

**Taxonomic and ecological observations on *Zygaena* F.
from the Province of Fars, Southern Iran
(Lepidoptera, Zygaenidae)**

by

CLAS M. NAUMANN*) and TOMMASO RACHELI

*) 11th contribution to the knowledge of the genus *Zygaena* F. and related taxa (Zygaenidae, Lepidoptera) (10: Ent.Z. 88: 37-40).

In 1976 the second author together with Ing. EMILIO STEFANELLI and friends of the Zoology department of the university of Rome, conducted an entomological and ecological field trip to Iran (May 22 to Juni 9). Since some of the findings in the moth genus *Zygaena* F. (Zygaenidae, Lepidoptera) are of special faunistic, ecological and phylogenetic interest a short account is given here.

Collecting and observations took place in the following localities:

- 1) Dasht-e-Arjan, biotop 1, 2100 m (approximately 60 km west of Shiraz):
A south exposed slope on the north-western border of Dasht-e-Arjan National Park. The biotope is characterised by small ravines, whose sides were scantily covered with bushes among which numerous *Marrubium crassidens* (Labiatae) were flowering. These were the main feeding and resting flowers for the *Zygaena*, as has also been stated by TREMEWAN (1975). Beside *Zygaena escalerae saadii* REISS, 1938, *Z. chirazica* REISS, 1938 and *Z. seitzi* REISS, 1938 the following species of Rhopalocera have been collected at this locality: *Colias aurorina* HERRICH-SCHÄFFER, 1850, freshly emerged *Chazara persephone* (HÜBNER, 1805), *Melitaea persea* KOLLAR, 1850, *M. gina* HIGGINS, 1942, *M. phoebe* (SCHIFFERMÜLLER & DENIS, 1775) and *M. cinxia* (LINNÉ, 1758), *Argynnis niobe* (LINNÉ, 1758), a few *Melanargia hylata* MENETRIES, 1832, *Vacciniina anisophthalma* KOLLAR, 1850, *Erynnis marloyi* (BOISDUVAL, 1834) and *Syrichtus tessellum tersa* (EVANS, 1949).
- 2) Dasht-e-Arjan, Biotope 2, 2100 m: a hilly locality at the south-eastern end of Dasht-e-Arjan National Park, with numerous oak trees. The biotope is covered with a vast number of bushes of *Astragalus* species, which are specially concentrated on light openings in the wood and outside the forest, were bushes of *Colutea* are to be seen, too. The most conspicuous Rhopalocera in this biotope were, in addition to the species mentioned above, *Iolana iolas* (OCHSENHEIMER, 1816), *Pseudochazara telephassa* (HÜBNER, 1827), *Pseudochazara pelopea* (KLUG, 1832), *Chazara briseis* (LINNÉ, 1758), *Chazara persephone* (HÜBNER, 1805), *Hyponerphela lupina* COSTA, 1836,

Limenitis reducta STAUDINGER, 1901, *Melitaea trivia* (SCHIFFERMÜLLER & DENIS, 1775), *M. perseae* KOLLAR, 1849, *M. gina* HIGGINS, 1942, *Strymonidia abdominalis* (GERHARD, 1853), *Apharitis maximus* (STAUDINGER, 1901), *A. myrmecophila* (DUMONT, 1922), *Kretania eurypilus* (FREYER, 1852), *Pandoriana pandora* (SCHIFFERMÜLLER & DENIS, 1775) *Plebejus pylaon* (FISCHER de WALDHEIM, 1832), *Papilio machaon* (LINNÉ, 1758), *Colotis fausta* (OLIVER, 1801), *Gonepteryx farinosa* ZELLER, 1847 and *Coenonympha saadi* KOLLAR, 1850.

In this biotope the highest number of *Zygaena* in one locality has been observed, i.e. five species: *Z. escalerai saadii* REISS, 1938, *Z. chirazica* REISS, 1938, *Z. seitzii* REISS, 1938, *Z. haematina* KOLLAR, 1849 and *Z. cambysea hafis* REISS, 1938.

