

# ATTRACTING NATIVE RAPTORS TO DAIRIES FOR MANAGEMENT OF PEST BIRDS



## Abstract

This Extension publication will review the negative impact of pest birds on dairies, describe the benefits of attracting native raptors to manage pest birds, and provide recommendations on how to attract native raptor species to dairy farms. Dairy producers, consultants, or veterinarians may use this publication as a tool to determine whether native raptor attraction techniques are suitable to manage pest birds on their farms or their clients' farms.

## Pest Birds on Dairies

Pest birds, especially European starlings (*Sturnus vulgaris*, a common avian pest species), are most often observed on dairy farms from early fall to early spring (Figure 1). European starlings are an invasive and migratory species that can easily adapt to new environments. As food resources become scarcer when environmental temperatures decrease, this avian species relies more heavily on cattle feed and establishes night roosts within dairy facilities (Medhanie et al. 2014). In 2017, due to pest birds consuming and spoiling cow feed, Washington dairy producers reported annual losses of \$55 per cow (Elser et al. 2019). Although feed losses are the highest reported damage caused by pest birds on dairies, these birds may also transmit diseases and decrease dairy cattle well-being. The risk of these birds disseminating pathogens to both animals and humans is also high (Medhanie et al. 2015). In a study examining fecal matter from European starlings, the amount of bird excrement found near dairy cattle feeding sites was much higher in the winter (December 2007–March 2008; Medhanie et al. 2014) than other seasons, highlighting the seasonal nature of pest bird presence on dairies (Figure 2). Another study noted similar bird presence patterns on dairies in Washington State, where pest bird abundance, feed depredation by birds, and fecal contamination of feed from birds was highest from January 1st to March 31st and lowest from July 1st to September 30th (Shwiff et al. 2012).

Dairy producers that reported more than 10,000 birds on their farms in Washington State had a higher risk of reporting cases of *Salmonella* or Johne's disease within their herds (Elser et al. 2019). *Escherichia coli* (*E. coli*) is a species of bacteria that colonizes the gut of avian pests and may be transmitted to dairy cattle via exposure to bird fecal matter. Different serotypes of *E. coli* are found in different species of bird. In one study, 70% of wild bird fecal samples collected on dairies were contaminated with *E. coli* (Fahim et al. 2019). Of these samples, serotype O78 was isolated from hooded crows, serotype O18 was isolated from Eurasian coots, and serotype O158 was isolated from northern shovelers. The *E. coli* O166 serotype was isolated from laughing dove fecal swabs and from cow's milk. Exposure to wild bird fecal matter has been identified as a cause of mastitis in dairy cows (Fahim et al. 2019). Pest birds are a threat to the economic viability of dairy farms and dairy cow well-being. Several methods are available to deter birds from dairies, but it is not easy for farmers to determine which method is best suited for their farm. The risks associated with using some deterrence methods make them less desirable. One low-risk deterrence method that is gaining popularity on farms is using native raptor attraction techniques (such as installing nest boxes) to attract birds of prey to dairies.



Figure 1. An image of a murmuration of starlings flying over a dairy farm. Photo: Marcy Bartelheimer.



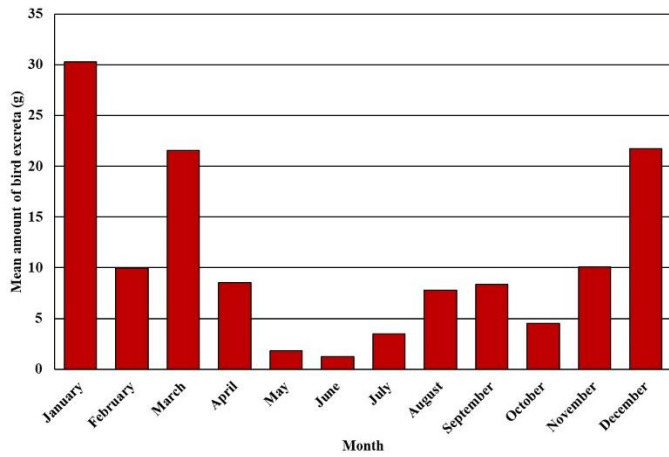


Figure 2. Amount of European starling excreta (feces) collected on a 3 ft by 3 ft tray near feed on 15 Ohio dairies in each month for 2007–2008 (adapted from Medhanie et al., 2014). *Note:* One gram (g) is equivalent to the weight of a paperclip.

