

## SEASONAL VARIATIONS IN THE WADER POPULATIONS OF THE BANYUASIN DELTA, SOUTH SUMATRA, INDONESIA

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This paper presents an overview of the wader migration through the east coast of South Sumatra Province, Indonesia. It provides the results of a monthly water bird census along a 50 km stretch of mudflats near Banyuasin. These surveys were carried out during August 1988 - August 1989. It appears that in the autumn, up to 500,000 waders, constituting a very considerable proportion of the East Palearctic flyway population utilize the Banyuasin area; the north-bound migration however, is insignificant. Recommendations for conservation of key wader sites are made.

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### INTRODUCTION

The East Asia - Australian Flyway population is one of the least studied of the world's four major wader flyways. Inaccessibility of many coastal areas, lack of expertise in the identification of waders, and lack of a network of observers and study groups in this region are just a few of the many factors contributing.

Only recently wetlands surveys have revealed the crucial importance of the tidal mudflats on the mangroves bordered coast of eastern Sumatra as staging grounds of large numbers of birds of the Ciconiiformes and Charadriiformes during the biannual wader migration. Studies by de Wulf (FAO 1986), Silvius & Verheugt (1985), Danielsen & Skov (1987) and Silvius (1987, 1988) showed that a substantial proportion of the East Asia - Australian Flyway population pass through eastern Sumatra. Furthermore they indicated as well that these coastal wetlands may provide the principal overwintering and wintering grounds for a number of species. There appear to be very few published accounts on the importance of tropical coastal sites within the East Asia-Australian Flyway for wintering or overwintering waders, as most surveys are conducted during the fall or during the northbound migration.

Our research programme was undertaken to describe the species composition and numerical densities during a year round migration period. Field work began in July 1988 with an introduction of the staff from the Environmental Study Centre of Sriwijaya University and staff of the Provincial Office of the Directorate General of Forest Protection and Nature Conservation to wader identification. Regular monthly counts were carried out starting in August 1988 and ending in August 1989. Each count lasted two days. The project was executed jointly with the Indonesian Directorate General of Forest Protection and Nature Conservation (PHPA), the Asian Wetland Bureau (AWB) and the Danish Ornithological Society.

### THE STUDY AREA

The coast of South Sumatra Province is characterized by an extensive fringe of tidal forest. Some of the widest extent of mangrove forests throughout Indo-Malayan region can be found near the Banyuasin estuary in South Sumatra. Here *Rhizophora* communities reach up to 35 km inland. Exposed mudflats are a common feature along the coast of South Sumatra Province. On average during low tide these mudflats extend up to 50 metres wide. However, during low water exposure of spring tides and especially near promontories mudflats can become exposed up to 1 km from the mangroves. Coastline formation is very complex: some areas are eroding while others are accreting rapidly, most notable near the estuaries of the rivers Musi, Sugihan and Lumpur (see Figure 1).

Geographically the area forms part of an extensive system of large river estuaries. The rivers Musi, Batang Hari, Tungkal, Indragiri and Kampar have their watershed in the Barisan mountains, which debouches in the shallow Malacca Strait. Consequently muds deposited along the South Sumatra coast originates from this volcanic mountain range and contains highly weatherable rich silts. Not surprisingly the main rivers carry a heavy silt load, which near the estuaries at sea gives rise to a turbid zone. These major river systems deposit large amounts of fertile mud. South Sumatra's largest river is the Musi which has an approximate water catchment area of 60,000 km<sup>2</sup> and discharges on average 200,000 m<sup>3</sup> annually. Coastal accretion is estimated to reach 30 meters a year. Under the main influence of the east monsoon and therefore carried by easterly sea currents most of the Musi silts are deposited on the west side in between the estuaries of the smaller (estuarine) rivers of Banyuasin and Sembilang (see Figure 1). *Avicennia* seedlings soon colonize these freshly deposited muds. Mudflats can be found from Riau province at Tanjung Datuk up to Lumpur Bay, near the border of Lampung, southern Sumatra, but are widest near Banyuasin.



was divided in four units (see Figure 2). Each area consisted of one accreting and one eroding stretch of mangrove. Flocks of waders could normally not be observed along these eroding stretches as hardly any bare mud is exposed during low tide. In addition no shelters other than branches of mangrove trees are available to the birds at high tides. Counts could be readily made by moving along these eroding mangrove zones and pausing regularly to identify waterbird species. At the four promontories, where extensive mudflats occurred, most of the waders were found either feeding, or roosting on the higher shores.