- 3) Sarra Tshenk, 2300 m (or Kuh-e-Borenjan, probably identic with Serra Tsheng, mentioned by BRANDT (1938). This is a north-west exposed slope above Dasht-e-Arjan, biotope 2, which is covered by oak trees. It is more humid than locality 1, but approximately shows the same type of vegetation as biotope 2. Only a few specimens of *Zygaena escalerai saadii* REISS, 1938 and *Z. chirazica* REISS, 1938 have been observed here, flying together with *Colias aurorina* HERRICH-SCHÄFFER, 1850, *Kirinia climene* (ESPER, 1783) and *Quercusia quercus* (LINNÉ, 1758).
- 4) Pass north-east of Sarvestan, on road to Korameh, approx. 2000 m. On top of the pass extends a north-eastern slope, where collecting took place in a rocky steppe biotope with a yellow-red underground. Umbelliferous bushes were flowering together with *Astragalus* and other thorny bushes. Only a few *Z. escalerai* ssp. and 1 ♂ *Z. chirazica* were taken here together with *Strymonidia sassanides* (KOLLAR, 1856) and *S. abdominalis* (GERHARD, 1853). Otherwise very few Rhopalocera were to be seen here.
- 5) Kuhenjan Paß, 1900 m, approx. 60 km south of Shiraz. A steppe biotope with numerous *Eryngium* spec.. *Astragalus* was absent here or at least not noticed. *Zygaena fredii* REISS, 1938 was the only *Zygaena* observed here, mainly on a northern slope, where very few Rhopalocera were observed, among which *Hyponephele wagneri mandane* KOLLAR, 1849 was flying together with *Strymonidia abdominalis* (GERHARD, 1833), *S. sassanides* (KOLLAR, 1850), *Apharitis maxima* (STAUDINGER, 1901), *Freyeria trochilus* (FREYER, 1844), *Polyommatus loewii* (ZELLER, 1847) and *Anapheis aurota* (FABRICIUS, 1793).
- 6) Qadar Abbad Pass, south-side, approx. 120 km east of Shiraz, 2100 m. On both sides of the top of the road and on the top itself *Zygaena sengana xerxes* TREMEWAN, 1975 and *Zygaena manlia* ssp. ad *isfahanica* TREMEWAN, 1975, were collected, the latter being by far less common. An intriguing species of Rhopalocera in this locality was *Melitaea sarvistana* WILTSHIRE, 1941 (RACHELI, 1978). The biotope was characterized by

high grasses in an usual steppe biotope and some rocks on a stony underground.

- 7) Izadkhast (or Yezd-i-Khast), 2200 m, about 100 km south of Esfahan, Prov. Esfahan. A steppe plateau with small glens covered with bushes of *Astragalus*. *Melitaea perseae* KOLLAR, 1849 and *Melitaea sarvistana* WILTSHIRE, 1941 were the two butterflies characterizing the biotope. Here 2 ♂, 1 ♀ of *Z. sengana* HOLIK & SHELJUZHKO, 1956 have been found, which do not agree with the two subspecies known so far. The flight was very fast and dissimilar to that of *Z. sengana xerxes* TREMEWAN, 1975 observed in Qadar Abbad Pass. This was possibly due to their initial period of flight, while the specimens on Qadar Abbad Pass were about 50 % worn out.

The material collected is located in the following collections: C.u.S. NAUMANN (Bielefeld), T. RACHELI (Rome), V. SBORDONI (Rome), E. STEFANELLI (Rome) and J.-C. WEISS (Hagondange).

In the following we should like to comment on the collected material, to give some taxonomic remarks and the biological observations which have been taken during the field study.

Zygaena (Agrumenia) escalerae saadii REISS, 1938 (fig. 5)

Dasht-e-Arjan, biotope 1, 25.–30.V.1976: the most common *Zygaena*, usually flying together with *Z. chirazica* REISS, 1938. The flight of this species was close to the ground and usually slow, but when the moth is troubled it dashes away and it is nearly impossible to be taken. The usual resting plant is *Marrubium crassidens* (Labiatae), while it also visits the bushes of an *Astragalus* species as already stated by TREMEWAN (1975).

TREMEWAN's observations on the behaviour of *Z. escalerae saadii* differ from those given here, stating that it is a shy species. This may be due to different ecological conditions, or also due to the number of individuals in a given biotope. If there are more specimens it may be less shy.

Dasht-e-Arjan, biotope 2, 2.–9.VI.1976: less common than in biotope 1, mainly on open areas in the oak forest.

Sarra Tshenk, 2300 m, 4.VI.1976: about 20 specimens,

Pass NE of Sarvestan, approx. 2000 m, end of May, 1976: 4 ♂♂, 2 ♀♀.

