pollen and nectar as a food source, and the larvae develop without any further care from their mother.*

A project of the Midwest Organic and Sustainable Education Service Funded by the USDA Risk Management Agency

Apples and Pork... from page 3

ium coli, a common parasite in swine, but not a cause of decreased health. A few eggs of Ascaris suum and Strongyle type (Threadworm) were found in one sow in early summer, but were not found in subsequent fecal samples from the same or any other sow. The young hogs also were healthy and free of parasites, except for one sample, which tested positive for a few Coccidial oocysts.

Summary of pig growth and carcass attributes: The 27 young pigs flash-grazed the orchard in June-July. They continuously ate apple pulp and discarded whole apples, about 450 kg per day since weaning, which was over 50% of their daily food intake. Adult and young animals ate in similar pasture lots, dirt lots, and shelters. Apple products were spread on the ground or on a concrete pad to minimize costs.

All lactating animals had free access to apple products, ground corn, and alfalfa hay. Growing pigs were provided about 2 kg of ground corn and hay per day beginning in October. Salt was provided at a rate of 4 to 6% of the supplemental food. In December of 2007 the corn and hay supplement was increased to 5 kg per pig per day. In 2008 we will start measuring food intake in a laboratory controlled growth study.

Pigs did not reach a desirable market weight at 8 months. Their average weight was 59.9 kg. compared to 150 kg. reached in the same time by conventionally raised hogs. Al-Mar Orchard owners chose to use apple by-products from their farm rather than buy off-farm feeds.

Al-Mar Orchard received organic certification for their pig operation in the fall of 2007. Jim will harvest the hogs in February or March of 2008 when they reach a live weight of 100 kg. ó

Photos courtesy of David Epstein

Network List-serv

This is proving to be one of our best winters on the list-serv. Winter is our expected chat time when one year ends and another is anticipated. Many of the interesting topics discussed since the fall were:

- ó fire blight and streptomycin – see below.
- ó flower thinning strategies
- ó sprayer options for young trees
- ó forest gardening, forest orcharding
- ó cold-hardy varieties
- ó site selection advice
- ó Pyganic and plum curculio control
- ó growing tart vs. sweet cherries
- ó peach leaf curl

If you missed these postings, you can join the list-serv at any time and read past postings. You can also unsubscribe at any time. To subscribe contact deirdreb@mindspring.com.

The "strep" discussion held some very interesting threads of information and debate. I'll attempt to present some of those. The gravity of fireblight was well portrayed as were the conditions. A fireblight epidemic can wipe out an orchard no matter what size, taking a grower's livelihood with it. Rootstocks and varieties are few that can withstand fireblight. Let it get out of hand and it can take years to get on top of it. It lurks waiting for the right environmental conditions. Some growers have never seen fire blight in their trees and never used anything to prevent it. Although research is on-going for alternatives, including biological controls, the antibiotic streptomycin is the only effective control to date and with back-action against fire blight. This antibiotic is allowed as a restricted material by the National Organic Program. It is, however, on the NOSB's sunset list. It was listed on the sunset list in 2007 for another five years. While growers may rarely use it, some want this tool available to them for fear of losing their orchard. Use of an antibiotic raised concerns for many, particularly as to what consumers might think. There were concerns about how rapidly it degrades in the environment and what impacts it might have on other bacteria besides the fireblight bacterium during its relatively short life. A couple growers stated success with hydrogen peroxide. ó

A project of the Midwest Organic and Sustainable Education Service Funded by the USDA Risk Management Agency

Bees... from page 5

6. Small gauge stainless steel craft wire (optional)
7. Small pieces of 2 x 4 scrap wood.

For tools you will need:

1. A fine-toothed wood handsaw, or a small table scroll saw.
2. A cordless ¼ inch drill with a screw driver bit.

Assembly and Installation

Saw the bamboo stakes into sections between 3 and 8 inches in length, leaving a natural node at one end—creating a tube that is sealed on one side. You want the sections to have an inside cavity diameter of ¼ to 5/16 inch wide. The longer the section the larger the diameter should be within this range. For example, cut your ¼ inch inside diameter sections only 3 inches in length, and cut the 5/16 diameter tubes closer to 8 inches in length. Basically the bees will be attracted to these different tube sizes depending on the individual species. You are trying to provide longer nest cavities for the larger ones, and shorter cavities for the smaller species. The stakes will be thicker on one end, so you should be able to cut a wide variety of tubes from a single pole. You may end up discarding sections of the stakes that are too large or too small. Cut the ends cleanly, making sure there are no splinters.