Observations were done if possible on a rising tide so that the speedboat could be pushed up as far up as possible on the mud bank. Counts made at low water exposure during spring tide were avoided as too far an area of soft muds had to be traversed to arrive anywhere near concentrations of waders. Identification of stints at species level was than impossible due to the difficult field conditions (haze and great distance). From September to December high tides occurred in the early afternoon, from January to May in the early morning, and from June to August they were late at night.

In zone 5 (Figure 2) there was a firm mud bank and coarse sand flat which allowed closer observations to be made. Flocks of birds at this site could be approached up to 50-100 m. Small wader species could easily be identified with telescopes. This roosting site of approximately one km<sup>2</sup>, which held the largest concentrations of waders, was normally counted during mid- to late afternoon with the sun behind the observers.

Monthly surveys were completed for all months even during the west Monsoon season, when local storms and heavy rain showers along the coast are a common phenomenon. During these months, sea conditions can be very rough and dangerous. As a consequence, we could not make a complete February count: the high tide roost north of Teluk Gelas could not be counted. Due to this and limited observation time elsewhere, wader totals could have been 100% higher in this months than were recorded.

#### SPECIES ACCOUNTS

Detailed information on the seasonality of species occurrence of each the 30 wader species recorded in the Banyuasin delta is described below. It appears that most species use the area in the autumn, with remarkably few birds during the north-bound migration. An overview of all wader counts is given in Table 1, while Figure 3 presents graphs of monthly counts of some selected species.

##### Grey Plover *Pluvialis squatarola*

A passage migrant and winter visitor in small numbers, recorded from September to January, with a peak migration on 3 October when 930 were seen.

##### Asian Golden Plover *Pluvialis dominica*

A passage migrant during north bound migration in small numbers. Also recorded on firm, river banks near Palembang 100 km south of the coast.

Table 1. Wader counts in the Banyuasin Delta, South Sumatra Province, Indonesia, in 1988-89.

	1988					1989							
	AUG.	SEPT.	OCT.	NOV.	DEC.	JAN.	FEB.	MAR.	APR.	MAY.	JUN.	JUL.	AUG.
Lesser Golden Plover		2	930	200	250	25							
Grey Plover								300	30			300	
Kentish Plover	2	153							5				
Lesser Sand Plover	6	18											50
Greater Sand Plover													
Lesser\Greater Sandplov.	250	1,322	5,565	6,624	1,310	1,675	50	2,000	715	35	15	50	200
Eurasian Curlew	673	1,004	7,061	6,900	1,200			420	2	35		31	2,500
Whimbrel	560	62	66	150	110	750	33	250	61	2	60	130	500
Far eastern Curlew		2	2,620	2,250	350	1,103	49	255	137	20			
Unident. Curlew	5,703	785	22	20									
Black-tailed Godwit		7,600	21,850	25,100	4,951	2,200	50	220	125	61	150	100	19,000
Bar-tailed Godwit		2,500	5,600	2,000		20		50	97		100	70	500
Asian Dowitcher		550	11,500	13,000	1,200	1,300	100	3,900	1,206	245	53	80	2,000
unid. Godwit/Dowitcher					1,000							1,550	
Redshank	540	819	5,889	1,952	450	570	25	470	692	72	35	70	15
Marsh Sandpiper	25	29	200	20	45	125	2	28	42	11	11	5	
Greenshank		2	25	5	8	2	1	170			1		
Spotted Greenshank		1	5		21								
Green Sandpiper			5	20		150							
Terek Sandpiper	35	445	3,090	5,680	1,475	1,050	50	20	5		1	22	
Common Sandpiper		11	62	40	20	12	5	2	5			1	
Ruddy Turnstone	90		560	182	100	60	8	30	170			12	
Great Knot		1	65						21				
Red Knot	70												
Broad Billed Sandpiper					15								
Red-necked Sandpiper	20		15		75	80		5	40				
Curlew Sandpiper		55	900	1,009	1,000	50		20	60			5	
Sanderling			31										
Unid. Waders	2,380		12,500	10,000	5,000	11,700	2,650	4,090	1,120	1,665	2,603	6,606	6,606
<b>TOTAL WADERS</b>	<b>10,129</b>	<b>15,361</b>	<b>78,561</b>	<b>75,132</b>	<b>18,600</b>	<b>19,872</b>	<b>3,673</b>	<b>12,230</b>	<b>7,450</b>	<b>2,146</b>	<b>3,029</b>	<b>9,021</b>	<b>25,315</b>

