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ISSN 2146-0035 ***Orijinal araştırma* (*Original article*)**

Erythmelus (*Paralellaptera*) *teleonemiae* (Subba Rao) (Hymenoptera: Mymaridae): a new parasitoid on *Monosteira lobulifera* Reuter (Hemiptera: Tingidae) and new record forTurkey[1]

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***Erythmelus (Paralellaptera) teleonemiae* (Subba Rao) (Hymenoptera: Mymaridae): *Monosteira lobulifera* Reuter (Hemiptera: Tingidae)'nın yeni bir parazitoiti ve Türkiye için yeni bir kayıt**

Öz: 2009-2011 yılları arasında yürütülen bu çalışmada Mardin ili badem ağaçlarında önemli zararlara yol açan *Monosteira lobulifera* Reuter (Tingidae: Hemiptera)'nın parazitoitleri araştırılmıştır. Çalışma sonucunda *M. lobulifera*'nın yumurtalarından çıkan yumurta parazitoiti *Erythmelus* (*Paralellaptera*) *teleonemiae* (Subba Rao, 1984) (Hymenoptera: Mymaridae) Türkiye faunası için yeni kayıt olarak tespit edilmiştir.

Anahtar sözcükler: Mardin, badem, Tingidae, *Monosteira lobulifera*, *Erythmelus (Paralellaptera) teleonemiae*

Abstract: In this study, the parasitoids of *Monosteira lobulifera* Reuter (Tingidae: Hemiptera), which causes serious damage to almond trees, were investigated in Mardin Province between 2009 and 2011. As a result of the study, the egg parasitoid *Erythmelus* (*Paralellaptera*) *teleonemiae* (Subba Rao, 1984) (Hymenoptera: Mymaridae), which was hatched from eggs of *M. lobulifera*, was determined as a first record for the Turkish fauna.

Key words: Mardin, almond, Tingidae, *Monosteira lobulifera*, *Erythmelus* (*Paralellaptera*) *teleonemiae*

Introduction

The Tingidae (Hemiptera) family (Lace Bugs) is of great importance due to feeding on a wide range of host plants such as fruit trees, forest trees, weeds and ornamental plants. Approximately 2,600 tingid species have been identified around the world (Guilbert 2001). These species are slender, possess net-like wing designs,

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and are generally smaller than 4 mm. Both adults and nymphs are phytophagous. Tingids live on the lower surface of the leaves and feed by sucking sap from the parenchyma tissue with a stylet, causing white spots to emerge after feeding. These damaged leaves fall early, thus causing significant yield losses by weakening plants. Females often lay their eggs in plant tissues. Some species cause galling on plants. They usually spend the winter as adults (Bodenheimer 1958; Nizamlıoğlu 1961; Göksu 1964; Drake & Ruhoff 1965; Lodos 1982; Péricart 1983; Önder & Lodos 1983; Gülperçin & Önder 1999; Schaefer & Panizzi 2000; Guilbert 2001; Demirsoy 2006).

Presently, 80 tingid species are known from Turkey (Önder & Lodos 1983; Önder et al. 2006). *Monosteira lobulifera* Reuter (Tingidae: Hemiptera) is one of the most important pest species of almond trees (*Amygdalus communis* L.) in Turkey. Önder & Lodos (1983), Maçan (1986), Bolu (2002) and Bolu (2007) reported that *M. lobulifera* causes serious damage and requires control in some parts of the South-east Anatolia Region of Turkey (Adıyaman, Batman, Diyarbakır, Gaziantep, Kilis, Mardin, Siirt, Şırnak). The almond is one of the most important agricultural products of Turkey. Approximately 12 % of total almond production in Turkey is obtained from the Southeast Anatolia Region (Anonymous 2012).

Environmentally friendly biological control methods, rather than methods that damage the environment, should be utilised in order to control tingid species. It is very important that the natural enemies of pests for IPM are known. Some studies to determine parasitoids and predators of tingids have been conducted, and different species belonging to different families have been identified. Some egg parasitoids of tingids have been reported among those species (Triapitsyn & Beardsley 2000; Triapitsyn 2003; Costa et al. 2003; Akbarzadeh-Shoukat 2006; Peña et al. 2007; Triapitsyn et al. 2007; Peña et al. 2009).

This study was conducted to determine the parasitoids of *M. lobulifera* which causes serious damage to almond trees in Mardin province.

Materials and methods

This study was conducted between 2009 and 2011 in Mardin Province, Turkey. Ten leaves were chosen randomly from different parts of almond trees. Leaf samples infested with eggs and nymphs of *Monosteira lobulifera* Reuter (Tingidae: Hemiptera) were brought to the laboratory in plastic containers covered with linen. To determine the egg parasitoids, leaves were first examined under a stereo-binocular microscope. Tingid nymphs, tingid adults and other species were then removed, with only their eggs remaining on the leaves. Secondly, leaves that were infested with eggs were transferred to parasitoid boxes. The boxes were checked daily in a laboratory where they were held at 25±1 ºC and 65±5 % RH.

