

# *Acanalonia conica* (Say, 1830): A new alien planthopper species established in Hungary (Auchenorrhyncha: Fulgoroidea: Acanaloniidae)

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## RESEARCH ARTICLE

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## ABSTRACT

*Acanalonia conica* (Say, 1830), the first representative of the Nearctic planthopper family Acanaloniidae (Hemiptera: Auchenorrhyncha: Fulgoroidea), introduced to Europe, is reported for the first time from multiple locations in Hungary. Diagnosis, detailed illustration of male genitalia and notes on ecology are provided along with the distributional records.

## KEYWORDS

*Acanalonia conica*, Fulgoromorpha, Acanaloniidae, new record, alien species

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## INTRODUCTION

The genus *Acanalonia* Spinola (1839) consists of 60 valid taxa, most of them distributed in the Nearctic and Neotropical regions (Freund and Wilson, 1995; Gnezdilov, 2012). One of its representatives, *Acanalonia conica* (Say, 1830), was accidentally introduced and became established in Europe at the beginning of the 21<sup>st</sup> century, now spreading rapidly. The taxon was first recorded in Veneto, Italy (D'Urso and Uliana, 2004, 2006) and became widespread throughout the country in the next years. More recently, its occurrence was reported from Switzerland (Trivellone et al., 2015), the southern part of Romania (Constantina et al., 2017), Slovenia (Seljak, 2018), Austria (Holzinger et al., 2020) and France (Pelozuelo et al., 2020). *A. conica* is known as a polyphagous herbivore, feeding on a variety of cultivated and wild plants belonging to different families, e.g. Rosaceae, Vitaceae, Asteraceae or Cannabaceae (Aldini et al., 2006; D'Urso and Uliana, 2006). The species is associated with flatid species *Metcalfa pruinosa* (Say, 1830), *Anormenis chloris* (Melichar, 1902) and *Ormenoides venusta* (Melichar, 1902) in America and is often found in mixed assemblages. This is resulted by the similar life history and overlapping distribution range of the four species (Wilson and Lucchi, 2001). *A. conica* is considered as a potential agricultural pest in viticulture because of inserting its eggs in wooden tissues of grapevine, causing mechanical damage in plant shoots, but currently, no report of serious damage is known. Hereby, the first occurrences of the species from Hungary are reported with morphological and ecological notes.

## MATERIAL AND METHODS

Adults of *A. conica* were collected by Nikolett Farkas (1 male), Ottó Merkl (1 female), Csaba Nagy (1 female) and Tamás Zilay (1 male and 1 female) were deposited in the Hemiptera Collection of Hungarian Natural History Museum, Budapest (HNHM), personal collection of Előd Kondorosy (PCEK, Keszthely, Hungary) and Csaba Nagy (PCCN, Budapest, Hungary). Bibliography and current taxonomic names were acquired from the FLOW (Fulgoromorpha Lists on The Web) database (Bourgoin, 2021).

Distribution data was recorded in comma-delimited text (.csv) format in Microsoft Excel (2019) software. Processing and visualisation of the recorded data were performed with QGIS 3.4.14 “Madeira” geographic information system platform. Exoskeletal and genital structures were studied with Leica MZ 9 5 stereoscopic microscope. Measurements were done by calibrated ocular micrometre. Imaging was done with Nikon D7200 digital camera mounted with AF-S Micro Nikkor 105 mm 1:2.8 ED lens. Characters of male genitalia was illustrated by András Orosz. Morphological terminology was adapted from Freund and Wilson (1995).

## RESULTS

### *Acanalonia conica* (Say, 1830)

**Diagnosis.** Colouration greenish (colouration may fade to yellowish on dead insects) with pale brown and white decorations at margins of forewings; apical part of tibiae and tarsi brownish. Forewings conspicuously broadened. The species resembles to flatid planthoppers



(e. g. *M. pruinosa*) in general facies, but with the combination of the following characters: in *A. conica*, veins of costal margin are irregular, in contrast in *M. pruinosa*, the veins of costal margin are parallel and perpendicular to the longitudinal axis of the body (Fig. 1); in *A. conica* surface of the clavus of forewing without tubercles contrary to *M. pruinosa*. Male genital structures as in Fig. 2.

