

when approached, but shift positions to keep a patch of cryptic undertail feathers oriented toward intruders (Crome, *Emu* 75:172-174, 1975).

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Effects of old nests on nest-site selection in Black-crowned Night-Herons and Snowy Egrets.—The use of old nests has been reported for Black-crowned Night-Herons (*Nycticorax nycticorax*) (Gross 1923), Little Blue Herons (*Egretta caerulea*) (Burger and Miller 1977), Green-backed Herons (*Butoroides striatus*) (Meyerriecks 1960), Cattle Egrets (*Bubulcus ibis*) and Tricolored Herons (*E. tricolor*) (Jenni 1969); however, the effect of old nests on nest-site selection during the following breeding season has not been investigated quantitatively. Nests of Black-crowned Night-Herons and Snowy Egrets (*E. thula*) survive the winter in large numbers at the Clark's Island heronry, Plymouth, Massachusetts, particularly when they are located in the dense foliage of eastern red cedars (*Juniperus virginiana*). During the spring of 1981 I attempted to determine the effect of old nests on nest-site selection in these two species.

Study area and methods.—The Clark's Island heronry (colony 324001, Osborn and Custer 1978) supports a breeding population of 500-600 pairs, mostly Black-crowned Night-Herons and Snowy Egrets (Davis and Parsons 1982).

On 28 March, 43 red cedar trees were divided into a group of 21 experimental trees from which all 52 old nests were removed and the sites of the old nests marked (hereafter "old sites"), and a group of 22 control trees, in which 53 nests were marked but left in place. No herons were observed on the island when the nest removal and tagging were done. All red cedars that contained at least one nest encountered in a transect through the colony were included in the study, and assignment to group was randomized by designating the group in which the next encountered tree would be placed. Nest density was comparable in control and experimental trees. Trees were examined at approximately weekly intervals (Fig. 1) beginning on 18 April, when 2 complete and 11 partial clutches were found. On each visit new eggs were marked, all new nest building noted, and the use of old nests recorded. A nest was considered active if one or more eggs were present. Species was determined by egg size (Snowy Egret eggs are smaller than those of night-herons) and confirmed after hatching. Statistical analysis was by χ^2 tests.

Results.—The date of the median active nest for Snowy Egrets was three weeks later than for Black-crowned Night-Herons in both the control and experimental trees (Fig. 1) (median test, $P < 0.05$).

Black-crowned Night-Herons built more nests in control trees than in experimental trees (14 nests/22 trees vs 12 nests/21 trees), as did Snowy Egrets (35 to 24), but the differences were not significant ($P > 0.05$). In control trees, Black-crowned Night-Herons used old nests in 86% of the cases, Snowy Egrets used them 60% of the time (Table 1). In the first nesting in each tree, Black-crowned Night-Herons used old nests in 85% of the cases, Snowy Egrets

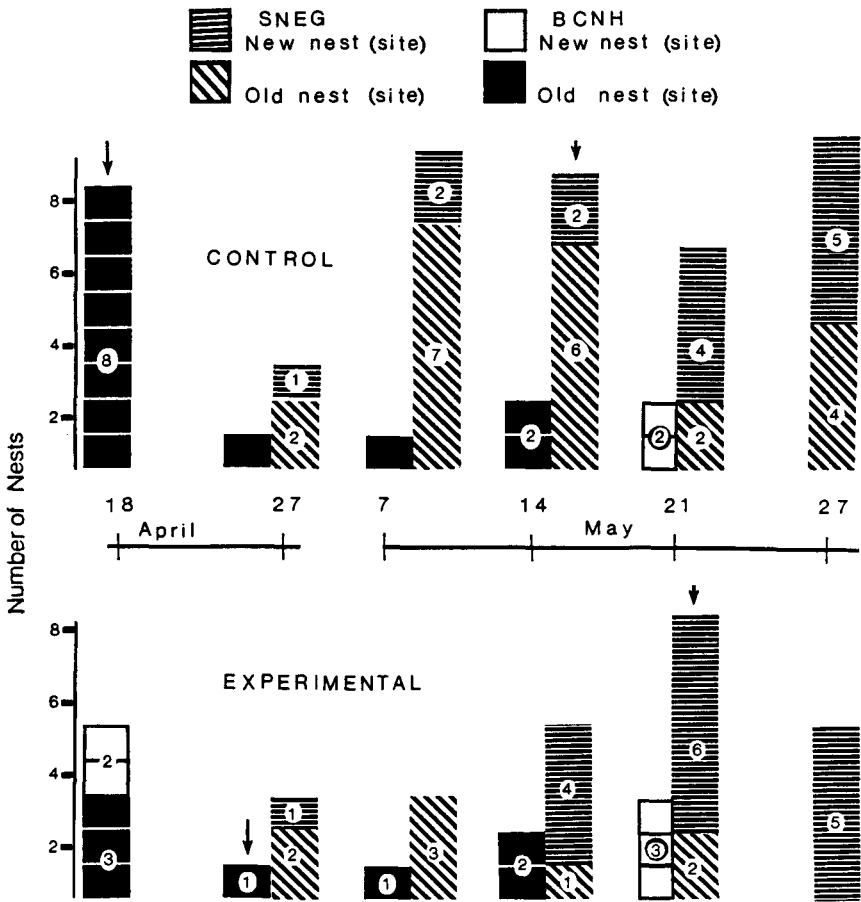


FIG. 1. Nests constructed in control trees (old nests left in place) and experimental trees (old nests removed) in April and May 1981 by Snowy Egrets (SNEG) and Black-crowned Night-Herons (BCNH). Long arrows indicate the date of the median active nest for Black-crowned Night-Herons; short arrows are for Snowy Egrets.

used them 76% of the time. When the data for both species are combined, old nests were used first in 21 of the 22 trees (95%). In the experimental trees, Black-crowned Night-Herons used old sites in 58% of the cases; Snowy Egrets used them 33% of the time. The comparison between the species was not significant ($P > 0.05$).

