

First Record of Blister beetle *Meloe rugosus* M. (Coleoptera: Meloidae), as insect pest on some field crops in Farafra Oasis, Western Desert, Egypt

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ABSTRACT

The blister beetle *Meloe rugosus* Marsham, (Coleoptera : Meloidae) was recorded for the first time as a serious insect pest attacking winter crops , particularly faba bean (*Vicia faba* L.) and wheat (*Triticum aestivum*) in Farafra Oasis, western desert of Egypt. Beans, peas, alfalfa, Egyptian berseem, onion and the wild weed, *Meliolotus indica* L. were also recorded as host plants of this species. Adults are phytophagous feeding plant foliage and flowers and under the stress of high population, plants may suffer death. Beetles occurred from early as November until late May. During s warming and feeding, beetles secrete cantharidin fluid, a potent blister agent and long -term health threat to nearly all livestock feeding on plants hay. Field observations on insect behavior, eggs, crop damage, and activity and host plants were briefly explained.

KEYWORDS: First Record, *Meloe rugosus*, Field observations, crop damage.

1. INTRODUCTION

The Blister beetles belonging family Meloidae (Coleoptera) including about 80 genera and three subfamilies (Bologna, 1991; Ruiz & Avila, 1993; Whitehead, 1999). Also, told it represented by more than 2500 species in 120 genera belonging to 3 subfamilies (Akbar, *et al.* 2017). All occur in the old world with two extending in northern America. Blister beetles get their common name from the irritating reaction of their body fluids with animal skin or delicate membranes. These fluids contain cantharidin, a potent blistering agent v. Adult beetles are phytophagous, feeding especially on plants in the family's Amaranthaceae, Compositae, Legiminosae and Solanaceae (Selander & Fasulo, 2000). Most adults eat only floral parts, but some, particularly those of *Epicuta* spp., eat leaves as well. Larvae of the most genera are specialized predators. Larvae enter the nests of wild bees and consume both immature bees and the provisions of one or more cells. Larvae of *Epicuta* spp. prey on the eggs of acridid grasshoppers (Selander, 1981). The genus *Meloe* Linnaeus, 1758 (tribe Meloini) includes 150 species by Giulio, *et al.* 2013. Alfieri (1976) recorded 9 species belonging to the genus *Meloe* family Meloidae (Coleoptera) from different localities of Egypt. The Life cycle and behavior of Blister beetles are unique, but they differ with different species since the evolution of most species is hypermetamorphic (Bologna & Pinto, 1992; Pinto *et al.*, 1996; El-Sheikh & Tokhy, 2020).

Farafra Oasis is located in the southwestern

part of the New Valley Governorate, at longitude and latitude (26 ° 49'23.3 " N 27 ° 46'33.3 " E), represents a third of the governorate's area. The oasis is characterized by the abundance of groundwater that helped cultivate large areas of land with field crops of good productivity. The climate of the oasis in the winter is warm and hot in the summer, thus concentrating agriculture in the winter (El-Sheikh, 2019).

The present paper deals with field observations on occurrence of the blister beetle, *M. rugosus* (Coleoptera: Meloidae) in faba bean, wheat and alfalfa fields, its diurnal activity, feeding habits, crop damage and host plants.

2. MATERIALS AND METHODS

During a recent survey of insects injurious to field crops cultivated in winter season of 2018 in Farafra Oasis, western desert of Egypt, adults of the blister beetle were first noticed with heavy numbers feeding on young seedlings of faba bean (*Vicia faba* L.) and wheat (*Triticum aestivum*). Further inspection of faba bean plantations revealed wider areas were invaded with these beetles. With season progress and development of faba bean plants, beetles feed on leaves, flowers and plant stems (Fig. 1). Specimens of beetles collected from faba bean, wheat fields (males & females) were preserved in 90 % ethanol and sent to Insect Classification Department, Faculty of Science, Ain Shams University; Insect Classification Department, Cairo University Collection and Plant Protection Research Institute, A. R. C. they was replied that it was not

represented in the Egyptian insect fauna. Also Sent to Dr. Whitehead (Worcestershire WR 10 3EH, UK), in July 2018, and to Dr. Marco Bologna, Universita Degli, Italy in December 2018, for identification. Later we received letters from both authors who confirmed identification of the specimens as *Meloe rugosus* Marsham, 1802 (Coleoptera: Meloidae).

