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Data to three insect orders (Embiidina, Dermaptera, Isoptera) from the Balkans

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Abstract. The Embiidina, Dermaptera and Isoptera material, collected in the Balkans by the soil zoological expeditions of the Hungarian Natural History Museum and the Hungarian Academy of Sciences between 2002 and 2012, is enumerated and depicted on maps. New country records of six earwig species are reported: *Chelidurella s.l. acanthopygia* (Gené, 1832) from Montenegro, *Anechura bipunctata* (Fabricius, 1781) from Albania, *Apterygida media* (Hagenbach, 1822) from Montenegro and Macedonia, *Guanchia obtusangula* (Krauss, 1904) from Macedonia, *Forficula aetolica* Brunner, 1882 from Bulgaria and *Forficula smyrnensis* Serville, 1839 from Montenegro and Macedonia. Populations of *Chelidurella* Verhoeff, 1902 from Dalmatian Croatia and Montenegro probably belong to two undescribed taxa, but these are threated as *C. s.l. acanthopygia* herein and their morphological features are showed on figures. Due to its rarity in the Balkans, taxonomical features of the Macedonian *Guanchia obtusangula* specimen are also showed on figures. The webspinner *Haploembia palaui* Stefani, 1955 is reported from Crete for the first time, which represents the second occurrence in the Balkans. The order Isoptera is reported from Montenegro and the Aegean Isles for the first time, while *Reticulitermes balkanensis* Clément, 2001 is considered as a nomen nudum.

Keywords. Earwings, Embioptera, Embiodea, webspinners, termites, new records

INTRODUCTION

Despite their conspiciuous appearance, frequency, low species number and easy identification, we have strikingly scattered knowledge on earwig (Dermaptera) fauna of the Balkan Peninsula. There are only five species reported from Albania (Brindle & Friese 1964, Heller 2004), 9 from Bosnia-Herzegovina (Brindle & Friese 1964, Heller 2004, Us & Matvejev 1967), 7 from Bulgaria (Heller 2004), 9 from Croatia (Brindle & Friese 1964, Heller 2004, Us & Matvejev 1967), 17 from Greece (Haas 2007, Heller 2004), 3 from Kosovo (Brindle & Friese 1964, Csiki 1923, Us & Matvejev 1967), 7 from Montenegro (Brindle & Friese 1964, Us & Matvejev 1967), 2 from Macedonia (Brindle & Friese 1964, Heller 2004, Us & Matvejev 1967), 10 from Romania (Heller 2004, Steinmann 1993), 7 from Serbia (Brindle & Friese 1964, Us & Matvejev 1967) and 7 from Slovenia (Heller 2004). Altogether, there are 25 species known from the Balkan peninsula.

Being less striking in appearance, and of whole lifecycle hided beneath stones and logs, we have even fewer data on the not so frequent Balkanic webspinners (Embiidina). Only two Mediterranean species of the genus *Haploembia* Verhoeff, 1904 were reported so far from coastal areas of the peninsula (Heller 2004, Ross 1966).

Contrary to the previous two orders dealt with in this paper, termites (Isoptera) are frequent and economically important insects, and one should think that they are much more explored in the Balkans. However, only scarce faunistical data are available on *Kalotermes flavicollis* (Fabricius, 1793) and three taxa of *Reticulitermes* Holmgren, 1913 (Harz & Kaltenbach 1976, Heller 2009).

Specimens of these three orders were sampled as side targets during the last ten years' Balkanic researches by the Hungarian Natural History Museum and the Hungarian Academy of Sciences, being focused on other soil invertebrates (Csuzdi *et al.* 2011, Dányi 2010, Fehér & Erőss

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2009, Kontschán 2010, Mahunka & Mahunka-Papp 2008, Murányi 2008, Szederjesi & Csuzdi 2012a, 2012b, Ujvári 2010) and certain water insects (Murányi 2007, 2011, Oláh 2010).

Nevertheless, also some hundred specimens of Embiidina, Dermaptera and Isoptera were compiled, and, given from their scarce Balkanian faunistical data, these are worth to publish. Diagnosis, distribution and ecology of the species found are also discussed.

MATERIAL AND METHODS

Embiidina and Isoptera were collected from under stones and logs, ground dwelling Dermaptera by singling while arboreal Dermaptera with beating sheet. Juvenile Embiidina were kept in jars between moss and stones for a few months to obtain matured males. Specimens are stored in 70% ethanol and deposited in the Collection of Smaller Insect Orders, Department of Zoology, Hungarian Natural History Museum (HNHM). A small Balkanic Dermaptera collection of the Mátra Museum, Gyöngyös, Hungary (MM) is also enumerated herein.

Drawings were made with a drawing tube on a Nikon SMZ800 microscope.

Distributional and ecological data of the species included were discussed after the following works; Embiidina: Fontana (2002), Heller (2004), Ross (1966) and Stefani (1955); Dermaptera: Brindle & Friese (1964), Harz & Kaltenbach (1976), Haas (2007), Heller (2004), Steinmann (1989, 1993) and Us & Matvejev (1967), Isoptera: Harz & Kaltenbach (1976) and Heller (2009).

Nomenclature follows Ross (1966) regarding Embiidina, Steinmann (1989, 1993) and Fontana *et al.* (2002) regarding Dermaptera, while Harz & Kaltenbach (1976) was used in case of Isoptera. Cited synonymies restricted to the original description and the first use of the present combination. Full list of synonymy can be found in the above mentioned works, respectivelly.

Abbreviations used: ZB: Zoltán Barina; SCs: Sándor Csősz; LC: László Czigány; SC: Szilvia Czigány; LD: László Dányi; TD: Tamás Deli; ZD: Zita Drahos; ÁE: Árpád Ecsedi; ZE: Zoltán Erőss; ZF: Zoltán Fehér; MF: Mihály Földvári; RG: Róbert Gőgh; KH: Krisztián Harmos; AH: András Hunyadi; TH: Tamás Huszár; PJ: Péter Juhász; JK: Jenő Kontschán; AK: Attila Kovács; TKa: Tomislav Karanovic; TK: Tibor Kovács; GM: Gábor Magos; DM: Dávid Murányi; VP: Vladimir Pešić; DP: Dániel Pifkó; FP: Ferenc Pósa; GP: Gellért Puskás; BS: Barnabás Sárospataki; DS: Dávid Schmidt; LS: László Somay, TS: Tímea Szederjesi; TSz: Tamás Szüts; ZU: Zsolt Ujvári.

RESULTS

Embiidina

Haploembia solieri (Rambur, 1842)

Embia solieri Rambur, 1842: 313.
Haploembia solieri (Rambur, 1842): Enderlein 1909: 188.

Material examined. Bulgaria: Burgas province, Sinemorec, coastal bush at the mouth of Silistar Stream (loc. 2007/83), N42°01.418' E28°00.490', 0 m, 08.04.2007, leg. LD, ZE, ZF, JK, DM: 1♂ (matured on 01.06.2007), 2 juveniles; *Albania:* Vlorë district, Dhërmi, macchia S of the village (loc. 2008/14), N40°08.387' E19°39.046', 160 m, 11.03.2008, leg. SC, DM: 1♂ (matured on 16.05.2008), 1 juvenile; *Greece:* Thrace, Xanthi regional unit, Galanis (Stathmos), querry above the Nestos River (loc. 2007/41), N41°05.595' E24°46.278', 60 m, 02.04.2007, leg. LD, ZE, ZF, JK, DM: 1♂ (matured on 04.06.2007), 9 juveniles; Thrace, Rhodope regional unit, Sapka Mts, Kizario, pasture SW of the village (loc. 2012/7), N41°03.492' E25°45.672', 140 m, 27.05.2012, leg. JK, DM, TS: 3♂2♀, 3 juveniles; Thrace, Rhodope regional unit, Maronia Hills, Petritis, rocky grassland above the village (loc. 2007/59), N40°54.080' E25°36.348', 220 m, 05.04.2007, leg. LD, ZE, ZF, JK, DM: 2♂ (matured on 04.06.2007), 21 juveniles; Thrace, Evros regional unit, Mesimvria, sandy seashore at

the Mesimvria Archeological Zone (loc. 2007/58), N40°51.692' E25°38.721', 15 m, 05.04.2007, leg. LD, ZE, ZF, JK, DM: 1♂, 5 juveniles.

Diagnosis. Hind basitarsus with two ventral papillae. Prothorax paler than the rest of the body, males apterous. Mandible not elevated baso-laterally. Left paraproct laterally upcurved and wrinkled but not bilobed, process of right hemitergite X straight.

Distribution and ecology. Widespread in the European Mediterranean, Crimea, Anatolia and also occurs in Egypt. Introduced to the Canaries, Madeira and the southwestern United States. Known from all coastal regions of the Balkans from Crete to the Istria. We found it mainly by the seaside but also in dry, warm habitats some 50 kilometres far form the sea (Fig. 32).

Remarks. Some additional *Haploembia* populations from Albania and Greece were sampled only as juveniles. These are not reported herein but showed on Fig. 32. Most of them are probably *H. solieri*, but the large, robust larvae collected in Rhodes are possibly belong to *H. palaui* Stefani, 1955.

***Haploembia palaui* Stefani, 1955**

Haploembia palaui Stefani, 1955: 116.

Material examined. Greece: Crete, Chania regional unit, Lefka Ori Mts, Omalos, rocky grassland W of the village (loc. 2013/6), N35°21.225' E23°51.355', 1020 m, 31.03.2013, leg. JK, DM, TS: 1♂ (matured on 04.05.2013); Crete, Rethymno regional unit, Ida Mts, limestone rocks at a pasture towards the observatory (loc. 2013/23), N35°12.560' E24°52.536', 1480 m, 02.04.2013, leg. JK, DM, TS: 1♂ (matured on 04.05.2013).

Diagnosis. Hind basitarsus with two ventral papillae. Prothorax not distinctly paler than the rest of the body, males apterous. Mandible elevated baso-laterally, forming distinct carinae. Left paraproct laterally upcurved and wrinkled but not bilobed, process of right hemitergite X straight.

Distribution and ecology. A rare species in the European Mediterranean, known only from the Baleares, the Iberian Peninsula and Greece. The single Greek record from 'Ktenia rock E of Island of Nasso (Naxos)' (Stefani 1955, Ross 1966), is a bit obscure: there is no islet called Ktenia by Naxos, but by Rhodes. We found it in dry habitats of high elevations, considerably above the localities of *H. solieri* found on the mainland (Fig. 32).

Dermaptera

***Anisolabis maritima* (Bonelli, 1832)**

Forficula maritima Bonelli, 1832: Bonelli in Géné 1832: 224.
Anisolabis maritima (Bonelli, 1832): Fieber 1853: 257.

Material examined. Croatia: Dubrovnik-Neretva county, Plat, seashore at the camping, N42°36' E18°13', 0 m, 11.08.2004, leg. DM: 1♀; *Montenegro:* Herceg Novi municipality, Bijela, seashore near Hotel Delfin (loc. 2008/25), N42° 27.163' E18°39.485', 0 m, 09.10.2008, leg. LD, ZF, JK, DM: 1♀.

