TÜBİTAK

Short Communication

Turk J Zool
33 (2009) 475-477
© TÜBİTAK
doi:10.3906/zoo-0811-8

Parasitoids of several lepidopterous pests in maize plantations in the Southeast Anatolian Region of Turkey

Celalettin GÖZÜAÇIK[1], Cafer MART[2], Kenan KARA[3,*]

[1]Plant Protection Research Institute, Diyarbakır - TURKEY

[2]Plant Protection Dept., Faculty of Agriculture, Kahramanmaraş¸ Sütçüimam University, Kahramanmaraş - TURKEY

[3]Plant Protection Dept., Faculty of Agriculture, Gaziosmanpaşa University, Tokat - TURKEY

Received: 11.11.2008

Abstract: The parasitoid complex of several lepidopteran pests were studied in maize plantations in the Southeast Anatolian Region of Turkey during 2003-2004. *Apenteles* sp., *Bracon hebetor* (Say.), *Chelonus oculator* Panzer, *Meteorus rubens* Nees (Hym.: Braconidae), *Conomorium patulum* Walk. (Hym.: Pteromalidae), *Diadegma crassicornis* (Gray.) subsp. *africator* Aubert (Hym.: Ichneumonidae), *Euplectrus* sp. (Hym.: Eulophidae), *Exorista larvarum* (Linnaeus), *E. xanthaspis* (Wiedemann) *Gonia bimaculata* Wiedemann, *Drino imberbis* (Wiedemann), *Pseudogonia rufifrons* (Wiedemann), and *Linnaemya neavei* Curran (Dip.: Tachinidae) were reared from field-collected larvae. *Mythimna loreyi* (Duponchel) (Lep.: Noctuidae) was for the first time found to serve as a host for *Diadegma crassicornis* (Gray.) subsp. *africator* (Hym.: Ichneumonidae).

Key words: Lepidoptera, pest, parasitoid, maize, Southeast Anatolia, Turkey

Güney Doğu Anadolu bölgesindeki mısır alanlarında zarar yapan bazı lepidoptera türlerinde saptanan parazitoitler

Özet: 2003-2004 yıllarında Güney Doğu Anadolu Bölgesi'ndeki mısır yetiştirilen alanlarda zarar yapan bazı Lepidoptera tırtıllarının parazitoitleri çalışılmış ve bu zararlılardan *Apenteles* sp., *Bracon hebetor* (Say.), *Chelonus oculator* Panzer, *Meteorus rubens* Nees (Hym.: Braconidae), *Conomorium patulum* Walk. (Hym.: Pteromalidae), *Diadegma crassicornis* (Gray.) subsp. *africator* Aubert (Hym.: Ichneumonidae), *Euplectrus* sp. (Hym.: Eulophidae), *Exorista larvarum* (Linnaeus), *E. xanthaspis* (Wiedemann) ve *Gonia bimaculata* Wiedemann, *Drino imberbis* (Wiedemann), *Pseudogonia rufifrons* (Wiedemann), ve *Linnaemya neavei* Curran (Dip.: Tachinidae) parazitoit türleri elde edilmiştir. *Diadegma crassicornis* (Gray.) subsp. *africator*'un *Mythimna loreyi* (Duponchel)'yi parazitlediği ilk defa tespit edilmiştir.

Anahtar sözcükler: Lepidoptera, parazitoit, mısır, Güney Doğu Anadolu, Türkiye

Maize is an important crop consumed as fresh and also used in different branches of industry in Turkey as well as in the rest of the world. About 34,242 t of maize grain is produced from 7537 ha land in the Southeastern Anatolian Region (Corn Report of Agriculture of Ministry, 2002). Maize is attacked by a wide spectrum of insect pests. The most important of them are lepidopteran species including cutworms *Agrotis ipsilon* Hufnagel, *A. segetum* Denis & Schiffermüller (Lepidoptera: Noctuidae); the stem

* E-mail: kkara@gop.edu.tr

borers, *Sesamia nonagroides* (Lefebvre) (Noctuidae), *Ostrinia nubilalis* (Hubner) (Pyralidae); leaf feeders *Spodoptera exigua* (Hubner), *S. littoralis* (Boisduval), *Pseudoletia unipuncta* (Hawitson.), *Mythimna loreyi* (Duponchel), and *Helicoverpa armigera* Hbn. (Noctuidae) (Kornosor, 1999; Gözüaçık and Mart, 2005).

