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A portable aviary for field observations of behavior

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ABSTRACT. We describe a lightweight, portable, and inexpensive field aviary that was designed for observing Northern Bobwhite (*Colinus virginianus*) vigilance and feeding behavior. The general construction details of this aviary are easily modified to accommodate a variety of bird species and research objectives.

SINOPSIS. **Aviario portatil para hacer observaciones en el campo sobre la conducta de aves**
Describimos un aviario portátil, liviano y de bajo costo diseñado para hacer estudios sobre la conducta alimentaria de *Colinus virginianus*. Los detalles en generales de construcción de este aviario se puede modificar fácilmente para acomodar una gran variedad de aves y diferentes objetivos de investigación.

Key words: *Colinus virginianus*, enclosure, feeding, Northern Bobwhite, techniques

It is often necessary to use an aviary when studying bird behavior. Much of the aviary literature applies to aviculture (Bocetti and Swayne 1995) or for indoor or outdoor housing (Mitterling 1966; Kalinoski and Gluck 1973). However, it is often necessary to observe bird behavior in a natural setting free from biases imposed by inappropriate habitat, disturbance, and other factors. For example, Elgar (1989) and Catterall et al. (1991) raised concern that many past studies that investigated the effect of group size on vigilance and feeding behavior might have been biased because they did not control for proximity to protective cover or danger, nearby visual obstructions, and the presence of potential predators (reviewed in Lima 1987).

Aviaries such as the one designed by Mitterling (1966) require the use of a tractor, front end loader, and post-hole auger to assemble. Permanent or more cumbersome structures can also pose disease problems (Bocetti and Swayne 1995). Because most aviaries are permanent structures, it is difficult to use them in natural settings. We think the use of a portable aviary could aid in reducing observational biases.

We developed a portable outdoor aviary for study of Northern Bobwhite (*Colinus virginianus*) vigilance behavior (Fig. 1). Because of limited space and inability to build a permanent structure, we developed an aviary that could be easily assembled and disassembled. Advantages of a portable aviary include reduction of enteric diseases due to a buildup of droppings (Alderton 1992), an ability to move it into different vegetation types, and an ability to move it different distances from protective cover to monitor differences in predator vigilance.

The aviary is constructed of 1.91-cm (0.75-inch) outside diameter (o. d.), schedule 40 PVC pipe and 2.54 × 2.54-cm (1.0 × 1.0-inch) poultry netting (Table 1). The dimensions of the PVC pipe frame are 3.05 × 3.05 × 1.30-m (10 × 10 × 6-ft, l × w × h). We recommend dividing the 3.05-m (10-ft) horizontal lengths into two 1.52-m (5-ft) sections and the upright lengths into two sections of 0.91 m (3 ft). Dividing the height produces three tiers of PVC pipe (base, center, top). We think that dividing both horizontal and vertical lengths is beneficial because it increases aviary stability,

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Fig. 1. View of assembled aviary in chosen vegetation type where Northern Bobwhite behavior observations occurred.

and it provides more area to attach poultry netting. This particular size accommodates ~20 Northern Bobwhites for feeding and vigilance observations. These dimensions can be easily modified to accommodate different bird species and study objectives.

Lengths of PVC pipe are joined with factory manufactured connectors. Three different styles of 1.91-cm (0.75-inch) schedule 40 joints were used (Table 1). At all corners, elbow joints are combined with either a "T" connector or a "+" joint. The elbow pieces are attached to the cross joints using a 7.62-cm (3-inch) piece of PVC pipe (Fig. 2). At the top and bottom frame sections a "T" joint is placed every 1.52 m, with an elbow joint and "T" connection at every 3.05 m. At the center 0.91-m high level, the same method is used, but with a "+" used as the cross joint. The joints and the PVC are fit together and tapped into place with a rubber mallet to ensure a tight fit. When attaching PVC pipe to connectors it is important not to

Table 1. Materials for construction of a 3.05 × 3.05 × 1.3-m portable field aviary.

(16) 0.91-m (3-foot), 1.91-cm (0.75-inch) o. d., schedule 40 PVC pipe.
(24) 1.52-m (5-foot), 1.91-cm (0.75-inch) o. d., schedule 40 PVC pipe.
(16) "T" joints, schedule 40, 1.91-cm (0.75-inch).
(12) elbow joints, schedule 40, 1.91-cm (0.75-inch).
(8) "+" joints, schedule 40, 1.91-cm (0.75-inch).
(12) 7.62-cm (3-inch), 1.91-cm (0.75-inch) outside diameter, schedule 40 PVC pipe.
(2) 12.19-m (40-feet), 0.91-m (3-foot) wide poultry netting 2.54 × 2.54-cm (1 × 1-inch) mesh.
(4) 3.05-m (10-foot), 0.91-m (3-foot) wide poultry netting 2.54 × 2.54-cm (1 × 1-inch) mesh.
(20) 15.24-cm (6-inch) plastic tent stakes.
(4000) 20.30-cm (8-inch) cable ties.

force the pieces; a snug fit is all that is needed. Because no cement is used to attach PVC, the aviary can be disassembled for easy storage.

Once the frame is constructed, a wire mesh shell can be added. We used poultry netting, which is 0.91 m (3-ft) wide with a 2.54 × 2.54-cm (1-inch) pattern of fencing. The netting is attached to the frame using 20.30-cm (8-inch) plastic cable ties pulled snugly to secure the netting to the frame. Ties can be cut easily, if needed, to dismantle the aviary. A total of 36.60 m (120 ft) of netting is used to cover the entire aviary (Table 1). The 0.91-m width of the netting matches with the divided supports of the aviary. The netting is attached at the base, center, and top-level supports around the outside of the frame. The roof is made with four sections each of 3.05 m (10 ft) of netting. Supports or braces can be added to allow the roof to hang as desired. All seams in the netting need to be secured with cable ties to prevent escape of birds. We recommend placing ties at approximately 7.62-cm (3-inch) intervals and elsewhere as needed. Human access to the aviary was provided by opening one of the seams in the lower portion of poultry netting. This allowed for easy entry and a securable exit point using the cable ties.

The aviary, once assembled, can be placed in desired vegetation types for observation of birds. Appliances for feeding, watering, and shelter can be added as needed. The aviary is built without a bottom, which allows it to be placed over features in the desired habitat to enhance the natural setting. Plastic tent stakes (15.24-cm, 6-inch) should be placed approximately every 0.61 m (2 ft) to secure the aviary to the ground. Guy ropes can be added if necessary to add more stability.

Electric fencing can be installed around the aviary to prevent predation on birds (Nash and Nash 1985). A skirt of poultry netting can be attached to the outside bottom of the aviary and staked flat to the ground to give predator protection and help prevent escape of birds. A blind can be erected near the aviary to facilitate observation or video-taping of the birds.

The entire assembled aviary is movable to different study locations and can be easily handled by two people. The total weight of the described aviary is approximately 41.00 kg (90 lbs), with the PVC piping and the poultry netting each weighing 20.50 kg (45 lbs).

This aviary is designed to be sturdy, collapsible, and inexpensive. The disassembled structure can be stored indoors in minimal space. The cost to build this aviary in 1999 was U.S. $154.70. To prevent disease transmission, the aviary unit can be sanitized by soaking individual parts in antiseptic solutions and moved to a different location.

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