Neth. J. Pl. Path. 82 (1976) 193–214

Check-list for scientific names of common parasitic fungi. Series 2a: Fungi on field crops: beet and potato; caraway, flax and oilseed poppy

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Accepted 8 July 1976

Abstract

This list gives a first account of the nomenclature of common parasitic fungi on field crops as used in official publications of the Netherlands Society of Plant Pathology and the Netherlands Ministry of Agriculture and Fisheries.

Introduction

The scientific names of common parasitic fungi on trees and shrubs have been treated in Series 1a and b of this check-list (Boerema and Verhoeven, 1972, 1973).

In this publication, Series 2a, an account is given of the nomenclature of common parasitic fungi on the field crops: beet (sugar-, fodder-, mangel) and potato (*Beta vulgaris* L. and *Solanum tuberosum* L.)[1]; caraway, flax and oilseed poppy (*Carum carvi* L., *Linum usitatissimum* L. and *Papaver somniferum* L.)[2]. Parasitic fungi on other field crops will be treated in Series 2b, 2c and 2d. The fungi have been selected in agreement with the Committee for Dutch Names of Plant Diseases ('Commissie voor Nederlandse Namen van Planteziekten'). The senior author is a member of this Committee of the Netherlands Society of Plant Pathology.

Different scientific names for the same fungal parasite often stem from different interpretations of the genus and species concepts. In most cases the opinion prevailing among mycological taxonomists has determined the choice. Sometimes the international rules of botanical nomenclature have been ignored in phytopathological literature. In such cases the choice has been made in agreement with the rules and recommendations published in the recent International Code of Botanical Nomenclature adopted by the eleventh Botanical Congress, Seattle, August 1969 (Stafleu et al., 1972), generally referred to as the 'Seattle Code'. The recognized scientific

[1] In the Netherlands usually indicated as 'hakvruchten' (crops in which the soil was hacked, i.e. weeded with the hack).

[2] In the Netherlands classified as 'handelsgewassen' (plants grown for speculative commercial purposes).

names should be used in the official publications of the Netherlands Society of Plant Pathology and the Netherlands Ministry of Agriculture and Fisheries.

For each species generally only well known synonyms, including their basionyms, are listed. To simplify the text various symbols and abbreviations are used. These are fully explained in the following list (also published in the first part of Series 1). The notes in the text give additional information on the nomenclature and refer to recent papers containing descriptions and data on pathogenicity and hosts.

Abbreviations and symbols

Authors' names

The names of authors are abbreviated in accordance with Recommendation 46[A] and 'Guide Citation' of the Seattle Code. The European lists of author abbreviations compiled by Ainsworth (1971), Hawksworth (1974), and the American list published by the U.S. Department of Agriculture (Anonymous. 1960) were consulted. In references to literature authors' names were deliberately not abbreviated.

& When a name has been published jointly by two authors the names of both are linked by an ampersand (Seattle Code, Recommendation 46[B]). In references to literature published by several authors the name of the last is preceded by the ampersand (Seattle Code, 'Guide Citation').

& al. The abbreviation of *et alii* (and others) is used when a name has been published by more than two authors, the abbreviated citation being restricted to that of the first author, followed by "& al." (Seattle Code, Recommendation 46[B]).

Serials

Serial publications are cited in conformance with the abbreviations in the World List of scientific Periodicals published in the years 1900–1960 (Brown and Stratton, 1963–1965) and succeeding annual volumes, referred

WL to as "WL". The abbreviated citations are always preceded by the word

in "*in*" (italicized). If the name of a periodical has changed, the abbreviations used conform with the title of the journal at the time the publication was cited; if this title is not mentioned in the WL its present title abbreviation is given between square brackets.

Citations are made in accordance with the 'Guide Citation' of the Seattle Code, volumes are indicated by an arabic numeral, printed in boldface type. When volumes are not numbered the years on the title pages are used as volume numbers. If a volume consists of parts paged separately the number of the part has been inserted in parentheses; this is also done when the parts have been issued in different years. If a periodical has appeared in more than one series in which the numbers of the volumes are repeated, the later series are designated by a roman capital figure. "II", "III" etc. Pages are given in arabic numerals, except those otherwise designated in the original.

Exsiccata works

Distributed exsiccata series accompanied by printed matter are considered as serial publications and coded in conformance with the WL abbreviations. They can always be recognized by the designation "No..." instead of by the number of the page. To avoid confusion the editor(s), "Ed.", is (are) often cited in square brackets. Fascicle "Fasc.", and Centurion "Cent." indications are always given in arabic numerals.

No.
Ed.
Fasc.
Cent.

Books

The titles of books are correspondingly abbreviated as serials (Seattle Code, 'Guide Citation') and further adapted to the title abbreviations of publications by Hawksworth (1974) and to the list of abbreviations published by the Commonwealth Mycological Institute (Anonymous, 1969). Volumes are indicated by an arabic numeral, printed in boldface type. If a book has appeared in more than one edition, after the first these are designated by "ed. 2", "ed. 3" etc.

ed.

