UDK 630* 453

Prethodno priopćenje – Preliminary communication
Šumarski list, 11–12 (2017): 577–582

Leptoglossus occidentalis HEIDEMANN, 1910 (Heteroptera: Coreidae) IN BOSNIA AND HERZEGOVINA – CURRENT DISTRIBUTION AND THE EARLIEST DOCUMENTED RECORDS

Leptoglossus occidentalis HEIDEMANN, 1910 (Heteroptera: Coreidae) U BOSNI I HERCEGOVINI – RECENTNA RASPROSTRANJENOST I PRVI DOKUMENTIRANI NALAZI

Dejan KULIJER[1], Mirza DAUTBAŠIĆ[2], Boris HRAŠOVEC[3], Adi VESNIĆ[4], Šemso ŠARIĆ[5], Osman MUJEZINOVIĆ[2]

Summary

Leptoglossus occidentalis Heidemann, 1910 is an invasive bug species native to the western part of North America and one of 16 alien Heteroptera species in Europe. After it was first found in Italy in 1999, the species spread fast across the continent, including the Balkan Peninsula. Our study confirms the species presence in Bosnia and Herzegovina and gives data on its distribution, including the earliest records for the country. Up untill now the species is found at nine different locations in the period from 2008 to 2016. The record from early spring 2008 suggests that the species was already present in Bosnia and Herzegovina in 2007 or even earlier. Most records pertain to overwintering adults. For the first time the species is reported from Bosnian pine (*Pinus heldreichii* H. Christ). The species is also reported from Klek village in Dubrovnik region, south Croatia.

KEY WORDS: alien species, Balkan Peninsula, conifers, Hemiptera, insect, invasive species, *Pinus heldreichii*, true bugs, western conifer seed bug

INTRODUCTION
UVOD

True bugs (Heteroptera) are one of the most diverse groups of insects with approximately 40.000 described species (Schuh and Slater 1995), out of which about 3.000 occur in Europe (Aukema and Rieger 1995–2006). Protić and Stanković (2015) estimated that the number of Heteroptera species currently known to occur in Bosnia and Herzegovina is roughly 750.

Leptoglossus occidentalis Heidemann, 1910, known also as western conifer seed bug, is an invasive bug species native to the area of North America west of Rocky Mts., from British Columbia to North Mexico (McPherson et al. 1990). It belongs to the family Coreidae, commonly called leaf-foo-

[1] Dejan Kulijer, dipl. biolog, National Museum of Bosnia and Herzegovina, Zmaja od Bosne 3, 71000 Sarajevo, Bosnia and Herzegovina. E-mail: dejan.kulijer@gmail.com
[2] Prof. dr. sc. Mirza Dautbašić, Doc. dr. sc. Osman Mujezinović, Faculty of Forestry, University of Sarajevo, Zagrebačka 20, 71000 Sarajevo, Bosnia and Herzegovina. E-mail: mirzad@bih.net.ba, osmansfs@yahoo.com
[3] Prof. dr. sc. Boris Hrašovec, Department of Forest Protection and Wildlife Management, University of Zagreb, Faculty of Forestry, Svetošimunska 25, 10002 Zagreb, Croatia. E-mail: hrasovec@sumfak.hr
[4] Doc. dr. sc. Adi Vesnić, Department of Biology, Faculty of Science, University of Sarajevo, Zmaja od Bosne 33-35, 71000 Sarajevo, Bosnia and Herzegovina. E-mail: vesnicadi@gmail.com
[5] Šemso Šarić, šum. teh. Public Forest Enerprise of Zenica – Doboj Canton, Alije Izetbegovića 25, 72220 Zavidovići, Bosnia and Herzegovina. E-mail: semsosumar@gmail.com

ted bugs due to the presence of a flattened, leaf-like expansion on the hind legs. It is up to 2 cm long and conspicuous in terms of coloration, characterized with reddish-brown body, transverse white zigzag line across the centre of its wings and leaf-like expansions of the hind tibiae (Fent and Kment 2011).

