

## THE IMPORTANCE OF SIERRA LEONE FOR WINTERING WADERS

A.Tye and H.Tye

Tye, A. and Tye, H. 1987. The importance of Sierra Leone to waders. *Wader Study Group Bull.* 49, Suppl./IWRB Special Suppl.7: 71-75.

Studies of Palaearctic wader species at coastal sites in Sierra Leone from 1981 to 1984 identified 3 major sites (each holding >20 000 waders), the Sierra Leone River, Yawri Bay and Sherbro River, and a fourth, the Scarcies Estuary, probably holding between 10 000 and 20 000 birds. These four together contain c. 260 km of mud or mud-sand foreshore with a muddy intertidal zone in excess of 17 500 ha (excluding extensive intertidal sand-flats which are used less by waders). Much mangrove has been cleared for swamp rice cultivation at the Scarcies Estuary but this appears to have had little effect on the waders and mudflats, and has probably increased the population sizes of some species which winter in the rice paddies. We give detailed estimates of the wintering populations of each species at the Sierra Leone River and Yawri Bay, and we estimate that populations of several species exceed 1% of the total numbers of these species wintering in Europe, the Mediterranean Basin and West Africa. We estimate that coastal Sierra Leone supports a total of 130 000 - 200 000 Palaearctic waders. Most species are winter visitors, arriving during August - December and remaining until April - May, with adults present for c. 8 months. Several species show passage peaks, mainly in autumn, probably representing birds going to southern Sierra Leone or small sites in neighbouring countries to the south-east. Sierra Leone does not appear to be on a major passage route. Individuals of several species overwinter in Sierra Leone: these are mainly first-summer birds, which do not assume breeding plumage.

Alan Tye and Hilary Tye, Department of Zoology, University of Sierra Leone, Freetown, Sierra Leone. (Present address: 2 School Lane, King's Ripton, Huntingdon, Cambridgeshire, PE17 2NL, U.K.)

### INTRODUCTION

Wader populations along the East Atlantic flyway have been comparatively well-studied in Europe, southern Africa, and north Africa south to Guinea-Bissau. Despite some misconceptions that there is no information from the intervening region, from Guinea to Angola (e.g. Poorter and Zwarts 1984), many important sites are known in this area and detailed studies have been made in some countries (e.g. in Ghana - Grimes 1969, 1972, MacDonald 1978; see also Tye 1987). This paper describes the important coastal wetlands in Sierra Leone and the numbers of waders using them, based on our studies from 1981 to 1984. We discuss only coastal sites and species, and only Palaearctic migrants. Intertidal areas quoted exclude sandflats and mangroves.

### MAJOR WADER SITES IN SIERRA LEONE

Sierra Leone possesses 3 major sites, each holding over 20 000 waders, and a fourth, the Scarcies Estuary, which we estimate to hold over 10 000 waders (Figure 1).

The Scarcies Estuary contains c. 30 km of mud or mud-sand foreshore, comprising a muddy intertidal area of c. 350 ha. There are also extensive sand beaches and intertidal sand-flats (>4000 ha). However, although some wader species sometimes forage on sand in Sierra Leone, most, even species such as Sanderling *Calidris alba* which are normally associated with sand-flats in Europe, feed mainly on mud or muddy sand.

Sierra Leone retains much of its mangrove forest, although some has been cleared for the cultivation of swamp rice (Figure 2). This could have had a major effect on waders only in the Scarcies Estuary: other mangrove clearances have not been immediately adjacent to large

