

Comparative biometrics of a Seychelles island *Borbo gemella* (Lepidoptera: Hesperiiinae) metapopulation

James M. Lawrence

4 Highgate, Sunny Road, Lakefield, 1501, SOUTH AFRICA

[jameslawrence@telkomsa.net, zizeeria@hotmail.com]

Introduction

Borbo gemella (Mabille) is widespread throughout Africa (Ackery, *et al.* 1995), including the malagasy subregion (Lawrence 2000; Gerlach & Matyot 2006). *B. gemella* has no recognized subspecies. Within Seychelles, it has been recorded from the islands of Mahé (Berger 1962; Fletcher 1910; Fryer 1912; Joannis 1894; Legrand 1965), Silhouette (Berger 1962; Fryer 1912; Gerlach, *et al.* 1997); Praslin (Berger 1962; Fletcher 1910; Fryer 1912; Joannis 1894), Aride (Aride Island Research Group 1999), Coetivy (Legrand 1965), Alphonse (Fletcher 1910; Holland 1896), Platte (Holland 1896), Curieuse (Hill, *et al.* no date) and Aldabra (Legrand 1965). Only recently has *B. gemella* been recorded from Cousine Island (Lawrence 2004; Lawrence 2005).

Although *B. gemella* is widespread, to date very little biometric work has been carried out on the various metapopulations of this species. This is particularly important for isolated island insect metapopulations, as these island individuals may show distinct morphological characteristics compared with continental ones (Vitousek, *et al.* 1995; Whittaker & Fernandez-Palacios 2007). In this short study, the size (i.e. wingspan) of *B. gemella* individuals collected on Cousine Island, Seychelles (4° 20' 41" S and 55° 38' 44" E) were measured. The data were then compared with published *B. gemella* sizes from various continental African sites.

Results

Twelve *B. gemella* specimens collected on Cousine Island, Seychelles were examined. Of the twelve specimens, ten were male and two were female. All specimens were collected between 23 November 2003 and 8 December 2003. Six specimens are housed in the private collection of the author. The other six specimens are housed in the collections on Cousine Island, Seychelles. The wingspan of each specimen was measured to the nearest millimeter. Table 1 lists *B. gemella* wingspans (mm) for Cousine Island, Seychelles, compared with the published sizes (mm) for individuals from South Africa, Malawi and West Africa. For some of the published *B. gemella* sizes for the continental African sites, the forewing length was given instead of the wingspan. In these cases the forewing length was doubled and 3mm added for the width of the thorax. This gave a comparative value of butterfly wingspan. These cases are indicated in Table 1. From Table 1 it can be seen that the Seychelles individuals are smaller than

the continental African ones.

Discussion

Clearly, the Cousine Island, Seychelles specimens are smaller than the continental African specimens. Berger (1962) also found that the Seychelles (specimens collected from Mahé, Silhouette, and Coetivy islands) individuals of *B. gemella* to be smaller than the continental African specimens. There are two possible explanations for the smaller size of the Seychelles specimens compared with continental African individuals.

Firstly, environmental breeding conditions on Cousine Island and the other Seychelles islands may not be ideal for *B. gemella*, resulting in smaller adults. Secondly, the smaller size of the island specimens compared with the continental specimens could indicate the first signs of morphological divergence occurring in the island individuals, possibly from genetic effects such as limited gene flow due to the geographical isolation of the Seychelles islands. Samways & Osborn (1998) found this to be the case for the migratory dragonfly *Pantala flavescens* (Fabricius) on Easter island, with island individuals differing in morphology, by being larger, and in behaviour to mainland ones. Although other *Borbo* species have been considered as migratory at certain times, for example *B. borbonica* (Henning *et al.* 1997), *B. gemella* is not considered migratory. This along with the great isolation of the Seychelles islands suggest that migrants rarely reach the Seychelles islands so limiting genetic exchange. Although the smaller size of the Seychelles individuals may be the first indications of morphological divergence due to geographical isolation, further genetic work would be required to confirm this.