Various abbreviations and signs

[ ] Square brackets are always used to enclose informative notes on the (original) citation of binomials, authors, papers, books, and so forth.

l.c. *Loco citato;* refers to literature cited previously for the same fungus. When a binomial of one author is published in the work of another the word "apud" is used if the work appeared in a serial publication or exsiccata-series, and the word "in" if the work is a book. This is in accordance with the Index of Fungi (Anonymous, 1972).

apud
in

When a name has been proposed but not validly published by one author (herbarium name; manuscript name; cases explained at *O*, Θ, * or † below) and thereafter validly published and ascribed to him by another author, the word "ex" is used to connect the names of the two authors (Seattle Code, Recommendation 46^{C}, 50^{A}).

ex

In accordance with Recommendation 46^{E} of the Seattle Code the word "ex" is also used to connect the authors of 'devalidated' and 'revalidated' names; see below under "*dn*" and "*rn*" [it was formerly recommended to cite the author of a devalidated name between square brackets; see also Donk (1961), who has proposed to use the word "per" for these citations].

Where the original, diagnostic characters or circumscription of a taxon have been altered, the two following abbreviated indications are used (according to the Seattle Code, Recommendation 47^{A}; see also McVaugh et al., 1968):

p.p. *Pro parte* (in part). Indicates that a taxon used in a certain sense by one author includes a part only of the taxon of the same name as circumscribed by an earlier author.

emend. *Emendavit* (emended, changed by). Followed by the name of an author who has changed the circumscription of a taxon without excluding its type.

= Equal. This sign is used for taxonomic synonyms based on different types.

≡ Triple equal. Used for nomenclatural synonyms based on the same type.

dn Devalidated name, i.e. a name published before the starting-point of the appropriate group (1801 and 1821, respectively, see Seattle Code, Art. 13 e, f).

rn Revalidated name or epithet; first known valid publication after the starting-point of the given group.

: Fries The colon before the name Fries as author means that an earlier validly published name was 'sanctioned' by Fries in the starting-point books Systema mycologicum and Elenchus fungorum (see Donk, 1961).

V Means that a correction in the spelling has been made (according to the Seattle Code, Art. 73).

H Illegitimate later homonym (Seattle Code, Art. 64).

np No priority according to Art. 60 of the Seattle Code (epithet from another rank).

Θ *Nomen nudum;* a naked name, i.e. a name published with no description or diagnosis, nor any reference to one.

O Perfect state (mostly telia) not described.

Δ Perfect state (mostly telia) for the first time validly described.

t Means that the type contains or refers to telia.

* An invalidly published name according to Art. 36 of the Seattle Code (no Latin diagnosis as required on or after 1 Jan. 1935).

† Invalidly published combination according to the third paragraph of Art. 33 of the Seattle Code (no full reference to the basionym as required on or after 1 Jan. 1953).

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Stafleu, F. A., Bonner, C. E. B., McVaugh, R., Meikle, R. D., Rollins, R. C., Ross, R., Schopf, J. M., Schulze, G. M., De Vilmorin, R. & Voss, E. G., 1972. International Code of Botanical Nomenclature adopted by the eleventh International Botanical Congress Seattle, August 1969. Regnum veg. 82.

ALTERNARIA LINICOLA Groves & Skolko

Alternaria linicola Groves & Skolko *in* Can. J. Res. Sect. C, **22**: 223. 1944.

H = *Alternaria linicola* Neergaard, Danish Alternaria and Stemphylium 302. 1945.

Note: For descriptions and disease symptoms on flax, Seedling Blight, see Neergaard l.c.: 300–306 and Malone & Muskett *in* Proc. int. Seed Test. Ass. **29**(2) [= Handb. Seed Health Test. Ser. 4, Fasc. 1]: 198–199. 1964. The fungus infects only plants of the genus *Linum*, see Neergaard l.c. and Gordenko *in* Mikol. i Fitopatol. **4**(4): 297–300. 1970.

ALTERNARIA SOLANI Sorauer

Alternaria solani Sorauer *in* Z. PflKrankh. **6**: 6. 1896.

= *Alternaria porri* (Ell.) Cif. f. sp. *solani* (Ell. & G. Martin) Neergaard, Danish Alternaria and Stemphylium 260. 1945.

≡ *Macrosporium solani* Ellis & G. Martin *in* Am. Nat. **16**: 1003. 1882.

Note: The causal agent of *Alternaria* Blight of potato and other Solanaceae, is often erroneously cited as *A. solani* '(Ell. & G. Martin) Sor.'. Sorauer l.c. treated *A. solani* as a new binomial and remarked that the relation of this species to *Macrosporium solani* Ellis & G. Martin required further investigation. For other synonyms see Neergaard, Danish Alternaria and Stemphylium 260–288. 1945. For descriptions, hosts and disease symptoms see Neergaard l.c. and Ellis, Dematiac. Hyphom. 482–484. 1971. The potato tuber rot caused by the fungus is discussed by Goossens *in* Tijdschr. PlZiekt. **39**: 165–172. 1933. For overwintering in soil see Basu *in* Phytopathology **61**: 1347–1350. 1971. On potato tubers this fungus is often associated with *Ulocladium consortiale* (Thüm.) Simmons; see Douglas *in* Pl. Dis. Reptr **56**: 308–309. 1972.

