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FIRST RECORD OF INVASIVE PEST *HALYOMORPHA HALYS* (STÅL, 1855) (HEMIPTERA, PENTATOMIDAE) IN KOSOVO

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Halyomorpha halys is a highly invasive pentatomid native to East Asia, currently expanding throughout Europe, North America and parts of South America. Its successful range expansion is linked to broad climatic tolerance, polyphagous feeding habits, and high ecological plasticity. In November 2025, a single individual of *H. halys* (Stål, 1855) was recorded in Klina, Kosovo, marking the first confirmed occurrence of this species in the country. The specimen was collected by hand in an abandoned house near the Drini i Bardhë River and preserved in 90% ethanol. Identification was carried out under laboratory conditions using standard dichotomous keys.

This new faunistic record contributes to the knowledge of the species' distribution within the Balkans and raises questions regarding its establishment potential and future spread in the region. Further systematic surveys are required to evaluate environmental drivers facilitating colonization and to assess possible ecological and agricultural impacts within Kosovo.

Keywords: pest expansion, entomological survey, species distribution, Balkan Peninsula

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Halyomorpha halys je visoko invazivna vrsta stjenica porijeklom iz istočne Azije, koja se trenutno širi po Europi, Sjevernoj Americi i dijelovima Južne Amerike. Njeno uspješno širenje povezano je sa širokom klimatskom tolerancijom, polifagnim prehrambenim navikama i visokom ekološkom plastičnošću. U studenom 2025. godine jedna jedinka *H. halys* (Stål, 1855) zabilježena je u Klini na Kosovu, što označava prvu potvrđenu pojavu ove vrste u zemlji. Primjerak je prikupljen ručno u napuštenoj kući u blizini rijeke Bijeli Drim i konzerviran u 90%-tnom etanolu. Identifikacija je provedena u laboratorijskim uvjetima korištenjem standardnih dihotomnih ključeva.

Ovaj novi faunistički nalaz doprinosi poznavanju rasprostranjenosti vrste na Balkanu i postavlja pitanja o njezinom potencijalu naseljavanja i budućem širenju u regiji. Potrebna su daljnja sustavna istraživanja kako bi se procijenili okolišni pokretači koji olakšavaju kolonizaciju te procijenili mogući ekološki i poljoprivredni utjecaji na Kosovu.

Ključne riječi: širenje štetnika, entomološko istraživanje, rasprostranjenost vrsta, Balkanski poluotok

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INTRODUCTION

Halyomorpha halys (Hemiptera: Pentatomidae) or the brown marmorated stink bug is a stink bug of economic importance, native to East Asia and an invasive pest species in Europe, North America and South America (HOEBEKE & CARTER, 2003; LESKEY *et al*., 2012; LEE *et al.*, 2013; HAYE *et al*., 2015; ZHU *et al.,* 2016; HAMILTON *et al*., 2018). Due to its polyphagous nature, *H. halys* can feed on virtually all primary fruit and vegetable crops in its invaded areas (KUHAR *et al.,* 2012; HAYE *et al.,* 2015). For example, in northern Italy, it has become a key pest in fruit orchards (MAISTRELLO *et al*., 2017; BARISELLI *et al*., 2016), with an estimated economic impact of €588 million on the production of pear, apple, peach, and kiwi in 2019 (CSO ITALY, 2020). *Halyomorpha halys* causes damage through its feeding activity. It inserts its stylets into the plant and injects saliva, pre-digesting the plant tissue before feeding on it (RICE *et al.,* 2014). This feeding behaviour causes scarring, deformities, pitting, and discolouration of the product, rendering it unmarketable or even inedible (RICE *et al.,* 2014).

The first European records of *Halyomorpha halys* were documented in Liechtenstein (ARNOLD, 2009) and Switzerland (WERMELINGER *et al*., 2008; HAYE *et al*., 2014). In the following years, the natural spread of *H. halys* occurred over short distances, but through various sources such as aeroplanes, cargo, plant trade, and vehicles, the pest has continued to spread over long distances throughout Europe (RABITSCH & FRIEBE, 2015), and new detections have been reported regularly in European countries. Greece and Belgium were first in 2011 (MILONAS *et al*., 2014; CLAEREBOUT *et al*., 2018), and then Germany, France, and Italy in 2012 (HECKMANN, 2012; CALLOT & BRUA, 2013; MAISTRELLO *et al*., 2014, 2018). In 2013, the pest was detected in Hungary (VÉTEK *et al*., 2014). In 2014, the pest was detected in Romania (MACAVEI *et al*., 2015) and Russia (MITYUSHEV, 2016), and in 2015, it was detected in Abkhazia (MUSOLIN *et al*., 2018). At the same time, the first records were confirmed in Austria (RABITSCH & FRIEBE, 2015), and Serbia (ŠEAT, 2015). This was followed in the next few years by Spain (DIOLI *et al*., 2016), Bulgaria (SIMOV, 2016), Slovakia (HEMALA & KMENT, 2017), and Georgia (GAPON, 2016) in 2016, and Croatia (ŠAPINA & JELASKA 2018), Slovenia (ROT *et al*., 2018), and Turkey (GÜNCAN & GÜMÜŞ, 2019) in 2017. In the same year, 2017, the pest was detected on the border between Eastern Europe and Western Asia in Azerbaijan (NURIYEVA, 2018). In 2017, it was also detected in Ukraine (UZHEVSKAYA 2017), Albania (CLAEREBOUT *et al*., 2018), Bosnia and Herzegovina (ZOVKO *et al*., 2019), the Czech Republic (KMENT & BŘEZÍKOVÁ, 2018), Malta (TASSINI & MIFSUD, 2019), Poland (CLAEREBOUT *et al*., 2018; BURY, 2021), and Portugal (GROSSO-SILVA *et al*., 2020), while in 2019 it was found in North Macedonia (KONJEVIĆ, 2020), and Moldova (DERJANSCHI & CHIMIS, 2019).

