PALEARCTIC COASTAL WADERS WINTERING IN SENEGAL

Peter L. Meininger

The Senegalese coastal wetlands do not hold the same impressive numbers of wintering birds as those of Mauritania (*e.g.* Altenburg *et al.* 1982, 1983) and Guinea-Bissau (*e.g.* Zwarts 1988). For some species Senegalese wetlands are, however, relatively important (*e.g.* Black-winged Stilt *Himantopus himantopus*, Avocet *Recurvirostra avosetta*).

Not all Senegalese wetlands have been extensively surveyed in winter. De Smet & Van Gompel (1979, 1980) presented details on counts in winter 1978/79 in wetlands between St. Louis and the northernmost portion of the Sine-Saloum Delta. Dupuy & Verschuren (1978) described the general occurrence of waders in the Sine-Saloum Delta, but most of their data concerned only spring 1977. Altenburg & Van der Kamp (1986) visited most Senegalese wetlands in October-November 1983, and presented some estimates based on their (generally incomplete) counts. Counts between 9 December 1987 and 7 January 1988 (by Greetje Y Boerma and Peter L. Meininger) and between 23 January and 10 February (by Philippe J. Dubois and Philippe Delaporte) in the Senegal Delta, the wetlands between Dakar and Joal, the northern part of the Sine-Saloum Delta and small parts of the Casamance augment these previously published accounts.

Table 1 presents, by area, the total number of Palearctic waders estimated to winter in Senegal. Species mainly occurring in inland areas (*e.g.* Ruff *Philomachus pugnax*, Wood Sandpiper *Tringa glareola*, Common Sandpiper *Actitis hypoleucos*) have not been included. This new estimate can be considered to update, and partly correct the figures presented by Altenburg *et al.* (1982, 1983). The sources for the estimates are given in Table 1. The figures have, however, been re-interpreted, taking into

Table 1. Estimated number of Palearctic (coastal) waders wintering in Senegal.

species	Senegal Valley and Delta	St Louis-Dakar	Dakar-Saloum Delta	Saloum Delta (incl. Fadiout)	Casamance	estimated total wintering in Senegal
Haematopus ostralegus	few	few	few	2000-3000 [1]	50-100 [9]	2000-3000
Himantopus himantopus	500-1500 [1]	1500-2000 [10]	250 [9]	750-1000 [1]	100-200 [9]	3000-5000
Recurvirostra avosetta	7200 [9]	1100-2000 [10]	10 [9]	900-1200 [1,4]	few	10000-15000
Charadrius hiaticula	>300 [2]	>250 [2]	700-1000 [9,10]	1000-2000 [9]	150-250 [3]	2500-4000
C. alexandrinus	>20 [9]	30 [2]	100-200 [9]	1500-2500 [9]	300-500 [3,9]	2000-4000
Pluvialis squatarola	65 [2]	few	500-800 [9,10]	200-500 [7,9]	100-200 [9]	1000-1500
Calidris canutus	50 [10]	10-50 [2]	60-100	300-500 [6,9]	50-100 [9]	500-1000
C. alba		2500 [2]	1500 [2]	2000 [2]	500-1000 [9]	6500-8000
C. minuta	5000-10000 [9]	}	1000-1500 [9]	2000-5000 [6,9]	1000-2000 [9]	10000-20000
C. ferruginea	2000-4000 [9]	} 3500 [2]	600-1000 [8,9]	2000-3000 [1,6,9]	100-500 [1]	5000-10000
C. alpina	150-500 [9]	}	10-50	100-250 [1,6]	>300 [3]	500-1000
Limosa limosa	3300 [1,9]	440 [2]	700-1000 [9]	4500-5000 [1]	1400-1700 [1]	10000-15000
L. lapponica	200 [2]		10-20 [9]	2000-2500 [1]	100-250 [1]	2000-3000
Numenius phaeopus	>50 [2]	12 [2]	20-50 [9]	750-1250 [1]	500-1500 [1]	1500-3000
N. arquata	10-25 [1]		10-20 [9]	>100 [2]	few	150-300
Tringa erythropus	100-1000 [1]	2 [2]	20-50 [9]	>350 [9,10]		500-1500
T. totanus	100-250 [1]	few [2]	50-100 [9]	250-500 [9]	250-500 [1]	1000-2000
T. nebularia	250-1000 [1]	15-30 [2]	50-100 [9]	>200 [2]	1000-1500 [1]	1500-3000
Arenaria interpres	160 [2]		100-200 [9]	500-1000 [2,3,9]	50-100 [1,9]	1000-2000

notes:

