Phelsuma **23** (2015); 1-5

A short note on the biogeography of the rarely observed Seychelles butterflies

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Introduction

The Seychelles Archipelago comprises 115 islands in the western Indian Ocean, and form the northern most part of the Malagasy biogeographical subregion. The Seychelles can be broadly divided into the northern granitic and southern coral islands (Braithwaite 1984) (Fig. 1). The granitic islands are situated approximately 930 km NE and 1600 km E of Kenya and Madagascar respectively. The southernmost coral islands of Aldabra Atoll lie about 800 km SW of the granitic islands.

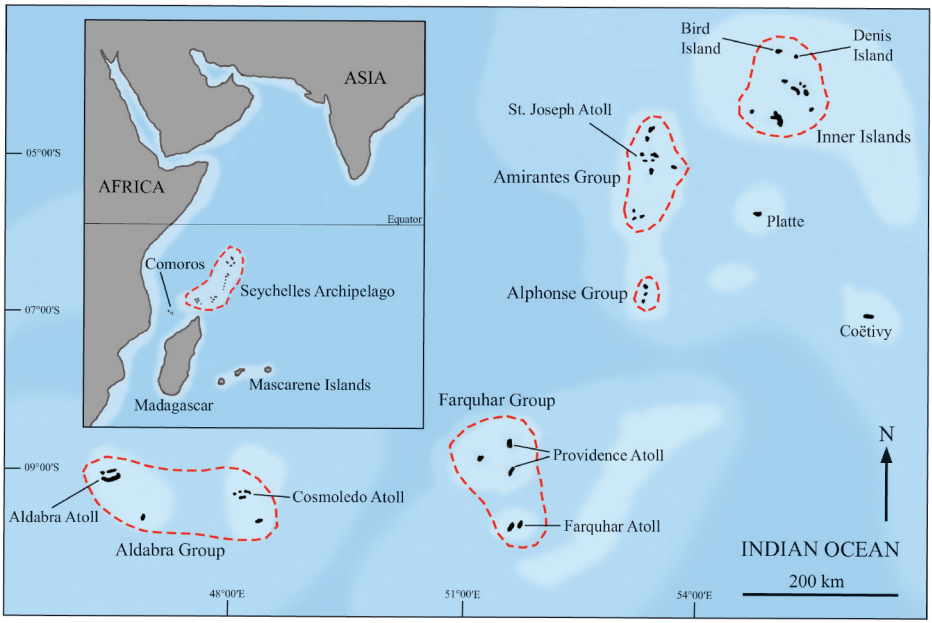

Figure 1. The Seychelles Archipelago, with inset map of the Malagasy subregion.

The Seychelles butterfly fauna is considered well-known with there being a large amount of historical and recent work available (Gerlach & Matyot 2006; Lawrence 2014). To date, 39 species and subspecies have been recorded from the Seychelles Archipelago. Approximately 25 % (i.e. nine species and subspecies) of these 39 taxa are known from captures or sightings of single or very few individuals (Table 1; Fig. 2).

By looking at the faunal affinities of these nine butterflies it is possible to determine the most probable origin of these taxa. The granitic island butterflies appear to have most likely originated from continental African stock, while the coral island taxa probably have a Madagascan and/or Comoros origin.

Four taxa require further discussion. *Papilio phorbanta nana* is a Seychelles endemic subspecies known only from a single male and female captured before 1880. This subspecies differs from the nominate subspecies from Réunion by being approximately half the size of *P. phorbanta phorbanta*. The Seychelles individuals were most likely introduced via the establishment of *Citris* species from Réunion in the 1700's (Legrand 1959). *Citris* species are the larval foodplants of the nominate subspecies (Martiré & Rochat 2008). Secondly, *Papilio dardanus* was observed on Aldabra by H. Legrand (1965) on 22 November 1959. It most likely represents either the subspecies *humbloti* Oberthür, 1888 from Comoros or *meriones* Felder & Felder, 1865 from Madagascar, although this remains undetermined as the individual was not captured. Thirdly, the taxonomy the Malagasy *Belenois* species require revision. It has been suggested that *B. grandidieri* is a dry season form of the endemic *Belenois aldabrensis* (Gerlach & Matyot 2006). However, at present both species are considered distinct and that taxonomy is followed here. Finally, *Euploea rogeri* (Geyer, 1837) is only known from two illustrations by Geyer in Hübner (1837), with the type specimen apparently lost. The butterfly is of unknown origin but was suggested by de Joannis (1894) to be from Seychelles. It may be synonymous with the Seychelles endemic *Euploea mitra* Moore, 1858 (Legrand 1965). As there is some doubt as to whether this butterfly actually existed, it is not included in Table 1, but is illustrated in Fig. 2 for historical purposes.

