

Extraordinary numbers of Oriental Pratincoles in NW Australia

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On 7 February 2004, we made an extraordinary count of 2.88 million Oriental Pratincoles at Eighty Mile Beach, NW Australia. This compares with the previous estimated population in the whole East Asian-Australasian flyway of just 75,000. We suggest that a combination of unusual weather and feeding conditions led to this concentration and that the population has always been much more numerous than previously supposed, with most occurring unrecorded in the vastness of outback Australia.

INTRODUCTION

The East Asian-Australasian flyway population of the Oriental Pratincole *Glareola maldivarum* breeds in E and SE Asia and migrates mostly to Australia where it occurs mainly during December to February. The most recent estimate of the flyway population is 75,000 (Bamford *et al.* 2003, Wetlands International 2002).

The main observations reported here were made during the NW Australia Wader and Tern Expedition 2004 (organised by The Australasian Wader Studies Group) while it was based at Eighty Mile Beach (Anna Plains Station), Western Australia (19° 20'S, 121° 26'E, Fig. 1) from 2 to 9 February 2004.

As we approached Anna Plains station on 2 February, it was immediately apparent that very large numbers of Oriental Pratincoles were using the area. We made sample counts and studied their daily behaviour. From dawn they fed extensively over the grazing grassland of the station as well as further inland above the bush, at least as far as the Great Northern Highway, 20 km from the coast. As the temperature increased each morning (the weather was relatively settled, calm and sunny throughout), the birds gradually moved out to the coast where they collected in huge aggregations on the upper mudflats and the beach. During the period of our observations, high water was in the middle of the day and, as the tide rose, the pratincoles moved onto the sandy beach. The birds remained on the beach or the upper mudflats, long after the tide had gone out and did not depart to feed inland until 1500–1600h. They then fed until dusk before going to roost on the grassy plains.

There were also smaller numbers of Oriental Plovers *Charadrius veredus* (a few thousand in total) behaving in much the same manner – feeding on the plains in the morning and late afternoon and roosting on the beach in the heat of the day.

There was no standing water on the plains except for a few puddles during the first day or so from light rain which fell on 30 January. However, there had been rather more rain

some weeks earlier, in late December, which had produced some new shoots of grass but not enough to allow it to grow very much; i.e. most of the grass was still quite short and there were some patches that were still completely bare.

We cannot be sure as to the identity of the pratincoles' main prey, but they appeared to be feeding extensively on Yellow-winged Locusts *Gastrimargus musicus* which were abundant, though by no means at plague levels (as they were in late March and early April 2003 (C. Minton & D. Hollands, unpubl. info.)). During our visit 250 pratincoles were caught and it was possible to feel what appeared to be the bodies of locusts in many of the birds' crops. Flying termites were also common as were non-flying, young (hopper) locusts and grasshoppers.

All pratincole species are largely crepuscular feeders (McNeil *et al.* 1992). However, the length of twilight in the tropics is so short that it must be necessary for them to choose between extending their feeding into daylight or into darkness or possibly both. Presumably Oriental Pratincoles in Australia choose daylight because on at least some days at Anna Plains large numbers fed throughout the morning until at least midday returning to feed again for about three hours before dusk. Possibly some continued to feed for a while after dusk because eight birds were caught in mist-nets when it was quite dark, though as it was only three days before full moon, there would have been a considerable amount of moonlight. The very similar Collared Pratincole *G. pratincola* has been recorded as feeding on moonlit nights (Urban *et al.* 1986).

