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Necklace Radio Transmitter Attachment For Pheasants

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We tested a pre-assembled, necklace-radio-transmitter-attachment design on female ring-necked pheasants (*Phasianus colchicus*) in northern Iowa. Birds were captured by nightlighting and bait trapping between September 1989 and March 1990. Radio transmitters were attached to 128 using a wire necklace. Two birds had problems adapting to the necklace, and 3 birds removed them. Twenty-three birds were still alive and wearing necklaces at the end of the study, for an average of 318 (SD = ± 52) days. Ease of attachment, long durability, light weight, and minimal bulk make the necklace an effective alternative to harness and poncho mounts.

INDEX DESCRIPTIONS: Attachment, Iowa, *Phasianus colchicus*, radio telemetry, research techniques.

The effect of harness-mounted radio packages on behavior and survival of gallinaceous birds was documented (Herzog 1979, Warner and Etter 1983, Hines and Zwickel 1985, Marks and Marks 1987, Marcstrom et al. 1989). Necklace-mounted radio packages, at 2-3% of body weight, showed greater utility than a backpack design for studies of ring-necked pheasant survival (Marcstrom et al. 1989). A poncho design (Armstrup 1980) was described for pheasants, but was more conspicuous and heavier than our necklace. Information on assembly, placement, and durability of the necklace is limited.

We captured and placed radio collars on hen pheasants in autumn and winter 1989-90. We report on the assembly, placement, and durability of a necklace radio-transmitter package that can be pre-assembled in the laboratory and later placed on female wild pheasants in the field.

METHODS

Radio transmitters, weighing about 11 g, were received from Holohil Systems Ltd., Woodlawn, Ontario, Canada with a lithium battery sealed inside moisture-resistant potting material. A 5-mm diameter copper ring exited and entered the potting material near the base of the antenna. Transmission life expectancy was 340 days.

Necklace harnesses were made by attaching both ends of a 15-cm-long, 18-kg-test, nylon coated, braided-steel wire (Berkley Steelon, Berkley, Spirit Lake, Iowa) to the copper ring on the transmitter package with 2 1-cm-long steel connector sleeves (size 3, 1.58 mm inside diameter, Berkley, Spirit Lake, Iowa) (Fig. 1). Neck-loop diameter was 3.5 cm; 1.5 cm on each end was used to secure the wire within the connector sleeve. Neck-loop size was determined from measurements obtained from the first 10 birds. Braided wire was covered with a 9.5-cm-long piece of clear Teflon tubing (0.8-mm i.d., Cole-Palmer Instrument Co., Chicago, Illinois) to reduce abrasion. Another 5-cm-long piece of clear shrink tube was used to secure the neck loop to the antenna base to cause the antenna to project over the back of the bird and to limit sideways movement. The necklace harness added <1 g to the package weight.

Hen pheasants were captured in northern Iowa by nightlighting (Labisky 1968) and bait trapping (Gates 1971) between September 1989 and March 1990. Radio transmitters were fitted to 128 hens using the wire necklace. Attachment time per necklace was <1 minute for 1 person. Each bird was monitored through August 1990, or until the bird died, transmission ceased, or the transmitter became separated from the bird.

RESULTS AND DISCUSSION

Necklace transmitters of 3 birds (2.5%) slipped over the head within an average of 96 days (SD = 35.3, n = 3) after release. Over-the-head transmitter loss is expected with a necklace system. Hens we radioed in autumn weighed between 300-1100 g at capture: 1 of the 3 overhead losses occurred on a bird weighing about 350 g. The other 2 birds weighed 905 g and 1050 g: why they lost the transmitter could