Diagnosis. Second tarsal segment not heart-shaped; antennae with more than 20 segments. Mesosternite with rounded hind margin; tegmina and wings absent. Male forceps assymetrical; basal part widened and denticulated. External parameres of male genitalia very long. Body dark; head, thorax, abdomen and forceps uniformly dark brown, legs yellowish.

Distribution and ecology. Cosmopolitan species, known from Croatia, Bosnia-Herzegovina, Bulgaria, Montenegro and Greece in the Balkans. We found it at sandy seashores in Croatia and Montenegro (Fig. 33).

***Labidura liparia* (Pallas, 1773)**

Forficula riparia Pallas, 1773: 727.
Labidura riparia (Pallas, 1773): Leach 1815: 48.

Material examined. Bulgaria: Varna province, Ĉajka (Zlatni pjasâci), seashore (loc. 2005/3),

N43°18.192' E28°03.138', 0 m, 04.09.2005, leg. MF, JK, DM, TSz: 1♀, 1 juvenile; *Macedonia:* Southeastern region, Novi Dojran, shore of Dojran Lake S of the village (loc. 2006/35), N41°13' E22°42', 150 m, 17.10.2006, leg. LD, JK, DM: 1♂, 1 juvenile; *Albania:* Gramsh district, Tërvol, gorge of the Holta Stream (loc. 2006/158), N40° 55.562' E20°13.390', 250 m, 26.08.2006, leg. ZF, AH, TH, DM: 1 juvenile; Vlorë district, Zvërnec, pine forest edge between Adriatic Sea and Nartë Lake, NW of the village (loc. 2008/13033), N40°31.718' E19°23.437', 5 m, 13.04.2008, leg. ZB, ZD, RG, DP, FP, DS: 1 juvenile; *Greece:* Central Macedonia, Serres regional unit, Neo Petrisi, Strimonas River E of the village (loc. 2007/4), N41°17.000' E23°19.994', 75 m, 30.03. 2007, leg. LD, ZE, ZF, JK, DM: 2♂; East Macedonia, Kavala regional unit, Nestos Delta, Nea Karia, channel E of the village (loc. 2007/37), N40°53.455' E24°44.406', 5 m, 02.04.2007, leg. LD, ZE, ZF, JK, DM: 1♂1♀; East Macedonia, Kavala regional unit, Nestos Delta, coastal puddles and sand vegetation (loc. 2007/39), N40° 50.907' E24°47.960', 5 m, 02.04.2007, leg. LD, ZE, ZF, JK, DM: 4♂10♀; Thrace, Xanthi regional unit, Lagos, shore of the Lake Vistonida (loc. 2007/50), N41°00.888' E25°06.839', 5 m, 04.04. 2007, leg. LD, ZE, ZF, JK, DM: 3♂1♀, 1 juvenile; Crete, Lasithi regional unit, Agios Georgios, large reservoir below the village (loc. 2013/44), N35°03.042' E25°41.750', 60 m, 05.04.2013, leg. JK, DM, TS: 1♂.

Diagnosis. Second tarsal segment not heart-shaped; basal segment longer than the third segment. Antennae with more than 20 segments; hind femur longer than pronotum. Male forceps long and without widening; inner margins with a large postmedial tooth. Body pale with variable dark pattern; head reddish to light brown, abdomen yellowish laterally and apically, basal and medial parts brown to dark brown, legs and forceps yellowish, thorax generally brown with pale to red longitudinal stripes.

Distribution and ecology. Cosmopolitan species, known from all the Balkan countries. We found it at sandy sea and lakeshores, or river banks in Bulgaria, Macedonia, Albania and Greece (Fig. 33).

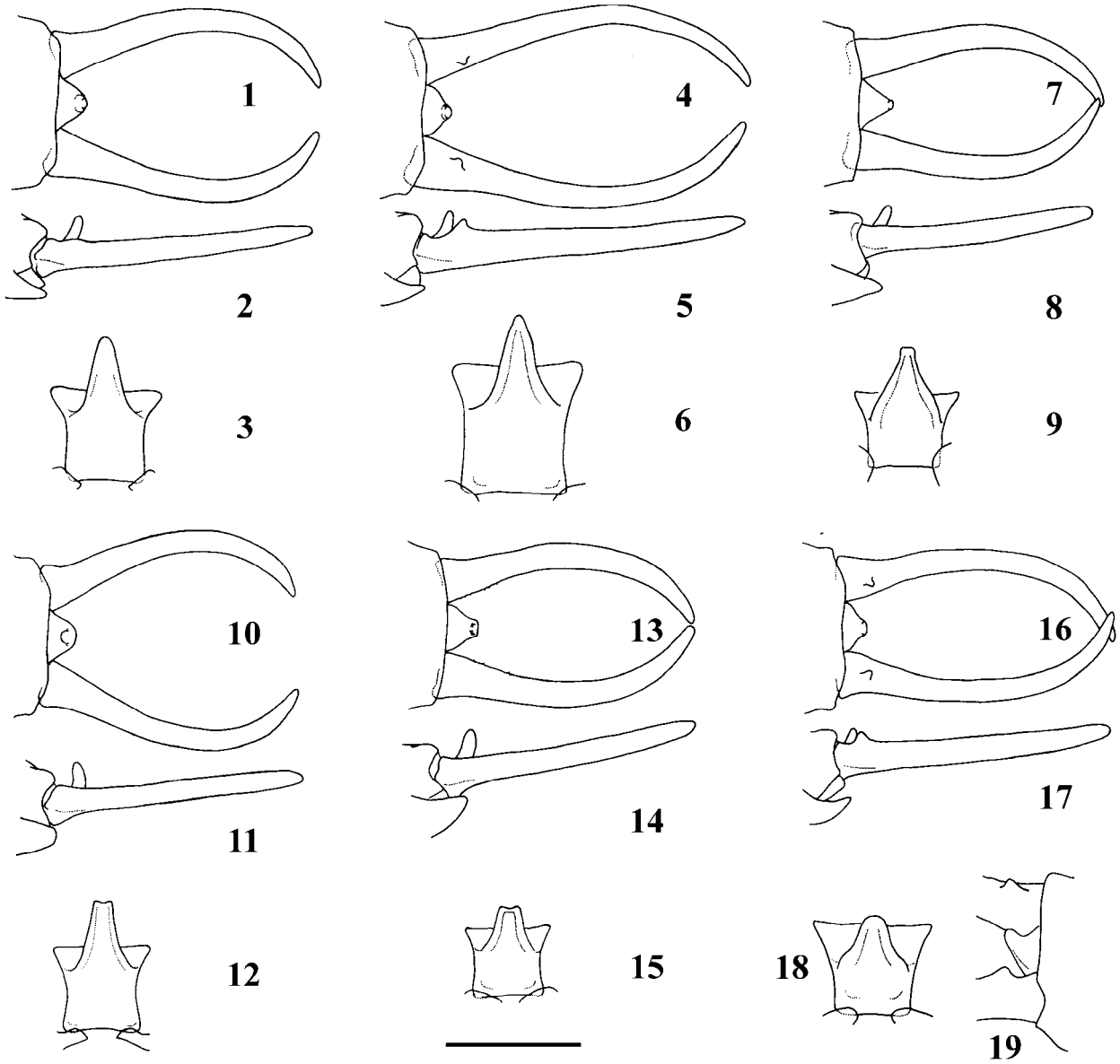
Chelidurella s.l. acanthopygia (Gené, 1832)

(Figsures 1–28)

Forficula acanthopygia Gené, 1832: 228.
Chelidurella acanthopygia (Gené, 1832): Verhoeff 1902: 186.

Material examined. Croatia: Varaždin county, Ivanščica Mts, Prigorec, karst stream above the village, N46°11.75' E16°07.28', 475 m, 06.04. 2010, leg. LC, DM: 1♂; Virovitica-Podravina county, Papuk Mts, Jankovač, beech forest at the waterfall of Kovač Stream, N45°31.5' E17°41.5', 450 m, 21.04.2004, leg. LD, JK, DM: 1♀; Virovitica-Podravina county, Papuk Mts, Jankovač, Jankovač Spring, (loc. 2012/193), N43° 31.135' E17°41.198', 510 m, 06.11.2012, leg. TK, GM: 1♂1♀ (MM, det. TK); Virovitica-Podravina county, Papuk Mts, Kokočak, beech forest above the village, 01.10.2005, leg. DM: 1♂1♀; Zadar county, Velebit Mts, Starigrad, Balinovac, mixed forest above Velebitski botanicki vrh., N44°49.02' E14°57.30', 1480 m, 29.04.2007, leg. LD: 2♂; *Montenegro:* Žabljak municipality, Durmitor Mts, Crno Jezero, Mlinski Stream (loc. 2011/212), N43°08.945' E19° 05.697', 1440 m, 05.11.2011, leg. TK, GM: 1♂ 1♀ (MM, det. TK); Žabljak municipality, Durmitor Mts, Donja Bukovica, Šuškovac (loc. 2011/221), N43°00.652' E19°09.613', 1330 m, 06.11.2011, leg. TK, GM: 1♀ (MM); Kolašin municipality, Sinjajevina Mts, Gornji Lipovo, beech forest NW of the village (loc. 2008/53), N42°53.829' E19°23.140', 1350 m, 11.10.2008, leg. LD, ZF, JK, DM: 1♂; Andrijevica municipality, Visitor Mts, Murino, beech forest SW of the village (loc. 2008/67), N42°37.957' E19° 50.419', 1645 m, 12.10.2008, leg. LD, ZF, JK, DM: 1♀.

