

**A NEW HOST *Lasioptera eryngii* (VALLOT, 1829) (DIPTERA: CECIDOMYIIDAE)
RECORD FOR *Pseudotorymus sapphyrinus* (HYMENOPTERA: TORYMIDAE)
FROM TURKEY***

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Abstract

This study was conducted in 2012 to determine the gall midges associated with field eryngo (*Eryngium campestre* L.), an important weed in cereal and leguminous fields in the Şanlıurfa province (Turkey). Infected common eryngo samples were collected from cereal and legume growing areas and were taken to the laboratory to culture. *Lasioptera eryngii* adults were obtained from the cultured common eryngo samples. This is the first record of *L. eryngii* for Şanlıurfa province and the second record for Turkey. As a result of our study it was determined that *L. eryngii* suppressed the development and distribution of *E. campestre*, an important weed of the crops. It inhibits the growth and development of generative parts of this host plant and prevents its spread to the surroundings areas. This fact is of great importance regarding the biological control of the weed. *Pseudotorymus sapphyrinus* (Hymenoptera: Torymidae) was reared from galls of *L. eryngii* on *E. campestre*. It is a new host of this parasitoid and the second record of occurrence of *P. sapphyrinus* from Turkey.

Key words: *Eryngium campestre*, *Lasioptera eryngii*, *Pseudotorymus sapphyrinus*, Turkey.

INTRODUCTION

Cereal and Leguminous cultivation is of great economic importance in Turkey. Approximately 50% of the agricultural land in Turkey is occupied by cereals, 33% of which is wheat. Approximately 79% of red lentil production in Turkey is obtained from the South Eastern region (Adıyaman, Batman, Diyarbakır, Gaziantep, Kilis, Mardin, Siirt, Şanlıurfa and Şırnak) (Anonymous, 2010).

In a study carried out to determine the prevalence and intensity of weeds in production areas of wheat in Diyarbakır the prevalence of *Eryngium campestre* 19.40% was identified at an intensity of 0.062 plant/m² (Özaslan, 2011). Gall midges (Cecidomyiidae) are one of the largest families in the order Diptera including many species inducing galls on various host plants. At present this family contains 6,203 known species in 736 genera (Gagné and Jaschhof, 2014). The present recorded gall midge fauna of Turkey includes 71 species belonging to 38 genera and associated with 59 host plant species (Skuhravá, 2005). A few gall midge species are zoophagous and

mycophagous. Larvae usually induce galls on various organs of host plants but larvae of some species develop on plant organs without making galls. They are usually host-specific for a definite plant species, even for a definite part in a given plant.

Galls of *Lasioptera eryngii* on *Eryngium campestre* were recorded for the first time at Taşlıçiftlik, Tokat, in northern Turkey, in June 2003 by H. Cam (Skuhravá et al., 2005). We recorded galls of *Lasioptera eryngii* in large amounts in the province Şanlıurfa in southeastern Turkey in 2012.

First of all, there is a need for more comprehensive studies to determine the distribution area and host plants of *L. eryngii* in the region. These studies will reveal whether *L. eryngii* can be used as a biological control agent of *Eryngium campestre* or not.

MATERIALS AND METHODS

Samples of *Eryngium campestre* including galls were collected from cereal and leguminous growing areas in the Şanlıurfa province (Turkey) during 2012. Each sample was put into a plastic bag and taken to the laboratory

for examination. Galls were kept in rearing cages until adult emergence. Specimens were taken from both wild and cultivated plants during irregular surveys carried out in the spring and summer seasons of the one-year study.

Host plants were sent for confirmation of identification to Prof. Dr. A. Selçuk Ertekin and parasitoids reared from the galls of *Lasioptera eryngii* were sent for identification to Prof. Dr. Miktat Doğanlar.

RESULTS AND DISCUSSIONS

During 2012 we obtained 51 adults of *Lasioptera eryngii* from one host plant, and also 15 adult parasitoids.

Material examined

19♀♀, 32♂♂ (reared on 19.V.2012, Ö. Cumali, from galls on *Eryngium campestre*; all mounted on microscope slides, deposited in the collection of Marcela Skuhrová, Praha, Czech Republic.) Şanlıurfa (37°13'N, 38°57'E at altitude of about 570 m).

Life cycle

Lasioptera eryngii produced two generations per year. Adults of *L. eryngii* emerged in the middle of May from galls, where they had hibernated as fully-grown larvae. Females searched for host plants and laid several eggs on young stems of *Eryngium*. Larvae hatched from eggs after several days, penetrated in plant tissue, started to suck plant liquid and induced galls. Larvae caused plurilocular swellings on stems, leaf petioles and main leaf veins of *Eryngium campestre* (Figure 1).



Figure 1. Galls of *Lasioptera eryngii* on stem of *Eryngium campestre* in the field in Şanlıurfa province in southeastern Turkey

The inner walls of the gall chambers were covered with fungal mycelium. Larvae pupate in galls and moved from inside of the gall to the surface where they changed into pupae. After several days pupae broke opening and adults flew from galls. Pupal exuviae remained in opening of galls (Figure 2).



Figure 2. Pupal exuviae (white) and orange larvae of *Lasioptera eryngii* (in cross section of the gall) protruding from openings on the gall

Females started to search for host plants and laid eggs on young parts of host plants. Larvae quickly developed, pupate in galls and adults emerged in July and August. Female started to search for suitable plants and the life cycle was repeated (Figure 3).

