Published December 20, 2022

Klapalekiana, **58**: 51–67, 2022
ISSN 1210-6100

Recent expansion of the assassin bug *Nagusta goedelii* (Hemiptera: Heteroptera: Reduviidae) within Slovakia and Romania, with additional records from Europe and the Middle East

Nedávna expanzia zákernice stromovej (*Nagusta goedelii*) (Hemiptera: Heteroptera: Reduviidae) v rámci území Slovenska a Rumunska, s doplňujúcimi nálezmi z Európy a Blízkeho Východu

Vladimír HEMALA[1)], Silviu ȚICU[2,3)], Jozef CUNEV[4)] & Anton KRIŠTÍN[5)]

[1)] Department of Botany and Zoology, Faculty of Science, Masaryk University, Kotlářská 2, CZ-611 37 Brno, Czech Republic; e-mail: vladimir.hemala@gmail.com
[2)] Applied Ecology Research Center, Faculty of Science, Lucian Blaga University of Sibiu, Doctor Ion Rațiu street 5-7, RO-550012, Sibiu, Romania; e-mail: silviu.ticu@ulbsibiu.ro
[3)] Natural History Museum, Brukenthal National Museum, Cetății Street 1, RO-550160, Sibiu, Romania
[4)] Piešťanská 14, SK-949 01 Nitra, Slovakia; e-mail: dodocunev@stonline.sk
[5)] Institute of Forest Ecology, Slovak Academy of Sciences, Ľ. Štúra 2, SK-960 53 Zvolen, Slovakia; e-mail: kristin@ife.sk

Heteroptera, Reduviidae, *Nagusta goedelii*, faunistics, first records, rediscovery, Greece, Hungary, Jordan, Romania, Slovakia, Syria

Abstract. The relatively rare assassin bug *Nagusta goedelii* (Kolenati, 1857) is rediscovered in Slovakia after 49 years, in Romania after 54 years, and reported from Syria and Jordan for the first time. Some additional records from Hungary and Greece (including the first records from Lesvos, Rhodos and Samos), and a chronological overview of all known Slovak and Romanian records are provided. Repeated observations of this species in Bratislava (Slovakia) between 2015–2020 suggest the presence of an established population in urbanised areas of the city, most probably as result of natural expansion. Another observations from Nitra (Slovakia) in 2020 and Piešťany (Slovakia) in 2021 indicate the probability of further extension of *N. goedelii* over a large part of the Danube Lowland. Here we discuss the possibility of synantropic behaviour of by this species.

INTRODUCTION

Nagusta goedelii (Kolenati, 1857) (Hemiptera: Heteroptera: Reduviidae: Harpactorinae) is a predaceous true bug species occurring predominantly on trees (rarely on shrubs) without special preference for any tree species (see Stehlík & Vavřínová 1998, Wachmann et al. 2006, Kment & Dolejšová 2010). The prey spectrum of the species is poorly known, but it apparently hunts various insects (predation of some crickets, flies, aphids, psyllids, scale insects, larvae of sawflies, larvae of moths, planthoppers from the family Flatidae and stoneflies has been observed) or arachnids; cannibalism is also frequent (see Putshkov 1979, 1987, Özbek et al. 1996, Wachmann et al. 2006, Putshkov & Moulet 2010, Kment & Dolejšová 2010, Rakhshani et al. 2010, Dioli 2014, Kaya Apak & Akşıt 2016, Kaplan et al. 2016, Çaylak 2021, Oğuzoğlu et al. 2021, this paper). *Nagusta goedelii* was also tested for predation of an

invasive stink bug *Halyomorpha halys* (Stål, 1855) (Pentatomidae) where it preyed mostly on the first instar larvae (Bulgarini et al. 2019). *Nagusta goedelii* is Ponto-Mediterranean species distributed from the Pannonian (= Carpathian) Basin, Balkan Peninsula and southern parts of Eastern European Plain up to Central Asia and Iran (Putshkov & Moulet 2010, Kment & Dolejšová 2010). In Europe, older records of the species are known from Austria, Bosnia and Herzegovina, Bulgaria, Croatia, European Turkey, Greece (including Crete), Hungary, Moldova, Montenegro, North Macedonia, Romania, Russia (South European Territory), Serbia, Slovakia, Slovenia and Ukraine (Putshkov & Putshkov 1996; Protić 1998, 2010; Rabitsch 2001, 2014; Gogala 2004; Putshkov & Moulet 2010; Fent 2011; Simov et al. 2012, 2017; Aukema et al. 2013; Dursun & Salur 2013; this paper). Recently, many cases of expansion of *N. goedelii* were documented within the territories of the above mentioned countries as well as into countries where the species had not previously been recorded, e.g. the Czech Republic (Kment & Dolejšová 2010), Italy (mainland, Sardinia) (Olivieri 2011, Dioli 2014, Luthi & Dioli 2020, Cianferoni et al. 2021), France (Aquitaine, Occitanie, Provence-Alpes-Côte d'Azur) (Fadda & Dusoulier 2016, Haxaire & Ducamp 2016, Baghi & Maurel 2017, Labatut & Charles 2020), Germany (Baden-Württemberg, Hesse, Rheinland-Pfalz) (Dorow et al. 2018, 2021; Dorow & Bott 2018; Wieland et al. 2021), and Lithuania (Ferenca et al. 2021). Although some authors (Kment & Dolejšová 2010, Cianferoni et al. 2021) reported that accidental human-mediated introduction is possible in some exceptional cases, a hypothesis that introduction was a reason for the recent expansion of *N. goedelii* was not supported by the vast majority of recent papers (e.g. Dioli 2014; Fadda & Dusoulier 2016; Haxaire & Ducamp 2016; Baghi & Maurel 2017; Dorow et al. 2018, 2021; Dorow & Bott 2018; Luthi & Dioli 2020). In Asia, the species is so far known from Azerbaijan, Armenia, Asian Turkey, Cyprus, Georgia, Iran, Iraq, Israel, Jordan, Syria and Turkmenistan (Putshkov & Putshkov 1996, Putshkov & Moulet 2010, Dursun & Salur 2013; recent records only from Turkey, Iran and Jordan: Ghahari et al. 2010, 2013; Rahimi et al. 2010; Rakhshani et al. 2010; Yildirim et al. 2010, 2013; Dursun 2011; Matocq et al. 2014; Küçükbasmacı & Kıyak 2015; Çerçi & Koçak 2016; Kaya Apak & Akşıt 2016; Şımşek & Bolu 2016; Mozhdehi et al. 2017; Çerçi et al. 2018; Ghahari 2019; Kaplan 2019; Çaylak 2021; Çerçi & Özgen 2021; Oğuzoğlu et al. 2021; this paper). *Nagusta goedelii* is a relatively rare species in Slovakia, but more widespread in Romania. In Slovakia, it was formerly known only from the surroundings of the Burda Hills (localities Štúrovo, Kamenica nad Hronom and Kováčov) (Stehlík 1958, Roubal 1959, Stehlík & Vavřínová 1998) and classified as a critically endangered species on the Red List of Heteroptera of Slovakia (Štepanovičová & Bianchi 2001). In Romania, the species is known from several parts of the country (Transylvania, Banat, Moldavia, Crişana and Oltenia), but only from nine locations (Horváth 1897, Montandon 1907, Benedek 1968, Schneider 1973, Kis et al. 1974, Protić 2010, Putshkov & Moulet 2010). While *N. goedelii* has only been known in Slovakia since the 1950s, in Romania its oldest known records date back to the end of the 19th century. In this paper, we provide some new records and three new localities from Slovakia and seven new localities from Romania documented by photographs (Slovakia: Figs 1–8; Romania: 9–13), which also represent the rediscovery of the species in Slovakia after almost 50 years and in Romania after 54 years. Moreover, we provide some additional records from Hungary and Greece, and the first known records of the species from Syria and Jordan.

MATERIAL AND METHODS

Map of distribution. The map of distribution (Fig. 14) of *N. goedelii* in Slovakia, Romania and some adjacent regions was generated in Google Earth 7.1.8.3036 and edited in Adobe Photoshop CC 20.0.5.

Abbreviations. spec. – unsexed adult; GBCR – Gavril Marius Berchi private collection, Cluj-Napoca, Romania; IRTR – Ioan-Alexandru Rădac private collection, Timişoara, Romania; JBPC – Jan Batelka private collection, Prague, Czech Republic; JCNS – Jozef Cunev private collection, Nitra, Slovakia; MMBC – Moravian Museum, Brno, Czech Republic; NMBS – Slovak National Museum, Bratislava, Slovakia; NMPC – National Museum, Prague, Czech Republic; SZMG – Savvas Zafeiriou private collection, Mytilene, Lesvos, Greece; ZSMC – Zoologisches Staatsammlung, Munich, Germany.

REVIEW OF THE RECORDS FROM SLOVAKIA AND ROMANIA

All available Slovak and Romanian records of *Nagusta goedelii* are reviewed below and arranged chronologically. Codes of Central European mapping grid (Ehrendorfer & Hamann 1965) following Novák (1989) were provided for Slovakia. For Romania, we used the UTM codes of the mapping grid of fauna and flora of Romania (Lehrer & Lehrer 1990). Photographs of some of the recorded specimens are shown on Figs 1–13. For a map of the distribution see Fig. 14.

