

Addition to the Peronosporales of Bulgaria

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Abstract. Of the 83 specimens of Peronosporales collected in the north-eastern part of Bulgaria in 1998 and 1999, and some 16 specimens collected earlier and present in herb. BUCM, two genera (*Basidiophora* and *Bremiella*), 6 species (*Basidiophora entospora*, *Bremiella baudysii*, *Peronospora affinis*, *P. holostei*, *P. medicaginis-minimae*, and *Pseudoperonospora cannabina*), and 32 fungus-host combinations are for the first time reported from this country. In addition, 30 new localities for previously known such combinations are included.

Key words: Bulgaria, fungal diversity, Peronosporales

Introduction

A joint project of the Institute of Botany, Bulgarian Academy of Sciences, and the Institute of Biology, Romanian Academy, investigated plant parasitic fungi occurring in Dobroudzha and on the Black Sea shore of Romania and Bulgaria. Two collecting trips were made on 21 September - 2 October 1998 and 17-30 May 1999 in the north-eastern part of Bulgaria, particularly in Dobroudzha. Of the 805 specimens collected, 83, included in this paper, were species of Peronosporales. In addition, 16 specimens of Peronosporales previously collected from Bulgaria by T. Săvulescu and T. Rayss between 1930-1934 were found in BUCM herbarium (abbreviation according to Holmgren *et al.* 1990). As a result, the Peronosporales of Bulgaria (Vanev *et al.* 1993; Negrean & Denchev 2000, 2002) are augmented with two genera (*Basidiophora* and *Bremiella*), 6 species (*Basidiophora entospora* Roze & Cornu, *Bremiella baudysii* (Skalický) Constant. & Negrean, *Peronospora affinis* Rossmann, *P. holostei* Casp. ex de Bary, *P. medicaginis-minimae* Gaponenko, and *Pseudoperonospora cannabina* (G.H. Oth) Curzi), and 32 fungus-host combinations. In addition, 30 new localities for previously known fungus-host combinations are reported from the Black Sea Coast,

Northeast Bulgaria, and Pirin Mts. Also included are several specimens of two recently introduced genera, *Paraperonospora* Constant. and *Hyaloperonospora* Constant. Representatives of these two genera were earlier reported from Bulgaria, but under their previous names.

An asterisk (*) precedes the new records. Vouchers are deposited in BUCM and the accession number within brackets is given at the end of each specimen citation. Some duplicates are also deposited in UPS. Gavril Negrean collected all specimens, unless otherwise stated.

List of specimens

Albugo bliti (Biv.) Kuntze

Amaranthus albus L. – *Black Sea Coast, Varna distr., Zlatni Pyasutsi, 27 Sep 1998 (136 214).

**A. hybridus* L. – Black Sea Coast, Dobrich distr., Balchik, 29 Sep 1998 (136 312); Black Sea Coast, Varna distr., Zlatni Pyasutsi, 27 Sep 1998 (136 204).