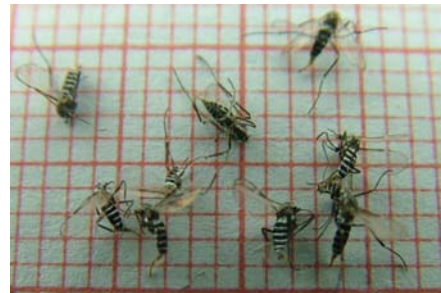


Figure 3. Females and males of *L. eryngii* reared from the gall. Small square – 1 mm

Larvae hibernate in the galls and pupate there in the spring of the following year.

Adult

The body is 3-4 mm long, dark coloured, abdomen with yellow and black bands. Black bands are formed of many very small black scales. Female antennae consist of 2+15 to 2+16 flagellomeres, male antennae of 2+11 to 2+14 flagellomeres. Females have ovipositors of characteristic shape, with a lateral group of strong setae and a group of strong, hooked setae on dark field dorsally and apical oblique lamella (Figure 4).

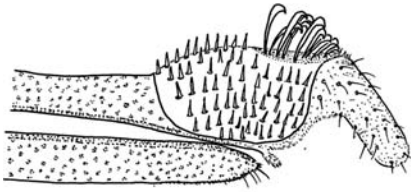


Figure 4. Ovipositor of the female of *L. eryngii* with groups of strong setae

Larva

Full-grown larvae are 3.4-3.5 mm long and orange coloured, with dark brown sternal spatula on the ventral side of the body. It is strongly sclerotized and has a bilobed anterior part.

Gall

Stem swellings are usually large, from 3.5 to 5 cm long and 1.5 cm broad, including many chambers, up to 30. The galls on leaf petioles and inflorescence stalks are usually smaller and include only a few chambers. Only one larva develops in each chamber.

Host plants

In the Şanlıurfa Province (Turkey) the galls of *L. eryngii* were recorded only on *Eryngium campestre* var. *campestre* (L.) Hudson. In Europe the galls were recorded also on other species of *Eryngium*, viz. *E. amethystinum* L., *E. maritimum* L. *E. tricuspidatum* L. and *E. dilatatum* Lam. (Möhn, 1966-1971).

Distribution

Lasioptera eryngii is a sub-Mediterranean and Mediterranean species. It occurs in many countries of central and southern Europe, in Africa (Algeria) and in Asia (Turkey) (Figure 5).

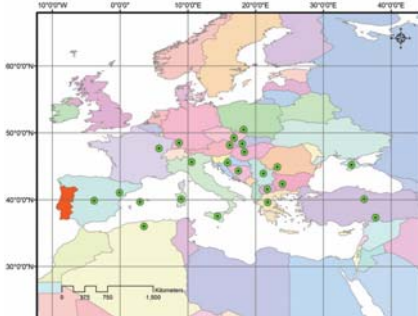


Figure 5. Distribution of *Lasioptera eryngii* in countries of Europe, Asia and North Africa

Its host plant, *Eryngium campestre*, is widely distributed in southern Europe including the Atlantic coast and coast of North Africa up to the Caspian Sea. The distribution of *L. eryngii* is smaller. Galls occur abundantly in southern Europe and markedly less frequently in the north (Skuhřavá, 1986; Skuhřavá, 1987). In the Czech Republic situated in central Europe *L. eryngii* is rare and therefore included on the red list of endangered species (Skuhřavá, 2005).

In Turkey the galls of *L. eryngii* were recorded for the first time in 2003 at Taşlıçiftlik, Tokat, in northern Turkey. After nine years the galls were recorded in the Şanlıurfa Province in southeastern Turkey at a relatively high population level. It seems that the area of distribution of *L. eryngii* have been extended to East.

Parasitoids

Several species of parasitic Hymenoptera have been reared from galls of *Lasioptera eryngii* in Europe. Fulmek (Fulmek, 1968) summarized scattered data on parasitoids and gave a list of 10 species obtained from galls of *L. eryngii*. Skuhřavá & Thuróczy (Skuhřavá and Thuróczy, 2007) reared the specimens of the genus *Torymus* from galls. In Turkey we reared *Pseudotorymus sapphyrinus* from galls.

New record host

In Turkey several adults of *Pseudotorymus sapphyrinus* (Hymenoptera: Chalcidoidea: Torymidae) have been reared from galls of *Lasioptera eryngii*. Graham & Gijswijt (Graham and Gijswijt, 1998) indicated that *P. sapphyrinus* is a parasitoid in galls of *Biorrhiza pallida* (Olivier) (Hymenoptera: Cynipidae) on *Quercus* sp. and consider it as a common species in Europe. Gencer (Gencer, 2003) reared adults of *P. sapphyrinus* from galls of *Diplolepis mayeri* Schld. (Hymenoptera: Cynipidae) on *Rosa* sp. and recorded it from a new host and for first time from Turkey.

We reared *P. sapphyrinus* from galls of *Lasioptera eryngii* on *Eryngium campestre*. It is a new host of this parasitoid and the second record of occurrence of *P. sapphyrinus* in Turkey.

CONCLUSIONS

Possibility of using *Lasioptera eryngii* seems to be suitable object for biological control of *Eryngium campestre*. It has two generations per year and each female is able to lay large quantity of eggs. Its galls are large, each gall includes many larvae that develop into adults in a relative short time. Forming galls on stems inhibits the growth and development of generative parts of this host plant and prevents its spread to the surroundings areas. This fact is of great importance regarding the biological control of this weed.

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