Between 1130h and 1230h on 5 February, two of us (CM & CH) carried out a quick survey of pratincoles along the northernmost 62 km of Eighty Mile Beach. In the southernmost 1 km of this section 46,000 were counted. To the north, the density was considered to be around half this figure. The coast to the south was not surveyed, but from a distance, the density appeared to be similar to the stretch that had been counted. Extrapolating from these observations suggested a population for the whole of Eighty Mile Beach of between 2.0 million and 4.6 million. Clearly, with a previously esti-



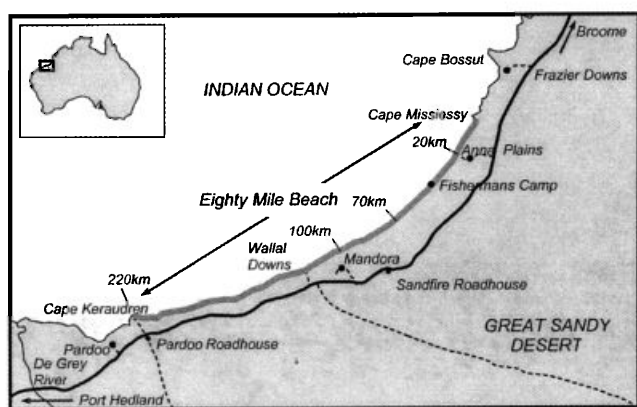


Fig. 1. Eighty Mile Beach, NW Australia, showing distances from Cape Missiessy south to Cape Keraudren.

mated flyway population of only 75,000, a full and accurate count was highly desirable. It was therefore arranged to carry out a detailed ground count of the northernmost 71 km of Eighty Mile Beach and the first 15 km of the bay to the north on 6 February and an aerial count of the whole beach on 7 February. In response to the plea by Brouwer *et al.* (2003) for good documentation of important counts, we explain exactly how these were carried out.

METHODS

Ground count on 6 February 2004

High water was at 1120h and the count was carried out as the tide was dropping between 1400h and 1500h. Counts were done by 3–6 experienced wader counters in each of three 4WD vehicles driven along the beach. One vehicle covered the northernmost 20 km of Eighty Mile Beach, from the Anna Plains entrance road to Cape Missiessy as well as 15 km of the bay to the north in the direction of Cape Bossut (Fig. 1). The second vehicle covered a 16 km section from

the Anna Plains entrance southward. The third vehicle covered the next 35 km to the south. Therefore the total length of beach counted was 86 km. Detailed counts were used as the basis for estimating numbers in large flocks. In each vehicle, a consensus was reached between the counters as to the figure that should be recorded.

Aerial count on 7 February 2004

High water was at 1147 h and the count took place as the tide was falling between 1230h and 1430h. The aircraft was a 4-seat Cessna with high wings that allowed good visibility. The count was carried out by PC, HS and BE who had all taken part in the previous day's ground count and were among the most experienced wader counters on the expedition. The aircraft flew from the Anna Plains entrance south to Cape Keraudren and then returned north to Cape Missiessy. One count was carried out by PC (who sat on the left behind the pilot) on the flight south and a duplicate count was done by HS (front right seat) on the flight north. BE (rear right seat) acted as recorder and cross-checked the counts whenever possible. The beach was counted in sections, divided by easily recognisable features, allowing us to compare the numbers in each section between the two counts. However, some of the features used (such as a whale skull) were not such as to enable their location to be identified on a map. One of these features was the rest of the members of the expedition who were banding waders having made a cannon net catch at 1200h, shortly before the flight. They made observations that helped us interpret the results of the count.

In both directions, the aircraft flew about 60 m above the water's edge and at about 150 kph.

RESULTS

The ground count revealed 818,000 Oriental Pratincoles along 86 km of beach on 6 February, whereas the southward and northward aerial counts on 7 February recorded 2.45 million and 2.88 million respectively over 235 km (Table 1).

Table 1. Counts of Oriental Pratincoles at Eighty Mile Beach, NW Australia, on 6 and 7 February 2004. The ground count on 6 February relates to the northernmost 71 km of Eighty Mile Beach plus 15 km further north towards Cape Bossut. The aerial counts relate to the whole 220 km of Eighty Mile Beach and the same extension to the north – a total distance of 235 km. Arrows show the direction of the aerial flights.

