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On the occurrence of *Drosophila suzukii* (Matsumura, 1931) in Slovakia

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Abstract

Small fruit fly (family Drosophilidae) Drosophila suzukii *(Matsumura, 1931) is native to southeast Asia although in recent years it quickly spreads, being now widespread over several continents.* D. suzukii *is a fruit crop pest and a serious economic threat to soft summer fruit. This article summarizes its occurrence at three selected sites in Eastern Slovakia during summer and autumn period 2017. All specimens recorded in this study were present only in autumn samples and only in beer and rotten meat (located above the vinegar) traps.*

Keywords

the spotted wing drosophila, invasion, pest, distribution, Slovakia

Introduction

The Asian vinegar fly, or spotted wing *Drosophila* (Fig. 1, 2) - *Drosophila suzukii* (Matsumura, 1931) (Diptera: Drosophilidae) is species at present widely distributed in Holarctic Region, Neotropic Region and in some parts of Oriental Region (here in higher altitudes with temperate/subtropical climate); it also invaded some isolated island groups: Hawaii and Réunion (Hauser 2011, Lee et al. 2011, Calabria et al. 2012, Cini et al. 2012, Deprá et al. 2014, Kinjo et al. 2014, Asplen et al. 2015). It appears to be a circumtropical, circumsubtropical, and circumtemperal species, with distribution range between 50° S and 70° N.

The species is a highly polyphagous and invasive primary pest, which could cause significant damage to a number of cultivated berry and stone fruit crops (Březíková et al. 2014). *D. suzukii* oviposits and feeds on healthy fruits, unlike most other *Drosophila* species (Calabria et al. 2012). This species has emerged as a major invasive insect pest of small and stone fruits in both Americas and Europe since the late 2000s (Asplen et al. 2015).

In the four countries comprising the eastern part of Central Europe, this species was recorded first in Hungary in 2012 (Kiss et al. 2013), next in Czech Republic in 2014 (Březíková et al. 2014), in Slovakia (NPPO of Slovakia 2014, Asplen et al. 2015) and in Poland (Łabanowska & Piotrowski 2015, Asplen et al. 2015).

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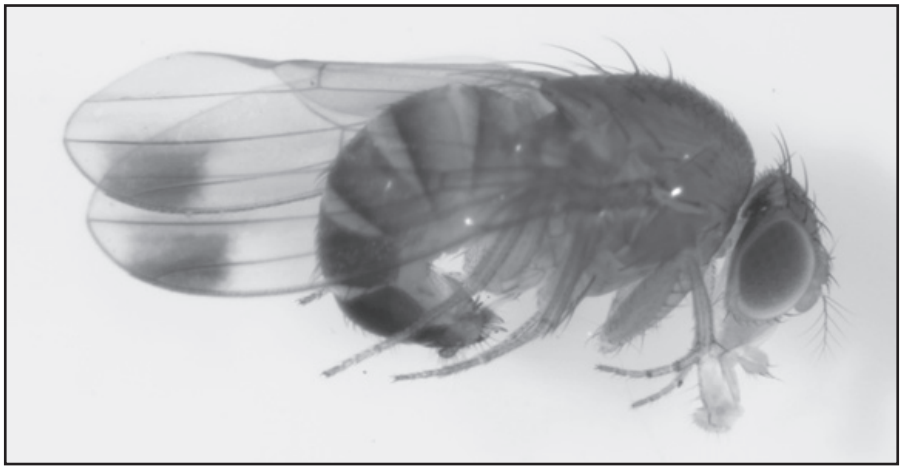

Figures 1. and 2. *Drosophila suzukii* (Matsumura, 1931) ventral view male (up) and female (down).

Material and methods

Bait traps consisted of big (1.5 litre) transparent plastic bottles with a circular opening (diameter 4 cm) in the upper third of the bottle laterally, filled with 0.3 litre of (i) beer, (ii) white sweet wine, (iii) natural fruit syrup, and (iv) rotten meat placed above

the vinegar were used. They were located at three sites in Eastern Slovakia (see Tab. 1), three traps of each type on each site.

Traps were hung 1.5–2 metres above the ground on branches of trees (mod. Dvořák 2007, Dvořák et al. 2008) in two periods: 2.–13.vi.2017 and 8.–19.ix.2017. The traps were exposed 10 days. Material was taken out, washed and fixed in ethanol. In laboratory members of Drosophilidae family were determined according to Bächli et al. (2004), taking in account also Calabria et al. (2012)

Table 1. List of collecting sites.

Site number	Site name	Codes of DFS *	Site description	Geographic coordinates	Altitude (m a.s.l.)	Collector
site 1.	Prešov	7093	field (school area)	48°59′22″N, 21°13′33″E	250	J. Oboňa
site 2.	Abranovce	7094	garden	48°56′8″N, 21°20′9″E	426	L. Demková
site 3.	Abrahámovce	6894	garden	49°09′42″N, 21°20′32″E	267	M. Kohútova

* codes of the Databank of the Slovak fauna (DFS)

Results and discussion

D. suzukii was not abundant, a total of 5 specimens (3 males and 2 females; Figs 1 and 2) were found in all samples. All collected specimens were present only in September samples. From all traps they were present only in those with (i) beer traps and (iv) rotten meat located above the vinegar traps.

Diptera: Drosophilidae

***Drosophila suzukii* (Matsumura, 1931)**

Material examined: site 1., 19.ix.2017, traps with rotten meat located above the vinegar, 2 males; site 2., 19.ix.2017, beer traps, 1 male; site 3., 19.ix.2017, beer traps, 2 females.

