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# THE PRESENCE AND BIONOMY OF A NEWLY DESCRIBED LONGHORN BEETLE, *AGAPANTHIA VITI* (COLEOPTERA: CERAMBYCIDAE) IN HUNGARY

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*Agapanthia viti* Rapuzzi and Sama, 2012 is a newly described Central European and North and Central Balkan faunistic element. The presence and the flight phenology of *A. viti*, associated with cutleaf teasel, *Dipsacus laciniatus* L., was studied at the Kaposvár-Toponár site (Somogy County, Hungary) during 2012-2013. According to our observation, a stationary population of *A. viti* was recorded in the examined area. However, its Hungarian occurrence is rather sporadic. The adult stage of the insect is described briefly. Adults appear on leaves of the host from the beginning of May until the middle of June. Its mating activity overlaps with two thirds of the flight period. The appearance of *A. viti* is strictly associated with *D. laciniatus*. *A. viti* observability is influenced by the intensity of the wind. The infestation levels were determined as 70±15% and 50±8% in 2012 and 2013, respectively. Further colonization in Hungary and increasing expansion in Europe could be assumed from our data.

***Agapanthia viti*, *Dipsacus laciniatus*, Hungary, flight phenology, abiotic factors**

Sándor Keszthelyi i David Horváth: Prisutnost i bionomija novoopisane vrste strizibube *Agapanthia viti* (Coleoptera: Cerambycidae) u Mađarskoj. Entomol. Croat. 2015. Vol. 19. Num. 1–4: 25–30.

Vrsta *Agapanthia viti*, Rapuzzi i Sama, 2012 nedavno je opisani srednjoeuropski te sjeverno i srednjebalkanski faunistički element. Prisutnost i fenologija leta vrste *A. viti*, povezana s vrstom krpasta češljugovina, *Dipsacus laciniatus* L., proučavana je na području Kapošvar-Toponár (županija Somogy, Mađarska) tijekom 2012.-2013. godine. Prema našem opažanju, stacionarna populacija *A. viti* zabilježena je u ispitivanom području. No ova vrsta se u Mađarskoj pojavljuje sporadično. Odrasli oblici pojavljuju se na lišću biljke domaćina od početka svibnja do sredine lipnja. Vrijeme parenja preklapa se s dvije trećine perioda leta. Pojava *A. viti* izrazito je povezana s vrstom *D. laciniatus*. Opažanje vrste *A. viti* ovisi o jačini vjetra. Tijekom 2012. godine utvrđena je jačina napada od 70±15%, a tijekom 2013. godine od 50±8%. Na temelju ovoga istraživanja pretpostavlja se da će se vrsta nastaviti širiti Mađarskom i ostatkom Europe.

***Agapanthia viti*, *Dipsacus laciniatus*, Mađarska, fenologija leta, abiotski čimbenici**

## Introduction

The genus *Agapanthia* Serville, 1835 is represented by over 34 species in the fauna of the West Palaearctic region (Hoskovec & Rejzek, 2014), of which seven were found in Hungary until 1971 (Kaszab, 1971; Merkl & Víg, 2009). All of them are ecologically associated with herbaceous vegetation (Rejzek *et al.*, 2001). The blue-tinged *Agapanthia* species are very various and difficult to identify. Species previously reported exclusively as *A. osmanlis* Reiche & Saulcy, 1858 were separated into three well differentiated species by Rapuzzi & Sama (2012): *A. ozdikmeni* Rapuzzi & Sama, 2012, *A. naciyae* Rapuzzi & Sama, 2012 and *A. viti* Rapuzzi & Sama, 2012.

Eastern and Southeastern Europe were given as the distribution area of *A. viti* (Rapuzzi & Sama, 2012). There are several records of *A. viti* since its description. These data originated from Central Europe and the North and Central Balkan Peninsula: Slovakia, Hungary, Romania (Rapuzzi & Sama, 2012), Croatia (Kovács *et al*., 2012) and Serbia (Ilić & Ćurčić, 2013).

