

Sympatric Foraging of Little Egrets and Snowy Egrets in Barbados, West Indies

JAMES A. KUSHLAN

P.O. Box 2008, Key Biscayne, FL 33149

Internet: jkushlan@earthlink.net

Abstract.—The New World Snowy Egret (*Egretta thula*) and Old World Little Egret (*Egretta garzetta*) are ecologically similar and historically allopatric species both of which recently colonized Barbados, West Indies, as breeding species. Examination of their foraging behavior in their zone of recent sympatry suggests that they choose the same (very limited) foraging sites but differ in foraging behavior. The larger Little Egret was more active and diverse in its foraging, fed more in upright posture, chose open, unvegetated sites more frequently, and was dominant over the Snowy Egret. The conservation situation in Barbados for these two species, and their thus-far unique sympatry, is uncertain as both feeding and nesting sites are far from secure. Received 23 April 2007, accepted 9 July 2007.

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The Snowy Egret (*Egretta thula*) and the Little Egret (*Egretta garzetta*) are similar in many respects: they are medium-sized, all-white herons, with yellow feet, dark bills and legs, and active and diverse feeding style (Kushlan and Hancock 2005). The two are in some ways ecological equivalents, the Snowy Egret being the Western Hemisphere species and the Little Egret being its Eastern Hemisphere counterpart.

The European population of the Little Egret has undergone a range expansion in recent years, notably to the north in Europe (Kushlan and Hancock 2005) and even more notably into the Western Hemisphere, establishing a nesting population in Barbados, West Indies, in 1994 (Massiah 1996; Massiah and Frost 1998). Prior to this colonization, the species was documented as a vagrant to the hemisphere, and two birds collected during this period had been ringed in Spain (Kushlan and Hancock 2005), suggesting a point of origin for the eventual colonists. Little Egrets are now observed elsewhere in the Caribbean and even along the North American Atlantic coast (McLaren 1989; Murphy 1992; Mlodinow *et al.* 2004). Conversely, the Snowy Egret has been documented as a vagrant to the Eastern Hemisphere (de Heer and Bos 1989).

Little and Snowy egrets were first observed nesting on Barbados in Graeme Hall Swamp (Massiah 1966). They nested initially

in a colony site dominated by Cattle Egrets (*Bubulcus ibis*) but eventually moved to a cluster of small mangrove trees within a nearby lagoon (Burke, pers. comm.) Nesting effort was again found in 1995, and by 1996 the population had increased to about a dozen nests (Massiah 1996). Nesting occurs throughout much of the year, peaking in late winter and spring (Burke, pers. comm.).

Several other wading birds occur on Barbados. Cattle Egrets are the most common heron and they nest in several sites on the island, including on trees with Little and Snowy egrets. Green Herons (*Butorides virescens*) are also common nesters, feeding primarily in suitable ponds and wetland patches. Great Blue Herons (*Ardea herodias*) and Great Egrets (*Ardea alba*) occur in winter. The Old World Grey Heron (*Ardea cinerea*) has occurred on Barbados with some regularity, and I observed one at the feeding site at Chancery Lane Swamp on 18 February 2007. Glossy Ibis (*Plegadis falcinellus*) was observed at the colony site and also at Chancery Lane. This is a single bird known from Barbados and has been there for several years (Burke, pers. comm.).

The newly overlapping range of the Little Egret and the Snowy Egret facilitated resolution of previous difficulties in distinguishing the two species in the field (Massiah 1996). This range overlap also provides the first opportunity to compare behaviors and interac-

tions of these similar species feeding together. In this paper I examine similarity and differences in the foraging behavior of the Snowy Egret and Little Egret in Barbados.

METHODS AND STUDY SITES

The Snowy and Little egrets nest in the Graeme Hall Swamp, located in southern Barbados, West Indies (Massiah 1996). Despite its small extent of 33 ha, the swamp is an important site because it is one of the few wetlands and only extensive mangrove swamp still extant in the country. As a result, it has been recognized as a national Environmental Heritage Site, a Wetland of International Importance under the Ramsar Convention (site 1591), and an Important Bird Area (Burke, in press). Part of the swamp is preserved as a private sanctuary, The Graeme Hall Nature Sanctuary, founded by Peter Allard. The foraging behavior of the two species was studied in February 2007, considered to be near the peak of the nearly year-round nesting cycle for the Little Egret (Burke and Frost, pers. comm.). Birds nesting in the sanctuary disperse to feed and they were observed foraging at Chancery Lane Swamp, also an Important Bird Area, and Congo Road Shooting Swamp. Due to the thickness of the vegetation, it was not possible to study the birds feeding within Graeme Hall Swamp, adjacent to the nesting site in The Graeme Hall Nature Sanctuary.

