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Duška SIMOVA-TOŠIĆ, Marcela
SKUHRAVÁ, Vaclav SKUHRAVÝ:

**Geologica &
Palaeontologica**

Gall Midges (Diptera:
Cecidomyiidae) of Slovenia

Museologica

Zoocecidi (Diptera:
Cecidomyiidae) Slovenije

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SCOPOLIA

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Gall Midges (Diptera: Cecidomyiidae) of Slovenia

Duška SIMOVA – TOŠIĆ¹, Marcela SKUHRAVÁ² and Vaclav SKUHRAVÝ³

1 Faculty of Agriculture, Zemun-Beograd, Serbia

2 Czech Zoological Society, Praha, Czech Republic

3 Institut of Entomology, Academy of Sciences, Česke Budějovice, Czech Republic

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ABSTRACT – The present gall midge fauna of Slovenia includes 219 species. According to the data on frequency occurrence, 14% belongs to solitarily, 10% to scarcely, 14% to moderately, 20% to considerably, 7% to abundantly and 5% to commonly occurring species. The most common species is *Didymomyia tiliacea* causing galls on leaves of *Tilia* spp. The majority (90%) are Euro-Siberian species. Ten of them have secondarily holarctic distribution being introduced into North America; 20 (10%) belong to Mediterranean species; *Contarinia helianthemi*, *C. aconitifloris* and *Dasineura rhododendri* are mountain species. Any species were mentioned to be pest on cultivated plants in Slovenia in the past.

IZVLEČEK – ZOOCECIDIJI (DIPTERA, CECIDOMYIIDAE) SLOVENIJE. – V tem delu opisana favna zoocecidijskih Slovenije obsega 219 vrst. Glede na pogostost pojavljanja spada 14% vrst med posamezno najdene, 10% med redke, 14% med zmerno, 20% med precej razširjene, 7% vrst je pogostih in 5% vrst splošno razširjenih. Najbolj splošno razširjena je *Didymomyia tiliacea*, ki povzroča šiške na listih *Tilia* spp. Večina vrst (90%) je evrosibirskih. Deset od teh je sekundarno holarktično razširjenih, ker so bile zanesene v Severno Ameriko; 20 vrst (10%) je mediteranskih; *Contarinia helianthemi*, *C. acomitifloris* in *Dasineura rhododendri* so gorske vrste. Nobena omenjenih vrst ni bila v preteklosti škodljiva na gojenih rastlinah v Sloveniji.

Introduction

Summarization of scattered data on the occurrence of animals in particular regions is very important because it shows the present stage of knowledge and makes it possible to evaluate the fauna of an examined region from various points of view. That is the reason why several countries of Europe, viz. For example England, Italy, Czech Republic, prepared check lists of faunas including either a broader area with all groups of invertebrates or insects, or smaller groups as insect order or family.

Such summarization of gall midge fauna inhabiting the territory of the former Yugoslavia was elaborated by SKUHRAVÁ and SKUHRAVÝ (1964). Similar reviews were given for countries surrounding the former Yugoslavia, viz. Rumania (SKUHRAVÁ, SKUHRAVÝ, NEACSU, 1972), Bulgaria (SKUHRAVÁ, SKUHRAVÝ, DONČEV, DIMITROV, 1991, 1992), Austria (SKUHRAVÁ, SKUHRAVÝ, 1991-92, 1995) and Italy (SKUHRAVÁ, SKUHRAVÝ, 1994).

Since 1964 many new data about occurrence of gall midges were published for the Balkan Peninsula, and therefore, it is now necessary to summarize these data and show the present stage of knowledge in special publications. In the first of these papers we summarize data from the territory of Slovenia. We also intend to elaborate two other papers dealing with gall midge faunas of Croatia and Bosnia and with the gall midges of Serbia, Montenegro and Macedonia.

Dedication

This paper is dedicated to Dr. F. Janežič emeritus professor of the University of Ljubljana, in recognition of his extensive investigations of gall-inducing animals in the territory of Slovenia as well other parts of the former Yugoslavia.

History

The first data on the occurrence of gall midge galls in the territory of Slovenia were given by BAUDYŠ (1928) who mentioned two species: *Rhabdophaga rosaria* on *Salix alba* and *S. purpurea* and *Dasyneura sisymbrii* on *Roripa islandica*. Later, BAUDYŠ (1941) mentioned three species, viz. *Zygiobia carpini* on *Carpinus betulus*, *Geocrypta galii* on *Galium schultesii* and *Cystiphora "taraxaci"* on *Hieracium umbellatum* (correctly *Cystiphora sanguinea*).

Gall midges of Slovenia were investigated mainly by JANEŽIČ, who collected galls caused by different animals on various host plant species. During twenty years of researches he recorded in twenty one contributions (JANEŽIČ, 1972-1990) many gall midge species in various parts of Slovenia. JANEŽIČ (1978, 1980) described three new gall midge species (*Dasineura cotini*, *Contarinia coronillae* and *Contarinia istriana*) according to the material collected at Portorož. Several data on the occurrence of gall midges in the territory of Slovenia are given by MAČEK (1971).

Study area

The territory of Slovenia is connected with the Balkan Peninsula. Its area covers about 20251 square kilometers. From the biogeographical point of view, it belongs to two biogeographical provinces: to the Middle-European Forest Province and the Pannonic Biogeographical Province (UDVARDY, 1975). The northern part of Slovenia is formed by the Alps, the greatest mountain system of Europe, its fauna belonging to the Euro-Siberian elements. The southern part of Slovenia penetrates into the mountain system of the Balkan Peninsula. The eastern part belongs to the Euro-Siberian area while the subprovince to the so called Pontic Region. The westernmost part belongs to the Mediterranean subregion (NOIRFALISE, 1987).

Material and methods

A list of gall midge species was compiled from all papers dealing with the occurrence of gall midge species in Slovenia (Fig. 1). Added thereto are new data about occurrence which were

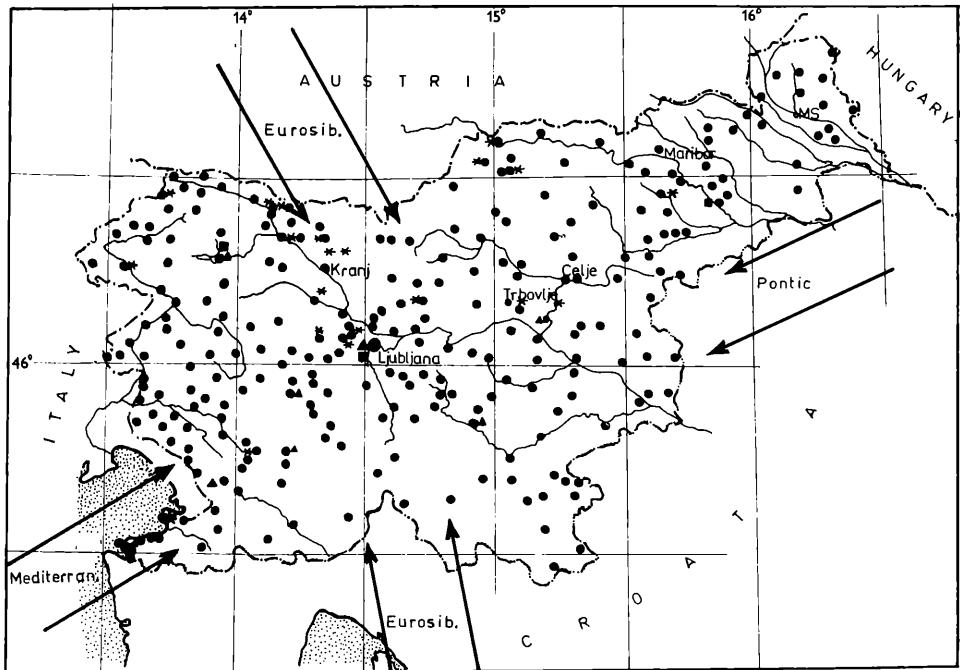


Fig. 1. The territory of Slovenia with areas where investigations of gall midge fauna were carried out by Janežič, Baudyš, Maček and Simova - Tošić; arrows show main ways of migration of faunal elements.

gathered by one of the present authors, D. Simova-Tošić, during the period from 1970-198 at the following localities: Ljubljana, Dolnji Logatec, Žužemberk, Škocjanske Jame, Postojna, Rimske Toplice, Ilirska Bistrica, Bohinj and Portorož. The species as recorded are marked with an asterisk.

The nomenclature of gall midge species is according to SKUHRAVÁ (1986), that of host plant species according to TUTIN et all. (1964-1980).

Results

According to the summarization of all data, 219 gall midge species are currently known in the territory of Slovenia. Six of them are recorded here for the first time as follows: *Aphidoletes aphidimyza*, *Arthrocnodax coryligallarum*, *Asphondylia rosmarini*, *Jaapiella bryoniae*, *Ozirhincus longicollis* and *O. millefolii*.

All species are edlist alphabetically, according to the following scheme: scientific name of gall midge species, followed by the name, or names of host plant species and then the names of collectors (in abbreviation) together with the indication of the year or years when his paper was published. The following abbreviations of collectors are used: J. (Janežič), Mač. (Maček), S. (Simova-Tošić).

The summarization of all data about occurrence of gall midges from the territory of Slovenia shows that this country belongs to relatively well explored areas of Europe. The number of gall midges in Slovenia may be compared with the gall midge faunas of adjacent countries:

Austria where 11 gall midge species are known (SKUHRAVÁ, SKUHRAVÝ, 1991-92, 1995), of Italy where 24 gall midge species (SKUHRAVÁ, SKUHRAVÝ, 1994) and of Rumania where 295 gall midge species are known (SKUHRAVÁ, SKUHRAVÝ, NEACSU, 1972). The data on gall midge fauna of Hungary have not been summarized.

In comparison with the middle-European gall midge fauna, the fauna of Slovenia seems to be poorer than that of the Czech Republic which includes 500 species (SKUHRAVÁ, 1994, a, b).

