North-Western Journal of Zoology
P-ISSN: 1584-9074, E-ISSN: 1843-5629

Vol. 5, No. 2, 2009, pp.307-320
Article No.: 051126

Romanian Eupelmidae (Hymenoptera, Chalcidoidea): new cytogenetic, faunistic and host records

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Abstract: Faunistic, cytogenetic and host data are presented for 15 species of Eupelmidae from east and south east Romania (Moldova and Dobroudja). The presence of *Calosota viridis* and *C. obscura* (Calosotinae) is confirmed and 11 species of Eupelmidae are newly recorded for Romania, including 3 species of Calosotinae (*Calosota aestivalis*, *C. dusmeti* and *Eusandalum walkeri*) and 8 species of Eupelminae (*Anastatus catalonicus*, *A. lichtensteini*, *A. ruficaudus*, *Arachnophaga picardi*, *Eupelmus aloysii*, *Eup. fulvipes*, *Eup. vindex* and *Eup. maculatus*). The male of *Eup. aloysii* is newly described and new host records are given for 4 species. A lectotype is designated for *Anastatus picardi* Bernard, 1936 and the status of the alleged type material of *Anastatus ameleophagus* Bernard, 1935 present in the collections of the Natural History Museum (London) is discussed. The karyotype $n = 6$ reported for *Calosota obscura* is the first recorded chromosome number for Calosotinae.

Key words: Chalcidoidea, Eupelmidae, cytogenetics, new records, hosts.

Introduction

The Eupelmidae is a small family of chalcid wasps (Hymenoptera, Chalcidoidea) with about 900 described species. Their larvae are primary or secondary parasitoids, usually of the preimaginal stages of insects but also parasitising other groups of arthropods. They are most specious in the tropical regions, with only relatively few species occurring in Europe (Noyes 2003). Many species are rare in collections, partly because most Eupelmidae are infrequently collected using sweep nets, the traditional method for collecting chalcid wasps. Interesting results are obtained using Malaise or pan traps to collect individuals or by rearing them from galls, dead wood infested with xylophagous coleopterans and other hosts. Unfortunately these techniques are time consuming and not frequently used. The difficulty in collecting eupelmids combined with the relatively few publications useful to identify them explains why the Romanian Eupelmidae fauna is still poorly known. There is no recent monographic revision of European Eupelmidae, but Ruschka (1921), Ferrière (1954), Erdős (1960), Bouček (1967), Kalina (1981a, b, 1988) and Askew & Nieves-Aldrey (2000, 2004, 2006) are the most useful papers for the identification of this group of microhymenopterans.

Material and methods

Specimen sampling

Specimens used in this study were collected mainly in nature reserves from East and South East Romania using a standard sweep net, yellow pan traps or

reared from their hosts as described by Noyes (1982). Collections were made during the years 2000-2008 by the author and other members of the micro-hymenoptera group from "Al. I. Cuza" University of Iaşi, in the context of a long term investigation of Romanian chalcidoid and proctotrupoid wasp biodiversity. Several species were obtained from dead wood inhabited by xylophagous insect larvae as a result of a study on the food plants of longhorn beetles (Coleoptera: Cerambycidae) (Dascălu 2006). The species were identified using all the available keys and descriptions and when possible by comparing them with identified material or type material. All specimens are deposited in the author's collection at "Al. I. Cuza" University of Iaşi, Romania.

Cytogenetics

Chromosome preparations for *Calosota obscura* were obtained from the ovaries of adult females as suggested by Gokhman & Quicke (1995) using the standard technique of Imai et al. (1988). This method gives good metaphasic spreads from a very small amount of cellular material as is the case of microhymenopterans. Chromosomes were stained with 6% Giemsa in Sorensen's phosphate buffer (0.15M, pH 6.8). Chromosome classification, based on centromere position, follows Levan et al. (1964).

CALOSOTINAE

Calosota Curtis, 1836

1. *Calosota acron* (Walker)

Eupelmus acron Walker, 1848: 219, United Kingdom.

Trigonoderus contractus Walker, 1872: 85, United Kingdom-England; synonymy by Graham, 1969a: 102 and 1969b: 91.

Calosota anguinalis Ruschka, 1921: 250, Austria; synonymy by Bouček, 1968: 236.

Calosota acron (Walker); combination by Bouček, 1968: 236.

Specimens examined. 7♀, Iaşi county, Bârnova Forest, 20.III.2005, branches of *Carpinus* with *Xestobium* sp., leg. Dascălu M.; 3♀, Bacău county, Gârleni village, 18.VII.2005, branches of *Fagus sylvatica* with *Xestobium plumbeum* (Illiger) and *Anobium fulvicorne*, leg. Dascălu M.