Identifications of all parasitoids that hatched from the eggs were made by Dr. Emilian PRICOP (Alexandru Ioan Cuza, Iasi University, Faculty of Biology, Romania). The host tingid species identification was done by Dr. Eric GUILBERT (Muséum National d'Histoire Naturelle Département Systématique et Evolution,

Paris, France). All parasitoid species obtained in this study were deposited in the personal collection of the last author.

Results and discussion

As a result of the study, the parasitoid *E. teleonemiae* that emerged from the eggs of *M. lobulifera* was determined as a first record for the Turkish fauna. This parasitoid is also first reported egg parasitoid of *M. lobulifera,*

E. teleonemiae belongs to the genus *Erythmelus* Enock, 1909 which is distributed worldwide. The Subgenus *Parallelaptera* Enock, 1909 is characterized by a funicle of the female antenna with 5 segments; flagellum of male antenna 10-segmented; forewings with almost parallel anterior and posterior margins.

Erythmelus rex (Girault 1911), one of the most widely distributed species, belongs to Subg. *Parallelaptera* and is probably the most frequently collected (Pricop 2008, 2012). *Erythmelus panis* (Enock, 1909) is rarely collected and is very close to *E. teleonemiae* (Triapitsyn 1993, 2003).

***Erythmelus* (*Paralellaptera*) *teleonemiae* (Subba Rao 1984)** (Figure 1)
[=*Parallelaptera polyphaga* Livingstone & Yacoob 1990]

Examined material: Mardin, Center, Akresta, 1071 m (37º 23' 29'' N-40º 38' 54'' E), 25.VI.2011, 18 specimens (4♀+14♂); Mardin, Yeşilli, Kabala, 890 m (37º 21' 38'' N-40º 47' 54'' E), 25.VI.2011, 8 specimens (1♀+7♂).

Distribution: India, Iraq (Triapitsyn 2003), Turkey.

Hosts: *Stephanitis pyri* (Fabricius 1775); *Dictya sp.*; *Monathia* (*Phaenotropis*) *cleopatrae* Horvath 1905; *Teleonemia scrupulosa* Stal 1873 and *Urentius euonymus* Distant 1909 (Hemiptera: Tingidae) (Subba Rao 1984; Livingstone & Yacoob 1988; Triapitsyn 1993, 2003; Noyes 2012).

New record host: *Monosteira lobulifera* Reuter 1888. No information could be located in the literature about egg parasitoids of *M. lobulifera.* Therefore, *E. teleonemiae* is reported as the first egg parasitoid of *M. lobulifera*. Some egg parasitoids of other tingids have been reported. Triapitsyn & Beardsley (2000) and Triapitsyn et al. (2007) reported that many species belonging to the *Anagrus* and *Erythmelus* genera (Hymenoptera: Mymaridae) are egg parasitoids of mirids and tingids. Costa et al. (2003) stated that *Erythmelus tingitiphagus* (Soares) infested about 7 % of eggs of *Leptopharsa heveae* Drake & Poor (Hemiptera: Tingidae) under laboratory conditions. Akbarzadeh-Shoukat (2006) reported *P. panis* as an egg parasitoid of *S.s pyri* in Iran, which was a first record for the Iranian fauna. Peña et al. (2007) reported that *Erythmelus* spp. are natural enemies of *Pseudacysta perseae* (Heidemann) (Hemiptera: Tingidae).

