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Three New Records of Gall Midges (Diptera: Cecidomyiidae) from Türkiye

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ABSTRACT

Three new records for the Turkish gall midges (Diptera: Cecidomyiidae) fauna were obtained for the first time from the seeds of *Salvia sclarea* L. collected during a field study in Denizli province, Türkiye. These new records are as follows: *Arthrocnodax salviae* Fedotova, 1995, *Dasineura salviae* (Kieffer, 1909) and *Lasioptera salviae* Schiner, 1868. The locations of the determined species in Türkiye, their world distribution and host plant data are provided.

Keywords: Salvia, host plant, Denizli, fauna.

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INTRODUCTION

The family Cecidomyiidae, commonly known as gall midges, is a diverse group of tiny flies belonging to the order Diptera. Cecidomyiidae, representing one of the largest families in Diptera, has a worldwide distribution with 6651 described species. Noteworthy among their attributes is propensity of many gall midge species to induce abnormal growths, termed plant galls, on host plant tissues. These formations arise through manipulation of the host plant's physiology by gall midge larvae, facilitating formation of galls serving as both nourishment sources and protective shelters for maturing larvae (Kolesik & Gagné, 2020; Gagné & Jaschhof, 2021).

Cecidomyiinae stands out as the most extensive subfamily within the gall midges (Cecidomyiidae), encompassing 617 genera and 5004 species. These species are distinguished for their capacity to incite the formation of plant galls, characterized by diverse morphologies encompassing a spectrum of shapes, sizes, and colors. Gall structures exhibit variability that depend on inducing species and specific host plant involved (Gagné & Jaschhof, 2021).

Looking at studies on Cecidomyiidae in Türkiye shows a total of 71 species distributed in 38 genera are listed for the fauna. Among these, 62 species demonstrate phytophagous behaviour, exhibiting associations with 59 distinct host plant species (Skuhravá, Bayram, Cam, Tezcan, & Can 2005). In the recent checklist, the current fauna includes 118 species (Mirumian & Skuhravá, 2022).

Here, we record three species of gall midges new to the fauna of Türkiye. By comparing to the faunas of neighbouring countries, it seems the fauna of Türkiye's gall midges are better known.

MATERIAL AND METHODS

Host plant samples (*Salvia sclarea* L.) (Fig. 1) collected from Denizli province, Türkiye in 2022 and placed in glass jars whose caps were sealed with tulle cloth and fixed with rubber bands to allow air circulation and prevent mold. The jars were checked weekly to detect adult emergence. After recording the emergence dates of the reared adults, they were stored in 75% ethanol. Skuhravá's key was consulted for identification of species (Skuhravá, 1997). Gagné & Jaschhof (2021) followed for the world distribution of the species.

Voucher specimens are preserved in the Entomology Research Laboratory, Pamukkale University.

RESULTS

Arthrocnodax salviae Fedotova, 1995

Material examined: Türkiye, Denizli, Tavas, Kızılcabölük, 37°41'N, 29°00'E, 1520 m a.s.l., collection date: 13.10.2022, emerging date: 15.10.2022, 1 ♂.

Distribution: Kazakhstan.

Host plant: *Salvia sclarea* L.

Remark: Genus *Arthrocnodax* with 49 known species has a worldwide distribution. Almost all the known species are known as predators of eriophyid mites (Acarinae: Prostigmata: Eriophyidae), and a few of them are also known as predators of gall midge larvae (Gagné & Jaschhof, 2021).

Till now, two species of *Arthrocnodax* namely, *A. coryligallarum* (Targioni-Tozzetti, 1887) and *A. vitis* Rübsaamen were recorded in Türkiye (Skuhravá et al., 2005; Skuhravá & Skuhravý, 2021). Larvae of the first species are predators of eriophyid mites *Phytoptus avellanae* Nal. (Acarina: Eriophyoidea) in big bud galls on *Corylus avellana* L. (Corylaceae) (Skuhravá, 1994) and, larvae of the second species are predator of grape erineum mites, *Colemerus vitis* (Pagenstecher) on the leaves of common grape vine, *Vitis vinifera* L. (Vitaceae) (Skuhravá & Skuhravý, 2021). By reporting of *A. salviae*, the species number of *Arthrocnodax* in Türkiye reach to three species.

Note: Regarding to the existence of two other species of gall midges in salvia flower buds, and considering the biology of genus *Arthrocnodax*, it can be concluded that *A. salviae* is a predator of *Dasineura salviae* and *Lasioptera salviae* larvae in salvia flower buds.

Dasineura salviae (Kieffer, 1909)

Material examined: Türkiye, Denizli, Tavas, Kızılcabölük, 37°41'N, 29°00'E, 1520 m a.s.l., collection date: 13.10.2022, emerging date: 15.10.2022, 1 ♂.

Distribution: Widespread Europe. Host plant: *Salvia pratensis* L. (Lamiaceae).

Host plant: *Salvia sclarea* L.

Remark: Genus *Dasineura*, which is cosmopolitan due to its species distribution, contains a total of 483 species. The genus includes mostly flower-dwelling or leaf-rolling species, and also many complex gall formers (Gagné & Jaschhof, 2021).

