

**From the west and from the east? First records of *Halyomorpha halys* (STÅL, 1855) (Hemiptera: Heteroptera: Pentatomidae) in Vorarlberg and Vienna, Austria.**

Aus dem Westen und dem Osten? Erste Nachweise von *Halyomorpha halys* (STÅL, 1855) (Hemiptera: Heteroptera: Pentatomidae) in Vorarlberg und Wien, Österreich.

The Brown Marmorated Stink Bug, *Halyomorpha halys* (STÅL, 1855), is native to East Asia (China, Taiwan, Japan, Korea, Vietnam) (LEE & al. 2013). It was first discovered outside its native distribution range in North America in the mid-1990s (HOEBEKE & CARTER 2003) and has spread to more than 40 U.S. federal states and Canada (Ontario) since then. The first record in Europe dates back to 2004, when specimens were found in Liechtenstein (ARNOLD 2009). *Halyomorpha halys* was subsequently recorded in several cantons in Switzerland (e.g., WERMELINGER & al. 2008, WYNIĞER & KMENT 2010, HAYE & al. 2014a), southern Germany (HECKMANN 2012) and northeastern regions of France (CALLOT & BRUA 2013). In 2012 it was detected in Modena, northern Italy (MAISTRELLO & al. 2013), and until 2014 approximately 200 records were made in northern Italy (MAISTRELLO & al. 2014). Genetic data indicate that Italian populations derive from at least two independent introduction events, one from Switzerland and one from Asia or North America (CESARI & al. 2015). In 2013 *H. halys* was detected in France in the region Île-de-France, some 400 km further west (GARROUSTE & al. 2014), and in Hungary in the vicinity of Budapest (VÉTEK & al. 2014), several hundred kilometres away from the closest known records in Italy. Recently, the first records for Greece were published (MILONAS & PARTSINEVELOS 2014), where the species is apparently present since 2011. Haplotype diversity indicates the movement of populations within Europe to generate secondary invasions, but also the occurrence of multiple invasions from Asia (GARIPEY & al. 2015). This means that in addition to the natural dispersal of the species over short distances, long-distance translocations happen in association with several pathways (e.g. aircrafts, cargo, vehicles, plant trade) from different source populations. It was only a question of when and where *H. halys* is found to appear in Austria.

On 4<sup>th</sup> August 2015 a specimen possibly belonging to *H. halys* was photographed in Vienna and the picture posted on a website (<http://insektenfotos.de/forum>). However, the quality of the picture did not allow an unambiguous determination, and therefore the owner was requested to report any further findings. On 27<sup>th</sup> August 2015 two more specimens were collected in the evening at light inside the same building in the city of Vienna (7<sup>th</sup> district, Zieglergasse, N 48°12'07" E 16°20'42", 210 m a.s.l.) and delivered to the first author, who confirmed the identity (Fig. 1).

Meanwhile, on 13<sup>th</sup> August 2015 a specimen of *H. halys* was observed and photographed (Fig. 2) in the evening at light on the wall of a building in the city of Dornbirn, Vorarlberg, on the premises of the “inatura Erlebnis Naturschau” museum (N 47°24'34.2" E 9°44'19.8", 438 m a.s.l.). No specimens were taken and no further specimen showed up since then, despite regular inspections of the trees and buildings in the surrounding area.



Figs. 1–3: (1) *Halyomorpha halys* from Vienna. (2) *Halyomorpha halys* from Dornbirn. (3) *Rhaphigaster nebulosa*. © 1, 3: W. Rabitsch; 2: G. Friebe.

Between 2<sup>nd</sup> and 9<sup>th</sup> November 2015 three specimens were collected while sun-bathing on the wall of a building in Vienna (20<sup>th</sup> district, Brigittenauer Lände, N 48°13'44.3" E 16°21'53.5", 164 m a.s.l.).

These are the first records of the Brown Marmorated Stink Bug for Austria. *Halyomorpha halys* might be confused with *Rhaphigaster nebulosa* (Fig. 3), but shows the following differences: membrane of forewing with brown stripes (with dots in *R. nebulosa*), head rectangular (triangular in *R. nebulosa*), elongated spine on the ventral side between legs absent (present in *R. nebulosa*), ventral side of the abdomen without black dots (with dots in *R. nebulosa*) (WYNIGER & KMENT 2010).

There is an extensive body of literature on the biology and ecology of the *Halyomorpha halys*, specifically from North America (RICE & al. 2014; see e.g., <http://www.stopbmsb>).

org/), as this species is regarded to be a pest on ornamental fruit trees and woody ornamentals (GARIEPY & al. 2014, HAYE & al. 2014b). There is considerable damage in North America, but infestations in Europe are still small and local (MÜLLER & al. 2011, PANSA & al. 2013). *Halyomorpha halys* is currently considered a nuisance and household pest in Europe, when entering buildings in search of hibernation sites in autumn. It develops one generation per year in Central Europe. Adults hibernate and become active in April and May, the new generation appears in August. *Halyomorpha halys* is an arboreal and polyphagous species that is known to feed on plant species from more than 30 different families, with a preference for shrubs and trees such as *Sorbus aucuparia*, *Cornus sanguinea*, and *Fraxinus excelsior*, but also non-native ornamental plants, such as *Catalpa bignonioides*, *Parthenocissus quinquefolia*, *Pawlonia tomentosa*, and *Ailanthus altissima* (HAYE & al. 2014b).

Alpine areas might limit or delay the further spread of *H. halys* within Austria, but the species is expected to increase in numbers and range in urban areas in both the west and east of Austria. Climatic niche models demonstrate a large suitable area for further invasions between latitudes 40° and 50° N in Europe (ZHU & al. 2012). Regarding the origin of the specimens it seems likely that the western population has reached Vorarlberg by natural spread from nearby Swiss populations. The eastern population, however, might have arrived in Vienna by natural spread from Hungary or by an independent introduction from European, North American, or Asian populations. Genetic data are required to disentangle the two-front invasion history of *H. halys* in Austria and are intended to be conducted in the future.

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