

WINTERING WADERS IN THE EBRO DELTA

by A. Martinez Vilalta

This article presents a summary of the results of a research programme into waders wintering in the Ebro Delta (NE Spain). The wintering population was counted in January between 1977 and 1983 and monthly counts were made from September to March for the winters 1979/80, 1980/81 and 1981/1982 to observe the fluctuations of the different species during the winter. Various aspects of habitat selection and daily activity have been studied. These are particularly interesting as they are subjects about which little or nothing is known in the Mediterranean area.

The study was carried out in the Ebro Delta, an extensive alluvial plain of 32 000 ha., with a surface area of some 16 700 ha. suitable for waders. Paddyfields dominate the landscape, comprising nearly half the total surface area, while lagoons, salt-marshes and salt-pans are also important. The coastal zone is characterized by two extensive bays and one small one. Man's influence on the environment of the Delta is considerable and the whole hydrological system is dependent on the rice-farming (Motis et al. 1981, Martinez-Vilalta 1984). Tides are of little importance as the average tidal range is only of some 15-20 cm, though at irregular intervals

the level can vary up to 50 cm. and even over one metre very occasionally.

THE WINTERING POPULATION

21 counts were made (see Table 1). Except in the cases of Golden Plover *Pluvialis apricaria*, Lapwing *Vanellus vanellus* and Snipe *Gallinago gallinago* the counts represent the total wintering population. All were carried out in the feeding areas, since the roosting areas of the Delta are unsuitable for such counts.

Within the Mediterranean region, the Delta is an important wintering ground and, most arrivals of the 12 000 to 20 000 wintering birds arrive in October and November. Numbers remain steady until March, when most birds leave. The average for the month of January in the years 1977/83 was 16 400 birds, with a maximum of 19 200. The wintering population of coastal waders is very stable (9500 - 13 400 birds) and most of the annual variations are caused by species that feed inland or in paddy-fields, especially Golden Plover, Lapwing, Snipe and Black-tailed Godwit *Limosa limosa*. The highest numbers occur in February (mean 17 500). Spring migration begins at this time, and is especially noticeable in the

Table 1a. Wader counts made in the Ebro Delta from January 1977 until winter 1979/80.

