

On the distribution and ecology of *Alloeonotus egregius* FIEBER 1864 and *A. fulvipes* (SCOPOLI 1763) (Heteroptera, Miridae)¹

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Abstract: Distribution, ecology, bionomy and host plants of *Alloeonotus egregius* FIEBER 1864 and *A. fulvipes* (SCOPOLI 1763) (Heteroptera, Miridae, Mirinae, Mirini) are reviewed based on published and hitherto unpublished records. Both *A. egregius* and *A. fulvipes* are Ponto-Mediterranean species, polyphagous on various herbs. The possibility of *A. egregius* being a glacial relict is discussed. *Alloeonotus egregius* is recorded for the first time from Slovakia; an overlooked published record of this species from Switzerland is rediscovered. *Rhinanthus major* L. (Scrophulariaceae) is recorded as new host plant of *A. egregius*.

Key words: *Alloeonotus*, Bosnia Hercegovina, Bulgaria, Croatia, Czech Republic, faunistics, Greece, Macedonia, Miridae, Montenegro, Serbia, Slovakia, Turkey.

Introduction

Alloeonotus FIEBER 1858 is a small plant bug genus belonging to the subfamily Mirinae, tribe Mirini, and subtribe Mirina. ROSENZWEIG (2001) classified it as a member of the *Closterotomus*-group together with *Closterotomus* FIEBER 1858 (Palearctic), *Reuterista* KIRKALDY 1904 (desert zone of Palearctic region), *Aphanosoma* A. COSTA 1842 (Euro-Caucasic), *Phytocoridae* REUTER 1906 (China), *Ecalocoris* MIYAMOTO & YASUNAGA 1990, and *Miyamotoa* YASUNAGA 1990 (both Japan). *Alloeonotus* contains four species of conspicuous black-yellow coloured bugs: *A. egregius* FIEBER 1864, *A. fulvipes* (SCOPOLI 1763), *A. obtusus* WAGNER 1968, and *A. spectabilis* KIRITSHENKO 1951, all of which are distributed in the Eastern Mediterranean and Pontic regions, from Italy in the west to Anatolia, Caucasus, and Kazakhstan in the east (SCHUH 1995; KERZHNER & JOSIFOV 1999). While *A. egregius* and *A. fulvipes* are more widely distributed, *A. obtusus* is restricted to Anatolia and *A. spectabilis* to the Russian Caucasus

and Georgia. In present paper we provide some hitherto unpublished records of *A. egregius* and *A. fulvipes* mainly from the Balkan Peninsula, include the first record of *A. egregius* from Slovakia, and summarize the known data on their distribution, ecology, and host plants.

Material and methods

Abbreviations of collections:

- KHMC. . . Private collection of Karel Hradil, Miletín, Czech Republic
MMBC. . . Moravian Museum, Brno, Czech Republic
NMPC. . . National Museum, Praha, Czech Republic

Habitus photographs were taken using a digital camera Olympus Camedia C-5050 ZOOM combined with a binocular microscope Olympus SZ X 12. Habitat photographs were prepared using a hand-held optical SLR camera Olympus IS-2000. The synonymy is mostly according to KERZHNER & JOSIFOV (1999).

¹ This paper is dedicated to Ernst Heiss, an outstanding and many-sided heteropterist, to celebrate his 70th birthday.



Fig. 1: Majerova skala Mt., meadow with occurrence of *Alloeonotus egregius* FIEBER 1864 (Photo: P. Kapitola, 15.vii.1996).

Fig. 2: *Rhinanthus major* L. (Scrophulariaceae), host plant of *Alloeonotus egregius* FIEBER 1864 (Slovakia, Majerova skala Mt.) (Photo: P. Kapitola, 15.vii.1996).



Results

Alloeonotus egregius FIEBER 1864 (Figs 3-7)

Alloeonotus egregius var. *soosi* WAGNER 1969 (unavailable name)

Material examined:

Bosnia Hercegovina: – Hercegovina, Gradac Mts., Vardište env., Koprinka (= Kotrman) village, Rudnik hill, valley of Beli Rzav brook, 700 m a.s.l., 31.v.1967, 2 ♂♂, 2 ♀♀ (1 ♀ newly hatched), P. Lauterer lgt., P. Kment det. (MMBC). Habitat: steppe, oak forest, environs of brook, mesic meadow; substrate – serpentinite.

Bulgaria: – Pirin Mts., Banderica (= B'nderitsa) basin, 500 m upstream above Banderica cottage under Vihren Mt., south-eastern slope up to 100 m above the stream, 2000-2160 m a.s.l., 26.vii.1971, 7 ♂♂, 16 ♀♀, P. Lauterer lgt., P. Kment det. (MMBC). Habitat: Sparse pine forest, undergrowth; associated plants – *Geranium* sp., *Cytisus* sp., *Verbascum* sp., *Veratrum* sp., *Thymus* sp., *Cerastium* sp., *Hypericum* sp., *Juniperus* sp., *Pinus mugo* Turra, *P. heldreichii* H. Christ., *Rubus* sp., *Picea* sp.; substrate – granite. – Pirin Mts., south-eastern slopes of Mt. Vihren, 100-350 m above Banderica cottage, 2100-2350 m a.s.l., 26.vii.1971, 10 ♂♂, 21 ♀♀, P. Lauterer lgt., P. Kment det. (MMBC). Habitat: Species rich herbage in a rocky ravine; associated plants – *Polygonum* sp., *Bupleurum* sp., *Vaccinium* sp., *Cytisus* sp., *Geranium* sp., *Stipa* sp., *Festuca* sp.; substrate – granite, exceptionally marble. – Pirin Mts., marble ridge and south-eastern slopes of Mt. Vihren, 400-500 m above Banderica cottage, 2400-2500 m a.s.l., 26.vii.1971, 2 ♀♀, P. Lauterer lgt., P. Kment det. (MMBC). Habitat: Alpine meadows on a steep slope; associated plants – *Sesleria* sp., *Cytisus* sp., *Genista* sp., *Saxifraga* sp., *Bupleurum* sp.; substrate – transition from granite to marble. – Pirin Mts., Banderica (= B'nderitsa) valley, environs of Banderica stream 1-3 km north of Banderica cottage, eastern, south-eastern and southern slopes, 1700-1900 m a.s.l., 27.vii.1971, 1 ♀, P. Lauterer lgt., P. Kment det. (MMBC). Habitat: Spruce zone, trees along a road, clearings and undergrowth; associated plants – *Vaccinium* sp., *Cytisus* sp., *Picea* sp., *Abies* sp., solitary *Pinus* sp.; substrate – marble. – Pirin Mts., Banderica (= B'nderitsa) basin and SE-E slopes of Mt. Vihren, Bansko, 1800-2300 m a.s.l., 17.vii.1987, 2 ♂♂, 4 ♀♀, P. Lauterer lgt., P. Kment det. (MMBC). Habitat: Mountain meadows and pastures; associated plants – *Dactylis* sp., *Nardus* sp., *Stipa* sp., *Geum* sp., *Cirsium* sp., *Pinus mugo*, *P. heldreichii*, *Juniperus* sp.; substrate – granite and limestone (marble).