L. occidentalis feeds on developing seeds in cones of different conifer species, with a preference for Pinaceae. It can cause significant damage on seeds by reducing seed fertility (Fent and Kment 2011). In its native range, *L. occidentalis* is classified as pest in conifer seed orchards (Mitchell 2000) that has a direct impact in reduction in the yield and quality of conifer seed crops (Connely and Schowalter 1991; Bates 2000). As the weather cools in autumn, *L. occidentalis* searches for sheltered places suitable for hibernation and often hides in human dwellings. In some cases they can aggregate in large numbers and become nuisance to people in their homes (Wheeler 1992).

Western conifer seed bug is one of 16 alien Heteroptera species introduced in Europe, 10 of which originate from North America (Rabitsch 2010). This extremely invasive insect species was introduced to Europe in 1999. After first discovery in northern Italy, near Vicenza (Taylor et al. 2001) the species spread fast throughout the country, and from Italy to neighboring countries: e.g. Switzerland in 2002 (Colombi, Brunetti, 2002), Slovenia in 2003 (Gogala 2003), Croatia in 2004 (Tescari 2004). Few years later it was recorded at several other, quite distant localities, like Barcelona-Spain in 2003 (Ribes and Escola 2005), Le Havre-France in 2006 (Dusoulier et al. 2007), Weymouth-UK in 2007 (Malumphy and Reid 2007) and Ostend-Belgium in 2007 (Aukema and Libeer 2007). These discoveries are probably result of separate introductions, possibly via sea transport from USA, as all these observations were made in close proximity of local ports (in Le Havre insects were discovered in the shipment of oak from the USA) (Dusoulier et al. 2007). Within only 15 years the western conifer seed bug practically conquered the whole Europe. By 2013 it was reported as far as Portugal, England, Norway, Turkey, Ukraine and Russia (Fent and Kment 2011).

In short time *L. occidentalis* also has spread all over Balkan Peninsula, reaching European part of Turkey in 2009 (Fent and Kment 2011). It probably spread to the western Balkans from Italy, via Slovenia (Jurc and Jurc 2005) or Croatia. In Croatia the species was first recorded in 2004 (Tescari 2004) and spread fast, particularly in the southern Mediterranean

