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GENERAL NOTES

Parental Desertion of Nestlings by White Ibis (*Eudocimus albus*) in Response to Muscle Biopsy.—Electrophoretic identification of allozymes has become an important tool in the study of avian genetic variability (Barrowclough et al. 1985) and mating systems (Mock 1983). Accurate electrophoretic studies require tissues with large numbers of polymorphic loci, and the inability to obtain such tissues has been crucial to the results of some studies (Frederick 1985, Mumme et al. 1985). Muscle usually contains large numbers of polymorphic loci and can be sampled by biopsy in the field without sacrificing subjects (Baker 1981). Thus, the use of muscle biopsy could allow accurate studies of parentage and genetic variability in many species of birds.

If subjects are to be observed after biopsy, subsequent behavior and survival must be unaffected. Baker (1981) found no obvious detrimental effects in three species of passerines. Similarly, Westneat (1986) and Westneat et al. (1986) have shown no detrimental effects of muscle biopsies on the body condition or survival of wintering White-throated Sparrows (*Zonotrichia albicollis*) or breeding Indigo Buntings (*Passerina cyanea*). In contrast, this report documents nestling abandonment by adult White Ibis following muscle biopsy by a similar technique.

As part of a larger study of the breeding behavior of White Ibis (Frederick 1985) I conducted an electrophoretic study of parentage in White Ibis in 1984 on Pumpkinseed Island in Winyah Bay, Georgetown Co., South Carolina. A complete description of the study site and trapping techniques can be found in Frederick (1985). I trapped adults on their nests in walk-in traps 2–7 d after the eggs had hatched. Because young became ambulatory 5 d after hatching, I wired nest corrals made of 1-in. poultrywire (31 cm high × 44 cm diameter) to all nests while young were hatching. The traps fitted within these corrals. This arrangement allowed the parents to brood and feed nestlings normally but prevented the escape of young when I entered the colony to tend the traps. After removal from the trap, I carried the adults in marked pillowcases to a padded work table 80 m from the nearest nest. The ibis was restrained on the table with padded cord. I biopsied three adults from different nests (2 females, 1 male) using Baker's (1981) procedure. An incision (approximately 40 mm long) was made with iris scissors through the skin and connective tissue overlaying the pectoralis muscle, starting from about 15 mm lateral and posterior to the sternum's anterior process and proceeding towards the humerus-furcula joint, parallel to the external muscle fibers. I steered the skin incision around feather papillae as much as possible. I then made two shallow (2 mm) incisions in the muscle about 5 mm apart, parallel with the skin incision, and using forceps, lifted a strand of tissue (approximately 35 × 4 × 2 mm) at the middle, cut it at both ends, and closed the skin over the wound with 4–6 sutures (5.0 silk). The last bird biopsied (a female) was sham-operated. I made the skin incision and closed the wound with 7 sutures (5.0 silk), but did not cut or remove any muscle. The entire handling time for biopsies was 30–40 min. Biopsied birds were fitted with an orange numbered patagial flag, weighed, measured, and released within 50 m of their nest.

Though brood patches were not evident, all birds bled copiously during the biopsy operation. The skin and feather tracts were heavily vascularized, and one cutaneous artery was large enough to eject blood more than 30 cm when I cut it. None of the birds was bleeding externally when released.

Though all biopsied birds flew normally after release, none of them were seen again, despite considerable time spent looking for them at the nest and elsewhere. These birds would have been obvious in the colony with their bright orange wing flags. The mates of the biopsied birds remained with the young and attempted to feed them, but all 3 broods apparently starved to death within 5 d of the biopsy. After the sham-operated bird also failed to return, I abandoned the biopsies.

Subsequently, I collected blood samples (0.3–2.0 ml each) from 57 adults by puncture of the brachial vein. These adults were captured, weighed, measured, and tagged exactly as the biopsied birds had been, though the handling time was shorter, usually not exceeding 20 min. In comparison to the biopsied adults, the bled adults probably experienced more human disturbance due to my daily trapping activities. Though the bled adults did usually leave the colony after release, all were seen on their nests the next day. All bled adults maintained normal feeding and brooding schedules, and two of these wing-tagged adults have been reported wintering in southern Florida, indicating the trapping, bleeding, and handling procedure did not affect parental abilities or the abilities to migrate long distances.