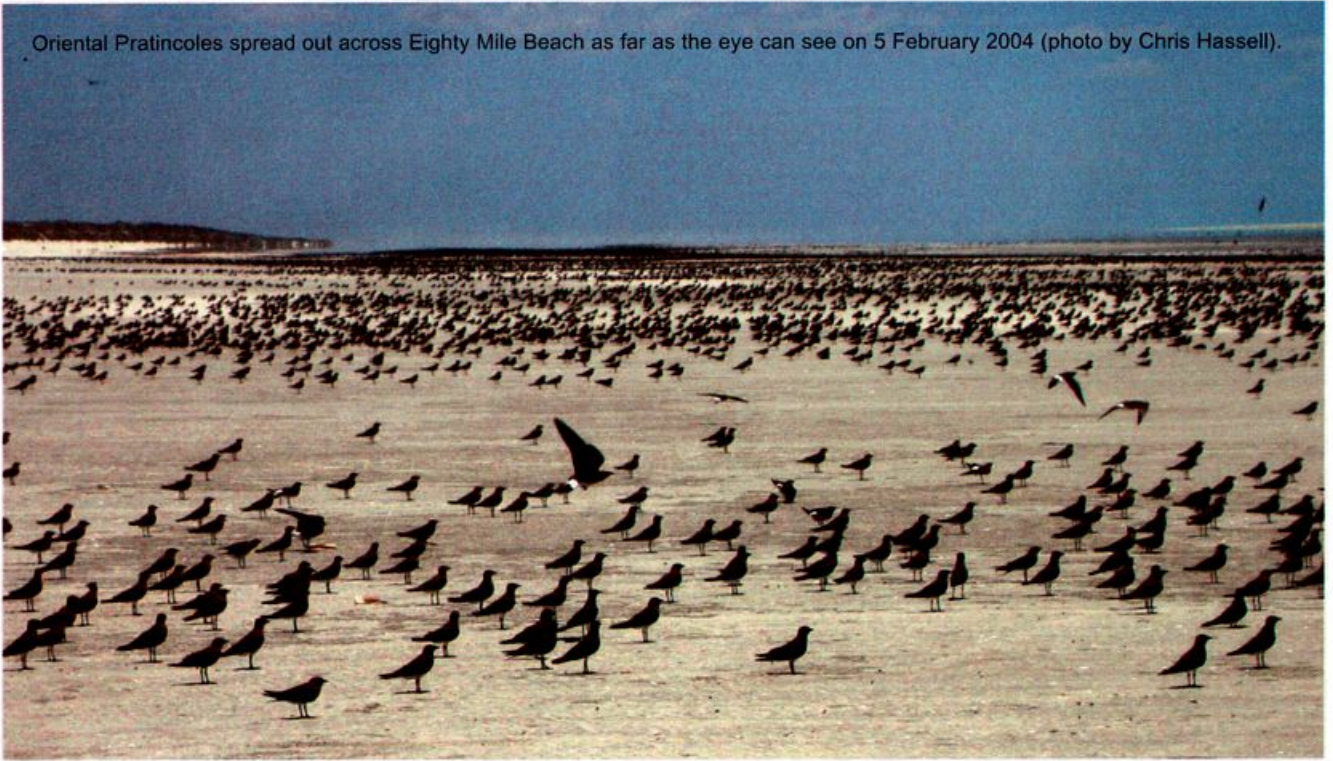
	Ground count 1400–1500h on 6 Feb		Southward aerial count 1230–1330h on 7 Feb (counter: P. Collins)	Northward aerial count 1330–1430h on 7 Feb (counter: H. Sitters)
Cape Bossut to Cape Missiessy	35,000		25,000 ^a	Finish 25,000
Cape Missiessy to Anna Plains entrance	41,000		48,000 ^a	↑ 48,000
Anna Plains entrance to Fishermans' camp	197,000	Start	270,000	↑ 102,000
Fishermans' camp to banding team	65,000		57,000	26,000
Banding team to whale skull	480,000 ^b		35,000	16,000
Whale skull to Mandora 2nd creek			1,751,000	2,516,000
Mandora 2nd creek to Mandora 3rd creek			33,000	20,000
Mandora 3rd creek to Mandora campsite			121,000	48,000
Mandora campsite to Cape Keraudren		Finish	108,000	Start 75,000
Totals	818,000 (partial count)		2,448,000^a	2,876,000

^a The northernmost counting sections from Cape Bossut to Anna Plains entrance were only counted during the northward flight, but the figures are repeated in the column for the southward flight and included in the total.