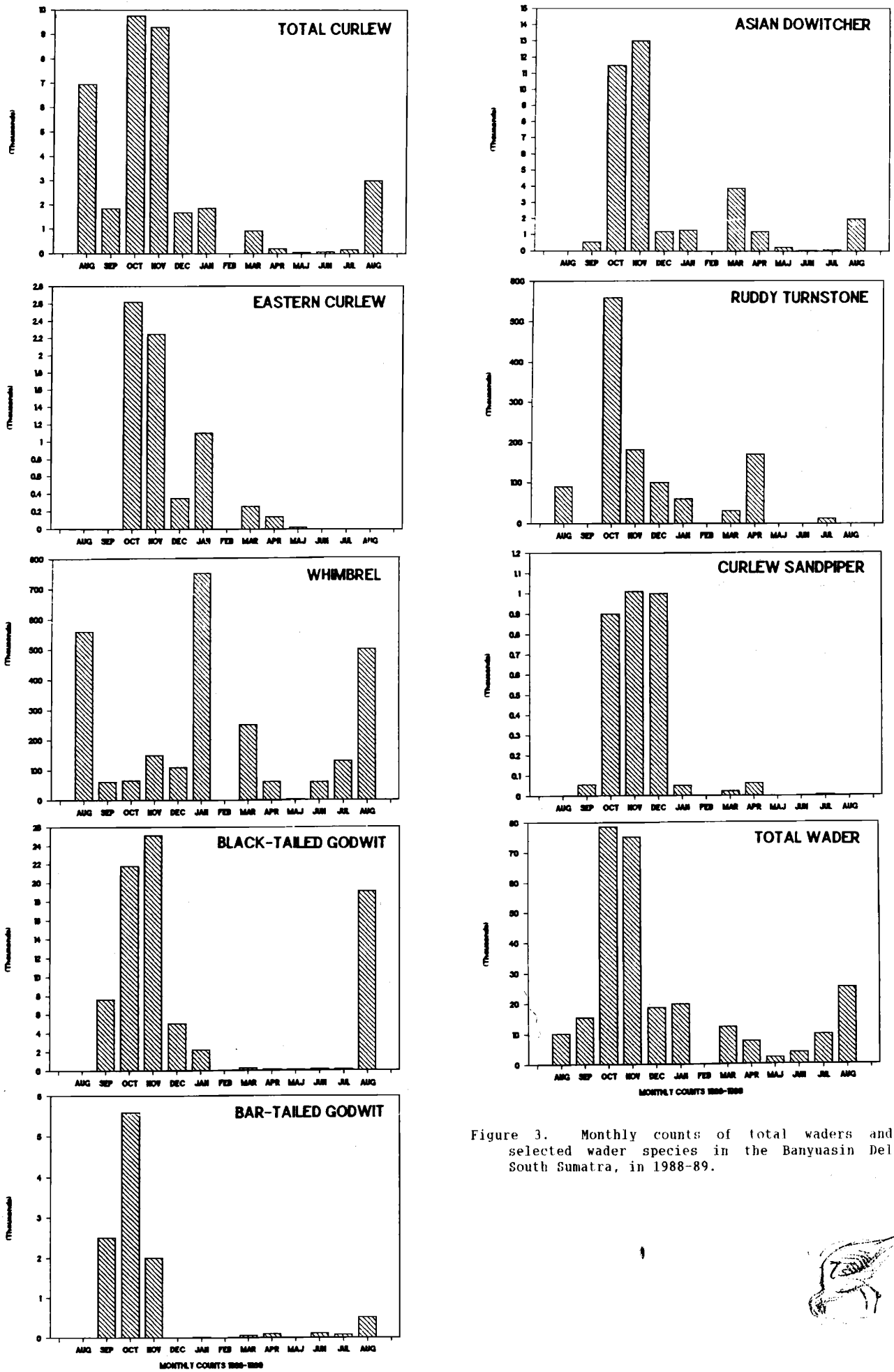


Figure 3. Monthly counts of total waders and of selected wader species in the Banyuasin Delata, South Sumatra, in 1988-89.



Kentish Plover *Charadrius alexandrinus*

A passage migrant during both northbound and southbound migration. Numbers varied greatly: two and five in August and April respectively and 153 in September, but flocks may have been overlooked during the surveys.

Mongolian Plover *Charadrius mongolus* & Greater Sand Plover *Charadrius leschenaultii*

These two species were grouped together as identification time often did not allow us to identify every Sand Plover at species level. Sand Plovers are common migrants and wintering visitors. A maximum number of 5,565 was present on 3 October. Numbers of Sand Plovers sharply declined after November, with a lowest count of 50 in February. Greater Sand Plovers formed the majority of Sand Plovers identified. A small population of less than 50 birds overwintered.

Eurasian Curlew *Numenius arquata*

A common passage migrant during both north- and south bound migration. First birds arrive as early as 4 July with numbers building up steadily throughout the autumn. A peak count of 7,061 was recorded on 3 October. Unlike Whimbrels and Far-eastern Curlews, Eurasian Curlews were not recorded in January and February, indicating that wintering grounds are probably further south.

Whimbrel *Numenius phaeopus*

Passage migrant and wintering migrant. Peak counts during migration were in August both 1988 and 1989 with 560 and 500 birds respectively (Figure 3). A small population maintained fairly constant numbers of less than 150 throughout the rest of the year, except for a winter peak count of 750 on 3 January.

Far Eastern Curlew *Numenius madagascariensis*

