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A METHOD FOR REPLACING TAIL-MOUNTED RADIO TRANSMITTERS ON BIRDS

JANICE A. REID, ROBERT B. HORN AND ERIC D. FORSMAN
U.S. Department of Agriculture, Forest Service
Pacific Northwest Research Station
3200 SW Jefferson Way
Corvallis, Oregon 97331 USA

Abstract.—A method of attaching radio transmitters to the tail feathers is described that permits easy removal and replacement of the transmitter without damaging the feathers. The transmitter is placed inside a piece of surgical tubing that is then epoxied to the tail feathers. Transmitter replacement is accomplished by slicing the tubing lengthwise, removing the old transmitter and inserting a new one.

MÉTODO PARA EL RECAMBIO DE RADIOTRANSMISORES EN TIMONERAS

Sinopsis.—Se describe un método para colocar radiotransmisores en las timoners que permite una fácil extracción y recambio del aparato sin dañar las plumas. El transmisor se introduce en un trozo de tubo quirúrgico que luego se pega con resina termoendurecible (epoxy) a las timoneras. La sustitución de los transmisores se realiza cortando el tubo longitudinalmente, sacando el transmisor antiguo e insertando uno nuevo.

As a result of concern that the harness method of attaching radio transmitters may influence survival or reproduction (Foster et al. 1992, Paton et al. 1991), many researchers are now using tail-mounted radio transmitters on Spotted Owls, *Strix occidentalis* (Guetterman et al. 1991, Kenward 1987). These transmitters typically weigh 5–6 g, and have a life expectancy of 9–13 mo. As Spotted Owls molt their rectrices only every 2 yr, it is often possible to obtain up to 2 yr of uninterrupted data by recapturing them and replacing their transmitters on a regular schedule. In this paper we describe a technique for attaching, removing, and replacing transmitters without damaging the rectrices. This technique should be applicable for any study where it is necessary to replace tail-mounted transmitters on a regular basis.

DESCRIPTION OF TECHNIQUE

We used Holohil Systems Ltd., Model RI-2C transmitters, but this technique is appropriate for any cylinder-shaped transmitter. The manufacturer provided small holes for attachment of string ties at the front and back of the transmitter body. Before attaching the string ties to the transmitter we moistened one end of the transmitter body and placed a tight-fitting piece of surgical tubing over the transmitter body. The tubing was cut so it was slightly shorter than the body of the transmitter (Fig 1). Two string ties (unwaxed dental floss) were then threaded through each of the two holes in the transmitter and fixed in place with a drop of epoxy in each hole.

Before installing the transmitter we applied a thin layer of Super Glue® to the portion of the surgical tubing that would eventually lay against the

