

ON THE SUDDEN MASS OCCURRENCE IN 1974 OF *PIERIS RAPAE* L. (LEPIDOPTERA, PIERIDAE) IN MADEIRA

By Niels L. Wolff *

(With 4 figures)

ABSTRACT

Although reported from the Azores and the Canaries, and occurring regularly both in Portugal and in N. Africa, the «Small White» butterfly, *Pieris rapae* L., is always stated as «absent from Madeira» in the literature. In 1971 a single specimen was taken in Funchal (on 15th December) — the first reliable record. In 1974 suddenly this state changed completely. On 4th July the first specimen was observed, and by the end of that month the butterfly appeared in such quantities in Funchal and environs as well as in many other places that it had become the most common butterfly in Madeira.

This paper mainly deals with the distribution of the species observed throughout the island in 1974 but an attempt has been made to approach an explanation of its sudden appearance — although with little success. Meteorological maps showing the weather situation on 3rd July 1974 clearly indicate the most favourable conditions for air-borne transportation of butterflies from Portugal to Madeira at the time concerned — but a situation like this — caused by a stable high pressure area around the Azores — is far from unique. The butterfly must, no doubt, have been transported by air currents to Madeira in previous years, but it has not been possible to point out the special circumstances which must have made it possible for the species to establish itself in 1974.

The presumed absence from Madeira of the «Small White», *Pieris rapae* L., had always been a mystery.

Although this common and widely distributed species is reported from the other Macaronesian Islands, the Azores and the Canaries, and occurs in Portugal and N. Africa, it had been regarded a fact that the only *Pieris* species inhabiting Madeira was the «Large White», *Pieris brassicae* L., which in Madeira is considered to have developed the subspecies *wollastoni* Butler (and another subspecies *cheiranti* Hübner

* Zoological Museum of the University of Copenhagen. Universitetsparken 15. 2100 København Ø. Denmark.

in the Canaries). In the new Field Guide to the European Butterflies, Higgins & Riley (1973:43), concerning the general distribution of *P. rapae*, definitely state: «Absent from Madeira».

The only mention in the literature of *P. rapae* in connection with Madeira is to be found in a foot-note by Rebel (1917:8) in his 7th Contribution to the Lepidoptera Fauna of the Canaries, stating that Otto Schertz — a German collector of Lepidoptera — in the beginning of March 1909 had observed a specimen of *P. rapae* in Madeira, adding that, unfortunately, this specimen is not available.

The first authentic specimen of *P. rapae* caught in Madeira is preserved in the collection of the Museu Municipal do Funchal. It was taken at Funchal 62 years later on (15th December 1971) near the harbour.

In September 1973 when I collected together with Ole Lomholdt, he informed me that he was rather sure to have seen a specimen of *P. rapae* near the Lido corner, but as it was not caught the observation could not be regarded as absolutely certain. In the period 4th-17th September 1973 (as well as in previous years) I carefully inspected all *Pieris* specimens crossing my way, but all proved to be *brassicæ*. In 1974 the situation regarding *P. rapae* changed radically. During a short visit to Madeira in April 1974 I had seen a few *P. brassicæ* but definitely no *rapae*. After arriving on my 7th journey to Madeira (on the 14th August) I paid a visit to the Municipal Museum in Funchal where Mr. G. E. Maul — the tireless helper of all foreign biologists — showed me a drawer containing several specimens of *P. rapae*, all taken in the environs of Funchal in 1974. His notes showed that the first observation dated from the 4th July and that during the period 21st-22nd July about 50-60 specimens could be seen simultaneously swarming in Funchal and surroundings. In fact *P. rapae* had become the most common butterfly in Madeira, even more common than *Colias crocea* Fourc.

During my stay (14th-26th August 1974) I saw *P. rapae* in great numbers practically everywhere, in the coastal area from Funchal to Ribeira Brava and northwards to Serra d'Água (1,800 ft.) where my observations northwards ended. Eastwards of Funchal the butterfly was swarming everywhere, especially common near Monte (2,000 ft.) and at Terreiro da Luta (2,650 ft.), but also present south of Poiso (at 4,500 ft.). Additional localities, worth mentioning, observed by other entomologists during August 1974 are Queimadas (2,700 ft.), Curral das Freiras (2,100 ft.), between Serra d'Água and São Vicente (reaching about 3,000 ft.) and near Pico Arieiro (5,400 ft.).