A passage migrant during both north- and south bound migration. Peak migration numbers were recorded on 3 October when 2,620 were present (Table 2, Figure 3). This figure represents almost 20% of the estimated world population (Howes & Parish 1989). After October peak numbers declined steadily. A winter population of 1,103 was recorded on 3 January. None were recorded after May.

Table 2. Relative abundance (% of total waders) of the seven most common species of waders observed during October 1984 and October/November 1988.

Species	Oct. 1988	Nov. 1988	Oct. 1984
Black-tailed Godwit	27.8	29.1	25.4
Asian Dowitcher	14.6	17.3	1.9
Eurasian Curlew	9.0	9.2	6.0
Redshank	7.5	3.0	18.7
Sand Plovers	7.1	8.8	21.9
Bar-tailed Godwit	7.1	2.7	11.5
Terek Sandpiper	3.9	7.6	8.5
Total	77.0	77.7	93.9

Sources: Silvius (1988) and this survey

Black-tailed Godwit *Limosa limosa*

The most common wader, with a peak count of 25,100 birds on 1 November (Figure 3). c. 25,000 of these were at one high tide roost near Teluk Gelas. At the same site, Danielsen & Skov (1987) observed 30,000 Black-tailed Godwits on 4 August 1985. Such large numbers of this species have been reported elsewhere only from the Niger Delta (West Africa) and the Gulf of Carpentaria (Australia). Our year round observations found very few overwintering Black-tailed Godwit, so it now seems that the August 1985 sightings by Danielsen & Skov (1987) may well have been a large influx of early migrants rather than summering birds as formerly believed. Autumn migration was recorded early both in 1988 and 1989, with large numbers already present on 31 July 1989 (a total of 19,000 Godwits). Between March and July a fairly constant and small population (less than 200 birds) of presumably overwintering Black-tailed Godwits were recorded. A steady decline in numbers occurred after November.

