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A NEW SUBSPECIES OF MASKED BOOBY *SULA DACTYLATRA* FROM LORD HOWE, NORFOLK AND KERMADEC ISLANDS

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SUMMARY

O'BRIEN, R.M. & DAVIES, J. 1990. A new subspecies of Masked Booby *Sula dactylatra* from Lord Howe, Norfolk and Kermadec Islands. *Marine Ornithology* 18: 1-7.

A new subspecies of Masked Booby, *Sula dactylatra fullagari*, is described from Lord Howe, Norfolk and Kermadec Islands. A diagnosis and description is given, and a summary of biology.

INTRODUCTION

The Masked Booby *Sula dactylatra* is distributed throughout tropical seas of the Atlantic, Indian and Pacific Oceans (Nelson 1978). Four subspecies are presently recognized: *S.d. dactylatra*, *S.d. granti*, *S.d. personata* and *S.d. melanops* (Nelson 1978, Dorst & Mougín 1979, Harrison 1985). Subspecific separation is based largely on the colouration of bill, legs and feet (Nelson 1978). One subspecies, *S.d. personata*, occurs in Australasia, with a distribution extending from the western Pacific to the eastern Indian Oceans (Kinsky 1970, Condon 1975, Dorst & Mougín 1979). A further, though doubtful subspecies, *S.d. bedouti*, stated to occur in the eastern Indian Ocean, has been placed in synonymy with *S.d. personata* by some authors (e.g. Condon 1975). During art work on this species, J. Davies recognized the distinctiveness of the Tasman Sea populations, which we formally describe in this paper.

MATERIALS AND METHODS

Specimens were borrowed from the following museums: Australian National Wildlife Collection, Canberra (ANWC), South Australian Museum (SAM), Queensland Museum (QM), Australian Museum (AM), Macleay Museum, University of Sydney (MM), and the National Museum of New Zealand (NMNZ). Additional information on specimens was sought from the British Museum of Natural History (BMNH) and the American Museum of Natural History (AMNH). Specimens were measured according to Baldwin *et al.* (1931), using Vernier calipers accurate to 0.02 mm and a fixed rule accurate to 1.0 mm. The following sexed adult specimens were examined in this study: *S. dactylatra* (new unnamed subspecies) 13321, 13365 (ANWC); 027217 (AM); B4374, B4375 (MM); DM1098, DM12710, DM15955, DM15956 (NMNZ); 215543, 254385, 254386, 254387, 254389, 254390, 279253, 279254, 729258, 729267, 729280, 729281 (AMNH). *S.d. personata* 294 (ANWC); B20565 (SAM); 018173 (QM); 1880-11-18-759, 1880-11-18-760 (BMNH). *S.d. bedouti* B9538, B9539 (SAM); 729243, 729244, 729246, 729247 (AMNH). *S.d. bedouti* is recognized here; because

no critical assessment of its unfeathered parts has ever been done, synonymy seems premature. We have used the subspecies criterion adopted by Rowley (1970). In Figure 1, the unshaded rectangles represent 1.3 X the standard deviation on either side of the mean, and illustrate the area within which 90% of the population can be expected to occur. If these rectangles do not overlap, subspecific separation, by Rowley's criterion, would be justified.

RESULTS

Diagnosis

Sula dactylatra fullagari subsp. nov.

Holotype: Australian National Wildlife Collection, Canberra. Reg. No 13321; adult male: N.S.W., Lord Howe Island, Mutton Bird Point, 12 February 1971; coll. J. McKean. Measurements (mm): wing 444; tail 198.7; exposed culmen 110.3; tarsus 58.6; middle toe and claw 99.5. Mass (label data) (g): 2 500. Paratypes: all specimens of adult *S.d. fullagari* in the Australian Museum 01527, 01528, 01529, 01530, 027217 and National Museum of New Zealand 1098, 12710, 15955, 15956. Comparing adults, *S.d. fullagari* differs from all other subspecies of *S. dactylatra* in having a dark brown rather than a yellow iris (Nelson 1978).

Description

Similar in all plumages to *S.d. personata*. Previous plumage descriptions of the Masked Booby are inadequate because they do not assess plumage colours qualitatively and are largely based on subjective judgement. For this reason, the adult is described here, using colours and colour names given in Smithe (1975). Entire head, neck, mantle, back, rump and upper tail-coverts, white. Feathering at margin of gular pouch, varies in shape: inverted V or U, or horizontal. Underparts, including under tail-coverts and axillaries, white. Tail, Sepia (119); rachis of rectrices, white. Scapulars, humerals, secondaries, tertials, greater

