Great Lakes Fruit, Vegetable & Farm Market EXPO
December 9-11, 2008
DeVo Place Convention Center, Grand Rapids, MI

Cherry

Wednesday morning 9:00 am

Where: Grand Gallery (lower level) Room D

Recertification credits: 1 (1C, PRIV CORE)
CCA Credits: NM(0.5) PM(0.5) CM(1.0)

Moderator: Jason Fleming, MSHS Board, Shelby, MI

9:00 a.m. Impacts of Fall Foliar Nitrogen in Tart and Sweet Cherry

- Gregory Lang, Horticulture Dept., MSU
- Nikki Rothwell, District Horticulturist and NWMHRS Coordinator, MSU Extension

9:40 a.m. Sweet Cherry Evaluation and the Interface with the New Cherry Website

- Nikki Rothwell, District Horticulturist and NWMHRS Coordinator, MSU Extension

10:00 a.m. Further Investigation of American Brown Rot Sensitivity to Sterol Inhibitor Fungicides

- Erin Lizotte, IFP/IPM Educator, MSU Extension

10:30 a.m. Harvesting Technology Update: A Review of Three Harvester Systems

- Ron Perry, Horticulture Dept., MSU
- Jim Flore, Horticulture Dept., MSU
- Gregory Lang, Horticulture Dept., MSU

DETERMINING TIMING AND IMPACTS OF FALL FOLIAR NITROGEN APPLICATIONS ON MONTMORENCY AND PROCESSING SWEET CHERRY GROWTH AND FRUITING

Team Leader: Nikki Rothwell
Team Members: Greg Lang and Jim Flore

Objectives:
The primary objective is to examine the timings and impacts of fall foliar nitrogen (N) applications to Montmorency tart cherry and sweet cherry when applied at different times. We determined if fall foliar N applications affect bearing cherry trees by measuring: a) N levels in spur buds, b) N levels in young fruits, c) spur leaf size and total leaf area per spur, d) fruit set, e) fruit size, f) fruit firmness, and g) shoot and/or bud cold hardiness.

Activities and Accomplishments:
The study was initiated in late summer and fall 2007 in three blocks. We applied foliar N to two sweet cherry orchards, one grower cooperator block and one Kristen block at the Northwest Michigan Horticultural Research Station (NWMHRS). Orchards were divided into a control treatment that received no nitrogen and a treatment that received one foliar urea application. Nitrogen treatments were applied 13 August 2007 at a rate of 40 lb of actual N/acre; tractor speed was 3mph. Each treatment was replicated five times. In the tart cherry block, whole trees received one of the following three treatments: 1) untreated check (UTC), 2) one foliar urea application at 40 lb/acre, and 3) two foliar urea applications (~1 week apart) at 40 lb/acre. To examine timings, the above treatments were imposed throughout the fall, approximately 2.5 weeks apart (mid-August, early Sept, late Sept, and mid-Oct) (Figure 1). The tart cherry treatments were set up in a randomized block design with four replications.

One of the main objectives of this project is to improve yields, but after one year, we did not observe higher yields in any nitrogen-treated sweet cherry blocks nor in the Montmorency orchard. We suspect we will need multiple years to show if fall foliar nitrogen has any impact on yield. In spring of 2008, fruiting spurs, young green fruit, and leaves were collected from the Montmorency block and the two sweet cherry blocks for nitrogen analysis. Ten fruiting spurs per tree were collected during bud swell on 31 March; buds were dried in a forced air oven for four days at 38 degrees Celsius then ground in a Wiley Mill Grinder. Young green fruit (10/tree) were collected post shuck-split on 5 June, and ten leaves per tree were collected from 2 year-old non-fruiting spurs in early August. Leaves were washed and air dried. Spurs and leaves were shipped to A & L Laboratories for nitrogen analysis. Buds from Montmorency trees had significantly high nitrogen in one and two applications of fall foliar nitrogen. Fruiting buds collected from sweet cherries did not have higher nitrogen content than the untreated controls. We also saw no differences in amount of nitrogen in collected sweet cherry leaves. Spur leaf size was measured in all three blocks after leaf elongation was complete in mid June. Ten leaves on different two-year old non-fruiting spurs were measured per tree. The largest leaf in the spur was chosen and the longest length and widest width was measured. Spur leaf size calculations are still underway.

We also measured the average weight (grams) per cherry in all treatments. Fruit weight was determined by collecting 100 fruit, 25 from each quadrant and weighing the cherries on a digital scale. Although the numbers were not significant, Montmorency and sweet cherry trees that received nitrogen applications had slightly heavier fruit. Fruit firmness was impacted by fall foliar nitrogen: Montmorency cherries were firmer with two applications of fall nitrogen and sweet cherries were also firmer on trees that received fall nitrogen.