Bar-tailed Godwit *Limosa lapponica*

A common passage migrant with a peak of 5,600 birds on 3 October (Figure 3). In contrast very few occur in spring, although small numbers of this species are seen in almost every month.

Common Redshank *Tringa totanus*

A common autumn passage migrant with peak of 5,889 birds on 3 October. Small numbers of this species were seen in every month.

Spotted Redshank *Tringa erythropus*

Although not recorded on the mudflats, the Spotted Redshank is an autumn migrant in small numbers at inland swamps, behind the mangrove fringe.

Marsh Sandpiper *Tringa stagnatilis*

A common passage migrant with the highest autumn count being 200 birds on October but also present throughout the year in small numbers. Marsh sandpipers occur also in inland swamps behind mangroves.

Common Greenshank *Tringa nebularia*

A passage migrant with great variation in the numbers present. One roost of 170 birds on 7 March indicates significant early north bound migration.

Spotted Greenshank *Tringa guttifer*

A rare migrant and winter visitor. This very rare wader was counted on three occasions: one bird on 4 September; five birds on 3 October and a roost of 21, on 1 December. This flock is the second largest ever recorded, the largest being an observation of 29 birds in West Malaysia in March 1978 (Howes & Parish 1989).

The December roosting flock was found near Telok Gelas. Here the birds were roosting on an area of coarse sandflats and firm mudbanks. This permitted a close approach by observers on foot so that observations could be made in good light by telescope from approximately 40-50 metres.

The flock could be readily identified as Spotted Greenshanks since Greenshanks were also

seen at the same site. In contrast to the Spotted Greenshank, the Greenshank were feeding actively along the water's edge. The Spotted Greenshanks were identified by their shorter legs compared to the Greenshank (which also differed in their yellowish colour) and by their two-toned slightly upturned bill. The bill of the Spotted Greenshank had a distinctly yellow base and greyish tip.

#### Green Sandpiper *Tringa ochropus*

A late autumn passage migrant and winter visitor, recorded in three counts. The largest flock was 150 birds, on 3 January.

#### Wood Sandpiper *Tringa glareola*

Not recorded along the coast but known as passage migrant in inland swamps behind the mangrove fringe.

#### Terek Sandpiper *Xenus cinereus*

A common passage migrant. Numbers built up steadily from September, with a peak count of 5,600 on 1 November.

#### Ruddy Turnstone *Arenaria interpres*

A passage migrant and winter visitor with a peak migration in the autumn (Figure 3). Maximum numbers present were 560 birds on 3 October.

#### Asian Dowitcher *Limnodromus semipalmatus*

A passage migrant and winter visitor. The largest numbers occurred on autumn migration with highest ever count of c. 13,000 Asian Dowitchers on 1 November. This number included one high tide roost of c. 12,000 near Teluk Gelas. Numbers of Asian Dowitchers declined after November to 1,300 birds, and increased again to 3,900 birds in March. After March the numbers dropped steadily to a low of 53 birds in June, indicating that some birds oversummer. These summering birds were all in non-breeding plumage. Evidence of oversummering Dowitchers in Indonesia has also come from the collection of a specimen made by Bartels on the north coast of Java (see Silvius *et al.* 1986) and by Danielsen & Skov (1987) for Jambi province.

Our November count in the Banyuasin delta has led to a completely revision of the world population estimate for Asian Dowitcher, which stood previously at 8,000 (Silvius 1988). The world population is now estimated as 15,000 - 20,000 birds (Parish 1989 *vide* Howes & Parish 1989).

#### Common Sandpiper *Actitis hypoleucos*

A migrant and winter visitor in small numbers. The highest number was 62 birds on 3 October. Common Sandpipers are also widespread inland in South Sumatra where they are non-breeding visitor throughout the year.

#### Common Snipe *Gallinago gallinago*

Although not seen on the mudflats, Common Snipe occurred as autumn migrants and winter visitor in the swamps behind the mangrove fringe.

