

First record of the leafhopper *Asymmetrasca decedens* (Homoptera: Ciudadellidae) in mainland Portugal

Primeiro registo da cigarrinha verde *Asymmetrasca decedens* (Homoptera: Ciudadellidae) em Portugal continental

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ABSTRACT

Asymmetrasca decedens, a polyphagous leafhopper widely distributed in Mediterranean region, is here reported as a new record to mainland Portugal. Heavy infestations of this species have been found associated with peach, apricot and plum orchards, as well as on *Alnus glutinosa*, in southern of Serra da Gardunha (Beira Interior Region). Typical symptoms, the so-called 'hopperburn', with leaves turning yellow and curling their edges downwards before drying-out and shedding, were spotted. Both adults and immature forms cause direct injury and the species also has the ability to be a vector of European Stone Fruit Yellows (16RX-B), among other phytoplasmas. External morphological characteristics of *A. decedens*, illustration of the male genitalia and a brief description of leaf lesions on peach are presented, in order to enable its identification, since it has a great potential for spreading as a pest. Not only *A. decedens* reveals a significant resistance to conventional insecticides, which may hinder its control, but also it has a vast host range of economically important plants, like ornamental or fruit trees.

Keywords: *Alnus glutinosa*, *Asymmetrasca decedens*, Beira Interior Region, peach orchards, Typhlocybinae

RESUMO

Asymmetrasca decedens, uma cigarrinha polífaga, largamente distribuída na região mediterrânica é aqui referenciada como um novo registo para Portugal continental. Importantes infestações desta espécie foram encontradas associadas a pomares de pessegueiro, damasqueiro e ameixeira e a amieiros (*Alnus glutinosa*), a sul da Serra da Gardunha, na região da Beira Interior. Foram observados os sintomas característicos, constituídos por folhas amareladas e enroladas nos bordos, viradas para baixo, antes de secarem e caírem. Quer os adultos quer as ninfas causam danos diretos nas plantas tendo a espécie também capacidade para ser vetora de fitoplasmas, entre os quais o *European Stone Fruit Yellows* (16RX-B). Neste artigo são apresentadas as características morfológicas externas de *A. decedens*, imagens da genitália masculina e uma descrição sucinta das lesões nas folhas de pessegueiro, de modo a permitir a sua identificação, na medida em que a espécie tem um elevado potencial de dispersão e de constituir populações com comportamento de praga. *A. decedens* apresenta uma significativa resistência aos inseticidas convencionais, o que pode dificultar o combate, tendo um vasto leque de hospedeiros entre culturas economicamente importantes, como fruteiras e plantas ornamentais.

Palavras-chave: *Alnus glutinosa*, *Asymmetrasca decedens*, pomares de pessegueiro, Região da Beira Interior, Typhlocybinae

Introduction

Asymmetrasca decedens (Paoli, 1932) (Homoptera: Cicadellidae) is a leafhopper belonging to the subfamily Typhlocybinae which include other species, like *Edwardsiana rosae* (Linnaeus, 1758), *Empoasca decipiens* (Paoli, 1930), *E. vitis* (Göethe, 1875), *Zygina flammigera* (Fourcroy, 1785) and *Z. rhamni* (Ferrari, 1882) also noticed as pests of cultivated plants (Pollini, 1998).

