

THE BEETLE *MORDELLISTENA PARVULA* GYLL. (COLEOPTERA, MORDELLIDAE), A NEW SUNFLOWER PEST IN ROMANIA

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ABSTRACT

Aspects of biology and ecology of the beetle *Mordellistena parvula* Gyll., a new sunflower (*Helianthus annuus* L.) pest are presented for the first time in Romania. *Mordellistena parvula* Gyll. is a univoltine species, hibernating as third instar larva, inside of sunflower stems and roots. Larvae of *Mordellistena parvula* Gyll. feed with the stem pith of sunflower. Natural enemies of this pest have not been reported till now. Some resistance and tolerance to the attack of this pest was recorded in inbred lines and hybrids of sunflower tested.

Key words: *Mordellistena parvula* Gyll., sunflower

INTRODUCTION

The family of *Mordellidae* comprises about 600 species of small insects, with dark colored tegument, sometimes with light colored drawings. The surface of the body is covered by silky hair, disposed in stripes or spots, rarely with bright reflections.

The length of the adult insects varies between 2 and 4 mm. The adult insects are very active and good flyers, being observed on the flowers of *Umbelliferae* and *Compositae* species.

Some species of *Mordellidae* could hop using the posterior legs and the tip of the abdomen.

The family *Mordellidae* is spread in Europe, Middle Orient and Asia, up to Mongolia (Balachowschy, 1962).

Until now, the beetle *Mordellistena parvula* Gyll. (syn: *Mordella parvula* Gyll., *Mordella troglodytes* Mann., *Mordella pusilla* Redt.) has not been reported as harmful for sunflower in Romania (Vrânceanu, 1974). The larvae of this beetle have been found inside of the stem of some sunflower inbreds and hybrids at Agricultural Research Station - Podu Iloaiei, and the adults in the samples collected by entomologic netting.

This study presents some aspects of the biology and ecology of the species *Mordellistena parvula* Gyll. as sunflower pest.

MATERIALS AND METHODS

The research was carried out in sunflower crops situated in Agricultural Research Station - Podu Iloaiei area, county Iași, between 1977-1995.

Observations were made particularly on the pest larvae developing in sunflower stems. Phenological stages of egg laying by the adults, the place of penetration of the first instar larvae into the petiole sheath and the development of the larvae were observed. Advancing directions of the larvae through the stem pith during their feeding period, the position and shape of the galleries as well as the number of larvae/stem were also recorded. The period of hibernation, including the moment of adult occurrence was determined.

All these observations were made periodically by sectioning the sunflower stems.

RESULTS AND DISCUSSIONS

At the beginning and in the middle of May, sunflower crops are visited by a large number of species of insects belonging to the orders *Homoptera*, *Heteroptera*, *Diptera*, *Coleoptera*, among which *Mordellistena parvula* Gyll. (Figure 1).

The body of this pest is narrow, laterally flattened and sharpened at the posterior side. The head is short, vertically inserted on the prothorax, bearing large oval prominent eyes. The antennae have 11 articles and are fixed behind the eyes. The elitra are slightly convex, narrowed at the posterior side, letting the pygidium partially uncovered. The legs are long and covered with hairs which are longer at the posterior pair. The tarsi have 5 articles at the first pair of legs and only four at the posterior pair. The color of the body is dark gray. The length of the body of adult insects varies be-

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Figure 1. Second (A) and third (B) instar larvae of *Mordellistena parvula* Gyll

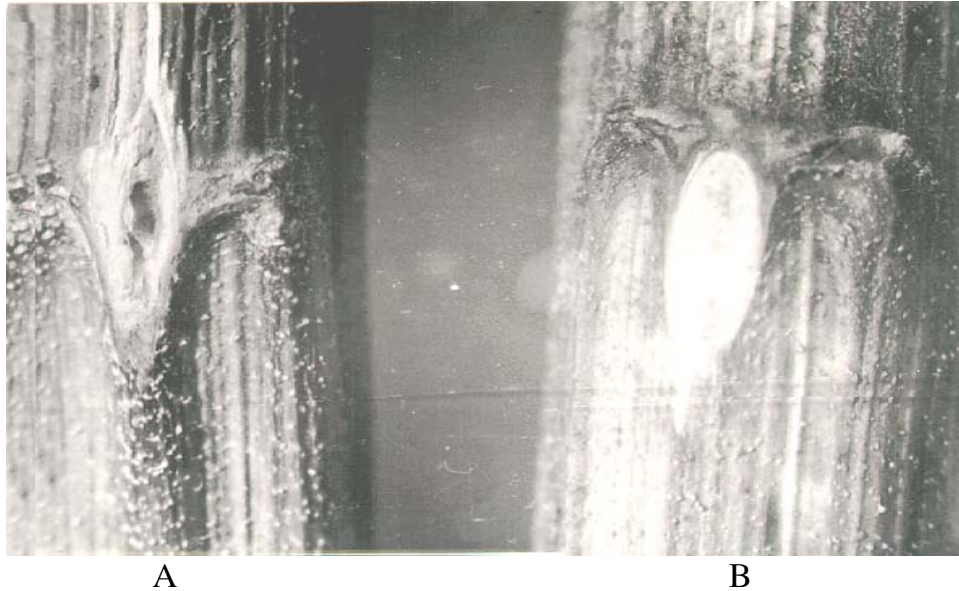


Figure 2. Longitudinal sections through the petiole sheath perforated (A) and non-perforated (B) by *Mordellistena parvula* Gyll. larvae

tween 2.6 and 3.1 mm.

