

Rediscovery of tospovirus vector *Dictyothrips betae* (Thysanoptera: Thripidae) in Slovakia after 72 years – Short Communication

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Abstract: The new record of *Dictyothrips betae* Uzel, 1895 (Thysanoptera: Thripidae) after 72 years in Slovakia is presented. *Dictyothrips betae* is an important pest and one of the few thrips species known as vectors of dangerous plant tospoviruses, causing severe yield losses to economically important crops worldwide. *D. betae* was swept from an herbal layer in blown sand dunes in SW Slovakia.

Keywords: blown sand dunes; thrips; tospoviruses

Thrips are generally known as crop pests (Lewis 1997) due to their invasive potential and ability to transmit plant viruses of several genera, such as *Orthotospovirus*, *Ilarvirus*, *Carmovirus*, *Sobemovirus* and *Machlomovirus* (Jones 2005; Trdan et al. 2006, 2008; Ciuffo et al. 2010; Rotenberg et al. 2015).

Tospoviruses (order: Bunyavirales, family: Tospoviridae), resp. genus *Orthotospovirus* (Karthikeyan et al. 2021), represents a major group of plant viruses and is exclusively transmitted by thrips. Worldwide, 14–15 thrips species are known to be vectors of 21 species of tospoviruses (Jones 2005; Riley et al. 2011; Rotenberg et al. 2015). The members from the genus *Orthotospovirus* belong to the most devastating viruses and significantly limit plant production worldwide (Karthikeyan et al. 2021). Tospovirus infections cause a range of symptoms on their host plants, including leaf speckling,

mottling, chlorotic, and necrotic lesions of various shapes, sunken spots, etches, ring spots, stunting, yellowing, and wilting (Riley et al. 2011).

The Thysanoptera fauna of Slovakia, currently characterized by the presence of 189 known species, includes five potential carriers of tospoviruses: *Frankliniella occidentalis* (Pergande, 1895), *F. intonsa* (Trybom, 1895), *F. fusca* (Moulton, 1902), *Thrips tabaci* Lindeman, 1889 and *Dictyothrips betae* (Žvaríková et al. 2020). *Dictyothrips betae*, as one of those species, was recorded to be a vector of *Orthotospovirus polygonianuli*, commonly known as Polygonum ring spot virus (PolRSV) (Ciuffo et al. 2010). This virus can infect several species, mainly from the Solanaceae family, potentially also plants of commercial interest such as pepper and tomato. It was isolated from *Fallopia convolvulus* L. Á. Löve and *F. dumetorum* L. Holub (Ciuffo et al. 2008).

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D. betae is characterized by Palearctic distribution (Riley et al. 2011). It was recorded in the Czech Republic, Hungary, Romania, Slovakia, Denmark, Italy and Netherlands, Germany, Latvia, Norway, Sweden, Finland, Poland, Switzerland, Ukraine, but also in Russia and Siberia (Franssen & Mantel 1962; Bhatti 1978; Zur Strassen 2003; Kobro 2011; Petrova et al. 2013; Gertsson 2015). Zhang et al. (2018) add recent findings from China (Inner Mongolia).

MATERIAL AND METHODS

Specimens of *D. betae* were collected during the research of Thysanoptera assemblages from blown dunes near Hurbanovo (SW Slovakia) (Figure 1). Thrips were sampled by a sweeping method. AGA solution (84% of ethyl alcohol, 8.3% of glycerol, 8.3% of acetic acid) was used as a conservation liquid. Thrips were mounted according to the standard preparatory techniques (Zvaríková et al. 2016; Masarovič et al. 2022) and determined according to Zur Strassen (2003) using a Leica DM2000 microscope (Leica Microsystems CMS GmbH, Germany).

RESULTS AND DISCUSSION

Two adult females were obtained on two adjacent plots at the Abóv site near the town of Hurbanovo

(1st: 47°52'46.184"N, 18°9'28.682"E; 2nd: 47°52'48.515"N, 18°9'28.450"E, both 109 m a.s.l.) on May 26 and August 22, 2023. Both locations' herbal layers contained grasses (Poaceae) together with species *Ballota nigra* L., *Aristolochia clematitis* L. and *Verbascum densiflorum*, Bertol. There are large agricultural fields with *Zea mays* L. and cereals.