**Measurements of body length.** male (HNHM): 8.76 mm; females (HNHM): 9.77–10.1 mm.



Fig. 1. *Acanalonia conica* (Say, 1830) lateral view (female, HNHM; scale bar: 3 mm)

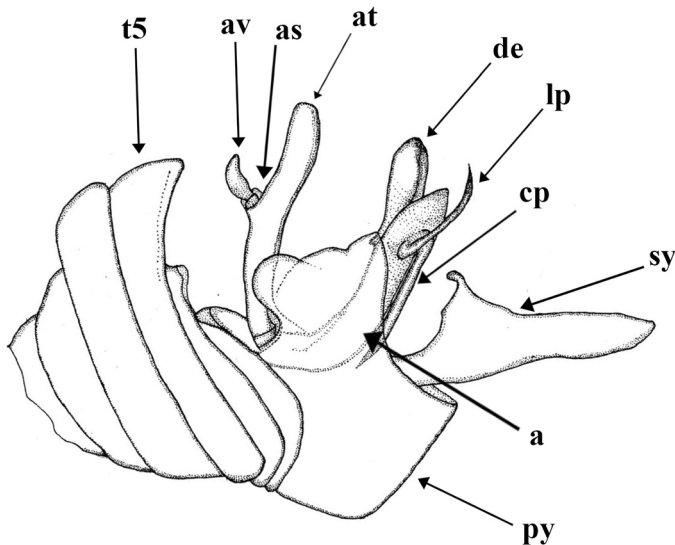


Fig. 2. Male genital apparatus of *A. conica* (lateral view; line drawing: A. Orosz) (Lettering: a – aedeagus; as – anal stylus; at – anal tube; av – anal valve; cp – caudal process; de – dorsal expansion; lp – lateral process; py – pygophore; sy – stylus; t5 – abdominal tergite V)



Table 1. Occurrences of *A. conica* in Hungary (asterisk indicates records at [izeltlabuak.hu](http://izeltlabuak.hu) 2021 citizen science database and were based on visual observation and photos)

Date	Location	GPS	Specimens	Collector (depository)
August 2016	Alibánfa, Zala County, Hungary	46°53' N, 16°55' E	1 male	N. Farkas (PCEK)
09 August 2018	Soroksár Botanical Gardens, Budapest, Pest County, Hungary	47°24' N, 19 09' E	1 female	O. Merkl (HNHM)
22 August 2019	forest between Debrecen and Pállag municipalities, Hajdú-Bihar County, Hungary	not available	1 male, 1 female	T. Zilay (HNHM)
30 August 2019	Újfehértó, Szabolcs-Szatmár-Bereg County, Hungary	47°82' N, 21°67' E	1female	Cs. Nagy (PCCN)
21 September 2019	Budapest, Pest County, Hungary	47°25' N, 21°37' E	1?	J. Mészáros (recorded by B. Kókay) ( <a href="http://izeltlabuak.hu">izeltlabuak.hu</a> 2021) *
30 July 2021	Debrecen, Hajdú-Bihar County, Hungary	47°31' N, 21°37' E	1?	Bodokrisz ( <a href="http://izeltlabuak.hu">izeltlabuak.hu</a> 2021) *

**Findings in Hungary.** Occurrences of *A. conica* were recorded from six locations in Hungary (Table 1, Fig. 3). Four records originate from collecting of specimens by sweep netting or singling (voucher specimens available in depositories as indicated in Table 1) and two records originate from visual observation of individuals with photo proof available at [izeltlabuak.hu](http://izeltlabuak.hu) (2021) citizen science database.

**Remarks.** *A. conica* was thoroughly described in Freund and Wilson (1995). Larvae resemble those of Flatidae (e.g., *M. pruinosa*). Good quality habitus photo of larvae was published in Holzinger et al. (2020).

**Ecology.** In addition to the known European host plants listed by (Aldini et al., 2006; D'Urso and Uliana, 2006), we report the first recorded case of its feeding on *Acer campestre*, *Humulus lupulus* and *Rubus fruticosus*.

