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REVIEW OF THE MYMARIDAE (HYMENOPTERA, CHALCIDOIDEA) OF PRIMORSKII KRAI: GENUS *ERYTHMELUS* ENOCK, WITH TAXONOMIC NOTES ON SOME EXTRALIMITAL SPECIES

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Seventeen named and one unnamed species of the fairyfly genus *Erythmelus* Enock, 1909 are classified into two subgenera: *Erythmelus* and *Parallelaptera* Enock, 1909; the nominotypical subgenus is divided into three species groups (*agilis*, *flavovarius*, *helopeltidis*). *E. (E.) kostjukovi* **sp. n.** (Krasnodarskii krai, Russia), *E. (E.) magnus* **sp. n.** (Primorskii krai, Russia), *E. (E.) nuinu* **sp. n.** (Primorskii krai, China, Republic of Korea), *E. (E.) vanheldeni* **sp. n.** (France, Italy, Spain), and *E. (E.) reductus* **sp. n.** (Colombia) are described and illustrated, *E. (E.) tingitiphagus* (Soares, 1941) is redescribed. The following new synonymies are proposed: *Erythmelus* Enock, 1909 = *Erythmelellus* Viggiani et Jesu, 1985, **syn. n.**; *E. (E.) flavovarius* (Walker, 1846) = *E. goochi* Enock, 1909, **syn. n.**, *E. dichromocnemus* Novicky, 1953, **syn. n.,** and *E. spinosus* Mathot, 1969, **syn. n.**; *E. (E.) agilis* (Enock, 1909) = *Enaesius limburgensis* Soyka, 1932, **syn. n.**; *E. (P.) panis* (Enock, 1909) = *Parallelaptera foucarti* Mathot *in* Demaire, 1973, **syn. n.**, and *P. panchama* Subba Rao, 1989, **syn. n.**; *E. (P.) rex* (Girault, 1911) = *E. margianus* S. Trjapitzin, 1993, **syn. n.** Keys to the females of eleven Palaearctic species of the subgenus *Erythmelus* and five world species of the subgenus *Parallelaptera* are given.

KEY WORDS: Hymenoptera, Mymaridae, *Erythmelus*, taxonomy.

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Восемнадцать видов рода *Erythmelus* Enock, 1909 рассматриваются в двух подродах: *Erythmelus* и *Parallelaptera* Enock, 1909; внутри номинативного подрода выделено 3 группы видов (*agilis*, *flavovarius*, *helopeltidis*). Описываются и иллюстрируются *E. (E.) kostjukovi* **sp. n.** (Краснодарский край, Россия), *E. (E.) magnus* **sp. n.** (Приморский край, Россия), *E. (E.) nuinu* **sp. n.** (Приморский край, Китай, Республика Корея), *E. (E.) vanheldeni* **sp. n.** (Франция, Италия, Испания) и *E. (E.) reductus* **sp. n.** (Колумбия), а *E. (E.) tingitiphagus* (Soares, 1941) переописывается. Предложена новая синонимия: *Erythmelus* Enock, 1909 = *Erythmelellus* Viggiani et Jesu, 1985, **syn. n.**; *E. (E.) flavovarius* (Walker, 1846) = *E. goochi* Enock, 1909, **syn. n.**, *E. dichromocnemus* Novicky, 1953, **syn. n.**, *E. spinosus* Mathot, 1969, **syn. n.**; *E. (E.) agilis* (Enock, 1909) = *Enaesius limburgensis* Soyka, 1932, **syn. n.**; *E. (P.) panis* (Enock, 1909) = *Parallelaptera foucarti* Mathot *in* Demaire, 1973, **syn. n.**, *P. panchama* Subba Rao, 1989, **syn. n.**; *E. (P.) rex* (Girault, 1911) = *E. margianus* S. Trjapitzin, 1993, **syn. n.** Дается определительная таблица (по самкам) 11 палеарктических видов подрода *Erythmelus* и 5 видов подрода *Parallelaptera*.

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INTRODUCTION

The fairyfly genus *Erythmelus* is one of the more speciose, "large" genera of Mymaridae, with 54 species including the new ones described herein. It is cosmopolitan in distribution and quite common, especially in warm, dry habitats. The trustworthy host records of *Erythmelus* are from eggs of Heteroptera mainly Miridae and Tingidae, some of which are well-known agricultural pests. Therefore, members of *Erythmelus* can potentially be important for classical or augmentative biological control programs against some of these pests, although probably they play a much larger role as native regulators of the population densities of their hosts. However, the biology of *Erythmelus* species is practically unknown besides the scarce information about their host associations. It seems that most species of *Erythmelus* are oligophagous, usually parasitizing a narrow to broad range of the hosts within the same family. Therefore, it is not surprising that distribution ranges of most *Erythmelus* species are quite wide.

Taxonomy of *Erythmelus* at the specific level has been in flux. Besides a few, regional keys to some of the described taxa, mainly in the subgenus *Parallelaptera* Enock, 1909, there are no taxonomic keys for the species of *Erythmelus*. This is the first attempt to redefine the genus and its subgenera, thus bringing nomenclatural stability, as well as to revise the subgenus *Parallelaptera* of the world and the Palaearctic species of the nominotypical subgenus. The species of *Erythmelus* s. str. outside of the Palaearctic region are yet to be revised. While dealing with the Old World species of the subgenus *Erythmelus* could be relatively easy if all the type specimens of the described taxa were available, revising the species in the New World will be a challenge. First, the type material of the species described earlier by Dozier (1932, 1937), Ogloblin (1934) and others must be carefully studied (at least a few synonymies among them are imminent because some species were based on females, and the other on males). Then hundreds of freshly collected specimens must be sorted to morphospecies, and exemplars will need to be slide-mounted and compared with the already described species, including those from the Old World. The description of *E. reductus* sp. n. and the redescription of *E. tingitiphagus* (Soares, 1941), both from South America, are included in this review only because they are important for broadening of the diagnosis of *Erythmelus.*

Collection and preservation methods of the material from Primorskii krai were described by Triapitsyn & Berezovskiy (2001). Terms for morphological features are those of Gibson (1997). All measurements are given in micrometers (µm), as length or, where necessary, as length/width. Abbreviations used are: F = funicle segment of the female antenna or flagellomere of the male antenna; MT = Malaise trap; YPT = yellow pan trap. New distribution records are asterisked (*).

Acronyms for depositories of specimens are as follows: BMNH, Natural History Museum, London, England, UK; CAS, California Academy of Sciences, San Francisco, California, USA; CNCI, Canadian National Collection of Insects, Ottawa, Ontario, Canada; EMEC, Essig Museum of Entomology, University of California, Berkeley, California, USA; FSCA, Florida State Collection of Arthropods, Gainesville, Florida, USA; ENITA, ENITA de Bordeaux, Gradignan, France; HNHM, Hungarian Natural History Museum, Budapest, Hungary; IBPV, Institute of Biology and Pedology, Vladivostok, Russia; IEAP, Istituto di Entomologia Agraria dell'Universita di Napoli, Portici, Italy; IEFA, E. Chiappini collection, Istituto di Entomologia e Patologia Vegetale, Universita Cattolica del Sacro Cuore, Piacenza, Italy; INHS, Illinois Natural History Survey, Champaign, Illinois, USA; ISNB, Institut Royal des Sciences Naturelles de Belgique, Brussels, Belgium; LACM, Natural History Museum of Los Angeles County, Los Angeles, California, USA; MNMS, Museo Nacional de Ciencias Naturales, Madrid, Spain; MZHF, Zoological Museum, Finnish Museum of Natural History, Helsinki, Finland; NHMW, Naturhistorisches Museum Wien, Vienna, Austria; SPLK, Systematic Parasitoid Laboratory, Plant Protection and Soil Conservation Station of Vas County, Kцszeg, Hungary; UCRC, University of California, Riverside, California, USA; USNM, National Museum of Natural History, Washington, D.C., USA; ZIN, Zoological Institute, Russian Academy of Sciences, St. Petersburg, Russia; ZMUC, Zoological Museum, University of Copenhagen, Copenhagen, Denmark; ZMUN, Zoological Museum, University of Oslo, Oslo, Norway.

Genus *Erythmelus* Enock, 1909

Parallelaptera Enock, 1909: 454 (type species: *Parallelaptera panis* Enock, 1909, Woking, England, by monotypy). Synonymized under *Erythmelus* by Schauff, 1984: 45.

Erythmelus Enock, 1909: 454 (type species: *Erythmelus goochi* Enock, 1909, Holloway, London, England, by monotypy); Schauff, 1984: 45; Yoshimoto, 1990: 45; Hayat, 1992: 88; Beardsley & Huber, 2000: 13; Triapitsyn & Huber, 2000: 613.

Enaesius Enock, 1909: 456 [type species: *Enaesius agilis* Enock, 1909, Woking, England; designated by Gahan & Fagan (1923: 50)]. Treated as a subgenus of *Erythmelus* s. str. by Debauche, 1948: 193, 197; *de facto* synonymized under *Erythmelus* by Schauff, 1984: 45.

Anthemiella Girault, 1911: 187 (type species: *Anthemiella rex* Girault, 1911, Urbana, Illinois, USA, by original designation). Synonymized under *Erythmelus* by Schauff, 1984: 45.

Eurythmelus: Ogloblin, 1934: 243 (lapsus).

Erythmelellus (as a subgenus of *Erythmelus*) Viggiani et Jesu, 1985: 487 (type species: *E. lygivorus* Viggiani et Jesu, 1985, Papiano, Perugia, Italy, by original designation).

DIAGNOSIS. Head very short in dorsal and lateral views, with gena extremely narrow behind eye; preorbital and supraorbital trabeculae appear as "broken" lines in slide-mounted specimens; mandible without teeth, reduced to a small stub; funicle of female antenna 5- or 6-segmented, very rarely 4-segmented; flagellum of male antenna 10- or 11-segmented, very rarely 9-segmented; pronotum and propodeum mediolongitudinally divided, scutellar placoid sensilla very close to each other and touching the transscutal articulation, dorsellum distinct and more or less projecting over propodeum as a small triangular lobe; tarsi 4-segmented; metasoma subsessile (petiole in dorsal view notably wider than long, more or less conspicuous in slide-mounted specimens); female gaster with a long and conspicuous hypopygium that is much larger than preceding sterna, male genitalia often exserted in dead specimens.

COMMENTS. Both sexes of *Erythmelus* are usually easily recognizable and can be distinguished from other Palaearctic Mymaridae using the generic key by Triapitsyn & Huber (2000). Females of *Erythmelus* have the metasoma with a long and conspicuous hypopygium, which is much larger than the preceding sterna (Huber, 1997). Males of *Erythmelus* are also quite distinct as their genitalia often extend nearly the length of the entire gaster and project out in dead specimens (Schauff, 1984). Both sexes of this genus lack mandibular teeth (the mandible is reduced to a minute stub) and the metanotum has a distinct dorsellum that more or less projects over the propodeum as a small triangular lobe (Huber, 1997).

The nomenclatural history of *Erythmelus* was clarified by Graham (1982) who gave detailed comments on the genus *Panthus* Walker, 1846. With some good arguments, he abstained from synonymizing *Erythmelus* under *Panthus*. Enock (1909) described the genera *Parallelaptera* and *Erythmelus* in that order on the same page. As the first reviewer, Schauff (1984) justifiably synonymized *Parallelaptera* under *Erythmelus*, which is the larger and better known genus. However, some authors did not accept this synonymy and preferred to treat *Parallelaptera* as a separate genus (Viggiani, 1988, 1989; Subba Rao, 1989; Viggiani & Jesu, 1988). Subba Rao (1989) formally reinstated *Parallelaptera* as a valid genus, but later Hayat (1992) noted that

Subba Rao's action was a mistake and transferred his Indian species of *Parallelaptera* to *Erythmelus*. Trjapitzin (1993) and Triapitsyn & Huber (2000) treated the species of *Parallelaptera* as members of the *panis* species group in *Erythmelus*. Finally, Beardsley & Huber (2000) classified the Hawaiian species of *Erythmelus* into two subgenera, *Erythmelus* s. str. and *Parallelaptera*, thus formalizing such a subdivision. I accept their viewpoint and provide the diagnoses for both subgenera. With such an arrangement, however, there is no proper place left within *Erythmelus* for the subgenus *Erythmelellus*; therefore it is synonymized herein under the nominotypical subgenus. The species comprising *Erythmelellus* at most form a species group within *Erythmelus*, called here the *helopeltidis* group.

The position of *Erythmelus* within the higher classification of Mymaridae and its relationships with other genera were discussed by Schauff (1984). Viggiani (1988b) placed *Erythmelus* and *Parallelaptera* in the tribe *Erythmelini* Viggiani, 1988 of the subfamily Mymarinae based solely on the external male genitalic characters; however, because the current higher classification of Mymaridae is not natural, it would be premature to comment here on the proper placement of *Erythmelus* within the family.

Key to the subgenera of *Erythmelus* and the species groups of *Erythmelus* s. str.

1. Funicle of female antenna usually 5-segmented, very rarely 4-segmented; flagellum of male antenna 10-segmented and F2 much shorter than F1 or F3 (Figs 53, 57); forewing with margins almost parallel, about as wide at apex of the marginal vein as at the broadest part of the disc (Figs 52, 56) . . . . Subgenus *Parallelaptera*

– Funicle of female antenna usually 6-segmented, very rarely 5-segmented; flagellum of male antenna usually 11-segmented, rarely 9- or 10-segmented and F2 about as long as F1 or F3; forewing with margins not parallel (except subparallel in *E. reductus* sp. n.), usually much wider at the broadest part of the disc than at apex of the marginal vein. (Subgenus *Erythmelus*) 2

2. Female antenna slender, with all funicle segments cylindrical and more or less subequal in length (Figs 1, 2, 5, 8), F1 about as long as pedicel or slightly shorter; most of forewing disc setose (Figs 3, 6, 9, 12, 15) . . . . the ***agilis*** species group

– Female antenna more compact, at least some funicle segments of contrastingly different lengths (F6 usually the longest), F1 usually notably shorter than pedicel; forewing disc usually with an extensive bare area (Figs 18, 22, 25, 41, 44, 47, 49) 3

3. Ovipositor relatively short, without a large basal loop; male genitalia simple (Fig. 26) . . . . the ***flavovarius*** species group

– Ovipositor relatively long, with a large basal loop; male genitalia complex (Figs 48, 50) . . . . the ***helopeltidis*** species group

Subgenus *Erythmelus* Enock, 1909

Erythmelus Enock, 1909: 454; Debauche, 1948: 192; Kryger, 1950: 58-59; Annecke & Doutt, 1961: 18; Hellén, 1974: 28; Trjapitzin, 1978: 527.

Erythmelus (as a subgenus of *Erythmelus*): Beardsley & Huber, 2000: 14.

Enaesius Enock, 1909: 456; Kryger, 1950: 55, 57.

Erythmelellus (as a subgenus of *Erythmelus*) Viggiani et Jesu, 1985: 487, **syn. n.**

DIAGNOSIS. Female funicle usually 6-segmented, sometimes 5-segmented (mainly in very small individuals or, more frequently, in minute species that parasitize eggs of Tingidae) due to either an occasional loss of a funicle segment (Fig. 33) or, more often, to a complete or partial fusion of any two neighboring funicle segments (Figs 43, 37-39); female clava with 5 or 6 longitudinal sensilla; male flagellum usually 11-segmented, rarely 9-segmented (Fig. 30) or 10-segmented (Fig. 11d, pl. 5 in Soares, 1941), with all flagellomeres more or less subequal in length (F2 about as long as F1 or F3); forewing with margins not parallel (except forewing margins subparallel in *E. reductus* sp. n., fig. 28), usually much wider at the broadest part of the disc than at apex of the marginal vein; petiole wider than long, conspicuous in slide-mounted specimens; male genitalia either relatively simple (Figs. 26, 31, 35, 36) or more complex (Figs. 13, 14, 48, 50).

Species of *Erythmelus* s. str. are generally small to medium-size (body length of most species is more than 0.5 mm, and some are 1.0 mm long or a little more). The reliable host records are from eggs of Miridae and Tingidae (Heteroptera).

COMMENTS. Debauche (1948) divided the genus *Erythmelus*, treated here as the subgenus *Erythmelus*, into two subgenera: *Erythmelus* s. str., treated here as the *flavovarius* species group, and *Enaesius*, treated here as the *agilis* species group.

