

The promiscuous Pectoral Sandpiper

“nothing evokes North Slope tundra more certainly than a male Pectoral Sandpiper, hooting through chilled Alaskan mist”

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AT BARROW, ALASKA, the Pectoral Sandpiper season begins with a few distant hoots sometime between the 5th and 10th of June. At first hearing one has difficulty accepting its source as avian. The hoot is a fog horn, a sonar beam, an electronic oscillator bearing no relation to the sounds about it. Even after bird and call are linked it seems preposterous. The way the call is made, the bodily distortions that male goes through to make its hoot, are visually just as odd as is the sound unworldly.

To appreciate the full dimensions of a Pectoral male in hoot display, one must start with some anatomical details. The chief character is the male's breast sac,

a pendulous, fat-filled organ hanging prominently even while the male stands immobile (Fig. 1). Its outline is enhanced by sharp contrast with the white vent, and more still by the way the male erects his feathers to expose their darker base.

But the sac comes into its own when the male takes flight to hoot (Fig. 2). He flies low over the tundra, often within a few centimeters of the upper blades of grass and sedge. As he flies, the sac balloons out to a bosom of immense proportions. He pumps it up and down, in synchrony with the hoot and often counterpoint to each wingbeat. The hoot itself is vaguely owl-like, a resonant,

deep *oó-ah, oó-ah, oó-ah* each syllable separated by a moment's silence and repeated two or three times per second for 10 to 15 seconds (Fig. 3 and record).

Viewing this display in profile is startling, but imagine what a female Pectoral sees. More often than not she serves as the focus of his flight: the male's path takes him directly over her in mid-hoot, perhaps only 5 cm from her head as she feeds in the grass. He looms an additional one-fourth to one-third bulkier than she and inflated in display, even bigger. Picture the view, were you she, of this throbbing, hooting mass suddenly swooping in low over the tundra, bearing down with sac

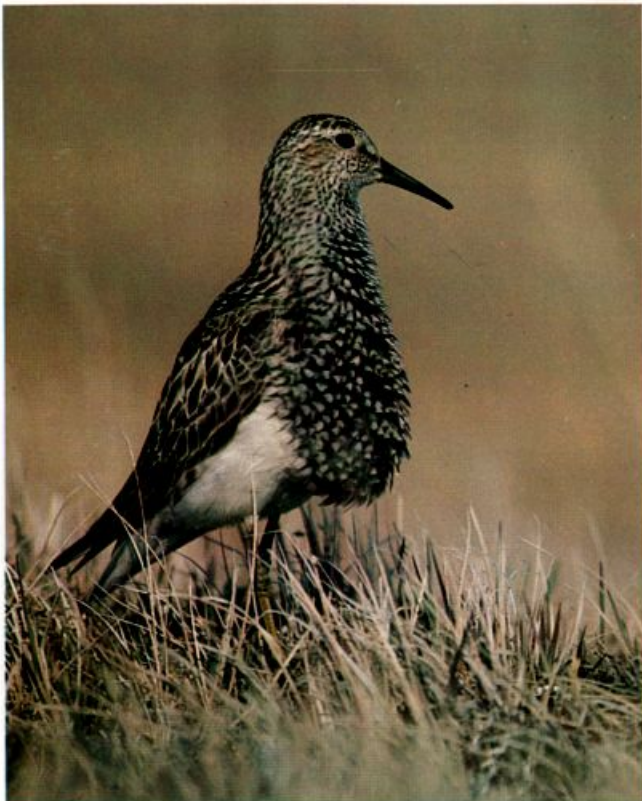


Figure 1. Male Pectoral Sandpiper surveying his territory from atop a tundra polygon.

