



## NORTH AMERICAN SECTION No. 8

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## ANNOUNCEMENTS

### Colour-marking

A number of colour-marking schemes will again be active in 1981 and observers are asked to be on the lookout for birds marked both this summer and in previous years. Details to be noted include species, date, place, colour of any dye and part of bird marked, and colour, number and position of colour-bands and metal band, including whether the bands were located on the 'upper' or 'lower' leg. Where the origin of the bird can be determined, a report may be sent directly to the bander as well as to the U.S. Banding Laboratory, U.S. Fish & Wildlife Service, Office of Migratory Bird Management, Laurel, Maryland 20811, U.S.A. The following are some of the schemes known to be operating in 1981 or in recent years - a fuller list is given in WSG Bulletin No. 29, N.A. Section No. 6, p. 27. Please contact the Editor if you would like a colour-marking scheme advertised.

1. C.W.S. Studies in James Bay The large-scale shorebird banding program run by the Canadian Wildlife Service in James Bay, Canada, will be continued in 1981. Birds are marked with picric acid and yellow or light blue colour-bands. Full details of sightings should be sent to Dr. R.I.G. Morrison, Canadian Wildlife Service, 1725 Woodward Drive, Ottawa, Ontario, Canada. K1A 0E7.

2. Red Knot A program of coordinated banding studies to investigate the migration of the Red Knot is being carried out by the Manomet Bird Observatory, with the involvement of the Canadian Wildlife Service. Over the past year, MBO staff have captured Red Knot in New Jersey, Massachusetts and Florida, and fieldwork is planned in Argentina in April 1981. Birds are being marked with picric acid and colour-bands. We are requesting anyone observing Red Knot to make a special effort to examine the birds for dye or colour-bands and to report any sightings to Brian A. Harrington, Manomet Bird Observatory, Manomet, Massachusetts 02345, U.S.A. - telephone (617)-224-6521. General observations on concentrations of Red Knot would also be very much appreciated, including reports where it can be ascertained that there were no colour-marked birds in a flock.

3. Other projects Please see listing in WSG Bulletin No. 29, N.A. Section No. 6, p. 27. Additional projects include: Marbled Godwits on Bodega Bay, California, by Peter G. Connors, Semipalmated Sandpipers at Churchill, Manitoba by Cheri L. Gratto and Baird's Sandpipers on Ellesmere Island by B. Witts and R.I.G. Morrison.

### International Shorebird Survey Scheme

The I.S.S./Maritimes Shorebird Survey scheme will continue in 1981. It is providing very useful data on shorebird distribution over a wide geographical area and we should welcome the participation of both old and new volunteer observers. We are especially interested in expanding the survey network in Central and South America. If you are able to assist with the surveys or know of anyone else who might, please contact one of the following:

1. for areas in Canada: Dr. R.I.G. Morrison, at the address above,
2. for areas in the U.S.A., the Caribbean, Central and South America: Brian A. Harrington, Manomet Bird Observatory, Manomet, Massachusetts 02345, U.S.A.

## PREDATOR-MOBGING BEHAVIOUR IN THE SHOREBIRDS OF NORTH AMERICA

by Tex A. Sordahl

The function, context and control of mobbing are poorly understood (Curio 1978). Its presence or absence in a species does not relate simply to taxonomy (Altmann 1956). And while some attempts have been made to interpret the likelihood of mobbing as a function of social grouping patterns, especially the probability of having kin nearby (Rohwer et al. 1976), other factors must be involved. For example, some evidence suggests that mobbing is more common among larger species of related taxa (Hamilton 1975). In an attempt to gain insights about mobbing, I examined its occurrence in the North American Charadrii. The results of my survey are presented here. The determinants and functions of shorebird mobbing will be discussed in greater detail elsewhere (Sordahl ms).

At least four types of shorebird behaviour could be interpreted as mobbing: (1) the tendency of nonbreeding flocks of some species to follow or track hunting raptors while making rapid maneuvers; (2) the tendency of many shorebirds to respond to their flockmates' distress screams by flying around them (Rohwer et al. 1976); (3) the tendency of individuals to be attracted to predators, circle around them or even land nearby (e.g. Sordahl 1979: 566; see interpretation in Kruuk 1979); (4) the swoop-diving or dive-bombing displays, and the actual chasing of potential predators, that many shorebirds exhibit. In this paper I restrict the term mobbing to the last category of behaviours which should perhaps be referred to as attack-mobbing. Thus, I exclude behaviours which may be only curiosity or escape behaviours, and limit mobbing to actions which have a more direct anti-predator function. Several shorebirds exhibit a behaviour, apparently evolved specifically to prevent ungulates from stepping on nests, in which the incubating bird allows the mammal to approach within 1-2 steps before flushing into its face; this may deflect the mammal, but it should not be considered mobbing.

