

## Some new records of powdery mildew fungi from Argentina

Uwe Braun<sup>1</sup>, Mirta Kiehr<sup>2</sup> & Rolf Delhey<sup>2</sup>

<sup>1</sup> Martin-Luther-Universität, FB. Biologie, Institut für Geobotanik und Botanischer Garten, Herbarium, Neuwerk 21, D-06099 Halle, Germany

<sup>2</sup> Universidad Nacional del Sur, Departamento de Agronomía, Altos de Palihue, 8000 Bahía Blanca, Argentina

Braun, U., M. Kiehr & R. Delhey (2000). Some new records of powdery mildew fungi from Argentina. – *Sydowia* 53(1): 34–43.

*Oidium insolitum* sp. nov. is described, and several new collections of powdery mildew fungi from Argentina are recorded.

Keywords: Argentina, Ascomycetes, anamorph, Erysiphales, new records, powdery mildew, taxonomy.

Powdery mildew fungi have been described and recorded from Argentina by Spegazzini (see Farr, 1973; Braun, 1987a), Neger (1899), Mena (1970), Roivainen (1977), and many other authors. More recently, papers dealing with powdery mildews from the north-east of Argentina have been published by several authors, e.g., Mazzanti de Castañón & Cabrera de Alvarez (1985, 1994), Mazzanti de Castañón & al. (1987), Mazzanti de Castañón & al. (1990), Alvarez & Mazzanti de Castañón (1991, 1992), and Cabrera de Alvarez & Mazzanti de Castañón (1991). Braun (1987b), Havrylenko (1993, 1995a,b, 1996, 1998) and Havrylenko & Braun (1998a, 1998b) published a series of papers dealing with the Erysiphales of Rio Negro and adjacent areas in Argentina. Havrylenko & Lorenzo (1999) recorded several powdery mildews from Tierra del Fuego.

There is a need for more studies on this fungal group in Argentina (Weltzien, 1978), as many parts of this vast country are insufficiently explored. In addition, many of the older records need revision on the basis of modern taxonomic concepts (Braun, 1987a; 1999; Braun & Takamatsu, 2000).

Most specimens recorded in the present paper were collected in an area around Bahía Blanca, Province of Buenos Aires, Argentina. Phytogeographically, this area pertains to the “Provincia Pampeana”, a grass land now heavily disturbed by agriculture, but the area from

Bahía Blanca to the south and west forms a part of the “Provincia Espinal”, which is a xerophytic bushland (Cabrera, 1971).

Most collections have been made by R. Delhey and M. Kiehr, a few by R. Delhey and U. Braun or other collectors. They are deposited at BB (Universidad Nacional del Sur, Departamento de Agronomía, Altos de Palihue, Bahía Blanca, Argentina). The taxonomy and nomenclature of the Erysiphales is based on Braun (1987a), supplemented by Braun (1999) and Braun & Takamatsu (2000). [The following combination of a species described from Argentina is missing in the latter paper: **Podosphaera spiralis** (Neger) U. Braun, M. Kiehr & R. Delhey **comb. nov.**, Bas.: *Sphaerotheca spiralis* Neger, Zbl. Bakt. Parasit Kd., 2. Abt., 20: 93 (1907).]

**Oidium insolitum** U. Braun, M. Kiehr & R. Delhey **sp. nov.** – Figs. 1, 2.

**Etymology.** – “*insolitus*” = unusual.

Mycelium amphigenum, superficiale, maculiforme vel effusum, griseo-album. Hyphae hyalinae, septatae, ramosae, leves, 3–7.5 µm latae. Appressoria distincta, papillaeformia, sublobata vel multilobata, solitaria vel paribus oppositis, 3–10 µm diam. Conidiophora ex hyphis sterilibus oriunda, erecta, subcylindracea, 30–120 × 6–10 µm, 1–2(–3)-septata, levia, hyalina, cellulis basalibus 18–60 µm longis et 6–8 µm latis, cellulis subsequentibus variabilibus, cellulis subterminalis saepe leniter inflatis. Conidia solitaria, subcylindracea, utrimque incrassata, 2–6-plo irregulariter nodulosa, 30–45 × 14–25 µm, hyalina, sublevia, guttulata.

