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CELALETTİN GÖZÜAÇIK

CAFER MART

KENAN KARA

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

Celalettin GÖZÜAÇIK¹, Cafer MART², Kenan KARA^{3,*}

¹Plant Protection Research Institute, Diyarbakır - TURKEY

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

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

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Abstract: The parasitoid complex of several lepidopteran pests were studied in maize plantations in the Southeast Anatolian Region of Turkey during 2003-2004. *Apanteles* 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 türlerinin parazitoitleri çalışılmış ve bu zararlılardan *Apanteles* 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 nonagrioides* (Lefebvre) (Noctuidae), *Ostrinia nubilalis* (Hubner) (Pyralidae); leaf feeders *Spodoptera exigua* (Hubner), *S. littoralis* (Boisduval), *Pseudaletia 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 (Besni), Batman (Merkez), Diyarbakir (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 Institute, Ankara-Turkey), and Pteromalidae and Eulophidae species by Dr. Miklat Doğanlar (Mustafa Kemal University, Hatay-Turkey). Host species were identified by Dr. Zuhul Okyar (Trakya University, Edirne-Turkey).

Apanteles 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*. *Apanteles* 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, *Apanteles* 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; İkincisoym et al., 1994; İnanc 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.

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