

**Title: Wildlife Damage Control in Small Fruit Crops
Final Report
Extension Proposal**

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Objectives:

To determine the pattern of bird damage throughout the harvest season of grapes and blueberries

To determine the effects of various bird control practices on grapes and blueberries

Justification:

Bird damage can result in significant crop losses for growers of small fruits. Damage is more apparent in small, isolated plantings. Birds consume fruits and damage others causing further losses due to increased rot pressure and losses to insects drawn into the planting by the damaged fruit.

Methods of bird damage prevention include habitat modification, taste repellents, scare devices and exclusion.

Habitat modification: Removal of nesting and roosting sites in the proximity of the plantings can reduce the presence of birds, and therefore crop losses to birds.

Taste Repellents: Methyl anthranilate is a compound isolated from Concord grapes and is labeled as a taste repellent for birds for several fruit crops. Unfortunately, this compound has been reported to impart an off-flavor to fruits, thus limiting its usefulness.

Scare Tactics: Scare devices fall into two categories: visual and auditory. Visual devices include mylar tape, scare eyes, plastic owls and snakes. While such products may work for a short period, continued effectiveness is dependent on getting them in the planting prior to the time birds begin feeding on the crop and moving the products around in the planting to prevent birds from getting used to their presence. Auditory devices include things like carbide cannons and distress calls. Carbide cannons, or similar devices, are only effective if they are moved around in the planting and the frequency and pattern of discharge is varied. Distress calls are subject to the same factors. In addition, it is essential to identify the types of birds feeding in the planting and getting distress calls specific to these kinds of birds.

Exclusion: Netting is the only sure-fire way to eliminate crop losses to birds. Nets may be put over individual rows or over the entire planting. Application and removal of nets over individual rows may be partially mechanized. Nets must be raised to gain access to the crop during harvest and lowered after. Nets may be placed directly on the plant canopy or suspended by a support wire over the canopy. If terminal elongation is ongoing at the time nets are put on, shoots may grow through nets laid on the plant canopy resulting in damage to the nets and plants when they are removed. To enclose the entire planting under nets, a frame needs to be constructed for their support. Extending the frame and nets beyond the borders of the planting allows operation of equipment under the nets and easy access to the crop. With care, nets should last for several years.

Methodologies:

A Bird X-Peller distress call was used to as an auditory scare device in a blueberry planting at the Middle Tennessee Research and Education Center in Spring Hill, TN. Robbins and mockingbirds were the primary types of birds feeding in the planting. Use of the scare device started prior to color development on the berries. Each day, the device was operated continually beginning one hour prior to sunrise and ending one hour after sunset. The frequency of broadcasting was varied throughout the period during which the device was used.

Netting demonstrations were established in grapes and blueberries at the Middle Tennessee Research and Education Center (MTREC) in Spring Hill, TN and the Highland Rim Research and Education Center (HRREC) in Springfield, TN and in blueberries at the Plateau Research and Education Center (PREC) in Crossville, TN. Both northern highbush and rabbiteye blueberries were included in the planting to give access to ripe fruit from early June through mid-August. Preliminary trials were conducted in 2006 to assess the amount of fruit lost to birds in blueberries. Individual plants were netted and yields were measured for netted versus unnetted plants. Cold weather eliminated the crop in 2007. In 2008, treatments in blueberries included netting individual rows with netting placed directly on plants and suspended above the row and enclosure of an entire section of the planting. Grape treatments included enclosing a section of the vineyard under nets at MTREC and HRREC and individual rows at HRREC.

Results:

As discussed in the 2006 Progress Report, the distress call provided only temporary relief from bird damage and was deemed to be less than acceptable based on the conditions existing at the Middle Tennessee Research and Education Center (MTREC). As a result of this, focus was directed exclusively to netting for exclusion of birds.

Preliminary trials at the Highland Rim Research and Education Center (HRREC) resulted in a total loss of unnetted Bluecrop fruit. Losses in Tifblue fruit were at 65 percent during the early harvest and decreased to approximately 30 percent in the latter harvests. Losses of higher quantities of fruit in the earlier parts of the harvest period are consistent to published reports of bird feeding patterns.

The following chart shows fruit losses to birds at the Highland Rim, Middle Tennessee and Plateau Research and Education Centers (HRREC, MTREC and PREC respectively) for both Bluecrop and Tifblue cultivars:

% Blueberry Crop Loss to Birds (unnetted vs. netted)

Research & Education Center	Cultivar	Yield Reduction
Plateau	Bluecrop	87.6
	Tifblue	32.6
Middle TN	Bluecrop	44.4
	Tifblue	15.4
Highland Rim	Bluecrop	56.0

Conclusions:

Bird damage can account for an appreciable portion of the crop, especially in small plantings, as demonstrated in the above table. Damage will vary from year to year and from planting to planting. The difference in losses among the three Research and Education Centers are reflective of the area in which the plantings were located. More bird habitat in the form of woodlands and other roosting sites were in the proximity of the PREC planting than the others so feeding pressure was greater.

With blueberries, losses in Bluecrop yield far exceeded those of Tifblue in both the 2006 and the 2008 demonstrations. This falls in line with existing information regarding crop losses due to birds. As the season progressed, bird damage abated somewhat, although losses were still substantial.

As expected, no differences in losses to birds were experienced where individual rows were netted where a support wire was used versus enclosing entire portions of the planting under a common net. From the standpoint of the farm crews and from the general public who harvested some of the fruit when the planting was opened for "Pick-Your-Own," enclosing entire portions of the planting under a common net was preferred over individual row netting since, once inside the enclosed portion, access to plants was not restricted by nets. While laying nets directly on the canopy of blueberry bushes saved

the expense of posts and a support wire, some fruit was lost to birds reaching through the net. Also, net removal was more difficult and some damage to the nets was sustained.

Impact Statement:

Site assessment should include potential wildlife problems along with the other parameters. For smaller size plantings, especially if located close to bird habitat, the cost of bird netting should be included in anticipated establishment and operating costs. The extra costs involved in netting plantings will be minor compared to the potential reduction in yields associated with bird feeding. Costs of the support system and the nets may well be recaptured during the first year of their use. If properly taken care of, bird nets should last for several years.

Blueberry plants used in the netting demonstration were set at 5 feet inrow and 10 feet between rows (871 plants per acre). Tifblue at the Plateau Research and Education Center was less affected by birds than at the other plantings and much less impacted by birds than Bluecrop. Even so, with a "Pick-Your-Own" price of \$1.50 per pound, bird damaged accounted for a loss of \$6.30 per plant (\$5,487.30 per acre).

An unexpected benefit of using netting was the exclusion of green June bugs from the plants, which also has amounted to substantial damage in some years.