A. candida (Pers.) Kuntze

**Alyssum caliacrae* E.I. Nyárády – Black Sea Coast, Dobrich distr., Balchik, 23 May 1999 (136 760).

**A. hirsutum* Bieb. – Black Sea Coast, Dobrich distr., near Kranevo, Albena, 20 May 1999 (136 606).

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- Decurainia sophia* (L.) Webb ex Prantl – *Black Sea Coast, Dobrich distr., Kavarna, 18 May 1999 (136 528); ditto, Balchik, 24 May 1999 (136 790).
- Sisymbrium loeselii* L. – *Black Sea Coast, Dobrich distr., Kavarna, 18 May 1999 (136 526 & 136 552); ditto, Balchik, 23 May 1999 (136 738).
- S. officinale* (L.) Scop. – *Black Sea Coast, Dobrich distr., Kavarna, in gardens, 18 May 1999 (136 585).
- **S. orientale* L. – Black Sea Coast, Dobrich distr., Balchik, 24 May 1999 (136 784).
- A. portulacae** (DC.) Kuntze
- Portulaca oleracea* L. subsp. *oleracea* – *Black Sea Coast, Dobrich distr., Balchik, Botanical Garden, 23 Sep 1998 (136 084).
- A. tragopogonis** (Pers.) Gray
- **Crupina vulgaris* Cass. – Black Sea Coast, Dobrich distr., Balchik, Touzlata, 22 May 1999 (136 734; UPS).
- Xeranthemum annuum* L. – *Black Sea Coast, Dobrich distr., Balchik, town's centre, 21 May 1999 (136 642); ditto, Touzlata, 22 May 1999 (136 725); ditto, 23 May 1999 (136 745); *Northeast Bulgaria, Silistra distr., Toutrakan, 17 Jun 1930, T. Săvulescu & T. Rayss (624).
- ***Basidiophora entospora** Roze & Cornu
- Conyza canadensis* (L.) Cronq. – Black Sea Coast, Dobrich distr., near Bulgarevo, Kaliakra promontory, 28 May 1999 (136 885); ditto, Kavarna, 18 May 1999 (136 555); ditto, Balchik, Botanical Garden, 17 May 1999 (136 524; UPS).
- Bremia lactucae** Regel
- **Carduus nutans* L. subsp. *macrolepis* (Peterm.) Kazmi – Black Sea Coast, Dobrich distr., Balchik, 24 May 1999 (136 783).
- **Cirsium vulgare* (Savi) Ten. – Black Sea Coast, Dobrich distr., Balchik, 23 May 1999 (136 741; UPS).
- **Crepis pulchra* L. – Black Sea Coast, Dobrich distr., near Kavarna, Chirakman, 18 May 1999 (136 547); ditto, Balchik, 21 May 1999 (136 658; UPS); ditto, Touzlata, 22 May 1999 (136 702; UPS).
- **Lactuca perennis* L. – Black Sea Coast, Dobrich distr., Balchik, 21 May 1999 (136 660); ditto, Tuzlata, 22 May 1999 (136 700; UPS).
- **L. serriola* L. – Black Sea Coast, Dobrich distr., Balchik, 25 May 1999 (136 824); ditto, 26 May 1999 (136 847).
- **Senecio vernalis* Waldst. & Kit. – Black Sea Coast, Dobrich distr., near Kranevo, Albena, 20 May 1999 (136 608; UPS).
- Sonchus asper* (L.) Hill. *subsp. *glaucescens* (Jordan) Ball – Black Sea Coast, Dobrich distr., near Bulgarevo, Kaliakra promontory, 28 May 1999 (136 884).
- ***Bremiella baudysii** (Skalický) Constant. & Negrean
- Berula erecta* (Hudson) Coville – Black Sea Coast, Dobrich distr., near Kranevo, bank of the stream Batova, near Albena, 20 May 1999 (136 616; UPS).
- Hyaloperonospora parasitica** (Pers. : Fr.) Constant.
- Camelina rumelica* Velen. – *Black Sea Coast, Dobrich distr., Kaliakra promontory, Bolata Dere, 19 May 1999 (136 586).
- Capsella bursa-pastoris* (L.) Medicus – *Black Sea Coast, Dobrich distr., Dourankoulak, 17 May 1999 (136 512); ditto, Bulgarevo, 19 May 1999 (136 595).
- Cardaria draba* (L.) Desv. subsp. *draba* – Black Sea Coast, Dobrich distr., Balchik, near Botanical Garden, 24 May 1999 (136 764).
- Decurainia sophia* (L.) Webb ex Prantl – *Black Sea Coast, Dobrich distr., Dourankoulak, 17 May 1999 (136 514); ditto, Balchik, 24 May 1999 (136 789).
- **Erysimum repandum* L. – Black Sea Coast, Dobrich distr., Balchik, 2 May 1936, T. Săvulescu (1651).
- Reseda inodora* L. – Black Sea Coast, Dobrich distr., between Bulgarevo and Kaliakra promontory (135 991; UPS). This fungus/host combination has been previously recorded from Bulgaria as *Peronospora crispula* Fuckel (Negrean & Denchev 2002).
- **Sisymbrium loeselii* L. – Black Sea Coast, Dobrich distr., Kavarna, in hortus, 18 May 1999 (136 553; UPS); ditto, Balchik, 21 May 1999 (136 643).
- S. officinale* (L.) Scop. – *Black Sea Coast, Dobrich distr., Balchik, 21 May 1999 (136 677); *Northeast Bulgaria, Silistra distr., Toutrakan, 14 Jun 1933, T. Săvulescu & T. Rayss (2700).
- Paraperonospora leptosperma** (de Bary) Constant.
- **Anthemis austriaca* Jacq. – Black Sea Coast, Dobrich distr., Dourankoulak, 17 May 1999 (136 516; UPS). This fungus has been previously indicated from Bulgaria as *Peronospora leptosperma* de Bary on *Chamomilla recutita* (L.) Rausch. (as *Matricaria recutita* L.) (Vanev *et al.* 1993).
- P. sulphurea** (Gäum.) Constant.
- **Artemisia absinthium* L. – Northeast Bulgaria, Silistra distr., Toutrakan, 2 Jun 1930, T. Săvulescu & T. Rayss (BUCM 2752). This fungus has been previously recorded from Bulgaria as *Peronospora sulphurea* Gäum. on *Artemisia vulgaris* L. (Vanev *et al.* 1993).
- ***Peronospora affinis** Rossmann
- Fumaria officinalis* L. – Black Sea Coast, Dobrich distr., Balchik, 21 May 1999 (136 640; UPS).
- P. alsinearum** Casp.
- Stellaria media* (L.) Vill. – *Black Sea Coast, Dobrich distr., Kranevo, 13 Apr 1934, T. Săvulescu & T. Rayss (970).