In the period between Christmas 1974 and the New Year 1974/75 I again paid a short visit to Madeira. *P. rapae* was still on the wing although not as plentiful as in August. Besides Funchal-Lido I noted the following localities: Arco da Calheta (1,300 ft.), Lombo do Brasil

(1,530 ft.), Bico do Paul (1,290 ft.). At Faial as well as at Terreiro da Luta the butterfly was common.

A further trip to Madeira in early May 1975 is hardly worth mentioning as my collecting activity was limited. *P. rapae* was still present, especially along the south coast, and I collected it also at Fajã da Nogueira (1,800 ft.).

The «Large White», *Pieris brassicae*, was in 1974 a trifle more plentiful than usual, but not remarkably common. Obviously, a probable estimation of the relative proportion of specimens seen of these two species must be doubtful. However, I consider it on the safe side to count that in August 1974, in southern Madeira, at least westwards to Ribeira Brava, about 20-30 *P. rapae* appeared before a specimen of *P. brassicae* turned up.

The Madeiran specimens of *P. rapae* (fig. 1), are exactly matching those illustrated by Manley & Allcard (1970:31, pl. 6 figs. 20-22) under the name *f. metra* Stephens. These specimens originate from Portugal (Algarve, Santander) and the form *metra* is stated to represent the spring brood.

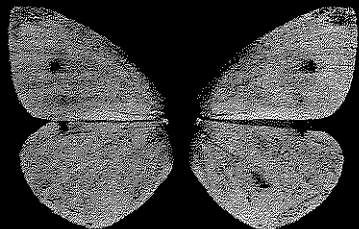
It was striking that many of the Madeiran specimens were freshly emerged and made certain that the species is breeding in Madeira. At Serra d'Água I found (on 23rd August) the larva of *P. rapae* full-grown (a short distance from a «colony» of 8 larvae of *P. brassicae*). Two larvae of *P. rapae* collected at Funchal-Lido on 25th December 1974 pupated on 27th December, and the adults emerged on 6th January 1975 demonstrating the extremely rapid development of the species in Madeira. No doubt, a transport through the air from Portugal must take place, now and then, and *P. rapae* must have been present, though sparsely, long before 1974. A possible existence of small and unnoticed populations here and there on the island cannot be excluded. Curiously the Lepidoptera fauna has been studied less thoroughly than that of many other insect orders. The question is: What is the explanation of the sudden mass explosion of the species in 1974?

According to my experience, regarding the dispersal of several species of Lepidoptera to Iceland (Wolff 1971) I do not doubt that the first condition must be that a swarm of specimens of *P. rapae* has been transported air-borne from Portugal to Madeira just at the time concerned.

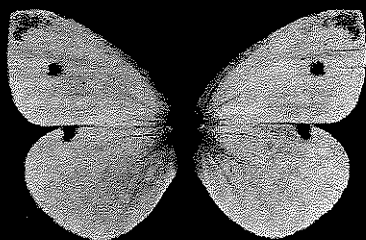
Having discussed the matter with Dr. R. A. French of the Rothamsted Experimental Station, Harpenden, we agree in that such a situation

Fig. 1. — *Pieris rapae* L. (× 1). Madeira 1974, Niels L. Wolff leg. 1: ♂ Funchal-Lido (60 ft.) 22.VIII. 2: ♂ Funchal-Lido (30 ft.) 18.VIII. (3: ♂ Fajã da Nogueira (1,800 ft.) 9.V.1975.) 4: ♂ Serra d'Água (1,800 ft.) 15.VIII. 5: ♂ Lombo do Brasil (1,530 ft.) 26.XII. 6: ♂ S. of Poiso (4,000 ft.) 22.VIII. 7: ♀ Funchal-Lido (60 ft.) 14.VIII. 8: ♀ Serra d'Água (1,800 ft.) 16.VIII. 9: ♀ Funchal-Lido (30 ft.) larva 25.XII, pupa 27.XII, bred 6.I.1975. 10: ♀ Funchal-Lido (30 ft.) 31.XII.

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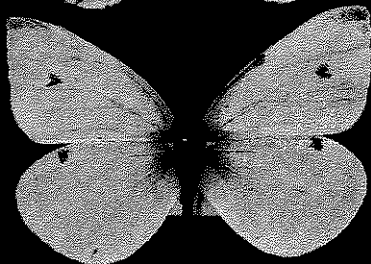
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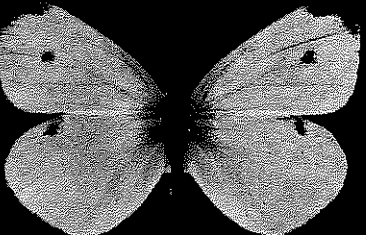
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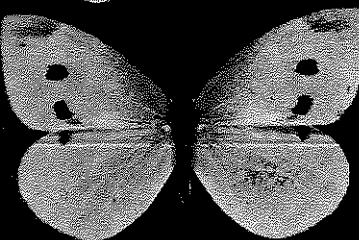
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arises, when an anticyclone approaches S. W. Europe from the Atlantic, having winds circulating around it, able to carry insects from e. g. Portugal to Madeira. But we also agree in this condition being far from unique. Taking into consideration that the first specimen was observed on 4th July and that the species became numerous at the end of that month — agreeing with an estimated period of about 3-4 weeks between oviposition and emergence of imago — the meteorological dates in the period close to 4th July deserve special interest.

