

Erysiphales in the valley of the river Vydrica (Malé Karpaty Mts.)

VIKTOR KUČERA

Department of Cryptogams, Institute of Botany, Dúbravská 14, SK-842 23 Bratislava, Slovakia; e-mail: botuviku@savba.sk

KUČERA V. (2001): Erysiphales in the valley of the river Vydrica (Malé Karpaty Mts.). – Thaiszia - J. Bot. 10: 101-110. ISSN 1210-0420.

ABSTRACT: Forty-two taxa of powdery mildew (Erysiphales) have been recorded in the valley of the river Vydrica (Malé Karpaty Mts.): *Arthrocladiella* (1), *Blumeria* (1), *Erysiphe* (20), *Microsphaera* (9), *Phyllactinia* (2), *Podosphaera* (1), *Sawadaea* (2), *Sphaerotheca* (4), *Uncinula* (1), and one anamorph in *Oidium* (1). Variability of biometric characters of cleistothecia, asci, ascospores, konidia are presented. Listed species were associated with 84 taxa of vascular plants; four of them represent new host plants for powdery mildews in Slovakia.

KEYWORDS: Erysiphales, Malé Karpaty Mts., new host plants

Introduction

Members of Erysiphales are obligate parasites of vascular plants, both wild and cultured. According to Paulech (1995) 108 species (treated in 12 genera) of erysiphalean associated with 714 host plants were reported fungi in Slovakia.

Brief history of the research on powdery mildews includes S. ENDLICHER' Flora Posoniensis (1875) including few species of *Erysiphe*, J. BOLLA who reported in his Die Pilze der Pressburger Flora (1875) 6 species (as *Erysiphe aquilegiae*, *Microsphaera alni*, *Phyllactinia suffulta*, *Sphaerotheca fuliginea*, *Trichocladia euonymi*, *Uncinula salicis*). J. A. BÄUMLER (1887, 1897, 1902, 1927) contributed numerous taxa, including those in the area studied in this paper. Recently students in the Department of Botany at the Comenius University, Bratislava, such as BRASLAVSKÁ (1972), KRAVECOVÁ (1973) a KRIŠTOFOVIČOVÁ (1998),

studied for their theses erysiphalean fungi in the environs of Bratislava. Significant contributions to the knowledge of erysiphalean fungi were published by PAULECH and his PhD students (PAULECH 1995, ZÁHOROVSKÁ 1984, 1985, 1986, 1984, ZLOCHOVÁ 1990, PAULECH & Zlochová 1991).

Material and methods

Studied area

Valley of the river of Vydrica is located in the northern part of the capital Bratislava in the Malé Karpaty mountains. Boundaries of the studied represent the spring of the river (390 m a.s.l.) in the northeast and the railway bridge "Červený most" in the south (200 m a.s.l.), and the ranges and tops of surrounding hills and mountains: hill Kamzík (439 m a.s.l.), Chlmec (383 m a.s.l.), Srnie (435 m a.s.l.), Malinský vrch (424 m a.s.l.). Yearly precipitation averages in 700-1000 mm, snow cover persist 100-120 days (ŠAMAJ in MAZÚR 1980).

All collecting site names cited ("specimens studied") are local names with the studied area. For details compare tourist map Malé Karpaty - Bratislava, 1: 50000 (published by Vojenský kartografický ústav, Harmanec, Slovakia, 1996).

Host plants

Members of Erysiphales were associated with 84 species of host plants. Four of them are new host plants for powdery mildews in Slovakia: *Conyza canadensis* (host of *Sphaerotheca fusca*), *Ligustrum vulgare* (host for *Microsphaera syringae*), *Prunella vulgaris* (host for *Erysiphe biocellata*), and *Pyretrum corymbosum* (host for *Erysiphe cichoracearum*).