Czech Republic: – Bohemia, ‘Prokop’ (= Praha, Prokopské údolí valley, 180-300 a.s.l.), without date, 4 ♂ ♀, coll. N. Kheil, P. Kment det. (NMPC).

Montenegro: – Kanjon – Tara, 600 m a.s.l., 6.vii.1958, 2♂♂, J. Mařan & L. Hoberlandt lgt., P. Kment det. (NMPC). – Źabljak Mts., Kanon Tare, 1000-1200 m a.s.l., 30.vi.1958, 5 ♂ ♀, Mihályi lgt., P. Kment det. (NMPC). – Źabljak Mts., 1500 m a.s.l., 28.-29.vi.1958, 7♂♂, 5 ♀ ♀, J. Mařan & L. Hoberlandt lgt., P. Kment det. (NMPC). – Źabljak Mts., Riblje jezero lake, 1450 m a.s.l., 1.vii.1958, 4♂♂, 9 ♀ ♀, J. Mařan & L. Hoberlandt lgt., P. Kment det. (NMPC). – Źabljak Mts., Zmijeničko jezero lake, 1200 m a.s.l., 5.vii.1958, 1♂, 1 ♀, L. Hoberlandt lgt., P. Kment det. (NMPC). – Źabljak, Podgora, 1300 m a.s.l., 30.vi.1958, 36 ♀ ♀, Mihályi lgt. + J. Mařan & L. Hoberlandt lgt.; 2.vii.1958, 49♂♂, 21 ♀ ♀, J. Mařan & L. Hoberlandt lgt., all P. Kment det. (NMPC). – Źabljak, Borova Glava, 1500 m a.s.l., 4.vii.1958, 31♂♂, 44 ♀ ♀, J. Mařan & L. Hoberlandt lgt., P. Kment det. (NMPC).

Serbia: – Kopaonik, Treska, 17.vii.1952, 1 ♀; 25.vii.1953, 1 ♀; 17.vii.1957, 1♂, all without collector; 16.viii.1957, 1 ♀ (newly hatched), Lj. Janković lgt., all P. Kment det. (NMPC).

Slovakia: – Slovakia occ., Velká Fatra Mts., Majerova skala Mt., 1200-1250 m a.s.l., 7.vii.1991, 4♂♂, 4 ♀ ♀ (1 ♀ newly hatched), 1 larva of 2nd instar, 3 larvae of 3rd instar, 6 larvae of 4th instar, 13 larvae of 5th instar, numerous additional adults and larvae observed; 3.viii.1994, 1 ♀; 15.vii.1996, 15♂♂, 11 ♀ ♀, many additional specimens observed, all P. Kapitola lgt.; 27.vii.1996, 4♂♂, 5 ♀ ♀, many additional specimens observed, J. Liška lgt.; all P. Kapitola det., K. Hradil & P. Kment revid. (KHMC, NMPC). Habitat: All specimens of *A. egregius* were collected in the top meadow of the Majerova skala Mt. and the pass below (towards the Krížna Mt.) (Fig. 1). In 1991 and 1994 the material was collected by sweeping. Petr Kapitola revisited the locality in 1996 in order to find the host plant(s). He found *A. egregius* concentrated on places overgrown with *Rhinanthus major* L. (Fig. 2) and observed many specimens sitting on this plant (one, two, or even three specimens per plant) (Fig. 3). Several specimens were sucking on whitered inflorescences. Males as well as females were also found on other plant species like grasses, *Achillea* sp. or *Chrysanthemum* sp., growing close to *Rhinanthus* plants. No specimens could be recorded by tentative beating from surrounding trees (i.e., *Fagus sylvatica* L., *Sorbus aucuparia* L., and *S. aria* (L.) CRANTZ. Thus, *Rhinanthus major* was the main host plant of *A. egregius* in this locality; substrate – limestone.



Fig. 3: *Alloeonotus egregius* FIEBER 1864 on *Rhinanthus major* L.; male above, female below (Slovakia, Majerova skala Mt.). (Photo: P. Kapitola, 15.vii.1996).

Distribution (Fig. 4)

According to ŠTYS & ŠTUSÁK (1961) *A. egregius* is a Ponto-Mediterranean species, according to JOSIFOV (1986) a Montan-Mediterranean and a Montan-Ponto-Mediterranean species according to HEISS & JOSIFOV (1990). It is recorded from the following countries: **Albania:** CSIKI (1940), MANCINI (1953), JOSIFOV (1970, 1986). **Austria:** Lower Austria: Schneeberg (type locality) (FIEBER 1864; REUTER 1881, 1896; LÖW 1886; FRANZ & WAGNER 1961; RABITSCH 1999b), Carinthia (REUTER 1881, 1890, 1896; PROHASKA 1924; RABITSCH 1999a, 2003), Styria (FRANZ & WAGNER 1961). **Bosnia Hercegovina:** APFELBECK (1891), REUTER (1896), SIENKIEWICZ (1964), PROTIĆ (1994b, 1998). **Bulgaria:** LINDBERG (1945), JOSIFOV (1960, 1986 – mountain regions of Bulgaria above the oak zone, i.e. above 800-1000 m a.s.l.), ŠTUSÁK (1974). **Croatia:** ‘Dalmatia’ (REUTER 1881, JOSIFOV 1986, PROTIĆ 1998). No exact record is known to us. **Czech Republic:** Bohemia (ŠTYS & ŠTUSÁK 1961, HOBERLANDT