Through the courtesy of the Air Weather Service of Copenhagen Air Port, Kastrup, I had the opportunity to study all relevant maps desired. Every three hours a most detailed and accurate large map showing the weather situation in all Europe is constructed. Figs. 2 & 3

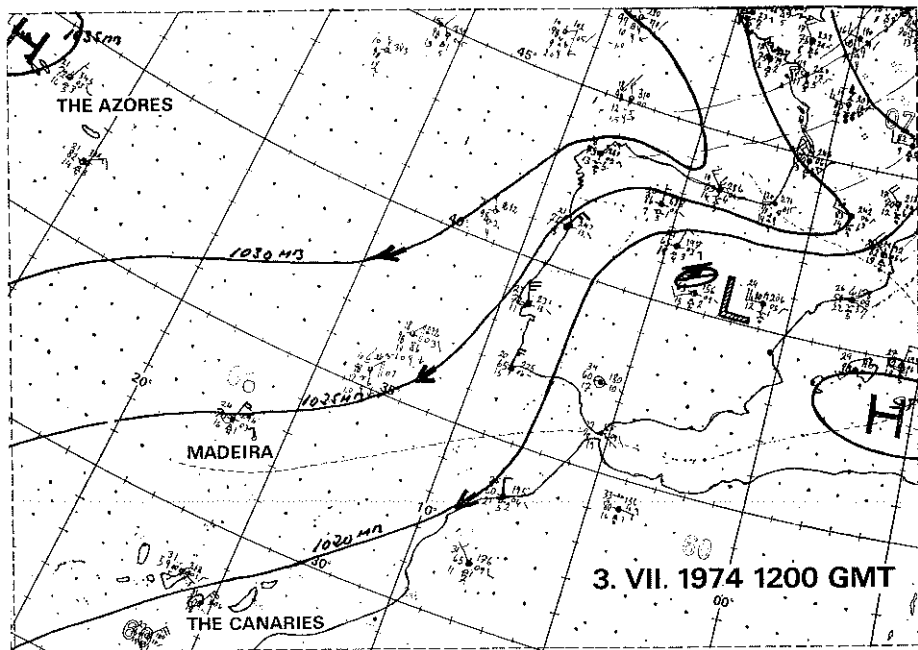


Fig. 2. — Map showing the weather situation in part of S. W. Europe on 3rd July 1974 at 1200 GMT. Published by permission of Flyvevejrtjenesten, Copenhagen Airport, Kastrup.

illustrate two maps showing only the weather situation in the part of S. W. Europe concerned on 3rd July at 1200 GMT and at 1800 GMT, respectively. It clearly appears that an air flow from Portugal, raising its speed in the afternoon, and pointing directly to Madeira, has made it possible for butterflies to land in Funchal on 4th July. However, it

must be remembered that a situation like this has happened several times as well in June 1974 as also in previous years. And it is also of importance to know if the species has been present in unusual quantities in the locality in Portugal where they started their flight — a question which I have had no opportunity to verify.

Another factor which has to be taken into consideration concerning the sudden establishment of the species in Madeira, is if exceptional