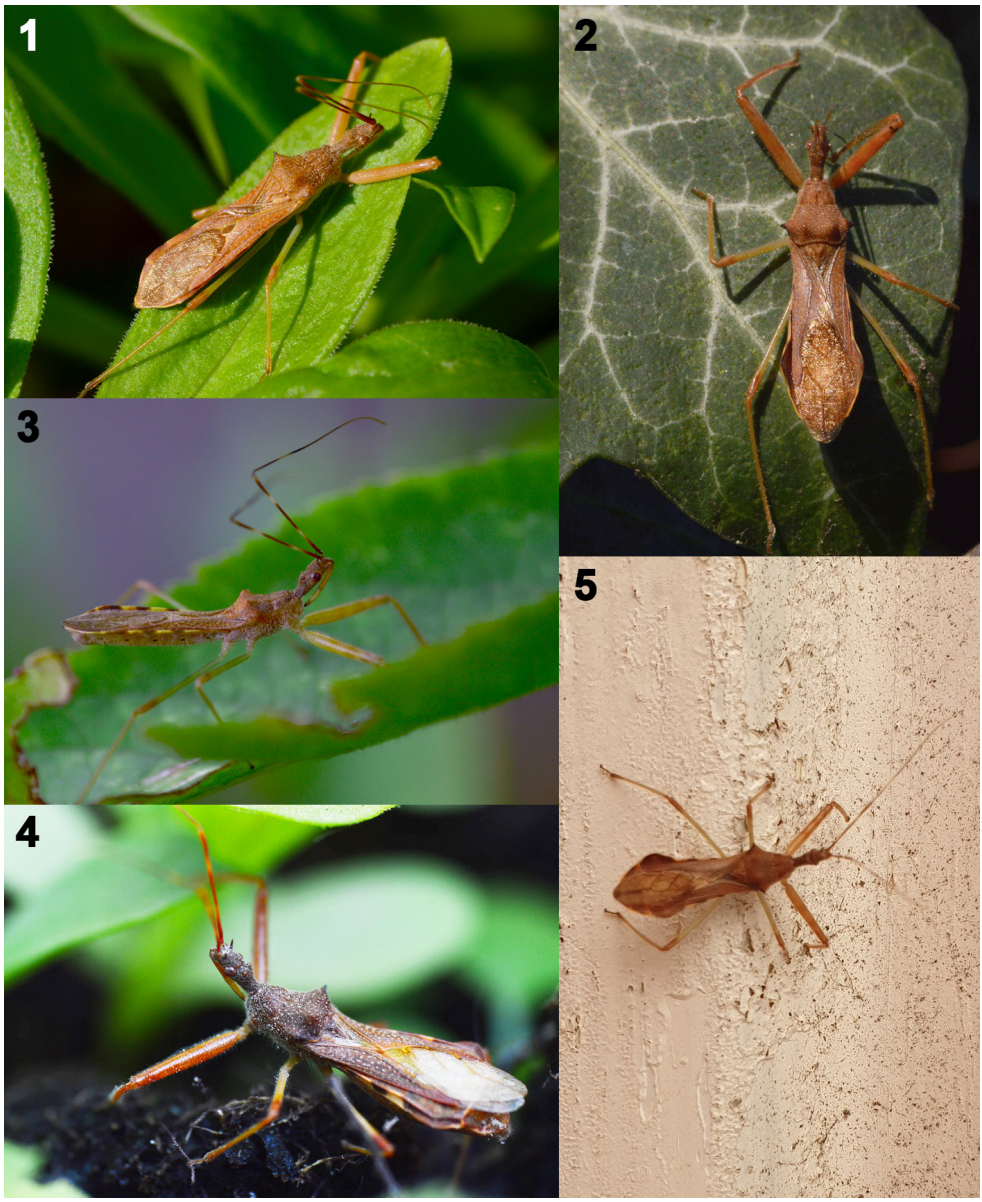
Slovakia:

1. Štúrovo (8278), no further details, 1 ♂, M. Kudla lgt., J. L. Stehlík det. (Stehlík 1958).
2. Štúrovo (8278), no further details, 1 ♀, [R.] Čepelák lgt., J. L. Stehlík det. (Stehlík 1958).
3. Hronská Kamenica (= Kamenica nad Hronom) (8178), 31.viii.1952, without information about specimen/s, [J.] Dlabola lgt. (Roubal 1959).
4. Kováčov (= Kamenica nad Hronom, part Kováčov) (8178), 120–150 m a.s.l., 14.v.1954, 1 ♀, J. Palásek lgt. (Stehlík & Vavřínová 1998).
5. Štúrovo (8278), 120–125 m a.s.l., ix.1954, 1 ♂, J. Palásek lgt. (Stehlík & Vavřínová 1998).
6. Štúrovo (8278), 120–125 m a.s.l., 15.vii.1956, 2 ♀♀, J. Palásek lgt. (Stehlík & Vavřínová 1998).
7. Štúrovo (8278), 120–125 m a.s.l., v.1961, 1 ♂, M. Kocourek lgt. (Stehlík & Vavřínová 1998).
8. Kamenica nad Hronom (8178c), pastures with tree and shrub succession on slopes E of village, ca. 158 m a.s.l., 6.v.2010, 1 ♀, and, 5.vii.2013, 1 ♀, both collected by sweep net, J. Cunev lgt. et det. (JCNS).
9. Bratislava–Staré Mesto, Patrónka (7868a), 30.ix.2015, 1 spec. and 26.x.2015, 1 spec., both photographed by A. Revický (A. Revický, pers. comm.), F. Šaržík det., V. Hemala revid. (Figs 1, 3).
10. Bratislava–Staré Mesto, Patrónka (7868a), 17.iii.2016, 1 spec. on leaf of ivy (*Hedera helix*); 7.v.2018, 1 spec., both photographed by A. Revický (A. Revický, pers. comm.), A. Revický det., V. Hemala revid. (Figs 2, 4).
11. Bratislava–Staré Mesto, Patrónka, Senická street (7868a), 15.ix.2017, 1 spec. on leaf of ivy (*Hedera helix*), photographed by A. Revický (A. Revický, pers. comm.), A. Revický det., V. Hemala revid. (Fig. 6).
12. Bratislava–Petržalka, Starhradská street (48°06′36.29″N 17°06′44.56″E; 7868d), on the balcony of a block of flats, 134 m a.s.l., 27.x.2019, 1 spec. photographed by M. Žemlička (M. Žemlička, pers. comm.) (Fig. 5).

13. Bratislava–Petržalka, Haanova street (48°07′12.90″N 17°07′18.85″E; 7868d), near window in building, 140 m a.s.l., 20.x.2020, 1 spec. photographed by an anonymous photographer, the specimen bit the photographer on the finger (Anonymous, pers. comm.).
14. Nitra–Staré Mesto, "Parkové nábrežie" residential complex, block of flats (48°19′02.10″N 18°05′30.22″E; 7674d), 28.x.2020, tens of specimens observed and 1 spec. photographed by A. Krištín, V. Hemala det. (Fig. 7).
15. Piešťany, Holubyho street (48°35′45.0″N 17°49′50.4″E; 7472b), 160 m a.s.l., 11.vii.2021, 1 larva photographed by P. Loduha (P. Loduha, pers. comm.), V. Hemala det., P. Kment revid. (Fig. 8).

Romania:

1. Zilah (= Zalău) (FT52) [Transylvania: Sălaj county], no more details (Horváth 1897).
2. Orsova (= Orșova) (FQ05) [Banat: Mehedinți county], 1881, [J.] Pável lgt. (Benedek 1968).
3. Désakna (= Ocna Dejului) (GT12) [Transylvania: Cluj county], no date, Z. Kiss lgt. (Benedek 1968). [Zilahi Kiss Endre alias Andreas Kiss von Zilah (*1873–†1931) was an entomologist who collected insects mostly in Transylvania including Désakna locality (his entire collection is deposited in Hungarian National History Museum in Budapest) (Müller 1932, Takács 2008); the record dates back to the period of his lifetime, ca. 1890–1931].
4. "Zorleni (Tutova)" (= Zorleni village near Tutova) (NM52) [Moldavia: Vaslui county], no further details (Montandon 1907).
5. Déva (= Deva) (FR48) [Transylvania: Hunedoara county], 1916, [J.] Mallász lgt. (Benedek 1968).
6. Ineu-Criș (= Ineu) (ET81) [Crișana: Bihor county], 15.ix.1928, 1 spec., [L.] Diószeghy lgt. (Schneider 1973).
7. Ineu-Criș (= Ineu) (ET81) [Crișana: Bihor county], 7.ix.1930, 1 spec., [L.] Diószeghy lgt. (Schneider 1973).
8. Herkulesbad (= Băile Herculane) (FQ17) [Banat: Caraș-Severin county], 26.x.1931, 1 ♀, [K.] Dorn lgt. (Protić 2010).
9. "Banat" (= Banat region) (without specified locality) [Banat], 28.x.1931, no more details, coll. ZSMC (Putshkov & Moulet 2010).
10. Craiova (GQ11) [Oltenia: Dolj county], 16.vi.1958, 1 ♀ (Kis et al. 1974).
11. Dobrovăț, under bark in deciduous forest (46°59′28″N 27°40′15″E; NN50) [Moldavia: Iași county], 240 m a.s.l., 11.xi.2012, 1 spec., A. Pintilioaie lgt., G. M. Berchi det. (GBCR).
12. Băile Herculane, inside a building (44°52′26″N 22°24′37″E; FQ17) [Banat: Caraș-Severin county], 147 m a.s.l., 4.xii.2013, 1 spec., G. M. Berchi lgt. et det. (GBCR).
13. Timișoara, on *Quercus robur* near a forest (45°46′48″N 21°15′55″E; ER17) [Banat: Timiș county], 90 m a.s.l., 20.x.2017, 1 spec., I. A. Rădac lgt. et det. (IRTR).
14. Costești commune, near Pietreni village (45°10′45.6″N 24°05′14.7″E; KL60) [Oltenia: Vâlcea county], 640–670 m a.s.l., 7.iv.2018, 1 spec. with a stonefly prey, and, 12.x.2019, 1 spec., both photographed by S. Țicu; A. Ardelean det., V. Hemala revid. (Figs 10, 12–13).
15. Vaidei, on *Prunus cerasifera* in a home garden (45°52′02.5″N 23°18′0.4″E; FR77) [Transylvania: Hunedoara county], 252 m a.s.l., 15.viii.2018, 1 L, I. A. Rădac lgt. et det. (IRTR).
16. Bălteni village (in Periș commune), Scroviștea Forest (44°42′12.4″N 26°01′00.9″E; MK14) [Muntenia: Ilfov county], 120 m a.s.l., 27.x.2018, 1 spec. photographed by F. Iagar (F. Iagar, pers. comm.), S. Țicu & I. A. Rădac det., V. Hemala revid. (Fig. 9).