**Holotypus.** – On *Lycium chilense* Miers ex Bertero (Solanaceae), Argentina, Province of Buenos Aires, Bahía Blanca, 22 March 2000, leg. R. Delhey and U. Braun (HAL). Isotypus BB (1329).

Mycelium amphigenous, superficial, forming thin patches or effuse, greyish white. – Hyphae hyaline, septate, branched, smooth, 3–7.5 µm wide. – Appressoria conspicuous, nipple-shaped, slightly to multilobed, solitary or in opposite pairs, 3–10 µm diam. – Conidiophores arising from creeping hyphae, erect, subcylindric, 30–120 × 6–10 µm, 1–2(–3)-septate, smooth, hyaline, foot-cells 18–60 × 6–8 µm, following cells variable (one or two, rarely three, about as long as the foot-cell or usually shorter), subterminal cell often somewhat swollen. – Conidia solitary, dumbbell-shaped, subcylindric, both ends enlarged, with several (two to six) irregular swellings, 30–45 × 14–25 µm, almost smooth, guttulate.

*Oidium insolitum* is a *Pseudoidium* with lobed appressoria and conidia formed singly. This species is, however, quite distinct from all *Oidium* anamorphs, characterised by very unusual dumbbell-like conidia. The conidia of *Leveillula saxaouli* (Sorokin) Golovin and

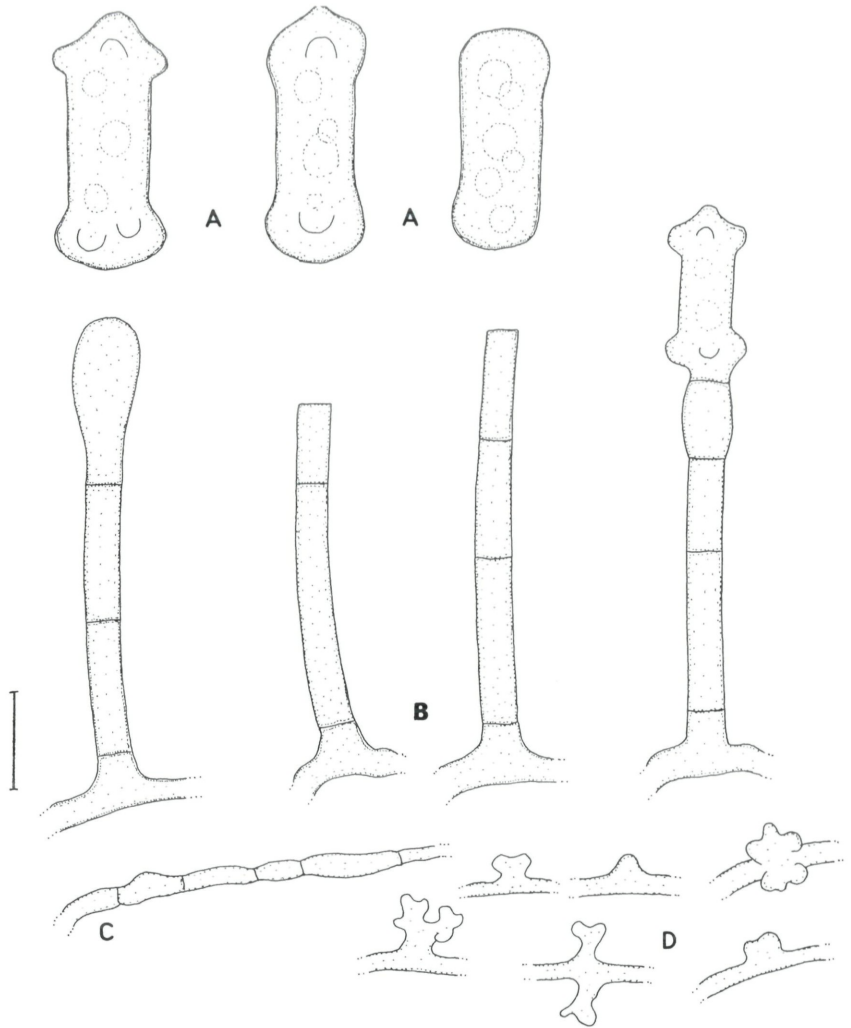


Fig. 1. *Oidium insolitum* sp. nov. – A. conidia. – B. conidiophores. – C. hypha. – D. appressoria. – Bar = 20  $\mu$ m. U. Braun del.