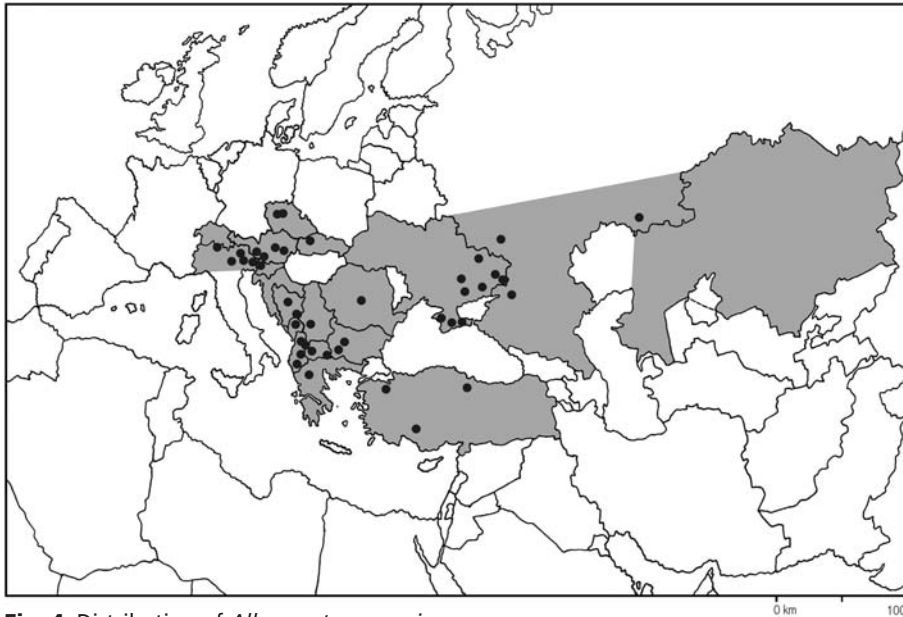


Fig. 4: Distribution of *Alloeonotus egregius* FIEBER 1864. Gray: countries with known occurrence; ●: exact locality).

1977). **Greece:** GÜNTHER (1990). **Italy:** Trentino-Alto Adige (DE BERTOLINI 1875; REUTER 1879, 1890, 1896; DALLA TORRE 1882; HELLER & DALLA TORRE 1883; BEZZI 1893; MANCINI 1950; TAMANINI 1955; SERVADEI 1967), Veneto (SERVADEI 1967), Friuli-Venezia Giulia (MANCINI 1950, SERVADEI 1967). For additional references see SERVADEI (1967). FARACI & RIZZOTTI VLACH (1995) listed the species only from North Italy. **Macedonia:** KORMILEV (1936), CSIKI (1940), WAGNER (1962), GÖLLNERSCHEIDING (1978), JOSIFOV (1986), PROTIĆ (1994b, 1998). **Montenegro:** SCHUMACHER (1914), HORVÁTH (1918), CSIKI (1940), WAGNER (1962), PROTIĆ et al. (1990), PROTIĆ (1994a, 1994b, 1998). **Romania:** SIENKIEWICZ (1962), ROSCA & POPOV (1982), STĂNESCU (1997). REUTER's (1881, 1896) record from Tulcea (as Bulgaria: Tultscha) most probably concerns *A. fulvipes*. JOSIFOV (1986) listed it from Dobruđa, most probably based on REUTER (1881, 1896). **Russia (South European Territory):** Provinces Voronezh, Rostov (KIRITSHENKO 1951), and Orenburg (KIRITSHENKO 1951, 1954). **Serbia:** CSIKI (1940), JANKOVIĆ (1963), PROTIĆ (1989, 1994a, 1994b, 1998). **Slovenia:** REUTER (1896, as Carniola), GOGALA & MODER (1960), GOGALA & GOGALA (1986, 1989), PROTIĆ (1994b, 1998). **Switzerland:** Ticino (GYLLENSVÄRD 1967). Overlooked by KERZHNER & JOSIFOV (1999) and other authors. **Ukraine:** Provinces Luhan'ska (KIRITSHENKO & TA-

LITZKIJ 1933, PUTSHKOV & PUTSHKOV 1996); Dnipropetrovsk (KIRITSHENKO & TALITZKIJ 1933); Donetsk, Kharkiv'ska and Zaporizhzhya (PUTSHKOV & PUTSHKOV 1996); Krym (= Crimea) (HORVÁTH 1888; REUTER 1881, 1896; JAKOVLEV 1906; KIRITSHENKO & TALITZKIJ 1933; KIRITSHENKO 1951; WAGNER 1969; PUTSHKOV & PUTSHKOV 1996). **Kazakhstan (Asian part):** KERZHNER & JOSIFOV (1999). No exact record is known to us. **Turkey (Asian part):** REUTER (1881, 1890, 1896), HORVÁTH (1883), LODOS et al. (2003). Misidentifications with other *Alloeonotus* (e.g., HOBERLANDT 1956) or even *Grypocoris* DOUGLAS & SCOTT, 1868 species are not excluded.

Ecology

According to the published data and the material studied in present paper two basic types of habitat inhabited by *A. egregius* can be distinguished:

1) **Mountainous and alpine regions above 1000 m a.s.l.** Most of the published records from the Balkans, the Alps and the Carpathians come from altitudes between 1000-1900 m a.s.l. (e.g. CSIKI 1940; FRANZ & WAGNER 1961; JANKOVIĆ 1963; JOSIFOV 1960, 1970, 1986; PROHASKA 1924; PROTIĆ et al. 1990; RABITSCH 1999a; SIENKIEWICZ 1962; ŠTUSÁK 1974). Our records from Bulgaria, Montenegro, Serbia, and Slovakia fit well to this interval, expanding it up to 2500 m a.s.l. in Bulgaria (P. Lauterer, pers. comm.). HEISS & JOSIFOV (1990) classified *A. egregius* as a typical inhabitant of the pine zone of Bulgarian mountains. In Serbia JANKOVIĆ (1963) mentioned it from the zone with the dominant plant association *Piceetum excelsae*. According to PROTIĆ (2003) *A. egregius* is a characteristic species of the biome of European high-mountain rocky grounds and pastures. In these altitudes *A. egregius* lives on various types of mountain meadows and pastures (DE BERTOLINI 1875; PROHASKA 1924; SIENKIEWICZ 1962; JOSIFOV 1970; PROTIĆ et al. 1990; our data), as well as on xerothermic or steppe-like vegetation on steep slopes (JANKOVIĆ 1963; ŠTUSÁK 1974; our data) or in undergrowth of sparse mountain forests (our data). FRANZ & WAGNER (1961) collected *A. egregius* in a *Nardetum*; JANKOVIĆ

(1963) mentioned it from the plant association *Agrostidetum vulgaris*, with dominant growth of *Agrostis capillaris* L. (syn. *A. vulgaris* With.), accompanied with additional species of Poaceae and Fabaceae. *Alloeonotus egregius* seems to be indifferent to geological substrates, inhabiting limestone, granite, as well as serpentinite (SIENKIEWICZ 1962; our data).

2) Steppes of eastern Europe up to ca 370 m a.s.l. Records from Ukrainian and Russian steppes belong to this second type of habitat (KIRITSHENKO & TALITZKIJ 1933; KIRITSHENKO 1951; KERZHNER 1964; PUTSHKOV & PUTSHKOV 1996). SIENKIEWICZ (1962) supposed that these records concern a misidentified *A. fulvipes* (its var. *separandus*), actually a characteristic inhabitant of steppes. However, KERZHNER (1964) clearly distinguished the two species in the material of the Zoological Institute, Russian Academy of Sciences, St. Petersburg, so the previous records of *A. egregius* from the steppe zone seem to be correct (I.M. Kerzhner, pers. comm.).