This population differs from those in Dasht-e-Arjan in having the usual white spots with more reddish centers and the hind wing margin being somewhat narrower. More material from this locality might reveal a new subspecies, intermediate between *saadii* and *thomasorum* ssp. n. (see fig. 1–4).

Zygaena (Agrumenia) escalerae thomasorum n. subsp. (fig. 6,7)

loc. typ.: Prov. Fars, 40 km E Neyriz.

This subspecies differs strikingly from the only other red subspecies of *escalerai*, so that we believe it to be a genetical fixed and stabilized subspecies and not a local modification.

Description: this subspecies differs in both sexes from ssp. *saadii* REISS, 1938 in having the red ground colour much more extended in both, fore and hind wing. While in *saadii* from Dasht-e-Arjan there are many specimens which do not have much or any red in the fore-wing spots 4 and 6, this is always present in *thomasorum*. The white surrounding of the fore wing spots is much reduced (as in *Z. brandti brandti* REISS, 1937) or sometimes even nearly missing. In spot 5 and 6 the upper white border is sometimes completely missing. The margin of the hind wing is much narrower than in *saadii* and the tornus nearly never reaches the cell. The hyaline streak is present as in *escalerai* and *saadii*, so differing from *Z. brandti* and *Z. sengana*. HOLIK & SHELJUZHKO, 1956, where it is missing.

Patagia, frons, palpi and coxae 1 are carmin red, while the tegulae usually are not coloured, except for a small cream or pink bordering in a few specimens. The abdominal belt is usually open on the dorsal side of segments 3–5, except for the most caudal section of the segments. The pleurae and the ventral side of segments 3–7 are uniformly red, while the tip of the abdomen and the valvae (in ♂) remain black.

In *saadii* there is a white margin of the hind border of the fore-wing. This is usually absent or very scanty in *thomasorum*.

Holotype ♂: Persia mer., Prov. Fars, 40 km E Neyriz, 5.V.1975, leg. THOMAS, coll. NAUMANN. Allotype ♀, 29 ♂♂ 10 ♀♀ with same data in coll. NAUMANN and coll. RACHELI; 5 ♂♂ paratypes, same data, coll. AISTLEITNER, (Feldkirch/Austria) and 3 ♂ paratypes, same data, coll. BLOM (Groningen). This type series is partially damaged by the action of ants (vic. genus *Phaidole*) in Iran.

Little information was collected on the ecology of the new subspecies. Mr. and Mrs. W. THOMAS informed us, that the specimens were flying and partially sitting on white flowers on the east side of a little mountain road which leads from Neyriz into the bassin of the Dasht-e-Neyriz.

Zygaena (Agrumenia) sengana xerxes TREMEWAN, 1975 (comb. nov.)

Zygaena (Agrumenia) brandti xerxes TREMEWAN, 1975, Ent. Gaz. 26: 230–231. type locality: Fars, Qader Abad Pass (S. side), 7000 ft., S. of Dehbid.

Numerous specimens were taken at the type locality on 1. – 2.VI.1976. A study of the genitalia of a male paratype of *cyrus* in coll. C. NAUMANN (slide no. 864) shows that this taxon is not conspecific with *Zygaena brandti nissana* REISS, 1937 and *Z. rosinae* KORB, 1902. The male genitalia agree well with those of *Z. escalerai saadii* REISS, 1938, and *Z. sengana* HOLIK & SHELJUZHKO, 1956 in having four main spines in the lamina dorsalis, while

Z. brandti and *Z. rosinae* have only two such main spines (for details see ALBERTI 1958/59). There is a considerable number of species in the Subgenus *Agrumenia* which have the type of four main spines, so that this character proves only that this taxon is not conspecific with *Z. brandti*. There is a number of differences in the habitus separating *sengana*, *cyrus* and *xerxes* from *Z. escalerae* (i.e. missing of the hyaline streak of the hindwing), so we believe that these belong to a *Zygaena* species of its own which – according to the Code – will have to be named *Zygaena (Agrumenia) sengana* HOLIK & SHELJUZHKO, 1956. Biological study might later throw more light on the relationships of this species to *Z. formosa* HERRICH-SCHÄFFER, 1852. In any case more biological information will be needed to come to a final decision since the morphology of genitalia and the habitus are not helpful in this case.