Methods

General morphometric methods and light microscopy were used to study specimens. Collections' identification was based on publications by BLUMER (1967), PAULECH (1995) and ZLOCHOVÁ (1990). Nomenclature of fungi follows PAULECH (1995) and nomenclature of vascular plants follows MARHOLD & HINDÁK (1998).

Voucher specimens are deposited in the herbarium of the Institute of Botany, Bratislava, Slovakia (SAV).

Abbreviations: Con - conidia, Spo - ascospores, Cl - cleistothecia, Asc – asci.

Annotated list of recorded taxa

Arthrocladiella mougeotii (LÉV.) VASSILKOV

Specimen studied: Pekná cesta; host: *Lycium barbarum* (9. 5. 1998).

Con: 23-28 x 11-14 μm ; as noted by BRAUN (1995) cleistothecia are rarely produced and the fungus identification was based on the anamorph and association with specific host plant.

***Blumeria graminis* (DC.) SPEER**

Specimens studied: Horná Mlynská dolina, Železná studnička, near sanatorium, upper part of the Vydrice valley; hosts: *Poa pratensis* (14. 5. 1999, 24. 5. 1999, 13. 7. 1999), *P. annua* (14. 8. 1999), *Lolium perenne* (4. 9. 1998, 15. 3. 1999), *Dactylis glomerata* (17. 6. 1999).

Con: 24-29 x 11-14 µm; no cleistothecia were observed and the fungus identification was based on the anamorph and association with specific host plant.

***Erysiphe artemisiae* GREV.**

Specimens studied: Horná Mlynská dolina, near sanatorium; host: *Artemisia vulgaris* (4. 9. 1998, 9. 11. 1997, 30. 9. 1998).

Cl: 101-123 µm, Asc: 62-69 x 27-34 µm, Spo: 21-25 x 13-17 µm.

***Erysiphe biocellata* EHRENB.**

Specimens studied: Horná Mlynská dolina; host: *Prunella vulgaris* (20. 7. 1999).

Con: 26-31 x 15-18 µm, no cleistothecia were observed and the fungus identification was based on the anamorph and association with host plant. *Prunella vulgaris* is a new host plant for this powdery mildew in Slovakia.

***Erysiphe cichoracearum* DC.**

Specimens studied: Horná Mlynská dolina, near the restaurant Snežienka, near sanatorium, slopes of the hill Hrubý vrch, upper part of the Vydrice valley, hill Kamzík, Kačín; hosts: *Achillea millefolium* (29. 10. 1999), *Cirsium arvense* (23. 10. 1999, 29. 10. 1999), *Cucurbita pepo* convar. *patisonia* (28. 5. 1998), *Eupatorium cannabinum* (28. 5. 1998, 17. 6. 1999), *Hieracium murorum* agg. (28. 5. 1998, 10. 10. 1998), *Mycelis muralis* (4. 9. 1998, 10. 11. 1998, 3. 7. 1999, 29. 10. 1999), *Pyretrum corymbosum* (15. 7. 1998), *Solidago gigantea* (13. 7. 1999, 29. 10. 1999), *Sonchus oleraceus* (10. 10. 1998, 12. 11. 1999), *Stenactis annua* (15. 7. 1998, 29. 10. 1999), *Tanacetum vulgare* (15. 7. 1998, 10. 10. 1998).

Con: 27-35 x 13-17 µm, Cl: 117-133 µm, Asc: 54-65 x 23-31 µm, Spo: 23-31 x 16-20 µm. *Pyretrum corymbosum* is a new host plant for this powdery mildew in Slovakia.

***Erysiphe circaeae* L. JUNELL**

Specimens studied: Železná studnička, near sanatorium, upper part of the Vydrice valley, hill Kamzík; host: *Circaea lutetiana* (4. 9. 1998, 29. 10. 1999).

Cl: 79-95 µm, Asc: 52-63 x 35-45 µm, Spo: 21-25 x 12-15 µm.

***Erysiphe convolvuli* DC.**

Specimens studied: Horná Mlynská dolina; host: *Calystegia sepium* (14. 8. 1999).