*A. viti* is strictly related to *A. osmanlis*, but it can be easily distinguished by the denser pubescence on both the dorsal and the ventral side. This pubescence is yellowish in *A. viti* and ash-colored in *A. osmanlis*. In *A. viti*, the puncturation on the head and pronotum is thinner and more regular, while there are no wrinkles at all on the base of the elytra. The erect black thin hairs on the head, pronotum and elytra are more densely distributed than in *A. osmanlis* (Rapuzzi & Sama, 2012).

*A. viti* was reared from *Dipsacus laciniatus* L. (Dipsacaceae) (Kovács *et al*., 1997; Sabol, 2009). However, these published data were mentioned for *A. osmanlis*. *A. osmanlis* has more host plants: *Dipsacus fullonum* L. (Dipsacaceae) (Rejzek *et al*., 2001) and *Cephalaria procera* Fisch. & Avé-Lall. (Caprifoliaceae) (Tozlu, 2010). There are data for other host plants, too, e.g., *Serratula* cf. *procera* Waldst. & Kit. (Asteraceae) (Rejzek et al., 2001).

Information on the biology and host plants of *A. viti* are very deficient and limited. The aim of the research was to obtain more data on *A. viti* phenology and biology, based on the observation of a Hungarian population.

## Materials and Methods

To determine the local population rate of *A. viti* at the Kaposvár-Toponár site (Somogy County, Hungary) the presence of both larvae and adults on the host plant, *D. laciniatus* were examined in 2012 and 2013. Dry previous-year stalks of *D. laciniatus* (Fig. 1) were cut to estimate the host plant infestation rate and the larval presence of *A. viti* on 15 May 2013. The instar larva presence was calculated by examination of 4×20 stalks in two villages (Kaposvár-Toponár and Fészerlak) on the basis of the damage of the plant parts.

The life cycle observation of *A. viti* was performed in the vegetation period and from the winter plant residues of *D. laciniatus* during 2012 and 2013. To study the adult appearance and the flight phenology of *A. viti*, the individuals were counted

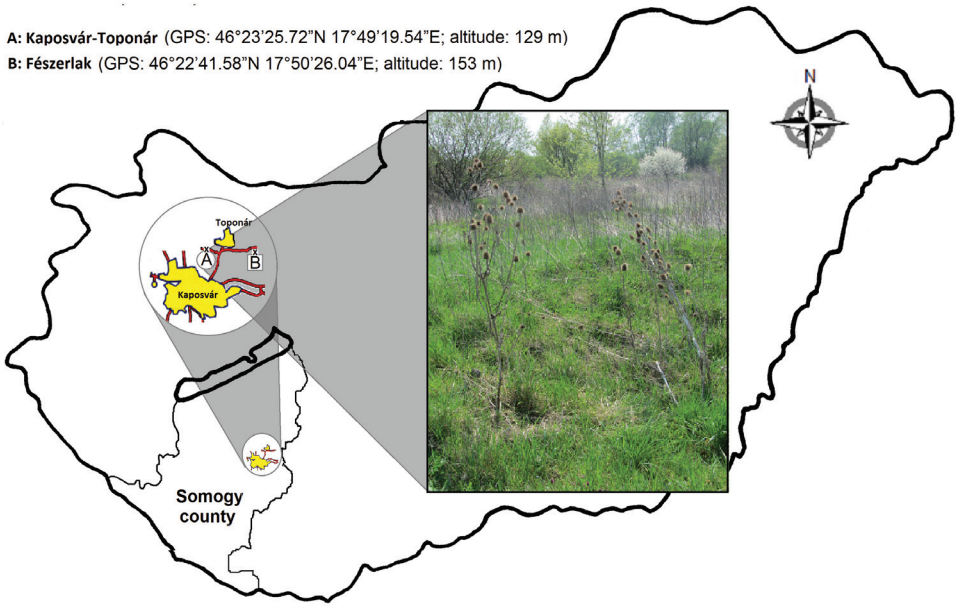


Fig. 1. Map of the observation sites of *A. viti* and *D. laciniatus* (photo) populations in the examined area.