Key to the Palaearctic species, females

1. Antenna relatively slender, all funicle segments distinctly cylindrical and more or less subequal in length (F4 or F6 may be slightly longer), F1 about as long as pedicel or slightly shorter (Figs 1, 2, 5, 8) 2
– Antenna relatively compact, funicle segments of various length, F6 much longer than any of the basal 4 funicle segments, F1 much shorter than pedicel (Figs 17, 20, 21, 40, 42, 43) 7
2. F4 without longitudinal sensilla . . . . 11. ***E. angelovi***
– F4 with 1 or 2 longitudinal sensilla (Figs 1, 2, 5, 8) 3
3. F5 with 2 longitudinal sensilla (Fig. 1) . . . . 1. ***E. soykai***
– F5 without longitudinal sensilla 4
4. Forewing (Fig. 3) narrow (length/width ratio 7.7-8.2), with disc strongly infuscated . . . . 2. ***E. vanheldeni* sp. n.**
– Forewing wide (length/width ratio less than 6.0), with disc either hyaline or only slightly infuscated 5
5. Ovipositor long (ovipositor/metatibia ratio about 1.7) . . . . 3. ***E. magnus* sp. n.**
– Ovipositor short (ovipositor/metatibia ratio 0.9-1.3) 6
6. Forewing (Fig. 9) narrow (length/width ratio 4.3-5.3); longest marginal cilia about 1.0 x maximal forewing width . . . . 4. ***E. agilis***
– Forewing (Fig. 15) wide (length/width ratio 4.0); longest marginal cilia 0.7 x maximal forewing width . . . . 5. ***Erythmelus* sp.**
7. F5 with 2 longitudinal sensilla (Fig. 17) . . . . 6. ***E. kostjukovi* sp. n.**
– F5 without longitudinal sensilla 8

8. Ovipositor short (ovipositor/metatibia ratio much less than 2.0), without a basal loop 9
– Ovipositor long (ovipositor/metatibia ratio 2.0 or more), with a conspicuous basal loop 10
9. Midlobe of mesoscutum usually bicolored: its anterior half brown to dark brown and its posterior half yellow to light brown; F2-F5 clearly longer than wide (Figs 20, 21) . . . . 7. ***E. flavovarius***
– Midlobe of mesoscutum mostly uniformly brown except for a median transverse stripe, which is slightly lighter (light brown); F2-F5 about as long as wide . . . . 8. ***E. israeliensis***
10. Forewing disc more uniformly setose at apex (Fig. 41); first gastral tergum contrastingly brown basally and yellow or light brown distally . . . . 12. ***E. lygivorus***
– Forewing disc less uniformly, more sparsely, setose at apex (Fig. 44); first gastral tergum entirely white or pale . . . . 13. ***E. nuinu* sp. n.**

The *agilis* species group

DIAGNOSIS. This species group includes mostly "larger" species (about 1 mm long), some of which were formerly placed in the genus (or subgenus) *Enaesius*. It is characterized by a relatively slender female antenna, with all funicle segments distinctly cylindrical and more or less subequal in length, and with F1 at least 0.7 length of the pedicel (Figs 1, 2, 5, 8), as well as by the forewing disc usually with numerous microtrichia, more or less uniformly setose in the apical half (Figs 3, 6, 9, 12, 15). The petiole is the most conspicuous among the species groups of subgenus *Erythmelus*. The male genitalia of *E. agilis* (Fig. 13, 14), the only species from this group for which males are known, are rather complex and possess sclerotized processes on the parameres, thus structurally resembling those of the *helopeltidis* group species (Figs 48, 50).

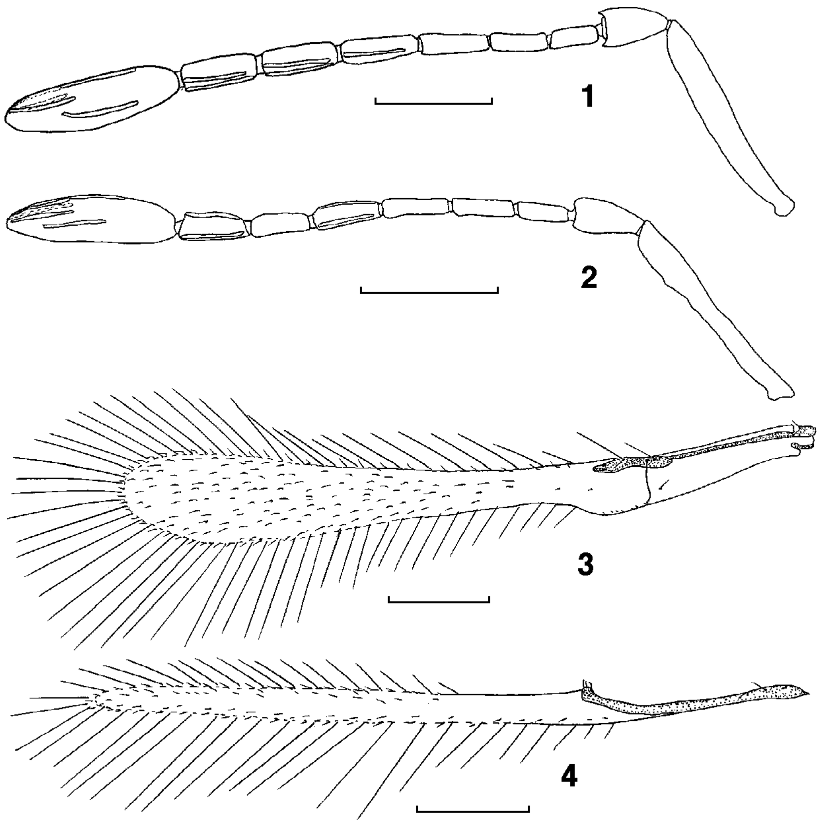
SPECIES INCLUDED. *E. agilis*, *E. magnus* sp. n., *E. soykai*, *E. vanheldeni* sp. n., and *Erythmelus* sp.

COMMENTS. This is the least studied species group within *Erythmelus* s. str., and its relationships to the other two groups remain unclear.

1. *Erythmelus* (*Erythmelus*) *soykai* Donev, 1998
Fig. 1

Erythmelus soykai Donev, 1998: 185 (holotype - ♀, Hundsheim, Austria [ISNB], not examined).

MATERIAL. **Austria**: Lower Austria, Hundsheim, 16.VII 1943, W. Soyka, 1♀ [EMEC]. **Hungary**: Sopron, Canyon in Sopron Mountains, 19.VI 1992, C. Thuróczy, 2♀ [SPLK]. **Kyrgyzstan**: Chuy, Karagajly-Bulak, 9 km W Ak-Tyuz, 42°52'47"N, 76°02'13"E, 2180-3400 m, 26.VII 2000, C.H. Dietrich, 1♀; Dzhalal-Abad, near junction Kara Kysmak and Chatcal River, 42°04'00"N, 71°35'41"E, 2240 m, 18.VI 1999, C.H. Dietrich, 1♀ [UCRC].



Figs 1-4. 1) *Erythmelus* (*Erythmelus*) *soykai*, ♀, Hundsheim, Lower Austria, antenna; 2-4) *E.* (*E.*) *vanheldeni* sp. n., holotype, ♀: 2) antenna, 3) forewing, 4) hind wing. Scale bars = 0.1 mm.

DIAGNOSIS. It is easily recognizable by the female antenna (Fig. 1) having 1 longitudinal sensillum on F4 and 2 longitudinal sensilla on both F5 and F6; the clava bears 5 longitudinal sensilla. I can add to description the ovipositor/metatibia ratio (1.2-1.3).

The head and body color of the dry-mounted female specimen from Kyrghyzstan is very dark brown except as follows: ocelli pale, eye dirty pink; antenna brown, pedicel and inner surface of scape slightly lighter; mesoscutum with a transverse, narrow, light brown median band; forewing infuscated behind venation, otherwise hyaline, venation dusky; legs unevenly colored, light to dark brown; basal 2/5 of gaster yellow, hypopygium dusky.

This species is known from the female sex only.

DISTRIBUTION. Austria, *Hungary, *Kyrgyzstan.

HOSTS. Unknown.

COMMENTS. The specimen from Austria bears similar label data to that of the holotype and paratype of *E. soykai* (Donev, 1998), but is not part of the type series.

2. *Erythmelus* (*Erythmelus*) *vanheldeni* S. Triapitsyn, sp. n.
Figs 2-4

MATERIAL. Holotype - ♀ (on slide) [UCRC]: **France**, Département Gironde, Sainte Colombe (nr. Castillon-la-Bataille), 44°54'N, 00°02'W, 2.VII 1998, M. van Helden, MT. Paratypes - France: same locality and collector as the holotype, 2.VII 1998, 1♀ on point; 30.VII 1998, 1♀ on point; 9.VII 1999, 1♀ on slide and 1♀ on point; 17.VIII 2000, 1♀ on card [ENITA, UCRC]; Département Hérault, Montpellier, C.N.R.S. Research Station, 3-9.II 1980, J.T. Huber, 1♀ on point. **Italy**: Sardinia, Tempio (Cusseddu), 3-10.VII 1978, 1♀ on point [CNCI]. **Spain**: Madrid, El Ventorillo, 1480 m, 3-9.VII 1988, Garrido, 1♀ on point [MNMS].

DESCRIPTION. FEMALE (holotype and paratypes). Color. Body dark brown except as follows: eyes and ocelli dirty pink, pedicel light brown, mesoscutum with a lighter, narrow, transverse, median band; appendages brown.

Head. Rounded and about as high as wide in anterior view, as broad as mesosoma. Vertex with a faint transverse sculpture; face and gena very lightly sculptured.

Antenna (Fig. 2). Scape almost smooth, slightly constricted medially, about 7 x as long as wide; pedicel a little longer than F1; all funicle segments cylindrical and subequal in length (F4 the longest), F1, F2, F3, and F5 without longitudinal sensilla, F4 with 1 or 2, and F6 with 2 longitudinal sensilla; clava 3.5 x as long as wide, with 5 longitudinal sensilla.

Mesosoma. Pronotum with inconspicuous sculpture, without strong setae. Mesoscutum wider than long, almost smooth, midlobe with a pair of strong setae anterior to a transverse, median, light brown band. Axilla small, with faint reticulate sculpture and a strong seta. Scutellum about as long as wide, much shorter than mesoscutum, almost smooth. Each lateral panel of metanotum with 2 weak setae. Propodeum a little shorter than scutellum, smooth.

Wings. Forewing narrow, with a conspicuous constriction just beyond venation (Fig. 3), 7.7-8.2 x as long as wide; hypochaeta reaching posterior margin, distal macrochaeta about 1.3 x length of proximal macrochaeta; blade strongly infuscated, more or less uniformly setose in distal half; longest marginal cilia about 2.0 x greatest width of wing. Hind wing (Fig. 4) 23-28 x as long as wide; blade slightly infuscated, more so apically, with 1 incomplete median row of setae; longest marginal cilia 5.0-5.7 x greatest width of wing.

Metasoma. Petiole a little wider than long. Gaster longer than mesosoma; ovipositor occupying about half length of gaster and not exserted beyond its apex, and about 1.0 x length of metatibia.

Measurements (holotype): Body length (taken before slide-mounting): 759; head length/width/height (length taken before slide-mounting): 99/197/182; mesosoma: 308; metasoma: 466; ovipositor: 230. Antenna: scape: 166; pedicel: 54; F1: 45; F2: 44;

F3: 51; F4: 55; F5: 45; F6: 54; clava: 130. Forewing: 689/86; longest marginal cilia: 169. Hind wing: 671/24; longest marginal cilia: 136. Legs (given as femur, tibia, tarsus): fore: 182, 182, 215; middle: 176, 239, 221; hind: 179, 224, 209.

MALE. Unknown.

DIAGNOSIS**.** The new species belongs to the *agilis* species group and is distinguished from other species in the group by the narrow forewing (Fig. 3) with a strongly infuscated disc.

DISTRIBUTION. France, Italy, Spain.

HOSTS. Unknown.

ETYMOLOGY**.** This species is named in honor of Dr. Maarten van Helden (ENITA) who collected the majority of specimens of the type series.

3. ***Erythmelus*** **(*Erythmelus*)** ***magnus*** **S. Triapitsyn, sp. n.**
Figs 5-7

MATERIAL. Holotype - ♀ (on slide) [ZIN]: **Russia**, Primorskii krai, Ussuriysk district, Gornotayozhnoye, M. Michailovskaya, 1-10.VII 2000, MT. Paratypes - Russia: same locality and collector as the holotype: 22-30.VI 2000, 1♀ on point; 1-10.VII 2000, 1♀ on slide; 1-10.VIII 2000, 1♀ on point [UCRC, ZIN].

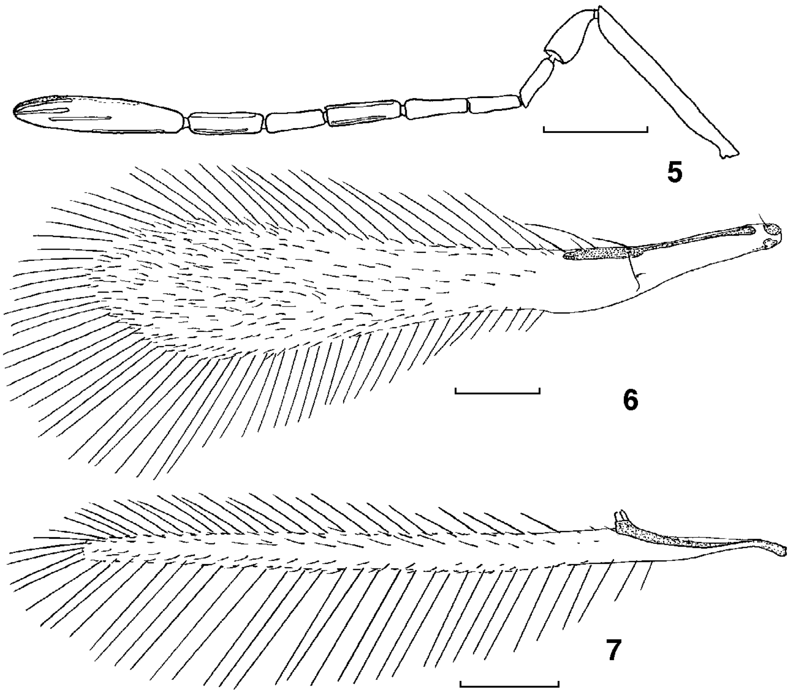
DESCRIPTION. FEMALE (holotype and paratypes). Color. Body and appendages mostly brown to dark brown except as follows: eye dirty pink, ocelli pale; inner sides of scape and pedicel light brown; mesoscutum with a light, narrow, transverse, median band; legs light brown to brown; basal two gastral terga (about 2/5 length of gaster) yellow to light brown.

Head. Rounded in anterior view, about as wide as mesosoma. Vertex transversely striate; face with a faint longitudinal sculpture.

Antenna (Fig. 5). Scape almost smooth, slightly curved, 7.5-8.1 x as long as wide; pedicel a little longer than F1; all funicle segments cylindrical, F4 and F6 the longest, F1, F2, F3, and F5 without longitudinal sensilla, F4 with 1 or 2, and F6 with 2 longitudinal sensilla; clava 4.8-5.2 x as long as wide, with 6 longitudinal sensilla.

Mesosoma. Pronotum lightly sculptured, each side lobe of pronotum with 2 strong setae. Mesoscutum wider than long, its midlobe with faint cellulate sculpture, side lobe cellulate-reticulate, midlobe with a pair of strong setae anterior to a transverse, median, light brown band. Axilla with a long, strong seta reaching almost half length of scutellum. Scutellum about as long as wide and as long as mesoscutum, posterior scutellum finely longitudinally striate. Each lateral panel of metanotum with 2 weak setae. Propodeum shorter than scutellum, faintly sculptured.

Wings. Forewing (Fig. 6) 5.2-5.5 x as long as wide; hypochaeta not reaching posterior margin, distal macrochaeta 1.6-1.9 x length of proximal macrochaeta; blade slightly infuscated basally but otherwise hyaline and more or less uniformly setose in distal half; longest marginal cilia 1.3-1.4 x greatest width of wing. Hind wing (Fig. 7) about 19 x as long as wide; blade mostly hyaline but slightly infuscated at apex, with 1 complete median row of setae; longest marginal cilia 4.2-4.6 x greatest width of wing.



Figs 5-7. *Erythmelus* (*Erythmelus*) *magnus* sp. n., ♀ (holotype and paratype): 5) antenna, 6) forewing, 7) hind wing. Scale bars = 0.1 mm.

Metasoma. Gaster longer than mesosoma; ovipositor occupying about 0.9 length of gaster, notably curved anteriorly (the loop is about 1/4 of its total length), exserted beyond apex of gaster by about 1/5 of its total length, and about 1.7 x length of metatibia (if the ovipositor is measured from the top of the curve basally to the tip).

Measurements (holotype): Body length (taken before slide-mounting): 1006; head length/width/height (length taken before slide-mounting): 133/203/212; mesosoma: 372; metasoma: 529; petiole: 42/60; ovipositor: 523. Antenna: scape: 182; pedicel: 58; F1: 50; F2: 54; F3: 63; F4: 71; F5: 59; F6: 73; clava: 174. Forewing: 873/167; longest marginal cilia: 227. Hind wing: 818/42; longest marginal cilia: 176. Legs (given as femur, tibia, tarsus): fore: 230, 209, 287; middle: 197, 294, 318; hind: 212, 306, 312.

MALE. Unknown.

DIAGNOSIS. New species is most close to *E. agilis*. The female of *E. magnus* sp. n. differs from one of *E. agilis* by having a relatively longer ovipositor, and also by F1 relatively shorter (the ratio between the length of the pedicel to the length of F1 is about 1.2 in *E. magnus* n. sp. compared to 0.9-1.0 in *E. agilis*) and by the marginal cilia of the forewing relatively longer (the longest marginal cilia/maximal forewing width ratio is 1.3-1.4 in *E. magnus* n. sp. and about 1.0 in *E. agilis*).

DISTRIBUTION. Russia (Primorskii krai).
HOSTS. Unknown.
ETYMOLOGY**.** The specific name means "great" in Latin.
COMMENTS. All specimens of this species were collected in a Malaise trap.

4. *Erythmelus* (*Erythmelus*) *agilis* (Enock, 1909)
Figs 8-14

Enaesius agilis Enock, 1909: 456, Pl. XIV, figs. 1-5 (lectotype - ♀, designated by Graham, 1982: 221, Woking, England [BMNH], examined); Kryger, 1950: 55.

Enaesius laticeps Enock, 1909: 456 (holotype - ♀, Woking, England [?lost from BMNH], not examined). *De facto* synonymized with *E. agilis* by Kryger, 1950: 57.

Enaesius limburgensis Soyka, 1932: 82 (holotype - ♀, Valkenburg, Limburg, Holland [?NHMW], not examined), **syn. n.**

Erythmelus (*Enaesius*) *agilis*: Debauche, 1948: 197.

