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Bartel T. Slauch
Brigham Young University

Jerran T. Flinders
Brigham Young University

Jay A. Roberson
Utah Division of Wildlife Resources, Salt Lake City

M. Ray Olson
Utah Division of Wildlife Resources, Springville, Utah

N. Paul Johnston
Brigham Young University

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RADIO TRANSMITTER ATTACHMENT FOR CHUKARS

Bartel T. Slauch¹, Jerran T. Flinders¹, Jay A. Roberson²,
M. Ray Olson³, and N. Paul Johnston⁴

ABSTRACT.—Thirty-seven chukars (*Alectoris chukar*), fitted with conventional poncho-type radio transmitters, were released on Antelope Island in Utah's Great Salt Lake. Twenty-seven removed their radios, averaging three days after release. The remaining 10 died from predation (average 15 days). Twenty-two chukars with pleated and six with harness ponchos were then released. Five of the pleated ponchos were removed (average four days), and 17 resulted in mortality (average two days). All six harness poncho-equipped birds were dead the following day. A consequential laboratory study comparing various attachment methods (conventional, pleated, harness, and "irreversible" flange poncho vs. bellystrap and wingstrap backpack) favored the wingstrap backpack. The effectiveness of 30 conventional ponchos and 30 wingstrap backpacks was compared on game farm chukars. Twenty-nine removed their ponchos within one day. One remained attached throughout the 30-day trial. All of the wingstrap backpacks remained attached with no apparent problems.

The poncho method of radio transmitter attachment has been used successfully for ruffed grouse (*Bonasa umbellus*) (Small and Rusch 1985) and ring-necked pheasants (*Phasianus colchicus*) (Hill and Robertson 1988). Although a certain method of attachment is compatible with one species, it may not work well for another. This has been shown to be true with various species of waterfowl (Joel D. Huener, personal communication).

The objective of this study was to compare poncho vs. backpack radio transmitter attachment for chukars (*Alectoris chukar*).

STUDY SITES

Field observations were of chukars released on Antelope Island in Utah's Great Salt Lake. Laboratory trials were conducted in 45 cm high × 75 cm wide × 90 cm long wire cages at the Brigham Young University avian research laboratory in Provo, Utah. Game farm chukars were housed in a 30 × 30-m run at the Utah Division of Wildlife Resources game farm in Springville, Utah.

MATERIALS AND METHODS

Thirty-seven chukars were fitted with 30-g radio transmitters using the conventional poncho attachment method (Fig. 1). They

were released on Antelope Island 25 August 1988. After six days 28 radios were recovered. Twenty-two radios were then attached to chukars using the pleated poncho (Fig. 1) and six using the harness poncho method (Fig. 1); all birds were released 1 September 1988. Failure of each attachment method promoted a small-scale study comparing conventional, pleated, harness, and "irreversible" flange ponchos (Fig. 1) with bellystrap and wingstrap backpacks (Fig. 2) using simulated radio transmitters.

Simulated poncho radio transmitters were constructed from 50 × 70 mm pieces of Lama-lite. A 7/16-inch (11.1-mm) hexagonal nut was attached to the lower part (8 mm from the bottom and 16 mm from either side) of each poncho using 20-gauge soft galvanized wire. A 30-cm-long piece of picture-hanging wire was attached to the left front of each poncho using two 3/8-inch (9.5-mm) hog rings. A 24-mm-diameter hole was cut in the upper half (13 mm from the top and either side) of each conventional, harness, and pleated poncho. A 15-mm-long piece of 16-gauge rebar tie wire was folded and then attached with two hog rings to the lower right front of each conventional poncho to help offset the weight of the antenna and to make the total weight equal to that of the wingstrap backpack (26 g). An 18-mm-diameter hole was cut in the "irreversible" flange poncho. Eight 3-mm slits

¹Department of Botany and Range Science, Brigham Young University, Provo, Utah 84602.

²Utah Division of Wildlife Resources, 1596 West North Temple, Salt Lake City, Utah 84116.

³Utah Division of Wildlife Resources, 1000 North Main, Springville, Utah 84663.