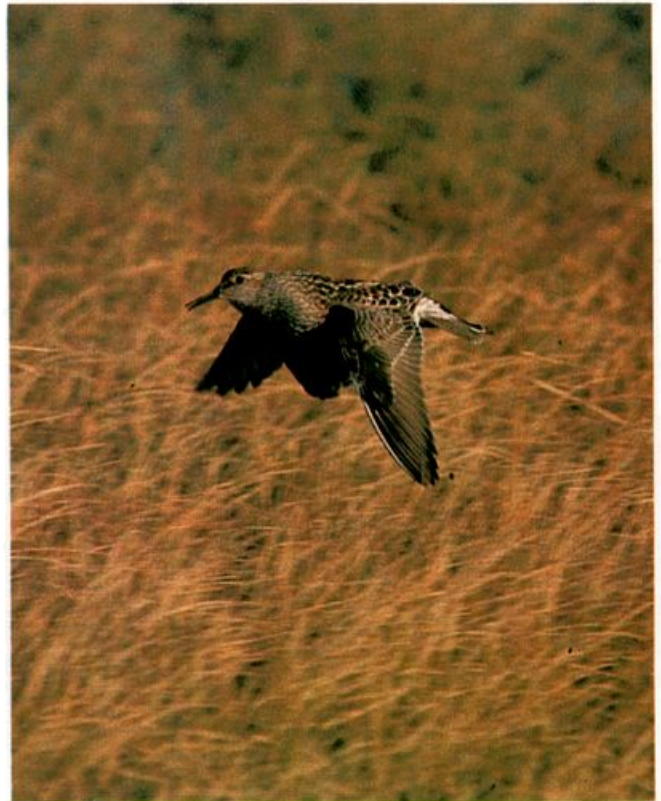


Figure 2. Male Pectoral Sandpiper in hoot display. The breast sac inflates and pumps up and down as the male hoots in flight.

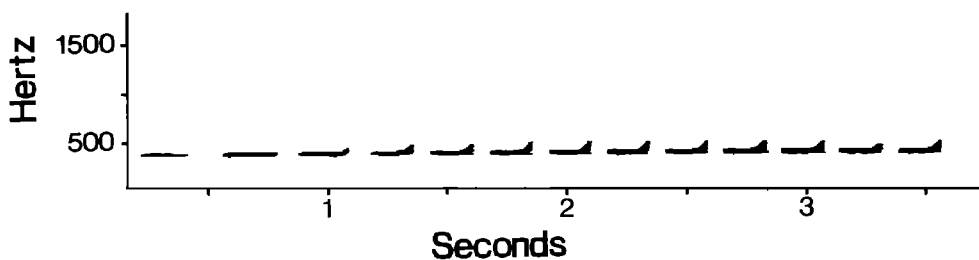


Figure 3. Sonograph of hoot by male Pectoral Sandpiper. The hoots increase in loudness from first note to last note (indicated by increasing darkness of sonograph from left to right) occurs because the bird was flying toward the microphone as it was being taped.

bouncing, wings pumping, and hoot pulsing all in your direction. In this perspective, it is best described as something out of the film "Close Encounters of the Third Kind."

Once beyond the female, the male flaps on. He quickly stops calling and changes his wingbeat cadence to a series of shallow, rapid flutters, each alternating with a soaring glide, never rising more than a few meters above the tundra surface (Fig. 4). The glide entails an awkward, hanging posture (Fig. 5).

Within 20 or 30 seconds, a sequence of these bouts carries the male in a broad arc, perhaps 50 to 100 meters away at most, until he circles back to the tundra mound from which he first took off. He lands there abruptly, runs erect to the crest, and stands to survey the scene while preening the dark bases of the feathers on his breast.

SOON HIS APPROACH to the female becomes more direct. He begins with a guttural, low call—a series of brief muted growls repeated from the ground once every one or two seconds for up to several minutes. Tail cocked, he then runs to her side, and if she stays, his posture becomes even more exaggerated (Fig. 6). He droops his wings, the breast sac balloons down and starts to jounce, and suddenly he escalates his voice, not in volume but in sheer fervor. It is a complex vocalization: a muted version of the hoot laid over a background of growls, heightened to an incessant, grating squawk. These two sounds together, hoot over growl, combine in a rolling boil of noise that rises and falls in volume through a repeated cycle of 2-3 seconds' duration.

This ushers in the final stage of pre-

copulatory display (Fig. 7). The male maneuvers to behind the female, wings up and waving, neck stretched out but weaving up and down through an arc of some 60 degrees. His calls take on a frenzied, wheezing pitch.

If the female turns him down, and more often than not she does, this whole sequence can last but a few seconds. But if she stays it may go on a minute or more before he finally mounts her. Throughout copulation, his calls and gestures continue unabated.