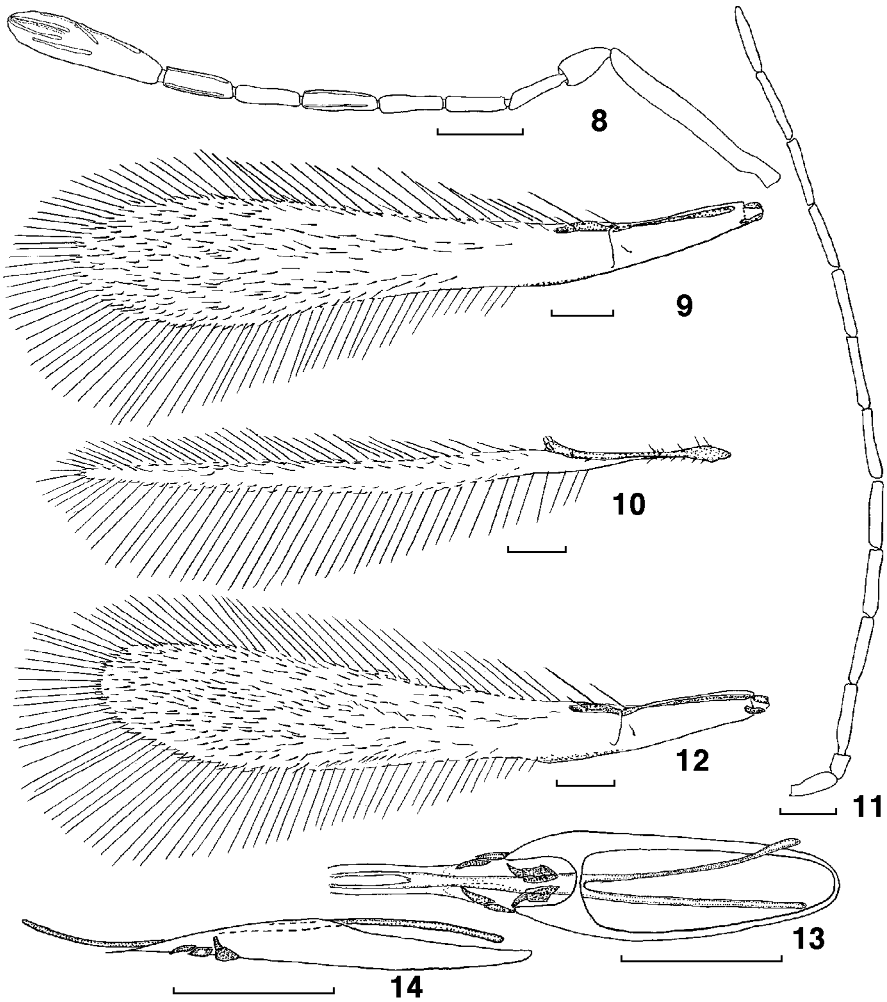
Erythmelus (*Enaesius*) *laticeps*: Debauche, 1948: 194.

Erythmelus agilis: Hellén, 1974: 28; Trjapitzin, 1978: 527; Graham, 1982: 219.

Erythmelus laticeps: Trjapitzin, 1978: 527.

MATERIAL. **Russia**: Kuril Islands, Shikotan I., inland of Gorobets Bay, 18.VIII 1998, B. K. Urbain, 1♀ [CAS]. Moscow Region: Noginsk district, Fryazevo, M. Tretiakov: 3-25.VII 2000, 1♀, 4♂; 8.VII 2001, 1♂. Pushkino district, Mamontovka, 10-20.VII 2000, E. Shouvakhina, 1♀ [UCRC, ZIN]. **Belgium**: Salm-Château, Champs des Dames, 8.VII 1981, R. Detry, 1♀ [CNCI]. ?**Denmark**: R.W. Schlick: 24.VII 1881, 1♀; 19.VII 1885, 1♀; 26.VII 1885, 1♀ [ZMUC]. **UK** (England): Surrey Co., Barnes Common, 8.VII 1995, J. S. Noyes, 1 ♂ [CNCI]. **Finland**: Eckerö, W. Hellén, 2♀; Hammarland, 29.VII 1953, W. Hellén, 1♀; Parikkala, W. Hellén, 1♂ [MZHF]. **Germany**: Hamburg: Anmühle near Hamburg, 300 m, 22.VIII 1984, L. Masner, 1♀, 1♂; Finmühle (near Hamburg), 300 m, 22.VIII 1984, L. Masner, 1♂ [CNCI]; Bayern, 48 km N Freising, 7.VII 1990, H.E. Andersen, 1♀ [UCRC]. **Italy**: Calabria, Camigliatello Silano, 26.VI 1988, J.D. Pinto, 1♀; Puglia, Gargano, 10 km W Monte San Angelo, 20.VI 1988, J.D. Pinto, 1♂. Sardinia, Tempio (Cusseddu), 26.VI-10.VII 1978, 6♀ [CNCI]. **Kyrgyzstan**: Chuy, Karagajly-Bulak, 9 km W Ak-Tyuz, 42°52'47"N, 76°02'13"E, 2180-3400 m, 26.VII 2000, C.H. Dietrich, 2♀; S. shore Lake Issyk-Kul, 10 km E Kadzhi-Saj, 42°10'33"N, 77°18'55"E, 1675 m, 2-6.VII 1999, C.H. Dietrich, 1♀; Osh, Gultcha Ravine, 50 km SSW Gultcha, 39°52'17"N, 73°21'26"E, 2530 m, 6.VII 2000, C.H. Dietrich, 1♀ [UCRC]. **Norway**: Oslo, Abildsø, M. Falck: VII. 1995, 8♀, 3♂; IX 1996, 1♂; Våle, Langløya, 26.V-8.VII 1991, L.O. Hansen, 1♀ [ZMUN]. **Switzerland**: Dielsdorf, 650 m, 17.VIII 1984, L. Masner, 1♀, 1♂; Rickenbach, 560 m, 14.VII 1994, P. Flükiger, 1♀ [CNCI].

DIAGNOSIS. This species is closely related to *E. magnus* sp. n. and *E. soykai*, from which it differs by the morphological features indicated in the key. The female *E. agilis* is characterized by the following: coloration of the body dark brown, except midlobe of mesoscutum with a light brown, transverse, median band, and with basal



Figs 8-14. *Erythmelus* (*Erythmelus*) *agilis*, Moscow region, Russia (♀ from Mamontovka, ♂ from Fryazevo): 8) antenna, ♀, 9) forewing, ♀, 10) hind wing, ♀, 11) antenna, ♂, 12) forewing, ♂, 13, 14) genitalia, ♂, dorsal (13) and lateral (14) view. Scale bars = 0.1 mm.

two terga of the gaster and the base of the third gastral tergum yellow; antenna (Fig. 8) slender, with a long scape, F1 about as long or only slightly longer than the pedicel, F4 and F6 each with 2 longitudinal sensilla, and clava with 6 longitudinal sensilla; forewing (Fig. 9) 4.3-5.3 x as long as wide, the longest marginal cilia 0.95-1.00 x maximal forewing width, disc more or less uniformly, densely setose in apical half; hind wing (Fig. 10) about 20 x as long as wide; ovipositor occupying about 0.8 length of gaster, a little exserted beyond its apex (by about 1/6-1.10 of its total length), ovipositor/metatibia ratio 0.9-1.3. The male *E. agilis* is similar to the female except for the normal sexually dimorphic characters; all flagellomeres of the antenna longer than the scape (Fig. 11), forewing (Fig. 12) slightly wider than in female, and genitalia (Fig. 13, 14) occupying about 1/2 length of gaster.

DISTRIBUTION. *Russia (Moscow region, Kuril Islands); Belgium, UK (England), Denmark (Kryger, 1950), Finland, *Germany, Holland (Soyka, 1932), *Italy, *Kyrgyzstan, *Norway, Sweden (Noyes, 2001), *Switzerland.

HOSTS. *Leptopterna dolabrata* (Linnaeus, 1758) (Miridae) (Noyes, 2001).

COMMENTS. Unfortunately, I was unable to locate the types of *Enaesius limburgensis* during my recent visit to Natuurhistorisches Museum Wien in Vienna, Austria. Their present depository is unknown. However, the description of this species provides enough information for its synonymy under *E. agilis.*

5. *Erythmelus* (*Erythmelus*) sp.
Figs 15, 16

MATERIAL. **Belgium**: Antheit (Corphalie), 11-25.VIII 1989, R. Detry, 1 ♀ [UCRC].

COMMENTS. This single female specimen is closely related to *E. agilis* but differs in having a much broader forewing (length/width ratio 4.0), and the longest marginal cilia is much shorter than the maximum forewing width (the ratio is 0.7) (Fig. 15). The hind wing (Fig. 16) is wider at the apex of venation than in the typical *E. agilis* (Fig. 10). The female antenna is very similar to that of *E. agilis*. Therefore this specimen may be either an aberrant form of the latter or, less likely, it represents an undescribed species.

The *flavovarius* species group

DIAGNOSIS. This species group of *Erythmelus* s. str., mentioned by Viggiani & Jesu (1985, 1988) first as the "*flavovarius* - *goochi*" group and then as the "*flavovarius*" group, respectively, includes mostly medium-size to small species (usually less than 1 mm long). It is characterized by a relatively compact antenna (Figs 20, 21), with funicle segments of various length (F6 usually the longest), and F1 less than 0.7 length of the pedicel; the chaetotaxy on the forewing is variable, the disc usually has few microtrichia, often leaving a large bare area in the apical half (Fig. 22). The male genitalia in some of the species are relatively simple (Fig. 26), without sclerotized processes on the parameres, and resemble those of the species belonging to the subgenus *Parallelaptera*, suggesting that the latter may be a derived offshoot of the *flavovarius* species group. Viggiani (1988, 1989) illustrated the dissected (unfolded) male genitalia of an *Erythmelus* sp., which definitely belongs to a member this species group, likely to *E. flavovarius* or a closely allied species.

SPECIES INCLUDED. *E. flavovarius*, *E. israeliensis* , and possibly *E. kostjukovi* sp. n. This group appears to be the largest within the subgenus *Erythmelus*, with some other, extralimital, species included, as follows: *E. reductus* sp. n., *E.*

tingitiphagus, *E. empoascae* Subba Rao, 1966 (Oriental), *E. flandersi* Doutt, 1949 (Nearctic), *E. gracilis* (Howard, 1881) (Nearctic), *E. miridiphagus* Dozier, 1937 (Nearctic and Neotropical), *E. picinus* (Girault, 1916) (Nearctic), *E. psallidis* Gahan, 1937 (Nearctic), and possibly *E. io* (Girault, 1911) (Nearctic).

Some undescribed or unidentified Neotropical species, and perhaps some of the species described by Ogloblin (1934) from Argentina and by Dozier (1932, 1937) from Haiti and Puerto Rico, resemble typical representatives of the *flavovarius* group and may either form a subgroup of the latter or form a separate species group within the subgenus *Erythmelus*. Their males may have a reduced number of flagellar segments, either 9 (as in *E. reductus* sp. n.) or 10 (as in *E. tingitiphagus*). Such species, especially those parasitizing eggs of Tingidae, are definitely the most advanced among the species comprising the nominotypical subgenus.

COMMENTS. In the specimens of *E. picinus* from Alaska, USA, that I have examined, F1 of the female antenna is 0.6-0.7 length of the pedicel. The male genitalia are relatively simple as in *E. flavovarius*, but much longer. The female of *E. picinus* appears to be somewhat related to *E. angelovi*, for which no males are known.

6. *Erythmelus* (*Erythmelus*) *kostjukovi* S. Triapitsyn, sp. n.

Figs 17-19

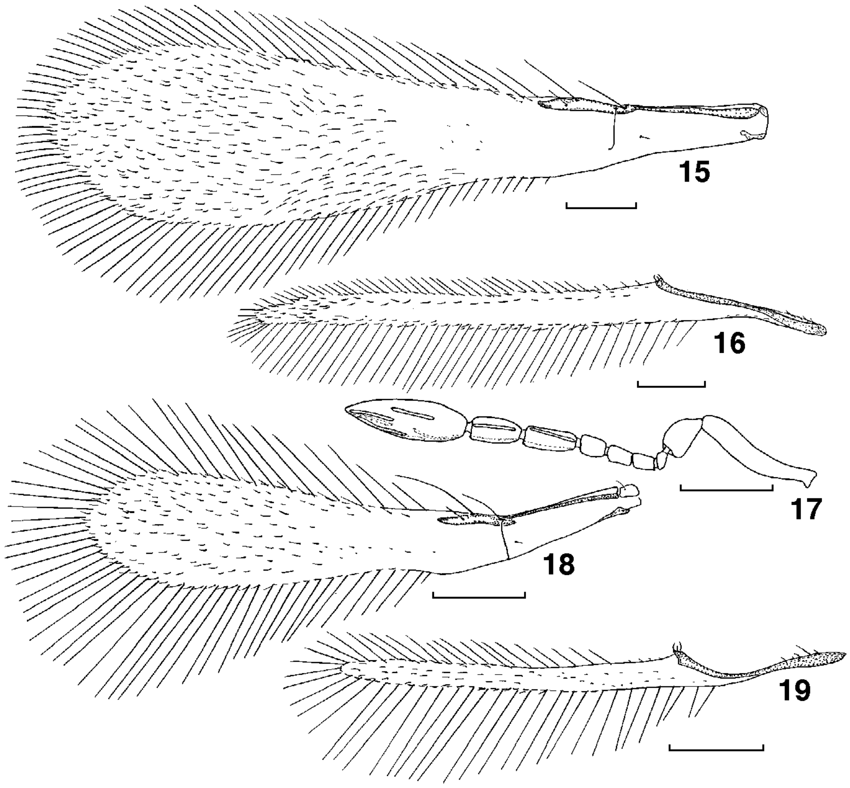
MATERIAL. Holotype - ♀ (on slide) [ZIN]: **Russia**, Krasnodarskii krai, Krasnodar, All Russian Research Institute of Biological Plant Protection, V. Kostjukov, 11-12.VIII 2001, YPT.

DESCRIPTION. FEMALE (holotype). Color. Head, mesosoma, and metasoma dark brown except as follows: eyes and ocelli dirty pink; mesoscutum with a lighter (light brown to brown), narrow, transverse, median band; basal two gastral terga yellow; hypopygium brown. Antenna, wing venation, and legs brown except F1 and inner surfaces of scape and pedicel slightly lighter; meso- and metacoxae (except basally), trochanters, foretibia, basal three tarsomeres of foretarsus and mesotarsus, and basal half of metatibia light brown.

Head. Rounded in anterior view, slightly wider than mesosoma. Vertex transversely striate; face faintly sculptured; torulus slightly below mid level of eye.

Antenna (Fig. 17). Scape slightly curved and finely longitudinally striate, 5.3 x as long as wide; pedicel 1.6 x as long as wide, much longer than F1; all funicle segments cylindrical, F1 the shortest, F2 and F3 subequal, slightly shorter and narrower than F4, F1-F4 without longitudinal sensilla; F5 and F6 subequal (F5 slightly longer and thinner), much longer and wider than preceding funicle segments, each with 2 longitudinal sensilla; clava 3.2 x as long as wide, with 6 longitudinal sensilla, 3 of them subapical.

Mesosoma. Pronotum with a reticulate sculpture, midlobe of mesoscutum and posterior scutellum longitudinally striate, side lobe of mesoscutum and axilla strigose, anterior scutellum, dorsellum, and propodeum almost smooth. Each side lobe of pronotum slightly longer than wide, without conspicuous setae. Mesoscutum about 1.6 x as wide as long, its midlobe with a pair of strong setae anterior to transverse,



Figs 15-19. 15, 16) *Erythmelus* (*Erythmelus*) sp. ♀, Antheit, Belgium: 15) forewing, 16) hind wing; 17-19) *E.* (*E.*) *kostjukovi* sp. n., holotype, ♀: 17) antenna, 18) forewing, 19) hind wing. Scale bars = 0.1 mm.

median, yellow band. Axilla small, apparently with a seta, which was broken off in the holotype. Anterior scutellum short, posterior scutellum rounded, 4.3 x length of anterior scutellum. Each lateral panel of metanotum with 1 weak seta. Propodeum a little shorter than mesoscutum; mesophragma broadly V-shaped, not reaching posterior margin of propodeum.

Wings. Forewing (Fig. 18) 5.2 x as long as wide; hypochaeta reaching posterior margin, distal macrochaeta about 1.5 x length of proximal macrochaeta; blade slightly infuscated basally but otherwise hyaline, with one complete row of setae beyond venation along anterior margin, with two irregular rows of microtrichia just beyond venation in the middle of a large bare area, and with 9-10 irregular rows of setae in the apical part, which is more or less uniformly setose; longest marginal cilia about 1.5 x greatest width of wing. Hind wing (Fig. 19) 17 x as long as wide; blade hyaline, with 1 complete median row of setae and an additional row of setae along each margin; longest marginal cilia 3.7 x greatest width of wing.

Metasoma. Gaster a little longer than mesosoma; ovipositor occupying about 0.7 x length of gaster, curved anteriorly in lateral view (the curve is about 1/2 of its total length), barely exserted beyond apex of gaster; ovipositor/metatibia ratio 1.7.

Measurements (holotype): Body length (taken before slide-mounting): 716; head length/width/height (length and height taken before slide-mounting): 83/247/200; mesosoma: 396; metasoma: 494; ovipositor: 339. Antenna: scape: 131; pedicel: 49; F1: 20; F2: 23; F3: 24; F4: 29; F5: 57; F6: 55; clava: 131. Forewing: 578/111; longest marginal cilia: 166. Hind wing: 540/32; longest marginal cilia: 119. Legs (given as femur, tibia, tarsus): fore: 146, 157, 161; middle: 128, 208, 190; hind: 139, 201, 201.

MALE. Unknown.

DIAGNOSIS**.** *E. kostjukovi* sp. n. differs from the Palaearctic species of the *flavovarius* and *helopeltidis* species groups by F5, which is slightly longer than F6 and bears 2 longitudinal sensilla. Two of the species described by Ogloblin (1934) from single female specimens from Argentina, *E. clavatus* Ogloblin, 1934 and *E. rosascostai* Ogloblin, 1934, also have longitudinal sensilla on F5 of the female antenna, however only 1 such sensillum is present in *E. rosascostai* on F5, which is shorter than F6. The clava of the female antenna is 3.2 x as long as wide in *E. kostjukovi* whereas it is 4.0 x as long as wide in *E. clavatus*, according to the measurements provided by Ogloblin (1934).

