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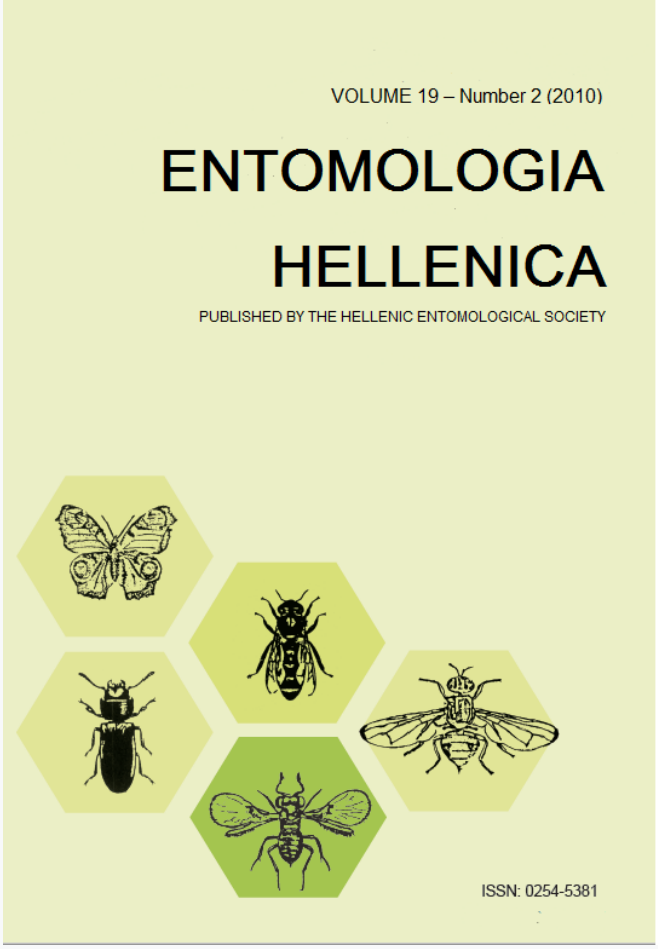

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Fauna of Encyrtidae, parasitoids of coccids in Golcuk Natural Park

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ABSTRACT

Species of Encyrtidae (Hymenoptera: Chalcidoidea), which are parasitoids of Coccoidea, were collected by malaise trap in Golcuk Natural Park during March-October, 2009. Forty-four species of encyrtids, belonging to 24 genera, were recorded during our survey. Two genera and nine species were found to represent new records for the Turkish fauna. Twenty-eight encyrtid species were identified to the species level and the remaining specimens to genus and morphospecies level. This was the first attempt at estimating the scale insect fauna using their parasitoids collected by malaise traps.

KEYWORDS: Hymenoptera, Chalcidoidea, Turkey.

Introduction

Parasitoids are the major component of many terrestrial ecosystems and may constitute up to 20% of all insect species (LaSalle and Gauld 1991, Godfray 1994, Memmot et al. 1994). Many phytophagous insect species seem, on average, to be considerably less abundant than would be expected by the availability of their resources and it was even difficult to find phytopgagous insects in the studied areas. This may be due to natural enemies that are limiting the abundance of these insects. Our aim was to study encyrtid parasitoids (Hymenoptera: Chalcidoidea) parasitizing coccids (Hemiptera: Coccoidea) and, based on these data, estimate the distribution of coccids in the Golcuk Natural Park (GNP).

Materials and Methods

Insect samples were collected from March to October, 2009, using malaise traps. Malaise traps were placed in two localities, namely Pilav Tepe at high altitude (1,520 m) and an Acacia reforested area close to the mean entrance of GNP at an altitude of 1,414 m. Traps were checked and material was taken every 10 days. After collecting the captured insects, they were sorted according orders after which the hymenopterans were sorted to superfamilies and families. Later, species of Chalcidoidea were Critical Point Dried. Encyrtidae material was card-mounted and slide-mounted according to the methodology given by Noyes (2010) and sorted to genus and species. Identifications were done by the first author using various keys (Trjapitzin 1989, Noyes and Hayat 1994, Guerrieri and Noyes 2000, 2005, Hayat 2006).

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Results and Discussion

Our study revealed 44 encyrtid species that belong to genera known to be parasitoids of coccids. However, host scale insect records are known for only 18 of these species. Since no host records are known for the remaining 26 species, they have not been included in the list provided below. The 18 species are known from 145 species of coccids worldwide

TABLE 1. Encyrtid parasitoids recorded from GNP with their known coccoid hosts.