Figs 1–5. *Nagusta goedelii* (Kolenati, 1857) from Slovakia, specimens photographed in Bratislava: 1–4 – Staré Mesto part, Patrónka: 1 – 26.x.2015, 2 – 17.iii.2016, 3 – first observed specimen on 30.ix.2015, 4 – 7.v.2018; 5 – Petržalka part, Starhradská street, 27.x.2019. (Photography: 1–4 – A. Revický; 5 – M. Žemlička).
Obr. 1–5. Zákernica stromová, *Nagusta goedelii* (Kolenati, 1857), zo Slovenska, jedince vyfotografované v Bratislave: 1–4 – časť Staré Mesto, Patrónka: 1 – 26.X.2015, 2 – 17.III.2016, 3 – prvý pozorovaný jedinec, 30.IX.2015, 4 – 7.V.2018; 5 – časť Petržalka, Starhradská ulica, 27.X.2019. (Fotografie: 1–4 – A. Revický; 5 – M. Žemlička).

17. Diculești commune, Băbeni-Olteț, in the village (44°37′01.9″N 23°58′47.8″E; KK99) [Oltenia: Vâlcea county], 201 m a.s.l., 18.ix.2019, 1 spec. photographed by S. Țicu; S. Țicu det., V. Hemala revid. (Fig. 11).

ADDITIONAL RECORDS

Material examined: HUNGARY: Fejér county: Alcsútdoboz, botanical garden, 47°25′20″N 18°35′31″E, 130–145 m a.s.l., 1.ix.2009, P. Lauterer lgt., P. Kment det. (NMPC). **Nógrád county:** Salgótarján–Kőváralja, only ca. 5 km from the Slovak state border, 1 spec. observed on the wall of house, 48°06′31.490″N 19°47′22.298″E, 278 m a.s.l., during late October 2018 (István Lantos, pers. comm.). **GREECE: Attica:** Attiki, Kiphissia (Athens), part Tatoi, 200 m a.s.l., pine wood and clearings, 15.ix.1998, 2 ♂♂ 3 ♀♀, P. Lauterer lgt., P. Kment det. (1 ♂ NMPC; 1 ♂ 3 ♀♀ MMBC). **Crete:** NW of Ano Viánnos, towards Thomadiano, 7.–8.iv.2004, 1 ♂ 1 ♀, J. Batelka & H. Batelková lgt., P. Kment det. (1 ♂ NMPC; 1 ♀ JBPC). **Lesvos:** Kómi, ca. 1.2 km NW from the village (39°11′36.30″N 26°23′58.11″E), 300 m a.s.l., 21.ii.2021, 1 spec., S. Zafeiriou lgt. et det. (SZMG). **Rhodos:** Koskinou (36°23′18.9″N 28°12′41.6″E), 83 m a.s.l., 21.iii.2020, 1 spec. observed by K. Kalaentzis (K. Kalaentzis, pers. comm.). **Samos:** Manolates, ca. 2 km SW from the village (37°46′15.1″N 26°48′48.0″E), 891 m a.s.l., 3.viii.2021, 1 larva observed by K. Kalaentzis (K. Kalaentzis, pers. comm.); Ampelos (37°48′3.30″N 26°47′57.71″E), 333 m a.s.l., 3.viii.2021, 1 larva observed by Ch. Kazilas (Ch. Kazilas, pers. comm.). **SYRIA:** Homs, v.1953, 1 ♀, [R.] Kargl lgt., J. Roubal det. et coll. (NMBS); Aleppo, no more details, 3.ix.1971, 1 ♂, no collector, P. Moulet det. (NMPC). **JORDAN:** Ajlun env., 30 km W from Jarsah, 32°19′52.6″N 35°43′06.6″E, 850 m a.s.l., 2.–3.vi.2007, 1 ♀, J. Bezděk lgt., P. Moulet det. (NMPC).

DISCUSSION

Slovakia: Only four localities (including recent records) of *Nagusta goedelii* were known from Slovakia until the publication of the present article. The oldest records from the country are published by Stehlík (1958) from Štúrovo (without precise collecting dates) and by Roubal (1959) from Kamenica nad Hronom (collected in 1952). Stehlík's (1958) records do not have specified dates, it is not possible to say which one of these records is the oldest known from Slovakia. Stehlík & Vavřínová (1998) published further records of the species from Kováčov (currently the part of Kamenica nad Hronom) (collected in 1954) and from Štúrovo (collected in 1954, 1956 and 1961). All of these records are situated near the Burda Hills area, which remained the only site of occurrence of *N. goedelii* in Slovakia. After a 49-year gap (in 2010), the species was discovered in Slovakia again in Kamenica nad Hronom. This record was soon repeated (in 2013) at the same locality. Both records are probably a result of pulsation of the northern boundary of the distribution area of the species, because *N. goedelii* had not been collected for almost 50 years despite frequent visits by a number of entomologists to the Burda Hills and its surroundings (being among the most popular entomological localities in the country). Later (in 2015), *N. goedelii* was first reported from Bratislava (based on photography of A. Revický; Fig. 3), which represents a new locality situated ca. 125–130 km west of the preceding localities in the surroundings of the Burda Hills. *Nagusta goedelii* was observed in Bratislava again in 2015, 2016, 2017, 2018 (by A. Revický; Figs 1–2, 4, 6), 2019

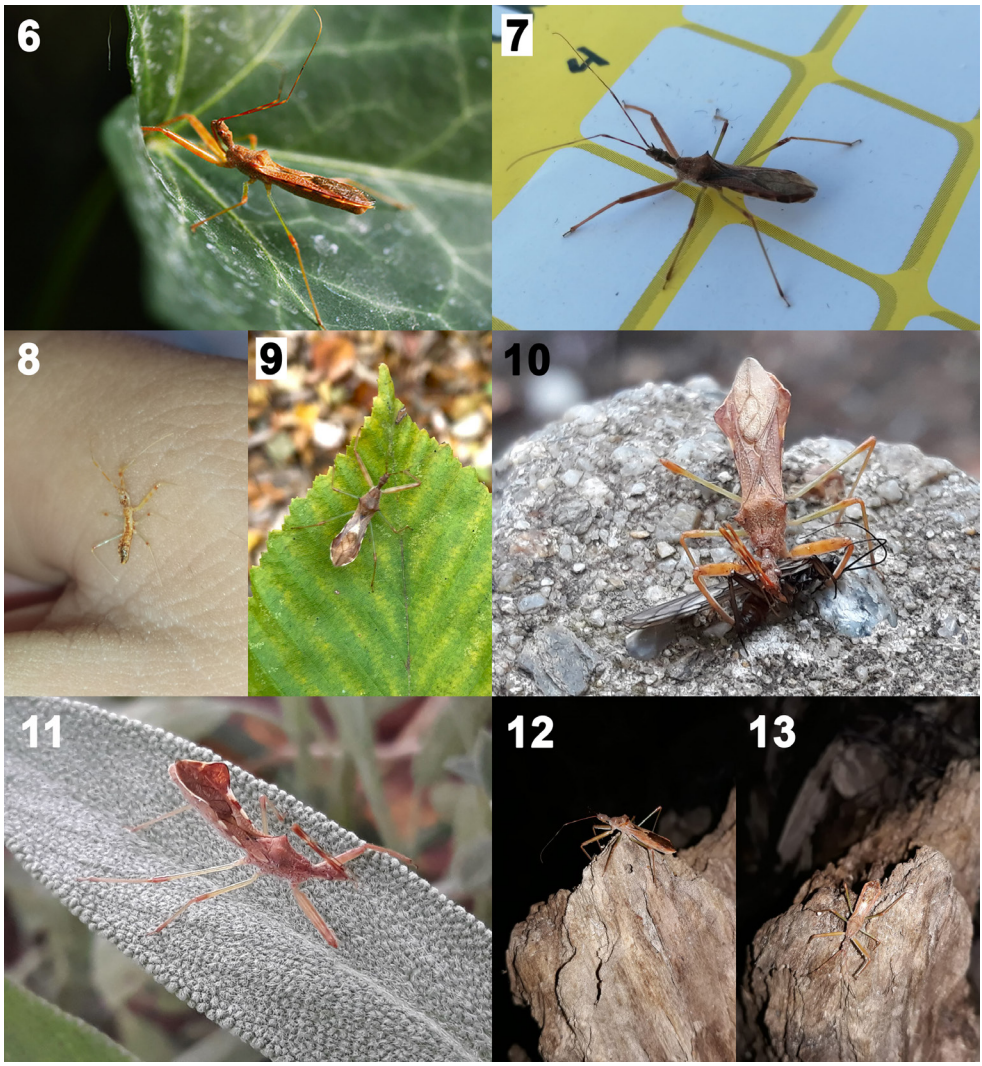
(by M. Žemlička; Fig. 5) and 2020 (anonymous photographer). These repeated observations suggest the existence of an established population of the species in Bratislava. It is possible that the occurrence of *N. goedelii* in Bratislava is a result of expansion or introduction because the city is situated very close to the borders of Hungary and Austria and an increasing number of records of the species was revealed in both these countries, including the Austrian capital, Vienna (situated ca. 55 km West from Bratislava) (D. Rédei, E. Kondorosy and W. Rabitsch pers. comm. in Kment & Dolejšová 2010; see also Kondorosy 2011, 2012; Rabitsch 2014; Frieß & Brandner 2014; Brandner & Frieß 2018). Several documented cases of expansion of the species into other European countries (especially in municipal areas) (Czech Republic, Italy, France, Germany; see Introduction) or cases of expansion into cities within the same country (e.g. Sofia, Vienna, etc.; see Simov et al. 2012, Rabitsch 2014) support this assumption. Tens of specimens of the species were observed also in the city of Nitra in 2020 (by A. Krištín; Fig. 7) ca. 75 km from Bratislava and ca. 71 km from Burda Hills, which may be a result of expansion or introduction from one of these two sites or from Hungary (the state border is ca. 61 km distance). An additional recent record come from Piešťany in 2021, a photograph of an early instar larva provided by P. Loduha (Fig. 8). This location is situated at the margin of the Danube Lowland, ca. 70 km from Bratislava and only ca. 36 km from Nitra in a beeline. Therefore, it can be assumed that *N. goedelii* has already spread over a large part of the Danube Lowland. It is possible that *N. goedelii* could also be recorded in other parts of Slovakia, because it was observed in Salgótarján–Kőváralja (Northern Hungary) during late October 2018 only ca. 5 km from the Slovak-Hungarian state border (István Lantos pers. comm.) (this paper). The species was included in the Red List of Heteroptera of Slovakia as critically endangered (Štepanovičová & Bianchi 2001), based only on its fragmentary occurrence in Burda Hills documented by findings in the 1950s and 1960s. Due to recent records indicating its expansion/reintroduction and also its current trend of spreading into new areas, towns, cities and countries within Europe, we propose that *N. goedelii* should be removed from the Red List of Heteroptera of Slovakia in the future.