The gall midge fauna of Slovenia was analyzed from the zoogeographical point of view according to a method described by SKUHRAVÁ (1987, 1994 a, b), from point of view of horizontal and vertical occurrence of species in the territory of Slovenia and their distribution areas in Europe or larger areas. Attention was given also to the economic importance of gall midges in the territory of Slovenia.

List of gall midge species

Ametrodiplosis thalictricola (Rubaamen, 1895): *Thalictrum lucidum* L. J.: 1977, 1988.

Anthodiplosis rudimentalis (Kieffer, 1901): *Artemisia vulgaris* L.; J.: 1978, 1979, 1980, 1981, 1982, 1984, 1984b, 1985, 1987, 1988, 1989, 1990.

****Aphidoletes aphidimyza*** (Rondani, 1847). Host:

Aphis fabae Scop. On *Pastinaca sativa* L., *Brevicoryne brassicae* L. on *Brassica oleracea* L. S. Dolnji Logatec, Žužemberk.

****Arthrocnodax coryligallarum*** (Targ., Tazz. 1886. Host: *Phytoptus avellanae* on *Corylus avellana* L.; S. Ljubljana.

Aschistonyx carpinicolus Rubsaamen, 1917.: *Carpinus betulus* L., *Ostrya carpinifolia* Scop.; J.: 1974, 1974b, 1975, 1976, 1976b, 1977, 1978, 1979, 1980, 1981, 1982, 1984, 1984b, 1985, 1986, 1987, 1988, 1989, 1990.

Asphondylia baudy Vimmer, 1937.: *Coronilla varia* L.; J.: 1976, 1977, 1978.

A. coronillae (Vallot, 1929) (= *jaapi* Rubs.): *Coronilla emerus* L., *C. emerus* L. ssp. *emeroides* Boiss. et Spr.; J.: 1974, 1976, 1978, 1979, 1980, 1981, 1984b.

A. cytisi Frauenfeld, 1873: *Cytisus supinus* L.; J.: 1974b 1977, 1981; S.: Dolnji Logatec.

A. dorycnii (Muller, 1870): *Dorycnium germanicum* (Grem.) Rouy.; J.: 1979.

A. genistae (Loew, 1850) (= *bitensis* Kffr.): *Genista sagittalis* L.; J.: 1981, 1988.

****A. melanopus*** Kieffer, 1890: *Lotus corniculatus* L.; J.: 1976, 1976b, 1977, 1978, 1981; S.: Rimske Toplice.

A. miki Wachtl 1880: *Medicago sativa* L.; J.: 1978, 1979, 1980, 1984, 1985, 1987.

****A. ononidis*** F. Löw.: *Ononis spinosa* L.; J.: 1977; S.: Dolnji Logatec.

A. pruniperda Rondani, 1867; (= *prunorum* Wachtl): *Prunus spinosa* L.; J.: 1973, 1976b, 1978, 1980, 1981, 1984, 1984b, 1985, 1986, 1988.

****A. rosmarini*** Kieffer, 1896: *Rosmarinus officinalis* L.; S.: Portorož.

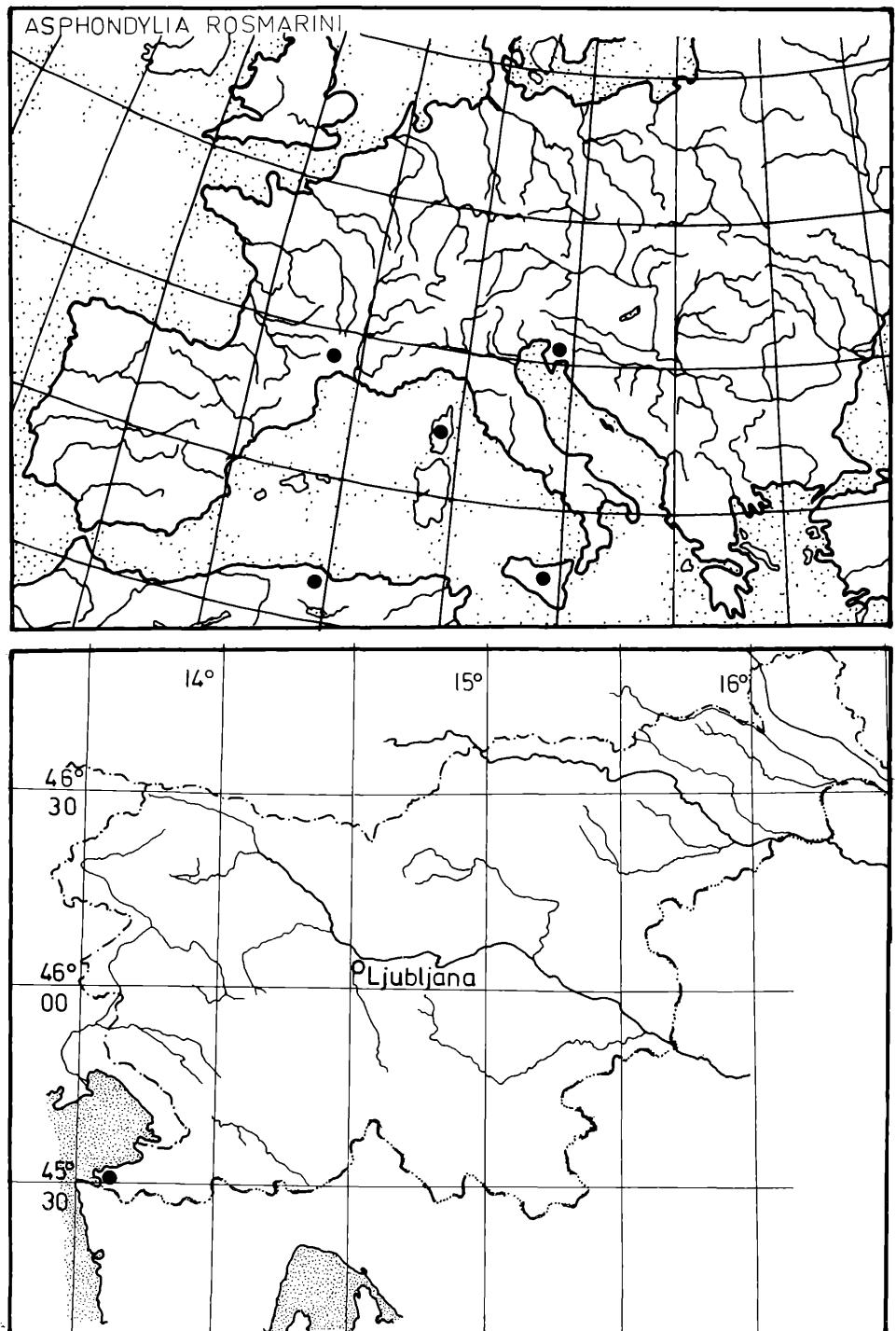


Fig.2. The occurrence of *Asphondylia rosmarini* on *Rosmarinus officinalis* in the Mediterranean area and Slovenia.

A. scrophulariae Schiner, 1856: *Scrophularia canina* L., *S. nodosa* L.; J.: 1978, 1979, 1981, 1984, 1984b, 1985, 1988, 1989.

***A. verbasci** (Vallot, 1827): *Verbacum austriacum* (Schott.), *V. blataria* L., *V. lychnitis* L., *V. nigrum* L., *V. thapsus* L., *V. thapsiforme* Scrad.; J.: 1976, 1976b, 1977, 1978, 1979, 1980, 1981, 1982, 1984, 1986, 1987, 1989, 1990.

Atrichosema aceris Kieffer, 1904: *Acer campestre* L.; J.: 1975, 1976, 1976b, 1977, 1978, 1979, 1980, 1981, 1982, 1983, 1984, 1984b, 1986; S.: Dolnji Logatec, Žužemberk.

Bayeriola thymicola (Kieffer, 1888): *Thymus serpyllum* L.; J.: 1975, 1984, 1987, 1990; S.: Dolnji Logatec.

Contarinia acerplicans (Kieffer, 1889): *Acer campestre* L., *A. monspessulanum* L., *A. pseudoplatanus* L.; J.: 1974b, 1981, 1982, 1984b, 1985, 1986, 1989.

C. aconitifloris Stelter 1962: *Aconitum vulparia* Rchb.; J.: 1976b, 1978, 1979, 1981, 1982.

C. anthobia (F. Löw, 1877): *Crataegus monogyna* Jacq. (= *C. oxyacantha* L.); J.: 1976b, 1977, 1978.

C. anthophthora (F. Löw, 1880): *Verbascum nigrum* L.; J.: 1978, 1982, 1984, 1986.

C. ballotae Kieffer, 1898: *Ballota nigra* L.; J.: 1976.

C. barbichi (Kieffer, 1890): *Lotus corniculatus* L.; J.: 1976b, 1984.

C. campanulae (Kieffer, 1895): *Campanula trachelium* L.; J.: 1978, 1979, 1985.

***C. carpini** Kieffer, 1897: *Carpinus betulus* L.; J.: 1973, 1976, 1976, 1978, 1979, 1980, 1982, 1984, 1986, 1987, 1989, 1990; S.: Postojna, Škocijanske Jame.

C. coronillae Janežič, 1978: *Coronilla emerus* L., *C. emerus* L. ssp. *emeroides* Boiss et Spr.; J.: 1976, 1979, 1980, 1984b.

C. coryli (Kaltenbach, 1859) (= *C. corylina* F. Löw): *Coryllus avellana* L.; J.: 1972, 1973, 1974, 1974b, 1975, 1976, 1976b, 1977, 1978, 1979, 1981, 1982, 1984, 1984b, 1985, 1986, 1987, 1988, 1989, 1990.

