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## The genus *Erysiphe* in Serbia

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A search for powdery mildew agents present in central, west and east Serbia was carried out during the period 1986–1995. A total of twenty-seven fungal species of the genus *Erysiphe* were observed, causing powdery mildews on 123 plant species. Twenty of the identified fungal species are recorded for the first time in Serbia, and powdery mildews are newly recorded on 83 host plant species.

**Key words:** *Erysiphe*, powdery mildew, host plant

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V průběhu let 1986–1995 byl prováděn výzkum onemocnění rostlin padlím ve středním, západním a východním Srbsku. Celkem bylo zjištěno 27 druhů z rodu *Erysiphe*, které byly příčinou chorob u 123 druhů rostlin. Dvacet z určených druhů je uvedeno poprvé pro Srbsko a choroba padlí je nově zaznamenána na 83 rostlinných druzích.

### INTRODUCTION

Fungi causing powdery mildews are widely distributed and parasitize on many plant species. They can reproduce very quickly, and expand in a very short time all over the surfaces of the plant organs causing great damage. Therefore attention has been paid to the study of these fungi since long. The first monograph was written by the French mycologist J.H. Léveillé in 1851, a second Salmon in 1900. Investigations into powdery mildews in our country are scarce and they mainly refer to crop plants (Radosavljević 1924; Josifović 1929; Perišić 1952; Grujić and Tomašević 1956; Jovičević 1958; Arsenijević 1983, etc.). Papers on the presence and distribution of these fungi are few (Ranojević 1910; Ranković 1988, 1989, 1991).

The present paper deals with the study of the fungal genus *Erysiphe*, predominantly a listing their host plants, besides their distribution and frequency in Serbia.

## MATERIAL AND METHODS

Powdery mildew agents were searched for during several vegetation periods in Serbia. Samples of diseased plants were collected during 1986-1995. The following taxonomic characteristics of the fungal species were studied: mycelium appearance and distribution on the surface of the infected host plant organs; conidiophore type; conidial shape and size; method and rate of germination; distribution of germ tubes and types of appressoria; cleistothecium diameter, shape and size; structure of appendages; number, shape and size of ascospores. The obtained values of the above mentioned characteristics are based on the microscopic study of 200 samples of the respective elements from each host plant, and the values of the characteristic features have been statistically processed and are presented for each fungal species in Table 1. The systematic of the causal agents of powdery mildews has been based on the works by Blumer, 1967; Junell, 1967a, 1967b; Sařata, 1985; Braun, 1987 and others.

Material of the collections examined has been deposited at the Mycological Herbarium of the Institute of Biology, Kragujevac (MHIB).

## RESULTS AND DISCUSSION

Based on a long-term study, 27 species of the fungal genus *Erysiphe* causing powdery mildews in Serbia, have so far been observed as parasites of 123 plant species. Twenty of these species are recorded for the first time in Serbia.

***Erysiphe aquilegiae* DC.**

Powdery mildews on *Aquilegia vulgaris* L. and *Thalictrum aquilegifolium* L. in Serbia were reported by Ranojević, (1910) who indicated *Erysiphe polygoni* DC. as the causal agent. During the present study, *E. aquilegiae* was found on *Aquilegia vulgaris* in the region of Kragujevac, in July and October 1988 and 1990 (rare), Topola, September 1988 (rare), MHIB No 352; and on *Thalictrum aquilegifolium* in the district of Kragujevac, July-October 1986-1995, (rare), MHIB No. 428.

This is the first record of the powdery mildew on *Aquilegia vulgaris* in Serbia.

***Erysiphe artemisiae* Grev.**

Powdery mildew on *Artemisia absinthium* L. and *A. vulgaris* was first reported by Ranojević (1910), and *Erysiphe cichoracearum* DC. was indicated as the causal agent.

