

The distribution, damage and parasite complex of a new alfalfa pest, *Melanagromyza sojae* (Zehnt) ¹ in the Jamahiriya

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ABSTRACT

Melanagromyza sojae (Zehnt) has not so far been reported from the Jamahiriya. Its larvae were found to mine alfalfa stems at Tagoura in August 1977. Mature alfalfa in all the fields surveyed in 17 localities of the Western region was later found infested. The percentage of mined stems in different fields was 66.6-100, 66.6-100 and 10.0-26.6 during September, October and November, 1977, respectively. Similar observations were noted in 1978-79 in two fields at Tagoura and Sidi Mesri, infestations of 46.6-85.8% in August-October and only 23.7% in November 1978. Infestation dropped to 6.7% in December and was negligible in January 1979. The damage was slight, (6.7-20%) in February-April. It increased progressively in May-July reaching a peak in August-October. Two Pteromelids, *Halticoptera circulus* (Walk) and *Sphegigaster nigrocornis* (Nees) and a Tetracampid, *Platynocheilus cupifrons* (Nees) were reared from the pest pupae and larvae, respectively. Parasitised insects were found at Tagoura and in the other localities surveyed. The occurrence of these species also seems to be a new record for the Jamahiriya.

INTRODUCTION

Alfalfa is the most important fodder crop in Jamahiriya. It is attacked by several insect pests. Armyworm, alfalfa weevil, aphids and leafminers are considered to be the most important. A serious outbreak of a stem mining Agromyzid (Diptera) was observed on alfalfa at Tagoura during August, 1977. Its larvae were reared to adults and identified by the Commonwealth Institute of Entomology, British Museum, London as *Melanagromyza* (Zehnt). This insect was not reported in the published lists (2, 3) of insects from the Jamahiriya and thus is considered a new record. The report of the Commonwealth Institute of Entomology also confirmed this. According to this report (1) this species is quite widespread. Its occurrence ranges through Egypt and India to Japan. In Egypt and Saudi Arabia it is associated solely with cultivated alfalfa but in other areas it occurs also on other leguminous plants. It is considered to be a serious pest of soy beans in India (4) and Japan (5). In view of the little available information on this new pest or its allied species, *Melanagromyza phaseoli* coq., already reported from Libya on beans, studies were initiated to gain further information on the behaviour of the pest under local conditions. This manuscript deals with its nature and extent of damage in the western region, seasonal incidence and natural enemies. It also includes some observations on the life cycle of the pest.

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MATERIALS AND METHODS

A survey of alfalfa fields was conducted during September-November, 1977, in 17 localities of the western region, which is the main alfalfa growing area in the Jamahiriya. A sample of 30 stems was randomly selected from various fields. Samples were collected only from the mature/overmature alfalfa plants. This procedure facilitated observation of the damage as it was more obvious in such stems. In some cases simultaneous samples from the young crop provided the comparison. A field was visited only once during the survey period. To study seasonal variation in the pest incidence, sampling was continued only at two places from April 1978 to March 1979. All samples were brought to the laboratory, dissected, and examined for damage pest, and its parasites. Pieces of the damaged stems with larvae and/or pupae of the pest or of its parasites were placed in specimen tubes until adult emergence. The adults of the parasites were also identified by the Commonwealth Institute of Entomology, British Museum, London. Notes on the life cycle of the pest and its feeding behaviour were taken by observing the infested stems. To determine the duration of the pupal stage, fresh specimens were placed in petri dishes on a moist filter paper and observed for adult emergence.

RESULTS AND DISCUSSION

Distribution and Damage:

The larvae mine alfalfa stems. During this course they feed on the parenchymatic cortex and the surrounding tissues. The affected tissues become macerated (fig. 1). A

Table 1 — Distribution and damage of *M. Sojae* on alfalfa in the Western region

Locality	Number of farms surveyed	% stems mined	Crop height (cm.)
September 1977			
Ainzara	2	100,0.0	57, 8
Sidimesri	1	93.3	50
Tagoura	1	100	51
Swani	1	66.6	51
Bengasheer	2	93.2, 96.6	49, 47
Alhathba Khadra	1	93.2	52
Sook ul Khamees	2	86.6, 100	50, 50
Sook ul Sabbat	2	100, 86.6	68, 50
October 1977			
Tamina	1	0.0, 66.6	46, 62*
Zulitan	2	0.0, 89.1	36, 57
Alhums	2	0.0, 73.3, 100	35, 70, 45*
Misurata	2	0.0, 66.6, 100	33, 60, 51*
Sabrata	1	86.6	50
Zawia	1	73.3, 89.9	72, 58*
Zahira	2	82.5, 100	51, 64
November 1977			
Wadi ramal	3	0,10,26.0	30, 53, 48
Algarabuli	1	13.3	48

