



# Great Lakes Fruit, Vegetable & Farm Market EXPO Michigan Greenhouse Growers EXPO

December 4-6, 2018

DeVos Place Convention Center, Grand Rapids, MI



## 57 Sweet Cherry

**Where:** Grand Gallery Overlook Room E & F

**MI Recertification Credits:** 2 (1C, COMM CORE, PRIV CORE)

**OH Recertification Credits:** 0.5 (presentations as marked)

**CCA Credits:** CM (1.5) PM (0.5)

**Moderator:** Chris Alpers, MSHS Board, Lake Leelanau, MI

- 2:00 PM**      **Potential Sweet Cherry Varieties for the Fresh Market**
- Lynn Long, Oregon State University
- 2:30 PM**      **Next-Generation Labor Efficient Orchard Systems for Fresh Market Sweet Cherries**
- Gregory Lang, Michigan State University
- 3:00 PM**      **Using Drones and Other Tactics for Bird Control in Sweet Cherry Orchards (OH 7, 0.5 hr)**
- Catherine Lindell, Michigan State University
- 3:30 PM**      **Evaluating the Effectiveness of Spray Materials to Protect Cherries From Rain**
- Lynn Long, Oregon State University
- 4:00 PM**      **Session Ends**

## USING DRONES AND OTHER TACTICS FOR BIRD CONTROL IN SWEET CHERRY ORCHARDS

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In a preliminary study of the potential of unmanned aerial systems, i.e. drones, to deter birds in fruit, we conducted observations during 2018 at four sweet cherry orchards, two in Leelanau County and two in Grand Traverse County. We worked with Peter Baumeler and Fred Page, who operated the drone, while our field assistant, Naomi Barnes, conducted observations of fruit-eating bird activity during three periods: a 15-minute pre-drone period before the drone was flown, a 15-minute period when the drone was flying, and a 15-minute post-drone period, after the drone had flown. We repeated this sequence of observation periods at the four orchards on a number of days before harvest and a few days after harvest. The observations sometimes revealed the results we expected (see Figure 1 below) with lower fruit-eating bird numbers during the periods when the drones were active compared to the pre- and post-drone periods. However, sometimes the results were not what we expected (Figure 2), with fruit-eating bird numbers fluctuating with no apparent pattern during the pre-drone, drone, and post-drone periods. Tests at a larger number of sites would be helpful in determining when drones are likely to deter birds. The Michigan Horticultural Society funded this study.

Figure 1. Fruit-eating bird numbers in a sweet cherry block before we deployed a drone (pre-drone period), during drone deployment (drone period) and after we stopped flying the drone (post-drone period). Leelanau County, 2018.

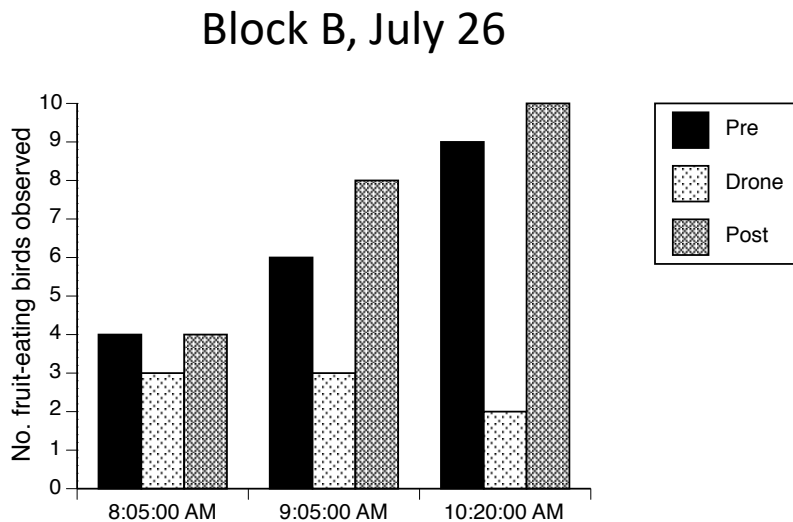
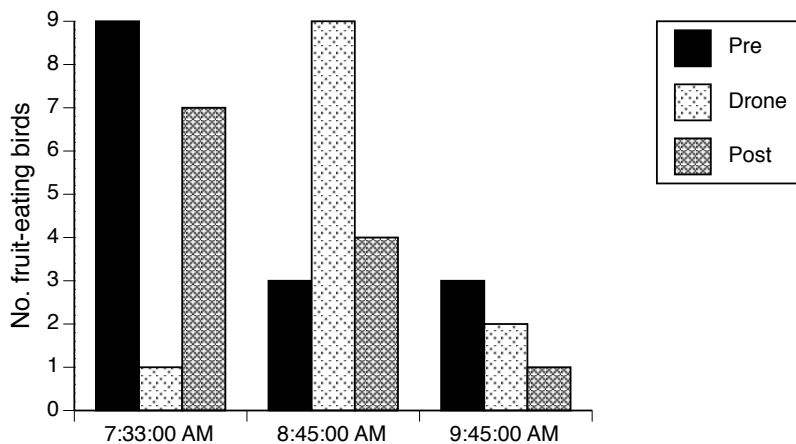


