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A Technique to Mark Incubating Birds.—In a study of the movement patterns of Cattle Egrets (*Bubulcus ibis*), we desired a marking technique that would minimize disturbance to the nesting colony and at the same time mark a large number of incubating adult egrets. The primary focus of our study was monitoring egret movements over an adjacent airport runway, where the birds posed a serious air-strike hazard. Seigfried (Trans. Roy. Soc. S. Afr. 39:420, 1971) placed "rain spray" sprinklers at the tops of roost trees and sprayed egrets with printers' ink using a motor-driven pump system. Although effective, this technique was too costly and labor intensive for our study.

We first attempted marking adult egrets by sprinkling Rhodamine B dye powder (E. I. duPont de Nemours & Co., Wilmington, Delaware) directly on egret eggs, a technique similar to one reported by Mossman (J. Wildl. Manage. 24:104, 1960). (Reference to trade names does not imply endorsement of commercial products by the federal government.) This method was unsuccessful in marking the adults, and only stained the outer surface of the eggs and nest. We then added the Rhodamine B powder to an oil-based silica gel (Vaseline would act as a similar medium). The dye to gel ratio we used was 1 cc of powdered dye dispersed in 10 cc of gel. We then placed 1 cc of the gel-dye mixture in the center of the upper surface of each egg in 16 clutches at the egret roost tree. Adults were off their nests for approximately 20 minutes as we applied the mixture to the clutches. Birds left the roost when we were within 20 m of the roost and returned to their nests 5 min after our departure. As the incubating birds preened their feathers to remove the sticky gel, the dye mixture spread over the ventral feather tract. The humidity in the air reacted with the dye mixture and stained the adult egrets' plumage. Birds marked with this technique retained purple feathers for 2–6 mo. With a spotting scope, stained birds were visible 200 m away.

This technique would probably be most effective with birds that have white or light colored plumage (e.g., larids, egrets). The primary advantage of this technique is that it allows researchers to mark large numbers of birds in a relatively short period of time without having to capture any birds. Although we did not autopsy egrets for traces of the dye, Rhodamine B is a systemic dye. Avian and mammalian consumption of food treated with the dye results in internal florescent marking of soft tissues (Evans and Griffith. J. Wildl. Manage. 37:73–81, 1973).

We made no attempt not to block the eggshell pores while using this technique, as another aspect of the study was investigating potential population control measures to minimize the air-stike hazard at the adjacent airport. None of the 16 clutches we applied

the gel-dye mixture to failed, but researchers interested in egg survival are cautioned that further experiments should be conducted to verify that the gel mixture does not adversely affect hatchability. We noted no instances of abnormal behavior in marked birds, although no intensive behavior observations were taken.—PETER W. C. PATON, *Department of Fishery and Wildlife Biology, Colorado State University, Fort Collins, Colorado 80523.* (Present address: *Redwood Science Lab, U.S. Forest Service, 1700 Bayview Dr., Arcata, California 95521.*) LARRY PANK, *Denver Wildlife Research Center, U.S. Fish and Wildlife Service, 101 12th St., Box 20, Fairbanks, Alaska 99701.* Received 16 Dec. 1985; accepted 4 Apr. 1986.

Brood Mortality Rates of Black-bellied Whistling-ducks in South Texas.—Mortality rates of ducklings are often used as estimates of waterfowl fledging success (Keith 1961, McGilvrey 1969, Reed 1975) and as an index to productivity (Grice and Rogers 1965, Hines and Mitchell 1983, Reed 1975, Smith and Hawkins 1948). I obtained mortality data for 10 Black-bellied Whistling-duck (*Dendrocygna autumnalis*) broods in south Texas as part of a broad study of brood ecology (Heins 1984).

The study was conducted at the Rob and Bessie Welder Wildlife Refuge (WWR) (1 brood), 12 km north of Sinton, San Patricio County, Texas, during July and August 1980; at the Frank Rooke Ranch (RR) (3 broods), which adjoins the WWR to the north in Refugio County, Texas, during September–November 1981; at Celanese Chemical Corporation (CCC) property (3 broods) in Corpus Christi, Nueces County, Texas, July–September 1981; and at Santa Ana National Wildlife Refuge (SA NWR) (3 broods), 12 km south of Alamo, Hidalgo County, Texas, in June 1981. All study wetlands were classified as the Persistent Emergent wetland type (Cowardin et al. 1979). They varied in size from 0.2 to 36 ha, and all had maximum water depths of about 1 m. Heins (1984) presents a detailed description of the vegetation at the study wetlands.

At the WWR, SA NWR, and CCC wetlands I observed broods from blinds positioned on the dikes of the ponds. At the RR study area I followed the movements of two female parents (both male and female Black-bellied Whistling-ducks attend their broods) fitted with backpack radio transmitters (Telonics Company, Mesa, Arizona) similar to those used by Dwyer (1972). After locating the radioed female, I observed the brood by either wading into the pond, or watching it from the shore or from a tree.

I identified individual broods either by the presence of a radioed parent, or by a combination of age-class and number of ducklings. Two broods were of known age, whereas I aged other broods using criteria developed by Cain (1970) and Gollop and Marshall (1954). Class I broods (n = 10) were neonates–3 wk, Class II broods (n = 7) were 3–7 wk, and Class III broods (n = 4) were 7–9 wk; fledging occurred between 59–63 d (Cain 1970).

The 10 broods in this study averaged 9.5 ducklings (Table 1). Bolen (1967) found an average of 9.9 ducklings for 53 broods of Black-bellied Whistling-ducks. No statistical comparison between these means is possible because they are based on different age classification systems.

Mean brood size ranged from 10.5 in age-class I to 8.7 in age-class III (Table 1). However, this decrease was not significant ($P > 0.25$; one-way ANOVA, GLM procedure for unbalanced data, SAS Institute, Inc. 1982). The non-significant decline in mean brood size may have been due to small sample sizes, as well as to the lack of independent samples because some of the same broods were counted in more than one age-class. Bolen's (1967) data showed a decrease (1.9 ducklings) in mean brood size after the first week of life, but an increase (1.5 ducklings) after the fourth week. However, he did no statistical test to determine if this change in mean brood size was significant.

The average of 9.5 ducklings per brood represents a loss of about four ducklings from an estimated mean clutch of 13.4 eggs per hen (Bolen 1967). Dump nesting is common among Black-bellied Whistling-ducks, but whether larger than normal clutch size affects duckling survival is unknown. Studies of Wood Ducks (*Aix sponsa*) (Heusmann 1972,