*E. artemisiae* was found on: *Artemisia absinthium*, in the vicinity of Valjevo, July-October 1989, 1991 and 1992 (rare), MHIB No. 734; *A. vulgaris* in the

Table I. Biometric characteristics of fungi of the genus *Erysiphe* in Serbia

FUNGUS	MICROSTRUCTURES						
	Cleisto- thecia	App	As (N)	As (D)	Sp (N)	Sp (D)	Con
<i>Erysiphe aquilegiae</i>	100-135	3-10	2-8	45-65,3×30-45	2-5	20-25,5×10-14,5	30-46,5×18-24
<i>Erysiphe artemisiae</i>	100-135	1	7-20	58-85×27-40	2	22-29×13-18	30-36×19-22
<i>Erysiphe betae</i>	80-135	1	4-12	55-72×30-42	2-5	18-25×12-15	31-51×16-22
<i>Erysiphe biocellata</i>	85-132	1-2	6-15	54-75×27-40	2	18-26×13-17	28-38×17-24
<i>Erysiphe buhrii</i>	90-130	1	3-8	55-77×28-45	3-5	19-27×11-15	36-51×17-22
<i>Erysiphe catalpae</i>	81-117	1-3	4-8	57-78×31-45	3-6	20-26×11-16,5	30-40×19-23
<i>Erysiphe cichoracearum</i>	80-140	1-4	4-20	52-90×24-45	2-(4)	19-30×12-18	25-45×15-19
<i>Erysiphe circaeae</i>	78-115	2-4	3-5	57-65×28-42	(2-)3-5(-6)	15-22×9-12	28-42×15-20
<i>Erysiphe convolvuli</i>	96-113	1-3	4-10	52-80×30-45	2-7	20-23×11-16	17-60×15-22
<i>Erysiphe cruciferarum</i>	95-120	1-3	4-10	54-71×27-40	2-6	18-24×9-14	30-50×15-20
<i>Erysiphe cynoglossi</i>	98-138	1-2	10-20	60-80×27-42	2(-3)	18-28×13-19	31-41×18-23
<i>Erysiphe depressa</i>	110-136	1	8-16	65-90×30-45	2	22-32×15-21	31-43×22-27
<i>Erysiphe fischeri</i>	118-168	1-2	14-20	63-88×30-43	2	20-28×13-19	28-36×17-21
<i>Erysiphe galeopsidis</i>	87-150	1-2	6-16	50-72×23-40	—	—	25-39×17-22
<i>Erysiphe galii</i>	103-138	1-2	4-10	38-54×30-40	—	—	25-34×16-19
<i>Erysiphe heraclei</i>	82-123	1-2	3-10	50-74×30-50	2-6	19-30×10-16	32-55×14-22
<i>Erysiphe lythri</i>	90-120	1-3	4-10	52-72×30-42	3-5	20-25×12-16	—
<i>Erysiphe magnicellulata</i>	100-138	1-3	12-22	61-80×25-37	2-4	21-27×13-16	29-36×17-22
<i>Erysiphe mayorii</i>	100-135	1/2-2	6-22	55-80×24-40	4-8	16-21×9-21	—
<i>Erysiphe pisi</i>	85-126	2-3	3-10	50-72×31-40	3-6	19-28×11-16	30-42×16-22
<i>Erysiphe pisi</i> <i>var. cruchetiana</i>	92-125	1-2	4-10	55-70×30-42	2-5	19-25×11-14	31-43×21-25
<i>Erysiphe polygoni</i>	80-122	1-2	3-10	55-75×30-40	2-4	19-29×10-15	30-51×15-23
<i>Erysiphe ranunculi</i>	76-108	1-4	2-8	50-70×27-40	2-5	18-25×11-15	30-40×21-24
<i>Erysiphe sordida</i>	88-127	short	6-16	51-68×28-36	2	20-26×12-16	30-39×16-21
<i>Erysiphe thesii</i>	93-115	1-5	4-10	54-70×30-38	3-5	18-24×10-13	31-40×16-18
<i>Erysiphe trifolii</i>	90-132	1-7	4-12	50-80×27-45	2-6	18-26×10-15	30-45×16-23
<i>Erysiphe urticae</i>	95-125	short	3-12	58-72×30-45	3-6	20-25×11-15	30-42×18-22
<i>Erysiphe verbasci</i>	115-140	short	10-20	60-78×30-37	2	20-35×14-18	33-43×21-27

Abbreviations: **Cleistothechia** — diameter of cleistothechia ( $\mu\text{m}$ ); **App** — length of appendages (in relation to the diameter of the cleistothechia); **As (N)** — number of asci; **As (D)** — dimensions of asci ( $\mu\text{m}$ ); **Sp (N)** — number of ascospores; **Sp (D)** — dimensions of ascospores ( $\mu\text{m}$ ); **Con** — dimensions of conidia ( $\mu\text{m}$ )

districts of Belgrade, August 1987 (common), Kragujevac, July-October 1986-1995 (common), Valjevo, August 1987 and 1988 (common), Arandjelovac, October 1987 (common), MHIB No. 378.