Con: 35-45 x 13-17 µm; no cleistothecia were observed and the fungus identification was based on the anamorph and association with host plant. The

species is quite common in residential areas of Bratislava but it was collected only once in the studied area.

***Erysiphe crucifearum* OPIZ**

Specimens studied: Horná Mlynská dolina, slopes of the hill Hrubý vrch; hosts: *Alliaria petiolata* (3. 7. 1999), *Capsella bursa-pastoris* (4. 9. 1998, 14. 8. 1999).

Con: 29-36 x 12-14 μm ; no cleistothecia were observed and the fungus identification was based on the anamorph and association with host plant.

***Erysiphe cynoglossii* (WALLR.) U. BRAUN**

Specimens studied: Horná Mlynská dolina, near sanatorium; host: *Pulmonaria officinalis* (29. 10. 1999).

No cleistothecia and/or conidia were observed and the fungus identification was based on the characteristics of mycelium and association with host plant.

***Erysiphe depressa* (WALLR.) SCHLTDL.**

Specimens studied: Horná Mlynská dolina; hosts: *Arctium lappa* (14. 8. 1999), *A. tomentosum* (7. 11. 1997).

Cl: 110-128 μm , Asc: 63-83 x 38-52 μm , Spo: 24-28 x 19-25 μm .

***Erysiphe galeopsidis* DC.**

Specimens studied: Železná studnička, near the restaurant Snežienka, near sanatorium, hill Kamzík, Kačín; hosts: *Balota nigra* (14. 8. 1999), *Lamium purpureum* (4. 9. 1998, 15. 10. 1998, 29. 10. 1999), *L. maculatum* (4. 9. 1998, 30. 10. 1998, 12. 11. 1999), *Glechoma hederacea* (15. 6. 1998, 28. 5. 1998), *G. hirsuta* (15. 6. 1998, 28. 5. 1998), *Stachys sylvatica* (9. 10. 1998, 15. 10. 1998).

Con: 23-44 x 9-16 μm , no cleistothecia were observed and the fungus identification was based on the anamorph and association with host plant.

***Erysiphe galii* S. BLUMER**

Specimens studied: Horná Mlynská dolina; hosts: *Galium aparine* (14. 7. 1998), *G. odoratum* (14. 7. 1998).

Con: 25-30 x 12-15 μm , no cleistothecia were observed and the fungus identification was based on the anamorph and association with host plant.

***Erysiphe heraclei* DC.**

Specimens studied: Horná Mlynská dolina, Železná studnička; hosts: *Aegopodium podagraria* (14. 9. 1999), *Anthriscus sylvestris* (11. 10. 1998, 13. 7. 1999), *Chaerophyllum aromaticum* (4. 9. 1998, 10. 11. 1998, 13. 7. 1999), *C. temulum* (10. 11. 1998), *Daucus carota* (4. 9. 1998, 10. 11. 1998, 12. 10. 1999), *Heracleum sphondylium* (15. 6. 1998, 10. 10. 1998, 14. 8. 1999), *Peucedanum oeroselinum* (10. 11. 1998).

Con: 31-39 x 12-16 μm , Cl: 86-108 μm , Asc: 48-58 x 28-38 μm , Spo: 19-24 x 12-15 μm .

Erysiphe hyperici (WALLR.) S. BLUMER

Specimens studied: near sanatorium; hosts: *Hypericum maculatum* (7. 11. 1997, 7. 11. 1999), *H. montanum* (7. 11. 1997, 3. 7. 1999), *H. perforatum* (7. 11. 1997, 3. 7. 1999, 12. 10. 1999), *H. tetrapterum* (12. 10. 1999).

Con: 33-41 x 13-17 μm , Cl: 97-114 μm , Asc: 54-74 x 30-42 μm , Spo: 17-23 x 10-13 μm . Braun (1995) treated the species in *Microsphaera* as *M. hypericarum* U. BRAUN (epithet "hyperici" was not available because of *M. hyperici* YU & LAI).

