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EFFECTS OF INVESTIGATOR DISTURBANCE ON THE SURVIVAL OF SNOWY EGRET NESTLINGS

WILLIAM E. DAVIS, JR.
College of Basic Studies
Boston University
Boston, Massachusetts 02215 USA

KATHARINE C. PARSONS
Manomet Bird Observatory
Manomet, Massachusetts 02345 USA

Abstract.—Snowy Egret (*Egretta thula*) nestlings were banded in June 1988 at Clark's Island, Plymouth County, Massachusetts. One group of chicks ($N = 33$) had been handled every 2 d since hatching, while another group ($N = 23$) had not been handled prior to banding. Both groups were monitored for a week after banding and no difference in survivorship for that period was observed. It is concluded that chronic disturbance caused by repeated handling and banding results in pre-fledging survival rates similar to the acute disturbance associated with banding unhabituated chicks.

EFECTO DEL DISTURBIO CAUSADO POR PARTE DE LOS INVESTIGADORES EN LA SOBREVIVENCIA DE PICHONES DE *EGRETTA THULA*

Sinopsis.—En junio de 1988 se anillaron pichones de *Egretta thula* en la isla Clark, Condado de Plymouth, Massachusetts. Un grupo de pichones ($n = 33$) se manejó cada 2 d y otro ($n = 23$) no se manejó previo al anillamiento. Ambos grupos fueron monitoreados por una semana posterior al anillamiento y no se observó diferencia en la sobrevivencia de ambos grupos. Se concluye que el disturbio crónico causado a pre-volantones, por repetidas manipulaciones y eventualmente el anillamiento, resulta en una tasa de sobrevivencia similar a disturbios asociados solamente al anillamiento.

Adverse effects of investigator disturbance on colonially-nesting birds have been documented quantitatively for a variety of avian families, including the Pelecanidae (Boellstorff et al. 1988), Phalacrocoracidae (Ellison and Cleary 1978), Ardeidae (Tremblay and Ellison 1979), and Laridae (e.g., Fetterolf 1983). Several studies of ardeids, however, indicate disturbance may not always yield adverse effects. Goering and Cherry (1971) found that frequency of disturbance bore no relationship to nestling survival in a Cattle Egret (*Bubulcus ibis*) colony. Parsons and Burger (1982) found that Black-crowned Night-Heron (*Nycticorax nycticorax*) chicks habituated to frequent handling and when disturbed, remained in their nests, while unhabituated chicks moved some distance away. Frederick and Collopy (1989) found no difference in reproductive success between two Tricolored Heron (*Egretta tricolor*) colonies, one visited frequently, the other infrequently, after courtship and early egg-laying stages.

In general, investigator disturbance early in the reproductive cycle (i.e., nest initiation, egg-laying) can produce serious adverse effects, but the effects of disturbance during the nestling stage are not well understood (Frederick and Collopy 1989).

Investigator disturbance can be severe during the process of banding birds, which involves capture and handling. In addition, disturbance can be protracted when there are large numbers of nestlings in small areas. During banding in an otherwise undisturbed colony, some week-old and older heron chicks left the nest, clambered among the branches, and fell to the ground or became entangled in branches, and were unable to return to their nests (B. Harrington, pers. comm.).

In contrast, Ardeid chicks subjected to intensive growth studies in which nestlings were handled regularly, habituated to the stress of investigator disturbance (Parsons and Burger 1982). Habituation may leave nestlings relatively insensitive to the trauma of banding.

As existing studies have produced conflicting results, we assessed the impacts of banding on pre-fledging survival of Snowy Egrets (*Egretta thula*) at the Clark's Island heronry (Plymouth County, Massachusetts) in 1988. We compared survival of chicks that had been subjected to regular disturbance (handling) with chicks that had never been handled prior to banding, and tested the null hypothesis that survivorship would not differ between groups.