Figure 2. Fruit-eating bird numbers in a sweet cherry block before we deployed a drone (pre-drone period), during drone deployment (drone period) and after we stopped flying the drone (post-drone period). Leelanau County, 2018.

## Block B, July 6



### Other bird management strategies

Bird management strategies can be grouped into several categories: 1) scaring, 2) barriers, 3) cultural management practices, for example encouraging natural predators, 4) deterrent sprays 5) lethal control and 6) more recently, interfering with birds' perception of their environments.

Scaring strategies. Birds habituate quickly to sounds and visual devices that are supposed to scare them. Simply placing decoys of predators or scare-eye balloons is not likely to deter birds for long. If one employs scaring devices, they should be deployed early in the season. Also, they are more likely to deter birds if there is some random component to their movement or sound. For example, inflatable tubemen should be moved within or around a block and, ideally, go on and off randomly (although one needs to be careful that they do not get caught in the crop). Propane cannons and devices that play recordings of distress calls or predator calls can be programmed to go on and off randomly. Some scaring strategies, like lasers, work in particular situations. For example, lasers deter Canada geese in low-light situations. Effigies (dead birds hung in the crop) may deter crows.

Barriers. Many growers use netting to deter birds; it was considered the most effective bird deterrent in a survey of 1500 fruit-growers (Anderson et al. 2013). Netting requires considerable effort and materials and is generally only a reasonable strategy for low-stature, high-value

crops. If one employs netting, it is important that the netting enclose the vulnerable fruit. Birds will easily get under the netting if there is a gap left between the bottom of the netting and the ground. Also, ideally, the netting will be on a frame to maintain some distance between the fruit and the netting. If the netting lies on the fruit, birds will simply reach the fruit through the netting.

Increasing resources for predators of birds. American kestrels, small predatory birds, can be attracted to orchards with nest boxes. Kestrels prey on insects, small mammals, and birds and we have good evidence that they deter pest birds in Michigan sweet cherry orchards (Shave et al. 2018). Occupancy rates of kestrel boxes vary across the state. Eighty to 90% of nest boxes in Leelanau County sweet cherry orchards attract kestrels each year while in blueberry fields in Van Buren and Allegan Counties, occupancy rates are generally between 30-35%. The difference in occupancy may result from the more open nature of cherry orchards compared to blueberry fields and greater amounts of short, grassy areas in Leelanau County compared to western Michigan. At the end of this hand-out are links to plans for building nest boxes and points about the best locations and maintenance of boxes. An important consideration is that kestrels in orchards eat voles and mice, so rodenticides should not be used in orchards when kestrels are present. Kestrels migrate out of the northern lower peninsula of Michigan in August but some kestrels may stay in the southern lower peninsula year-round. As a final point, our research shows that consumers are enthusiastic about this type of bird management and so informing your customers about your use of predator nest boxes may be valuable in marketing (Herrnstadt et al. 2016).

Deterrent sprays. Bird deterrent sprays (there are several on the market) contain methyl anthranilate because it is the only chemical currently allowed for use on fruit. Methyl anthranilate is also a food additive that imparts a fruity odor to products. The method of action of methyl anthranilate is that it irritates the trigeminal nerve in the bill of birds. Generally, tests of the efficacy of methyl anthranilate products have not produced strong evidence that it deters birds in field situations. If sprays containing methyl anthranilate are used, they should be applied following the label as closely as possible to increase the likelihood of effectiveness. For example, bird deterrence may be improved if they are applied with foggers, which produce smaller droplets, than typical sprayers. Also, the sprays need to be reapplied after it rains.