Erysiphe knautiae DUBY

Specimens studied: Horná Mlynská dolina; hosts: *Knautia dipsacifolia* (13. 7. 1999), *K. drymeia* (20. 7. 1997, 4. 9. 1998, 30. 10. 1998, 13. 7. 1999, 12. 11. 1999).

Cl: 183-221 μm , Asc: 52-63 x 35-53 μm , Spo: 18-21 x 10-12 μm .

Erysiphe pisi DC.

Specimens studied: slopes of the hill Hrubý vrch; host: *Medicago lupulina* (10. 11. 1999).

No cleistothecia and/or conidia were observed and the fungus identification was based on the characteristics of mycelium and association with host plant.

Erysiphe polygoni DC.

Specimens studied: Horná Mlynská dolina, Železná studnička; hosts: *Polygonum aviculare* (4. 9. 1998), *Rumex obtusifolius* (30. 10. 1998, 4. 9. 1998).

Con: 30-42 x 12-19 μm , Cl: 109-131 μm , Asc: 62-71 x 31-39 μm , Spo: 24-30 x 10-13 μm .

Erysiphe ranunculi GREV.

Specimens studied: Horná Mlynská dolina, slopes of the hill Hrubý vrch; hosts: *Ranunculus acris* (10. 11. 1998, 14. 8. 1999), *Ranunculus* sp. (14. 8. 1999).

Cl: 75-89 μm , Asc: 51-62 x 33-43 μm , Spo: 20-25 x 11-13 μm . Braun (1995) treated the species as *Erysiphe aquilegiae* var. *ranunculi* (Grev.) Zeng & Chen.

Erysiphe sordida L. JUNELL

Specimens studied: Horná Mlynská dolina; host: *Plantago major* (23. 10. 1997, 8. 11. 1997, 4. 9. 1998).

Con: 29-35 x 13-18 μm , Cl: 107-144 μm , Asc: 52-60 x 26-35 μm , Spo: 17-24 x 13-17 μm .

Erysiphe trifolii GREV.

Specimens studied: Horná Mlynská dolina, Železná studnička; hosts: *Trifolium pratense* (8. 9. 1998, 26. 8. 1999), *Securigera varia* (10. 7. 1998).

Con: 31-38 x 14-18 μm , no cleistothecia were observed and the fungus identification was based on the anamorph and association with host plant.

Erysiphe urticae (WALLR.) S. BLUMER

Specimens studied: Horná Mlynská dolina, near the restaurant Snežienka, near sanatorium; host: *Urtica dioica* (8. 9. 1998, 30. 10. 1998, 12. 11. 1999).

Cl: 111-127 μm , Asc: 59-69 x 32-41 μm , Spo: 18-22 x 12-16 μm .

Erysiphe verbasci (JACZ.) S. BLUMER

Specimens studied: Horná Mlynská dolina; host: *Verbascum densiflorum* (15. 6. 1998, 14. 7. 1998).

Con: 31-38 x 15-19 μm , no cleistothecia were observed and the fungus identification was based on the anamorph and association with host plant.

Microsphaera alphitoides GRIFF. et MAUBL.

Specimens studied: Horná Mlynská dolina, near sanatorium; hosts: *Quercus dalechampii* (9. 11. 1997, 4. 9. 1998, 22. 3. 1999), *Q. petraea* (18. 9. 1998, 8. 11. 1998, 12. 11. 1999), *Q. robur* (23. 10. 1997, 7. 11. 1997, 30. 9. 1998, 22. 3. 1999).

Con: 28-34 x 15-18 μm , Cl: 92-104 μm , Asc: 52-61 x 35-44 μm , Spo: 17-22 x 11-12 μm .

Microsphaera astragali (DC.) TREVIS.

Specimens studied: near the restaurant Snežienka, near sanatorium; host: *Astragalus glycyphyllos* (10. 7. 1998, 4. 9. 1998, 14. 8. 1999).

