



# ATTRA Sustainable Agriculture

A program of the National Center for Appropriate Technology • 800-346-9140 • [www.attra.ncat.org](http://www.attra.ncat.org)

## Vertebrate Integrated Pest Management Series

# Beneficial and Pest Birds: Vertebrate IPM Tip Sheet

Birds, similar to insects, can be beneficial or be pests to farmers. Beneficial birds can help reduce insects, weeds, or rodent pests that feed on and destroy crops. Pest birds, on the other hand, can damage and destroy seed, vegetable, fruit, and vine crops, causing significant economic losses. They can also be vectors of disease that can threaten the poultry industry, or they can spread *E. coli*, *Campylobacter spp.*, and *Salmonella spp.* in fruits and vegetables. Pest birds also consume and contaminate livestock and dairy feed (Medhanie et al., 2014). Sometimes, the same birds can be beneficial by consuming insects in the spring but then become pests in the fall when they consume vegetation, fruits, and seeds.

Farmers and pest-control professionals need to identify the beneficial and pest birds, and be able to manage or manipulate those birds that shift from beneficial to pest. This tip sheet was developed to help achieve those goals.



*A bird catching an insect on the fly. Photo: wikimedia*

## Bird Identification

The first step in any integrated pest management strategy is to identify the pest. In the case of birds, identification is critical in order to determine whether the birds are pest, beneficial, or both. The following websites can help with correct identification:

The Cornell Lab of Ornithology, All About Birds:

[www.allaboutbirds.org](http://www.allaboutbirds.org)

The Cornell Lab of Ornithology, Merlin Bird ID App (ideal for smart phones): <http://merlin.allaboutbirds.org>

Project FeederWatch: <https://feederwatch.org/learn/identifying-birds>

Audubon Guide to North American Birds:

[www.audubon.org/bird-guide](http://www.audubon.org/bird-guide)

Bird Watcher's Digest:

[www.birdwatchersdigest.com/bwdsite/learn/identification.php](http://www.birdwatchersdigest.com/bwdsite/learn/identification.php)

Before any action against birds is carried out, be aware of the Migratory Bird Treaty Act (MBTA) that protects all native birds from harassment or harm, except by permit. There is an exception in which one can take native birds without a permit if they will cause harm to crops or livestock. Check with the U.S. Fish and Wildlife Service, or with your local agricultural commissioner, for more information. Non-native birds not protected by MBTA include European Starlings, Pigeons, and House Sparrows.



*Feeding insects to a chick. Photo: flickr*

## Creating Habitat for Birds on Farms

Sustainable agriculture relies on biodiversity to provide the environmental services on which it depends to maintain productivity. Biodiversity is created by establishing habitat on the farm that harnesses the diversity of wildlife, including birds. Several types of effective habitat can be created or enhanced on agricultural land that can increase beneficial bird populations and provide pest-control services (Garfinkel and Johnson, 2015):

- Hedgerows of native plants around edges of farms provide habitat for birds, as well as attracting beneficial insects, reducing weeds, reducing soil erosion, and improving water quality. Perennial grasses provide cover for ground-feeding birds, flowering plants attract insectivores and nectar-feeding birds, woody shrubs are good for roosting, and bigger trees provide bird nesting sites and serve as perches for raptors such as hawks.



