



Bye Bye Birdie – Bird Management Strategies for Small Fruit

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To paraphrase an old but reliable resource on life, there is a time and a place for everything, including birds. But even to an ardent birdwatcher like me it's obvious that the commercial small fruit planting at or near harvest is neither the time, nor the place. What to do to minimize damage caused by our colorful neighbors? An integrated approach to bird management is often the most successful.



A Bird's Eye View of Bird Biology



Berries are a good food source for birds especially in dry years when other food sources may be in short supply (Could one of those years be 2007?). Damage to commercial berry crops by birds during these years may be a serious problem. Some studies estimate up to 30% of blueberry crops may be lost under such conditions. Three types of bird damage may occur in small fruit plantings – whole berry removal, fruit knocked off bushes by foraging

birds, or punctures/pecking damage. Whole berries may be stripped from bushes or canes or holes pecked in attached fruit in the case of brambles and blueberries. Strawberries are most often slashed or partially consumed. Some birds, such as jays, robins, and woodpeckers can easily peck out larger berries. However, most birds prefer a berry size of 1/2-inch or less in diameter so that they can swallow the berry whole. Smaller birds may puncture fruit, leaving them open to infection by fruit rots. Punctured fruit are difficult to detect during harvest and sorting. Berries developing post-harvest fruit rots jeopardize pack quality.



De-Bird or Not to De-Bird, That is the Question?!

On many farms bird damage is minimal. Growers may choose to ignore the problem or consider small losses incurred as part of the costs of small fruit production. Other growers may experience substantial losses with large portions of the crop being consumed or damaged. If you have experienced serious bird damage in the past, there is definitely cause for continued concern. If bird

damage in your plantings has been minimal, you may only need to address bird management in years when damage is likely to increase significantly.

How to decide if bird management is warranted? A study done in New Zealand (Spurr and Coleman, 2005) suggests a simple pretreatment cost-benefit analysis of the bird control technique(s) under consideration should be used to make bird management decisions. In this instance, the bird control technique under review was repellents. Cost effectiveness was calculated based on the cost and effectiveness of each repellent, the value of the crop, and the loss to birds if the crop was not protected (Table 1). Total cost was calculated based on cost of raw materials + labor to make an application x the number of applications needed.

So, for example, if your berry crop is worth \$10,000/acre, the expected loss to birds without treatment is 20%, and the bird repellent under consideration is 50% effective, then the repellent should cost less than \$1,000/acre to be cost effective. The same sort of simple cost benefit analysis would also be applicable to other bird management techniques. In the case of netting or other durable equipment such as distress callers or canons, however, the duration of the technique (i.e. life of the netting) would need to be factored in as well.

Table 1. Maximum total cost per acre allowable for a bird repellent treatment to be cost-effective on a berry crop yielding \$10,000/acre¹. (Source: Spurr and Coleman, 2005 with some revision by the author)

Loss to Birds	Effectiveness of treatment (i.e. reduction in loss to birds)			
	25%	50%	75%	100%
5%	<\$125	<250	<\$375	<\$500
10%	<\$250	<\$500	<\$750	<\$1,000
20%	<\$500	<\$1,000	<\$1,500	<\$2,000
30%	<\$750	<\$1,500	<\$2,250	<\$3,000

¹For berry crops of differing values, simply multiply the values in the table by the value of the berry crop divided by \$10,000 i.e. for berry crops valuing \$25,000/acre, multiply the corresponding table value by 2.5. For a berry crop valuing \$5,000/acre multiply the corresponding value by 0.5.

A Bird in the Hand is Worth Two in the Bush

In the event a bird problem develops, how to determine who is the culprit? Which of our feathered “friends” are just flying by and which are the ones to keep an eye out for in your small fruit plantings? Fire up those binoculars and do a little investigative birding. Early morning and evenings before dusk are times when birds are most active. Take that lawn chair and cup of coffee to the field and be prepared to be “vewry, vewry quiet!” Refer to table one for information on the most probable

miscreants and their ID. While these may be the most frequent/numerous visitors to your berry plantings, other birds may visit as well (Table 2).

Table 1. Common Berry-Feeding Birds and Their Identification.