Lethal control. Although potentially appealing, lethal control doesn't have a strong track record for reducing bird damage although it may be warranted in specific contexts. Whether or not one needs a permit to kill pest birds depends on the bird species and the context. Please see the following MSU extension article for regulations concerning permits:

[https://www.canr.msu.edu/news/do\\_i\\_need\\_a\\_permit\\_to\\_control\\_wildlife\\_on\\_my\\_farm](https://www.canr.msu.edu/news/do_i_need_a_permit_to_control_wildlife_on_my_farm).

Interfering with birds' perception of their environments. Recent developments in bird management impair birds' abilities to perceive their environment and may have applicability in fruit-production systems. "Sonic nets", for example, broadcast noise at the same frequencies at which birds communicate, so potentially interfering with birds' ability to warn each other about danger. One test showed that the nets deterred birds from an airfield. Preliminary studies of

“laser scarecrows”, where a laser beam sweeps over a field, show some promise in reducing bird activity in sweet corn. By reducing birds’ abilities to communicate and perceive predators, these techniques may be less susceptible to habituation than scare techniques.

Anderson, A., C. Lindell, K.M. Moxcey, B. Siemer, P. Curtis, J. Carroll, C. Burrows, J. Boulanger, K. Steensma and S. A. Shwiff. 2013. Bird Damage to Select Fruit Crops: The Costs of damage and the benefits of control in Five States. *Crop Protection* 52:103-109.

Herrnstadt, Z., Howard, P.H., Oh, C.-O. Lindell, C.A. 2016. Consumer Preferences for ‘Natural’ Agricultural Practices: Assessing Methods to Manage Bird Pests. *Renewable Agriculture and Food Systems*. 6(1):516-523

Shave, M.E., S.A. Shwiff, J.L. Elser and C.A. Lindell. 2018. Falcons using orchard nest boxes reduce fruit-eating bird abundances and provide economic benefits for a fruit-growing region. *Journal of Applied Ecology* 55:2451-2460. DOI: 10.1111/1365-2664.13172

**\*Building, Installing and Monitoring American Kestrel Nest Boxes\*** Plans for the “Spartan” kestrel nest box and mounting tower (designed by Tom Comfort) can be found here:

<http://www.nestboxbuilder.com/nestbox-article-spartan.html>. Additional plans for a simple kestrel nest box can be found here: 1)

[https://www.nrcs.usda.gov/Internet/FSE\\_DOCUMENTS/nrcs144p2\\_063830.pdf](https://www.nrcs.usda.gov/Internet/FSE_DOCUMENTS/nrcs144p2_063830.pdf)

