

BIRD MIGRATION STUDIES IN INDIA - THE MIGRANT WADERS OF THE FAMILY CHARADRIIDAE*

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ABSTRACT

The data on the family Charadriidae, members of which formed part of the 200,000 birds of various species and families ringed in India between 1959 and 1969, are examined with reference to their migratory movements between their summer and winter habitats. The weight changes of species wintering in India have also been studied and future problems for investigation are suggested.

INTRODUCTION

THIS report examines the data obtained on the migratory movements, place of origin and weight changes of wading birds of the family Charadriidae ringed up to December 1969 under the Bombay Natural History Society's bird migration study project at Point Calimere in Thanjavur District (Tamil Nadu) and Bharatpur, Rajasthan. The weight data are largely from Pt. Calimere and cover the first quarter of 1970 also. Recovery information relates to birds ringed at Bharatpur as well as in other areas where camps were held during the decade since 1959 when systematic ringing was started by the Society resulting in more than 200,000 birds being ringed to date.

Among the 67 species of the family Charadriidae recorded from India (Ali and Ripley, 1969), 7989 birds of 26 migrant species were ringed at Point Calimere during the year 1969. The monthwise figures are given in Table 1. It will be seen that non-breeding individuals of several species remain in India throughout the northern summer without migrating to their breeding grounds. The Table gives an indication of the numbers of such stay-backs in suitable localities. The abrupt rise in abundance marking the influx period of the migrants is also clearly shown.

A comparison of the numbers of the species of Charadriidae ringed at Point Calimere (Marine littoral and coastal swamps) and Bharatpur (Inland freshwater swamps and flooded fields (Table 2) reveals the apparent habitat preference of the species. The methods of trapping were different in the two areas, which may have biased this information to some extent. It should also be remembered that some may be only passage migrants inland i.e. at Bharatpur. In the majority of instances no genus is exclusively marine littoral or restricted to inland swamps and lakes though genera such as *Phalaropus* for the former and *Capella* for the latter are examples of such exclusiveness. Species, however, seem to be more selective.

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TABLE 1

| Species | June | July | August | Sept. | Oct. | Nov. | Dec. | Total |
|---------------------------------|------|------|--------|-------|------|------|------|-------|
| <i>Pluvialis squatarola</i> | — | — | — | 1 | 9 | 13 | 8 | 31 |
| <i>Pluvialis dominica</i> | — | — | — | — | 6 | 3 | 52 | 61 |
| <i>Charadrius leschenaultii</i> | — | 1 | 1 | 2 | 5 | 8 | 2 | 19 |
| <i>Charadrius dubius</i> | 2 | — | 2 | 2 | 10 | 9 | 29 | 54 |
| <i>Charadrius mongolus</i> | 127 | 119 | 26 | 113 | 142 | 239 | 97 | 863 |
| <i>Numenius arquata</i> | — | — | — | 2 | 1 | — | — | 3 |
| <i>Numenius phaeopus</i> | — | 1 | — | 2 | 1 | 5 | — | 9 |
| <i>Limosa limosa</i> | — | — | — | — | — | 6 | 2 | 8 |
| <i>Limosa lapponica</i> | — | — | — | — | 5 | 1 | 3 | 9 |
| <i>Tringa totanus</i> | 7 | 17 | 7 | 14 | 31 | 35 | 5 | 116 |
| <i>Tringa stagnatilis</i> | 1 | — | — | — | 11 | 42 | 31 | 85 |
| <i>Tringa nebularia</i> | 4 | 1 | — | — | 5 | 3 | 3 | 16 |
| <i>Tringa glareola</i> | — | — | — | — | 1 | 2 | 14 | 17 |
| <i>Tringa terek</i> | 4 | 12 | 1 | 2 | 20 | 7 | 3 | 49 |
| <i>Tringa hypoleucos</i> | — | — | — | 1 | 1 | — | 1 | 3 |
| <i>Arenaria interpres</i> | 4 | — | 3 | 22 | 6 | 2 | — | 37 |
| <i>Calidris albus</i> | — | — | — | — | 1 | 1 | — | 2 |
| <i>Calidris tenuirostris</i> | — | — | — | — | 5 | — | 1 | 6 |
| <i>Calidris temminckii</i> | — | — | — | — | — | 1 | — | 1 |
| <i>Calidris minutus</i> | — | 8 | 134 | 417 | 1378 | 1808 | 970 | 4715 |
| <i>Calidris alpinus</i> | 4 | 4 | — | 3 | 8 | 4 | — | 23 |
| <i>Calidris testaceus</i> | 9 | 46 | 21 | 52 | 140 | 734 | 114 | 1116 |
| <i>Limicola falcinellus</i> | — | — | 2 | 16 | 42 | 209 | 54 | 323 |
| <i>Philomachus pugnax</i> | — | 2 | — | — | 53 | 27 | 14 | 96 |
| <i>Phalaropus lobatus</i> | — | — | — | — | 2 | — | — | 2 |