<p>European Starling (<i>Sturnus vulgaris</i>)</p>	<p>Starlings have shiny black plumage spangled with white. They walk rather than hop. Starlings are noisy birds uttering a wide variety of mechanical-sounding and melodic sounds, including a distinctive "wolf whistle."</p> <p>These birds will eat almost anything, including farmland invertebrates, berries, and garbage. They may descend on plantings in large flocks. Smaller fruits like blueberries are consumed whole; larger fruits such as strawberries may be slashed.</p>		
<p>Red-Winged Blackbird (<i>Agelaius phoeniceus</i>)</p>	<p>The common name for this species is taken from the mainly black adult male's distinctive red shoulder patches, or "epaulets", which are visible when the bird is flying or displaying. At rest, the male also shows a pale yellow wing bar.</p> <p>The female is blackish-brown and paler below. The female is considerably smaller than the male, at 7 inches verses his 9.5 inches.</p> <p>The Red-winged Blackbird feeds primarily on plant seeds, including weeds and waste grain. In season, it eats blueberries, blackberries, and other fruit.</p>		

House Finch
(*Carpodacus mexicanus*)

Adults have a long brown tail and are a brown or dull-brown color across the back with some shading into deep grey on the wing feathers. Breast and belly feathers may be streaked. In most cases, adult males have a reddish color to their heads, necks and shoulders. Adult females have brown upperparts and streaked under parts.

House Finches forage on the ground or in vegetation. They primarily eat grains, seeds and berries. In blueberries, they start at the top of the bush and peck berries in rapid succession, leaving many berries damaged.



Cedar Waxwing
(*Bombycilla cedrorum*)

The Cedar Waxwing has smooth, silky plumage and a "bandit mask" It is between the size of a sparrow and a robin.

Waxwings eat berries and sugary fruit year-round. When the end of a twig holds a supply of berries that only one bird at a time can reach, members of a flock may line up along the twig and pass berries beak to beak down the line so that each bird gets a chance to eat.

Cedar Waxwings often feed in large flocks numbering hundreds of birds. They will move in huge numbers if berry supplies are low.



American Robin
(*Turdus migratorius*)

The American Robin is 10–11 in long. It has gray upperparts and head, and orange under parts, usually brighter in the male. It has a small yellow beak and distinctive crescents around the eyes.

Food consists mainly of insects and earthworms. Robins are also fond of some berries; they will fly in especially to feed on them during periods when they ripen. Robins may feed in large flocks from roosting sites. They, along with starlings, are probably the birds most frequent reported as causing small fruit bird problems.



Common Grackle
(*Quiscalus quiscula*)

The 11-13" adults have a long dark bill, a pale yellowish eye and a long tail; their plumage is an iridescent black. Adult females are slightly smaller and less glossy.

Grackles forage on the ground, in shallow water or in shrubs; they will steal food from other birds. They are omnivorous, eating insects, minnows, frogs, eggs, berries, seeds and grain, even other smaller birds.



Sea Gulls
(*Larus spp.*)

Gulls are typically medium to large birds, usually grey or white, often with black markings on the head or wings. They have stout, longish bills, and webbed feet

They are omnivorous; their diet may include insects, fish, grain, berries, eggs, earthworms and rodents.



(Sources for descriptions and images: Wikipedia: <http://en.wikipedia.org/wiki/English>.)

Table 3: Feeding Preferences of Common Northeastern Species of Birds

Most of diet is fruits and berries

Catbird, Gray **Waxwing, Cedar**

Some of diet is fruits and berries

Bluebird, Eastern	Grackle, Common	Robin, American	Towhee, Eastern
Blackbird, Red-winged	Grosbeak, Rose-breasted	Siskin, Pine	Vireo, Red-eyed
Bluebird, Eastern	Gulls	Sapsucker, Yellow-bellied	Vireo, White-eyed
Bobwhite, Northern	Jay, Blue	Sparrow, Song	Vireo, Yellow-throated
Bunting, Indigo	Kingbird, Eastern	Sparrow, White-throated	Warbler, Palm
Cardinal, Northern	Kingbird, Gray	Starling, European	Warbler, Yellow-rumped
Crow, American	Kinglet, Ruby-crowned	Swallow, Tree	Woodpecker, Downy
Dove, Mourning	Meadowlark, Eastern	Tanager, Summer	Woodpecker, Hairy
Finch, House	Mockingbird, Northern	Thrasher, Brown	Woodpecker, Pileated
Finch, Purple	Oriole, Baltimore	Thrush, Hermit	Woodpecker, Red-bellied
Flicker, Northern	Oriole, Orchard	Thrush, Wood	
Flycatcher, Great Crested	Phoebe, Eastern	Titmouse, Tufted	

(Source: [NSIS: Florida's Fruit- and Berry-Eating Birds](#). Names in bold indicate the most common species found in small fruit plantings.)

Your Bird Management Arsenal - Everything But the Kitchen Sink?!

