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RECAPTURING RADIO-TAGGED RUFFED GROUSE BY NIGHTLIGHTING AND SNOW-BURROW NETTING

This paper describes two new techniques for capturing ruffed grouse (*Bonasa umbellus*). Use of these and several established methods makes capture of radio-tagged grouse possible throughout the year.

From April 1969 to May 1973, three telemetry studies of ruffed grouse were conducted at the Cedar Creek Natural History Area in Anoka and Isanti counties, southeastern Minnesota. One goal was to monitor individual, radio-tagged grouse for periods longer than the three-month normal battery life, which required recapture for replacement of batteries. Three known techniques used for recapturing grouse were baited funnel (lily-pad) and mirror traps (Gullion, J. Wildl. Manage. 29[1]:109–116, 1965) and nest traps (Weller, J. Wildl. Manage. 21[4]:456–458, 1957, Coulter, Bird-Banding 29[4]:236–241, 1958). These methods did not work well for grouse in summer (June–September) and winter (January–March) periods. Therefore, two additional methods to capture grouse—nightlighting and snow-burrow netting—were developed. By combining these 5 techniques, we caught 165 individual ruffed grouse a total of 325 times and were able to record 9,917 grouse-days of telemetry data.

CAPTURE BY NIGHTLIGHTING

Nightlighting has been used successfully to capture various animal species (Labisky, Illinois Nat. Hist. Surv. Biol. Notes 62, 1968). This paper reports the first known successful use of nightlighting to capture and recapture ruffed grouse.

A five-man nightlighting crew was found to be most successful. Equipment for the crew included two battery-powered, back-

pack-mounted spotlights, five hand-held flashlights or head-mounted miner's lights, two dip nets, and one portable radio receiver. Each backpack assembly consisted of a 12-V, 12-ampere-hour motorcycle battery encased in a wooden box and bolted to an inexpensive backpack frame. A 100-watt, 100,000-footcandle, aircraft landing light was mounted in a spotlight frame and connected to the battery via a 1-m coiled cable. Each backpack unit (battery, frame, and spotlight) cost approximately \$30.00, weighed 6.6 kg, and had an effective life of 35–45 minutes. Homemade dip nets were used to net grouse. Each net had a 60-cm diameter hoop, a 1.2-cm knotless nylon mesh bag, and a 2-m-long handle.

The equipment distribution was as follows: each man carried a hand-held or head-mounted light, two members carried backpack-mounted spotlights, two others carried dip nets, and the fifth person carried the radio receiver.

After the radio-tagged grouse had roosted for the night, its location was determined by triangulation, and the nightlighting crew moved to a point approximately 100 m from the bird. The receiver operator then located the grouse, after which one spotlight carrier and one netter were positioned on each side of the operator. The spotlights were turned on and crew members searched for the roosted bird. Care was taken not to silhouette crew members with the lights because this flushed grouse prematurely. Once the bird was located, spotlights were positioned on both sides of it and a netting attempt was made. When dense vegetation at an arboreal roost prevented capture, the netter would try to knock the bird off balance. Grouse so dislodged appeared

disoriented in their attempt to flush. This behavior was noted most often under a dense canopy of leaves on overcast nights. However, even under these ideal conditions, grouse seldom appeared completely disoriented by the spotlights as occurs with some other wildlife species.

If a netting attempt failed and the bird flew, the receiver operator relocated the bird and the capture attempt was repeated. The average flight distance during night-lighting attempts for 69 flushes was 147 m (range 2 to 458, all seasons included, original and reflushes combined).

This technique was used during all seasons to recapture radio-tagged grouse, but was most successful during the late spring, summer, and fall periods (Fig. 1). Night-lighting was attempted on 55 radio-tagged grouse, and 39 were recaptured (71 percent success). Most success occurred from 1 May to 20 August 1971, when 11 consecutive recapture attempts produced 11 grouse.

Of the 39 recaptures made by night-lighting, 35 percent were made at or near the original roost site, 41 percent after the 1st flush, 14 percent after the 2nd flush, 5 percent after the 3rd flush, and 5 percent after the 4th flush. The importance of relocating the bird is readily apparent since 65 percent of all recaptures were made after the first attempt failed. Ruffed grouse usually landed on the ground after the initial flush from the roost and this behavior made them more vulnerable to recapture. Average recapture time from triangulation to capture was just under one hour.