#### *Erysiphe betae* (Vanha) Weltz.

Powdery mildew on sugar beet was earlier reported by Marić and Kovačević (1964) and Marković (1985).

During the present study *E. betae* was observed near Belgrade, in September 1986 and 1988 (common), and Kragujevac, June-October 1986-1995 (common), MHIB No. 471; on *Beta vulgaris* var. *cycla* L., in Kragujevac, September 1986 and 1987 (rare), and in Valjevo, September 1987 (rare), MHIB No. 407.

#### *Erysiphe biocellata* Ehrenb.

Powdery mildews on *Salvia pratensis* L., and *S. verticillata* L. were found (Ranojević, 1910), and *Erysiphe galeopsidis* DC. was reported as the causal agent.

*E. biocellata* was found on *Lycopus exaltatus* L. in Kragujevac, October 1990 (rare), MHIB No. 632; on *L. europaeus* L. near Kraljevo, September 1987 and 1988 (rare), MHIB No. 611; on *Mentha arvensis* L. in the districts of Valjevo, October 1986 (rare), MHIB No. 297; on *Salvia pratensis* L. in Kragujevac, July-October 1987-1988, and Valjevo, 1986, 1987 (common), MHIB No. 377; and *S. verticillata* L., Kragujevac and Valjevo, August 1986, 1987 (common), MHIB No. 627. The biometric characteristics, presented in Tab. 1, vary in ranges reported by other investigators (Braun, 1987; Sařata, 1985; Blumer, 1967 etc.).

*B. biocellata* on *Lycopus europaeus* and *Mentha arvensis* are recorded for the first time in Serbia. According to the available references, *Lycopus exaltatus* is reported as a new host plant for the first time in Europe and other regions.

#### *Erysiphe buhrri* U. Braun

*E. buhrri* was found on *Silene alba* (Mill.) Krause in Kragujevac, August-October 1987 (rare), MHIB No. 531; on *S. viridiflora* L., near Koceljeva, July-October 1988-1989 and 1991 (rare), MHIB No. 644. Powdery mildews on these species, as well as the agent *Erysiphe buhrri*, are recorded for the first time in Serbia.

#### *Erysiphe catalpae* Simon.

*E. catalpae* was found on *Catalpa bignonioides* Walt. in Belgrade, October 1988 (rare) and in Kragujevac, August-October 1988-1989 (rare), MHIB No. 597.

This fungus, as well as powdery mildew on *C. bignonioides*, are recorded for the first time in this country.

### *Erysiphe cichoracearum* DC.

Powdery mildews on *Sonchus arvensis* L., *S. asper* (L.) Hill, and *S. oleraceus* L. were observed by Ranojević (1910); on *Cucumis melo* L., *C. sativus* L., *Cucurbita maxima* L. and *C. pepo* L. they were reported by Spasić (1961); on *Nicotiana tabacum* L. by Grujičić and Tomašević (1956); on *Cucumis sativus* L. (Ristić 1985), etc.