on the host plant surface (2×10 plants indicated by stakes) from the beginning of May until the middle of June 2012 and 2013 (Tozlu, 2010). The survey was done every second day. The observation data for 2012 and 2013 are presented on a columnar diagram. The effects of abiotic factors on the observed individuals of *A. viti* were statistically examined withregression and correlation analyses ($P \leq 0.05$). The flight period of *A. viti* (1 May – 30 June) was observed in both years. Statistical analyses were performed using Microsoft Excel 2007 and SPSS 11.5 for Windows 7 Enterprise. The values of abiotic environmental factors (mean temperature, precipitation, wind speed) in the examined period for the area concerned were obtained from Kaposvár University (http://idojaras.sic.hu/index.php?disp=func/actuals.php.).

## Results

The life cycle of *A. viti* lasts one year. The developmental stages are briefly described below. The larvae masticate into the stalk of the host plant. The species overwinters in the form of mature larva. Larvae begin to pupate in the second week of May. Adults appear on the leaves of the host plant at the end of May. Females oviposit into the stems, and most eggs hatch in 8-12 days. The early instars start to feed on the stem intensively after the third week of June. Starting from mid-September, they overwinter in the stem base of the plant.

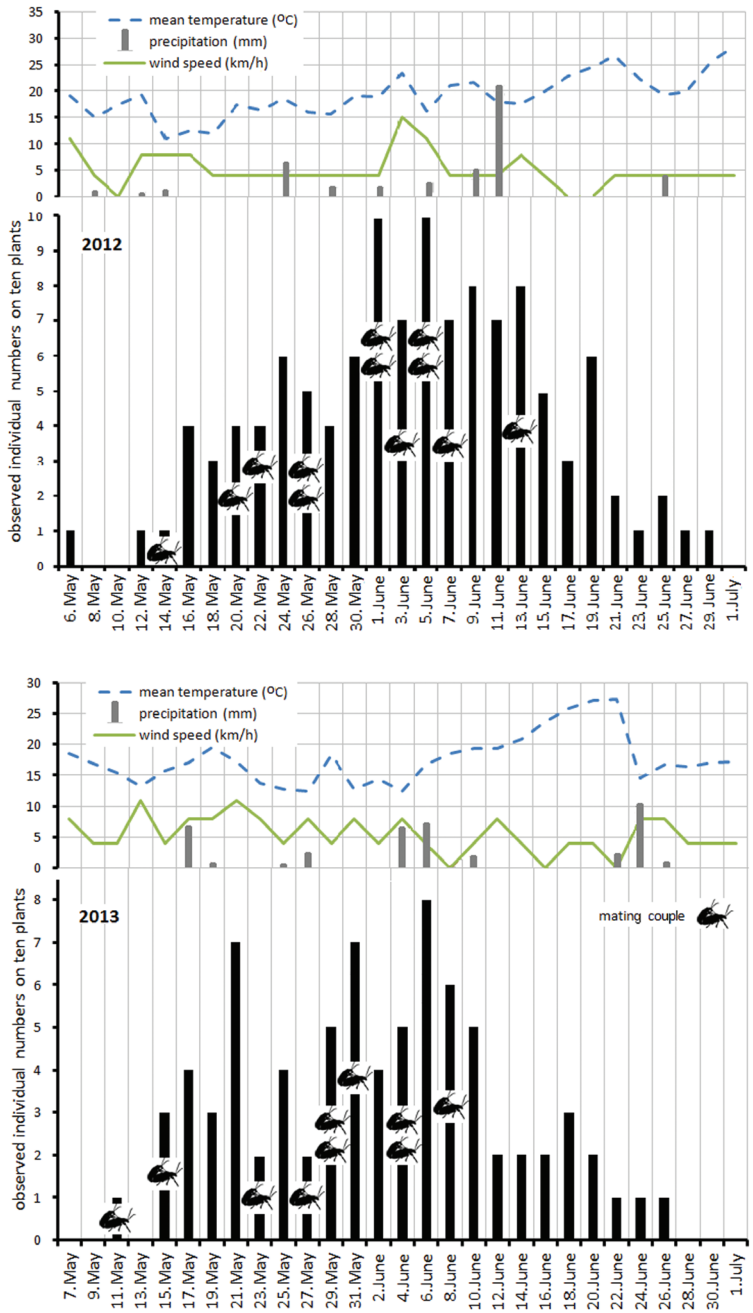


Fig. 2. Flight diagrams of *A. viti* at the Kaposvár-Toponár site (Somogy County, Hungary) in 2012 and 2013 in correlation with abiotic factors.

The appearance of adults in 2013 was like that of the previous year. The adult abundance during the observation period is shown in Fig. 2. The majority of adults flew from the end of May until the beginning of June, in both 2012 and 2013. *A. viti* appeared with a prolonged flight peak in the eastern part of the Somogy County in both years. The first beetles were observed in the first decade of May. The flight peak period was the first decade of June, with an average of 8.4 (2012) and 5.6 (2013) specimens trapped per plant, respectively. In the middle of June the number of observed adults suddenly decreased.

Mating started at the beginning of the flight period, and lasted until the beginning of the last third of the flight period. The laying of eggs could be observed in parallel with female mating activity. The stalks were masticated by females directly before the egg laying.