However, these two 'characteristic' habitats of *A. egregius* do not seem to be strictly delimited and we can add a third habitat type: **3) transitional habitat.** In Gradac Mts. (Hercegovina) *A. egregius* was collected at 700 m a.s.l. (habitat: steppe, oak forest, environs of a brook, and mesic meadow on serpentinite; P. Lauterer, pers. comm.), where it co-occurred with *A. fulvipes*. We examined also two females collected in Tara canyon (Žabljak Mts., Montenegro) at the altitude of 600 m a.s.l. However, both records are from mountains where *A. egregius* actually is recorded above 1000 m a.s.l. But also HELLER & DALLA TORRE (1883) reported *A. egregius* from 100-1700 m a.s.l. in South Tyrol.

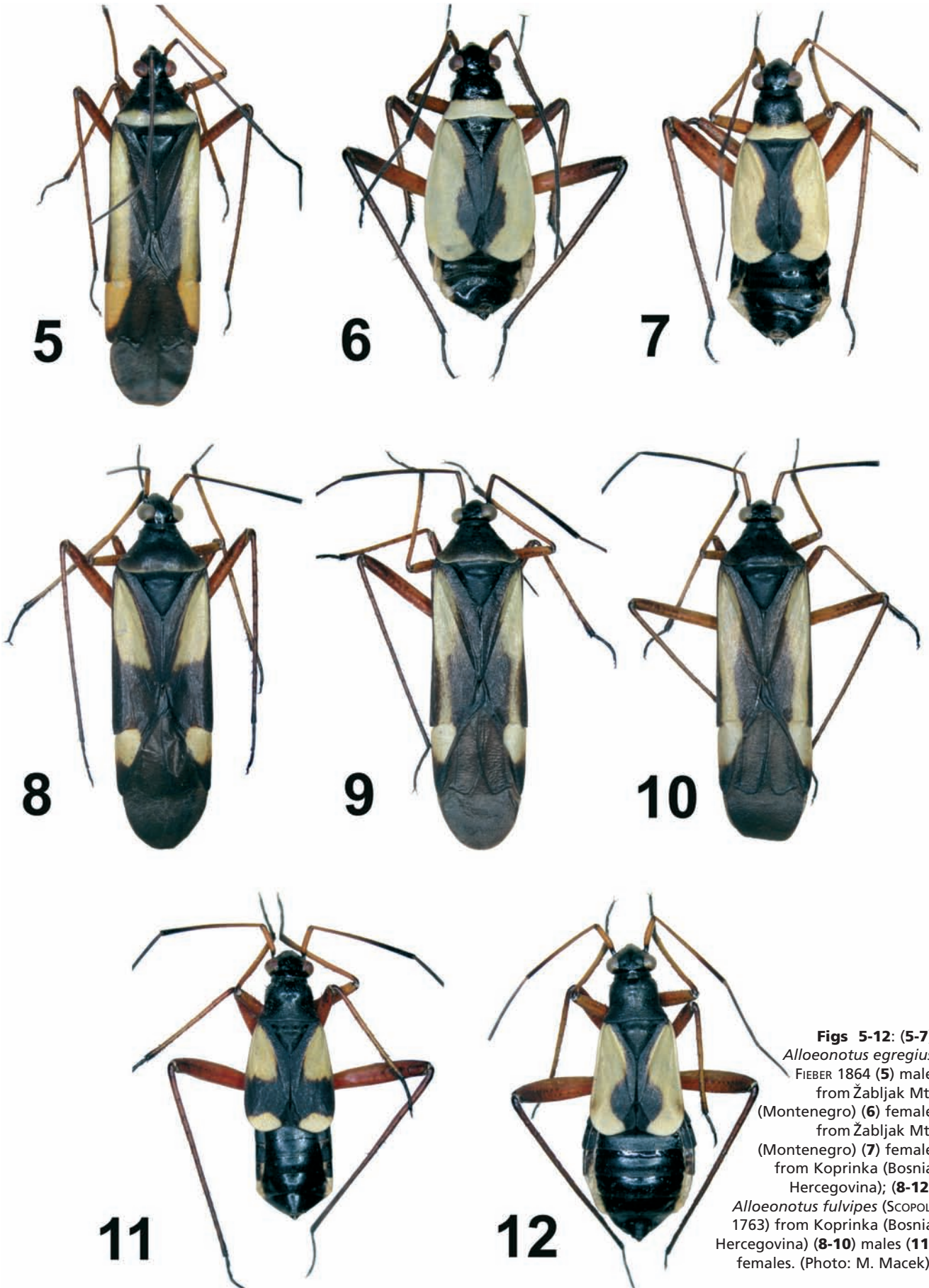
More interesting are the following two records from Central Bohemia (Czech Republic), which are the northernmost in Central Europe: ŠTYS & ŠTUSÁK (1961) recorded one female from May 1959 in the environs of Dobříš (370 m a.s.l.), unfortunately without detailed information about the circumstances of the record. During the preparation of present paper the senior author discovered in the collection of the National Museum in Praha (NMPC) four additional females from the Prokopské údolí valley in Prague (180-300 m a.s.l.). There are no dates on the lo-

cality labels of these specimens; however, the collector Napoleon Manuel Kheil, lived between 1849-1923 (KOLEŠKA 1983).

KERZHNER (1964) and PUTSHKOV & PUTSHKOV (1969) considered *A. egregius* to be a characteristic species of the steppe zone in Ukraine and southern Russia. In contrast Central European authors regarded it as an alpine or mountain species (e.g. REUTER 1881, 1896; DALLA TORRE 1882; STICHEL 1930, 1937, 1957; WAGNER 1943, 1952, 1971; SIENKIEWICZ 1963; WAGNER & WEBER 1964; JOSIFOV 1970). FRANZ & WAGNER (1961) assumed *A. egregius* could be a glacial relict. This hypothesis may well explain its current distribution – *A. egregius*, originally widely distributed in Central Europe under the conditions of cold steppe, retreated into the remaining areas of the primary treeless vegetation during the postglacial warming and forest spreading, i.e. the steppes of eastern Europe or the high mountains. In the lower altitudes of Central Europe, the primary treeless areas have been preserved usually on steep slopes with southern exposition and other places with soil conditions insufficient for growing of forest. From the Bronze Age on, various secondary treeless areas had been maintained by ancient farmers and herdsmen, and facilitated survival of some plant and animal species of open land within the Central European forest zone. While survival of several snail species of cold steppe on suitable treeless places (rocky steppes, wetlands) in Central Europe is well documented (e.g., LOŽEK 2000), there are no comparable data for the poorly fossilizing insects. At least the Bohemian record from the Prokopské údolí valley (currently a nature reserve with well-developed rocky dry grassland) fits to this supposed scheme. The hypothesis by ŠTYS & ŠTUSÁK (1961) who assumed that *A. egregius* immigrated into Bohemia during the subboreal postglacial steppe period, is an alternative possibility.