upper wing-coverts, greater primary coverts, tertial coverts and alula, Vandyke Brown (121). Basal inner webs of humerals, secondaries and tertials, white, extending to 2/3 feather length. Basal 1/2 of scapulars and alula, white on both webs, forming inverted V shape on each feather. Primaries, Sepia (119), fading to Vandyke Brown (121) with wear; inner webs basally white. Median, lesser, humeral and marginal upper wing-coverts, white. All under wing-coverts, white. Bare parts (based on photos, see distribution section): Iris, Sepia (219). Orbital-ring, Blackish Neutral Grey (82). Bill, Buff-Yellow (53); recorded as greenish yellow by (Oliver 1955); unknown whether bill colour differs sexually, as noted in *S.d. personata* (Hindwood *et al.* 1963). Gular pouch, facial skin, and proximal bill, Blackish Neutral Grey (82). Legs and feet vary in colour, usually Medium Plumbeous (87) with Pratt's Payne's Grey (88) shade. Label data on holotype state: feet and webs, dull chrome yellow. Legs and feet are described as greenish grey, yellowish on webs in Oliver (1930).

Egg measurements, for *S.d. fullagari*, given in Basset-Hull (1910) and Merton (1970), fall within the range of *S.d. personata* in the Coral Sea (Hindwood *et al.* 1963). Wing measurements are greater in *S.d. fullagari*, compared with *S.d. personata* and *S.d. bedouti* (See Table 1 and Fig. 1). Details of skeletal morphology and associated measurements are given in Van Tets *et al.* (1988).

Distribution

Label data on specimens, and photographic evidence from Lindsey (1986), Hermes (1985), Soper (1976) and Robertson (1985), confirm the presence and breeding of this subspecies on Lord Howe and Norfolk Islands in the Tasman Sea, and the Kermadec Islands in the Pacific Ocean. Lord Howe Island is the southernmost breeding colony of the Masked Booby in the world (Fullagar *et al.* 1974). On these breeding islands, several outlying islands, or islets, are used as gannetries. Summaries of these gannetries are given in Hindwood (1940), Fullagar *et al.* (1974), and Brown

