

The Lepidoptera of Cousine Island, Seychelles

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Introduction

This reports provides an overview of all Macro-lepidoptera collected on Cousine Island (4°20'S; 55°40'E) between 5 June 2002 and 30 April 2003. The topography, climate and vegetation of Cousine have been described by BOURQUIN (1996; 1997). Besides short publications on the butterflies of Cousine (BOURQUIN, *ET AL.* 2000; LAWRENCE 2000; LAWRENCE 2004a), and some brief unpublished notes on the Sphingidae moths (Lawrence 2003), very little has been written on the Lepidoptera of Cousine. As much new information has since come to light, a more comprehensive report is presented. A total of 18 species are discussed in terms of their distributions within and outside Seychelles, as well as known foodplant selection in relation to Cousine's floral diversity. Lepidoptera taxonomy follows that of LEGRAND (1965), while floral taxonomy follows Robertson (1989).

Systematic list

1) *Diaphana indica* (SAUNDERS, 1851) (Pylalidae: Pyraustinae)

A widespread species in Seychelles, being recorded from the Seychelles islands of Mahé, Praslin, Fregate, Bird, Coetivy, Silhouette and Aldabra (LEGRAND 1965). On Cousine this species was collected on 07 October 2002.

Its distribution outside Seychelles includes most of the Afrotropical region, parts of the Oriental and Australian regions, where larvae have been recorded on Cucurbitaceae plants (PINHEY 1975). Interestingly, the specimen was collected roosting under the leaves of *Cucurbita moschata* (DUCH. ex LAM). On Mahé larvae were found on *Achyranthes aspera* L. (Amaranthaceae) (LIONNET 1984), which is commonly found on Cousine (BOURQUIN 1996), but is being removed as it is an invasive weed.

2) *Syngamia abruptalis* (WALKER, 1859) (Pylalidae: Pyraustinae)

This Palaeotropical species was collected on Cousine on 8 October 2002. The Seychelles records include Mahé, Silhouette (Legrand 1965) and North Island (GERLACH *et al.* 2001).

Larvae have been recorded on various Labiatae, (*Ocimum basilicum* L. and *Plectranthus* sp.), *Elephantopus* sp. (Compositae) and *Gossypium* sp. (Malvaceae) (GERLACH *pers. comm.*). *Gossypium hirsutum* L. has been recorded on Cousine (Bourquin 1996). However, as it is considered invasive, attempts have been made to eradicate it from Cousine.

3) *Uresiphita limbalis* (DENIS & SCHIFFERMULLER, 1775) (Pylalidae: Pyraustinae)

Another Palaeotropical species collected on Cousine on 13 April 2003. Also recorded

from Mahé (LEGRAND 1965) and Silhouette (GERLACH *pers. comm.*).

Known foodplants include *Sophora* sp. (Papilionaceae) (Gerlach *pers. comm.*), and *Cedrela* sp. (Meliaceae) (KROON 1999). No records exist for the occurrence of any Papilionaceae or Meliaceae on Cousine, although both *Sophora tomentosa* L. and *Cedrela odorata* L. occur on other Seychelles islands (ROBERTSON 1989).

4) *Thalassodes antithetica* HERBULOT, 1964 (Geometridae: Geometrinae)

A Seychelles endemic species recorded from Mahé and Silhouette (Legrand 1965). On Cousine, a specimen was collected on the 16 February 2003.

5) *Perigea pauperata* (WALKER, 1858) (Noctuidae: Amphipyriinae)

A widespread species that was collected on Cousine on 25 September 2002 and 15 November 2002. In both cases, specimens were attracted to lights in the early evening. In Seychelles, this species has been recorded from Mahé and Fregate (GERLACH *pers. comm.*). Its distribution outside Seychelles includes the Afrotropical region and its islands.

Known larval foodplants include *Caropsis* sp. (Apiaceae) (KROON 1999). However, as ROBERTSON (1989) does not list any Apiaceae from Seychelles, it must use other plant families for larval foodplants. Other species of *Perigea* are known to use the Asteraceae (particularly *Bidens pilosa* L.) which is widespread in Seychelles (ROBERTSON 1989).