## Native Raptors on Farms: Managing Pests

According to the California Department of Fish and Wildlife, the term *raptor* refers to birds of prey, which include hawks, eagles, owls, and falcons (California Department of Fish and Wildlife 2022). Due to the predatory nature of raptor species, they are higher on the food chain in comparison to avian pest species. As a predatory species, several key characteristics of raptors include powerful feet with talons for grasping, holding, and killing prey, as well as hooked beaks for killing and eating prey (Saranraj et al. 2019). An example of a native raptor is the American kestrel (*Falco sparverius*), which is a widespread generalist raptor that includes a variety of small animals in its diet. The presence of raptors, including kestrels, is used as a tool to control avian or rodent pests (Shave et al. 2018a). Professional falconry employs raptors to scare off pest birds and has been documented as one of the most successful techniques in reducing pest bird numbers in landfill and airport settings (Steensma et al. 2016). Raptors, such as kestrels, can be attracted to farms by installing suitable nest boxes. In fruit crops, the installation of raptor nest boxes attracts the natural predators of fruit-eating birds and is effective in reducing damages from pest birds (Bardenhagen et al. 2020). One study demonstrated that more kestrels were present on sites that installed nest boxes than sites that did not install nest boxes, and the kestrels were more likely to colonize and persist at sites with nest boxes (Shave 2017). Similarly, orchards that installed raptor nest boxes observed a more pronounced decrease in fruit-eating birds than orchards that did not install nest boxes (Shave et al. 2018b). Installing nest boxes is just one of several methods to consider when attempting to attract raptors to a farm.

## Native Raptors on Farms: Raptor Attraction Methods

Farms that provide suitable habitat will more easily attract and maintain raptor presence. One method of providing suitable habitat is by installing artificial perches. An easy way to install perches is to attach them to already-existing fenceposts, which will ensure they are sturdy and stable for bird use (Kross et al. 2018). American kestrels, great horned owls, barn owls, and red-tailed hawks use artificial perches most often, and they prefer 15-foot perches over 20-foot perches (Kross et al. 2018). It is also important to consider specific environmental requirements; for example, barn owls require open, grassy, agricultural habitat (Wendt and Johnson 2017). The installation and management of raptor nest boxes (Figure 3 and Figure 4) requires more time and effort than managing artificial perches.

Nest boxes must be diligently monitored and maintained to promote raptor use. Negligence in nest box maintenance can result in raptor rejection of the nest boxes, which allows other birds (including pest birds) to inhabit the nest boxes (Jasinski et al. 2021). The temperature within nest boxes also plays a role in raptor inhabitation. Higher nest box occupancy occurs when the temperatures within the nest box are cooler. Installing the nest boxes in shaded areas can lead to an increase in raptor occupancy, as seen with barn owls in one study (Charter et al. 2010). The following are additional guidelines for attracting raptors to a farm:

- If a nest box is not used for several years, consider changing the location.
- Nest boxes should be installed at least ten feet above the ground.
- Clean and repair nest boxes annually.
- Install nest boxes prior to nesting season (i.e., in the spring).
- Avoid installing nest boxes near areas with heavy vehicular or human traffic.
- Do not disturb birds in their nest boxes.

## Concluding Statements

In conclusion, attracting native raptors may help farmers manage pest bird damage on their farms. Although not every farm has suitable, natural habitat for raptors, farmers can install artificial perches and nest boxes to provide habitat for native raptor species. With proper management and maintenance, raptor nest boxes have been successful in attracting raptors and, ultimately, decreasing pest bird populations on farms. Visit the [UC Davis California Raptor Center website](#) for more information on implementing raptor nest boxes.



Figure 3. An image of American kestrel nest boxes constructed by Ben Dover. The kestrel nest boxes are 21 inches tall in the back, 14.5 inches tall in the front, 10 inches long, and 5 inches wide. Photo: Amber Adams Progar.



Figure 4. An image of an owl nest box constructed by Ben Dover. The barn owl nest box is 24 inches long, 16 inches tall, and 16 inches wide. Photo: Amber Adams Progar.

