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Growing Organic Strawberries

Eric Sideman, Ph.D., Director of Technical Services, Maine Organic Farmers and Gardeners Association, Green, ME

(Summarized by Pam Fisher from a presentation to the North American Strawberry Growers Association, Savannah, Ga., January, 2006)

Different strawberry production systems can be adapted to organic production, including the matted row system, which is lightly mulched with straw in the planting year to reduce weeds, and the plasticulture system. In both cases, best results are achieved when the crop is harvested for just one year.

Weed control is a challenge for both conventional and organic strawberry growers. Tools for weed control include the Lely springtine, Buddingh finger weeder, and the Reigi weeder. The Reigi is now available in 2 and 3 row models, and very popular. Hand weeding is still needed in addition to the mechanical weed control provided by these implements.

Crop rotations and the use of cover crops are important organic production strategies. Grain underseeded to hay (grown for 5 years) helps build the soil. This must be followed by a year of annual cover crops to control white grubs and other soil insects. A popular cover crop after berries is oats and hairy vetch. Other rotational schemes include a series of green manures (buckwheat, soybeans or cowpeas) and fallow. The green manure/fallow cycle is repeated for two-three summers, ending with oats in the fall before going back to berries.

A biologically active soil resulting from green manures and cover crops will have large reserves of nutrients to feed the crop. Nutrient reserves are built over the years and then maintained for

the most part with composts. Natural sources of plant nutrients can be used to supplement nutrient needs.

Insect pests can sometimes be controlled by crop rotation. For example, crop rotation is the only way to control strawberry rootworm. Clipper weevil can be kept in check by crop rotation, with a maximum of 2 years fruiting. However, crop rotation doesn't help with tarnished plant bug control. Damage from this pest can be reduced by managing vegetation on land around the field, don't mow anything while strawberries are in bloom.

Row covers and black plastic mulch (non photodegradable) are allowed in organic production. Certain organically acceptable slug and mouse baits are available.

For more information **Maine Organic Farmers and Gardener's Association**: www.mofga.org.
Check out the **New Resource Guide for Organic Insect and Disease Management** :
<http://www.nysaes.cornell.edu/pp/resourceguide/index.php>

Links on weed control tools :

<http://www.hort.cornell.edu/bellinder/publications/CultTools1.pdf>

<http://www.uvm.edu/vtvegandberry/factsheets/cultivators.html>

http://sci.agr.ca/stjean/publication/bulletin/cultivator-sarcler_e.htm

Money from EFP for Horticulture

Donna Speranzini, OMAFRA Nutrient Management Program Lead, Horticulture

The new Canada-Ontario Environmental Farm Plan has lots of opportunities for horticulture producers. Each registered farm business has the potential to receive up to \$45,000 in cost share money for on-farm environmental projects.

Aside from the normal EFP things like well head upgrades, fuel and pesticide storage, soil erosion protection and shelterbelts, money is available for the following horticultural items:

IPM

- Equipment modifications for improved IPM (spray curtains, air induction or low drift nozzles, injection systems, spray towers, pesticide recovery units, rate controllers, tank rinse systems, air assist, foam marker systems, or GPS)
- Weather monitoring/reporting and prediction equipment, materials and services from a qualified provider
- Record keeping software
- Traps and sampling equipment
- Costs of biocontrol or cultural control practices
- Mobile water tanks for mounting on a trailer or truck

Irrigation

- Irrigation equipment (low pressure nozzles, pipes, hoses, booms, filters and emitters, installation costs, soil moisture monitoring equipment, flow meters with totalized outputs, rain gauges)
- Water treatment units to meet fruit and vegetable washwater standards, irrigation water quality standards, or to remove ions and odour
- Water meters

Water Supply Expansion

- Drilling and construction costs for new wells, test drilling and deepening current wells for agricultural use
- Well development (pump testing, water quality samples, consulting fees)
- Hydrologic impact assessments fees for professionals
- Cisterns where required for agricultural use from low flowing wells
- Construction and consulting for new pond/reservoir (sized for drought, water quality sampling, hydro-G)
- Expansion of current pond
- Pond aeration systems, pond liners and intake works, and fencing