*Bird resting on the hedge. Photo: Rex Dufour, NCAT*

- Windbreaks provide nesting and brood-rearing habitat, potential food, protection from wind and adverse weather, escape cover, and refuge for many species of birds. Windbreaks may provide travel corridors that facilitate movement of animals between other habitats. They are used as resting stops by migratory birds (Natural Resources Conservation Service, 2004). Windbreak species should be, ideally, native tree and shrub species suitable for the soils in your area.
- Riparian corridors are the most productive habitat for birds because of their ability to serve a large area that transects many farms and converges with many different land uses. Riparian habitats provide water, food, nesting sites, resting areas during migration, and overwintering sites.
- Surrounding landscape may add to the diversity and numbers of birds and their pest-control abilities. There is evidence that increasing natural habitat in landscapes dominated by temperate annual crops also increases biological control (Thies and Tschardt, 1999).
- Marginal land can be made useful by planting native grasses and shrubs on it that can reduce erosion, improve water quality, and provide habitat for insects and birds.
- Cover crops increase the number of insects and allow birds to rest and forage during migrations. Many agricultural landscapes lack habitat, and cover crop fields may also be important areas providing shelter and forage for resident birds.
- Intercropping—such as planting sunflower rows along with vegetables—can increase insectivorous birds and the foraging of insects without damaging the crop (Jones and Sieving, 2006).
- Ponds and ditches can be managed to attract birds and other wildlife. Keeping the margins of ponds, ditches, and reservoirs well vegetated can improve the value of these wetland habitats for birds like egrets and herons and can improve water quality.
- Fallow fields and crop rotation are good ways to provide cover for wildlife. Leaving a recently cropped field to idle for a period will encourage birds to forage and nest in the area. Rotating different crops will reduce pests and diseases and provide a variety of insects and plants for birds to feed on.
- Brush piles provide cover for ground-nesting birds, but beware that they also may encourage squirrels and rabbits. Having the piles on farm edges or close to waterways will be more suitable for nesting, because birds would not be as exposed to predators as they are when nesting in an isolated pile.
- Fallen or dead-standing trees provide valuable habitat for birds and other animals. Cavity-nesting birds can make use of the hollows. Insects that break down the fallen tree serve as food, and fallen limbs provide cover. Limbs can also serve as perches for raptors, and lower limbs can provide sites for songbirds to prey on insects.
- Nest boxes must be constructed for the particular bird you desire to attract to your farm. Box size, height from the ground, and entrance-hole diameter are all important in attracting the desired species (See Appendix). Having the right bird house will help in excluding unwanted pest birds like starlings and sparrows.



*Heron hunting a gopher. Photo: Linda Welz, [www.march.afrc.af.mil](http://www.march.afrc.af.mil)*

## Management of Pest Birds

Scouting the crop when it's immature will help determine at what stage of maturation the crop is susceptible, and which birds are causing damage. The best time of day to look for birds is in the early morning or just before dusk in the evening. When problem



birds are first detected, a treatment strategy should be prepared and implemented depending on the species, number of birds, and type of crop. Experts recommend a combination of treatments for an effective management plan.

- *Habitat modification* consists of eliminating habitat that might attract pest birds, such as water sources, plants that serve as cover, dense trees for roosts, spilled grain from storage bins or machinery, or anything else that will attract birds to the area. Mowing weeds and grasses may keep some birds away.
- *Frightening devices* can be auditory or visual. Combining both can be more effective, and rotating the combinations may prevent habituation.

— Auditory devices make noises like explosions, sirens, and distress calls. They can be effective at first, but they need to be moved around to different areas to avoid familiarization. Distress calls can be species-specific and require good-quality sound equipment. Another method, known as “benign acoustic deterrence,” uses sounds that don’t have to be loud, but whose different wavelengths interfere with bird communication.

— Visual devices like scarecrows, reflective tape, hawk kites, owl and scary-eye balloons have limited effectiveness and have to be relocated and used in combination with sound devices to remain effective. Helikites are helium-filled balloons that are tethered and float high above the field. Helikites can hover high in the sky (200 feet) and simulate birds of prey. Lasers are a new technology being used more in berry- and cherry-growing areas of the Northwest. Their effectiveness varies with daylight intensity, depending on how powerful they are. Because most bird pests are active during dawn and dusk, the lasers can be adjusted to wavelengths and frequencies that specific birds don’t like. There are robots available in the market that manually move the laser toward the birds. Drones with GPS are in development that look like raptors in flight and emit predatory bird calls, as well as distress cries.

- *Predators* can be effective based on birds’ natural fear of hawks and falcons. Most prey birds will form a flock and flee the raptor, thus leaving the area. Producers can hire falconers to fly early mornings and late evenings, depending on the bird activity. Installing kestrel boxes may attract these predators to the farm property. Perches installed above the crops and along ditches or riparian areas can attract numerous hawks. Also, the use of dogs like border collies has been effective at airports, golf courses, and agricultural areas in keeping ground-foraging birds at bay, but this may not be effective with perched or flying birds.
- *Exclusion* utilizes nets, hoop houses, or floating row covers to keep birds physically away from crops. It is costly and used on high-value crops like wine grapes, blueberries, brambles, and aquaculture operations.
- *Repellents* are applied on crops to make the taste unpalatable to birds. They are marginally effective because of large amounts needed, and some are volatile and wear off.
- *Shooting* may be effective in small areas for scaring off most of the flock. Check with local authorities to determine whether permits are needed before shooting at birds.
- *Nest destruction* may discourage birds from using an area, but you will have to consult with local fish and game officials or county agricultural commissioners as to the legality.
- *Trapping* involves luring birds to a location using food, water, or decoys. There are many types of traps, so research and consult with local authorities as to which method is practical and useful in your area. Additionally, if live trapping is allowed, the target birds will then have to be euthanized.