I classified shorebirds as either mobbers or non-mobbers, based on personal experience and questionnaires sent to researchers who have extensive field experience with particular species. The questionnaire explained the definition of mobbing used here and inquired simply whether or not a species had ever been observed mobbing potential predators of adults, eggs or chicks.

Table 1. Size and occurrence of mobbing behaviour in shorebirds breeding in North America

Species	weight in grams <sup>a</sup>	mobbing <sup>b</sup>	reference <sup>c</sup>
<b>Jacaniidae</b>			
American Jacana <u>Jacana spinosa</u>	m-85, f-113	yes	Jenni & Betts 1978
<b>Haematopodidae</b>			
American Oystercatcher <u>Haematopus palliatus</u>	680	yes	MAH, DFP
Black Oystercatcher <u>Haematopus bachmani</u>	709	yes	DJM
<b>Recurvirostridae</b>			
American Avocet <u>Recurvirostra americana</u>	340	yes	DFP, TAS
Black-necked Stilt <u>Himantopus mexicanus</u>	128-170	yes	TAS
<b>Charadriidae</b>			
Semipalmated Plover <u>Charadrius semipalmatus</u>	64	no	DDG, MAH, BK, DFP
Wilson's Plover <u>Charadrius wilsonia</u>	64	no	MAH
Killdeer <u>Charadrius vociferus</u>	99	no	TAS
Piping Plover <u>Charadrius melodus</u>	43-64	no	MAH, DFP
Snowy Plover <u>Charadrius alexandrinus</u>	57	no	TAS
Mountain Plover <u>Charadrius montanus</u>	107 <sup>d</sup>	no	WDG
Lesser Golden Plover <u>Pluvialis dominica</u>	113-170	yes	DFP, Drury 1961:181
Black-bellied Plover <u>Pluvialis squatarola</u>	283	yes	JPM, DFP, H8hn 1957
<b>Scolopacidae</b>			
<b>Calidridinae</b>			
Surfbird <u>Aphriza virgata</u>	142-184	no	SFM, RBW
Red Knot <u>Calidris canutus</u>	142	yes	DFP, Bent 1927
Sanderling <u>Calidris alba</u>	57-89	no	DFP, Parmelee 1970
Semipalmated Sandpiper <u>Calidris pusilla</u>	23-43	no	SFM, DFP, FAP, TAS
Western Sandpiper <u>Calidris mauri</u>	23-43	no	DS, DT
Rufous-necked Sandpiper <u>Calidris ruficollis</u>	17-28	no	BK
Least Sandpiper <u>Calidris minutilla</u>	17-28	no	JRJ, BK, DFP
White-rumped Sandpiper <u>Calidris fuscicollis</u>	35-50	no	TAS, Drury 1961
Baird's Sandpiper <u>Calidris bairdii</u>	35-64	no	BK, Drury 1961
Pectoral Sandpiper <u>Calidris melanotos</u>	57-92	no	SFM, DFP, FAP, TAS
Curlew Sandpiper <u>Calidris ferruginea</u>	99	no	FAP
Purple Sandpiper <u>Calidris maritima</u>	57-85	no	EHM
Rock Sandpiper <u>Calidris ptilocnemis</u>	57-85	no	DDG
Dunlin <u>Calidris alpina</u>	43-71	no	JRJ, SFM, DFP, FAP
Stilt Sandpiper <u>Micropalama himantopus</u>	50-71	no	JRJ, EHM, Jehl 1973
Buff-breasted Sandpiper <u>Tryngites subruficollis</u>	57-85	no	PM, JPM, DFP
<b>Gallinaginae</b>			
Common Snipe <u>Capella gallinago</u>	92-177	no	BK, TAS, RBW
Short-billed Dowitcher <u>Limnodromus griseus</u>	71-99	no	WEG, JRJ
Long-billed Dowitcher <u>Limnodromus scolopaceus</u>	128	no	BK, DS, DT
<b>Scolopacinae</b>			
American Woodcock <u>Philohela minor</u>	m-156, f-213	no	TJD, OSP
<b>Tringinae</b>			
Hudsonian Godwit <u>Limosa haemastica</u>	255-359	yes	JRJ, DFP, Hagar 1966
Bar-tailed Godwit <u>Limosa lapponica</u>	198-454	yes	BK, Bent 1927
Marbled Godwit <u>Limosa fedoa</u>	269-510	yes	WEG, KFH, MAH
Eskimo Curlew <u>Numenius borealis</u>	454	?	
Whimbrel <u>Numenius phaeopus</u>	567	yes	JRJ, BK, DFP, Skeel 1978
Bristle-thighed Curlew <u>Numenius tahitiensis</u>	340-454	yes	Allen 1948:760
Long-billed Curlew <u>Numenius americanus</u>	907	yes	DFP, TAS
Upland Sandpiper <u>Bartramia longicauda</u>	170-198	yes	Bowen 1975
Greater Yellowlegs <u>Tringa melanoleuca</u>	163-227	yes	Gabrielson 1944
Lesser Yellowlegs <u>Tringa flavipes</u>	78-128	yes	Randall 1961, Matthiessen 1967:100
Solitary Sandpiper <u>Tringa solitaria</u>	43-64	no	BK, RBW
Spotted Sandpiper <u>Actitis macularia</u>	36-70 <sup>e</sup>	no	LWO
Wandering Tattler <u>Heteroscelus incanus</u>	71-135	no	RBW, Weeden 1965
Willet <u>Catoptrophorus semipalmatus</u>	177-340	yes	MAH, TAS
<b>Arenariinae</b>			
Ruddy Turnstone <u>Arenaria interpres</u>	128	yes	DFP, TAS, Bent 1929
Black Turnstone <u>Arenaria melanocephala</u>	128	yes	CMH, Bent 1929
<b>Phalaropodinae</b>			
Wilson's Phalarope <u>Phalaropus tricolor</u>	43-85	no	TAS
Northern Phalarope <u>Phalaropus lobatus</u>	28-50	no	DFP, DS, DT
Red Phalarope <u>Phalaropus fulicarius</u>	43-64	no	DFP, FAP, DS, DT