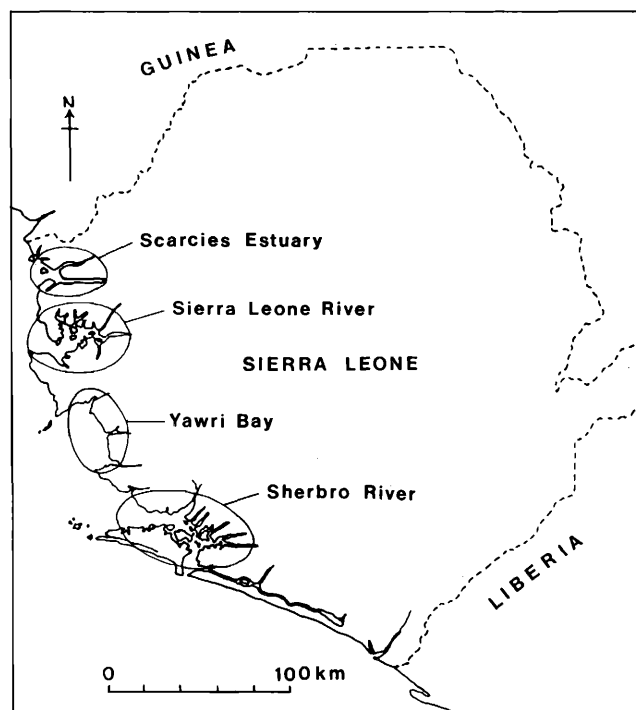


Figure 1. Major wader wintering sites in Sierra Leone.

mudflats. The Scarcies development has taken place over the last 50 years. Judging by comparisons of early notes with recent observations (albeit only qualitative), this clearance so far appears to have had little detrimental effect on wader populations or on the mudflats seaward of the cleared mangroves. Indeed, some species (e.g. Black-tailed Godwit



Figure 2. The extent of mangrove forest and mangroves cleared for swamp rice cultivation. The map shows swamp rice only where it occurs on areas which formerly carried mangrove. After FAO/UNDP-MANR Land Resources Survey Project SIL/73/002, 1980.

*Limosa limosa*, Wood Sandpiper *Tringa glareola*) may have benefitted from this development of c. 20 km<sup>2</sup> of rice paddies, a preferred habitat for these species in Africa (Poorter and Zwarts 1984). Longer-term effects of the mangrove clearance on the mudflats may yet appear, as mangroves provide the main organic input to tropical mudflats and exert a great influence on sediment accretion rates.

The Sierra Leone River is the combined estuary of several rivers, with over 110 km of mud or mud-sand foreshore, mainly backed by mangroves, and c. 1800 ha of intertidal mud and muddy sand. Sand-flats are less extensive here than at the Scarcies Estuary. There has been some mangrove clearance for rice cultivation (Figure 2). This has not yet affected the most important areas for waders, although further clearance may eventually do so. Mangrove clearance is the major form of alteration to wader habitat in Sierra Leone. Some mudflats (<100 ha) near Freetown (see Figure 2) have been damaged or destroyed by reclamation for building works, but this remains a comparatively minor threat, as most of the flats important for waders are rather distant from the capital.

Yawri Bay has c. 60 km of mud foreshore backed by mangroves. The bay is shallow, creating exceptionally wide intertidal flats totalling c. 9100 ha. The mud is generally softer, with less sand, than at the estuarine sites in Sierra Leone, possibly because the bay is sheltered and is not scoured by any large river or major marine current. However, from counts on known areas, it appears that wader densities are somewhat lower than in the Sierra Leone River.

The Sherbro River is the strait behind Sherbro Island and the estuaries of several rivers which drain into the strait. It has over 60 km of mud or mud-sand foreshore, comprising over 6500 ha, and also extensive sand-flats.

The rest of the Sierra Leone coastline is mostly sandy with small rocky promontories on the Sierra Leone Peninsula, on which Freetown stands (Figure 2). The southern third of the coast is a 180 km steep sand beach, broken only by three sandy inlets (Figures 1 and 2). Minor sites known to support small numbers of waders include three small creeks between the Scarcies Estuary and the Sierra Leone River, many sandy bays on the Sierra Leone Peninsula and two sandy inlets near the Liberian border. However, these sites probably hold in total less than 1500 waders. Our surveys of 8 of them did not reveal unusually high numbers of any species.

#### WINTERING POPULATIONS

We have not made detailed censuses at the Scarcies Estuary or the Sherbro River, but notes by earlier ornithologists are available, particularly for the Scarcies Estuary (G.D. Field, pers. comm.). Until recently, the rice paddies and mudflats of the Scarcies Estuary regularly held over 1000 Black-tailed Godwits, with peak numbers exceeding 10 000 (Glanville per G.D. Field, pers. comm.), making this the most important site in the country for this species. However, the employment of large numbers of bird-scarers in commercial rice plantations may have reduced these populations. Although only estimated roughly, densities and relative abundance of other species on the Scarcies mudflats seem similar or slightly lower than those measured at the Sierra Leone River.

