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Eight years of systematic investigation of the Rhopalocera of Turkey (Lepidoptera : Satyridae, Lycaenidae)

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Summary

A study of the Turkish Rhopalocera is presented as an example of how systematic investigation and cooperation between workers can improve the efficiency and usefulness of entomological research. A few notes are given on *Hipparchia pellucida* (Stauder, 1924), *Hyponephele wagneri* (Herrich-Schaeffer, 1846) and *Maniola telmessia* (Zeller, 1847). The geographical variation of *Satyrium ilicis* (Esper, 1779) is discussed and the taxa *caudatula* (Zeller, 1847), *cilicica* (Holtz, 1897) and *syra* (Pfeiffer, 1932) are considered synonyms of the nominate subspecies.

Introduction

We have been collecting and studying the butterfly fauna of Turkey since 1977. Records have been obtained from museums and some private collections in western Europe, but the bulk of information has come from 20 expeditions, mainly to the southern part of Turkey. We work in close cooperation with several German entomologists, who have visited Turkey even more often than ourselves.

The collecting itself is certainly not the aim of our entomological activities and we will concentrate on the wider implications of our work in this paper. The following aspects will be covered : Objectives, handling of material, processing of data, the survey and some results.

Objectives

As stated already, the collecting itself is not our aim, although we agree with de Jong (1982), that collecting is indispensible in fulfilling the aims of taxonomy. The aims, as phrased by de Jong, are to increase our knowledge

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of the diversity of life and to obtain some understanding of the processes that have led to this diversity. The aims of our study of the Rhopalocera of Turkey are more specifically :

1. To determine the distribution and range of all Rhopalocera within Turkey.
2. To obtain systematic data on morphological variation within the species.
3. To obtain a maximum of ecological information.
4. To make these data useful for both present and future scientists.

As we have made our data available to others, we have also received a considerable amount of data in return — a typical snowball effect.

Handling of material

The objective of making data useful to others means a commitment with respect to the handling, that is the determination, preparation and storage, of the large amount of insects we have collected. Most of the butterflies can be identified in the field, but several species can easily be overlooked. The first action after each expedition is to make all specimens suitable for accurate identification and pin them. The material is stored temporarily, wings folded, and sorted by species for each locality, so that a particular species can be retrieved easily for further preparation and investigation.

Except for small reference collections at home, all material is deposited in the collection of the Zoological Museum of Amsterdam and for safety reasons, type material is in part deposited also in one or more other museums. The fact that we, as amateur entomologists, do not have a private collection is a logical consequence of our previously mentioned main objective. We are in the fortunate position that the museum of Amsterdam has understood that its scientific significance can only be maintained and even increased greatly by an active involvement of amateurs. Thus not only is the supervision of the Palaearctic butterflies in the hands of an amateur, but new material is also mainly supplied by amateurs. The result is a useful collection which is used by more and more people, who bring more and more of their own material into the collection.

We will not go into a discussion of the relative uselessness of many private collections and also of several museum collections with regard to scientific progress. We will stress however the cooperation of museums and amateurs with the objective of making data really useful to everybody.

Processing of data

Although the progress in electronic equipment has brought the use of a computer within our possibilities, we still process the data manually. Computer or not, it is again our objective which pushes us to work systematically, in particular to record relevant data in the field. It is not the most exciting part of the field work, but it is essential for later processing.

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A certain amount of forward planning reduces recording time in the field to a minimum. A simple table is prepared before each expedition. The known records of all species are indicated in the table for each of the provinces that we intend to visit. With those data at hand we can see immediately which species, both rare and common, need extra attention. In the field, after the material has been stored, the locality data are recorded and a preliminary list is made of all species identified or observed. Making a few notes on biotope and ecological observations as well as taking photographs of the biotope(s) are routine actions. Furthermore, a rough description is made of the landscape during travelling, together with remarks for further investigations, possibly at another time of the year.

At home, field records are completed such that the data are, and remain available for further processing. Distribution records are passed to Dr. Wagener (Bocholt, FRG) and Mr. Hesselbarth (Diepholz, FRG), who are in the process of preparing a faunistic treatise of the Rhopalocera of Turkey. Important records, new observations and our conclusions on species limits, either splitting or lumping, are published as soon as possible separately.

