2007

Use of decoy traps to protect blueberries from juvenile European starlings

Michael R. Conover
Utah State University

Richard A. Dolbeer
USDA/APHIS/Wildlife Services' National Wildlife Research Center

Human–Wildlife Conflicts 1(2):265–270, Fall 2007

Use of decoy traps to protect blueberries from juvenile European starlings

Michael R. Conover, Jack H. Berryman Institute and Department of Wildland Resources, Utah State University, Logan, UT 84322-5230, USA *conover@cc.usu.edu*
Richard A. Dolbeer, USDA/APHIS/Wildlife Services' National Wildlife Research Center, 6100 Columbus Avenue, Sandusky, OH 44870, USA

Abstract:
Fruit consumption by large flocks of juvenile European starlings (*Sturnus vulgaris*) is a serious problem for growers of strawberries, grapes, apples, cherries, blueberries, and other small fruit. This study examined if numbers of juvenile European starlings foraging in blueberry orchards could be reduced by catching them in decoy traps and relocating the birds elsewhere. From late July through August of 1989, 620 juvenile starlings were captured in 2 decoy traps at a blueberry orchard in Connecticut. A similar number were caught during the same period in 1990. During these 2 years, numbers of juvenile starlings foraging daily in the orchard dropped from >500 before the traps were opened to <100 afterwards. During 1987 and 1988, when no trapping was conducted, starling numbers at the orchard remained high throughout the summer. Trapped starlings were banded and released unharmed 50–100 km away, and none were seen again at the blueberry orchard. During the 2 years of operation, traps caught only 19 nontarget birds of 6 species; all were released unharmed. Decoy traps were specific for juvenile starlings; no adult starlings were captured. These results indicate that decoy traps can be used in a nonlethal manner to reduce berry losses to flocks of juvenile starlings.

Key words: blueberries, decoy traps, human–wildlife conflicts, relocation, starlings, *Sturnus vulgaris*, translocation, trapping

Small fruit such as blueberries, cherries, and grapes are often subject to bird damage. In some orchards, these losses can exceed half of the crop (Conover 1982). Yet, most birds are protected by federal and state laws and can be killed only after depredation permits have been issued. Hence, nonlethal techniques are needed to protect fruit from birds. Netting the plants is one of the most effective techniques to reduce bird damage, but it is often cost-prohibitive and labor-intensive because nets must be erected and taken down annually to protect them from weather (Conover 2001). Another alternative is using chemical repellents that are sprayed directly on the fruit. Although the repellent methiocarb has consistently reduced bird damage to small fruit (Dolbeer et al. 1994), it is no longer registered for use in the United States as a bird repellent and cannot be used for this purpose (Conover 2001). Fear-provoking stimuli such as predator models, propane cannons, and harassment may initially prove effective in reducing losses, but their effectiveness usually wanes in a few days once the birds have habituated to them (Conover 1982). Hence, there is a need for an effective, nonlethal technique to protect small fruit from birds.

In the northeast United States, northern mockingbirds (*Mimus polyglottos*), American robins (*Turdus migratorius*), northern orioles (*Icterus galbula*), and house finches (*Carpodacus mexicanus*) are the main culprits in small (<1 ha) blueberry orchards (Conover 1982). These birds, often foraging alone or in small groups, can be seen during the day flying repeatedly between the orchard and nearby woodlots. Most of these birds are adults that maintain territories in the surounding areas, which are usually forested. Although often <100 individual passerines and other territorial birds may be foraging in a single orchard, even a small number of birds can remove a substantial proportion of the berries from a small orchard. Large orchards (>5 ha) suffer less from these territorial birds because the proportion of the crop lost to these birds is less, due to the large number of blueberries available. However, large orchards have their own unique bird problem, which begins in late July when juvenile European starlings (*Sturnus vulgaris*) leave their parents' territories and form large flocks composed entirely of juveniles. In the Northeast, many large blueberry orchards are plagued by a resident flock of juvenile starlings that forage daily in the orchard. These flocks often number in the hundreds. Due to their large size, these flocks can cause severe losses even in large orchards.

Unlike most birds, juvenile starlings are relatively easy to catch in decoy traps due to their attraction to each other and their lack of experience. Hence, it may be possible to protect fruit orchards from large flocks of juvenile starlings merely by trapping them and relocating them elsewhere. This experiment tests this hypothesis.

Methods

This experiment was conducted during a 4-year period: 1987–1991 at Rose's Berry Farm in Glastonbury, Connecticut. This 16-ha blueberry farm, a popular "pick-your-own" retail operation, grew several different blueberry cultivars (e.g., Berkeley, Blue Crop, Blue Ray, Darrow, and Late Blue) so that ripe berries were available throughout most of July and August. This long harvest period also made the orchard attractive to juvenile starlings because they were able to forage on ripe fruit for much of the summer.