Comments. Recorded as associated with *Anobium punctatum* (De Geer) (Coleoptera, Anobiidae) in old dry wood (Graham 1969b). We reared *C. acron* from dry branches of *Carpinus* (Corylaceae) together with *Xestobium* sp. (Coleoptera, Anobiidae) and dry branches of *Fagus* (Fagaceae) with *Xestobium plumbeum* (Illiger) and *Anobium fulvicorne* Sturm (new host records). This widely distributed European species was recorded in Romania by Erdős (1960).

2. *Calosota aestivalis* Curtis

Calosota aestivalis Curtis, 1836: 596, United Kingdom.

Calosoter vernalis Walker, 1837: 359, United Kingdom; synonymy by Graham, 1969b: 90.

Calosota fumipennis Bolívar y Pieltain, 1923: 65, Spain; synonymy by Askew & Nieves-Aldrey, 2006: 89.

Specimens examined. 2♀, Iaşi county, Bârnova Forest, 24.III.2005, branches of *Carpinus* with *Xestobium plumbeum*, *Xestobium* sp. and *Ptinomorphus imperialis* (L.), leg. Dascălu M.; 1♂ Constanţa county, Hagieni Forest Nature Reserve, VIII.2005, branches of *Fraxinus ornus* with *Clorophorus sartor*, leg. Dascălu M.; 1♂, Iaşi county, Botanical Garden of Iaşi, 15.II.2005, branches of *Pinus*

nigra with *Anthaxia* sp., *Magdalis memnonia*, *Magdalis rufa*, leg. Fusu L.; 1♀, Iaşi county, Botanical Garden of Iaşi, 08.V.2007, leg. Popescu I.

Comments. The species is a parasitoid of xylophagous coleopteran larvae (Bouček 1977, Trjapitzin 1978) but has not previously been recorded as associated with *Chlorophorus sartor* (Müller) (Coleoptera, Cerambycidae) or *Xestobium* spp. (Coleoptera, Anobiidae) (new host records). It is widely distributed in Europe but has not been previously recorded from Romania (new record).

3. *Calosota dusmeti* Bolívar y Pieltain

Calosota dusmeti Bolívar y Pieltain, 1929: 139, Spain.

Specimens examined. 1♀, Iaşi county, Valea lui David Nature Reserve, 15.VIII.2001, leg. Mitroiu M.; 1♀, Constanţa county, Hagieni Forest Nature Reserve, 06.VII.2006, leg. Fusu L.

Comments. This species was previously recorded with certainty only from Spain. According to Askew et al. (2001) the record of Nikol'skaya (1952) for Tajikistan needs to be confirmed. This is the first record from Romania.

4. *Calosota obscura* Ruschka

Calosota obscura Ruschka, 1921: 249, Austria.

Calosota lixobia Erdős, 1946: 133, Hungary; synonymy by Askew & Nieves-Aldrey, 2006: 93.

Calosota lixobia var. *hyperparasita* Erdős, 1946: 136, Hungary.

Calosota lixobia var. *mordellistenae* Erdős, 1960: 201.

Specimens examined. 1♀, Botanical Garden of Iaşi, 22.VII.2005, leg. Fusu L.; 2♀, Constanţa county, Mangalia, Hagieni Forest Nature Reserve, 06.VII.2007, leg. Fusu L. & Popovici O.; 1♀, Constanţa county, Valul lui Traian Nature Reserve, 16.V.2007, leg. Fusu L.; 2♀ Tulcea county, Gura Dobrogei Nature Reserve, 12.V.2007, leg. Fusu L.; 1♂, Iaşi county, Bârnova Forest, Poiana cu Schit Nature Reserve, 21.VI.2007, leg. Fusu L. & Popovici O.

Comments. The species was recorded as associated with Aylacini galls (Hymenoptera: Cynipidae) on stems of herbaceous plants, but it is probably a parasitoid of some coleopteran larvae present in the same stems (Askew & Nieves-Aldrey 2006, Gómez et al. 2006). It was also reared from *Onopordum corymbosum* Willk. (Compositae) stems together with *Lixus* sp. (Coleoptera, Curculionidae) and other beetles (Askew & Nieves-Aldrey 2006). Erdős (1946, 1949, 1960), by dissecting plant stems, unequivocally established that the species (treated by him as *C. lixobia*) is a parasitoid of coleopteran larvae. He reared the species from *Lixus cardui* Olivier larvae in the stems of *Onopordum acanthium* L. and from *Mordellistena parvula* (Gyllenhal) larvae (Coleoptera, Mordellidae) in the stems of *Artemisia vulgaris* L. (Compositae) (he described the specimens obtained from the latter host as *C. lixobia* var. *mordellistenae* Erdős). He also described *C. lixobia* var. *hyperparasita* Erdős as a hyperparasitoid. It parasitizes two chalcidoid species in the genus *Entedon* (Hymenoptera, Eulophidae), parasitoids of the true weevils *Lixus cardui*, *L. filiformis* (Fabricius) and *Rhinusa asellus* (Gravenhorst) larvae.