Romania: Only nine old records of *N. goedelii* were available until now from Romania (three of them are from Transylvania). The oldest known records come from Zalău in Sălaj county (Transylvania) without date (Horváth 1897) and from Orșova in Mehedinți county (Banat) collected 1881 (Benedek 1968). One record came from Ocna Dejului in Cluj county (Transylvania) without date (Benedek 1968) – collected by Andreas Kiss von Zilah (*1873–†1931) in the period of his lifetime (ca. 1890–1931). Further records came before 1907 from Zorleni near Tutova in Vaslui county (Moldavia region) (Montandon 1907), in 1916 from Deva in Hunedoara county (Transylvania region) (Benedek 1968), in 1928 and 1930 from Ineu-Criș (= Ineu) in Bihor county (Crișana region) (Schneider 1973), in 1931 from Băile Herculane in Caraș-Severin county (Banat region) (Protić 2010) and from Banat region without specified locality (Putshkov & Moulet 2010) and in 1958 from Craiova in Dolj county (Oltenia region) (Kis et al. 1974). *Nagusta goedelii* was rediscovered in Romania after 54 years (in 2012) in Dobrovăț (Iași county, Moldavia region) from the record by A. Pintilioaie (this paper). Later records came from Băile Herculane (in 2013 repeatedly after 82 years; by G. M. Berchi), Timișoara (in 2017; by I. A. Rădac), Vaidei (Hunedoara county, Transylvania region) (in 2018; by I. A. Rădac), Costești (Vâlcea county, Oltenia region) (in 2018; from a photographic record by S. Țicu (Fig. 10)) and from Bălteni (Ilfov county, Muntenia region) (in 2018; from a photographic record by F. Iagar (Fig. 9)) (this paper). In 2019, the species

was observed again in Costești (Vâlcea county, Oltenia region) (Figs 12–13) and in Băbeni-Olteţu (the same county and region) (Fig. 11). Although the expansion of *N. goedelii* into the larger cities of Romania was observed only in one case at the edge of Timişoara (it was also observed ca. 30 km North of the centre of Bucharest), more cases of such expansions are plausible, as observed in other European countries [e.g. Sofia in neighboring Bulgaria (Simov et al. 2012)].

Hungary: The oldest known occurrence was recorded from Mecsek Hills near Pécs (Baranya county) in the early 1860s (collected by M. Májer) (Horváth 1877; stated as "Pécs" in Horváth 1897). Further old records are known from Balf near Fertő (= Neusiedler See) Lake (Sopron county) (Horváth 1897, 1923; Gulde 1940), Csurgó (Somogy county), Gödreszentmárton (part of Gödre village at the present time; Baranya county) and Nagyharsány (Baranya county) (Horváth 1897). Benedek (1968) published additional older records from the following localities (arranged chronologically): Pécs (without date; probably the same material as Horváth (1877, 1897) had seen), Nagyharsány (in 1880; probably the same material as Horváth (1897) had seen), Szentmárton (in 1882; probably Gödreszentmárton stated in Horváth (1897) ['Szentmárton' is a confusing name included as part of a number of Hungarian town and village names and as part of older Hungarian names of some towns and villages in present Slovakia and Romania, but in the context of Horváth's records it is most probable that it corresponds with the locality in his work]), Simontornya (in 1928, 1931, 1933, 1935 and 1937; Tolna county) and Pomáz (in 1934 and 1935; Pest county). The locality Simontornya was stated also in Protić (2010) from 1931 (deposited in the Natural History Museum in Belgrade) and in Putshkov & Moulet (2010) without more details only with the information about two museum collections where the specimens are deposited (Zoologische Staatssammlung in Munich, Germany and Muséum d'Histoire Naturelle de Genève, Switzerland). Later records are stated by Kondorosy (2001, 2011) from Somogy county (without specified locality) and Zala county (Balatongyörök, Keszthely). Kment & Dolejšová (2010) wrote that D. Rédei and E. Kondorosy personally communicated to them about an increasing number of unpublished records in Hungary, indicating increasing population density of the species. Kondorosy (2012) stated that *Nagusta goedelii* is a native species (considering the old records), which has multiplied recently due to climate change. Several recent unpublished records of the species are known from the near vicinity of the Slovak state border, e.g. Alcsútdoboz (Fejér county) in 2009 distant ca. 38 km (P. Lauterer lgt.) or Salgótarján-Kőváralja (Nógrád county) in 2018 distant even only ca. 5 km from the Slovak state border (I. Lantos, pers. comm.) (this paper).

Ukraine: The oldest known record comes from Belbek (= Fruktove) in Crimea before 1905 (Jakovlev 1905; cited in Gross-Heim 1931). The nearest known locality to Slovak and Romanian borders is Dyula (formerly Yulivtsi) in Zakarpattia region (collected 3.vi.1954) (Roshko 1959a; as "Yulievtsy"). The locality is in only ca. 2 km from the Romanian border and ca. 80 km from the Slovak border (and ca. 15 km from the Hungarian border). *Nagusta goedelii* was listed by Roshko (1956) among true bug species in the area defined as follows: "In southernmost parts of Zakarpattia, in wild sites on southern slopes of hills of the Berehove district, as well as in the Vynohradiv district near Kholmovets and Yulievtsy villages and Chorna Hora Mt. the following thermophilic species live…" [followed by the list of eleven species including *N. goedelii*]. This was most probably based on material from Dyula, because no other locality for the species was mentioned by Roshko (1959a). The species was



Figs 6–13. *Nagusta goedelii* (Kolenati, 1857) from Slovakia and Romania: 6–8 – Slovakia: 6 – Bratislava-Staré Mesto, Patrónka (15.x.2017), 7 – Nitra (28.x.2020), 8 – Piešťany (11.vii.2021); 9–13 – Romania: 9 – Bălteni village, Scroviștea forest (27.x.2018), 10 – Costești commune, near Pietreni village (7.iv.2018, specimen with a stonefly prey), 11 – Diculești commune, Băbeni-Olteţu (18.ix.2019); 12–13 – Costești commune, near Pietreni village (12.x.2019). (Photography: 6 – A. Revický; 7 – A. Krištín; 8 – P. Loduha; 9 – F. Iagar; 10–13 – S. Țicu).

Obr. 6–13. Zákernica stromová, *Nagusta goedelii* (Kolenati, 1857) zo Slovenska a z Rumunska: 6–8 – Slovensko: 6 – Bratislava-Staré Mesto, Patrónka (15.X.2017), 7 – Nitra (28.X.2020), 8 – Piešťany (11.VII.2021); 9–13 – Rumunsko: 9 – Bălteni, les Scroviștea (27.X.2018), 10 – Costești, pri obci Pietreni (7.IV.2018, jedinec s ulovenou pošvatkou), 11 – Diculești, obec Băbeni-Olteţu (18.IX.2019); 12–13 – Costești, pri obci Pietreni (12.X.2019). (Fotografie: 6 – A. Revický; 7 – A. Krištín; 8 – P. Loduha; 9 – F. Iagar; 10–13 – S. Țicu).

only briefly mentioned in the discussion of Roshko (1959b), but without any exact locality and therefore it was most probably also based on the record in Roshko (1959a). Zakarpattia region is also mentioned in Putshkov (1979, 1987), but without specified locality/ies. The occurrence of *N. goedelii* in other parts of Ukraine is still unknown, but the species is possibly present in the southern regions of the country.