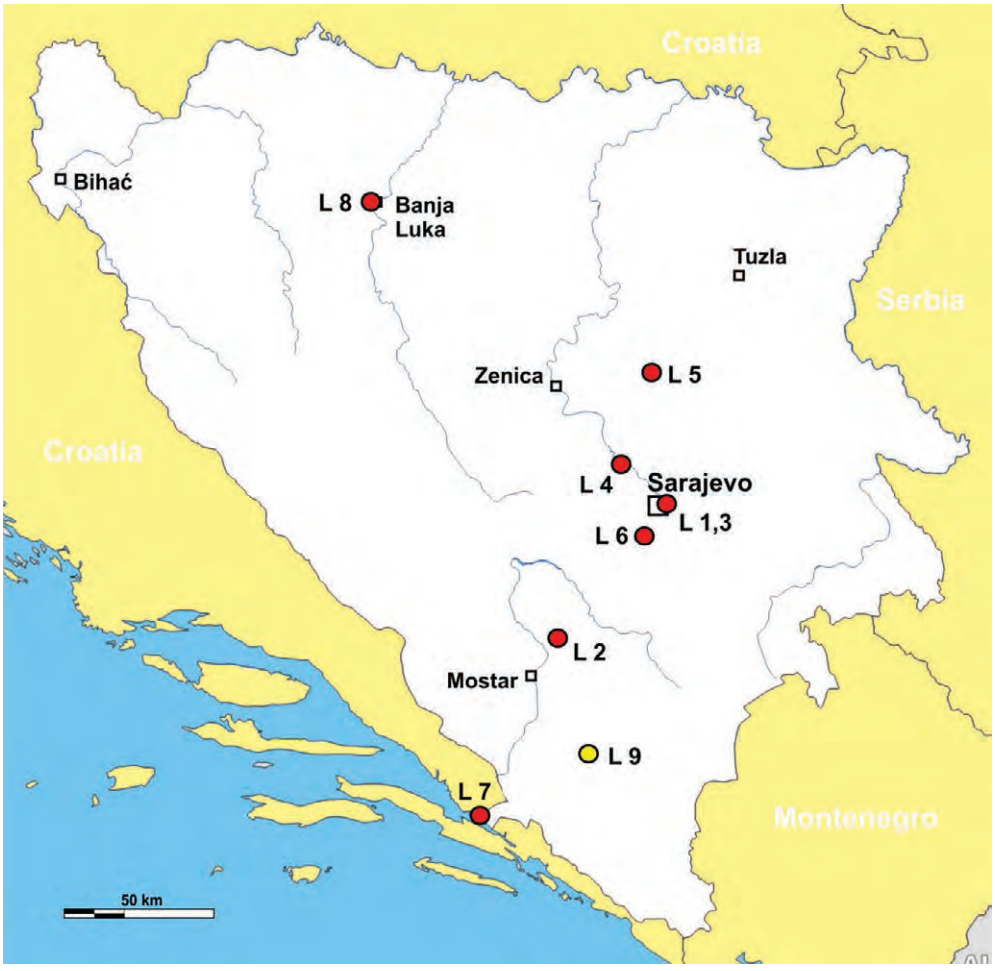

Figure 1 – The distribution of *Leptoglossus occidentalis* in Bosnia and Herzegovina. Red dots represent new localities, yellow dot denotes the location of one male *L. occidentalis* recorded in 2014 and published by Protić and Stanković (2015).

Slika 1. – Nalazi *Leptoglossus occidentalis* u Bosni i Hercegovini. Crvene točke označavaju do sada neobjavljene, nove lokalitete nalaza, žuta točka označava publicirani nalaz jednog mužjaka iz 2014. godine (Protić i Stanković 2015).

region of the country (Kment and Baňař 2008; Hrašovec 2013; Matošević and Pajač Živković 2013; Pajač Živković et al. 2013). Soon it was also discovered in other countries: Serbia in 2006 (Protić 2008); Bulgaria (Simov 2008), Bosnia and Herzegovina (this paper), Montenegro (Hradil 2008) and Greece (Petrakis 2011) in 2008; and recently in 2015 in Macedonia (Kulijer 2016) and Kosovo (Kulijer and Ibrahimi 2017).

First report on the species presence in BiH was presented by Dautbašić et al. (2014). In 2015 additional record from South Herzegovina was published by Protić and Stanković (2015). In this paper we present the oldest documented finding of *L. occidentalis* in Bosnia and Herzegovina and the current knowledge on its distribution in the country.

MATERIALS AND METHODS
MATERIJAL I METODE

L. occidentalis adults were collected from eight new localities in period between 2008 and 2016 (Fig. 1). They were observed casually and collected by hand. The collected specimens were preserved in 80 % ethanol. Specimens from Zvijezda Mt., Duboštica and Igman Mt., Veliko polje, Čavle are deposited at the Faculty of Forestry, University of Sarajevo, while the specimens from National Museum, Visoko and Klek are deposited in the collections of the National Museum of Bosnia and Herzegovina in Sarajevo.

RESULTS AND DISCUSSION
REZULTATI I RASPRAVA

Material examined: **L. 1.: Sarajevo, National Museum building**, dead specimen in a window frame, N 43.854240° E 18.402890°, 532 m a.s.l., 26/IV/2008, 1 adult, leg. & det. D. Kulijer; 15/X/2015, 532 m a.s.l., 1 adult, leg. & det. D. Kulijer; **L. 2.: Ruište, Prenj Mt.**, at the edge of Bosnian pine forest, N 43.464740° E 17.926777°, 1044 m a.s.l., 14/XI/2010, 1 adult, leg. & det. D. Kulijer; **L. 3.: Sarajevo, Faculty of Science building**, dead specimen in an office, N 43.854470° E 18.395708°, 531 m a.s.l., III/2015, 1 adult, leg. & det. A. Vesnić; **L. 4.: Visoko, Monestery**, dead specimen in a window frame, N 43.992843° E 18.185500°, 419 m a.s.l., 18/VII/2013, 1 adult, leg. & det. D. Kulijer; **L. 5.: Zvijezda Mt., Duboštica**, (living specimen on leaf and caught in bottle), N 44.238056° E 18.377500°, 562 m a.s.l., 22/VIII/2013, 1 adult, leg. & det. M. Dautbašić; **L. 6.: Igman Mt., Veliko polje, Čavle**, (living specimen on stem and caught in bottle), N 43.748889° E 18.268056°, 1202 m a.s.l., 15/VIII/2016, 1 adult, leg. & det. O. Mujezinović; **L. 7.: Neum, city**, N 42.926791° E 17.614584°, 74 m a.s.l., 30/IX/2016, 1 adult, leg. & det. D. Kulijer; **L. 8.: Banja Luka, Lauš**, N 44.775735° E 17.171385°, 175 m a.s.l., 05/XI/2016, 1 adult, leg. & det. D. Kulijer;