DISTRIBUTION. Russia (Krasnodarskii krai).

HOSTS. Unknown.

ETYMOLOGY**.** This species is named after the collector, Dr. Victor V. Kostjukov.

COMMENTS. The holotype has a part of the flagellum of one antenna missing.

7. *Erythmelus* (*Erythmelus*) *flavovarius* (Walker, 1846)
Figs 20-26

Panthus flavovarius Walker, 1846: 52 (lectotype - ♀, designated by Graham, 1982: 219, ?Ireland [Hope Entomological Collections, Oxford, England (UK)], not examined).

Erythmelus goochi Enock, 1909: 455, Pl. XIII, figs. 6-10 (lectotype - ♀, designated by Graham, 1982: 220, Holloway, London, England [BMNH], examined), **syn. n.**; Bakkendorf, 1933: 42; Kryger, 1950: 60; Hellén, 1974: 28; Trjapitzin, 1978: 527; Donev, 1985a: 63; Donev, 1987: 77; Donev, 1988a: 196; Donev, 1988b: 205.

Enaesius parvus Soyka, 1932: 83 (?holotype - ♀, Valkenburg, Limburg, Holland [?NHMW], not examined). *De facto* synonymized with *E. goochi* by Debauche, 1948: 194-195 and formally synonymized with *E. flavovarius* by Graham, 1982: 219.

Erythmelus (*Erythmelus*) *goochi*: Debauche, 1948: 195-197.

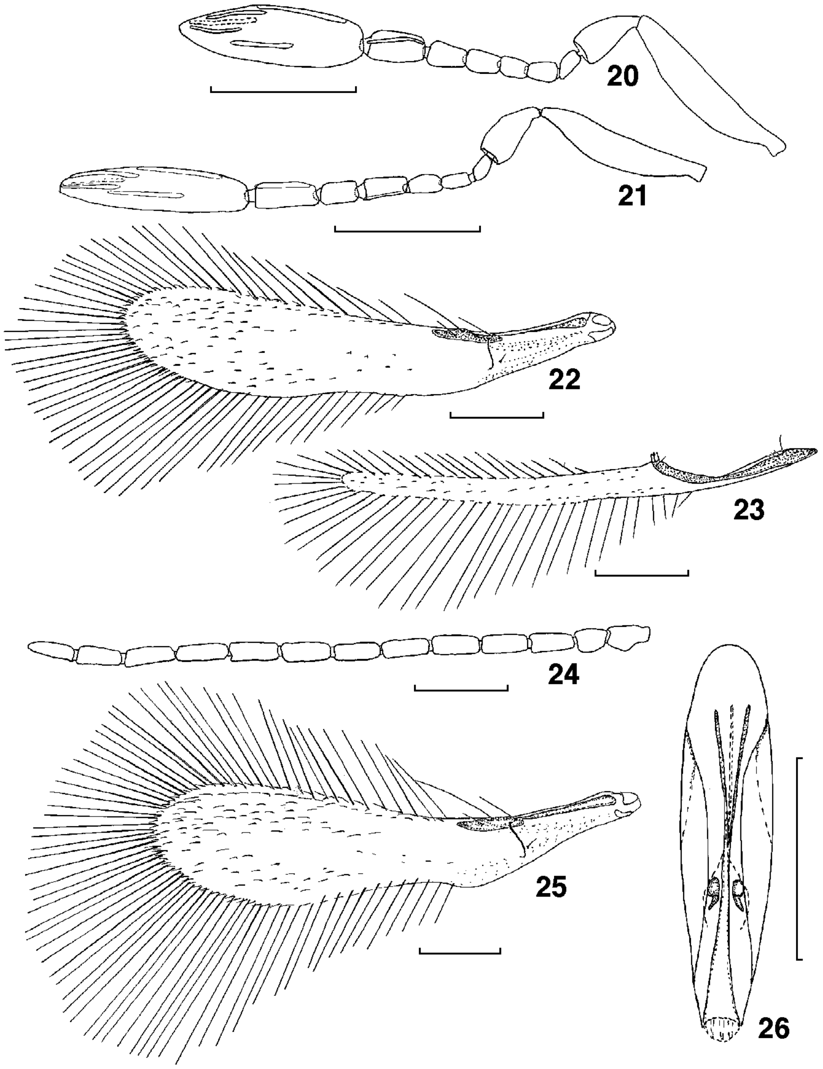
Erythmelus maculatus Enock: Kryger, 1950: 61, **nom. nud.**

Erythmelus (*Enaesius*) *dichromocnemus* Novicky, 1953: 13 (?holotype - ♀, Poland [present depository unknown], not examined), **syn. n.**

Erythmelus spinosus Mathot, 1969: 15 (holotype - ♀, Rièzes, Belgium [ISNB], not examined), **syn. n.**

Erythmelus spinosus: Trjapitzin, 1978: 527.

Erythmelus flavovarius: Graham, 1982: 219-220; Viggiani & van Harten, 1996: 74; Baquero & Jordana, 2002: 80.



Figs 20-26. *Erythmelus* (*Erythmelus*) *flavovarius*, Sainte Colombe, France: 20) antenna, ♀ (F4 without longitudinal sensilla), 21) antenna, ♀ (F4 with a longitudinal sensillum), 22) forewing, ♀, 23) hind wing, ♀, 24) antenna, ♂, 25) forewing, ♂, 25) genitalia, ♂, dorsal view. Scale bars = 0.1 mm.

MATERIAL. **Russia**: Krasnodarskii krai, Krasnodar, 23-24.VIII 2001, V. Kostjukov, 1♀. Moscow Region: Noginsk district, Fryazevo, 26.VII-31.VIII 2000, M. Tretiakov, 1♀, 2♂. Pushkino district, Mamontovka, 10.VII-20.VIII 2000, E. Shouvakhina, 6♀. Primorskii krai, Ussuriysk district, Gornotayozhnoye, M. Michailovskaya:

24.VII-1.VIII 1999, 2♀; 5-11.VIII 1999, 1♀; 12-17.VIII 1999, 5♀; 21-31.VII 2000, 1♀; 21-26.VIII 2000, 2♀; 1-11.IX 2002, 1♂ [IBPV, UCRC, ZIN]; Sakhalin, D. J. Bennett, T. Anderson: 2 km E Sokol: 21.VII 2001, 1♀; 24.VII 2001, 1♀; 6 km E Sokol: 31.VII 2001, 3♀; 16.VIII 2001, 1♀, 1♂ [CAS]. **Belgium**: C. Ethe-Buzenol, 19.V-2.VI 1981, P. Grootaert, 1♀ [CNCI]; Waterloo, 30.VIII-9.IX 1992, P. Dessart, 1♀ [ISNB]. **China**: Beijing, Fragrant Hills, 23-24.VII 2002, M. L. Buffington, 2♀ [UCRC]. Beijing Province, Mentougou District, G. Melika: Liyan Ling (Linshan Mts.), 40°00.28'N, 115°30.75'E, 1749 m, 2.VIII 2002, 1♀. Xiaolongmen Sta., 39°59.22'N, 115°31.48'E, 1095 m, 28.VII 2002, 6♀, 1♂ [SPLK, UCRC]. **UK** (England): Berkshire Co., Ascot, Silwood Park, Sunninghill: em. 1961, O.W. Richards, 1♀, 1♂ («from branch of broom on which 25♀, 9♂ of *Asciodema obsoletum* were sleeved 21-29.VI 1960, then branch exposed and sleeved again in 1961»); 14.VIII 1962, O.W. Richards, 1♀ («ex. *Heterocordylus tibialis* in broom, *Sarothamnus scoparius*») [EMEC]; Surrey Co.: Barnes Common, 8.VII 1995, 1♀; Dorking, Box Hill, 16.VII 1994, J.S. Noyes, 2♀; Richmond Park, 18.VII 1996, J.S. Noyes, 2♀ [CNCI]. **Finland**: Helsinki, Kottby, 1♀; Jomala, W. Hellén, 1♀; Nystad, W. Hellén, 1♀ [MZHF]. **France**: Département Gironde, Sainte Colombe, 44°54'N, 00°02'W: 13.VIII 1998, M. van Helden, 1♀; 23-27.VII 2000, S. Bessart, M. van Helden, 2♀, 2♂ ("on *Alnus glutinosa*"); 17.VIII 2000, M. van Helden, 12♀, 1♂ [ENITA, UCRC]. **Georgia**: Adzhariya: Khulo district, Kvatiya, 2.VIII 1953, V. Trjapitzin, 1♀ (on oak); Shuahevi district, Oladauri, 7.VIII 1953, V. Trjapitzin, 1♀ (on plum) [ZIN]. **Germany**: Hamburg: Anmühle (near Hamburg), Sachsenwald, 300 m, 22.VIII 1984, L. Masner, 1♀, 1♂; Finmühle (near Hamburg), 300 m, 22.VIII 1984, L. Masner, 2♀ [CNCI]; Hessen, Schlitz, Breitenbach, 5.VIII 1971, Illies, 1♀ [HNHM]; Maklenburg, Malchin, Jettchens Hof, VIII 1935, H. Stammer, 1♀ [EMEC]. **Greece**: Rhodes I. (Rodhos), Ixia, 15-29.VIII 1984, M.C. Day, 1♀ [CNCI]. **Hungary**: Vas Co., Mt. Kцszeg, Hörmann forràs, 27.VII 1996, C. Thuróczy, 1♀ (on *Fagus sylvatica* L.) [SPLK]. **Iran**: Markazi Province, Karaj, VII-IX 1977, J.T. Huber, 7♀, 6♂ [CNCI, UCRC]. **Italy**: Abruzzi, Pescara, Città S. Angelo, 23.III 1991, Solari, 1♀; Emilia-Romagnia, Pontenure, E. Mazzoni (on melon): III 1992, 2♀, 2♂; VIII 1992, 1♂; Lombardia, Pavia, 18.VI 1981, Rufinazzi, 1♀ [IEFA]; Sardinia, Tempio (Cusseddu), 26.VI-3.VII 1978, 2♂ [CNCI]. **Norway**: Horum, Verket, 8.VI-19.VIII 1996, L.O. Hansen, 1♂; Oslo: Abildsш, M. Falck: VII 1995, 1♀; IX 1996, 1♀; Manglerud, VIII 1995, L.O. Hansen, 1♀ [ZMUN]. **Oman**: Salalah, 18.X 1986, J. Huber-Reacher, 2♀ [CNCI]. **Spain**: Madrid, El Ventorillo, 1480 m, Garrido: VIII 1988, 2♀, 1♂; VII 1991, 24♀, 5♂ [MNMS]. **Switzerland**: Rickenbach, 560 m, P. Flükiger: 14.VII 1994, 1♀; 6.X 1994, 1♀ [CNCI]. **Thailand**: near Chiang Mai, Doi Poi Experiment Station, 2.VII 1981, G. Gordh, 1♂. **Turkmenistan**: near Mary, Sovkhoz "Karakumkanal", 15.VI 1992, S. Triapitsyn, 1♂ (on *Atriplex* sp.) [UCRC].

DIAGNOSIS. Both sexes of *E. flavovarius* are usually easy to distinguish by the coloration of the midlobe of mesoscutum, which is partly brown (the anterior half) and partly yellow (usually) to light brown (the posterior half); yellow markings are present also on the lateral lobes of the mesoscutum, the axilla, and the mesopleura, and the base of the gaster (about 1/3 or more) is yellow to light brown. In addition, the female *E. flavovarius* is characterized by the following: antenna (Figs 20, 21) with all funicular segments longer than wide, F4 usually without longitudinal sensilla (Fig. 20), rarely with 1 longitudinal sensillum (Fig. 21) (hence the above synonymy of *E. spinosus* under *E. flavovarius*), F6 usually with 1, but sometimes with 2 longitudinal sensilla (more often in non-European specimens), clava with 5 longitudinal sensilla; forewing (Fig. 22) 4.4-4.9 x as long as wide, with apical part of disc (about 1/3) more or less evenly setose, and remainder of disc with few microtrichia, longest marginal cilia 1.4-1.7 x maximal forewing width; hind wing (Fig. 23) 16-18 x as long as wide; ovipositor occupying about 0.7-0.8 x length of gaster, barely exserted beyond its apex, ovipositor/metatibia ratio 1.5-1.6. Male *E. flavovarius* are similar to females except for the normal sexually dimorphic characters; antennal flagellomeres (Fig. 24) about as long as scape or a little longer, forewing (Fig. 25) slightly wider than in female (length/width ratio 4.0-4.4), and genitalia (Fig. 26) about as long as 0.6-0.7 length of gaster.

The Indian species *E. empoascae* Subba Rao, 1966 seems to be very closely related, and possibly conspecific, to *E. flavovarius* but without seeing the holotype of *E. empoascae* its true identity is impossible to determine because the original description and illustrations (Subba Rao, 1966) are insufficient. Subba Rao (1966, 1970) mentioned that in *E. empoascae*, the forewing blade is evenly setose and the longest marginal cilia on the female forewing are as long as the wing's width.

DISTRIBUTION. *Russia (Moscow region, Krasnodarskii krai, Primorskii krai, Sakhalin); Austria (Novicky, 1953), Belgium, Bulgaria (Donev, 1987, 1988a, 1988b), Cape Verde Islands (Viggiani & van Harten, 1996), *China, Denmark (Kryger, 1950), UK (England), Finland, *France, *Georgia, Germany, Greece, Holland (Soyka, 1932), Hungary, *Iran, ?Ireland (Graham, 1982), *Italy, *Norway, *Oman, Poland (Novicky, 1953), Romania (Noyes, 2001), Spain, *Switzerland, Sweden (Noyes, 2001), *Turkmenistan, *Thailand.

HOSTS. *Pilophorus perplexus* Douglas et Scott, 1875 (Donev, 1987) and *Polymerus cognatus* (Fieber, 1858) (Miridae) (Noyes, 2001). *Heterocordylus tibialis* (Hahn, 1833) and *Asciodema obsoleta* (Fieber, 1864) (Miridae) are added here as other known hosts of this species. The likelihood that *E. flavovarius* is a polyphagous species, able to attack eggs of various Miridae, is very high.

COMMENTS. The above synonymies of *E. goochi* and *E. dichromocnemus* under *E. flavovarius* are rather obvious; Graham (1982) came short of formally synonymizing *E. goochi*, probably because he examined only a few old, poorly mounted specimens, mainly from the United Kingdom. One female and one male from Moscow region, Russia, and two females from Richmond Park, Surrey Co., England (UK), differ somewhat from the typical *E. flavovarius* in having the distal half of the midlobe of mesoscutum brown, thus the midlobe of mesoscutum has a narrow, light brown, transverse median band like in *E. lygivorus*. The female forewing in these specimens is slightly wider, the ovipositor a little longer but lacking the basal loop (the ovipositor/metatibia ratio up to 2.0), and the male genitalia are somewhat longer and narrower than in typical *E. flavovarius*. I consider them as mere aberrant forms of *E. flavovarius*, which is in fact a very variable species.

8. *Erythmelus* (*Erythmelus*) *israeliensis* Viggiani et Jesu, 1985

Erythmelus israeliensis Viggiani et Jesu, 1985: 485 (holotype - ♀, Btacha Valley, Israel [IEAP], not examined); Donev, 1999: 56.

MATERIAL. **Russia**: Daghestan, 20 km E Kara-Kagaz, 15-25.VI 1960, E. Sugonjaev, 3♀, 5♂ (on *Tamarix* sp.) [ZIN]. **Iran**: Markazi Province, Karaj, 16-17.VII 1977, J.T. Huber, 1♂. **Turkmenistan**: Old Nisa, 15.VI 1992, V. Trjapitzin, 1♂ (emerged 28.VI 1992 at University of California, Riverside quarantine laboratory from *Atriplex* sp.) [UCRC].

DIAGNOSIS. *Erythmelus israeliensis* is extremely close to *E. flavovarius*, from which it differs by the features indicated in the key. In addition, Viggiani & Jesu (1985) note that F2-F5 of the female antenna are subrectangular or subquadrate in *E. israeliensis* but clearly cylindrical in *E. flavovarius* (Fig. 20); however, this character does not hold very well in the numerous specimens collected by Dr. J. T. Huber from Karaj, Iran - many of them have the forewing as in *E. israeliensis* but the funicle segments of the female antenna as in *E. flavovarius*. I provisionally assign such specimens to *E. flavovarius* because many *Erythmelus* species, especially small ones, tend to be highly variable depending on the host and location, and thus eventually these two species may or may not be found to be synonymous. For the time being, however, it would be best to retain them as separate species because their males also have some minor, although perhaps not very stable, differentiating features: the flagellomeres are relatively shorter and the apodemes of the genitalia reach the anterior margin of the phallobase in *E. israeliensis* (Fig. I-4, p. 486 in Viggiani & Jesu, 1985). In *E. flavovarius*, the apodemes of the genitalia normally do not reach the anterior margin of the phallobase (Fig. 26). This could be a rather weak character, however.

DISTRIBUTION. *Russia (Daghestan); Bulgaria (Donev, 1999), *Iran, Israel, *Turkmenistan.

HOSTS. Unknown. In Israel *E. israeliensis* was taken on a *Tamarix* sp. (Viggiani & Jesu, 1985), and so were the specimens from Daghestan, Russia.

9. *Erythmelus* (*Erythmelus*) *reductus* S. Triapitsyn, sp. n.