The survey

We have been inspired mainly by Dr. Wagener and Mr. Hesselbarth to work together in a survey of the whole of Turkey from 1980 on. Because relatively little was known of the fauna of southern Turkey, we decided to concentrate our activities to the southern provinces. We have now visited about 300 localities, one or more times, as illustrated in Fig. 1. The expeditions have been (and still are) planned to make a complete and systematic survey, covering also months other than July and August. The earliest collecting date was April 27th, the latest was September 1st. The most complete investigation

Fig. 1. Localities visited from 1977 to 1985.

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has been of central-southern Turkey and we intend to complete our first series of three expeditions through the south-east of Turkey, all about the first half of June, within ten weeks. These expeditions will cover three almost parallel routes from Adana towards Hakkari and Van.

Observations on three species

In Figs 2-4, the known distribution is presented of *Hipparchia pellucida* (Stauder, 1924), *Hyponephele wagneri* (Herrich-Schaeffer, 1846) and *Maniola telmessia* (Zeller, 1847). The records before and after 1975 are represented by different symbols to emphasize our contribution after this date, including those of our German colleagues Mr. Hesselbarth and Dr. Wagener.

Fig. 2. *Hipparchia pellucida*. ○ until 1975. ● after 1975.

Fig. 3. *Hiponephele wagneri*. ○ until 1975. ● after 1975.

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Fig. 4. *Maniola telmessia*. ○ until 1975. ● after 1975.

H. pellucida can be distinguished from *H. algirica* (Oberthür, 1876) by the larger size of the genitalia of both male and female, which can easily be seen without dissection. The species was recorded as being rather scarce from different places in Turkey until 1984, when we found *pellucida* abundantly, in particular in the Provinces of Gaziantep and Hakkari. We have observed *pellucida* in different biotopes: between pine trees as well as in open brushwood, on flat and neglected agricultural land as well as in mountainous rocky areas. A very interesting observation was that of a continuous stream of butterflies, mainly *pellucida* and to a lesser extent *M. telmessia, Hyponophele lupina* (Costa, 1836) and *Pseudochazara pelopea* (Klug, 1832), flying through a narrow valley in the Province of Hakkari early June 1984. We counted about 30 butterflies per minute for one hour with no sign of stopping when we left. *H. pellucida* loves the heat of the sun, as we have observed many specimens on the warm tarmac of the road or still flying around, when *Pseudochazara pelopea* and *P. telephassa* (Geyer, 1827) were already in the shade of either trees or rocks.

H. wagneri had only been recorded from a few localities in the Provinces of Gaziantep, Malatya, Elazig and Tunceli in 1980. Our first observation of the species, which was in Akseki, central Taurus, in 1981, was already some 500 km further west. Now we have found the species over the whole of south-eastern Turkey, although one cannot say that the species is common. *H. wagneri* has been observed mostly in rocky mountainous biotopes. We have never found the species in flat and open areas. *H. wagneri* hides in holes in the rocky slopes. The most remarkable observation was in the Province of Urfa early June 1984, when we saw a few hundred specimens of *wagneri* together with hundreds of other butterflies in a large cave in the only steep rockface which could be found within 20 km of the flat bare land and cornfields, simmering in the heat of the sun.

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M. telmessia has been recorded more often than the two aforementioned species, but still relatively little was known until 1980. Our impression is now of a very common species in the south of Turkey. The distribution of *telmessia* overlaps that of *Maniola jurtina* (Linnaeus, 1758), to which the species is closely related. Although the flight period of *telmessia* starts 3 or 4 weeks earlier than that of *jurtina*, we have observed the two species flying together several times. The main flight period of *telmessia* is between early May and early June, depending on local conditions. The species has one generation. The females hide from the heat during the summer, aestivating to some extent, and lay eggs in September or October. We have succeeded in obtaining eggs from a female caged outside after 16 weeks. We now know something about the variation and biology of the species, a publication on which is in progress.

The geographical variation of *Satyrium ilicis* (Esper, 1779)

Due to the lack of material, it was quite acceptable up to eight years ago to distinguish five subspecies (including the nominate subspecies) within Turkey :

S. i. ilicis (Esper, 1779) with type locality Erlangen, Germany
S. i. caudatula (Zeller, 1847) with type locality south-west Turkey, originally described as a species, but considered a subspecies by several authors, e.g. Zerny (1932) and Higgins (1966), but not Koçak (1975).
S. i. cilicica (Holtz, 1897) type locality in the Province of Içel, south of the Taurus, originally described as a variety of ilicis on the basis of only two specimens.
S. i. syra (Pfeiffer, 1932) type locality Karaman Maras.
S. i. prinoptas (Zerny, 1932) type locality Libanon.

