

- MINOCK, M. E. 1980. Some relationships between Common Grackles and Yellow-headed Blackbirds nesting in the same marsh. *Passenger Pigeon* 42:125-127.
- ORIAN, G. H. 1980. Some adaptations of marsh-nesting blackbirds. Princeton Univ. Press, Princeton, NJ.
- , AND M. F. WILLSON. 1964. Interspecific territories of birds. *Ecology* 45:736-745.
- SIEGEL, S. 1956. *Nonparametric statistics for the behavioral sciences*. McGraw-Hill, New York.
- VOIGHTS, D. K. 1973. Food niche overlap of two Iowa marsh icterids. *Condor* 75:392-399.
- WELLER, M. W., AND C. S. SPATCHER. 1965. Role of habitat in the distribution and abundance of marsh birds. Iowa State Univ. Agr. and Home Econ. Exp. Stat., Spec. Rep. No. 43.
- WILLSON, M. F. 1966. Breeding ecology of the Yellow-headed Blackbird. *Ecol. Monogr.* 36.
- MICHAEL E. MINOCK, *University of Wisconsin Center-Fox Valley, Midway Road, Menasha, Wisconsin 54952*, and JOHN R. WATSON, *477 Victoria Drive, Ft. Collins, Colorado 80525*. Received 20 May 1982; accepted 19 Apr. 1983.

**A New Attachment Method for Patagial Tags.**—In 1976 and 1977, as a part of an ecological study of the Common Raven (*Corvus corax*) in southeastern Oregon (Stiehl 1978), I needed a tag that would: (1) allow identification of individual birds up to a distance of 400 m; (2) be durable in the event that follow-up study of the population was desired; and (3) have a method of attachment which did not require special materials. To meet these needs, I developed a method of attachment which proved to be quite satisfactory for ravens, and used readily available materials.

*Tag design.*—Plastic-coated nylon fabric (trademarks "Safflag," Safety Flag Co. of America, Pawtucket, RI, and "Herculite," Herculite Protective Fabrics Corp., Newark, NJ) was cut into a dumbbell shape approximately 20 × 10 cm after Southern (1971). Two reinforcement eyelets (Textron Inc., New York, NY) crimped to the fabric 5 cm apart reduced tearing of the tag.

*Attachment.*—I attached tags as an assistant held a bird and extended its wing. The patagium was pierced with a small bore leather punch about 2 cm behind the webcord (similar to the "slit" described by Hester (1963)). The tag was wrapped around the leading edge of the wing. Reinforcement eyelets were aligned with the hole in the patagium and the tag attached with a 3 mm diameter × 19 mm aluminum "pop rivet" with a pair of 3 mm aluminum "back-up plates" (USM Corp.) (Fig. 1). A 19 mm "pop rivet" has a minimum compressed length of about 8 mm, which is greater than the thickness of the patagium. The tissue, therefore, is not damaged when the rivet is compressed. The total weight of one patagial tag and rivet was 7.36 g. Both patagia could be marked, and the bird banded with a U.S. Fish and Wildlife Service leg band in 2 or 3 min. Using various color combinations, birds were marked for individual identification by marking either one or both wings. The tags allowed identification of both flying and perched birds up to 400 m with a spotting scope (Fig. 2). I found the use of easily available materials such as "pop rivets" to be a great advantage in this field investigation, as a supply of rivets was generally available, even in a remote location.

*Effects of marking on birds and tag durability.*—I marked 266 adult, nesting, or fledgling Common Ravens during 1976 and 1977 and observed no apparent behavioral or physical stress in the marked birds. In two birds, a small blood vessel was severed during tag attachment, but bleeding was slight and stopped within 1 min. Adults flew readily and without observable difficulty immediately after being tagged. Birds usually stretched and preened the marked wing when they first perched. Nestlings (30 to 35 days post-hatching) likewise appeared unaffected by the marking. Repeated observations of both marked and unmarked nestlings revealed no difference in fledging age or typical behaviors.