	1977		1979				1980		
	15-16 Jan	14-16 Jan	17-19 Mar	12-13 Sept	11-22 Oct	19-21 Nov	17-19 Dec	27-29 Jan	18-20 Feb
<i>Haematopus ostralegus</i>	-	2	20	-	-	-	4	1	-
<i>Himantopus himantopus</i>	-	1	70	18	2	-	-	-	-
<i>Recurvirostra avosetta</i>	-	300	396	552	334	324	224	225	275
<i>Glareola pratincola</i>	-	-	1	-	1	-	-	-	-
<i>Charadrius dubius</i>	-	-	4	91	-	1	10	-	-
<i>Charadrius hiaticula</i>	-	13	2	54	75	-	37	65	-
<i>Charadrius alexandrinus</i>	64	32	107	574	88	71	70	50	44
<i>Pluvialis apricaria</i>	150	21	-	-	45	1	-	1250	331
<i>Pluvialis squatarola</i>	691	600	627	10	37	140	398	516	704
<i>Vanellus vanellus</i>	1532	1550	20	20	236	272	193	2106	538
<i>Calidris canutus</i>	-	-	3	1	-	-	-	-	-
<i>Calidris alba</i>	95	61	108	76	41	42	26	82	105
<i>Calidris minuta</i>	-	552	77	520	452	403	689	931	1087
<i>Calidris temminckii</i>	-	-	-	-	1	1	-	-	-
<i>Calidris ferruginea</i>	-	-	-	171	1	-	-	-	-
<i>Calidris alpina</i>	8485	7984	6503	857	724	5178	8909	7782	8289
<i>Philomachus pugnax</i>	7	1	64	6	271	9	143	145	154
<i>Lymnocyptes minimus</i>	-	-	-	-	-	-	-	-	-
<i>Gallinago gallinago</i>	3331	3115	12	125	1487	2635	3878	1124	750
<i>Limosa limosa</i>	2589	1050	754	360	2640	1944	3797	2182	6992
<i>Limosa lapponica</i>	10	37	-	41	18	7	20	13	10
<i>Numenius phaeopus</i>	-	8	-	9	-	-	-	-	-
<i>Numenius arquata</i>	102	117	152	9	11	22	38	117	95
<i>Tringa erythropus</i>	1	17	22	109	532	66	12	105	33
<i>Tringa totanus</i>	770	410	1051	505	86	495	474	505	806
<i>Tringa stagnatilis</i>	-	-	1	-	10	-	-	-	-
<i>Tringa nebularia</i>	1	31	4	17	4	51	6	3	4
<i>Tringa ochropus</i>	-	7	-	3	14	3	5	-	1
<i>Tringa glareola</i>	-	1	-	150	-	2	-	2	1
<i>Actitis hypoleucos</i>	-	1	-	8	8	1	-	1	-
<i>Arenaria interpres</i>	1	6	1	1	-	2	5	3	-
<i>Phalaropus lobatus</i>	-	-	-	-	1	-	-	-	-
<i>Charadrius sp.</i>	-	-	-	-	-	9	-	-	-
<i>Pluvialis sp.</i>	600	-	-	-	-	-	-	-	-
<i>Calidris sp.</i>	25	1250	-	-	-	40	-	100	-
<i>Tringa sp.</i>	763	-	-	233	-	-	-	-	-
TOTAL	19217	17167	10000	4520	7119	11719	18938	17308	20219

Table 1. Wader counts made in the Ebro Delta during winters 1980/81 and 1981/82, and in January 1983.