6) *Hypena masuralis* GUENÉE, 1854 (Noctuidae: Hypeninae)

A Palaeotropical species that is widespread in Seychelles being recorded from Cetyv, Frégate, Aride, Praslin, Mahé, Silhouette and Cachée (LEGRAND 1965; ARIDE ISLAND RESEARCH GROUP 1999; GERLACH *pers. comm.*). On Cousine the species was collected on the 28 April 2003.

Known foodplants include both *Commelina diffusa* BURM. f. (Comellinaceae) and *Desmodium* sp. (Papilionaceae) (GERLACH *pers. comm.*). BOURQUIN (1996) lists *Commelina benghalensis* L. as occurring on Cousine.

7) *Achaea catella* (GUENÉE, 1852) (Noctuidae: Catocalinae)

Not recorded during this study, but listed as being collected on Cousine by BOURQUIN (1997). Also recorded from Aride (ARIDE ISLAND RESEARCH GROUP 1999), Mahé (LEGRAND 1965) and Silhouette (GERLACH 1998). This species is widely distributed throughout the Afrotropical region, where its larvae have been recorded on various Leguminosae (*Bauhinia* sp. and *Tamarindus* sp.) (PINHEY 1975). Although *Bauhinia* sp. and *Tamarindus* sp. do not occur on Cousine, six other Leguminosae species are known to grow on Cousine (Bourquin 1996).

8) *Parallelia angularis* (BOISDUVAL, 1833) (Noctuidae: Catocalinae)

Previously recorded from the Seychelles islands of Mahé (Legrand 1965) and Silhouette (GERLACH *pers. comm.*). On Cousine this species was collected on 1 October 2002 and again on 13 March 2003. Outside Seychelles this species has been recorded throughout

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most of the Afrotropical region including its islands (PINHEY 1975).

Larval foodplants include *Phyllanthus* sp. (Euphorbiaceae) (GERLACH *pers. comm.*). Four species of *Phyllanthus* are known to occur on Cousine: *P. amaurus* SCHUM. & THONN., *P. nummularifolius* POIR., *P. casticum* WILLEM, and *P. acidus* (L.) Skeels (BOURQUIN 1996).

9) *Remigia conveniens* WALKER, 1858 (Noctuidae: Catocalinae)

Recorded from the Seychelles islands of Mahé, Poivre, Praslin, Felicite and Silhouette (LEGRAND 1965). On Cousine, a dead specimen was found on the coastal flat on 8 October 2002. A widespread species found in Central America, the Afrotropical and Indo-Malaysian regions (PINHEY 1975). It is known to feed on the Proteaceae which has only been recorded on Mahé as an ornamental (GERLACH *pers. comm.*).

10) *Herse convolvuli* (L., 1758) (Sphingidae: Acherontiinae)

Recorded from the Seychelles islands of Mahé, Farquhar, Silhouette (LEGRAND 1965) and Aride (ARIDE ISLAND RESEARCH GROUP 1999). On Cousine, the first specimen was collected in November 1996. A further specimen was collected on the 21 March 1998. During this study, *H. convolvuli* were regularly encountered being attracted to lights during November. specimens were collected from the coastal flat on the NE side of Cousine.

A late instar larva was seen being eaten by a Seychelles magpie robin (*Copsychus sechellarum* Newton) on the coastal flat in December 2002, indicating that this species was breeding on the island. Adults were also observed feeding from flowers of *Hymenocallis littoralis* (JACQ.) SALISB. (Amaryllidaceae) in the early evening.

Outside Seychelles this species is widely distributed, including most of the African continent, Europe, Asia and Australia. *H. convolvuli* has been recorded on various Convolvulaceae (PINHEY 1975) of which *Ipomoea pescaprae* (L.) R.Br., *I. macrantha* ROEM. & SCHULTES and *I. venosa* (DESR.) ROEM. & SCHULTES have been recorded on Cousine. On Mahé, *H. convolvuli* larvae have been recorded on *Tabebuia* sp. (Bignoniaceae) (LIONNET 1984). As *H. convolvuli* is also a well known migrant (PINHEY 1975), it is quite possible that this species has only recently become established on Cousine.