^b It is probable that the ground count extended south of the whale skull, but it is not known how far. Therefore this figure is not directly comparable with those for the aerial counts.



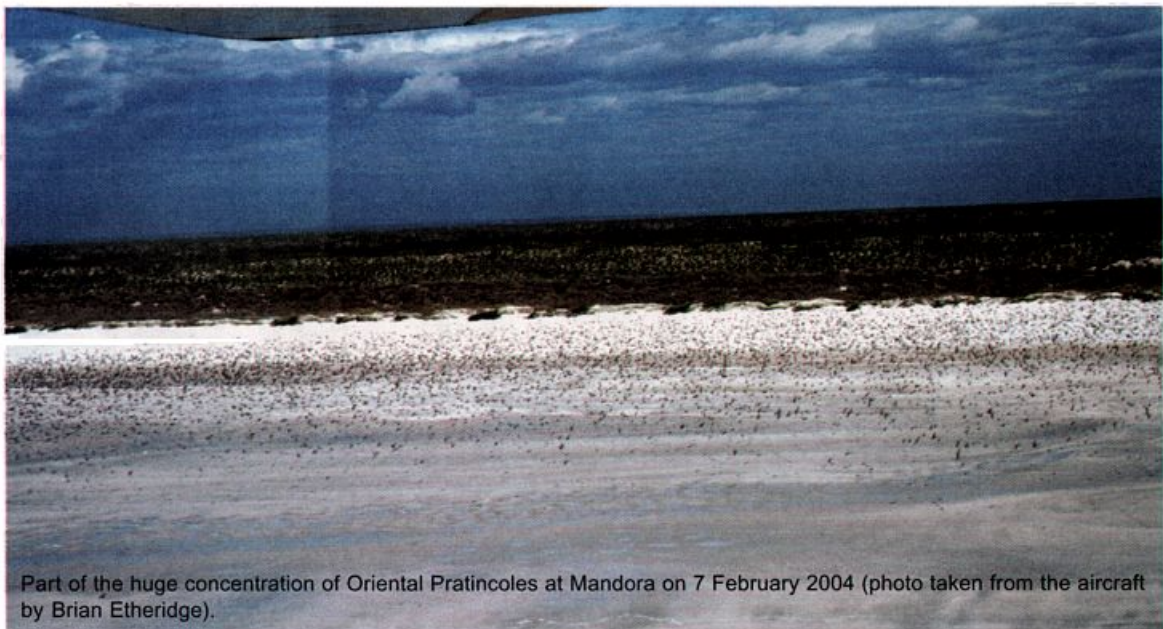
Oriental Pratincoles spread out across Eighty Mile Beach as far as the eye can see on 5 February 2004 (photo by Chris Hassell).



The grazing grasslands of Anna Plains station where Oriental Pratincoles fed in the morning and evening and where they roosted at night and where some were caught in mist nets (photo by Holly Sitters).



Oriental Pratincoles were very aggressive in the hand with a strong bite. Note the wide gape (for swallowing large flying insects, like locusts) and the large eye (for crepuscular feeding) (photo by Holly Sitters).



Part of the huge concentration of Oriental Pratincoles at Mandora on 7 February 2004 (photo taken from the aircraft by Brian Etheridge).

We had expected that the two aerial counts would give essentially the same result, and that the duplication would merely allow us to assess our accuracy. However, it is evident that there had been a major redistribution between the counts. All sections showed higher numbers during the first (southward) count compared with the second (northward) count with the sole exception of the “whale skull to Mandora 2nd creek” section which had by far the greatest numbers and where the count increased from 1.75 million to 2.52 million.

DISCUSSION

Allowing for the difficulties of counting huge numbers of birds from an aeroplane, we are confident that the total number of Oriental Pratincoles at Eighty Mile Beach on 7 February 2004 was within the range 2.4 to 3.0 million. Moreover, the ground count provides some corroboration in that extrapolating from the 818,000 counted over 86 km to the whole 235 km gives an estimated total for the beach of 2.2 million (despite the fact that the Mandora area where the largest numbers were found during the flight was not included). However, for the reasons set out below, it is our opinion that the population was actually around the upper end of this range at about 3.0 million.