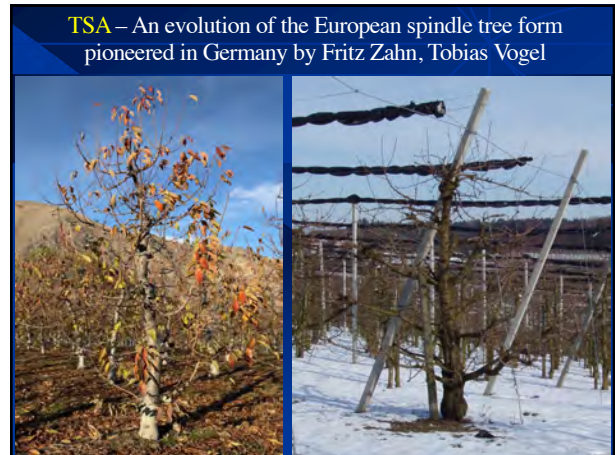
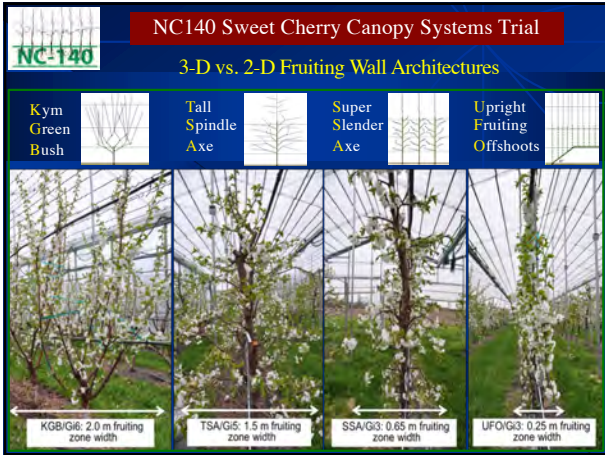
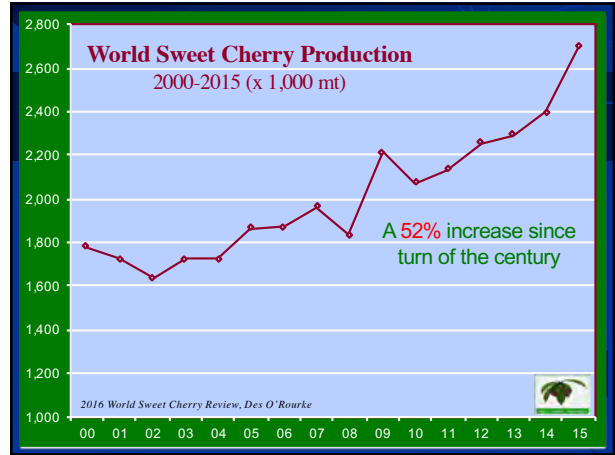
2) <https://nestwatch.org/learn/all-about-birdhouses/birds/american-kestrel/>. Boxes should be installed away from wooded areas to reduce the risk of occupancy by European starlings. Open habitat with sparse trees/shrubs is desirable. Boxes mounted on their own poles/towers can be installed within the orchard itself, either at the end of a row or within a row in an open spot if there is a missing plant. Boxes should be installed at least one-half mile apart to allow for kestrel territoriality. Boxes should be installed 10 – 20 feet from the ground. The box entrance should face the southeast; kestrel nests are more likely to produce young from boxes facing southeast. Kestrels do not build nests, so the bottom of nest boxes should be lined with wood shavings or animal bedding. Boxes that were occupied during the summer should have the wood shavings replaced during the following fall/winter or early spring in preparation for the next breeding season. If a European starling occupies a box, it will add grass and other materials to the box and lay 5 – 7 pale blue eggs. An identified starling nest should be removed from the box, and new wood shaving should be added to the box if needed. European starlings are not native to North American so no permits are needed to remove their nests. Please consider contributing to the nationwide kestrel nest box monitoring effort by registering your boxes with the American Kestrel Partnership. You can get started here:

<http://kestrel.peregrinefund.org/begin-obs>

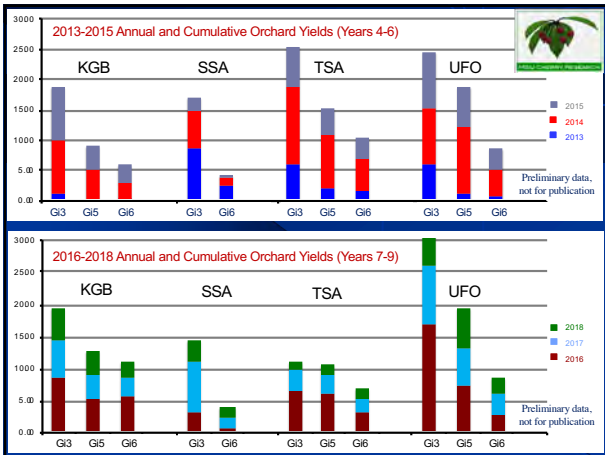
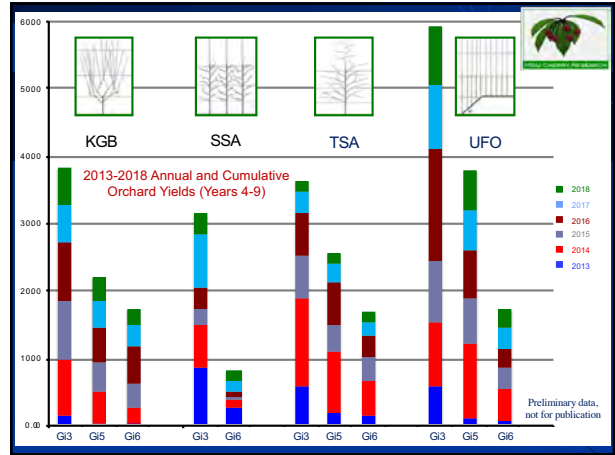
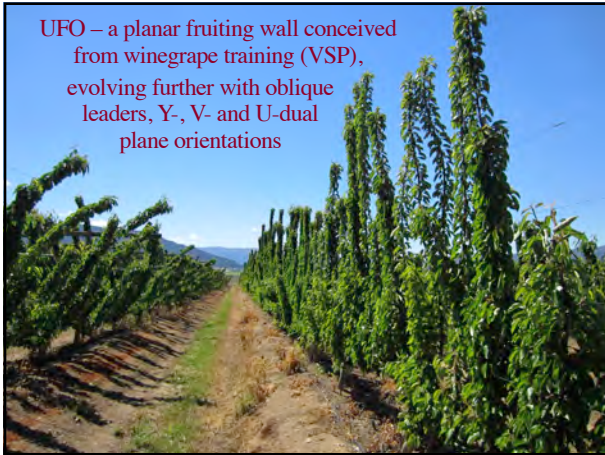
### **Acknowledgments.**