This leafhopper is widely distributed in the Mediterranean region and West Asia and has been reported in many countries as Greece (Drosopoulos, 1980; Loukas and Drosopoulos, 1992), Iran (Al-Asady, 2002; Haghighian and Sadeghi, 2001), Israel (Nestel and Klein, 1997), Italy (Allegro *et al.*, 2011; Cravedi *et al.*, 1995; Nicòtina and De Florio, 1995; Pollini, 1998; Pollini and Bariselli, 1995; Servadei, 1971; Viggiani and Guerrieri, 1989), Lebanon (Dakhil *et al.*, 2011), Madeira Island (Portugal) (Freitas and Aguin-Pombo, 2004), Slovenia (Holzinger and Seljak, 2001), Spain (Alvarado *et al.*, 1994; Torres *et al.*, 1998, 1999, 2000, and 2002), Switzerland (Guenthart and Muehlethaler, 2002), Tunisia (Chaieb *et al.*, 2011; Chaieb and Bouhachem-Boukhris, 2012) and Turkey (Atakan, 2009, and 2011; Baspinar, 1994; Baspinar *et al.*, 2013). The leafhopper *Asymmetrasca decedens* is a polyphagous species occurring on herbaceous plants (Chenopodiaceae, Fabaceae, Solanaceae, Lamiaceae) as well as on tree or shrubs species (Rosaceae, Salicaceae, Ulmaceae) affecting leaves and causing a severe growth reduction (Matthews, 1994). In the last years injury caused by this leafhopper has been reported on many cultivated plant species like almond (Jacas *et al.*, 1997; Torres *et al.*, 1998, and 1999), cherry (Torres *et al.*, 2000), cotton (Atakan, 2009, and 2011), peach (Alvarado *et al.*, 1994; Cravedi *et al.*, 1995; Viggiani and Guerrieri, 1989), pomegranate (Baspinar *et al.*, 2013), raspberry (Grassi and Dal Rí, 2006) and *Salix* sp. (Allegro *et al.*, 2011), among others.

Adults and nymphs of *A. decedens* feed almost continuously, piercing and sucking the cell contents in lower leaf veins, causing the leaf a burned appearance. On peach trees, they may cause stunted shoots with small curled leaves, especially on young specimens, in nurseries, and on grafted plants. Damaged leaves may turn yellow, starting from the margins and definitively dry and die (Alvarado *et al.*, 1994, Chaieb *et al.*, 2011). Additionally,

A. decedens is a potencial vector of phytoplasma diseases as 16SrX-B phytoplasma sub-group (European Stone Fruit Yellows: ESFY), reported on peaches by Pastore *et al.* (2004) and AlmWB phytoplasma, in almond (Dakhil *et al.*, 2011).

This is the first record of *A. decedens* to mainland Portugal.

Material and Methods

Material was studied from Site 1 - Gardunha Agro Farm, Louriçal do Campo, farm gate location: 40° 01' 33.09" N, 7° 30' 06.62" W, 435m altitude and Site 2 - Gardunha Agro Farm, Lardosa, farm gate location: 39° 58' 59.72" N, 7° 27' 20.69" W, 400m altitude (WGS 84 Coordinate System, Google Earth) (Fig. 1).