Con: 29-36 x 14-16 μm , Cl: 80-117 μm , Asc: 43-80 x 16-58 μm , Spo: 21-32 x 12-16 μm .

Microsphaera bäumleri MAGNUS

Specimens studied: Železná studnička; host: *Vicia sylvatica* (30. 10. 1998).

Cl: 109-125 μm , Asc: 60-67 x 29-44 μm , Spo: 24-28 x 13-16 μm .

Microsphaera euonymi (DC.) SACC.

Specimens studied: Horná Mlynská dolina, upper part of the Vydrlica valley, hill Kamzík; host: *Euonymus europaeus* (4. 9. 1998, 31. 10. 1998, 29. 10. 1999).

Con: 34-39 x 13-17 μm , Cl: 84-106 μm , Asc: 43-63 x 27-43 μm , Spo: 16-26 x 9-14 μm .

Microsphaera grossulariae (WALLR.) LÉV.

Specimens studied: Železná studnička; hosts: *Grossularia uva-crispa* (7. 11. 1999), *Ribes nigrum* (14. 8. 1999).

Cl: 99-116 μm , Asc: 47-58 x 27-35 μm , Spo: 18-22 x 11-13 μm .

Microsphaera lonicerae (DC.) G. WINTER

Specimens studied: Horná Mlynská dolina; host: *Lonicera xylosteum* (12. 11. 1999).

Cl: 78-98 μm , Asc: 49-60 x 32-42 μm , Spo: 21-26 x 12-15 μm .

Microsphaera pseudaccaciae (P. D. MARCHENKO) U. BRAUN

Specimens studied: Horná Mlynská dolina, upper part of the Vydrice valley; host: *Robinia pseudoaccacia* (22. 10. 1997, 4. 9. 1998, 14. 8. 1999).

Con: 30-36 x 12-15 μm , Cl: 194-227 μm , Asc: 52-61 x 32-42 μm , Spo: 18-21 x 12 μm .

Microsphaera syringae (SCHWEIN.) MAGNUS

Specimens studied: Horná Mlynská dolina; hosts: *Ligustrum vulgare* (29. 10. 1999), *Syringa vulgaris* (12. 9. 1999).

Con: 24-29 x 11-14 μm , Cl: 81-93 μm , Asc: 46-57 x 34-41 μm , Spo: 18-22 x 11-12 μm . *Ligustrum vulgare* is a new host plant for this powdery mildew in Slovakia.

Microsphaera vanbruntiana W. R. GERARD

Specimens studied: near the restaurant Snežienka, upper part of the Vydrice valley; host: *Sambucus racemosa* (10. 10. 1998).

Cl: 99-135 μm , Asc: 58-69 x 33-43 μm , Spo: 24-28 x 12-16 μm .

Oidium oxalidis MCALPINE

Specimens studied: Horná Mlynská dolina; host: *Xanthoxalis stricta* (13. 7. 1999)

Con: 24-34 x 11-14 μm , no cleistothecia were observed and the fungus identification was based on the anamorph and association with host plant. According to Braun (1995) this is the anamorph of *Microsphaera russellii* CLINT.

Phyllactinia fraxini (DC.) FUSS

Specimens studied: Horná Mlynská dolina, Železná studnička; hosts: *Fraxinus excelsior* (10. 10. 1998, 29. 10. 1999), *Fraxinus* sp. (25. 9. 1997).

Cl: 170-223 μm , Asc: 59-85 x 27-32 μm , Spo: 26-37 x 16-23 μm .

Phyllactinia guttata (WALLR.) LÉV.

Specimens studied: Železná studnička; host: *Fagus sylvatica* (8. 11. 1997, 10. 10. 1998).

Cl: 186-266 μm , Asc: 53-96 x 21-37 μm , Spo: 26-44 x 16-23 μm .