* Indicates more than one sample at the same farm

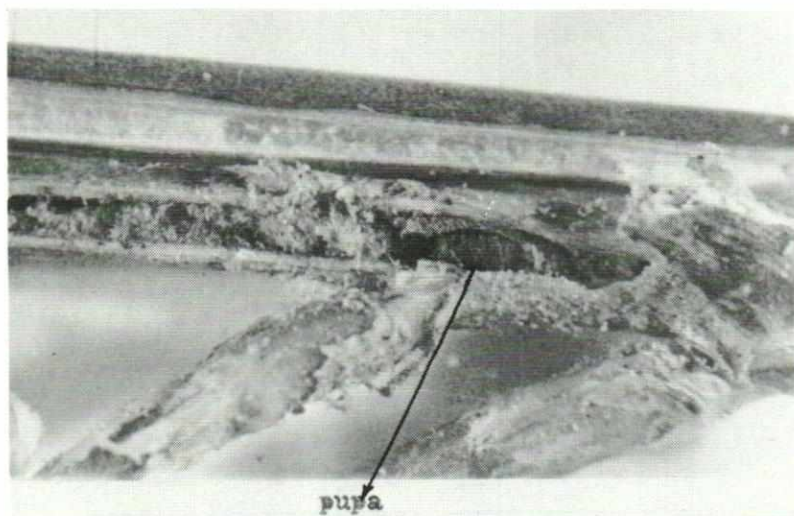


Fig. 1 — Alfalfa stem showing *M. sojae* damage and pupa.

single larva was found to mine only about 10 cm. of the stem. Upto six larvae were found in some of the stems. Simultaneous or successive infestation by several larvae at different heights of the stem resulted in mines extending almost through its entire length. The pest attack, however, did not produce any obvious symptoms externally. Only in severe infestations the crown leaves withered or dried up. This is in contrast to its effects on soy-bean. The latter plant are reported to become crippled and die (4). Further studies are needed, however, to investigate stress effect of pest attack on the growth and productive life of alfalfa.

Sampling from different localities in the Western region showed its heavy infestation everywhere. The percentage of mined stems in mature alfalfa crop was 66.6-100, 66.6-100 and 10.0-26.6 in the fields surveyed during September, October and November 1977, respectively. Alfalfa regrowths in their early stages of development i.e. 8-35 cm. tall showed no stem tunnels. All alfalfa fields whether of recent years planting or sown several years before had been infested. Similarly all the six alfalfa varieties, Sonora, Mcapa, Peruvian, India, African and the local Tagouri grown at ARC, Tagoura, were found infested.

Seasonal Incidence:

Examination of mature alfalfa during April-May, 1978 revealed 6.7-29.0% mined stems at Tagoura and Sidimesri (fig. 2). The damage rose to 23.1-29.7% by June and to 39.6-46.2% by July, 1978. It reached its peak, 46.2-72.6% (Tagoura) and 56.1-85.8% (Sidimesri) in August/September, 1978. Further observations taken only at Sidimesri indicated high infestation, 76.7%, also in October. It, however, dropped to 23.7% in November and 6.7 in December 1978. Sampling in January, 1979 showed no damage at Sidimesri. Such stems were found, however, in very low numbers at the Cattle Project Farm, Zawia. Pest damage reappeared during February at Sidimesri. Its intensity was, however, very low, 6.7% in February-March.