Austria: Although very old records of *N. goedelii* were reported in close proximity to the current Austrian-Hungarian border (Balf near Fertő/Neusiedler See Lake in Hungary; see Horváth 1897, 1923). Wagner (1967) wrote only: '…occurs through Hungary up to the Vienna Basin'. However, Wagner (1967) did not give any specified locality of the species from Austria, and Rabitsch (2001) did not find any specimen with Austrian locality in Wagner's collection (only specimens from Hungary were found). Therefore, Rabitsch (2001) assumed that Wagner (1967) could use the Vienna Basin only as generalizing reference to the known records near the Austrian border in Hungary. It should be noted that the Vienna Basin (which is part of the Pannonian Basin) extends not only to Austria, but also to parts of the Czech Republic, Slovakia and Hungary. Therefore, Wagner's (1967) report should be considered as questionable. The first confirmed record of *N. goedelii* from Austria comes from 1999, Bad Gleichenberg in Southern Styria (Rabitsch 2001). Later the number of records dramatically increased. Frieß & Brandner (2014) published more records from Graz (2006, 2010, 2012 and 2014), Trautmannsdorf (2010 and 2011), Oberedelstauden (2011), Paldau (2013), Kranach (2013) and Kaindorf an der Sulm (2013) (all from Styria). Rabitsch (2014) stated further record from Graz (2013), one record from Lower Austria – from Baden near Vienna (2012) and one record from Vienna (2013). Later, Brandner & Frieß (2018) and Korn et al. (2019) provided a number (ca. 15 together) of additional Styrian records. Most of these records come from inside houses and flats where the adults overwinter.

Czech Republic: The species was erroneously listed from the country by Putshkov & Moulet (2010) due to a misinterpretation of Günther & Schuster (1990) who mentioned Czechoslovakia (abbreviated as 'C' there) citing Stehlík (1958) whose work lists the species only from Slovakia (this problem was explained in Kment & Dolejšová 2010). Hoberlandt's work from '1958' cited in Putshkov & Moulet (2010) does not exist and is only an error for Stehlík (1958). Nevertheless, one living female of *N. goedelii* was collected in 2010 in Prague, probably as a result of an accidental introduction (Kment & Dolejšová 2010). Due to lack of further records of the species, it is assumed that *N. goedelii* has not yet established a viable population in the country (P. Kment, pers. comm. 2021).

Greece: The oldest known Greek records of *N. goedelii* come from Attica and Crete before 1892 (Reuter 1892). Later records are known from Canea (= Chania) (Crete) in 1906 (Josifov 1986), Herkules (= Heraklion) (Crete) in 1931 (Putshkov & Moulet 2010), Tympaki (Crete) in 1958 (Putshkov & Moulet 2010), Sisses (Crete) in 1977 (Heiss et al. 1991), Chersonissos (= Hersonissos) (Crete) in 1983 (Heiss & Hopp 1987), Athens (Attica) in 1998 (this paper), surroundings of Ano Viánnos (Crete) in 2004 (this paper) and Tatoi Royal Estate (Attica) in 2015 (Simov et al. 2017). All the available published data come only from Attica and Crete, but *N. goedelii* was also observed in Koskinou (Rhodos) in 2020 (by K. Kalaentzis), near Manolates and Ampelos (both Samos) in 2021 (by K. Kalaentzis and Ch. Kazilas) and near Kómi (Lesvos) in 2021 (by S. Zafeiriou) (this paper), which represent the first known records of the species from these three islands. Therefore, the occurrence of the species can also be expected in other parts of the country as well as on other Greek islands.



Fig. 14. Distribution of *Nagusta goedelii* (Kolenati, 1857) in Slovakia, Romania and adjacent regions. Yellow lines – state borders, white triangles – old published records from 19th century and before 1916, white squares – published records from 1928–1961, white rhombi – published records after 1999, white circles – our new unpublished records. (Source of map: Google Earth).

Obr. 14. Rozšírenie zákernice stromovej, *Nagusta goedelii* (Kolenati, 1857), na Slovensku, v Rumunsku a okolitých regiónoch. Žltá čiara – štátne hranice, biele trojuholníky – staré publikované údaje z 19. storočia a spred roku 1916, biele štvorce – publikované údaje z rokov 1928–1961, biele kosoštvorce – publikované údaje po roku 1999, biele krúžky – nové nepublikované údaje. (Zdroj podkladu mapy: Google Earth).

Jordan: New species for the fauna of the country, recorded only from Ajlun vicinity in 2007 until now.

Syria: New species for the fauna of the country, but based only on two old records collected 69 (Homs) and 51 (Aleppo) years ago. Recent occurrence needs confirmation.

Neither of the last two countries is listed in Putshkov & Putshkov (1996) or Putshkov & Moulet (2010) or Aukema et al. (2013). In the neighbourhood of Jordan and Syria, the species is known from Turkey, Iraq, Israel and Cyprus, ca. 100–160 km distant (see Introduction).

ACKNOWLEDGEMENTS. We are very grateful to Anton Revický and Miroslav Žemlička (both Bratislava, Slovakia) for providing their photographs (Figs 1–6) and locality data, to an anonymous photographer (Bratislava, Slovakia) for providing further locality data, to Patrik Loduha (Piešťany, Slovakia) for providing his photograph (Fig. 8) and locality data, to Gavril Marius Berchi and Ioan Alexandru Rădac (both Babeș-Bolyai University, Cluj-Napoca, Romania) for providing the locality data from Romania, to Florin Iagar (Bucharest, Romania) for providing his photograph (Fig. 9) and locality data, to Konstantinos Kalaentzis (Leiden University, the Netherlands), Christos Kazilas (Leiden University, the Netherlands) and Savvas Zafeiriou (Agricultural University of Athens, Greece) for providing the locality data from Greece (Lesvos, Rhodos and Samos islands), to Petr Kment (National Museum, Prague, Czech Republic) for providing the locality data from Syria, Jordan, Hungary and Greece, to Vladimír Janský

(Slovak National Museum, Bratislava, Slovakia) for the possibility to study Jan Roubal's collection of Heteroptera deposited in the Slovak National Museum including one specimen of *N. goedelii* from Syria, to István Lantos (Bükk National Park, Nógrád–Ipoly Region, Office in Salgótarján, Hungary) for providing of locality data from his observation in Northern Hungary, to Attila Balázs (Mendel University, Brno, Czech Republic) for some translations from Hungarian and to Petr Kment for valuable comments on the manuscript. This work was supported by the project of Masaryk University No. MUNI/A/1098/2019.

REFERENCES

AUKEMA B., RIEGER C. & RABITSCH W. 2013: *Catalogue of the Heteroptera of the Palaearctic Region. Volume 6. Supplement.* The Netherlands Entomological Society, Amsterdam, xxiii + 629 pp.

BAGHI R. & MAUREL J.-P. 2017: Première observation de la punaise prédatrice Nagusta goedelii (Kolenati, 1857) en région Occitanie (Hemiptera, Reduviidae). *Carnets Natures* **4**: 1–4.

BENEDEK P. 1968: Revision on the families Reduviidae and Phymatidae in the Carpathian Basin with the description of a new species from Hungary (Heteroptera). *Folia Entomologica Hungarica* **21 (18)**: 297–316.

BRANDNER J. & FRIEß T. 2018: Interessante Wanzenfunde aus Österreich II (Insecta: Heteroptera). *Joannea Zoologie* **16**: 67–92.

BULGARINI G., BADRA Z. & MAISTRELLO L. 2019: Predatory ability of wild generalist predators against eggs and first instar nymphs of Halyomorpha halys. Pp. 106–107. In: BRANCO M., FRANCO J. C., GROSS J. & IORIATTI C. (eds): Proceedings of the Joint Meeting of the IOBC-WPRS Working Groups "Pheromones and other semiochemicals in integrated production" & "Integrated Protection of Fruit Crops" at Lisbon (Portugal). 20-25 January 2019. "Merging pheromones and other semiochemicals with integrated fruit production: current approaches and applications from research to field implementation in a changing environment". *IOBC-WPRS Bulletin (Bulletin OILB-SROP)* **146**: i–xvi + 1–188.

ÇAYLAK B. 2021: *Tire ve Ödemiş ilçelerinde domates, birinci ve ikinci ürün patates alanlarında domates güvesi [Tuta absoluta (Meyrick) (Lepidoptera: Gelechiidae)]'nin popülasyon değişimi, zararı ve doğal düşmanlarının belirlenmesi.* [*Determination of population changes, damage and natural enemies of the tomato leafminer [Tuta absoluta (Meyrick) (Lepidoptera: Gelechiidae)] in Tire and Ödemiş districts in tomato, early and late season product potato areas*]. Master thesis. Aydın Adnan Menderes University, Graduate School of Natural and Applied Sciences, Aydın, x + 50 pp. (in Turkish, with English abstract).

ÇERÇİ B. & KOÇAK Ö. 2016: Contribution to the knowledge of Heteroptera (Hemiptera) fauna of Turkey. *Journal of Insect Biodiversity* **4 (15)**: 1–18.

ÇERÇİ B. & ÖZGEN İ. 2021: Contribution to the knowledge of Heteroptera (Hemiptera) fauna of Elazığ Province with a new record for the fauna of Turkey. *Journal of the Heteroptera of Turkey* **3 (1)**: 50–75.

ÇERÇİ B., ÖZGEN İ. & DIOLI P. 2018: Additional faunistic notes on heteroptera [sic!] (Hemiptera: Insecta) in East Anatolia (Turkey). *Journal of Entomology and Zoology Studies* **6 (1)**: 1225–1231.

CIANFERONI F., ROGGERO M., PANTALEONI R. A. & LORU L. 2021: Nagusta goedelii (Kolenati, 1857) (Hemiptera Heteroptera Reduviidae) in Sardinia: human-mediated dispersal aids this species to spread west. *Biodiversity Journal* **12 (2)**: 297–300.

DIOLI P. 2014: Presenza in Italia di Nagusta goedelii (Kolenati, 1857) e note sulla sua biologia ed ecologia (Hemiptera: Heteroptera: Reduviidae). *Onychium* **10** (2013): 32–39.

DOROW W. H. O. & BOTT H. 2018: Erstnachweis von Nagusta goedelii (Kolenati, 1857) für Baden-Württemberg (Heteroptera: Reduviidae). *Heteropteron* **53**: 31.

