

The occult spread of the invasive brown marmorated stink bug, *Halyomorpha halys* (Stål, 1855) (Hemiptera Pentatomidae), in Sardinia (Italy)

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ABSTRACT

The invasive brown marmorated stink bug, *Halyomorpha halys* (Stål, 1855) (Hemiptera Pentatomidae), was recorded in autumn 2018 in Sassari (northern Sardinia, Italy), after a previous finding in Cagliari (over 200 km away in southern Sardinia) in autumn 2016. It is not clear whether the species has already spread throughout the Sardinia or whether the sighting in the North of Sardinia is due to a second introduction. However, it is usual for this species to have a long period with low population level after its first introduction into a new area. The presence of this very polyphagous alien species is a serious hazard for Sardinian agriculture.

KEY WORDS

Alien insects; nuisance urban pest; agricultural pest; Italy; Europe.

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INTRODUCTION

The Hemiptera Pentatomidae *Halyomorpha halys* (Stål, 1855), known as the brown marmorated stink bug, is native to Asia, where it is considered a nuisance pest in urban areas due to its overwintering in buildings, and an agricultural pest on fruits and seeds (Lee et al., 2013). In the last two decades it has become invasive in North America and Europe, has been established in Chile, near Santiago, and has been found in shipments from the United States and Asia to New Zealand and Australia. The timing of the invasions and current distribution in Europe have been summarized by Cianferoni et al. (2018).

Its autumnal shelter-seeking behaviour facilitates both the spread across wide geographical areas and the short-range secondary translocations through human activities, and repeated independent introductions are likely (Hamilton et al., 2018; Leskey & Nielsen, 2018). Current genetic data suggest a mixed origin of both the European (Cesari et al., 2015, 2017) and the West coast of the United States populations (Hamilton et al., 2018).

RESULTS

Between the 16th October and the 17th December 2018, four findings (five specimens) of *H. halys*

were recorded in the city of Sassari (northern Sardinia, Italy) and its surroundings. All the specimens were collected inside buildings, and each was collected (Fig. 1), identified and conserved in the collection of one of the authors (LL) (Table 1). This record is the second in Sardinia (but the first for the North of the island), the previous one regarded two specimens collected in the city of Cagliari in autumn 2016 (Dioli et al., 2016).

No other reports about the presence of this species in Sardinia are known to the authors (Fig. 2). A survey on crops in experimental stations of Agris Sardegna in the neighborhood of Cagliari, Oristano and Sassari during 2018 did not reveal the bug's presence. However, it is not clear whether the species has already spread throughout the Sardinia or it has been introduced more than once and in different locations.

DISCUSSION

Typically, after the introduction into a new area, this species shows low population levels for a long period. In USA, the first specimens were collected in 1996, but the presence of the species became evident only five years later, and invasive after a decade (Hamilton et al., 2018). On mainland Italy, similarly, the first specimen was collected in 2007, but only in 2012 was the species extensively detected (Cianferoni et al., 2018).

In its first stages of invasion the species appears to be only an urban pest, because of its overwintering in houses and commercial buildings, whereas the agricultural problems come later. This has been confirmed many times in several countries in North



Figure 1. *Halyomorpha halys* collected inside a building of Sassari city (Italy).

America (Hoebeke & Carter, 2003; Garipey et al., 2014) and Europe (for example: Milonas & Parsinvelos, 2014; Macavei et al., 2015; Rabitsch & Friebe, 2015, Simov, 2016). The slow and silent spread of this pest should not be underestimated. The brown marmorated stink bug could be a serious threat for Sardinian agriculture.

According to the model proposed by Kriticos et al. (2017), Sardinia, in particular its western coast, appears to be a suitable area for *H. halys*. Three areas - the southern Sulcis, the central Oristano Plain, and the northern Nurra - reach the same suitability level as a large part of northern and central Italy. All three of these areas have very important

#	Collection date	Locality	Coordinate N	Coordinate E	Specimens	Collector
1	16 Oct 2018	Sassari	40.72723	8.56915	2 males	V. Ligios
2	19 Oct 2018	Sassari	40.71679	8.57006	1 female	V. Ligios
3	14 Dec 2018	Li Punti	40.75490	8.49679	1 female	G. Medde
4	17 Dec 2018	Sassari	40.72414	8.56023	1 male	A. Muroli

Table 1. *Halyomorpha halys* records from North Sardinia (Italy).

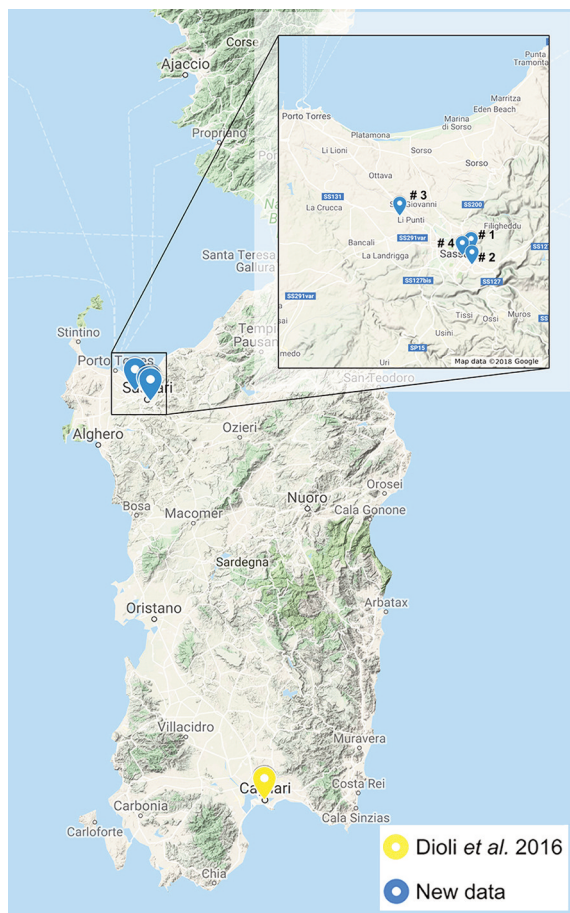


Figure 1. Sites in which *Halyomorpha halys* was collected in Sardinia (Italy). Numbers refer to the data cited in Table 1.

agricultural productions potentially threatened by the brown marmorated stink bug which is able to damage almost every fruit or seed of agricultural importance (Leskey & Nielsen, 2018) including rice (Lupi et al., 2017). Moreover, this bug is also able to become a key pest of additional crops in invaded countries (Lee et al., 2013).

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