Published records: L. 9.: Berkovići, Dobro Polje, Mt. Straževica, 28/VIII/2014, 1 adult, leg. M. Stanković, det. Lj. Protić (Protić & Stanković, 2015).

Chronologically, the first record of *L. occidentalis* in the country was one dead adult found in early spring (April 26th) 2008 in the city center of Sarajevo, in the office of Natural History department building of the National Museum of Bosnia and Herzegovina. The specimen was well preserved but seemed to be dead for some time. The fact that it was found indoors in early spring, suggest that it entered the building in autumn, probably seeking for suitable overwintering shelter. This also suggests that the species was present in BiH at least as early as 2007. To our knowledge, this is the oldest documented record of the species presence in the country. In the period between 2008 and 2016 single specimens were occasionally encountered in the buildings of the National Museum of Bosnia and Herzegovina and in the botanical garden surrounding the building, but the exact dates were not recorded.

Figure 2 – *Leptoglossus occidentalis* found on Bosnian pine (*Pinus heldreichii* H. Christ) at Ruište, Mt. Prenj (left) (Photo: D. Kulijer) and *L. occidentalis* from Duboštica, Mt. Zvijezda, (right) (Photo: Š. Šarić)
Slika 2 – *Leptoglossus occidentalis* nalaz na munjiki (*Pinus heldreichii* H. Christ) na lokaciji Ruište, u masivu Prenja (lijevo) (Foto: D. Kulijer) i *L. occidentalis* snimljen u Duboštici, u području masiva Zvijezda planine (desno) (Foto: Š. Šarić)

The second oldest record originates from Ruište, Prenj Mt. A single specimen (Fig. 2 left) was collected on November 14th 2010 within the stand of endemic Bosnian pine (*Pinus heldreichii* H. Christ). This finding site was surrounded by Bosnian pines, the tree species native to mountainous areas of the Balkans and southern Italy (Farjon 2013). Based on published data this is the first time that *L. occidentalis* is associated to this pine, this is not to big suprise as Pinaceae are known to be its preferred host tree group..

In March 2013 dead adult was found in the building of the Faculty of Science in Sarajevo, located in the Sarajevo city center, while the second observation in this year was made in August when a single specimen (Fig. 2 right) was found at Duboštica, Zvijezda Mt. within a mixed stands of European black pine (*Pinus nigra* J. F. Arnold) and Scots pine (*Pinus sylvestris* L.).

In 2016, a new observation was made near Veliko polje on Igman Mt. at the locality mostly populated by Norway spruce (*Picea abies* (L.) H. Karst.) and European silver fir (*Abies alba* Mill.) forest. On September 23, 26 and 28 single adults were also observed in Klek, small settlement on the Adriatic coast in Croatia, less than 2 km from the border with Bosnia and Herzegovina, and on September, 30 one specimen was found on the building wall in Neum city in Bosnia and Herzegovina. At the margin of the Klek settlement, Aleppo pine forest is present, as well as in Neum and its vicinity. According to available published data (Tescari, 2004; Kment & Baňař, 2008; Pajač Živković et al. 2013) the record from Klek represents the southernmost observation of the species in Croatia so far. The most recent of the findings in BiH dates from November 2016 in urban part of Banja Luka city and represents an overwintering individual that was found in one apartment building in Lauš settlement.