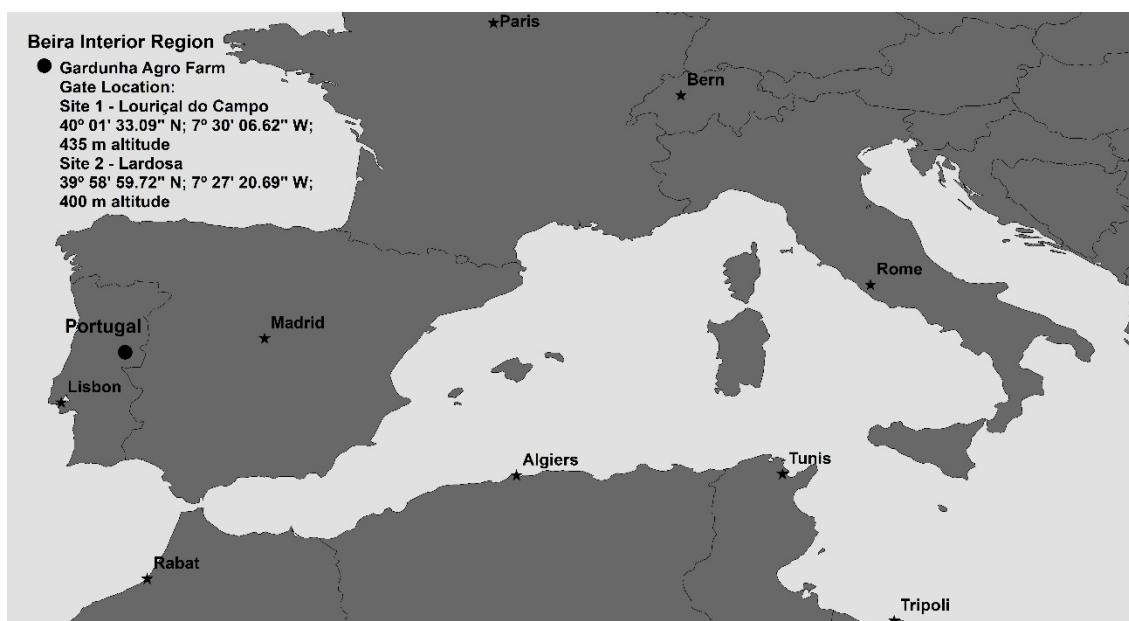


Figure 1 - Location of Beira Interior Region, where *Asymmetrasca decedens* was recorded for the first time in mainland Portugal.

Collection of adults occurred from middle April to the end of September of 2013 by yellow and blue sticky traps, the beating method and direct catch on peach, apricot and plum orchards, as well as on common alder (*Alnus glutinosa* (L.) Gaertner) trees, in the neighbourhood of the orchards. Some adult specimens were obtained by rearing nymphs in entomological boxes, collected on leaves of peach and common alder trees.

In order to obtain scanner photomicrographs the genitalia pieces were removed and submitted to the critical point drying method, using super dry CO₂ in a Balzers apparatus. Specimens were placed on metallic supports, coated with a thin layer of gold and examined under a JEOL scanning electron microscope (Jeol JSM-5200LV). The SEM images were transferred directly into a computer and analysed.

Results and Discussion

In 2013 *A. decedens* has been captured in Beira Interior Region associated with peach, apricot and plum orchards and common alder, *A. glutinosa*, surrounding the orchards. Nevertheless, infestations, symptoms and injury were observed in previous years in the peach orchards in the same province.

Asymmetrasca decedens is a leafhopper (Fig. 2) with an overall length range from 3-3.5 mm. It is characterized by a general body colour green-yellowish

similar to other closely related leafhoppers, namely species of *Empoasca*.

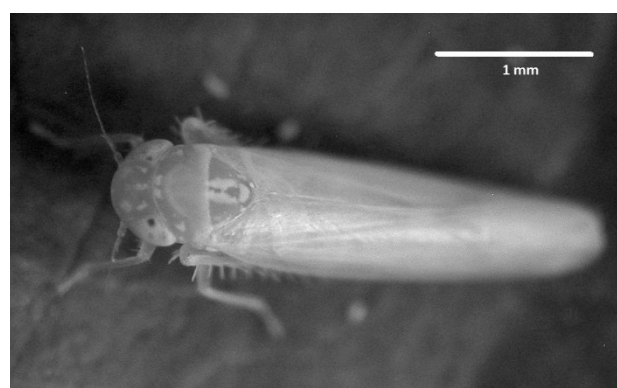


Figure 2 - Adult of the leafhopper *Asymmetrasca decedens*.

Specific identification can only be achieved through the study of the male genitalia (Le Quesne and Payne, 1981; Ribaut, 1936). The aedeagus (Fig. 3a) is characterized by a L-like projection situated laterally and slightly beneath the apex. The aedeagal shaft, distinctive cylindrical with a spherical base, extends apically to a narrow tube ending to the apex which slightly runs upward to a small process (Fig. 3b).