D. suzukii was first found in Slovakia in a trap at a farm at Malé Ludince (DFS – 8078, 132 m a.s.l.) on 9.x.2014 (NPPO of Slovakia 2014) and according to Asplen et al. (2015: Electronic supplementary material) in traps at Rimavská Sobota (DFS – 7686, 210 m a.s.l.), 26.x.2014 and Štúrovo (DFS – 8278, 111 m a.s.l.), 18.x.2014.

Recent occurrence data on *D. suzukii* in Slovakia including results of this study are shown in Fig. 3.

This species can be identified on the basis of unambiguous characters. The male has a distinct dark spot near the tip of each wing (Fig.1); females do not have the wing spotted (Fig. 2). The foreleg of the male bears dark combs of cuneiform setae on the first and second tarsi. The female has a long, sharp, serrated ovipositor - Fig. 4 (e.g. Asplen et al. 2015).

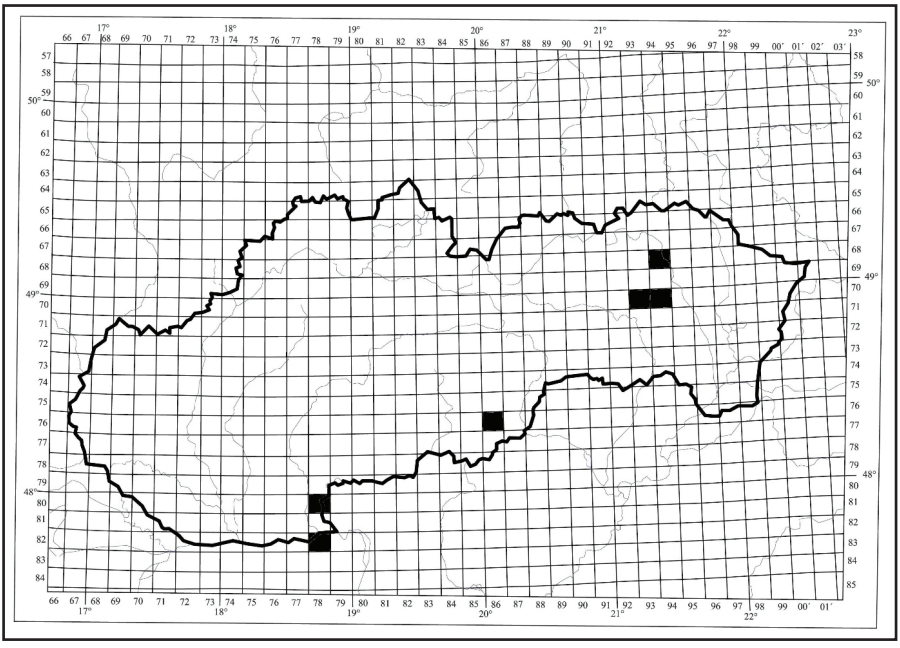

Figure 3. Recent occurrence data on *D. suzukii* in Slovakia.

Figure 4. *Drosophila suzukii* (Matsumura, 1931) female ovipositor.

The lifespan of *D. suzukii* varies greatly among generations; from a few weeks to ten months (e.g. Hauser 2011, Lee et al. 2011, Calabria et al. 2012, Cini et al. 2012, Deprá et al. 2014, Kinjo et al. 2014, Asplen et al. 2015). Generations hatched earlier in the year have shorter lifespans than generations hatched after September. Only adults overwinter successfully as was found out by the research conducted thus far (e.g. Lee et al. 2011, Asplen et al. 2015).

In Slovakia, all specimens of this pest were caught by different traps only in autumn (September, October) and in relatively low abundance (NPPO of Slovakia 2014, Asplen et al. 2015, present study).

The fertilized female searches for ripe fruit, lands on the fruit, inserts its serrated ovipositor to pierce its skin and deposits 1 to 3 eggs per insertion. Females oviposit on multiple fruits, but at sites with scarce fruit, many females oviposit on the same fruit. A female may lay as many as 300 eggs during its lifespan. With several generations per season, and the ability for the female to lay up to 300 eggs each, the potential population size of *D. suzukii* is huge. It is also important to note that males of *D. suzukii* become sterile at 30°C and population size may be limited in regions that reach that temperature (e.g. Hauser 2011, Cini et al. 2012, Kinjo et al. 2014, Asplen et al. 2015).

The larvae grow inside the fruit. The oviposition site remains visible in many fruits as a small pore scar in the skin of the fruit often called a "sting". After 1 or 2 days, the area around the "sting" softens and depresses creating an increasingly visible blemish. The depressions may also exude fluid which may attract infection by secondary bacterial and fungal pathogens. Larvae may leave the fruit, or remain inside it, to pupate (Bolda et al 2010).

Unlike its vinegar fly relatives, which are primarily attracted to rotting or fermented fruit, female of *D. suzukii* attack fresh, ripe fruit by using the saw-like ovipositor to lay eggs under the fruit's soft skin. The larvae hatch and grow in the fruit, destroying the fruit's commercial value. The larvae are small, white, and cylindrical, reaching 3.5 mm in length (e.g. Asplen et al. 2015). *D. suzukii* is a fruit crop pest and a serious economic threat to soft summer fruit; i.e., cherries, blueberries, raspberries, blackberries, peaches, nectarines, apricots, grapes, and others (Asplen et al. 2015).
This pest is present in Slovakia from 2014, however considerable damage has not yet been recorded. Nevertheless, it is very important to pay attention to it and monitor its occurrence and abundance in the territory of Slovakia, especially at sites with large areas of soft summer fruit.

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