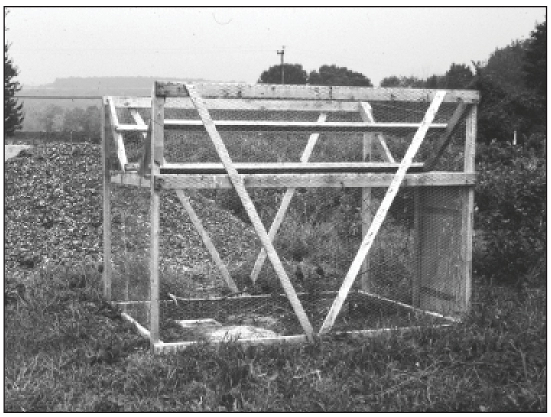

FIGURE 1. Modified Australian crow trap used to catch starlings.

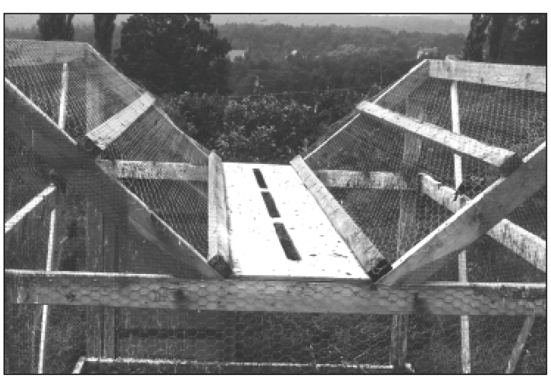

FIGURE 2. Board on the roof of the modified Australian crow trap with a slit cut lengthwise in it. Starlings enter the trap through this slit, but it is too narrow for them to fly out through it.

Two different types of decoy traps were used in this experiment. One was a Modified Australian Crow Trap (2 x 3 x 2 m) made of chicken wire with a V-shaped roof slanting down to the middle of the trap where there was a 3-m board with a 6-cm slit cut into it (Figure 1). Birds trying to enter the trap from the top could jump down through this slit, which was too narrow to allow the birds to exit (Figure 2). The second trap (4 x 5 x 2 m) was made by looping Toron® polypropylene bird netting (J. A. Cissel Company of Farmingdale, New Jersey) over a wooden frame. A hole of 0.5 x 0.5 m was cut in the center of its roof, and a wooden frame of equal size was attached. On the interior of this frame, a grid of wires each 6 cm apart was strung in a cross-hatch fashion. This trap was based on the same principle as the Modified Australian Crow Trap. The weight of the wooden frame pulled down the bird-netting roof in the center by about a meter. This sloping roof directed starlings attempting to enter the trap down to the wooden frame. The openings in the frame were 6 x 6 cm, large enough to allow birds to jump down into the trap, but not large enough to allow them to fly out again (Figure 3). This second trap type was called a funnel-net trap and was similar to traps used to catch blackbirds in rice fields (Meanley 1971).

Both decoy traps were baited by maintaining 20–40 starlings inside them, and it was these birds that attracted the conspecifics. Captive starlings were provided canned dog food, fruit, hulled sunflower seeds, corn, wheat, and water *ad libitum*. Trapped starlings were translocated more than 50 km from the orchard and released unharmed. All starlings were aged as adults or juveniles based on their plumage. Before their release, 435 starlings were marked either by banding or shortening a tail feather by 1–2 cm so that they could be recognized. Rose's Berry Farm was searched 10–20 times weekly for the return of any translocated starlings by using a spotting scope to check the local starling flock for marked birds. All captured starlings were also checked for bands and shortened tail feathers.

Both traps were placed out in the blueberry orchard during the last week in July and left until the end of August during both 1989 and 1990. To assess their effectiveness, the number of juvenile starlings, adult starlings, and other

Figure 3. Funnel-net trap used to catch starlings.

birds captured in these traps was monitored on a weekly basis. To assess trap effectiveness in reducing starling numbers, the number of starlings foraging in the orchard 1 week prior to opening the trap was counted, and the counts between 2 years when trapping occurred (1989 and 1990) and 2 years when it did not (1987 and 1988).