Table 1. Wintering populations for the Sierra Leone River and Yawri Bay (including only species with at least 500 individuals), estimated from counts of sample areas over three winters. Asterisks indicate populations >1% of the estimated total numbers of birds wintering in Europe, the Mediterranean Basin, and northern and western Africa<sup>1</sup>.

	Sierra Leone River	Yawri Bay	Totals for Europe, Med. Basin, N. & W. Africa <sup>1</sup>
Ringed Plover <i>Charadrius hiaticula</i>	8600*	6000*	228 000
Kentish Plover <i>Charadrius alexandrinus</i>	2100*	500	68 000
Grey Plover <i>Pluvialis squatarola</i>	2300*	3500*	174 000
Knot <i>Calidris canutus</i>	200	1500	750 000
Sanderling <i>Calidris alba</i>	2900*	200	178 000
Little Stint <i>Calidris minuta</i>	1800	200	223 000
Curlew Sandpiper <i>Calidris ferruginea</i>	16 600*	9500*	405 000
Black-tailed Godwit <i>Limosa limosa</i>	200	500	?
Bar-tailed Godwit <i>Limosa lapponica</i>	1000	2500	702 000
Whimbrel <i>Numenius phaeopus</i>	1100*	2000*	50 000
Redshank <i>Tringa totanus</i>	4000*	14 000*	385 000
Greenshank <i>Tringa nebularia</i>	700*	2000*	48 000
Common Sandpiper <i>Actitis hypoleucos</i>	4700	4500	?

<sup>1</sup>Obtained by adding the "estimated totals" for Europe and West Africa from Tables 6.2 and 6.3 of Altenburg et al. (1982) and the figures for the Mediterranean Basin from Smit (1986), and rounding numbers to the nearest 1000.

The Sherbro River is Sierra Leone's most important site for Knot *Calidris canutus*, which appear from rough estimates to reach higher densities than measured for this species in Yawri Bay, while densities of other species seem similar to those in Yawri Bay.

Table 1 gives estimates of the over-wintering populations (mid-winter values) for the Sierra Leone River and Yawri Bay, calculated from censuses of sample localities of known area within them, during 1982-84. The estimates for the Sierra Leone River are extrapolations from weekly counts at sites comprising 6% of the total intertidal zone, together with single or few visits to other sites to check that the regular census sites were representative. The estimates for Yawri Bay are based on monthly counts covering 7% of the bay: estimates for this site may be too low as our censuses did not cover the most remote and undisturbed parts of the bay.

The populations of several species (Table 1) appear to exceed 1% of the total numbers of these species wintering in Europe, the Mediterranean Basin and West Africa combined, although the West African populations were probably underestimated by Altenburg et al. (1982) from whom these totals were partly derived (see Poorter and Zwarts 1984, Tye 1987). In addition, both the Sierra Leone River and Yawri Bay support more than 20 000 wintering waders, and so are of international importance under the criteria of the Ramsar Convention (see Lyster 1985). It is probable that the Sherbro River, and possibly the Scarcies Estuary, are also of international importance for waders.

Palearctic migrant waders with less than 500 individuals regularly wintering at these sites include Turnstone *Arenaria interpres*, Curlew *Numenius arquata*, Marsh Sandpiper *Tringa stagnatilis* and Temminck's Stint *Calidris temminckii*. Species which mainly winter inland are seen also occasionally at the coast, especially Wood Sandpiper and Green Sandpiper *Tringa ochropus*. Several of these less common winter visitors, such as Curlew, Temminck's

Stint and Turnstone and several irregular winter visitors or vagrants including Oystercatcher *Haematopus ostralegus*, Spotted Redshank *Tringa erythropus*, Ruff *Philomachus pugnax* and Dunlin *Calidris alpina*, have their main winter ranges further north than Sierra Leone.

