

Bye-Bye Birdie: Repelling Birds from Fruit Plantings

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Birds are wonderful creatures that fill the morning air with song, eat many insects that affect our crops and our health, and usually enhance our quality of life. But, for growers of cherries, blueberries, grapes, gooseberries, and even apples, birds can be major pests. In one survey, blueberry growers in the Northeastern United States estimated that nearly 30 percent of their crop is lost to bird depredation each year. Across the country, 10 percent of the blueberry crop is probably lost—at a cost of \$10 million. Recently, fresh food handlers have been concerned about the possibility of birds introducing *Salmonella* and other pathogens into the food supply. Since the loss of Mesurool more than a decade ago, no effective chemical repellent has been available to keep birds off fruit in the field. Netting is expensive and difficult to install, so most growers would like to avoid using it if possible.

With the cooperation of Paul Curtis,

wildlife management specialist in Cornell's Department of Natural Resources, and Ian Merwin, Department of Horticulture, we have been examining the effectiveness of various techniques for repelling birds in blueberries, grapes and cherries for the past several years. Most of the techniques have had limited effectiveness, but others have worked reasonably well.

Grape Expectations

Perhaps the most desirable approach to controlling bird populations is to spray something onto the plants that will repel birds during the season. Scientists have known for many years that certain chemicals are distasteful to birds. Unfortunately, most chemicals used in the past had toxicological effects (i.e. Mesurool was an insecticide), so the search began for a non-toxic chemical that was distasteful to birds, but not detectable to humans at

Depredation by birds is a difficult and costly problem for agricultural producers. A combination of visual and audio scare devices, coupled with taste deterrents, is the most effective approach to reducing bird damage in orchards, vineyards and berry plantings.

harvest. Researchers found that methyl anthranilate, a major flavor component of Concord grapes, was distasteful to birds. It is the reason why birds tend to avoid Concord but feast on other varieties. Methyl anthranilate is manufactured in large quantities by food processors and is added to chewing gum, candy, juice, and soft drinks.

When sprayed onto cherry trees or blueberry plants, pure methyl anthranilate converts into an acid that severely burns leaves. Over several years, companies have formulated products that encapsulate the methyl anthranilate and make it safe to use in fruit plantings. The product is now registered for use in fruit plantings as Bird-Shield and Rejex-It. However, we have found several problems with this material. First, it is a vola



Photo 1. Bird damage to tart cherries.



Photo 1. Bird damage to blueberries.

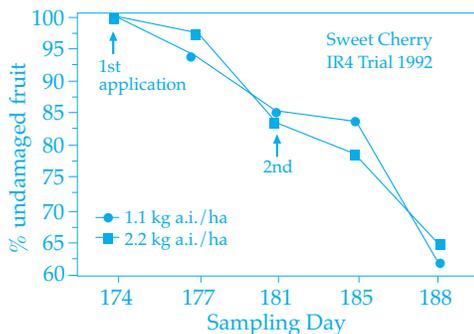


Figure 1. Percentage of undamaged sweet cherry fruits in response to treatment with methyl anthranilate (two rates).

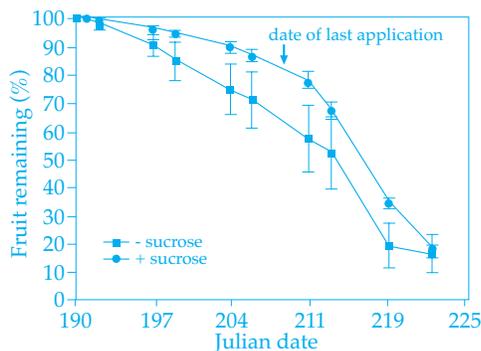


Figure 2. Fruit loss due to birds in blueberry plantings treated and not treated with sucrose syrup.

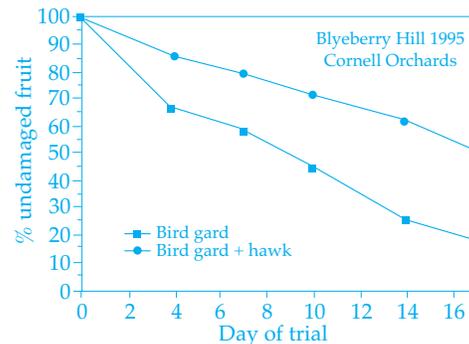


Figure 3. Fruit loss due to birds in a planting with Bird-Gard, and in a planting with Bird-Gard plus hawk models.

tile compound that has a short residual on exposed fruit. We have found good repellency for about three days, but the material loses its effectiveness later (Figure 1). Similar results have been reported from Oregon and Florida. Secondly, to repel birds, a large amount must be consumed in one bite. It is less effective when applied uniformly as it would be with an air blast sprayer. Thirdly, it must be reapplied after rainfall. Although methyl anthranilate works well in some situations (e.g. as a goose repellent in turf), we have not found it to be a reliable deterrent in fruit crops, particularly in rainy climates and in blueberries that ripen over long periods of time.