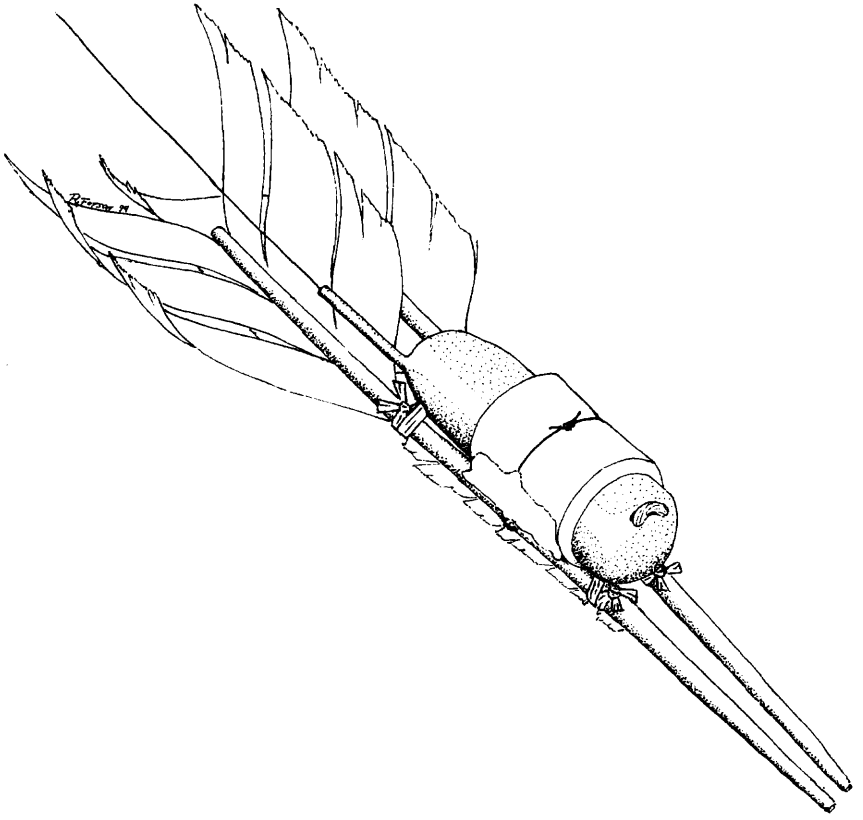

FIGURE 1. Attachment of radio transmitter to the central tail feathers. Transmitter is held in place by the string ties around each feather and by the surgical tubing that is glued to the feathers with 5-minute epoxy. Knots are secured with a drop of epoxy or Super Glue®. Antenna can be secured to the feather with string ties if desired.

rectrices (Fig. 1). This produced a rough surface on the tubing that would bond tightly to the 5-min epoxy used to glue the tubing to the feathers.

Transmitters were attached to the underside of the two central rectrices, as close as possible to the base of the feathers (about 8 mm from the skin) as described by Gutterman et al. (1991) and Kenward (1987) (Fig. 1). Rubbing alcohol was used to remove oil and dirt from the feather shafts to provide better adhesion of the epoxy. Care was taken to avoid bending or pulling on the rectrices, which can cause premature molt (Kenward 1985).

The first step in attaching the transmitter was to tie the strings on the front of the transmitter to the two central rectrices. Each pair of strings was wrapped once around the corresponding rectrix and secured with a double surgeon's knot (Fig. 1). Then, a layer of 5-min epoxy was applied

to the feather shafts and the underside of the surgical tubing. The tubing was then pushed against the feather shafts, forming a glue line between the feather shafts and the tubing. A single piece of string was then wrapped around both central rectrices and the transmitter and tied off to hold the transmitter securely against the feather shafts while the epoxy was setting and the posterior string ties were tied off around the rectrices (Fig. 1). All knots were sealed with a drop of Super Glue® or epoxy. Although not absolutely necessary, we sometimes used one or more additional pieces of string to tie the transmitter antenna to one of the rectrices to anchor the antenna more securely. Once the installation was complete we sprinkled a layer of talcum powder over the fresh epoxy to make sure that it did not stick to adjacent feathers.

To remove the transmitter and replace it with a new one, we used a sharp knife or scissors to slice the surgical tubing along its longitudinal axis and to cut through all knots. The transmitter was then gently pulled out of the tubing. There are two options for attaching a new transmitter. One is to apply a thin coat of epoxy to the inside of the old tubing, place a new transmitter into the tubing, and secure new string ties to the feathers. Another option is to trim off all of the old tubing except for the portion that is glued to the feathers and then epoxy and tie the new transmitter to the base of the old one. The latter method is preferable in cases where transmitters will be replaced more than one time as it allows the use of a new piece of surgical tubing each time.

RESULTS AND DISCUSSION

We installed radio transmitters on 125 juvenile Spotted Owls. Only six transmitters detached from the rectrices prematurely. Examination of the transmitters that fell off indicated that they did so because we used insufficient epoxy to form a firm bond with the feather or because we did not adequately cleanse the rectrices with alcohol before attachment, thus resulting in a weak bond between the epoxy and feathers. We successfully replaced transmitters on 38 different Spotted Owls. None of the replacement transmitters became detached. The only problem encountered was that in some cases owls either pulled out or prematurely molted their tail feathers. This problem occurred with 11 of 125 birds initially radio-marked and with six of 38 owls that had their transmitters replaced.

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LITERATURE CITED

FOSTER, C. C., E. D. FORSMAN, E. C. MESLOW, G. S. MILLER, J. A. REID, F. F. WAGNER, A. B. CAREY, AND J. B. LINT. 1992. Survival and reproduction of radio-marked adult spotted owls. J. Wildl. Manage. 56:91–95.

GUETTERMAN J. H., J. A. BURNS, J. A. REID, R. H. HORN, AND C. C. FOSTER. 1991. Radio

telemetry methods for studying spotted owls in the Pacific Northwest. U.S. Dept. Agr. For. Serv. Gen. Tech. Rep. PNW-GTR-272.

KENWARD, R. E. 1985. Raptor radio-tracking and telemetry. Int. Council Bird Preservation Tech. Bull. 5:409–420.

———. 1987. Wildlife radio tagging: equipment, field techniques and data analysis. Academic Press, London, U.K.

PATON, P. W. C., C. J. ZABEL, D. L. NEAL, G. N. STEGER, N. G. TILGHMAN, AND B. R. NOON. 1991. Effects of radio tags on spotted owls. J. Wildl. Manage. 55:617–622.

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