A total of six species belonging to the genus were recorded in Türkiye (Skuhravá et al., 2005). These species are *D. affinis* (Kieffer, 1886), *D. crataegi* (Winnertz, 1853), *D. oleae* (F. Löw, 1885), *D. rosae* (Bremi, 1847), *D. rufescens* (Stefani, 1896), and *D. viciae* (Kieffer, 1888). By reporting of *D. salviae*, the species number of *Dasineura* in Türkiye reach to seven species.

Note: It has been reported that the red larvae live in the swollen flower buds of *Salvia pratensis* (Skuhravá & Skuhravý, 2021).

Lasioptera salviae Schiner, 1868

Material examined: Türkiye, Denizli, Tavas, Kızılcabölük, 37°41'N, 29°00'E, 1520 m a.s.l., collection date: 13.10.2022, emerging date: 15.10.2022, 1 ♀.

Distribution: South Africa. Host plant: *Salvia* sp. (Lamiaceae).

Host plant: *Salvia sclarea* L.

Remark: Genus *Lasioptera* is primarily found in the Old World, with only a few species present in North America. Most species seem to be gall makers, especially in plant

stems, while some are successor species that inhabit galls left behind by the original gall makers. The genus is represented by a total of 129 valid species (Gagné & Jaschhof, 2021). Six species were totally determined in Türkiye in previous studies (Skuhravá et al., 2005): *L. berlesiana* Paoli, 1907, *L. carophila* F. Löw, 1874, *L. eryngii* (Vallot, 1829), *L. populnea* Wachhtl, 1883, *L. rubi* (Schrank, 1803), and *L. turcica* Möhn, 1968. With the addition of *L. salviae*, the number of *Lasioptera* species in Türkiye now totals seven.

CONCLUSIONS AND DISCUSSION

Following faunistic and taxonomic investigations were conducted on gall midges fauna of neighbouring countries: 240 species from Bulgaria (Skuhravá, Skuhravý, Dončev, & Dimitrova, 1991), 167 species from Greece (Skuhravá & Skuhravý, 1997), 124 species from Armenia (Mirumian & Skuhravá, 2022), 123 species from Georgia (Skuhravá, Skuhravý, & Buhr, 2013), 80 species from Iran (Karimpour, Skuhravá, Razmi, & Lotfalizadeh, 2024), 11 species from Azerbaijan (Skuhravá, 1986), and 9 species from Iraq (Skuhravá, 1986). Recently, three species were added to the fauna of Turkish gall midges as new records (Mirumian & Skuhravá, 2022). Our study records three more species so the fauna includes 121 species now.

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REFERENCES

Gagné, R.J. & Jaschhof, M. (2021). *A Catalog of the Cecidomyiidae (Diptera) of the World*. (5th ed.). Systematic Entomology Laboratory, Agricultural Research Service, U.S. Department of Agriculture U.S. National Museum NHB, Washington, D.C., USA.

Karimpour, Y., Skuhravá, M., Razmi, M., & Lotfalizadeh, H. (2024). New Records of Iranian Grass Gall Midges (Diptera: Cecidomyiidae). *Journal of the Entomological Research Society*, 26(1), 81-91.

Kolesik, P. & Gagné, R.J. (2020). A review of the gall midges (Diptera: Cecidomyiidae) of Indonesia: taxonomy, biology and adult key to genera. *Zootaxa*, 4847(1), 01-82.

Mirumian, L. & Skuhravá, M. (2022). The gall midges (Diptera: Cecidomyiidae) of Armenia. 2. New records of occurrence. *Acta Societatis Zoologicae Bohemicae*, 85, 23-34.

Skuhravá, M. (1986). Family: Cecidomyiidae. In Á., Soós & L., Papp (Eds.). *Catalogue of Palaearctic Diptera* (pp. 72-297). Vol. 4. Budapest: Akadémiai Kiadó & Amsterdam: Elsevier.

Skuhravá, M. (1994). The zoogeography of gall midges (Diptera: Cecidomyiidae) of the Czech Republic II. Review of gall midge species including zoogeographical diagnoses. *Acta Societatis Zoologicae Bohemicae*, 58, 79-126.

Skuhravá, M. (1997). Family Cecidomyiidae. In L., Papp & B., Darvas (Eds.). *Contributions to a Manual of Palaearctic Diptera (with Special Reference to Flies of Economic Importance)* (pp. 71-204). Vol. 2. Nematocera and Lower Brachycera. Budapest: Science Herald.

Skuhravá, M. & Skuhravý, V. (1997). Gall midges (Diptera: Cecidomyiidae) of Greece. *Entomologica*, Bari, 31, 13-75.

Skuhravá, M. & Skuhravý, V. (2021). *The gall midges of Europe*. KNNV, Netherlands.

Skuhravá M., Skuhravý V., & Buhr H.J. (2013). Gall midges (Diptera: Cecidomyiidae) of Georgia. *Acta Societatis Zoologicae Bohemicae*, 77, 99-137.

Skuhravá M., Skuhravý V., Dončev K.D., & Dimitrova B.D. (1991). Gall midges (Cecidomyiidae, Diptera) of Bulgaria. I. Faunistic researches in the 1978–1987 period. *Acta Zoologica Bulgarica*, 42, 3-26.

Skuhravá, M., Bayram, S., Cam, H., Tezcan, S., & Can, P. (2005). Gall midges (Diptera: Cecidomyiidae) of Turkey. *Turkish Journal of Entomology*, 29(1), 17-34.