P. arborescens (Berk.) Casp.

Papaver dubium L. – *Black Sea Coast, Dobrich distr., Comana, 1 May 1936, T. Săvulescu (1087); ditto, Balchik, 1 May 1936, T. Săvulescu (1083).

**P. rhoeas* L. – Black Sea Coast, Dobrich distr., Dourankoulak, 17 May 1999 (136 511).

P. asperuginis W.G. Schneid.

Asperugo procumbens L. – *Black Sea Coast, Dobrich distr., Balchik, Botanical Garden, 21 May 1999 (136 639).

P. astragalina Syd.

**Astragalus hamosus* L. – Black Sea Coast, Dobrich distr., Balchik, 21 May 1999 (136 656).

P. calotheca de Bary

Galium aparine L. – *Black Sea Coast, Dobrich distr., Balchik, 21 May 1999 (136 666); *Northeast Bulgaria, Dobrich distr., Dobrich, 26 May 1999 (136 830). This fungus/host combination has been previously published from Bulgaria as *Peronospora aparines* (de Bary) Gäum. (Vanev *et al.* 1993).

P. conglomerata Fuckel

**Erodium ciconium* (L.) L'Hér. – Black Sea Coast, Dobrich distr., Balchik, 21 May 1999 (136 662; UPS).

**Geranium molle* L. – Black Sea Coast, Dobrich distr., Balchik, Touzlata, 22 May 1999 (136 704).

**G. pusillum* L. – Black Sea Coast, Dobrich distr., Balchik, Touzlata, 22 May 1999 (136 706); Northeast Bulgaria, Silistra distr., Toutrakan, 27 Apr 1933 & 28 Apr 1933, T. Săvulescu & T. Rayss (2545 & 2551).

**G. pyrenaicum* Burm. fil. – Black Sea Coast, Dobrich distr., Balchik, 24 May 1999 (136 777).

P. debaryi E.S. Salmon & Ware

Urtica urens L. – *Black Sea Coast, Dobrich distr., Bulgarevo, 19 May 1999 (136 593).

P. farinosa (Fr. : Fr.) Fr.

**Atriplex patula* L. – Northeast Bulgaria, Dobrich distr., Dobrich, 26 May 1999 (136 840).

P. grisea (Unger) Unger

**Veronica anagallis-aquatica* L. – Black Sea Coast, Dobrich distr., Balchik, 21 May 1999 (136 669; UPS).

****P. holostei*** Casp. ex de Bary

Holosteum umbellatum L. – Black Sea Coast, Dobrich distr., Balchik, 28 Apr 1931, T. Săvulescu & T. Rayss (1995).

P. knautiae Fuckel ex J. Schröt.

Cephalaria transylvanica (L.) Roemer & Schultes – *Black Sea Coast, Dobrich distr., Balchik, Touzlata, 27 May

1999 (136 852); ditto, Balchik, Botanical Garden, 24 May 1999 (136 763); ditto, near Kranevo, Albena, 20 May 1999 (136 635); *Northeast Bulgaria, Dobrich distr., Dobrich, 26 May 1999 (136 826). This fungus/host combination has been previously published from Bulgaria as *Peronospora cephalariae* Vincens (Vanev *et al.* 1993).