The specimens were flying on the southern slopes of the pass, where they were found together with *Z. manlia* ssp. ad *isfahanica* TREMEWAN, 1975. They do not differ in behaviour from *Z. escalerae saadii*. A few specimens were found hidden in *Astragalus*-bushes.

Zygaena chirazica REISS, 1938

Dasht-e-Arjan, biotope 1, 25.–30.V.1976. The species flew together with *Z. escalerae saadii*, but it was much scarcer than the latter one. Usually the species is resting on flowers of *Pterocephalus persicus* (Dipsacaceae) and *Marrubium crassidens* (Labiatae). If flying it is difficult to be distinguished from *Z. escalerae saadii*.

In the males of the series before us spot 6 is usually white-yellowish, but sometimes has a red filling, which than always communicates with the red center of spot 5. Spot 4 is nearly always yellowish, even 1, 2 and 2a only carry a few reddish scales, which is not the case in the males. The red abdominal belt is restricted to segment 5 in the males, where it is usually open on the ventral side. In one male there is no trace of this belt. It is a dark specimen with black streaks covering the hyaline streaks of the hindwing up to the base. In some other specimens the belt is obscure, but still visible.

In the ♀♀ it is stronger, often closed ventrally and sometimes it is present on the dorsal side of segment 6, too. – Obviously the flight season for this moth was mainly over, so it is assumed that it will appear usually during early May. Pass N of Sarvestan, 1900 m, 2.VI.1976: one single male was taken on this locality.

Dasht-e-Arjan, biotope 2, 2.–9.VI.1976: 1 ♂ 1 ♀, coll. RACHELI.

Sarra Tshen, 2300 m, 4.VI.1976: 1 ♂, 1 ♀, coll. RACHELI.

Zygaena (Mesembrynus) seitzi seitzi REISS, 1938

Dasht-e-Arjan, biotope 1, 25.–30.V.1976, and biotope 2, 4.–9.VI.1976.

In biotope 1 only one female was observed while in biotope 2 *Z. seitzi* occurred

unscarcelly in a small open area a few hundred yards from the closed forest. The specimens usually sit inside the bushes of an *Astragalus* species belonging to the Subgenus *Tragacantha* (det. D. PODLECH, 1977), where it has also been observed in copula and laying eggs on the leaves of this *Astragalus*, which must so be the feeding plant in Dasht-e-Arjan. This finding is in contradiction to WILTSHIRE's observation (1952), who states that the food plant „is a large yellowflowering umbellifer found at 7000 feet and higher on the Shiraz mountains“, which he identified as *Prangos ferulacea*.

Since field observations in Dasht-e-Arjan have shown, that *Zygaena seitzii* is bound to *Astragalus* and that the ♂♂ and ♀♀ have often been found resting on this plant it has to be assumed that *Z. seitzii* has two different feedings plants: an *Umbellifera* and a *Papilionaceae*. As it is known from the genus *Zygaena* that all other species are either monophagous or at least bound to one or two plant genera of the same family, this fact may indicate that *Z. seitzii* is an archaic remnant of an early side branch of *Zygaena*, which already existed before the definite splitting into the subgenera *Mesembrynus* and (*Agrumenia* + *Zygaena*). It seems to be of extreme importance for the reconstruction of the phylogeny of *Zygaena* to find out whether both plants will be accepted readily as a food plant within the same population or whether there are two different strains of the species.

Zygaena (Mesembrynus) haematina KOLLAR, 1850

Only one single male (coll. STEFANELLI) has been taken in Dasht-e-Arjan, biotope 2, where it flew together with *Z. escaleraei saadii*, *Z. seitzii* and *Z. cambysea hafis*. Obviously its' period was just beginning, because a few more specimens have been taken in the same locality by ROSE, HOFMANN and HESSELBARTH between 7. and 18.VI.1976.

All these specimens agree well with the single male of KOLLARs collection in the Vienna museum. This specimen (fig. 8) bears the following labels: „Kots. (= KOTSCHY leg.), m, D, 82, Type“ (KOLLARs handwriting); „Manw. abgebil., 1845.“, „Type“, „haematina KLLR., Schiraz. 1849“. We designate this specimen as lectotype and add to it the following label: „Lectotypus ♂, *Zygaena haematina* KOLLAR, 1849, teste C. NAUMANN & T. RACHELI, 1978“.