During the present study *E. cichoracearum* was found on *Aster* spp. (cult.) in Kragujevac, July-October 1986-1995 (common); Belgrade, August 1987 (common); Valjevo, September 1987-1988 (common), MHIB No. 361; *Carduus crispus* L., in the vicinity of Valjevo, August 1987 (rare), Knić, September 1988 (rare), MHIB No. 531; on *Centaurea cyanus* L., in the vicinity of Kragujevac, August-October 1986-1987 and 1988 (common), and Valjevo, July 1987 (common), MHIB No. 297; on *Centaurea jacea* L., vicinity of Kragujevac, August-October 1986-1987 (common) and Valjevo, July 1987, September 1989 (common), MHIB No. 316; on *Cichorium intybus* L., in the districts of Kragujevac, July-October 1986-1987 (rare), and Valjevo, September 1986 (common), MHIB No. 334; on *Cirsium arvense* (L.) Scop., in the district of Kragujevac, June-October 1986-1995 (common) and Valjevo and Užice, July-October 1987, 1988, 1989 (common), MHIB No. 373; on *Cirsium vulgare* (Savi) Ten., in Belgrade, August 1986 (rare), MHIB No. 446; on *Dahlia variabilis* (Willd.) Desf., in Belgrade, September 1988 (rare), [abac, October 1986, 1987 (rare), MHIB No. 371; on *Cucumis sativus* L., *C. melo* L., and *Cucurbita pepo* L. throughout the investigated region, June-October 1986-1995 (common), MHIB No. 281; on *Inula britannica* L., *Inula salicina* L., Kragujevac, October 1988 (common), MHIB No. 592, 610; on *Lactuca quercina* L., *Lactuca saligna* L., *Lactuca serriola* L., in the vicinity of Kragujevac, July-October 1987-1988 (common), MHIB No. 451, 467, 506; on *Nicotiana tabacum* L., in the district of [abac, September 1993 (rare), MHIB No. 645; on *Picris hieracioides* L., *Sonchus arvensis* L., *S. asper* (L.) Hill, and *S. oleraceus* L., throughout the study region, June-October 1986-1995 (common), MHIB No. 300, 406, 423, 471; on *Tragopogon pratensis* L., in the vicinity of Kragujevac and Valjevo, September 1989 (rare), MHIB No. 699; on *Tanacetum vulgare* L., *Solidago virgaurea* L., and *Viola tricolor* (cult.), in the vicinity of Belgrade, September 1988, and Kragujevac, September 1987 and 1988 (common), MHIB No. 483, 512 and 603.

*Aster* spp., *C. crispus*, *C. cyanus*, *C. jacea*, *C. intybus*, *C. arvense*, *C. vulgare*, *D. variabilis*, *I. britannica*, *I. salicina*, *L. quercina*, *L. saligna*, *L. serriola*, *P. hieracioides*, *S. arvensis*, *T. pratensis*, *T. vulgare*, *S. virgaurea* and *V. tricolor* are recorded for the first time as host plants of powdery mildews in Serbia.

**Erysiphe circaeae** L. Junell

*E. circaeae* was found on *Circaea lutetiana* L. in Kragujevac, September 1988 (rare), MHIB No. 691.

Powdery mildew on this plant, as well as *Erysiphe circaeae*, are recorded for the first time in the region investigated.

**Erysiphe convolvuli** DC.

Powdery mildew on *Convolvulus arvensis* L. was earlier observed by Ranojević (1910).

In the course of the present study *E. convolvuli* was found on *Convolvulus arvensis* L. in many sites throughout the investigated region during June-October 1986-1995 (common), MHIB No. 703, on *Calystegia sepium* (L.) R. Br., in Kragujevac, only in October 1991 (rare), MHIB No. 455.

Powdery mildew on *C. sepium* and its causal agent, *Erysiphe convolvuli* are recorded here for the first time.

**Erysiphe cruciferarum** (Opiz) L. Junell

Powdery mildew on *Armoracia rusticana* G., M. et Sch. was observed by Ranojević (1910), who identified the causal agent as *Erysiphe polygoni* DC. The same author observed powdery mildews on *Brassica nigra* L. and *Sisymbrium officinale* (L.) Scop., the disease being attributed to *Erysiphe pisi* DC.

*E. cruciferarum* was found on *Armoracia rusticana* G., M. et Sch. in many sites of the investigated region during June-October 1986-1995 (common), MHIB No. 307; on *Brassica napus* L. and *B. nigra* L. in vicinity of Kragujevac and Topola, September 1988 (rare), MHIB No. 513 and 518, on *Capsella bursa-pastoris* L. in Kragujevac, September 1989 (rare), MHIB No. 639, on *Sinapsis arvensis* L., near Topola, September 1988 (rare), MHIB No. 546; on *Sisymbrium loeselii* L. and *S. officinale* (L.) Scop., in the vicinity of Kragujevac and Valjevo, September 1987-1988 (rare), MHIB No. 582 and 583.

Powdery mildews on *Capsella bursa-pastoris*, *Sinapsis arvensis*, *Sisymbrium loeselii*, as well as the causal agent *Erysiphe cruciferarum* are reported for the first time in Serbia.

**Erysiphe cynoglossi** (Wallr.) U. Braun

Ranojević (1910) observed powdery mildew on *Symphytum officinale* L. and the agent was identified as *Erysiphe cichoracearum* DC.

