Sweet Cherry

Wednesday afternoon 2:00 pm

Where: Gallery Overlook (upper level) Room E & F
MI Recertification credits: 2 (1C, COMM CORE, PRIV CORE)
OH Recertification credits: 0.5 (presentations as marked)
CCA Credits: PM(1.0) CM(1.0)
Moderator: Mark Meizio, Cherry Bay Orchards, Traverse City MI

2:00 pm	Bird Management in Sweet Cherries • Catherine Lindell, Integrative Biology Department/Center for Global Change and Earth Observations • Megan Shave, Integrative Biology, MSU
2:20 pm	Alternate Hosts Harboring Spotted Wing Drosophila Near NW MI Sweet Cherry Orchards • Nikki Rothwell, NWMHRS Coordinator, MSU Extension, Traverse City, MI
2:35 pm	Spotted Wing Drosophila Management Research in France (OH: 2B, 0.5 hr) • Gerard Charlot, CTIFL, Bellegarde, France
3:05 pm	Fruiting Wall and Other High-Density Training Systems • Gerard Charlot, CTIFL, Bellegarde, France
3:40 pm	The Benefits and Challenges of Transitioning to High-Density Sweet Cherry Systems - Grower Panel
4:10 pm	Session Ends

Bird Management in Sweet Cherries

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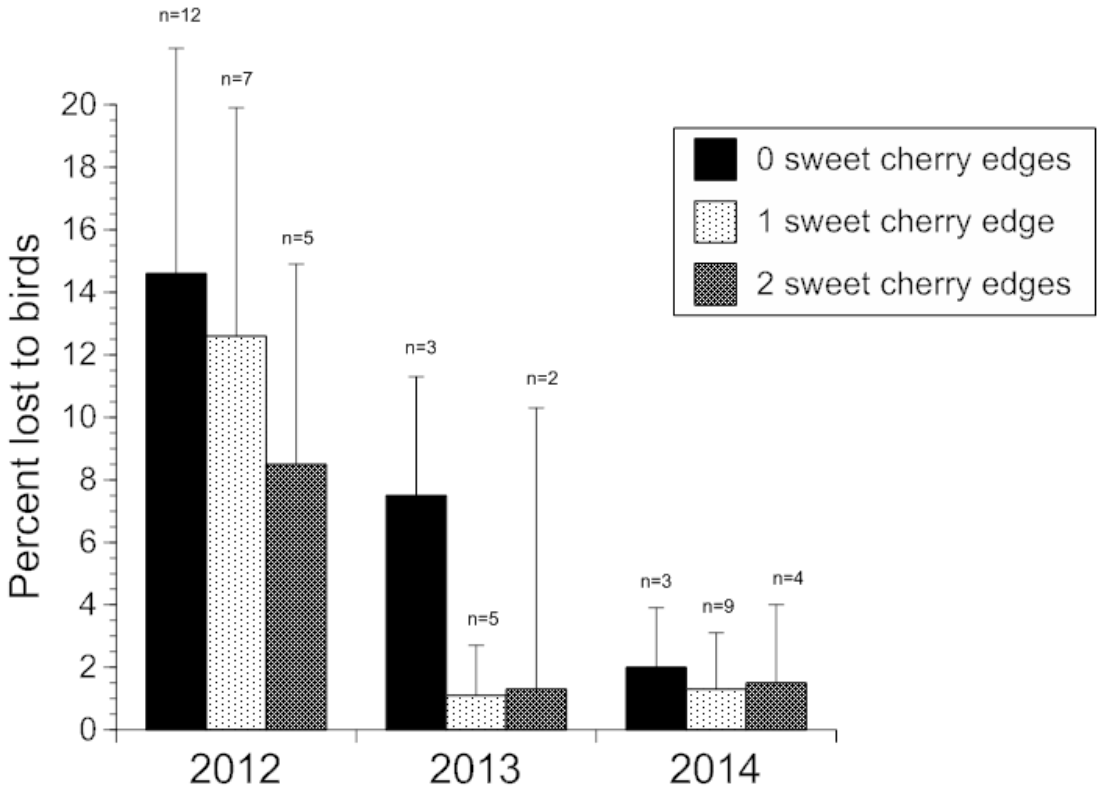
Risk factors for high fruit damage by birds.
A. When there is less fruit in a given area, there will be higher percent bird damage to the fruit that is available. When/where to expect higher percentages of damage: 1) low-yield years (for example 2012 in Michigan, Figure 1), 2) early-ripening varieties.