This species was tentatively recorded from Romania by Andriescu (2003) as *Calosota* aff. *obscura* and the above records

confirm the presence of the species. The record of *Calosota lixobia* var. *mordellistenae* from Valea lui David Natural Reserve (Suciu & Popescu 1965) was also probably based on a specimen of *C. obscura.*

Cytogenetics. The three specimens from the Botanical Garden of Iaşi and Gura Dobrogei Nature Reserve were used for cytogenetic studies. I managed to observe several mitotic prometaphasic plates with 12 chromosomes, but exact chromosome morphology was impossible to determine; only meiotic chromosomes examined during prophase I of meiosis (Fig.1a) gave good results. Six bivalents were observed in diplotene, of which five are closed, ring-shaped, with two chiasmata and one open with a single chiasma. Because the centromere is well visible in all chromosomes it was possible to determine, more or less exactly, the type of each chromosome. A schematic representation of the karyotype based on measurements taken from chromosomes in diplotene is shown in Fig.1b. Although the exact centromere position may diverge to some extent due to different degrees of chromatin condensation in meiosis and mitosis, it is safe to assume that *C. obscura* has five pairs of dibrachial metacentric chromosomes, the first being evidently larger than the others, and one pair of small subtelocentric chromosomes bearing a secondary constriction on the long arm near the primary constriction.

The cytogenetic data presented here for *Calosota obscura* (n = 6) are the first recorded karyotype from the Calosotinae. Previous data for the Eupelmidae include only species from the subfamily Eupelminae (Gokhman & Quicke 1995, Gokhman 2002a, Fusu 2008) that have karyotypes of n = 5, 7, 8 and 10. A karyotype with large meta- or submetacentric chromosomes and a pair of small acrocentric or subtelocentric chromosomes as in *C. obscura* is a rare feature in Chalcidoidea, where karyotypes with biarmed chromosomes of similar size predominate (Gokhman 2002a). This kind of karyotype, present in both *Eupelmus* (Eupelminae) (Fusu 2008) and *Calosota* (Calosotinae) (present study), could be an autapomorphy that supports the monophyly of Calosotinae + Eupelminae. Like

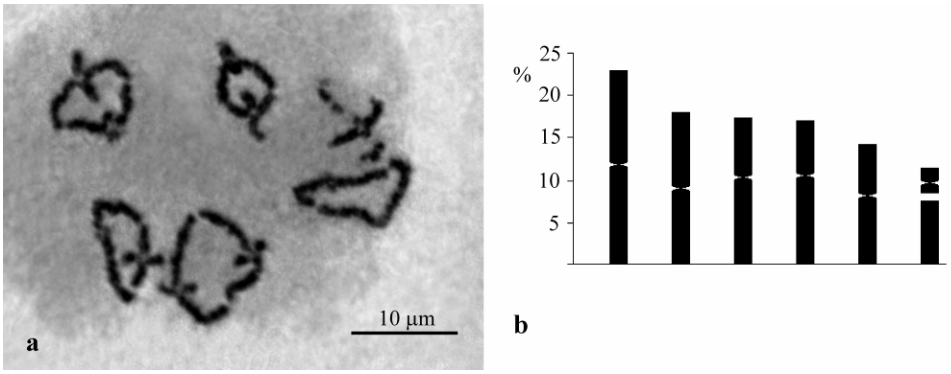

Figure 1. Chromosomes of *Calosota obscura*. a: diplotene with five closed and one open bivalent; b: schematic representation of the karyotype.

other characters that could sustain the monophyly of Eupelmidae (Gibson, 1989), this one is also prone to homoplasy and is found in other, unrelated groups. A karyotype with similar features is present in some Eulophidae (Gokhman 2002b, 2004), a few Torymidae (Goodpasture 1975, Goodpasture & Grissell 1975, Gokhman & Mikhailenko 2007) and Aphelinidae (Baldanza et al. 1999, Baldanza & Giorgini 2001), indicating that similar chromosome sets must have evolved independently several times. The haploid chromosome number of 5 in most *Eupelmus* and 6 in *Calosota* seems to favor the hypothesis that the two karyotypes are only superficially similar.

5. *Calosota viridis* Masi

Calosota viridis Masi, 1922: 142, Italy.

Calosota modesta Bolívar y Pieltain, 1929: 133, Spain; synonymy by Askew & Nieves-Aldrey, 2006: 95.

Calosota matritensis Bolívar y Pieltain, 1929: 140, Spain; synonymy by Askew & Nieves-Aldrey, 2006: 95.

Calosota coerulea Nikol'skaya, 1952: 483, Tadzhikistan; synonymy by Bouček, 1970: 79.

