**P. Huemer 2013. Studiohefte 12. Die Schmetterlinge Österreichs (Lepidoptera). Systematische und faunistische Checkliste**. – Tiroler Landesmuseen-Betriebsgesellschaft m. b. H., Innsbruck, Austria. 304 pp. ISBN 978-3-900083-42-7. Price: 14.80 € plus shipping costs. Orders can be placed online at http://www.tiroler-landesmuseen.at/shop.php/de/druckwerke_alle_/studiohefte

Austrian Lepidoptera sparked a great interest in many European lepidopterists who have spent a great deal of their time hunting butterflies and moths in the picturesque alpine valleys and high rocky mountains of the Alps. Austria is one of the most geologically and biogeographically interesting European countries, and therefore it comes as no surprise that the publications on different species of Lepidoptera of this country started in the 18th century, for example the Gracillariidae from Austria being studied already by Fabricius (1798). After two hundred years, this interest in Austrian butterflies and moths is still very much alive. New molecular data, which recently became available, require correct species identification and accompanying taxonomic information, which can be provided only by standardised checklists. This book represents an updated, re-written, and taxonomically improved edition of the Austrian catalogue of Lepidoptera which was published two decades ago (Huemer & Tarmann 1993) and is adapted to the present-day purposes. The novelty of the 2013 edition is summarized on p. 15. A total of 4071 species, presently recorded from Austria, are listed, and 119 species are indicated either as false, ambiguous, or based on accidental records, so the community of lepidopterists is invited to cautiously re-evaluate and re-study these interesting cases. In contrast to many taxonomic catalogues, this systematic and faunistic checklist of Austrian Lepidoptera is the result of a huge collecting effort of generations of lepidopterists and it particularly demonstrates the great field experience of the author himself.

Furthermore, the faunistic data, presented in the form of a table divided per provinces of Austria, are based on voucher specimens deposited in the collection of the Tiroler Landesmuseum Ferdinandeum or associated collections in other museums, so these voucher specimens credit the checklist as a highly reliable reference source. Two new synonymisation acts (in Oecophoridae and Crambidae) are included in the book and one case of synonymy is revised (in Tortricidae). Nine species belonging to the families Gracillariidae, Oecophoridae, Gelechiidae, Elachistidae, Tortricidae, Geometriidae and Noctuidae are presented as new for the Austrian fauna.

The Checklist begins with colour plates containing 128 photographs of butterflies or moths in nature in their resting position. Usually such systematic-faunistic checklists are quite dull publications, so the inclusion of a subset of colourful and high-quality photographs makes this publication visually attractive. The systematic-faunistic checklist, which occupies a major part of the book (p. 32–203), follows van Nieukerken et al. (2011) for the classification of the lepidopteran families and Kaila et al. (2011) for the classification of the superfamily Gelechioidea and hypothesised phylogenetic relationships. The short introductory list of suborders, infraorders, clades and families is presented at the beginning of the chapter allowing the reader to easily spot these higher taxa in the faunistic table. However, for species one needs to look at the index first before trying to find them in the very long faunistic table. The species arrangement within the genera is not as handy for use of this checklist as one could wish. Probably it would have been easier for the reader to find species within the genera if they were arranged alphabetically. The determination of the phylogenetic position of alpine species of Lepidoptera is far from complete. We still lack a clear picture of relationships of species and numerous species complexes, especially in microlepidoptera, and despite the truly rapid advances in molecular techniques, the problems of specific relationships and species delimitations still fall on speculations in many cases, so the alphabetical order of the species within the genera might have its own advantages such as user-friendliness and easy finding of any species of interest.

Synonyms in the species group have been kept to a strict minimum and were subjectively chosen for those cases in which these names have been used often in earlier literature or when they were used as valid species names in the earlier version of the catalogue (Huemer & Tar-

mann 1993) either as species or subspecies. The author refers to the online world catalogues for a complete synonymy. Synonyms in the genus-group have been kept to a strict minimum as well. At the end of the book (p. 204–243), a comprehensive chapter Comments provides useful and interesting information on the taxonomic and/or distributional peculiarities of certain species indicated by the letter K in the systematic and faunistic checklist. The reference list (p. 244–261) is robust, non-abbreviated and gives a good overview of publications on the Austrian lepidopteran fauna. The book ends with the highly needed index.