Both our findings plus the review of published cases of *L. occidentalis* appearance and spread in Balkan Peninsula demonstrate a significant lack of spatial data connected with the lack of collecting effort. It is therefore hard to establish exact routes and times of invasions of alien species. As a consequence, in some areas the species are discovered only after they become well established and common. The occurrence of *L. occidentalis* in BiH is probably a result of natural spread from Croatia and/or Serbia where it was documented earlier, in Croatia in 2004 (Tescari 2004) and in Serbia in 2006 (Protić 2008). In Bosnia and Herzegovina little attention is given to invasive insect species and the dicoveries are mainly accidental (e.g. Kulijer 2010). Most records of *L. occidentalis* from BiH refer to overwintering individuals, majority from Sarajevo, where most of the authors reside. These records refer to accidental discovery of adults found in or near buildings in autumn/spring. The paper from Protić and Stanković (2015) reported 77 bug species from BiH, among which eight (app. 10%) are considered new for the country. This clearly illustrates a still insufficient knowledge of the BiH fauna of Heteroptera.

In the following years target research and survey of *L. occidentalis* in the country is needed in order to determine the distribution, population status and potential damaging threat to the conifer forest ecosystems and the seed production in forestry. The monitoring program for this species should be urgently established in Bosnia and Herzegovina to estimate the potential risks of mass expansion in the country.

REFERENCES
LITERATURA

- Aukema, B., Libeer, R., 2007: Eerste waarneming van *Leptoglossus occidentalis* in België (Heteroptera: Coreidae). Bulletin van de Koninklijke Belgische Vereniging voor Entomologie, 143: 92-93.
- Aukema, B., Rieger, C., 1995–2006: Catalogue of the Heteroptera of the Palaearctic Region. Vols 1–5. Netherlands Entomological Society, Amsterdam. Vol. 1, 222 pp., Vol. 2, 361 pp., Vol. 3, 577 pp., Vol. 4, 346 pp., Vol. 5, 550 pp.
- Bates, S.L., 2000: Impact of *Leptoglossus occidentalis* (Hemiptera: Coreidae) on Douglas-fir seed production. Journal of Economic Entomology, 93: 1444–1451.
- Colombi, L., Brunetti, R., 2002: Rapporto del Servizio Fitosanitario del Cantone Ticino. Servizio Fitosanitario, Bellinzona, 36 pp.
- Connely A.E., Schowalter T.D., 1991: Seed losses to feeding by *Leptoglossus occidentalis* (Heteroptera: Coreidae) during two periods of second year cone development in Western White Pine. Journal of Economic Entomology, 84: 215–217.
- Dautbašić, M., Hrašovec, B., Mujezinović, O., 2014. New invasive species of western conifer seed bug *Leptoglossus occidentalis* (Heteroptera: Coreidae) in Bosnia and Herzegovina. 2nd Symposium of Turkey Forest Entomology and Pathology, Symposium Proceedings, Antalya, Turkey, 659 pp.
- Dusoulier, F., Lupoli, R., Aberlenc, H.-P., Streito, J.-C., 2007: L'invasion orientale de *Leptoglossus occidentalis* en France: bilan de son extension biogéographique en 2007 (Hemiptera Coreidae). L'Entomologiste, 63(6): 303–308.
- Farjon, A., 2013: *Pinus heldreichii*. The IUCN Red List of Threatened Species 2013: e.T42368A2975719. http://dx.doi.org/10.2305/IUCN.UK.2013-1.RLTS.T42368A2975719.en. Downloaded on 19 October 2016.
- Fent, M., Kment, P., 2011: First record of the invasive western conifer seed bug *Leptoglossus occidentalis* (Heteroptera: Coreidae) in Turkey. North-Western Journal of Zoology, 7(1): 72–80.
- Gapon, D.A., 2013: First records of the western conifer seed bug *Leptoglossus occidentalis* Heid. (Heteroptera, Coreidae) from Russia and Ukraine, regularities in its distribution and possibilities of its range expansion in the Palaearctic region. Entomological Review, 93(2): 174–181.
- Gogala, A., 2003: Listonožka (*Leptoglossus occidentalis*) že v Sloveniji (Heteroptera, Coreidae). Acta entomologica sloveniae, 11: 189-190.

