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THE FIRST FINDING OF WALNUT HUSK FLY *RHAGOLETIS COMPLETA* (DIPTERA, TEPHRITIDAE) IN SLOVAKIA

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KEY WORDS

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ABSTRACT

Walnut husk fly *Rhagoletis completa* Cresson, 1929 is reported for the first time from Slovakia. Data on the distribution, morphology and biology of the species are given.

Walnut husk fly *Rhagoletis completa* Cresson 1929 originates from North America, it was also considered as subspecies of *Rhagoletis suavis* ssp. *completa* Cresson. The species is native to southern and central USA and northernmost part of Mexico. Since 1920 is adventive in western part of USA (White & Elson-Harris 1992). *R. completa* was first time reported in Europe from Italy where it was recorded attacking walnuts in Veneto and Friuli Venezia Giulia. Later the species was observed damaging walnuts in some areas of Piermont and Lombardi. Soon the species was regularly observed also in Croatia (Bjelis 2008) and Bosnia and Herzegovina (Ostojic et al. 2014). Beside of this, restricted or occasional occurrence of *R. completa* is known also from Austria, France, Germany, Hungary, Netherlands and Slovenia (CABI/EPPO 2014). So far, four *Rhagoletis* species were known from the territory of Slovakia (Kozánek 1998).

Findings in Slovakia. *R. completa* was first time recorded in Slovakia in the frame of extensive entomological research of insect communities in urban environment (Bratislava) at collecting sites Bratislava – Rača (N 48° 12′ 34.93″, E 17° 9′ 8.94″), 18. 8. 2017: 3♂, 3♀ and 4. 9. 2017 1♂, 2♀ and Bratislava – Petržalka (N 48° 7′ 30.4″, E 17° 7′ 29.79″): 1♂. All specimens were collected by using of Malaise traps. Additional specimens were obtained in the frame of the regular monitoring of insect pests provided by Central Control and Testing Institute in Agriculture in Bratislava at collecting sites Bratislava – Ružinov (N 48° 9’ 39.51″, E 17° 10’ 53.17″), 6. 9. 2017 by using of yellow sticky traps and Hrnčiarovce nad Parnou (N 48° 20’ 37.63″, E 17° 33’ 57.09″), 11. 9. 2017 (6 living larvae).

Description of adult. Head is semi-globular; frons in both sexes is yellow, orange-yellow in lower half. Antennae are entirely yellowish. Mesonotum is brown, its lateral and hind margin dark brown. Scutellum is yellowish brown with dark brown margins. Brown margins of mesonotum and scutellum are darker in male. All femora in male are dark brown to brownish black. Front and mid femora in female are brown, hind femora light brown. Tibiae in both sexes are light brown, hind tibiae brown. Tarsi are yellowish brown last two tarsal segments are darkened. The wing pattern of transversal bands is similar to other *Rhagoletis* species,

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accessorial transversal band is missing. Abdominal terga in both sexes are brown progressively darkened posteriorly. It can be easily differentiates from further economically important Central European *Rhagoletis cerasi* by the absence of accessorial band between preapical and discal transversal band and brown coloration of mesonotum (black in *R. cerasi)* (Fig. 1 and 2).

Description of third instar larva. Colour of living larvae shiny, whitish, due to fat body, brownish content of the intestine can shine trough. Body subcylindrical, tapering on both anterior and posterior end, integument smooth, only creeping welt equipped by transversal rows of small back-curved spines. Cephalic segment is simple, rounded. Anal segment truncated, ventrally with bilobed anal pad. Anterior spiracles with 15 papillae, posterior spiracles simple (Fig. 3).

Cephaloskeleton of third instar larvae. The mouth hooks are strongly developed, subparallel, with blunt apex and strong ventral process. The epistomal sclerite delicate, C-shaped in dorsal view. The intermediate sclerite H-shaped in ventral view, the apical parts are strongly sclerotised. The subhypostomal sclerites converging, V-shaped in lateral view. The posterior sclerite: parastomal bars thin, up-curved distally; vertical plate well developed, with strongly sclerotised anterior part; dorsal bridge with T-shaped sclerotised area; dorsal and ventral cornua almost equally broad; the ventral cornua in ventral view our-glass shaped. Pharynx with 8 grooves (Fig. 4).