Fertigation

- Fertigation equipment (tanks, mixing, blending, metering systems, backflow valves)
- Planter modifications to include drip tape
- Repairs and improvements to water intake systems

On-farm Composting

- Infrastructure and specialized equipment for composting (pads, walls, covers, vessels, conveyers, mixing, watering and monitoring)

Cull Fruit and Vegetable Management (liquids and solids)

- Modification and construction of storage and treatment facilities for liquid and solid fruit and vegetable waste.
- Recycling systems for waste waters (conservation tools to reduce water, storage, collection, and transfer systems)

Protection from Wild-life

- Fencing to protect high value crops, and drip irrigation systems
- Scaring and repellent systems (electronic, netting, noise, guard animals, and chemicals)

Funding is provided for anywhere from 30-50% of the project, depending on the particular details of the project. You have the opportunity to credit your time and machinery use as in-kind support for the project. Participants are also encouraged to take advantage of other sources of funding, for example your local conservation authority.

People who haven't completed an EFP workbook need to attend the workshop, complete the EFP self assessment action plan and have their book confidentially peer reviewed. If you already

have a “deemed appropriate” EFP action plan completed between 1993 and April 2004 it will be honoured until March 31, 2006 and you will not have to take another course.

Although there is lots of money available, it is available on a first come first serve basis. So, if any of the projects identified above are on your to do list, the time is now for horticulture producers to take advantage of this program.

Remember the program is called the “Environmental” Farm Plan so funding is available to help you move your EFP Action Plan rating from a “1” or “2” (poor) category into a “3” to “4” (best) category. Non environmental projects, such as hail netting, will not be funded.

This money can all be accessed through your local EFP coordinator. You find this information on the OSCIA web site at www.ontariosoilcrop.org or by calling 1-800-265-9751.

Minor Use Registrations: What is third party liability?

Pam Fisher, Berry Crop Specialist and Leslie Huffman, Weed Management Specialist (Horticultural Crops), OMAFRA

Third party liability refers to a clause added to several minor use labels in Canada. The 3rd party liability clause has been an important factor in the success of the minor use registration program, which has provided our industry with several important registrations.

Registrants are sometimes reluctant to add new uses to their pesticide labels, especially if the new use is for a low-acreage and high value crop. In these cases, there is little economic incentive for the registrant to add the new minor use to the label, and the risks associated with liability can be very high. To encourage registrants to support important minor use registrations, the third party liability clause was developed.

Example of a third party liability clause:

The DIRECTIONS FOR USE for this product for the use(s) described on the Supplementary Label were developed by persons other than (Registrant xx) and accepted for registration by Health Canada under the User Requested Minor Use Label Expansion program. (Registrant xx) itself makes no representation or warranty with respect to performance (efficacy) and/or crop tolerance (phytotoxicity) claims for this product when used on the crop(s) listed on this Supplementary Label. Accordingly, the Buyer and User assume all liability arising, and agree to hold Registrant xx harmless from any claims based on efficacy and/or phytotoxicity in connection with the use(s) described on this Supplementary Label.

In other words, if the product causes crop damage or if it fails to control the labeled weeds, the user cannot sue the registrant for damages.

However, the registrant remains responsible for the environmental impact and toxicological effects of their product, as they supplied the information in support of the original registration.

Table 1: Examples of products used on berry crops with third party liability clauses on the label;

| Product | Registrant | Crop |
|-------------|--------------------------|--------------|
| Goal 2XL | Dow Agrosiences | strawberries |
| Dual Magnum | Syngenta Crop Protection | Strawberries |

Research Highlights from the Berry Program of the University of Guelph

Adam Dale, Department of Plant Agriculture, University of Guelph, Simcoe

(From a presentation at the Ontario Fruit and Vegetable Convention, Feb 16, 2006)

Today, I shall be talking about highlights in berry research that have happened over the last 10-15 years. These would not have been accomplished without the help and support of many people in various research teams, the leaders of these teams are Becky Hughes, John Zandstra, John O'Sullivan, Rebecca Hallett, and John Potter (AAFC). I shall highlight eight areas and talk briefly about the future.