The survivorship of the biopsied birds is unknown. However, the biopsy technique is apparently too traumatic to be used with White Ibis. This finding is striking when compared with the relatively benign effects of the same technique in other species. The only difference in procedure from the successful technique used on passerines was the absolute length of the incision and size of tissue sample removed. However, both dimensions were proportionately smaller in the ibis than in the passerines. The timing of the treatment in the ibis' reproductive cycle was almost exactly the same as in that of benign biopsies performed on Indigo Buntings (Westneat et al., 1986).

Because bled birds did not abandon their nests, the trapping and handling procedures are not implicated as the cause of abandonment. Similarly, bled and biopsied birds had young of equivalent ages. Although bled birds had generally shorter handling times, several bled birds were handled for longer than any of the biopsied birds, and did not abandon their nests. Thus the length of handling time was probably not the cause of abandonment for the biopsied birds. Because both biopsied and sham-operated birds responded similarly, the incision and consequent heavy bleeding was probably the source of trauma. While the heavy vascularization could have been a temporary condition related to the nesting stage, it is more likely a permanent blood supply for the feathers that are distributed rather evenly across the breast. Other parts of the body not involved in brooding or incubating (thigh, back) appeared to be similarly vascularized.

Alternatively, flight impairment rather than blood loss could have been the major source of trauma. From the Pumpkinseed colony, White Ibis fly an estimated 40–80 km round trip each day to and from feeding areas (pers. obs.). Pectoralis wounds in birds that regularly fly long distances might easily become aggravated. A similar wound might have considerably less effect on wintering or breeding passerines that only move short distances following biopsy.

Thus while muscle tissue is an obvious choice for electrophoretic studies, its collection should be approached with caution, and the effects of biopsy investigated before any major study is planned. I suggest that the species most susceptible are those with fully feathered breasts and those that regularly undertake long trips during the time they would be biopsied.

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Loss of Nasal Saddle on Mallard.—Nasal discs and, later, nasal saddles have been widely used to mark ducks for long-term individual identification without having the bird in hand (Bartonek and Dane 1964, Doty and Greenwood 1974, Greenwood 1977, Lindmeir and Johnson 1958, Sugden and Poston 1968). These workers apparently assumed that nasal markers did not materially change the behavior or increase the mortality of marked ducks. However, Greenwood and Bair (1974) reported problems with icing on Mallards (*Anas platyrhynchos*) with nasal saddles and Koob (1981) found that nasal saddles changed the behavior of male Ruddy Ducks (*Oxyura jamaicensis*) during the breeding season.

Erskine (cited by Bartonek and Dane 1964) stated that nasal discs increased the mortality of mergansers (*Mergus sp.*) and cautioned against their use on diving ducks. He assumed that the plastic discs caused mortality by entangling the ducks in under-water vegetation. Bartonek and Dane (1964) reported ducks losing their nasal discs by becoming entangled in fences and traps and tearing the disc and monofilament pin out through the dorsal surface of the bill between the nares. In the 2 or 3 cases where this was known to occur, the break between the nares had healed completely. These observations and concerns led to the development of the nasal saddle in an effort to reduce entanglement.

On my study area, a pair of Mallards were captured in a decoy trap on 17 April 1984 on the Bierbrauer Waterfowl Production Area in St. Croix County, Wisconsin. The birds were leg banded (female: 1337-75510, male: 1197-96283) and marked with color-coded nasal saddles similar to those described by Greenwood. The pair was observed together on 5 occasions in April on the same wetland where trapped.

On 29 April the female was found hanging by her nasal saddle from the 5 cm mesh netting on the top of a swim-in bait trap (Hunt and Dahlka 1953) in the same wetland. She appeared to be in good condition and was released. On 9 May, I flushed the female—identified by her nasal saddle—from the shoreline near the bait trap site.

On 15 May, I observed an unmarked female Mallard with saddled male Mallard 1197-96283 near the bait trap site. Through a 20× spotting scope, it appeared that her upper bill was torn at the nares. On 17 May, I recaptured female Mallard 1337-75510 in the bait trap. Her urethane saddle and nylon pin had torn out between the nares through the dorsal surface of the bill.

This is the first known incident of a nasal saddle being torn through a duck's bill in more than 800 ducks saddled in my study from 1982 to 1984. However, 2 Blue-winged Teal (*Anas discors*) were found hanging from their nasal saddles in the top netting of a bait trap in 1983. Both ducks were examined and released with nasal saddles intact. Blue-winged Teal entanglement in similar traps in southern Wisconsin has occurred with at least 1 mortality recorded (W. E. Wheeler, pers. comm.). Smaller-mesh netting for the trap top might reduce or eliminate this problem. Waterfowl researchers should be aware of the potential for entanglement and loss of nasal saddles.

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