

# FIRST RECORD OF A WHITE-TAILED BROWN MORPH RED-FOOTED BOOBY *SULA SULA* ON CHRISTMAS ISLAND, INDIAN OCEAN

JANOS C. HENNICKE

*Department of Ecology and Conservation, Biocenter Grindel, University of Hamburg,  
Martin-Luther-King-Platz 3, Hamburg, 20146, Germany  
(janos.hennicke@uni-hamburg.de)*

*Received 28 August 2008, accepted 4 April 2009*

HENNICKE, J.C. 2009. First record of a white-tailed brown morph Red-footed Booby *Sula sula* on Christmas Island, Indian Ocean. *Marine Ornithology* 37: 179–180.

The Red-footed Booby *Sula sula* is an abundant and widely distributed tropical seabird (Nelson 1978, Harrison 1985, del Hoyo *et al.* 1992). It breeds in tropical waters around the globe in large numbers, but is absent from the eastern tropical Atlantic.

The species is considered to be one of the most polymorphic seabirds with respect to plumage colour (Le Corre 1999), with three recognized major adult plumage types (white, white-tailed brown, brown) and several intermediates, including golden white, black-tailed white, and white-headed white-tailed brown (Nelson 1978, Del Hoyo *et al.* 1992). Although the genetic basis of the polymorphism in this species has been identified (Baião *et al.* 2007), the processes and factors underlying the distribution of the various morphs are not fully understood (Le Corre 1999, Steeves *et al.* 2003, Baião *et al.* 2007). Some of the morphs overlap in their distribution and can interbreed (e.g. white and white-tailed brown morphs in the Caribbean, Atlantic Ocean and Western Indian Ocean), whereas some morphs occur only in restricted areas of the species' distribution. For example, the black-tailed white morph is found only on Galapagos (Nelson 1978, Del Hoyo *et al.* 1992, Le Corre 1999, Baião *et al.* 2007).

On Christmas Island (Indian Ocean, 10°25'S 105°40'E), only the golden white morph, which has a yellowish-golden tinge on head and neck has been recorded so far (Nelson 1978, Harrison 1985,

Marchant & Higgins 1990, Del Hoyo *et al.* 1992). During the dry season 2007, fieldwork on Red-footed Boobies was carried out at Ethel Beach, a major nesting site of this seabird in the northeast of the island. From mid-August to mid-September, a white-tailed brown morph Red-footed Booby was repeatedly observed amongst the golden white morphs. To the author's knowledge, this record is the first of this morph, and also of any morph other than the golden white morph, on Christmas Island.

The bird was of a size similar to that of the golden white morph. The colour of head, neck and body was warm brown, with a pale light brown lower rump. Wings were dark brown, and the tail was white. Legs and feet were bright red. The bill was uniformly pale blue-greyish without a dark or blackish tip. The face was pink at the base of the mandibles and rich blue around the eyes (Fig. 1). These features indicate that the individual was not a juvenile or subadult white morph with delayed moulting into adult plumage.

The bird was observed sitting in trees at heights between 3 m and 30 m, both alone and close to other boobies. On several occasions, it was seen on the ground searching for and collecting twigs, a behaviour common in nest-building adults as well as in courting subadults (Nelson 1978). However, no nest of this bird was found, and so it remains unclear whether the animal was breeding.



**Fig. 1.** White-tailed brown morph of a Red-footed Booby *Sula sula* at Ethel Beach, Christmas Island, Indian Ocean. (Photos by M. van der Stap)

Attempts to catch the bird for banding failed. Because the bird was not individually marked, it is possible that different animals of the same morph were seen at Ethel Beach. However, this possibility is unlikely, because the observations were all made over a short time period and at one location. Thus, the same individual most likely was seen repeatedly.