A rough estimate of the total number of waders wintering in coastal Sierra Leone can be made by assuming that overall densities are similar to the mean density at the Sierra Leone River and Yawri Bay. Taking the population estimates from these two sites, with the intertidal area of all sites, gives a wintering population estimate of 130 000 to 200 000 Palearctic waders. The lower and upper figures result from using the length of shoreline and the intertidal area respectively as the base for the calculation (these figures differ since the width of the intertidal zone varies from place to place).

Waders suffer little persecution in Sierra Leone, being rarely shot or trapped. Possibly because of this, they are relatively unafraid of a human presence on mudflats, permitting approach of an observer to within 40 m and approaching a stationary human within 20 m, contrary to the experience of Poorter and Zwarts (1984) in Guinea-Bissau, who found that waders avoided a 'zone' of 100-200 m around a human. Hence, even flats which are heavily-exploited by people for shellfish in Sierra Leone have higher wader densities (Tye unpubl.).

#### MIGRATION TO AND THROUGH SIERRA LEONE

Counts of waders in Aberdeen Creek in the Sierra Leone River may be used to illustrate migration patterns, as our data are most complete for this site. No wader species occurs only on passage: some individuals of every species over-winter. Waders arrive in Sierra Leone mostly from August to December, and wintering birds remain until April or May. In many species, arrival occurs in two stages, with adults appearing mostly in August-September and first-year birds in

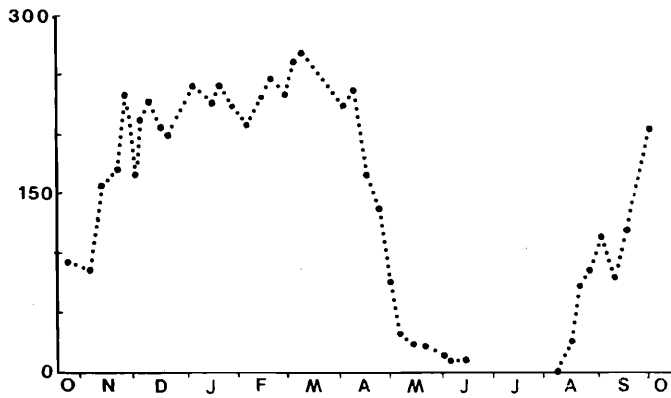


Figure 3. Numbers of Ringed Plovers counted at Aberdeen Creek in 1982-83.

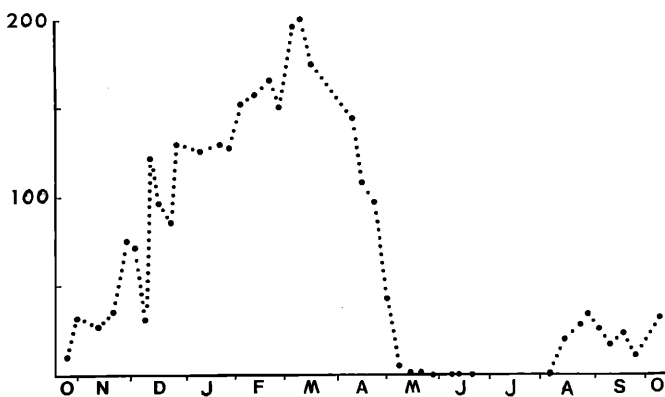


Figure 4. Numbers of Common Sandpipers counted at Aberdeen Creek 1982-83.

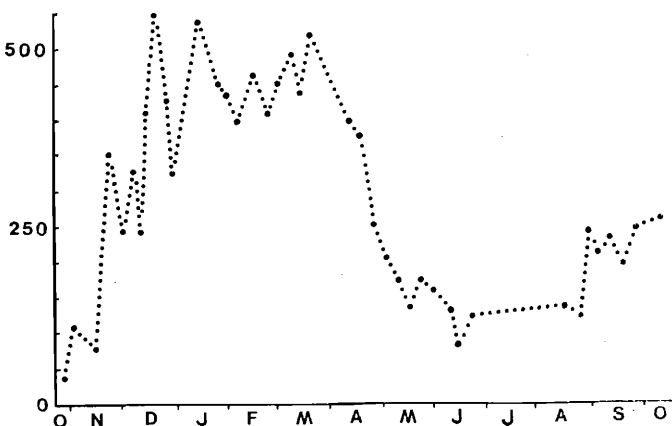


Figure 5. Numbers of Curlew Sandpipers counted at Aberdeen Creek in 1982-83.