PARASITOID	HOST
1. Anagyrus aligarhensis	*Adelosoma phragmitidis*, ***Antonina graminis***, *Antonina purpurea*, *Kiritshenkella sacchari*, *Nipaecoccus viridis*, *Phenacoccus arthrophyti*, ***Phenacoccus aceris***, *Pseudococcus comstocki*, *Pseudococcus cryptus*, *Saccharicoccus sacchari*, *Trionymus copiosus*, ***Trionymus multivorus***
*2. Anagyrus schmuttereri**	*Phenacoccus piceae*
3. Blastothrix gurselae	*Kermes palestiniensis*
4. Cheiloneurus claviger	***Acanthopulvinaria orientalis***, *Ceroplastes ceriferus*, *C. japonicus*, *Pulvinaria aurantii*, ***Coccus hesperidum***, *Didesmococcus unifasciatus*, *Ericerus pela*, ***Eulecanium ciliatum***, ***Parthenolecanium corni***, *E. giganteum*, *E. kunoense*, *E. kuwanai*, *P. quercifex*, ***E.rugulosum***, ***E. tiliae***, ***Filippia follicularis***, ***Lichtensia viburni***, ***P. persicae***, ***P.rufulum***, *Physokermes fasciatus*, *Ph. hemicryphus*,***Pulvinaria vitis***, *P. idesiae*, *Rhodococcus spiraeae*, *Rh. turanicus*, ***Saissetia oleae oleae***, ***Sphaerolecanium prunastri***, *Stotzia maxima*, *Eriococcus brachypodii*, *Neoacanthococcus tamaricicola*, ***Kermes vermilio***, *Maconellicoccus hirsutus*, *Nesticoccus sinensis*, *Nipaecoccus filamentosus*, ***Phenacoccus aceris***, ***Planococcus citri***
*5. Cheiloneurus elegans**	*Aclerda subterranea*, ***Anapulvinaria pistaciae***, *Eulecanium franconicum*, ***Physokermes piceae***, ***Pulvinaria vitis***, *Antonina purpurea*, ***Phenacoccus hordei***, *Ph. manihoti*, ***Trionymus aberrans***
6. Cheiloneurus paralia	***Asterolecanium arabidis***, ***Ceroplastes floridensis***, ***Eriopeltis festucae***, *Rhodococcus turanicus*, *Luzulaspis bisetosa*, *Eriococcus desertus*, *E.insignis*, ***E. devoniensis***
7. ***Dusmetia ceballosi****	*Fonscolombia europaea*
8. Ericydnus robustior	***Trionymus multivorus***, ***Mirococcus inermis***, ***Peliococcopsis priesneri***, ***T. perrisii***
*9. Ericydnus sipylus**	***Heliococcus bohemicus***, ***Heterococcus nudus***

*Coccid names in bold represent Turkish records; encyrtid genus names in bold and species names with asterix represent new Turkish records respectively.

TABLE 1 (continued). Encyrtid parasitoids recorded from GNP with their known coccoid hosts.