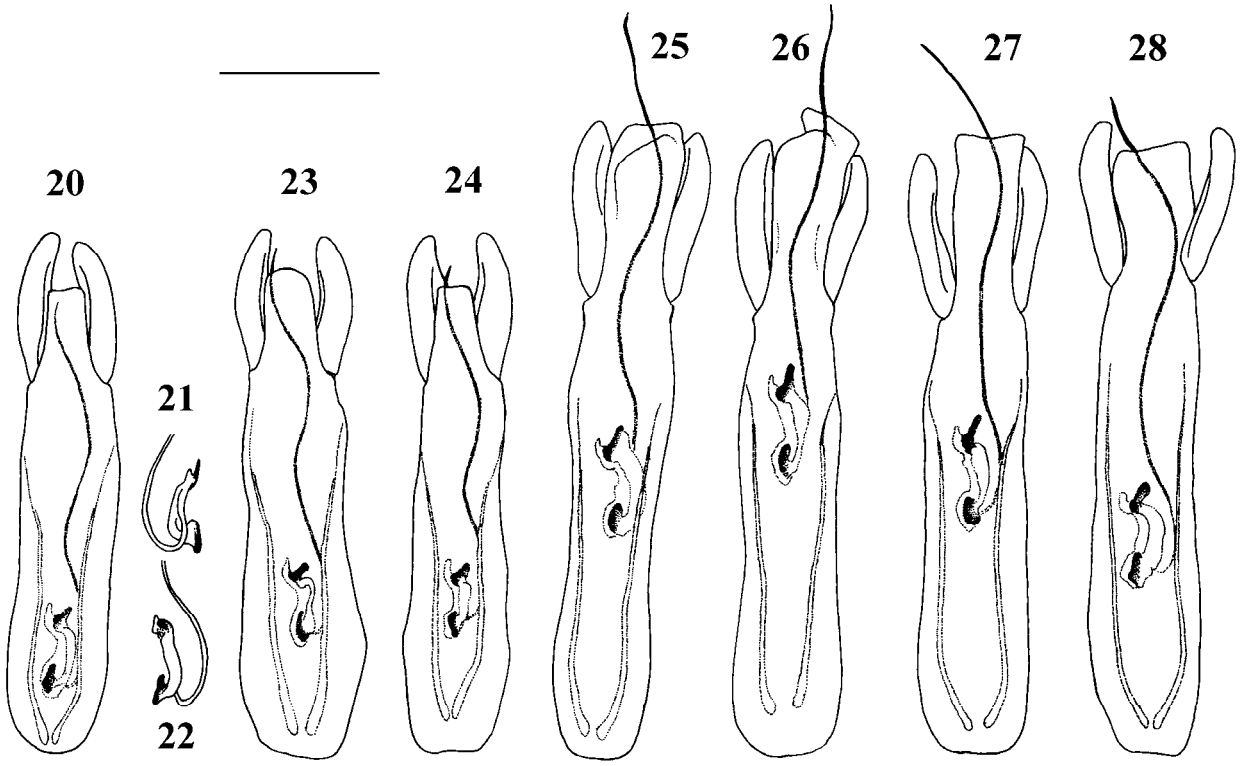
Diagnosis. Second tarsal segment heart-shaped; antennae with 13–15 segments. Tegmina much reduced, clasp-like; wings absent. Male forceps slender, strongly curved; basal part usually with a dorsal tooth. Pygidium forms a strong, upcurved hook with simple apex. Male genitalia with long virga. Body pale; head and forceps brownish orange, legs and thorax yellowish, abdomen reddish brown.



Figures 1–19. *Chelidura s.l. acanthopygia* (Gené, 1832) males. 1–3 = Croatia, Papuk Mts, Kokočak; 4–6 = Croatia, Papuk Mts, Jankovač; 7–9 = Croatia, Ivanščica Mts, Prigorec; 10–12 = Montenegro, Sinjajevina Mts, Gornji Lipovo; 13–15 = Montenegro, Durmitor Mts, Crno Jezero; 16–19 = Croatia, Velebit Mts, Starigrad; 1, 4, 7, 10, 13, 16 = terminalia, dorsal view; 2, 5, 8, 11, 14, 17 = terminalia, lateral view; 3, 6, 9, 12, 15, 18 = pygidium, caudal view; 19 = terminal segment, dorsolateral view (scale 1 mm, only for Figs. 3, 6, 9, 12, 15, 18).

Distribution and ecology. Widespread European species, it was known from Slovenia, Croatia, Bosnia-Herzegovina, Serbia and Romania in the Balkans. We found it in beech or mixed forests in Croatia and Montenegro; new for the fauna of Montenegro (Fig. 33).

Remarks. Only the specimens from North Croatia (Ivanščica and Papuk Mts, Figs. 1–9, 20–24) agree completelly with the sensu stricto diagnosis of *C. acanthopygia* (Capra 1982, Galvagni 1994, 1995, 1996, 1997, Harz 1980, Vigna Taglianti 1993). The further specimens cannot surely be



Figures 20–28. *Chelidura s.l. acanthopygia* (Gené, 1832) male genitalia. 20–22 = Croatia, Papuk Mts, Kokočak; 23 = Croatia, Papuk Mts, Jankovač; 24 = Croatia, Ivanščica Mts, Prigorec; 25 = Montenegro, Sinjajevina Mts, Gornji Lipovo; 26 = Montenegro, Durmitor Mts, Crno Jezero; 27–28 = Croatia, Velebit Mts, Starigrad; 20, 23–28 = genitalia, dorsal view; 21–22 = vesicle, right and left lateral views (scale 1 mm).

identified as one of the described species. Males from Dalmatia (Velebit Mts, Figs. 16–19, 27–28) remind to *C. thaleri* Harz, 1980 while males from Montenegro (Durmitor and Sinjajevina Mts, Figs. 10–15, 25–26) remind to *C. guentheri* Galvagni, 1994, but neither of them agree completely. However, their description as new species would require more material from the Balkan.

Anechura bipunctata (Fabricius, 1781)

Forficula bipunctata Fabricius, 1781: 340.
Anechura bipunctata (Fabricius, 1781): Bormans & Krauss 1900: 101.

Material examined. Montenegro: Žabljak municipality, Durmitor Mts, Crno Jezero, Dobri do (loc. 2011/216), N43°05.980' E19°02.692', 1810 m, 06.11.2011, leg. TK, GM: 1♂ (MM, det. TK); Nikšić municipality, Vojnik Mts, Jasenovo Polje, rocky grassland E of the village (loc. 2008/34), N42°53.696' E19°04.766', 1455 m, 09.10.2008, leg. LD, ZF, JK, DM: 3♂3♀; Kolašin municipality, Sinjajevina Mts, Gornji Lipovo, alpine grassland NW of the village (loc. 2008/52), N42°54.181' E19°22.933', 1645 m, 11.10.2008, leg. LD, ZF, JK, DM: 2♀; Bar municipality, Rumija Mts, macchia between Boljevići and Tudemili, at the old tunnel (loc. 2008/82), N42°11.474' E19°06.489', 440 m, 14.10.2008, leg. LD, ZF, JK, DM: 1♂1♀; *Albania:* Tropojë district, Prokletije Mts, Dragobi, rocky grassland between Gjarpnit e Sipërme and Gjarpnit e Poshtme (loc. 2011/37), N42°27.968' E19°59.241', 2060 m, 10.07.2011, leg. ZB, AK, GP, BS: 2♀; Tropojë district, Prokletije Mts, Dragobi, rocky grassland in the peak region of Mt. Gjarpni (loc. 2011/38), N42°27.596' E19°58.633', 2180 m, 10.07.2011, leg. ZB, AK, GP, BS: 1♀; Shkodër district, Prokletije Mts, alpine grassland and limestone rocks on Pejë Pass (loc. 2005/7), N42°26.650' E19°46.228', 1720 m,

31.05.2005, leg. KB, ZB, DM, DP: 3♂; Shkodër district, Prokletije Mts, alpine grassland and limestone rocks on the slope of Mt. Harapë (loc. 2005/8), N42°26.588' E19°45.824', 1800 m, 31.05.2005, leg. KB, ZB, DM, DP: 4♂; Tropojë district, Prokletije Mts, Curraj i Epërm, slope of Mt. Alshines above the village, N42°23.260' E19°56.766', 1920 m, 22.07.2012, leg. ZB, GP, BS, LS: 2♀.

Diagnosis. Second tarsal segment heart-shaped; antennae with 9–12 segments. Pronotum wider than long. Tegmina much longer than pronotum; wings projecting beyond tegmina with less than half length. Male forceps not widened but double curved; inner margin with a large medial, basal portion with a dorsal teeth. Pygidium short and broad. Body dark; head and basal part of forceps reddish orange, legs and sides of pronotum yellowish; tegmina with small, projecting part of wings with large light spots; further parts of the body black.

Distribution and ecology. A montane species, distributed from the Central Mediterranean to Central Asia. It was known from Croatia, Bosnia-Herzegovina, Serbia, Romania, Bulgaria, Kosovo and Montenegro in the Balkans. We found it in grasslands or shrubs, mostly at high elevation in Montenegro and Albania. Although it was reported from Albania by Csiki (1923), that locality is recently in Kosovo and the new data are the first ones from Albania proper (Fig. 34).

Apterygida media (Hagenbach, 1822)

Forficula media Hagenbach, 1822: 16.
Apterygida media (Hagenbach, 1822): Bormans & Krauss 1900: 117.

Material examined. Serbia: Syrmia district, Fruska Gora, Krušedol, stream valley W of the village, N45°05' E19°55', 19.04.2004, leg. LD, JK, DM: 1♂; Bor district, Đerdap Mts, Mosna, oak forest at the edge of the village (loc. 2006/4), N44°25.777' E22°10.633', 100 m, 12.10.2006, leg. LD, JK, DM: 2♀; Bor district, Đerdap Mts, Dobra, Reka Pesača, beech forest with a stream (loc. 2010/23), N44°34.670' E21°59.250', 385 m, 28.10.2010, leg. LD, JK, ZU: 1♂2♀; Zaječar district, Gamzigrad, gallery of Crni Timok River (loc. 2006/15), N43°55.510' E22°07.770', 185 m, 14.10.2006, leg. LD, JK, DM: 1♀; *Croatia:* Požega-Slavonia county, Papuk Mts, Kutjevo, young beech forest above the village, towards the pass, 20.04.2004, leg. LD, JK, DM: 1♂; Požega-Slavonia county, Papuk Mts, Kutjevo, springs at Velika Rijeka, N of the village (loc. 2012/195), N45°28.983' E17°51.550', 580 m, 06.11.2012, leg. TK, GM: 2♂ (MM, det. TK); Virovitica-Podravina county, Papuk Mts, Jankovač, spring above the waterfall of Kovač Stream, N45°31.126' E17°41.198', 455 m, 21.04.2004, leg. LD, JK, DM: 1♂; Virovitica-Podravina county, Papuk Mts, Voćin, Đjedovoca Stream above the village, N45°35.508' E17°30.075', 365 m, 23.04.2004, leg. LD, JK, DM: 1♂2♀; Virovitica-Podravina county, Papuk Mts, Kokočak, beech forest above the village, 01.10.2005, leg. DM: 1♂; *Bulgaria:* Sliven province, Slivenska planina, Stara Reka, beech forest clearing S of the village (loc. 2011/59), N42°50.520' E26°10.512', 600 m, 11.10.20011, leg. ÁE, TK, GP: 3♀; Sliven province, Slivenska planina, Stara Reka, stream in alder gallery S of the village (loc. 2011/61), N42°48.879' E26°10.542', 800 m, 11.10.20011, leg. ÁE, TK, GP: 2♂3♀; Sliven province, Slivenska planina, Bjala, stream in beech forest SE of the village (loc. 2011/58), N42°42.548' E26° 13.138', 650 m, 10.10.20011, leg. ÁE, TK, GP: 1♂4♀; Plovdiv province, Černatika Mts, Bachkovo, stream SW of the village (loc. 2011/48), N41°55.567' E24°50.290', 450 m, 09.10.20011, leg. ÁE, TK, GP: 1♂; Blagoevgrad province, Dâbrash Mts, Pletena, streamside shrub SW of the village (loc. 2011/42), N41°37.395' E23°57.132', 850 m, 08.10.20011, leg. ÁE, TK, GP: 1♂; *Montenegro:* Kolašin municipality, Komovi Mts, Mateševo-Bare Kraljske, Nesirenski Stream (loc. 2011/236), N42°45.077' E19°34.387', 1030 m, 08.11.2011, leg. TK, GM: 1♀ (MM); Herceg Novi municipality, Krivošije Mts, Mokrine, open macchia NW of the village (loc. 2008/10), N42°30.855' E18°29.242', 560 m, 07.10.2008, leg. LD, ZF, JK, DM: 1♀; *Macedonia:* Eastern region, Vlaina Mts, Pehčevo, Ravna Stream above the village (loc. 2006/42A), N41°46' E22°54', 1000 m, 18.10.2006, leg. LD, JK, DM: 1♀; Pelagonia region, Pelister Mts, Brajčino, Brajčino Stream below the village (loc. 2006/30), N40°

54.133' E21°09.363', 985 m, 16.10.2006, leg. LD, JK, DM: 7♂12♀; Pelagonia region, Pelister Mts, Nižepole, alpine grassland and beech forest around the ski course (loc. 2006/31), N40°58.812' E21°15.165', 1375 m, 17.10.2006, leg. LD, JK, DM: 1♀; *Greece:* Peloponnese, Arcadia regional unit, Kalavrita, ruderalia by the Vouraikos River, W of the city (loc. 2009/63), N38°02.154' E22° 05.899', 685 m, 07.04.2009, leg. LD, JK, DM: 1♀.