Specimens examined. 1♀, Tulcea county, Babadag Forest, to the South from Codru village, 28.VII.2007, leg. Fusu L. & Popovici O.; 1♀, Constanța county, Agigea Natural Reserve, from galls of *Tetramesa brevicornis* on *Festuca* sp., VIII.2005, leg. Fusu L.; 1♀, Tulcea County, Danube Delta, Letea, sand dunes, yellow pan traps, 09-10.VI.2008, leg. Popovici O.

Comments. This species is a parasitoid of *Tetramesa* spp. (Hymenoptera, Eurytomidae) in stems of Gramineae (Bouček 1970). It was recorded from *Tetramesa cereipes* Erdős galls in stems of *Elymus repens* (L.) Gould (Gramineae) (Erdős 1960) and we reared it from *Tetramesa brevicornis* (Walker) galls on *Festuca* sp. (Gramineae) (new host record). The record of this species (as *C. matritensis*) for Romania by Andriescu (2003) is most likely a misidentification because the single specimen was obtained from *Scolytus rugulosus* (Müller) (Coleoptera, Curculionidae) in branches of *Malus pumila* Mill. (Rosaceae) (very doubtful host record).

Eusandalum Ratzeburg, 1852

6. *Eusandalum walkeri* (Curtis) (Fig.2b)

Stenocera walkeri Curtis, 1836: 596, United Kingdom.

Stenoceroides walkeri (Curtis); combination by Dalla Torre, 1898: 269.

Eusandalum walkeri (Curtis); combination by Bouček, 1967: 268.

Eusandelum walkeri (Curtis); misspelling of genus name by Vidal, 2001: 59.

Specimens examined. 1♀, Constanța county, Canaraua Fetei Nature Reserve, 16.V.2005, leg. Fusu L. & Popovici O.

Comments. This widely distributed but rare species was recorded as parasitoid of *Agrilus angustulus* (Coleoptera, Buprestidae) (Bouček 1967). It is distributed in many European countries, Israel and Georgia (Bouček 1967, Trjapitzin 1978); this is the first record of the species from Romania.