Phenology

Adults of *A. egregius* start occurring at the end of May (Czech Republic (May, without exact date) – ŠTYS & ŠTUSÁK (1961); Bosnia Hercegovina (May 31) – our data; Ukraine (May 31) – KIRITSHENKO &



Figs 5-12: (5-7) *Alloeonotus egregius* FIEBER 1864 (5) male from Žabljak Mt. (Montenegro) (6) female from Žabljak Mt. (Montenegro) (7) female from Koprinka (Bosnia Hercegovina); (8-12) *Alloeonotus fulvipes* (SCOPOLI 1763) from Koprinka (Bosnia Hercegovina) (8-10) males (11) females. (Photo: M. Macek).

TALITZKIJ (1933); all these records are from low altitudes. *A. egregius* becomes much more frequent in June (Albania – JOSIFOV (1970); Austria – PROHASKA (1924) – numerous larvae and only a single adult; Bulgaria – JOSIFOV (1960); Greece – GÜNTHER (1990); Macedonia – WAGNER (1962); Montenegro – our data; Slovenia – GOGALA & GOGALA (1989); Ukraine – KIRITSHENKO & TALITZKIJ (1933), reaching their top frequency in July (Albania – CSIKI (1940), JOSIFOV (1970); Austria – PROHASKA (1924) – numerous adults and only a single larva, FRANZ & WAGNER (1961), RABITSCH (1999a); Bulgaria – ŠTUSÁK (1974), our data; Italy – DE BERTOLINI (1875), TAMANINI (1955), Montenegro – WAGNER (1962), PROTIĆ et al. (1990), our data; Romania – SIENKIEWICZ (1962); Serbia – JANKOVIĆ (1963), our data; Slovakia – our data – including larvae of various instars; Slovenia – GOGALA & GOGALA (1986). The records of *A. egregius* later in the year are quite rare – August (Montenegro – PROTIĆ et al. (1990); Slovakia – our data; Slovenia – GOGALA & MODER (1960), GOGALA & GOGALA (1986); however, we examined one recently hatched female collected in Serbia on August 16th. – September (Slovenia – GOGALA & GOGALA (1989). *Alloeonotus egregius* seems to be an univoltine species (WAGNER 1943, 1952). The long period of its occurrence could be explained by particular populations dealing with local differences of environmental conditions, especially the altitude. *Alloeonotus egregius* overwinters in the egg stage (e.g., WAGNER 1943, 1952, 1971; STICHEL 1957; FRANZ & WAGNER 1961; WAGNER & WEBER 1964).

Host plants

Except for the records by DE BERTOLINI (1875), who swept *A. egregius* from flowers on a meadow, most of the previous authors mentioned oaks (*Quercus* spp., Fagaceae) as host plant of *A. egregius* (WAGNER 1943, 1952, 1961, 1971; WAGNER & WEBER 1964; EHANNO 1987) or more generally, broad-leaved trees (WAGNER 1943, 1952; STICHEL 1957; WAGNER & WEBER 1964; ŠTYS & ŠTUSÁK 1961; EHANNO 1987; PROTIĆ 1994a), often with references to the original Wagner papers. However, already SIENKIEWICZ (1962) doubted the association

with oaks as *A. egregius* often lives in such high altitudes where no oaks grow. Also in our Slovak locality, beating of trees (*Fagus sylvatica*, *Sorbus* spp.) did not yield any specimen of *A. egregius*. In Romania, SIENKIEWICZ (1962) observed *A. egregius* on inflorescences of *Galium erectum* Huds. (Rubiaceae), and supposed it to be the host plant. PROTIĆ et al. (1990) indicated *Verbascum* sp. (Scrophulariaceae) as the most common host plant of *A. egregius* in the mountains of Montenegro. LODOS et al. (2003) collected *A. egregius* on *Matricaria chamomilla* L. (Asteraceae) in Turkey. Our Slovak material was collected mostly on *Rhinanthus major* (Scrophulariaceae), however, some specimens were observed also on grasses (Poaceae), *Achillea* sp. and *Chrysanthemum* sp. (Asteraceae). JOSIFOV (1970) mentioned 'herbs from the mountain regions' as host plants. According to ROSENZWEIG (2001), all species of *Alloeonotus* live on grasses. Considering all the records known to us, *A. egregius* seems to be a polyphagous species sucking on various herbs. However, there is no exact record of larvae sucking on a particular plant species, which might bring some more light into the matter.

Alloeonotus fulvipes (SCOPOLI 1763) (Figs 8-13)

Cimex fulvipes SCOPOLI 1763

Cimex avellanae GMELIN 1790 (unnecessary new name for *C. fulvipes* SCOPOLI 1763)

Capsus distinguendus HERRICH-SCHAEFFER 1838

Alloeonotus egregius var. β , FIEBER 1864 (unavailable name)

Alloeonotus caspicus HORVÁTH 1884

Alloeonotus fulvipes var. *separandus* HORVÁTH 1888

Alloeonotus fulvipes f. *macedonica* SCHUMACHER 1918

Alloeonotus fulvipes f. *paganettii* SCHUMACHER 1918

Material Examined:

Bosnia Hercegovina: – Bosnia bor., Žepče, vi.[19]27, 2♂♂, 18♀♀, O. Štěpánek lgt., P. Kment det. (NMPC, KHMC). – Bosnia, Jajce, 1.vi.1968, 2♀♀, J. Hladil lgt., P. Kment det. (MMBC). – Bosnia, Šipovo, 1.vi.1968, 1♀, J. Hladil lgt., P. Kment det. (MMBC). – Hercegovina, western slopes of the pass between Bjelašnica and Njegoš Mts., 11 km north-east of Plana, 500 m north-east of Korita village, 800 m a.s.l., 3.vi.1967, 2♂♂, P. Lauterer lgt., P. Kment det.