To summarise, the author should be cordially thanked for sharing his extraordinary taxonomic and faunistic knowledge of Lepidoptera of his home country and congratulated for the impressive results. This checklist should be in the library of any lepidopterist interested in European Lepidoptera and especially in the libraries of those amateurs and professionals who spend their holidays in this beautiful country or collecting in the SEL study area, which is just across the Austrian border. The book is in German; however, I am very certain that this fact will not hinder any lepidopterist from buying it and admiring this meticulous work.

## References

Fabricius, J. C. 1798. Supplementum entomologiae systematicae. Hafniae, apud Proft et Storch: 480–572.

Huemer, P. & G. Tarmann 1993. Die Schmetterlinge Österreichs (Lepidoptera). Systematisches Verzeichnis mit Verbreitungsangaben für die einzelnen Bundesländer. – Veröffentlichungen des Tiroler Landesmuseums Ferdinandeum **73**: 1–224.

Kaila, L., M. Mutanen & T. Nyman 2011. Phylogeny of the mega-diverse Gelechioidea (Lepidoptera): adaptations and determinants of success. – Molecular Phylogenetics and Evolution **61**: 801–809.

Nieukerken, E. J. van, L. Kaila, I. J. Kitching, N. P. Kristensen, D. C. Lees, J. Minet, C. Mitter, M. Mutanen, J. C. Regier, T. J. Simonsen, N. Wahlberg, S.-H. Yen, R. Zahiri, D. Adamski, J. Baixeras, D. Bartsch, B. Å. Bengtsson, J. W. Brown, S. R. Bucheli, D. R. Davis, J. De Prins, W. De Prins, M. E. Epstein, P. Gentili-Poole, C. Gielis, P. Hättenschwiler, A. Hausmann, J. D. Holloway, A. Kallies, O. Karsholt, A. Kawahara, S. J. C. Koster, M. Kozlov, J. D. Lafontaine, G. Lamas, J.-F. Landry, S. Lee, M. Nuss, K. T. Park, C. Penz, J. Rota, B. C. Schmidt, A. Schintlmeister, J. C. Sohn, M. A. Solis, G. M. Tarmann, A. D. Warren, S. Weller, R. V. Yakovlev, V. V. Zolotuhin, & A. Zwick 2011. Order Lepidoptera Linnaeus, 1758. – *In*: Z.-Q. Zhang (ed.), Animal biodiversity: An outline of higher-level classification and survey of taxonomic richness. – Zootaxa **3148**: 212–221.

Jurate De Prins

**P. Leraut 2012. Moths of Europe, volume 3, Zygaenids, Pyralids 1 and Brachodids.** N. A. P. Editions, Verrièrres-le Buisson. ISBN 978-2-913688-15-5. Price: £79.99 plus shipping costs.

This book is an English translation from French of volume 3 of Les Papillons de nuit d'Europe – *Zygènes, Pyrales 1*. The present review deals only with the family Zygaenidae, as we understand that the section on pyralids is being dealt with by a specialist in that group.

Undoubtedly, as with volumes 1 and 2, this book is an excellent identification guide to the moths of Europe, based on the colour illustrations. However, the text is unfortunately marred by scientific error and misinformation, so that it would have benefited greatly, if it had been peer-reviewed by relevant specialists before publication. Moreover, in this respect, members of 'Groupe d'Information de Recherche et d'Animation sur les Zygaenidae – GIRAZ', a society formed by a dedicated team of French entomologists who specialise in making a specific study of the French zygaenid fauna, appear not to have been consulted.

While much of the information provided in the text is compilatory, regarding the Procridinae the now out-of-date *Forester Moths* (Efetov & Tarmann 1999) is the only publication that is cited in the references. However, many publications devoted to the taxonomy of this group have subsequently been published (Efetov 2001c, 2004, 2005; Efetov et al. 2003) but apparently are not referred to.