Figs 27-31

MATERIAL. Holotype - ♀ (on slide) [Humboldt University, Villa de Leyva, Colombia]: **Colombia**, Amazonas, Parque Nacional Natural Amacayacu, 3.82°S, 70.26°W, 8-12.III 2000, B.V. Brown, G. Kung, M. Sharkey, MT. Paratypes - Colombia: Amazonas, Parque Nacional Natural Amacayacu: 3.82°S, 70.26°W: 45 m, 8-12.III 2000, M. Sharkey, 1♀, 1♂ on cards; 8-12.III 2000, B.V. Brown, G. Kung,

M. Sharkey, 1♀ on slide; 45-55 m, 9-12.III 2000, B.V. Brown, G. Kung, M. Sharkey, 1♀, 1♂ on slides. Matamata, 3°23'S, 70°06' W, 150 m, A. Parente: 2-8.V 2000, 1♀ on card; 8-15.V 2000, 4♀ on cards; 12-19.VII 2000, 1♀ on card; 30.X-11.XI 2000, 2♀ on cards. San Martín, 3°23'01"S, 70°06'01"W, 150 m, 23-30.IV 2000, B. Amado, 1♀ on point [CNCI, LACM, UCRC, USNM].

DESCRIPTION. FEMALE (holotype and paratypes). Color. Head dark brown, eye and ocelli dirty pink; mesosoma and metasoma mostly brown except as follows: mesoscutum with a yellow, narrow, transverse, median band; axilla yellow to light brown laterally and distally; 3 basal gastral terga (or sometimes a little more than half length of gaster basally) yellow to light brown, hypopygium light brown. Appendages: scape, pedicel, and wing venation light grayish brown; legs light brown.

Head. Wider than mesosoma. Vertex transversely striate, face with a faint longitudinal sculpture.

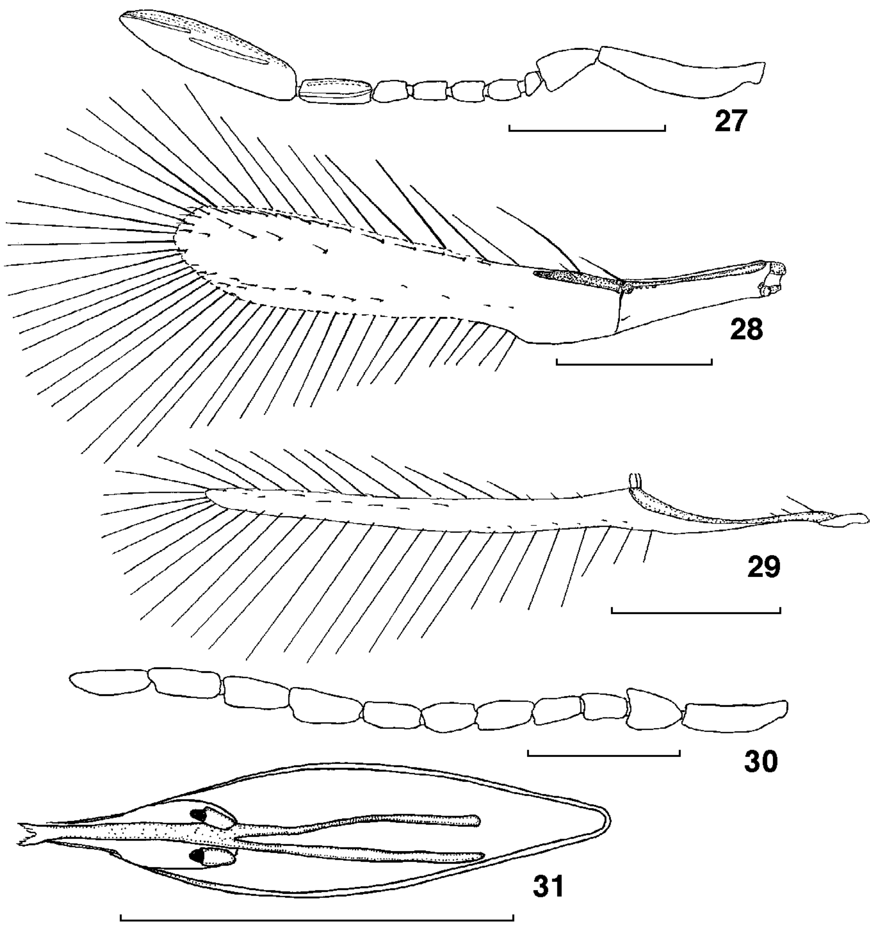
Antenna (Fig. 27). Scape slightly curved and finely longitudinally striate, about 6.0 x as long as wide; pedicel also finely longitudinally striate, about 1.7 x as long as wide, much longer than F1; all funicle segments longer than wide except for F1 which is about as long as wide and trapezoidal in lateral view, F2-F5 subequal in length, F1-F5 without longitudinal sensilla, F6 the largest funicle segment, almost twice as long as any of the 4 preceding segments, with 2 longitudinal sensilla, clava 4.0-4.1 x as long as wide, with 5 longitudinal sensilla, 2 of them subapical and 3 submedial.

Mesosoma. Pronotum striate, each side lobe of pronotum with 3 strong setae. Mesoscutum wider than long, its midlobe finely longitudinally striate and with a pair of strong setae anterior to a transverse, median, yellow band. Axilla with a long, strong seta almost reaching half length of scutellum. Scutellum oval, about as long as mesoscutum, posterior scutellum finely longitudinally striate. Each lateral panel of metanotum with 1 weak seta, sometimes with 2. Propodeum much shorter than scutellum, smooth.

Wings. Forewing (Fig. 28) 5.7-6.1 x as long as wide, with subparallel margins; hypochaeta almost reaching posterior margin, distal macrochaeta 1.6-1.9 x length of proximal macrochaeta; blade strongly infuscated; disc mostly bare except for a few setae at apex arranged in an incomplete row, and an irregular row of setae along posterior margin; longest marginal cilia 2.1-2.3 x greatest width of wing. Hind wing (Fig. 29) 16-18 x as long as wide; blade notably infuscated, more strongly at apex, with 2 irregular rows of microtrichia; longest marginal cilia 5.2-5.4 x greatest wing width.

Metasoma. Petiole much wider than long. Gaster a little longer than mesosoma; ovipositor occupying 0.7-0.8 length of gaster, notably exserted beyond its apex (by about 1/6-1/7 of its total length), and 1.4-1.8 x length of metatibia.

Measurements (holotype): Body length (taken before slide-mounting): 537; head length/width (length taken before slide-mounting): 83/176; mesosoma: 212; metasoma: 270; ovipositor: 207. Antenna: scape: 109; pedicel: 41; F1: 15; F2: 23; F3: 24; F4: 24; F5: 23; F6: 45; clava: 124. Forewing: 400/66; longest marginal cilia: 154. Hind wing: 394/21; longest marginal cilia: 109. Legs (given as femur, tibia, tarsus): fore: 112, 100, 115; middle: 109, 146, 140; hind: 97, 145, 136.



Figs 27-31. *Erythmelus* (*Erythmelus*) *reductus* sp. n.: 27) antenna, ♀, 28) forewing, ♀, 29) hind wing, ♀, 30) antenna, ♂, 31) genitalia, ♂, dorsal view. Scale bars = 0.1 mm.

MALE (paratypes). Similar to female except for the normal sexually dimorphic characters and the following. Gaster mostly brown, including the basal terga. Antenna (Fig. 30) 11-segmented (flagellum 9-segmented), all flagellomeres shorter than scape. Forewing length/width ratio about 5.9. Gaster shorter than mesosoma; genitalia as in fig. 31.

Measurements (n=1, paratype): Body: 558 (length, taken before slide-mounting); head: 70; mesosoma: 242; metasoma: 266. Antenna: scape: 66; pedicel: 33; F1: 30; F2: 32; F3: 35; F4: 38; F5: 38; F6: 45; F7: 43; F8: 45; F9: 48. Forewing: 410/70; longest marginal cilia: 170. Hind wing: 406/22; longest marginal cilia: 121. Genitalia: 145.

DIAGNOSIS**.** The male of *E. reductus* sp. n. has a 9-segmented antennal flagellum (Fig. 30), unlike all other described species of subgenus *Erythmelus* which have an 11-segmented, rarely a 10-segmented, flagellum (males are not known in some species). The female of the new species is closest to *E. cingulatus* Ogloblin, 1934, described from a single female specimen from Loreto, Misiones, Argentina. *E. reductus* differs from the latter by a narrower (length/width ratio 5.5-5.9), strongly infuscated forewing with longer marginal cilia relative to the maximal width of the wing (the forewing of *E. cingulatus* is about 4.7 as long as wide).

E. reductus is only provisionally assigned to the *flavovarius* species group.

DISTRIBUTION. Colombia.

HOSTS. Unknown.

ETYMOLOGY**.** The specific name refers to the reduced number of the flagellar segments in the male antenna.

10. *Erythmelus* (*Erythmelus*) *tingitiphagus* (Soares, 1941)
Figs 32-36

Anaphes tingitiphagus Soares, 1941: 265, pl. 4-6, figs. 8-14 (syntypes - 3 slides, possibly 2 ♀ and 1 ♂, according to the original photographs, Copacabana, Rio de Janeiro, Brazil [Escola Nacional de Agronomia, Rio de Janeiro, Brazil], not examined).

Erythmelus tingitiphagus: Huber, 1992: 77.

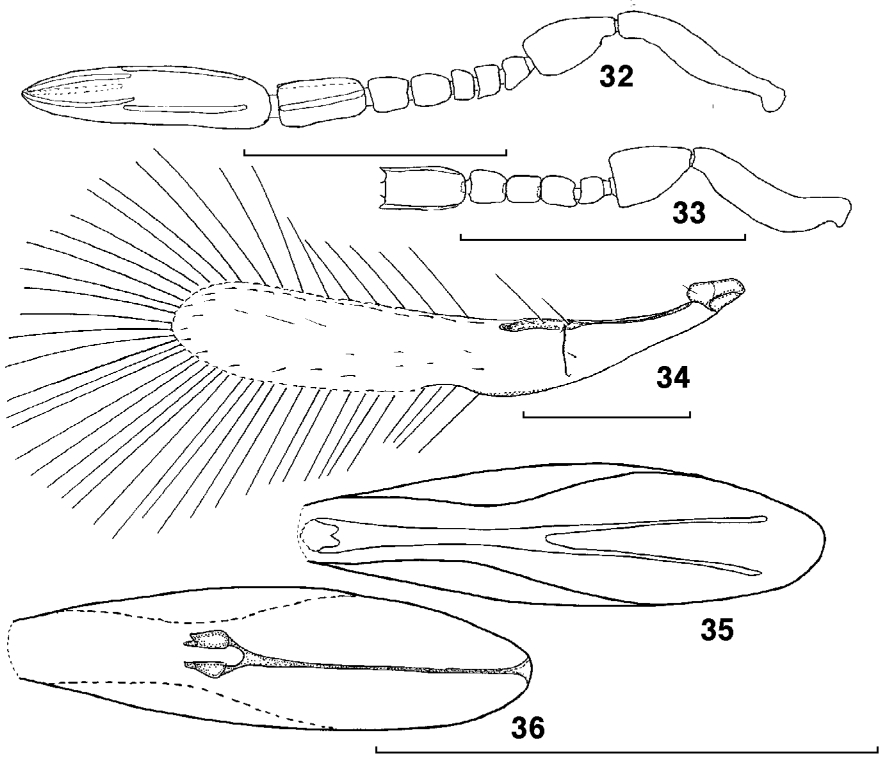
MATERIAL. **Brazil**: Pará, Belém, 13.V 1991, F.D. Bennett, numerous ♀, ♂ ("ex. tingid (*Gargaphia lunulata*) eggs on *Passiflora edulis*") [FSCA, UCRC]; Sro Paulo, Pindorama, IV 1999, V.A. Costa, 8♀, 5♂ ("ex. *Leptopharsa heveae* eggs in *Hevea brasiliensis*") [CNCI]. **Venezuela**: El Taque, 31.V 1991, F.D. Bennett, 2♀ ("ex. *Leptodictya tabida* eggs on *Saccharum officinarum*"); Lara: Barquisimeto, 25.IV 1991, F.D. Bennett, 2♀ ("ex. *Leptodictya tabida* eggs on *Saccharum officinarum*"); Lara, 23.IV 1991, F.D. Bennett, 1♀ ("ex. *Leptodictya tabida* eggs on *Saccharum officinarum*"); Turin, 15.IV 1991, F.D. Bennett, 1♀ ("ex. *Leptodictya tabida* eggs on *Saccharum officinarum*") [FSCA, UCRC].

REDESCRIPTION. FEMALE. Length 460-510.

Color. Body brown to dark brown except as follows: eye and ocelli dirty pink; mesoscutum with a lighter (yellow or light brown), narrow, transverse, median band; dorsellum and median part of propodeum light brown; 2 or 3 basal gastral terga (about 3/7 to 1/2 length of gaster) yellow to light brown. Appendages pale or light brown.

Head. Rounded anterior view, wider than mesosoma. Vertex large, strongly transversely striate.

Antenna (Figs. 32, 33). Scape slightly curved and finely longitudinally striate, 5.0-5.5 x as long as wide; pedicel also longitudinally striate, about 1.8-1.9 x as long as wide, much longer than F1; funicle normally 6-segmented (Fig. 32), but often 5-segmented because of an occasional loss of F3 (Fig. 44) or fusion of any 2 neighboring segments (for instance F4 and F5 on one of the antennae, as shown in fig. 8, pl. 4 in



Figs 32-36. *Erythmelus* (*Erythmelus*) *tingitiphagus*, Barquisimeto, Venezuela (32) and Belém, Brazil (33-36): 32, 33) antenna, ♀ (32 - funicle 6-segmented, 33 - funicle 5-segmented, clava not shown), 34) forewing, ♀, 35, 36) genitalia, ♂, dorsal (35) and ventral (36) view. Scale bars = 0.1 mm.

Soares, 1941), that can happen either on one or both antennae in the same specimen; in specimens with a 6-segmented funicle, F1-F5 of variable length, usually subglobular or subquadrate, sometimes F1, F2, or F3 transverse, and F1-F5 without longitudinal sensilla; F6 (F5 if funicle 5-segmented) the largest funicle segment, with 2 longitudinal sensilla, clava 4.4-4.8 x as long as wide, with 5 longitudinal sensilla, 3 of them subapical and 2 medial.

Mesosoma. Pronotum lightly sculptured, each side lobe of pronotum with 3 strong setae. Mesoscutum wider than long, finely longitudinally cellulate, with a strong seta on side lobe in posterolateral angle, midlobe with a pair of strong setae anterior to a transverse, median, yellow or light brown band. Axilla with a faint reticulate sculpture and a strong seta. Scutellum about as long as wide and as long as mesoscutum; posterior scutellum rounded, notably longitudinally striate. Dorsellum small and rhomboidal, each lateral panel of metanotum with 2 weak setae. Propodeum much shorter than mesoscutum or scutellum, almost smooth.

Wings. Forewing (Fig. 34) about 5.0-5.1 x as long as wide, with a slight, but notable narrowing of the blade beyond venation; hypochaeta almost reaching posterior margin, distal macrochaeta 1.7-1.9 x length of proximal macrochaeta; blade slightly infuscated basally but otherwise hyaline; disc mostly bare except for a few scattered setae arranged in 3 incomplete, irregular rows, one such row submedian and 2 other along margins in the distal half of the disc; longest marginal cilia 1.9-2.1 x greatest width of wing. Hind wing 15-16 x as long as wide; blade almost hyaline, with 1 incomplete median row of setae; longest marginal cilia 4.3-4.7 x greatest wing width.

Metasoma. Petiole much wider than long, strap-like in dorsal view. Gaster about as long as or a little longer than mesosoma (often shorter than mesosoma in dry specimens); ovipositor occupying slightly more than half length of gaster, 1.4-1.5 x length of metatibia, not or barely exserted beyond apex of gaster.

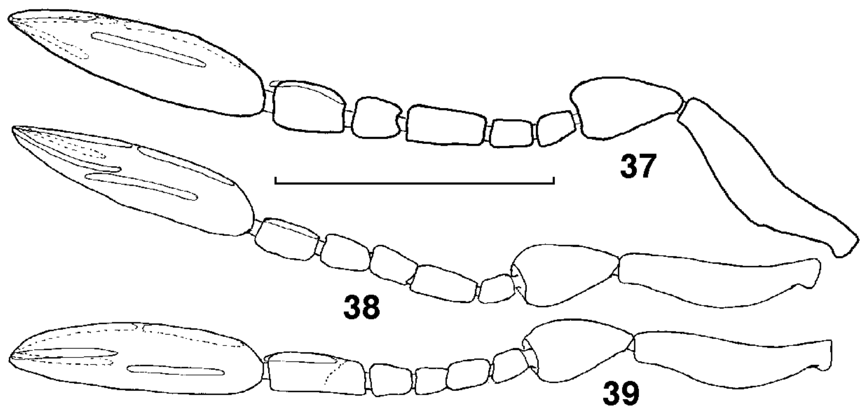
MALE. Length 440-500. Similar to female except for the normal sexually dimorphic characters and the following: antenna (Fig. 11d, pl. 5 in Soares, 1941) 12-segmented (flagellum 10-segmented), with scape smooth and very short, only a little longer than pedicel; forewing relatively wider than in female (length/width ratio about 4.7), the disc a little more pubescent apically; genitalia as in Figs 35, 36.

DIAGNOSIS. This distinctive species is perhaps related to *E. pastoralis* Ogloblin, 1934, described from a single female specimen from Loreto, Misiones, Argentina, as their female antennae, structure of the mesosoma, and coloration are very similar. The relative length of the longest marginal cilia to the maximal width of the forewing (2.0-2.2:1 in *E. tingitiphagus* and 1.6:1 in *E. pastoralis*) seems to be the only (although potentially unreliable) character (as it is often prone to intraspecific variability) that separates these two species, based on the analysis of the original description of *E. pastoralis* (Ogloblin, 1934), which unfortunately lacks an illustration of the forewing. Therefore, a decision about their possible conspecificity must be made only after the holotype female of *E. pastoralis* is examined. *E. tingitiphagus* is also very closely related to an apparently undescribed species from Florida, USA, reared by F.D. Bennett in 1991 from eggs of *Corythucha floridana* Heidemann, 1909 (Tingidae) on oak (I have seen numerous female specimens in FSCA). The mesoscutum of the latter is uniformly colored (dark brown) and F6 of the female antenna, which normally has a 6-segmented funicle, but sometimes a 5-segmented funicle due to fusions of any two neighboring segments (Figs 37-39), bears only 1 longitudinal sensillum.