Genus *Dictyothrips* is a member of the *Anaphothrips* group, but it lacks a long setae on the pronotum (Masumoto & Okajima 2017). *Dictyothrips betae* is the only member of the genus with a yellow body and a slight reddish tinge on the thorax. Delicate markings within the sculptured reticles on the body represent typical traits of the species (Figure 2).

Tergite IX possesses short, stout major setae, and anterior campaniform sensilla is absent. Ocellar setae III are small and close together within the ocellar triangle. Antennae are multicoloured and eight-segmented. Segments I and II are yellow, segments III–V are basally yellow and apically brown, and segments VI–VIII are brown. Segments III–VI have prominent microtrichia rings on both surfaces (Figure 3) (Priesner 1928; Zur Strassen 2003). Tergites II–VIII with translucent craspedum. Sternites II–VI with one to five irregularly arranged discal setae, craspeda absent (Zhang et al. 2020).

Priesner (1928) reported *D. betae* on sugar beet. Still, there are records also from meadows of *Galinum* (Schliephake & Klimt 1979), from genus *Galinoga* (Orosz et al. 2006), and individuals from China



Figure 1. Records of *Dictyothrips betae* in Slovakia
(A) Hviezdoň (N Slovakia from 1952) and (B) recent record Abóv (SW Slovakia)

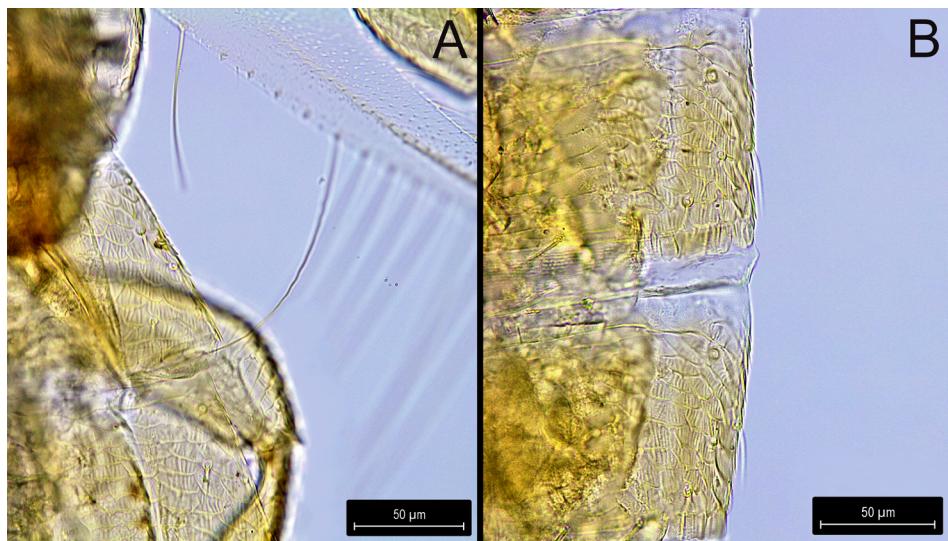


Figure 2. Delicate markings within the sculptured reticles on the body
 A – anterior part of abdomen,
 B – posterior part of abdomen; 400 × magnification

come from Poaceae (Zhang et al. 2018). Two specimens were found on *Stellaria media* (L.) Vill. during the spring season (March–May) (Szénási et al. 2002) and Petrova et al. (2013) observed *D. betae* on strawberries. Šefrová (2015) considers this species as a pest of sugar beet. Tospovirus transmission studies were conducted on *Fallopia convolvulus* and *F. dumetorum* (Ciuffo et al. 2008, 2010).

Dictyothrips betae has been reported in many parts of the eastern Palaearctic region, including Slovakia (Zur Strassen 2003). Moreover, Šefrová and Laštúvka (2005), in the sense of Pelikán (1952), added it to the catalogue of alien animal species in the Czech Republic in which it is characterized as a naturalized, post-invasive species from the Mediterranean region with spontaneous introduction to the country. Dudich et

al. (1943) recorded *D. betae* for the first time in Slovakia in 1943 (S Slovakia, without specific location) as *Anaphothrips omissus* Priesner 1924. In 1952, this species was also recorded by Pelikán (1952) at the location Hviezdoň (Belianske Tatry Mountains, N Slovakia) at an altitude of 1620 m a.s.l. We have recorded *D. betae* after 72 years in southwestern Slovakia in the location of Aba. Wider research is being conducted to provide the occurrence of the species in the area.

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Figure 3. Rings of microtrichia on antennal segments (400 × magnification)

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