The characterisation of the Zygaenidae, as defined in this book (p. 41), has several shortcomings. For example, the Phaudinae is included as a subfamily, although quite recently (Nieukerken et al. 2011) it was placed as a family within the Zygaenoidea. All species of Zygaenidae have ocelli (not only in the Zygaeninae, as mentioned) and, together with the presence of the chaetosemata (not mentioned), are two of the most important characters of the family. The antenna of Zygaenidae is bipectinate, biserrate or simple with a clubbed terminal end and not only 'pectinate and club-shaped'. The labial palpi are prominently developed in the tribe Artonini (subfamily Procridinae), of medium length in the tribe Procridini and only in the Chalcosiinae and Zygaeninae are they 'weakly developed'.

The wing venation representing the Zygaeninae (apparently of a *Zygaena* species) is figured (p. 42, fig. 20) but, as there is no indication from which species the drawing was made, the impression is given that this character situation is constant in the Zygaeninae. This is incorrect as there are strong differences in some of the Zygaeninae (e.g., *Pryeria sinica* or *Epizygaenella caschmirensis*, see Alberti 1954: 445, pl. 44, figs 1 and 7, respectively). The same can be said about the figure of the wing venation of the Procridinae (genus *Jordanita*) (p. 43, fig. 21), as there are some important differences within this subfamily. In the case of *Jordanita*, for example in *J.* (*Roccia*) *naufocki*, veins $R_4$ and $R_5$ are stalked or connate in the forewing, while in the closely related species *J.* (*R.*) *tianshanica* (pl. 4, fig. 15) $R_4$ and $R_5$ arise separately from the cell (Efetov 1990: 11).

The description of the habitus of the Procridinae is misleading; it is incorrect to state that the forewing is 'usually narrow' (p. 42) and that most Procridinae 'have a uniform single-tone colouring'. In fact the habitus of Procridinae is very diverse. In Europe most species do have a uniform colouration with a submetallic sheen on the body and forewing upper side, but some of the tropical species can be very colourful with yellow, red and white spots and stripes, with green or blue metallic pattern, or even with almost completely translucent wings. The antennae in Procridinae are bipectinate in the male, bipectinate or biserrate in the female and only in the Central American genus *Pseudoprocris* do they consist of a simple flagellum without lateral extensions, thus forming a clubbed antenna as in *Zygaena*.

On page 54 it is stated that *Jordanita subsolana* belongs to the subgenus *Lucasiterna*, but *Ino subsolana* is the type-species of the subgenus *Solaniterna*; therefore the correct combina-

tion is *Jordanita* (*Solaniterna*) *subsolana* (Efetov 2004: 33, 119). *Jordanita graeca sultana* is cited (p. 55) as a valid subspecies, but this is a synonym under *J. graeca graeca* (Efetov 2001b: 156). It is stated (p. 61) that the larval host plant of *Adscita jordani* is unknown, but the larva feeds on *Rumex* species (Efetov & Tarmann 2003a, 2003c). It should have been mentioned on pages 63 and 64 that *Adscita bolivari* and *A. mannii* belong to the subgenus *Tarmannita* (Efetov 2000: 169). The larval host plants of *Adscita obscura* belong not only to the family Cistaceae, as mentioned on page 66, but also to the Rosaceae and Fabaceae (Tarmann & Tremewan 2001). On page 66 it is considered that *Adscita alpina* has two valid subspecies, viz. *A. alpina alpina* and *A. alpina italica*. However, Efetov & Tarmann (2000) have shown that *A. alpina* and *A. italica* are two well-differentiated species that have strong differences in the female genitalia. *Adscita italica* is found in central and southern Italy, whereas *A. alpina* is only found in the Alps, viz. south-eastern France, southern and south-eastern Switzerland, western Austria and northern Italy (Efetov & Tarmann 2000, 2003b). *Adscita* (*Zygaenoprocris*) *taftana* is briefly mentioned on page 67 but following the revision of the genus *Zygaenoprocris*, the current placement of this species is *Zygaenoprocris* (*Molletia*) *taftana* (Efetov 2001a: 45).