#### Red Knot *Calidris canutus*

An uncommon migrant. Seventy birds were present on 1 August 1988. According to van Marle & Voous (1988), Red Knots are classified as probably an uncommon winter visitor or non-

breeding summer visitor from arctic East Asia. This status was based on three records only, with none made in the autumn. During March 1985 Silvius (1986) observed a small flock of five birds near River Apung - River Dinding.

#### Great Knot *Calidris tenuirostris*

An uncommon passage migrant, with small numbers found on two occasions during the autumn: one bird on 4 September and 65 birds on 3 October. In addition there was one record of 21 birds during the north bound migration on 5 April.

#### Red-necked Stint *Calidris ruficollis*

Passage migrant and winter visitor. Small numbers were seen between 1 August when 20 birds were seen and 4 April when there were 40 birds. Red-necked Stints preferred feeding along the water-edge on extremely soft mud.

#### Curlew Sandpiper *Calidris ferruginea*

A common autumn passage migrant, mostly in late autumn (October - November), with a peak of 1,009 birds on 3 October. Very few occur in spring.

#### Sanderling *Calidris alba*

One observation of 31 birds on 3 October, but is possible that Sanderlings may have been overlooked at other times. Van Marle & Voous (1988) list Sanderlings as an uncommon migrant with only a few records available from Sumatra.

#### Broad-billed Sandpiper *Limicola falcinellus*

A rare winter visitor: one record of 15 on 1 December, but may have been overlooked.

#### Black-winged Stilt *Himantopus himantopus* spp *leucocephalus*

Although the Black-winged Stilt is a common passage migrant on mud banks and inland swamps near the Lampung province border it was not recorded at the Banyuasin flats and inland swamps.

#### Collared Pratincole *Glareola maldivarum*

An occasional visitor from inland swamps.

### DISCUSSION

Of the total of 103 wader species known from the East Asia - Australian region 27 were recorded for the Banyuasin area. During the 1988-1989 census a maximum of 78,000 waders was counted on 3 October with almost as many (75,000) present on 1 November. This five-fold increase in waders in October - November compared to any other time of the year is remarkable. It highlights the importance of the Banyuasin area as a late autumn staging site. It is not inconceivable that the majority of the wader species seen during late autumn utilize nearby sheltered bays and associated mudflats (outside our count area) as their main wintering grounds rather than migrating further south. The steep drop in the wader total in December coincided with a built up of numbers near Tanjung Selokan some 100 km east of Banyuasin, as reported by a number of fishermen. The presence of key wintering grounds near Tanjung Selokan and an extensive mudflat areas of the Tanjung Lumpur promontory seems a fairly reasonable supposition since the large number of Asian Dowitchers have yet to be

located elsewhere in Indonesia after they leave the Banyuasin area in November. Other parts of the region probably cannot accommodate such a very large number of waders.

As part of the joint PHPA/AWB wetland surveys a few sites elsewhere have been identified of having extensive mudflats. These include Brantas, and Cilacap (both on Java) and South Irian Jaya. None of these locations surveyed in 1988 were reported to hold significant numbers of waders. A survey at Way Kambas (Lampung province, Sumatra) recorded a combined total of 864 Asian Dowitchers/Godwits on the coast of this National Park in December, an increase of 510 birds compared to numbers in October 1988. Asian Dowitchers were the most abundant wader species in this area (University of Southampton 1989).

In March 1989 we also carried out wader counts along the entire coast line of the South Sumatra province. A total of 25,000 waders were counted, including 12,230 at Banyuasin. Of the 25,000 birds counted, 9,000 were seen near Tanjung Lumpur near the Lampung border (see Figure 1). These observations emphasize the importance of coastal areas in the province east of the Banyuasin delta.

Budget limitations and rough weather conditions prevented the team from confirming the reports of large roosts of waders at Tanjung Selokan east of our main study area (Figure 1). Such an investigation should be a priority task for any follow-up surveys for the region as the area may include major wintering sites of Asian Dowitchers.