Results

During 1989, 620 juvenile starlings were captured: 230 in the Modified Australian Crow Trap and 390 in the funnel-net trap. No adult starlings were captured. In addition to juvenile starlings, the Modified Australian Crow Trap caught 1 common grackle (*Quiscalus quiscula*) and 1 northern mockingbird. The funnel-net trap caught 6 house finches, 5 common grackles, 3 northern mockingbirds, 1 American robin, 1 brown-headed cowbird (*Molothrus ater*), and 1 song sparrow (*Melospiza melodia*). Most starlings (273) were captured during the first week, and the weekly capture rate gradually trailed off during the 4-week capture period. Concomitantly with this weekly decline in the number of starlings caught, the number of starlings foraging at Rose's Berry Farm also declined (Figure 4).

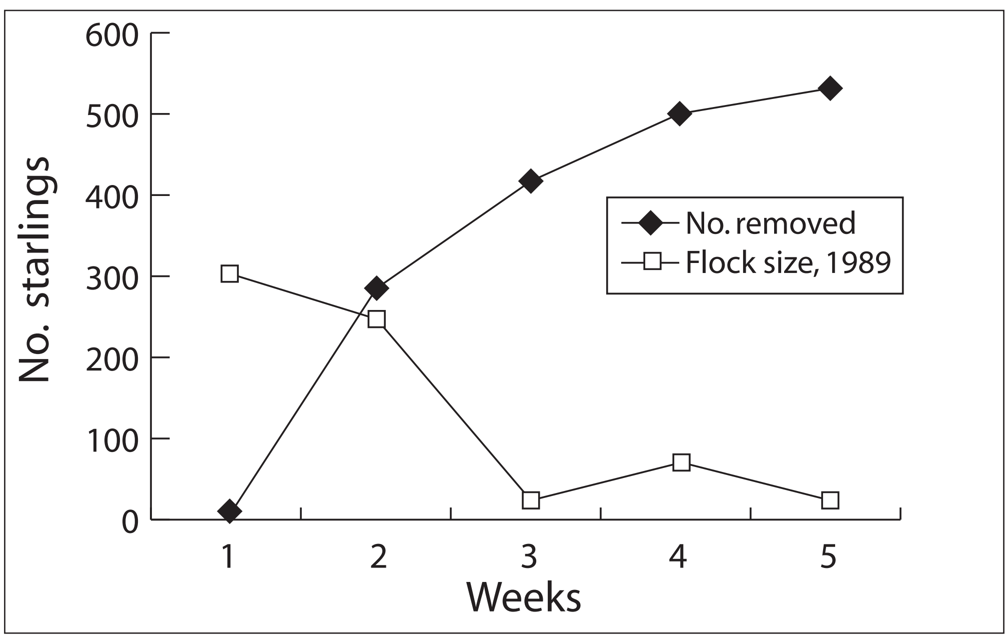

Figure 4. Cumulative number of European starlings trapped during 1989 at Rose's Berry Farm in Glastonbury, Connecticut, and the number of starlings remaining in local flock during the same period of time (week 1 is the last week in July).

continued during the next 4 weeks. Because juvenile starlings form large flocks, they were easy to locate and count. Counts of starlings feeding in the orchard were also made during 1987 and 1988 when no trapping occurred. Therefore, starling numbers could be compared

During 1990, the number of starlings captured in the traps could not be assessed because migrant workers at the farm routinely removed starlings from the traps and ate them. They informed us that they had removed "hundreds." In addition to birds removed by the workers, 31

