

Acanalonia conica (Hemiptera, Fulgoromorpha, Acanaloniidae), a Nearctic species recently introduced in Europe

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Abstract

The Nearctic species *Acanalonia conica* (Say 1830) has been recently found in Italy. Analysis shows that the species has a good capability to settle outside its natural range. *A. conica* is a very polyphagous species and the population density in Italy appears larger than the one recorded in North America. We conclude that *A. conica* should be regarded as a potential pest in Europe.

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Introduction

In 2004, we reported the first record in Europe of the Nearctic planthopper *Acanalonia conica* (Say, 1830) (Acanaloniidae) (D'Urso & Uliana 2004). The genus *Acanalonia* Spinola, 1839 is widely distributed in the Americas and comprises over 60 species. *Acanalonia conica* ranges in the United States from Florida to Texas, and from Connecticut to Nebraska (Fig. 1). In general shape species resemble species of Flatidae, but can be easily distinguished by the lack of parallel veins along the costal margin and by the presence of 'granules' in Flatidae at the base of the fore wings. *A. conica* is bright green, about 1 cm long, laterally compressed, with long subrectangular fore wings bearing a network of veins. It is very easily recognizable among the European Auchenorrhyncha. The colour anyway may fade to pale yellow in dead specimens. *A. conica* differs from the other species of the genus by the shape of the vertex, which is strongly protruded beyond the compound eyes in form of a conical

angle. Distinctive characters are also found in the shape of the male pygofer, of the aedeagus and of the female 8th abdominal sternite.

Further taxonomical and morphological details can be found in Freud & Wilson (1995), who revised the genus *Acanalonia* in the USA and provided a detailed description of *A. conica*, describing and illustrating male and female genital structures. Some authors have regarded the Acanaloniidae as a subfamily of the Issidae but, according to Emeljanov (1999), the the Issidae, Caliscilidae and Acanaloniidae may be clearly separated by characters of the bases of the ovipositor structure

In the USA, *A. conica* is a polyphagous species living on wild and cultivated trees, shrubs and grasses belonging to different families such as Liliaceae, Rosaceae, Vitaceae, Ulmaceae, Juglandaceae, Labiatae, Chenopodiaceae, Oleaceae, and others (Wilson & McPherson, 1980a, 1981). Some of its host plants have economic importance (e.g. *Vitis* L. and some ornamentals), but serious damage never occurs, as populations

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Fig. 1. Distribution map of *Acanalonia conica*.

are usually small and incapable of threatening cultivated plants. This species is known to be univoltine with eggs laid in the summer and autumn overwintering. Adults in Illinois are present from July to September (Wilson & McPherson 1980b, 1981). Eggs are laid individually inside woody tissue of the plant host. The nymphal stages are brown in colour and have a typical hump-backed shape. They are covered with long white waxy filaments and, like the adults, produce abundant honeydew.

In the Nearctic Region, *A. conica* often lives associated with three flatid species: *Metcalfa pruinosa* (Say 1830), *Flatormenis chloris* (Melichar 1902), and *Ormenis venusta* (Melichar 1902; Wilson & McPherson 1980b; Freund & Wilson 1995; Wilson & Lucchi 2000, 2001). According to Wilson & Lucchi (2001), due to the low population densities, this association may not be accidental, and undoubtedly involves attraction processes among these insects and between these and the host plants.

Material and methods

Studies on the biology of *A. conica* in Italy were made by collecting specimens in Venetia (Italy) with a UV lamp and directly from the host plants with an entomological 'beating tray', from June to September in 2003–2004.

Results

In the Old World *A. conica* was first collected and identified in 2003 among the material attracted by a UV lamp in the second author's garden, located in Rosara di Codevigo, province

of Padova (Padua). The first specimens were observed at the end of June and in the following weeks (until the first half of August); specimens were found near the UV lamp site on *Buddleja davidii* Franchet. In the same period, a few adults were also collected indoors. In September, the remains of many *A. conica* (mainly forewings) were found by sifting hazel wood litter along the Brenta river, about 1 km away from the first collecting site, together with remains of the introduced Nearctic flatid species *M. pruinosa*.