- Hradil, K., 2008: *Leptoglossus occidentalis* (Heteroptera: Coreidae), a new alien species in Montenegro. Acta entomologica serbica, 13(1/2): 77–79.
- Hrašovec, B., 2013: *Leptoglossus occidentalis* and *Harmonia axyridis* – One North American and one Asian recently introduced species in their autumn search for a safe overwintering shelter. Šumarski list, 137(11–12): 670.
- Jurc, D., Jurc, M. 2005: Leaf footed conifer seed bug (*Leptoglossus occidentalis*, Hemiptera: Coreidae) is quickly spreading across Slovenia. Gozdarski vestnik, 63(2): 59–67.
- Kment, P., Baňař, P., 2008: Additional records of the invasive nearctic bug *Leptoglossus occidentalis* (Heteroptera: Coreidae) in Croatia. Natura Croatica, 17(2): 141–147.
- Kulijer, D., Ibrahimi, H., 2017: First report of invasive species *Leptoglossus occidentalis* (Heteroptera: Coreidae) in Kosovo, (in prep.). Acta Entomologica Slovenica, 25(1): 115–118.
- Kulijer, D., 2010: First record of invasive species *Harmonia axyridis* (Pallas, 1773) (Coleoptera: Coccinellidae) in Bosnia and Herzegovina. Acta Entomologica Serbica, 15(1): 141–143.
- Kulijer, D., 2016: *Leptoglossus occidentalis* (Heteroptera: Coreidae) and *Harmonia axyridis* (Coleoptera: Coccinellidae), two new invasive alien species for insect fauna of Macedonia. Ecologica Montenegrina, 5: 22–25.
- Malumphy, C., Reid, S., 2007: Non-native Heteroptera associated with imported plant material in England during 2006 and 2007. Het News, 10: 2–4.
- Matošević, D., Pajač Živković, I., 2013: Alien phytophagous insect and mite species on woody plants in Croatia. Šumarski list, 137(3–4): 191–205.
- McPherson, J.E., Packauskas, R.J., Taylor, J. & O´Brien, M.F., 1990: Eastern range extension of *Leptoglossus occidentalis* with a key to *Leptoglossus* species of America north of Mexico (Heteroptera: Coreidae). The Great Lakes Entomologist, 23(2): 99–104.
- Mitchell, P.L., 2000: Leaf-footed bugs (Coreidae). In: Heteroptera of Economic Importance. Ed. by Schaeffer, C.W. and A. R. Panizzi. CRC Press, Boca Raton, Florida. pp. 337–403.
- Pajač Živković, I., Barić, B., Matošević, D., 2013. Strane fitofagne vrste stjenica (Heteroptera) u Hrvatskoj. Entomologia Croatica, 17(1–4): 79–88.
- Petrakis, P.V., 2011: First record of *Leptoglossus occidentalis* (Heteroptera: Coreidae) in Greece. Entomologia Hellenica, 20: 83–93.
- Protić, Lj., Stanković, M., 2015: New research on the fauna of Heteroptera in Bosnia-Herzegovina. Acta Entomologica Serbica, 20: 13-28.
- Protić, Lj., 2008: *Leptoglossus occidentalis* Heidemann (Heteroptera: Coreidae) in Serbia. Acta Entomologica Serbica, 13, 81–84.
- Rabitsch, W., 2008: Alien true bugs of Europe (Insecta: Hemiptera: Heteroptera). Zootaxa, 1827: 1–44.
- Rabitsch, W., 2010: True Bugs (Hemiptera, Heteroptera). Chapter 9.1. In: Roques A et al. (Eds) Alien terrestrial arthropods of Europe. BioRisk 4(1): 407–403. doi: 10.3897/biorisk.4.44
- Ribes J., Escola O., 2005: *Leptoglossus occidentalis* Heidemann, 1910, hemípter neàrctic trobat a Catalunya (Hemiptera: Heteroptera: Coreidae). Resums Sessio Conjunta d'Entomologia, ICHN-SCL, 13: 47–50.
- Schuh, R.T., Slater, J.A., 1995: True bugs of the World (Hemiptera: Heteroptera). Cornell Univ. Press, 336 pp.
- Simov, N., 2008: Western conifer seed bug *Leptoglossus occidentalis* Heidemann, 1910 (Heteroptera: Coreidae) already in Bulgaria. Historia Naturalis Bulgarica, 19, 179–180.
- Taylor, S.J., Tescari, G., Villa, M., 2001: A Nearctic pest of Pinaceae accidentally introduced into Europe: *Leptoglossus occidentalis* (Heteroptera: Coreidae) in northern Italy. Entomological News, 112: 101–103.
- Tescari, G., 2004: First record of *Leptoglossus occidentalis* (Heteroptera: Coreidae) in Croatia. Entomologia Croatica, 8(1–2): 73–75.
- Wheeler, A.G.Jr., 1992: *Leptoglossus occidentalis*. A new conifer pest and household nuisance in Pennsylvania. Regulatory Horticulture, 18: 29–30.