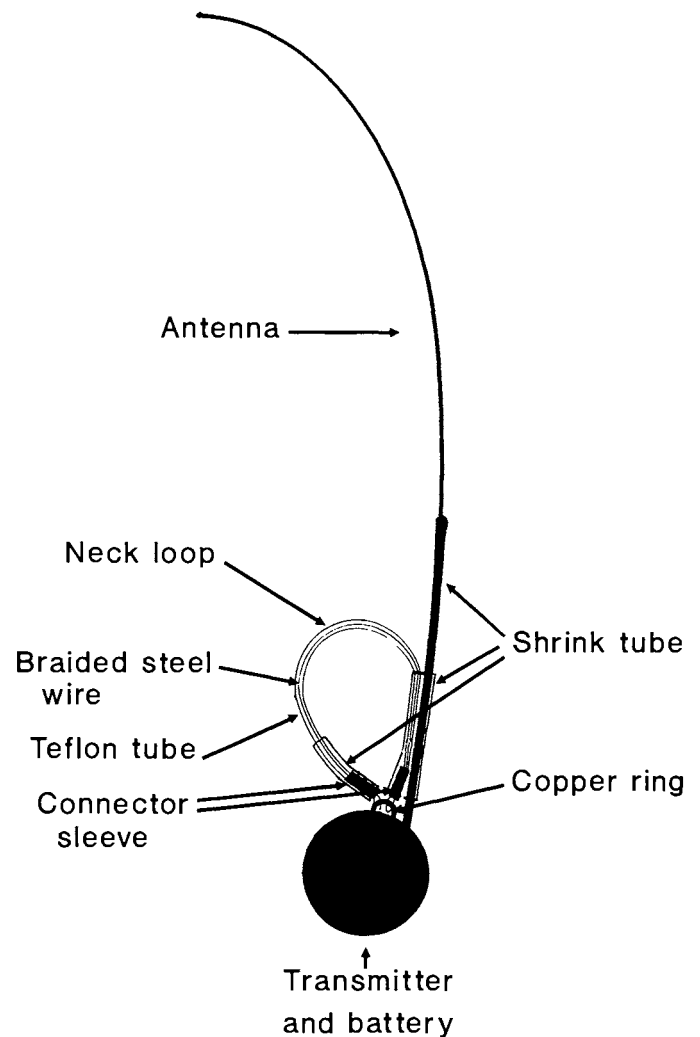


Fig. 1. Necklace radio-transmitter harness used for ring-necked pheasant.

not be determined.

The necklace failed on 30 birds (23%) where the braided wire exited the connector sleeve (farthest from the antenna) after an average of 188 days (SD = 69.2, n = 30). Normal movements apparently caused fatigue of the braided wire of the loop or weakened the crimp in the connector sleeve. This problem probably occurred because of friction

between the copper ring and the braided wire of the necklace or because the braided steel wire slipped out of the connector sleeve. Extending the braided steel wire from 15 cm to 16 cm and bending back the extra 1-cm portion along the outside of the connector sleeve should prevent the wire from slipping out of the sleeve. Placement of a 2-cm-long piece of shrink tube over the connector sleeve and a portion of the braided wire would reduce bending of the braided wire where it enters the connector sleeve.

Transmitters on 6 birds (5%) fell off when the copper ring that attaches to the neck loop broke after an average of 182 days ($SD = 44.1$, $n = 6$), apparently due to wear caused by friction between the copper ring and the braided wire of the neck loop. Covering of the copper ring with shrink tube during the manufacturing would correct the problem.

Death of 3 birds (2.5%) was caused by the necklace. One bird caught its leg in the harness and was unable to free the leg. Two birds were found dead within 8 days after release with severely abraded skin and muscle tissues under the necklace. Examination of recaptured birds showed no similar or other injuries related to the transmitter package.

Transmitters on 22 birds (17%) failed or were unrecoverable. Forty-one transmitters (32%) with necklace harnesses intact were recovered from birds that were killed by predators, illegal hunting, or vehicle collisions. The transmitters were still working on 23 live birds (18%) at the end of the study after an average of 318 days ($SD = 51.8$, $n = 23$).

CONCLUSION

Necklace radio-transmitter harnesses for ring-necked pheasants provided greater utility in previous studies than other designs (Marcstrom et al. 1989). We showed that pre-assembled necklace harnesses placed on ring-necked pheasant hens by 1 person in the field in <1 minute are durable for up to an average of 318 days with little to no effect on hen survival.

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