TABLE 2

| Species | Bharatpur | Pt. Calimere |
|--------------------------------|-----------|--------------|
| <i>Pluvialis dominica</i> | 2 | 61 |
| <i>Charadrius leschenaulti</i> | — | 19 |
| <i>Charadrius dubius</i> | 85 | 54 |
| <i>Charadrius alexandrinus</i> | 39 | 245 |
| <i>Charadrius mongolus</i> | — | 870 |
| <i>Numenius phaeopus</i> | — | 9 |
| <i>Numenius arquata</i> | 1 | 3 |
| <i>Limosa limosa</i> | 46 | 8 |
| <i>Limosa lapponica</i> | — | 9 |
| <i>Tringa erythropus</i> | 13 | — |
| <i>Tringa totanus</i> | 19 | 116 |
| <i>Tringa stagnatilis</i> | 81 | 85 |
| <i>Tringa nebularia</i> | 12 | 16 |
| <i>Tringa ochropus</i> | 52 | — |
| <i>Tringa glareola</i> | 1964 | 7 |
| <i>Tringa terek</i> | — | 49 |
| <i>Capella gallinago</i> | 494 | — |
| <i>Capella minima</i> | 124 | — |
| <i>Arenaria interpres</i> | — | 37 |
| <i>Calidris tenuirostris</i> | — | 6 |
| <i>Calidris albus</i> | — | 2 |
| <i>Calidris minutus</i> | 469 | 4715 |
| <i>Calidris temminckii</i> | 102 | 1 |
| <i>Calidris alpinus</i> | 1 | 23 |
| <i>Calidris testaceus</i> | 3 | 1116 |
| <i>Limicola falcinellus</i> | 3 | 423 |
| <i>Philomachus pugnax</i> | 2158 | 96 |
| <i>Phalaropus lobatus</i> | — | 9 |

[2]

Ringling recoveries provide definit evidence of migratory movements, confirming conjectural data. As such even though recoveries may be meagre when compared with the numbers ringed, each recovery by itself is as exciting as a new discovery. The fact that recoveries do occur is in itself a matter of deep satisfaction considering the enormous odds against it, such as: the vast population of which the ringed bird or birds from a negligible component; the great distance that lie between the summer and winter habitats; and the chance of the bird being obtained by a person not intelligent enough to return the ring to the ringer. (The Society's rings carry the following legend in addition to a serial number "Inform Bombay nat. Hist. Soc.")

Among the 28 species of migratory Charadriidae which have been ringed during the Society's field camps in various part of the country recovery data are available on 8 species. These are briefly discussed.

