

## Evidence of Double Brooding by Black-bellied Whistling-Ducks

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**ABSTRACT.**—We report the first observation of double brooding by Black-bellied Whistling-Ducks (*Dendrocygna autumnalis*). We monitored 151 nest boxes on the Rob and Bessie Welder Wildlife Refuge in south Texas during 1998 and 1999 and uniquely marked

all incubating pairs of Black-bellied Whistling-Ducks using these nesting structures. We color-banded a pair of Black-bellied Whistling-Ducks in May 1999 that was incubating a clutch of 21 eggs, from which 18 young eventually fledged. The same pair later incubated a second clutch of 15 eggs in July and August 1999, of which 12 hatched. Double brooding is apparently not a common reproductive strategy for Black-bellied Whistling-Ducks in south Texas, but could be facilitated through biparental investment in most aspects of reproduction, including incubation and brood rearing, and a relatively long potential breeding season in most of this species' breeding range. *Received 9 May 2011. Accepted 22 July 2011.*

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Black-bellied Whistling-Ducks (*Dendrocygna autumnalis*) typically raise one brood per breeding season, although they may renest if the first clutch is destroyed or their first brood is lost early in brood-rearing (Delnicki 1973). Currently, the Wood Duck (*Aix sponsa*) is the only North American duck species known to commonly raise two broods in a single nesting season (Haramis 1990). Double brooding has been documented less frequently in several other species of dabbling ducks including White-cheeked Pintail (*Anas bahamensis*) (Sorenson et al. 1992), American Black Duck (*A. rubripes*) (Benson and Foley 1962), and Mallard (*A. platyrhynchos*) (Olsen et al. 2003). The growing season in south Texas is >300 days (Tunnel 2002), and ample time may exist for Black-bellied Whistling-Ducks to produce two broods provided adequate habitat conditions are available. Johnson and Barlow (1971) possibly observed a pair of Black-bellied Whistling-Ducks with a second brood in the same breeding season, but the pair was not marked and the observation could not be confirmed. Other researchers that studied the breeding ecology of Black-bellied Whistling-Ducks found no evidence of double brooding (Bolen 1967, Delnicki 1973). Delnicki (1973) speculated that a female Black-bellied Whistling-Duck may be physiologically incapable of double brooding. Our observation is the first confirmed documentation of a Black-bellied Whistling-Duck successfully producing two broods in a single breeding season.

#### METHODS

We studied the reproductive ecology of Black-bellied Whistling-Ducks on the Rob and Bessie Welder Wildlife Refuge near Sinton, Texas in 1998 and 1999 (28° 07' N, 92° 22' W). We monitored nesting activity in 151 nest boxes at the refuge. We captured all incubating pairs of Black-bellied Whistling-Ducks in their nest box during late incubation during the 1998 and 1999 breeding seasons. We marked captured birds with an U.S. Geological Survey aluminum band on the right tarsus and a uniquely coded, plastic band on the left tarsus in accordance with U.S. Geological Survey (Permit #10360) and Texas A&M University—Kingsville Institutional Animal Care and Use Committee protocols (Approval #1-97-34).

#### OBSERVATIONS

We discovered a clutch of six eggs on 16 April 1999 in nest box A near a small windmill pond.

Seven days later on 23 April 1999, the clutch was being incubated and we left it undisturbed. We captured the female (WB49) on 18 May 1999 while she incubated 21 eggs. We captured her male mate (YB03) while incubating the clutch on 21 May 1999. We observed this pair of birds on 24 May in the nest box with young and the next morning 18 ducklings exited the nest box and were observed with the marked pair. Thirty-eight days later on 1 July 1999 we observed the marked pair with 13 fully-feathered ducklings on Paloma Tank, ~2.5 km from nest box A. We discovered a clutch of three eggs on 13 July 1999 in nest box B at Paloma Tank and on 20 July we flushed the same marked pair and 13 recently fledged Black-bellied Whistling-Ducks from the shoreline of Paloma Tank. The clutch in nest box B contained nine eggs on this visit (20 July). By 26 July, we discovered that female WB49 was incubating a second clutch of 15 eggs in nest box B. The male (YB03) and previously fledged young were not observed. We captured female WB49 on 10 August 1999 and male YB03 the next day while incubating the second clutch in nest box B. We revisited nest box B on 21 August 1999 and found 12 hatched and three unhatched eggs. Neither of the two broods was observed again.

#### DISCUSSION

We documented that Black-bellied Whistling-Ducks are capable of double brooding. This is a single observation, but there are several aspects of Black-bellied Whistling-Duck ecology that could increase the propensity for double brooding. First, their potential breeding season is long relative to other species of waterfowl because they breed primarily in subtropical and tropical regions. The growing season in south Texas is >300 days (Tunnel 2002), and a breeding season of this length provides ample opportunity to lay, incubate, and raise two clutches when habitat conditions are favorable. Second, both males and females share in incubation and brood-rearing duties (James and Thompson 2001). Biparental care in these aspects of reproduction may allow females to maintain a positive nutrient/energy balance throughout nesting and brood rearing, reducing the time between fledging their first ducklings and laying the second clutch. Black-bellied Whistling-Ducks may also rely largely on exogenous versus endogenous nutrients for egg production, as these birds will readily feed on high-energy waste grains at stock yards, grain mills, and sorghum fields during the

breeding season (Bolen 1967; JDJ, pers. obs.). This may enhance the ability of some females to meet the high nutrient demands of producing two clutches and rearing these young.

Similar to geese, Black-bellied Whistling-Ducks often remain in family groups through late summer after young are fledged (Bolen 1967), and possibly through the first winter (Cottam and Glazner 1959). How double-brooding behavior affects family group dynamics and other life history strategies of this species remains unknown. Further understanding reproductive strategies, including the advantages of biparental incubation and brood rearing and the role of nutrient reserves in reproduction, are avenues for future research in this species.

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