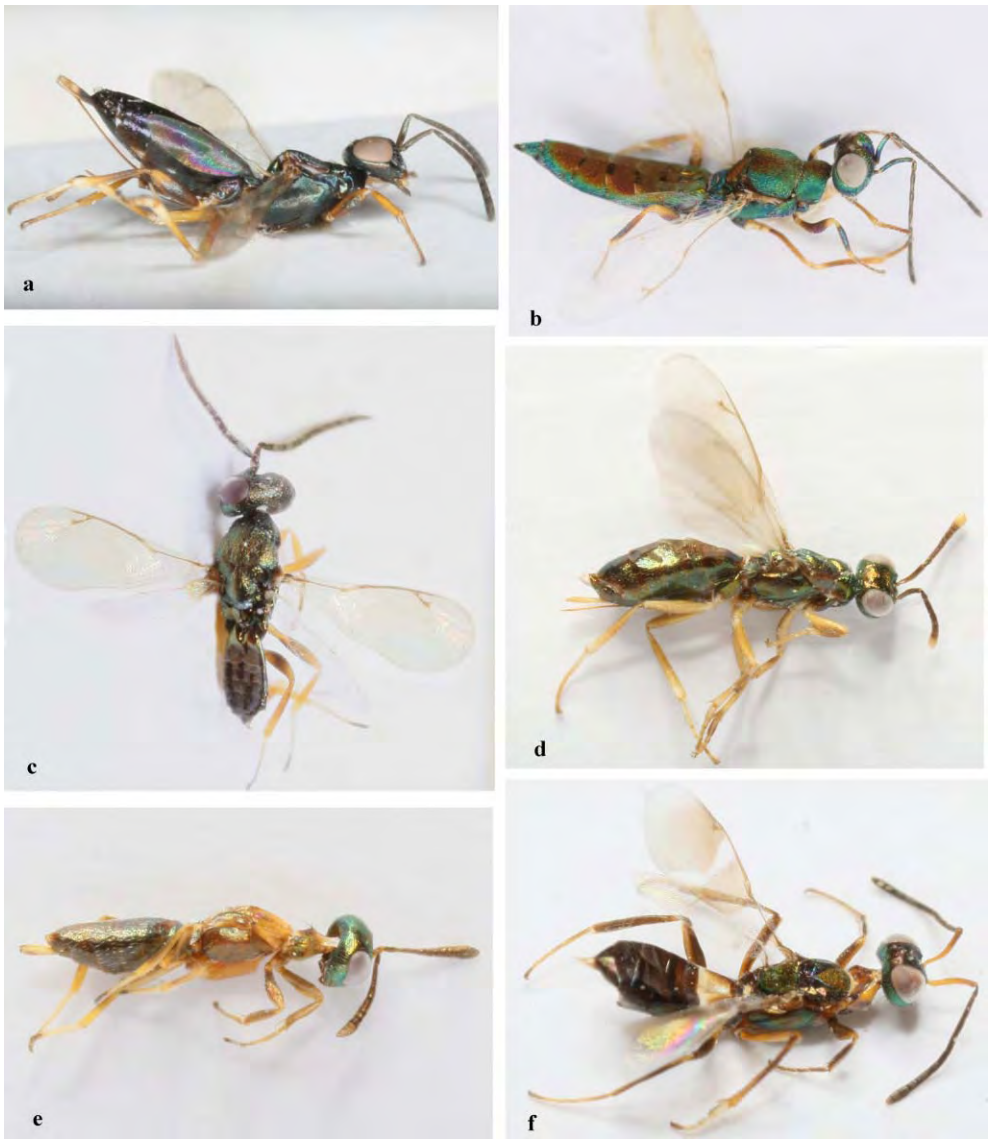

Figure 2. Habitus of adult Eupelmidae:
a - *Eupelmus vindex*, ♀; **b -** *Eusandalum walkeri*, ♀; **c -** *Eupelmus aloysii*, ♂;
d - *Eupelmus phragmitis*, ♀; **e -** *Eupelmus maculatus*, ♀; **f -** *Anastatus catalonicus*, ♀.

EUPELMINAE

Anastatus Motschulsky, 1859

7. *Anastatus catalonicus* Bolívar y Pieltain (Fig.2f)

Anastatus catalonicus Bolívar y Pieltain, 1935: 284, Spain.

Specimens examined. Bârnova Forest, Iaşi county: 1♀, 30.IX.2005, Curături village, leg. Fusu L.; 2♀, 14.IX.2005, Poiana Ciobanului, leg. Fusu L.; 2♀1♂, 21.VI.2007, Poiana cu Schit Nature Reserve, leg. Fusu L. & Popovici O.

Comments. The species is a parasitoid in the eggs of *Iris oratoria* (L.) (Mantodea, Mantidae) (Ferrière 1954) and *Lymantria dispar* (L.) (Lepidoptera, Lymantriidae) (Maier 1995). It was described from continental Spain (Bolívar y Pieltain 1935) and subsequently recorded from Canary Islands (Askew & Nieves-Aldrey 2004), France (Ferrière 1954) and Germany (Maier 1995); new to the Romanian fauna.

8. *Anastatus lichtensteini* (Ruschka)

Eupelmus lichtensteini Ruschka, 1921: 299, France.

Anastatus lichtensteini (Ruschka); combination by Ferrière, 1954: 11.

Anastatus ameleophagus Bernard, 1935: 209, France; synonymy by Ferrière, 1954: 11.

Specimens examined. ROMANIA: 1♀, Tulcea county, Gura Dobrogei Natural Reserve, 12.V.2007, leg. Fusu L.; FRANCE: 1♀, Fréjus (Var), Ameles, V.'35, F. Bernard; 3♀1♂, Fréjus (Var), Ameles eclos V, F. Bernard; 2♀, Nice 1; 2♂, Nice 7 (all the specimens from France are identified as *A. ameleophagus* by F. Bernard and deposited in BMNH).

Comments. Bernard (1935) described *Anastatus ameleophagus* on the base of 7♀ and 3♂ emerged in August from oothecae of *Ameles* collected at Fréjus [in 1934 according to Bernard (1936)]. I examined the 6♀ and 3♂ "cotypes" of *Anastatus ameleophagus* mentioned by Askew & Nieves-Aldrey (2004) and deposited in the Natural History Museum, London (BMNH). All the specimens, although labeled "cotype", are clearly not part of the type series: 4♀ and 1♂ have the right locality and host data but were reared in May, not in August (the label of one specimen also mentions the year 1935); 2♀ and 2♂ are from Nice. I suppose the specimens in BMNH are a part of those mentioned later by Bernard (1936) in his paper on the biology of *A. ameleophagus* and were accidentally labeled as cotypes.

The species is a parasitoid in mantid ootheca (Mantodea, Mantidae). The list of known hosts include *Ameles decolor* (Charpentier) (Askew & Nieves-Aldrey 2004), *Ameles abjecta* Cyrillo and *Iris oratoria* (Ferrière 1954). The association with *Mantis religiosa* (L.) (Ruschka 1921) seems dubious (Ferrière 1954) and needs confirmation. It was hitherto known only from France, Morocco (Ferrière 1954) and Spain (Askew & Nieves-Aldrey 2004). According to Erdős (1960: 189) the record from Hungary (Erdős 1947) was based on a misidentification. New to the Romanian fauna.

