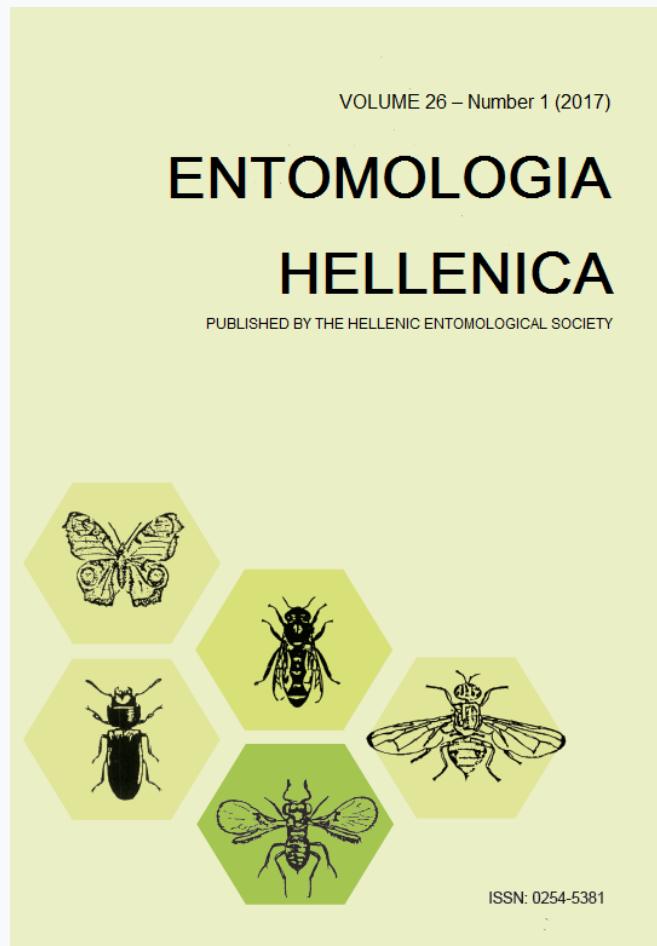


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SHORT COMMUNICATION

First report of *Antigastra catalaunalis* on sesame in Greece

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ABSTRACT

In August 2016, severe infestations of sesame crops by the sesame leaf webber and capsule borer, *Antigastra catalaunalis* (Duponchel) (Lepidoptera: Crambidae), were recorded in rural areas of the Regional Unit of Drama, Northern Greece. Larval feeding-damage symptoms were observed on leaves and capsules. Infestations were recorded in all of the inspected sesame fields. The infestation levels were considerable high resulting in significant economic loss. To our knowledge, this is the first report of *A. catalaunalis* severe infestation on sesame in Greece.

KEY WORDS: sesame leaf webber and capsule borer, Crambidae, severe infestation, insect feces.

Sesame (*Sesamum indicum* L., Pedaliaceae) is one of the oldest cultivated plants in the world. The major sesame producing countries are the United Republic of Tanzania, India, Sudan and China, followed by Myanmar, Nigeria, Burkina Faso, Ethiopia, Chad and Uganda (FAOSTAT 2014). In Greece, sesame was cultivated up until the 1970s, but later its cultivation was abandoned. In recent years, there has been an increasing interest in sesame cultivation. Approximately 660 ha were cultivated with sesame crops in 2016 (OPEKEPE 2016). The present study reports the first recorded severe infestation of sesame crops by the sesame leaf webber and capsule borer, *Antigastra catalaunalis* (Duponchel) (Lepidoptera: Crambidae), in Greece.

In August 2016 the first symptoms of the larval infestation were observed in a one-hectare field with late-sown sesame as a subsequent crop to barley, at the pod set stage, in the rural area of Nerofraktis (41,0256° N / 24,1190° E, WGS 84) in the Regional Unit of Drama (Region of Eastern Macedonia and Thrace). First instars were mostly observed on the top leaves of the plants feeding initially on the leaf epidermis (Fig. 1A). Second instars, besides infesting the leaves (Fig. 1B), were also observed damaging capsules (Fig. 1C) as well as shoots causing longitudinal superficial erosions. Late instars were found boring galleries in the mesophyll of the main stem of the plant (Fig. 1D). Leaf silk-webbing was also observed, as a result of larval activity

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(Fig. 2). A characteristic feature of the infestation was the abundance of insect feces on the leaves, bases of capsules and shoots. Larvae often exhibited cryptic behavior in the narrow gap between the shoot and the capsules.