*E. cynoglossi* was found on *Echium vulgare* L. in the Kragujevac area in September 1986 and 1988 (rare); Belgrade, October 1987 (rare) and Kragujevac,

August-October 1987 and 1989 (rare), Mhib No. 392; on *Symphytum officinale* L. in the vicinity of Belgrade, September 1986 and 1988 (common); Kragujevac, July-October 1986, 1987 and 1989 (common) and Valjevo, September 1988 (rare), Mhib No. 443; on *S. tuberosum* L. near Kragujevac, September 1987 (rare); Paraćin, October 1988-1989 (common) and Jagodina, September 1988 (rare), Mhib No. 392.

Powdery mildews on *Symphytum tuberosum* and *Echium vulgare* had not been reported so far in this country.

### *Erysiphe depressa* (Wallr.) Schlecht.

Powdery mildews on *Arctium lappa* L. and *A. minus* L. were reported in Serbia by Ranojević (1910) who attributed the disease to *Erysiphe cichoracearum* DC.

Now, *E. depressa* was identified on *Arctium lappa* L. throughout the investigated region, during June-October 1986-1995 (common), Mhib No. 317; on *A. minus* (Hill) Bernh. and *A. tomentosum* L., in the districts of Kragujevac, September 1993 (rare), and Valjevo, September 1992, (rare), Mhib No. 871 and 982.

Powdery mildew on *A. tomentosum* and its agent *Erysiphe depressa* are recorded for the first time in Serbia.

### *Erysiphe fischeri* Blumer

*E. fischeri* was found on *Senecio vulgaris* L. in Kragujevac, October 1989 (rare), Mhib No. 763. Its biometric characteristics, presented in Tab. 1, are similar to those reported by Braun (1987), Blumer (1967) and others.

In Serbia, *Erysiphe fischeri* is recorded for the first time on this plant.

### *Erysiphe galeopsidis* DC.

Powdery mildew on *Galeopsis speciosa* Mill. was reported by Ranojević (1910).

*Erysiphe galeopsidis* was now found on *Chaiturus marrubiastrum* (L.) Ehrh. ex Spenn. and *Lamium galeobdolon* L., Topola, September 1988, (rare), Mhib No. 673, 674; on *Galeopsis tetrahit* L. in Valjevo, October 1988, (rare), Mhib No. 632; on *Ballota nigra* L., Niš, October 1987 (rare), Mhib No. 562; *Lamium album* L. and *L. maculatum* L., Čačak, September 1990, (rare), Mhib No. 427, 428; on *L. purpureum* L., *Melittis melissophyllum* L. and *Galeopsis speciosa* Mill., in the district of Belgrade, September 1989, (rare), Mhib No. 717, 718 and 719; on *Galeopsis pubescens* Bess., and *Stachys palustris* L. in the vicinity of Arandjelovac, October 1987, (rare), Mhib No. 531 and 532.

*Erysiphe galeopsidis* on *B. nigra*, *C. marrubiastrum*, *G. pubescens*, *G. tetrahit*, *L. album*, *L. galeobdolon*, *L. maculatum*, *L. purpureum*, *M. melissophyllum* and *S. palustris* are recorded in Serbia for the first time.

#### *Erysiphe galii* S. Blumer

Ranojević (1910) observed powdery mildew on *Galium aparine* L. and attributed it to *Erysiphe polygoni* DC.

Now, *E. galii* was identified on *Galium aparine* L. in numerous sites of the investigated region, during July-October 1986-1995, (common), MHIB No. 577, and on *G. verum* L. in the vicinity of Kragujevac, September 1989, (rare), MHIB No. 511.

Powdery mildew on *G. verum* and its causal agent are reported in this paper for the first time in Serbia.

#### *Erysiphe heraclei* DC.

Powdery mildews on *Carum carvi* L., *Daucus carota* L., *Falcaria vulgaris* Bernh., *Pastinaca sativa* L. and *Tordylium maximum* L. were observed by Ranojević (1910).

*Erysiphe heraclei* was now identified on *Angelica sylvestris* (L.) Hoff., vicinity of Valjevo, September 1987 (rare), MHIB No. 587; on *Carum carvi* L., vicinity of Kragujevac, August 1986, (rare), MHIB No. 391; on *Daucus carota* L., Kragujevac, September 1987, 1988 (rare), MHIB No. 464; *Eryngium campestre* L., *Falcaria vulgaris* Bernh. and *Heracleum sphondylium* L., vicinity of Kragujevac, September 1986 (rare), MHIB No. 356, 371 and 412; on *Pastinaca sativa* L. and *Petroselinum sativum* L. in numerous sites of the investigated region, July-October 1986-1994 (common), MHIB No. 419 and 478; on *Peucedanum alsaticum* L. and *P. cervaria* (L.) Guss. in the vicinity of Kragujevac, September 1988, MHIB No. 621 and 637; on *Pimpinella saxifraga* L. throughout the investigated region, July-October 1986-1995 (common), MHIB No. 374; on *Tordylium maximum* L. in the district of Kragujevac, September 1989, MHIB No. 768; on *Torilis arvensis* (Huds.) Link in the surroundings of Knić and Kraljevo, September 1989, MHIB No. 747.

