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**First report of *Graphopsocus cruciatus* (LINNAEUS) and
Ectopsocopsis cryptomeriae (ENDERLEIN)
(Psocoptera: Psocomorpha: Stenopsocidae and Ectopsocidae)
from Iran**

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Abstract

In 2013, two psocids species were collected from citrus leaves in the north of Iran and identified as *Ectopsocopsis cryptomeriae* from Ectopsocidae and *Graphopsocus cruciatus* from Stenopsocidae. This is the first record of family Stenopsocidae and genus *Graphopsocus* from Iran. Furthermore, both species are newly recorded for Iranian psocids fauna.

Key words: Psocoptera, *Ectopsocopsis cryptomeriae*, *Graphopsocus cruciatus*, Iran.

Zusammenfassung

Die Psocopteren *Ectopsocopsis cryptomeriae* (Ectopsocidae) und *Graphopsocus cruciatus* (Stenopsocidae) wurden 2013 auf Citrus-Blättern erstmalig im Iran nachgewiesen. Dies bedeutet auch das erstgenannte Vorkommen der Familie Stenopsocidae für den Iran.

Introduction

Within the order Psocodea, Psocoptera (psocids, booklice or barklice) with more than 5500 species worldwide (LIENHARD 2003), comprise a paraphyletic group of non-parasitic members (LYAL 1985; YOSHIZAWA & JOHNSON 2003, 2005; JOHNSON et al. 2004; GRIMALDI & ENGEL 2005, BESS et al. 2006). They range from 1-10 mm in length

and characterized by long antennae, developed postclypeus, pick-like lacinia, reduced prothorax and developed pterothorax.

Psocids are arranged into three suborders, i.e. Trogiomorpha, Troctomorpha and Psocomorpha (MOCKFORD 1993; SMITHERS 1996; LIENHARD & SMITHERS 2002; JOHNSON et al. 2003). The largest suborder, Psocomorpha, contains 30 of the 45 extant families (JOHNSON et al. 2013). Until now, approximately 7 species of psocids are reported from Iran (AHADIYAT 2004; JALILZAND et al. 2005; AHADIYAT & ZANGENESH 2007). Psocoptera are not collected routinely by most entomologists, furthermore, almost any part of Iran has not been surveyed by specialists, so it is quite likely that this number is a considerable underestimate of the total fauna.

Material and methods

In November 2013, some psocid specimens were collected from citrus leaves and branches Gorgan and vicinity and transferred into 95 % ethanol for preservation. Our samples were identified by Prof. Edward L. Mockford, School of Biological Sciences, Illinois State University. The collected specimens were deposited in the Collection of the Department of Plant Protection, College of Agriculture, Ferdowsi University of Mashhad.

Results and discussion

In our study, the Psocoptera specimens were identified as *Graphopsocus cruciatus* (LINNAEUS) from Stenopsocidae and *Ectopsocopsis cryptomeriae* (ENDERLEIN) from Ectopsocidae in the suborder Psocomorpha. This is the first record of the family Stenopsocidae and genus *Graphopsocus* for the insect fauna of Iran. Furthermore, both species are new for the Iranian psocid fauna. Including these records, the current total number of recorded Psocoptera species of Iran is 9.

Family Stenopsocidae

Macropterous; tarsi 2-segmented, tarsal claws without preapical tooth; Fore wing venation in distal part of wing obvious, Areolapostica present, Pterostigma joined to Rs by a cross vein and areola postica joined to M by a crossvein, fore wing M 3-branched, fore wing with 1 row of setae on veins.

Genus *Graphopsocus* KOLBE, 1880

Forewings patterned, Pterostigma strongly widened at pterostigmal crossvein; fore wing margin obviously setose to wing apex only and the hind margin glabrous (NEW & LIENHARD 2007). Currently, 22 species are recognized in this genus (LIANG et al. 2013).

***Graphopsocus cruciatus* (LINNAEUS, 1768)**

Head pale yellow with brown markings on vertex and postclypeus; Thorax with terga dark brown; abdomen greenish yellow, with brown apex; forewing about 3-3/4 mm. long, with five dark marks on the proximal half and a light "F" like mark on the distal half; hindwings with two brown patches in anal cell (NEW 1974).

Distribution: This is a cosmopolitan species and has been recorded from Europe; Algeria; Austria; Belgium; Bulgaria; Cyprus; Czechoslovakia; Denmark; Finland; France; Germany; Great Britain; Greece; Hungary; Ireland; Israel; Italy; Luxembourg; Morocco;

Netherlands; Norway; Poland; Portugal; Spain; Switzerland; Tunisia; Turkey; USSR; Yugoslavia; Canary Islands; Madeira; Canada; USA; Mexico; Argentina; Brazil; Angola; Zambia; China; Japan; Mongolia Finland; Dominica; Colombia (JOHNSON et al. 2013).

M a t e r i a l e x a m i n e d : 15♀ ♀, 2♀ ♀, Golestan province, Gorgan, 15.XII. 2013, Leg. P. Aghadokht.

Family Ectopsocidae

Tarsi 2-segmented; Antennae more than 10-segmented; claws without preapical tooth; fore wing membrane not setose; areola postica absent; tergite 9 of males with comb of teeth and/or other sclerotised structure; subgenital plate of females bilobed with row of subapical setae.

Genus *Ectopsocopsis* BADONNEL, 1955

Hind wing Rs and M connected by crossvein or wing reduced; first flagellar segment of males not spinose; female subgenital plate bilobed or with median lobe, never with protuberance between lobes

***Ectopsocopsis cryptomeriae* (ENDERLEIN, 1907)**

This species was originally described from Japan; Antennae 13-segmented; Forewing without areola postica; pterostigma rectangular; hindwing with Rs and M connected by a crossvein; pulvillus broad; female sub genital plate bilobed or with median lobe. Gonapophyses strongly reduced

Distribution: Japan; Germany; Hungary; Israel; Italy; Switzerland; USSR; Yugoslavia; Bermuda Islands; USA; Cuba; Jamaica; Mexico; Brazil; Chagos Archipelago; China; Korea; Taiwan; Pacific; Micronesia; Hawaii (JOHNSON et al. 2013).

M a t e r i a l e x a m i n e d : 1♀, Golestan province, Gorgan, 15.XII. 2013, Leg. P. Aghadokht.

Discussion

We have observed relatively high densities of two psocid species on citrus trees, but we do not know if these two psocid species are agricultural pests; furthermore, we did not find any information about their role on their host plants. More studies on the biology, ecology, and food habits of these two species could reveal their role in agricultural ecosystems.

With regard to the fact that very little collecting by specialists has been done in Iran, it is not unexpected that the real richness of psocid species in this country is higher than what is presently known. So, the psocids fauna of Iran will undoubtedly continue to grow as more material is found and studied.

Acknowledgment

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