Larvae collected in the field were allowed to complete their development in the laboratory of the Department of Quality and

Phytosanitary Inspections of Drama, Greece. The morphological characters of both the larvae (Fig. 3) and the emerged adults (Fig. 4) resembled *A. catalaunalis*. For species confirmation, both the external and the genitalia morphology of adult samples was examined by the third author. The species was confirmed as *A. catalaunalis* (Hannemann 1964, Parenti 2000).

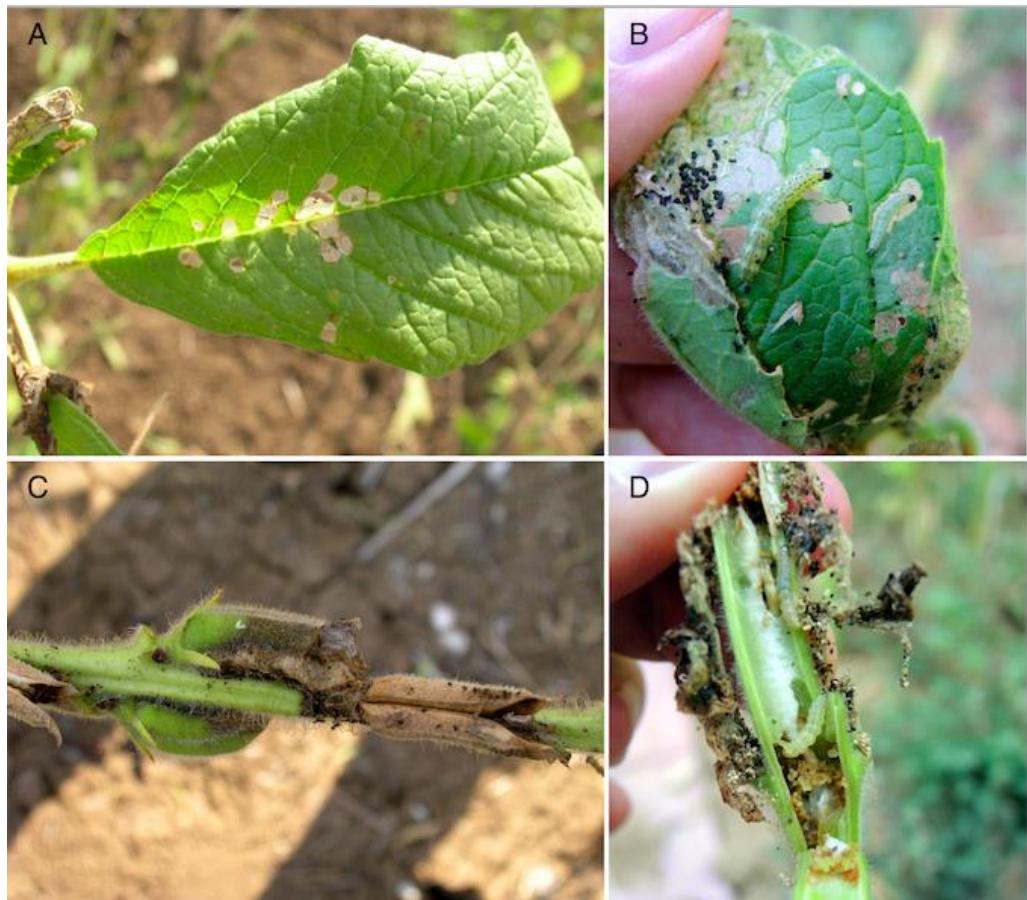


FIG. 1. Damage symptoms on leaf (A and B), capsules (C) and stem (D) of sesame due to larval feeding of *Antigastra catalaunalis*.