*Erysiphe heraclei* on *A. sylvestris*, *E. campestre*, *H. sphondylium*, *P. alsaticum*, *P. saxifraga* and *T. arvensis* are recorded for the first time in Serbia.

#### *Erysiphe lythri* L. Junell

*Erysiphe lythri* was found on *Lythrum salicaria* L., Kragujevac, October 1988 (rare), MHIB No. 614. Its biometric characteristics, presented in Tab. 1 vary in ranges reported by other investigators (Braun, 1987; Salata, 1985; Junell, 1967; etc.).



The occurrence of powdery mildew on this species, as well as its agent *Erysiphe lythri*, in Serbia are recorded for the first time.

***Erysiphe magnicellulata* U. Braun**

*E. magnicellulata* was found on *Phlox paniculata* L. in Belgrade, September 1989 (rare), MHIB No. 706.

This is the first record in Serbia of *Erysiphe magnicellulata*.

***Erysiphe mayorii* S. Blumer**

*E. mayorii* was observed on *Cirsium arvense* (L.) Scop. by Ranković et al. (1991).

*E. mayorii* was found on *C. arvense* in Kragujevac, September-October 1987-1990 (rare), MHIB No. 429.

***Erysiphe pisi* DC.**

Powdery mildews on *Pisum sativum* L. and *Medicago sativa* L. were observed by Ranojević (1910) and Radosavljević (1924).

*Erysiphe pisi* was found on: *Medicago lupulina* L., Kragujevac, September 1988-1989 (common), MHIB No. 633; *M. sativa* L., Kragujevac and [abac, August 1988 (rare), MHIB No. 671; *Pisum sativum* L. in numerous sites of the investigated region, MHIB No. 607; *Vicia cassubica* L., in the surroundings of Valjevo, August 1986, 1987 (common), MHIB No. 378; *V. cracca* L. and *V. sepium* L., in the districts of Kragujevac and Valjevo, September 1988 (common), MHIB No. 646.

Its presence on *Medicago lupulina*, *Vicia cracca* and *V. sepium* are reported for the first time, so are new host plants of this fungus in Serbia.

***Erysiphe pisi* var. *cruchetiana* (S. Blumer) U. Braun**

Powdery mildew on *Ononis spinosa* L. as well as the fungus *Erysiphe cruchetiana* were reported from Serbia by Ranković and Čomić (1991).

*E. pisi* var. *cruchetiana* was found on *Ononis spinosa* L. in the vicinity of Gornji Milanovac and Kragujevac during July-October 1987-1992 (common), MHIB No. 564.

***Erysiphe polygoni* DC.**

Powdery mildew on *Polygonum aviculare* L. was observed by Ranojević (1910).

*Erysiphe polygoni* was found on: *Polygonum aviculare* L. and *Persicaria hydropiper* (L.) Spach, *Rumex crispus* L. and *R. sanguineus* L., during June-October 1986-1995, throughout the investigated region (Kragujevac, Belgrade,

Valjevo, Šabac, Gornji Milanovac, Čačak, Kraljevo, Jagodina, etc.) (common), MHIB No. 277, 286, 319 and 407.

*Erysiphe polygoni* is here recorded for the first time on *Persicaria hydropiper*, *Rumex crispus* and *R. sanguineus* in the investigated region.

#### *Erysiphe ranunculi* Grev.

Ranojević (1910) observed powdery mildew on *Clematis integrifolia* L. and attributed the disease to *Erysiphe polygoni* DC.

During the present study, *E. ranunculi* was found on *Clematis integrifolia* in the surroundings of Šabac, September 1986 (rare), MHIB No. 392; *Ranunculus lanuginosus* L., in the districts of Kragujevac and Valjevo, September 1988 (rare), MHIB No. 633; *R. acris* L., *R. repens* L., *R. sardous* Crantz., in the districts of Kragujevac, September 1988 (rare), MHIB No. 577, 609 and 588.