Whatever the tactics employed decisions on bird management need to be pro-active. Discouraging bird feeding becomes difficult, if not impossible, once a feeding pattern has been established and birds recognize your planting as a food source.

Is a somewhat peaceful co-existence possible? Yes, if you take a long-term approach to bird management and have your annual tactics in place and employed well before fruit begins to ripen. Use several tactics simultaneously, and vary the types and locations of tactics frequently for best results.

Remember to keep good records from year to year on amounts of bird damage occurring, control tactics used, and their success (or lack thereof) , along with environmental conditions of years when bird damage increased. Be vigilant in observation and scouting, and always begin tactics before fruit begin to ripen and feeding habits become established.

What bird management tactics should you include in your arsenal? Everything but the kitchen sink! Seriously, birds, like other animals, become accustomed to various scare tactics over time. Those distress call tapes that worked so well the first week may not be as successful by weeks 2 and 3. Unfortunately, no one single tactic is effective as a stand-alone method of bird control, with the exception of bird netting.

Tactics to consider include the following: cultural practices, exclusion, sensory deterrents, scare devices, and protection/development of predator habitat. Each tactic is discussed below. See Resource list at the end of the article for sources (not an exhaustive list, by any means...)

Cultural Management Practices

One of the bird management tactics to consider begins before planting! Cultural management begins with site selection. The site where your planting is located may be a critical factor in bird problems later so choose wisely.

While all small fruit plantings are susceptible to damage, those located closer to urban environments where robins and starlings are more abundant may have greater damage. Isolated plantings may receive more damage. Smaller plantings tend to exhibit more damage than larger plantings. So much fruit is available in larger plantings that damage on any one site is generally low.

Locate new plantings away from convenient cover or perch sites such as woods, hedgerows, power lines, and brushy fields. Control grass and weeds in and around plantings to limit numbers of seed-eating birds.

Bird damage to small fruit is often greatest on early ripening varieties, as they mature when other fruits may not be available. Netting on these varieties may be cost effective.

Exclusion

Various methods of exclusion may be used, including row covers, netting, and other types of physical barriers. These barriers simply prevent birds from reaching fruit.

Netting continues to be the most complete and effective way to reduce bird damage in small fruit plantings. That said, it is relatively expensive compared to other methods and probably the most labor intensive. However, it is also the most durable. Netting materials, with proper care, may last 3 to 10 years.

In some cases, netting is placed directly over plants or bushes. In other instances, a framework is constructed over the planting and netting is suspended on the frame.

Several commercial small fruit growers in the northeast use netting on frames, supported by wire. The netting support structure is 6 to 10 feet above the ground and allows for routine agricultural activities to be carried on under the netting, such as spraying, mowing, and fruit harvest. Netting is removed and stored each season to prolong netting life.

Nylon, polyethylene, cotton, plastic-coated wire and other netting materials are available. Select netting with a $\frac{3}{4}$ " mesh to exclude small birds. Support posts that are pounded rather than augured give stronger support. Augered posts should be set in concrete for additional stability. Tops of poles are generally covered with some type of smooth covering (rubber inner tubes, plastic bottles etc.) to protect netting as it is applied and removed, and as it moves in the wind. Pounded anchor posts need to be set outside netted areas to serve as additional support for outside posts.

Bird netting cost varies considerably with type, manufacturer, and quality (available from many sources, see list at end of article). The initial installation costs may be quite high but costs may be pro-rated over the 3 to 10 year life of the material. One estimate indicates material and labor to erect a 1 acre bird netting system 7-8 ft in height is approximately \$2,280 (Dellamano, 2006). Additional annual costs involved application, removal and winter storage of netting; these costs were estimated to be approx. \$619/acre for the same system.



Sensory deterrents

Sensory deterrents are those which assault the senses. They may be olfactory (smelly!), gustatory (taste bad!), auditory (the Noise, oh the Noise, Noise, **NOISE**, **NOISE!**), or visual (**SCAR-R-R-R-EY!**). Sensory deterrents may target a single sense, such as a repellent applied to fruit to discourage feeding or more than one sense such as motion activated lights/sprinklers, or owl models which emit predator calls followed by bird distress calls.

Chemical Repellents

Bird repellents are often portrayed as an effective, “clean, green” method of bird management (Spurr and Coleman, 2005). There are currently 2 bird repellents labeled for use in NY State. They are the methyl anthranilate-based products Bird Shield and Rejex-It Crop Guardian. Research here and in other states (Michigan, Oregon, Washington and Florida) indicates these products have both positive and negative aspects.