With regard to the distribution of Procridinae species, there are a number of errors. The map on page 47 implies that *Rhagades pruni* inhabits the whole of Spain, but it is found only in a very restricted area in the north-eastern part of the country (Efetov 2004: 14). *Adscita mannii* is regarded as highly local (p. 65), but in Italy, for example, it is widely distributed and even mass occurrences are sometimes found in many habitats. On page 66 it is stated that *Adscita krymensis* was first described in the Crimea and also reported from Ukraine (p. 66), but the species is known only from the Crimea (Efetov 2001c); moreover, the latter is part of southern Ukraine.

Of the 108 *Zygaena* species currently considered to be valid (Hofmann & Tremewan 2010), 63 are listed in the check-list on page 68, but it is rather puzzling that 36 of these are extra-limital to Europe. The criterion for such a selection is not given and it remains unclear why many European species are excluded, e.g., four European endemics (*Z. romeo*, *Z. rhadamanthus*, *Z. oxytropis*, *Z. anthyllidis*) and five species with a wide distribution in Europe, viz. *Z. osterodensis*, *Z. nevadensis*, *Z. filipendulae*, *Z. lonicerae* and *Z. ephialtes*. Moreover, *Z. mana* and *Z. alpherakyi*, two endemics to the Caucasus region and bio-elements of the fauna of the Russian territory, are also excluded. Generally speaking, one can say that the check-list is very poorly compiled, incomplete and inconsistent and without any systematic concept; moreover, it does not reflect the relevant literature (Tremewan 1988; Hofmann & Tremewan 1996: 187–219, 2010).

The arrangement of the genitalia figures is puzzling and it is unclear as to what the author is trying to do in this respect. For example, on page 71 the male genitalia of *Z. exulans*, *Z. minos* and *Z. purpuralis* are compared (the first-mentioned not closely related to the two last-mentioned species), while on page 73 the female genitalia of *Z. purpuralis*, *Z. minos* and *Z. youngi* are figured (the last-mentioned species not closely related to the former two and placed in a different subgenus).

With regard to the distribution of *Zygaena* species, the map on page 69 shows a single record of *Z. purpuralis* from Sicily; presumably this follows Naumann et al. (1984: 96). However, there are no authentic records of this species from the island and even Bertaccini & Fiumi (1999: 65) refer to the distribution map in Naumann et al. According to the distribution map on page 85, *Z. trifolii* occurs throughout Sicily but the species is only known from a few records from the vicinity of Syracusia (Hofmann et al. 1994: 43; Hofmann & Tremewan, 1996: 183). On page 92 it is stated that the Isle of Skye is the sole locality in Scotland for *Z. lonicerae*, but the species has spread during the last few years from northern England into the border counties of Scotland (Bland 2001). It is stated (p. 95) that *Z. nevadensis* possibly occurs in Italy near the frontier with

France, but there are no records of this species from that region. However, it was recently discovered in Calabria (Efetov et al. 2011), a record that has been overlooked in the book. *Zygaena exulans* is said to occur from 1000–3000 m.a.s.l., depending on latitude (p. 120), but in Scotland the species occurs at around 700–850 m, while in northern Scandinavia and the northern part of European Russia it is found near the sea level. *Pryeria sinica*, described from Japan with a distributional range from there to Taiwan, South Korea, China and the Far East of Russia, has recently been reported from Europe (England, Spain); however, it is erroneously stated (p. 123) that the species was originally from western Asia. The distribution of *Z. tamara* is cited as Turkey to Afghanistan but the most easterly known site for *Z. tamara* is in the vicinity of Semnan in the Iranian Alborz mountains and no records are known from further east and, of course, from Afghanistan (A. Hofmann, pers. obs.). For *Z. cambysea* it is stated 'Iran' but in fact this species is also widely distributed in eastern Turkey and Armenia and recorded from Azerbaijan and Iraq (Hofmann & Tremewan 1996). Although *Z. rosinae* (p. 250, pl. 13 fig. 9) is labelled 'Téhéran' (a city of 15 million inhabitants), its distribution is cited as Turkey and Caucasus. As far as Turkey is concerned, the distribution is peripheral and there are only a few records from Transcaucasia, its main occurrence being throughout Iran (A. Hofmann, pers. obs.).