11) *Acherontia atropos* (L., 1758) (Sphingidae: Acherontiinae)

Recorded from the islands of Mahé and Silhouette (LEGRAND 1965). Several late instar larvae were found feeding on the leaves of *Cordia subcordata* LAM. (Boraginaceae) on 1 April 2003. Larvae were bred through to adult to confirm identification. On Mahé, *A. atropos* larvae have been recorded on *Momordica charantia* L. (Cucurbitaceae), *Tabebuia* sp. (Bignoniaceae) and *Clerodendron* sp. (Verbenaceae) (LIONNET 1984).

This conspicuous species appears to also only have recently have become established on Cousine, as there have been no prior records for this species on the island. Records also exist for this species breeding on *Datura* sp. (Solanaceae) (PINHEY 1975). *D. metel* L. has been recorded on Cousine (BOURQUIN 1996), but as it is an invasive weed, it is slowly being eradicated from Cousine, and at the time of the study

only occurs as isolated plants.

12) *Borbo borbonica morella* (JOANNIS, 1893) (Hesperiidae: Hesperinae)

Dealt with previously by BOURQUIN, *et al.* (2000). However, no individuals were seen during this study. As the Afrotropical nominate subspecies is migratory (Larsen 1996), it is quite possible that previous specimens collected on Cousine were migrants from the larger islands, and that this Seychelles endemic subspecies is not permanently resident on Cousine. Another possibility is that in certain years it occurs in low numbers and is overlooked. Other Seychelles records include Mahé, Praslin, Aldabra (BERGER 1962; LEGRAND 1965), Aride (ARIDE ISLAND RESEARCH GROUP 1999) and Cousin (HILL, *et al.* 2003).

BOURQUIN, *et al.* (2000) records it as being scarce on Cousine, and is seen from October to April, usually near the *Pisonia/Ficus* forest edge. Larval foodplants of the nominate subspecies include various grasses (Henning, *et al.* 1997) of which numerous species have been recorded on Cousine (BOURQUIN 1996).

13) *Borbo gemella* (MABILLE, 1884) (Hesperiidae: Hesperinae)

The ecology and biology of this species on Cousine has been dealt with by LAWRENCE (2004a). This species has only recently been recorded as occurring on Cousine. However, as both *B. borbonica morella* and *B. gemella* are very similar in appearance, confusion between the two could easily have occurred, especially with identifying individuals on the wing.

This species is widespread in Seychelles, with it being recorded from the following islands: Mahé, Silhouette, Praslin, Aride, Coetivy, Alphonse, Platte and Aldabra (BERGER 1962; LEGRAND 1965; ARIDE ISLAND RESEARCH GROUP 1999). Outside Seychelles, it occurs throughout most of Africa and SW Arabia (Larsen 1996).

On Cousine, the flight period is throughout the year, with it being most commonly encountered between November and January. Like *B. borbonica morella*, it also favors the *Pisonia/Ficus* forest edge biotope. Larval foodplants include various Poaceae (KROON 1999). On Cousine, LAWRENCE (2004a) recorded eggs being laid on the upper surfaces of young *Stenotaphrum dimidiatum* (L.) BRONGN. swards.

14) *Lampides boeticus* (L., 1767) (Lycaenidae: Polyommatainae)

Previously recorded from Cousine by BOURQUIN, *et al.* (2000), with five individuals seen between the 14th and 15th March 1998. During this study, two further individuals were seen on the coastal flat, one on 5 December 2002 and the other on 8 February 2003. Short visits to Mahé (Beau Vallon) on 3 June 2002, and to Praslin (Plaine Hollandasie) on 29 August 2002 indicated that this species was quite abundant on the larger islands during the SE monsoon period.

Seychelles distributions listed by Legrand (1965) include Mahé, Silhouette and Cosmoledo. Also recorded from Aride by the ARIDE ISLAND RESEARCH GROUP (1999). Outside Seychelles, this species is widespread, occurring from western Europe and Africa, through the Indo-Malayan area to Australia, the islands of the west Pacific and as far as Hawaii (Common & WATERHOUSE 1981; GAY, *et al.* 1992).