*L. lanuginosa* (Fuckel) Golovin are similar, but the anamorphs of *Leveillula* spp. belong in the genus *Oidiopsis* Scalia.

'*Oidium erysiphoides*' has been recorded on *Lycium cestroides* from Argentina (Spegazzini, 1898), but the identity of this fungus is not known.

### New records of powdery mildew fungi from Argentina

New records and new hosts are marked as follows: !! = new to South America, ! = new to Argentina, ++ = new host, + = new host for Argentina.

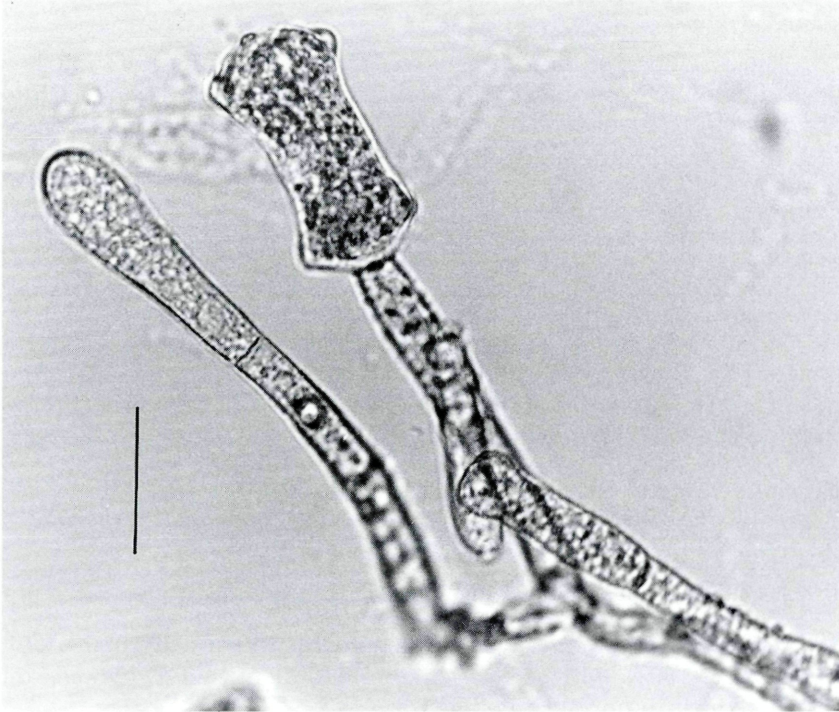


Fig. 2. *Oidium insolitum* sp. nov. – Conidiophores. – Bar = 20  $\mu$ m. Micrograph by R. Delhey.

*Erysiphe alphitoides* (Griffon & Maubl.) U. Braun & S. Takamatsu

On *Quercus robur* L., Prov. Buenos Aires, Punta Alta, partido Rosales, 28 April 1983; No. 10; leg. R. Araoz (holomorph); and Prov. Buenos Aires, Parque Prov. E. Tornquist, 19 March 2000, No. 1326; leg. R. Delhey & U. Braun (anamorph).

Powdery mildew on oaks is known in Argentina since the 1920's and the fungus has been determined as the anamorph of *Microsphaera quercina* (Marchionatto, 1944). The teleomorph has been later found by J. E. Wright (cited in: Fernández Valiela, 1978).

*Erysiphe aquilegiae* DC.

On *Ranunculus repens* L., Prov. Buenos Aires, Bahía Blanca, 13 August 2000; No. 1408; leg. R. Delhey & M. Kiehr (anamorph) +.

*Erysiphe betae* (Vaňha) Weltzien

On *Chenopodium ambrosioides* L., Prov. Buenos Aires, Bahía Blanca, 14 March 2000; No. 1316; leg. R. Delhey (anamorph) +.

*Erysiphe convolvuli* DC.

On *Convolvulus arvensis* L., Prov. Buenos Aires, Col. La Merced; partido Villarino, 18 February 2000; No. 1332, leg. R. Delhey & M. Kiehr (anamorph).

On *Convolvulus bonariensis* Cav., Prov. Buenos Aires, Bahía Blanca, 18 March 2000; No. 1322; leg. R. Delhey (anamorph) ++.