In 2004, surveys were made around the first two collecting sites, showing that *A. conica* has a good capability to settle outside its natural range. Nymphal stages were first recorded by the end of June on riparian vegetation along the Brenta river, later also on cultivated specimens of *B. davidii*. Adults were observed in the summer, from July until 10th September. Preliminary observations on the population density were performed by means of an entomological 'beating tray' held under the foliage of the host plants (Fig. 2). The

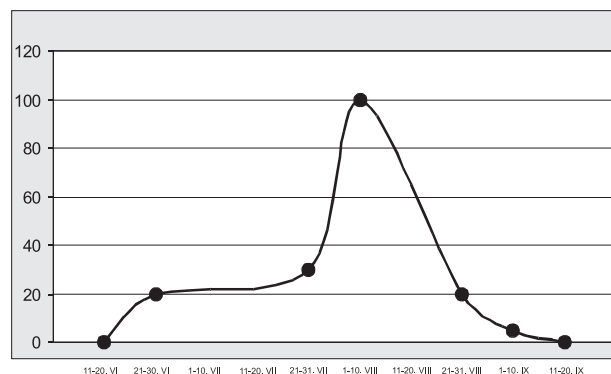


Fig. 2. *A. conica* population density observed during summer 2004 (specimens per man/hour).

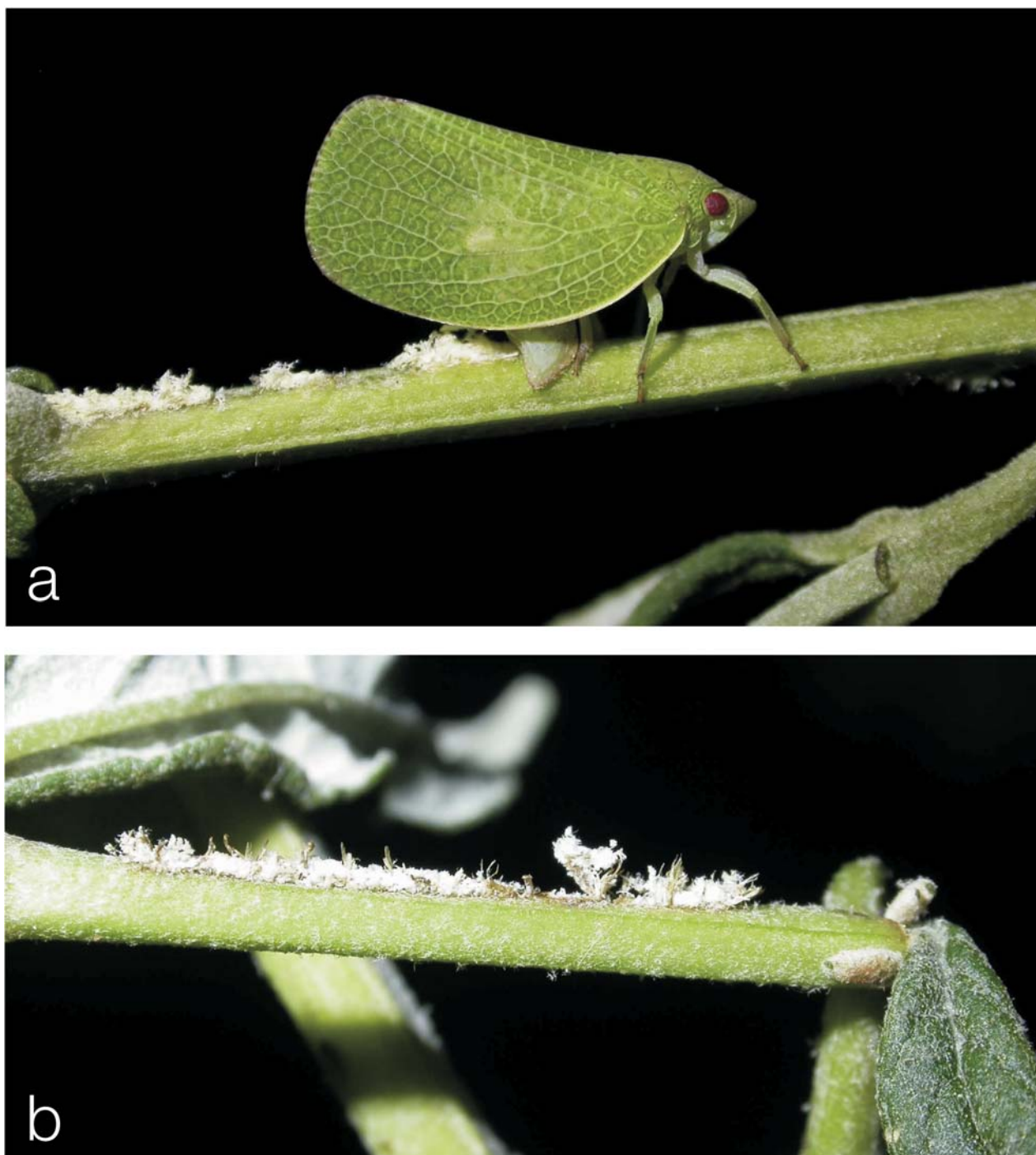


Fig. 3. Female of *Acanalonia conica* laying eggs in the twig of *Amorpha fruticosa*. **a** – Twig of *Amorpha fruticosa* containing eggs of *Acanalonia conica*; **b** – Specimens from Brenta river (Padua). A coloured version of this figure is published in the online version of this article.