C. cotini Kieffer, 1901: *Cotinus coggygria* Scop.; J.: 1976b, 1978, 1981.

C. craccae Kieffer, 1897: *Vicia cracca* L.; J.: 1976, 1976b, 1977, 1980, 1981, 1986.

C. gei Kieffer, 1909: *Geum urbanum* L.; J.: 1984.

C. helianthemi (Hardy, 1850): *Helianthemum grandiflorum* DC. *H. nummularium* (L.) Mill. ssp. *obscurum* (Čelak) Holub (= *H. ovatum* Viv. Duval); J.: 1979.

C. hyperici Barnes, 1952: *Hypericum perforatum* L.; J.: 1974b.

C. inulicola Stelter, 1965: *Inula hirta* L.; J.: 1976b

C. istriana Janežič, 1980: *Coronilla emerus* L. ssp. *emeroides* Boiss et Spr.; J.: 1981, 1984, 1984b.

C. jaapi Rubsaamen, 1914: *Lathyrus pratensis* L.; J.: 1976b.

C. jacobaeae (Loew, 1850): *Senecio vulgaris* L.; J.: 1974b.

**C. loti* (De Geer, 1778): *Lotus corniculatus* L.; J.: 1974b, 1976, 1976b, 1977, 1979, 1984b, 1986, 1987, 1989; S.: Žužemberk.

C. lysimachiae (Rubsaamen, 1893): *Lysimachia vulgaris* L.; J.: 1976b, 1980, 1984.

**C. medicaginis* Kieffer, 1895: *Medicago sativa* L. *M. sativa* L. ssp. *falcata* (L.) Arcangels.; J.: 1976, 1977, 1978, 1979, 1980, 1981, 1982, 1984, 1984b, 1986, 1987, 1989, 1990; S.: Dolnji Logatec, Žužemberk.

C. molluginis Rubsaamen 1889: *Galium mollugo* L.; J.: 1974b, 1975, 1977, 1978, 1980, 1982, 1984, 1984b, 1986, 1990.

C. nasturtii (Kieffer, 1888): *Brassica oleracea* L., *B. rapa* L. *Diplotaxis tenuifolia* (L.) DC., *Roripa silvestris* L.; J.: 1974b, 1976, 1977, 1979, 1981, 1984, 1985.

**C. petioli* (Kieffer, 1898) = *Syndiplosis petioli* (Kffr.): *Populus tremula* L., *P. deltoides* Marsh (= *P. canadensis* Asch.); J.: 1972, 1974, 1974b, 1976, 1976b, 1977, 1979, 1981, 1982, 1984, 1984b, 1985, 1986, 1987, 1988; S.: Postojna.

C. pisi (Winnertz, 1854): *Pisum sativum* L.; J.: 1972, 1984.

C. pyrivora (Riley, 1886): *Pyrus communis*; J.: 1972, 1982, 1986.

C. quercicola (Rubsaamen, 1899) = *Syndiplosis quercicola* (Rubs.): *Quercus cerris* L.; J.: 1976, 1976b, 1977, 1979, 1980, 1981, 1984, 1984b, 1985, 1986, 1987, 1990.

C. quercina (Rubsaamen, 1890): *Quercus petraea* (Mill.), *Q. pubescens* Willd., *Q. robur* L.; J.: 1975, 1976, 1976b, 1977, 1979, 1980, 1981, 1982, 1984b, 1985, 1986, 1987.

C. schlechtendaliana (Rubsaamen, 1893) (= *C. sonchi* Kffr.): *Sonchus arvensis* L.; J.: 1982.

C. scrophulariae Kieffer, 1896: *Scrophularia canina* L.; J.: 1978; M.: 1971.

C. solani (Rubsaamen, 1891): *Solanum dulcamara* L.; J.: 1976b, 1977, 1978, 1980, 1981, 1985, 1989.

C. subulifex Kieffer, 1897: *Quercus cerris* L.; J.: 1975, 1976, 1976b, 1979, 1981, 1982, 1984, 1984b, 1985, 1986.

**C. tiliarum* (Kieffer, 1890): *Tilia cordata* Mill., *T. platyphyllos* Scop.; J.: 1972, 1973, 1974, 1975, 1976b, 1977, 1978, 1979, 1981, 1982, 1984, 1984b, 1985, 1986, 1987; S.: Rimske Toplice.

C. tremulae Kieffer, 1909: *Populus tremulae* L.; J.: 1972, 1976, 1976b, 1978, 1979, 1980, 1981, 1982, 1984, 1984b, 1985, 1986, 1987, 1988, 1989, 1990.

C. trotteri Kieffer, 1909: *Ostrya carpinifolia* Scop., *Carpinus betulus* L.; J.: 1975, 1976, 1977, 1978, 1979, 1980, 1981, 1984, 1985, 1986, 1987, 1988, 1990.

C. viburnorum Kieffer, 1913: *Viburnum lantana* L., *V. opulus* L.; J.: 1972, 1976b, 1977, 1978, 1979, 1984b, 1987.

***Craneiobia corni** (Giraud, 1863): *Cornus sanguinea* L.; J.: 1972, 1973, 1974, 1974b, 1975, 1976, 1976b, 1977, 1978, 1979, 1980, 1981, 1984, 1984b, 1985, 1986, 1987, 1988, 1989; M.: 1971; S.: Dolnji Logatec, Žužemberk.

Cystiphora sanguinea (Bremi, 1847) (= *hieracii* F.Low): *Hieracium murorum* L. (= *H. sylvaticum* L.); J.: 1975, 1976b, 1977, 1981, 1984, 1984b, 1988.

***C. sonchi** (Bremi, 1847): *Sonchus arvensis* L.; J.: 1972, 1974, 1974b, 1975, 1976, 1976b, 1977, 1980, 1981, 1982, 1984, 1984b, 1985; M.: 1971; S.: Dolnji Logatec, Rimske Toplice.

***C. taraxaci** (Kieffer, 1888): *Taraxacum officinale* Web.; J.: 1974b, 1975, 1976b, 1980, 1981, 1982, 1984, 1984b, 1985, 1987, 1988, 1989; S.: Dolnji Logatec, Postojna.

Dasineura acrophila (Winnertz, 1853): *Fraxinus angustifolia* Vahl. ssp. *oxycarpa* (Bieb. ex Willb.), *F. excelsior* L.; J.: 1974b, 1975, 1977, 1978, 1984b, 1986; M.: 1971.

***D. affinis** (Kieffer, 1886): *Viola odorata* L.; J.: 1975, 1976, 1976b, 1977, 1978, 1979, 1980, 1984, 1984b, 1985, 1988; S.: Dolnji Logatec.

D. alpestris (Kieffer, 1909): *Arabis alpina* L. ssp. *Caucasica* (Willd.) Briquet.; J.: 1975, 1976b, 1977, 1978, 1980, 1981, 1982, 1984, 1984b, 1985, 1986, 1987, 1988, 1989, 1990.

D. angelicae (Rubašamen, 1915): *Angelica sylvestris* L.; J.: 1980, 1981, 1982.

D. armoriacae (Vimmer, 1963): *Armoracia rusticana* P. G. B. May, Sch.; J.: 1976b, 1985, 1986, 1987, 1988.

D. asperulae (F. Löw, 1875): *Galium odoratum* (L.) Scop. (= *Asperula odorata* L.); J.: 1976b.

D. auritae (Rubašamen, 1915): *Salix caprea* L., *S. cinerea* L.; J.: 1974b, 1976, 1977, 1990.

D. berberidis (Kieffer, 1909): *Berberis vulgaris* L.; J.: 1974, 1975, 1976b, 1977, 1978, 1979, 1981, 1982, 1984, 1984b, 1985, 1986, 1987, 1988, 1989.

D. brassicæ (Winnertz, 1853): *Brassica rapa* L.; J.: 1977.

D. capsulae (Kieffer, 1901): *Euphorbia cyparissias* L., *E. helioscopia* L.; J.: 1982; S.: Dolnji Logatec, Portorož.

D. clausilia (Bremi, 1847) = *Rabdophaga inchbaldiana* (Mik.): *Salix caprea* L., *S. elaeagnos* Scop., *S. purpurea* L., *S. daphnoides* Vill.; J.: 1985, 1987, 1988, 1989, 1990.

D. cotini (Janežič, 1978): *Cotinus coggygria* Scop.; J.: 1978, 1979, 1980, 1981, 1982, 1984, 1984b, 1989.

***D. crataegi** (Winnertz, 1853): *Crataegus monogyna* Jacq. (= *C. oxyacantha* L.); J.: 1972, 1974, 1974b, 1975, 1976, 1976b, 1977, 1978, 1979, 1981, 1982, 1984, 1984b, 1985, 1986, 1987, 1988, 1989, 1990; M.: 1971; S.: Postojna, Rimske Toplice.

D. engstfeldi (Rubaamen, 1889): *Filipendula ulmaria* (L.) Maxim.; J.: 1974b, 1978, 1979, 1982, 1988.

D. filicina (Kieffer, 1889): *Pteridium aquilinum* (L.) Kuhn.; J.: 1976, 1976b, 1977, 1979, 1980, 1981, 1982, 1984, 1984b, 1985, 1986, 1987, 1988, 1989, 1990.

***D. fraxinea** (Kieffer, 1907): *Fraxinus excelsior* L., *F. ornus* L.; J.: 1978, 1979, 1980, 1981, 1982, 1984, 1984b, 1985, 1986, 1987, 1988, 1989, 1990; S.: Postojna.

D. fraxini (Bremi, 1847): *Fraxinus angustifolia* Vahl. ssp. *oxycarpa* (Bieb. ex Willd.), *F. excelsior* L.; J.: 1972, 1974b, 1975, 1976, 1977, 1978, 1979, 1981, 1982, 1984, 1984b, 1985, 1986, 1987, 1988, 1989, 1990; M.: 1971.

D. galicaulis Stelter, 1964: *Galium mollugo* L., *G. verum* L.; J.: 1976b, 1977, 1980, 1981, 1984, 1984b, 1985, 1986, 1987, 1988, 1990.