Diagnosis. Second tarsal segment heart-shaped; antennae with 11–12 segments. Tegmina slightly longer than pronotum; wings rudimentary. Male forceps long and slender without widening; inner margins with a large medial and usually with a smaller basal teeth. Pygidium large, flattened. Body pale; head brownish orange, abdomen reddish brown, legs, pronotum, tegmina and forceps yellowish brown.

Distribution and ecology. Widespread European species, it was known from Slovenia, Croatia, Bosnia-Herzegovina, Serbia, Romania, Bulgaria and Greece in the Balkans. We found it in different habitat types, mostly streamside forests or shrubs in Serbia, Croatia, Bulgaria, Montenegro, Macedonia and Greece; new for the fauna of Montenegro and Macedonia (Fig. 34).

Remarks. Ingrisch (2012) included the species in his key for the Orthopterous insects of the Durmitor Mts, Montenegro, as not yet reported but possibly occuring in the area.

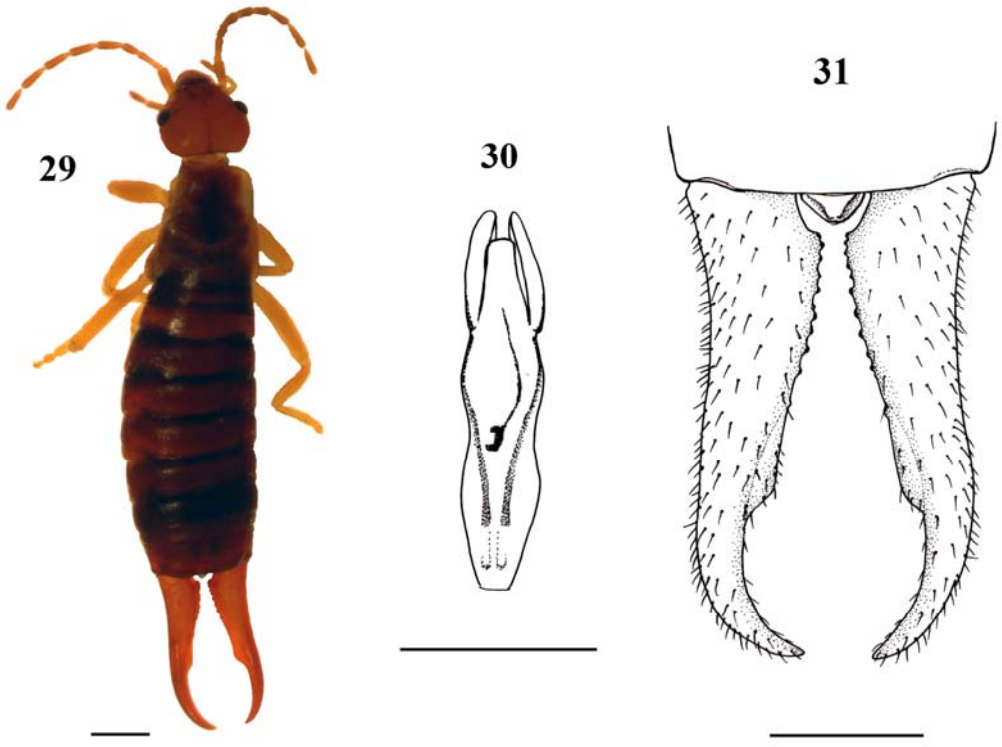
***Guanchia obtusangula* (Krauss, 1904)**

(Figsures 29–31)

Forficula obtusangula Krauss, 1904: 10.
Guanchia obtusangula (Krauss, 1904): Steinmann 1993: 580.

Material examined. Macedonia: Vardar region, Jakupica Mts, Bogomila, softwood gallery of Babuna River below the village (loc. 2006/46), N41°35.610' E21°30.260', 460 m, 19.10.2006, leg. LD, JK, DM: 1♂.

Diagnosis. Second tarsal segment heart-shaped; antennae with 10–13 segments. Tegmina



Figures 29–31. *Guanchia obtusangula* (Krauss, 1904) male, Macedonia, Jakupica Mts, Bogomila. 29 = habitus; 30 = genitalia; 31 = terminalia, dorsal view (scales 1 mm).

as long as pronotum; wings absent. Widened basal part of male forceps longer than its half length; inner margins denticulated. Pygidium small and rounded. Central paramere of the male genitalia narrow; virga short. Body dark; head and forceps orange, thorax and abdomen reddish brown, legs and sides of pronotum yellowish.

Distribution and ecology. Central and East Mediterranean species (Apennine Peninsula with Sicily, the Balkans and the Levant), it was known from Slovenia, Croatia, Montenegro and Albania in the Balkans. We found it in a gallery forest in Macedonia; new for the fauna of Macedonia (Fig. 34).

Remarks. Because of rarity of the species, diagnostic features of the Macedonian specimen are showed on Figs. 29–31; it belongs to the brachylabic form.

***Forficula auricularia* Linnaeus, 1758**

Forficula auricularia Linnaeus, 1758: 423.

Material examined. Romania: Mehedinți county, Porțile de Fier, Eşelnița, Eşelnița Stream in the village (loc. 2011/9), N44°42.678' E22°21.558', 100 m, 10.06.2011, leg. TK, DM, GP: 1♀; *Serbia:* Bor district, Đerdap Mts, Donji Milanovac, oak forest above the city (loc. 2006/10), N44°29.228' E22°03.498', 450 m, 13.10.2006, leg. LD, JK, DM: 1♂2♀; Bor district, Đerdap Mts, Golubinje, stream valley N of the village (loc. 2006/11), N44°30.993' E22°12.692', 90 m, 13.10.2006, leg. LD, JK, DM: 2♂1♀; Bor district, Đerdap Mts, Golubinje, beech forest on the foot of Mt. Mali Štrbac (loc. 2010/12), N44°38.201' E22°18.416', 120 m, 27.10.2010, leg. LD, JK, ZU: 1♂1♀; Bor district, Homoljske Planina, Žagubica, karst plateau above the city (loc. 2006/14), N44°16.743' E21°51.398', 765 m, 14.10.2006, leg. LD, JK, DM: 2♂2♀; Zlatibor district, Negbina, Markovič Spring N of the village (loc. 2002/92), N43° 33.124' E19°46.490', 940 m, 19.10.2002, leg. ZE, ZF, JK, DM: 1♀; *Croatia:* Primorje-Gorski Kotar county, Krk Island, Krk, pine forest, 08.05.2004, leg. LD: 2♀; *Bulgaria:* Varna province, Black Sea coastal hills, Pobitite kamâni, sandy semidesert (loc. 2005/2), N43°13.407' E27°42.385', 100 m, 03.09.2005, leg. MF, JK, DM, TSz: 1♂; Sliven province, Slivenska planina, Stara Reka, beech forest clearing S of the village (loc. 2011/59), N42°50.520' E26°10.512', 600 m, 11.10.20011, leg. ÁE, TK, GP: 1♂; Haskovo province, Sakar Mts, Balgarska Polyana, rocky grassland SW of the village (loc. 2011/49), N42°01.351' E26° 11.450', 500 m, 09.10.20011, leg. ÁE, TK, GP: 1♂; Smoljan province, Perelik Mts, Pamporovo, alpine grassland at the settlement (loc. 2012/32), N41°37.450' E24°42.411', 1560 m, 31.05.2012, leg. JK, DM, TS: 1♀; Sofia province, Vitosha Mts, Kladnitsa, forest stream E of the village (loc. 2011/10), N42°34.049' E23°11.690', 1100 m, 03.10.20011, leg. ÁE, TK, GP: 1♂; Pazardzhik province, Rila Mts, open spring above Belmeken dam (loc. 2011/23), N42°10.389' E23°48.068', 1950 m, 06.10.20011, leg. ÁE, TK, GP: 1♀; Sofia province, Rila Mts, Rilski Manastir, Camping Zodiak (loc. 2005/8a), N42°08.563' E23°21.478', 1210 m, 06.09.2005, leg. MF, JK, DM, TSz: 1♀; Sofia province, Rila Mts, Rilski Manastir, Drushlevitsa Stream (loc. 2011/31), N42°07.999' E23°20.480', 1150 m, 07.10.20011, leg. ÁE, TK, GP: 1♀; *Montenegro:* Herceg Novi municipality, Krivošije Mts, Mokrine, open macchia NW of the village (loc. 2008/10), N42°30.855' E18°29.242', 560 m, 07.10.2008, leg. LD, ZF, JK, DM: 1♀; Kotor municipality, Lovćen Mts, gorge E of Kotor along the road to Njeguši (loc. 2008/17), N42°24.145' E18°46.498', 400 m, 08.10.2008, leg. LD, ZF, JK, DM: 1♂; Žabljak municipality, Durmitor Mts, Pošćenska dolina, Valovito Lake (loc. 2011/216), N43°05.805' E19°04.038', 1710 m, 06.11.2011, leg. TK, GM: 1♂1♀ (MM, det. TK); Plužine municipality, Durmitor Mts, Boričje, pasture above the village, 14.08.2004, leg. DM: 1♂; Šavnik municipality, Treskavac Mts, Pošcenje, rocky grassland at the N end of Kanjon Nevidio (loc. 2008/40), N42°59.298' E19° 04.070', 950 m, 10.10.2008, leg. LD, ZF, JK, DM: 1♂; Nikšić municipality, Nikšić Basin, Vidrovan, rocky grassland at Vukovo Spring (loc. 2008/32), N42°51.466' E18°56.596', 675 m, 09. 10.2008, leg. LD, ZF, JK, DM: 1♂1♀; Berane municipality, Bjelasica Mts, Kurikuće, Suvoda Stream (loc. 2008/60), N42°52.781' E19°44.467', 1170 m, 11.10.2008, leg. LD, ZF, JK, DM: 1♀; Mojkovac municipality, Sinjajevina Mts, Bogomolje, mouth of Ljutica Stream (loc. 2011/211), N43°08.277' E19°18.128', 645 m, 05.11.2011,