Fig. 5. *Satyrium ilicis*. Centerline of transitional area :
— — — — western form-southeastern form.
— ·· — ·· — *S. i. ilicis-S. i. prinoptas.*

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S. ilicis has now been recorded from 138 localities scattered all over Turkey (Fig. 5). We have been able to study 794 specimens from 125 localities. We have studied the type material, eight specimens, of the subspecies *syra*, which is in the Zoological Staatssammlung München. *S. ilicis* has been recorded from sea level up to 2050 m and from 12th May to the first week of August.

It appears that the species can vary significantly locally. To some extent, we have found transitions in the morphological characters of the species in the northern part of the Province of Hatay and roughly along the line Karaman Maras - Elazig - Van. We do not see any reason for separating the populations west and north of this line from the European populations of the subspecies *ilicis*. The most remarkable observation in north-east Turkey was at the Topuzdagi Geçidi, at 1500 m, East Cappadocia. There we found a population of mainly small and dark specimens with hardly any markings on the underside. We also found some „normal" specimens and several transitional forms, so we consider that population to belong to the subspecies *ilicis*.

We have studied 42 specimens from the Province of Mugla from near the type locality of *caudatula* and 39 specimens from the Province of Içel, the type locality of *cilicica*. We conclude that neither the material from Mugla nor that from Içel can be separated from the material (450 specimens) from the western half of Turkey. Moreover, the features mentioned for *caudatula* by Zeller and those mentioned for *cilicica* by Holtz are present in almost all populations from western Turkey. These features are :

caudatula : Mainly the long tail at vein 2 of the hindwing ; further, on the underside : (1) the white internervular markings on the forewing slightly curved (concave outside). (2) the white marking in cell 2 of the hindwing almost straight with a small hook, (3) the red marking in cell 2 of the hindwing sickle-shaped (concave outside), and on the upperside : (4) the ferruginous patch small and faint, or absent.

cilicica : A large blue spot in the anal angle of the hindwing underside.

Based on our investigations it appears that the specimens from the mediterranean areas south of the Taurus are slightly richer marked on the underside, as can also be found in specimens from the Sultandaglari. We conclude that both subspecies *caudatula* and *cilicica* are synonyms of subspecies *ilicis*.

The type material of syra surprisingly does not agree with Pfeiffer's description. We have found that Karaman Maras is in the transitional area between the western form (ssp. *ilicis*) and a south-eastern form, which is lighter and less marked on the underside. We found both forms in Karaman Maras. Pfeiffer described the lighter form, whereas the type specimens are only of the darker western form indistinguishable from ssp. *ilicis*. We must therefore conclude that : (1) Pfeiffer's type material of *syra* is not representative of the south-eastern form and (2) on the basis of the type material subspecies *syra* is identical to subspecies *ilicis*.

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From Karaman Maras eastwards we have found only the lighter form. We have found both forms in the north of the Province of Siirt and among the material from the Province of Tunceli. We hope that we shall obtain a better understanding of the interrelation of both forms during our next expedition this year which will explore the supposed transitional area from Malatya to Mus.

We have studied 25 specimens from the southern half of the Province of Hatay which we consider to belong to *S. i. prinoptas*. We have seen one typical *prinoptas* specimen and one typical *ilicis* from one locality, recorded May 1985 and July 1980 respectively. This is not enough to decide on the status of *prinoptas*. Further investigation is required.

Epilogue

We hope we have succeeded in drawing your attention to our systematic work on the Rhopalocera of Turkey. We highly recommend our approach to the subject, in particular in making the data useful to everybody, and by boosting results through cooperation. We hope that new contacts will arise, in particular with entomologists having knowledge of the neighbouring countries of Turkey.

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Note added in 1992

This lecture has since been translated into Russian and published in *Vestnik Zoologii* 2/1991 : 71-74. A more detailed and improved discussion on *S. ilicis* was published in 1991 : Rhopalocera of Turkey. 6. On the geographical variation of *Satyrium ilicis* (Esper) with description of *S. ilicis zabni* n.ssp. from South East Turkey (Lepidoptera : Lycaenidae). *Ent. Ber., Amst.* 51 (3) : 38-43.

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