A much larger number of adults and mating insects were registered in 2012 than in 2013. This phenomenon cannot be correlated to abiotic factors, which is proven by statistical analysis. However, the results showed a positive correlation between observed longhorn beetle individuals and the increase of average daily temperatures ($P=0.065$; $r=0.254$), and a negative correlation between observed individuals and precipitation quantities ($P=0.126$; $r=-0.450$), but these were not statistically significant. A significant value was only present in the case of effects of the wind speed on the presence of longhorn beetle adults ($P=0.016$; $r=-0.363$).

The infestation levels (%±SE) of *D. laciniatus* significantly vary (Toponár-Deseda: 70±15 %; Fészerlak: 50±8 %). Deceased adults were observed sometimes in the passages of the larvae. Overall, in the most cases the larvae and their passages cannot be found in the upper and thinner internodes of *D. laciniatus*. *A. viti* prefers 1.5-cm-diameter stalks. The larvae move into ground-closed internodes at the end of their development. Outside larva apertures were observed on the surface of these thick internodes in most cases of damaged stalks. The abandoned passages can be afterwards occupied by commensalic species (e.g., Megachilidae, Formicidae).

## Discussion

The life cycle of *A. viti* is very similar to that of *A. osmanlis* (Tozlu, 2010). The conduct of larvae, the period of flight, the egg laying and the host plant choice are the same in the two species.

A stationary population of *A. viti* was recorded in Eastern Somogy County area. This was confirmed by the presence of both the larvae and adults. However, its occurrence is rather sporadic there, because its presence cannot be observed in other *D. laciniatus* populations in the surrounding areas.

The flight of adults lasts around 1.5 months, which overlaps with the larval and stalk development period of the host plant in Hungary, *D. laciniatus*. The species belongs to the group of late spring-early summer longhorn beetles (Keszthelyi, 2015). Its flight period overlaps with the flight period of other Central European *Agapanthia* species (Hoskovec & Rejzek, 2014).

The appearance of *A. viti* is strictly associated with its host plant. First of all, its observability is influenced only by the wind intensity. This phenomenon is not in accordance with the flight features of the majority of insect pests in agroecosystems, where temperature and precipitation are the main factors that influence insect flight and other activities (Kozár, 1997). This can be explained by the short lifespan and sexual lability of several adult insects (Hansky, 1999).

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