With reference to cyanogenesis and the toxic properties found in the Zygaenidae, it would have been better to use the term 'glucosides' rather than heterosides (p. 44), the latter apparently referring to such compounds found in plants. Moreover, the use of glucoside is well established in the zygaenid literature, e.g., Franzl (1992). It is also stated that linamarin and lotaustralin are biosynthesized by the larvae, which is correct, but these compounds can also be sequestered by the larvae from their host-plants that contain them. On the same page it is stated that '... the caterpillars feed without really hiding themselves', which does apply to many species, but some only feed at dusk and dawn, e.g., those of *Z. transalpina* in Europe, while those of many species in the Middle East feed only at night (Hofmann & Tremewan pers. obs.).

In several places the word 'adrets', meaning 'southerly facing slopes', has been used, with reference to habitats; while 'adrets' is a geographical term acceptable in both French and English, it is rarely if ever used in the latter language and is not included in many English dictionaries.

Greater consistency in the botanical nomenclature would have been desirable. The host plant for Z. *angelicae* is cited as *Coronilla varia* (p. 107), but five pages before it is stated that *Z. ephialtes* lives on *Securigera varia* (the correct combination); one of these two names should also have been mentioned as the host plant of '*Z. hippocrepidis*' (p. 106), which in this book is separated as a valid species from *Z. transalpina*, a placement that is not generally accepted by most *Zygaena* specialists (Hofmann & Tremewan 1996). On page 93 it is stated that a larval host plant for *Z. romeo* is *Trifolium montanum*, but there are no authentic records of the larva of this species ever feeding on this plant or on any members of the genus *Trifolium*.

The flight period of *Z. sedi* is stated to be exclusively May (p. 85), but in the Crimea (Ukraine) the species occurs from the end of May to the beginning of July (Efetov 2005: 170), in Greece it flies from mid-June to the beginning of July and in Turkey from the end of June to mid-July (A. Hofmann & W. G. Tremewan pers. obs.). It is considered that the flight period of *Z. occitanica* is mainly in July (p. 112), but it emerges in many localities (e.g., eastern and southern Spain) in mid-May and its flight period is already over before the end of June; moreover, in the vicinity of Almería it is even found at the end of April (A. Hofmann & W. G. Tremewan pers. obs.).

On a positive note, the reproduction of the photographs of most of the *Zygaena* adults is good and the figures should enable anyone to identify any specimens (if correctly determined by Leraut) that they might encounter except for those that need to be dissected. Even then, the specimens are obviously figured at different scales, e.g., *Z. zuleima* (p. 248, pl. 12 fig. 14) is seemingly larger than *Z. truchmena* and *Z. persephone*. The same can be said about *Z. nevadensis* (p. 265,

pl. 20 figs 6–13), for example, the figures being reproduced almost as large as *Z. lavandulae* or *Z. theryi*. In those depicting the Procridinae, the shadow on the right hand side of the specimens is somewhat distracting and gives not only the impression of an unfocused picture but also extends the proportions optically. In this respect, the line drawings of the genitalia should help, but unfortunately these are so finely drawn and reproduced so small that many critical characters are not readily visible. For example, those purporting to illustrate the lamina dorsalis of *Z. minos* and *Z. purpuralis* (p. 71) are inadequate and do not show the diagnostic characters clearly.

This English translation has many typographical and/or translation errors. To give only a few examples, 'reticulum' for retinaculum (p. 41), 'Nedblstreif' for Nebelstreif (p. 103), 'Bade-Wurtemberg' for Baden-Württemberg' (p. 107); such shortcomings are also found in some of the scientific names, e.g. *Z. loyselis* '*unguemachi*' for *Z. loyselis ungemachi* (p. 248).

## References


Alberti, B. 1954. Über die stammesgeschichtliche Gliederung der Zygaenidae nebst Revision einiger Gruppen (Insecta, Lepidoptera). – Mitteilungen aus dem Zoologischen Museum der Humboldt-Universität Berlin **30**: 115–480, pls 1–62.

Bertaccini, E. & G. Fiumi 1999. Bombici e Sfingi d'Italia **3** (Lepidoptera Zygaenidae). – Giuliano Russo Editore, Monterenzio. 160 pp., 13 pls, text-figs, distr. maps.

