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Post-hatch brood amalgamation by Black-bellied Whistling-Ducks.—Post-hatch brood amalgamation (post-HBA) occurs when parents incubate and hatch their own young, but subsequently rear young of other individuals as well. The term also applies to cases in which young are reared by other adults as well as situations in which pairs cooperatively rear their broods together (Eadie et al. 1988, Afton 1993). Afton and Paulus (1992) reported that brood amalgamations have been described in 41 waterfowl species. Eadie et al. (1988) and Afton and Paulus (1992) grouped post-HBA into four categories: (1) *adoption,* a pair or single female accepting foster young into their own brood, (2) *creche* or *mixed brood,* a group of birds containing any number of adults (not necessarily related to the young) plus two or more young which are parentally unrelated, (3) *gang-brooding,* mated pairs or several different females with their associated broods joining together, and (4) *kidnapping,* a pair or dominate female which aggressively kidnaps young of a subordinate pair or female. However, no records of post-HBA in the tribe Dendrocygnini have been recorded (Afton and Paulus 1992). I report here the first occurrence of post-HBA in Black-bellied Whistling-Ducks (*Dendrocygna autumnalis*).

On 3 June 1987, I received 30 one-day-old Black-bellied Whistling-Duck ducklings obtained from a single nest by personnel of the Texas Dept. of Parks and Wildlife. Six ducklings died within the first 3 h of captivity. The ducklings were housed at the Caesar Kleberg Wildlife Research Institute's South Pasture Facility 10 km south of Kingsville, Texas. They were fed a mixture of chick starter and water ad libitum and were housed for two weeks in a brooder. Subsequently they were moved to a pen that was half indoors and half outdoors (4 m length × 2 m width × 2 m height). The outdoor half of the pen was enclosed with 2.54 cm chicken wire and an electric fence to prevent predation. Four ducklings escaped the outdoor pen through the chicken wire fence. The outdoor pen also contained a 151-L water tank for the birds.

During the growth and development of these ducklings, adult whistling-ducks regularly visited the pen. During the first 2 h of daylight, adults perched on top of 2.5-m fence poles leading out from the duckling housing facility. The adults vocalized, and the ducklings responded, presumably in response to the adult calls. After perching on the fence posts, the adult Black-bellied Whistling-Ducks would then fly to a 4-ha pond 300 m north of the duckling pen. The peak number of adults on the fence posts in the morning was 28. On at least five occasions, one pair of adults would perch on individual 2.5-m poles next to the duckling pen and stay throughout the day. When the adults were leaving the pond in the evening, up to eight would perch on the poles and vocalize. Vocalizations by adults and ducklings would occur while they were in visual proximity of one another and continue until 0.5 h of light remained in the day at which time the adults would leave toward the south.

The remaining 20 ducklings made their first attempt at flight on 8 July 1987 and were

subsequently released on the pond. The young birds swam to the middle of the pond, responding to the calls of the adults. The released ducklings were joined by four families from the surrounding brush and water edge. Each family consisted of two adults and consisted of five, seven, four, and three ducklings, respectively. The four naturally occurring and the one released broods amalgamated with two adults from one of the families. I assumed the adults to be a male and a female because previous research has shown that adults of both sexes tend to their young equally (Bolen 1971, 1979; McCamant and Bolen 1977; Rylander et al. 1980). The other adults joined the flock of Black-bellied Whistling-Ducks using the pond. Approximately 90 adult Black-bellied Whistling-Ducks spent each day on the 4-ha pond north of the ducklings' pen. The adults used the surrounding brush, trees, and water edges. The post-HBA was checked at least twice daily, 4 h after sunrise and 4 h before sunset, and when other time periods permitted. Observations of the brood lasted from 10–30 min. The post-HBA spent its time near the edges of the pond moving to the middle of the pond when there was potential danger. The adults not with the brood continued to return to and leave from the pond each day. A pair of adults and the brood remained intact for four weeks. At the end of the four weeks on the pond, the adults and brood joined up with the flock of Black-bellied Whistling-Ducks using the pond and began to participate in the daily movements.

My observation is the first post-HBA reported for Black-bellied Whistling-Ducks. The post-HBA is a combination of Eadie et al. (1988) and Afton and Paulus' (1992) category 2 of creche or mixed brood and category 1 for adoption. Additional observations are needed to determine the factors influencing post-HBA in Black-bellied Whistling-Ducks.

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LITERATURE CITED

AFTON, A. D. 1993. Post-hatch brood amalgamation in Lesser Scaup: female behavior and return rates, and duckling survival. Prairie Nat. 25:227–235.

——— AND S. L. PAULUS. 1992. Incubation and brood care. Pp. 62–108 *in* Ecology and management of breeding waterfowl (B. D. J. Batt, A. D. Afton, M. G. Anderson, C. D. Ankney, D. H. Johnson, J. A. Kadlec, and G. L. Krapu, eds.). Univ. Minnesota Press, Minneapolis, Minnesota.

BOLEN, E. G. 1971. Pair-bond tenure in the Black-bellied Tree Duck. J. Wildl. Manage. 35:385–388.

———. 1979. The Black-bellied Whistling Duck in south Texas: a review. Proc. Welder Symposium 1:175–185.

EADIE, J. MCA., F. P. KEHOE, AND T. D. NUDDS. 1988. Pre-hatch and post-hatch brood amalgamations in North American Anatidae: a review of hypotheses. Can. J. Zool. 66: 1709–1721.

MCCAMANT, R. E. AND E. G. BOLEN. 1977. Response of incubating Black-bellied Whistling-Ducks to loss of mates. Wilson Bull. 89:621.

RYLANDER, M. K., E. G. BOLEN, AND R. E. MCCAMANT. 1980. Evidence of incubation patches in whistling ducks. Southwestern Nat. 25:126–128.

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