leg. TK, GM: 1♂ (MM, det. TK); Kolašin municipality, Kolašin, motel at the edge of the city (loc. 2008/50), N42°49.563' E19°31.025', 915 m, 10.10.2008, leg. LD, ZF, JK, DM: 1♂1♀; Kolašin municipality, Manastir Morača, karst spring and its outlet (loc. 2010/2/1), N42°45.942' E19°23.436', 300 m, 10.07.2010, leg. DM: 1♀; Kolašin municipality, Manastir Morača (loc. 2011 /248), N42°45.942' E19°23.436', 300 m, 10.11. 2011, leg. TK, GM: 1♂2♀ (MM, det. TK); Andrijevica municipality, Visitor Mts, Murino, gallery of Dosova Stream S of the village (loc. 2008/70), N42°38.458' E19°52.113', 970 m, 12.10.2008, leg. LD, ZF, JK, DM: 1♂1♀; Podgorica municipality, Gornji Mileš, Rogamsko brdo (loc. 2011 /239), N42°23.995' E19°18.710', 65 m, 09.11. 2011, leg. TK, GM: 1♀ (MM, det. TK); Bar municipality, Crmnica Mts, Sotonići, restaurant above the village (loc. 2012/12), N42°14.190' E19°02.636', 200 m, 15.06.2012, leg. ZF, TKa, TK, DM, VP: 1♂; Plav municipality, Prokletije Mts, Vušanje, Zastan, mountain pasture S of the village (loc. 2008/63), N42°29.387' E19°48.912', 1330 m, 12.10.2008, leg. LD, ZF, JK, DM: 1♂; Plav municipality, Rugovo Mts, Velika, beech forest below Čakor Pass (loc. 2005/51), N42° 41.302' E19°57.906', 1235 m, leg. TD, ZE, ZF, DM: 1♀; *Macedonia:* Eastern region, Osogovska Planina, Kočani, Ponikva, mountain pasture, N42º01.477' E22º21.561', 1550 m, 20.09.2009, leg. ZB, GP, LS: 3♂; Eastern region, Osogovska Planina, Kočani, Ponikva, disturbed grassland, N41º58.006' E22º22.541', 1000 m, 21.09.2009, leg. ZB, GP, LS: 1♂1♀; Southwestern region, Sum, spring lake above the Ohrid Lake (loc. 2006 /23), N41°10.972' E20°37.928', 705 m, 16.10. 2006, leg. LD, JK, DM: 2♀; *Albania:* Malësia e Madhë district, Hani i Hotit, macchia by the Shkodër Lake (loc. 2006/82), N42°20.053' E19° 25.617', 30 m, 10.05.2006, leg. LD, JK, DM: 2♂1♀; Malësi e Madhe district, Madhë Mts, Gërçarë border station, house walls (loc. 2005 /45), N42°35.014' E19°46.487', 950 m, 04.10. 2005, leg. TD, ZE, ZF, DM: 1♂; Tropojë district, Prokletije Mts, Dragobi, grassland in the valley of Motinë Stream (loc. 2012/1), N42°25.701' E19° 58.230', 610 m, 21.07.2012, leg. ZB, GP, BS, LS: 1♀; Shkodër district, Prokletije Mts, Okol, karst spring and beech forest N of the village, towards Pejë Pass (loc. 2003/83), N42°25.664' E19° 45.704', 990 m, 06.07.2003, leg. ZE, ZF, JK, DM: 4♂3♀; Shkodër district, Prokletije Mts, Okol, forest brook in the village (loc. 2012/170), N42° 24.079' E19°45.882', 875 m, 09.10.2012, leg. PJ, TK, DM, GP: 1♂1♀ (MM, det. TK); Tropojë district, Prokletije Mts, Rrogam, limestone rocks, cave and alpine grassland beneath Valbonë Pass (loc. 2005/62), N42°24.681' E19°48.885', 1560 m, 06.10.2005, leg. TD, ZE, ZF, DM: 1♂; Shkodër district, Prokletije Mts, Mollë, Shallë River influence to Koman Lake (loc. 2012/31), N42°11.982' E19°49.121', 180 m, 18.06.2012, leg. ZF, TK, DM: 1♀; Shkodër district, Mes, Kir River at the Mesi Bridge (loc. 2010/43), N42°06.874' E19°34.483', 50 m, 23.05.2010, leg. ZF, DM, ZU: 2♀; Lezhë district, Lezhë, in the city (loc. 2004/112), N41°46.489' E19°38.408', 10 m, 09.10.2004, leg. ZF, JK, DM: 1♀; Pukë district, Dardhë, Hotel Kunora, on house walls (loc. 2005/71), N42°10.549' E20°09.458', 750 m, 07.10.2005, leg. TD, ZE, ZF, DM: 1♂1♀; Kukës district, Topojan, gorge N of the village (loc. 2007/106), N41°59.200' E20°31.715', 900 m, 24. 06.2007, leg. LD, ZE, ZF, AH, DM: 1♂; Kukës district, Skavicë, Drin i Zi River and Bushtricë Stream at their confluence, limestone rocks at the village (loc. 2005/82), N41°56.109' E20°21.792', 305 m, 09.10.2005, leg. TD, ZE, ZF, DM: 1♂; Dibër district, Draj-Reç, limestone rocks and pasture N of the village (loc. 2005/86), N41° 53.447' E20°20.220', 550 m, 09.10.2005, leg. TD, ZE, ZF, DM: 1♂; Dibër district, Korab Mts, Radomirë, spring E of the village (loc. 2007/125), N41°49.032' E20°30.016', 1440 m, 26.06.2007, leg. LD, ZE, ZF, AH, DM: 1♂; Dibër district, Korab Mts, Radomirë, Radomirë Stream E of the village (loc. 2007/143), N41°49.022' E20° 30.022', 1445 m, 28.06.2007, leg. LD, ZF, DM: 1♂1♀; Krujë district, Shkanderbeu Mts, Noi, limestone rocks on Mt. Krujë, above the village (loc. 2002/144), N41°31.374' E19°48.987', 700 m, 26.10.2002, leg. ZE, ZF, JK, DM: 1♂; Mat district, Gropë Mts, Gurri i Bardhë, open stream S of the village (loc. 2007/159), N41°25.839' E20°05.518', 1025 m, 30.06.2007, leg. LD, ZE, ZF, AH, DM: 1♂; Tiranë district, Gropë Mts, limestone rocks and forest brook S of Shtyllë Pass, along the Klos–Elbasan road (loc. 2004/120), N41°22.158' E20°05.079', 1500 m, 09.10.2004, leg. ZF, JK, DM: 1♂1♀; Pogradec district, Vallamarë Mts, Velçan i Mokrës, limestone rocks at the settlement (loc. 2003/56),

N40°56.269' E20°27.244', 1100 m, 01.07.2003, leg. ZE, ZF, JK, DM: 1♀; Berat district, Berat, city street (loc. 2004/129), N40°42.217' E19° 57.231', 65 m, 10.10.2004, leg. ZF, JK, DM: 1♀; Berat district, Tomor Mts, Leghë, macchia and pastures in the Vodicë valley (loc. 2004/5), N40° 41.651' E20°02.219', 140 m, 24.05.2004, leg. KB, KH, DM: 1♂; Berat district, Tomor Mts, Karkanjos, gallery of Karkanjos Stream below the village (loc. 2004/7), N40°41.657' E20°03.548', 360 m, 25.05.2004, leg. KB, KH, DM: 1♀; Skrapar district, Tomor Mts, Çorovodë, dry forest and limestone walls above the gorge of Çorovodë Stream, NE of the city (loc. 2004/125), N40° 31.246' E20°15.112', 475 m, 10.10.2004, leg. ZF, JK, DM: 1♀; Skrapar district, Ostrovicë Mts, Backë, Krojmbret Spring and its outlet N of the village (loc. 2013/27), N40°31.753' E20°25.152', 1965 m, 28.05.2013, leg. PJ, TK, GM, GP: 2♀; Skrapar district, Ostrovicë Mts, Backë, N of the village towards Frengu Peak (loc. 2006/135), N40°30.983' E20°24.422', 1450 m, 20.08.2006, leg. ZF, AH, TH, DM: 5♂4♀; Korçë district, Vithkuq, gorge of Zgorolicë Stream E of the village (loc. 2003/68), N40°31.998' E20°37.366', 1090 m, 03.07.2003, leg. ZE, ZF, JK, DM: 1♂2♀; Vlorë district, Vlorë, seashore S of the city (loc. 2008/10), N40°23.349' E19°28.897', 0 m, 11.03. 2008, leg. SC, DM: 1♀; Tepelenë district, Kendrevicë Mts, Progonat, Gurri Stream and its gorge E of the village (loc. 2004/132), N40°12.368' E19°57.411', 950 m, 11.10.2004, leg. ZF, JK, DM: 1♂; Tepelenë district, Kendrevicë Mts, Progonat, brook and grassland W of the village (loc. 2004/133), N40°12.486' E19°56.075', 785 m, 11.10.2004, leg. ZF, JK, DM: 1♂; Gjirokastër district, Gjirokastër, Kalaje e Gjirokastërit, castle walls (loc. 2004/144), N40°04.280' E20°08.263', 330 m, 13.10.2004, leg. ZF, JK, DM: 1♂; Sarandë district, Çikë Mts, Borsh, Ixuor Spring in the village (loc. 2004/146), N40°03.686' E19° 51.462', 105 m, 13.10.2004, leg. ZF, JK, DM: 1♂1♀; *Greece:* Central Macedonia, Serres regional unit, Kerkini Mts, Ano Poroia, stream in a plane tree forest (loc. 2007/3), N41°17.637' E23°02.187', 510 m, 30.03.2007, leg. LD, ZE, ZF, JK, DM: 1♀; Thrace, Xanthi regional unit, Sminthi, rocks and small river S of the village (loc. 2012/43), N41°12.495' E24°51.752', 200 m, 03.04.2007, leg. LD, ZE, ZF, JK, DM: 1♀; Thrace, Rhodope regional unit, Papikio Mts, Vronti, stream gorge at the village (loc. 2007/53), N41°11.421' E25°17.693', 425 m, 04.04.2007, leg. LD, ZE, ZF, JK, DM: 1♀; Thrace, Rhodope regional unit, Sapka Mts, Kizario, pasture SW of the village (loc. 2012/7), N41°03.492' E25° 45.672', 140 m, 27.05.2012, leg. JK, DM, TS: 1♂6♀; Epirus, Preveza regional unit, Thesprotiko Mts, Vrisoula, plane tree gallery S of the village (loc. 2011/11), N39°14.904' E20°41.735', 220 m, 05.05.2011, leg. JK, DM, TS, ZU: 1♂1♀; Central Greece, Phocis regional unit, Giona Mts, Prosilio, mountain pasture S of the village (loc. 2009/71), N38°33.827' E22°20.939', 680 m, 08.04.2009, leg. LD, JK, DM: 1♀; Peloponnese, Arcadia regional unit, Neo Salmeniko, Finikas River at the village (loc. 2009/66), N38°16.292' E21°57.020', 185 m, 08.04.2009, leg. LD, JK, DM: 2♀; Peloponnese, Arcadia regional unit, Aroania Mts, Planitero, Planitero (Ladon) Springs in the village (loc. 2009/61), N37°56.022' E22°09.971', 640 m, 07.04.2009, leg. LD, JK, DM: 1♀; Peloponnese, Arcadia regional unit, Panagitsa, smalll river and its plane tree gallery in the village (loc. 2009/55), N37°46.392' E22°13.341', 515 m, 06.04.2009, leg. LD, JK, DM: 1♂; Peloponnese, Arcadia regional unit, Tetrazi Mts, Agia Theodora, karst springs (loc. 2009/43), N37°21.269' E21°58.782', 490 m, 05.04.2009, leg. LD, JK, DM: 1♀; South Aegean, Naxos regional unit, Ghalini, open stream at the village (loc. 2013/47), N37°06.888' E25°25.715', 35 m, 06.04.2013, leg. JK, DM, TS: 1♂.

