

A SURVEY OF MADEIRAN BUTTERFLIES, 1981

By A. R. Swash * and R. R. Askew *

With 6 figures

Resumo. As borboletas diurnas foram estudadas durante os meses de Abril, Julho e Agosto de 1981 fazendo parte do programa da Expedição de 1981 da Universidade de Manchester. Foram observadas treze das catorze espécies que temos conhecimento viverem na Madeira e apresenta-se dados sobre a sua distribuição na metade leste da ilha, com especial realce para as duas espécies que se estabeleceram recentemente *Artogeia rapae* e *Pararge aegeria*.

Abstract. The butterfly fauna was surveyed during April, July and August 1981 as part of the programme of the Manchester University 1981 Expedition. Thirteen of the fourteen species that are known to regularly occur on Madeira were observed, and notes on their distribution in the eastern half of the island are presented with particular attention to the two recently established species, *Artogeia rapae* and *Pararge aegeria*.

Several authors have described the butterfly fauna of Madeira, but the species list given by Baker (1891) is deficient in only one species, *Danaus plexippus* L., from that of Manley and Allcard (1970). During the last decade, however, two further species have become established and a decrease in abundance of some of the endemic forms has been reported. These faunal changes prompt us to place on record our observations on the status of the species in 1981. We visited Madeira separately for two weeks in April (RRA) and seven weeks in July and August (ARS), as participants in the University of Manchester 1981 Expedition. We confined our survey to the eastern half of Madeira.

The National Geographic Society, the Linnean Society, the British Museum (Natural History) and the University of Manchester generously provided financial assistance, and we are much indebted also to Mr. G. E. Maul for making available much helpful information and to fellow members of the expedition, particularly Miss L. A. Lace, Dr. L. M. Cook and Dr M. V. Hounscome, for additional data.

* Department of Zoology, University of Manchester, Manchester M13 9PL, England.

***Pieris brassicae wollastoni* Butler**

This endemic subspecies was at one time common and widespread on Madeira (Martin 1941) but has recently become scarce. Worms (1964) records a single sighting and Wolff (1975) observed a few specimens in 1973 and states that in 1974 it was 'a trifle more plentiful than usual'. Mr Maul is unaware of any records in the last three or four years. In 1981 isolated sightings in April at Porto da Cruz and in August at Ribeiro Frio, Funchal and Santa Cruz indicate that the species is still quite widespread but the only sizeable population located was in the valley leading to Fajã da Nogueira where, in July and August, several specimens were seen near the river and a few at greater altitude up to about 1000 m.

***Artogeia rapae* L.**

The Small White is one of the two recently established species on Madeira. There was a possible sighting of a single specimen in 1909 but the first confirmed record is of a specimen captured in December 1971. In 1974, however, very large numbers appeared suddenly in July and by the end of the month it was described as the commonest butterfly on Madeira. This mass occurrence of *A. rapae* is fully documented by Wolff (1975) who discusses possible causes and shows that climatic conditions at the beginning of July 1974 were favourable for a flight of butterflies from Portugal. Wolff emphasises, however, that such conditions must have occurred many times prior to 1974 so that the sudden colonisation can not be fully explained. The species has remained common on Madeira since 1974. Dr L. C. Higgins informs us that he found it 'common but local' in 1977 and in 1981 it was plentiful, especially in cultivated areas near the south coast from Funchal to Machico, but also on the north coast at Boca do Risco, Porto da Cruz and Faial, and occasional specimens were noted inland. Additionally, a few were seen in August on Porto Santo and one on Deserta Grande. The establishment of this species has been rapid and after seven years it remains one of the commonest Madeiran species. The question of whether or not there is any interaction between *A. rapae* and *P. brassicae* can not be answered with certainty but the possibility exists that the decline of *P. brassicae*, which predated the spread of *A. rapae*, may have facilitated the colonisation of Madeira by *A. rapae*.

***Colias crocea* Geoffroy**

A common insect in open areas from sea level to an altitude of over 1300 m. It was one of the few butterflies seen on the treeless peninsula of São Lourenço and was observed also on Deserta Grande although not on Porto Santo. Wings of predated individuals were found under stones that harboured lizards.