Sažetak

Sjeverno-američka stjenica, *Leptoglossus occidentalis* Heidemann, 1910, jedna je od 16 neeuropskih vrsta stjenica do danas unešenih u Europu, od kojih 10 potječe upravo iz Sjeverne Amerike (Rabitsch, 2010). Zbog svojeg prirodnog područja pridolaska u Sjevernoj Americi, područja Pacifičke obale omeđena lancem Stjenjaka na zapadu, Amerikanci su je nazvali „zapadnom stjenicom sjemena četinjača" (*western conifer seed bug*), čime su, uz područja pridolaska, naznačili i njenu štetnost za sjeme drvenastih vrsta iz porodice Pinaceae. Zbog osobite morfološke značajke, spljoštenog proširenja goljenice stražnjih nogu, također je poznata i kao „stjenica listolikog stopala" (*leaf-footed bug*). Slovenski autori iskoristili su ovaj naziv kao predložak i dodali mu češer kao objekt prehrane, pa su je nazvali „storževa listonoška" (Jurc & Jurc, 2005). U svakom slučaju, ova se stjenica nakon dolaska na europski kontinent u Italiji 1999. godine (Taylor et al. 2001.) vrlo brzo širila Europom, pa je u nepunih 10 godina prodrla u velik broj europskih zemalja, od Velike Britanije na zapadu, do Ukrajine i Rusije na istoku, od Norveške na sjeveru do Turske na jugu (Malumphy & Reid, 2007; Fent & Kment, 2011; Gapon, 2013). Među zemljama juga Europe, kojima se proširio ovaj novi invazivni štetnik, našla se i Bosna i Hercegovina. U radu su prikazani svi provjereni i dokumentirani nalazi *L. occidentalis* na području BiH, od prvog pronalaska i do sada neobjavljenog nalaza iz travnja 2008. godine (zgrada Zemaljskog muzeja BiH u Sarajevu), pa do najsvježijih nalaza ljeti i ujesen 2016. godine (Igman, Neum, Banja Luka). Recentno područje na kojemu je evidentirana ova nova invazivna stjenica u BiH, pregledno je prikazano prostorno označenim podacima nalaza na slici 1. Iako očekivan, značajan je i prvi nalaz ove nove invazivne stjenice u

reliktnim sastojinama bora munjike (*Pinus heldreichii* H. Christ) u masivu Prenja u studenom 2010. godine. Uvid u kronološki slijed i prostornu distribuciju nalaza *L. occidentalis* u Bosni i Hercegovini od 2008. do 2016. godine ukazuju na razmjerno brzo širenje ovog štetnika i vjerojatno lokalno povećanje populacije, što je zasigurno rezultiralo i njenom lakšom detekcijom. Nalaze se ipak treba shvatiti u kontekstu u kojem su nastali, a to su u velikoj većini bili neciljani, slučajni nalazi entomologa tijekom nekih drugih terenskih istraživanja. Radi uočljivosti i krupnoće same stjenice i činjenice da se ujesen zavlači u ljudske nastambe, nije rijetkost da se često i građanstvo pojavljuje kao „dojavljivač" novih invazivnih vrsta. Važno je stoga ukazati na nepostojanje sustavnog praćenja pojave i širenja *L. occidentalis* na ovim prostorima. Uspostava ciljanog monitoringa i praćenja pojave, a posebice potencijalnog štetnog utjecaja *L. occidentalis* u borovim sastojinama i sjemenskim objektima u Bosni i Hercegovini, nužan su preduvjet potrajnog gospodarenja šumskim bogatstvom i kvalitetniju organizaciju i učinkovitost sustava zaštite šuma od ovog novog invazivnog štetnika.

KLJUČNE RIJEČI: strane vrste, Balkanski poluotok, četinjače, Hemiptera, kukac, invazivni štetni organizam, *Pinus heldreichii,* stjenice, stjenica listolikog stopala