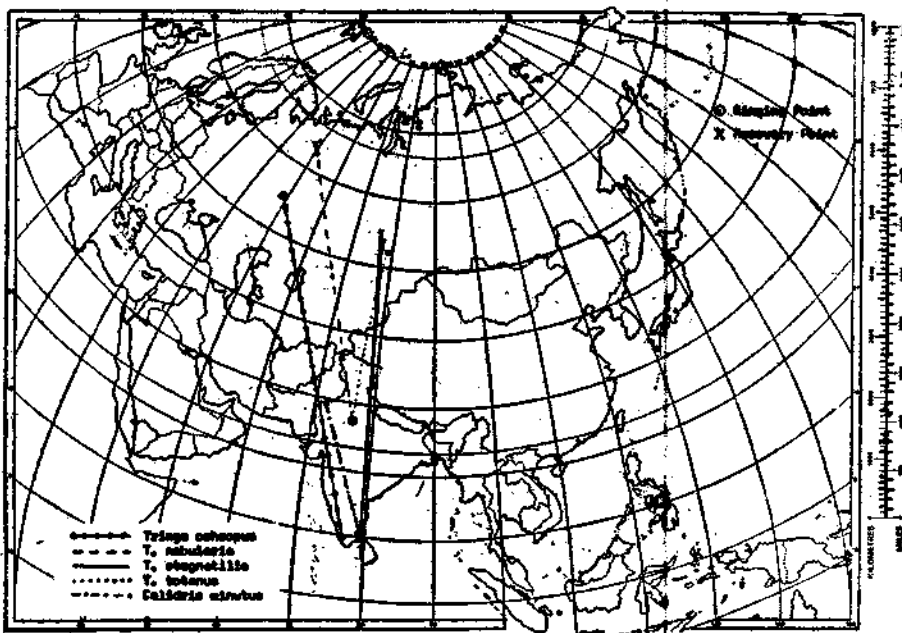


Fig. 1

Tringa totanus (Common Redshank)

Between the years 1964 and 1969, 165 birds of this species were ringed at four locations, two in eastern India, one in Central and one in south India. A single recovery (Fig. 1) has been reported of a bird (1 out of 9) ringed at Bharatpur, Rajasthan on 6 Oct. 1965 and recovered in the spring of 1966 at Atai, near Blagokeshchenka (52° 50' N; 79° 53' E), U. S. S. R. approximately 2700 km NNE of Bharatpur.

***Tringa stagnatilis* Bechstein**

460 birds of this species were ringed between 1962 and 1969, at four locations, two in east, and one each in south and central India. Two recoveries were obtained, both out of 57 birds ringed at Point Calimere in November 1962. Both were recovered in May (1963 and 1967) in more or less the same area (Fig. 1) and were apparently on their breeding grounds (Ali and Ripley, 1969). The straight-line distance between the points of ringing and recovery is c. 5100 km.

***Tringa nebularia* (Gunnerus) Greenshank**

79 birds of this species were ringed between 1964 and 1969. A single recovery has been reported in June 1968 from Arkhangelsk Region, near Vozhgora ($64^{\circ} 35'N$; $48^{\circ} 25'E$) out of 4 birds ringed at Bharatpur, Rajasthan in October 1966.

The straight-line distance between ringing and recovery points is c. 4600 km.

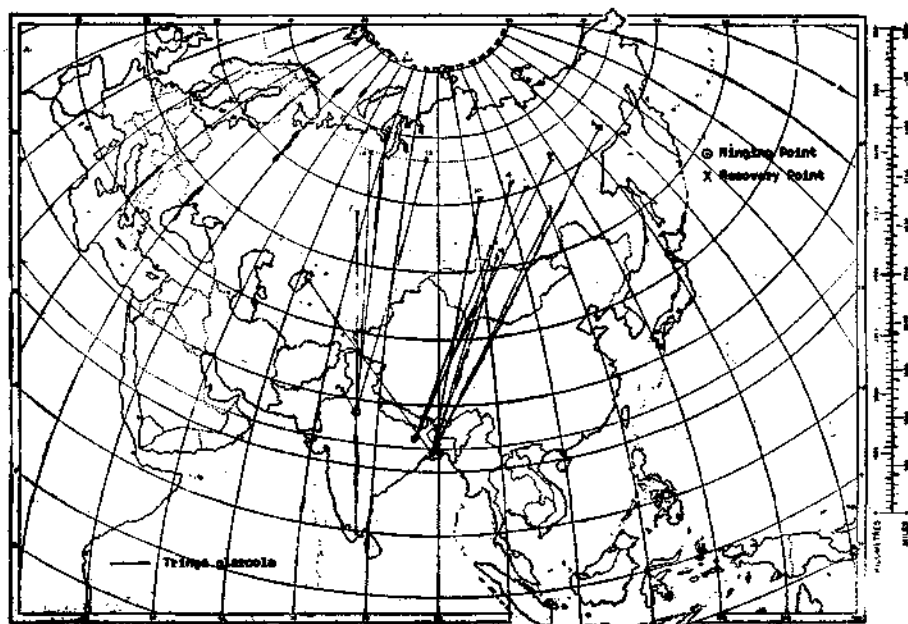


Fig. 2

***Tringa ochropus* Linnaeus (Green Sandpiper)**

Between 1959 and 1969, 189 birds of this species were ringed from six localities but without a recovery report. There is, however, an earlier record of the recovery of a bird ringed in Russia (near Kazan $56^{\circ}N$; $49^{\circ}E$) in June 1929 and recovered near Kottayam, Kerala in 1933—a straight line map distance of some 5880 km (*J. Bombay nat. Hist. Soc.*, 47 : 699).