Antigastra catalaunalis male moths are 8 mm in length with a wingspan of 23 mm while females are 12 mm in length with a wingspan of 27 mm (Ahirwar et al. 2010). Eggs are small, 0.41 mm in length, with a tapered shape and white-colored (Ahirwar et

al. 2010). First and second instars initially have a black head and pronotum plate. Their body is pale colored and dotted with black spots (Fig. 3A). Third instars gradually gain a greenish hue, while the pronotum plate is whitish with a pair of black spots (Fig. 3B).

In total, there are five instars and the length of the fully developed larva is approximately 16 mm (Ahirwar et al. 2010).



FIG. 2. Leaf silk-webbing due to larval feeding of *Antigastra catalaunalis*.

According to the literature infestation of sesame by *A. catalaunalis* occurs approximately two weeks after germination, however damage is more severe after the initiation of flowering, especially in dry periods (Suliman et al. 2013). Under field conditions, in Central India, the life cycle of this species lasts an average of 27 days. More specifically, it takes 2-3 days for egg hatching, 10-15 days for larval development, 4-12 days for the pupal stage which takes

place either on the plants or in the ground, and 6-9 days for the adult life span (Ahirwar et al. 2010, Suliman et al. 2013). Pre-oviposition period is approximately 1 day and females lay on average 60 eggs during their lifetime. Egg laying takes place in the morning on the undersurface of the leaves, on the capsules and on the shoots and lasts about 3-4 days (Ahirwar et al. 2010).

In India, this species completes as many as 14 generations per year mainly due to the prevalence of maximum daily temperatures between 31 and 36°C, mean daily temperatures around 27°C and low rainfall (below 55 mm) during the flowering and fruiting stages of the sesame crop which favor the infestation by this species (Ahirwar et al. 2010). Interestingly, similar weather conditions were also observed in the area of Neroftaktis during the summer (July-August) of 2016, with mean maximum daily temperatures higher than 31°C, mean daily temperatures around 25°C and only 16.9 mm rainfall (NOA 2016), which might explain the existence and adaptation of *A. catalaunalis* in this certain area.

Antigastra catalaunalis is considered a serious pest of sesame in India (Ahirwar et al. 2010, Karuppaiah and Nadarajan 2013,

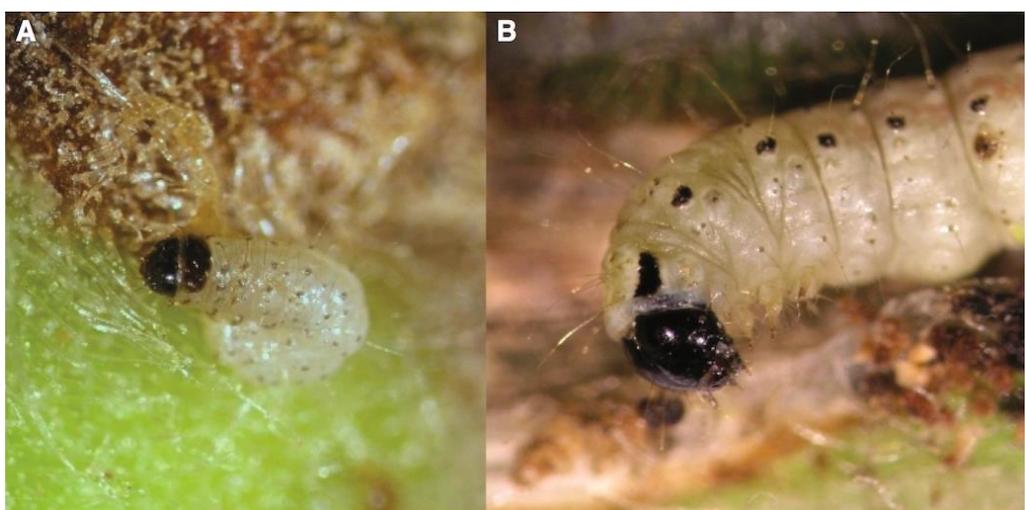


FIG. 3. Second (A) and third instar (B) of *Antigastra catalaunalis*.