AUREOBASIDIUM PULLULANS var. *LINI* (Laff.) W. B. Cooke

Aureobasidium pullulans var. *lini* (Laff.) W. B. Cooke *in* Mycopath. Mycol. appl. **17**: 34. 1962.

≡ *Polyspora lini* Lafferty *in* Scient. Proc. R. Dubl. Soc. II, **16**: 258. 1921.

≡ *Kabatiella lini* (Laff.) Karakulin in Vassilevsky & Karakulin, Parazitnye nesovershennye griby 2: 209. 1950.

H ≡ *Kabatiella lini* (Laff.) von Arx *in* Verh. K. ned. Akad. Wet. [Afd. Natuurk.] reeks 2, **51** (3): 45. 1957.

Note: This causal organism of Browning and Stem-Break of flax had been previously arranged under *Polyspora* Lafferty (1921) = *Kabatiella* Bubák (1907) on the basis of its in vivo characters. Cultural studies, however, have lead to the opinion that it should belong to *Aureobasidium* Viala & Boyer (1891). At present it is usually classified as a pathogenic form or variety of the ubiquitous saprophyte *Aureobasidium pullulans* (de Bary) G. Arn. (syn. e.g. *A. vitis* Viala & Boyer, type species of *Aureobasidium*), although according to Mrs. Hermanides-Nijhof (C.B.S.-Baarn) it deserves the species rank (personal information). The conidia of the flax parasite are slightly smaller than those of *A. pullulans* and further they can be differentiated serologically, see Tempel *in* Tijdschr. PlZiekt. **64**: 482–484. 1958. In New Zealand a perfect state of

this flax parasite has been described: *Guignardia fulvida* Sanderson *in* N. Z. Jl agric. Res. **8**: 131–141. 1965. However, there are no further records of this state and in Europe apparently it does not play a role in the life cycle of the fungus. For cultural characters see W.B. Cooke l.c. For disease symptoms see Muskett & Colhoun, Dis. Flax 17–24. 1947 [as *Polyspora lini*].

BOTRYTIS CINEREA Pers. ex Pers.

rn *Botrytis cinerea* Pers. ex Persoon, Mycol. eur. **1**: 32. 1822.
: Fries, Syst. mycol. **3** [Sect. 2]: 396–397. 1832.
dn ≡ *Botrytis cinerea* Persoon, Syn. meth. Fung. 690. 1801.

Note: This ubiquitous collective species known as Grey Mould, is also listed in Series 1a of the check-list (*in* Neth. J. Pl. Path. **78**, Suppl. 1: 6. 1972). It is usually cited as *B. cinerea* Pers. ex Fr., but before Fries accepted the species, the name had already been validated by Persoon (1822, l.c.). *B. cinerea* represents a group of morphologically almost inseparable conidial states. In the perfect state (*Botryotinia* or *Sclerotinia)* it is often easy to differentiate individual species (see e.g. Hennebert & Groves *in* Can. J. Bot. **41**: 341–370. 1963). One of these, *Botryotinia fuckeliana* (de Bary) Whetzel ≡ *Sclerotinia fuckeliana* (de Bary) Fuck., is often cited in literature as the perfect state of the *B. cinerea* group. For description and notes on the diseases caused by *B. cinerea* see Ellis & Waller *in* C.M.I. Descr. p
1974.

CERCOSPORA BETICOLA Sacc.

Cercospora beticola Saccardo *in* Nuovo G. bot. ital. **8**: 189. 1876.
V rn = *Phyllosphaera beticola* (DC.) ex Dumortier, Obs. bot. 86. 1822 [as '*P. betaecola*'; genus name rejected, cf. Seattle Code].
V dn ≡ *Sphaeria lichenoides* var. *beticola* de Candolle in de Candolle & de Lamarck, Fl. fr. [ed. 3] **5** [6]: 148. 1815 [as '*i. betaecola*'].
V ≡ *Depazea beticola* (DC. ex Dumort.) Fuckel *in* Jb. nassau. Ver. Naturk. **23–24**: 382. 1870 ["1869"; = Symb. mycol.; '*D. betaecola* DC.'].
= *Cercospora spinaciae* Oudemans *in* Ned. kruidk. Archf III, **2**(1): 314–315. 1900.

Note: This fungus is well known as causal agent of beet Leaf Spot, but is also parasitic on other Chenopodiaceae, see Chupp, Monogr. Cercospora 111–112. 1953, and Frandsen *in* Arch. Mikrobiol. **22**: 145–175. 1955. Similar *Cercospora's* occur on plants of other families, see Chupp l.c., Frandsen l.c. and Ellis, Dematiac. Hyphom. 275–278. 1971. However, on the basis of cultural characteristics, differentiation into separate taxa appears to be possible, see Frandsen l.c. The synonymy of *Sphaeria lichenoides* var. *beticola* DC. with *C. beticola* has been established by the study of de Candolle's original material preserved in 'Conservatoire et Jardin botaniques' at Geneva. For other synonyms of the fungus on Chenopodiaceae see Chupp l.c. and Frandsen l.c. For the epidemiology of *C. beticola* on sugarbeet see Bleiholder & Weltzien *in* Phytopath. Z. **72**: 344–353. 1971 and **73**: 46–68, 93–114. 1972. For disease symptoms as compared with other leaf spot diseases of beet see Wenzl *in* Pflanzenarzt **6**: 59–62. 1953.