How Sweet It Is

In nature, most bird-dispersed fruits contain only simple, monosaccharide sugars (i.e. fructose, glucose) rather than disaccharides (i.e. sucrose that contains two sugar molecules). Certain bird species do not have the necessary stomach enzymes to digest disaccharides, so it is not surprising that smaller, bird-dispersed fruits contain only monosaccharides. Blueberries, a

bird-dispersed fruit, contain mostly fructose and glucose for sweetening, whereas apples, a mammal-dispersed fruit, contain sucrose. Humans cannot distinguish between these different sugars, but birds can. When birds are force-fed sucrose, they become ill.

We applied sucrose syrup to blueberry plantings just when the fruits were beginning to turn blue. The syrup was made by dissolving 230 lbs of table (cane) sugar in 21 gallons of hot water, yielding 40 gallons of syrup. Olympic Spreader Sticker was added at 310 ppm. This made a sufficient amount of syrup to treat one acre of blueberries. The syrup solution was reapplied after periods of heavy rainfall.

In our first test with sugar, birds damage was 50 percent less where sucrose was applied, compared to an adjacent field that did not receive treatment (Figure 2). The number of birds visiting the planting in the early morning also was greatly reduced, from 70 bird visits per hour to 2. Although our results have been promising, we have not conducted large-scale trials where entire orchards have been treated. In our tests,

birds have always had a choice between treated and untreated fruit. In a situation where all fruit in a large area is treated, birds may feed despite the sugar.

Drawbacks to using the sugar are: re-application is necessary after a rain, an increase occurs in the number of yellow jackets on the fruit in late summer, and the sugar crystallizes on the berries. The sugar washes off easily, but its presence will require an explanation for pickers, especially at pick-your-own farms. Although each treatment cost \$50-\$60 per acre, and we applied sugar four times during the season, the total expense (\$200-\$240) was far less than the losses to birds that the adjacent field experienced.

A Distressing Situation

Audio tapes, cannons, shotguns, firecrackers and other types of noises have been used for years to scare birds from agricultural plantings. Unfortunately, birds rapidly acclimate to these devices, particularly if they are not moved every few days. The use of these devices alone requires constant vigilance.



Photo 3. Propane powered "cannons" are common bird deterrents.



Photo 4. Hawk model made of wood and hung by fishing line.

Some farmers have argued that capturing real birds in a trap for a few days will help repel birds since the captured birds will warn others of the danger. The challenge, of course, is capturing wild birds in enclosures. Several attempts have been made to develop a bird-capturing device, but none are very effective.

Recently, a new electronic device named "Bird-Gard" has been developed that emits digitized, species-specific bird distress calls. The device we tested emitted distress calls of crows, robins and starlings every minute during daylight hours. We tested the device in two blueberry fields with high bird pressure, and found it to be effective for about 7 to 10 days. In one field, we added hawk models after a couple of weeks and observed a further reduction in feeding (Figure 3). When the device was turned off, feeding increased dramatically. Newer versions of the Bird-Gard include a shriek of a hawk prior to the distress calls, a photosensitive cell, and a random calling pattern.

Even though feeding by certain bird species was reduced, many birds still fed in the plantings, especially ground-feeders like sparrows and finches. Because blueberries ripen over such a long period of time,

the birds have ample opportunity to habituate to the sounds. Furthermore, species composition changes over time, so sounds that work early in the harvest may not work at the end of the season. However, the Bird-Gard easily paid for itself and was one of our more effective tools.

One blueberry grower reported that an owl model was very effective for him. The owl mounts on a bearing on top of a post, allowing the owl to swivel in the slightest breeze. In addition, the owl emits a loud shriek at intervals, powered by a solar cell. The combination of sound and visual scare device works much better than either by itself.

We have tried several other strategies for scaring birds, most of which have failed to reduce bird damage. We have surrounded a blueberry planting with strobe lights, but found they were not effective for repelling birds. We also tested a device from Japan that looks like a bird, but contains a powerful magnet purported to disrupt the natural sense of direction of birds for distances up to 70 ft. After hanging many of these magnets over a blueberry field, we found them to be ineffective at repelling birds from the planting. In addition, we tested a special machine that laid

out a sprayable "biodegradable" netting over a blueberry planting. The application was too slow and uneconomical to use.

Summary

To summarize, plastic netting is highly effective at keeping birds away from fruit plantings, but its application is very labor-intensive and costs are high. Birds have difficulty acclimating to their own distress call, so a device such as Bird-Gard can be effective for reasonable periods of time, particularly when supplemented with visual scare devices such as hawk kites and eye balloons. Sugar can be an effective repellent as well, particularly in a dry year when bird pressure tends to be greater anyway. A combination of visual and audio scare devices, coupled with taste deterrents, is the most effective approach to reducing bird damage in orchards, vineyards and berry plantings.

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