	1980		1981			1981				1982			1983	
	21-24 Dec	19-22 Jan	19-22 Feb	19-21 Mar	22-25 Sept	19-22 Oct	16-19 Nov	21-24 Dec	25-27 Jan	17-19 Feb	15-17 Mar	16-18 Jan		
<i>Haematopus ostralegus</i>	3	-	14	12	1	-	-	5	-	10	4	6		
<i>Himantopus himantopus</i>	-	-	-	51	23	-	-	-	-	-	13	-		
<i>Recurvirostra avosetta</i>	85	301	310	663	344	221	150	57	206	214	472	165		
<i>Glareola pratincola</i>	-	-	-	-	-	-	-	-	-	-	-	-		
<i>Charadrius dubius</i>	-	-	-	-	-	-	-	-	-	-	19	-		
<i>Charadrius hiaticula</i>	141	98	78	36	28	26	43	69	147	128	88	140		
<i>Charadrius alexandrinus</i>	76	121	38	109	1206	183	83	220	95	57	134	93		
<i>Pluvialis apricaria</i>	-	196	16	-	-	-	50	6	16	144	8	162		
<i>Pluvialis squatarola</i>	528	916	1021	235	9	27	303	110	335	119	357	610		
<i>Vanellus vanellus</i>	1129	908	25	3	-	4	188	277	562	188	9	738		
<i>Calidris canutus</i>	-	-	-	-	-	-	-	-	-	-	-	-		
<i>Calidris alba</i>	56	25	110	35	70	126	77	22	36	113	6	73		
<i>Calidris minuta</i>	400	710	770	543	409	537	1322	730	733	479	474	867		
<i>Calidris temminckii</i>	-	-	-	-	68	-	-	-	-	-	-	-		
<i>Calidris ferruginea</i>	-	-	-	-	-	-	-	-	-	-	-	-		
<i>Calidris alpina</i>	10119	9267	9862	3444	2263	3183	7384	4400	9576	7623	5128	8004		
<i>Philomachus pugnax</i>	25	25	48	153	26	61	72	-	94	2	600	6		
<i>Lymnryptes minimus</i>	1	-	-	-	-	-	-	-	-	-	-	-		
<i>Gallinago gallinago</i>	1429	829	379	19	55	172	2732	950	247	789	57	940		
<i>Limosa limosa</i>	1761	1716	3514	1277	1067	2053	1829	1217	721	4316	1297	2289		
<i>Limosa lapponica</i>	25	73	67	66	48	6	29	1	1	37	3	4		
<i>Numenius phaeopus</i>	-	-	-	-	-	-	-	-	-	-	-	-		
<i>Numenius arquata</i>	198	127	150	57	10	72	68	37	74	66	27	70		
<i>Tringa erythropus</i>	97	70	98	30	288	130	112	116	6	23	43	27		
<i>Tringa totanus</i>	839	478	831	1929	445	918	819	409	719	605	1910	707		
<i>Tringa stagnatilis</i>	-	-	-	-	-	-	-	-	-	-	-	-		
<i>Tringa nebularia</i>	5	6	9	10	19	44	2	-	4	6	6	6		
<i>Tringa ochropus</i>	11	6	2	2	15	2	14	3	-	-	-	1		
<i>Tringa glareola</i>	5	-	-	2	73	1	3	-	-	-	3	-		
<i>Actitis hypoleucos</i>	1	-	2	2	10	-	-	-	-	-	2	1		
<i>Arenaria interpres</i>	8	11	-	6	5	1	-	1	-	-	5	9		
<i>Phalaropus lobatus</i>	-	-	-	-	-	-	-	-	-	-	-	-		
<i>Charadrius sp.</i>	-	-	-	-	-	-	-	-	-	-	-	-		
<i>Pluvialis sp.</i>	-	-	-	-	-	-	-	-	-	-	-	-		
<i>Calidris sp.</i>	-	-	-	-	-	40	-	-	30	-	-	151		
<i>Tringa sp.</i>	-	-	-	-	-	1	-	-	-	-	-	-		
TOTAL	16942	15873	17344	8684	6482	7808	15280	8630	13602	14919	10665	15069		

Black-tailed Godwit. The dominant species is always the Dunlin *Calidris alpina*, which normally comprises about 50% of the total wintering wader population. Of particular interest is the presence of species such as Little Stint *Calidris minuta* and Black-tailed Godwit, and in the context of the Mediterranean the Delta is also important for Grey Plover *Pluvialis squatarola*, Dunlin and Snipe.

DAILY ACTIVITY

In the Delta waders feed during all the daylight hours: between ten and eleven hours a day in the winter. The two species studied in greatest depth, Dunlin and Black-tailed Godwit, feed all day, the periods with most feeding activity being dawn and dusk and that of least being the middle of the day (Figure 1). The importance of nocturnal feeding for the different species was not studied. It is only known that Black-tailed Godwit does not feed at night, while most other species feed intensively around dusk and do continue after dark.

Table 2. Feeding time spent by different species of waders during daylight (10-11 hours) in winter (December-January).

	Feeding time (%)	Birds sampled
<i>Pluvialis squatarola</i>	24.7	198
<i>Calidris minuta</i>	96.7	93
<i>Calidris alpina</i>	66.5	1755
<i>Limosa limosa</i>	84.9	1545
<i>Tringa totanus</i>	70.9	117