<sup>a</sup>-converted to metric from Palmer 1967; most single values are upper limits, m-male, f-female

<sup>b</sup>-aggressive swooping at predators

<sup>c</sup>-initials represent personal observations (TAS) or personal communications from: TJD - Thomas J. Dwyer, DDG - Daniel D. Gibson, WEG - W. Earl Godfrey, WDG - Walter D. Graul, CMH - Colleen M. Handel, KFH - Kenneth F. Higgins, MAH - Marshall A. Howe, JRJ - Joseph R. Jehl, Jr., BK - Brina Kessell, SFM - Stephen F. MacLean, Jr., DJM - Dennis J. Martin, PM - Philip Martin, EHM - Edward H. Miller, JPM - J. Peter Myers, LWQ - Lewis W. Oring, DFP - David F. Parmelee, OSP - Olin Sewall Pettingill, Jr., FAP - Frank A. Piteika, DS - Douglas Schamel, DT - Diané Tracy and RBW - Robert B. Weeden.

<sup>d</sup>-from Graul 1973

<sup>e</sup>-L.W. Oring, pers. comm.

Table 1 presents the results for 51 of the 52 species that breed in North America. It is clear that only the larger species mob predators, and that mobbing does not follow taxonomic lines. Mobbing occurs in at least one species in every family. Within the large family Scolopacidae, mobbing occurs in three of six subfamilies. It is striking that most plovers do not mob, but that the two largest species do; that most calidridines do not mob, but that at least one of the two largest species does; and that most tringines do mob, but that the three smallest species do not. Within the Charadriidae it is also noteworthy that while few members of the Charadriinae mob, most if not all members of the larger-sized Vanellinae (which do not breed in North America) do (W.D. Graul pers. comm.). Although many morphological and ecological factors influence the antipredator behaviour of shorebirds, the occurrence of attack-mobbing appears to be largely size-dependent, with a size threshold at ca. 100-120 grams body weight. No information was available for the Eskimo Curlew, but the data obtained lead to the prediction that it is a mobbing species.

The relationship between size and mobbing has been noted previously in a general way. The occurrence of dive-bombing behaviour in various gulls, terns, jaegers and shorebirds led Hamilton (1975:86) to suggest that it originated in the ancestors of the Charadriiformes and has been retained by the larger species. Assuming that this order is monophyletic (Strauch 1976, 1978), such a view is appealing but would require the modification that the behaviour has also been lost in the Alcidae, a group whose poor aerobatic skills probably preclude efficient mobbing.

I found no evidence that any shorebird mobs predators in the non-breeding season; in fact, I suspect that mobbing is contingent upon the presence of eggs of young in all shorebirds, as it is in American Avocets and Black-necked Stilts (unpublished data). It is widely held that adult shorebirds protect themselves best from predators by forming flocks (Goss-Custard 1970, Page and Whitacre 1975, Shanewise and Herman 1979), some of the best evidence being that even species which are territorial in the winter form compact flocks when raptors appear (Myers 1980). Thus, the function of mobbing in shorebirds appears to be chiefly the protection of eggs and young. Secondly it may protect adults, who at nesting time abandon the safety of flocks to incubate on relatively isolated territories (if mobbing causes a predator to hunt that area less frequently).