The active ingredient methyl anthranilate is similar to the chemical responsible for the major flavor component of Concord grapes. It is manufactured in large quantities by food processors and is considered safe for human consumption by the FDA. However, it is a volatile compound and has a short residual on exposed fruit giving good repellency for approx. 3 days then gradually losing effectiveness. In addition, a large amount of product needs to be consumed in one bite in order for it to be most effective. Application technologies for small fruit such as air blast sprayers are designed to apply small amounts of product uniformly over larger areas, thus reducing product efficacy.

Applications of sucrose syrups have been demonstrated to repel birds from blueberry plantings. The exact method of repellency is not well documented, but it is thought birds such as European Starlings and American Robins are unable to digest the disaccharides in sugar. Most birds are able to digest simple monosaccharide sugars found in fruits (Brugger *et. al.*, 1993).

Sugar solutions in New York were applied to blueberry plantings when fruit began to turn blue. In this trial 230 lbs of sugar was dissolved in 21 gallons of hot water, for a total of 40 gallons of sugar solution. Olympic Spreader Sticker was also added at 310 PPM. The treatment cost \$40-\$50/acre and was applied 4 times during the season for a total control cost of \$160. Bird damage was reduced 50% where sugar solution was applied versus untreated adjacent plots. The total expense was far less than losses to birds experienced in the non-treated plot. An increase in Japanese beetles and yellow jackets was observed, however, in year 2 in treated plots.

Auditory Scare Devices

Sound may be used as bird repellent, causing fear, pain, disorientation, communication jamming, audiogenic seizures or



internal thermal effects. The sounds most frequently used fall into 2 categories: distress calls, and noise makers (pyrotechnics).

Distress call repellents have been used successfully to drive birds from fields or roosts. However, these calls are species specific, so a grower must be able to identify the bird causing damage for them to be successful. Units are also available that incorporate predator calls as well as distress calls. Most units are programmable as to time between calls, species of bird, randomized calls, etc. Units are battery, solar, or electrically powered. Smaller units cover 1-3 acres; larger units may cover up to 8 acres.

Units range in price from \$250 to \$3,500 depending on the size of the area to be protected, power supply, cables, and additional speakers needed.



Some auditory units come packaged in the form of visual deterrents. One unit available is called the "Screech Owl" (Birdbusters), and pivots on a bearing with the wind, providing both auditory and visual deterrent in one unit. Four predator/scare sounds are programmed in the unit: birds in distress, predator attack cries and wing beats from birds taking flight. The rotating base mounts easily to any flat surface and spins in the wind. A photo cell activates the sounds during daylight hours only (\$95).

A similar unit, sold as the "Eagle" (Spec Trellising) also provides both auditory and visual deterrents. This bird-scare device (a large black bird shaped kite with a 5' 6" wingspan and 3' 4" in height) is launched into flight by the wind. The Eagle flaps its wings as it darts around the sky, adding both movement and a "swooshing" noise to scare away hungry birds. As the wind eases off, a counterweight retracts the line back into the pole, leaving the Eagle perched atop its pole. The 45 degree angled PVC top section encloses a 11' 6" line which launches the birdscarer into the wind. The kite, when not in motion, sits upon a 20' steel pole scaring birds by its very presence, shape and color. One Eagle is recommended per 2.5 acres.



New York studies have shown distress call devices to be effective for 7-10 days in plantings with high bird pressure. Use of predator models in conjunction with distress call units gave further reduction in feeding. Best results were obtained when units were moved regularly and used in conjunction with visual scare devices. Distress calls have a tendency to have more long-term effects than noise makers, which rely on fear or avoidance of perceived danger.

Pyrotechnics, or noise makers, such as bangers, poppers, sirens, and

so on provide short term control of birds. They may include Bird Bombs, Bird Whistlers, and Shell Crackers (Sutton Ag). However, these products are often as annoying to neighbors and customers as they are to the birds!

In fact, a group of concerned (annoyed) citizens in British Columbia has even developed a web site called, appropriately, Ban the Canon, located at: <http://bancannons.tripod.com/devices.html>. This web site provides information on all sorts of bird control alternatives to pyrotechnics in an effort to reduce noise pollution caused by propane canons and the like in their province!

The “Zon Gun” (Birdbusters, Sutton Ag) pictured left is a lightweight portable propane-fired cannon emits automatic thunderclaps that deter pest birds and other nuisance wildlife. The intervals between detonations can be adjusted from 2-30 minutes. The Zon Gun operates on LP gas and uses a 'piezo' lighter for ignition that is good for 100,000 sparks. Each 10kg bottle of propane produces 12-15,000 detonations. The standard model is fully automatic, ground mounted, simple, practical, affective and rotates a full 360 degrees for wide coverage. Cost for this unit, plus timer and tripod is \$650.