DOROW W. H. O., SCHOTTHÖFER A. & VOIGT K. P. 2021: Erstnachweis der Raubwanze Nagusta goedelii (Kolenati, 1857) in Rheinland-Pfalz (Heteroptera: Reduviidae). *Heteropteron* **61**: 24–26.

DOROW W. H. O., VOIGT K. & BÖTTGE H. 2018: Erstnachweis von Nagusta goedelii (Kolenati, 1857) für Deutschland (Heteroptera: Reduviidae). *Heteropteron* **52**: 17–21.

DURSUN A. 2011: A study on the Nabidae and Reduviidae (Hemiptera: Heteroptera) of the Kelkit Valley and Amasya, Turkey. *Acta Entomologica Serbica* **16 (1/2)**: 35–43.

DURSUN A. & SALUR A. 2013: Presence of Sphedanolestes sanguineus (Fabricius, 1794) in Turkey, followed by an annotated checklist of Reduviidae (Hemiptera: Heteroptera). *Turkish Journal of Zoology* **37**: 610–620.

EHRENDORFER F. & HAMANN U. 1965: Vorschläge zu einer floristischen Kartierung von Mitteleuropa. *Berichte der Deutschen Botanischen Gesellschaft* **78**: 35–50.

FADDA S. & DUSOULIER F. 2016: Première observation de Nagusta goedelii (Kolenati, 1857) en France (Hemiptera Reduviidae). *L'Entomologiste* **72 (2)**: 111–112.
FENT M. 2011: Gökçeada ve Bozcaada Heteroptera (Insecta: Hemiptera) faunasina katkilar. (Contributions to the knowledges of Heteropterean [sic!] (Insecta: Hemiptera) faunas of Gökçeada and Bozcaada Islands, Turkey). *Trakya University Journal of Natural Sciences* **12 (1)**: 35–46 (in Turkish, with English subtitle and abstract).
FERENCA R., TAMUTIS V., MARTINAITIS K. & PŪTYS Ž. 2021: Species of true bugs (Hemiptera: Heteroptera) new for Lithuanian fauna. *Lietuvos Entomologų Draugijos Darbai* **5 (33)**: 9–16.
FRIEß T. & BRANDNER J. 2014: Interessante Wanzenfunde aus Österreich und Bayern (Insecta: Heteroptera). *Joannea Zoologie* **13**: 13–127.
GHAHARI H. 2019: Study on the natural enemies in some sugar beet fields (Beta vulgaris L.), Iran. *Journal of Sugar Beet* **35 (1)**: 91–102 (in Iranian, with English title).
GHAHARI H., CAI W.-Z., CHÉROT F., CARPINTERO D. L., MOULET P., OSTOVAN H., MONTEMAYOR S. I., HAVASKARY M. & LINNAVUORI R. E. 2010: A contribution to Heteroptera (Hemiptera) of Arasbaran and vicinity, northwestern Iran. *Entomotaxonomia* **32 (3)**: 186–194.
GHAHARI H., MOULET P., CAI W.-Z. & KARIMI J. 2013: An annotated catalog of the Iranian Reduvioidea (Hemiptera: Heteroptera: Cimicomorpha). *Zootaxa* **3718 (3)**: 201–238.
GOGALA A. 2004: Heteroptera of Slovenia, II: Cimicomorpha I. *Annales for Istrian and Mediterranean Studies, Series Historia Naturalis* **14 (2)**: 237–258.
GROSS-HEIM V. A. 1931: Materiyaly do spisky polutverdokryl'tsiv (Hemiptera-Heteroptera) Ukrainy. Beiträge zum Verzeichnis der Halbflügler (Hemiptera-Heteroptera) der Ukraine. *Zbirnik Prats' Zoologichnogo Muzeyu (Travaux du Musée Zoologique)* **10**: 63–114 (in Ukrainian, with German subtitle).
GULDE J. 1940: *Die Wanzen Mitteleuropas: Hemiptera Heteroptera Mitteleuropas. VII. Teil. 12. Familie: Dysodiidae. 13. Familie: Phymatidae. 14. Familie: Reduviidae. 15. Familie: Nabidae.* Verlag Otto H. Wrede, Frankfurt am Main, 116 pp.
GÜNTHER H. & SCHUSTER G. 1990: Verzeichnis der Wanzen Mitteleuropas (Heteroptera). *Deutsche Entomologische Zeitschrift, Neue Folge* **37 (4–5)**: 361–396.
HAXAIRE J. & DUCAMP P. 2016: Deuxième observation et première capture de Nagusta goedelii (Kolenati, 1857) en France (Heteroptera, Reduviidae). *Revue de l'Association Roussillonnaise d'Entomologie* **25 (2)**: 104–105.
HEISS E., GÜNTHER H., RIEGER C. & MALICKY H. 1991: Artenspektrum und Phänologie von Heteropteren aus Lichtfallenausbeuten von Kreta (Heteropteren aus Kreta IX). *Berichte des Naturwissenschaftlichen-Medizinischen Verein Innsbruck* **78**: 119–143.
HEISS E. & HOPP I. 1987: Heteropteren aus Kreta V (Insecta: Heteroptera). *Berichte des Naturwissenschaftlichen-Medizinischen Verein Innsbruck* **74**: 185–195.
HORVÁTH G. 1877: A magyarországi rablópoloskák átnézete. [An overview of Great Hungarian assassin bugs (Reduviidae) and damsel bugs (Nabidae)]. *Természetrajzi Füzetek* **1**: 136–151 (in Hungarian).
HORVÁTH G. 1897: Ordo Hemiptera. Pp. 5–72. In: PASZLAVSZKY J. (ed.): *A Magyar birodalom állatvilága. A Magyar Birodalomból eddig ismert állatok rendszeres lajstroma. Fauna Regni Hungariae. Animalium Hungariae hucusque cognitorum enumeratio systematica.* A Királyi Magyar Természettudományi Társulat [= Royal Hungarian Natural History Society], Budapest, 72 pp. (in Hungarian and Latin).
HORVÁTH G. 1923: A Fertő-tónak és közvetlen környékének Hemiptera-faunája. (Faunula hemipterorum lacus Fertő in Hungaria occidentali regionisque adjacentis). *Annales Musei Nationalis Hungarici* **20**: 182–199 (in Hungarian, with Latin subtitle).
JAKOVLEV V. E. 1905: Hemiptera-Heteroptera Tavricheskoy gubernii. [Hemiptera-Heteroptera of the Taurian government (= Crimea)]. *Horae Societatis Entomologicae Rossicae* **37** (1904–1905): 220–246 (in Russian).
JOSIFOV M. V. 1986: Über die Verbreitung mancher Heteropterenarten auf der Balkanhalbinsel und der Insel Zypern. *Acta Zoologica Bulgarica* **34**: 42–48.
KAPLAN M. 2019: Diyarbakır ili bazı kiraz bahçelerinde bulunan zararlı ve faydalı böcek türleri ile bazı önemli zararlı türlerin doğada görülme zamanı. (Phytophagous and beneficial species on some cherry orchards, time to see some important species in nature in Diyarbakır Province). *European Journal of Science and Technology* **17**: 283–289 (in Turkish, with English subtitle and abstract).
KAPLAN M., ÖZGEN İ. & AYAZ T. 2016: Mardin ili zeytin bahçelerinde zeytin pamuklubiti [Euphyllura straminea Loginova (Hemiptera: Psyllidae)]' nin doğal düşmanları ve önemli türlerin popülasyon değişimi. [Natural enemies of the olive psyllid [Euphyllura straminea Loginova (Hemiptera: Psyllidae)] and population trends of the most important species in olive orchards in Mardin Province (Turkey)]. *Harran Tarım ve Gıda Bilimleri Dergisi* **20 (3)**: 175–182 (in Turkish, with English abstract).