Not apparent in Table 1 is that variation exists within the two categories, mobber and non-mobber. Relatively small mobbing species are less aggressive or are observed mobbing less often than larger mobbing species - e.g. Lesser Golden Plover (Drury 1961:213), Upland Sandpiper (K.F. Higgins pers. comm.), Lesser Yellowlegs (Gabrielson 1944, R. Frisch pers. comm.), Black-necked Stilt (pers. obs., Hamilton 1975:88). And large non-mobbing species are more aggressive than smaller non-mobbing species - e.g. Surf-bird (R. Frisch pers. comm.), Wandering Tattler (R. Frisch pers. comm.). Thus, there may be some scaling of behaviour with size.

Another intriguing possibility is geographical variation in mobbing behaviour. In a few cases, one of the observers listed in Table 1 reported that a species does not mob predators while other sources indicated that it does. I assumed that the few observer discrepancies resulted from differences in experience with particular species under the appropriate circumstances (it requires greater experience with a species to state confidently that it does not mob than to state that it does). However, information available on the Lesser Golden Plover suggests geographical variation. Observations throughout the breeding season indicate that the population at Barrow, Alaska, does not mob (pers. obs., J.P. Myers pers. comm., B.J. McCaffery pers. comm.), whereas other populations apparently do exhibit mobbing (D.F. Parmelee pers. comm., Drury 1961:181). If such geographical variation exists, it will be a challenge to specify the causal differences in selective regimes.

The breeding behaviour of several species and populations is poorly known; further study of breeding shorebirds, and compilations of the mobbing behaviour of shorebirds from other parts of the world, will clarify the ideas presented above. It is apparent from this brief review that the likelihood of mobbing in North American Charadrii is related to size. The regularity across different families in the threshold body weight is striking, particularly given the wide diversity of social systems represented in this group. Thus, in shorebirds it may be possible to explain the presence or absence of mobbing in quite simple terms, the principal determinants being that (1) young or eggs are nearby, and (2) an individual is large enough to have an effect on the predator.

#### Acknowledgements

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#### Addendum

I have recently received information that suggests geographical variation in the predator-mobbing behaviour of another shorebird species, the Upland Sandpiper. Observers have reported an absence of mobbing by Upland Sandpipers in Alaska (B. Kessel pers. comm.), Manitoba (E.H. Miller pers. comm.), and North Dakota (K.F. Higgins pers. comm.). However, Daniel E. Bowen (pers. comm.) described unequivocal examples of mobbing of humans and one instance of mobbing of a coyote (*Canis latrans*) in Kansas. He further opined that only parents with young weighing less than 30 g exhibit mobbing. If this is true, and certainly it is clear that in many species both the intensity and the form of antipredator behaviour change during the nesting cycle (pers. obs., unpubl. data), it underscores the importance of making observations throughout the breeding season.

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## WINTERING BEHAVIOUR AND SITE FAITHFULNESS OF AMERICAN GOLDEN PLOVERS *PLUVIALIS DOMINICA FULVA* IN HAWAII

by Oscar W. Johnson, Patricia Johnson and Philip Bruner

In August 1979, we initiated a comprehensive study of the wintering biology of the American Golden Plover on the island of Oahu, Hawaii. The major areas under investigation are: behaviour, moult and fat cycles, and the chronology of migration. Certain preliminary findings through October 1980 can be reported at this time.

Adult plovers reach their wintering grounds beginning in August. Most still retained one quarter to one half of their breeding plumage upon arrival. Juveniles did not begin to arrive until late September.

During the winter of 1979-80, we caught plovers in mist-nets and colour-banded them for individual identification. We subsequently chronicled the behaviour of 37 marked birds over extended periods through spring migration, 25-26 April 1980.

The wintering population was composed of territorial and non-territorial birds in approximately equal proportions. Of the banded birds, 23 were territorial and 14 non-territorial. Territories were occupied in a wide range of habitats, with lawns and brushy pastures especially favoured. Territorial birds fed, loafed, preened, and slept on their territories during daylight hours for the entire winter cycle. At night, they roosted communally on nearby small islands. (Note: The study site for this work lacked the urban roof-top roosts found elsewhere on the island: such roosts are described in the next paper.- Ed.). Territorial defence behaviours ranged from brief confrontations and chases to violent aerial fights, and were particularly intense during territory establishment in fall. Based on collected specimens, some juveniles of both sexes established territories, but most territory holders were adults, predominantly males.

In fall 1980, 30 of 37 marked birds (81%) returned to the study area. Each returning individual behaved as it had during the previous winter: in all, 16 territorial and 14 non-territorial. Moreover, each of the territorial birds reoccupied the same territory it had defended previously.

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