Though all three aerial counters were experienced at counting waders in thousands and tens of thousands, none had previously been confronted with the huge numbers we found at Mandora. Undoubtedly, there was plenty of scope for error, especially when assessments had to be made in an instant, with no time for reflection. Nevertheless the fact that there is reasonable correspondence between the counts suggests that our results are in the right ball-park. Moreover, as we explain below, there is a clear reason for the discrepancy between them.

The southward flight took place only an hour or so after high water which, at 7.8 m, was a fairly big spring tide. Therefore most of the exposed beach was quite narrow. Typically, the pratincoles occurred evenly-spaced in large flocks well up the beach whereas nearly all the other waders (mostly sandpipers Scolopacidae and plovers Charadriidae) were in much more compact flocks at the water's edge. As the aircraft passed, the pratincoles tended to fly inland over the dunes and the other waders flew over the sea. Because of the speed of the aircraft, neither were seen to settle. The pratincoles proved to be relatively easy to distinguish from the other, mainly grey, waders. They were darker and their white rumps were often easy to see. Moreover their habit of spreading out evenly spaced high up the beach and of flying over the dunes rather than the sea helped to distinguish them.

The huge concentration in the “whale skull to Mandora 2nd creek” section occurred around the mouths of a series of creeks where the sandy beach was much wider than elsewhere. We came to the conclusion that this area was favoured because of the space it afforded, especially the fact that the birds could roost some distance from the dunes which might give cover to potential predators. It is our common experience when cannon-netting waders on beaches that they may be pushed up onto a narrow beach gently by the tide but, once they are flying, they will not readily land in such a situation. Presumably narrow beaches close to dunes are more dangerous and this may be clearer to birds that are flying. We therefore suppose that, having taken flight when the aircraft passed, many of the pratincoles did not settle in the same place but made for the broader beach at Mandora. Therefore to this already large concentration there would have been added many of the birds disturbed by the aircraft – from both north and south – as well as additional birds arriving late from feeding inland.