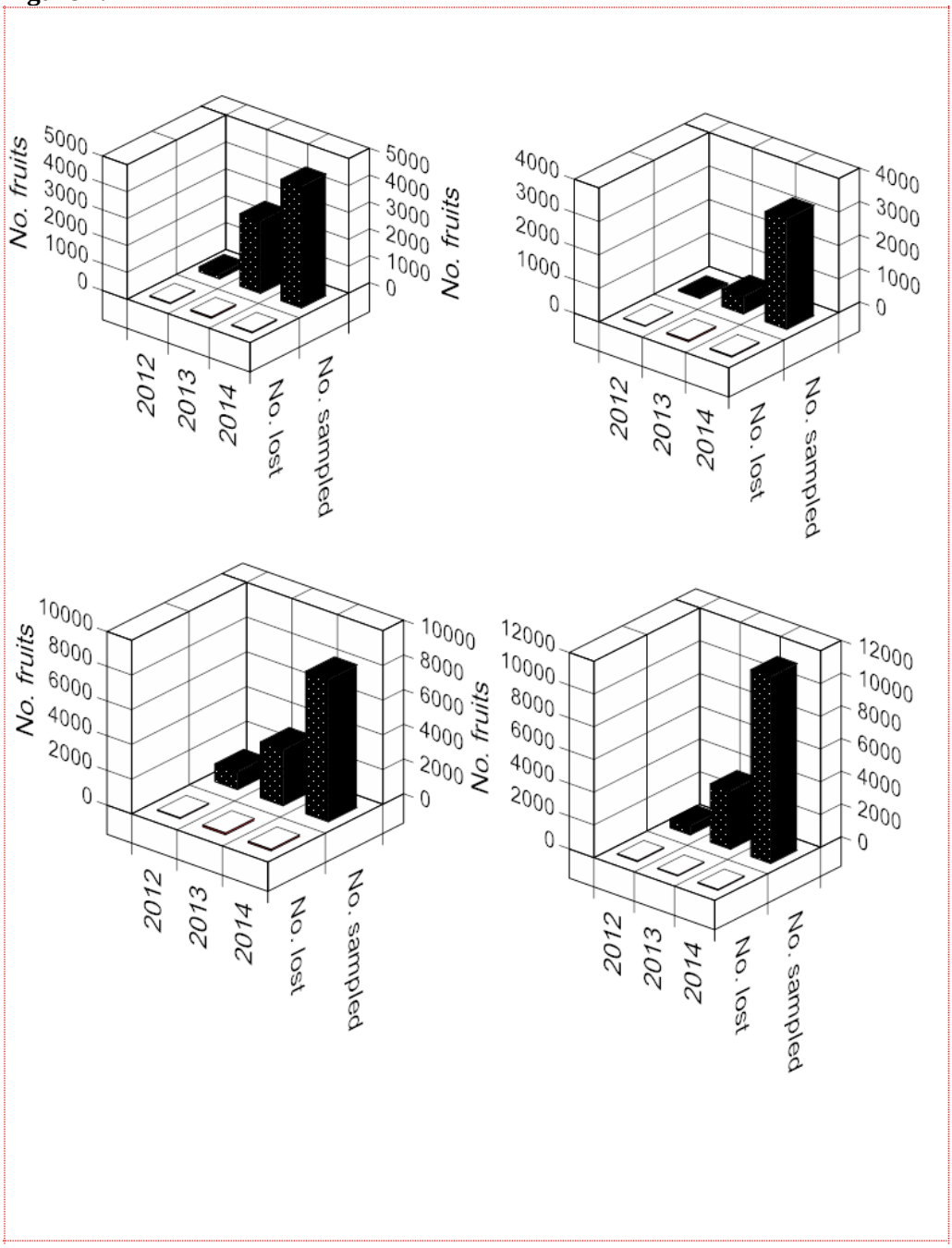
B. Blocks near resources important to birds are at higher risk for damage. When/where to expect higher damage: 1) blocks under wires, 2) edges of blocks not adjacent to other sweet cherries (Figure 1), 3) near night roosting sites, 4) isolated blocks with little human activity, 5) potentially blocks near dairy farms.

Figure 1. Michigan sweet cherries had higher percent bird losses in 2012 although this effect varied with the number of block edges adjacent to other sweet cherry blocks. In other words, blocks near other sweet cherry blocks are protected to some degree from bird damage.