Diagnosis. Second tarsal segment heart-shaped; antennae with 13–16 segments. Tegmina much longer than pronotum; wings projecting beyond tegmina with less than half length. Widened basal part of male forceps shorter than its half length; inner margins denticulated, ends with a marked tooth. Pygidium small and rounded. Body dark; head orange, abdomen reddish brown, legs and forceps yellowish, pronotum, tegmina and wings yellowish or darker, projecting part of wings with light spots, tegmina without light spots.

Distribution and ecology. Cosmopolitan species, known from all the Balkan countries. We found it in diverse and very different type of habitats in Balkanian parts of Romania, Serbia, Croatia, Bulgaria, Montenegro, Macedonia, Albania and Greece (Fig. 35).

Remarks. The huge amount of specimens show remarkable variability. Both macrolabic and brachylabic forms were found in most of the countries.

Forficula aetolica Brunner, 1882

Forficula aetolica Brunner, 1882: 18.

Material examined. Bulgaria: Burgas province, Strandzha Mts, Veselie, Ropotamo Stream towards Yasna Polyana (loc. 2011/54), N42° 18.647' E27°37.443', 20 m, 10.10.20011, leg. ÁE, TK, GP: 1♂; *Greece:* South Aegean, Rhodes regional unit, Embonas, streamside ruderalia E of the city (loc. 2012/23), N36°14.107' E27°52.036', 365 m, 09.11.2012, leg. JK, DM: 1♀; South Aegean, Rhodes regional unit, Apollona, Triana, stream gorge with plane trees (loc. 2012/24), N36°15.261' E27°55.157', 315 m, 09.11.2012, leg. JK, DM: 1♂; South Aegean, Rhodes regional unit, Salakos, 'Butterfly River', a gorge NE of the city (loc. 2012/26), N36°17.391' E27°57.007', 135 m, 10.11.2012, leg. JK, DM: 1♂1♀; South Aegean, Rhodes regional unit, Kremasti, stream at the city (loc. 2012/51), N36°24.530' E28°06.633', 5 m, 14.11.2012, leg. JK, DM: 1♀; South Aegean, Karpathos regional unit, Voloda, gorge by the village (loc. 2012/39), N35°33.240' E27°09.878', 405 m, 12.11.2012, leg. JK, DM: 1♀; Crete, Chania regional unit, Kakopetros, stream and its plane tree gallery near the village (loc. 2013/2), N35°24.803' E23°45.391', 430 m, 31.03.2013, leg. JK, DM, TS: 1♂; Crete, Rethymno regional unit, Gouleditana, olive grove with oak stands at the village (loc. 2013/11), N35°17.206' E24° 29.949', 440 m, 01.04.2013, leg. JK, DM, TS: 1♀; Crete, Heraklion regional unit, Loutraki, stream and its gorge below the village (loc. 2013/46), N35°03.413' E25°24.887', 670 m, 05. 04.2013, leg. JK, DM, TS: 1♀.

Diagnosis. Second tarsal segment heart-shaped; antennae with 11–13 segments. Tegmina slightly longer than pronotum; wings absent. Widened basal part of male forceps shorter than its half but longer than its third length; inner margins denticulated. Pygidium large; dorsal part apically pointed. External parameres of the male genitalia broad. Body pale; head orange, abdomen orange brown, legs, pronotum, tegmina and forceps yellowish.

Distribution and ecology. East Mediterranean species (Balkans, Crimea, Anatolia, Caucasus, the Levant and Iran), it was previously known only from Greece in the Balkans. We found it on shrubs in Bulgaria and the Greek Isles; new for the fauna of Bulgaria (Fig. 36).

Forficula decipiens Gené, 1832

Forficula decipiens Gené, 1832: 7.

Material examined. Croatia: Lika-Senj county, Velebit Mts, Jurjevo, camping, N44°41.929' E14°54.493', 10 m, 30.04.2007, leg. LD: 1♂; Dubrovnik-Neretva county, Trsteno, roadside vegetation SE of the village (loc. 2008/7), N42° 42.293' E17°59.401', 95 m, 07.10.2008, leg. LD, ZF, JK, DM: 3♂3♀; *Greece:* Peloponnese, Messinia regional unit, Velika, river in the village (loc. 2009/33), N37°00.310' E21°55.811', 10 m, 04.04.2009, leg. LD, JK, DM: 1♂.

Diagnosis. Second tarsal segment heart-shaped; antennae with 11–14 segments. Tegmina slightly longer than pronotum; wings absent. Widened basal part of male forceps shorter than its half but longer than its third length; inner margins toothed. Pygidium small; dorsal part not narrowed apically. External parameres of the male genitalia narrow. Body dark; head orange, abdomen reddish brown, legs, pronotum, tegmina and forceps yellowish.

Distribution and ecology. Holomediterranean species, known from Croatia, Romania, Montenegro and Greece in the Balkans. We found it under stones in grassy vegetations in Croatia and Greece (Fig. 36).

Forficula smyrnensis Serville, 1839

Forficula smyrnensis Serville, 1839: 38.

Material examined. Serbia: Bor district, Đerdap Mts, beech forest between Miroč and Brza

Palanka (loc. 2010/16), N44°28.616' E22° 21. 074', 405 m, 27.10.2010, leg. LD, JK, ZU: 1♀; Bor district, Đerdap Mts, Donji Milanovac, oak forest (loc. 2010/20), N44°28.551' E22°04.406', 335 m, 28.10.2010, leg. LD, JK, ZU: 1♂; *Montenegro:* Bar municipality, Rumija Mts, Stari Bar, M. Mikuliçi (loc. 2011/243), N42°06.278' E19° 08.930', 320 m, 09.11.2011, leg. TK, GM: 1♂ (MM, det. TK); *Macedonia:* Southwestern region, Sveti Naum, karst springs above the Ohrid Lake, N40°54.613' E20°44.872', 705 m, 16.08. 2011, leg. SC, DM: 1♂; *Albania:* Librazhd district, Qukës Shkumbin, karst sidespring at the quarry (loc. 2012/118a), N41°05.786' E20° 26.551', 380 m, 22.06.2012, leg. ZF, TK, DM: 1♀ (MM); Tepelenë district, Tepelenë, Uji i Ftohtë, karst springs, limestone rocks and degraded forest (loc. 2004/137), N40°15.011' E20°03.548', 165 m, 12. 10.2004, leg. ZF, JK, DM: 1♀; *Greece:* Central Macedonia, Serres regional unit, Kerkini Mts, Ano Poroia, stream in a plane tree forest (loc. 2007/3), N41°17.637' E23°02.187', 510 m, 30.03. 2007, leg. LD, ZE, ZF, JK, DM: 1♀; East Macedonia, Kavala regional unit, Proastio, softwood gallery of Nestos River, E of the village (loc. 2007/40), N40°59.458' E24°44.579', 30 m, 02.04. 2007, leg. LD, ZE, ZF, JK, DM: 1♂; Peloponnese, Arcadia regional unit, Parnon Mts, Elatos, chestnut forest S of the village (loc. 2009/4), N37°20.909' E22°32.169', 1005 m, 02.04.2009, leg. LD, JK, DM: 1♀.

Diagnosis. Second tarsal segment heart-shaped; antennae with 9–11 segments. Tegmina much longer than pronotum; wings projecting beyond tegmina with about half length. Widened basal part of male forceps very short; inner margins denticulated. Pygidium small; laterally emarginated. Central paramere of the male genitalia narrowing; virga with basal vesicle. Body dark; head orange, abdomen and forceps reddish black, legs and pronotum yellowish, tegmina reddish black with large, light spots, projecting part of wings mostly white.

Distribution and ecology. Central and East Mediterranean species (Corsica, Carpathian Basin, Balkans, Anatolia, Caucasus and the Levant), it was previously reported from Croatia, Serbia, Romania, Bulgaria, Albania and Greece in the Balkans. We found it in different types of wet forests in Serbia, Montenegro, Macedonia, Albania and Greece; new for the fauna of Montenegro and Macedonia (Fig. 37).

Forficula lurida Fischer, 1853

Forficula lurida Fischer, 1853: 75.

Material examined. Greece: Thrace, Rhodope regional unit, Maronia Hills, rocky grassland above Petritis (loc. 2007/59), N40°54.080' E25° 36.348', 220 m, 05.04.2007, leg. LD, ZE, ZF, JK, DM: 1♀; Thrace, Rhodope regional unit, Maronia Hills, rocky mediterranean bush above Maronia Cave (loc. 2007/60), N40°55.732' E25°30.138', 165 m, 05.04.2007, leg. LD, ZE, ZF, JK, DM: 7♂2♀; Thrace, Evros regional unit, Mesimvria, sandy seashore at the Mesimvria Archeological Zone (loc. 2007/58), N40°51.692' E25°38.721', 15 m, 05.04.2007, leg. LD, ZE, ZF, JK, DM: 2♂3♀; South Aegean, Rhodes regional unit, Mt. Atavyros peak region, rocky grassland (loc. 2012/4), N36°12.233' E27°51.913', 1095 m, 07. 11.2012, leg. JK, DM: 1♂1♀; South Aegean, Rhodes regional unit, Mt. Atavyros, rocky evergreen oak stand (loc. 2012/5), N36°12.247' E27°51.344', 1055 m, 07.11.2012, leg. JK, DM: 2♂; South Aegean, Rhodes regional unit, Mt. Atavyros, Ploumadhes, pine forest (loc. 2012/7), N36°12.017' E27°49.286', 610 m, 07.11.2012, leg. JK, DM: 1♂1♀; South Aegean, Rhodes regional unit, Asklipiio, rocky pine forest on Selli hill, N of the village (loc. 2012/18), N36°06.595' E27°54.998', 200 m, 09.11.2012, leg. JK, DM: 1♂; South Aegean, Rhodes regional unit, Apollona, Triana, stream gorge with plane trees (loc. 2012/24), N36°15.261' E27°55.157', 315 m, 09. 11.2012, leg. JK, DM: 1♂1♀; South Aegean, Rhodes regional unit, Platania, 'Koinotis Platania' spring W of the village (loc. 2012/25), N36°15.321' E28°00.129', 285 m, 09.11.2012, leg. JK, DM: 1♀; South Aegean, Karpathos regional unit, Mt. Lastos, rocks in the peak region (loc. 2012/38), N35°34.300' E27°09.541', 905 m, 12.11.2012, leg. JK, DM: 3♀; Crete, Lasithi regional unit, Sfaka, dry limestone gorge beneath the village (loc. 2013/32), N35°09.197' E25°55.248', 240 m, 04.04.2013, leg. JK, DM, TS: 1♀; Crete, Lasithi regional unit, Zakros, stream and its plane

tree gallery N of the village (loc. 2013/37), N35° 06.918' E26°13.153', 190 m, 04.04.2013, leg. JK, DM, TS: 2♀.