9. *Anastatus ruficaudus* Ferrière

Anastatus ruficaudus Ferrière, 1954: 15, France.

Specimens examined. 3♀, Constanța county, Alah-Bair Hill Nature Reserve, 10.IX.2005, leg. Fusu L.

Comments. This rare species was described from France (Ferrière 1954) and subsequently recorded from United Kingdom (Askew 1987) and Slovakia (Kalina 1989). It is new to the Romanian fauna. Nothing is known of its host associations.

Arachnophaga Ashmead, 1896

10. *Arachnophaga* (*Parasolindenia*) *picardi* (Bernard)

Anastatus picardi Bernard, 1936: 71, France.

Mercetina picardi (Bernard); combination by Ferrière, 1954: 17.

Arachnophaga picardi (Bernard); combination by Askew & Nieves-Aldrey, 2004: 34.

Specimens examined. FRANCE: Lectotype ♀ of *Anastatus picardi* Bernard (present designation) with the following labels: "Fréjus (Var), eclos VII – 35, F. Bernard", " oothèque *Ameles*", "COTYPE", "Pres. by Imp. Inst. Ent. B. M. 1937-132", "*Anastatus Picardi* ♀, F. Bernard det." and " in genus *Eupelmella*, Ch. Ferrière det."; Paralectotype ♀ of *Anastatus picardi* Bernard (present designation) with the following labels: "Nice 2", "COTYPE", "Pres. by Imp. Inst. Ent. B. M. 1937-132" and "*Anastatus Picardi* ♀, F. Bernard det."; ROMANIA: 1♀, Constanța county, Agigea Natural Reserve, 28-29.IV.2006, leg. Fusu L.

Comments. Bernard (1936) described *Anastatus picardi* on the base of 13♀ and 8♂ emerged in July from oothecae of *Ameles decolor* collected at Fréjus and in October from oothecae collected at Nice. As mentioned by Askew & Nieves-Aldrey (2004), in Natural History Museum (London) there are 2♀ and 1♂ of *A. picardi* labeled as 'cotypes'. The two females have the right labels (see above under specimens examined) and are clearly syntypes of *Anastatus picardi* Bernard. The male, labeled "Fréjus (Var), *Ameles*, VII 35, F. Bernard", "COTYPE", "Pres. by Imp. Inst. Ent. B. M. 1937-132" and "*Anastatus Picardi* ♂, F. Bernard det." is a dark male of *Anastatus ameleophagus* Bernard [=*Anastatus lichtensteini* (Ruschka)] and should be removed from the type series. To avoid possible confusion resulting from the mixed type series and the presence in Muséum National d'Histoire Naturelle (Paris) of a non type specimen labeled as type (Askew & Nieves-Aldrey 2004), the female from Fréjus (Var) is selected as lectotype. It is uncontorted, entire (except for the missing forewing rudiments) and glued with the ventral part on a rectangular card.

Like two of the previously mentioned *Anastatus*, this species is a parasitoid in mantid ootheca. The list of known hosts includes *Ameles decolor*, *Ameles abjecta*, *Iris oratoria*, *Empusa pennata* (Thunberg) (Ferrière 1954) and possibly *Ameles spallanzania* (Rossi) (Askew & Nieves-Aldrey 2004). It was hitherto known only from France, Spain (Askew & Nieves-Aldrey 2004) and Italy (Herting 1971); new to the Romanian fauna.

Eupelmus Dalman, 1820

11. *Eupelmus* (*Eupelmus*) *aloysii* Russo (Fig.2c)

Eupelmus aloysii Russo, 1938: 229, Italy.

Eupelmus sculpturatus Nikol'skaya, 1952: 502, Russia-Voronezh Oblast; synonymy proposed by Kalina, 1988: 3.

Eupelmus suecicus Hedqvist, 1963: 137, Sweden; synonymy by Bouček, 1968: 237.

Specimens examined. 2♀1♂, Botanical Garden of Iaşi, 15.II.2005, branches of *Pinus nigra* with *Pityogenes bistridentatus* and *Pityophthorus buyssoni*, leg. Fusu L.; 1♀, Iaşi county, Bârnova Forest, 20.III.2005, dry branches of *Tilia*, leg. Dascălu M.M.; 1♀, Vrancea county, Paltin village, 14-15.IX.2007, Yellow Pan Traps, leg. Chiriac Nicoleta.