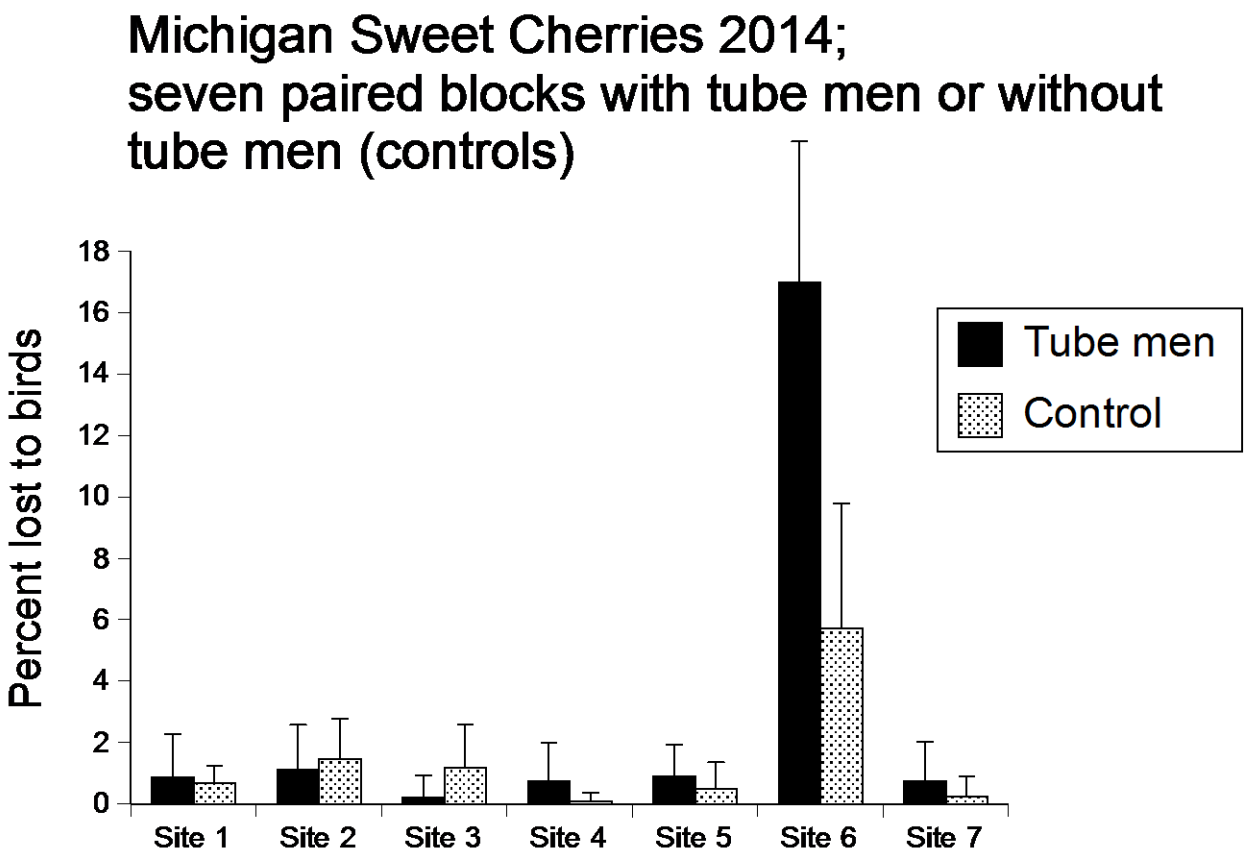
The actual **numbers** of fruit lost to birds were relatively constant in several Michigan sweet cherry orchards we sampled in 2012-2014 (**Figure 2**). Because the fruit yields were much higher in 2013 and 2014 (as measured by the number of fruits sampled) than in 2012, the **proportion** lost was much higher in 2012. **Figure 2** shows results from four Michigan sweet cherry blocks we sampled for bird damage in 2012 through 2014.

Figure 2.



Therefore, in high-yield years, bird management may be less critical than in low-yield years. Bird management also may not be very effective in high-yield years. In 2014, for example, with high sweet cherry yields, the percentages lost to birds in orchards with and without inflatable tube men were generally low and similar (**Figure 3**).

Figure 3.



Considerations in development of bird management strategies.
Each farm is unique and should be assessed for risk factors like wooded edges that provide "staging areas" for fruit-eating species like American robins.
Some deterrents, like lasers, work in particular situations. For example lasers deter Canada geese in low-light situations. However, lasers are not likely to deter the pest birds generally seen in sweet cherries during the day.
Using multiple scare deterrents, deploying them early in the growing season, and moving them frequently should enhance their effectiveness in deterring birds.
Providing nest boxes and perches for predatory birds will increase the presence and may increase the activity of these birds in orchards. The most common predatory bird, the American kestrel, preys on rodents that eat young cherry trees, insects, and small birds. These types of biodiversity-friendly pest management strategies may also be useful in marketing.