COLLETOTRICHUM COCCODES (Wallr.) Hughes

Colletotrichum coccodes (Wallr.) Hughes *in* Can. J. Bot. **36**: 754. 1958.

≡ *Chaetomium coccodes* Wallroth, Fl. crypt. Germ. **2**: 265. 1833.

= *Colletotrichum atramentarium* (Berk. & Br.) Taubenhaus *in* Mem. N. Y. bot. Gdn **6**: 549. 1916.

≡ *Vermicularia atramentaria* Berkeley & Broome *in* Ann. Mag. nat. Hist. II, **5**: 378. 1850.

Note: *C. coccodes*, the causal organism of Black Dot of potato and tomato plants, has been recorded on at least 35 other plant species, representing 13 families; see von Arx *in* Biblthca mycol. **24** [= Revis. Gloeosporium, ed. 2]: 156–157. 1970 and Chesters & Hornby *in* Trans. Br. mycol. Soc. **48**: 583–594. 1965. Although it is generally considered to be a ubiquitous saprophytic fungus, as secondary invader it may cause serious disease symptoms. In the phytopathological literature it is commonly known under the synonym *Colletotrichum atramentarium*. For other synonyms see von Arx *in* Phytopath. Z. **29**: 453. 1957. In older literature it was often erroneously indicated as *Colletotrichum phomoides* (Sacc.) Chester, which, according to the type *Gloeosporium phomoides* Sacc., refers to a *Phomopsis* species, see von Arx 1970 l.c. For description and cultural characteristics see von Arx 1957 l.c., Chesters & Hornby l.c., Mordue *in* C.M.I. Descr. pathog. Fungi Bact. 131. 1967 and Kokko & Shoemaker *in* Fungi Canadenses 51. 1974. For notes on disease symptoms and biology see Mordue l.c. See also Forlot *in* Phytopath. Z. **59**: 249–266. 1967.

COLLETOTRICHUM LINI (Westerd.) Toch.

Colletotrichum lini (Westerd.) Tochinai *in* J. Coll. Agric. Hokkaido imp. Univ. **14**: 176. 1926.

≡ *Gloeosporium lini* Westerdijk *in* Jversl. phytopath. Lab. Willie Commelin Scholten **1915**: 6. 1916.

H = *Gloeosporium lini* Manns & Bolley *in* Bull. N. Dak. agric. Exp. Stn **259**: 35. 1932.

= *Colletotrichum linicola* Pethybridge & Lafferty *in* Scient. Proc. R. Dubl. Soc. II, **15**: 368. 1919.

Note: In phytopathological literature this pathogen of flax, Seedling Blight, is usually referred to as *C. linicola*. For description and disease symptoms see Muskett & Colhoun, Dis. Flax 11–16. 1947 and Malone & Muskett *in* Proc. int. Seed Test. Ass. **29**(2) [= Handb. Seed Health Test. Ser. 4, Fasc. 1]: 254–255. 1964.

ERYSIPHE BETAE (Vañha) Weltzien

Erysiphe betae (Vañha) Weltzien *in* Phytopath. Z. **47**: 127. 1963.

≡ *Microsphaeria betae* Vañha *in* Z. ZuckInd. Böhm. **27**: 180. 1903.

Note: Powdery Mildew of beet was previously known in the literature under the collective names *Erysiphe communis* (Wallr.) ex Link: Fr. sensu Blumer *in* Beitr. KryptogFlora Schweiz **7**(1): 177–187. 1933 (rejected ambiguous name, see Junell *in* Trans. Br. mycol. Soc. **48**: 541–542. 1965) and *Erysiphe polygoni* DC. ex St.-Am. sensu Salmon *in* Mem. Torrey bot. Club **9**: 174–193. 1900 (*E. polygoni* sensu stricto is only known from Polygonaceae). Recent studies by Weltzien l.c.: 123–128 and Junell *in* Svensk bot. Tidskr. **61**: 217. 1967, have shown that it represents a separate species, so far only recorded from *Beta* spp. For descriptions see Weltzien l.c., Junell

1967 l.c. and Kapoor *in* C.M.I. Descr. pathog. Fungi Bact. 151. 1967.

FUSARIUM OXYSPORUM Schlecht.

Fusarium oxysporum Schlechtendal, Fl. berol. Crypt. **2**: 139. 1824 [emend. Snyder & Hansen p.p. *in* Am. J. Bot. **27**: 64–67. 1940].

: Fries, Syst. mycol. **3** [Sect. 2]: 471. 1832.

f.sp. *LINI* [(Bolley) Snyd. & Hans.]