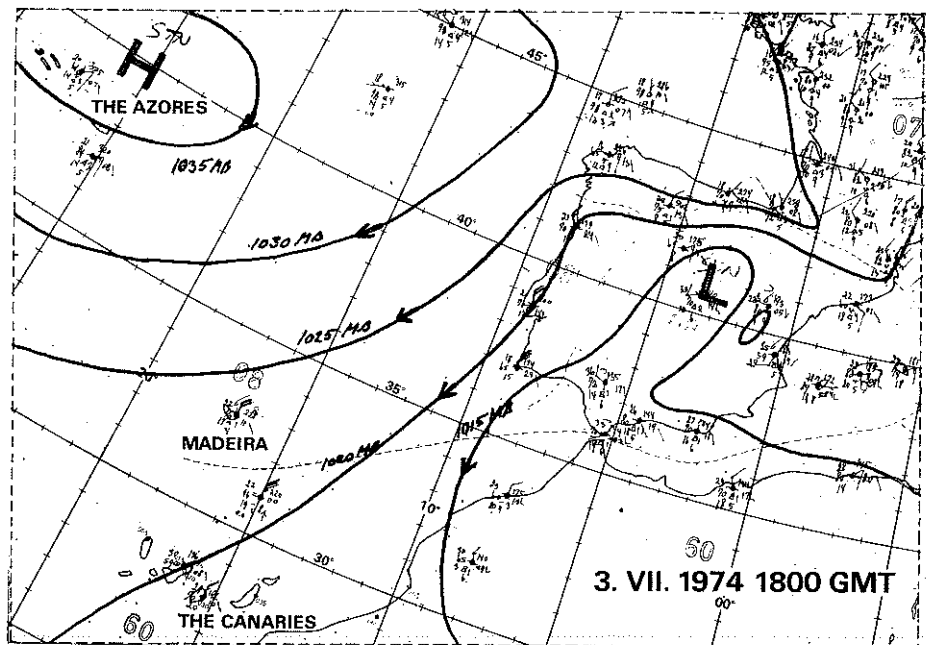


Fig. 3. — Map showing the weather situation in part of S.W. Europe on 3rd July 1974 at 1800 GMT. Published by permission of Flyvevejtjenesten, Copenhagen Airport, Kastrup.

temperature conditions may have occurred in the period between 4th July and end of July, this being especially favourable for the growth of the larva.

Through Mr. Maul I have procured the meteorological map recording the average daily temperature in various parts of Madeira Fig. 4 illustrates the mean daily temperature in Funchal for the dates 3rd-4th-5th-6th July in the ten-year period 1965-1974. It must be admitted that 1974 shows the highest mean temperature in the entire period, but the difference (.1 degrees centigrade) is so insignificant that not the least importance can be attached to it (!)

A factor which might influence such a situation is a possible change in use of pesticides. In December 1974 I saw *S. of Faial* insecticides being sprayed on cabbage plants, but as these in most cases are grown singly, often under bananas, willows etc. spraying with pesticides is probably not used regularly and cannot have any effect on the matter in question.

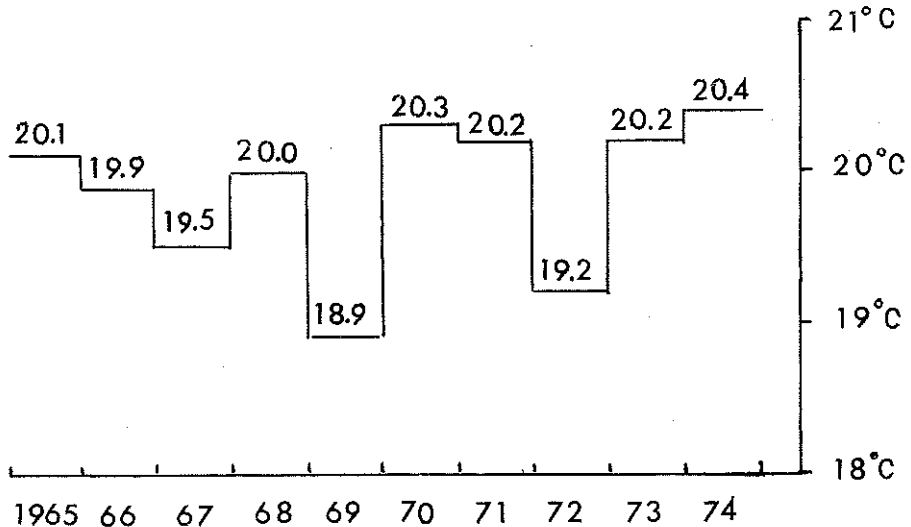


Fig. 4 — Diagram showing the main daily temperature (°C) in Funchal as an average for the dates 3rd, 4th, 5th and 6th July in the 10-year period 1965-1974.

A definite explanation of the unexpected behaviour of *P. rapae* in 1974 is thus still wanting. All the same I find it useful at this early stage to publish the above facts in order to form the basis of further studies of the fate in the future of the species in question in Madeira.

I owe my best thanks for help to Mr. G. E. Maul, Funchal, Dr. R. A. French, Harpenden, Mr. A. Wedege, Kastrup, and for communication of finds unknown to me to Mr. M. Münster-Swendsen, Copenhagen and to Mr. E. Traugott-Olsen, Marbella. I offer my special thanks to my wife who tirelessly has accompanied me on my excursions.

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