Stack the tubes with the open ends upright in a cardboard box, and spray paint them black. This increases their attractiveness to bees. If you wish, you may also paint the inside of the buckets florescent blue. These two colors contrast particularly well for bees, whose color perception is different from our own.

Next drill several holes in one side of the bucket, near the base. These holes allow water to drain out in case rain splashes inside them.

Mount the buckets at about chest level on one wall of your barn or shed, preferably an east, or south facing side with overhanging eaves (to protect them from rain). Cluster the buckets close together and mount them by driving deck screws through the base of the bucket directly into the wall, making sure that the drainage holes you drilled in the bucket are facing down. The opening of the bucket will need to be facing slightly upward to prevent the bamboo tubes from falling out. You can do this by mounting a small piece of 2 x 4 scrap wood under the bottom half of the base of the bucket with deck screws.

Finally fill the buckets with the bamboo tubes. To prevent them from moving around inside the bucket, you may wish to bind the tubes together into clusters of ten or so with some stainless steel craft wire.

After reading this you may be tempted to mount the buckets on poles, or in trees throughout your garden. Don't do it. Bees are attracted to large visual landmarks such as building walls where they can sun themselves in the morning. Bees are also attracted to other nesting bees, so the more nest buckets you can place together on a single wall, the more attractive your nests will be. Small, isolated nest blocks attract few bees.

Your nest buckets should be installed in late winter, before the first bloom, and you should not touch or disturb them throughout the growing season. Do not be disappointed if you see little activity at your nests during the first season, your population will grow over time.

In the next issue we will discuss how to actually manage these nests (including over-wintering, as well as disease and predator control) and how to identify which species you have. ó

Nest buckets installed below the protective eaves of a garage. Note that the buckets are tilted slightly upward to prevent the bamboo tubes from spilling out. Even under the shelter of the roof-line rain may accidentally splash into the bucket—make sure there are drain holes in the base of the bucket to prevent problems with standing water.

A project of the Midwest Organic and Sustainable Education Service Funded by the USDA Risk Management Agency

Rootstocks for Pears

- by David Sliwa, Sliwa Meadow Farm

David Sliwa
563-328-3922, psliwa@gmail.com

When checking the nursery catalog for pears, you may have noticed that the offerings of varieties and rootstocks are modest compared to those for apples. Especially lacking are truly dwarfing, reliable roots for pears. A look through eight tree fruit nursery catalogs that I had available, four from eastern and four from western US, showed the most common rootstocks for pears to be: Bartlett and Winter Nelis seedlings (both Pyrus communis); Pyrus betulafolia seedling (BET); OH X F87, OH X F97 and OH X F333 (from the Old Home and Farmingdale series); and Quince (Cydonia oblonga).

This paper discusses each of these rootstocks in terms of relative size and general characteristics of pear trees on these roots. Other than comments from personal experience, information about these rootstocks was garnered from the following sources: P. Lombard and M. Westwood. "Pear Rootstocks" in *Rootstocks for Fruit Trees*. 1987; J. Tromp et al. *Fundamentals of Temperate Zone Tree Fruit Production*. 2005 ; K. Hummer. "Old Home and Farmingdale. An Historical Perspective " in *Fruit Varieties Journal* 52 1998; and H. B. Tukey. *Dwarfed Fruit Trees* 1964. I had phone conversations with G. Mielke in 2003 and 2004, and with J. Turner in 2007, who are of the Mid-Columbia Ag. Research and Extension Center, Hood River OR .

Among the previously mentioned rootstocks, Lombard and Westwood list OH X F97 as the standard tree size against which the other rootstocks are compared. Its size is roughly 22 ft. tall and 14 ft. wide. The relative size of the other stocks is expressed as a percentage of the standard, with the standard being 100%.

Dwarfing Rootstocks. OH X F 87 and 333 are about 70% of standard size according to Lombard and Westwood. Mielke rated OH X F87 the best, being more precocious and having higher production in the first 10 years compared with OH X F97. The latter, however, responds best to training and is more easily propagated.

Turner related that OH X F87 is utilized heavily in current research including high-density pear plantings of vertical fruiting walls at 4 ft by 12 ft spacing. Compared to OH X F97, OH X F87 is more compact with closer internodes and is easier to contain. Furthermore, Turner indicated that commercial production of OH X F87 has been slow because it is difficult to propagate in the nursery. However, grower demand has stimulated greater rootstock production.