Gonepteryx cleopatra maderensis Felder

Like the Madeiran Large White, the Madeiran Brimstone is an endemic form that has declined to the status of uncommon and local. Baker (1891) reported it to be common, Gardner and Classey (1960) state that it 'is not common, and appears restricted to the more northern parts of the island', Worms (1964) did not see it in April 1964, and we found it in only one area. In April, three worn females were observed near Fajã do Cedro Gordo flying near the Ribeira da Ametade. During August a number of specimens, mostly males, were seen further up this river towards Fajã da Nogueira, and about eight were found in and around the botanical gardens at Ribeiro Frio at the end of July. The Ribeiro Frio — Fajã da Nogueira region appears to be a stronghold of the species; the two specimens figured by Manley and Allcard (1970) are both from Ribeiro Frio (1954 and 1964).

Lycaena phlaeas L.

L. phlaeas was found to be locally common at moderate altitudes. A strong colony was located in April at an altitude of about 1100 m. on a hillside to the east of Curral das Freiras, and in July and August the species was noted near Achada do Cedro Gordo, Balcões, near Camacha and between Pico Ruivo and Encumeada.

Madeiran examples of the Small Copper are attributed to subspecies *phlaeoides* Staudinger, a form distinguished by extensive darkening that nearly obliterates the hind wing submarginal copper band (Manley and Allcard 1970). Baker (1891) emphasises the very dark colour of Madeiran insects but mentions also that paler specimens are occasionally found, and Cockerell (1923) states that a specimen from Porto da Cruz is 'ordinary *phlaeas*, not dark at all'. The material collected in 1981 is no darker than that from southern Europe; certainly there is no suggestion of obliteration of the hind wing submarginal copper band. The hind wing underside, however, is much less uniformly coloured than in European specimens, having conspicuous greyish scaling forming a more or less defined band in the outer discal area.

Lampides boeticus L.

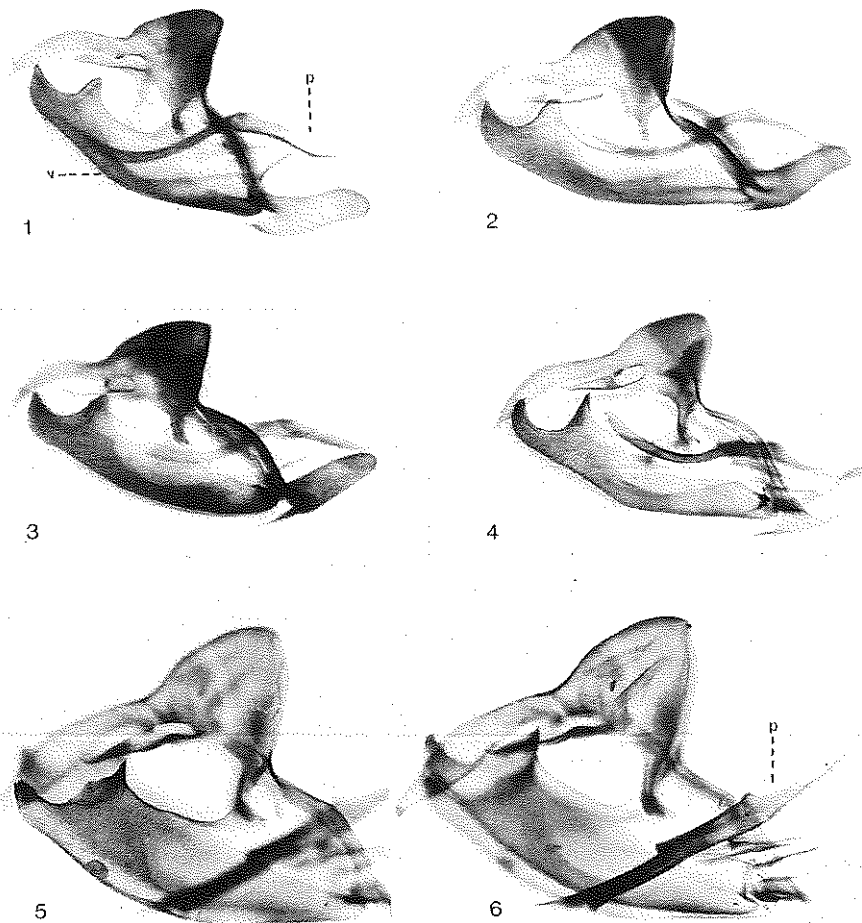
Long-tailed Blues were present and often numerous at most localities visited below 1300 m., both in April and the summer 1981.