⁴Department of Animal Science, Brigham Young University, Provo, Utah 84602.

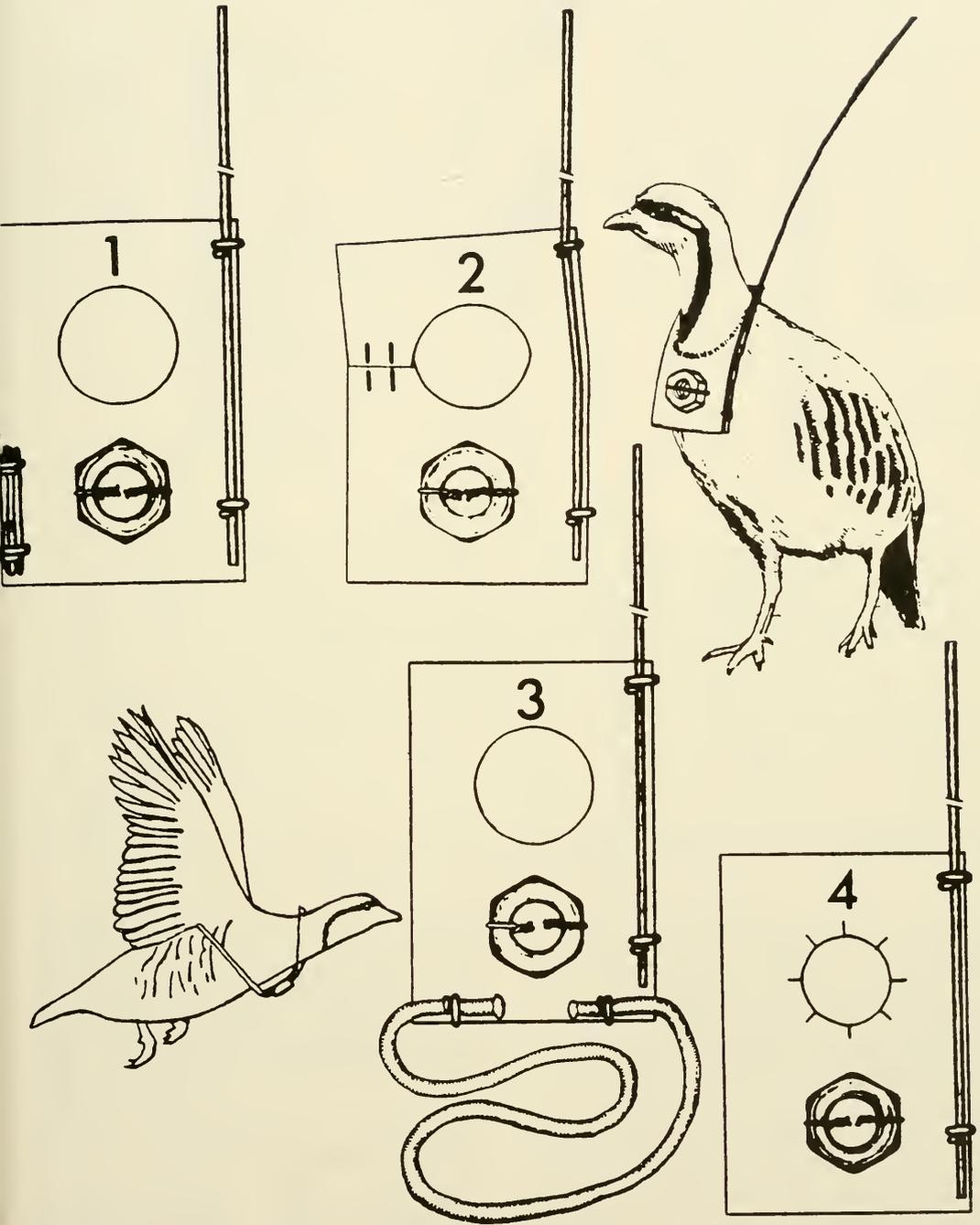


Fig. 1. Poncho attachment of simulated radio transmitters: 1, conventional; 2, pleated; 3, harness; and 4, "irreversible" flange.