Foraging behavior was documented by scanning the study sites at five minute intervals recording the instantaneous feeding behavior, posture, and habitat choice of each observable egret. Prey caught, interactions among birds, and composition of feeding assemblages were also recorded. Observations were made between 06.00 and 12.00 h, by which time feeding activity generally had ceased. Feeding behavior nomenclature follows Kushlan and Hancock (2005), which should be consulted for descriptions. Feeding sites are extremely limited in Barbados, and although an additional three possible feeding sites were explored, feeding was observed in only the three noted above.

RESULTS

The Study Populations

During the study period, there were five nests each of Snowy and Little egrets at the colony site, and up to ten birds of each species were observed displaying or otherwise using the nesting islands. The maximum tally of Little Egrets on the same day at the nesting site and two feeding sites was 22, approximately the number estimated in the current adult population of the island (Frost, pers. comm.).

On three occasions it was impossible to identify individuals to species at the feeding site. In each case, the puzzling individual ap-

peared relatively small (i.e., Snowy Egret size) but had grey/white lores (a Little Egret character) and long head plumes (Little Egret) within a more robust crown of head feathers (Snowy Egret). It is possible these were somewhat unusual Snowy Egrets or that they were the offspring of a mixed pairing of Little and Snowy egrets. Inter-species copulation has been observed at the colony site by Martin Frost (Frost, pers. comm.). Additional study would be required to confirm hybridization, and all the nesting pairs observed in February 2007 (N = 4) were of the same species.

Foraging

Both species fed together within mixed aggregations of water birds. The maximum numbers of each species counted at the feeding areas were: Little Egret—12; Snowy Egret—8; Great Blue Heron—5; Grey Heron—1; Great Egret—4; Green Heron—2; Glossy Ibis—1; Greater Yellowlegs (*Tringa melanoleuca*)—30; and Common Moorhen (*Gallinula chloropus*)—10. Spacing varied within the aggregations. If few birds were present they were somewhat dispersed, but they also gathered periodically in denser 'shoulder-to-shoulder' aggregations. In some situations the birds were far enough apart to be considered as feeding alone. However, there was never only a single bird observed at any feeding sites. There was no obvious difference in the feeding behaviors or postures of birds feeding near or apart from other birds.

Little Egrets used more types of feeding behaviors than did Snowy Egrets. Little Egrets fed from either upright or crouched posture using the following feeding behaviors: standing, walking slowly, walking quickly, and running. While standing they foot stirred and peered over. They also hopped, flew and prey robbed. Snowy Egrets fed from either upright or crouched posture and used standing, walking slowly and walking quickly. While standing they also foot stirred.

Comparing standing to more active behaviors, Little Egrets fed more actively than did Snowy Egrets (Chi Square = 15.944, df = 1, P = 0.001). Little Egrets fed by standing

only during 42% of the observations ($N = 131$) whereas Snowy Egrets used standing in 69% of observations ($N = 96$).

The two species also differed in the frequency of use of behaviors (Chi Square = 26.988, $df = 5$, $P = 0.001$). Little Egrets used walking slowly 24%, walking quickly 26%, running 3%, hopping 4%, and flying 2% ($N = 131$). Snowy Egrets used walking slowly 24% and walking quickly 6% ($N = 96$).

The two species differed in their feeding posture (Chi Square = 42.704, $df = 1$, $P = 0.001$). Little Egrets fed more in upright posture, 83% of observations ($N = 126$), whereas Snowy Egrets fed from an upright posture in only 41% of observations ($N = 97$).

Prey robbing interactions between Little Egrets and Snowy Egrets were observed four times. In each case the Little Egret was successful in harassing the Snowy Egret into dropping its prey.

Differences in habitat use were also observed (Chi Square = 10.365, $df = 1$, $P = 0.01$). The choices of foraging habitat used by egrets at the feeding areas were: (1) shallow, open pools of water; or (2) emergent grass on the edge of such pools. Although both species tended to use open areas, Little Egrets used open areas more frequently (95%, $N = 74$) than did Snowy Egrets (75%, $N = 51$).

Most food items caught were too small to distinguish. The larger items caught by all the herons were fish two to four cm long. The larger ones required handling and were the prey items subject to piracy.