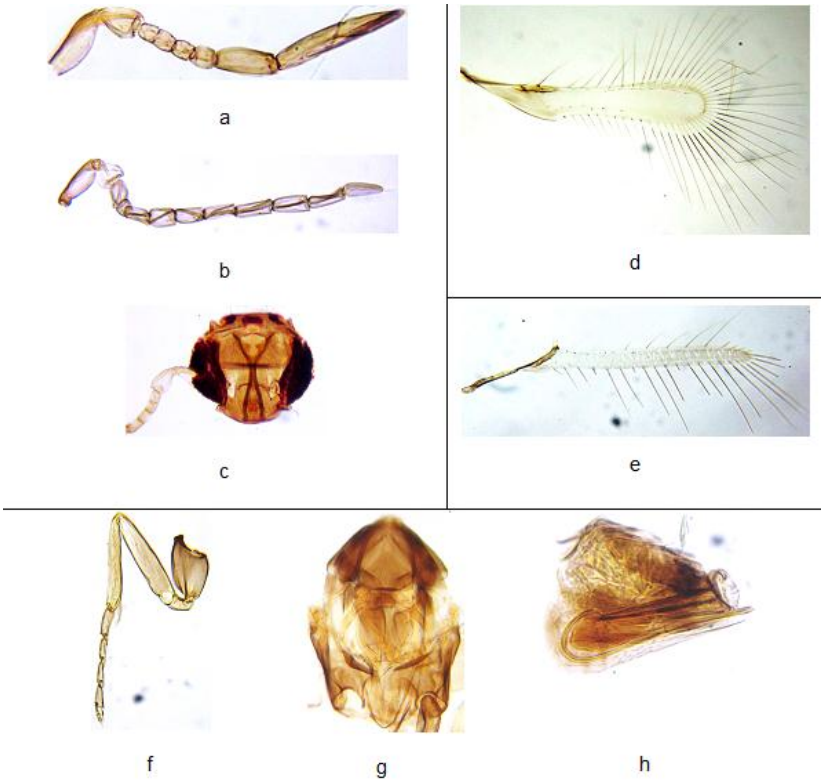

Figure 1 *Erythmelus* (*Parallelaptera*) *teleonemiae* (Subba Rao, 1984): female antenna (a); male antenna (b); head (c); fore wing (d); hind wing (e); fore leg (f); mesosoma (g); metasoma (h) (original).

Peña et al. (2009) reported the egg parasitoid *Erythmelus klopomor* Triapitsyn from *P. perseae*, which was a first record for the Florida (USA) fauna.

In the current study, the adult population density of *M. lobulifera* that causes serious damage to almond trees was at high levels in July, August and September. The numbers of almond orchards have increased in recent years due to subsidies by the Food, Agriculture, and Livestock Ministry in Mardin Province, Turkey (Anonymous 2012). The parasitoids and predators of tingids should be determined in order to help protect almond orchards from future tingid damage. It would also be useful to examine in greater detail the parasitism rate of *E. teleonemiae* on eggs of *M. lobulifera* and its effect on other tingid species in future studies.

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References

Anonymous 2012. Türkiye İstatistik Kurumu Bitkisel Üretim İstatistikleri. URL: http://tuikapp.tuik.gov.tr/bitkiselapp/bitkisel.zul. [Erişim: 16 Ağustos 2012].

Akbarzadeh-Shoukat G. 2006. Seasonal changes in population of the Pear Lace Bug, *Stephanitis pyri* F. (Heteroptera: Tingidae) and identification of its natural enemies In West Azarbaijan apple Orchards. *Journal of Agricultural Science*, 15 (4): 91-100.

Bodenheimer F. S. 1958. Türkiye'de ziraate ve ağaçlara zararlı olan böcekler ve bunlarla savaş hakkında bir etüt. *Bayur Matbaası, Ankara*, 346 s.

Bolu H. 2002. Güneydoğu Anadolu Bölgesi antepfıstığı alanlarındaki böcek ve akar faunasının saptanması. *Türkiye Entomoloji Dergisi*, 26 (3): 197-208.

Bolu H. 2007. Population dynamics of lacebugs (Heteroptera: Tingidae) and its natural enemies in almond orchards of Turkey. *Journal of the Entomological Research Society*, 9 (1): 33-37.

Costa V. A., C. F. Pereira & A. Batista Filho 2003. Observações preliminares sobre o parasitismo de ovos de *Leptopharsa heveae* (Hemiptera: Tingidae) em seringueira em Pindorama. *Arquivos Do Instituto Biologico*, 70 (2): 205-206.

Demirsoy A. 2006. Yaşamın temel kuralları–Entomoloji (omurgasızlar-böcekler). Cilt- II /Kısım- II. *Meteksan Yayınları, Ankara*, 945 s.

Drake C. J. & F. A. Ruhoff 1965. Lagebugs of the world, A catalog (Hemiptera: Tingidae). *Smithsonian Institution, Washington*, 710 pp.

Göksu M. E. 1964. Sakarya ve Kocaeli bölgeleri meyve ağaçlarında zarar yapan armut kaplanının *(Stephanitis pyri* (Fabricius)) biyolojisi ve mücadelesi üzerinde araştırmalar. *T.C. Tarım Bakanlığı Göztepe Zirai Mücadele Enstitüsü Yayınları, İstanbul*, 58 s.

Guilbert, E. 2001 Phylogeny and evolution of exaggerated traits among the Tingidae (Cimicomorpha, Heteroptera). *Zoolica Scripta*, 30: 313–324.

Gülperçin N. & F. Önder 1999 Bornova koşullarında *Stephanitis pyri* (F.)'nin biyolojisi ve doğal düşmanları üzerinde çalışmalar. *Türkiye Entomoloji Dergisi*, 23(1): 51-56.