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Larval foodplants include various legumes (PRINGLE, *et al.* 1994). Legumes are not common on Cousine, but are well represented (BOURQUIN 1996). As *L. boeticus* is strongly migratory (ACKERY, *et al.* 1995), and its occurrence on Cousine is sporadic, this species may not at present be breeding on Cousine.

15) *Zizeeria knysna* (TRIMEN, 1862) (Lycaenidae: Polyommatainae)

Another species briefly dealt with by BOURQUIN, *et al.* (2000). A commonly encountered species found over the entire island, especially the coastal flat, throughout all months of the year. Recorded from the Seychelles islands of Mahé, Saint Anne, Silhouette, Praslin, Farquhar, Desroches, Aigle, Bird, Denis, Cousin, Aride and North (LEGRAND 1965; LAWRENCE 2004b). Outside Seychelles its range extends from Mediterranean Europe to western and southern Africa (HIGGINS & HARGREAVES 1991).

Larvae are known to feed on a large variety of foodplants, including *Amaranthus* sp. (Amaranthaceae) (KROON 1999) and *Euphorbia* sp. (Euphorbiaceae) (PRINGLE, *et al.* 1994). On Cousine females were observed ovipositing on *Amaranthus dubius* MART. ex THELL. during the SE monsoon period. Also, three species of *Euphorbia* (i.e. *E. hirta*, L., *E. prostrata* AIT. and *E. pyrifolia* LAM.) grow on Cousine (BOURQUIN 1996).

16) *Vanessa cardui* (L., 1758) (Nymphalidae: Nymphalinae)

First recorded from Cousine by Bourquin (2000). Occasionally encountered on Cousine's coastal flat areas. Previous records are from April and March. However, an individual was seen during January 1998. During this study only two individuals were seen, one on the 7 December 2002 and the other on the 23 April 2003.

Within Seychelles this species has been recorded from the islands of Mahé, Sainte-Anne, Coetivy, Assumption, Desroches (LEGRAND 1965) and Aride (ARIDE ISLAND RESEARCH GROUP 1999). Recently (April 2005) this species has also been recorded from Bird Island (M. NORAH *pers. comm.*). Outside Seychelles this species is cosmopolitan, though absent from most of South America (LARSEN 1996).

Larval foodplants include members of the Boraginaceae, Compositae and Malvaceae (VAN SON 1979; PRINGLE *et al.* 1994), of which representatives of all are found on Cousine (BOURQUIN 1996). As this species is a very well known migrant (ACKERY *et al.* 1995), it may explain its sporadic occurrence on Cousine and other islands such as Bird. As yet, there is no direct evidence of this species breeding on Cousine. However, the specimen collected on Cousine during April 2003, was a freshly emerged individual with little signs of damage to its wings, possibly indicating that it was not a migrant.

17) *Hypolimnas misippus* (L., 1764) (Nymphalidae: Nymphalinae)

The ecology of this species on Cousine was dealt with by Lawrence (2000) and BOURQUIN *et al.* (2000). This species is widely distributed in Seychelles, being recorded from the islands of Mahé, Saint Anne, Silhouette, North, Praslin, Aride, Aldabra, Cosmoledo, Coetivy, Desroches and Cousin (LEGRAND 1965; LIONNET 1984; GERLACH *et al.* 1997; ARIDE ISLAND RESEARCH GROUP 1999).

Outside Seychelles, this species is widely distributed, occurring throughout the Orient, Afrotropics, U.S.A. (Florida), West Indies, French Guiana and NE Brazil

(ACKERY *et al.* 1995).

During this study, this species was recorded during late November, early December 2003, and again during March, April 2003. When on the wing, adults were commonly encountered on the coastal flat area of Cousine.

H. misippus females are well known mimics of *Danaus chrysippus* (L.). The following female forms were recorded on Cousine by LAWRENCE (2000): f. *misippus* (L.); f. *alcippoides* BUTLER; f. *dorippoides* AURIVILLIUS; f. *inaria* CRAMER. One specimen collected by LAWRENCE (2000) was an intermediate form between f. *immima* BERNARDI and f. *aclippoides*.