D. galicola (F. Löw, 1880): *Galium mollugo* L., *G. verum* L.; J.: 1976, 1976b, 1981, 1984, 1984b, 1989, 1990.

D. geisenheyneri (Kieffer, 1904): *Hippocratea commosa* L.; J.: 1980, 1981, 1984, 1984b, 1985, 1986, 1987, 1988.

***D. genistarum** (Kieffer, 1909): *Genista pilosa* L.; J.: 1974, 1976; S.: Dolnji Logatec.

D. glechomae (Kieffer, 1889): *Glechoma hirsuta* W. et K.; J.: 1974b, 1978, 1986.

D. glyciphyli (Rubaamen, 1912): *Astragalus glycyphyllos* L.; J.: 1984.

D. heterobia (Loew, 1850) = *Rabdophaga heterobia* (H. Lw.): *Salix fragilis* Sm.; J.: 1974.

***D. hyperici** (Bremi, 1847): *Hypericum perforatum* L.; J.: 1974b, 1975, 1976, 1976b, 1977, 1981, 1984, 1984b; S.: Žužemberk, Rimske Toplice.

D. irregularis (Bremi, 1847) = *acercrispans* (Kffr.): *Acer campestre* L., *A. obtusatum* Mill. *A. pseudoplatanus* L.; J.: 1973, 1974, 1974b, 1975, 1976, 1976b, 1977, 1978, 1979, 1981, 1982, 1984, 1984b, 1985, 1986, 1987, 1988, 1989, 1990.

D. iteobia (Kieffer, 1890) = *Rabdophaga iteobia* (Kffr.): *Salix aurita* L., *S. caprea* L.; J.: 1972, 1974, 1974b, 1975, 1976, 1976b, 1977, 1980, 1981, 1982, 1984, 1984b, 1985, 1986, 1987, 1989, 1990.

D. kellneri (Henschel, 1875) (= *laricis* F.Low): *Larix decidua* Mill.; J.: 1977, 1978, 1981, 1982, 1985, 1986, 1987, 1988, 1989, 1990.

***D. lathyricola** (Rubaamen, 1890): *Lathyrus pratensis* L., *L. silvestris* L.; J.: 1976, 1977, 1980, 1981, 1982, 1984, 1989; S.: Dolnji Logatec, Žužemberk.

D. lupulinae (Kieffer, 1891): *Medicago lupulina* L.; J.: 1975, 1977, 1985, 1987.

D. mali (Kieffer, 1904): *Malus domestica* Borhk., *M. sylvestris* Mill.; J.: 1972, 1973, 1974b, 1975, 1976, 1976b, 1977, 1978, 1979, 1980, 1981, 1982, 1984, 1984b, 1985, 1986, 1988, 1989, 1990.

D. marginemtorquens (Bremi, 1847) = *Rabdophaga marginemtorquens* (Bremi): *Salix caprea* L., *S. daphnoides* Vill., *S. eleagnos* Scop., *S. purpurea*; *S. viminalis* L.; J.: 1974b, 1975, 1976b, 1977, 1978, 1979, 1980, 1981, 1982, 1984, 1984b, 1985, 1986, 1987, 1989.

***D. medicaginis** (Bremi, 1847) = *ignorata* (Wachtl): *Medicago sativa* L. ssp., *M. sativa* ssp. *falcata* (L.) Arcangels.; J.: 1984b, 1987, 1989; S.: Dolnji Logatec.

***D. oleae** (F. Löw, 1885): *Olea europea* L.; J.: 1972, 1981, 1984b, 1987; S.: Portorož.

D. oxyacantha Rubsaamen, 1914: *Crataegus monogyna* Jacq. (= *C. oxyacantha* L.); J.: 1977, 1982, 1984b.

D. papaveris (Winnertz, 1853): *Papaver rhoeas* L.; J.: 1975.

D. periclymeni (Rubaamen, 1889): *Lonicera nigra* L.; J.: 1974b, 1977, 1984b.

***D. plicatrix** (Loew, 1850): *Rubus caesius* L., *R. canescens* DC. *R. plicatus* Weihe et Nees, *R. idaeus* L.; J.: 1973, 1977, 1978, 1979, 1980, 1981, 1982, 1984, 1984b, 1985, 1986, 1987, 1988, 1989, 1990; S.: Rimske Toplice.

D. populeti (Rubaamen, 1889): *Populus tremula* L.; J.: 1976, 1976b, 1978, 1979, 1980, 1981, 1982, 1984, 1984b, 1985, 1986, 1988, 1990.

D. pteridicola (Kieffer, 1901): *Pteridium aquilinum* (L.). Kuhn.; J.: 1976, 1976b, 1977, 1978, 1979, 1980, 1981, 1982, 1984, 1984b, 1985, 1986, 1987, 1988, 1989, 1990; S.: Postojna.

D. pustulans (Rubaamen, 1889): *Filipendula ulmaria* (L.) Maxim.; J.: 1973, 1974, 1975, 1976b, 1977, 1978, 1979, 1980, 1981, 1982, 1984, 1984b, 1985, 1986, 1987, 1988, 1989, 1990.

D. pyri (Bouche, 1847): *Pyrus communis* L. (= *P.domestica* Med); J.: 1977, 1978, 1982, 1984, 1984b, 1985, 1986, 1987, 1988, 1989, 1990.

D. ranunculi (Bremi, 1847): *Ranunculus acris* L., *R. repens* L., *R. lanuginosus* L.; J.: 1974b, 1975, 1976, 1976b, 1977, 1978, 1979, 1980, 1981, 1982, 1984, 1984b, 1985, 1988.

D. rhododendri (Kieffer, 1909): *Rhododendron hirsutum* L.; J.: 1979.

D. rosaria (Loew, 1850) = *Rabdophaga rosaria* (Lw.): *Salix alba* L., *S. aurita* L., *S. cinerea* L., *S. caprea* L., *S.fragilis* Sm., *S. purpurea* L., *S. viminalis* L., *S. triandra* L.; J.: 1972, 1973, 1974, 1974b, 1975, 1976, 1976b, 1977, 1978, 1979, 1980, 1981, 1982, 1984, 1984b, 1985, 1986, 1987, 1988, 1989, 1990.

D. rubella (Kieffer, 1896): *Acer campestre* L.; J.: 1978, 1979, 1981, 1982.

D. ruebsaameni (Kieffer, 1909): *Carpinus betulus* L.; J.: 1976, 1979, 1980, 1981, 1982, 1984, 1984b, 1985, 1986, 1987, 1988, 1989, 1990.

D. salicis (Schrank, 1803) (= *Rabdophaga salicis* (Schr.), *R. ramicola* Rubs., *R. nervorum* Kffr., *R. karschi* Kffr.): *Salix aurita* L., *S. cinerea* L., *S.daphnoides* Vill., *S. elaeagnos* Scop., *S. glabra* L., *S. purpurea* L.; J.: 1974b, 1976, 1980, 1981, 1982, 1984, 1984b, 1989.

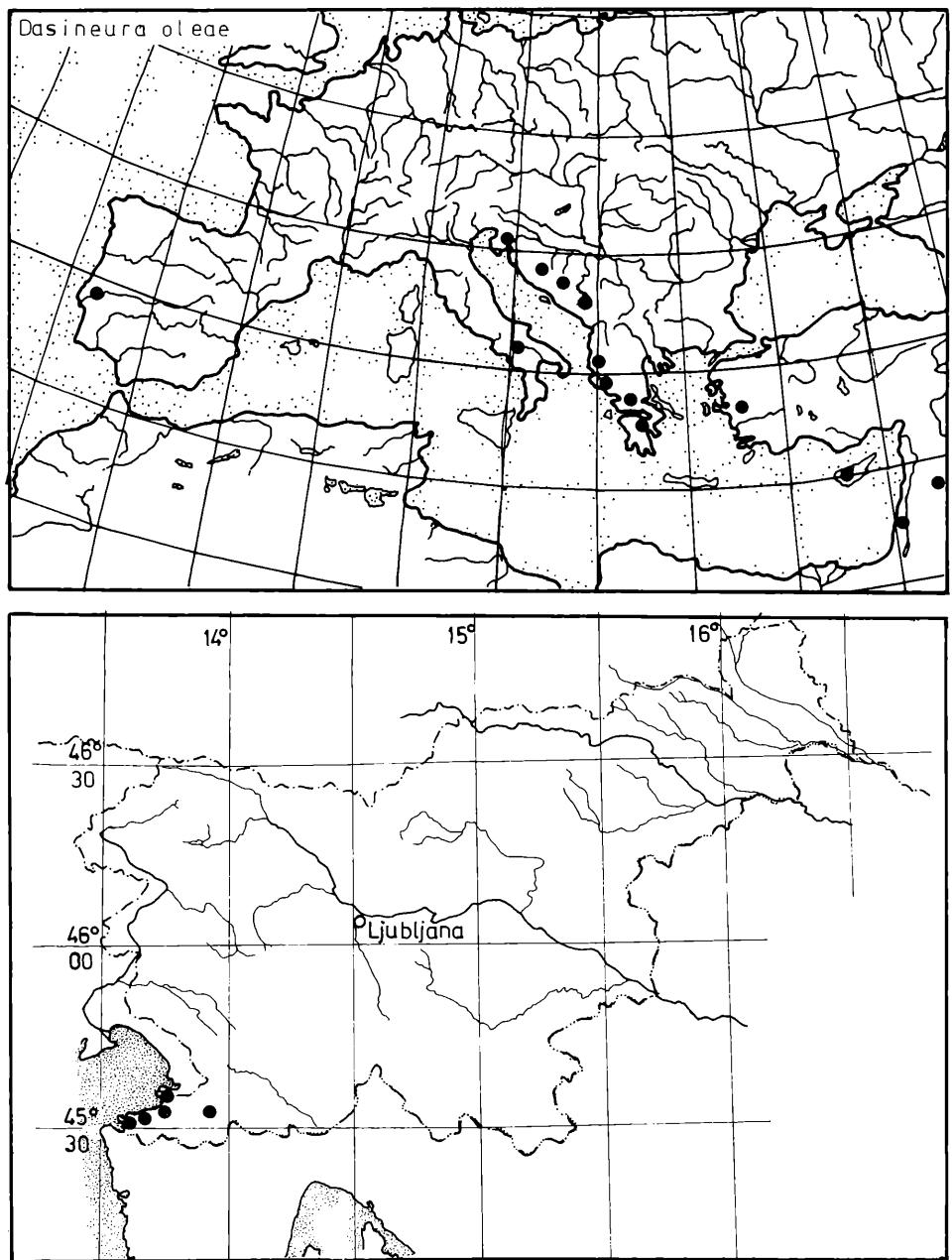


Fig.3. Occurrence of *Dasineura oleae* causing galls on the leaves of *Olea europaea* in the Mediterranean area and Slovenia.