Mielke characterized OH X F333 as being less productive and cited worldwide reports of smaller fruit size. I have found at my orchard in NE Iowa, the pear varieties Worden Seckel, Nova, Patten, Luscious, Giffard and Gourmet on OH X F333 have all produced fruit the size expected from descriptions in the literature, but I have no comparisons of these varieties on other rootstocks. Hummer reviewed the historical development of the Old Home and Farmingdale series, which is characterized mainly by resistance to the bacterial disease, fire blight.

Pear varieties on seedling Pyrus communis stocks of Bartlett and Winter Nelis are roughly 90% of standard. Historically these two seedling stocks have been the most widely used in North America according to Lombard and Westwood. This is likely due in large measure to their hardiness and adaptability to a wide range of soil conditions. As seedlings there is some variability among a population of these rootstocks, more so with Bartlett than Winter Nelis, according to Mielke. Winter Nelis is also more vigorous and yields a slightly larger tree.

BET seedling is the most vigorous of the stocks being considered and is about 130 % of standard. Because of its high vigor, BET works well with weak growing varieties such as Seckel. It seems well suited as an understock for most Asian pears. Lombard and Westwood characterized BET as strongly anchored by a large root system, highly adaptable to many soil types and fire blight resistant, but not very winter hardy.

Quince. The history of quince as a dwarfing rootstock for pear has been long and is described by Tukey. Quince was used in France as early as 1600 and in England around 1685. Early selections of quince such as Portugal Quince and Augers quince were identified in 1667 and 1880, respectively. More recent quince selections listed by Tromp et al., include C.132 from TransCaucasia, S.3 from Poland,

Continued on page 8

A project of the Midwest Organic and Sustainable Education Service Funded by the USDA Risk Management Agency

Pear Rootstock....from page 7

and QR 530 – 4 and 11 from East Malling, England. Quince can be precocious, productive and successful producing a tree about 50 % of standard. But as Tromp et al., point out, all of the Asian pears and many European pear varieties are not graft compatible with quince.

Importantly, quince is not winter hardy. The hardiness issue with quince may change, however. The National Clonal Germplasm Repository (NCGR) in Corvallis Oregon has recently acquired close to100 new quince selections including about two dozen potential quince rootstocks. Some of these are from areas with cold winters and may prove to be cold hardy.

In the spring of 2007 I received from Joseph Postman of the NCGR 17 quince selections of self-rooted cuttings or seedlings to be tested for cold hardiness at my orchard in NE Iowa, zone 4b. Among the test quince selections expected to be more cold hardy based on place of origin are one from Poland, three from Volgogard Russia and one from Uzbekistan. It is now early December 2007 and already below-zero temperatures and snow have settled in. Maybe we'll get a test winter for these quince their first season in the orchard.

So which rootstock to choose? If you're a commercial orchardist, most likely there's no question that the small tree is what you're looking for. The tree fruit industry has largely shifted to high-density plantings using trees on size-controlling or dwarfing rootstocks. This trend is manifested by the International Fruit Tree Association that had its start fifty years ago as the Dwarf Fruit Tree Association. Name changes over the years reflected the changing focus of the organization. Initially the emphasis was to promote the use of dwarf fruit trees. However, when the last name change occurred in 2005, since the use of dwarf trees was the norm, the word 'dwarf' was dropped.

Dwarfing stocks for apples have proven successful. With other tree fruits, however, especially pears, dwarfing rootstocks are still experimental. But there is an active search to find or develop size-controlling roots.

Smaller trees may be appealing as well to backyard horticulturists and others wanting to grow tree fruits in limited spaces. Also many orchard activities such as pruning, spraying and harvesting are more easily done with small trees. If dwarfed trees are also precocious and productive they can be very desirable. For other growers the choice of rootstocks may be tied to the type of management they require. Generally smaller trees require more intensive attention and inputs versus larger trees, which stand on their own roots and, by and large, thrive with minimum care.

I'm searching for a truly dwarfing pear rootstock because I appreciate the practical aspects of managing small fruit trees, and high-density plantings are visually appealing to me. At the same time I'd say there's certainly a need to keep planting some trees that will be large, stately and even a century old someday. Fruit trees of that sort are a wonder to behold and have on repeated occasions stirred my soul in awe. ó

Dormant Season Checklist

– by Michael Phillips, Lost Nation Orchard, New Hampshire

ó Check for deer incursions regularly; ski between trees to pack down vole tunnels.