In sharp contrast to this reaction to visiting females, a resident male shows no tolerance to territorial violations by other males. Males employ a suite of behaviors to repel intruders, and their interactions regularly flare into feather-pulling fights. These break out in the midst of long border walks: neighbors marching parallel along shared bound-

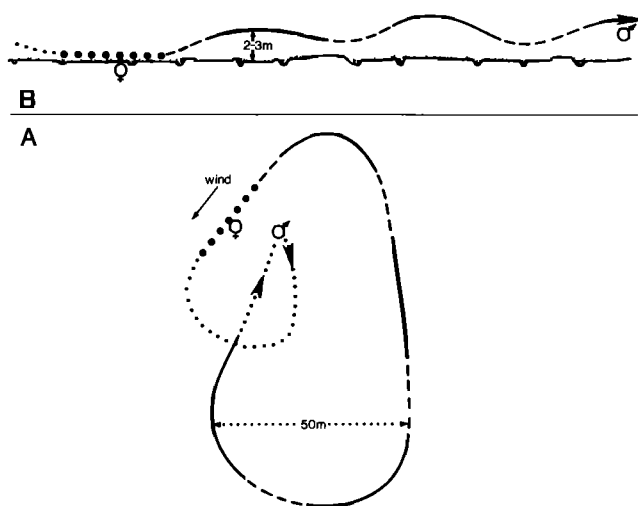


Figure 4. Diagram of hoot display path of a male Pectoral Sandpiper. A. View from above. Taking off downwind from a tundra polygon, the male circles upwind (small dotted line) and then lowers into a hoot display over the female (large dotted line). After passing the female, he rises into an alternative sequence of power flutters (dashed line) and soars (solid line), circling broadly back toward his starting point. B. View from side. While hooting the male is only a few centimeters above the tundra surface. In his post-hoot soar he rises 2-3 m above the ground. The cross-section of tundra shows the strongly polygonized ground characteristic of Alaska's North Slope coastal plain.

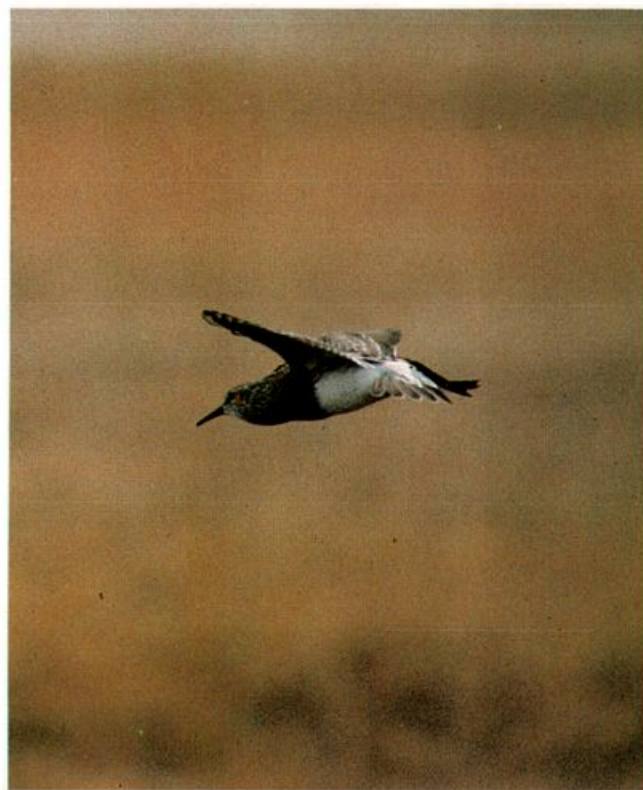


Figure 5. Male Pectoral Sandpiper in post-hoot soar. As he holds this posture he swivels his tail to control flight direction.



Figure 6. Display by male Pectoral Sandpiper as he approaches a female. Wings are drooped, tail is cocked, and he is growling.

aries, bowing and feinting with necks outstretched and wings lowered (Fig. 8).