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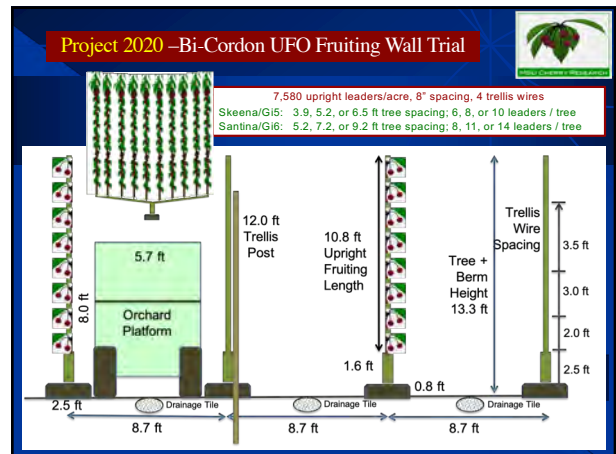
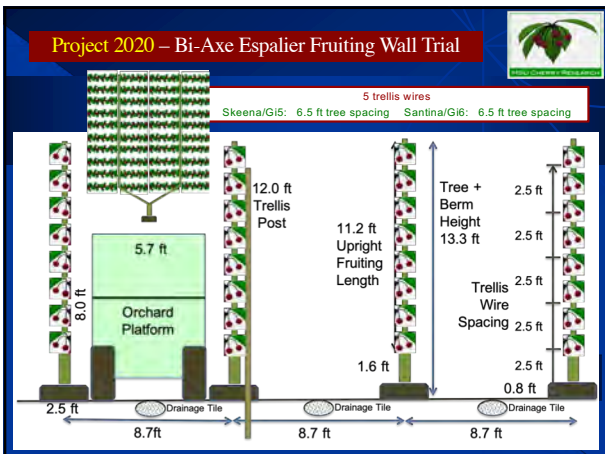
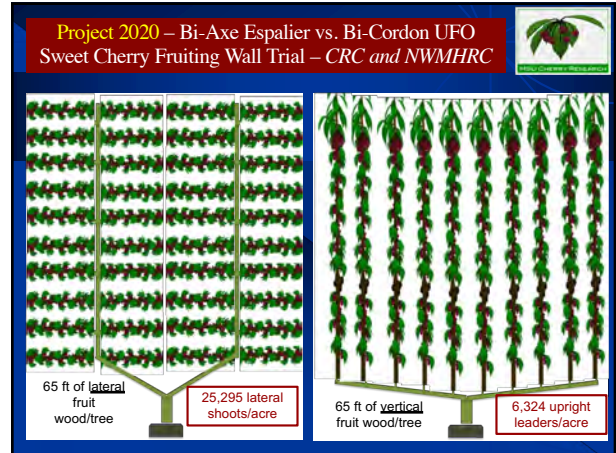