Livingstone D. & M. Yacoob 1988. A new species of *Parallelaptera* (Hymenoptera: Mymaridae) an egg parasitoid of Tingidae from Southern India. *Journal of the Bombay Natural History Society*, 84 (3): 631-634.

Lodos N. 1982. Türkiye Entomolojisi II, genel uygulamalı ve faunistik. *Ege Üniversitesi Ziraat Fakültesi Yayınları No: 429, Bornova, İzmir*, 580 s.

Maçan G. 1986. Güneydoğu Anadolu Bölgesinde bademlerde zarar yapan böcek türleri, önemlilerinin tanınmaları, yayılışları ve ekonomik önemleri üzerinde araştırmalar. Tarım Orman ve Köyişleri Bakanlığı Diyarbakır Bölge Zirai Mücadele Araştırma Enstitüsü Müdürlüğü, *Araştırma Eserleri Serisi No:5*, 82 s.

Nizamlıoğlu K. 1961. Türkiye ziraatinde zararlı olan böcekler ve mücadelesi. *Zirai Mücadele Enstitüsü Fasikülleri, İstanbul*, 510 s.

Noyes J.S. 2012. Universal Chalcidoidea database. World Wide Web electronic publication. URL: http://www.nhm.ac.uk/entomology/chalcidoids/index.html. [Erişim: 20 Ağustos 2012].

Önder F. & N. Lodos 1983. Preliminary list of Tingidae with notes on distribution and importance of species in Turkey. *Ege Üniversitesi Ziraat Fakültesi Yayınları No: 449, Bornova, İzmir*, 51 s.

Önder F., Y. Karsavuran, S. Tezcan & M. Fent 2006. Türkiye Heteroptera (Insecta) kataloğu. *Ege Üniversitesi Ziraat Fakültesi Yayınları, Bornova, İzmir*, 170 s.

Peña J. E., R. Duncan, W. Roltsch, R. Gagné & F. Agudelo 2007. Natural enemies of the Avocado Lace Bug, *Pseudacysta perseae* (Heteroptera: Tingidae) in Florida, USA. Proceedings VI World Avocado Congress (Actas VI Congreso Mundial del Aguacate), Chile, 10 pp.

Peña J. E., S. V. Triapitsyn, D. Long, G. A. Evans & W. Roltsch 2009. First record of *Erythmelus klopomor* (Hymenoptera: Mymaridae) as a parasitoid of the Avocado Lace Bug, *Pseudacysta perseae* (Heteroptera: Tingidae). *Florida Entomologist*, 92 (2): 394-395.

Péricart, J. 1983. Hémiptéres Tingidae Euro-Méditerranéens. *Fédération Française des Sociétés de Sciences Naturelles. Faune de France*, *V. 69, France*, 626 pp.

Pricop E. 2008. Mymarid wasps (Hymenoptera, Chalcidoidea, Mymaridae) new to Romanian Fauna. *Analele Stiintifice ale Universitatii " Alexandru Ioan Cuza " Iaşi, Seria Biologie animala*, LIV: 35-48.

Pricop E. 2012. Fairy fly diversity (Hymenoptera, Chalcidoidea, Mymaridae) in natural and anthropized ecosystems, from the Eastern Part of Romania. PhD thesis, Faculty of Biology, "Alexandru Ioan Cuza" University of Iasi, 316 pp. [in Romanian].

Schaefer W. C. & A. R. Panizzi 2000. Heteroptera of economic importance. *Boca Raton, FL: CRC Press, LLC*, 824 pp.

Subba Rao B.R. 1984. Descriptions of new species of oriental Mymaridae and Aphelinidae (Hymenoptera: Chalcidoidea). *Proceedings of the Indian Academy of Sciences (Animal Sciences)*, 93: 253-255.

Triapitsyn S.V. 1993. A new *Erythmelus* (Hymenoptera: Mymaridae) from central Asia, an egg parasitoid of *Circulifer* spp. (Homoptera: Cicadellidae). *Entomological News*, 104 (5): 267-271.

Triapitsyn S. V. 2003. Review of The Mymaridae (Hymenoptera: Chalcidoidea) of Primorskii Krai: Genus *Erythmelus* Enock, with taxonomic notes on some extralimital species. *Far Eastern Entomologist*, 126: 29.

Triapitsyn S. V. & J. W. Beardsley 2000. A review of the Hawaiian species of *Anagrus* (Hymenoptera: Mymaridae). *Proceedings of the Hawaiian Entomological Society*, 34: 23-48.

Triapitsyn S. V., V. V. Berezovskiy, M. S. Hoddle & J. G. Morse 2007. A review of the Nearctic species of *Erythmelus* (Hymenoptera: Mymaridae), with a key and new additions to the New World fauna. *Zootaxa*, 1641: 1-64.