Birds play a vital role in the overall functioning of various ecosystems, from nutrient cycling in soils to providing pest control on livestock and crops. Unfortunately, bird populations are declining on farmlands worldwide due to habitat losses and pesticide use (Greshko, 2018). Habitat conservation and development are critical if bird populations are to recover and provide us with their valuable services. Proper identification and the use of integrated pest management practices will prepare the farmer and pest control advisors with strategies and tools to manage birds that cause damage to a crop.



A starling. Photo: wikimedia



A turkey. Photo: Rex Dufour, NCAT

## NRCS Practices Supporting Beneficial Birds

By Rex Dufour, NCAT

USDA Natural Resources Conservation Service provides financial and technical support for many conservation practices that support more diverse populations of beneficial birds. The practices listed below are funded through the Environmental Quality Incentives Program (EQIP). Additional bird-friendly practices not listed here are available under the Conservation Stewardship Program (CSP), termed “enhancements.” Visit the website to see the full list of practices: [www.nrcs.usda.gov/wps/portal/nrcs/detailfull/national/technical/cp/ncps/?cid=nrcs143\\_026849](http://www.nrcs.usda.gov/wps/portal/nrcs/detailfull/national/technical/cp/ncps/?cid=nrcs143_026849).

Hedgerow 422	Riparian Forest Buffer 391
Conservation Cover 327	Riparian Herbaceous Cover 390
Cover Crop 340	Shallow Water Development and Management 646
Critical Area Planting 342	Silvopasture 381
Cross Wind Trap Strips 589C	Structures for Wildlife 649
Early Successional Habitat Development/Management 647	Tree/ Shrub Establishment 612
Field Border 386	Upland Wildlife Habitat Management 645
Filter Strip 393	Wetland Creation 658
Herbaceous Wind Barriers 603	Wetland Enhancement 659
Land Reclamation, Currently Mined Land 544	Wetland Restoration 657
Land Reclamation, Abandoned Mined Land 543	Wetland Wildlife Habitat Management 644
Multi-Story Cropping 379	Windbreak/Shelterbelt Establishment 380
Range Planting 550	Windbreak/Shelterbelt Renovation 650
Restoring of Rare or Declining Natural Communities 643	

## References

- Garfinkel, Megan, and Matthew Johnson. Pest-removal Services Provided by Birds on Small Organic Farms in Northern California. *Agriculture, Ecosystems & Environment* 211 (2015): 24-31.
- Greshko, Michael. 2018. Around the World, Farmland Birds Are in Steep Decline. June 1. <https://news.nationalgeographic.com/2018/05/farmland-birds-declines-agriculture-environment-science>
- Jones, J.A and K.E Sieving. 2006. Intercropping sunflower in organic vegetables to augment bird predators of arthropods. *Agriculture, Ecosystems & Environment*. Vol. 117, Issues 2–3. November. p.171-177.
- Medhanie, G.A., D.L. Pearl, S.A. McEwen, M.T. Guerin, C.M. Jardine, J. Schrock, and J.T. LeJeune. 2014. A longitudinal study of feed contamination by European starling excreta in Ohio dairy farms (2007-2008). *J. Dairy. Sci.* 97:5320-5238.
- Natural Resources Conservation Service - South Dakota. 2004. Windbreaks/Shelterbelts as Wildlife Habitat. Job Sheet Insert 380. April. [www.nrcs.usda.gov/Internet/FSE\\_DOCUMENTS/16/nrcs143\\_010026.pdf](http://www.nrcs.usda.gov/Internet/FSE_DOCUMENTS/16/nrcs143_010026.pdf)
- Thies, C. and T. Scharntke. 1999. Landscape structure and biological control in agroecosystems. *Science*. 285, 893–895