Both species chose proportionally more old nests in the control trees and old sites in the experimental trees early in the season than late in the season (Fig. 1). For Snowy Egrets, a comparison of the data for weeks of April 27–May 14 (31 nests) with the data of May 21–27 (28 nests), indicates that they chose significantly more ($P < 0.05$) old nests and old sites during the earlier period (15/5 vs 6/9 for old nests; 6/5 vs 2/11 for old sites). Black-crowned

TABLE 1

NUMBER OF SNOWY EGRETS AND BLACK-CROWNED NIGHT-HERON NESTS IN CONTROL AND EXPERIMENTAL TREES, OLD NEST OR NEW NEST CONSTRUCTION (CONTROL TREES), AND NEST CONSTRUCTION IN OLD OR NEW SITES (EXPERIMENTAL TREES)

	All nests			First nest in tree	
	Old*	New	Total	Old	New
Snowy Egret					
Control	21	14	35	13	4
Experimental	8	16	24	7	4
Black-crowned Night-Heron					
Control	12	2	14	11	2
Experimental	7	5	12	6	3

* Old nest in control tree; old nest site in experimental tree.

Night-Herons showed a similar pattern, but small sample sizes ($N = 14$ in control trees, $N = 12$ in experimental) precluded statistical comparisons.

Black-crowned Night-Herons had one nest per tree in 21 cases (95%) and more than one nest in 2 trees. Snowy Egrets nested singly in 16 cases (39%) and had more than one nest per tree in 25 trees. Black-crowned Night-Herons had one nest per tree significantly more often than Snowy Egrets ($P < 0.05$).

Discussion.—A number of authors have examined factors involved in nest-site selection in herons and ibises. Meyerricks (1960) suggested that an old nest, if available, was the primary object around which Green-backed Herons center territorial behavior. Burger (1978) suggested that herons selected nest sites on the basis of such characteristics as plant species, vegetation height, and “openness.” She also suggested a vertical alignment among species, with the larger herons nesting highest, and with dominance playing an important role. McCrimmon (1978) and Beaver et al. (1980) examined structural nest-site characteristics such as nest height, distance of nest to tree center, and diameter of nest branch, and stressed the importance of vegetation structure in nest dispersion and nest-site selection. Thus both structural characteristics of the nest sites and social factors may play a role in nest-site selection among herons and ibises.

The data presented in this study suggest that nest-site selection by Black-crowned Night-Herons and Snowy Egrets was a complex phenomenon that may have been influenced by (1) the time of nesting, (2) the presence of old nests, and (3) the presence of other nesting pairs.

The date of the median active nest for both species was one week later in the experimental trees. The preference for using an old nest by the first pair of Black-crowned Night-Herons or Snowy Egrets to nest in each tree is consistent with the hypothesis that herons are initially attracted to trees with old nests. As none of the herons or egrets was banded, the possibility that birds returned to the same nest that they had occupied the previous year was not tested.

Both species chose more old sites in the experimental trees early in the season than late in the season, and the difference was significant for Snowy Egrets. The number of available old sites decreased as they were occupied, and it may be that there was a limited number of structurally sound sites in each tree, with the better sites occupied first each year.

Social factors appeared to influence nest-site selection as well, as many Snowy Egrets

nested in trees with conspecifics even though adjacent unoccupied trees were available. Black-crowned Night-Herons are often predators within the colony (T. Custer, pers. comm.), and it may be that the Snowy Egrets gained protection against predation by their social nesting.

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The use of tape-recorded calls to count Virginia Rails and Soras.—Tape recordings have been used for two decades in censusing breeding birds (Johnson et al., pp. 68–75 in Ralph and Scott, eds., *Studies in Avian Biology*, Vol. IV, 1981). Because of the elusive nature of rails and the dense vegetation that they inhabit, tape playing has become a principal means of counting rails. The playing of taped calls significantly increased the calling rate of breeding Virginia Rails (*Rallus limicola*) and Soras (*Porzana carolina*) (Glahn, *Wilson Bull.* 86:206–214, 1974). Both species responded equally well to interspecific and conspecific calls. Baird (M.S. thesis, Fort Hays State College, Fort Hays, Kansas, 1974), however, found that Soras responded less consistently to taped calls than did Virginia Rails, and concluded that broadcasts of taped calls could not be applied accurately to counting Soras. This paper (1) tests the hypothesis that breeding Virginia Rails and Soras respond equally well to tapes of interspecific and conspecific calls and (2) addresses the value of night counts in obtaining indices of breeding rail densities.