highest density was observed in the first half of August and 100 specimens per man-hour were collected. Although the two sets of data are not immediately comparable, Wilson & Lucchi (2000), found that the population density of *A. conica* in its natural range seems to be much smaller than in Italy, 2.2 specimens per man-hour were collected in Missouri (USA) in the first half of July.

We attempted to keep adults in captivity, and observed females laying into the twigs of *Amor-*

pha fruticosa L. (specimens were collected at the end of August and eggs were obtained within one or two days) (Fig. 3). As in USA, the species is univoltine and the eggs overwinter.

As in the USA, in Italy *A. conica* was shown to be a very polyphagous species. We collected both nymphs and adults on many different plants, grasses, bushes and shrubs. The preferred host plant was *Amorpha fruticosa*. *A. conica* was also collected repeatedly (or was collected on

plants isolated from the surrounding vegetation, therefore indicating them as a possible host) on *Corylus avellana* L., *Buddleja davidii*, *Cornus sanguinea* L., *Prunus* L. sp., *Urtica dioica* L., *Parietaria officinalis* L., *Humulus lupulus* L., *Solanum nigrum* L., *Chenopodium* L. sp., *Xanthium italicum* Moretti.

The population of *A. conica* observed along the Brenta river lives in association with *M. pruinosa*.

Discussion

As far as we know at present in Europe, *A. conica* is present only in northern Italy in the province of Padua, along the Brenta river.

A. conica is likely to have reached Italy in the egg stage, possibly on potted woody plants imported from the USA during the cold season.

The establishment of *A. conica* in Italy is very significant, and we regard this species as a potential pest, like *M. pruinosa*. In Europe, the latter species also appeared for the first time (1979) in Venetia, province of Treviso (Zangheri & Donadini 1980), then spread rapidly throughout Italy, and reaching other European countries and is now present in Italy, France, Switzerland, Austria and Slovenia (Hoch 2005). *M. pruinosa* has little economic impact in its original distributional range, due to the low population density, and only limited damage has been reported among plants of economic importance like *Citrus* L., *Dahlia* Cav., *Salvia* L. and *Ligustrum* L. In Europe, however, its occasional very large populations on wild and cultivated plants may cause serious damage. Considerable amounts of wax and honeydew are produced as a result of feeding from phloem tissue, which allows the development of mildew. As a result *M. pruinosa* has become, in Europe, a pest of considerable economic significance, as many ornamental plants and crops (such as grapevine and many fruit-bearing trees) suffer from its feeding.

The life cycle and behaviour of *A. conica* resemble those of *M. pruinosa*, so it is also possible that *A. conica* will also become a pest, in Italy and perhaps elsewhere due to its extreme polyphagy the lack of natural enemies and to the new habitat apparently suitable for a long-term establishment of the species. Therefore, it is important to immediately prevent repeated introductions from the USA and to conduct research on the potential of biological control of *A. conica*. Particular attention must also be paid to the

flatids (*F. chloris* and *O. venusta*) which, in the USA, are associated with *A. conica* and could be also casually introduced to Europe. *F. chloris* and *O. venusta*, like *A. conica* and *M. pruinosa*, are widely polyphagous species, living on many wild and cultivated plants and also share a similar life cycle. Attention must be paid to the import of ornamentals and fruit bearing plants (such as grape vine varieties from U.S. countries where the above mentioned species are present). These species are most likely to reach Europe in the egg stage, hidden inside twigs and small branches.

In the USA the dryinid *Gonatopus secundus* (Fenton 1984), is a natural enemy of *A. conica* (Olmi 1984; Guglielmino & Olmi 1997). Adults and nymphal stages were also attacked by *Epi-pyrops barberiana* (Dyar, 1902) (Lepidoptera; Epipyropidae) (Wilson & McPherson 1979); the same authors (1981), observed larval mites of the genus *Leptus* Latreille, 1796 attached to the abdomen of the nymphs.

We are planning to conduct further research, on the biology of *A. conica* in Italy, with particular attention to its distribution, its ecology and its relationships with *M. pruinosa*. Data will be compared with those concerning the natural populations living in USA.

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