Mordellistena parvula Gyll. is an exclusively phytophagous species in the larval stage, in the stage of adult feeding with the pollen from different spontaneous plants, particularly from *Umbelliferae*. The adults develop successfully, from the pupae from soil and from stem and root rests, at the beginning of May till the beginning of June. The females are more numerous and the males are rare. After a period of feeding they pair, and after a short while lay the eggs gradually.

The eggs are laid into the superior epidermis at the base of sunflower leaf sheaths, beginning with the 6th pair of leaves.

A female can lay 1-3 eggs on a single plant. From our observations, several females can lay eggs on a sunflower stem so that sometimes up to 14 larvae could be present on the same plant.

During the plant development, the females lay eggs at the base of leaf sheaths from superior levels and first instar larvae occur. The pest has three larval stages.

First instar larvae of *Mordellistena parvula* Gyll. have a length of 3 mm. The larvae of the second instar are 6-8 mm long (Figure 1 A), have a milky-white color, are apodal, with cephalic capsule colored in light brown. As they feed, the larvae turn to yellow. The third instar larvae are 10 mm long and they reach the maturity toward the end of October. The cephalic capsule of the third instar larvae is light brown (Figure 1 B).

Narrow galleries could be observed in the pith of the attacked plants, being oriented more or less towards the base of the stems (Figure 2). The larvae damage also sometimes the conductive vessels in the stem penetration area (Figure 3).

Solid excreta, resulted from the larval feeding with plant tissues, are stored within the galleries from place to place, as the larvae advance. A number of 2 till 8 larvae were generally found.

Hard attacks cause the reduction of seed yield/plant and root and stem lodging (Figure 4) (particularly when strong winds occur) and

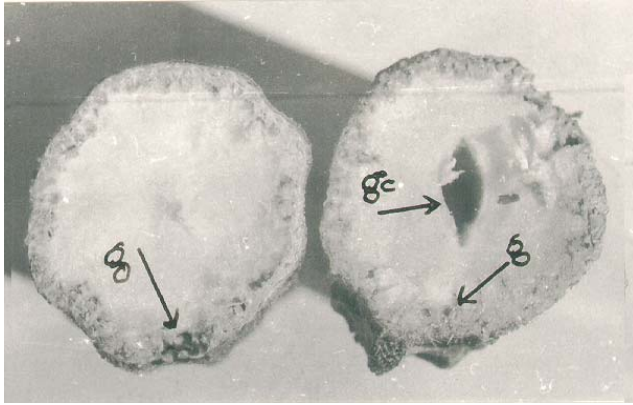


Figure 3. Cross-sections through sunflower stem pith: galleries (g) created by *Mordellistena parvula* Gyll. and central gallery (gc)

subsequently important losses at mechanical harvest. Sawdust or orifices were not observed with unaided eye at the point where the eggs were laid and the larvae penetrated into the stem, as compared with the European corn borer (*Ostrinia nubilalis* Hbn).

Due to the larval attack, a central gallery could more or less occur in the stem pith, which usually is larger towards the stem base. In October, larvae of the second and third instar could be observed concomitantly in sunflower stems and roots.

The pest hibernates as last instar larva, in stems immediately near the root neck, as well as in roots. In spring, in month of May, the larvae which hibernate in roots, move upwards through the pith (till to the area where the stem was sectioned) and pupate.

Beetle develop from pupae.

The mode of attack. The larvae attack the sheath of the leaf petioles, then the conductive vessels and the stem pith of sunflower plants. The larvae feed permanently with the pith, inside the stems with their mouth framework of "breaking and chewing" type. Toward the end of the larval feeding period, close to the beginning of hibernation stage, fully crowded together excreta are encountered in gallery on segments of 1-2.8 mm length. In continuation of these excreta deposits a gallery oration of 1.7 - 3.2 cm length is partially lined with a very fine cloth like a veil of white-grayish colour, where the hibernating larva is found.

All galleries from the stems are directed towards the base of the plants.

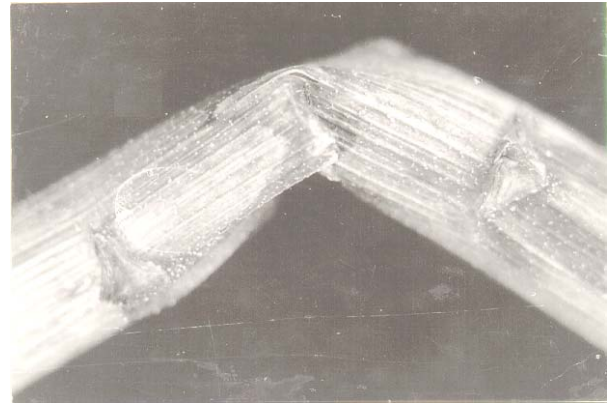


Figure 4. Sunflower stem breaking caused by the attack of *Mordellistena parvula* Gyll. larvae

None of the natural enemies of this pest has been mentioned in the literature (Thompson and Simonds, 1964; 1965).

Host plants. In Romania, the pest develops on the cultivated or spontaneous sunflower (*Helianthus annuus* L.)

CONCLUSIONS

The species *Mordellistena parvula* Gyll. was observed in Romania as sunflower pest for the first time.

Data concerning the biology and ecology (the moment of adult occurrence, egg laying onto the host plant, the larval instars, the mode of attack, the hibernation) of this new pest were recorded.

The observations made several years and during the whole vegetation period of host plant led to the conclusion that *Mordellistena parvula* Gyll. is a univoltine species under climatic conditions of Romania.

Some sunflower inbred and hybrids were found to be resistant or tolerant to the attack of *Mordellistena parvula* Gyll.

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