Fusarium oxysporum f. sp. *lini* (Bolley) Snyder & Hansen *in* Am. J. Bot. **27**: 66. 1940.

≡ *Fusarium lini* Bolley *in* Proc. Soc. Promot. agric. Sci. **22**: 1. 1901; *in* Bot. Gaz. **34**: 150. 1902.

Note: For general descriptons of the most labile and variable species *F. oxysporum* see Booth *in* C.M.I. Descr. pathog. Fungi Bact. 211. 1970 and Booth, Genus Fusarium 130–134. 1971. For cultural characteristics of the special form causing Wilt of flax see Malone & Muskett *in* Proc. int. Seed Test. Ass. **29**(2) [= Handb. Seed Health Test. Ser. 4, Fasc. 1]: 271–273. 1964. The different types of wilt caused by this special form are described by Muskett & Colhoun, Dis. Flax 32–38. 1947. A review of research on flax wilt is given by Kommedahl, Christensen & Frederiksen *in* Tech. Bull. Minn. agric. Exp. Stn **273**. 1970 [35 pp.].

FUSARIUM SOLANI var. *COERULEUM* (Lib. ex Sacc.) Booth

Fusarium solani var. *coeruleum* (Lib. ex Sacc.) Booth, Genus Fusarium 51. 1971.

V ≡ *Fusarium coeruleum* (Lib.) ex Saccardo *in* Syll. Fung. **4**: 705. 1886 (as '*F. caeruleum*'; with reference to the herbarium name

Θ *Selenosporium coeruleum* Libert).

†*V* ≡ *Fusarium solani* var. *coeruleum* (Lib. ex Sacc.) Bilai, Fusarii 287. 1955 [as 'var. *caeruleum*'].

Note: In Europe this is the most common causal organism of Dry Rot of potato tubers. It can be differentiated from other forms and varieties of *Fusarium solani* (Mart.) Sacc. by the shape of the macroconidia and the deep violet-blue pigment developing on the surface of agar cultures. For description see Booth l.c.: 51–53. An extensive review of the potato storage disease caused by *F. solani* var. *coeruleum* and other *Fusarium* spp. is given by Boyd *in* Rev. Pl. Path. **51**: 305–308. 1972.

HELICOBASIDIUM BREBISSONII (Desm.) Donk

Helicobasidium brebissonii (Desm.) Donk *in* Taxon **7**: 164. 1958.

≡ *Protonema brebissonii* Desmazières *in* Pl. cryptog. N. France [ed. 1] Fasc. 14, No. 651. 1834; *in* Annls Sci. nat. (Bot.) II, **6**: 242–243. 1836.

= *Helicobasidium purpureum* Patouillard *in* Bull. Soc. bot. Fr. **32**: 172. 1885.

stat. myc. *RHIZOCTONIA CROCORUM* (Pers.) DC. ex Mérat

rn *Rhizoctonia crocorum* (Pers.) DC. ex Mérat, Nouv. Fl. Env. Paris, ed. 2, **1**: 134–135. 1821.

: Fries, Syst. mycol. **2** [Sect. 1]: 265. 1822.

dn ≡ *Rhizoctonia crocorum* (Pers.) de Candolle *in* Mém. Mus. Hist. nat., Paris **2**: 216. 1815.

dn ≡ *Sclerotium crocorum* Persoon, Syn. meth. Fung. 119.1801.

Note: This soil-inhabiting fungus, which attacks the underground parts of a wide range of plants, Violet Root Rot, is commonly known in phytopathological literature as *H. purpureum*. For descriptions and illustrations of both states see Buddin & Wakefield *in* Trans. Br. mycol. Soc. **12**: 116–140. 1927 and McNabb *in* N. Z. Jl Bot. **4**: 533–535. 1966. For disease symptoms (illustrations) and notes on the biology see Anonymous *in* Adv. Leafl. Minist. Agric. Fish. Fd, Lond. **346**. 1974.

HELMINTHOSPORIUM SOLANI Dur. & Mont.

Helminthosporium solani Durieu de Maisonneuve & Montagne, Fl. d'Algérie, Crypt. **1** [Sect. 4]: 356. 1849.

= *Helminthosporium atrovirens* (Harz) Mason & Hughes apud Hughes *in* Can. J. Bot. **31**: 631. 1953.

V ≡ *Dematium atrovirens* Harz *in* Bull. Soc. imp. Nat. Moscou [Byull. mosk. Obshch. Ispȳt. Prir.] **44**: 129. 1871 [as '*D. atro-virens*'].

V ≡ *Spondylocladium atrovirens* (Harz) Harz ex Saccardo *in* Syll. Fung. **4**: 483. 1886 [as '*S. atro-virens*'].

Note: In older literature the causal organism of Silver Scurf of potato tubers is generally known as *Spondylocladium atrovirens*. It represents, however, a typical species of *Helminthosporium*, see Hughes l.c. and Ellis *in* Mycol. Pap. **82**: 2–5. 1961. For descriptions and disease symptoms see Ellis l.c., Ellis *in* C.M.I.Descr. pathog. Fungi Bact. 166. 1968 and Ellis, Dematiac. Hyphom. 390. 1971. See further the review on silver scurf given by Boyd *in* Rev. Pl. Path. **51**: 313–315. 1972.