ó Order rootstock; collect scions for grafting.

ó Prune all bearing trees once the bitter cold days of deep winter have passed. Establish an open framework of scaffold branches that allows maximum penetration of sunlight and drying breezes.

ó Look for fire blight cankers if that bacterial woe struck in your orchard the previous season. Damaged bark tissue needs to be pruned out and removed regardless of what it does for tree structure. Severe blight may warrant using copper as a delayed dormant application when buds show green tissue.

ó Remove all mummified fruit (still on trees) while pruning to reduce rot spore inoculum.

ó Complete routine maintenance on all orchard equipment.

ó Network with other growers: Share what you experienced this past season, listen to their stories, and then ponder what you may want to fine tune in your management approach.

ó Order orchard supplies for the coming season. Be prepared!

A project of the Midwest Organic and Sustainable Education Service Funded by the USDA Risk Management Agency

Soil Research....from page 2

may originate from different sources, including bacteria, fungi, plants and animals, soil microorganisms are considered the major source.

Now to discuss some of the highlights of our research to date. We studied five specific enzymes that are involved in cycling carbon, nitrogen, sulfur, and phosphorus. We chose these particular enzymes primarily because of their importance in cycling nutrients and in decomposing organic matter, and secondarily because of some advantages in similar principles and methodologies in measuring all five enzymes. They are relatively simple and inexpensive to analyze and use chemicals of low toxicity. All these factors increase their potential to be used by commercial soil testing facilities. And that is what we are striving for, measurements that are sensitive to orchard floor management changes and that are feasible for commercial soil labs to conduct.

In October 2006 and 2007, we collected topsoil samples at four sweet cherry orchards in Oregon:
• two organically managed research farms at OSU, and
• two commercial, conventionally managed farms.
Then we applied different soil management systems within the tree rows.

At the two OSU research farms, we compared two soil management systems: landscape cloth and organic amendments of straw at one farm and at the other, bark mulch and leaf compost. Both research farms were planted in April 2005. Trees are Regina on Giesla 6 rootstock (9' x 16' spacing) and are trained as central leader. Both farms are drip irrigated. The only fertilizer application (Nutri-rich 4-3-3; 20 lbs/ac) was under the landscape cloth treatment in Aug 2007.

At the two conventional farms we compared using straw mulch to the more typical 'bare ground' approach. Trees at one farm are four-year old Tieton on Giesla 6 rootstock. Trees at the other are Sweethearts on Mazzard rootstock planted in 1999.

Soil enzyme activities and fatty acid profiles were measured.

Summary of Findings

Commercial, conventional orchards

We found increased enzymatic activities for carbon, nitrogen, and sulfur cycles where straw mulches were applied in these two conventionally managed orchards compared to the bare ground treatments at these orchards. (The increase was between 31 and 93 % greater depending on the enzyme and sampling year.) Because we saw a response after only one year, we were very encouraged by the quick response of the soil enzymes to these treatments. Moreover, the straw was not mixed into the soil and yet changes were measurable up to 6 inches below the surface! Assuming increased enzyme activity results in increased nutrient cycling, these findings indicate that a positive biological effect can be attained quickly by applying straw mulch.

Organic research farms

From soil samples collected in Oct 2006 under landscape fabric at one farm, we measured a shift in the toward greater proportions of fungal and GM- bacteria biomass and a higher F:B ratio under the straw mulch compared to landscape cloth. The functioning of the soil microbial community in 2006 also changed as a result of orchard floor management.

Under straw mulch there were greater enzymatic activities involving sulfur and phosphorus (up to 56% greater). This is likely due to the proportional increase of fungal biomass. Fungi produce what the sulfur enzyme likes to attack. The sulfur enzyme we studied may indirectly indicate changes in fungal biomass.

There was not as much impact on soil enzyme activities under straw mulch the next year (Oct 2007). (Only a 20% increase in the enzyme activity for sulfur.) This result was not surprising because the last application of the straw mulch in August 2006 was mixed into the soil using a Rinieri rotary cultivator. Mixing the straw into the soil puts more soil microbes in contact with the straw to degrade it more rapidly. Consequently in Oct 2007, we saw little, if any, straw residue remaining on the surface. Therefore, there is little long-term (more than a few months) benefit of straw mulch in organic systems when using cultivation to reduce weed pressure.