PARASITOID	**HOST**
10. Leptomastix dactylopii	*Aspidiella hartii*, *Delottococcus quaesitus*, *Dysmicoccus brevipes*, *Ferrisia virgata*, *Nipaecoccus viridis*, *Phenacoccus gossypii*, *Ph. hargreavesi*, *Ph. madeirensis*, *Ph. saccharifolii*, ***Ph. solani***, *Formicococcus njalensis*, *Planococcus aemulor*, ***P. ficus***, *P. kenyae*, *P. kraunhiae*, *P. lilacinus*, *P. Minor*, ***P.vovae***, ***Pseudococcus longispinus***, *P. calceolariae*, *P. concavocerarii*, *P. maritimus*, *P. occiduus*, *Delottococcus proteae*, *P. solani*
11. ***Mahencyrtus comara****	***Chaetococcus phragmitis***, *Balanococcus singularis*, *Trionymus copiosus*, *T. dactylis*, ***T.perrisii***
*12. Metaphycus lounsburyi**	*Asterolecanium coffeae*, ***Ceroplastes floridensis***, *Waxiella mimosae*, *Coccus capparidis*, ***C. hesperidum***, ***C. pseudomagnoliarum***, ***Lichtensia viburni***, *Pulvinaria psidii*, ***Saissetia coffeae***, ***S. oleae***, ***Parlatoria oleae***
*13. Metaphycus petitus**	*Eriococcus insignis*
*14. M. swirskii**	***Pulvinaria floccifera***, *Coccus capparidis*, ***C. hesperidum hesperidum***, *C. viridis*, ***Protopulvinaria*** sp., *Protopulvinaria pyriformis*, ***Saissetia coffeae***, ***S. oleae***, *S. somereni*
*15. M. zebratus**	***Planchonia arabidis***, ***Ceroplastes floridensis***, *Drepanococcus cajani*, ***Eriopeltis festucae***, *E. lichtensteinii*, *Lecanopsis formicarum*, *Luzulaspis luzulae*, ***Parafairmairia*** sp., ***Parthenolecanium*** sp., ***P. corni***, ***P. persicae***, ***P. pomeranicum***, ***P. rufulum***, ***Pulvinaria vitis***, ***Rhodococcus perornatus***, ***Saissetia oleae oleae***, *Aonidiella orientalis*, ***Eriococcus roboris***, ***Nipaecoccus*** sp., ***Phenacoccus aceris***, ***Trionymus perrisii perrisii***
16.Pseudococcobius obenbergeri	***Trionymus multivorus***
17. Rhopus flavidus	***Pseudococcus*** sp.
18. Zaomma lambinus	***Asterodiaspis variolosa***, *Ceroplastes rubens*, *Mesolecanium nigrofasciatum*, *Phyllostroma myrtilli*, ***Prodiaspis tamaricicola***, *Aspidiotus destructor*, ***A. nerii***, ***A. perniciosus***, *A. spurcatus*, *Aulacaspis difficilis*, ***A. rosae***, ***Chionaspis salicis***, ***Chrysomphalus aonidum***, *Diaspidiotus juglansregiae*, ***D. marani***, ***D. perniciosus***, ***D. prunorum***, ***D.pyri***, ***D. zonatus***, ***Lepidosaphes conchiformis***, *L. malicola*, ***L. ulmi***, *L. tubulorum*, *Acutaspis paulista*, ***Dynaspidiotus abietis***, *Chionaspis alnus*, ***Pseudaulacaspis pentagona***, *Acanthococcus aceris aceris*, ***Eriococcus spurius***

*Coccid names in bold represent Turkish records; encyrtid genus names in bold and species names with asterix represent new Turkish records respectively.

(Ben-Dov et al. 2010, Noyes 2010), 60 of which have been recorded from Turkey, as shown in Table 1. Previous studies have recorded 23 coccid species from Isparta province (Japoshvili and Karaca 2002, 2003, Japoshvili et al. 2009), in addition to *Pulvinaria vitis* (L.)*, Puto* sp. and *Chionaspis salicis* (L.), which have since been found. Only 9 species of encyrtids were previously reared from coccids in the Isparta province. Two genera and 9 species of parasitoids are new records for Turkish fauna. These records suggest that many more species of coccids are likely to be recorded from this area in future, some of which may represent new records for Turkey and even undescribed species. In this regard, further investigations and collecting in natural habitats are required.

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Μελέτη της παρουσίας παρασιτοειδών της οικογένειας Encyrtidae, σε κοκκοειδή έντομα στο φυσικό πάρκο Golcuk της Τουρκίας

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ΠΕΡΙΛΗΨΗ

Είδη της οικογένειας Encyrtidae (Hymenoptera: Chalcidoidea), που παρασιτούν σε κοκκοειδή έντομα (Coccoidea), συλλέχθηκαν με παγίδα malaise στο φυσικό πάρκο Golcuk της Τουρκίας κατά την περίοδο Μάρτιος-Οκτώβριος 2009. Σαράντα τέσσερα είδη παρασιτοειδών της οικογένειας Encyrtidae που ανήκουν σε 24 γένη, καταγράφηκαν κατά τη διάρκεια της μελέτης. Δύο γένη και εννιά είδη είναι νέες καταγραφές για την εντομοπανίδα της Τουρκίας. Είκοσι οκτώ είδη αναγνωρίσθηκαν σε επίπεδο είδους και τα υπόλοιπα σε επίπεδο γένους ή μορφότυπου. Αυτή είναι η πρώτη προσπάθεια εκτίμησης της παρουσίας κοκκοειδών εντόμων σε μια περιοχή, χρησιμοποιώντας ως δείκτη τα παρασιτοειδή που συλλέγονται με τη βοήθεια παγίδας malaise.