The powdery mildew fungus on *C. arvensis* in Argentina has been named '*Oidium erysiphoides*' by Spegazzini (1898), while *E. convolvuli* has been identified on the same host from the Province of Río Negro (Braun, 1987b; Havrylenko, 1998).

*Erysiphe cruciferarum* Opiz ex L. Junell

On *Rapistrum rugosum* (L.) All., Prov. Buenos Aires, Bahía Blanca, 18 March 2000; No. 1323; leg. R. Delhey (anamorph).

On *Sisymbrium irio* L., Prov. Buenos Aires, Col. La Merced, partido Villarino, 22 February 2000; No. 1311; leg. R. Delhey & M. Kiehr (anamorph) +.

Montero (1981) identified '*Oidium balsamii*' as the agent of powdery mildew on *R. rugosum* in the Pampean region. More recently, *E. cruciferarum* has been recorded on this host in the Province of Río Negro (Braun, 1987b).

*Erysiphe heraclei* DC.

On *Conium maculatum* L., Prov. Buenos Aires, Saavedra, 7 January 1995; No. 1091; leg. R. Delhey (anamorph).

On *Foeniculum vulgare* Mill., Prov. Río Negro, Viedma, 5 March 1998; no. 1277; leg. R. Delhey (anamorph) +.

'*Oidium erysiphoides*' has been recorded on *C. maculatum* by Spegazzini (1898), while Havrylenko (1998) identified *E. heraclei* on the same host in northern Patagonia.

*Erysiphe howeana* U. Braun

On *Oenothera* sp., Prov. Buenos Aires, dunes of Pehuén-Co, partido Rosales, 2 April 2000; No. 1381; leg. R. Delhey & M. Kiehr (anamorph).

*Erysiphe knautiae* Duby, Bot. gall. 2: 870 (1830) !!

On *Scabiosa atropurpurea* L., Prov. Buenos Aires, Bahía Blanca, 15 March 2000; No. 1320; R. Delhey & U. Braun (anamorph).

*Erysiphe platani* (Howe) U. Braun & S. Takamatsu

On *Platanus* sp., Prov. Buenos Aires, Necochea, 2 February 1987; No. 120; leg. R. Delhey & M. Kiehr and Prov. Buenos Aires, Bahía Blanca, 22 March 2000; No. 1330; leg. R. Delhey & U. Braun (anamorphs).

*Microsphaera platani* has been recorded on *Platanus* before in the province of Mendoza (Klingner, 1982) and actually is widespread in Argentina.

*Erysiphe polygoni* DC.

On *Polygonum aviculare* L., Prov. Buenos Aires, Bahía Blanca, 15 March 2000; No. 1321; leg. R. Delhey (anamorph).

On *P. aviculare* '*Oidium erysiphoides*' has been recorded by Spegazzini (1898), while Havrylenko (1998) identified *E. polygoni* on the same host in north Patagonia.

*Erysiphe trifolii* Grev.

On *Melilotus albus* Medik., Prov. Buenos Aires, Bahía Blanca, 15 March 2000; No. 1319; leg. R. Delhey (anamorph) +.

On *M. officinalis* (L.) Lam., Prov. Buenos Aires, Lumb, partido San Cayetano, 4 March 2000; No. 1301; leg. R. Delhey & M. Kiehr (anamorph) +.

*Golovinomyces cichoracearum* (DC.) V. P. Gelyuta

On *Aster squamatus* Hieron. ex Sod., Prov. Buenos Aires, Bahía Blanca, 14 March 2000; No. 1333; leg. R. Delhey (anamorph).

On *Baccharis ulicina* Hook. & Arn., Prov. Buenos Aires, Bahía Blanca, 3 April 2000; No. 1387; leg. R. Delhey & M. Kiehr (anamorph, mainly on stems) ++.

On *Noticastrum haplopappus* Remy., Prov. Buenos Aires, dunes of Pehuén-Co, partido Rosales, 2 April 2000; No. 1382; leg. R. Delhey & M. Kiehr (anamorph) ++.

On *Xanthium spinosum* L., Prov. Buenos Aires, Bahía Blanca, 19 April 2000; No. 1399; leg. R. Delhey & M. Kiehr (holomorph; ascomata on stems).

On *Sonchus oleraceus* L., Prov. Buenos Aires, Bahía Blanca, 13 August 2000; No. 1405; leg. R. Delhey & M. Kiehr (anamorph).

