

NOTES

Fla. Field Nat. 24(3): 74-75, 1996.

**SANDERLING (*CALIDRIS ALBA*) FLIGHT DURATION IN RESPONSE TO
INADVERTENT DISTURBANCE**

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Sanderlings (*Calidris alba*) are common fall and winter inhabitants of many south Florida marine coastal areas (Kale and Maehr 1990, Robertson and Woolfenden 1992) where they are frequently observed foraging in the intertidal zone of sandy beaches. Burger and Gochfeld (1991) modeled diurnal and nocturnal responses of Sanderlings to human activities at a Florida beach and reported altered foraging behaviors, running responses, flight responses, and daily activity patterns for the birds in their study. Roberts and Evans (1993) examined response patterns of foraging Sanderlings to approaching humans in England, and found that flight reactions were related to approacher distance and flock composition variables. Sprandel et al. (FGFWFC unpubl. ms.) reported that humans were the primary cause of disruption at 48 of the 60 wintering shorebird sites they evaluated in Florida. We report herein the flight durations of foraging Sanderlings when they were inadvertently disturbed by humans walking rapidly or jogging at two Florida beaches.

The two study sites were at Woolbright Beach located in the town of Ocean Ridge, Palm Beach County, and the beach at Avalon State Recreation Area located in unincorporated St. Lucie County about 14.5 km south of Vero Beach. Data were collected on Saturdays and Sundays from 21 October to 3 December 1995, at various times between 09:00 and 18:00 on clear to partly cloudy days, and were random in relation to tidal cycle. The Woolbright study area usually was lightly occupied by people during observation periods, while the Avalon site always was lightly occupied. Observations were made with binoculars from elevated walkways crossing the dunes. These structures enabled an unobstructed view of Sanderlings along the beach for about 200+ m in each direction.

Foraging groups of Sanderlings (estimated group size range=1-17 birds, mean=4.7) were observed as they were inadvertently approached by people walking rapidly (ca. ≥ 2 steps/sec.) or jogging (ca. $\geq 2-3$ steps/sec.) along the narrow intertidal zone. Although the approaches differed slightly in mechanics, data were pooled because the approach speeds were similar. No pets accompanied the approachers. Typical Sanderling responses to this type of disturbance consisted of vigilant behavior, followed by running and subsequent flight. Most groups of birds remained coalesced during flight and then relanded together. Due to distances and angles of observation, we were unable to accurately determine the moment a running response actually started and abated for birds that did not take flight. Consequently, only the durations of flight responses could be quantified. Similarly, Roberts and Evans (1993) could not reliably quantify Sanderling running responses. All flight durations were timed with a stopwatch. One group of birds was lost from sight during flight and eliminated from the sample. The data from both sites initially were tested as to whether they were normally distributed (SAS Institute Inc. 1990); both distributions were heavily skewed. Natural log transformations were then used to normalize the

Table 1. Duration of flight responses of Sanderlings at two sites in south Florida.

Location	Number of observations	Range (sec.)	Mean±1 S.D. (sec.)
Woolbright Beach	26	1.83-58.50	7.70±2.17 ¹
Avalon Beach	7	3.33-21.14	7.44±1.91 ²
Totals	33	1.83-58.50	7.64±2.09

^{1,2}No significant (t -test=0.1095, P =0.70, $d.f.$ =25, 6) difference found.

data sets thereby allowing calculation of means, standard deviations, and t -test analysis of the site means. The geometric means and standard deviations calculated in Table 1 reflect these back-transformed data estimated by the delta method to obtain the asymptotic distribution (see Agresti 1984).

Of the 26 flights recorded at Woolbright Beach, 84.6% (n =22) ranged from 1.83 to 12.49 sec. with the remainder (n =4) timed at 19.82, 26.55, 32.53, and 58.50 sec. Similarly, of the seven flights recorded at Avalon Beach, 85.7% (n =6) ranged from 3.33 to 13.58 sec. with one longer flight of 21.14 sec. No significant (t =0.1095, p =0.70, $d.f.$ =25, 6) difference was found between flight durations of the birds at Woolbright Beach and those at Avalon Beach (Table 1). However, sample sizes may have been too small, and unbalanced, to detect such variation.

Sanderlings foraging on many south Florida beaches are subject to frequent, inadvertent human disturbances of varying intensities. At both sites in this study joggers and speedwalkers frequently caused flight responses in Sanderlings when they co-occupied the narrow intertidal zone. However, people walking slowly or standing leisurely at the water's edge sometimes had birds foraging within ca. 10-20 m of them. Similar effects to these have previously been reported for various nonbreeding shorebirds by Burger (1981). Roberts and Evans (1993) also suggested that Sanderlings may maximize foraging time in the presence of disturbance by minimizing numbers of flights and distances of flights they undertake. Likewise, the apparently short duration of most flights recorded during this study may support the notion of various behavioral mechanisms for maximizing Sanderling foraging time at a site once it is occupied. Such strategies may provide maximum caloric benefit for foraging Sanderlings when low intensity disturbance regimes exist.

We thank W. K. Taylor and J. A. Gore for their reviews which considerably improved the manuscript.

LITERATURE CITED

- AGRESTI, A. 1984. Analysis of Ordinal Categorical Data. John Wiley and Sons, New York.
- BURGER, J. 1981. The effect of human activity on birds at a coastal bay. *Biol. Conserv.* 21:231-241.
- BURGER, J., AND M. GOCHFELD. 1991. Human activity influence and diurnal and nocturnal foraging of Sanderlings (*Calidris alba*). *Condor* 93:259-265.
- KALE, H. W., II, AND D. MAEHR. 1990. Florida's Birds. Pineapple Press, Inc., Sarasota.
- ROBERTS, G., AND P. R. EVANS. 1993. Responses of foraging Sanderlings to human approaches. *Behaviour* 126:29-43.
- ROBERTSON, W. B., JR., AND G. E. WOOLFENDEN. 1992. Florida Bird Species—An Annotated List. Florida Ornithol. Soc. Spec. Publ. no. 6, Gainesville.
- SAS INSTITUTE, INC. 1990. SAS procedures guide, version 6. SAS Inst., Cary, North Carolina.
- SPRANDEL, G. L., J. A. GORE, AND D. T. COBB. Unpubl. manuscript. Winter shorebird survey draft final performance report—Sept. 1995. Florida Game and Fresh Water Fish Comm., Tallahassee, Florida.