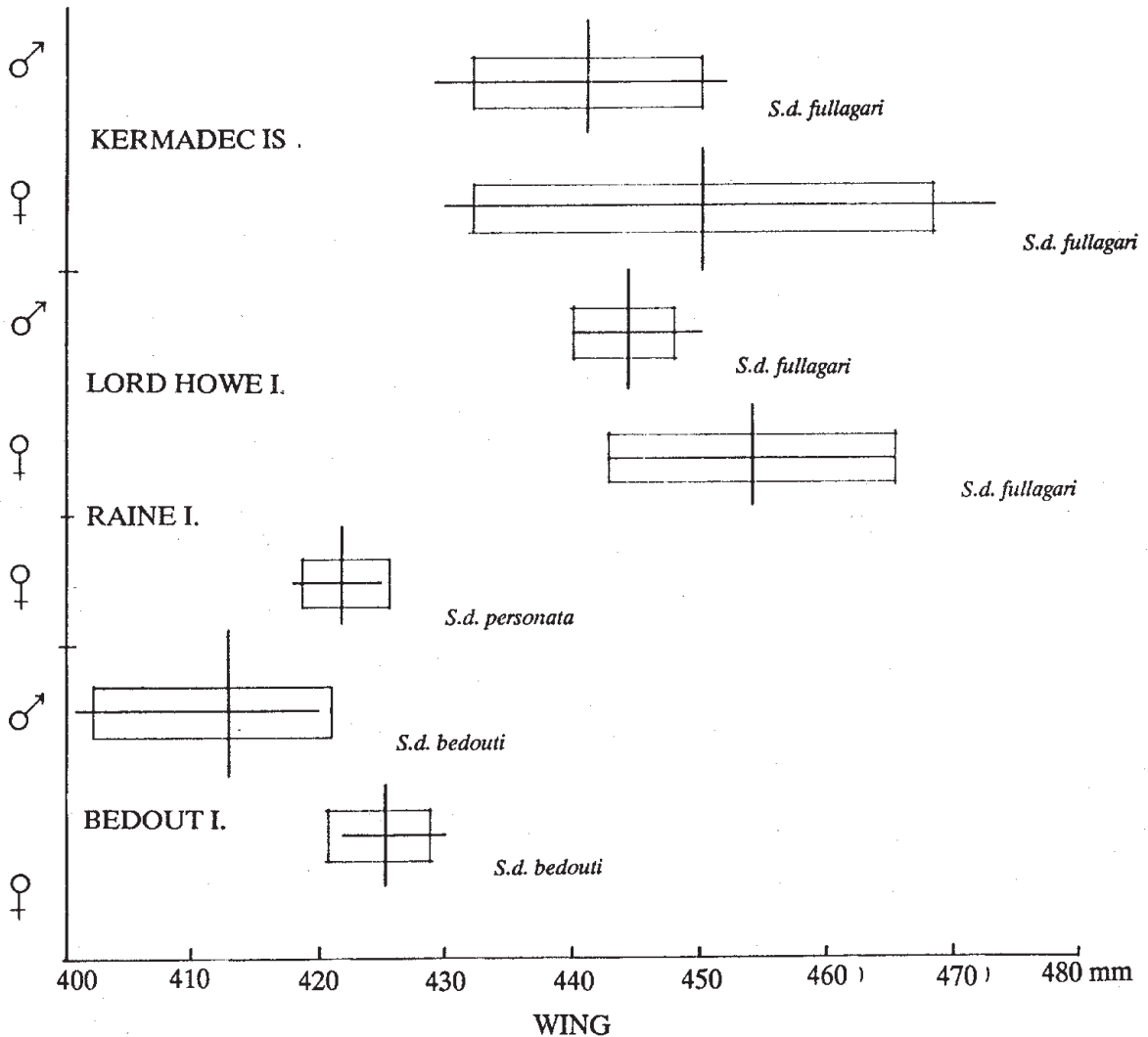


Figure 1

Wing measurements of sexed adult Masked Boobies *Sula dactylatra*; those from Lord Howe and Kermadec Islands are *S.d. fullagari*; Raine Island, *S.d. personata*; and Bedout Island, *S.d. bedouti*. The vertical line represents the mean; horizontal line, the range; and open rectangle, 90% of the population. Actual measurements are given in Table 1. Norfolk Island data are not included because of the small sample size.

TABLE 1

MEASUREMENTS (MM) OF SEXED ADULT MASKED BOOBIES *SULA DACTYLATRA* FROM VARIOUS MUSEUMS

Locality ^a	Males			Females				
	Mean	SD ^b	Range	Mean	SD ^b	n	Range	
	Wing							
1.	441	7	7	429-455	450	14	4	430-468
2.	441	6	2	435-448			-	
3.	444	3	5	440-450	454	9	3	443-465
1.2.3.	442	6	14	429-455	452	12	7	430-468
4.		-			421	2	5	418-425
5.	413	8	3	401-420	425	3	3	422-430
	Culmen							
1.	107.2	3.1	7	104-112	108.0	1.8	4	105-110
2.	105.0	-	2	105,105			-	
3.	111.2	1.6	5	109.1-114	112.4	2.6	3	109-115.4
1.2.3.	108.3	3.3	14	104-114	109.9	3.1	7	105-115.4
4.		-			104.5	2.1	4	102-108
5.	104.3	1.2	3	103-106	103.9	2.1	3	101-105.8
	Tarsus							
1.	60.4	3.6	7	55-65	61.5	2.2	4	59-65
2.	56.5	3.5	2	53,60			-	
3.	57.8	0.9	5	56.5-59	60.5	4.7	3	54-65
1.2.3.	58.9	3.3	14	53-65	61.0	3.5	7	54-65
4.		-			61.8	2.8	5	57.8-66
5.	53.9	2.8	3	51-57.7	54.4	2.8	3	52-58.4
	Tail							
1.	180	5	7	170-186	180	3	4	177-186
2.	174	1	2	173,175			-	
3.	187	11	5	175-202.7	190	12	3	174-205
1.2.3.	181	9	14	170-202.7	184	9	7	174-205
4.		-			174	3	4	170-179.7
5.	171	4	3	165-175	177	6	3	172-186
	Toe							
1.	96.8	2.5	7	93-100	100.2	5.3	4	95-109
2.	95.0	2.0	2	93,97			-	
3.	100.1	2.1	5	97.6-104	95.0	5.9	3	89-103.2
1.2.3.	97.7	2.9	14	93-104	98.0	6.1	7	89-109
4.		-			94.0	1.9	5	91-96.3
5.	95.4	2.0	3	93-98	96.1	4.3	3	90-100

^a1. Kermadec Islands (NMNZ, AMNH); 2. Norfolk Island (AMNH); 3. Lord Howe Island (ANWC, AM, MM, AMNH); 1.2.3. combined; 4. Raine Island (ANWC, SAM, QM, BMNH); 5. Bedout Island (SAM, AMNH).

^b Standard deviation

(1979), for Lord Howe Island; Hermes *et al.* (1986) for Norfolk Island, and Merton (1970) for the Kermadec Islands.

