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NEW HARNESS DESIGN FOR ATTACHMENT OF RADIO TRANSMITTERS TO SMALL PASSERINES

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Abstract.—Proper attachment of radio transmitters to small passerines is critical to success of telemetry studies. Neck loop and wing loop harnesses pose a number of problems. Gluing techniques are better, but are time consuming. A figure-8 harness that slides on over the legs of the bird, with the transmitter resting over the synsacrum, provides a rapid attachment technique that minimizes problems of balance and physical discomfort.

NUEVO DISEÑO DE ARNÉS PARA ATAR TRANSMISORES A PASSERIFORMES PEQUEÑOS

Sinopsis.—El atar correctamente radiotransmisores a Passeriformes de poco tamaño, es crítico en el éxito que se pueda tener en estudios de telemetría. Los arneses de lazos en el pescuezo y las alas presentan una serie de problemas. Las técnicas en las cuales se utiliza pegamento son mucho mejores, pero consumen mucho tiempo. Un arnés en forma de "ocho" que se desliza por sobre las patas del ave, con el transmisor descansado sobre el sacro, provee de una atadura rápida que minimiza problemas de balance y de incomodidad física.

Attachment of radio transmitters is always a serious consideration in field studies. A poorly attached transmitter can cause injury or death of the study subject within a short time; even if the subject does not die, its behavior can be altered to the point where the data collected on it are useless.

We have been using radio transmitters on small (<50 g) and medium-sized (50–200 g) birds for over a decade, and have employed a variety of attachment methods (Odom et al. 1982; Rappole et al. 1989, 1990; Winker et al. 1990). Initially, we used wing loop or neck loop harnesses, such as described by Nicholls and Warner (1968), Cochran (1980), and Mech (1983:44). We found that these methods caused two kinds of problems. First, they affected behavior of the bird. Observations showed that the bird seldom behaved as if it were not "aware" of the transmitter package, and the packages appeared to affect flight. Second, 10–15% of the birds were able to work a wing, a leg or the bill through a loop of the harness, generally causing complete immobilization.

Until recently, we found that the best attachment method to avoid these problems was that devised by Raim (1978). His method involves the following: 1) removal of feathers from the attachment area, 2) gluing a chiffon patch to the exposed area (using eyelash glue to avoid irritating

the skin), 3) tying a cotton patch to the transmitter and 4) gluing the two patches together.

This method works very well, particularly if the transmitter is placed over the synsacrum. Higher placements inhibit wing movement. When the transmitter is correctly placed, flight appears normal and the bird seldom appears to notice the transmitter. Also, there is never a problem with limb inhibition. Nevertheless, the method has drawbacks. First, it is not very suitable for use at the capture site. You almost have to bring the bird back to an enclosed place for processing. Second, it is time consuming. From time of capture to time of release, the process requires about an hour. Third, the method demands considerable handling of the bird, often weakening the captive. Fourth, it takes some time to perfect the art of holding the bird while applying the patches and allowing the glue to dry. Fifth, the transmitter will fall off in 2–3 wk. This last criticism can be a positive point, of course, depending on the type of study.

Though we have used Raim's (1978) method extensively, we have continued to search for ways to avoid the above-mentioned problems. We believe that the method presented below accomplishes this goal. The design involves a two-loop harness in the shape of a figure-8. The loops are made of catheter tubing, cotton or any other non-irritating ligature material. The ligature should be about 1 mm in diameter. A smaller diameter tubing can cause irritation.

The loops can be attached to the transmitter using epoxy, super glue or any other permanent cement; or they can be tied. We have had transmitters prepared according to our specifications by Dr. Dan Stoneburner of Custom Telemetry [1859 Industrial Drive, Watkinsville, GA 20677; (404)769-4024] with the tubing already attached as part of the transmitter.

The size of the loop depends on the size of the study species, and is a matter that should be decided with some experimentation. Loop size, as referred to hereafter, is the distance from the base of the transmitter to the end of the stretched loop. As a general rule, a Kentucky Warbler (*Oporornis formosus*) (12 g) would require a loop of 22 mm, a Wood Thrush (*Hylocichla mustelina*) (40 g) 29 mm, and a female Great-tailed Grackle (*Quiscalus mexicanus*) (100 g) 40 mm.

To place the transmitter on the bird, hold the bird firmly in the left hand, slide the right hand loop over the right foot, and pull the loop up as far as possible on the proximal end of the thigh. Now, grasp the bird in the right hand holding the transmitter over the synsacrum. Bend the bird's left leg at the tibiotarsal joint, slide the left loop over the joint, and pull the loop up to the proximal end of the left thigh. When properly placed and with loops of the proper size, the transmitter should ride over the feathers of the synsacrum with 1–2 mm of play (Fig. 1). If the transmitter is too snug, the bird will be unable to hop or walk. If it is too loose, the bird will quickly step out of it.

We have used the figure-8 design very successfully on several species, from warbler-sized to male grackle-sized birds (10–200 g). We believe that it will work well on most avian species that have long, external

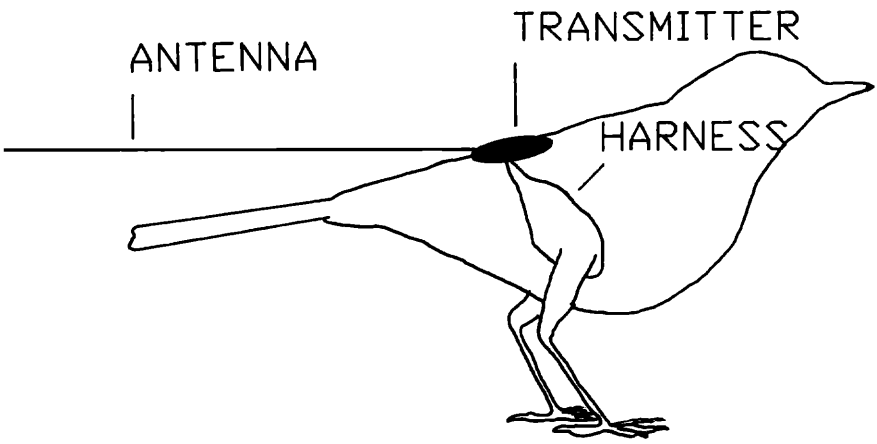

FIGURE 1. Lateral view of a bird showing placement of the figure-8 harness and transmitter.

thighs. We know that the design will not work on species, such as ducks and doves, that do not satisfy these requirements.

Once a person has determined the correct loop length for the study species, and developed some facility in handling the bird, a transmitter with figure-8 harness can be attached in a matter of seconds. The package rides over the synsacrum where disturbance to the bird is minimal.

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