D. saliciperda (Dufour, 1841) (= *Rabdophaga saliciperda* Duf.): *Salix alba* L.; J.: 1972, 1976.

***D. serotina** (Winnertz, 1853): *Hypericum perforatum* L., *H. maculatum* Crantz.; J.: 1976, 1976b, 1977, 1978, 1980, 1981, 1982, 1984, 1984b, 1985, 1987; M.: 1971; S.: Portorož.

***D. sisymbrii** (Schrank, 1803): *Rorippa silvestris* (L.) Bess.; J.: 1974b, 1975, 1976, 1976b, 1977, 1978, 1979, 1980, 1981, 1982, 1984, 1984b, 1985, 1986, 1987, 1988, 1989, 1990; M.: 1971; S.: Dolnji Logatec.

D. spadicea (Rubsamen, 1917): *Vicia cracca* L., *V. sepium* L.; J.: 1977, 1985.

D. strumosa (Bremi, 1847) = *galeobdolonitis* (Winn.): *Galeobdolon luteum* Huds.; J.: 1978.

***D. symphyti** (Rubssamen, 1891): *Symphytum officinale* L.; J.: 1977, 1982; S.: Portorož, Rimske Toplice.

D. subpatula (Bremi, 1847): *Euphorbia cyparissias* L., *E. helioscopia* L.; J.: 1974b, 1980, 1982, 1989.

D. terminalis (Loew, 1850) = *Rabdophaga terminalis* (Lw.): *Salix alba* L., *S. babylonica* L., *S. caprea* L., *S. fragilis* Sm., *S. purpurea* L., *S. triandra* L., *S. viminalis* L.; J.: 1973, 1974, 1974b, 1975, 1976b, 1977, 1978, 1979, 1980, 1981, 1982, 1984, 1984b, 1986, 1987, 1988, 1989, 1990.

D. tetensi (Rubsamen, 1891): *Ribes nigrum* L.; J.: 1972, 1984, 1985, 1987, 1988, 1989; M.: 1971.

D. teucrii (Tavares, 1903) = *teucriicola* (Kffr.): *Teucrium chamaedrys* L.; J.: 1974b.

D. thomasiiana (Kieffer, 1888): *Tilia cordata* Mill., *T. platyphyllos* Scop.; J.: 1975, 1976, 1976b, 1977, 1978, 1979, 1980, 1981, 1982, 1984, 1984b, 1985, 1986, 1987, 1988, 1989, 1990.

D. tiliiae (Schrank, 1803) = *tiliamvolvens* (Rubs.): *Tilia cordata* Mill., *T. platyphyllos* Scop.; J.: 1972, 1973, 1974, 1974b, 1975, 1976, 1977, 1978, 1979, 1980, 1981, 1982, 1984, 1984b, 1985, 1986, 1985, 1986, 1987, 1988, 1989, 1990; M.: 1991.

D. tortilis (Bremi, 1847) = *alni* (F.Lw.): *Alnus glutinosa* (L.) Gaertn., *A. incana* (L.) Moench.; J.: 1974b, 1975, 1976, 1976b, 1977, 1978, 1979, 1981, 1982, 1984, 1984b, 1985, 1986, 1987, 1988, 1989, 1990.

D. tortrix (F. Löw, 1877): *Prunus domestica* L., *P. spinosa* L.; J.: 1978, 1979, 1980, 1981, 1982, 1984b, 1985, 1986, 1987, 1988.

***D. trifolii** (F. Löw, 1847): *Trifolium campestre* Schreb., *T. pratense* L., *T. repens* L.; J.: 1972, 1974b, 1976, 1982, 1984, 1984b, 1985, 1986, 1987, 1988, 1989, 1990; S.: Dolnji Logatec.

***D. tympani** (Kieffer, 1909): *Acer campestre* L.; J.: 1976b, 1977, 1979, 1980, 1987, 1990; M.: 1971; S.: Bohinj.

D. turionum (Kieffer et Trotter, 1904): *Asparagus acutifolius* L.; J.: 1979, 1980, 1981, 1989.

D. tubularis (Kieffer, 1909): *Quercus cerris* L.; J.: 1982, 1985.

D. ulmaria (Bremi, 1847): *Filipendula ulmaria* (L.) Maxim.; J.: 1973, 1974, 1974b, 1975, 1975, 1976, 1977, 1978, 1979, 1980, 1981, 1982, 1985, 1986, 1987, 1988, 1989, 1990; M.: 1971; S.: Dolnji Logatec.

D. urticae (Perris, 1840): *Urtica dioica* L.; J.: 1974, 1982, 1984, 1984b, 1985, 1986, 1987, 1988, 1989, 1990.

D. verbasci (Kieffer, 1909): *Verbascum nigrum* L.; J.: 1977.

***D. viciae** (Kieffer, 1888): *Vicia cracca* L., *V. sativa* L., *V. sepium* L.; J.: 1976, 1976b, 1977, 1978, 1979, 1981, 1982, 1985, 1987, 1988, 1989; S.: Žužemberk.

D. violae hirtae Stelzer, 1982: *Viola hirta* L.; J.: 1976.

D. virgaureae (Liebel, 1889): *Solidago virgaurea* L.; J.: 1981, 1984, 1986.

***Didymomyia tiliacea** (Bremi, 1847) = *reaumuriana* (F. Löw.): *Tilia cordata* Mill., *T. platyphyllos* Scop., *T. tomentosa* Moench. J.: 1972, 1973, 1974, 1974b, 1975, 1976, 1976b, 1977, 1978, 1979, 1980, 1981, 1982, 1984, 1984b, 1985, 1986, 1987, 1988, 1989, 1990; M.: 1971; S.: Postojna, Dolnji Logatec, Rimske Toplice.

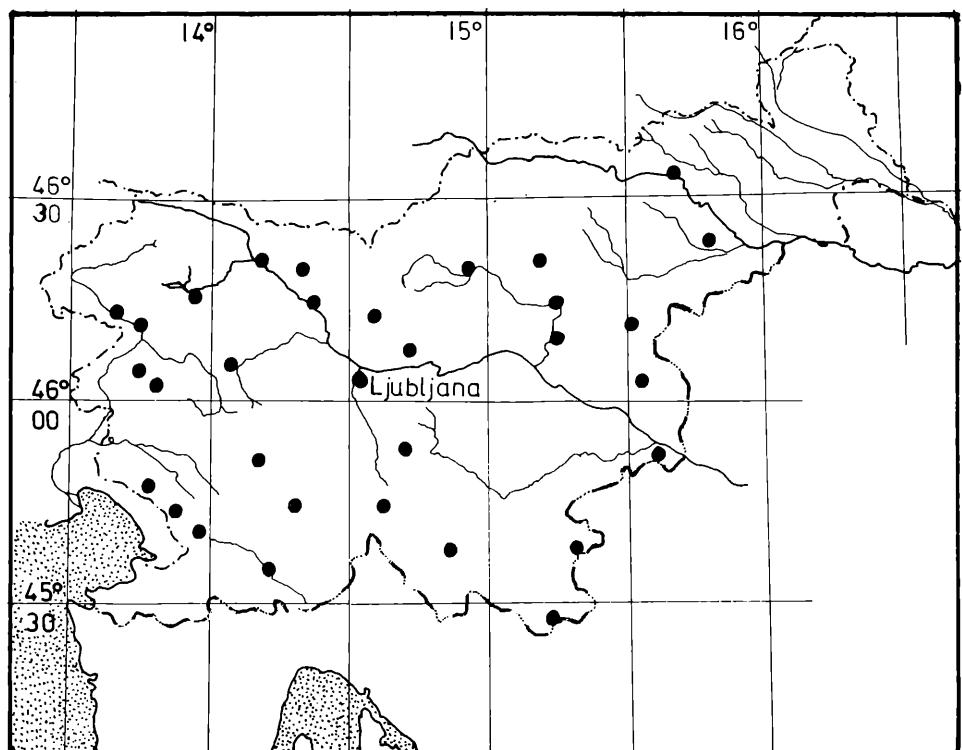


Fig. 4. Occurrence of *Didymomyia tiliacea* causing galls on the leaves of *Tilia* spp., a very common gall midge species in the territory of Slovenia.

**Diodaulus linariae* (Winnertz, 1853): *Linaria vulgaris* Mill.; J.: 1976b; S.: Dolnji Logatec, Žužemberk.

D. traili (Kieffer, 1889): *Pimpinella saxifraga* L.; J.: 1979, 1980, 1981, 1984, 1984b.

**Drisina glutinosa* Giard, 1893: *Acer campestre* L., *A. optusatum* W. et K., *A. monspessulanum* L., *A. platanoides* L., *A. pseudoplatanus* L.; J.: 1974b, 1975, 1976, 1976b, 1977, 1978, 1979, 1981, 1982, 1984, 1985, 1986, 1987, 1988, 1989, 1990; S.: Škocijanske Jame.

**Geocrypta galii* (Loew, 1850): *Galium mollugo*, L., *G. sylvaticum* L., *G. verum* L.; J.: 1974, 1974b, 1975, 1976, 1976b, 1977, 1978, 1979, 1980, 1981, 1982, 1984, 1984b, 1985, 1986, 1987, 1988, 1989; S.: Žužemberk.