Bland, K. P. 2001. A new site for *Zygaena lonicerae latomarginata* Tutt, 1899 (Lepidoptera: Zygaenidae) in Scotland. – Entomologist's Gazette **52**: 70.

Efetov, K. A. 1990. A new species of the genus *Adscita* (Lepidoptera, Zygaenidae) from the Middle Asia. – Vestnik Zoologii **1990** (4): 8–11, figs 1–4.

Efetov, K. A. 2000. A new subgenus of the genus *Adscita* Retzius, 1783 (Lepidoptera: Zygaenidae, Procridinae). – Tavricheskiy mediko-biologicheskiy Vestnik **3** (1–2): 168–174, figs 1–12.

Efetov, K. A. 2001a. On the systematic position of *Zygaenoprocris* Hampson, 1900 (Lepidoptera: Zygaenidae, Procridinae) and the erection of two new subgenera. – Entomologist's Gazette **52**: 41–48, figs 1–15.

Efetov, K. A. 2001b. An annotated check-list of Forester moths (Lepidoptera: Zygaenidae, Procridinae). – Entomologist's Gazette **52**: 153–162, figs 1–5.

Efetov, K. A. 2001c. A Review of the Western Palaearctic Procridinae (Lepidoptera: Zygaenidae). – Simferopol. 328 pp., col. frontispiece, 98 text-figs, 44 monochrome, 29 col. pls.

Efetov, K. A. 2004. Forester and Burnet moths (Lepidoptera: Zygaenidae). The genera *Theresimima* Strand, 1917, *Rhagades* Wallengren, 1863, *Zygaenoprocris* Hampson, 1900, *Adscita* Retzius, 1783, *Jordanita* Verity, 1946 (Procridinae), and *Zygaena* Fabricius, 1775 (Zygaeninae), 272 pp., col. frontispiece, 183 figs, 1 col. pl. Simferopol.

Efetov, K. A. 2005. The Zygaenidae (Lepidoptera) of the Crimea and other regions of Eurasia, 420 pp., col. frontispiece, 78 figs, 27 monochrome, 32 col. pls, distr. maps. Simferopol.

Efetov, K. A. & G. M. Tarmann 1999. *Forester Moths*: The genera *Theresimima* Strand, 1917, *Rhagades* Wallengren, 1863, *Jordanita* Verity, 1946, and *Adscita* Retzius, 1783 (Lepidoptera: Zygaenidae, Procridinae). – Apollo Books, Stenstrup. 192 pp., figs 1–415, 12 col. pls.

Efetov, K. A. & G. M. Tarmann 2000. On the systematic position of *Procris alpina italica* Alberti, 1937, and *Procris storaiae* Tarmann, 1977 (Lepidoptera: Zygaenidae, Procridinae). – Tavricheskiy mediko-biologicheskiy Vestnik **3** (1–2): 161–167, figs 1–8.

Efetov, K. A. & G. M. Tarmann 2003a. On the systematic position of *Adscita bolivari* (Agenjo, 1937) and *Adscita jordani* (Naufock, 1921) (Lepidoptera: Zygaenidae, Procridinae). Pp. 6569, figs 1–5. – *In*: K. A. Efetov, W. G. Tremewan & G. M. Tarmann (eds), Proceedings of the 7th International Symposium on Zygaenidae (Lepidoptera), Innsbruck (Austria), 4–8 September 2000: 360 pp., col. frontispiece, text-figs. Simferopol.

Efetov, K. A. & G. M. Tarmann 2003b. On the biology and distribution of *Adscita* (*Adscita*) *alpina* (Alberti, 1937), *A.* (*A.*) *italica italica* (Alberti, 1937) and *A.* (*A.*) *italica storaiae* (Tarmann, 1977) (Lepidoptera: Zygaenidae, Procridinae). – *In*: T. Keil (ed.), VIII International Symposium on Zygaenidae, Dresden, 10–14 September 2003: 1415.

Efetov, K. A. & G. M. Tarmann 2003c. New data on the biology of *Adscita* (*Adscita*) *jordani* (Naufock, 1921) (Lepidoptera: Zygaenidae, Procridinae). – *In*: T. Keil (ed.), VIII International Symposium on Zygaenidae, Dresden, 10–14 September 2003: 16.