DISCUSSION

Both Little and Snowy egrets are well documented active foragers using diverse foraging behaviors; the Snowy Egret being the heron species for which the most feeding behaviors have been documented (Kushlan and Hancock 2005). However, in their zone of overlap on Barbados, each fed distinctively. The Little Egret fed more actively, used more kinds of behaviors, fed more often in the open, and more frequently from an upright posture. Although it fed by standing or walking slowly, it very often used a disturb

and chase technique of alternating walking quickly, running, and hopping in pursuit of prey. The sequence of behaviors, was reminiscent of the feeding activity shown by the Reddish Egret (*Egretta rufescens*) in similar tropical, shallow, open-water situations (Kushlan and Hancock 2005). The Snowy Egret, in contrast, fed primarily by crouching low, standing and walking, and often foot stirring. It was in general a much less active forager.

It was clear in feeding situations studied that the Little Egret was dominant to the Snowy Egret, using forward stabs and displacement flights to assume Snowy Egret feeding sites or to attempt to rob large prey that required handling. The Little Egret was obviously larger both in height and in mass than the Snowy Egret. Thus, the dominance can be accounted for by size, which is a typical situation among herons. Although not quantified, this dominance hierarchy was not apparent in the nesting colony, where each species successfully defended its nesting sites under crowded conditions.

In conclusion, these observations suggest that in Barbados, the Little Egret and Snowy Egret choose the same (limited) foraging areas but differ in foraging behavior, the larger Little Egret being more active and diverse in its foraging, more restricted to open unvegetated sites and dominant to the Snowy Egret. It is intriguing that both species established themselves as nesting populations on Barbados at the same time, and so their pattern of use of the available environment developed simultaneously. While it is likely these precise differences might not persist in other foraging situations, should they develop, at least at the location of their first natural sympatry, the species appear to use slightly different foraging strategies within the very limited habitat available to them.

Their continued existence in Barbados appears tenuous (Kushlan *et al.* 2007). The site at which the two species nest has eroded from near constant use by the birds, aggravated by storms. It now amounts to only a few shrubs on which potential nest sites are extremely limited. Furthermore, foraging sites, including those in the Graeme Hall Swamp

and at the two sites studied, are far from secure in the long term. The Graeme Hall nesting site, given its condition, requires active management, which is possible because the site is within The Graeme Hall Nature Sanctuary, a private nature reserve that is well recognized by the government and international conservation community. Foraging sites in Graeme Hall Swamp outside the sanctuary are part of a proposed park, for which feeding habitat management unfortunately is not presently envisioned (Friends of Graeme Hall Committee, 2006). The Chancery Lane Swamp is on private land, the edges of which are being developed. The privately owned Congo Road Shooting Swamp depends for its existence on active management as a hunting reserve. Most other wetlands that could serve as feeding sites are also on private lands, and require management for their continued existence. Clearly, the continuation of this intriguing biogeographic experiment will depend on a successful long-term campaign to preserve and manage the limited nesting habitat and the precious few available feeding sites on the island of Barbados.

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LITERATURE CITED

- Burke, W. in press. Important Bird Areas of Barbados. BirdLife International.
- de Heer, P and E. Bos. 1989. Snowy Egrets on the Azores—a new Western Palearctic bird. *Birding World* 2: 58-60.
- Friends of Graeme Hall Committee. 2006. Graeme Hall National Park—A vision for Graeme Hall and Barbados. Friends of Graeme Hall, Barbados.
- Kushlan, J. A. and J. A. Hancock. 2005. *Heron*. Oxford University Press.
- Kushlan, J, W. Burke, M. Frost and E. Massiah. 2007. Little Egret conservation in Barbados. *Birds Caribbean* No.05-06:1-2.
- Massiah, E. 1996. Identification of Snowy Egret and Little Egret. *Birding World* 9: 434-444.
- Massiah, E. and M. Frost. 1998. The Little Egrets of Graeme Hall Swamp. *Journal of the Barbados Museum and Historical Society* 44: 65-67.
- McLaren, I. A. 1989. Thoughts on North American Little Egrets. *Birding* 21: 284-287.
- Mlodinow, S. G., W. E. Davis, Jr. and J. I. Dies. 2004. Possible anywhere: Little Egret. *Birding* 36: 52-62.
- Murphy, W. L. 1992. Notes on the occurrence of the Little Egret (*Egretta garzetta*) in the Americas, with reference to other Palearctic vagrants. *Colonial Waterbirds* 15: 113-123.