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BUFF-BREASTED SANDPIPERS NESTING IN ASSOCIATION WITH BLACK-BELLIED PLOVERS

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Bailey (1948:225), referring to Semipalmated Sandpiper (*Calidris pusilla*) and Black-bellied Plover (*Pluvialis squatarola*), stated: "Brower has made the interesting observation that the little sandpipers secure protection by their association with the plovers, as the latter are aggressive and drive off the jaegers." Other observers reported additional examples of "timid" (not predator-mobbing) shorebirds nesting near "bold" (predator-mobbing) ones, including Common Redshanks (*Tringa totanus*) and Common Snipes (*Gallinago gallinago*) nesting near Northern Lapwings (*Vanellus vanellus*; Campbell 1974, Mayo 1974), and Common Redshanks, Common Snipes, and Ruffs (*Philomachus pugnax*) nesting near Black-tailed Godwits (*Limosa limosa*; Dyrcz et al. 1981). Göransson et al. (1975) found the rate of predation on artificially placed nests with eggs was lower where large predator-mobbing shorebirds were present than where they were absent.

Shorebirds have also been reported nesting in association with colonial terns, for example, Common Ringed Plovers (*Charadrius hiaticula*; Campbell 1974) and all three phalaropes (Höhn 1967, Bengtson 1968, Hildén and Vuolanto 1972). All these authors but Höhn thought the shorebirds derived protection by associating with the aggressive terns. We suggest that our observation of Buff-breasted Sandpipers (*Tryngites subruficollis*) nesting in association with Black-bellied Plovers is another example of a timid shorebird species purposely nesting near an aggressive species to derive protection from predators.

We studied shorebirds at Cambridge Bay, Victoria Island, Northwest Territories, from 7 June to 11 July 1975. This area has been described in detail by Parmelee et al. (1967). We saw male Buff-breasted Sandpipers displaying occasionally on low-lying but fairly dry tundra about 5 km northeast of Cambridge Bay, and on 24 June, at the same site, we flushed a female from a nest containing three eggs. On the following day, the complete clutch of four was present. All four eggs in the nest were pipping on 16 July (Karl and Steve Maslowski, pers. comm.), and if hatching took place that day or the next, the incubation period would have been 21–22 days (not previously reported for this species). A second nest containing a complete clutch of three eggs was discovered on 8 July, but these eggs had not pipped by 16 July.

Both of these nests were close to the nest of a pair of Black-bellied Plovers, the first being 30 m west-northwest and the second 15 m east of the plover nest. The Buff-breasted Sandpiper nests were closer to the Black-bellied Plover nest than were any of the 34 other shorebird nests that we found at Cambridge Bay to each other; most inter-nest distances exceeded 50 m. We were surprised by the proximity of the sandpipers to the plovers, because there seemed to be many similar areas of tundra that could have accommodated the sandpipers. A comparable situation existed at Prudhoe Bay, Alaska, where David McDonald (pers. comm.) found Buff-breasted Sandpiper nests and broods in association with Black-bellied Plovers in 1978.

The Buff-breasted Sandpipers nested near the Black-bellied Plovers at Cambridge Bay despite aggressive behavior by the plovers. On most of our visits to the nests, one of the plovers chased one of the sandpipers. Both male and female plovers chased sandpipers of either sex (a few males displayed nearby), and it appeared that almost any time a sandpiper became conspicuous a plover would chase it.

The plover eggs hatched on 10 July; based on a 27-day incubation period (Drury 1961), their incubation should have begun on about 14 June. Thus, both female sandpipers must have laid their eggs after the plovers began incubation and would have had ample opportunity to avoid the area. Birds benefitting from these associations would be expected to begin nesting later than the species with which they associated (Eriksson and Göttmark 1982).

The Buff-breasted Sandpipers appeared to benefit from the "protective umbrella" provided by association with nesting Black-bellied Plovers. The two pairs of Black-bellied Plovers that we watched near Cambridge Bay regularly, perhaps invariably, attacked and drove away predatory birds that flew over their territories. Our 11 observations of this interaction included four attacks on Long-tailed Jaegers (*Stercorarius longicaudus*), three on Parasitic Jaegers (*S. parasiticus*), two on Pomarine Jaegers (*S. pomarinus*), and two on Glaucous Gulls (*Larus hyperboreus*), all known to prey on shorebird eggs. Only two other shorebird species present at Cambridge Bay drove away predators in this fashion. Ruddy Turnstones (*Arenaria interpres*), of which two pairs were present in our study area, were observed to attack the same four species of predators a total of 12 times, thus behaving much like the Black-bellied Plovers. Lesser Golden-Plovers (*Pluvialis dominica*) were less likely to attack avian predators; from the five pairs in our study area, we observed only two such attacks—both on the smallest predator, the Long-tailed Jaeger.