Varietal resistance to root lesion nematode. We came up with the concept nematode load to describe the variation between strawberry varieties. Simply put, nematode load is the number of nematodes that plant will host. It includes all the nematodes in the roots and in the surrounding soil. Our results showed that varieties closely related to Veestar and Redcoat would host about three times as many root lesion nematode as those related to the University of California germplasm, such as Annapolis and Glooscap.

Resistance to Tarnished plant bug. Tarnished plant bugs cause considerable damage to strawberry fruits, particularly dayneutral varieties. We surveyed a large number of varieties and selections to try to detect variability that we could exploit. Two years data indicated that *Fragaria virginiana* clones collected in Ontario were much more resistant to plant bugs than cultivated varieties. However, there was considerable variability within the cultivated varieties. Evangeline and the dayneutral, Fort Laramie, were the most tolerant.

Additional studies showed that resistance was polygenic and recessive. However, we have been able to select dayneutral clones with high resistance from progenies of Fort Laramie x Evangeline and Fort Laramie and FV4-90, a wild hybrid.

Presently, we have a graduate student, Cynthia Rougoor, investigating the mechanisms of resistance in strawberry tarnished plant bugs.

Strawberry breeding. The program has released a number of varieties over the years. The most recent of these were: Startyme (1995), G19 (1997), Sapphire (2001) and Serenity (2002). We expect to release an early variety in 2007, and three or four more from 2009 onwards as virus-tested material becomes available.

Also, we have been selecting for winter-hardiness in New Liskeard and have one selection that has potential. This is presently being virus-tested.

Greenhouse raspberries. Since 1994, we have been working to develop systems to grow raspberries successfully year-round in the greenhouse. We have determined which varieties are suitable, worked out scheduling protocols and determined the economic feasibility.

The first thing we noticed was that the fruit quality of greenhouse-grown raspberries is vastly superior to that from field-grown plants.

The most suitable varieties that are available to us, are the summer-bearers, Tulameen and Nova, the early fall-bearers, Autumn Britten and Polana, and the yellow fall-bearer, Anne.

Fruiting can be scheduled in several ways. With summer-bearing varieties, plants can be brought into the greenhouse at 6 week intervals to give continuous cropping. With fall-bearing plants, canes can be summer-pruned and plant can be cold-stored to achieve the same effect.

Economic studies which used data from a greenhouse raspberry grower, indicated that raspberries can be grown profitably. If the greenhouse was dedicated to raspberries, an internal rate of return of 18% was achieved. If the greenhouse costs were amortized over two crops the internal rate of return was 42%.

Glyphosate resistance in strawberries. Resistance to glyphosate is found in wild strawberries in Ontario. This has been transferred by conventional means into cultivated strawberry. Our selections are not yet completely resistant, but we estimate that practical levels of resistance will be available in selections of variety quality in two more generations.

Herbicide and insecticide trials. The Simcoe Research Station is GLP certified. Consequently, over the last three years, Dual II Magnum, Spartan, Admire, Select and Sencor have been tested in residue and tolerance trials on some of the berry crops. The data from these trials are now part of applications for minor use registrations.

Dayneutral strawberries. Dayneutral strawberries will fruit in Ontario throughout the summer and can extend the fruiting season well beyond the normal strawberry season. When high tunnels are used there is potential to harvest fruit from late May into November.

This year we have started a project to assess the market feasibility and gather market intelligence, develop adapted dayneutral varieties which will enable us to compete with imports, investigate dayneutral production methods to maximize yield, and to determine how feasible it is to use high tunnels to extend the season.

Future research. Over the last year, a group of researchers has been assembled to work together on berry crops. They include production scientists, working on production and plant physiology, breeding, entomology and pathology, post-harvest physiology and food chemistry, and extension specialists. Together we hope to provide the information to maintain and expand the berry industry in the Province.

The Ontario Berry Grower is edited by:

Pam Fisher
Berry Crop Specialist, OMAFRA,
Box 587, Simcoe,
ON N3Y 4N5
519-426-2238
pam.fisher@omafra.gov.on.ca