#### *Erysiphe sordida* L. Junell

Powdery mildew was observed by Ranojević (1910) on *Plantago major* L. and the disease was attributed *Erysiphe cichoracearum* DC.

*Erysiphe sordida* was now found on *Plantago major* and *P. media* L., widely distributed throughout Serbia (Belgrade, Kragujevac, Valjevo, Čačak, Kraljevo, Topola, Gornji Milanovac, Paraćin, etc.), during June-October 1986-1995 (common), MHIB No. 116 and 117.

*P. media* is a new host plant for this species in Serbia.

#### *Erysiphe thesii* L. Junell

Powdery mildew on *Thesium linophyllum* L., as well as the fungus *Erysiphe thesii*, were reported from Serbia, by Ranković et al. (1991).

*Erysiphe thesii* was found on *Thesium linophyllum* in the surroundings of Kragujevac, Gornji Milanovac and Topola, August-October 1988-1989 (rare), MHIB No. 579.

#### *Erysiphe trifolii* Grev.

Jovanović (1969) observed powdery mildew in this country on *Trifolium pratense* L. and the causal agent was cited as *Erysiphe communis* Grev. f. *trifolii* Rabenh. Ranojević (1910) observed powdery mildews on *Melilotus officinalis* (L.) Pallas, *Trifolium pratense* L., *T. hybridum* L., and attributed them to *Erysiphe polygoni* DC.

*E. trifolii* was now found on *Galega officinalis* L., *Lathyrus aphaca* L., *Lathyrus pratensis* L. and *Lathyrus tuberosus* L. in the vicinity of Kragujevac,

June-October 1987-1988 (common), MHIB No. 562, 583, 633, 642; on *Lotus corniculatus* L., Valjevo, 1986 (rare), MHIB No. 392; *Melilotus albus* Med. and *M. dentatus* (W. et K.) Pers. in the vicinity of Kragujevac and Šabac, September 1988-1989, (common), MHIB No 637 and 638; *M. officinalis* (L.) Pallas in the district of Kragujevac, September 1988 (common), MHIB No. 589; *Trigonella coerulea* (L.) Ser. in Koceljeva, September 1987 (rare), MHIB No. 537; *Trifolium arvense* L., *T. campestre* Schreb. and *T. hybridum* L., throughout the investigated region (Kragujevac, Kraljevo, Valjevo, Užice, Niš, etc.), June-October 1986-1995 (common), MHIB No. 331, 493 and 514.

Powdery mildews on *G. officinalis*, *L. aphaca*, *L. pratensis*, *L. tuberosus*, *L. corniculatus*, *M. albus*, *M. dentatus*, *T. coerulea*, *T. arvensis* and *T. campestre* are reported for the first time in Serbia.

#### *Erysiphe urticae* S. Blumer

*E. urticae* was found on *Urtica dioica* L. in numerous localities of Serbia (Belgrade, Kragujevac, Arandjelovac, Topola, Valjevo, etc.), July-October 1986-1994 (common), MHIB No. 296.

Powdery mildew on *U. dioica*, as well as its causal agent *Erysiphe urticae*, were so far not observed in this region.

#### *Erysiphe verbasci* (Jacz.) S. Blumer

Ranojević (1910) reported powdery mildew on *Verbascum nigrum* L. and cited *Erysiphe taurica* Arn. as its causal agent.

*E. verbasci* was now identified on *Verbascum nigrum* in the surroundings of Kragujevac, Gornji Milanovac and Lajkovac, September 1988 (rare), MHIB No. 627; and on *V. thapsus*, Kragujevac, September 1988 (rare), MHIB No. 589. Biometric characteristics, presented in Tab. 1, are similar to those established by others authors (Braun 1987; Salata 1985; Blumer 1967; etc.).

*Erysiphe verbasci* on *Verbascum thapsus* is recorded for the first time in Serbia.

### CONCLUSIONS

Based upon the study of powdery mildews on plants collected on the territory of Serbia during the period of 1986-1995, 27 different species belonging to the fungal genus *Erysiphe* were identified, 20 of which are recorded here for the first time in Serbia. They were found as the cause of powdery mildews of 123 plant species, 83 of which represent new hosts for *Erysiphe* fungi in Serbia.

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