It is obvious, that the type locality of *Z. haematina* KOLLAR, 1849 is somewhere in the vicinity of Shiraz itself. Specimens from localities in the Barm-i-Fiuruz mountains collected by BRANDT, WILTSHIRE and TREMEWAN in coll. NAUMANN, WIEGEL and others differ in size and colouration. The colour ranges from a very light yellow to fleshy red, while none is as dark red as the type specimen and the recently collected specimens from Dasht-e-Arjan. We assume that the specimens from Barm-i-Firuz belong to a different subspecies, which still awaits description.

Zygaena fredii REISS, 1938

Kuhenjan Pass, 1900 m, 29.V.1976.

This was the only *Zygaena* species to be found in the locality, where it was discovered on an Umbellifera and resting on *Eryngium* spec., which tentatively has been identified as *E. billardieri nigromontanum*. We have compared the long series before us with a natural size colour slide of the holotype ♂ of *Zygaena fredii* in the Riksmuseum Stockholm. A detailed analysis of the somewhat complicated nomenclature and taxonomy of the middle East *Mesembrynus* of the *manlia*-group will be given elsewhere (NAUMANN & RACHELI, in preparation), so we do not discuss the details here.

The specimens from Kuhenjan Pass differ from the holotype ♂ of *fredii* only in having a somewhat more extended wing pattern, i.e. the spots 1, 2 and 2a are confluent, 3 and 4 not divided and 6 is great enough to approach spot 5. The hind wing margin is identical with *fredii* and the abdominal belt is closed ventrally, which is not the case in the type specimen. In fresh specimens of our series (most specimens are somewhat worn) the cream colour is very bright and noticeable, a character that obviously disappears soon after the emergence.

Obviously *Zygaena fredii* is conspecific with *Zygaena manlia qashqai* TREMEWAN, 1975, *Z.m. askarii* TREMEWAN, 1975 and *Z.m. kermanensis* TREMEWAN, 1975, which have to be transferred to *Zygaena fredii* (for details see NAUMANN & RACHELI, 1978, in preparation).

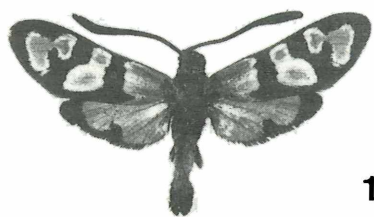
Zygaena manlia ssp. ad *isfahanica* TREMEWAN, 1975

Zygaena excellens isfahanica TREMEWAN, 1975, Ent. Gaz. 26: 242–245. loc. typ.: Isfahan: Pass (N. side) NW. of Meimeh, 700 ft.

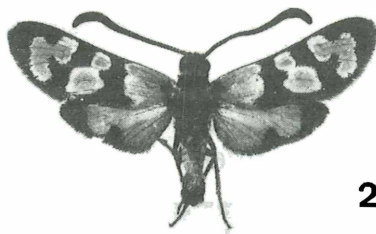
Qadar Abbad Pass, 2200 m, 1.–2.VI.1976.

This is the type locality of *Zygaena fredii askarii* (originally described as *Z. manlia askarii*, see NAUMANN & RACHELI, 1978, in preparation). The specimens before us do not at all agree with the description of *Z. 'manlia' askarii* given by TREMEWAN (1975), but do so very well with the description of *Zygaena excellens isfahanica*. Obviously both species, *fredii* and *manlia*, occur at Qadar Abbad Pass, as is also proved by three specimens of *manlia* (= *excellens*) from this locality collected by COTTRILL (TREMEWAN in litteris).

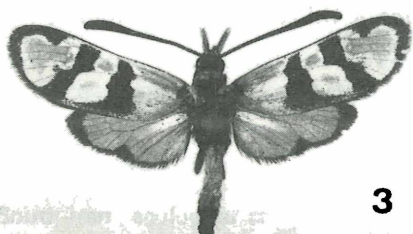
This record of *Zygaena manlia* is the first from the province of Fars. Nearly all specimens were resting on thorny bushes or in the grass, except two or three, which have been taken during their heavy flight in the late afternoon. Feeding habits have so far not been observed in this species. The differences in flight behaviour to *Zygaena fredii* from Kuhenjan Pass are quite striking, but it agrees also very well with that described by TREMEWAN (1975) for *Z. manlia isfahanica*.