## DISCUSSION

*A. conica* is the first representative of the Nearctic fulgoroid planthopper family Acanaloniidae, which was introduced and became established in Europe. Since its first report from North-eastern Italy, it appears to be spreading on the continent. Findings suggest that the species is present in Hungary since 2016, but in course of this 5-years period only sporadic occurrences of at most two individuals were recorded. Contrastingly, in the neighbouring countries (Austria, Romania and Slovenia) up to 12 specimens were originating from a single collecting site. Taking these data into account it is to be concluded that the understanding of the situation of *A. conica* in Hungary requires further, aimed monitoring of the species. The survey may imply citizen science approach due to the striking appearance and easy identification of the species. *A. conica*



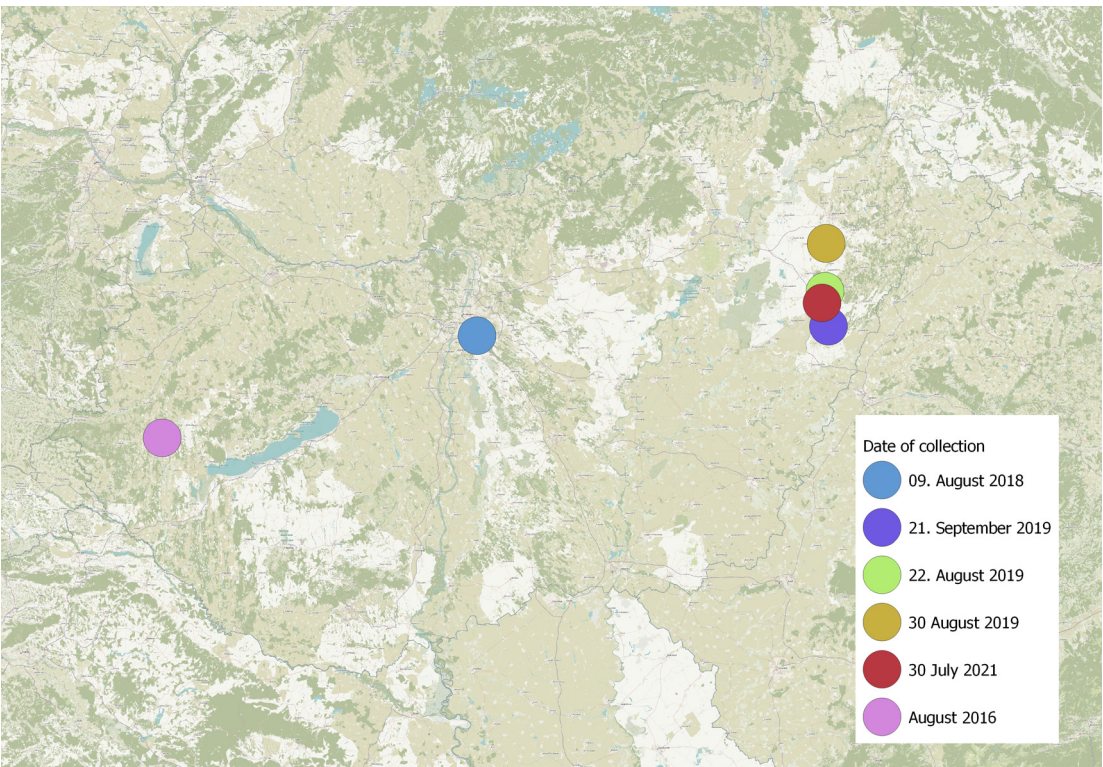


Fig. 3. Distribution of *A. conica* in Hungary (map generated with QGIS 3.4.14 „Madeira” software)





can be readily distinguished from other planthopper taxa known from Hungary by its vivid greenish colouration combined with the conspicuously broadened forewing. The species resembles flatid planthoppers (e.g., *M. pruinosa*), but the differences in the venation of forewing and genital structures allow infallible identification. This planthopper species is a polyphagous herbivore with a relatively diverse host plant range which includes multiple cultivated plants of agricultural significance. The species is considered a potential pest of grapevines due to its oviposition behaviour: females inserting eggs in the wooden tissues of grapevine sprouts, thus causing mechanical damage. Furthermore, these scars can be entry points for bacterial, viral and fungal infections. *A. conica* is recorded to be forming mixed assemblages with three Nearctic flatid species, *M. pruinosa*, *A. chloris* and *O. venusta*, due to their overlapping area and host plant range. From these species, *M. pruinosa* is known from across Europe. The presence of *M. pruinosa* and *A. conica* on the continent suggests that in case of introduction, the remaining two species are likely to be established; thus, it is recommended to thoroughly monitor agricultural shipment containing host plants of these species.

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