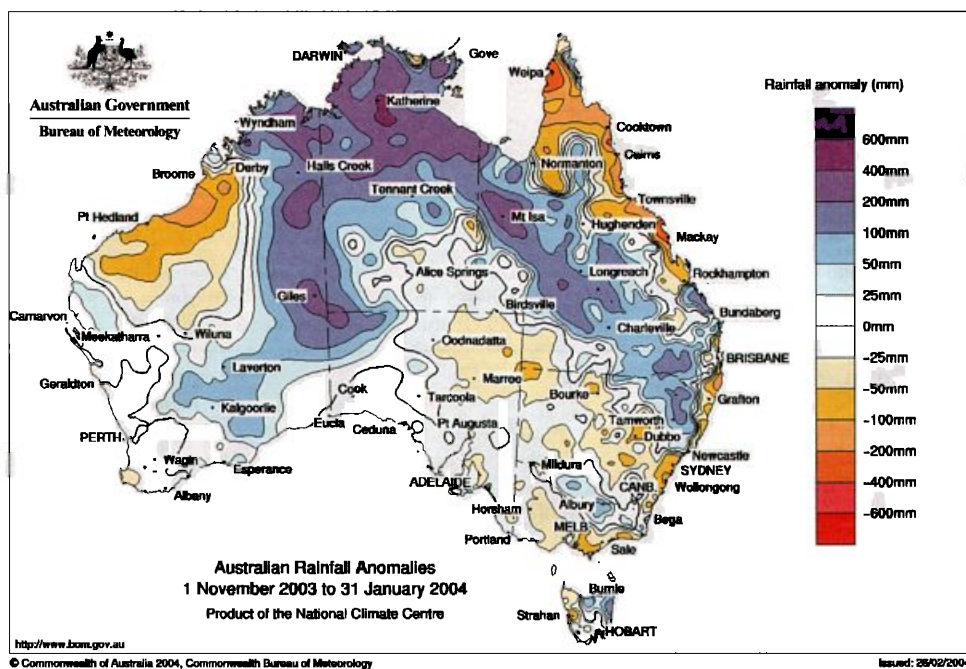


Fig. 2. Australian rainfall anomalies for 1 November 2003 to 31 January 2004. Colours show the difference between the amount of rain that fell during this period in comparison with the average for the same period during 1961–1990. (Note: most of the increased rainfall relates to December and January; November rainfall was much closer to the 1961–1990 average.) (Map supplied by and reproduced with the permission of the Australian Government Bureau of Meteorology.)



Observations made by the banding team, based about 40 km to the north of the concentration at Mandora, showed that from 1100h to noon (i.e. over high water) there had been a continuous stream of pratincoles moving south past them. These observations ceased at noon because that is when they made a cannon-net catch, but there is no reason to suppose that the southward movement did not continue for sometime after. Our interpretation is that these birds were late arrivals from inland feeding that were unwilling to land on the narrow beaches further north and were making for the broad beach at Mandora.

It is therefore likely that the differences between the aerial counts arose from disturbance by the aircraft making the birds concentrate at Mandora, and by birds continuing to fly onto Eighty Mile Beach from inland during the high tide period. For these reasons, we consider that the second higher count of 2.88 million is likely to be the better measure of the total number of pratincoles actually present. Moreover there are reasons why even this could be on the low side. First, if the 428,000 difference between the counts can be explained by late arrivals, it is possible that the movement of birds from inland had not stopped before the second flight but continued. Secondly, we made no attempt to look for pratincoles inland; some may have continued feeding there. Thirdly, BE's assessment of HS's counts was that if anything they were conservative. Therefore it is our opinion that there were probably at least 3.0 million Oriental Pratincoles in the vicinity of Eighty Mile Beach on 7 February 2004. However, we did not count 3.0 million, we counted 2.88 million and that is the figure that we suggest should be quoted.

Oriental Pratincoles are nomadic during the non-breeding season moving around in response to the availability of food which is largely determined by rainfall (Higgins & Davies 1996). It would therefore seem likely that at least part of the reason for the concentration at Eighty Mile Beach was the presence of an abundant food supply, mainly locusts. However, we have no means of knowing whether the concentration was caused more by the presence of food there or by its absence elsewhere.

Although Oriental Pratincoles may move into an area soon after rainfall, they may leave at the onset of persistent heavy rain (Higgins & Davies 1996). Therefore the birds at Eighty Mile Beach may have come from an area of very high

rainfall. This is very likely because much of N Australia to the east of Eighty Mile Beach, from the Kimberleys to the Gulf of Carpentaria, experienced particularly wet weather in December 2003 and January 2004 with large areas recording considerably more rain than the 1961–1990 average (Fig. 2). Therefore it is likely that the Oriental Pratincole population is normally spread widely across N Australia (and never properly recorded because it is so scattered and remote from people), but in December 2003 and January 2004 it was pushed west by the rains, leading to an unprecedented concentration at Eighty Mile Beach. Consistent with such a westwards movement are counts of Oriental Pratincoles made both before (further NE) and after (further SW) we recorded the large numbers at Eighty Mile Beach (Table 2).

Our count of 2.88 million represents a huge increase on the previous estimate of the East Asian-Australasian flyway population of only 75,000. Moreover at the same time there could well have been other significant numbers of Oriental Pratincoles elsewhere in Australia (such as N Queensland where rainfall was low (Fig. 2)) as well as the probably small population in countries further north, such as New Guinea and Indonesia and sedentary birds in SE Asia (Bamford *et al.* 2003, Wetlands International 2002). Have there always been millions of Oriental Pratincoles in this flyway or has there been a recent population explosion? We cannot give a definitive answer to this. Certainly there was no evidence that the 2003 breeding season was especially productive because only 21 of the 250 Oriental Pratincoles caught at Anna Plains (8.4%) were aged as juveniles (though it is possible that the ageing criterion used – presence of un-moulted juvenile secondaries – is not wholly reliable as late as February, so the proportion might have been slightly higher). However, if there has been a population explosion, the limits to the maximum possible rate of reproduction mean that the population would have numbered millions or many hundreds of thousands for quite a few years, yet numbers like this have never been reported before. We have, however, obtained details of some very large counts from 1975 and 1981 that have not previously been published (R. Johnstone, pers. comm., Table 3). These include one of 350,000–400,000 near the south-western end of Eighty Mile Beach on the surprisingly late date of 24 April 1975. This must have been an exceptional situation because, although intensive observations