Diagnosis. Second tarsal segment heart-shaped; antennae with 12–13 segments. Tegmina much longer than pronotum; wings projecting beyond tegmina with less than half length. Widened basal part of male forceps shorter than its half length; inner margins denticulated, without marked tooth. Pygidium small and rounded. Male genitalia very narrow. Body dark; head orange, abdomen reddish brown, legs and forceps yellowish, pronotum, tegmina and wings yellowish or darker, projecting part of wings with light spots, tegmina without light spots.

Distribution and ecology. Central and East Mediterranean species (Apennine Peninsula, Balkans, Anatolia, the Levant and Iran), known from Croatia, Bosnia-Herzegovina, Montenegro and Greece in the Balkans. We found it mostly in rocky grasslands but also in forested gorges in eastern Greece (Fig. 37).

Remarks. Specimens from Thrace all belong to the brachylabic form while we found both macrolabic and brachylabic specimens on the isles, even sympatrically.

Isoptera

Kalotermes flavicollis (Fabricius, 1793)

Termes flavicollis Fabricius, 1793: 91.
Kalotermes flavicollis (Fabricius, 1793): Hagen 1853: 479.

Material examined. Greece: Peloponnese, Lakonia regional unit, Potamia, plane tree gallery E of the village (loc. 2009/17), N36°55.332' E22° 29.877', 220 m, 03.04.2009, leg. LD, JK, DM: 1 soldier, 1 worker.

Diagnosis. Frons without frontanelle; eyes small. Pronotum not narrowed apically. Soldiers with three teethed mandible.

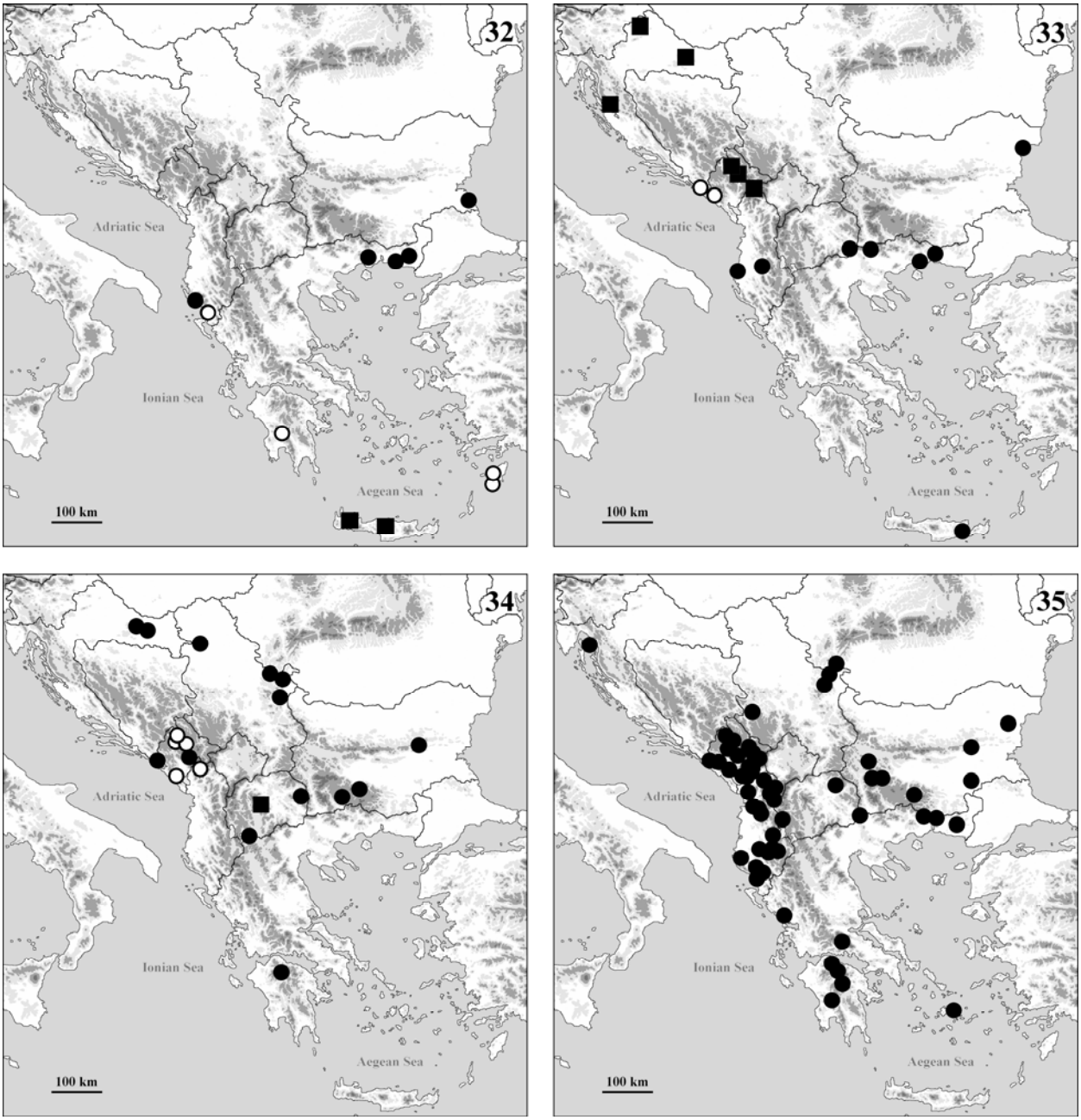
Distribution and ecology. Holomediterranean species, known from Croatia and Greece in the Balkans. We found it in a gallery forest in Greece (Fig. 38).

Reticulitermes spp.

Material examined. Romania: Tulcea county, Babadag forest, 02.06.2005, leg: SCs: 3 soldiers, 25 workers; *Croatia:* Zadar county, Maslenica (loc. 2006/7), 05.05.2006, leg. TK: 1♂, 1 soldier; *Bulgaria:* Burgas province, Sinemorec, coastal bush at the mouth of Silistar Stream (loc. 2007/83), N42°01.418' E28°00.490', 0 m, 08.04. 2007, leg. LD, ZE, ZF, JK, DM: 5 workers; *Montenegro:* Budva municipality, Budva, seashore (loc. 2007/92), 12.06.2007, leg. ZF: 13 workers; *Albania:* Berat district, Tomor Mts, Tomor i Madhë, Kalaja e Tomorit, limestone rocks and rocky grassland (loc. 2004/10), N40°42.160' E20°06.568', 1180 m, 26.05.2004, leg. KB, KH, DM: 1 soldier, 4 workers, 1 juvenile; Berat district, Tomor Mts, Karkanjos, gallery of Karkanjos Stream below the village (loc. 2004/7), N40° 41.657' E20°03.548', 360 m, 25.05.2004, leg. KB, KH, DM: 1♂3♀; Vlorë district, Radhimë, seashore beneath the village (loc. 2006/86), N40° 21.673' E19°28.832', 0 m, 11.05.2006, leg. LD, JK, DM: 1♂; Vlorë district, Dhërmi, macchia and rocky grassland S of the village (loc. 2006/90), N40°08.607' E19°39.735', 250 m, 11.05.2006, leg. LD, JK, DM: 1♀; *Greece:* Central Macedonia, Serres regional unit, Neo Petrisi, Strimonas River E of the village (loc. 2007/4), N41°17.000' E23°19.994', 75 m, 30.03.2007, leg. LD, ZE, ZF, JK, DM: 1 soldier, 18 workers; East Macedonia, Kavala regional unit, Lekanis Mts, Zarkadia, quarry N of the village (loc. 2007/34), N41°-02.109' E24°37.941', 230 m, 02.04.2007, leg. LD, ZE, ZF, JK, DM: 11 soldiers, 1 worker, 3 juveniles; East Macedonia, Kavala regional unit, Lekanis Mts, Zarkadia, macchia above the village (loc. 2007/36), N41°01.400' E24°38.507', 200 m, 02.04.2007, leg. LD, ZE, ZF, JK, DM: 10 soldiers, 10 workers, 4 juveniles; East Macedonia, Drama regional unit, Dit-Rodopi Mts, Sidironero, Miloi Stream E of the village (loc. 2007/29), N41°21.223' E24°16.286', 525 m, 01.04.2007, leg. LD, ZE, ZF, JK, DM: 6 workers; Thrace, Rhodope regional unit, Maronia Hills, rocky mediterranean bush above Maronia Cave (loc. 2007/60), N40°55.732' E25°30.138', 165 m, 05. 04.2007, leg. LD, ZE, ZF, JK, DM: 2 workers, 9 juveniles; Thrace, Rhodope regional unit, Sapka Mts, Nea Sanda, oak forest E of the village (loc. 2007/56), N41°07.672' E25°53.223', 650 m, 04.