We expected a more pronounced change in the soil microbial community composition and associated enzyme activities at one organic orchard site because of the two bark mulch and one-leaf mulch treatments. We also expected to find a greater proportion of fungi under the mulch treatment because fungi possess

Continued on page 10

A project of the Midwest Organic and Sustainable Education Service Funded by the USDA Risk Management Agency

Soil Research....from page 8

special enzymes to degrade woody materials, such as bark mulch. However, the soil samples collected in 2005 showed no change in most of the fungal markers and actually a decrease in the arbuscular mycorrhizal fungi (AMF) compared to the cloth treatment. We did find lower relative proportions of all bacteria markers under the organic mulches. Under the cloth, bacteria dominated. We are uncertain why fungi were not found in greater relative proportions under the mulches. We are analyzing samples collected this last fall to see if this pattern is consistent from year to year or if other changes have occurred in the soil microbial community.

At the organic site with the bark plus leaf mulch treatments, in 2006 only the enzyme activity for nitrogen was greater (75 %). This increased activity decreased to about 25 % greater under the mulch treatment in Oct 2007. The products of N-enzyme activity can be directly taken up by plants or further converted into inorganic N (nitrate or ammonium) via N mineralization. As a reminder from Part I, we also found an increase in potentially mineralizable N from the leaf compost. These results indicate that the application of municipal leaf compost material in Oct 2006 resulted in a rapid flush of nitrogen with some residual impact remaining the next year. The application of bark mulch prior to the leaf compost did not result in a change in enzymatic activity but did result in increasing soil organic matter compared to landscape cloth. This was the only orchard where application of an organic amendment resulted in increased soil organic matter (SOM). Remember that this site received 3 applications (2 of bark mulch and 1 leaf compost) and that bark mulch is relatively less decomposable than the other mulches applied.

In general, increases in SOM often take many years to become measurable. Therefore, using other biological tests can often provide an indication of how management changes may affect future SOM levels and nutrient cycling. The increased enzyme activities at the conventional farms indicate that the addition of straw mulch is positively impacting how the soil microbial communities are functioning with increased levels in enzymes involved in C, N, and S cycles. It also is interesting that the increased SOM at the organic orchard with bark-leaf mulch did not correspond to an equivalent increase in enzyme activities (with the exception of the N-enzyme increasing 25%).

In general, increases in SOM stimulate the microbial biomass and subsequent enzyme production and activities. The fact that the increased OM levels at the one organic orchard do not correspond to overall increased enzyme activities suggest that the quality of the added OM is less degraded by those specific enzymes and thus, is of a lower quality than the native OM in the soil. However, it is important to point out that increasing SOM levels can have positive impacts other than a biological one. For example, increased water holding capacity, decreased compaction, and increased porosity are physical attributes affected by increases in SOM.

The addition of the less decomposable bark mulch was intentionally applied to slow down the release of N from the high SOM (3-4%) naturally present. As the trees grew and nutrient demand increased, we applied a more labile ('active') material (municipal leaf compost). Likely this is why we find an increase in the N-enzyme activity; this enzyme is often positively related to the amount of nitrogen that is mineralized in soil. (See Part 1 on potentially mineralizable N.) .

We continue to collect data and interpret results. Our aim is to determine which biological soil tests are most sensitive to orchard floor management changes. It is too early at this time to make recommendations based on these four orchards. However, out of the five enzyme activities measured, the two most sensitive ones were the ones that are involved in N and S cycling and have been proposed as indicators of fungal biomass. Additionally, the nitrogen enzyme, NAG, is an indicator of how much nitrogen potentially can be mineralized (converted to inorganic forms).

Currently, enzyme assays are not commercially available. However, they can be relatively simple, inexpensive, and quick, and could be adapted easily by commercial laboratories offering other soil tests. They should not be the only tests, however. They are best used for comparing management changes within a given farm. Likely, some combination of soil biological, chemical, and physical measures will be most useful in providing an index of how management affects overall soil quality and orchard health.