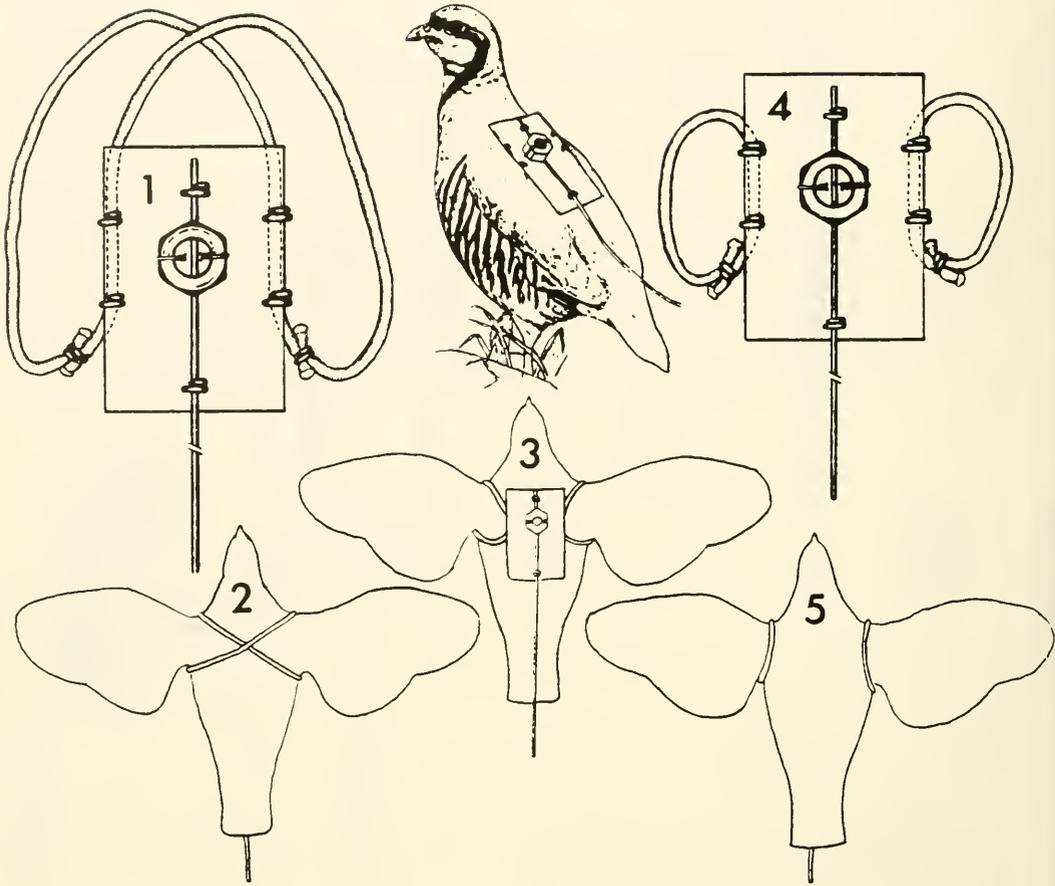


Fig. 2. Backpack attachment of simulated radio transmitters: 1, bellystrap; 2, bellystrap (ventral view); 3, bellystrap or wingstrap (dorsal view); 4, wingstrap; 5, wingstrap (ventral view).

were made to allow the hole to open to 24 mm diameter. A 25-mm-long piece of 3-mm-diameter nylon rope was attached along the bottom of the harness poncho. The rope was looped around the back behind the wings of the bird. The pleated poncho was folded and stapled on the right of the neck hole to reduce the diameter to approximately 20 mm.