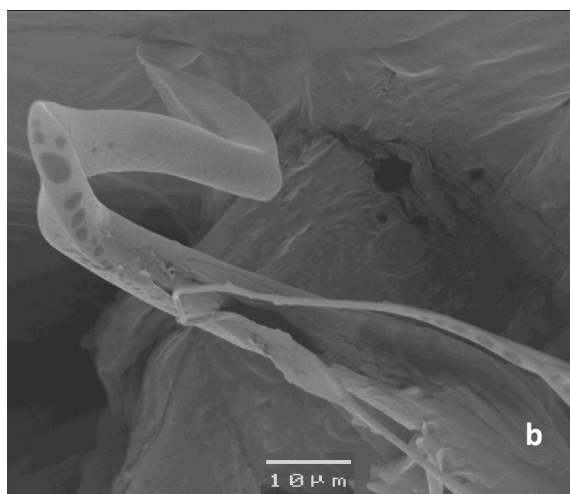
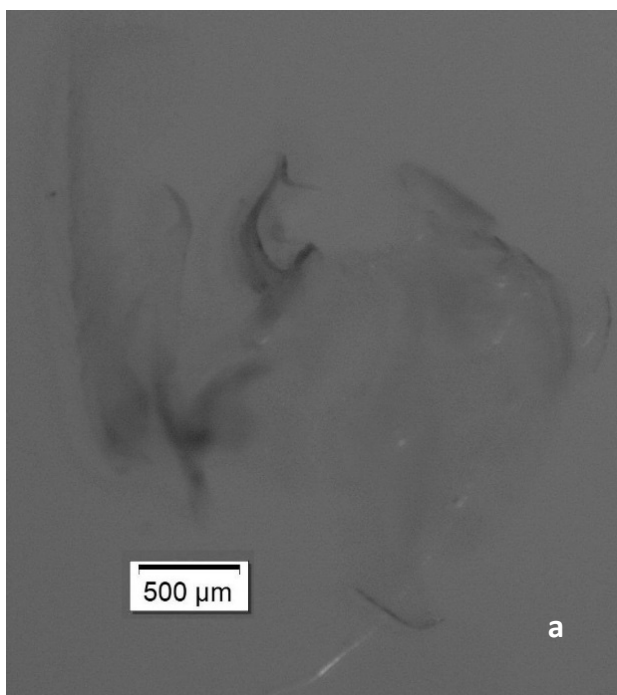


Figure 3 - *Asymmetrasca decedens* male genitalia. Typical aedeagus with L-like projection – OM, Scale bar = 500 μm (a) and aedeagus distinctive apical process – SEM, Scale bar = 10 μm (b).

Asymmetrasca decedens feeds and reproduces on common alder (Fig. 4), that surrounds peach orchards. A total of, mostly overlapping, four-five generations occurs during the summer months on orchards.



Figure 4 - *Asymmetrasca decedens* nymphs on common alder (*Alnus glutinosa*).

The injuries observed in peach, apricot and plum trees, especially in young ones, was mainly stunted shoots with curled leaves (Fig. 5), as described in Alvarado *et al.* (1994), Chaieb *et al.* (2011), and Pollini (1998). Since the plant reserves for the following season are severely reduced, a slower development of trees was also observed.



Figure 5 - *Asymmetrasca decedens* symptoms of attack. Peach orchard (a) and young peach tree (b) with curling leaves (c); *Alnus glutinosa* with characteristic hopperburn (d).

In the past few years many plant trees have been imported to Beira Interior Region for plantation of new orchards. A hypothetic pathway of the introduction of *A. decedens* in mainland Portugal might be related with plant trees imported from countries where the species is present, probably in the Mediterranean region.

The presence of *A. decedens* in mainland Portugal will require careful attention from phytosanitary authorities, since it is a species that has shown some resistance to common insecticides, which would become a challenge in the future.

Conclusions

The leafhopper *Asymmetrasca decedens* has been recorded and identified for the first time in mainland Portugal in 2013 on peach, apricot and plum orchards and on common alder (*Alnus glutinosa*) surrounding the orchards. The presence of this species in mainland Portugal is a new threat to Portuguese agriculture, especially on peach orchards.

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