Tringa glareola Linnaeus (Wood or Spotted Sandpiper)

There are 24 recoveries (14 of them extralimital) out of total of 5060 birds ringed at seven localities between the years 1961 and 1969;

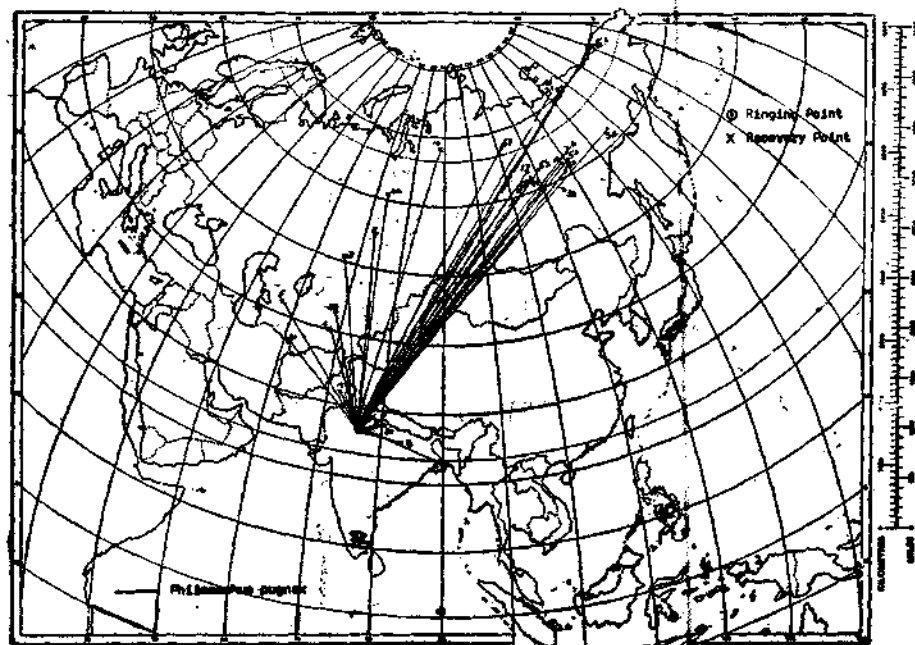


Fig. 3

According to Dementiev *et al.* (1951) the nesting range of this species covers the whole of Eurasia north of approximately 50° latitude and extends up to the fringe of the arctic circle. The recoveries indicate that there are perhaps discrete nesting populations over this vast range. Among the nine recoveries of birds ringed in eastern India in Bihar and the environs of Calcutta, seven were recovered (5 in May and 2 in August) between 52° & 62° N and 100° & 130° E. The only recovery further east is at 62° 48' N; 148° 12' E and the only exception being the recovery of a Calcutta ringed bird at Kzyl in Ordinsk Region (45° 45' N; 62° 09' E) exactly a month and a half after its release on 5 April 1962, showing that the bird had covered the distance 3600 km at an average of 240 km per day. It may be that the bird started on its journey several days after ringing or had reached its destination several days before being killed, or both, therefore the daily average is purely hypothetical. The four recoveries of Bharatpur-ringed birds are further west between 58° & 70° N and 65° & 90° E. Whether the separation of western and eastern migrants is due to the availability of easy flyways or whether they belong to more than one population is not known. The importance of Bharatpur as a staging area for migrants moving into the peninsula is emphasised by the recovery of a Bharatpur-ringed Wood Sandpiper at Sivaganga, Tamil Nadu (9° 51' N; 78° 30' E) in the extreme south of the Peninsula. This bird ringed in October 1967 was recovered in December 1968, suggesting that it had made one round journey to its northern breeding grounds in the interval.

***Calidris minutus* (Leisler) Little Stint**

Between 1963 and 1969, 5815 Little Stints were ringed at four locations. The recoveries total six, of which five are from a few kilometres further up the east coast from Point Calimere. These recoveries are of little interest apart from confirming that there is a considerable amount of illegal trapping all along the coast. The single long distance recovery is of a bird ringed at Point Calimere in November, 1969 and recovered at Kairpur Sadirat, Alipur Thahsil, W. Pakistan c. 2320 Km NNW in June 1970, doubtless while on passage to its breeding grounds in the arctic tundra.