P. lamii A. Braun

Lamium amplexicaule L. – *Black Sea Coast, Dobrich distr., Balchik, 18 Apr 1931, T. Săvulescu & T. Rayss (2072).

L. garganicum L. – *Pirin Mts, ? 'Altepe', 9 Aug 1964, leg. C.C. Georgescu, fungus comm. & det. G. Negrean (87 846).

**L. maculatum* L. – Black Sea Coast, Dobrich distr., Balchik, Botanical Garden, 19 May 1999 (136 599; UPS).

****P. medicaginis-minimae*** Gaponenko

Medicago lupulina L. – Black Sea Coast, Dobrich distr., Balchik, 21 May 1999 (136 688).

**M. minima* (L.) Bartal. – Black Sea Coast, Dobrich distr., Balchik, Touzlata, 22 May 1999 (136 714; UPS); ditto, Balchik, 21 May 1999 (136 651; UPS); ditto, near Botanical Garden, 21 May 1999 (136 638; UPS); ditto 29 May 1999 (136 901; UPS).

P. sordida Berk. & Broome

Veronica hederifolia L. – *Black Sea Coast, Dobrich distr., Balchik, 28 Apr 1931, T. Săvulescu & T. Rayss (1149).

**V. polita* Fries – Northeast Bulgaria, Silistra distr., Toutrakan, 14 Jun 1933, T. Săvulescu & T. Rayss (918).

P. sparsa Berk.

Geum urbanum L. – *Black Sea Coast, Dobrich distr., Balchik, 23 May 1999 (136 740); ditto, Botanical Garden, 24 May 1999 (136 768). This fungus/host combination has been previously published from Bulgaria as *Peronospora gei* Syd. (Vanev *et al.* 1993).

P. trifoliorum de Bary

**Trifolium campestre* Schreber – Black Sea Coast, Dobrich distr., Kranevo, 20 May 1999 (136 614); ditto, Kaliakra promontory, 28 May 1999 (136 868); Northeast Bulgaria, Silistra distr., Toutrakan, 2 Jun 1931, T. Săvulescu & T. Rayss (as *Trifolium procumbens* L.) (2856).

**T. diffusum* Ehrh. – Black Sea Coast, Dobrich distr., Balchik, 21 May 1999 (136 682).

**T. echinatum* Bieb. – Black Sea Coast, Dobrich distr., Balchik, near Botanical Garden, 29 May 1999 (136 900).

P. viciae (Berk.) Casp.

Lathyrus cicera L. – *Black Sea Coast, Dobrich distr., Balchik, 21 May 1999 (136 646 & 136 676); *Northeast Bulgaria, Dobrich distr., Dobrich, 26 May 1999 (136 821).

**L. sphaericus* Retz. – Northeast Bulgaria, Dobrich distr., Dobrich, 26 May 1999 (136 833).

Vicia angustifolia Grubb. – *Black Sea Coast, Dobrich distr., Balchik, Touzlata, 27 May 1999 (136 860); *Northeast Bulgaria, Dobrich distr., Dobrich, 26 May 1999 (136 825).

**V. cracca* L. – Northeast Bulgaria, Silistra distr., Toutrakan, 14 Jun 1932, T. Săvulescu & T. Rayss (as *Vicia pannonica* Crantz) (2210).

V. narbonensis L. – *Black Sea Coast, Dobrich distr., Balchik, 21 May 1999 (136 659); ditto, near Kranevo, Albena, 20 May 1999 (136 626).

Plasmopara conii (Casp.) Trotter

Conium maculatum L. – *Black Sea Coast, Dobrich distr., near Kavarna, at the foot of the hill Chirakman, 18 May 1999 (136 535); ditto, Balchik, 18 May 1999 (137 151).

**Pseudoperonospora cannabina* (G.H. Otth) Curzi

Cannabis sativa L. subsp. *spontanea* Serbr. (*C. ruderalis* Janisch) – Northeast Bulgaria, Dobrich distr., Dobrich, 26 May 1999 (136 829; UPS).

P. humuli (Miyabe & Takah.) G.W. Wilson

Humulus lupulus L. – Black Sea Coast, Dobrich distr., Balchik, 21 May 1999 (136 654); ditto, near Botanical Garden, 30 May 1999 (136 905).

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