In Part 3, I will shift this discussion from soil biological indicators of soil quality to soil nematodes and their utility in assessing orchard floor management changes. ó

A project of the Midwest Organic and Sustainable Education Service Funded by the USDA Risk Management Agency

Network's First Advanced Grower Retreat February 20-21, 2008

The Network is hosting its first ***Advanced Grower Retreat*** just before and in proximity to the MOSES Organic Farming Conference. The Retreat will start at 1:30 PM on Wednesday, February 20 and end with dinner Thursday evening, February 21 in time to attend the plenary panel discussion at the Conference in LaCrosse. The Retreat will be held at the Historic Trempealeau Hotel, which overlooks the Mississippi River, in Trempealeau, Wisconsin. For purposes of group dynamics, the retreat is limited to about 25 growers.

The Retreat will be a grower-to-grower discussion time. Growers are encouraged to bring their production, marketing, and expense data to refer to during discussions. The Network Advisory Council wishes to focus our discussions on three topics: value-added fruit businesses; markets and pricing; and the future of the Network. A resource person may be invited for the discussion on the Network's future.

Other topics may be covered as time allows and as they relate to reducing grower risk in organically producing and marketing tree fruits in the Midwest. Topics that could not be discussed, for which interest is strong, will be considered for coverage via field days, the newsletter, list-serv, and future events.

To expand the benefits resulting from the Retreat discussions, two to three of the growers attending will be asked to host a field day in 2008 for Network-wide participation. Therefore, those registering for the Retreat should be willing to host a field day.

Advance registration by February 10 and $50 per person are required. The registration fee covers meals comprising Wednesday dinner, Thursday continental breakfast, lunch, and dinner, plus refreshments.

Book your room for the Retreat at one of two locations. Please indicate when booking that you are with our ***Organic Tree Fruit Network***. The first is our meeting location, the Historic Trempealeau Hotel, which is providing a 10% discount on their room rates. They have a variety of rooms ranging from $35 to $100 per night. Info is available at www.trempealeauhotel.com; (608) 534-6898. The other hotel, The Inn on the River, is directly across the street from the Trempealeau Hotel. Their room rate is $65 per night. For info: www.innontheriverwisconsin.com, 608-534-7784.

Register early as the Retreat size is limited. Use the Retreat registration form on our website under EVENTS and available from the Network Coordinator. Scholarships are available to help offset costs to participate. Please contact the Network Coordinator. (deirdreb@mindspring.com or 608-967-2362)

Please consider continuing your stay in Trempealeau for the Organic Farming Conference. Both hotels are located about 30 minutes north of the La Crosse Convention Center where the Conference is held. (For the Conference, register directly with MOSES. www.mosesorganic.org or call to receive a flyer at 715-772-3153)

We appreciate the support of the USDA Risk Management Agency for this Retreat.

"In A Glass of Cider"
- Robert Frost

It seemed I was a mite of sediment
That waited for the bottom to ferment
So I could catch a bubble in ascent.
I rode up on one till the bubble burst
And when that left me to sink back reversed
I was no worse off than I was at first.
I'd catch another bubble if I waited.
The thing was to get now and then elated.

ORGANIC FARMING RESEARCH FOUNDATION

New Fruit Grant Opportunity!

Do you have a research or outreach project idea? If so, check out the new fruit research and education project grant funds available at the Organic Farming Research Foundation. Growers can apply, too, not just researchers and extension specialist at universities. You can help advance the state of the art in organic fruit farming. Network participants are among those who have received grants from OFRF. Growers are encouraged to work with researchers in planning their project and writing a proposal.

Projects can be for up to three years for a maximum of $20,000 per year. Deadlines are mid-July and mid-December annually. Work on your project proposal now, before spring is upon us. To learn more, visit www.ofrf.org or call Jane at 831-426-6606.

New on Network Web Pages

Under ***EVENTS:***
ó Advanced Grower Retreat information and registration form

Under ***RESEARCH***:
ó Herb S. Aldwinckle's research at Cornell University on fire blight and disease resistant apple varieties and rootstocks.

ó Patricia McManus and Barrett Gruber's research at UW-Madison on the effects of copper on controlling cherry leafspot.

ó Varieties and Integrated Pest and Disease Management Programme for Organic Apple Production

ó Efficacy and physiological effect of oil/lime sulfur combinations. Jim Schupp et al Penn State University. This report looks at flower thinning on apple.

Under ***INFORMATION:***
ó Video tutorial on T-bud and chip bud grafting techniques

ó A Pocket Guide for IPM Scouting in Michigan Apples.

ó A Pocket Guide for IPM Scouting in Stone Fruits.

Under ***NEWSLETTERS:***
ó This newsletter, in addition to all our newsletters.