For information about deploying kestrel nest boxes, please see:
http://birddamagetofruitcrops.info/PDFs/OrchardKestrelBoxFactSheet_20140310.pdf

Acknowledgments.
U.S.D.A. Specialty Crop Research Initiative, many state fruit grower industry groups, fruit growers in Michigan, New York, Oregon, Washington, and California.

Spotted Wing Drosophila Management Research in France

G. Charlot, Ctifl, centre de Balandran (FRANCE)

This work is carried out within a framework coordinated by my colleague C. Weydert (Ctifl centre de Balandran, Weydert@ctifl.fr).

The spotted-wing Drosophila (SWD), *Drosophila suzukii*, has become a major pest in France since 2010. For the last four years every region is concerned, with more damage in southern areas on important crops such as cherry, strawberry, raspberry or even fig, apricot and peach in years with high risk like 2014. Since 2012, *D. suzukii* has been observed in all neighbouring countries of France : Spain, Italy, Switzerland, Germany, Belgium, UK.

A national research and dissemination project (Casdar, supported by the Ministry of Agriculture) was launched in 2013 and will continue till the end of 2015. It brings together 13 essential French partners of on-farm research to assess all possible control strategies : mass trapping, plant protection with chemical and natural compounds, insect-proof nets, biological control, functional biodiversity, sanitary methods.

Female *D. suzukii* winter in numerous shelters like, hedges, copses, forest. So it may attack as soon as cherries turn pink. When the winter is mild the *D. suzukii* population is high at the end of winter and damage may be severe on the earliest varieties at the beginning of May.

It seems that weather conditions remain important factors to the occurrence of damage as the pest. *D. suzukii* prefers relatively cool climates and humidity. The microclimatic conditions in the crop seem to have an important impact on *D. suzukii* populations and damage. The humidity in the crops must be avoided at all costs: trees must be pruned to enhance air circulation, grass must be kept short and stagnant water must be avoided.

Catching *D. suzukii* is very important for different reasons. It's very useful to study the behavior of *D. suzukii* in time and space. Even if we do not currently have a decision-making tool based on captures, the monitoring gives information on the quantity of *D. suzukii* in a location and could indicate the arrival of the population in a plot. Many trials have been carried out during the project to find the best trap and attractant and to evaluate the mass trapping systems. The best attractant seems to be the mix "baker's yeast + sugar", followed by the attractant of the Riga® trap (Andermatt), the Dros'Attract® (Biobest) and the Fruit Fly® (Koppert), that are all more or less equivalent to the "VVE" mix: apple cider vinegar, red wine and water.

Some parameters like firmness, skin thickness, sugar and acidity level certainly have an impact on the fruit sensitivity but we have not found "less-sensitive" cherry varieties (6 varieties tested) in our studies either in vitro or in vivo.

Plant protection with conventional products generally achieve satisfying control of populations when the control strategy includes larvicides combined with adulticides, but this often requires an intensive spraying schedule. Many trials have been carried out with insecticides and alternative products on cherry. Currently, control is based on treatments with the following substances: dimethoat and/or phosmet, completed with adulticides (for example: lambda cyalothrin, deltamethrin, spinetoram (with derogation), cyazypyr etc.).

Organic products do not provide sufficient protection when the level of population is medium or high.One product can be used in organic crops: spinosad (also with derogation). No other alternative products can be recommended. Garlic oil or other repellent products did not show any efficiency.

Although insect-proof nets (row by row protection) reach a close to full efficacy, they appear difficult to set up in cherry orchards since labor and financial investment is high.

Right now, with several trials on cherry, strawberry and raspberry, we did not prove the efficacy of mass trapping to reduce damage of *D. suzukii*. The trap efficacy and the ease of use must absolutely be improved and the mass trapping system will continue to be studied (inside or surrounding the plots).

Cold storage of the fruits after harvest has been studied to assess if this technique could kill *D. suzukii* eggs and larvae when the damage is not externally visible. The cherries were stored for 48 hours at +1.5°C, 0°C or -1°C. At these temperatures fruit quality was maintained. Cold storage can stop the development of larvae and kill the eggs and the smallest larvae but the development of the oldest larvae can start again at room temperature. The lower the temperature, the higher the efficacy of this method.