Our observations generally agree with Sordahl's (1981) conclusion that only larger shorebirds mob avian predators, as none of the smaller species breeding at Cambridge Bay (*Charadrius semipalmatus, Calidris pusilla, C. bairdii, C. melanotos, C. himantopus, Tryngites subruficollis, Phalaropus lobatus,* and *P. fulicaria*) mobbed predators. The Ruddy Turnstone, at 105–110 g (Parmelee et al. 1967), however, is smaller than a few non-mobbing species, such as Surfbird (*Aphriza virgata*) and Wandering Tattler (*Heteroscelus incanus*), and about the same size as the non-mobbing dowitchers (*Limnodromus* spp.). The Black Turnstone (*Arenaria melanocephala*) and Lesser Yellowlegs (*Tringa flavipes*) are similarly small mobbers, the latter apparently the smallest at 80–90 g (Irving 1960). Although weight seems to be a primary factor in whether or not a species mobs, agility in flight and bill shape, size, and hardness may also be involved.

Two disadvantages may accrue to "timid" shorebirds that nest near "bold" ones. First, they may be harassed, as we saw the plovers harass the sandpipers when we flushed them from their nests. David McDonald (pers. comm.), saw a Black-bellied Plover chase a Buff-breasted Sandpiper at Prudhoe Bay. Similarly, Nikki Ellman (pers. comm.) found Ruddy Turnstones to be aggressive toward most shorebirds that entered their territories on the Canning River delta, Alaska, in 1980, including six instances involving Buff-breasted Sandpipers. A second disadvantage to the sandpipers might be the attraction of predators by the conspicuous plovers, in particular mammalian predators that the plovers would be unable to repel.

We have no direct evidence of any protection afforded these Buff-breasted Sandpiper nests relative to other shorebird species, as not one of 37 shorebird nests that we found and checked regularly at Cambridge Bay in 1975 was taken by a predator (some had not hatched as of our departure). No arctic foxes (*Alopex lagopus*) were present, but at least

one pair of Parasitic and three pairs of Long-tailed jaegers nested in our study area. This is a surprisingly low predation rate for an area with resident jaegers (cf. Norton 1973).

In summary, we observed two female Buff-breasted Sandpipers nesting near a pair of Black-bellied Plovers. We argue that the potential benefits of nesting near a species that regularly attacked and drove off avian egg-predators led the sandpipers to choose nest sites within the "protective umbrella" of the plovers. Although our observations are anecdotal, we believe they indicate a good example of "timid" shorebirds nesting near "bold" ones as an anti-predator adaptation. This phenomenon could be a factor influencing shorebird nest distribution and deserves more detailed study.

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FOOD THEFT IN THE PRESENCE OF ABUNDANT FOOD IN HERRING GULLS

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While observing Herring Gulls (*Larus argentatus*) in another study, we noticed that gulls frequently stole from each other, although food was abundant. While kleptoparasitism is well documented in gulls and other birds (e.g., Hulsman 1976, Morrison 1978, Taylor 1979), and the utility of food theft has been examined (Kushlan 1978), we wished to investigate possible non-nutritional causes of food theft. To do so, we first quantified the occurrence of theft on feeding gulls at a refuse dump, then measured how often Herring Gulls chose theft when food was plentiful.

We ran two types of experiments, both using small feeding stations for the gulls. Category I trials, involving one station, were designed to study how often a gull would be the object of attempted robbery when it discovered a piece of food that required handling. Category II trials used two feeding stations and were designed to investigate how often gulls chose to steal from a feeding conspecific when abundant food was available nearby. We conducted all experiments at a refuse dump near Wakefield, Rhode Island, which had a reliably high gull population and abundant food. We used a vehicle as an observation blind. The two 15 cm × 22 cm feeding stations were made of plywood, with a shallow food bowl in the center. Two 20-cm steel stakes driven through the base of each station anchored them in one spot during experimental trials. In all trials, we placed the feeding station(s) in the secondary feeding area (Monaghan 1980), crumbled a bread slice into each food bowl, and returned to the vehicle blind, approximately 50 m away. We did not use the primary feeding area, some 100 m away, because refuse was actively being covered over and gull feeding was too frenzied for us to accurately observe sequences of events.

For Category I trials, we placed one feeding station in a secondary feeding area and returned to the vehicle. The trial began when a Herring Gull found the bread and began eating. We classed trials as "no theft" if the gull ate all the food without intervention by another gull. If a second gull approached the first and was chased off, we classed the trial as "attempted theft." If the second gull displaced the first at the food, we classed the trial as "successful theft." Twenty-five Category I trials were run.

For Category II trials, we baited two feeding stations with one crumbled bread slice each, placed them in a secondary feeding area 1 m apart, and returned to the vehicle. When a Herring Gull found either station, the trial was begun. If the gull finished eating the bread in one