This was considered the first record of this species as an insect pest feeding on faba bean, wheat and alfalfa plants in Farafra Oasis (Fig. 1 & 2). *Meloe rugosus* was also firstly recorded in India by Anand (1978).

3. RESULTS AND DISCUSSION

Field survey of insects feeding on winter crops in Farafra Oasis showed noticeable numbers of the blister beetle, *M. rugosus* feeding on the leaves and flowers of faba bean (*Vicia faba* L.), peas (*Pisium sativum* L.), Egyptian berseem (*Trifolium alexandrinum* L.), alfalfa (*Medicago sativa* L.), wheat (*Triticum aestivum* L.), onion (*Allium cepa* L.) and *Meliolotus indica*, a wild weed. Several of the Florida blister beetles feed on cultivated plants and often damage alfalfa, beat, potato, tomato, peanuts, Soybeans, carlesweed (Pigweed), puncture vine (gothead), and many other species of plants both wild and domestic (Ward, 1985; Selander & Fasulo, 2000).

Most of the beetles collected from the fields were found feeding on the leaves and flowers of faba bean, peas, alfalfa, wheat, onion and wild weeds; the most injured crop was faba bean and wheat. Newly emerged beetles were seen moving in swarms from range – land to faba bean fields where they disperse and starting feeding. These young plants are the most preferable food for beetles. The bean and wheat crop was planted in early November, and the time of the appearance of the beetles meets with the appearance of bean seedlings about 10 - 12 days with 2-3 leaflets. The newly emerged beetles have strong mandibles and long for legs were seen masticate and attack faba bean and Wheat seedlings feeding on leaves and plant stems and finally completely destroy the whole plants. Beetles were generally more numerous on the field side nearest to range – land and irrigation canals (El-Sheikh & Tokhy, 2020)

Through field observations in mid-January, the mating stage begins, where the male and female meet with the female sex pheromone. It was noted that the male searches for the female in the early morning, and when one of them meets the other, courtship may start and mating. Female of Beetles spent two hours searching for the appropriate ovipositing site and used mandibles, fore and hind legs in excavating the ovipodition chamber in the soil and chose elevated places in the field. Eggs are

laid in a longitudinal mass. Female moves after egg lying and continue feeding until death (Akbar, *et al.*, 2017). Eggs hatch in the first week of February to larvae called triungulin larvae (Fig. 1 & 2).

Adults attacking young seedlings above soil surface, completely eating and destroy them; this demanded reseeding the crop. Foliage and flowers of the plants were also contaminated with cantharidin fluid secreted by the adults which burns and kills leaves and flowers. Moreover, beetles feeding cause defoliation (Fig.2). Cantharidin is a stable chemical and long-term health threat to nearly all livestock, particularly cows and other mammals that are fed contaminating alfalfa hay (Ward, 1958; Martín *et al.*, 2010).

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5. REFERENCES

- Akbar SA, Dar MA, Wachkoo AA (2017).** Redescription of the blister beetle *Meloe semicoriaceus* fairmaire, 1891 (Coleoptera: Meloidae: Meloinae) with notes on courtship behavior. *Biodiversity International Journal*, V., 1 Issue 2.
- Alfieri A (1976).** The Coleoptera of Egypt. *Memories de la Societe Entomologique d' Egypte*, 5, 361 pp.
- Anand RK (1978).** First record of *Meloe proscrabaeus* Linnaeus and *M. violaceus* Marsham (Coleoptera: Meloidae) from India, Along with further description and key to the Indian species. *J Ent. Res.* 2 (1): 40 – 42.
- Bologna MA (1991).** Coleoptera: Meloidae. In *Fauna d' Italia*. Edizioni Calderini, Bologna, Italy, pp. 366 - 370.
- Bologna MA Pinto JD (1992).** A review of *Meloe* (Taphromeloe), including a description of the first-instar larva of *M. erythrocnemus* and comments on the classification of the tribe Meloini (Coleoptera: Meloidae). *Proc. Entomol. Soc. Washington*, 94 (3): 299-308.
- El-Sheikh WEA (2019).** Population Dynamics and Seasonal Development of the Egyptian Alfalfa Weevil, *Hypera brunneipennis* (Boh.), (Coleoptera: Curculionidae) In El-Farafra Oasis, New Valley Governorate, Egypt. *J. Plant Prot. and Path.*, Mansoura Univ., 10 (6): 311 - 316, 2019. https://jppp.journals.ekb.eg/article_48297.html



Fig 1. Field observations on the Blister beetle adults of *M. rugosus*. a: adult male; b: female; c: Feeding on Peas; d: Feeding on faba bean; e: stage of mating; f: stage of courtship.