Predators and parasitoids have been researched in crops and environment and two years of trials tests have been carried out with the indigenous pupal parasitoid *Trichopria drosophilae* on strawberry under insect-proof greenhouses. This parasitoid develops well on *D. suzukii* but did not succeed in decreasing the damage in the crop because the development of *D. suzukii* was too fast. Our research on indigenous or exotic parasitoids will continue and we hope to obtain results transferable to orchards.

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Fruiting Wall and Other High-Density Training Systems

G. Charlot, Ctifl, centre de Balandran (FRANCE)

In France, cherry trees are usually trained to an open vase system. Other training systems of cherry are also possible. They allow a morerapid fruit set and make pruning and harvest easier. The arrival of new rootstocks has made these training systems easier. That is to say the single axe, biaxe, triaxe, fruiting wall, drilling, KGB, UFO. The choice between these different systems will depend on the expected development of the soil/cultivar/rootstock combination. The greater the vigour, the more axes are needed to divide the growth and limit the development of the trees as far as height and width are concerned. Protection of the trees from insects and rain can also be considered.

Fruiting wall

The cherry fruit wall is based on the apple orchard management concept developed by two colleagues from Ctifl , A. Masseron and L. Roche. By reducing the thickness of the hedge and mechanizing tree pruning we expect the fruit wall to lower production costs and offset labor shortages.

We have conducted four trials since 2001. Eight varieties with different growth habits, grafted on Tabel®Edabriz (2001-2014).Four varieties were grafted on Maxma 14 (2007-2014). Two varieties were grafted on two rootstocks (Gisela 6, Weiroot 158). These two last trials are in progress.

Regina, 9 years old, 12 days after mechanical pruning and 8 days before harvest

Coup'éco machine used for fruiting wall

Shape of the trees

The trees may be trained in axis, biaxis, triaxis, palmette.

Choice of the varieties

The varieties must be very productive, with good ramification and spreading to willowy habit, particularly if they are trained in axis. We have good results with Bellise, Ferdouce, Folfer, Regina, Rubin, Staccato, average results with Ferrovia and Kordia, bad results with Fertard (variety with an average productivity). In Nîmes, Regina, with good pollinators such as Ferrovia, Rubin, Summit has a very good productivity (15 t/ha on average).

Choice of the rootstocks

The rootstocks must be productive to very productive, dependant upon the soil fertility, the vigor of the varieties and shape of the trees (axis, biaxis, palmette) : Gisela 5, Tabel®Edabriz, Piku 1, Gisela 6, Weiroot 158, PHL-A, Maxma 14.

Pruning

The trees are mechanically pruned after the third leaf, 40-50 cm from the trunk and between 2.70-3.2 m from the ground. Time of mechanical pruning depends on the vigor and growth of the trees. In case of relatively good growth mechanical pruning should be carried out during the vegetative growth. In case of late vigor it must be done in winter. To ensure satisfactory fruit size, additional winter pruning is necessary every year or every 2 years.

Planting distances

- Between the rows : 3.5 m
- On the rows : 1.5 m (axis), 2 to 2.5 m (biaxis, palmette)

Other high-density systems

Axis, bi and triaxis, palmette

For the past 6 years we have tried these training systems with numerous varieties and rootstocks. The hedgerow is quite flat by removing the branches which are perpendicularly to the row.

- Axis : we use dwarfing rootstocks (Gisela 5, Tabel®Edabriz, Piku 1) and plant the trees at 3.5-4 m between the rows and 1.50 m on the rows.
- Bi and triaxis :we use semi-dwarfing rootstocks (Gisela 6, Weiroot 158, PHL-A, Furtos, Maxma 14) and pay attention to obtain a well-balanced axis : If the two axis are not well balanced, we train the most vigorous one at an angle and we train the less vigorous one vertically.
- Palmettte : 4 to 6 axis. The trees may be grafted on semi-dwarfing or vigorous rootstocks (Furtos, Maxma 14, Maxma 60, SL 64) as this depends on soil and variety fertility.

Biaxis : Regina, 4 years old, grafted on Gisela 6

Palmette : Rosie, 6 years old, grafted on Maxma 14

Drilling

This training system was successfully used for pears. One trial has been carried out by S. Pinczon du Sel from La Tapy since 2012. At plantation, the trees are pruned 40 cm from the ground. The following year, 3 axis are selected and trellised in V form : one axis on one side and two on the other side. This system allows the tree's vigor to be controlled even using semi-dwarfing to vigorous rootstocks.

Regina, 3 years old, grafted on Maxma 60

KGB and UFO

Several trials have been set up during the past 4 years in order to determine the varieties and rootstocks that are well adapted to these training systems.

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