Simulated backpack radio transmitters were constructed from 50×70 -mm pieces of Lam-a-lite. (The backpack design was intended to test the feasibility of attaching poncho radio transmitters as backpacks. A normal backpack attachment would not be as wide.) A 7/16-inch (11.1-mm) hexagonal nut was attached 20 mm from the bottom and 16 mm from each side. A 30-cm-long piece of picture-hanging wire was attached to the center of the front of the

Lam-a-lite with two 3/8-inch (9.5-mm) hog rings. A 25-cm-long piece of 3-mm-diameter nylon rope was attached along each side of the bellystrap backpack. The anterior end of the rope on the left side passed under the belly of the bird and attached to the posterior end of the rope on the right side. The anterior end of the rope on the right side passed under the belly and attached to the posterior end of the rope on the left side. The ends were connected using hog rings. A 15-cm-long piece of 3-mm-diameter nylon rope was attached along each side of the wingstrap backpacks using two hog rings. The ropes were looped around the birds' wings and then connected using hog rings.

Picture-hanging wire was not a good choice to simulate antenna wire since, after being

TABLE 1. Effectiveness of radio transmitter attachment methods on chukars.

Location	Radio transmitter attachment method	Number of birds with radios attached	Number of radios recovered	Recovery condition	Average number of days on bird
Field	Conventional poncho	37	27	off bird	3
			10	mortality	15
	Pleated poncho	22	5	off bird	4
Field	Pleated poncho	22	17	mortality	2
			6	0	off bird
	Harness poncho	6	6	mortality	1
Lab	Conventional poncho	2	2	off bird	0
	"Irreversible" flange poncho	2	2	off bird	1 ^a
	Harness poncho	2	2	fatigued	1 ^a
	Pleated poncho	2	2	fatigued	1 ^a
	Bellystrap backpack	2	2	off bird	0
	Wingstrap backpack	2	2	good	14 ^b
Game farm	Conventional poncho	30	29	off bird	0
			1	good	30 ^c
	Wingstrap backpack	30	30	good	30 ^c

^aTransmitters were removed to prevent further injury.

^b14-day trial

^c30-day trial

bent, it did not return to a straight position. To prevent irritation to the birds, each "antenna" was cut to a length of 15 cm.

Two "radios" of each attachment method were tested for a 14-day period at the Brigham Young University avian research laboratory. Since the wingstrap backpack seemed the most compatible with chukars, a larger study was conducted at the Utah Division of Wildlife Resources game farm to confirm the results of the laboratory trial.

Thirty conventional poncho-type transmitters and 30 wingstrap backpack simulated radio transmitters were fitted to game farm chukars. Although the poncho attachment was not permanent, it was selected for comparison with the wingstrap backpack because it did not result in injury to the birds. For 30 days the birds were monitored to evaluate permanence of attachment, flight ability, and feather wear.

RESULTS AND DISCUSSION

Several of the conventional poncho-equipped chukars released on Antelope Island flew for a short distance, struck the antenna with a wing, and then fell to the ground. Others flew well and landed, then began to flip in the air in attempts to remove the radios. Those that were unsuccessful lay for awhile in an exhausted state before trying

again. Of the 37 radio-equipped birds (Table 1), 27 removed the radios in an average of three days. The remaining 10 were killed at an average of 10 days following release, quite probably because their fatigued condition made them easy prey.

Of the 22 chukars fitted with pleated ponchos, five were able to remove their radios (average four days). Seventeen were killed or found dead (average two days postrelease). Many had injuries around the neck area, apparently from trying to remove the radios. All of the six harness poncho birds were found dead after one day.

During the laboratory trial, the conventional ponchos, "irreversible" flange ponchos, and bellystrap backpacks were easily removed by the birds within a few minutes following attachment. The pleated and harness ponchos were removed by the researcher after one day because the birds were exhausted and/or injuring themselves. The wingstrap backpack attachment worked well during the 14-day trial with no apparent irritation to the birds.

In the game farm trial, 27 of the birds freed themselves from the ponchos within a few minutes of their attachment. Two more were off by the next morning; only one remained attached for the duration of the trial. All of the wingstrap backpacks remained attached with no indication of irritation to the birds. Flight ability seemed to be unimpaired. Several of

the chukars, whose "radios" fit too loosely, showed signs of minor feather wear around the wings.

The results of these studies indicate that chukars are intolerant of attachment to their ventral side. Although the poncho attachment is compatible with other species, the wing-strap backpack appears to be better for chukars. For species on which radio attachment has not been studied, a laboratory trial, preliminary to field study, would be a good precaution.

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