As unlikely as all of these events and displays may seem, the full extravagance of a Pectoral male's behavior can be appreciated only with complete detail on its promiscuous social ways. Pectoral Sandpiper, *Calidris melanotos*, belongs to a subfamily of shorebirds, the calidridine sandpipers, that contains a remarkable array of mating systems (Pitelka *et al.* 1974, Myers 1981). This group's social patterns run the gamut from boringly monogamous Dunlin, *C. alpina* (Holmes 1966), all the way to lekking species like Ruff, *Philomachus pugnax* (Hogan-Warburg 1966), and Buff-breasted Sandpiper, *Tryngites subruficollis*. Pectoral Sandpipers' behaviors fall near these latter species (Pitelka 1959).

Males mate promiscuously. They display toward almost any female that lands on their territory, or to those merely flying by. In fact, male Pectoral Sandpipers can be even less discriminating: we have seen one mount a dead male Red Phalarope, *Phalaropus*



Figure 7. Final precopulatory stages of display for male Pectoral Sandpiper. These postures are accompanied by a fervent squawk that rises in intensity as he prepares to mount.

fulicarius, and yet another court unfledged Dunlin. No Pectoral male, moreover, is deterred by already having a mate in the thick of egg-laying: males will alternate within the hour, first attending one female with an egg or two laid toward her final clutch of four, and then switching to other, new arrivals.

FEMALE BEHAVIOR is more enigmatic. No female has ever been seen mating with more than one male, and a female spends most of her time within the confines of a single male's territory. Yet she strays to other areas on occasion. And when she does, her response to other males' attentions is much the way she interacts with her usual mate in precopulatory display. Thus it may be that females allow several males to sire a single clutch—but we need more observations.

A male's role in parenthood stops with clutch completion. He takes no part in incubation or brooding, nor does he help build the nest. In fact, most males depart for wintering grounds in southern South America before the eggs have pipped. Thus females are left to

hatch and raise the brood alone (Fig. 9), and they leave the breeding grounds well before the young do.

This pattern of mating shares several features with that of lekking species—male promiscuity and absence of male parental care, females visiting more than one male and possibly having more than one male father her clutch. It differs however, in a few key regards. Pectoral Sandpiper territories are spread broadly over the tundra, and show few hints of clustering other than what might result as birds crowd together in more desirable sites. The territories range in size from under one hectare to over 10. Moreover, the territory is an important food source for both male and female sandpipers. In contrast, males of lekking species defend territories often only a few meters in diameter, tightly clustered together in an arena, the lek. These defended sites are used for display, but generally not for feeding, especially not by females.

For all the drama and intensity of events that lead to copulation in Pectoral Sandpipers', actual observations of the final step are infrequent, without



Figure 8. Two territorial male Pectoral Sandpipers in a parallel border march.

persistent effort. Most interactions between male and female end unconsumated. What makes this odd is that copulations in other breeding shorebirds near Barrow are witnessed frequently, despite their more Victorian social patterns. In fact, the general pattern across this group of sandpipers is that those with more promiscuous mating habits are also less conspicuous in their actual copulation, even if precopulatory events are more exaggerated.

Such are the displays and social system of the promiscuous, preposterous Pectoral Sandpiper. These birds, their sounds and manners, form the essence of June on the the north Alaskan coastal plain: for anyone who's been there, nothing evokes North Slope tundra more certainly than a male Pectoral Sandpiper, hooting through chilled Alaskan mist.

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LITERATURE CITED

- HOGAN-WARBURG, A. J. 1966. Social behaviour of the ruff, *Philomachus pugnax* (L.) *Ardea* 54:109-225.
- HOLMES, R. T. 1966. Breeding ecology and annual cycle adaptations of the red-backed sandpiper (*Calidris alpina*) in northern Alaska. *Condor* 68:3-46.
- MYERS, J. P. 1979. Leks, sex, and Buff-breasted Sandpipers. *Amer. Birds* 33:823-825.
- . 1981. Cross-seasonal interactions in the evolution of sandpiper social systems *Beh. Ecol. Sociobiol.* 8:195-202.
- PITELKA, F. A. 1959. Numbers, breeding schedule, and territoriality in Pectoral Sandpipers of northern Alaska. *Condor* 61:233-264.
- , R. T. HOLMES, and S. F. MAC LEAN, JR. 1974. Ecology and evolution of social organization in arctic sandpipers. *Am. Zool.* 14:185-204.

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Figure 9. Female Pectoral Sandpiper brooding chicks. (All photos/ J. P. Myers).