MELAMPSORA LINI var. *LINIPERDA* Körn.

Melampsora lini var. *liniperda* Körnicke *in* Land.- u. forstw. Z. Prov. Preussen **1865**: 10. 1865.

≡ *Melampsora liniperda* (Körn.) Palm *in* Svensk bot. Tidskr. **4**: 4. 1910.

= *Melampsora lini* var. *major* Fuckel *in* Jb. nassau. Ver. Naturk. **23–24**: 44. 1870 ["1869"; = Symb. mycol.].

* = *Melampsora lini-usitatissimi* Kuprevicz in Kuprevicz & Tranzschel, Fl. Pl. Crypt. URSS 4, Ured. **1**: 374. 1957 [as '(Pers. pr. p.) Kupr. comb. nov.'].

Note: The Rust of fibre flax is usually indicated as *Melampsora lini* (Ehrenb.) Desm. [for author citation see Laundon *in* Taxon **16**: 194–195. 1967]. However, the latter *M. lini* var. *lini*, is strongly specialized to the wild *Linum catharticum* and differs from the rust of flax by smaller teleutospores. For description, biology and additional hosts of the flax rust see Gäumann *in* Beitr. KryptogFlora Schweiz **12**: 190–193. 1959 (under *M. liniperda*), Laundon & Waterston *in* C.M.I. Descr. pathog. Fungi Bact. 51. 1965 (as *M. lini*) and Wilson & Henderson, Br. Rust Fungi 64–66. 1966. See also Muskett & Colhoun, Dis. Flax 25–29. 1947. For physiologic specialization see Laundon & Waterston l.c. and Zimmer & Hoes *in* Pl. Dis. Reptr **58**: 311–313. 1974.

MYCOCENTROSPORA ACERINA (Hartig) Deighton

Mycocentrospora acerina (Hartig) Deighton *in* Taxon **21**: 716. 1972.

≡ *Cercospora acerina* Hartig *in* Unters. forstbot. Inst. München **1**: 58. 1880.

≡ *Centrospora acerina* (Hartig) Newhall *in* Phytopathology **36**: 849. 1946.

= *Cercospora cari* Westerdijk & van Luijk *in* Meded. phytopath. Lab. Willie Commelin Scholten **8**: 54. 1924.

Note: For description and other synonyms of this plurivorous species, which causes Anthracnose of caraway, see Deighton *in* Mycol. Pap. **124**: 2–4. 1971. The name change *Mycocentrospora* Deighton (1972 l.c.) for *Centrospora* Neerg. (1942) was made necessary by the existence of the algal genus *Centrospora* Trevisan (1895). For occurrence of *M. acerina* on seed see Gill *in* Pl. Dis. Reptr **55**: 731–732. 1971. Media for isolating and producing cultures of the fungus bearing either conidia or chlamydospores are given by Day, Lewis & Martin *in* Ann. appl. Biol. **71**: 201–202. 1972.

MYCOVELLOSIELLA CONCORS (Casp.) O. Const.

V Mycovellosiella concors (Casp.) O. Constantinescu *in* Revue Mycol. **38**: 95–96. 1973 [as '*Mycovelosiella*'].

≡ *Fusisporium concors* Caspary *in* Ber. Verh. K. preuss. Akad. Wiss. Berl. **1855**: 314. 1855.

≡ *Cercospora concors* (Casp.) Saccardo *in* Syll. Fung. **4**: 449. 1886.

= *Cercospora heterosperma* Bresadola *in* Annls mycol. **1**: 129. 1903.

Note: The causal organism of Leaf Blotch of potato is generally known as *Cercospora concors* but represents a typical member of *Mycovellosiella* Rangel (*in* Archos Jard. bot., Rio de J. **2**: 71. 1917). For descriptions and disease symptoms see Constantinescu, l.c., and Chupp, Monogr. Cercospora 536. 1953.

OIDIUM LINI Bond.

Oidium lini Bondartsev [Bondartzev] *in* Bolez. Rast. **5–6**: 326. 1913.

H = *Oidium lini* Škorić *in* Glasn. sum. Pok. [Annls Exp. forest.] **1**: 108. 1926.

Note: In Europe Powdery Mildew of flax is only found in the conidial state. For description see Blumer, Echte Mehltaupilze 303. 1967. In the U.S.A. and Japan a perfect state is also recorded, belonging to the genus *Erysiphe* Hedw. f. ex Fr. According to Hammarlund, this perfect state refers to a plurivorous species for which he has introduced the provisional name '*Erysiphe polyphaga*' [*]. See also Blumer l.c. and Junell *in* Symb. bot. upsal. **19** (1): 41–43, 99–102. 1967. The generic name *Oidium* for conidial *Erysiphe* has become a nomen conservandum (see Taxon **24**: 534. 1975).

OOSPORA PUSTULANS Owen & Wakef.