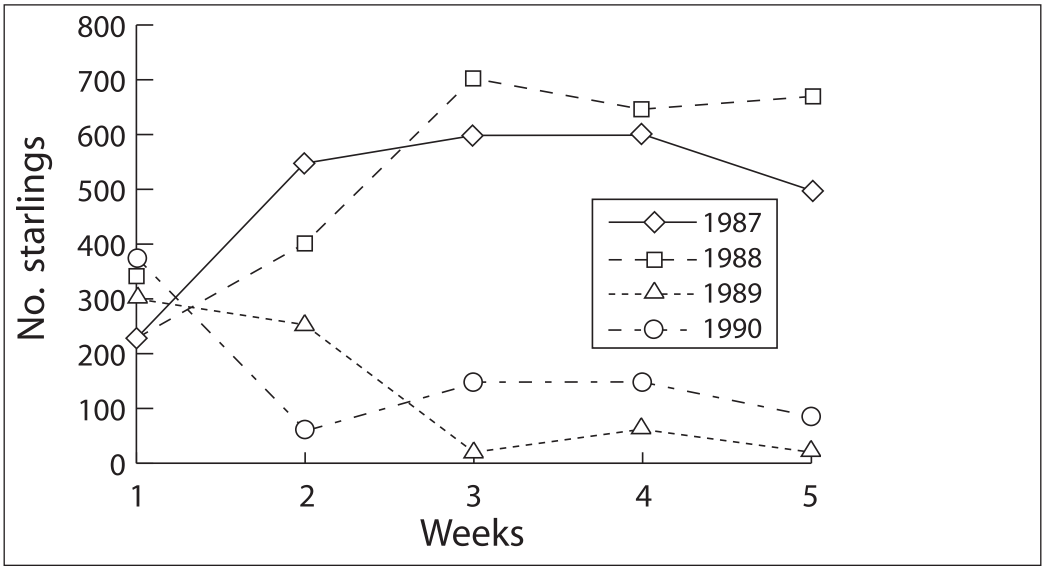

Figure 5. Number of European starlings in the flock at Rose's Berry Farm in Glastonbury, Connecticut, during 1987 and 1988 when no trapping was conducted and during 1989 and 1990 when decoy traps were open and trapped starlings were relocated (week 1 is the last week in July).

starlings were captured and translocated the first week, 42 in the second week, 33 in the third week, and one in the fourth week. We removed 60 starlings from the Modified Australian Crow Trap and 27 from the funnel-net trap. Only 1 nontarget species was removed from the trap, a northern mockingbird from the Modified Australian Crow Trap. During 1989 and 1990, none of the 435 translocated starlings that had been marked (tail clipped or banded) were ever recaptured or seen again at Rose's Berry Farm.

During 1987 and 1988 when no trapping was conducted, the number of juvenile starlings increased during the last week of July (week 1) and remained high throughout August (Figure 5). During 1987, the number of starlings peaked at 600 birds, and during 1988, it peaked at 725 birds. During 1989 and 1990, the number of starlings present before the traps were open (week 1) were similar to their number during the first week of the 2 prior years. However, after traps were open at the end of the first week, the number of starlings foraging in the orchard declined to about 100 birds and remained at these low levels throughout August.

Discussion

When juvenile starlings leave their parents' territories and start to forage on their own, they often join large flocks composed entirely of juvenile starlings. Rose's Berry Farm, like many large blueberry farms in the Northeast, is plagued by flocks of juvenile starlings. Throughout the 1980s, a large flock always congregated at Rose's Berry Farm in late July when the berries ripened. The flock remained until the end of August when the berries were gone. This flock posed a unique problem at the farm because no other avian species formed such large flocks or foraged extensively in the middle of the orchard.

At large orchards in the Northeast such as the one where we worked, starlings were the most significant bird pest. At these orchards, use of decoy traps to capture and relocate starlings may be an effective means of reducing bird damage to blueberries. At small orchards (<1 ha), our observations indicated that most of the berries were taken by other avian species (Conover 1982), and the use of a decoy trap would be ineffective.

In the present experiments, both the Modified Australian Crow Trap and the funnel-net trap worked well. Traps were only effective once 10–20 starlings were placed inside each trap, and it was important to keep these decoy birds in good health. Care was taken to make sure that they had a variety of soft and hard foods and plenty of water. Despite our best efforts, some captive birds always escaped. Sometimes birds found holes in the trap that allowed them to escape. Merely checking the traps for holes did not end this problem because some mammalian predators broke into the traps, creating holes that allowed birds to escape. In other cases, people released the birds or took them for their own uses. For these reasons, it was important to have another trap located elsewhere in the orchard so that we could use the birds in it as a new source of starlings for the other trap.

These results indicated that it is easy to catch juvenile starlings with decoy traps in late summer. Our decoy traps were very specific for juvenile starlings, which were less wary than adults and more attractive to flocks of cohorts than to adult starlings. In fact, >800 juvenile starlings (97%) were captured in the 2 decoy traps, but not a single adult was captured. Of the other 19 birds captured, 7 were common grackles and brown-headed cowbirds, which most farmers would not consider as nontarget species. The specificity of decoy traps resulted from the tendency of the captive birds to attract conspecifics rather than other avian species. By removing all birds from the traps other than juvenile starlings, our traps became specific for starlings.

Production of small fruit in the United States is a multibillion-dollar enterprise, and flocks of juvenile starlings are a serious problem for many small fruit growers. While our studies were limited to blueberry orchards, large flocks of juvenile starlings also damage apples and consume large numbers of grapes, cherries, currants, raspberries, and other small fruit. The deployment of Modified Australian Crop Traps or funnel-net traps that contain live starlings may be an effective means to alleviate some of these problems. Other investigators have used decoy traps to catch thousands of brown-headed cowbirds and red-winged blackbirds (*Agelaius phoeniceus*) by baiting them with these species. For instance, Meanley (1971) reported catching large numbers of red-winged blackbirds, brown-headed cowbirds, and grackles in decoy traps located in rice fields. Weatherhead et al. (1980) used decoy traps to collect 815 red-winged blackbirds, 124 grackles, 430 starlings, and 410 cowbirds in Quebec.