Fig 2. Beetle behavior in the field. a: cluster of eggs; b: oviposition chamber in the soil; c: Cantharidin fluid excreted by adult beetles; d: triungulin larvae.

El-Sheikh WEA, Tokhy AI (2020). The blister beetle *Meloe proscarabaeus* Coleoptera: Meloidae) a dangerous pest threatens field crops in New Valley Governorate, Egypt. *Egypt. J. Plant Prot. Res. Inst.* 3 (1): 73 – 82.

Giulio ADi, Sciotti A, Bologna MA (2013). Revision of first instar larvae of *Meloe*, subgenera *Eurymeloe* and *Coelomeloe*, with new descriptions and a key to the species (Coleoptera: Meloidae). *Italiana J. of zool.*, 80 (2), 242-254 .

Martín Palomares-Pérez, Esteban Rodríguez-leyva, Harry brailovsky, Mírez-alarcón (2010). First Record of *Hesperolabops nigriceps* Reuter (Hemiptera: Miridae) on *Opuntia ficus-indica* in Milpa Alta, Mexico City. *Neotropical Entomology* 39(5):829-830 .

Pinto JD, Bologna MA, Bouseman JK (1996). First-instar larvae, courtship and oviposition in *Eletica*: amending the definition of the Meloidae (Coleoptera: Tenebrionoidea). *Systematic*

Entomology, 21 (1): 63-74.

Ruiz JL, Avla JM (1993). Contribution to the known Meloidae (Coleoptera) in the southern Iberian Peninsula. *Boletín de la Asociación Española de Entomología*, 17: 141 – 148.

Selander RB (1981). Evidence for a third type of larval prey in Blister beetles (Coleoptera: Meloidae). *J. Kansas Entomol. Soc.*, 54: 757 – 783.

Selander RB, Fasulo TR(2000). *Featured Creatures*. DPI Entomology Circular 268, University of Florida, 9 pp., USA.

Ward CR (1985). Blister beetles in alfalfa. An update NMSU Cooperative Ext. Service, Agric. Sci. Center at Artesia Mimeographed Report, 4 pp .

Whitehead PF (1999). Recent records of *Meloe rugosus* Marsham (Col., Meloidae), including second Somerest and third Gloucestershire spec. *Entomologist's Monthly Magazine*, 135: 1624 – 1627.

الملخص العربي

"التسجيل الأول للخنفساء الحارقة (*Meloe rugosus* M. (Coleoptera: Meloidae) كأفة حشرية على بعض المحاصيل الحقلية في واحة الفرافرة ، الصحراء الغربية ، مصر"

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تم تسجيل الخنفساء الحارقة ، *Meloe rugosus* Marsham (Coleoptera: Meloidae) لأول مرة كأفة حشرية خطيرة تهاجم المحاصيل الشتوية ، خاصة الفول البلدي (*Vicia faba* L.) و القمح (*Triticum aestivum*) في واحة الفرافرة ، الصحراء الغربية لمصر. كما تم تسجيل الفاصوليا والبسلة والبرسيم الحجازي والبرسيم المصري والبصل والعشب البري ، كعوائل نباتية لهذا النوع. الطور الكامل نباتي التغذية حيث يتغذى علي اوراق وازهار وسيقان النبات. عند زيادة تعداد جمهور الخنافس الحارقة تؤدي الي موت النباتات. تتواجد الخنافس في الحقل من الاسبوع الاول من نوفمبر وتستمر الي اخر مايو. خلال تغذية الخنافس علي النباتات تفرز مادة قلبية سامة يطلق عليها الكانثردين من مفاصل الارجل وقرون الاستشعار تؤدي الي موت النبات ، كما انها مادة سامة تهدد حيونات المزرعة عند تغذيه الماشية علي النباتات الملوثة بمادة الكانثردين. تم شرح الملاحظات الميدانية على سلوك الحشرات ووضع البيض ومظاهر الاصابة والضرر ونشاط الخنافس والعوائل النباتية بإيجاز.