Gephyraulus raphanistri (Kieffer, 1886): *Brassica rapa* L., *Raphanus raphanistrum* L., *Sinapis arvensis* L.; J.: 1976, 1976b, 1978, 1990.

**Harmandia cavernosa* (Rubaamen, 1899): *Populus tremula* L.; J.: 1972, 1973, 1974, 1974b, 1975, 1976, 1976b, 1977, 1981, 1982, 1984, 1984b, 1985, 1986, 1987, 1988, 1990; S.: Postojna.

H. globuli (Rubaamen, 1889): *Populus tremulae* L.; J.: 1972, 1973, 1974, 1974b, 1975, 1976, 1976b, 1977, 1978, 1980, 1981, 1982, 1984, 1984b, 1985, 1986, 1987, 1988, 1989.

H. populi Rubsaamen, 1917: *Populus tremulae* L.; J.: 1974, 1974b, 1976b, 1977, 1981, 1982, 1984, 1984b, 1985, 1986, 1987.

H. pustulans Kieffer, 1909: *Populus tremulae* L.; J.: 1977, 1978, 1982, 1984, 1984b, 1986.

H. tremulae (Winnertz, 1853) = *oewi* (Rubs.): *Populus tremula* L.; J.: 1972, 1973, 1974, 1974b, 1975, 1976, 1976b, 1977, 1979, 1980, 1981, 1982, 1984, 1984b, 1985, 1987, 1988, 1989.

**Harrisomyia vitrina* (Kieffer, 1909) = *Dasineura vitrina* (Kffr.): *Acer pseudoplatanus* L.; J.: 1974, 1976, 1976b, 1977, 1978, 1979, 1980, 1981, 1982, 1984, 1984b, 1987, 1988, 1989, 1990; S.: Dolnji Logatec.

**Hartigiola annulipes* (Hartig, 1893): *Fagus sylvatica* L.; J.: 1972, 1973, 1974, 1974b, 1975, 1976, 1976b, 1977, 1978, 1979, 1980, 1981, 1982, 1984, 1984b, 1985, 1986, 1987, 1988, 1989, 1990; M.: 1971; S.: Postojna.

**Iteomyia capreae* (Winnertz, 1853): *Salix caprea* L., *S. cinerea* L., *S. aurita* L., *S. fragilis* Sm.; J.: 1972, 1973, 1974, 1974b, 1975, 1976, 1976b, 1977, 1978, 1979, 1980, 1981, 1982, 1984, 1984b, 1985, 1986, 1987, 1988, 1989, 1990; S.: Škocijanske Jame.

**Jaapiella bryoniae* (Bouche, 1847): *Bryonia alba* L.; S.: Žužemberk.

J. clethrophila Rubsaamen, 1917: *Alnus glutinosa* (L.) Gaertn.; J.: 1974.

J. floriperda (F. Löw, 1888): *Silene cucubalus* Wiebel., *S. vulgaris* (Moench) Garcke.; J.: 1974b, 1984.

J. genisticola (F. Löw, 1877): *Genista pilosa* L.; J.: 1974.

J. jaapiana (Rubaamen, 1914): *Medicago lupulina* L., *M. sativa* L.; J.: 1974b, 1976, 1977, 1984, 1988.

J. loticola (Rubaamen, 1889): *Lotus corniculatus* L.; J.: 1974b, 1975, 2976b, 1984b.

***J. medicaginis** (Rubaamen, 1912): *Medicago sativa* L., *M. sativa* L. ssp. *falcata* (L.) Arcangeli.; J.: 1975, 1979; S.: Dolnji Logatec.

***J. schmidti** (Rubaamen, 1912): *Plantago lanceolata* L.; J.: 1974b, 1976b, 1978, 1980, 1981, 1982, 1984, 1984b, 1985, 1986; S.: Žužemberk, Rimske Toplice.

J. thalictri (Rubaamen, 1895): *Thalictrum flavum* L.; J.: 1984, 1987.

J. veronicae (Vallot, 1827): *Veronica chamaedrys* L.; J.: 1974b, 1982, 1984, 1984b, 1985, 1986, 1987, 1988, 1989, 1990; M.: 1971.

J. volvens Rubsaamen, 1917: *Lathyrus pratensis* L.; J.: 1988.

***Janetia cerris** (Kollar, 1850): *Quercus cerris* L.; J.: 1973, 1975, 1976, 1976b, 1977, 1979, 1980, 1981, 1982, 1984, 1984b, 1985, 1986, 1987, 1988, 1989, 1990; S.: Postojna, Škocijanske Jame.

J. homocera (F. Löw, 1887): *Quercus cerris* L.; J.: 1973, 1976, 1979, 1980, 1982, 1984, 1985, 1986, 1987.

***J. nervicola** (Kieffer, 1909): *Quercus cerris* L.; J.: 1976, 1979, 1980, 1981, 1982, 1984, 1984b, 1985, 1986, 1987, 1988, 1989, 1990; S.: Postojna.

***J. pustularis** (Kieffer, 1909): *Quercus cerris* L.; J.: 1976b, 1977, 1979, 1982, 1984, 1984b, 1985, 1986, 1987, 1988, 1990; S.: Škocijanske Jame.

J. szepligetii (Kieffer, 1896): *Quercus cerris* L.; J.: 1976, 1976b, 1981, 1982, 1985, 1986, 1987, 1988, 1989.

***Janetiella lemeei** (Kieffer, 1904): *Ulmus glabra* Huds., *U. minor* Mill. (= *carpinifolia* Gled.); J.: 1972, 1974, 1974b, 1975, 1976b, 1977, 1981, 1984, 1984b, 1987, 1988; S.: Postojna.

***J. thymi** (Kieffer, 1888): *Thymus serpyllum* L.; J.: 1974; S.: Dolnji Logatec, Žužemberk.

***Kiefferia pericarpiicola** (Bremi, 1847) = *pimpinellae* (F. Lw.): *Angelica sylvestris* L., *Anthriscus sylvestris* (L.) Hoffm., *Carum carvi* L., *Chaerophyllum aureum* L., *Daucus carota* L., *Ferulago campestris* (Basser) Grec. (= *galbanifera* Koch.), *Foeniculum vulgare* Mill., *Pastinaca sativa* L., *Heracleum sphondylium* L., *Pimpinella major* (L.) Huds., *P. sativa* L., *P. saxifraga* L., *Peucedanum oreoselinum* (L.) Moench., *P. cervaria* (L.) Lapeyr; J.: 1975, 1976, 1976b, 1977, 1978, 1979, 1980, 1981, 1982, 1984, 1984b, 1985, 1986, 1987, 1988, 1989, 1990; S.: Portorož, Žužemberk, Dolnji Logatec.

***Lasioptera carophila** F. Löw, 1874: *Angelica sylvestris* L., *Anthriscus sylvestris* (L.) Hoffm., *Carum carvi* L., *Daucus carota* L., *Ferulago campestris* (Basser) Grec., (= *galbanifera* Koch.), *Foeniculum vulgare* Mill., *Pastinaca sativa* L., *Peucedanum cervaria* (L.) Lapeyr., *P. oreoselinum* (L.) Moench., *Pimpinella anisum* L., *P. major* L., *P. saxifraga* L., *Seseli annuum* L.; J.: 1975., 1976b, 1977, 1978, 1979, 1980, 1981, 1982, 1984, 1984b, 1985, 1986, 1987, 1988, 1989, 1990; S.: Portorož, Dolnji Logatec, Žužemberk.

L. rubi (Schrank, 1803): *Rubus caesius* L., *R. idaeus* L., *R. plicatus* Weihe et Nees; J.: 1972, 1974, 1975, 1976, 1976b, 1977, 1978, 1979, 1980, 1981, 1982, 1984, 1984b, 1985, 1986, 1988; M.: 1971.

L. populnea Wachtl, 1883: *Populus tremula* L.; J.: 1985.

Loewiola centaureae (F. Löw, 1875): *Centaurea jacea* L., *C. rhenana* Borsau (= *stoebe* L.), *C. scabiosa* L., *C. panonica* (Hef.) Sm. (= *jacea* L. ssp. *angustifolia* Schrk.); J.: 1974, 1974b, 1975, 1976, 1984, 1984b, 1985, 1986, 1987, 1988, 1989; M.: 1971.

L. serratulae Kieffer, 1905: *Serratula tinctoria* L.; J.: 1974b, 1976b, 1979, 1980, 1984, 1984b, 1985, 1986; M.: 1971.

***Macrodiplosis dryobia** (F. Löw, 1877): *Quercus cerris* L., *Q. pubescens* Wills., *Q. petraea* (Matt.) Liebl., *Q. robur* L.; J.: 1972, 1973, 1974, 1974b, 1975, 1976, 1977, 1978, 1979, 1980, 1981, 1982, 1984, 1984b, 1985, 1986, 1987, 1988, 1989, 1990; M.: 1971; S.: Škocijanske Jame.

***M. volvens** Kieffer, 1897: *Quercus cerris* L., *Q. petraea* (Matt.) Liebl., *Q. pubescens* Willd., *Q. robur* L.; J.: 1972, 1973, 1974, 1974b, 1975, 1976, 1976b, 1977, 1978, 1979, 1980, 1981, 1982, 1984, 1985, 1986, 1987, 1988, 1989, 1990; S.: Postojna.

Macrolabis heraclei (Kaltenbach, 1862) = *corrugans* (F. Löw.): *Heracleum sphondylium* L.; J.: 1976b, 1978, 1979, 1980, 1981, 1982, 1984, 1984b, 1985, 1986, 1987, 1989, 1990.

M. hieracii Rubsaamen, 1917: *Hieracium murorum* L. (= *sylvaticum* L.); J.: 1976b, 1977, 1981, 1982, 1989.

M. lamii Rubsaamen, 1915: *Lamium album* L., *L. maculatum* L., *L. orvala* L., *L. purpureum* L.; J.: 1979, 1981, 1984, 1987, 1988, 1990.