Visual Deterrents

Many types of visuals scare devices are available from simple holographic tapes to large predator kites. Terror eyes are an inflatable visual scare device that confuses birds with lifelike reflective predator eyes and markings. They come in 3 colors (black, orange and yellow) and cost approximately \$5 - \$45 each.

Another visual scare device is flash tape, or holographic ribbon. These come in various length rolls, materials and colors and repel birds by producing an optical, audible discomfort zone. Made from holographic Mylar foil, holographic ribbons provide spot control for nuisance birds by producing an optical, audible and physical discomfort zone. The light reflected from its holographic surface is menacing to most pest birds. A light breeze provides movement and a metallic rattle which encourages birds to keep their distance.

Application is easy; with scissors, cut several pieces of ribbon 2 to 3 foot long. Position the length of ribbon where nuisance birds will see and hear it. Fasten them at one end to the desired locations using Velcro, string, twine, staples, etc. Make sure the length of ribbon can move freely with the wind. Approximate cost of this type of material ranges from \$4-\$88 a roll depending on roll length and material.

Other Devices



Other bird scare devices utilize various techniques such as lights, sprinklers, and motion. “Scarecrow” is one such device which uses an infrared sensor that detects birds when they are present, and releases an immediate shot of water to startle them and keep them away. Scarecrow protects day and night for up to 6 months (or 3000+ activations) on one 9 volt battery. Scarecrow covers approximately 1,600 sq. ft. in a single blast of water. Connection

to a garden hose is required for operation of this device. Prices for these units range from \$80 to \$100 for these units.

Another device, "ScareWyndmill" uses motion to frighten birds, along with blades painted with special uv light reflecting paint. Purportedly to the birds the uniquely painted spinning blades look like the flapping of wings of a flock of birds taking off in fright. The 36" diameter blades repel birds in up to a one acre area.

Approximate cost for these is \$79 each)JWB Marketing. They have been found effective on small birds, and tested in blueberry plantings.



Encouraging Natural Predators

Owls and Hawks are natural predators of birds that may be a problem in small fruit plantings. One method of bird management to consider then is how best to encourage these birds to live in the vicinity of berry plantings. An easy way to encourage owls is to install nest boxes the size that owls would use. Sharp-shinned hawks surprise and capture all their prey from cover or while flying quickly through dense vegetation. They are adept at navigating dense thickets. The great majority of this hawk's prey is small birds, especially various songbirds such as sparrows, wood-warblers and American Robins. Birds caught have ranges in size from a 4.4 g-Anna's Hummingbird to a 577 g (1.2 lb)-Ruffed Grouse and any bird within this size range is potential prey. Typically, males will target smaller birds, such as sparrows, and females, will pursue larger prey, like robins and flickers. The Sharp-shinned Hawk is a regular visitor to bird feeders, where it eats birds, not seed.

There are also companies who will visit your property and bring trained hawks or falcons with them to attack your bird situation. According to their information, once a hawk starts circling a field, problem birds leave the area very quickly. Usually hawk silhouettes or heli-kytes that simulate hawks in flight are flown simultaneously, and the problem birds will stay away for a good while thinking that the silhouettes are the real thing. These companies also give recommendations for more permanent bird control solutions.

A Word about Wildlife Conservation and Protection

The following birds, for various reasons, may be permanently removed from plantings: European Starling (introduced species not protected by state or federal law), , Red-winged Blackbird (protected by State and Federal law--but a depredation order allows you to take these birds *when they are committing or about to commit damage to crops.*) and American Crow (protected by State and Federal law--but a depredation order allows you to take these birds *when they are committing or about to commit damage to crops.*)

All other species listed in Table 3 are protected by State and Federal law and would require special permits from the Federal government (US Fish and Wildlife Service) and the State (New York Department of Environmental Protection) to live trap and relocate or kill these birds to protect crops.

If You Can't Beat 'Em, Feed 'Em

As a last resort, after a feeding pattern has already been established and other methods have failed, consider placing feeders filled with sunflower, millet, nectar, and peanuts away from plantings to distract birds from fruit. (Remember sharp-shinned hawks frequent feeders...) Or plant border rows with smaller berried plants outside the main planting as an alternative food source to the larger berried varieties inside the planting. Then get out that lawn chair and those binoculars again, sit back and enjoy the view!

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