Efetov, K. A., G. M. Tarmann & W. G. Tremewan 2011. *Zygaena nevadensis* Rambur, 1858 (Lepidoptera: Zygaenidae, Zygaeninae) newly recorded from the southern tip of the Penisola Appenninica (Apennine Peninsula), Italy. – Entomologist's Gazette **62**: 123–129, figs 1–5.

Efetov, K. A., W. G. Tremewan & G. M. Tarmann (eds) 2003. Proceedings of the 7th International Symposium on Zygaenidae (Lepidoptera), Innsbruck (Austria), 4–8 September 2000: 360 pp., col. frontispiece, text-figs. – Simferopol.

Franzl, S. 1992. Synthesis, transport and storage of cyanogenic glucosides in larvae of *Zygaena trifolii* (Esper, 1783) (Lepidoptera: Zygaenidae). Pp. 21–37, text-figs 1–6, pls 1–3. – *In*: C. Dutreix, C. M. Naumann & W. G. Tremewan (eds), Proceedings of the 4th Symposium on Zygaenidae, Nantes 11–13 September 1987. Recent advances in burnet moth research (Lepidoptera: Zygaenidae). – Theses zoologicae **19**: 193 pp., 6 pls.

Hofmann, A., G. Reiss & W. G. Tremewan 1994. Preliminary notes on the *Zygaena* Fabricius, 1777, fauna of Tunisia (Lepidoptera: Zygaenidae): part 2. – Entomologist's Gazette **45**: 39–51, figs 1–7.

Hofmann, A. & W. G. Tremewan 1996. A systematic Catalogue of the Zygaeninae (Lepidoptera: Zygaenidae). – Harley Books, Colchester. 251 pp.

Hofmann, A. & W. G. Tremewan 2010. A revised check-list of the genus *Zygaena* Fabricius, 1775 (Lepidoptera: Zygaenidae, Zygaeninae), based on the biospecies concept. – Entomologist's Gazette **61**: 119–131.

Naumann, C. M., R. Feist, G. Richter & U. Weber 1984. Verbreitungsatlas der Gattung *Zygaena* Fabricius, 1775 (Lepidoptera, Zygaenidae). – Theses zoologicae **5**: 1–45, text-fig., maps 1–97.

Nieukerken, E. J. van, L. Kaila, I. J. Kitching, N. P. Kristensen, D. C. Lees, J. Minet, C. Mitter, M. Mutanen, J. C. Regier, T. J. Simonsen, N. Wahlberg, S.-H. Yen, R. Zahiri, D. Adamski, J. Baixeras, D. Bartsch, B. Å. Bengtsson, J. W. Brown, S. R. Bucheli, D. R. Davis, J. De Prins, W. De Prins, M. E. Epstein, P. Gentili-Poole, C. Gielis, P. Hättenschwiler, A. Hausmann, J. D. Holloway, A. Kallies, O. Karsholt, A. Kawahara, S. J. C. Koster, M. Kozlov, J. D. Lafontaine, G. Lamas, J.-F. Landry, S. Lee, M. Nuss, K. T. Park, C. Penz, J. Rota, B. C. Schmidt, A. Schintlmeister, J. C. Sohn, M. A. Solis, G. M. Tarmann, A. D. Warren, S. Weller, R. V. Yakovlev, V. V. Zolotuhin, & A. Zwick 2011. Order Lepidoptera Linnaeus, 1758. – *In*: Z.-Q. Zhang (ed.), Animal biodiversity: An outline of higher-level classification and survey of taxonomic richness. – Zootaxa **3148**: 212–221.

Tarmann, G. M. & W. G. Tremewan 2001. Notes on the biology and ecology of *Adscita* (*Adscita*) *obscura* (Zeller, 1847) (Lepidoptera: Zygaenidae, Procridinae). – Entomologist's Gazette **52**: 91–99, figs 1–9.

Tremewan, W. G. 1988. A Bibliography of the Zygaeninae (Lepidoptera: Zygaenidae) – Harley Books, Colchester. 188 pp.

K. A. Efetov, A. Hofmann, G. M. Tarmann & W. G. Tremewan