Life-Cycle:

Examination of the infested stems showed that larva entered the stem probably through the petiole at its axis where the stipule joins the stem. It then mined downwards. Moulting took place in the mined tissue. On reaching the lower part of the stem

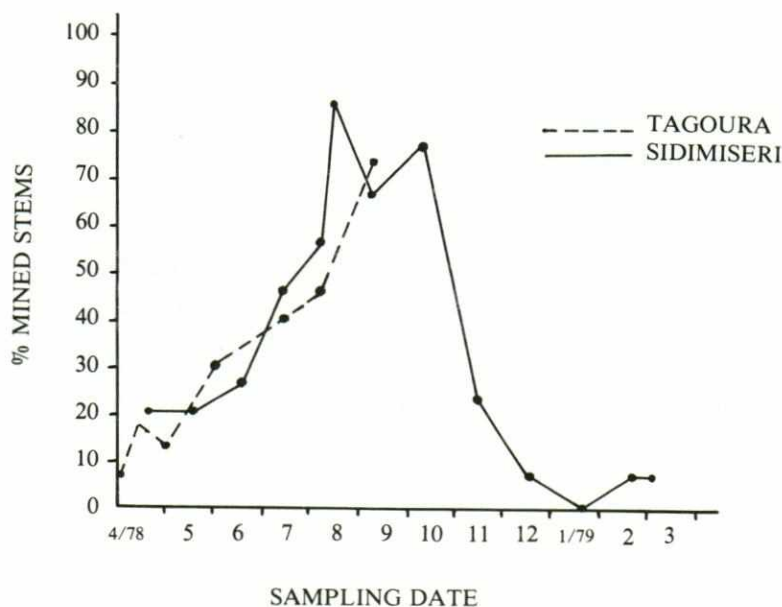


Fig. 2 — Seasonal incidence of *M. sojae* attack on alfalfa.

the larva returned upwards and pupated near the soil surface (fig. 1). To facilitate adult emergence the larva removes the tissues in front of its pupation site leaving behind only a thin layer of the epidermis. Many of the larvae feeding in the upper portion of the stem do not reach the stem base and pupate there. In the month of September empty puparia were found in alfalfa stems only 4 weeks old. Thus it appears that the development from egg to adults takes less than 4 weeks in September. Pupal period was found to be 5-8 days in September. Flies could be swept from alfalfa throughout the year. They were, however, very common in summer, August-October and scarce in winter, December-January. Larvae and pupae were also found in all the seasons.

Parasite Complex:

The parasites, *Halticoptera circulus* (Walk.) and *Sphegigaster nigricornis* (Nees) (Hymenoptera: Pteromalidae) and *Platynbocheilus cupifrons* (Nees) (Hymenoptera Tetracampidae) were reared from the insect pupae and larvae, respectively. The parasitisation was high i.e. 45.5% at Tagoura during August, 1978. None of these parasites have been reported in the lists of insects of Libya (2, 3). Hence this appears to be a first record of their occurrence in the Jamahiriya. Some unidentified *Pteromalidae* (Hymenoptera) are known to attack its larvae also in India on soybean (4).

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توزيع وأضرار حشرة جديدة * (*Melanagromyza sojae* (Zehnt)) وطفيلاتها على القصب (البرسيم أو الصفصفة) في الجماهيرية

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المستخلص

Melanagromyza sojae (Zehnt) لم يسبق تسجيلها في الجماهيرية وقد وجد أن يرقاتها تثقب سيقان نباتات القصب في تاجوراء في أغسطس 1977 م، وفيما بعد وجدت في سبعة عشرة موقع من التي تم مسحها في المنطقة الغربية.

ان نباتات القصب المكتملة النمو كانت مصابة وكانت النسبة المئوية لسيقان النباتات المصابة من 66,6 - 100 ومن 66,6 - 100 ومن 10 - 26,6 في أشهر سبتمبر، أكتوبر ونوفمبر 1977 م على التوالي وسجلت نتائج مشابهة في عامي 1978 - 1979 في حقلين في تاجوراء وسيدى المصرى حيث كانت الاصابات من 46,6 - 85,8% في الأشهر أغسطس - أكتوبر و 23,7% فقط في نوفمبر 1978 م وانخفضت الاصابات الى 6,7% في ديسمبر وكانت قليلة جدا في يناير 1979 م وكان الضرر قليلا أى حوالى 6,7 - 20% فبراير - ابريل وقد ازدادت تدريجيا في مايو ويوليو ووصلت قممتها في أغسطس - أكتوبر.

وقد وجدت ثلاثة طفيليات من رتبة *Hymenoptera* تتطفل على يرقة وعذراء هذه الحشرة وقد وجدت هذه الطفيليات الحشرية في تاجوراء والمناطق الأخرى التي تم مسحها.

ويعتقد أن هذه الطفيليات تسجل لأول مرة في الجماهيرية.