M. orobi (F. Löw, 1877): *Lathyrus vernus* (L.) Bernh.; J.: 1976b.

M. pilosellae (Binnie, 1877): *Hieracium pilosella* L.; J.: 1976b.

M. podagrariae Stelter, 1962: *Aegopodium podagraria* L.; J.: 1974b, 1975, 1976b, 1977, 1981, 1984, 1984b, 1985, 1986, 1987, 1988, 1990.

M. ruebsaameni Hedicke, 1998: *Prunella vulgaris* L., *P. grandiflora* (L.) Schall.; J.: 1975, 1976, 1977, 1978, 1979, 1981, 1982, 1984, 1984b, 1985, 1988.

M. stellariae (Liebel, 1889): *Stellaria media* (L.) Vill.; J.: 1977.

Massalongia rubra (Kieffer, 1890): *Betula pendula* Roth.; J.: 1976b, 1977, 1982, 1984.

***Mikiola fagi** (Hartig, 1893): *Fagus sylvatica* L.; J.: 1972, 1979, 1982, 1984, 1984b, 1985, 1986, 1987, 1988, 1989; S.: Postojna.

Mikomya coryli (Kieffer, 1912): *Corylus avellana* L.; J.: 1975, 1976, 1976b, 1977, 1978, 1979, 1981, 1982, 1984, 1984b, 1985, 1986, 1987, 1989.

Monarthropalpus flavus (Schrank, 1776) = *buxi* (Lab.): *Buxus sempervirens* L.; J.: 1972, 1982, 1984, 1984b, 1985, 1986, 1987, 1989; S.: Ljubljana, Rimske Toplice.

***Neomikiela beckiana* (Mik, 1885): *Inula conyzoides* DC.; J.: 1976b, 1975, 1976b, 1977.**

***N. lychnidis* (Heyden, 1861): *Silene alba* (Mill.) Krause (= *Melandrium album* (Mill.) Garcke; J.: 1976, 1976b.**

****Oligotrophus juniperinus* (Linnaeus, 1758): *Juniperus communis* L.; J.: 1974b, 1976, 1976b, 1978, 1979, 1980, 1981, 1982, 1984, 1984b, 1985, 1986, 1987, 1988, 1989, 1990; S.: Škocijanske jame.**

***O. panteli* (Kieffer, 1898): *Juniperus communis* L.; J.: 1976, 1976b, 1984b, 1989.**

***O. schmidti* Rubsaamen, 1914: *Juniperus communis* L., *J. oxycedrus* L.; J.: 1974b, 1975, 1976, 1976b, 1977, 1977, 1978, 1979, 1980, 1981, 1982, 1984, 1984b, 1985, 1986, 1987, 1988, 1989.**

***Ozirhincus longicollis* Rondani, 1840: *Matricaria perforata* Meret (= *indora* L.); S.: Dolnji Logatec.**

***O. millefolii* (Wachtl, 1884): *Achillea millefolium* L.; S.: Dolnji Logatec.**

***O. tanaci* (Kieffer, 1889) = *Clinorrhyncha tanaceti* Kffr.: *Tanacetum vulgare* L.; J.: 1976, 1976b, 1977, 1978, 1980, 1981, 1982, 1984, 1984b, 1985, 1986, 1987, 1988, 1990.**

***Phegomyia fagicola* (Kieffer, 1901): *Fagus sylvatica* L.; J.: 1973, 1974, 1974b, 1975, 1976b, 1977, 1978, 1979, 1981, 1982, 1984, 1984b, 1986, 1987, 1988, 1989,**

****Physemocecis hartigi* (Liebel, 1892): *Tilia cordata* L., *T. platyphyllos* Scop.; J.: 1976, 1976b, 1977, 1978, 1979, 1980, 1981, 1982, 1984, 1985, 1986, 1987, 1988, 1989, 1990; S.: Ljubljana, Rimske Toplice.**

***P. ulmi* (Kieffer, 1909): *Ulmus minor* Mill. (= *carpinifolia* Gled.), *U. laevis* Pall., *U. scabra* Mill.; J.: 1976, 1976b, 1977, 1978, 1979, 1980, 1981, 1982, 1984, 1984b, 1985, 1986, 1987, 1989, 1990.**

***Placochela nigripes* (F. Löw, 1877): *Sambucus nigra* L., *S. ebulus* L.; J.: 1976, 1976b, 1977, 1978, 1980, 1981, 1982, 1984, 1984b, 1985, 1986, 1987, 1988, 1990.**

***P. ligustri* (Rubaamen, 1899): *Ligustrum vulgare* L.; J.: 1976b, 1978, 1979, 1980, 1981, 1982, 1984, 1984b, 1985.**

***Polystepha panteli* (Kieffer, 1909): *Quercus cerris* L., *Q. robur* L., *Q. pubescens* Willd., *Q. petraea* (Matt.) Lieb.; J.: 1975, 1976, 1976b, 1979, 1982, 1984, 1984b, 1986, 1987, 1988.**

***Putoniella pruni* (Kaltenbach, 1872) = *marsupialis* (F. Lw.): *Prunus domestica* L., *P. spinosa* L.; J.: 1972, 1974, 1974b, 1978, 1980, 1981, 1982, 1984, 1984b, 1986, 1987, 1988, 1990.**

***Rhopalomyia artemisiae* (Bouche, 1834) = *Boucheella artemisiae* (Bouche): *Artemisia vulgaris* L.; J.: 1990.**

***R. foliorum* (Loew, 1850): *Artemisia vulgaris* L.; J.: 1975, 1976b, 1978, 1979, 1980, 1981, 1982, 1984, 1984b, 1985, 1986, 1987, 1990.**

R. millefolii (Loew, 1850): *Achillea collina* Beck., *A. millefolium* L.; J.: 1976b, 1977, 1979, 1980, 1981, 1984, 1984b, 1986, 1988.

R. tanaceticolia (Karsch, 1879): *Tanacetum vulgare* L.; J.: 1974, 1974b, 1975, 1976b, 1977, 1980, 1981, 1984, 1985, 1990.

Rondaniola bursaria (Bremi, 1847): *Glechoma hederacea* L.; J.: 1974, 1974b, 1975, 1976b, 1977, 1978, 1980, 1981, 1982, 1984, 1984b, 1985, 1987, 1988, 1989, 1990.

***Sackenomyia reaumuri** (Bremi, 1847) = *Phlyctidobia solmsi* Kffr.: *Viburnum lantana* L.; J.: 1972, 1973, 1974, 1974b, 1975, 1976, 1976b, 1977, 1978, 1979, 1980, 1981, 1982, 1984, 1984b, 1985, 1986, 1987, 1988, 1989, 1990; M.: 1971; S.: Žužemberk.

***Semudobia betulae** (Winnertz, 1853): *Betula pendula* Roth.; J.: 1976, 1976b, 1977, 1978, 1979, 1981, 1982, 1984, 1984b, 1985, 1987, 1988, 1989, 1990; S.: 1982, Rimske Toplice.

S. skuhravae Roskam, 1977: *Betula pendula* Roth.; J.: 1976, 1981, 1984, 1984b, 1985, 1987, 1988, 1989, 1987, 1988, 1989, 1990; S.: 1982, Rimske Toplice.

S. tarda Roskam, 1977: *Betula pendula* Roth.; J.: 1984, 1984b, 1985, 1987, 1988, 1989, 1990; S.: 1982, Rimske Toplice.

Schizomyia galiorum Kieffer, 1889: *Galium odoratum* (L.) Scop. (= *Asperula odorata* L.), *G. mollugo* L., *G. sylvaticum* L. *Rubia peregrina* L.; J.: 1974b, 1976b, 1977, 1978, 1979, 1980, 1981, 1982, 1984, 1984b, 1985, 1986, 1987, 1988, 1989, 1990.

***Spurgia capitigena** (Bremi, 1947) = *Bayeria capitigena* (Bremi): *Euphorbia amygdaloides* L., *E. cyparissias* L., *E. helioscopia*; J.: 1973, 1974b, 1975, 1976, 1976b, 1977, 1978, 1980, 1981, 1982, 1984b, 1985, 1986, 1987, 1988, 1989; S.: Dolnji Logatec, Portorož.

Thecodiplosis brachyntera (Schwagrichen, 1835): *Pinus sylvestris* L.; J.: 1976, 1977.

Tricholaba trifolii Rubsaamen, 1917: *Trifolim pratense* L.; J.: 1988, 1989, 1990.

Wachtiella ericina (F. Löw, 1885): *Erica carnea* L.; J.: 1972, 1973, 1974, 1974b, 1975, 1976, 1976b, 1977, 1978, 1979, 1980, 1981, 1982, 1984, 1984b, 1985, 1986, 1987, 1988, 1989, 1990.

***W. persicariae** (Linnaeus, 1767): *Polygonum viviparum* L.; J.: 1979; S.: Dolnji Logatec.

W. riparia (Winnertz, 1853): *Carex vulpina* L.; J.: 1976.

***W. rosarum** (Hardy, 1850): *Rosa arvensis* Huds., *R. gallica* L. *R. canina* L., *R. pendulina* L., *R. tomentosa* Sm.; J.: 1972, 1973, 1974, 1974b, 1975, 1976, 1976b, 1977, 1978, 1979, 1980, 1981, 1982, 1984, 1984b, 1985, 1986, 1987, 1988, 1990; S.: Dolnji Logatec, Postojna.

***W. stachydis** (Bremi, 1847): *Stachys sylvatica* L.; J.: 1974, 1974b, 1976b, 1978, 1980, 1981, 1982, 1984, 1984b, 1985, 1986, 1987, 1988, 1989, 1990; S.: Žužemberk.

Zygiobia carpini (F. Löw, 1874): *Carpinus betulus* L.; J.: 1973, 1974, 1974b, 1975, 1976, 1976b, 1978, 1979, 1981, 1982, 1984, 1984b, 1985, 1986, 1987, 1988, 1989, 1990; M.: 1971.