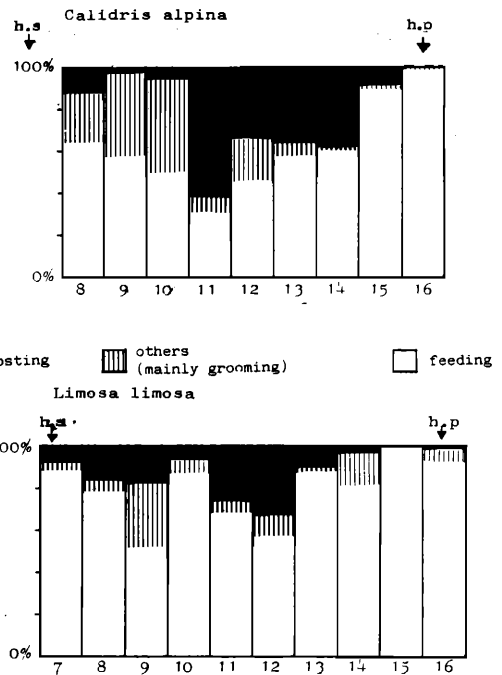


Figure 1. Daily activity patterns of Dunlins and Black-tailed Godwits during mid-winter (December-January). The day divided in one-hour periods. h.s. = sunrise, h.p. = sunset.

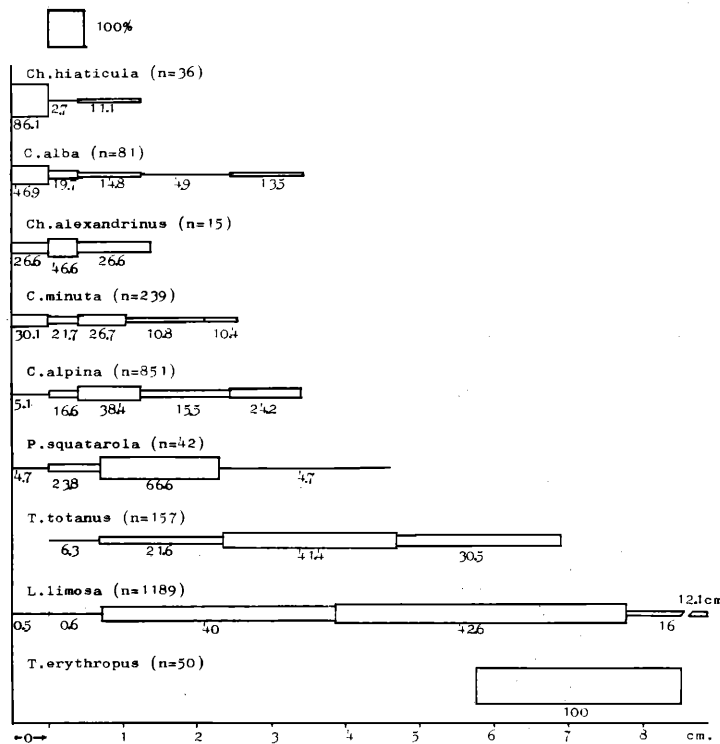


Figure 2. Water level on the feeding grounds of different species. The variation in thickness of the line and the number below indicate the frequency with which birds fed in each of the five depths for each species. The depth was measured from the extent of submersion of the legs of the birds, in the following categories for each species: foot visible; foot covered; water half-way up the tarsus; water up to the tarsal joint; and all the leg submerged.