Podosphaera leucotricha (ELLIS et EVERH.) E. S. SALMON

Specimens studied: Horná Mlynská dolina; host: *Malus domestica* (14. 5. 1999).

Con: 34-39 x 13-17 μm , no cleistothecia were observed and the fungus identification was based on the anamorph and association with host plant.

Sawadaea bicornis (WALLR.) HOMMA

Specimens studied: Horná Mlynská dolina, Železná studnička, near sanatorium; hosts: *Acer campestre* (23. 10. 1997, 7. 5. 1998, 30. 9. 1998), *A. pseudoplatanus* (9. 11. 1997, 18. 9. 1998).

Con: 22-31 x 16-22 μm , Cl: 98-116 μm , Asc: 67-76 x 40-47 μm , Spo: 17-21 x 10-13 μm .

Sawadaea tulasnei (FUCKEL) HOMMA

Specimens studied: Horná Mlynská dolina, Železná studnička; host: *Acer platanoides* (4. 9. 1998, 10. 10. 1998).

Con: 22-25 x 14-16 μm , Cl: 156-186 μm , Asc: 68-86 x 39-49 μm , Spo: 17-23 x 10-14 μm .

Sphaerotheca aphanis (WALLR.) U. BRAUN

Specimens studied: Železná studnička; host: *Geum urbanum* (14. 8. 1999).

Con: 29-36 x 13-18 μm , no cleistothecia were observed and the fungus identification was based on the anamorph and association with host plant. BRAUN (1995) treated this taxon as *Sphaerotheca aphanis* var. *aphanis* (WALLR.) U. BRAUN.

Sphaerotheca balsaminae (WALLR.) H. KARIS

Specimens studied: Železná studnička; host: *Impatiens noli-tangere* (4. 9. 1998, 14. 8. 1999).

Cl: 86-98 μm , Asc: 66-76 x 55-64 μm , Spo: 16-20 x 13-16 μm .

Sphaerotheca fusca (FR.) S. BLUMER

Specimens studied: Horná Mlynská dolina; hosts: *Taraxacum* sect. *Ruderalia*. (4. 9. 1998), *Conyza canadensis* (4. 9. 1998), *Lapsana communis* (12. 11. 1999).

Spo: 25-29 x 14-17 μm , Cl: 69-84 μm , Asc: 55-65 x 46-53 μm , Spo: 11-14 x 9-12 μm . *Conyza canadensis* is a new host plant for this powdery mildew in Slovakia.

Sphaerotheca macularis (WALLR.) LINDAU

Specimens studied: Horná Mlynská dolina; host: *Humulus lupulus* (25. 10. 1998, 18. 11. 1998, 14. 8. 1999).

Con: 23-28 x 14-16 μm , Cl: 77-95 μm , Asc: 69-88 x 54-63 μm , Spo: 17-21 x 12-15 μm .

Uncinula adunca (WALLR.) LÉV.

Specimens studied: Horná Mlynská dolina; host: *Salix capraea* (9. 10. 1998, 29. 10. 1999).

Spo: 31-36 x 14-17 μm , Cl: 129-158 μm , no data for asci and ascospores (specimen small and poorly developed).

Acknowledgments

I would like to express my thanks to Assoc. Prof. ERIKA ZÁHOROVSKÁ for her supervision on my thesis studies, PAVEL LIZOŇ for discussion on the topic and for reading and commenting on the manuscript, and JÁN RIPKA and PAVOL MEREĎA for help and valuable comments.