What is interesting here, is the high percentage these rarely observed butterflies make up the total number of taxa recorded from these islands. Whether or not this is the case on other island systems worldwide is unknown and requires detailed knowledge of an islands butterfly fauna. All the taxa listed here, with the exception of *P. phorbanta nana*, are widespread and often considered migratory. Also, in four cases more than one individual was captured. This indicates that these rarely observed butterflies probably represented individuals from ephemeral populations that established and subsequently

Figure 2. a) *Coeliades forestan arbogastes* ♂ b) *Pelopidas mathias* ♂ c) *Papilio phorbanta nana* ♂ d) *Papilio phorbanta nana* ♀ e) *Papilio dardanus* ♂ f) *Catopsilia florella* ♂ g) *Belenois grandidieri* ♂ h) *Belenois grandidieri* ♀ i) *Amauris niavius dominicanus* ♂ j) *Junonia hierta cebrene* ♂ k) *Hypolimnas bolina jacintha* ♂ l) *Hypolimnas bolina jacintha* ♀ m) *Euploea rogeri* ♀ n) *Euploea rogeri* ♀ (paintings a - l by M. Crafford-Venter; paintings m - n from Hübner 1837).

died out on the various islands. The probability of a single vagrant butterfly arriving in Seychelles and being captured are poor at best, although it could potentially happen on an occasional basis.

Islands are well known for their dynamic and often rapid species turnover rates (Whittaker & Fernández-Palacios 2007). The ephemeral nature of certain island butterfly populations has important biodiversity conservation implications at a regional scale. Small populations with negligible immigration rates to sustain them are likely to disappear naturally (Fahrig & Merriam 1994). The disappearance of endemic island populations is however more of a conservation concern, with their extinctions more likely due to anthropogenic factors.

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Table 1. Distribution and faunal affinities of the rarely observed Seychelles butterfly taxa. C = Comoros; Ma = Madagascar; R = Réunion; M = Mauritius; A = Continental Africa; O = Orient; SG = Seychelles granitic islands; SC = Seychelles coral islands; X = taxon present in geographic area

Seychelles taxon	C	Ma	R	M	A	O	SG	SC	Notes
Hesperiidae									
Coeliades forestan arbogastes (Guenée, 1863)	-	X	-	-	-	-	-	X	Two captures (Lawrence 2010)
Pelopidas mathias(Fabricius, 1798)	X	X	-	-	X	-	-	X	One capture (Lionnet 1970)
Papilionidae									
Papilio phorbanta nana Oberthür, 1880	-	-	-	-	-	-	X	-	Two captures (Legrand 1959)
Papilio dardanus Brown, 1776	X	X	-	-	-	-	-	X	One sighting (Legrand 1965)
Pieridae									
Catopsilia florella (Fabricius, 1775)	X	X	X	X	X	X	X	-	One capture (de Joannis 1894)
Belenois grandidieri (Mabille, 1878)	-	X	-	-	-	-	-	X	Two captures (Lionnet 1970)
Nymphalidae									
Amauris niavius dominicanus (Trimen, 1879)	-				X	-	X	-	One capture (Legrand 1965)
Hypolimnas bolina jacintha (Drury, 1773)	-	X	-	X	X	X	X	X	One capture, one sighting, one unconfirmed sighting (Lawrence 2014)
Junonia hierta cebrene (Trimen, 1870)	-	-	-	-	X	-	X	-	One capture (Legrand 1965)