Larval foodplants include the Acanthaceae and Portulacaceae (NOLET 1984; PRINGLE *et al.* 1994; KROON 1999). On Cousine both families are represented by *Asystasia* sp. and *Portulaca oleracea* L. respectively (BOURQUIN 1996).

18) *Melanitis leda helena* (Westwood) (Nymphalidae: Satyrinae)

Recorded from the Seychelles islands of Mahé, Silhouette, Cosmoledo, Aldabra, Coetivy, Desroches (LEGRAND 1965), North and Aride (ARIDE ISLAND RESEARCH GROUP 1999). Outside Seychelles, this subspecies occurs throughout most of the Afrotropical region, including its islands, and Arabia (ACKERY *et al.* 1995).

A total of four individuals were seen during the study. The first individual was seen on 30 November 2002. A further two specimens were seen on the 28 and 29 December 2002. The final specimen was seen on 9 January 2003. All individuals were seen in the under-story of the *Pisonia* and *Ficus* forest areas.

Larval foodplants include various grasses (KROON 1999) of which numerous species have been recorded on Cousine (BOURQUIN 1996). Interestingly, all specimens seen were in fresh condition with little or no wing damage indicating that they were not migrants from the larger surrounding islands.

Discussion

Only 18 species were recorded on Cousine during this study (plus a further 6 other records – Appendix I) indicating that Lepidoptera are not abundant on this island. However, this list is certainly not complete. A single unidentified geometrid moth was collected during February 2003. Unfortunately the specimens was damaged before being identified. Also, no attempt was made to collect the Micro-lepidoptera.

Based on the above systematic list, approximately 89% of Cousine's known lepidoptera are widespread species commonly found throughout the Afrotropical region and in some cases further. Only two of the above taxa are endemic to Seychelles, one being an endemic species (i.e. *T. antithetica*), and the other an endemic subspecies (i.e. *B. borbonica morella*). Unfortunately, *B. borbonica morella* was not collected during this study, indicating that this species may not always be present on Cousine, or occurs in low numbers in certain years.

Another feature of Cousine lepidopterous fauna is that several of the species are well known migrants. This is clearly supported by many of the migrant species only being recorded once or sporadically. This is not unexpected, as migrant species would be the most likely ones to colonize isolated ecosystems, such as islands. Moreover,

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most of the species recorded during this study have known larval foodplants growing on Cousine, so the potential for these sporadically encountered species becoming established is favorably. However, island ecosystems are extremely dynamic and species change over would be rapid and common place.

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Appendix I. Other Lepidoptera records from Cousine

The following species were recorded by J. GERLACH in 2001:

- Orthoctha rhodothicta* (MEYRICK, 1911) (Tineidae) Endemic
- Metachanda thaleropis* MEYRICK, 1911 (Metachandidae) Endemic
- Epicroesa* sp. (Heliodinidae) Endemic
- Marasmia poeyalis* (BOISDUVAL, 1833) (Pyralidae) Palaeotropical
- Marasmia trebiusalis* (WALKER, 1859) (Pyralidae) Palaeotropical
- Hypenodes croceipicta aegrota* BERIO, 1962 (Noctuidae) Endemic subspecies

Invertebrates associated with the Seychelles sheath-tailed bat *Coleura seychellensis*

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The Seychelles sheath-tailed bat *Coleura seychellensis* PETERS, 1868 is a Critically Endangered (IUCN 2004) emballonurid bat restricted to the granitic islands of Seychelles. Three roost sites are known on Mahé and Silhouette. Of these the largest roost is on Silhouette, occupied by 32 individuals (Gerlach 2004). The Silhouette roost has been studied in detail since 2003 (GERLACH 2004). Observations of the roosts and the bats within it have identified a number of invertebrate species associated with the bats. Two occupied and two unoccupied cave within the roost system have different characteristics and different invertebrate faunas. Roost A is comparatively large and open, this is used regularly, usually in the early morning and late afternoon. Roost B is more enclosed and is the main permanent roost, this is also the only identified breeding site for the species. Roost C is a small abandoned roost that may have been used only occasionally. Roost D is intermediate in characteristics between roosts A and B. It is