Host plants and impact of larval development. In North America, walnut husk fly was recorded from several species of *Juglans* (*J. californica, J. hindsii, J. nigra*) but only exceptionally from *J .regia*, which is the main host of this species in Europe. According to the literature data it can attack also stone fruits (*Prunus persica*) (Bush 1966). Hislop et al. (1981) described two types of walnut fruit damage. Larvae of early infestation populations impede the kernel resulting in malformations of nuts or even empty shell. In normal or late-season infestation larvae feed on mesocarp causing the whole husk or large portion of it to turn black but the kernel is undamaged. Ciampolini & Trematerra (1992) observed 50 % infestation of harvested walnuts in Italian orchards and Kasana & Aliniazee (1996) recorded up to 95 % infestation on untreated trees in Oregon.

Biology of walnut husk fly. Based on the study of Kasana & Aliniazee (1996) from Oregon, adult fly emerge from late June till the mid of August occasionally up to early September. The peak of oviposition is in August. Females lay eggs bellow the skin of the walnut fruit, eggs hatch after 3 to 7 days. Larvae usually feed 2 – 5 weeks on the mesocarp. Mature larvae leave the fruit, pupate in the soil under the host tree where over winter in the pupal stage. Adult flies live up to 40 days depending under the field conditions. Similarly as in other *Rhagoletis* species, adult dispersion is reduced to short distance, long distance distribution is caused mainly by the transport of infected fruits. Parasitic wasps *Biosteres sublaevis* (Braconidae), *Coptera occidentalis* (Diapriidae) and *Trybliographa* sp. (Figitidae) are natural enemies of walnut husk fly.

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Figure 1. Male of walnut husk fly *Rhagoletis completa*.

Figure 2. Female of walnut husk fly *Rhagoletis completa*.

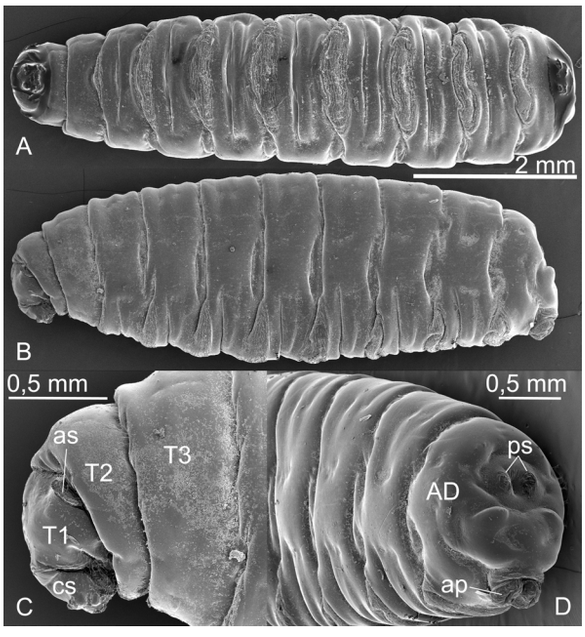

Figure 3. SEM images of third instar larva of *Rhagoletis completa*.

A – ventral view; B – lateral view; C – cephalic segment and thorax, lateral view; D – rear end of the larva; AD – anal division; ap – anal pad; cs – cephalic segment; T1-T3 – 1st to 3rd thoracal segments; ps – posterior spiracles

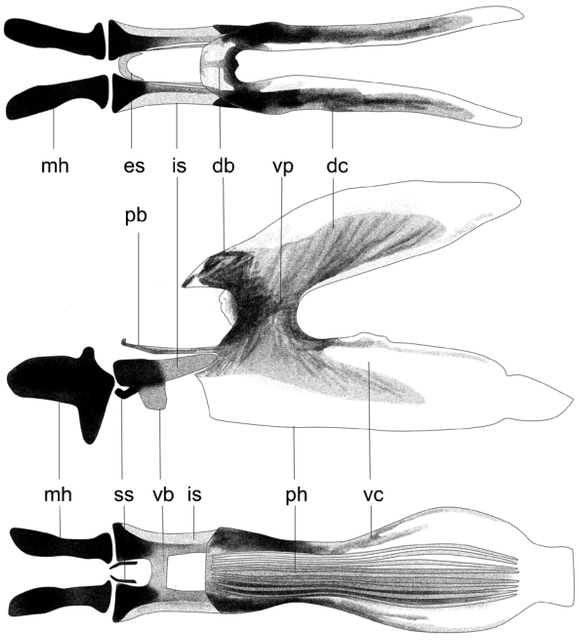

Figure 4. Cephaloskeleton of *Rhagoletis completa*, third instar.

From top: dorsal, lateral and ventral view; dc – dorsal cornua; db – dorsal bridge; es – epistomal sclerite; is – intermediate sclerite; mh – mouth hooks; pb – parastomal bar; ph – pharynx; ss – subhypostomal sclerite; vc – ventral cornua; vb – ventral bridge; vp – vertical plate.

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