

# First report of *Toxomerus dispar* (Fabricius, 1794) (Diptera: Syrphidae) preying *Spodoptera frugiperda* (J.E. Smith, 1797) (Lepidoptera: Noctuidae) in laboratory

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The fall armyworm *Spodoptera frugiperda* (Smith, 1797) (Lepidoptera: Noctuidae) is one of the most important pests in Brazilian maize fields that causes damage to approximately 57% of the crop (Cruz et al., 1999). However, several biological control agents occur freely in agroecosystems and are known to suppress the *S. frugiperda* population (Dequech et al., 2004; Bortolotto et al., 2014). Among the predator insects, hoverflies have been reported to occur in maize fields but are usually associated with aphid infestation (Swaminathan et al., 2015). Thus far, few studies have investigated hoverflies preying on lepidopteran pests, and the spectrum of preys examined is unclear. To our knowledge, this is the first report of *Toxomerus dispar* larvae (Fabricius, 1794) (Diptera: Syrphidae) preying on *S. frugiperda* caterpillars (Figure 1).

Thirty specimens of hoverfly larvae were collected from 100 plants (in V<sub>9</sub>-V<sub>10</sub> phenological stage) in a maize field, located in Londrina (23°20'601" S 51°12'764" W), Paraná State, in April 2013. In laboratory, the hoverfly larvae were segregated using a brush, and then individually placed in Petri dishes (diameter: 10 cm) under controlled conditions (25 °C ± 2 °C, 60% ± 20% humidity, and a 12-h photoperiod). A piece of moistened cotton ball was placed in each Petri dish along with a maize leaf disc (10 cm<sup>2</sup>) daily infested with 10 aphids, and the larvae were allowed

to feed aphids until they reach the third-instar stage (due to the high aggressivity of *S. frugiperda* against newly hatched hoverfly larvae). Thereafter, first and second instar *S. frugiperda* caterpillars (obtained from the Laboratory of Embrapa Soybean, Londrina, PR, Brazil) were provided *ad libitum* as feed to hoverfly larvae (Figure 1), until they reached the pupal stage or died.

*Toxomerus dispar* larvae consumed two caterpillars in 24 h, on average, and the larval viability was found to be 76.7%, which indicated that *S. frugiperda* caterpillars have high nutrient content and may have facilitated the development of hoverfly larvae. *T. dispar* larvae that reached the pupal stage were retained in the same Petri dishes until adults emerged. The adults were then transferred to plastic micro tubes containing 70% alcohol to kill them. These individuals were then identified by comparison with the other specimens stored in the museum at the State University of Londrina (UEL) and were identified as *T. dispar*, which prey on other insects such as aphids (Rojo et al., 2003; Swaminathan et al., 2015) and *Diatraea* spp. caterpillars (Guilding, 1828) (Lepidoptera: Crambidae) (Rojo et al., 2003). Therefore, this report indicates that *S. frugiperda* is a newly identified prey of hoverfly larvae. In conclusion, we suggest further investigation of the bioecology of this predator in maize fields. Moreover, assays within an isolated area of approximately 1 m<sup>2</sup> under controlled conditions could corroborate the use of these predators in the field.

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**Figure 1.** Larva of third instar of *Toxomerus dispar* (Fabricius, 1794) (Diptera: Syrphidae) preying first instar of *Spodoptera frugiperda* (Smith, 1797) (Lepidoptera: Noctuidae) caterpillar in laboratory. Bar = 2 mm.

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