Table 2. Large counts of Oriental Pratincoles ($\geq 1,000$) in NW Australia in January and February 2004 before and after large numbers were recorded at Eighty Mile Beach during 2–9 February (distances and direction are from Anna Plains station homestead: see Fig. 1). During 14–16 February, PC and FO'C also recorded an aggregate of 1,245 Oriental Pratincoles in 12 small flocks SW of Anna Plains.

Date (in 2004)	Count	Site	Distance and direction from Anna Plains	Observer
23 & 24 Jan	"tens of thousands" (not seen during 25 Jan to 1 Feb)	Crab Creek & Roebuck Plains near Broome	170 km NE	CM ¹
14 Feb	2,000	From Great Northern Highway	280 km SW	PC
15 Feb	10,000	ditto	250 km SW	FO'C
	1,000	ditto	290 km SW	FO'C
	1,000	ditto	310 km SW	FO'C
16 Feb	8,000	Near Port Hedland	340 km SW	FO'C
	20,000	From Great Northern Highway	350 km SW	FO'C
	1,000	ditto	355 km SW	FO'C
	2,500	From North West Highway	415 km SW	FO'C
	1,000	ditto	435 km SW	FO'C

¹ and other members of the NW Australia Wader & Tern Expedition 2004



Table 3. Counts of large numbers of Oriental Pratincoles in NW Australia before 2004 (the first three were reported via Ron Johnstone of the West Australian Museum, Perth).

Date	Count	Site	Observers
9 February 1975	130,000–150,000	Near Mount Blaze (20° 00'S, 119° 41'E)	John Darnell
24 April 1975	350,000–400,000	ditto	John Darnell
21 & 22 January 1981	“hundreds of thousands”	Port Hedland (20° 20'S, 118° 30'E)	A. Chapman
February 1989	50,000	Roebuck Plains, near Broome (18° 00'S, 122° 25'E)	Brice Wells & Gail Hooper
January 2001	50,000	Anna Plains station (19° 20'S, 121° 26'E)	NW Australia Wader & Tern Expedition 2001

have been made of waders in NW Australia since the early 1980s, hardly any Oriental Pratincoles have been seen after the first week of March.

We have included in Table 3 two more recent observations, each of 50,000 pratincoles. As it happens, in both cases the observers concerned consider the figure recorded was probably an underestimate. The first, by Brice Wells and Gail Hooper, was of a very large flock that was difficult to count at least 1 km wide along the whole 14 km stretch of the Great Northern Highway where it crosses Roebuck Plains, near Broome (B. Wells pers. comm.). The second record relates to observations made by most of the current authors and others during a previous expedition to Anna Plains station and Eighty Mile Beach in January 2001. At that time, the ground was still very wet with considerable amounts of standing water from heavy rain the previous year and many of the station roads were impassable. Presumably because of the wet and relatively cool conditions, the pratincoles did not roost on the beach in the middle of the day. Therefore this count related to only those parts of the Anna Plains grasslands that were accessible, so the total number of pratincoles present may well have been much greater.

In light of the evidence, we suggest that the East Asian-Australasian flyway population of Oriental Pratincoles has always been much larger than previously thought. In most years, it is simply dispersed across the vastness of the largely uninhabited parts of N Australia. In February 2004, however, it became concentrated in the region of Eighty Mile Beach, partly because of the availability of food there, but probably more especially because the birds were avoiding areas of heavy and widespread rainfall elsewhere in tropical Australia.

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