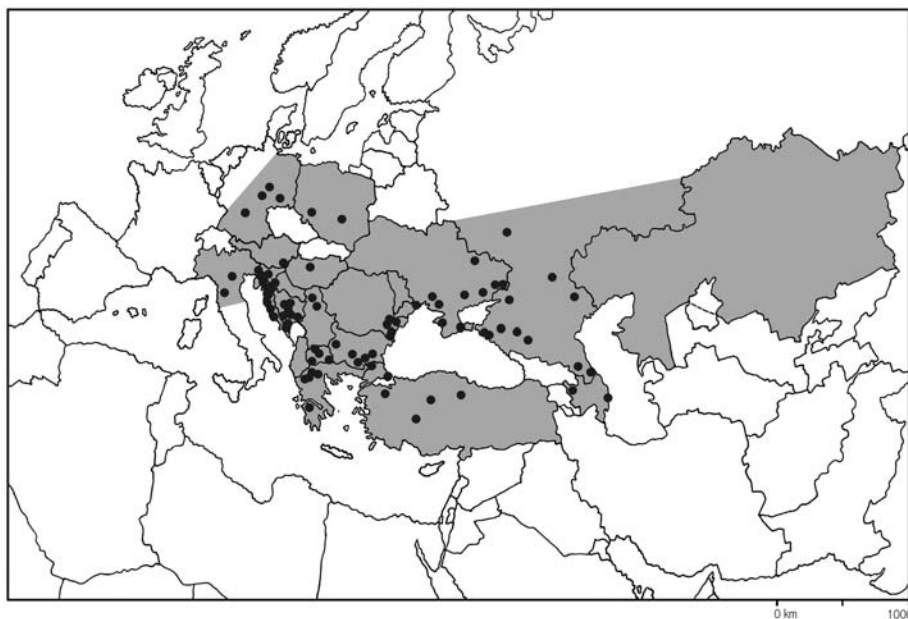


Fig. 13: Distribution of *Alloeonotus fulvipes* (SCOPOLI 1763). Gray: countries with known occurrence; ●: exact locality).

(MMBC). Habitat: Polje with subxerothermic elements and sparse growth of young oaks, south-eastern exposition; substrate – limestone. – Hercegovina, Gradac Mts., Vardište env., Koprinka (= Kotrman) village, Rudnik hill, valley of Beli Rzav brook, 700 m a.s.l., 31.v.1967, 11♂♂, 10♀♀, P. Lauterer lgt., P. Kment det. (MMBC). Habitat: steppe, oak forest, environs of a brook, mesic meadow; substrate – serpentinite.

Bulgaria: – Lyulin pl., vi.[19]35, 1♀, Tábořský lgt., J.L. Stehlík det. as *A. egregius*, P. Kment revid. (MMBC); vi.[19]36, 1♂, 2♀♀, Tábořský lgt., J.L. Stehlík det. as *A. egregius*, P. Kment revid. (NMPC). – Momchilgrad, 700-800 m a.s.l., 23.vi.1961, 1♂, 18♀♀, L. Hoberlandt lgt., P. Kment det. (NMPC, KHMC).

Croatia: – Dalmatia, without date, 1♀, without collector, P. Kment det. (NMPC). – Gospić, 1894, 1♀, Sequens lgt., ? det. as *A. distinguendus*, P. Kment revid. (NMPC). – Istria, Giordani (= Jurdani), vii.[19]38, 1♀, Balthasar lgt., J.L. Stehlík det., P. Kment revid. (MMBC).

Greece: – Thessaly, Tríkala, Malakásion, without date, 9♀♀, without collector, P. Kment det. (NMPC).

Macedonia: – Prespansko jezero lake, 14.vii.1976, 1♀, J. Hladil lgt., P. Kment det. (MMBC). – Titova Veles, 28.v.1964, 1♂, 1♀, J. Raušer lgt., P. Kment det. (MMBC).

Turkey: – European part, Edirne, 8.-13.vi.1947, 8♀♀, Exp. N. Mus.ČSR lgt., L. Hoberlandt det., P. Kment revid. (NMPC) (HOBERLANDT 1956). – Asian part, Anatolia, Moğan Gölü lake, 5.vii.1947, 2♀♀, Exp. N. Mus. ČSR lgt., L. Hoberlandt 1953 det. as *A. egregius*, P. Kment revid. (NMPC) (HOBERLANDT 1956, as *A. egregius*).

Distribution (Fig. 13)

According to JOSIFOV (1986) *A. fulvipes* is a Ponto-Mediterranean species. It is recorded from the following countries: **Albania:** KERZHNER & JOSIFOV (1999), not listed by JOSIFOV (1986), no record data known to us. **Austria:** Recorded only from Söchau in Styria by SABRANSKY (1912). According to RABITSCH (2004), no confirmed records or recent findings are known. **Bosnia Hercegovina:** HORVÁTH (1888), APFELBECK (1891), NOVAK & WAGNER (1951), SIENKIEWICZ (1964), WAGNER (1968, 1969), PROTIĆ (1994b, 1998). **Bulgaria:** NEDELKOV (1908), JOAKIMOV (1909), JOSIFOV (1960, 1964, 1986 – oak zone north and south of Stara Planina Mts.). **Croatia:** REUTER (1875, as *A. distinguendus*; 1881, 1896), KORLEVIĆ (1887), HORVÁTH (1897), NOVAK & WAGNER (1951), SIENKIEWICZ (1964), JOSIFOV (1986), STRPIĆ (1994), PROTIĆ (1994b, 1998). **Germany:** HERRICH-SCHAEFFER (1838) described *Capsus distinguendus* from Germany. REUTER (1875) reported *A. distinguendus* from Laibach (Baden-Württemberg). REUTER (1896) recorded it from Thuringia (Gotha) and from Borussia (as doubtful record). STICHEL (1930, 1937) and WAGNER (1952) listed it from the Oder river basin, Mecklenburg, Thuringia, Westphalia, and the Alps. However, HOFFMANN & MELBER (2003) listed only Saxony, Thuringia (both before 1950), and Saxony-Anhalt (the last record from 1993 – GRUSCHWITZ & BARTLES 2000) and regarded the records from Bavaria and North Rhine-Westphalia as doubtful. **Greece:** DROSOPOULOS (1980), JOSIFOV (1986), GÜNTHER (1990), LINNAVUORI (1999). **Hungary:** MÉSZÁROS (1984), KONDOROSY (1999). **Italy:** Emilia (SERVADEI 1967), Friuli-Venezia Giulia (SCOPOLI 1763, from Carniolia – the type locality; REUTER 1888 and 1896 from Gorice/Gorizzia; SERVADEI 1967; JOSIFOV 1986), Toscana (REUTER 1890, 1896; SERVADEI 1967). FARACI & RIZZOTTI VLACH (1995) listed it from North and South Italy. **Macedonia:** HORVÁTH (1918), SCHUMACHER (1918), KORMILEV (1936), DANIEL (1957), WAGNER (1962, 1969), GÖLLNER-SCHIEDING (1982), PROTIĆ (1994b, 1998). **Moldavia:** DERZHANSKY (1997, including additional references). **Poland:** ASSMANN (1854) listed several lo-