The polymorphism in plumage colour in Red-footed Boobies is not caused by a spontaneous single mutation (Baião *et al.* 2007), and so this bird must have originated from a colony other than that at Christmas Island (where the white-tailed brown morph breeds); it must have arrived either as an adult or juvenile, maturing on the island. However, determining from where the bird came to Christmas Island is difficult. Red-footed Boobies are highly pelagic seabirds (Nelson 1978, Schreiber *et al.* 1996, Weimerskirch *et al.* 2005), and not only juveniles but adults are known to undertake long-range inter-island movements (Harrington 1977, Nelson 1978). The closest breeding colonies of this morph are in the western Indian Ocean (Tromelin, Europa, Aldabra) and in the Coral Sea off Australia (Nelson 1978, Le Corre 1999), which makes it likely that the bird came from one of those regions—a hypothesis that has to remain open, however. Genetic analyses might answer the question, which would be interesting, because the Western Indian Ocean colonies are considered to be genetically relatively isolated from one another, whereas a considerable amount of gene flow occurs within the Pacific population of this species (Le Corre 1999, Steeves *et al.* 2003). Thus, in future fieldwork on Christmas Island, attempts will be made to band this bird, to take a genetic sample and to observe if it is successfully interbreeding with the predominant white golden morph of the island.

#### ACKNOWLEDGEMENTS

This work was conducted within the framework of the Christmas Island Seabird Project, which was supported by grants from the Universität Hamburg, the Deutsche Ornithologen Gesellschaft and a number of private sponsors. Austasian Airlines, Grube KG Hützel and Globetrotter Hamburg provided in-kind support. L. Braun, J. Navarro and M. van der Stap helped in the field. Special thanks to M. van der Stap for providing the photos. Parks Australia North Christmas Island issued all necessary permits and provided accommodation.

#### REFERENCES

- BAIÃO, P.C., SCHREIBER, E.A. & PARKER, P.G. 2007. The genetic basis of the plumage polymorphism in Red-footed Boobies (*Sula sula*): a Melanocortin-I receptor (MC1R) analysis. *Journal of Heredity* 98: 287–292.
- DEL HOYO, J., ELLIOTT, A. & SARGATAL, J. (Eds). 1992. Handbook of the birds of the world. Volume 1. Barcelona, Spain: Lynx Edicions. 696 pp.
- HARRINGTON, B.A. 1977. Winter distribution of juvenile and older Red-footed Boobies from the Hawaiian island. *Condor* 79: 97–90.
- HARRISON, P. 1985. Seabirds. An identification guide. Boston: Houghton Mifflin.
- LE CORRE, M. 1999. Plumage polymorphism of Red-footed Boobies (*Sula sula*) in the Western Indian Ocean: an indicator of biogeographic isolation. *Journal of Zoology (London)* 249: 411–415.
- MARCHANT, S. & HIGGINS, P.J. (Eds). 1990. Handbook of Australian, New Zealand and Antarctic birds. Volume 1. Melbourne, Australia: Oxford University Press. 664 pp.
- NELSON, J.B. 1978. The Sulidae. Gannets and boobies. Oxford, UK: Oxford University Press. 1012 pp.
- SCHREIBER, E.A., SCHREIBER, R.W. & SCHENK, G.A. 1996. Red-footed Booby (*Sula sula*) In: Gill, F.B. & Poole, A. (Eds). The birds of North America. No. 241. Philadelphia, Pennsylvania and Washington, DC: The Academy of Natural Sciences and The American Ornithologists' Union. pp. 1–24.
- STEEVES, T.E., ANDERSON, D.J., McNALLY, H., KIM, M.H. & FRIESEN, V.L. 2003. Phylogeography of *Sula*: the role of physical barriers to gene flow in the diversification of tropical seabirds. *Journal of Avian Biology* 34: 217–223.
- WEIMERSKIRCH, H., LE CORRE, M., ROPERT-COUDERT, Y., KATO, A., JAQUEMENT, S. & MARSAC, F. 2005. The three-dimensional flight of Red-footed Boobies: adaptations to foraging in a tropical environment? *Proceedings of the Royal Society of London, Series B* 272: 53–61.