The total of 78,561 waders in October 1988 also constitutes the largest count ever made during the four surveys made since 1984 in Banyuasin. It is reasonable to suppose that unfamiliarity with the locations of high tide roosts during the first autumn survey of 1984, as well as the lack of a shallow research vessel, prevented the team from close observation of shorelines. This may have resulted in an underestimation of waders present on the mudflats during the counts of 22/23 October 1984. It has already been reported by Silvius (1988) that Asian Dowitchers may have been overlooked in South Sumatra Province, as observers had no previous experience with identifying this species.

During the 1988/1989 census the most common waders were respectively Black-tailed Godwit and Asian Dowitchers which in October and November 1988 formed over 40% of the wader population. The relative abundance of the counted wader species is shown in Table 3.

The number of waders recorded along the Banyuasin coastline exceeds those from any other coastal area of western Indonesia. The population of waders utilizing the Banyuasin mudflats are thus a very considerable proportion of the total East Palearctic flyway population, estimated to be 5-6 million birds (Howes & Parish 1989). Taking into consideration an average turnover rate of migratory waders to be in the range of 4-5 times the peak count, an estimated 500,000 waders use the coastal mudflats of South Sumatra. On this basis the Banyuasin area ranks second in importance as key-site for migratory waders of the East Palearctic flyway, after the Noakhali Islands, Bangladesh.

## CONSERVATION

The extensive mangroves and associated mudflats of the Banyuasin estuary have been identified as a priority area for conservation management. Currently the mangrove belt is classified as protection forest. This status needs, however, to be upgraded to Wildlife Reserve, to allow for daily management and wardening. A joint PHPA, Asian Wetland Bureau and the Environmental Study Centre of the Sriwijaya University (at Palembang) project undertaken during 1988/89, has proposed the establishment of this area, with an total extent of 387,500 ha, as Wildlife reserve (Danielsen & Verheugt 1990). The area has been listed in the Asian Wetlands Directory (Scott 1989) as of world significance.

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Funds to carry out this survey were received from the UNDP/IBRD DESC Project and the joint PHPA/Asian Wetland Bureau/Danish Ornithological Society South Sumatra Project. Staff members of the latter project, which was funded through WWF and DANIDA, joined the monthly monitoring scheme from March 1989.

## REFERENCES

- Balakrishnan, N., Abdul Aziz, P.K., Arunachalam, M., Dharmaraj, K. & Krishnakumar, K. 1984. Ecology of Indian estuaries: ecology and distribution of benthic macro fauna in the Astamudi estuary, Kerala. *Mahasagar Bulletin of the National Institute of Oceanography* 17 (2): 89-101.
- Erftemeyer, P., & Djuharsa, E. 1988. Survey of coastal wetlands and waterbirds in the Brantas and Solo deltas East Java, Indonesia. *PHPA-Asian Wetland Bureau Interwader report* No. 5, Bogor.
- Danielsen, F., & Skov, H. 1987. Waterbird surveys in South east Sumatra. *Oriental Bird Club Bull.* No. 6: 8-11.
- Danielsen, F., & Verheugt, W.J.M. 1990. *Integrating conservation and land-use planning in the coastal region of South Sumatra, Indonesia.* With contributions from H Skov, A Purwoko, R Kadarisman & U Suwarman. AWB/PHPA/DOS/PPLH, Bogor.
- Howes, J.R., & Parish, D. 1989. *New information on Asian shorebirds: A preliminary review of the INTERWADER Programme 1983 - 1989 and priorities for*