Not only was immediate flight unimpaired, but the tags did not appear to affect long distance flight capability. One bird was seen 100 km from the study area 3 days after

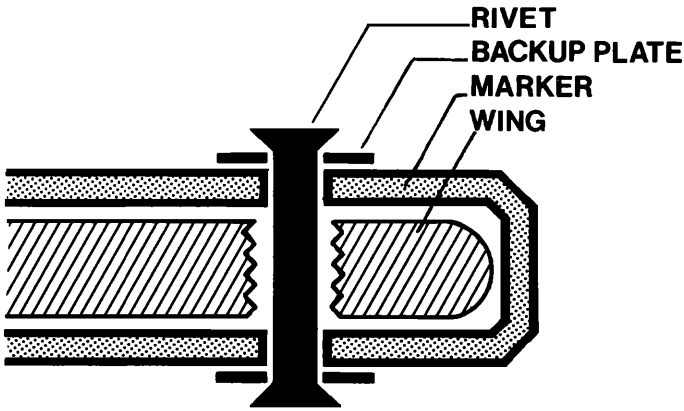


FIGURE 1. Diagram showing method of tag attachment.

marking. Another was seen 450 km from the study area 5 months after marking and 6 others have been seen over 240 km from the study area within 1 year of the marking date.

Although no quantitative data were gathered to determine a rate of tag loss, the marking procedure apparently resulted in durable tag attachment. Over 400 sightings were made of marked birds during the study period with several individuals observed up to 25 times. Within 1 year after marking, 238 (89%) of the tagged birds were observed



FIGURE 2. Appearance of a tagged bird illustrating size, placement and visibility of the tags.

and some of the ravens marked in 1976 still had patagial tags in 1982 (L. Nicholas, pers. comm.).

One individual was recaptured 11 months after it had been marked. The color of the tag (Saflag) was slightly faded, but could be easily identified, thereby contradicting the conclusions of Nesbitt (1979) that the original color of Saflag is lost after weathering for one year. The marginal coverts under the tag were worn, but flight appeared normal and behavior was typical for an adult raven. The patagial puncture had healed well and I observed no infection.

"Pop rivet" fasteners for patagial tags provide an easy and reliable method of marking large birds using readily available supplies. A similar method of tag attachment has been used for Black Vultures (*Coragyps atratus*) with good success (J. Jackson, pers. comm.). My method requires an assistant to hold the bird during tag application. No adverse effects due to marking have been observed. Marked birds have been seen at considerable distances from the marking site, displayed "typical" flight characteristics, and have been observed with tags up to 6 years after being marked. The longevity of markers attached in this manner is perhaps only limited by the durability of the fabric used.

#### LITERATURE CITED

- HESTER, A. E. 1963. A plastic wing tag for individual identification of Passerine birds. *Bird-Banding* 34:213-217.
- NESBITT, S. A. 1979. An evaluation of four wildlife marking materials. *Bird-Banding* 50: 159.
- SOUTHERN, W. E. 1971. Evaluation of a plastic wing-marker for gull studies. *Bird-Banding* 42:88-91.
- STIEHL, R. B. 1978. Aspects of the ecology of the Common Raven in Harney Basin, Oregon. Ph.D. dissertation, Portland State University, Portland, Oregon.
- RICHARD B. STIEHL.—*College of Environmental Sciences, University of Wisconsin-Green Bay, Green Bay, Wisconsin 54302*. Received 8 Feb. 1982; accepted 5 Oct. 1982.

**Live Northern Harrier Entrapped in Ice.**—On 16 January 1982, at 1400 in Calhoun County, Illinois, we found a live, second-year female Northern Harrier (*Circus cyaneus*) with its right foot firmly entrapped in ice. The leg was covered with ice to 1.5 cm above the toes on the tarsometatarsus. The harrier was located approximately 1 m below level ground on the bank of a drainage ditch next to a small secondary road. We carefully removed the bird and took it to Western Illinois University in Macomb for observation.

The right tarsometatarsal region was inflamed, probably due to the bird's repeated attempts to free itself from the ice. After 1 week the foot appeared normal and the harrier did not noticeably favor its leg. On 9 February 1982 we released the bird.

A likely explanation for this incident was the combination of weather conditions the previous evening that included 1.5 cm of rain, high winds gusting to 32 km per hour, and a drop in temperature from 0°C to -23°C. On the evening of 15 January the harrier probably roosted on the bank of the drainage ditch to escape the severe wind and rain. At first the rain melted the existing snow cover and then the rapid drop in temperature froze the slush and entrapped the bird.

We were unable to find any literature pertaining to similar occurrences for this species, and found very little literature pertaining to similar occurrences for other terrestrial birds. However, there have been numerous reports of aquatic birds in such a predicament. As far as we can determine, this is the first recorded instance of a live Northern Harrier entrapped in ice.

R. GIVEN HARPER and THOMAS C. DUNSTAN, *Department of Biological Sciences, Western Illinois University, Macomb, Illinois 61455*. Received 7 Oct. 1982; accepted 11 Mar. 1983.