We measured cold hardiness in Montmorency in November and again in February. For each test date, 20 branches per tree were collected. Three replications per freeze treatment were wrapped in moistened cheese cloth and inoculated with ice to reduce the super-cooling effect throughout the test. After inoculation, branches will be wrapped in aluminum foil and placed into programmable freezer where the temperature will be reduced 3 to 5˚C per hour. Six freezing temperatures will be targeted and the control will be held at 5˚ C. The lowest target temperature will be that which kills 100% of the samples while the upper temperature will yield 100% survival. Once the samples have been subjected to the target temperature, they will be removed from the freezer and allowed to gradually thaw for 24 hours. Thawed tissues will be moved to humidity chambers held at room temperature. We will evaluate bud mortality at 6-8 days post-treatment, rating the cambium/phloem area as either dead (damaged) or alive (no damage). Our data suggests that trees receiving fall foliar nitrogen can withstand colder temperatures at a mid-early (8 September) and late (21 October) applications. The early and mid-late timing for nitrogen applications did not improve cold hardiness, but the treatments did not cause higher mortality. Two applications of fall foliar nitrogen do improve cold hardiness compared with only one application.

Impacts:
Soft fruit cost the tart cherry industry an average of $6 million per year from 1990-2004, and as much as $14.3 million in a single year (J. Nugent, unpublished data). Horticultural studies have suggested that several aspects of tree physiology may play potential roles in the occurrence of soft fruit. Investigating fall foliar N applications to improve N reserves and subsequent fruit quality may be a practical orchard management technique to help reduce tart cherry soft fruit problems.

Properly sizing fruit is important in processing sweet cherry systems in order to increase yields and in fresh production to improve marketability. This study investigated whether N reserves can be manipulated to improve fruit set and/or size (hence yields), without negatively impacting vegetative growth or tree hardiness. Because fall foliar N has been shown to increase spur leaf size, we hypothesize that over time fall foliar N also will increase fruit size and/or fruit set, thereby improving profitability for growers.

Cold hardiness is an issue of concern in both sweet and tart cherry trees, especially in Michigan where adverse climatic effects can include early fall freezes, exceptionally cold winters, widely fluctuating winter temperatures, and spring frosts. Cold tolerance in fruit trees increases as winter approaches, but extreme shifts in temperature can subject cherry trees to injury throughout late fall and winter. Even if a cherry tree is adequately cold-temperature acclimated, harsh winters can damage fruiting buds as well as vegetative tissues of the tree. Poor cold hardiness can result in poor crop yields, and more importantly, high tree mortality. The application of fall foliar nitrogen appears to improve cold hardiness.

Funding Partnerships: International Fruit Tree Association (Lang, $17,500

SWEET CHERRY EVALUATION AND THE INTERFACE WITH THE NEW CHERRY WEBSITE

N.L. Rothwell, District Horticulturist, NWMHRS
W.W. Shane, District Horticulturist, SWMREC
G.A. Lang, Dept. of Horticulture, MSU
K.L. Powers, Research Technician, NWMHRS
T. Valentine, Research Technician, MSU
T.M. Aichele, Dept. of Geography, MSU
J.N. Landis, IPM Program, MSU

The new MSU cherry website (www.msu.edu) has many attributes that will benefit Michigan growers. Due to the complex nature of producing cherries, growers rely on up-to-date horticultural and pest management information from Michigan State University (MSU) extension staff and specialists, and as of August 2007, no centralized system for dispensing cherry information existed. By merging all Michigan cherry information into a single internet location, growers will have well-organized, swift access to important resources, saving valued time, especially during the busy growing season.

Because the sweet cherry cultivar evaluation project is currently underway at three fruit research stations, standardizing the data collection was an important goal for the team members. In 2007, we established a standardized data collection method for all sites and produced an evaluation protocol and a fruit data sheet to collect similar data at all sites in all years. An upgraded computerized database was developed during winter 2008 using the new consistent data collection parameters from the three sites. After the new database was programmed, all past and present yearly data were merged. In addition to assimilating all cultivar data, the new database has been streamlined to minimize input error and to expedite the entry process. This standardization also accelerates the review process and more importantly grower access in consistent and timely outputs on the new cherry website.

Data from all promising sweet cherry cultivars will be posted onto the new website in a consistent manner (ie. all varieties will be categorized and listed in a consistent manner). Growers will have regular access to named varieties posted on the cherry website, including both tree and fruit characteristics. A template of a variety webpage will be available for comment in January 2009.

FURTHER INVESTIGATIONS OF AMERICAN BROWN ROT SENSITIVITY TO STEROL INHIBITOR FUNGICIDES

Erin Lizotte, Dr. George Sundin, Dr. Nikki Rothwell, Dr. Tyre Proffer, Karen Powers

Fruit growers are faced with a lack of available fungicides and due to the limited options, the development of fungicide resistance. Pursuant to developing resistance management strategies and determining current sensitivity levels, the NWMHRS in collaboration with the MSU Tree Fruit Pathology Lab, has been evaluating the *in vitro* sensitivity levels of *Monilinia fructicola* (American brown rot) to sterol inhibitor fungicides, including fenbuconazole (Indar) and propiconazole (Orbit). Additionally, efficacy trials have been performed in the field. The field efficacy data maintains fenbuconazole is the best available fungicide, and that it is capable of controlling isolates that represent the average, current sensitivity level found in population surveying (2007). Despite these finding, *in vitro* lab results show a shift in the pathogen population towards reduced sensitivity.