- the future. Asian Wetland Bureau, Kuala Lumpur.
- Nash, S.V., & Nash, A.D. 1985. A checklist of the forest and forest edge birds of the Padang-Suqihan Wildlife Reserve, South Sumatra. *Kukila* 2(3): 51-58.
- Parish, D. 1989. Population estimates of waterbirds using the East Asian Flyway. In: H. Boyd & J.Y. Pirot (eds.) *Flyways and reserve networks for water birds. IWRB Special Publ. No. 9*: 8-13.
- Scott, D.A. (ed.). 1989. *A directory of Asian Wetlands*. IUCN, Gland, Switzerland.
- Silvius, M.J. 1986. Survey of coastal wetlands in Sumatra Selatan and Jambi. *PHPA Interwader report No. 1*. Kuala Lumpur.
- Silvius, M.J. 1988. On the importance of Sumatra's coast for waterbirds with notes on the Asian Dowitcher, *Limnodromus semipalmatus*. *Kukila* 3(3-4): 117-137.
- Silvius, M.J., & Verheugt, W.J.M. 1986. The birds of Berbak Game Reserve, Jambi Province, Sumatra. *Kukila* 2(4): 76-84.
- Silvius, M.J., Verheugt, W.J.M., & Iskandar, J.. 1986. *Coastal Wetlands Inventory of South-east Sumatra. Report of the Sumatran Waterbird Inventory Oct-Dec 1984*. ICBP Study Report No. 9. International Council for Bird Preservation, Cambridge.
- University of Southampton. 1989. Progress report to Asian Wetland Bureau on waterbird surveys in Way Kambas, June 1989. Unpublished.

## MEASUREMENTS, WEIGHTS AND MOULT OF WADERS ON THE BANC D'ARGUIN, MAURITANIA, OCTOBER 1988

Rob Lensink & Peter L. Meininger

Lensink, R. & Meininger P.L. 1990. Measurements, weights and moult of waders on the Banc d'Arguin, Mauritania, October 1988. *Wader Study Group Bull.* 58: 35-48.

Data on measurements, weights and moult of 789 waders captured on the Banc d'Arguin, Mauritania in October 1988 are presented and discussed. Taking "pairs" of measurements (bill-total head, tarsus-tarsus & toe, first secondary-wing length) proved to be a useful check for errors in the data, since these "pairs" are highly correlated. In Dunlin, Sanderling and Turnstone clap-netting in the village of Iouik caught a higher proportion of juveniles than in mist-net catches elsewhere. The weights of juvenile birds in the village did not differ from those captured elsewhere. Foreign ringed waders captured included one Ringed Plover, two Sanderlings, one Knot and five Turnstones.

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### INTRODUCTION

Between 28 September and 24 October 1988 Rob Bijlsma, Rob Lensink and Peter Meininger visited the Parc National du Banc d'Arguin, Mauritania. The main purpose of this visit was to capture, ring and measure as many waterbirds, and waders in particular, as possible. Our study was part of a larger project, carried out by WIWO (Foundation Working Group for International Wader and Waterfowl Research) in collaboration with the Netherlands Marine Science Foundation.

The Banc d'Arguin is an area of major international importance for migrant waders and terns, both as a staging and as a wintering area (e.g. Dick 1975, Altenburg *et al.* 1981, Ens *et al.* 1989). At present more is known about the condition of waders in this area in spring (Ens *et al.* 1989) than in autumn. The only information currently available on condition, measurements and origin of waders using the area in autumn was collected by a British expedition in autumn 1973 (Dick 1975, Dick & Pienkowski 1979). Our major aim was to collect additional data, to trap at some other sites and to collect more measurements of birds captured. Additional measurements of birds captured may cast light on the geographical origin (Engelmoer *et al.* 1987).

Compared with the project in 1973 (Dick 1975) the 1988 team had a much shorter stay (3.5 weeks), fewer participants (three), no cannon nets, no transport, plenty of moon, wind and locusts swarms (the latter also in the mist-nets.....). In spite of all this a total of 1,036 birds were newly ringed: 789 waders, 210 "other waterbirds" (mainly gulls and terns) and 37 passerines. Twenty birds captured already carried a ring ("controls"). Five Turnstones *Arenaria interperes* and five Slender-billed Gulls *Larus genei* had been ringed locally during previous recent expeditions. Other controls included foreign ringed Ringed Plover (1), Sanderling (2), Knot (1), Turnstone (5) and Common Tern (1 from UK).

### METHODS

Two simple clap-nets (each 5x12 m) were used on 11 days between 30 September and 22 October, exclusively in the village of Iouik (19°52'N 16°18'W), to trap waders and Slender-billed Gulls feeding on fish remnants and garbage among the fishermen's huts and along the shore. In 64 successful attempts (at least one bird captured) we mainly trapped Sanderlings (up to 500 present) and Turnstones (up to 1,100 present).