Nightlighting as a technique for capturing non-radio-tagged ruffed grouse was tested on four nights during summer and early fall. Fourteen birds were flushed and none was captured. The use of trained pointing dogs on two of these occasions did not increase success. During night-lighting attempts on radio-tagged grouse,

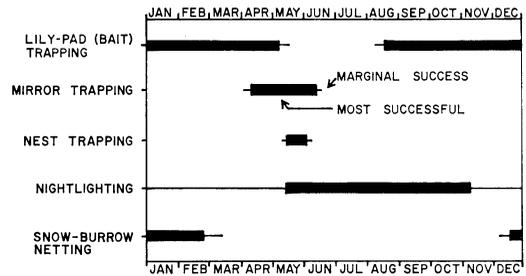


Fig. 1. Effectiveness of five methods for capturing or recapturing ruffed grouse related to time of year. Data for all methods are based on our experience at Cedar Creek; data for lily-pad and mirror trapping also were drawn from personal communication with G. Gullion.

59 unmarked grouse were seen or heard flushing. Of these, 7 were captured (12 percent success) because they were within several meters of marked grouse. Additional field work may refine the nightlighting technique for capture of non-radio-tagged grouse, but it cannot be recommended at this time.

Only 1 of the 46 birds captured by nightlighting (39 radio-tagged, 7 unmarked) was seriously injured and died. Other grouse suffered only slight feather loss.

CAPTURE FROM SNOW BURROWS

During the winter when the depth of soft powder snow exceeds 20 cm, ruffed grouse commonly burrow in the snow to roost. During this period the recapture of radio-marked grouse was accomplished by netting during daylight hours. Lily-pad trapping also has been used during the winter period (Fig. 1), but snow-burrow netting is specific for each radio-tagged bird and eliminates abnormal behavior associated with bait sites.

The location of the bird was plotted by triangulation and a two-man crew then moved to a point near the roosted bird. One member carried a radio receiver and the other carried the snow-capture net. The

receiver operator located the radio-tagged grouse and both members searched for the plunge hole where the bird entered the snow to roost. When this was located, the netter would approach and bring the net down forcefully over the estimated location of the roosted bird. Some grouse would flush from the burrow immediately, whereas others would delay for several seconds.

A 60-cm diameter dip net was used successfully to recapture 4 radio-marked grouse, but the specially-built snow-capture net was preferred. This net had a 1.3 m square frame with a 2.6-m-long handle. Both were made of electrical conduit (1.2- and 1.9-cm diameter, respectively). A 1.2-cm knotless nylon net was stretched tightly over the frame (Nichols Net and Twine Co., E. St. Louis, Ill.). The total net weighed 4.8 kg and material cost was approximately \$5.50.

The snow-capture net was used to capture 4 radio-tagged grouse in 7 attempts (57 percent success). The average time for capture was 30 minutes. We feel that this capture method has greater potential than the current sample size indicates.

The snow-capture net also was used successfully to capture unmarked grouse observed leaving known feeding sites to burrow-roost. The bird was allowed to roost for two or three hours to reduce the risk of wild flushes. A snow-burrow netting attempt was made similar to that described for radio-marked grouse. Seven unmarked grouse were captured in 31 attempts (23 percent success). Average time per capture was 45 minutes. Although snow-burrow capture of unmarked grouse was not highly successful on a percentage basis, the short time required to capture a bird makes it a practical technique.

The density of vegetation near the snow burrow was perhaps the major factor determining success or failure of a particular netting attempt. Dense cover increased noise, reduced the visibility of plunge holes, and prevented proper placement of the net at the roost site. Also, once the netter had determined the avenue of approach to the snow-burrow, a steady pace was found to be most successful to approach within the 2- to 4-m distance required for netting.

Use of the two new capture methods described in this paper, in combination with lily-pad trapping, mirror trapping, and nest trapping, may better enable the field researcher to maintain individual, radio-tagged grouse for long-term telemetry studies. These new techniques also will be helpful to short-term studies where animals should be recaptured at the end of the data period to determine their general physical condition and to remove transmitters.

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