On *A. squamatus* (as *A. linifolius*) and *X. spinosum* 'Oidium *erysiphoides*' has been recorded by Spegazzini (1898). Dal Bello & Carranza (1995) reported the presence of 'Oidium *ambrosiae*' on *S. oleraceus* in the La Plata region.

*Golovinomyces cichoracearum* var. *latisporus* (U. Braun) U. Braun

On *Helianthus annuus* L., Prov. Buenos Aires, Villalonga, partido Patagones, 17 February 2000; No. 1312; leg. R. Delhey & M. Kiehr (anamorph).

On *Helianthus tuberosus* L., Prov. Buenos Aires, Bahía Blanca, 15 March 2000; No. 1317; leg. R. Delhey & M. Kiehr (anamorph) +.

On *Rudbeckia laciniata* L., Prov. Buenos Aires, Bahía Blanca, 15 March 2000; No. 1318; leg. R. Delhey & U. Braun (anamorph) +.

*Erysiphe cichoracearum* has previously been recorded on *H. annuus* in Argentina (Sarasola & Rocca de Sarasola, 1981).

*Leveillula taurica* (Lév.) Arnaud

On *Passiflora caerulea* L., Prov. Buenos Aires, Bahía Blanca, 24 August 1996; No. 1309; leg. C. B. Villamil and Prov. Buenos Aires, Bahía Blanca, 22 July 1995; 1310; leg. R. Delhey & M. Kiehr (anamorphs) +.

On *Solanum sisymbriifolium* Lam., Prov. Buenos Aires, Villa Ventana, partido Tornquist, 19 March 2000; No. 1328; leg. R. Delhey & U. Braun (anamorph) ++.

*Neoerysiphe cumminsiana* (U. Braun) U. Braun !!

On *Bidens pilosa* L., Prov. Buenos Aires, Bahía Blanca, 14 March 2000; 1334; leg. R. Delhey (holomorph) ++.

On *Eupatorium subhastatum* Hook. & Arn., Prov. Buenos Aires, Tandil, 21 July 1993; No. 1046; leg. R. Delhey & M. Kiehr and Prov. Buenos Aires, Parque Prov. E. Tornquist; No. 1324; leg. R. Delhey & U. Braun (anamorphs) ++.

*Podosphaera euphorbiae* (Castagne) U. Braun & S. Takamatsu

On *Euphorbia peplus* L., Prov. Buenos Aires, Bahía Blanca, 16 May 1992; No. 902; leg. R. Delhey & M. Kiehr and Prov. Buenos Aires, Bahía Blanca, 2 January 1996; No. 1127; leg. R. Delhey & M. Kiehr (anamorphs).

'Oidium *erysiphoides*' has been recorded by Spegazzini (1898) on *E. peplus*.

*Podosphaera fuliginea* (Schltdl.: Fr.) U. Braun & S. Takamatsu

On *Veronica persica* Poir., Prov. Buenos Aires, Bahía Blanca, 7 October 1990; No. 725; leg. R. Delhey & M. Kiehr (anamorph) +.

*Podosphaera fusca* (Fr.) U. Braun & N. Shishkoff, in Braun & Takamatsu (emend.)

On *Calendula officinalis* L., Prov. Buenos Aires, Bahía Blanca, 13 August 2000; No. 1406; leg. R. Delhey & M. Kiehr (anamorph).

On *Conyza albida* Willd. ex Spreng., Prov. Buenos Aires, Bahía Blanca, 15 March 2000; No. 1335; leg. R. Delhey (anamorph) ++.

On *Taraxacum officinale* Wiggers, Prov. Buenos Aires, Bahía Blanca, 14 March 2000; No. 1313; leg. R. Delhey & M. Kiehr and Prov. Buenos Aires, Villa Ventana, 19 March 2000; No. 1327; leg. R. Delhey & U. Braun (anamorphs) +.

*C. officinalis* has been recorded as a host of this fungus in the provinces of Corrientes (Cabrera de Alvarez & Mazzanti de Castañón, 1991) and Río Negro (Havrylenko, 1998).

*Podosphaera* cf. *lini* (Tsvetkova) U. Braun & S. Takamatsu !!

On *Cliococca selaginoides* (Lam.) C. M. Rogers & Mildner ( $\equiv$  *Linum selaginoides* Lam.), Prov. Buenos Aires, Parque Prov. E. Tornquist, 19 March 2000; No. 1325; leg. R. Delhey & U. Braun (anamorph) ++.