Comments. This species is a parasitoid of bark beetle larvae (Coleoptera, Curculionidae, Scolytinae). *Phloeotribus scarabaeoides* (Bernard) (Russo 1938), *Hylesinus toranio* (Danthoine) (Hedqvist 1963), *Scolytus* sp. (Nikol'skaya 1952) and *Scolytus intricatus* Ratzeburg (Marković & Stojanović 2003, as *E. sculpturatus*) have been previously recorded as hosts. We have also found the species associated with *Pityogenes bistridentatus* (Eichhoff) and *Pityophthorus buyssoni* Reitter in dead branches of *Pinus nigra* J.F.Arnold (Pinaceae) (new host records). It is very rarely collected but widely distributed in Europe, from Italy and Spain in the south (Askew & Nieves-Aldrey 2000) to Sweden in the north (Hedqvist 1963, 2003); it is new to the Romanian fauna. The record of *Eupelmus* aff. *sculpturatus* Nikol'skaya for Romania (Andriescu 2003) was not connected with *Eupelmus aloysii* but with a species close to *Eupelmus* (*Eupelmus*) *microzonus* Förster [I have examined the specimen mentioned by Andriescu (2003); it was reared from *Phaseolus vulgaris* L. (Leguminosae) seeds with Bruchidae larvae]. The male of *Eupelmus aloysii* has apparently never been recorded nor described. A short description and comparative notes are given below to facilitate the recognition of the male of this peculiar species.

Description of the male: Head and mesosoma dark green, with copper and golden reflections, fainter on head and stronger on mesosoma; mesopleuron dark bluish-green; metasoma dark with faint bluish-green luster at base. Antennae dark brown; scape with a dirty yellow stripe on the lower external margin. Legs dirty yellow except front femora slightly darkened in middle, middle and hind femora brown with basal and apical parts yellowish brown, and tarsi yellowish white with the last two segments dark brown. Fore wing slightly infuscated, pale brown, with brownish venation (Fig.2c). Head with several long setae on the lower face near the malar sulcus; transverse in dorsal view, 2 times as broad as long and lenticular in lateral view, 1.65 times as high as long. Eyes separated by 0.5 times head breadth; ocelli arranged in obtuse triangle of about 120°; postocellar line 2 times longer than ocellar-ocular line. Antennae long, combined length of pedicel and flagellum twice breadth of head; flagellum cylindrical with elongated segments, flagellomere 1 very short, ring-like, flagellomere 2 about 3 times longer than wide, flagellomere 8 about 2 times longer than wide and 0.7 times the length of flagellomere 2; scape 3 times longer than wide. Mesosoma 1.6 times longer than wide; fore wing 2.25 times longer than wide, with well developed spe-

culum below parastigma; marginal vein: stigmal vein: postmarginal vein = 30 : 8 : 11 (Fig.3). Body length 1.75 mm.

The male of *E. aloysii* can be distinguished from other *Eupelmus* (*Eupelmus*) males in Europe by a unique combination of characters: very elongated flagellomeres [similar to the male of *Eupelmus* (*Episolindelia*) *linearis* Förster, but in this species pedicel plus flagellum is about 1.8 times longer than breadth of head]; dark green color of the body, with legs extensively dirty yellow; slightly infuscated fore wings.

12. *Eupelmus* (*Eupelmus*) *fulvipes* Förster

Eupelmus fulvipes Förster, 1860: 127, Austria.

Specimens examined. 1♀, Constanța county, Hagieni Forest Nature Reserve, 25.VI.2000, leg. Mitroiu M.

Comments. This rarely collected species was recorded from Caucasus, Central Europe (Bouček 1977) and South Europe in Spain (Askew & Nieves-Aldrey 2000) and Italy (Askew et al. 2006). According to Bouček (1977) all host records for this species are dubious. It was recorded recently as a parasitoid of *Diplolepis mayri* (Schlechtendal) (Hymenoptera, Cynipidae) (Askew et al. 2006).

13. *Eupelmus* (*Eupelmus*) *phragmitis* Erdős (Fig.2d)

Eupelmus phragmitis Erdős, 1955b: 35, 45, Hungary.

Specimens examined. 1♀, Botanical Garden of Iaşi, 19.VI.2004, leg. Popovici O.; 1♀, Iaşi county, Bârnova Forest, Curături village, 29.V.2005, leg. Fusu L.

Comments. This infrequently collected species associated with *Phragmites australis* (Cav.) Trin. ex Steud. (Gramineae) was described from Hungary (Erdős 1955b) and subsequently found in Czech Republic (Bouček 1968) and Danube Delta in Romania (Tudor & Roman 1973). It is a parasitoid of *Tetramesa phragmitis* (Erdős) (Hymenoptera, Eurytomidae) (Erdős 1960, Tudor & Roman 1973). The species was not mentioned in the list of Romanian Eupelmidae by Andriescu (2003).

14. *Eupelmus* (*Eupelmus*) *vindex* Erdős (Fig.2a)

Eupelmus vindex Erdős, 1955a: 291, Hungary.

Specimens examined. 2♀, Botanical Garden of Iaşi, 22.VII.2005, leg. Fusu L.