NOTES. *E. tingitiphagus* is only provisionally assigned to the *flavovarius* species group.

DISTRIBUTION. Argentina (Noyes, 2001), Brazil, *Venezuela.

HOSTS. *Corythaica cyathicollis* (Costa, 1864) [= *C. planaris* (Uhler, 1893)], *C. monacha* (Stål, 1858), *Gargaphia lunulata* (Mayr, 1865), *Leptodictya tabida* (Herrich-Schaeffer, 1840), and *Leptopharsa heveae* Drake et Poor, 1935 (Tingidae). Host associations of *E. tingitiphagus* are likely to include many species of Tingidae, besides the five species listed above. Its two first known hosts, *C. cyathicollis* and *C. monacha*, were mentioned by Soares (1941), the other three are new host records for this parasitoid.



Figs 37-39. *Erythmelus* (*Erythmelus*) sp., ♀, antenna, funicle 5-segmented, Florida, USA: 37) Pompano Beach, F3 and F4 fused, 38, 39) Ft. Drum (38 - F2 and F3 fused, 39 - F5 and F6 fused). Scale bars = 0.1 mm.

COMMENTS. Recognizing this species has been relatively easy because of the availability of photographs and drawings of both female and male *E. tingitiphagus* accompanying the short description by Soares (1941), although I have not seen the type material. The original description, however, mentioned mostly generic morphological characters of *Erythmelus* besides the coloration, hence the necessity of a redescription of *E. tingitiphagus* based on other material at my disposal.

The *helopeltidis* species group

DIAGNOSIS. This species group is very closely related to the *flavovarius* group, to which it is likely basal. It is characterized by a long ovipositor with a large basal loop in the female (Fig. III-1, p. 490 in Viggiani & Jesu, 1985) and complex male genitalia with sclerotized processes on the parameres (Figs 48, 50 and fig. III-2, p. 490 in Viggiani & Jesu, 1985). Chaetotaxy on the forewing is variable but usually discal hairs are present only at the wing apex in females (Figs 41, 44, 49); the forewing is more pubescent in conspecific males (Fig. 47 and fig. II-4, p. 488 in Viggiani & Jesu, 1985).

SPECIES INCLUDED. *E. lygivorus* and *E. nuinu* sp. n. *E. angelovi* may belong here as well, but without examination of the male genitalia it is only tentatively assigned to the *helopeltidis* species group because there is also a chance that it may belong to the *flavovarius* species group. The extralimital species that gave its name to the group is *E. helopeltidis* Gahan, 1949 (Oriental). Some of the Australian species described by Girault (1912b) may turn out to be members of this group (there is one undetermined female specimen from Australia in UCRC which definitely belongs to it). Members of the *helopeltidis* species group seem to be more diverse and common in the Oriental region (I have seen at least one undescribed species from Sri Lanka).

COMMENTS. This group includes the European *E. lygivorus*, type species of the subgenus *Erythmelellus.* The two diagnostic morphological features of *Erythmelellus*, according to Viggiani & Jesu (1985), are the structure of the female genitalia (notably a long ovipositor with a large basal loop) and of the male genitalia (complex and with sclerotized processes on the parameres). Neither of these two characters, however, appears to be of generic or subgeneric value in *Erythmelus* but at best they both are of species-group value within the nominotypical subgenus. First, the ovipositor length in most large genera of Mymaridae almost always (with a few exceptions) is a specific, not a generic or subgeneric type of character. For instance, *E. magnus* sp. n., which clearly belongs to the *agilis* species group, has a long ovipositor with a sizable basal curve and also the associated external female genitalic structures similar to the ones found in *E. lygivorus* and *E. nuinu* sp. n. I have seen many species in other mymarid genera (e.g., *Acmopolynema* Ogloblin, 1946, *Gonatocerus* Nees, 1834, *Polynema* Haliday, 1833) that possess a long ovipositor and the structures of the female reproductive apparatus associated with it; these are very similar to those in the *helopeltidis* group species. Second, the male genitalia of *E. agilis* (Fig. 13, 14),which is a member of the different species group within the same subgenus, are quite similar to those of *E. helopeltidis* (Fig. 50), *E. lygivorus* (Fig. III-2, p. 490 in Viggiani & Jesu, 1985), and *E. nuinu* (Fig. 48).

11. *Erythmelus* (*Erythmelus*) *angelovi* Donev, 1985

Erythmelus angelovi Donev, 1985b: 77 (holotype - ♀, Lukovica, nr. Asenovgrad, Rhodope Mountains, Bulgaria [A. Donev collection, University of Plovdiv "Paissiy Hilendarski", Plovdiv, Bulgaria], not examined); Donev, 1988b: 205.

MATERIAL. **Kyrgyzstan**: Issyk-Kul, S. shore Lake Issyk-Kul, 10 km E Kadzhi-Saj, 42°10'33"N, 77°18'55"E, 1675 m, 5.VII 1999, C.H. Dietrich, 1♀ [UCRC].

DIAGNOSIS. In the original diagnosis, Donev (1985b) compared *E. angelovi* with *E. flavovarius*, but Viggiani & Jesu (1985) considered it to be closely related to *E. lygivorus* Viggiani et Jesu, 1985. Indeed, *E. angelovi* somewhat resembles the species from the *helopeltidis* group based on the presence of a long ovipositor (Fig. 3, p. 78 in Donev, 1985b) and of a large bare area on the forewing disc (Fig. 4, p. 78 in Donev, 1985b). This species is easily recognizable by the combination of a relatively long F1 (Fig. 1, p. 78 in Donev, 1985b), which is about 0.7 length of the pedicel, and F4 of the female antenna lacking longitudinal sensilla. Thus it seems to possess some features of the *agilis, flavovarius,* and *helopeltidis* species groups. Until a male of this species is found (it is presently unknown) and its genitalia are studied, the proper placement of *E. angelovi* remains unclear.

DISTRIBUTION. Bulgaria (Donev, 1985b, 1988b), *Kyrgyzstan.

HOSTS. Unknown.

COMMENTS. The single female from the shore of Lake Issyk-Kul in Kyrgyzstan is only provisionally identified as *E. angelovi* because it has some differences from the type specimens of this species from Bulgaria. Although the antenna is very similar to the one of *E. angelovi* measured and illustrated by Donev (1985b) (except for having 6, rather than 5, longitudinal sensilla on the clava, but the sixth sensillum can be easily overlooked), the forewing is somewhat different, being relatively longer (length/width 4.9 compared with 4.2 in *E. angelovi* from Bulgaria), with the longest marginal cilia slightly, but notably greater (1.35 x) than the maximal width of the forewing (about equal in *E. angelovi* from Bulgaria) and with disc more setose in the apical half than in the Bulgarian specimens. The ovipositor in the female from Kyrgyzstan does not reach the base of the gaster and is shorter (555 µm) than in one of the specimens measured by Donev (1985b) (780 µm). However, I am reluctant to describe a new species from a single specimen, based on such minor differences that are frequently subject to intraspecific variability.

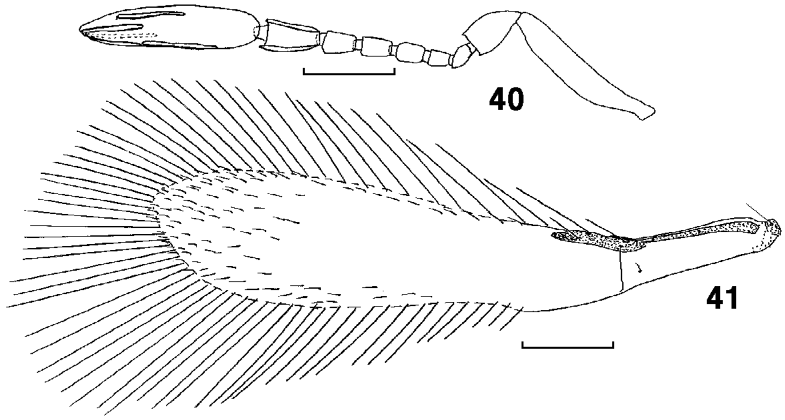
12. *Erythmelus* (*Erythmelus*) *lygivorus* Viggiani et Jesu, 1985
Figs 40, 41

Erythmelus (*Erythmelellus*) *lygivorus* Viggiani & Jesu, 1985: 487 (holotype - ♀, Papiano, Perugia, Italy [IEAP], not examined).

MATERIAL. **France**: Département Gironde, Sainte Colombe, 44°54'N, 00°02'W, 13.VIII 1998, M. van Helden, 1♀ [UCRC]. **Hungary**: Arad-Kövi, Fényes, 1♀; Budapest, L. Biró, 1♀ [HNHM]. **Italy**: Lombardia, Pavia: 21.V 1981, Rufinazzi, 1♀; 18.VI 1981, Rufinazzi, 1♂ [IEFA]. Umbria, Perugia, Monte Peglia, 4-14.VI 1978, 1♂ [CNCI]. **Spain**: Madrid, El Ventorillo, 1480 m, VII 1991, Garrido, 4♀, 1♂ [MNMS].

DIAGNOSIS. Superficially, the female *E. lygivorus* can be confused with some *E. flavovarius* as both species have a similarly looking antenna and forewing, however the forewing of *E. lygivorus* has a larger bare area on the disc (Fig. 41). In addition to the features mentioned in the key, the female of *E. lygivorus* is characterized by the following: midlobe of mesoscutum with a lighter (light brown), narrow, transverse, median band; antenna (Fig. 40) with all funicle segments longer than wide, F1-F5 without longitudinal sensilla, F6 with 2 longitudinal sensilla, and clava with 5 longitudinal sensilla; forewing (Fig. 41) about 4.2 x as long as wide, with apical part of disc (about 1/4-1/3) more or less evenly setose, remainder of disc almost bare, only with a complete row of setae along anterior margin and a few microtrichia along posterior margin in distal half, longest marginal cilia about 1.3 x maximal forewing width; hind wing 17-18 x as long as wide; ovipositor occupying almost entire length of gaster (Fig. III-1, p. 490 in Viggiani & Jesu, 1985), notably exserted beyond its apex (the degree varies), ovipositor/metatibia ratio about 2.2 (if the ovipositor is measured from the top of the loop basally to the tip). Male *E. lygivorus*, well described and illustrated by Viggiani & Jesu (1985), are similar to females except for the normal sexually dimorphic features and the forewing, which is notably wider and more pubescent than in females (Fig. II-4, p. 488 in Viggiani & Jesu, 1985).

DISTRIBUTION. *France, *Hungary, Italy, *Spain.



Figs 40, 41. *Erythmelus* (*Erythmelus*) *lygivorus*, ♀, Sainte Colombe, France: 40) antenna, 41) forewing. Scale bars = 0.1 mm.

HOSTS. *Lygus pratensis* Linnaeus, 1758 and *L. rugulipennis* Poppius, 1911 (Miridae) (Viggiani & Jesu, 1985).

COMMENTS. This interesting species is for the first time reported here from countries other than Italy, thus providing an indication that its distribution may be wider than it is reported above; it is likely to include most of the Mediterranean region and Central Europe.

13. *Erythmelus* (*Erythmelus*) *nuinu* S. Triapitsyn, sp. n.
Figs 42-48

MATERIAL. Holotype - ♀ (on slide) [ZIN]: **Russia**, Primorskii krai, Ussuriysk district, Gornotayozhnoye, M. Michailovskaya, 24.VII-1.VIII 1999, MT. Paratypes - Russia: same locality and collector as the holotype: 10-14.VI 1999, 1♀ on slide and 1♀, 1♂ on points; 12-17.VIII 1999, 2♀ on slides and 1♀ on point; 28.VIII-5.IX 1999, 1♀, 1♂ on slides and 2♀ on cards; 6-14.IX 1999, 1♂ on slide; 20-31.VII 2002, 1♀ on point; 1-11.IX 2002, 1♂ on point [CNCI, IBPV, UCRC, ZIN]. **China**: Beijing Province, Mentougou District, Xiaolongmen Sta., 39°59.22'N, 115°31.48'E, 1095 m, 28.VII 2002, G. Melika, 1♀ on point [SPLK]. **Republic of Korea**: Gyeonggi-do, Suwon-si, Seoudun-dong, Seoul National University, 15.IX 2001, J.-W. Kim, 1♂ on slide [UCRC].

DESCRIPTION. FEMALE (holotype and paratypes). Color. Head, mesosoma, and metasoma dark brown or almost black except as follows: eye and ocelli dirty pink; mesoscutum with a lighter, narrow, transverse, median band; basal two gastral terga pale or white; hypopygium brown. Antenna, wing venation, and legs brown except F1 and inner sides of scape and pedicel slightly lighter; meso- and metacoxae (except basally), trochanters, foretibia, basal three tarsomeres of foretarsus and mesotarsus, and basal half of metatibia light brown.

Head. Rounded and higher than wide in anterior view, slightly wider than mesosoma. Vertex large, transversely striate (aciculate); face and gena faintly sculptured.

Antenna (Fig. 42). Scape slightly curved and finely longitudinally striate, about 5 x as long as wide; pedicel also finely longitudinally striate, about 2 x as long as wide, much longer than F1; each funicle segment cylindrical, F1-F3 subequal in length, F4-F6 progressively longer, all funicle segments progressively wider than the preceding funicle segment, F1-F5 without longitudinal sensilla, F6 the largest funicle segment, with 2 longitudinal sensilla, F5 and F6 rarely fused to form one segment (Fig. 43); clava 3.6-3.7 x as long as wide, with 5 longitudinal sensilla, 3 of them subapical and 2 medial.

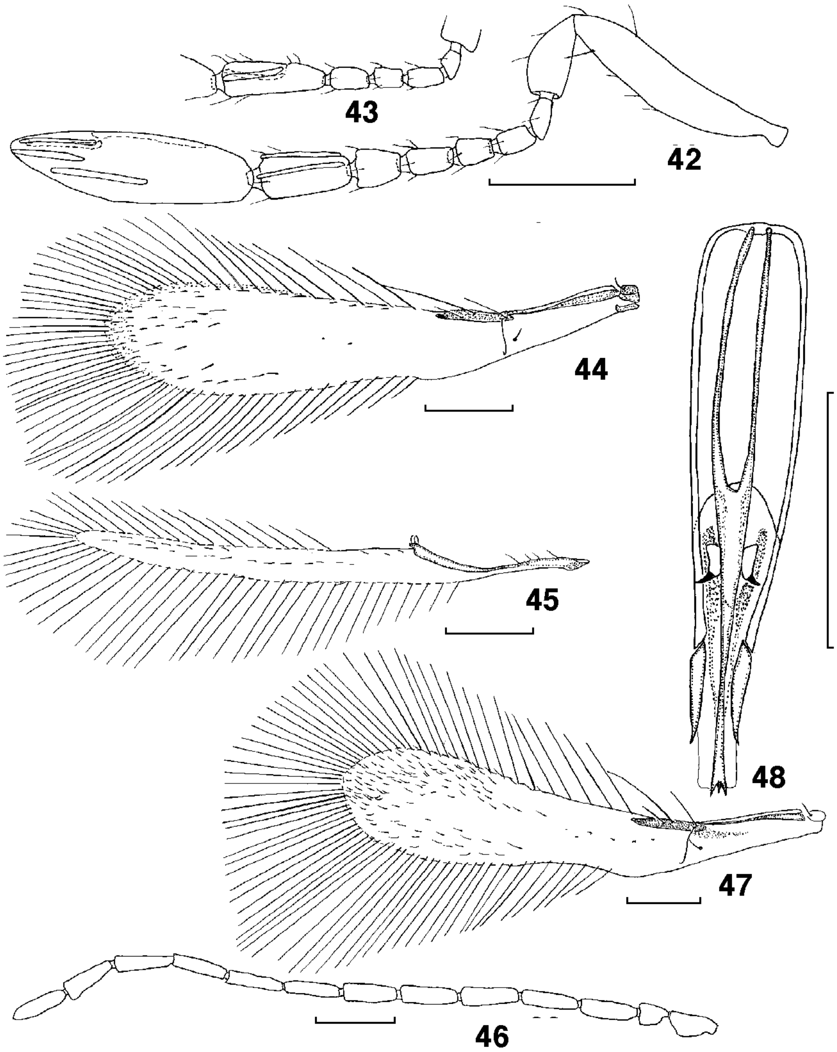
Mesosoma. Pronotum with a cellulate sculpture, each side lobe of pronotum with 2 strong setae. Mesoscutum wider than long, its midlobe finely longitudinally striate (aciculate) and side lobe cellulate-reticulate, midlobe with a pair of strong setae anterior to a transverse, median, yellow band. Axilla small, with faint reticulate sculpture and a long, strong seta almost reaching half length of scutellum. Scutellum oval, longer than wide and slightly longer than mesoscutum, finely longitudinally striate except near anterior margin. Each lateral panel of metanotum with 1 weak seta. Propodeum much shorter than mesoscutum or scutellum, almost smooth.

Wings. Forewing (Fig. 44) 4.5-5.0 x as long as wide, with venation typical of the genus; hypochaeta reaching posterior margin, distal macrochaeta 1.6-2.0 x length of proximal macrochaeta; blade slightly infuscated basally and distally but otherwise hyaline; disc mostly bare except for a few setae at apex and a few scattered microtrichia elsewhere, a complete row of setae along anterior margin, and an incomplete, irregular row of setae along posterior margin in distal half of disc; longest marginal cilia 1.2-1.5 x greatest width of wing. Hind wing (Fig. 45) about 20 x as long as wide; blade mostly hyaline but slightly infuscated at apex, with 1 complete median row of setae; longest marginal cilia 5.2-6.0 x greatest width of wing.