04.2007, leg. LD, ZE, ZF, JK, DM: 5 soldiers, 53 workers, 73 juveniles; Epirus, Thesprotia regional unit, Vrosina, oak forest at the village (loc. 2006/100), N39°37.248' E20°31.355', 360 m, 12. 05.2006, leg. LD, JK, DM: 1 soldier, 10 workers; Epirus, Ioannina regional unit, Votonosi, stream E of the village (loc. 2006/102), N39°45.965' E21° 05.838', 660 m, 13.05.2006, leg. LD, JK, DM: 1♀, 2 soldiers, 1 worker, 2 juveniles; Epirus, Ioannina regional unit, Lefkothea, Smolitsas River E of the village (loc. 2006/101), N39°43.053' E20°36.645', 200 m, 12.05.2006, leg. LD, JK, DM: 1♂; Epirus, Preveza regional unit, Louros, rocky macchia N of the village (loc. 2011/10), N39°10.630' E20°44.063', 90 m, 05.05.2011, leg. JK, DM, TS, ZU: 1♀; West Greece, Aetolia-Acarnania regional unit, Akarnanika Mts, Trifos, shore vegetation of a small artifical pond S of the village (loc. 2011/22), N38°48.396' E21°05.650', 330 m, 06.05.2011, leg. JK, DM, TS, ZU: 1 worker; West Greece, Aetolia-Acarnania regional unit, Chouni, forest spring N of the village (loc. 2011/26), N38°51.053' E21°32.720', 565 m, 07. 05.2011, leg. JK, DM, TS, ZU: 4♀, 9 workers; Ionian Islands, Lefkada regional unit, Rahi, plane tree gallery W of the village (loc. 2011/19), N38° 43.363' E20°41.404', 50 m, 06.05.2011, leg. JK, DM, TS, ZU: 2♂7♀; Central Greece, Phocis regional unit, Ag. Pandes, macchia E of the village (loc. 2009/70), N38°20.842' E22°18.846', 50 m, 08.04.2009, leg. LD, JK, DM: 1 soldier, 8 workers; Peloponnese, Arcadia regional unit, Neo Salmeniko, Finikas River at the village (loc. 2009/66), N38°16.292' E21°57.020', 185 m, 08. 04.2009, leg. LD, JK, DM: 1 soldier; Peloponnese, Arcadia regional unit, Vitina, woody pasture SW of the city (loc. 2009/54), N37°39.031' E22°10.156', 960 m, 06.04.2009, leg. LD, JK, DM: 2 workers, 9 juveniles; Peloponnese, Arcadia regional unit, Elliniko, Gortis ruins (loc. 2009/47), N37°32.378' E22°02.788', 320 m, 06.04.2009, leg. LD, JK, DM: 4 soldiers, 1 worker; Peloponnese, Arcadia regional unit, Tetrazi Mts, Agia Theodora, karst springs (loc. 2009/43), N37° 21.269' E21°58.782', 490 m, 05.04.2009, leg. LD, JK, DM: 1 soldier, 4 workers; Peloponnese, Arcadia regional unit, Tripotamo, oak forest S of the village (loc. 2009/42), N37°20.996' E22° 06.392', 400 m, 05.04.2009, leg. LD, JK, DM: 7 soldiers, 12 workers, 17 juveniles; Peloponnese, Messinia regional unit, Kondovounia Mts, Tripila, open macchia N of the village (loc. 2009/39), N37°11.311' E21°47.148', 390 m, 05.04.2009, leg. LD, JK, DM: 2 soldiers, 5 juveniles; Peloponnese, Messinia regional unit, Egaleo Mts, Platanovrisi, ruderal olive groove W of the village (loc. 2009/38), N37°07.214' E21°47.925', 400 m, 05. 04.2009, leg. LD, JK, DM: 2 soldiers, 6 workers; Peloponnese, Lakonia regional unit, Peristeri, macchia N of the village (loc. 2009/10), N36° 53.226' E22°40.251', 435 m, 03.04.2009, leg. LD, JK, DM: 2 soldiers, 8 workers, 5 juveniles; South Aegean, Rhodes regional unit, Prophitis Ilias, rocky cedar forest at the monastery (loc. 2012/2), N36°16.624' E27°56.543', 605 m, 07.11. 2012, leg. JK, DM: 5 workers; South Aegean, Rhodes regional unit, Aghios Nektarios, pine forest E of the monastery (loc. 2012/46), N36° 15.943' E28°04.822', 145 m, 14.11.2012, leg. JK, DM: 2 soldiers, 4 workers; South Aegean, Karpathos regional unit, Kipos, rocky semidesert N of the village (loc. 2012/36), N35°27.228' E27° 09.476', 65 m, 12.11.2012, leg. JK, DM: 1 soldier, 2 workers, 3 juveniles; Crete, Lasithi regional unit, Dikti Mts, Katharo, rocky evergreen oak forest E of the settlement (loc. 2013/31), N35°09.242' E25°35.185', 1070 m, 03.04.2013, leg. JK, DM, TS: 1 soldier, 8 workers; *Turkey:* Edirne province, Kuru Mts, degraded oak forest at the pass of the Keşan–Gelibolu road (loc. 2007/61), N40°42.446' E26°47.030', 300 m, 05. 04.2007, leg. LD, ZE, ZF, JK, DM: 18 workers.

Remarks. Unfortunatelly, the Balkanic species of *Reticulitermes* presently cannot be identified on morphology. Besides the accepted names *R. clypeatus* Lash, 1952 and *R. lucifugus* (Rossi, 1792), the name *R. balkanensis* Clément, 2001 regularly used in recent literature (Heller 2009). It was first appeared in Clément *et al.* 2001, but no formal description can be traced, thus, it must be considered as nomen nudum. Nevertheless, I list these occurrences herein to represent the first data of the order from Montenegro and the Aegean Isles, and to note the existence of such material for future students. The specimens were found in rather different habitats, both under stones and in logs in Romania, Croatia, Bulgaria, Montenegro, Albania, Greece and European part of Turkey (Fig. 38).



Figures 32–35. New localities of Embiidina and Dermaptera in the Balkans. 32 = *Haploembia solieri* (Rambur, 1842) (dot), *Haploembia palaui* Stefani, 1955 (squarre) and *Haploembia spp.* (ring); 33 = *Anisolabis maritima* (Bonelli, 1832) (ring), *Labidura riparia* (Pallas, 1773) (dot) and *Chelidurella s.l. acanthopygia* (Gené, 1832) (square); 34 = *Anechura bipunctata* (Fabricius, 1781) (ring), *Apterygida media* (Hagenbach, 1822) (dot) and *Guanchia obtusangula* (Krauss, 1904) (square); 35 = *Forficula auricularia* Linnaeus, 1758.

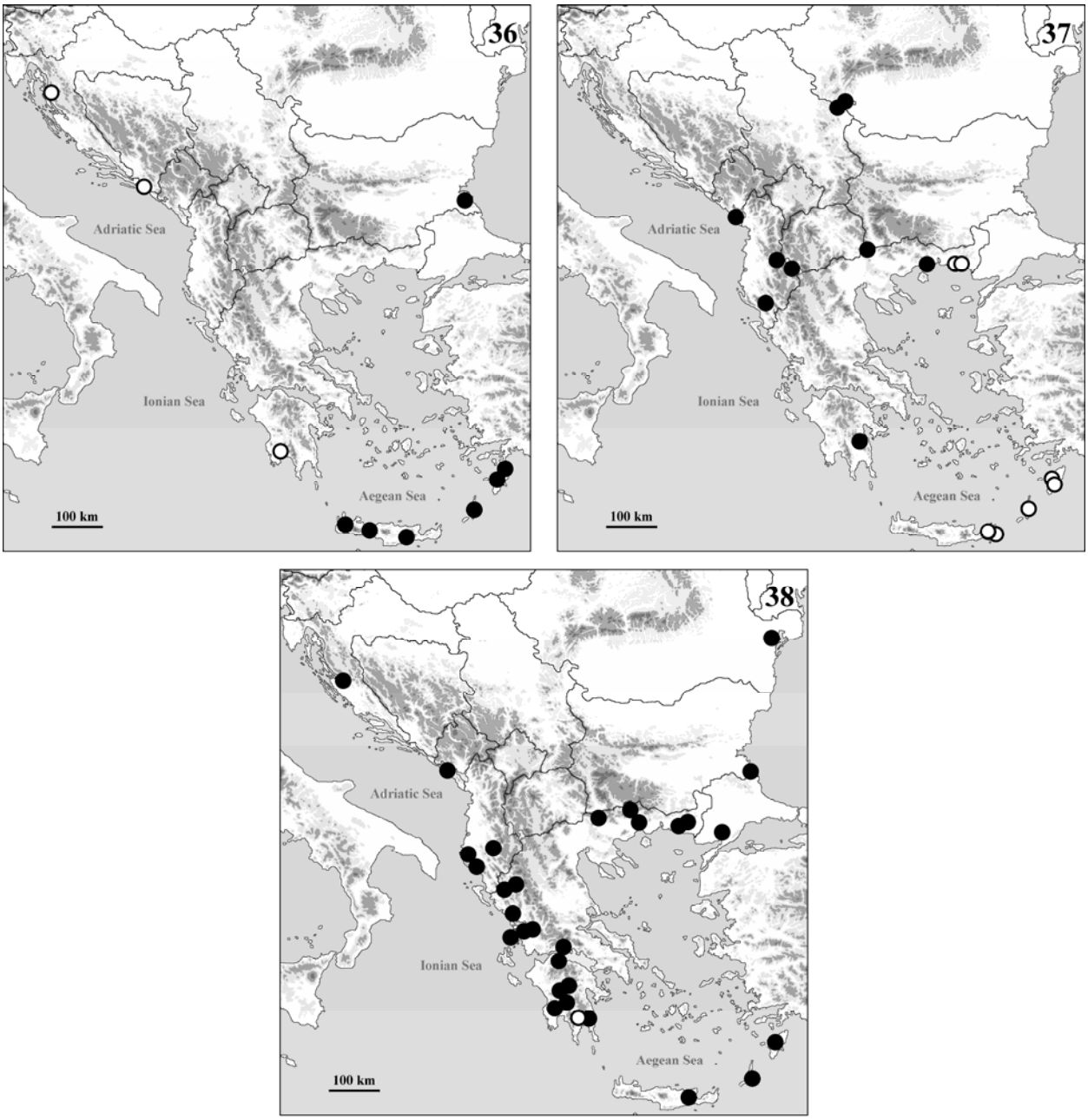


Figure 36–38. New localities of Dermapteraand Isoptera in the Balkans. 36 = *Forficula aetolica* Brunner, 1882 (dot) and *Forficula decipiens* Gené, 1832 (ring); 37 = *Forficula smyrnensis* Serville, 1839 (dot) and *Forficula lurida* Fischer, 1853 (ring); 38 = *Kalotermes flavicollis* (Fabricius, 1793) (ring) and *Reticulitermes spp.* (dot).

DISCUSSION

Our Dermaptera material consists of eleven species, representing eight new country records of six species. The specimens threated herein as *Chelidurella s.l. acanthopygia* need further investigation, as some populations probably refer to undescribed species. The fact that some new country records refer to widespread and common species like *Apterygida media*, indicates our

rather poor knowledge on the distribution of earwigs in the Balkans. More than half of the specimens belong to *Forficula auricularia* and only a small fragment represent rare, true Mediterranean taxa. Three of the eleven species are cosmopolitan, two are European, one is central Eurasian montane, one is Holomediterranean, three are Central and East Mediterranean while one prepresents East Mediterranean faunaelement. Two species were found only in littoral habitats, two are arboreal, one lives in montane grasslands, three in wet forests while three species occured in wide range of biotopes.

The Embiidina specimens studied are all belong to *Haploembia*, representing both species known from the Balkans. Webspinners seem to be rare in the peninsula, inhabiting only the areas of Mediterranean climate and were not always found in the seemingly suitable, dry or seaside habitats.

The Isoptera material consists of a single lot of the Holomediterranean *Kalotermes flavicollis* and a huge amount of *Reticulitermes*. Unfortunatelly, the latter genus is in urgent need of revision and our specimens cannot be identified with sure on the basis of morphology. Small colonies of Balkanic *Reticulitermes* are rather frequent in low and dry areas not far from the sea, but they occasionally were found also in wet habitats, in mountains above 1000 meters and some 100 kilometers far from the coasts but are still unknown from the landlocked countries. Our material represents the first data of these frequent insects both from Montenegro and the Greek Isles, indicating that they are rather poorly studied in the peninsula.

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