***Zeuxidiplosis giardi** (Kieffer, 1896): *Hypericum perforatum* L.; J.: 1987; S.: Dolnji Logatec.

Horizontal occurrence

The horizontal occurrence of gall midge species in the territory of Slovenia has been evaluated according to the number of citations, i.e. the number of papers where a particular gall midge species was recorded.

All 219 gall midge species were found in Slovenia may be divided into six frequency groups, viz. solitarily, scarcely, moderately, considerably, abundantly and commonly occurring species (SKUHRAVÁ, 1975).

1. Solitarily occurring species

Each species is cited in one paper only. About 30 gall midge species (14%) belong in this group. The majority of them are rare species in their distribution area as a whole, i.e. *Macrolabis orobi* on *Lathyrus vernus*.

2. Scarcely occurring species

Each species is recorded in two papers. About 20 gall midge species (10%) pertain to this group. For example, *Ametropidopsis thalictricola* and *Jaapiella thalictri*, both causing galls on various species of *Thalictrum*, belong in this group.

3. Moderately occurring species

Each species is quoted in three to four papers. More than 30 species (14%) fall into this group. Two species described by Janežič, viz. *Contarinia cotini* and *Contarinia istriana* belong into this group.

4. Considerably occurring species

Each species is mentioned in five to ten papers. More than 40 gall midge species (20%) come into this group. Also *Dasineura oleae*, typical Mediterranean species, belong in this group.

5. Abundantly occurring species

Each species is recorded in 11 to 20 papers. More than 80 gall midge species (37%) belong in this group. They mainly cause galls on the leaves of various forest trees and shrubs, as for example *Atrichosema aceris* on *Acer campestre*, *Contarinia carpini* and *Zygiobia carpini* on *Carpinus betulus*.

6. Commonly occurring species

Each species is mentioned in more than 20 papers. The following ten gall midge species (5%) fall into this group: *Didymomyia tiliacea* and *Dasineura tiliae* (Fig. 4) causing galls on *Tilia* spp.; *Craneiobia corni* on *Cornus sanguinea*; *Dasineura crataegi* on *Crataegus monogyna*; *Hartigiola annulipes* on *Fagus sylvatica*; *Iteomyia capreae* and *Dasineura rosaria* inducing galls on various species of *Salix*; *Macrodiplosis dryobia* on *Quercus* spp.; *Sackenomyia reaumurii* on *Viburnum lantana* and *Wachtiella rosarum* on *Rosa* spp.

For example, *Didymomyia tiliacea* (= *D. reaumuriana*), the most common species in the territory of Slovenia, was found by Janežič during the period from 1972-1990 in 160 localities in various parts of Slovenia (Fig. 4).

Zoogeography

From the zoogeographical point of view, the majority of gall midges occurring in the territory of Slovenia belongs to Euro-Siberian species and only a small part, about twenty species (10%) may be considered to be Mediterranean elements. The territory of Slovenia spreads among the countries lying along the Mediterranean Sea and as a hilly country, Slovenia is but little influenced by the Mediterranean climate. It is the northernmost country in the Balkan Peninsula, covered with mountains, only a small part in the west having a Mediterranean climate which creates conditions in which southern species may penetrate into an area and inhabit it (Fig. 1.).

The following twenty species may be considered typical Mediterranean elements: *Dasineura oleae* causing galls on *Olea europaea* (Fig. 3.); *Asphondylia rosmarini* on *Rosmarinus officinalis* (Fig. 2); *Dasineura turionum* on *Asparagus acutifolius*; *Asphondylia coronillae*, *Contarinia coronillae* and *Contarinia istriana*, all causing galls of various shapes on *Coronila emerus*; *Dasineura cotini* producing galls on *Cotinus coggygria*; *Asphondylia dorycnii* on *Dorycnium* spp.; *Asphondylia scrophulariae* changing the flower buds of *Scrophularia canina* into galls; *Asphondylia verbasci* developing in flower buds of various *Verbascum* spp.; *Wachtiella ericina* changing into galls the buds of *Erica carnea*.

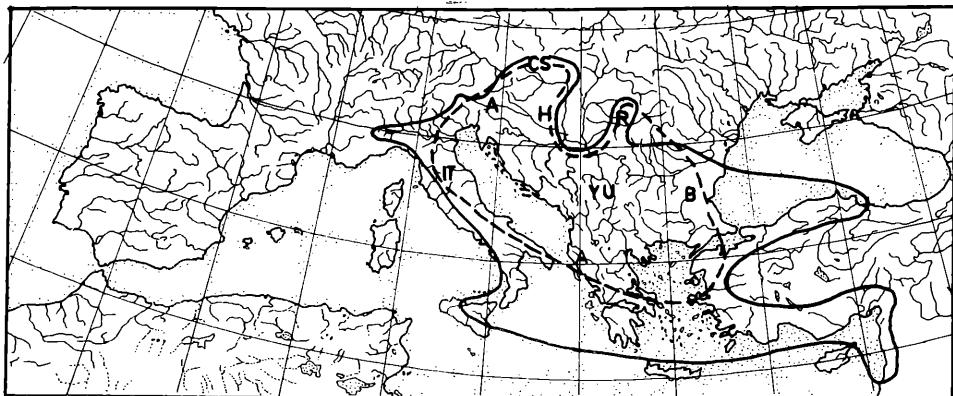
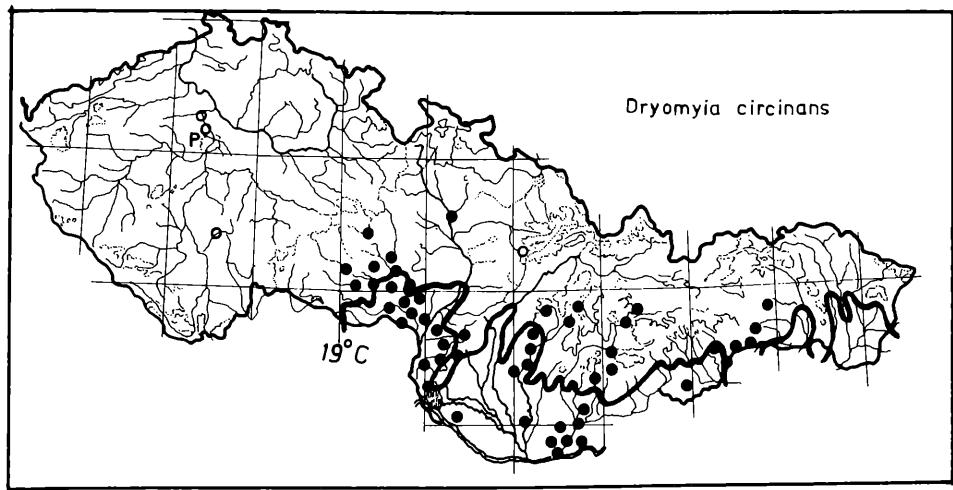


Fig.5. Distribution area of *Dryomyia circinans* causing galls on the leaves of *Quercus cerris* (below) and boundary of its distribution area running through the southernmost part of Slovakia (above).

Several gall midge species are associated with *Quercus cerris* the distribution area of which reaches from the south-east of the Balkan Peninsula up to nearly Middle Europe where the boundary of its area is running through the territory of southern Slovakia (Fig. 5). The following eight gall midge species (from the 11 described) were found in the territory of Slovenia: *Dryomyia circinans*, *Contarinia subulifex*, *Janetia cerris*, *J. homocera*, *J. nervicola*, *J. pustularis*, *J. szepligetii* and *Dasineura tubularis*.

The majority of gall midges occurring in Slovenia belong to the Euro-Siberian species which usually occupy large distribution areas (SKUHRAVÁ, 1987). About ten gall midge species have a Holarctic type of distribution, e.g. *Dasineura mali*, *Dasineura pyri* and *Contarinia pyrivora* but they are not real holarctic species because they were introduced, probably with nursery materials, from North America to Europe.

Three species may be described as mountain species: *Contarinia helianthemi* and *Dasineura rhododendri* which were found by JANEŽIČ (1979) at Komna between 1500-1600 m.a.s.l. in the Julian Alps, each species only at one locality. Galls of *Contarinia aconitifloris* were found at 10 localities in the Julian Alps, at altitudes of 1350 (Krn) and between 1500- 1600 m a.s.l.(Bogatin).

Dasineura alpestris, which is primarily a mountain species, secondarily occurs in lower situated localities. It was probably transferred together with its host plant, *Arabis alpina*, as a nice rockery plant in gardens.

Three species which were recently described by JANEŽIČ (1978, 1980), viz. *Dasineura cotini*, causing galls on *Cotinus coggygria*, *Contarinia istriana* and *Contarinia coronillae* developing in galls on *Coronilla emerus* and *C. emerus* ssp. *emeroides* have not been observed elsewhere and may therefore be considered endemic species for this area.

Economic importance

Although the gall midge fauna of Slovenia include also species developing on cultivated plants, they all at present occur in small quantities and do not cause injury to their host plants. The following species may be considered to be potential pests of cultivated plants in Slovenia: *Contarinia medicaginis*, *Dasineura medicaginis*, *Asphondylia miki*, *Jaapiella medicaginis*, developing on *Medicago* spp.; *Contarinia nasturtii* and *Dasineura brassicae* on *Brassica* spp.; *Contarinia pisi* on *Pisum sativum*; *Dasineura mali* on cultivated apple-tree, mainly on young shrubs in nurseries.

In their larval stage all these species live hidden in the galls, so they are usually overlooked and sometimes their increasing occurrence is observed too late, at a time when they are in the stage of an outbreak.

VASILJEVIĆ et al. (1991) published a bibliography of papers from 1973 till present dealing with plant protection problems of the fauna of the former Yugoslavia. In this summary 31 papers are mentioned dealing with gall midges and their outbreaks in the large territory of the former Yugoslavia. Any of the paper deals with gall midges as pests in the territory of Slovenia.

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Skuhravy [Skuhravý] Václav

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