## Further Resources

- Hedgerows and Farmscaping for California Agriculture: A Resource Guide for Farmers, 2nd Edition. 2018. By Sam Earnshaw. Community Alliance with Family Farmers. [www.caff.org/wp-content/uploads/2011/08/CAFF-Hedgerow-Manual\\_web032118.pdf](http://www.caff.org/wp-content/uploads/2011/08/CAFF-Hedgerow-Manual_web032118.pdf)
- National Resource Conservation Service (NRCS). [www.nrcs.usda.gov/wps/portal/nrcs/site/national/home](http://www.nrcs.usda.gov/wps/portal/nrcs/site/national/home)
- Songbird, Bat and Owl Boxes: Vineyard Management with an Eye towards Wildlife. 2008. By Emily Heaton, Rachel Long, Chuck Ingels, and Tom Hoffman. University of California, Agriculture and Natural Resources. Publication 21636.
- Supporting Beneficial Birds and Managing Pest Birds. 2019. By Jo Ann Baumgartner, Sara Kross, Sacha Heath, and Shelly Connor. Wild Farm Alliance. [www.wildfarmalliance.org/bird\\_resource](http://www.wildfarmalliance.org/bird_resource)

# Appendix

## Birdhouse Dimensions by Species

Species	Floor (Inches)	Height (Inches)	Hole Diameter (Inches)	Hole Above Floor (Inches)	Box Above Ground (Feet)
<b>Chickadees</b>					
Chickadees	4x4	6-10	1 1/8	4-8	6-15
Titmice	4x4	6-12	1 1/4	4-10	6-15
<b>Ducks</b>					
Wood Duck	10x18	10-24	4	12-16	6-20
<b>Flycatchers</b>					
Ash-throated	6x6	8-12	1 1/2	6-10	5-15
Great Crested	6x6	8-12	1 3/4	6-10	5-15
<b>Falcons</b>					
American Kestrel	8x8	12-15	3	9-12	8-30
<b>Nuthatches</b>					
Brown-headed, Pygmy, and Red-breasted	4x4	8-10	1 1/4	6-8	5-15
White-breasted	4x4	8-10	1 3/8	6-8	5-15
<b>Owls</b>					
Barn	10x18	15-18	6	4	12-18
Screech	8x8	12-15	3	9-12	8-30
<b>Phoebes</b>					
Black, Eastern, and Say's	6x6 nest shelf	6	–	–	8-12
<b>Swallows</b>					
Barn	6x6 nest shelf	6	–	–	8-12
Purple Martin	6x6	6	2 1/4	1-2	6-20
Tree and Violet Green	5x5	6-8	1 1/2	4-6	6-15
<b>Thrushes / Bluebirds</b>					
Eastern Bluebird	5x5	6-12	1 1/2	4-10	4-10
Western Bluebird	5x5	6-12	1 1/2	4-10	4-10
Mountain Bluebird	5x5	6-12	1 9/16	4-10	4-10

## Birdhouse Dimensions by Species, continued

Woodpeckers					
Downy	4x4	8-10	1 1/4	6-8	5-15
Hairy	6x6	12-15	1 1/2	9-12	8-20
Lewis's	7x7	16-18	2 1/2	14-16	12-20
Flicker	7x7	16-18	2 1/2	14-16	6-20
Pileated	8x8	16-24	3x4	12-20	15-25
Red-headed	6x6	12-15	2	9-12	10-20
Yellow-bellied	5x5	12-15	1 1/2	9-12	10-20
Warblers					
Prothonotary	5x5	6	1 1/8	4-5	4-8
Wrens					
House	4x4	6-8	1 1/8	4-6	5-10
Carolina	4x4	6-8	1 1/4	4-6	5-10
Bewick's	4x4	6-8	1 1/8	4-6	5-10

Source: *Birdwatching Bliss*, [www.birdwatching-bliss.com/bird-house-dimensions.html](http://www.birdwatching-bliss.com/bird-house-dimensions.html)

## Notes

---

# Notes

---

---

This material is based upon work that is supported by the National Institute of Food and Agriculture, U.S. Department of Agriculture, under award number 2013-51106-20970.

**Beneficial and Pest Birds: Vertebrate IPM Tip Sheet**

By Martin Guerena, NCAT Agriculture Specialist • Published May 2019 ©NCAT  
IP560 • Slot 584



Produced by the National Center for Appropriate Technology  
(parent organization to the ATTRA Project, [www.attra.ncat.org](http://www.attra.ncat.org))  
[www.ncat.org](http://www.ncat.org) • 1-800-ASK-NCAT

Contact Us! [attra.ncat.org](http://attra.ncat.org) • Toll-free: 800-346-9140 • Email: [askanag@ncat.org](mailto:askanag@ncat.org)