The aim of the present study was to determine the larval and pupal parasitoid complex of the dominating lepidopteran pests, such as *Sesamia cretica* Led., *S. nonagrioides* (Lef.), *Spodoptera exigua* (Hübner), *Agrotis segetum* (Hfn.), *A. ipsilon* (Hfn.), *Mythimna loreyi* (Duponchel), and *Ostrinia nubilalis* Hübner, and their effectiveness in maize plantations in the Southeast Anatolian Region of Turkey in 2003 and 2004. Surveys were conducted in the first crop of maize fields in Adıyaman (Besni), Batman (Merkez), Diyarbakir (Bismil and Ergani), and Şanlıurfa (Merkez, Siverek) (total 16 localities) in 2003 and 2004. Studies on the second crop of maize were realized in Adıyaman (Besini), Batman (Merkez), Diyarbakır (Merkez, Ergani, and Bismil), Mardin (Kızıltepe), and Şanlıurfa (Akçakale, Harran, and Siverek). Host larvae and pupae were collected from all parts of plants and brought to the laboratory in an ice box. Immature stages of pests were placed in plastic cups containing food at 25 ± 1 °C, 65 ± 5 r.h., and illumination of 1500 lux for 16 h per day till parasitoid pupae were observed. The food in the form of maize plant material (fresh leaf, stalk, and cob) was changed daily. Tachinids were identified by the third author. Braconids were identified by Dr. Ahmet Beyarslan (Trakya University, Edirne-Turkey), Ichneumonid species by Dr. Yasemin Özdemir (Plant Protection Research Institue, Ankara-Turkey), and Pteromalidae and Eulophidae species by Dr. Miktat Doğanlar (Mustafa Kemal University, Hatay-Turkey). Host species were identified by Dr. Zuhal Okyar (Trakya University, Edirne-Turkey).

Apenteles sp. and *B. hebetor* (Say.) (Hym.: Braconidae) were determined as larval parasitoids and *Conomorium patulum* Walk. (Hym.: Pteromalidae) as a pupal parasitoid of *S. cretica* and *S. nonagrioides*). *Meteorus rubens* Nees (Hym.: Braconidae) was recovered as a larval parasitoid and *Gonia bimaculata* Wiedemann (Dipt.: Tachinidae) as a larval-pupal parasitoid of *A. segetum* and *A. ipsilon*. *Apenteles* sp. was recorded as a larval parasitoid of *O. nubilalis*, whereas *E. xanthaspis* (Wiedemann) (Dipt.: Tachinidae) was a larval parasitoid and *C. oculator* Panzer (Hym.: Braconidae) an egg-larval parasitoid of *S. exigua*. The following parasitoids, *Apenteles* sp., *D. crassicornis* . subsp. *africator* , *Euplectrus* sp., *Exorista larvarum* (Linnaeus), *Drino imberbis* (Wiedemann), *Pseudogonia rufifrons* (Wiedemann), and *Linnaemya neavei* Curran were larval parasitoid and *C. oculator* an egg-larval parasitoid of *M. loreyi*. *Mythimna loreyi* is a new host record for *D. crassicornis* (Gray.) subsp. *africator*.

According to Yu and Horstmann (1997), this parasitoid species is distributed in the Palaearctic Region. It was previously recorded by Kolarov (1995) in Ankara (Bala, İlyakut) and Kayseri (Yahyalı) in Turkey, where this Ichneumonid species was reared from *Oria musculosa* Hb. (Lep.: Noctuidae).

A number of previous studies have been reported on the parasitoid complexes of the most important lepidopteran pests on maize in different regions of Turkey (Kavut, 1985; Kayapınar and Kornoşor, 1992; İkincisoy et al., 1994; İnanç and Beyarslan, 2001; Sertkaya et al., 2004; Sertkaya and Bayram, 2005; Gürbüz and Aksoylar, 2005; Kara et al., 2007). The previously recorded parasitoids belong to the Braconidae, Ichneumonidae (Hymenoptera), and Tachinidae (Diptera) families. These families have the potential to significantly suppress lepidopteran pest populations (İnanc and Beyarslan, 2001; Gürbüz and Aksoylar, 2005; Kara and Aksu, 2008).