calities of *Capsus distinguendus* from Silesia, however, the identity of his material is questionable. STICHEL (1937) reports Eastern Prussia, Pomerania and Silesia without exact localities; the only more recent record is from Kruszewiec near Lubochnia (STRAWIŃSKI 1936). **Romania:** REUTER (1881, as Bulgaria: Tultscha = Tulcea), MONTANDON (1907), SIENKIEWICZ et al. (1961), SIENKIEWICZ (1963, 1964), WAGNER (1969), KIS (1976), SCHNEIDER (1976), ROSCA & POPOV (1982), JOSIFOV (1986), STĂNESCU (1997). **Russia (South European Territory):** Dagestan (JAKOVLEV 1873; KIRITSHENKO 1918), Volgograd province (JAKOVLEV 1874a, 1874b; REUTER 1896), Krasnodar and Stavropol provinces (KIRITSHENKO 1918), Voronezh and Rostov provinces, Nizhnaya Volga (KIRITSHENKO 1951), Caucasus (REUTER 1896; KIRITSHENKO 1951). **Serbia:** PROTIĆ (1994b, 1994c, 1998). **Slovenia:** SCOPOLI (1763, from Carniola – the type locality), REUTER (1875, as *A. distinguendus*; 1888 and 1896 from Gorice/Gorizia), STICHEL (1924, from Wippach = Vipava), GOGALA & MODER (1960), JOSIFOV (1986), GOGALA & GOGALA (1986, 1989, 1994), PROTIĆ (1994b, 1998). **Ukraine:** Provinces Kharkiv'ska (REUTER 1896; KIRITSHENKO 1951; PUTSHKOV & PUTSHKOV 1996); Luhan'ska (KIRITSHENKO & TALITZKIJ 1933; KIRITSHENKO 1951; PUTSHKOV & PUTSHKOV 1996); Kherson'ska (KIRITSHENKO 1951; PUTSHKOV & PUTSHKOV 1996); Donetsk, Mykolayiv, Odessa and Zaporizhzhya (PUTSHKOV & PUTSHKOV 1996), Krym (= Crimea) (REUTER 1881, 1896; JAKOVLEV 1906; KIRITSHENKO 1951; PUTSHKOV & PUTSHKOV 1996). For additional references see PUTSHKOV & PUTSHKOV (1996). **Kazakhstan: European part:** KERZHNER & JOSIFOV (1999); no exact record data known to us. **Asian part:** ASANOVA (1974). **Turkey: European part:** REUTER (1896), HOBERLANDT (1956), SIENKIEWICZ (1964), JOSIFOV (1986). **Asian part:** FIEBER (1864, as *A. egregius* forma β), REUTER (1881, 1890, 1896), HORVÁTH (1883, 1888). HOBERLANDT (1956, as *A. egregius*), SEIDENSTÜCKER (1959). **Azerbaijan:** HORVÁTH (1878, 1884), KIRITSHENKO (1918), GIDAYATOV & ATAKISHIEVA (1981). **?Iran:** Not listed from Iran by KERZHNER & JOSIFOV (1999).

REUTER (1890, 1896) mentioned *A. fulvipes* var. *caspicus* from 'Persia borealis (Signoret)'. Also WAGNER (1968) listed *A. caspicus* from Iran. This record may concern some species of the genus *Grypocoris*, which are habitually similar to *Alloeonotus*, e.g. *Grypocoris golestanicus* HEISS 2002 from Golestan (see HEISS & LINNAVUORI 2002). However, the occurrence of *A. egregius* in Iranian Azerbaijan cannot be excluded.

Ecology

Alloeonotus fulvipes seems to be a characteristic species of various steppe and xerophilous formations in low altitudes (DANIEL 1957; GIDAYATOV & ATAKISHIEVA 1981), but also in mountains (ASANOVA 1974; GIDAYATOV & ATAKISHIEVA 1981; LINNAVUORI 1999; our data). According to KIRITSHENKO & TALITZKIJ (1933) it is a common inhabitant of steppes and virgin steppes in Ukraine. SEIDENSTÜCKER (1959) collected *A. fulvipes* in Turkey in a treeless steppe on shores of a lake. SIENKIEWICZ (1963) emphasized that he never found *A. fulvipes* in mountains or wet places in Romania. As a characteristic habitat he mentioned dry meadows, open and sunny road and forest margins, dumps, and railway embankments with sparse and low vegetation. In Anatolia, HOBERLANDT (1956) collected the species in a xerophilous vegetation of steppe formation at the Moğan Gölü lake, but he described the other locality near Edirne as a 'leafy growth along a river'. Our material from the environs of Korita (Bosnia Hercegovina) was collected in a polje with subxerothermic elements and a sparse growth of young oaks. In our second record from Hercegovina (Koprinka env.), the exact habitat is less clear (steppe, oak forest, environs of a brook and mesic meadow). MÉSZÁROS (1984) recorded *A. fulvipes* in Hungary, and PROTIĆ (1994c) in Serbia in apple orchards. REUTER (1875) mentioned it from grassy places. JOSIFOV (1964) reported it in Bulgaria from mesic habitats with dense herbaceous vegetation, LINNAVUORI (1999) from mountain meadows in Peloponnesus (Greece). PROTIĆ (2003) classified *A. fulvipes* into the 'biome of European, mostly deciduous forests'. There are also some additional papers considering *A. fulvipes* as a forest species. STRAWIŃSKI (1936) mentioned a

record in central Poland from a spruce-fir forest with birches. ASANOVA (1974) listed *A. fulvipes* among species characteristic for mountain forests of eastern Kazakhstan. SABRANSKY (1912) collected *A. fulvipes* in Austria on oaks together with *Cyllecoris histrionius* (LINNAEUS 1767); this record, however, is doubtful (see RABITSCH 2004). Our records of *A. fulvipes* are from localities with limestone or serpentinite substrates.

Phenology

Adults of *A. fulvipes* occur in May (Bosnia Hercegovina – our data; Bulgaria – JOAKIMOV (1909); Croatia – NOVAK & WAGNER (1951); Germany – REUTER (1875); Macedonia – WAGNER (1962), our data; Russia (Caucasus) – KIRITSHENKO (1918); Ukraine – KIRITSHENKO & TALITZKIJ (1933)), June (Azerbaijan – KIRITSHENKO (1918); Bosnia Hercegovina – NOVAK & WAGNER (1951), our data; Bulgaria – JOAKIMOV (1909), JOSIFOV (1960, 1964), our data; Croatia – REUTER (1875), NOVAK & WAGNER (1951); Macedonia – DANIEL (1957); Romania – SCHNEIDER (1976); Russia (Caucasus) – KIRITSHENKO (1918); Slovenia – REUTER (1875), GOGALA & MODER (1960), GOGALA & GOGALA (1986); Ukraine – KIRITSHENKO & TALITZKIJ (1933); Turkey – HOBERLANDT (1956), SEIDENSTÜCKER (1959)), and July (Azerbaijan – KIRITSHENKO (1918); Croatia – NOVAK & WAGNER (1951), our data; Macedonia – our data; Slovenia – GOGALA & MODER (1960), GOGALA & GOGALA (1986); Ukraine – KIRITSHENKO & TALITZKIJ (1933); Turkey – HOBERLANDT (1956)). Univoltine species, overwintering in the egg stage (e.g. WAGNER 1943, 1952, 1971; FRANZ & WAGNER 1961; WAGNER & WEBER 1964).