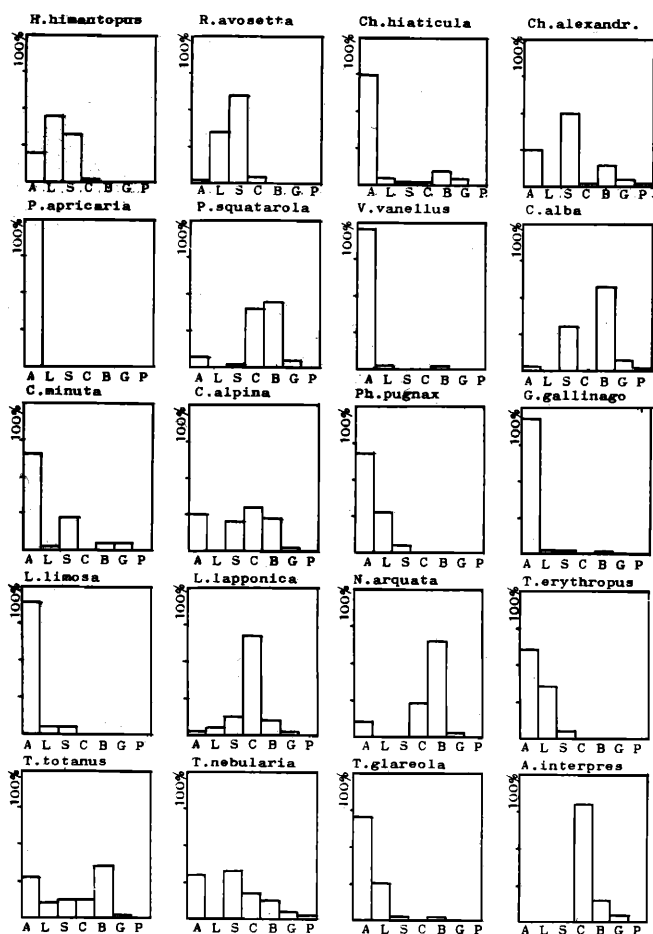


Figure 3. Habitat chosen by the different species during the winter (September-March): A Paddyfields; L Lagoons; S Salt-pans; C Marine salt-marshes; B Bays; G Albufera (brackish lagoon regularly flooded by the sea and the river); P Beaches.

HABITAT SELECTION

In the Delta waders feed in places where the soil is very wet or in shallow waters. They prefer paddyfields which are waterlogged, with perhaps a few small puddles, and tidal mudflats (Figure 3). They are found in places where the water is up to 12 cm deep, though most prefer areas where the water level is below 8 cm. The most common species, Dunlin, is normally found feeding where the level is less than 2.5 cm (see Figure 2). As can be seen in the Figure 2, plovers (Charadriidae) tend to feed in shallower waters than those of sandpipers (Scolopacidae), irrespective to their size.

The roosting sites are in the least disturbed zones. Roosting areas are quite large and are usually close to good feeding nearby. The birds collect in scattered groups at sites which may vary from time to time. In the Ebro Delta, coastal waders normally roost in the bays, although very occasionally they move to the paddyfields and lagoons.

REFERENCES

- Martinez-Vilalta, A. 1984. La invernada de limícolas en el Delta del Ebro. Tesina de Licenciatura, Barcelona University.
 Motis, A., Martinez, A., Matheu, E. and Llimona, F. 1981. Results of the census of Ebro Delta wader population, March 1979 - February 1980. *Wader Study Group Bull.* 32: 40-43.

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OTHER NOTICES

ORIENTAL BIRD CLUB

A new organisation, the Oriental Bird Club, has been formed recently. The club covers the entire Oriental region from Pakistan east to China and south to Indonesia. The chief aims of the club are to encourage an interest in Oriental birds and their conservation; to act as a forum for birdwatchers interested in Oriental birds; and to operate an information exchange system, with assistance in ornithological surveys.

The club will publish two bulletins, and a journal, *The Forktail*, annually. The journal will publish material on all aspects of Oriental birds.

Ordinary membership is £6 p.a. Membership application forms can be obtained from *The Membership Secretary, Oriental Bird Club, c/o The Lodge, Sandy, Bedfordshire SG19 2DL, U.K.*

FUNCTIONAL MORPHOLOGY OF VERTEBRATES

The Morphology Department of Leiden University is holding a summer course on the Functional Morphology of Vertebrates, from 26 - 30 August 1985. The course will consider the selection and use of the procedures and interpretation of results in the field of functional morphology, as exemplified by practical research on the craniofacial region in a range of vertebrates.

The enrollment fee is Dfl. 50, and some hotel bed and breakfast accommodation is available at a cost of Dfl. 35 - 80 a day. Further details and registration forms can be obtained from *Prof. P. Dulleweijer, Zoologisch Laboratorium, Kaiserstraat 63, 2311 GP Leiden, The Netherlands.*