CABI-Plantwise 2016), Turkey (CABI-Plantwise 2016) and Ethiopia (Gebregergis et al. 2016a). It is a species of tropical origins, widespread in the Mediterranean region such as Spain, France, Italy, Malta, Greece and Cyprus (Schaffers 2009, de Jong et al. 2014). Due to its ability to develop rapidly dense populations and its aggressive feeding behavior on sesame, macroscopic crop inspections at regular intervals are crucial for early detection of this species. In India, the economic damage threshold is estimated to 2.25 larvae per square meter (Rajendra et al. 1987). On the other hand, in most of the Central European countries, *A. catalaunalis* occurs only as a very rare migrant (Prins and Veraghtert 2006, Schaffers 2009).



FIG. 4. Adult of *Antigastra catalaunalis* (dorsal view).

On the particular sesame field in the area of Nerofraktis very extensive foliage loss was observed (Fig. 5). Mean percentage of infested plants was greater than 80% and approximately 50% of the capsules were seriously affected. Yield losses were estimated to be higher than 50%, due to direct insect damage and premature opening of the infested capsules. It is worth to mention that even a minimal damage of the capsules resulted in early ripening and shedding their seeds before or during harvest.



FIG. 5. Leaf loss due to *Antigastra catalaunalis* infestation on sesame crop.

Control of *A. catalaunalis* is based on cultural practices, use of natural enemies for biological control and chemical control. Early sowing helps the crop to avoid leaf webber damage, whereas delayed sowing is associated with significantly higher levels of damage to sesame leaves, flowers and pods, as well as with poor crop yield (Karuppaiah 2014). The release of parasitoids and predators has been reported to reduce the population growth of *A. catalaunalis* (Karuppaiah 2014). An extensive list of *A. catalaunalis* parasites is given by Hallman and Sanchez (1982). Conservation of the existing natural predators (spiders, coccinellid beetles, mantids and predatory stink bugs) and parasitoids (Braconidae and Ichneumonidae) along with application of microbial pesticides such as *Bacillus thuringiensis* var. *kurstaki* (Karuppaiah 2014), in terms of IPM, resulted in the efficient control of *A. catalaunalis* in sesame (Sasikumar and Kumar 2014). Furthermore, two applications of insecticides at 2 and 4 weeks after sesame germination resulted also in the efficient control of *A. catalaunalis* (Gebregergis et al. 2016b). However, in Greece, to date, there is no chemical or microbial pesticide approved for the control of sesame crop pests. Such limitation could be resolved through ministerial decrees granting pesticide approvals for minor crops such as sesame.

Hereby, we demonstrate the potential threat of *A. catalaunalis* on sesame as well as the destructive consequences followed by a heavy infestation. Thus, it is of critical importance to inform promptly the sesame farmers, especially those that are located in the Mediterranean region, of this major threat, as well as for the potential control methods in order to avoid future crop losses.

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Πρώτη αναφορά προσβολής σε σουσάμι από το *Antigastra catalaunalis* στην Ελλάδα

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ΠΕΡΙΛΗΨΗ

Τον Αύγουστο του 2016, καταγράφηκαν σοβαρές προσβολές σε καλλιέργειες σουσαμιού από το έντομο *Antigastra catalaunalis* (Duponchel) (Lepidoptera: Crambidae) σε αγροτικές περιοχές της Περιφερειακής Ενότητας Δράμας. Το *A. catalaunalis* είναι ένας σημαντικός εχθρός της καλλιέργειας του σουσαμιού σε περιοχές όπου αυτό καλλιεργείται. Παρατηρήθηκαν συμπτώματα προσβολής από τις προνύμφες του εντόμου σε φύλλα, βλαστούς και κάψες. Οι προσβολές καταγράφηκαν σε όλους τους αγρούς με καλλιέργεια σουσαμιού που επιθεωρήθηκαν, με επίπεδα προσβολής υψηλά τα οποία προκάλεσαν οικονομική απώλεια. Στο βαθμό που γνωρίζουμε, αυτή είναι η πρώτη αναφορά σοβαρών προσβολών σουσαμιού από το *A. catalaunalis* στην Ελλάδα.