KAYA APAK F. & AKŞİT T. 2016: Natural enemies and population dynamics of the blackmargined aphid (Monellia caryella (Fitch) Aphididae, Hemiptera) on pecan trees in Aydın, Turkey. *Journal of the Entomological Research Society* **18 (3)**: 49–60.
KIS B., BOBÎRNAC B., MATEI I. & COSTESCU C. 1974: Contribuţii la cunoaşterea Heteropterelor din sudul Olteniei. [Contribution to the knowledge of Heteroptera in southern Oltenia]. *Studii şi Cercetări, CCES al Judeţului Olt* (Slatina) **1974**: 229–237 (in Romanian).
KMENT P. & DOLEJŠOVÁ K. 2010: The assassin bug Nagusta goedelii (Hemiptera: Heteroptera: Reduviidae) in Prague: an accidental introduction? *Klapalekiana* **46**: 191–201.
KONDOROSY E. 2001: Somogy megye poloskafaunája (Heteroptera). (Bug fauna of Somogy county (Heteroptera)). *Natura Somogyiensis* **1**: 123–134 (in Hungarian, with English subtitle, abstract and summary).
KONDOROSY E. 2011: Keszthely és környéke poloskafaunájának alapvetése (Heteroptera). (Heteroptera fauna of Keszthely and vicinity). *Folia Musei Historico-Naturalis Bakonyiensis* **28**: 105–145 (in Hungarian, with English subtitle and abstract).
KONDOROSY E. 2012: Adventív poloskafajok Magyarországon. (Invasive alien bug (Heteroptera) species in Hungary). *Növényvédelem* **48 (3)**: 97–104 (in Hungarian, with English subtitle and abstract).
KORN R., FRIEß T. & PAILL W. 2019: Wanzenbelege (Insecta: Heteroptera) aus Österreich in der Sammlung des Universalmuseums Joanneum Graz. *Joannea Zoologie* **17**: 171–286.
KÜÇÜKBASMACI İ. & KIYAK S. 2015: A study on the fauna of Heteroptera of Ilgaz Mountains (Kastamonu, Çankırı) with a new record for Turkey. *Nevşehir Bilim ve Teknoloji Dergisi Cilt* **4 (1)**: 1–33.
LABATUT S. & CHARLES L. 2020: Premières observations en Gironde de Nagusta goedelii (Kolenati, 1857) (Hemiptera Reduviidae). *Bulletin de la Société Linnéenne de Bordeaux*, *Tome* **155**, *Nouvelle Série* **48 (1)**: 55–56.
LEHRER A. Z. & LEHRER M. 1990: *Cartografierea faunei şi florei României (coordonate arealografice)*. [*Mapping the Romanian fauna and flora (arealographic coordinates)*]. Editura Ceres, Bucharest, 295 pp. (in Romanian).
LUTHI F. & DIOLI P. 2020: Gli eterotteri negli strati bassi dell'atmosfera in un sobborgo di Bologna (Insecta: Hemiptera: Heteroptera). (True bugs in the lower atmosphere in a suburb of Bologna). *Quaderno di Studi e Notizie di Storia Naturale della Romagna* **51**: 127–166.
MATOCQ A., PLUOT-SIGWALT D. & ÖZGEN İ. 2014: Terrestrial Hemiptera (Heteroptera) collected in southeast Anatolia (Diyarbakir, Mardin and Elaziğ provinces) (Turkey): second list. *Munis Entomology & Zoology* **9 (2)**: 884–930.
MONTANDON A. L. 1907: Contributions a la faune entomologique de la Roumanie. *Buletinul Societaţii de Ştiinţe* **16 (1–2)**: 55–82.
MOZHDEHI M. S., SARAFRAZI A. & RASTEGAR J. 2017: Study on Reduviidae (Hemiptera: Heteroptera) of Iran, deposited in the Hayk Mirzayans Insect Museum. *Journal of Applied Entomology and Phytopatology* **85 (1)**: 111–124.
MÜLLER A. 1932: Zum Gedächtnis. Dr. med. Z. Kiss Endre †. Geb. 1873 in Zilah [= Zalău], gest. 14. Januar 1931 in Szilágycseh [= Cehu Silvaniei]. *Verhandlungen und Mitteilungen des Siebenbürgischen Vereins für Naturwissenschaften zu Hermannstadt* [= Sibiu] **81–82** (1931–1932): 1–4.
NOVÁK I. 1989: Seznam lokalit a jejich kódů pro síťové mapování entomofauny Československa. [List of localities and their grid codes used in faunistic mapping in Czechoslovakia]. *Zprávy Československé Společnosti Entomologické při ČSAV* **25**: 3–84 (in Czech).
OĞUZOĞLU Ş., AVCİ M. & İPEKDAL K. 2021: Predators of the giant pine scale, Marchalina hellenica (Gennadius 1883; Hemiptera: Marchalinidae), out of its natural range in Turkey. *Open Life Sciences* **16**: 682–694.
OLIVIERI N. 2011: Segnalazioni faunistiche italiane. 504 – Nagusta goedelii (Kolenati, 1857) (Heteroptera Reduviidae). *Bollettino della Società Entomologica Italiana* **143 (1)**: 40–44.
ÖZBEK H., GÜÇLÜ Ş. & HAYAT R. 1996: Kuzeydoğu Tarım Bölgesinde taş çekirdekli meyve ağaçlarında bulunan fitofag ve predatör böcek türleri. [Investigations on the phytophagous and predator insect species on stone-fruits in North-East agricultural region of Turkey]. *Turkish Journal of Agriculture and Forestry* **20**: 267–282 (in Turkish, with English abstract).
PROTIĆ Lj. 1998: Catalogue of the Heteroptera fauna of Yugoslav countries. Part one. *Prirodnjački Muzej u Beogradu, Posebna Izdanja* **38**: 1–215.
PROTIĆ Lj. 2010: Assassin bugs (Insecta: Heteroptera: Reduviidae) in collections of the Natural History Museum in Belgrade. *Bulletin of the Natural History Museum in Belgrade* **3**: 141–159.
PUTSHKOV P. V. 1979: Preimaginal'ni stadiyi Nagusta goedelii Stal [sic!] (Heteroptera, Reduviidae) i cikl yiyi zhittya v URSR. [Preimaginal stages of Nagusta goedelii Stal [sic!] (Heteroptera, Reduviidae) and its life cycle in UkSSR (= Ukrainian Soviet Socialist Republic)]. *Dopovidi Akademiyi Nauk Ukrayinskoyi RSR* **9**: 765–768 (in Ukrainian).

PUTSHKOV P. V. 1987: *Khishchnetsy. Fauna Ukrainy. Tom 21. Poluzhestkokrylye. Vypusk 5*. [*Assassin bugs. Fauna of Ukraine. Volume 21. Hemiptera. Part 5*]. Naukova Dumka, Kiiv, 245 pp. (in Russian).
PUTSHKOV P. V. & MOULET P. 2010: *Hémiptères Reduviidae d'Europe occidentale. Faune de France et régions limitrophes. Volume 92*. Fédération Française des Sociétés de Sciences Naturelles, Paris, 668 pp. + 24 pls.
PUTSHKOV P. V. & PUTSHKOV V. G. 1996: Family Reduviidae Latreille, 1807 – assassin-bugs. Pp. 148–265. In: AUKEMA B. & RIEGER C. (eds): *Catalogue of the Heteroptera of the Palaearctic Region. Volume 2. Cimicomorpha I*. The Netherlands Entomological Society, Amsterdam, xiv + 361 pp.
RABITSCH W. 2001: Notizen zur Wanzenfauna Österreichs (Insecta, Heteroptera). *Linzer Biologische Beiträge* **33 (1)**: 83–86.
RABITSCH W. 2014: Erstnachweise von Nagusta goedelii (Kolenati, 1857) (Heteroptera: Reduviidae) in Wien und Niederösterreich. *Beiträge zur Entomofaunistik* **14**: 177–179.
RAHIMI M., MODARRES AWAL M. & MEHNEH A. H. 2010: Introduction to assassin bugs (Het.: Reduviidae) in Mashhad region (Khorasan Razavi province) and their distribution. *Munis Entomology & Zoology* **5 (Supplementum)**: 945–948.
RAKHSHANI H., EBADI R., HATAMI B., RAKHSHANI E. & GHARALI B. 2010: A survey of alfalfa aphids and their natural enemies in Isfahan, Iran, and the effect of alfalfa strip-harvesting on their populations. *Journal of Entomological Society of Iran* **30 (1)**: 13–28.
REUTER O. M. 1892: Griechische Heteroptera gesammelt von E. v. Oertzen und J. Emge. *Berliner Entomologische Zeitschrift* **36 (1)**: 17–34.
ROSHKO G. M. 1956: O raspredelenii nastoyashchikh poluzhestkokrylykh v nekotorykh ekotopakh Zakarpatskoy oblasti. [About distribution of recent true bugs in several ecotopes of the Zakarpattia region]. *Nauchnye Zapiski* **21**: 145–153 (in Russian).
ROSHKO G. M. 1959a: Ekologo-faunisticheskiy obzor nekotorykh khishchnykh grupp Hemiptera Zakarpatskoy oblasti URSR. [An ecologic-faunistic overview of several living groups of Hemiptera of the Zakarpattia region of UkSSR (= Ukrainian SSR)]. *Doklady i Soobshcheniya, Seriya Biologicheskaya* **3**: 39–42 (in Russian).
ROSHKO G. M. 1959b: Nekotorye itogi izucheniya nastoyashchikh poluzhestkokrylykh Zakarpat'ya. [Some results of the research on Heteroptera of Zakarpattia]. In: Fauna i zhivotnyy mir Sovetskikh Karpat. [Fauna and animal world of the Soviet Carpathians]. *Nauchnye Zapiski* **40**: 161–171 (in Russian).
ROUBAL J. 1959: Druhý príspevok k zoznamu slovenských Heteropter. [The second contribution to the list of Slovak Heteroptera]. *Biológia* (Bratislava) **14**: 372–374 (in Slovak).
SCHNEIDER E. 1973: Catalogul heteropterelor din colecţiile Muzeului de Istorie Naturală din Sibiu (partea a 2-a). [Catalogue of Heteroptera in the collections of Natural History Museum in Sibiu (part 2)]. *Studii şi Comunicări "Muzeul Brukenthal"* (Sibiu) **18**: 139–182 (in Romanian).
SIMOV N., LANGOUROV M., GROZEVA S. & GRADINAROV D. 2012: New and interesting records of alien and native true bugs (Hemiptera: Heteroptera) from Bulgaria. *Acta Zoologica Bulgarica* **64 (3)**: 241–251.
SIMOV N., GRADINAROV D. & DAVRANOGLOU L.-R. 2017: Three new assassin bug records (Hemiptera: Heteroptera: Reduviidae) for the Balkan Peninsula. *Ecologica Montenegrina* **13**: 25–29.
ŞİMŞEK A. & BOLU H. 2016: Diyarbakır ili Antep fıstığı (Pistacia vera L.) alanlarındaki yararlı böcek faunasının belirlenmesi. (Determination of the beneficial insect fauna in pistachio (Pistacia vera L.) areas in Diyarbakır province). *Bitki Koruma Bülteni* **2016**: 267–282 (in Turkish, with English subtitle and abstract).
STEHLÍK J. L. 1958: Zajímavé nálezy Heteropter na Moravě a na Slovensku III. Interesting founds of Heteroptera in Moravia and Slovakia III. *Acta Musei Moraviae, Scientiae Naturales* **43**: 137–144 (in Czech).
STEHLÍK J. L. & VAVŘÍNOVÁ I. 1998: Results of the investigations on Heteroptera in Slovakia made by the Moravian Museum (Reduviidae, Phymatidae, Nabidae: Prostemmatinae). *Acta Musei Moraviae, Scientiae Biologicae* **82** (1997): 109–126.
ŠTEPANOVIČOVÁ O. & BIANCHI Z. 2001: Červený (ekosozologický) zoznam bzdôch (Heteroptera) Slovenska. [Red (ecosozological) list of Heteroptera of Slovakia]. Pp. 105–106. In: BALÁŽ D., MARHOLD K. & URBAN P. (eds): Červený zoznam rastlín a živočíchov Slovenska. [Red list of plants and animals of Slovakia]. *Ochrana Prírody* **20 (Supplement)**: 1–160 (in Slovak).
TAKÁCS A. 2008: Zilahi Kiss Endre – entomológusról. [Endre Kiss from Zilah – about an entomologist]. In: Parókia Portál (2008): Dalbimbó Egyesület. [Dalbimbó Association]. Online: https://honlap.parokia.hu/lap/dalbimbo-egyesulet/cikk/mutat/zilahi-kiss-endre/ (accessed 17 November 2019).
WACHMANN E., MELBER A. & DECKERT J. 2006: *Wanzen. Band 1. Dipsocoromorpha. Nepomorpha. Gerromorpha. Leptopodomorpha. Cimicomorpha (Teil 1). Die Tierwelt Deutschlands und der angrenzenden Meeresteile nach ihren Merkmalen und nach ihrer Lebensweise. 77. Teil*. Goecke & Evers, Keltern, 264 pp.