A project of the Midwest Organic and Sustainable Education Service Funded by the USDA Risk Management Agency

Tree Fruit Topics at the Midwest Organic Research Symposium

This year is a special year in that MOSES, along with the Organic Farming Research Foundation, is offering a first-ever Midwest Organic Research Symposium on February 21-23 in conjunction with the Organic Farming Conference in La Crosse, WI. We used the list-serv to encourage submissions from farmers and scientists. The following were accepted for the Symposium that pertain to tree fruits.

• Insect and disease management in organic fruit crops – Kathleen Delate of Iowa State University
• The Clarksville Hort. Expt. Station organic apple project – Mark Whalon of Michigan State University
• A pilot study on integrating organic pork and apple production – Jim Koan, Al-Mar Orchard, MI
• Suppressing plum curculio in fruit trees with OMRI-certifiable, insect-pathogenic nematodes and fungi – Mark Whalon of Michigan State University
• Pennsylvania Regional Organic Fruit Industry Transition (PROFIT) 2007 Update – James Travis, Pennsylvania State University

Also note the Conference hosts a Sat. 4 PM session by Jim Koan and Mark Whalon on "Practical tools and innovative strategies in controlling major apple insect pests." ó

The NetEx

The Network Exchange, or NetEx, is for Network growers to use. Please use it similar to a Classifieds section, but at no charge. NetEx allows Network participants to exchange information on services or things to share, buy, or sell. It is not for product or input advertising. However, for now, knowledge-based services provided by Network participants are fine. Other examples: exchange or share scion wood, find others to make bulk purchases, orchard consulting or pest scouting services, find orchard or processing equipment, host a work day, offer a seminar (such as grafting or pruning), and any other way to help us improve our organic production and marketing of tree fruits, except for product advertising.

The **Green City Market** is actively seeking vendors who grow fruit organically, are in transition, or have been certified by the Midwest Food Alliance. Please visit the Market's web page at www.chicagogreencitymarket.org and contact Sheri Doyel, Farm Forager, chicagofarmforager@yahoo.com or 312-213-6607.

ORGANIC FRUIT WANTED. We are looking for certified organic fruit to purchase for our 400-member CSA. Please contact us if you are interested. We are located close to Madison, WI. Beth Kazmar, Tipi Produce, 608-882-6196,

A project of the Midwest Organic and Sustainable Education Service Funded by the USDA Risk Management Agency

Announcements

ó **North American Farmers' Direct Marketing Convention**, February 15-20, Wisconsin Dells. http://www.nafdma.com 413-529-0386 or toll-free 888-884-9270.

ó **Advanced Organic Grower Retreat**. February 20-21. See information inside.

ó **Organic University, Organic Farming Conference, and Midwest Organic Research Symposium**. February 21-23. La Crosse Convention Center, La Crosse, Wisconsin. Register at www.mosesorganic.org or call 715-772-3153.

ó **Organic Apple Production Budgeting**. April 3, 10-3. Dane County Extension Office, Madison, Wisconsin. Craig Chase, a farm business specialist at Iowa State University Extension, among other speakers, will lead this very practical seminar.. Advance registration required along with $10. More details to follow on the Network's list-serv. For more information and to register, contact Bill Wright, who is organizing the seminar, at the Organic Learning Center, UW-Brown County Extension at (920) 391-4658 or Wright_WP@co.brown.wi.us .

ó **Organic Fruit Research and Education Project Grants**. Due July 15, 2008. Organic Farming Research Foundation. www.orfr.org 831-426-6606.

The next issues of Just Picked will be early April, early July and late September 2008. Please contact the Network Coordinator to write an article or provide ideas for content.

Just Picked is a publication of the Upper Midwest Organic Tree Fruit Growers Network.
Our Mission is:
To share information and encourage research to improve the organic production and marketing of tree fruits in the Midwest, and to represent the interests of growers engaged in such.

The Upper Midwest Organic Tree Fruit Growers Network was started in 2004 for the purpose of sharing information and encouraging research to improve organic tree fruit production and marketing in the Upper Midwest. The Network is supported by the Midwest Organic and Sustainable Education Services (MOSES) and the Risk Management Agency of the USDA in addition to other event sponsors. This newsletter is produced by MOSES, layout by Jody Padgham.

Upper Midwest Organic Tree Fruit Network
c/o MOSES
PO Box 339
Spring Valley WI 54767