***Calidris testaceus* (Pallas) Curlew-Sandpiper**

1133 Curlew-Sandpipers were ringed at four locations. Five recoveries have so far been reported, all except one from within the country. One of the recoveries is of a bird ringed at Bharatpur in 1967 (1 out of 6) recovered near Mayuram in Tamil Nadu ($10^{\circ} 07' N$; $79^{\circ} 45' E$) provides further evidence of the importance of Bharatpur as a staging area for migrants. The single recovery outside India but still within the winter range, is of a Point Calimere-ringed bird ringed on 10 February 1970 and recovered across the sea on the Jaffna Peninsula, Sri Lanka on 3rd November 1970.

***Philomachus pugnax* (Linnaeus) Ruffe**

Between 1963 and 1969, 6093 Ruffs were ringed at five stations and 55 recoveries have been reported. The recoveries provide interesting data on the movements and breeding areas of the Ruffs that visit India. Twenty inland recoveries were in U. P., Bihar NE Madhya Pradesh and E. Pakistan (present Bangladesh), the monthwise breakup being January (5), February (4), April (2), May (1), October (1), November (6) and December (3). As already noted (Ali and Ripley, 1969), the birds ringed at Bharatpur in autumn (inward migration) show a tendency to move eastward. Recoveries in West Pakistan and Afghanistan (February 2, March 3, June 1) are of birds apparently on spring (outward) migration. Extralimital recoveries in Russia show that the majority of the birds recovered between 55° and 110° longitude are moving into or out of their nesting area (February (1), March (1), April (1), May (2), June (1) and September (3). All the 15 recoveries east of 110° longitude are in May among these 11 between $60^{\circ} 65' N$ and $110^{\circ} 135' E$. Apparently this is the main nesting area of the population wintering in India. Indian ringed ruffs have been recovered in the U.S.S.R. at various localities between $42^{\circ} 20' N$, $58^{\circ} 55' E$ to $69^{\circ} 43' N$ $170^{\circ} 18' E$, the latter being the longest distance covered by a Bharatpur ringed bird. The straight line distance between points of ringing and recovery being approximately 7200 km.

Migratory birds are usually very conservative about their routes and their breeding as well as winter quarters. There is good evidence elsewhere of birds returning to the same place at more or less the same time year after year, the ringing data now accumulating in India tend to confirm this. A ruffe originally ringed on 5 October 1966 at Bharatpur was recaptured in the same locality the following year on 24 October 1967; the ring was replaced, and the bird released. It was shot two months later at Shahjahanpur, U. P. (c 250 km ENE) on 10 January 1968.

It is well known that migrants store up fat and increase in weight prior to migration. Table 3 shows the weight of random samples of 10 species during the arrival and departure months. In most cases the weights on arrival in India (September/October) and in the departure months (March/April) are available, and show in general, a fairly substantial increase.

TABLE 3

| Species | October 1969 | March 1970 | April 1970 | Percentage of Increase |
|--------------------------------|---------------------|-------------------|-----------------|------------------------|
| <i>Charadrius alexandrinus</i> | 32(23-45) [15] | 32 (27-38) [9] | 34(23-45)[9] | |
| <i>Charadrius mongolus</i> | 44(34-55)[25] | 45(37-60)[25] | 50(38-62)[25] | 13.64 |
| <i>Tringa totanus</i> | 96(82-109)[10] | 93(82-103)[10] | 97(80-1050)[10] | 104 |
| <i>Tringa stagnatilis</i> | 56(46-66)[10] | 70(52-94)[10] | | 20 |
| <i>Tringa teves</i> | 52(42-60)[15] | | 54(35-78)[7] | 3.70 |
| <i>Calidris minutus</i> | 21(17-27)[20] | 22(15-28)[20] | 23(18-25)[20] | 9.52 |
| <i>Calidris testaceus</i> | 46(38-54)[20] | 46(41-65)[20] | 50(38-65)[20] | 8.70 |
| <i>Limicola falcinellus</i> | 29(40-41)[20] | 40(32-47)[20] | 42(32-49)[20] | 44.83 |
| <i>Philomachus pugnax</i> | 150 (124-164) [20]* | 175(143-203)[7]* | | 16.66 |
| | 93(62-148) [20]** | 106(71-115)[30]** | | |

* Male ** Female

The ecological basis of this weight increase has not been studied in India so far. We do not know for instance, whether there is an increase in the hours of feeding or a change of diet in the period preceding migration, or what else is responsible. This and similar problems need investigation. Goss-Custard (1969) provides examples of the type of studies that require to be started on Indian waders.

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