References

- BÄUMLER J. A. (1887): Beiträge zur Cryptogamen - Flora des Pressburger Comitates. – Vehr. Vereins Natur-Heilk. Pressburg. 6: 66-122.
- BÄUMLER J. A. (1897): Beiträge zur Cryptogamen - Flora des Pressburger Comitates. Die Pilze. – Vehr. Vereins Natur-Heilk. Pressburg 9:129-206.
- BÄUMLER J. A. (1902): Beiträge zur Cryptogamen - Flora des Pressburger Comitates. Die Pilze IV. – Vehr. Vereins Natur-Heilk. Pressburg 14: 3-60.
- BÄUMLER J. A. (1927): Beiträge zur Cryptogamen - Flora des Pressburger Comitates. Die Pilze V. – Vehr. Vereins Natur-Heilk. Pressburg 24 (33): 25-62 [ed MOESZ].
- BOLLA J. (1875): Die Pilze der Pressburger Flora. – Verh. Vereins Natur-Heilk. Pressburg, 2: 43-71.
- BLUMER S. (1967): Echte Mehltaupilze (Erysiphaceae) Ein Bestimmungsbuch für die in Europa vorkommenden Arten. – Gustav Fischer Verlag, Jena.
- BRASLAVSKÁ O. (1972): Parazitické mikromycéty okolia Bratislavy. – [BSc.] thesis (ms.), Dept. of Botany, Komensky Univ., Bratislava.
- BRAUN U. (1995): The powdery mildews (Erysiphales) of Europe. – Gustav Fischer Verlag, Jena.
- ENDLICHER Š. (1830): Flora Posoniensis, exhibes planta circa Posonium sponte crescentes aut frequentius cultas, methodo naturali dispositas. – Posoni.
- KRAVECOVÁ M. (1973): Múčnatky (Erysiphaceae) a ich hostiteľské rastliny v Botanickej záhrade UK Bratislava. – [BSc.] thesis (ms.), Dept. of Botany, Komensky Univ., Bratislava.
- KRIŠTOFOVIČOVÁ B. (1998): Fytopetogénne mikromycéty na drevinách v Bratislave a jej okolí. – [BSc.] thesis (ms.), Dept. of Botany, Komensky Univ., Bratislava.
- MARHOLD K. & HINDÁK F. [eds.] (1998): Zoznam nižších a vyšších rastlín Slovenska. Checklist of non-vascular and vascular plants of Slovakia. – Veda, Bratislava.
- MAZÚR E. [ed.] (1980): Atlas Slovenskej socialistickej republiky. – Slovenská akadémia vied, Slovenský úrad geodézie a kartografie, Bratislava.
- PAULECH C. (1995): Mycota (huby), Ascomycetes (vreckaté), Erysiphales (múčnatkotvaré). – In: GOLIAŠOVÁ K. (ed.): Flóra Slovenska, Vol. 10/1., pp. 1-294. – Veda, Bratislava.
- PAULECH C. & ZLOCHOVÁ K. (1991): Phytopathogenic micromycetes of the family Erysiphaceae distributed in plant communities of Devínska Kobyla hill. – Biológia (Bratislava) 46: 773-780.
- ZÁHOROVSKÁ E. (1984): Die Entwicklung des Eichen - Mehltaus *Microsphaera alphitoides* Griff. et Maubl. im verlaufe der Vegetationsperiode. – Acta Fac. Rerum Nat. Univ. Comeniana, Bot. 31: 83-93.
- ZÁHOROVSKÁ E. (1985): Die Keimung der Konidien des Pilzes *Microsphaera alphitoides* Griff. et Maubl. im verlaufe der Vegetationsperiode. – Acta Fac. Rerum Nat. Univ. Comeniana, Bot. 32: 77-84.
- ZÁHOROVSKÁ E. (1986): Parazitická huba *Microsphaera* a jej konídiové štádium na duboch Slovenska. I. – Česká Mykol. 40: 30-37.

- ZÁHOROVSKÁ E. (1988): Parazitická huba *Microsphaera* a jej askokarpové štádium na duboch Slovenska. II. – Česká Mykol. 42: 149-157.
- ZLOCHOVÁ K. (1990): Fytopatogénne mikromycéty čeľade Erysipheceae parazitujúce na hostiteľských rastlinách čeľade Cucurbitaceae na území Slovenska. – PhD thesis (ms.), Institute of Botany, Bratislava.

Received: 20 October 2000
Accepted: 27 November 2000