Comments. This rare species is easy to recognize by the peculiar shape of the head

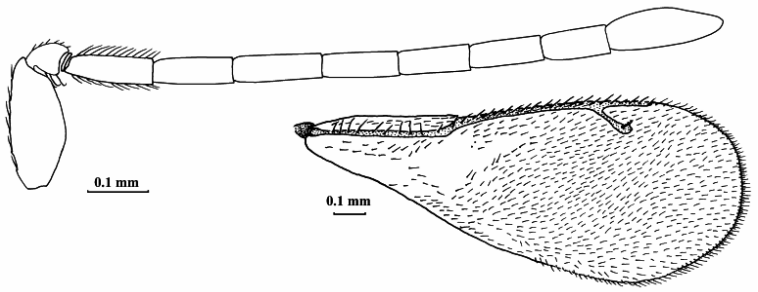

Figure 3. Antenna and fore wing in the male of *Eupelmus aloysii.*

that looks triangular in lateral view (Fig.2a; Fig.4h in Erdős 1955a), due to the conspicuously flattened vertex and protruding lower parascrobal region; ovipositor short and stout, with ovipositor sheath (measured from the middle of constriction that delimits the 2nd valvifer from the 3rd valvula) at most 0.65 times length of hind tibia; fore wing uniformly infuscated; scape tawny to dark brown, legs mostly testaceous. It was described from Hungary (Erdős 1955a) and subsequently found in Italy (Bouček 1970) and India from where it was reported as a parasitoid of *Scolytus* sp. (Narendran et al. 2001); the record from India seems quite improbable and needs a confirmation. New to the Romanian fauna.

15. *Eupelmus* (*Macroneura*) ? *maculatus* (Ferrière) (Fig.2e)

Eupelmella maculata Ferrière, 1954: 9, France.
Macroneura maculata (Ferrière); combination by Kalina, 1981: 105.
Eupelmus (*Macroneura*) *maculatus* (Ferrière); combination by Askew & Nieves-Aldrey, 2000: 57.

Specimens examined. 1♀, Tulcea county, near Babadag city, forest edge by the highway, 21.VII.2006, leg. Popovici O.; 1♀, Botanical Garden of Iaşi, 20.VIII.2008, leg. Fusu L. & Popovici O.

Comments. This species is recorded from France (Ferrière 1954), Spain (Askew & Nieves-Aldrey 2000), Algeria, Tadzhikistan, Bulgaria and Republic of Moldova (Ciumai) (Kalina 1981b); it is new to the Romanian fauna. The specimen from Iaşi is the most northern (N 47° 11′) record of this thermophilous species. The specimens from Romania differ from those in south France (type locality) and Spain only in having the tegula yellow to brownish yellow (Fig.2e) and not snow-white. According to Kalina (1981: 93) the records from Algeria, Tadzhikistan, Bulgaria and Republic of Moldova are based on similarly colored specimens. It is not clear to me if this is due to geographical variation of *E. maculatus* or if these specimens represent a different species.

Discussion

Andriescu (2003) listed 29 species in a catalog of Romanian Eupelmidae and Tudor & Roman (1973) found *Eupelmus phragmitis* in the Danube Delta. Because *Calosota lixobia* is considered a synonym of *C. obscura* (Askew & Nieves-Aldrey 2006) and both names were listed in the above mentioned catalog, the species list of Eupelmidae from Romania included 29 currently accepted names. The present paper adds 11 more species for a total of 40 species from Romania. This number is probably fairly close to the actual number of species because it is equal to or greater than the number of Eupelmidae species recorded from Hungary (37 species), Italy (40 species), Czech Republic (29 species) and Slovakia (31 species) (Noyes 2003). However in Spain there are 61 species registered to date (Askew & Nieves-Aldrey 2000, 2004, 2006). This suggests that at least 10 more species might be present in Romania because it is the only European country with more than four biogeographical regions. While Romania has five of the 11 European biogeographical regions, Spain has only three (Doniță et al. 2005).

Further collecting effort is needed to fully investigate the Eupelmidae of Romania.

Acknowledgments. I thank my colleagues Ovidiu Popovici, Maria-Magdalena Dascălu, Mircea Mitroiu, Irinel Popescu and Chiriac Nicoleta for contributing with valuable specimens, Prof. Ionel Andriescu for information on the subject and help in locating some publications and Ionuț Iorgu for taking the photomicrographs. I am thankful to John Noyes and Andrew Polaszek for their kind support during my stay at the Natural History Museum, London and to the three anonymous referees for their critical and very useful comments on this paper. This research received support from the SYNTHESYS Project (http://www.synthesys .info/) which is financed by European Community Research Infrastructure Action under the FP6 "Structuring the European Research Area" Programme (application GB-TAF-4479).

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Submitted: 27 September 2008
/ Accepted: 19 May 2009

Published Online: 30 June 2009