Issoria lathonia L.

Cited in the literature as a commonly occurring species on Madeira, we failed to find *I. lathonia* in 1981 adding weight to the view that its appearance on Madeira is dependent upon migrations.

***Vanessa atalanta* L.**

This butterfly appears never to have been considered numerous on Madeira. In April three specimens were observed 'mountaintopping'



Figs. 1-6 — Photographs of male genitalia, viewed from the right, of: (1) *Pararge aegeria aegeria*, Dordogne, France; (2) *P. a. tireis*, Gloucestershire, England; (3) *P. a. aegeria*, Madeira; (4) *P. a. xiphioides*, Tenerife, Canary Is.; (5) *P. xiphia*, Madeira; (6) *P. xiphia*, Madeira, to show the penis. All figures are to the same scale, p = penis, v = valve.

on Pico das Pedras and in July one was seen at Fajã da Nogueira. In August, two individuals were noted on Deserta Grande and one on Porto Santo.

***Vanessa indica vulcania* Godart (= *occidentalis* Felder)**

Frequent in April with sightings at Machico, Santa Cruz, Camacha, Santo da Serra, Porto da Cruz, Faial and São Jorge, mostly at low to medium altitude in cultivated areas. In summer the species was apparently scarce with just one record from Fajã da Nogueira.

***Vanessa cardui* L.**

Occasional, scattered specimens only were noted in 1981; previous observers have described the Painted Lady as common on Madeira. In August, it was seen on Deserta Grande and Porto Santo, as well as on Madeira.

***Hipparchia aristaeus maderensis* Balcer**

We follow Higgins and Riley (1980) in assigning this endemic subspecies to *H. aristaeus* rather than to *H. semele* or *H. algerica*. In commenting upon its Madeiran distribution, Kudrna (1977) writes that it is local and rare in 'rocky clearings of sparse deciduous woodland on steep, south facing slopes' and gives Pico do Arieiro (c. 1700 m.) and Eira do Serrado (c. 1000 m.) as localities. Specimens figured by Manley and Allcard (1970) are from Monte and Terreiro da Luta. The insect flies from mid-June to mid-September; none was seen in April but in August the species was very common in the area around Casa do Arieiro, between Pico do Arieiro and Pico Ruivo, and beside the track from Pico Ruivo to about halfway to Encumeada. The habitat of the butterfly is boulder-strewn grassland, flat about Casa do Arieiro but south-sloping elsewhere. Between the two Picos, the vegetation included bracken and tree heather, and was less open than near Casa do Arieiro where the Grayling appeared to avoid patches of bracken. *H. a. maderensis* was the commonest butterfly at altitudes in excess of 1600 m. with this type of terrain.

***Pararge xiphia* F.**

Of all the Madeiran endemics, the Madeiran Speckled Wood has the foremost claim to being a full species. Indeed, most authors regard it as such, although Higgins (1975) prefers to consider it a well-marked subspecies of the polytypic *P. aegeria*. That the former view is correct is strengthened by the continuing integrity of *xiphia* in the presence of *aegeria* (see below), there being no suggestion of hybridisation in any of the large number of specimens seen by us.

Baker (1891) reports that *P. xiphia* 'is one of the commonest species in Madeira at intermediate elevations' and its status today seems to be little altered. In 1981, we found it most commonly near Portela and in the Ribeiro Frio — Fajã da Nogueira region, both in spring and summer, but it was absent at low altitude near the coast

(unlike *P. aegeria*). The species appears to have a preference for the edges of roads and broad paths in woodland, and for large glades. Males were seen to interact in spiralling flights, but these were brief and we did not detect a return to the original resting place by either contestant. No male interaction was observed between *P. xiphia* and *P. aegeria*, although the two species sometimes flew in close proximity. In such situations, the flight of *P. xiphia* was noticeably faster and more direct than that of its congener.

Pararge aegeria L.

This is the second species, with *A. rapae*, to have become recently established on Madeira. Higgins (pers. comm.) informs us that the late Norman Riley took the first specimen on Madeira in October 1976, and that in 1977 it was quite common. The species is recorded from Madeira in Higgins and Riley (1980). Madeiran examples are of the bright fulvous typical form widespread in southern Europe. The male genitalia of Madeiran *aegeria* (fig. 3) are identical to those of specimens from southern France (fig. 1) and differ only slightly (broader valvular teeth) from those of *P. aegeria xiphioides* Staudinger from Tenerife (fig. 4), but are significantly different, particularly in the shape of the penis and valve, from the male genitalia of *P. xiphia* (figs. 5 & 6).