Oospora pustulans Owen & Wakefield *in* Kew Bull. **1919**: 297. 1919.

Note: This causal organism of the potato tuber disease known as Skin Spot cannot be maintained under *Oospora* Wallr., as this is an illegitimate generic name, see Hughes *in* Can. J. Bot. **36**: 791. 1958 and Donk *in* Taxon **11**: 92–93. 1962. The correct generic status of the fungus, however, is not clear at present. For disease symptoms, transmission, biology and other data see Boyd *in* Rev. Pl. Path. **51**: 311–313. 1972. A new medium for the isolation of the fungus from potato tubers and soil is described by Bannon *in* Trans. Br. mycol. Soc. **64**: 554–556. 1975.

PERONOSPORA ARBORESCENS (Berk.) de Bary

Peronospora arborescens (Berk.) de Bary *in* Annls Sci. nat. (Bot.) IV, **20**: 119. 1863.

≡ *Botrytis arborescens* Berkeley *in* Jl R. hort. Soc. **1**: 31. 1846.

Note: For description of Downy Mildew of the oilseed poppy see Gäumann *in* Beitr. KryptogFlora Schweiz **5**(4): 66–72. 1923 (conidiophores and conidia) and Gustavsson *in* Bot. Notiser **112**: 10. 1959 (characteristics of oospores). A morphologically similar *Peronospora* occurs on some wild poppies, but it is possible that the fungus on *Papaver somniferum* is so specialized that it is unable to infect other Papaveraceae. For disease symptoms see Gustavsson *in* Op. bot. Soc. bot. Lund. **3**(1): 70–72. 1959.

PERONOSPORA FARINOSA (Fr.) Fr.

Peronospora farinosa (Fr.) Fries, Summ. veg. Scand. **2**: 493. 1849.

≡ *Botrytis farinosa* Fries, Syst. mycol. **3** [Sect. 2]: 404. 1832 ['In foliis vivis v.c. Atriplicibus'].

f. sp. *BETAE* [Byford]

Peronospora farinosa f. sp. *betae* Byford *in* Trans. Br. mycol. Soc. **50**: 606. 1967.

= *Peronospora schachtii* Fuckel *in* Fungi rhen. Suppl. Fasc. 1, No. 1508. 1865; *in* Jb. nassau. Ver. Naturk. **23–24**: 71. 1870 ["1869"; = Symb. mycol.].

= *Peronospora betae* Kühn *in* Z. landw. CentVer. Prov. Sachsen **29**: 276. 1872.

Note: The species concept of the Downy Mildew of the Chenopodiaceae is discussed by Yerkes & Shaw *in* Phytopathology **49**: 499–507. 1959. They show that the various *Peronospora* species described from chenopodiaceous plants cannot be distinguished morphologically, but only by their hosts. For the special form occurring on beet see the descriptions given by Gäumann *in* Beitr. KryptogFlora Schweiz **5**(4): 308–309, 312–313. 1923 and Gustavsson *in* Op. bot. Soc. bot. Lund. **3**(1): 22–23. 1959 [in both cases as *P. schachtii*]. For disease symptoms etc. see Hull *in* Bull. Minist. Agric. Fish. Fd, Lond. **142**, ed. 2: 29–32. 1960 [under *P. schachtii*].

PHOMA EXIGUA Desm. var. *EXIGUA*

Phoma exigua Desm. *in* Annls Sci. nat. (Bot.) III, **11**: 282–283. 1849, var. *exigua* [varietal name to cite without an author's name. cf. Seattle Code Art. 26; name automatically established (autonym) by the publication in 1965 of the varietal name *P. exigua* var. *linicola* (Naumov & Vass.) Maas].

≡ *Phoma exigua* Desm. f. sp. *exigua* Malcolmson & E. G. Gray *in* Trans. Br. mycol. Soc. **51**: 619. 1968 [see Boerema *in* Trans. Br. mycol. Soc. **52**: 509–513. 1969].

= *Phoma solanicola* Prillieux & Delacroix *in* Bull. Soc. mycol. Fr. **6**: 179. 1890.

† ≡ *Phoma exigua* var. *solanicola* (Prill. & Delacr.) Popkova, Malikova & Kovaleva, Abstr. Pap. int. Congr. Pl. Path. 2 [Minneapolis, Minnesota] 0572. 1973; *in* Arch. Phytopath. PflSchutz **10**: 94. 1974 [as '*Phoma exigua* var. *solanicola*

Prill. et Del.'; see also note].

= *Phoma tuberosa* Melhus, Rosenbaum & E. S. Schultz *in* J. agric. Res. **7**: 251. 1916.

= *Ascochyta phaseolorum* Sacc. *in* Michelia **1** (2): 164. 1878.