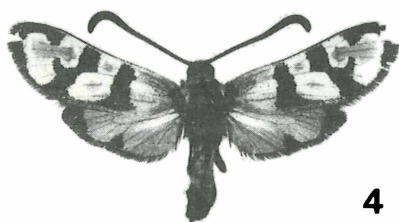
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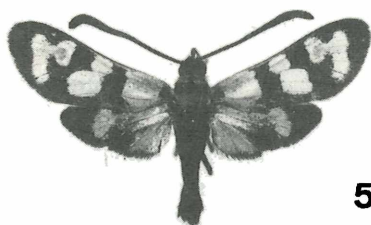
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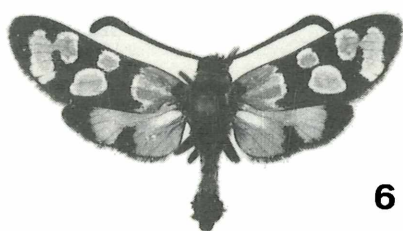
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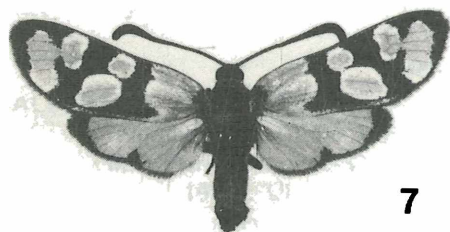
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6



7



8

legend:

- Fig. 1–4: 2 ♂♂, 2 ♀♀ *Zygaena (Agrumenia) escalerae* POZJADE, 1900, ssp. between *saadii* REISS, 1938 and *thomasorum* ssp. n. (Iran, Prov. Fars, Pass NE of Sarvestan on road to Korameh, 2000 m, E.V. 1976).
- Fig. 5: *Zygaena (Agrumenia) escalerae saadii* REISS, 1938, extreme dark ♂ (Iran, Prov. Fars, Dasht-e-Arjan National Park, biotope 1, 25.–30. V.1976).
- Fig. 6,7: *Zygaena (Agrumenia) escalerae thomasorum* ssp. n., fig 6 (holotype ♂), fig. 7 allotype ♀ (Iran, Prov. Fars, 40 km E Neyriz, 5.V.1976, leg. THOMAS).
- Fig. 8: *Zygaena (Mesembrynus) haematina* KOLLAR, 1849, lectotype ♂ (Schiraz, 1849; for details see text).

Zygaena (Mesembrynus) cambysea hafis REISS, 1938

4 ♂♂, 2 ♀♀, Dasht-e-Arjan, biotope 2, 2.—9.VI.1976.

The specimens were flying together with *Zygaena escaleraei saadii*, *Z. chirazica*, *Z. seitzii* and *Z. haematina*. They preferred small open areas within the oak forest. The flight was very swift at about 1.5 m from the ground. Obviously the flight period was almost over, when the specimens were taken.

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Abstract

Based on a collection of eight species of *Zygaena* from the province of Fars (South-Iran) ecological and ethological observations are described and presented together with some taxonomic and phylogenetic considerations. The species concerned are: *Zygaena (Agrumenia) escaleraei*, *cyrus*, *chirazica*, *Zygaena (Mesembrynus) seitzii*, *haematina*, *fredi*, *manlia* and *cambysea*. *Zygaena escaleraei thomasorum* ssp. n. is described from a locality east of Neyriz.

Zusammenfassung

Anhand einer Aufsammlung von acht verschiedenen *Zygaena*-Arten aus der Provinz Fars (Süd-Iran) werden ökologische und ethologische Beobachtungen beschrieben und zusammen mit einigen taxonomischen und phylogenetischen Überlegungen dargestellt.

Die behandelten Arten sind: *Zygaena (Agrumenia) escaleraei*, *cyrus*, *chirazica*, *Zygaena (Mesembrynus) seitzii*, *haematina*, *fredi*, *manlia* und *cambysea*. *Zygaena escaleraei thomasorum* ssp. n. wird aus dem Gebiet östlich Neyriz beschrieben.

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- 632-634, 671-675, 698-699, 701-702 und **56**: 11-15, 23-24, 32-34, 59-61, 163.
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Anschrift der Verfasser: Prof. Dr. CLAS M' NAUMANN
Universität Bielefeld,
Fakultät für Biologie,
Postfach 8640
D-4800 Bielefeld 1

Dr. TOMMASO RACHELI,
Via Guiseppe Valmarana 66,
I 00139 Roma

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