METHODS

Between 15 and 23 June 1988, we banded 56 Snowy Egret nestlings in randomly selected nests of two groups: chicks that were regularly disturbed prior to banding (HANDLED) ($N = 33$ chicks, 11 nests) and chicks that were not handled prior to banding (NOT-HANDLED) ($N = 23$ chicks, 7 nests).

We captured and weighed approximately every second day after hatching the HANDLED group of chicks. This disturbance entailed repeated intrusions into the colony area and nest-tree, and often involved tree-climbing by the investigators. Chicks were chased if they left their nests. We attempted to band all HANDLED chicks in each nest at age 7–10 d, although because brood-mates hatch asynchronously, this was not always possible.

NOT-HANDLED chicks were never captured prior to banding. Their nests were subjected to the less traumatic disturbance of investigators present in the colony; however, NOT-HANDLED and HANDLED nests were selected in separate sub-colony areas to minimize pre-banding disturbance to the NOT-HANDLED sample. During banding at approximately 7–10 d of age, NOT-HANDLED chicks were subjected to the same type of intrusive disturbance which the HANDLED chicks experienced regularly.

We weighed all nestlings with Pesola spring balances (±0.5 g) and obtained flattened wing chord lengths with calipers (±0.1 mm) at the time of banding. All banded nestlings received a U.S. Fish and Wildlife Service aluminum band and a numbered color band.

After banding, we visited all nests in the study (HANDLED and NOT-HANDLED) to check nest contents and ascertain nestling survival every 2–3 d, weather permitting. Nest checks entailed viewing the contents of

the nest with a mirror mounted on a 2.5-m pole and by visually searching the nest-tree for mobile young. These visits, while disturbing, were far less intrusive than visits where young were handled. We terminated the study at 7–8 d post-banding.

RESULTS AND DISCUSSION

Mean weights of HANDLED and NOT-HANDLED chicks/nest were not different ($\bar{X}_{\text{HANDLED}} = 205.4 \pm 32.3$ g; $\bar{X}_{\text{NOT-HANDLED}} = 246.4 \pm 66.4$ g; $t = 1.52$, $P = 0.17$). Similarly, mean wing chord lengths did not differ between groups ($\bar{X}_{\text{HANDLED}} = 83.6 \pm 17.8$ mm; $\bar{X}_{\text{NOT-HANDLED}} = 100.5 \pm 32.9$ mm; $t = 1.42$, $P = 0.17$), suggesting the groups were comparable in age and condition at the time of banding.

Of 23 NOT-HANDLED chicks, three nestlings failed to survive 1 wk post-banding, whereas four HANDLED nestlings (of 33) failed to survive the same period. Survivorship of nestlings after banding was not different between the two groups ($\chi^2 = 0.011$; $P = 0.918$).

Three deaths in each group resulted from nest predation, probably by a Great Horned Owl (*Bubo virginianus*), which was seen frequently in the colony. In the NOT-HANDLED group, freshly killed and dismembered chicks from a single nest were found 3 d following banding. In the HANDLED sample, we found depredated chicks from a single nest 5 d after banding and 2 d after our most recent visit. Nocturnal predation in the colony was widespread during 1988, and appeared unrelated to the frequency of investigator visits. The fourth HANDLED chick death resulted from starvation.

In conclusion, we found no difference between the survival rates of the two groups of chicks that received different levels of disturbance prior to banding. Although our samples are small, this study suggests that chicks subjected to regular disturbance as nestlings are not conferred an advantage in surviving the disturbance associated with banding compared to unhabituated chicks (Parsons and Burger 1982). Our results also suggest that the acute trauma of handling endured by relatively naive chicks at the time of banding results in pre-fledging survival rates that are similar to rates of banded, habituated chicks.

As all chicks in this study were disturbed to some considerable degree, we do not address quantitatively or qualitatively the adverse effects of disturbance to colonially-nesting birds compared to undisturbed birds. This study does suggest, however, that Snowy Egret nestlings may be relatively insensitive to variation in disturbance.

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