Host plants

ASSMANN (1854) recorded *A. fulvipes* from oaks (*Quercus* spp.) and *Galium mollugo* L. (Rubiaceae). Despite REUTER's (1875) record from grasses, REUTER (1896) provided for *A. fulvipes* the following host plants: "in *Corylo avellana* (SCOPOLI), in *Quercu* et *Galio mollugine* (ASSMANN)". This information (i.e. *Quercus* spp. (Fagaceae) and *Corylus avellana* L. (Corylaceae)) was later notoriously repeated in most papers and keys (e.g. NEDELKOV 1908; STICHEL 1930, 1937;

HEDICKE 1935; STRAWIŃSKI 1936, 1950; WAGNER 1943, 1962, 1961, 1971; FRANZ & WAGNER 1961; WAGNER & WEBER 1964; EHANNO 1987). An additional record from *Quercus* sp. was reported by SABRANSKY (1912) from Austria. STRAWIŃSKI (1936, 1950) recorded it from *Betula pendula* ROTH (= *B. verrucosa* EHRH.) (Betulaceae) in Poland. However, the two former records need a further confirmation. PROTIĆ (1994c) found *A. fulvipes* in Serbian apple orchards on *Malus domestica* BORKH. (Rosaceae s. l.) as well as on weeds. According to SIENKIEWICZ (1963), *A. fulvipes* lives on herbs in sunny places; he emphasized that he never found *A. fulvipes* on trees or shrubs. SIENKIEWICZ et al. (1961) collected *A. fulvipes* on *Euphorbia esula* L. (Euphorbiaceae) and *Reseda lutea* L. (Resedaceae) in southern Romania and SEIDENSTÜCKER (1959) in Turkey on shrubs of *Peganum harmala* L. (Rutaceae). According to ROSENZWEIG (2001), *Alloeonotus* species live on grasses (Poaceae). *A. fulvipes* seems to be a polyphagous species living mainly on various herbs. Observations of larval feeding, which are missing so far, might help to answer the host plant question.

Discussion

The identification of *Alloeonotus* species is mostly based on differences in the coloration of pronotum and hemelytra, and the shape of the pronotum. The identification is complicated by an apparent colour variability of *A. fulvipes* (see Figs 8-12), which lead to descriptions of several forms differently interpreted by later authors. HORVÁTH (1884) described *A. caspicus* from Baku (Azerbaijan), which was synonymized by REUTER (1896) with *A. fulvipes*, restored as a valid species by WAGNER (1955), once more synonymized with *A. fulvipes* by KERZHNER (1964), and still retained as a valid species by WAGNER (1968, 1971). HORVÁTH (1888) described the FIEBER's (1864) *A. egregius* var. β as *A. fulvipes* var. *separandus*, whose coloration may well resemble that of *A. egregius* (see Figs 5-7, 10, 12). *Alloeonotus fulvipes* var. *separandus* was raised to the species rank by JOSIFOV (1959), and synonymized with *A. fulvipes* by SIENKIEWICZ (1963). SCHUMACHER (1918) described two additional forms: *Alloeonotus*

fulvipes f. *macedonica* from Macedonia (raised to subspecies by STICHEL (1957) and treated as a variant of *A. fulvipes* by WAGNER (1968)), and *A. fulvipes* f. *paganettii* from Montenegro. WAGNER (1968) revised and keyed the genus, recognizing five valid species: *A. fulvipes* (with var. *separandus* and var. *macedonicus*), *A. egregius*, *A. caspicus*, *A. spectabilis*, and new species *A. obtusus*. In a subsequent paper, WAGNER (1969) discussed again the status of *A. fulvipes* var. *separandus* and described *A. egregius* var. *soosi* from Crimea, differing from the typical *A. egregius* in having the entire pronotum black. This form, even if taxonomically irrelevant, may complicate the identification because it differs from *A. fulvipes* var. *separandus* only in the shape of pronotum and male genitalia. Unfortunately, WAGNER (1971) in his well-known monograph on the Mediterranean Miridae did not include the figures of *A. egregius* var. *soosi* and female of *A. fulvipes* var. *separandus* with outer part of corium entirely yellow, which complicates the use of the key. An alternative key to *Alloeonotus* species (excl. *A. obtusus*) is given by KERZHNER (1964). Possible confusions of various colour forms in the past (e.g., HOBERLANDT 1956) makes the interpretation of older *Alloeonotus* records difficult; especially the records from Turkey, Caucasus, and Crimea need a critical re-examination. The study of female genitalia may bring additional characters useful for the identification of the most problematical forms; the female genitalia of *A. fulvipes* were already described by ROSENZWEIG (2001).

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Zusammenfassung

Verbreitung, Ökologie, Bionomie und Wirtspflanzen von *Alloeonotus egregius* FIEBER 1864 und *A. fulvipes* (SCOPOLI 1763) (Heteroptera, Miridae, Mirinae, Mirini) werden aus der Literatur und bisher unveröffentlichten Daten zusammengefasst. Beide Arten sind ponto-mediterran verbreitet und leben polyphag an verschiedenen Krautigen. Die Möglichkeit, dass es sich bei *A. egregius* um ein Glazialrelikt handelt, wird diskutiert. *Alloeonotus egregius* wird erstmals aus der Slowakei gemeldet; ein bisher übersehener publizierter Nachweis der Art aus der Schweiz wird wiederentdeckt. *Rhinanthus major* L. (Scrophulariaceae) wird als neue Futterpflanze für *A. egregius* gemeldet.

Souhrn

Tato práce podává přehled rozšíření, ekologie a živných rostlin klopušek *Alloeonotus egregius* FIEBER 1864 a *A. fulvipes* (SCOPOLI 1763) (Heteroptera: Miridae: Mirinae: Mirini) na základě publikovaných i dosud nepublikovaných údajů. *Alloeonotus egregius* a *A. fulvipes* jsou ponto-mediterránní druhy, polyfágní na různých bylinách. Je diskutována možnost, že *A. egregius* je glaciální relikt. Je zde uveden první nález *A. egregius* ze Slovenska (Velká Fatra: Majerova skala) a rovněž je zmíněn publikovaný a všeobecně přehlížený údaj o tomto druhu ze Švýcarska. Kokrhel větší (*Rhinanthus major* L.) (Scrophulariaceae) je novou živnou rostlinou druhu *A. egregius*.

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