[1] based on Altenburg & Van der Kamp (1986): October-November 1983

[2] based on De Smet & Van Gompel (1979): December 1978- January 1979

[3] based on De Ridder (1977): winter 1975/76

[4] 5000 near Kaolack on 5 March 1976 (Dupuy 1976)

[5] 1000 on 20 April 1977 (Dupuy & Verschuren 1978)

[6] ten thousands of Calidris sp. in early spring, most abundant Little Stint followed by Dunlin and Knot (Dupuy & Verschuren 1978). There is no mention of > 100 000 wintering (Little) Stints by Dupuy & Verschuren (1978), contra Altenburg et al. (1982, 1983).

[7] there is no mention of >1000 wintering Grey Plovers by Dupuy & Verschuren, contra Altenburg et al. (1982).

[8] there is no mention of 10 500 Curlew Sandpipers by De Smet & Van Gompel (1979), contra Altenburg et al. (1982).

[9] our observations 9 December 1987-7 January 1988

[10] based on observations of Philippe J. Dubois and Philippe Delaporte, 23 January-10 February 1988

account the coverage of the areas and current knowledge of the area of suitable habitat present for various wader species.

It should be stressed that a complete wader census of the extensive mangrove areas of the Sine-Saloum Delta and the Casamance has never been carried out, so that the figures presented in Table 1 are tentative estimates.

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Peter L. Meininger, Belfort 7, 4336 JK Middelburg, The Netherlands.

ESTIMATING THE DATE OF HATCHING OF EGGS OF GOLDEN PLOVER *PLUVIALIS APRICARIA*

D. W. Yalden & P. E. Yalden

INTRODUCTION

Because they are nidifugous, wader chicks are usually ringed in the nest within a day of hatching. It is useful, therefore, to be able to predict the date of hatching of a nest found at some unknown date through incubation. We have found enough nests of Golden Plover in the last three years, and followed them through to hatching, to allow a reasonable prediction of hatching date to be made.

METHODS

All nests (24) were found in the Peak District, in northern England, between 1986 and 1988. On discovery of a nest, length and breadth of each egg was measured to 0.01 mm using Camlab plastic calipers, and weighed to 0.1 g with a 50 g Pesola balance. A Volume Index ($L \times B^2 \div 1\,000$, as per Byrkjedal & Kalas 1985) was calculated for each egg, and the mean weight and Volume Index for each clutch then calculated. These means were used to calculate a Density Index (weight ÷ Volume Index). Most nests (21) were followed through to hatching, and the date on which the measurements had been taken was then expressed as the number of days before hatching.

A few clutches were reweighed later in incubation, and these allow a direct estimate of the rate of loss of weight. The regression of 'Density Index' on 'Date of Hatching' was calculated, but without using these re-weighings. Because both the date to hatching and the weight (as taken under field conditions) were subject to error and approximation, the regression used was the reduced major axis.

RESULTS

Egg dimensions and densities are summarised in Table 1. Density indices were calculated for 21 clutches which were followed through to hatching. The regression is shown in Figure 1, together with the calculated values for day -30

Table 1. Egg dimensions of 24 clutches of Golden Plover *Pluvialis apricaria*: Length (L), Breadth (B) and Volume Index (VI), and calculated initial density, initial weight and weight loss from the regression (y = -389x + 168). Note that the Volume Index of 64.78, calculated from the mean Length and mean Breadth is slightly lower than the value given here, which is the mean value for the Volume Index of each clutch.

mean (S.D.)			Calculated		
L(mm)	B(mm)	VI	Initial Density	Initial Weight (g)	Weight Loss (g/day)
50.43 (1.56)	35.84 (1.02)	64.95 (4.73)	0.509	33.06 (2.41)	0.17