Movements

No other sulid has been recorded breeding within the range of this subspecies in recent times, other than the Australasian Gannet *Morus serrator*, on Norfolk Island, where three pairs are established (Hermes 1985) and the extinct Tasman Booby *Sula tasmani* (Van Tets *et al.* 1988). Therefore, banding records must refer to this subspecies. Nestlings banded on Lord Howe Island disperse great distances; one bird has been recovered near Cape York, Queensland (Anon. 1980) and another at Tonga (Anon. 1981). Two nestlings banded on Lord Howe Island were recovered at New Caledonia, in their first and second years, respectively (McKean 1963, Nelson 1978). Nestlings banded on Norfolk Island, have been recovered at New Caledonia and Vanuatu (e.g. Anon. 1982, 1985), and on the Kermadec Islands (Anon. 1989). Movements of adults are not well known, but an adult banded on Norfolk Island has been recaptured at the Kermadec Islands (Anon. 1989), suggesting some interchange of island populations. Whether birds up to three years old move between neighbouring islands and establish themselves as breeders at non-natal colonies, as happens in *S.d. personata* (Nelson 1978), is not yet known.

Status

Generally uncommon. Accounts of population estimates for Lord Howe Island are given in McKean (1963), Fullagar *et al.* (1974), Brown (1979) and Van Tets & Fullagar (1984). Van Tets & Fullagar (1984) state that several hundred pairs may have nested on and around Lord Howe Island, during the 1970/71 season.

On Norfolk Island, Tarburton (1981) reported an estimate of 200 pairs on Nepean Island and 100 pairs on Philip Island, which he observed in

December 1978 and 1979. On Nepean Island, nestlings have been regularly banded in the spring of each year. Between 1977 and 1985, an average of 477 young were raised per year, ranging from 111-672 young per year (Hermes *et al.* 1986). There has been some expansion recorded on Norfolk Island, with birds breeding on the main island, but since 1978 breeding has ceased there (Schodde *et al.* 1983, Hermes *et al.* 1986).

There are few population estimates for Masked Boobies on the Kermadec Islands. Merton (1970) recorded 36 breeding pairs on the Herald Islets from November 1966 to January 1967; 50 pairs were noted by Edgar *et al.* (1965). In August 1966, 30 pairs were breeding on Macauley Island (O'Brien 1966 in Merton 1970). Robertson & Bell (1984) suggest an estimate of less than 1 000 pairs for the Kermadec Islands.

Breeding biology

No detailed breeding study of the Masked Booby has been undertaken on these islands. The breeding season is protracted on all of them. Peak breeding at Lord Howe Island, is in October (Basset-Hull 1910), and spring (Fullagar *et al.* 1974); on Norfolk, September (Hermes *et al.* 1986); on the Kermadec islands, no data are available, but eggs have been recorded from late August until November (Oliver 1955). On Philip Island, an outlier of Norfolk Island, the egg dates are 5 July-3 January, chicks from 5 September to 29 March, and earliest fledging date, 2 January (Hermes *et al.* 1986). Nesting on the two outliers of Norfolk Island, Philip and Nepean Islands, is not in synchrony; being earlier on the latter (Moore 1985, Hermes *et al.* 1986, *cf.* Tarburton 1981).

Etymology

We name this subspecies after the Australian ornithologist, Dr Peter Fullagar, for his contribution to Australian ornithology, and in particular, to the knowledge of the avifauna of Lord Howe Island.

DISCUSSION

Oliver (1930, 1955) was the first to mention that Masked Boobies on the Kermadec Islands had dark brown irises as adults, but did not recognize the distinctiveness of this character. There are few cases of subspecific differences in birds based mainly on iris colour; none in the Pelecaniformes is known, other than the present subspecies. Analogous examples, all involving island avifaunas, can be found in the adults of the following species: Blackbrowed Albatross (*D.m. melanophrys* has a dark brown iris, Robertson 1985); the Kelp or Southern Blackbacked Gull *Larus dominicanus* (*L.d. vetula* has a dark grey-brown iris, Brooke & Cooper 1979) and Glossy Starling *Aplonis panayensis* (*A.p. tyleri* has a brown iris, Abdulali 1967).

In addition to iris colour, wing measurements of *S.d. fullagari* are greater than those of *S.d. personata* and *S.d. bedouti* (Fig. 1), and satisfy Rowley's (1970) criteria for subspecific separation. Wing measurements, particularly in females of *S.d. personata* and *S.d. bedouti*, overlap. This lends some support to regarding the two as not subspecifically distinct, but other characters, such as the colours of unfeathered parts, will need to be taken into consideration before a thorough assessment can be undertaken of the subspecific status of *S.d. bedouti*.

Masked Boobies tend to be found on small uninhabited islands and appear to be prone to disturbance (e.g. Hermes *et al.* 1986). Comparing the population status of all subspecies of *Sula dactylatra*, as given by Nelson (1978), it appears that *S.d. fullagari* is the rarest. Any attempt by *S.d. fullagari* to recolonize the main island at Norfolk Island or expand its breeding distribution elsewhere should be encouraged by the exclusion of predators and limiting human disturbance.

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