Metasoma. Gaster a little longer than mesosoma; ovipositor occupying 0.8-0.9 length of gaster, strongly curved anteriorly (the loop is about 2/5 of its total length) and markedly exserted beyond apex of gaster (usually by about 1/5-1/6 of its own total length, in one specimen almost by 1/2 of its total length, the degree of its protrusion varies greatly); 2.0-2.2 x (in some specimens up to 2.4) length of metatibia (if the ovipositor is measured from the top of the loop basally to the tip).

Measurements (holotype): Body length (taken before slide-mounting): 828; head length/width (length taken before slide-mounting): 83/215; mesosoma: 375; metasoma: 430; ovipositor: 448. Antenna: scape: 146; pedicel: 51; F1: 24; F2: 22; F3: 22; F4: 29; F5: 29; F6: 54; clava: 164. Forewing: 587/131; longest marginal cilia: 161. Hind wing: 567/28; longest marginal cilia: 146. Legs (given as femur, tibia, tarsus): fore: 157, 157, 194; middle: 131, 219, 234; hind: 128, 223, 241.

MALE (paratypes). Similar to female except for the normal sexually dimorphic characters and the following. Body lighter than in female, mostly brown to dark brown, antenna and basal gastral terga light brown, legs light brown to brown. Antenna (Fig. 46) 13-segmented, all flagellomeres longer than scape. Forewing (Fig. 47) relatively wider than in female (length/width ratio 3.8-4.2), disc much more pubescent at apex,



Figs 42-48. *Erythmelus* (*Erythmelus*) *nuinu* sp. n. (♀ from Gornotayozhnoye, Russia, ♂ from Seoudun-dong, South Korea): 42, 43) antenna, ♀, with normal funicle (42) and funicle with F5 and F6 fused (43), 44) forewing, ♀, 45) hind wing, ♀, 46) antenna, ♂, 47) forewing, ♂, 48) genitalia, ♂, dorsal view. Scale bars = 0.1 mm.

especially along anterior margin. Gaster shorter than mesosoma; genitalia (Fig. 48) similar in shape and structure to those of *E. lygivorus* as illustrated by Viggiani & Jesu (1985) but clearly different in the details.

Measurements (*n*=1, paratype): Body: 808; head: 99; mesosoma: 389; metasoma: 320. Antenna: scape: 58; pedicel: 38; F1: 69; F2: 74; F3: 73; F4: 73; F5: 73; F6: 73; F7: 73; F8: 73; F9: 73; F10: 73; F11: 69. Forewing: 650/172; longest marginal cilia: 237. Hind wing: 622/24; longest marginal cilia: 173. Genitalia: 256.

DIAGNOSIS**.** Among the Palaearctic species, the new species is closest to *E. lygivorus*, from which it differs mainly in the chaetotaxy of the forewing, especially in the male (posterior half at the apex is more densely setose in the male of *E. lygivorus* but is almost hairless in *E. nuinu* n. sp., fig. 47) as well as in the shape of the male genitalia. The coloration of the metasoma in females of these two species is also different: in *E. nuinu*, the base of metasoma (two first gastral terga) is completely white or pale whereas in *E. lygivorus*, the basal part of the first gastral tergum is brown but the apical part and the second gastral tergum are yellow to light brown, thus the metasoma appears to have a yellow band basally (Viggiani & Jesu, 1985). *E. nuinu* sp. n. is especially close to *E. helopeltidis* Gahan, 1949, described, without any illustrations, from a large series of female and male specimens reared in Kuala Lumpur, Malaysia, from eggs of *Helopeltis cinchonae* Mann, 1907 (Miridae), a pest of the tea plant (Gahan, 1949). Later, Subba Rao (1970) illustrated the female of *E. helopeltidis* and also recorded this species in India from three female specimens reared from a seed feeding fly, *Ophiomyia lantanae* (Froggatt, 1919) (Diptera: Agromyzidae), but this host record seems doubtful. The meso- and metatibiae in females of *E. helopeltidis* are light brown whereas their apices are dark brown in females of *E. nuinu*. The female forewing of *E. helopeltidis* (Fig. 49) is rather wide (length/width ratio is about 4), with the longest marginal cilia slightly less than maximum wing width; the ovipositor in female *E. helopeltidis* occupies the whole length of the gaster and is notably exserted beyond its apex, ovipositor length/metatibia length ratio is about 2.6-3.1 (if the ovipositor is measured from the top of the loop basally to the tip); the male genitalia of *E. helopeltidis* (Fig. 50) are similar in structure to those in *E. nuinu* but more elongated (examined were the paratypes of *E. helopeltidis* from USNM, under No. 58988, 3♀, 1♂ on 2 points and 20♀, 15♂ on 4 slides, labeled: "Ex *Helopeltis cinchonae* eggs R. A. Lever Cameron Highlands 4700 ft. Kuala Lumpur July 20, 1948").

DISTRIBUTION. Russia (Primorskii krai), China (Beijing Province), and Republic of Korea.

HOSTS. Unknown.

ETYMOLOGY**.** The specific name means "wow" in Russian.

COMMENTS. All specimens of this species from Primorskii krai were collected in a Malaise trap.

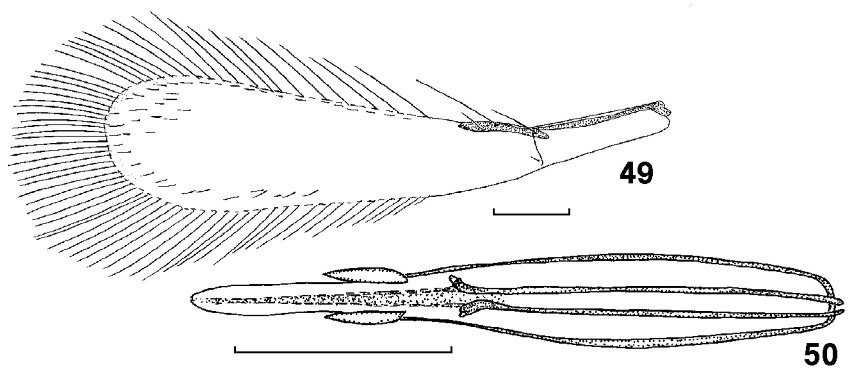
Subgenus *Parallelaptera* Enock, 1909

Parallelaptera Enock, 1909: 454; Girault, 1912a: 297; Debauche, 1948: 189; Kryger, 1950: 81; Annecke & Doutt, 1961: 17; Hellén, 1974: 29; Trjapitzin, 1978: 527; Subba Rao, 1984: 255; Subba Rao, 1989: 164.

Anthemiella Girault, 1911: 187. Synonymized under *Parallelaptera* by Girault, 1912a: 297.

Erythmelus: Schauff, 1984: 45 (part.); Trjapitzin, 1993: 267 (as the *panis* species group); Triapitsyn & Huber, 2000: 613 (as the *panis* species group);

Erythmelus (as a subgenus of *Erythmelus*): Beardsley & Huber, 2000: 14.



Figs 49, 50. *Erythmelus* (*Erythmelus*) *helopeltidis*, paratypes: 49) forewing, ♀, 50) genitalia, ♂. Scale bars = 0.1 mm.

DIAGNOSIS. Funicle of female antenna usually 5-segmented (Figs 51, 55), rarely 4-segmented due to complete or partial fusion of F1 and F2, clava with 5 longitudinal sensilla; flagellum of male antenna 10-segmented, with F2 much shorter than F1 and F3 (Figs 53, 57); forewing (Figs 52, 56) with anterior and posterior margins almost parallel beyond venation (forewing about as wide at apex of venation as at broadest part of disc); petiole much wider than long, quite inconspicuous even in slide-mounted specimens; male genitalia simple (Figs. 54, 58).

COMMENTS. Species comprising the subgenus *E.* (*Parallelaptera*) are very small (body length of most species is about 0.5 mm) and tend to have very wide distributions, like many other members of *Erythmelus*. Most of the trustworthy host records are from eggs of Tingidae.

Key to the World species, females

1. F1 and F2 partially or completely fused, so that funicle appears 4-segmented, especially in dry specimens . . . . 14. ***E. vladimir***
– F1 and F2 clearly separate from each other, funicle distinctly 5-segmented . . . 2
2. F3 much longer than F4, with 2 longitudinal sensilla . . . . 15. ***E. funiculi***
– F3 subequal to or shorter than F4, without longitudinal sensilla 3
3. F1, F2, and F3 subequal in length and about as long as broad in lateral view . . . . 16. ***E. teleonemiae***
– At least F2 or F3 (or both) notably longer than preceding funicle segment and both distinctly longer than wide in lateral view 4
4. F5 about 0.8-0.9 x combined length of F3 and F4 (Fig. 51); mesosoma usually shorter than metasoma; forewing (Fig. 52) length/width ratio 7.0-9.0 . . . . 17. ***E. rex***
– F5 about 1.0-1.3 x combined length of F3 and F4 (Fig. 55); mesosoma usually notably longer than metasoma; forewing (Fig. 56) length/width ratio 6.3-6.6 . . . . 18. ***E. panis***

14. *Erythmelus* (*Parallelaptera*) *vladimir* S. Triapitsyn et Fidalgo, 2001

Erythmelus (*Parallelaptera*) *vladimir* S. Triapitsyn & Fidalgo, 2001: 163 (holotype - ♀, Viçosa, Minas Gerais, Brazil [Fundación e Instituto Muguel Lillo, San Miguel de Tucumán, Tucumбn, Argentina], examined).

DIAGNOSIS. This is one of the most easily recognizable species of *E.* (*Parallelaptera*) because of its unique funicle, as mentioned in the key and illustrated in the original description (Triapitsyn & Fidalgo, 2001).

This species is known from the female sex only.

DISTRIBUTION. Brazil.

HOSTS. *Acanthocheila armigera* (Stel, 1858) (Tingidae) (Triapitsyn & Fidalgo, 2001).

15. *Erythmelus* (*Parallelaptera*) *funiculi* (Annecke et Doutt, 1961)

Parallelaptera funiculi Annecke et Doutt, 1961: 44 (holotype - ♀, Pretoria, South Africa [South African National Collection of Insects, Plant Protection Research Institute, Pretoria, South Africa], not examined; paratype - ♀ (on slide): South Africa, Pretoria, III 1959, D.P. Annecke, suction trap [EMEC], examined).

Erythmelus funiculi: Trjapitzin, 1993: 268, 270.

Erythmelus (*Parallelaptera*) *funiculi*: Beardsley & Huber, 2000: 14.

MATERIAL. **USA**, Hawaii (Hawaiian Islands): Molokai I., Mapulehu near Ililiopae Heiau, V 1995, W.D. Perreira, 1♀ [UCRC]; Oahu I.: Waimanalo Experiment Station, 21-28.VIII 1986, L. LeBeck, 5♀; University of Hawaii Campus, Gilmore Hall, 10-13.VII 1986, L. LeBeck, 1♀ [CNCI].

DIAGNOSIS. *E. funiculi* is a very distinctive species due to the proportions of funicle segments of the female antenna: F3, which bears two longitudinal sensilla, is much longer than F2 or F4 and almost as long as F5.

This species is known from the female sex only.

DISTRIBUTION. South Africa (Annecke & Doutt, 1961), Uganda (Trjapitzin, 1993),USA (Hawaiian Islands) (Beardsley & Huber, 2000).

HOSTS. Unknown.

16. *Erythmelus* (*Parallelaptera*) *teleonemiae* (Subba Rao, 1984)

Parallelaptera teleonemiae Subba Rao, 1984: 253 (holotype - ♀, Bangalore, Karnataka, India [BMNH], not examined).

Parallelaptera telenemiae [sic]: Goncharenko & Fursov, 1988: 59.

Parallelaptera polyphaga Livingstone et Yacoob, 1990: 631 (holotype - ♀, Chamundi Hills, India [Division of Entomology, Bharathiar University, Coimbatore, Tamil Nadu, India], not examined). Synonymized under *E. teleonemiae* by Hayat, 1992: 88.

Erythmelus teleonemiae: Hayat, 1992: 88; Trjapitzin, 1993: 268.

Erythmelus polyphagus: Trjapitzin, 1993: 268.

MATERIAL. **India**: Tamil Nadu, Coimbatore, 1♀, 1♂. **Iraq**: Mosul, Nenavali Agricultural Station, 20.IX 1985, 1♀, 1♂ ("ex. *Stephanitis pyri*") [BMNH].

DIAGNOSIS. Only slightly different proportions of female antennal segments, as mentioned in the key, separate this species from *E. panis*, which was also reported from southern India (as *P. panchama* Subba Rao, 1989). Considering the fact that lengths and even the number of funicle segments are not stable in some other species of *Erythmelus*, especially those minute species that parasitize eggs of Tingidae, there is a good chance that these two species may be the same. The male genitalia of *E. teleonemiae*, illustrated by Livingstone & Yacoob (1990), are identical to those of *E. panis*.

DISTRIBUTION. India, Iraq.

HOSTS. *Stephanitis pyri* (Fabricius, 1775) (Tingidae) in Iraq (Trjapitzin, 1993) and 22 other tingid species in India, listed by Livingstone et al. (1997).

COMMENTS. This species may eventually have to be synonymized under *E. panis*. However, because I could examine only a few specimens from India and could not check the range of variability of the antennal characters in the females of this species, I refrain from doing so until more material become available.

17. *Erythmelus* (*Parallelaptera*) *rex* (Girault, 1911)
Figs 51-54

Anthemiella rex Girault, 1911: 185 (holotype - ♀, Urbana, Illinois, USA [USNM], examined).

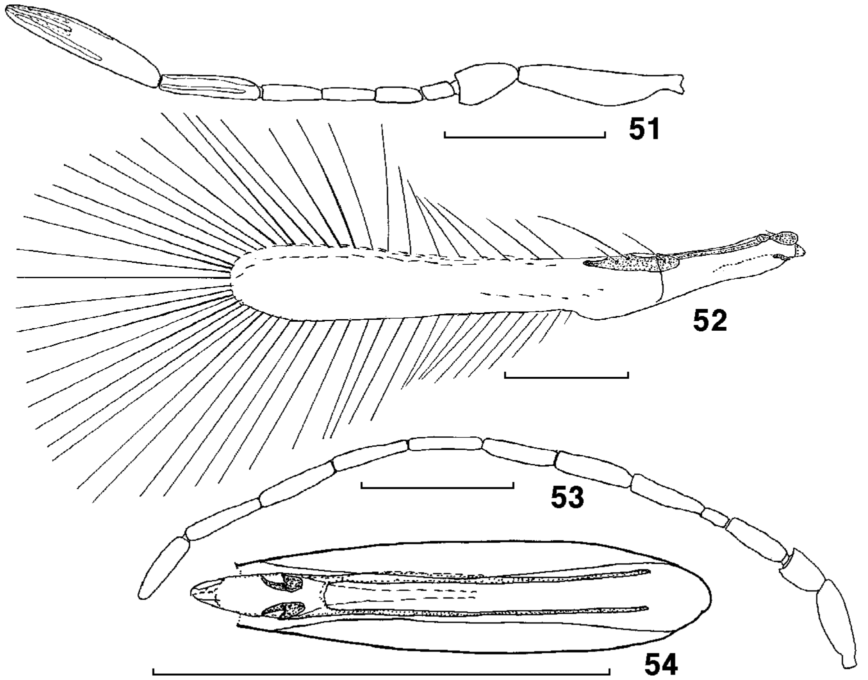
Parallelaptera rex: Girault, 1912a: 298; Girault, 1929: 8.

Parallelaptera ?rex: Annecke & Doutt, 1961: 17.

Erythmelus rex: Trjapitzin, 1993: 268, 270.

Erythmelus margianus S. Trjapitzin, 1993: 268 (holotype - ♀, Old Nisa, Turkmenistan [ZIN], examined), **syn. n.**

MATERIAL. **Russia**: Moscow Region, Noginsk district, Fryazevo, 15-25.VIII 2000, M. Tretiakov, 1♀. Primorskii krai, Ussuriysk district, Gornotayozhnoye, M. Michailovskaya, 11-14.VII 1999, 1♀ [UCRC]. **Austria**: Burgenländ, St. Andrä, Neusiedlersee, 11.VIII 1942, S. Nowicky, 1♂; Lower Austria: Hundsheim, W. Soyka: 12.IX 1954, 1♀; 22. IX 1954, 1♀ [NHMW]. **Canada**: Alberta: Writing-on-Stone Prov. Park, 29.V-6.VI 1981, D. McCorquodale, 1♀; 0.5 km E Writing-on-Stone Prov. Park, 6-13.VIII 1981, D. McCorquodale, 1□; Ontario, Innisville, 12.VII 1963, W.R.M. Mason, 1♀; Quebec, Ste. Anne de Bellevue, 19.VI 1993, K. Al-Ghamdi, 3♀, 1♂ ("ex. *Adelphocoris* on *Solidago*"); Prince Edward I., Harrington, 19.VIII 1983, M.E.M. Smith, 1♀ [CNCI]. **France**: Département Gironde: Mérignac, 19.VIII 2000, S. Bessart, M. van Helden, 1♀, 1♂ (on *Chenopodium glaucum* L.). Sainte Colombe, 13.VIII 1998, M. van Helden, 1 ♂ [UCRC]. Département Hérault, Montpellier, European Parasite Laboratory, 9.I 1990, 4♀, 1♂. **Greece**: Rhodes I. (Rodhos), Ixia, 15-29.VIII 1984, M. C. Day, 2♀. Iran: Markazi Province, Karaj, VI-IX 1977 and 1978, J.T. Huber, numerous ♀, ♂ [CNCI]. **Kyrgyzstan**: Talas,



Figs 51-54. *Erythmelus* (*Parallelaptera*) *rex*: 51) antenna, ♀, Oildale, USA, 52) forewing, ♀, Riverside, USA, 53) antenna, ♂, San Lucas, USA, 54) genitalia, ♂, Old Nisa, Turkmenistan, dorsal view. Scale bars = 0.1 mm.