Decoy traps have been used to protect the endangered Kirtland's warblers (*Dendroica kirtlandii*) from nest parasitism by brown-headed cowbirds (Winters 1973, Walkinshaw 1983) and to protect fig, cherry, and blueberry orchards from house finches and other birds (Elliot 1964, Clark 1967, Dolbeer 1989). Yet, decoy traps failed to reduce bird damage to grain fields during fall,despite catching many red-winged blackbirds (Meanley 1971, Weatherhead et al. 1980, Dolbeer 1989). These findings suggest that decoy traps are more successful when used to alleviate problems of an isolated and local nature caused by a relatively small number of birds. For instance, there are only a few blueberry orchards in Connecticut. Likewise, Kirtland's warblers nest in only a few restricted areas. In these cases, a reduction in bird densities is needed only in a small, localized area. In contrast, in their failed attempt, Weatherhead et al. (1980) trapped over 2,000 blackbirds and starlings, but this represented less than 3% of the blackbirds using a local roost. Therefore, it is not surprising that their trapping efforts did not reduce blackbird damage to local cornfields. We also suspect that decoy traps will be more successful to address problems that occur in summer rather than fall or winter because there is a slower turnover rate in local bird populations during summer than after birds begin to migrate. For instance, the juvenile starlings in the flock at Rose's Berry Farm during August were the same individuals that were there in July based on our observations of banded individuals.

In this study, there was no need to kill the trapped starlings, and all were released at sites 50–100 km away. None of the released birds was observed later back at the farm. Juvenile starlings have little homing experience and probably have no reason to want to return to their capture site. If adult starlings are relocated, there is a greater probability of them returning to the capture site. Hence, it may be necessary to take adults farther away before releasing them. Releasing the birds unharmed was a successful strategy in this case because blueberry orchards are widely dispersed in Connecticut, and we released the starlings far from any blueberry orchards. In situations where relocating starlings might create additional problems, captive starlings can be killed (Conover 2001). Because European starlings are an exotic species in the United States, no federal permit is needed for killing them, but state permits may be required.

Acknowledgments

We thank H. Rose and S. Rose for access to their blueberry farm and for their help in conducting this study. This research was funded by the Utah Agricultural Experiment Station.

Literature cited

Clark, W. R. 1967. The summer European starling problem in Tulare County. Vertebrate Pest Conference 3:94–97.

Conover, M. R. 1982. Behavioral techniques to reduce bird damage to blueberries: methiocarb and a hawk-kite predator model. Wildlife Society Bulletin 10:211–216.

Conover, M. R. 2001. Resolving human–wildlife conflicts: the science of wildlife damage management. CRC, Boca Raton, Florida, USA.

Dolbeer, R. A. 1989. Current status and potential of lethal means of reducing bird damage to agriculture. Pages 474–483 *in* H. Ouellet, editor. Acta 19 Congresus Internationais Ornithologica, University of Ottawa Press, Ottawa, Canada.

Dolbeer, R. A., M. L. Avery, and M. E. Tobin. 1994. Assessment of field hazards to birds from methiocarb applications to fruit crops. Pesticide Science 40:147–161.

Elliot, H. N. 1964. Starlings in the Pacific Northwest. Vertebrate Pest Conference 2:29–39.

Meanley, B. 1971. Blackbirds and the southern rice crop. U.S. Fish and Wildlife Service, Bureau of Sport Fisheries and Wildlife, Resource Publication 100, Washington, D.C., USA.

Walkinshaw, L. H. 1983. Kirtland's warbler: the natural history of an endangered species. Cranbrook Institute of Science, Bulletin 58, Bloomfield Hills, Michigan, USA.

Weatherhead, P. J., H. Greenwood, S. H. Tinker, and J. R. Bider. 1980. Decoy traps and the control of blackbird populations. Phytoprotection 61:65–71.

Winters, R. O. 1973. Cowbird trapping and the Kirtland's warbler. Bird Control Seminar 6:102–

MICHAEL R. CONOVER is a professor in the Department of Wildland Resources at Utah State University. He is a member of the Jack H. Berryman Institute and editor of *Human–Wildlife Conflicts.*

RICHARD A. DOLBEER (photo) serves as the national coordinator for the U.S. Airport Safety and Assistance Program within USDA Wildlife Services. He has conducted research on a variety of human–wildlife conflicts over the past 34 years. He was the 2005 recipient of the Federal Aviation Administration's Excellence in Aviation Research award for his outstanding contributions to aviation safety.