Table 1. *Borbo gemella* biometrics for Cousine Island, Seychelles, South Africa, Malawi and West Africa

Location	Mean wingspan (mm)	Reference
Cousine, Island, Seychelles	Males: 29.4mm (29-30mm) (n=10) Females: both 31mm (n=2)	This study
South Africa	Males: 35-37mm Females: 40-42mm	Woodhall 2005
South Africa	Males: 35-39mm ^{note 1} Females: 40-42mm ^{note 2}	Henning, <i>et al.</i> 1997
Malawi	32mm	Gifford 1965
West Africa	35mm ^{note 3}	Larsen 2005

^{note 1} Henning, *et al.* (1997) lists male forewing length as 16-18mm

^{note 2} Henning, *et al.* (1997) lists female forewing length as 18.5-19.5mm

^{note 3} Larsen (2005) lists the forewing length as 16mm

Acknowledgements

I would like to thank Mr. M.F. Keeley of Cousine Island for the opportunity of making this study, Mr. J. Henwood for making the stay on Cousine Island logistically possible.

References

- Ackery, P.R., Smith, C.R. & Vane-Wright, R.I. 1995 (Eds.). *Carcasson's African Butterflies*. CSIRO, Australia.
- Aride Island Research Group, 1999. The ecology and conservation of Aride Island, Seychelles. *Phelsuma* 7:37-55.
- Berger, L.A. 1962. Hesperiiidae récoltés aux Seychelles. *Lambillionea*, **LXII**, Nos 3-6:19-20.
- Fletcher, T. 1910. Lepidoptera, exclusive of the Tortricidae and Tineidae, with some remarks on their distribution and means of dispersal amongst the islands of the Indian Ocean. *Transactions of the Linnean Society of London* **13**:265-324.
- Fryer, J.C.F. 1912. The Lepidoptera of Seychelles and Aldabra, exclusive of the Orneodidae and Pterophoridae and of the Tortricina and Tineina. *Transactions of the Linnean Society, London* **15**:1-28.
- Gerlach, J., Matyot, P. & Saaristo, M. 1997. Silhouette species list. *Phelsuma* **5** (suppl. A).
- Gerlach, J. & Matyot, P. 2006. *Lepidoptera of the Seychelles Islands*. Blackhuys Publishers, Leiden, The Netherlands.
- Gifford, D. 1965. *Butterflies of Malawi*. The Hetherwick Press, Church of Central Africa, Blantyre.
- Henning, G.A., Henning, S.F., Joannou, J.G. & Woodhall, S.E. 1997. *Living Butterflies of Southern Africa, Vol 1*. Umदाus Press, South Africa.
- Hill, J.M., Vel, T.M., Parr, S.J., & Shah, N.J. no date. *Curieuse*. Unpublished report.
- Holland, W.J. 1896. List of Lepidoptera from Aldabra, Seychelles and other East African islands, collected by Dr. W.L. Abbott. *Proceedings of the United States National Museum* **1064**:265-273.
- Joannis, De, J. 1894. Mission scientifique de M. Ch. Alluaud aux îles Sechelles, Lépidoptères. *Annales de la Société Entomologique de France* **1894**:425-438.
- Larsen, T.B. 2005. *Butterflies of West Africa, 2 Vols*. Apollo Books, Stenstrup, Denmark.
- Lawrence, J.M. 2000. Preliminary evaluation of the composition, distribution and faunal affinities of the butterflies of the Seychelles Archipelago. *Metamorphosis* **11**(4):174-184.
- Lawrence, J.M. 2004. Ecology and biology of a Seychelles island *Borbo gemella* (Lepidoptera: Hesperiiinae) metapopulation. *Phelsuma* **12**:153-157.
- Lawrence, J.M. 2005. The Lepidoptera of Cousine island, Seychelles. *Phelsuma* **13**:94-101.
- Legrand, H. 1965. Lépidoptères des îles Seychelles et d' Aldabra. *Mémoires du Muséum National D' Histoire Naturelle, Paris A* **37**:1-210.
- Samways, M.J. & Osborn, R. 1998. Divergence in a transoceanic circumtropical

- dragonfly on a remote island. *Journal of Biogeography* **25**:935-946.
- Vitousek, P.M., Loope, L.L. & Andersen, H. (Eds.). 1995. *Islands: Biological Diversity and Ecosystem Function*. Springer-Verlag, Berlin.
- Whittaker, R.J. & Fernandez-Palacios, J.M. *Island Biogeography: Ecology, Evolution and Conservation 2nd ed.*. Oxford University Press.
- Woodhall, S. 2005. *Field Guide to Butterflies of South Africa*. Struik Publishers, Cape Town.