Kara Buura Ravine, 20 km S Kyzyl-Adyr, 42°26'23"N, 71°33'16"E, 1300 m, 15.VI 1999, C.H. Dietrich, 1♀ [UCRC]. **Mexico**: Baja California, Santo Domingo, 7.V 1928, C.F. Henderson, 6♀, 1♂ ("ex. eggs of *Eutettix tenella* in *Chenopodium*") [EMEC]; Hidalgo, Pachuca, 24.V 1992, A.J. Guzmán Larralde, 3♀ [Centro de Entomología y Acarología, Colegio de Postgraduados, Montecillo, Estado de México, Mexico]. **Spain**: Alicante, J.K. Holloway (on *Amaranthus* sp.): 16-17.VII 1952, 6♀; 19.V 1953, 1♀; Río Jarama, J.K. Holloway (on *Chenopodium* sp.): 3.VIII 1952, 1♀; 25.VIII 1952, 4♀; Rota-Juez, 19.VIII 1952, J.K. Holloway, 11♀ (on *Chenopodium* sp.). Toledo, 11.VIII 1952, J.K. Holloway, 1♀ (on *Chenopodium* sp.) [EMEC]. **Turkmenistan**: Enev, VI 1993, S. Myartseva, 2♂ (on *Atriplex* sp. and *Beta* sp.); Bayram-Ali, 3.VI 1992, S. Triapitsyn, 1♀ (on *Salsola* sp.); Kara-Kum Desert near Bayram-Ali, 15.VI 1992, S. Triapitsyn, 2♂ (on *Atriplex* sp.); Mary Oasis, Sovkhoz "Karakumkanal": 21.V 1992, V. Trjapitzin, 3♀; 4.VI 1992, S. Triapitsyn, 2♀ (on *Atriplex* sp.); 15.VI 1992, S. Triapitsyn, 3♀, 2♂ (on *Salsola* sp.) [UCRC, ZIN]; Old Nisa: 9-11.VI 1992, S. Triapitsyn, 8♀, 5♂ (on *Atriplex* sp.); 15.VI 1992, V. Trjapitzin, 4♀, 5♂ (on *Atriplex* sp.) [CNCI, UCRC, ZIN]. **USA**: Arizona, Pima Co., Tucson, 22.IX 1982, 4♀ ("3rd generation ex. *Lygus hesperus*, USDA lab culture") [CNCI]; California, Fresno Co.: Big Panoche Canyon, 22.V 1952, C.E. Kennett, 1 ♀ ("on *Atriplex*"). Vicinity of Coalinga, 17.VIII 1955, F.E. Skinner, 5♀ ("ex. cage of fogweed"); Coalinga Nose, 6.X 1953, C.B. Huffaker, 1♀ ("ex. Russian thistle"); 4 mi. W Kearney Park, 13.IX 1951, C.E. Kennett, C.B. Huffaker, 7♀ ("ex. *Atriplex bracteosa*"); Kerman, 13.IX 1951, C.E. Kennett, 1♀ ("on *Atriplex bracteosa*"). Mercey Hot Springs, 16.X 1952, R.L. Doutt, 8♀ ("on *Atriplex*"); Parlier: 26.IV 1973, R.L. Doutt, 2♀ (in vineyard); 17.IV 1974, 1♀ (on citrus) [EMEC]; Kern Co., Oildale: 12.V 1992, M.S. Moratorio, 3♀ (on *Atriplex* sp.); 19.IV 1993, S. Triapitsyn, 1 ♀ (on *Atriplex* sp.); 11.VI 1993, S. Triapitsyn, 2♀ (on *Atriplex* sp.) [UCRC]; Kings Co., Hub, 13.IX-18.X 1951, C.E. Kennett, 13♀ ("on *Atriplex bracteosa*"); Los Angeles Co., Los Angeles, 13.V 1928, C.F. Henderson, 1♀ ("ex. eggs of *Eutettix* in *Chenopodium* and *Atriplex*"); Monterey Co.: Salinas Valley, C.F. Henderson: 1♀, 1♂ ("ex. eggs of *Eutettix tenella* in *Chenopodium*"); numerous ♀, ♂ ("ex. eggs of *Eutettix tenella* in *Atriplex*"); 5♀, 3♂ ("ex. eggs of *Eutettix tenella* in Australian saltbush"); San Lucas, 31.VIII-13.IX 1954, C.E. Kennett, 36♀, 13♂ ("ex. cage of fogweed") [EMEC]; Riverside Co., Riverside, 18.X 1996, I.M. Bayoun, 1♀ (on *Chenopodium* sp.) [UCRC]; Santa Barbara Co., Santa Maria, 10.VIII 1954, C.E. Kennett, 13♀ ("ex. cage of *Chenopodium*"); Ventura Co., Camarillo, 26.VIII 1953, C.E. Kennett, 4♀ ("on *Atriplex*") [EMEC]; Iowa, Cedar Co., 12 mi. SSE Tipton, 28.VIII 1983, J.D. Pinto, 2♀ [UCRC]; Ohio, Wayne Co., Snyder Farm, OARDC, 27.V 1992, T. Miklasiewicz, 1♀. **UK** (Wales): Mid Glamorgan Co., Kenfig Pool NNR, 4.VIII 1994, J.S. Noyes, 1♀. W. Glamorgan Co., Oxwich NNR, 5.VIII 1994, J.S. Noyes, 1♀ [CNCI].

DIAGNOSIS. Very close to *E. panis*, from which it may be distinguished by the characters given in the key. However, occasionally smaller females of *E. rex* and larger females of *E. panis* may be easily confused with each other. The flagellomeres of the male antenna (Fig. 53) and the male genitalia (Fig. 54) seem to be relatively longer in *E. rex* than in *E. panis* (Figs. 57 and 58, respectively). The elongated male genitalia of *E. rex* (Fig. 54) are perhaps the best distinctive feature of this species.

DISTRIBUTION. *Russia (Moscow region, Primorskii krai); *Austria, *Canada, *France, *Greece, *Iran, *Kyrgyzstan, Mexico, *Spain, *Turkmenistan, USA, UK (*Wales).

HOSTS. This species is associated with hosts laying their eggs in plants belonging to the Chenopodiaceae. *Adelphocoris* sp. and *Lygus hesperus* Knight, 1917 (Miridae) are new host records for *E. rex*. The only previously known host was the beet leafhopper, *Neoaliturus (Circulifer) tenellus* (Baker, 1896) (Homoptera: Cicadellidae), initially reported by Severin (1924), who studied its egg parasitoids on saltbushes (*Atriplex* spp.) in the San Joaquin Valley of California, USA. Now I consider that host record to be erroneous because the rearing method used by Severin unlikely was good enough to differentiate exact hosts of the egg parasitoids emerging from the samples of plant material; the latter likely contained parasitized eggs of both leafhoppers and mirid and/or tingid bugs. Annecke & Doutt (1961) and also Mathot (*in* Demaire, 1973) shared this point of view. Earlier, I myself mistakenly reported *N. tenellus* as host of *E. margianus* in Turkmenistan (Trjapitzin, 1993). However, experiments I conducted later with the emerged *E. margianus* (= *E. rex*) parasitoids in quarantine resulted in their failure to reproduce on *N. tenellus* eggs. Similar results were reported by Annecke & Doutt (1961) with their specimens from Alicante, Spain.

Besides Miridae, likely hosts of this species could also be Tingidae that feed on various Chenopodiaceae such as *Atriplex*, *Chenopodium*, and *Salsola*. According Drake & Ruhoff (1965), the only species reported on these plants in western North America is *Corythaica venusta* (Champion, 1898) whereas in the Old World, those catalogued are *Dictyla nassata* (Puton, 1874) and *Derephysia foliacea* (Fallén, 1807), both widely distributed in the Palaearctic region.

COMMENTS. After examining numerous specimens of *E. rex* from North America and of *E. margianus* from the Palaearctic region, it became clear to me that minor differences in the body coloration, proportions of the antennal segments, etc. (Trjapitzin, 1993), do not really justify keeping the latter as a separate species.

18. *Erythmelus* (*Parallelaptera*) *panis* (Enock, 1909)
Figs 55-58

Parallelaptera panis Enock, 1909: 454, Pl. XIII, Figs 1-5 (holotype - ♀, Woking, England [BMNH], examined; allotype - ♂, Richmond, England [BMNH], examined); Debauche, 1948: 190; Kryger, 1950: 83; Hellén, 1974: 29; Donev, 1985a: 63; Trjapitzin, 1978: 527; Goncharenko & Fursov, 1988: 59; Viggiani & van Harten, 1996: 75.

Parallelaptera foucarti Mathot *in* Demaire, 1973: 30 (holotype - ♀, ?Rubona, Rwanda [Musée Royal d'Afrique Centrale, Tervueren, Belgium], examined), **syn. n.**

Parallelaptera sp. near *rex*: Viggiani & Jesu, 1988: 1024.

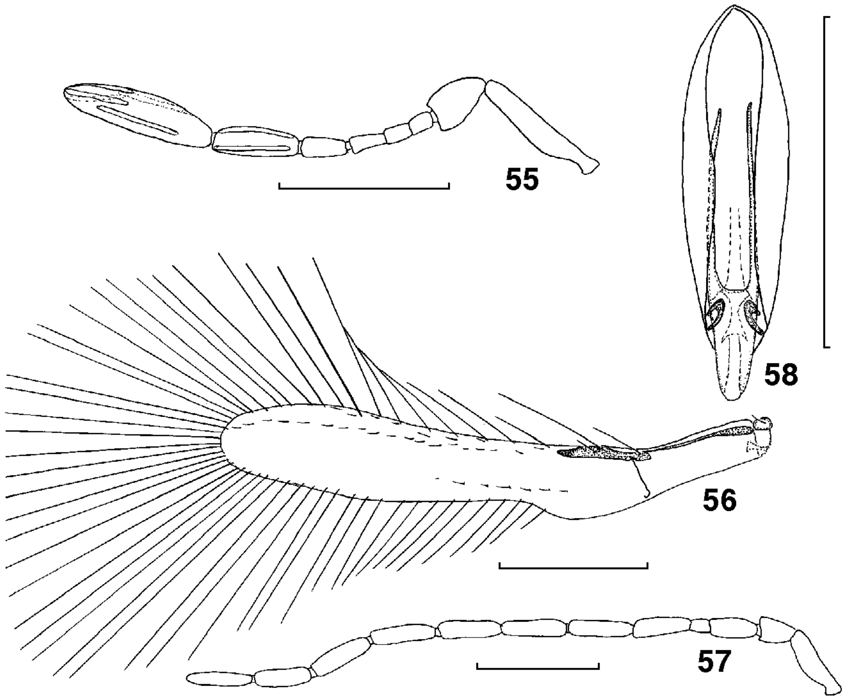
Parallelaptera panchama Subba Rao, 1989: 165 (holotype - ♀, Coimbatore, Tamil Nadu, India [BMNH], not examined; paratype - ♀, same data as the holotype [BMNH], examined), **syn. n.**

Erythmelus panchamae [sic]: Hayat, 1992: 88.

Erythmelus panis: Trjapitzin, 1993: 268, 270; Baquero & Jordana, 2002: 80-81.

Erythmelus panchamus: Trjapitzin, 1993: 268, 270.

MATERIAL. **Russia**: Primorskii krai, Ussuriysk district, Gornotayozhnoye, M. Michailovskaya: 11-14.VII 1999, 2♀; 12-17.VIII 1999, 1♂; 21-26.VIII 2000, 1♀ [UCRC, ZIN]. **Austria**: Lower Austria: Hundsheim: 20.IX 1953, W. Soyka, 1♀ [NHMW]; Hundsheimer Berg near Hainburg, below 480 m, 9-17.VI 1978, H. Zettel, 4♀ [CNCI]. **China**: Beijing Province, Mentougou District, G.Melika: Liyan Ling (Linshan Mts.), 40°00.28'N, 115°30.75'E, 1749 m, 2.VIII 2002, 3♀. Xiaolongmen Sta., 39°59.22'N, 115°31.48'E, 1095 m, 28.VII 2002, 14♀, 12♂ [SPLK, UCRC]. **UK** (England): (Berkshire, Ascot, Silwood Park, A. Eguagie ("ex. *Tingis ampliata* (Herrich-Schaeffer) in thistle, *Cirsium arvense*"): 12-16.VI 1966, 2♀, 1♂; 16-24.VI 1966, 2♀, 1♂; 21-28.VII 1966, 4♀, 2♂ [EMEC]. **Finland**: Parikkala, W. Hellén, 1♀, 1♂; Taipalsaari, W. Hellén, 1♂ [MZHF]. **France**: Département Gironde:



Figs 55-58. *Erythmelus* (*Parallelaptera*) *panis*, Sainte Colombe, France: 55) antenna, female, 56) forewing, ♀, 57) antenna, ♂, 58) genitalia, ♂, dorsal view. Scale bars = 0.1 mm.

Mérignac, S. Bessart, M. van Helden: 5.VIII 2000, 1♀, 1♂ (on *Urtica dioica* L.); 6.VIII 2000, 1♂ (on *Solanum tuberosum* L.); Sainte Colombe, 44°54'N, 00°02'W: 2.VII 1998, M. van Helden, 1♂; 30.VII 1998, M. van Helden, 1♂; 13.VIII 1998, M. van Helden, 4♀, 2♂; 17.IX 1998, S. Bessart, M. van Helden, 2♂; 9.VII 2000, S. Bessart, M. van Helden, 1♀ (on *Prunus avium* (L.) Moench); 19.VII 2000, 1♀ ("on *Malus sylvestris*"); 17.VIII 2000, M. van Helden, 7♀, 1♂ [ENITA, UCRC]; Département Hérault, Montpellier: 8-14.IX.1979, J.T. Huber, 1♀; European Parasite Laboratory, 9.I 1990, 2♀, 2♂ [CNCI]. **Germany**: Maklenburg, Malchin, Jettchens Hof, VIII 1936, H. Stammer, 1♀ [EMEC]. **Hungary**: Vas Co., Köszeg, C. Thuróczy: 14.VIII 1995, 1♂; 16-17.VIII 1996, 1♀ [SPLK]. **Iran**: Markazi Province, Karaj, J.T. Huber: 13-17.VII 1977, 4♀, 7♂; 1-3.IX 1977, 1♀, 3♂ [CNCI, UCRC]. **Italy**: Calabria, Convento di Colloreto, ca. 5 km N Morano Calabria, 22.VI 1988, J.D. Pinto, 1♂ [CNCI]. Campania, Portici, F. Silvestri, 1♀ [IEAP]. Sardinia, Tempio (Cusseddu), 28.VIII-4.IX 1978, 1♂ [CNCI]. **Kyrgyzstan**: S. shore Lake Issyk-Kul, 10 km E Kadzhi-Saj, 42°10'33"N, 77°18'55"E, 1675 m, 2-6.VII 1999, C.H. Dietrich, 1♂; Osh: Gultcha Ravine, 50 km SSW Gultcha, 39°52'17"N, 73°21'26"E, 2530 m, 6.VII 2000, C.H. Dietrich, 1♀; Ikizyak River, 2 km E junction with Kok-Suu River, 39°42'51"N, 73°46'30"E, 3100 m, 9.VII 2000, C.H. Dietrich, 1♂; Karakuldzha, Lajsu Ravine, 40°31'20"N, 73°37'10"E, 1815 m, 25.VI 1999, C.H. Dietrich, ♀ [INHS, UCRC]. **Mali**: Mourdiah, M. Matthews: 25.VIII-5.IX 1986, 1♀, 3♂; 25.IX-3.X 1986, 1♀ [CNCI]. **Norway**: Horum, Verket, 8.VII-19.VIII 1995, L.O. Hansen, 2♀ [ZMUN]. **Spain**: Balearic Islands, Mallorca, Palma Nova, 26.VIII-3.IX 1983, M.C. Day, 1♀ [CNCI]. Madrid, El Ventorillo, 1480 m, Garrido: VIII 1988, 5♀; VII 1991, 10♀ [MNMS]. **Switzerland**: 26.VIII 1952, W. Soyka, 1♀ [NHMW].

DIAGNOSIS. See the above diagnosis for *E. rex*. This is a highly variable species, especially in the proportions of the funicle segments in the female antenna. Such variability may be due to polyphagy, body size, or geographical factors. The male genitalia of *E. panis* (Fig. 58) are relatively short; the genitalia of the male specimens at my disposal are only slightly different from those illustrated earlier by Viggiani (1988, 1989).

DISTRIBUTION. *Russia (Primorskii krai); Austria, Belgium (Debauche, 1948), Bulgaria (Donev, 1985a), Cape Verde Islands (Viggiani & van Harten, 1996),*China, *Congo (Zaire) (Demaire, 1973), Denmark (Kryger, 1950), UK (England), Finland, *France, *Germany, Greece (Donev, 1985a), *Hungary, *India (Subba Rao, 1989), Iran, Italy, *Kyrgyzstan, *Mali, Moldova (Goncharenko & Fursov, 1988), *Norway, *Rwanda (Demaire, 1973), Spain, *Switzerland.

HOSTS. *Corythucha ciliata* (Say, 1832) (Viggiani & Jesu, 1988) and *Stephanitis pyri* (Fabricius, 1775) (Goncharenko & Fursov, 1988; Akbarzadeh-Shoukat, 1998) (Tingidae). The lacebugs *Habrochila ghesquierei* Schouteden, 1953 and *Tingis ampliata* (Herrich-Schaeffer, 1838) are additional host records for *E. panis*.

COMMENTS. This polyphagous species is likely to occur not only throughout the range of its well-known lacebug host, *S. pyri*, in the Palaearctic region but also well beyond its borders. Demaire (1973) noted that besides Rwanda, *P. foucarti* (= *E. panis*) was known from eggs of *H. ghesquierei* on coffee in Zaire. Based on morphology, both *P. foucarti* and *E. panchamus* fall within the range of features characteristic of *E. panis* and therefore they are synonymized herein under the latter.

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