November-December. Thus adults of these Palaearctic-breeding species spend about 8 months of the year in the tropics. Species showing this migration pattern include Ringed Plover (Figure 3), Kentish Plover, Grey Plover, Redshank, Greenshank and Bar-tailed Godwit.

Numbers of some species fluctuate during the main autumn arrival period or, less commonly, during spring departures, in contrast to stability at other times. Autumn fluctuations occur in Little Stint, Sanderling, Common

Sandpiper (Figure 4) and Curlew Sandpiper (Figure 5), and spring fluctuations in Little Stint, Sanderling and Common Sandpiper (Figure 4). These fluctuations appear to represent immigration and emigration of birds whose wintering areas are unknown. Although spring and autumn numbers of other species fluctuate much less, there could still be turnover of passage birds but with a balance between immigration and emigration. This cannot be established at present, as there have been no sightings elsewhere of birds marked in Sierra Leone.

There are few, if any, major wader wintering sites on the West African coast between Sierra Leone and Nigeria (Tye 1987). This leaves three possibilities for the destination of passage birds:

1. There could be a major migration route around the West African coast to the important wintering grounds in the Bight of Biafra from eastern Nigeria to Gabon (see e.g. Serle 1957, Smith 1966, Christy 1982). This seems unlikely as the passage peaks are relatively small, are evident for only a few species, and their timing does not fit well with the timing of arrivals further west (Walsh 1971, Grimes 1974). Furthermore, the main migration route to the Bight of Biafra in autumn seems to be direct across the central and eastern Sahara (MacLaren 1954, Dorst 1962, Walsh 1971, Grimes 1974, Elliott et al. 1976, Summers and Waltner 1979).
2. Waders could migrate directly across the Gulf of Guinea to southern Africa, where there are several major wintering sites (Summers et al. 1977). There is no direct evidence for this, except possibly for Knot (Summers and Waltner 1979): the main routes for other species to southern Africa seems to be down the Rift Valley and east coast of Africa (Summers and Waltner 1979, Dowsett 1980, Pearson and Britton 1980, Ash 1981, Tree 1985, Summers et al. 1987) and via the Sahara and Bight of Biafra (Elliott et al. 1976, Summers and Waltner 1979).
3. If the total number of passage birds is small, they could be migrating only to southern Sierra Leone and/or to small sites further round the coast to the south-east. This possibility seems the most likely, as passage peaks are small. It is also supported by later arrivals at minor sites in western Ghana (MacDonald 1978) than in Sierra Leone. In contrast, waders migrating to eastern Ghana seem to arrive earlier via a trans-Saharan route (Grimes 1974, MacDonald 1978), suggesting that the division between the two flyways may occur in Ghana.

It has been known for some time that some waders over-summer in the West African tropics (e.g. Bannerman 1931, 1951), as occurs widely in southern Africa (Summers et al. 1987). In southern Africa these are chiefly first-summer birds. Appreciable numbers of Grey Plovers, Curlew Sandpipers (Figure 5), Redshanks, Greenshanks, Bar-tailed Godwits and Whimbrels stay in Sierra Leone for the northern summer. Although many species, including Grey, Ringed and Kentish Plovers, Curlew Sandpipers and Bar-tailed Godwits, begin their pre-nuptial moult before they leave Sierra Leone, over-summering birds retain non-breeding dress (cf. Pearson and Britton 1980). Almost all birds which we have seen or caught in summer have been first-summer individuals. However, we

do not know what proportion of the first-year birds present in winter does not migrate, nor what proportion does not assume breeding plumage.