*Podosphaera pannosa* (Wallr. : Fr.) de Bary

On *Rosa banksiae* R. Br. in Ait., Prov. Buenos Aires, Bahía Blanca, 14 March 2000; No. 1314; leg. M. Crespo (anamorph) +.

*Podosphaera xanthii* (Castagne) U. Braun & N. Shishkoff, in Braun & Takamatsu (emend.)

On *Cucurbita moschata* Duch. ex Poir., Prov. Buenos Aires, Bahía Blanca, 18 February 2000; No. 1331; leg. R. Delhey & M. Kiehr (anamorph).

On *Glandularia pulchella* (Sweet) Tronc., Prov. Buenos Aires, Bahía Blanca, 30 September 1984; No. 66; leg. R. Delhey & M. Kiehr (anamorph).

On *Verbena litoralis* H.B.K., Prov. Buenos Aires, Villa Ventana, Partido Tornquist, 19 March 2000; No. 1360; leg. R. Delhey & U. Braun (anamorph).

*Sphaerotheca fuliginea* has been identified as causal agent of powdery mildew on eight cucurbitaceous crops, including *C. moschata*, in the NE of Argentina (Mazzanti de Castañón & al., 1987). Likewise, Mazzanti de Castañón & Cabrera de Alvarez (1994) recorded *Sphaerotheca verbenae* Săvul. & Negru on *G. pulchella* and *V. litoralis* in the Prov. of Corrientes.

*Oidium* sp. (cf. *Golovinomyces cichoracearum*)

On *Senecio selloi* DC., Prov. Buenos Aires, Balcarce, 23 November 1989; No. 574; leg. R. Delhey & F. Anderson (anamorph) ++.

## Discussion

In the present contribution, one new species is described. In addition, three records of species new for South America, 11 new hosts for known powdery mildew fungi, 14 new host-parasite com-

binations for Argentina and 12 new combinations for the southern Pampean region are reported.

Twenty-two of the host plants recorded in this paper are introduced taxa, while 17 are native species. This, however, does not necessarily mean that powdery mildews are less represented in the native Flora of South America than in that of the northern hemisphere. It rather reflects the situation that many of the introduced plants are widespread crops or weeds, which can be surveyed easily. In addition, epidemics of powdery mildews are more likely to occur in disturbed habitats, dominated by introduced plants, than in undisturbed native vegetation.

Although the present contribution has only a limited scope, one may extract some preliminary conclusions about the origin and distribution of some of the powdery mildew fungi treated. For instance, we have four powdery mildew taxa on hosts belonging to the Asteraceae:

1. *G. cichoracearum* var. *cichoracearum*, with one introduced and four native host species, three of the latter group belonging to the tribe *Astereae* and one to the *Heliantheae* (to this group we may add the *Oidium* sp. recorded on *Senecio selloi*, tribe *Senecioneae*); this indicates that the present taxon has a long evolutionary history in South America, which is in disagreement with the view that this fungus is a circumboreal element (Mercé, 1975);
2. *G. cichoracearum* var. *latisporus*, with three hosts in the *Heliantheae*, all introduced from North America; this would confirm the probable North American origin of this variety and its apparent restriction to the *Heliantheae* (Braun, 1987a);
3. *N. cumminsiana*, with two native hosts belonging to the *Eupatorieae* and the *Heliantheae*; this is the first record of *N. cumminsiana* for South America, previously known only from North America and Japan (Braun, 1987a), and strongly suggests that the present species is of American origin; and
4. *P. fusca*, with one native and two introduced host belonging to three different tribes.

### Acknowledgments

We gratefully acknowledge the help of Carlos B. Villamil (Universidad Nacional del Sur, Departamento de Biología, Bahía Blanca) in determining various host plants. The stay of U. Braun in Argentina has been financed by FOMEC-Argentina.



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(Manuscript accepted 28<sup>th</sup> October 2000)

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Zeitschrift/Journal: [Sydowia](#)

Jahr/Year: 2001

Band/Volume: [53](#)

Autor(en)/Author(s): Braun Uwe, Kiehr Mirta, Delhey Rolf

Artikel/Article: [Some new records of powdery mildew fungi from Argentina. 34-43](#)