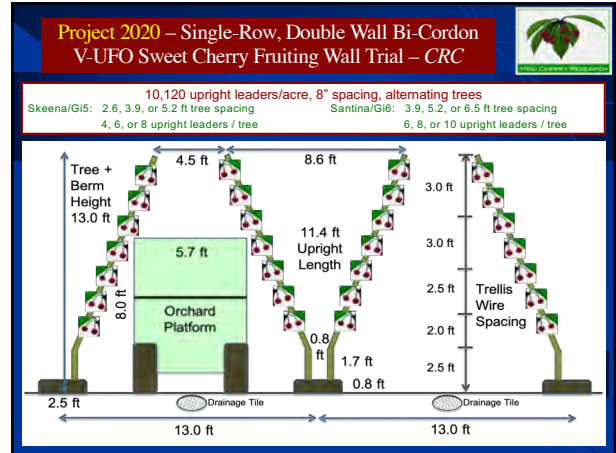
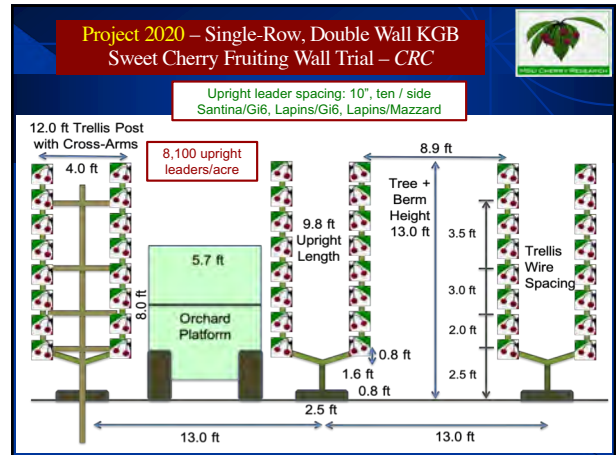


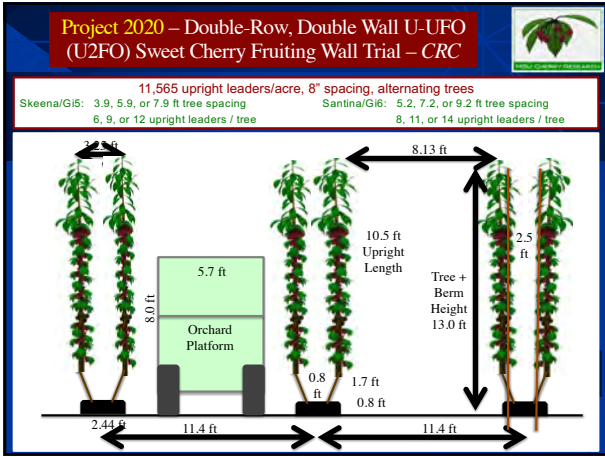


Projected Cumulative Orchard Yield (2010-17) (MT/ha, [ton/acre]) Preliminary data, not for publication						
Cultivar	Rootstock	KGB	TSA	UFO	SSA	
Skeena (British Columbia)	Gi3	85 [39]	124 [57]	177 [81]	-	
	Gi5	79 [36]	100 [46]	170 [78]	-	
	Gi6	68 [31]	74 [34]	114 [52]	-	
Skeena (Nova Scotia)	Gi3	20 [9]	26 [12]	17 [8]	-	
	Gi5	26 [12]	37 [17]	17 [8]	-	
	Gi6	24 [11]	31 [14]	17 [8]	-	
Benton (Michigan)	Gi3	33 [15]	33 [15]	50 [23]	28 [13]	
	Gi5	20 [9]	24 [11]	33 [15]	-	
	Gi6	15 [7]	15 [7]	15 [7]	7 [3]	
Regina (New York)	Gi3	11 [5]	22 [10]	22 [10]	24 [11]	
	Gi5	11 [5]	31 [14]	31 [14]	22 [10]	
	Gi6	9 [4]	22 [10]	13 [6]	15 [7]	









**MSU Tree Fruit Research**

Training video clips at:  
[www.giselacherry.com](http://www.giselacherry.com)

[www.hrt.msu.edu/greg-lang](http://www.hrt.msu.edu/greg-lang)