Most waders leave Sierra Leone between early April and early May (e.g. Figures 3-5). This is rather later than departures from South Africa (Elliott et al. 1976, Pringle and Cooper 1977) but at about the same time as from Mauritania (Ens 1985). This implies that such birds are unlikely to be staging elsewhere in West Africa, but may be embarking on long flights to north African or European staging sites.

#### ACKNOWLEDGEMENTS

We thank G.D. Field for helpful discussion.

#### REFERENCES

- Altenburg, W., Engelmoer, M., Mes, R. and Piersma, T. 1982. *Wintering waders on the Banc d'Arguin*. Stichting Veth tot steun aan Waddenonderzoek: Leiden.
- Ash, J.S. 1981. Spring passage of Whimbrel *Numenius phaeopus* and other waders off the coast of Somalia. *Scopus* 5: 71-76.
- Bannerman, D.A. 1931, 1951. *The Birds of Tropical West Africa*. Vols 2 and 8. Crown Agents: London.
- Christy, P. 1982. Notes sur des migrateurs palearctiques observes sur le littoral gabonais. *Oiseau Rev. Fr. Ornithol.* 52: 251-258.
- Dorst, J. 1962. Considerations sur l'hivernage des canards et limicoles palearctiques en Afrique tropicale. *Terre Vie* 16: 183-192.
- Dowsett, R.J. 1980. The migration of coastal waders from the Palaeartic across Africa. *Gerfaut* 70: 3-35.
- Elliott, C.C.H., Waltner, M., Underhill, L.G., Pringle, J.S. and Dick, W.J.A. 1976. The migration system of the Curlew Sandpiper *Calidris ferruginea* in Africa. *Ostrich* 47: 191-213.
- Ens, B. (ed.). 1985. *Entre le Sahara et la Siberie*. WIWO: Ewijk.
- Grimes, L.G. 1969. The Spotted Redshank *Tringa erythropus* in Ghana. *Ibis* 111: 246-251.
- Grimes, L.G. 1972. *The non-passerine birds of the Accra Plains, Ghana*. Mimeographed Report: Legon.
- Lyster, S. 1985. *International Wildlife Law*. Grotius: Cambridge.
- MacDonald, M.A. 1978. Seasonal changes in numbers of waders at Cape Coast, Ghana. *Bull. Niger. Ornithol. Soc.* 14: 28-35.
- MacLaren, P.I.R. 1954. Notes on Palaeartic terns and waders in West Africa. *Ibis* 96: 601-605.
- Pearson, D.J. and Britton, P.L. 1980. Arrival and departure times of Palaeartic waders on the Kenya coast. *Scopus* 4: 84-89.
- Poorter, E. and Zwarts, L. 1984. Resultats d'une premiere mission ornitho-ecologique de l'UICN/WWF en Guinee-Bissau. Unpubl. report.
- Pringle, J.S. and Cooper, J. 1977. Wader populations (Charadrii) of the marine littoral of the Cape Province, South Africa. *Ostrich* 48: 98-105.
- Serle, W. 1957. A contribution to the ornithology of the Eastern Region of Nigeria. *Ibis* 99: 371-418.
- Smit, C. 1986. Wintering and migrating waders in the Mediterranean. *Wader Study Group Bull.* 46: 13-15.
- Smith, P.A. 1966. Palaeartic waders in the Niger Delta. *Bull. Niger. Ornithol. Soc.* 3: 2-6.
- Summers, R.W. and Waltner, M. 1979. Seasonal variations in the mass of waders in southern Africa, with special reference to migrations. *Ostrich* 50: 21-37.
- Summers, R.W., Cooper, J. and Pringle, J.S. 1977. Distribution and numbers of waders (Charadrii) in the south-western Cape, South Africa, summer 1975-76. *Ostrich* 48: 85-97.
- Tree, A.J. 1985. Studies of Greenshanks in southern Africa. *Wader Study Group Bull.* 45: 39-40.
- Tye, A. 1987. Identification of major wintering grounds of Palaeartic waders on the Atlantic coast of Africa. *Wader Study Group Bull.* 49.
- Walsh, F. 1971. Early Palaeartic waders at Kainji and New Bussa in 1969. *Bull. Niger. Ornithol. Soc.* 8: 32-34.