In accordance with these previous studies, we observed that there is a broad parasitoid fauna lepidopteran pests on maize. To fully exploit the control potential of these parasitoids, IPM (Integrated Pest Management) strategies should be adopted. This requires efforts to conserve these beneficial organisms in maize agro-ecosystem and avoidance of repeated applications and excessive use of insecticides. Detailed studies on the biology and ecology of parasitoids can further help to develop strategies to optimize their use as biological control.

Acknowledgments

We are grateful to all scientists who identified the insect specimens.

References

Corn Report. Agriculture of Ministry I.P. and C.A. Presidency Report, 2002. Ankara-Turkey.

Gözüaçık, C. and Mart, C. 2005. The studies on determination of lepidopterous pest and their densities and distributions in maize fields in Southeast Anatolia. J. Agric. Fac. HRU. 9: 11- 16.

Gürbüz, F.M. and Aksoylar, M.Y. 2005. New Records of Ichneumonidae (Hymenoptera) Species from Turkey. Phytoparasitica 33: 121-122

İkincisoy, Y., Kornoşor, S. and Sertkaya, E. 1994. Investigation on natural enemies of *Acantholeucania loreyi* (Duponchel) (Lepidoptera: Noctuidae) larvae in Çukurova Region. Proc. Third Turkish National Congress of Biological Control (Adana, Turkey), pp. 555- 564 (Turkish, with English abstract).

İnanç, F. and Beyarslan, A. 2001. A Study on Microgastrinae (Hymenoptera:Braconidae) Species in Gokceada and Bozcaada. Tr. J. of Zoology 25: 287-296.

Kara, K., Gözüaçık, C. and Mart,C. 2007. Tachinid Parasitoids (Diptera:Tachinidae) of *Mythimna* (*Acantholeucania*) *loreyi* in the Southeast Anatolian Region of Turkey. Phytoparasitica 35: 136-139.

Kara, K. and Aksu, S. 2008. Contributions to the Turkish Tachinidae (Diptera) Fauna. Tr. J. of Zoology 32: 1-2.

Kavut, H. 1985. The investigations on *Sesamia* species in zea and millet plants, especially, biology and ecology of corn stalk borer (*Sesamia nonagrioides* Lef.) on corn in Aegean Region, (Izmir, Turkey), PhD Thesis (unpublished), 67p.

Kayapınar, A. and Kornosor, S. 1992. Natural enemies of *Ostrinia nubilalis* Hubner (Lepidoptera: Pyralidae) in Cukurova region, and their distribution, and parasitization rate of *Trichogramma evanescens* Westwood (Hymenoptera: Trichogrammatidae). Proc. Second Turkish National Congress of Entomology (Adana, Turkey), pp. 89-98 (Turkish, with English abstract).

Kolarov, J. 1995. A cataloque of the Turkish Ichneumonidae (Hymenoptera). — Entomofauna **7**: 137-188.

Kornosor, S. 1999. Entomological problems of maize in Turkey. Proc. XX Conf. International Working Group on *Ostrinia* and Other Maize Pests (Adana, Turkey), pp.14-23.

Sertkaya, E., Bayram, A. and Kornoşor, S. 2004. Egg and Larval Parasitoids of the Beet Armyworm *Spodoptera exigua* on Maize in Turkey. Phytoparasitica 32: 305-312.

Sertkaya, E. and Bayram, A. 2005. Parasiotid Community of the Loreyi Leaf Worm *Mythimna* (=*Acantholeuconia) loreyi*: Novel Host-Parasitoid Associations and Their Efficiency in the East Mediterranean Region of Turkey. Phytoparasitica 33: 441-449.

Yu, D.S and Horstmann, C. 1997. A cataloque of World Ichneumonidae (Hymenoptera) Part1: Subfamilies Acaenitinae to Ophioninae. - The American Entomological Institute 58: 1-763.