In 1981 we formed the impression that *P. aegeria* was at least as common as *P. xiphia*, being seen at most places visited up to an altitude of about 1400 m. although most abundant below 1000 m. It was not seen on Porto Santo or the Desertas, nor on the eastern peninsula of Madeira. The usual habitat was under trees and bushes infiltrated by sunlight, and *P. aegeria* seemed tolerant of denser tree cover than *P. xiphia*. However, the two species were found flying together in a number of localities (e.g. Portela, Ribeiro Frio, Fajã da Nogueira). Interactions between males of *aegeria* were generally more prolonged than those of *xiphia* and involved the return of one individual to the original resting place (as described by Davies (1978) for *P. a. tircis* Butler).

Danaus plexippus L.

The Monarch is resident on the Canary Islands and is irregularly, if not infrequently, seen on Madeira although there are no breeding records. One specimen was seen at the end of July just east of Machico.

The Madeiran species list concludes with *Colias hyale* L. and *Hypolimnas misippus* ab. *inaria* Cramer which are casual vagrants. Specimens of both were seen by Burr in the collection of the Seminário at Funchal (Cockerell 1923).

A total of sixteen species (only twelve probably resident) may appear small for an island the size of Madeira lying in relatively low latitudes, but its isolation undoubtedly contributes to the relative pau-

city of its butterfly fauna. That Madeira has not been ecologically saturated with butterfly species is dramatically demonstrated by the rapid establishment of two species in recent years.

Of the endemic forms, *P. xiphia* is common and widespread and *H. aristaeus maderensis* is local but its colonies remain strong. *G. cleopatra maderensis* and *P. brassicae wollastoni*, however, are much less common than formerly and their future must be viewed with some concern.

It will be of great interest to note what impact, if any, *P. aegeria* makes on *P. xiphia* in the future. It must be questionable whether two such closely allied species can continue in stable coexistence and much will depend upon the extent of their ecological differences. It should be noted, however, that the coexistence on Madeira of *V. atalanta* and *V. indica* is long-standing and presumably stable. Detailed ecological studies of these two pairs of species on Madeira should be rewarding, and of particular interest would be clarification of the larval food-plants utilised on Madeira. A food-plant of *V. indica* larvae has yet to be recorded.

REFERENCES

- Baker, G. T. :
 1891. Notes on the Lepidoptera collected in Madeira by the late T. Vernon Wollaston. *Trans. ent. Soc. Lond.*: 197 - 221.
- Cockerell, T. D. A. :
 1923. The Lepidoptera of the Madeira Islands. *Entomologist* 56: 243-247.
- Davies, N. B. :
 1978. Territorial defence in the Speckled Wood butterfly (*Pararge aegeria*): the resident always wins. *Anim. Behav.* 26: 138-147.
- Gardner, A. E. & Classey, E. W. :
 1960. Report on the insects collected by the E. W. Classey and A. E. Gardner expedition to Madeira in December 1957. *Proc. S. Lond. ent. nat. Hist. Soc.* 1959: 184-206.
- Higgins, L. G. :
 1975. The classification of European butterflies. Collins, London.
- Higgins, L. G. & Riley, N. D. :
 1980. A field guide to the butterflies of Britain and Europe. (4th ed.). Collins, London.
- Kudrna, O. :
 1977. A revision of the genus *Hipparchia* Fabricius. E. W. Classey, Faringdon.
- Manley, W. B. L. & Allcard, H. G. :
 1970. A field guide to the butterflies and burnets of Spain. E. W. Classey, Hampton.
- Martin, K. :
 1941. Schmetterlinge von Madeira. *Zool. Meded.* 23: 1-12.
- Wolff, N. L. :
 1975. On the sudden mass occurrence in 1974 of *Pieris rapae* L. (Lepidoptera, Pieridae) in Madeira. *Bol. Mus. Mun. Funchal* 29: 26-32.
- Worms, C. G. M. de :
 1964. Madeira in the spring, April 1964. *Entomologist's Rec. J. Var.* 76: 252-254.

A d d e n d u m . *Neohipparchia statilinus* Hufnagel is recorded from Madeira (very local) by Higgins & Riley (1980 : 265).