## References

- Bardenhagen, C.J., P.H. Howard, and S.A. Gray. 2020. A Bird's Eye View: Fruit Grower Interest in Adoption of Raptor Nest Boxes. *Agroecology and Sustainable Food Systems* 44 (10): 1384–1393.
- California Department of Fish and Wildlife. 2022. [Raptors of California](#).
- Charter, M., K. Meyrom, Y. Leshem, S. Aviel, I. Izhaki, and Y. Motro. 2010. Does Nest Box Location and Orientation Affect Occupation Rate and Breeding Success of Barn Owls *Tyto alba* in a Semi-arid Environment? *Acta Ornithologica* 45 (1): 115–119.
- Elser, J., A. Adams-Progar, K. Steensma, T. Caskin, S. Kerr, and S. Shwiff. 2019. Economic Impacts of Birds on Dairies: Evidence from a Survey of Washington Dairy Operators. *PLoS ONE* 14 (9): e0222398.
- Fahim, K.M., E. Ismael, H.S. Khalefa, H.S. Farag, and D.A. Hamza. 2019. Isolation and Characterization of *E. coli* Strains Causing Intramammary Infections from Dairy Animals and Wild Birds. *International Journal of Veterinary Science and Medicine* 7 (1): 61–70.
- Jasinski, M., M. Hughes, H.W. Fraser, S. Fitzgerald, and J.J. Willwerth. 2021. Kestrel Nest Box Occupancy and Fledging Rates and the Effect of Kestrel Presence and Absence on Bird Abundance and Activity in Fruiting Crops in the Niagara Region and Norfolk County. *Crop Protection* 139: 105377.
- Kross, S., R. Chapman, A. Craig, and T.R. Kelsey. 2018. Raptor Use of Artificial Perches in California Rangelands in Fall. *Proceedings of the Vertebrate Pest Conference* 28: 202–207.
- Medhanie, G.A., D.L. Pearl, S.A. McEwen, M.T. Guerin, C.M. Jardine, and J.T. LeJeune. 2015. Dairy Cattle Management Factors That Influence On-Farm Density of European Starlings in Ohio, 2007–2009. *Preventive Veterinary Medicine* 120: 162–168.
- Medhanie, G.A., D.L. Pearl, S.A. McEwen, 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). *Journal of Dairy Science* 97: 5230–5238.
- Saranraj, P., P. Sivasakthivelan, and N. Muthukumar. 2019. *Novel Advances in Agricultural and Veterinary Sciences*. JPS Scientific Publications India.
- Shave, M.E. 2017. American Kestrels Occupying Nest Boxes in Michigan Cherry Orchards Show High Reproductive Rates and Tolerance of Monitoring. *Journal of Raptor Research* 51: 50–60.
- Shave, M., B. Lundrigan, and C. Lindell. 2018a. Effects of American Kestrel Nest Boxes on Small Mammal Prey in Cherry Orchards. *Proceedings of the Vertebrate Pest Conference* 28: 224–230.
- Shave, M.E., S.A. Shwiff, J.L. Elser, and C.A. Lindell. 2018b. Falcons Using Orchard Nest Boxes Reduce Fruit-Eating Bird Abundances and Provide Economic Benefits for a Fruit-Growing Region. *Journal of Applied Ecology* 55: 2451–2460.
- Shwiff, S.A., J.C. Carlson, J.H. Glass, J. Suckow, M.S. Lowney, K.M. Moxcey, B. Larson, and G.M. Linz. 2012. Producer Survey of Bird-Livestock Interactions in Commercial Dairies. *Journal of Dairy Science* 95: 6820–6829.

Steensma, K., C. Lindell, D. Leigh, C. Burrows, S. Wieferich, and E. Zwamborn. 2016. Bird Damage to Fruit Crops: A Comparison of Several Deterrent Techniques. *Proceedings of the Vertebrate Pest Conference 27*: 196–203.

Wendt, C.A., and M.D. Johnson. 2017. Multi-Scale Analysis of Barn Owl Nest Box Selection on Napa Valley Vineyards. *Agriculture, Ecosystems & Environment 247*: 75–83.

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