WAGNER E. 1967: *Die Tierwelt Deutschlands und der angrenzenden Meeresteile. 55. Teil. Wanzen oder Heteroptera. II. Cimicomorpha.* VEB Gustav Fischer Verlag, Jena, iii + 179 pp.
WIELAND F., EHLERS H. J. & SCHNEEBERG K. 2021: Erstnachweis der Raubwanze Nagusta goedelii (Kolenati, 1857) (Heteroptera: Reduviidae) für Rheinland-Pfalz. *Pollichia-Kurier* **37 (1)**: 23–25.
YILDIRIM E., MOULET P., KÜLEKÇI G. & BULAK Y. 2010: Contribution to the knowledge of Reduviidae (Hemiptera) fauna of Turkey. *Linzer Biologische Beiträge* **42 (1)**: 825–831.
YILDIRIM E., YAZICI G., KUL R. & MOULET P. 2013: Contribution to the knowledge of the Anthocoridae, Lyctocoridae, Nabidae, Reduviidae and Tingidae (Hemiptera, Heteroptera) fauna of Turkey. *Journal of the Entomological Research Society* **15 (3)**: 53–66.

SÚHRN

Zákernica stromová (*Nagusta goedelii* (Kolenati, 1857)) je dravý druh bzdochy vyskytujúci sa predovšetkým na stromoch, vzácnejšie aj na kroch, bez preferencie konkrétneho druhu dreviny. Preferované spektrum koristi je málo známe. Dosiaľ bola pozorovaná predácia na niektorých druhoch svrčkov, dvojkrídlovcov, vošiek, mér a červcov, na larvách širokopásych blanokrídlovcov, húseniciach drobných motýľov a na cikádkach z čeľade Flatidae. V tomto príspevku na základe fotografie dokladujeme pozorovanie predácie aj na pošvatkách. U zákernice je často prítomný taktiež kanibalizmus. Jedná sa o pontomediteránny druh rozšírený od Panónskej nížiny (Karpatskej kotliny) až do strednej Ázie a Iránu. V poslednom desaťročí boli v Európe zaznamenané viaceré nálezy druhu aj stovky kilometrov mimo jeho pôvodný areál, ktoré môžu byť výsledkom expanzie a/alebo introdukcie.

V tomto príspevku prinášame prehľad doteraz známeho rozšírenia zákernice stromovej na Slovensku a v Rumunsku, niekoľko doplňujúcich nálezov druhu z Maďarska a Grécka (vrátane ostrovov Kréta, Rodos a Samos), a prvé známe nálezy druhu pre fauny Jordánska a Sýrie.

Na území Slovenska bol druh dosiaľ známy iba z oblasti pohoria Burda (v minulosti známeho aj ako Kováčovské kopce). Taktiež nie sú známe staršie nálezy než zo začiatku 50. rokov 20. storočia. V príspevku prezentujeme jednak potvrdenie prítomnosti druhu v pohorí Burda z lokality v blízkosti Kamenice nad Hronom a jednak deväť recentných fotografických záznamov o prítomnosti druhu na troch nových lokalitách, konkrétne na dvoch miestach priamo v intraviláne mesta Bratislava (časť z týcho fotografií je na obr. 1–5 a obr. 6) a v mestách Nitra (obr. 7) a Piešťany (obr. 8). Nálezy zákernice stromovej z Bratislavy, Nitry a Piešťan môžu byť s najväčšou pravdepobnosťou výsledkom expanzie druhu nakoľko najbližšia iná známa lokalita leží taktiež na Slovensku (spomenuté pohorie Burda) a zároveň je známe veľké množstvo nálezov (väčšina dosiaľ nepublikovaných) z Maďarska, kde najstaršie publikované nálezy pochádzajú už z 19. storočia. Ako tretí zdroj možnej expanzie druhu, konkrétne do Bratislavy, prichádza v úvahu aj susedné Rakúsko, kde síce najstarší doložený nález je až z roku 1999, ale v poslednom desaťročí tam druh silno expandoval najmä v oblasti Štajerska a našiel sa dokonca aj priamo vo Viedni a jej okolí. Prítomnosť alebo náhodné nálezy druhu v intravilánoch miest v poslednom desaťročí nie sú v rámci Európy ničím neobvyklým; druh bol objavený napr. v Štajerskom Hradci, Viedni, Sofii a pod.; existuje aj nález z Prahy, kde sa však tento druh neetabloval. Druh totiž často využíva ľudské príbytky na zimovanie, a to najmä mimo svoj pôvodný areál. Možnosť nálezu zákernice stromovej aj na ďalších lokalitách v rámci Slovenska nemožno vylúčiť; vysoko pravdepodobný by mohol byť napr. na juhu stredného Slovenska, pretože najbližšia známa lokalita k tejto oblasti leží len 5 km od štátnej hranice v meste

Salgótarján v susednom Maďarsku. Zákernica stromová bola zaradená na Červený zoznam bzdôch Slovenska ako kriticky ohrozená (viď Štepanovičová & Bianchi 2001) z dôvodu jej výskytu, známeho dovtedy len z niekoľkých lokalít v pohorí Burda. Avšak vzhľadom na súčasné nálezy potvrdzujúce jej šírenie (vo vzácnych prípadoch možno aj introdukciu), ako aj súčasný trend jej šírenia do nových oblastí, miest či krajín, navrhujeme vyradenie druhu z prípadného červeného zoznamu bzdôch Slovenska pripravovaného v budúcnosti.

V Rumunsku je zákernica stromová známa hneď z niekoľkých regiónov (Transylvánia, Banát, Moldavsko, Krišana, Munténia a Oltensko), avšak len s malým počtom lokalít. Najstaršie známe nálezy druhu sú uvádzané už z konca 19. storočia (lokality Zălau a Ocna Dejului v Transylvánii, a lokalita Orşova v Banáte). Posledná doteraz publikovaná lokalita je uvádzaná z roku 1958. Z krajiny uvádzame recentné nálezy druhu na siedmych lokalitách (z toho šesť nových) z rokov 2012–2019 (obr. 9–13), ktoré predstavujú potvrdenie prítomnosti druhu v Rumunsku po 54 rokoch. V Rumunsku síce zatiaľ nebola potvrdená expanzia druhu priamo do intravilánov miest, avšak druh bol už zaznamenaný v lese tesne na okraji mesta (Temešvár) či 30 km severne od Bukurešti. Vzhľadom na situáciu v iných európskych krajinách (napr. Sofia v susednom Bulharsku) je expanzia druhu aj priamo do intravilánov väčších miest v Rumunsku veľmi pravdepodobná. Prehľad všetkých uvedených lokalít z území Slovenska a Rumunska je vyobrazený aj na mape (obr. 14).

V Grécku bola zákernica stromová známa síce už od konca 19. storočia, avšak všetky dostupné publikované údaje pochádzajú len z dvoch oblastí – polostrova Atika a ostrova Kréta. Okrem niekoľkých recentných nálezov z týchto dvoch oblastí uvádzame aj vôbec prvé známe údaje o výskyte druhu na ostrovoch Lesbos, Rodos a Samos, ktoré sú však v pomerne tesnej blízkosti pobreží Turecka, kde je druh známy z veľkého množstva údajov a lokalít. Prítomnosť druhu aj na ďalších ostrovoch i v ďalších častiach Grécka je preto veľmi pravdepodobná.

Zákernica stromová bola prvý raz zaznamenaná v dvoch krajinách Blízkeho Východu – Jordánsku a Sýrii. Zatiaľ čo v prípade Jordánska sa jedná o relatívne recentný údaj (rok 2007), údaje zo Sýrie sú o niečo staršie (roky 1953 a 1971) a prítomnosť druhu v Sýrii si preto do budúcna bude vyžadovať potvrdenie recentným nálezom. Avšak je veľmi pravdepodobná, nakoľko sa druh vyskytuje v niekoľkých susedných krajinách (napr. Turecko, v ktorom sú známe aj nálezy z posledných rokov).

Kniha Planeta Praha od odborných poradců stejnojmenného filmu přináší bohatě ilustrovanou formou vše, co se do filmu nevešlo, a ještě mnohem víc.

K dostání v e-shopu www.jakost.net a knihkupectvích.

jakost