The issue of invasive species is increasing worldwide. Kosovo, a small landlocked country in the Western Balkans with an area comparable to Montenegro, still has limited knowledge of its native biodiversity and is increasingly facing biological invasions. Recent research has documented 14 alien animal species in Kosovo: the fishes *Oncorhynchus mykiss*, *Carassius gibelio*, *Pseudorasbora parva*, *Ctenopharyngodon idella*, and *Lepomis gibbosus* (GASHI *et al*., 2015; MAXHUNI & IBRAHIMI, 2016); the insects *Perillus bioculatus*, *Leptoglossus occidentalis*, *Cydalima perspectalis*, *Harmonia axyridis*, and *Corythucha arcuata* (KULIJER & IBRAHIMI, 2017; GECI & IBRAHIMI, 2018; GECI *et al*., 2020; IBRAHIMI *et al*., 2022; GECI *et al*., 2024a); and the spiders *Pholcus phalangioides*, *Parasteatoda tepidariorum*, *Ostearius melanopygius*, and *Spermophora senoculata* (GECI & NAUMOVA, 2021; GECI *et al*., 2022; GECI *et al*., 2024b). With the present record of *H. halys*, the number of known alien animal species in Kosovo increases to 15.

MATERIAL AND METHODS

Study area and specimen collection

A specimen of *Halyomorpha halys* was collected in November 2025 from an abandoned house located near the Drini i Bardhë River in Klina, western Kosovo (42°37'13.6"N, 20°33'50.3"E; 392 m a.s.l.) (Fig. 1). The area is characterized by a mix of peri-urban structures and riparian vegetation, which may provide suitable microhabitats for overwintering pentatomids. The specimen was collected by hand and preserved in 90% ethanol. The material is currently deposited in the Zoology Laboratory, Department of Applied Ecology, Faculty of Agribusiness at Haxhi Zeka University, Peja.

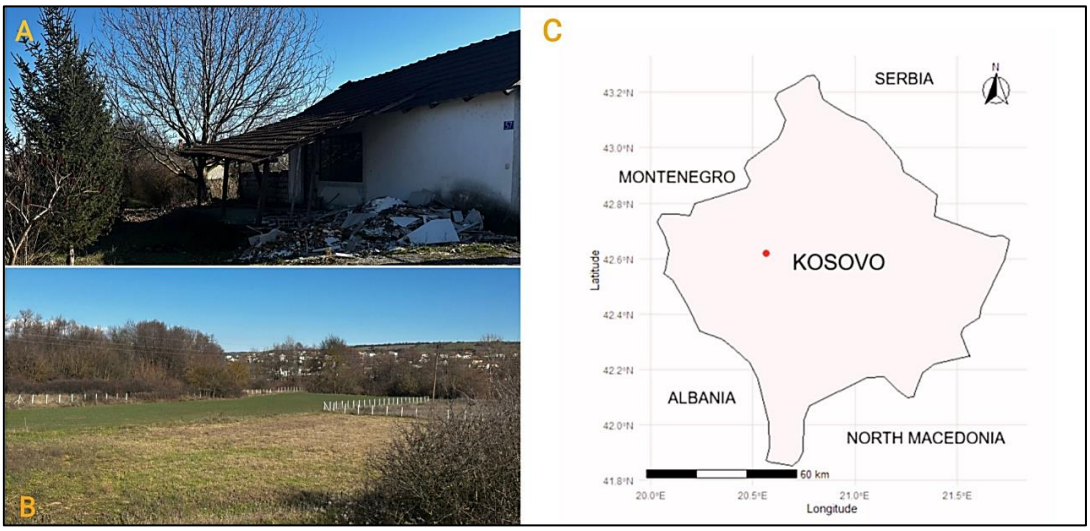


Fig. 1. (A) Site where the species was recorded; (B) Surrounding habitat characteristics; (C) Map of Kosovo showing the sampling locality.

Laboratory procedures and identification

Identification of the specimen was conducted under laboratory conditions using a stereomicroscope. Diagnostic morphological traits, including coloration patterns, antennal banding, pronotal and scutellar morphology, and general body shape, were examined and compared against standard dichotomous keys for the species. The identification was further confirmed following CLAEREBOUT *et al*. (2018).



Fig. 2. Dorsal habitus of *Halyomorpha halys* (adult) collected in Kosovo.

RESULTS

A specimen of *Halyomorpha halys* was collected in an abandoned house near the Drini i Bardhë River in Klina, western Kosovo (42°37'13.6"N, 20°33'50.3"E; 392 m a.s.l) on 16.XI.2025. This represents the first confirmed record of the species in Kosovo (Fig. 2).

DISCUSSION

The present study documents *H. halys* for the first time in Kosovo, representing a new record for the country's entomofauna. This finding aligns with broader invasion patterns observed across the Balkans and southeastern Europe, where the species has rapidly expanded during the last decade (ŠEAT, 2015; ŠAPINA & JELASKA, 2018; ZOVKO *et al.*, 2019; KONJEVIĆ, 2020). The detection of *H. halys* in Kosovo highlights the need for systematic monitoring and further research on its distribution, population dynamics, and host plant associations. Early detection is crucial for assessing potential agricultural risks and for designing evidence-based strategies aimed at preventing establishment and economic damage in vulnerable production areas. The data generated here provide an important baseline for future biological control efforts, pest risk assessment, and biodiversity conservation at the national level, contributing to a clearer understanding of the regional invasion process of *H. halys*.

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