Note: This ubiquitous wound- or weak-parasitic fungus is especially known by its occurrence in association with Gangrene lesions of potato tubers. However, the principal causal organism of potato gangrene is a separate fungus, now distinguished as *Phoma exigua* var. *foveata* (Foister) Boerema, see below. *Phoma exigua* sensu stricto, i.e. var. *exigua*, is the most frequent *Phoma* species on herbaceous plants, characterized by conidia which are extremely variable in size and the occurrence of septa ('secondary septation', cf. Boerema & Bollen *in* Persoonia **8**(2): 111–144. 1975). This explains its extensive synonymy, see Boerema & Höweler *in* Persoonia **5**(1): 15–28. 1967 and Boerema & Dorenbosch *in* Stud. Mycol. **3**: 25–29. 1973. On potatoes it was formerly known as *Phoma solanicola* and *P. tuberosa*. As a plurivorous weak parasite the fungus is repeatedly treated in literature under the synonym *Ascochyta phaseolorum*, see e.g. Crossan *in* Phytopathology **48**: 248–255. 1958, Alcorn *in* Aust. J. biol. Sci. **21**: 1143–1151. 1968 and Boerema *in* Neth. J. Pl. Path. **78**: 113–115. 1972. Typical strains of the fungus are among others characterized by the production of the antibiotic 'E', in plate cultures demonstrable by oxidation with alkali, see Boerema & Höweler l.c. and Logan & O'Neill *in* Trans. Br. mycol. Soc. **55**: 67–75. 1970. For a review of the extensive literature on gangrene of potatoes caused by *P. e.* var. *exigua* and *P.e.* var. *foveata* see Boyd *in* Rev. Pl. Path. **51**: 308–311. 1972. Finally it should be noted that in Russian literature (Popkova & al. 1973, l.c., and Popkova & Kovaleva *in* Mikol. i Fitopatol. **7**: 235–237. 1973) is stated that '*P. exigua* var. *solanicola*' belongs to the ascomycete *Ophiobolus porphyrogonus* (Tode ex Desm.) Sacc. = *Leptospora rubella* (Pers. ex Fr.) Rabenh. However, comparative cultural studies have shown that the latter is quite a different fungus, which produces in vitro only ascomata, see Boerema *in* Trans. Br. mycol. Soc. **67**: 312, 315. 1976.

PHOMA EXIGUA var. *FOVEATA* (Foister) Boerema

Phoma exigua var. *foveata* (Foister) Boerema *in* Neth. J. Pl. Path. **73**: 192. 1967.

≡ *Phoma foveata* Foister *in* Trans. Proc. bot. Soc. Edinb. **33**: 66. 1940.

≡ *Phoma solanicola* f. *foveata* (Foister) Malcolmson *in* Ann. appl. Biol. **46**: 639. 1958.

≡ *Phoma exigua* Desm. f. sp. *foveata* (Foister) Malcomson & E. G. Gray *in* Trans. Br. mycol. Soc. **51**: 619. 1968 [see Boerema *in* Trans. Br. mycol. Soc. **52**: 509–513. 1969].

Note: This is the most important causal organism of Gangrene of potatoes. Morphologically it shows much resemblance with the ubiquitous *Phoma exigua* Desm. var. *exigua*, which also occurs in association with potato gangrene. In vitro, however, *P. e.* var. *foveata* is easy to distinguish from *P. e.* var. *exigua* by the production of several anthraquinone pigments (Bick & Rhee *in* Biochem. J. **98**: 112–116. 1966), see Boerema l.c., Boerema & Höweler *in* Persoonia **5**(1): 15–28. 1967, Logan & Khan *in* Trans. Br. mycol. Soc. **52**: 9–17. 1969 and Tichelaar *in* Neth. J. Pl. Path. **80**: 169–171. 1974. These pigments can be demonstrated by thin layer chromatography in extracts of tissue of potato tubers with rot caused by *P. e.* var. *foveata*, see Mosch & Mooi *in* Neth. J. Pl. Path. **81**: 86–88. 1975. Some isolates of *P. e.* var. *foveata* also produce

antibiotic 'E' (in plate cultures demonstrable by oxidation with alkali), just as the typical isolates of the ubiquitous *P. e.* var. *exigua*, see Boerema & Höweler l.c. and Logan & Khan l.c. Isolates producing antibiotic 'E' appear to be more pathogenic than isolates which do not produce this substance, see Logan & Woodward *in* Rec. agric. Res. Minist. Agric. N. Ire. **19**: 27–31. 1971 and Rogers & Stewart *in* Rep. Scott. Pl. Breed. Stn **53**: 31–32. 1974. When *P. e.* var. *foveata* and *P. e.* var. *exigua* are grown together in plate cultures, a conspicuous violet line occurs in the marginal region between both, see Langerfeld *in* NachrBl. dt. PflSchutzdienst., Stuttg. **26**: 163–164. 1974. A recent review of the extensive phytopathological literature on gangrene of potatoes caused by *P. e.* var. *foveata* and *P. e.* var. *exigua* is given by Boyd *in* Rev. Pl. Path. **51**: 308–311. 1972.

PHOMA EXIGUA var. *LINICOLA* (Naumov & Vass.) Maas

Phoma exigua var. *linicola* (Naumov & Vass.) Maas *in* Neth. J. Pl. Path. **71**: 118. 1965.

≡ *Ascochyta linicola* Naumov & Vassilievsky apud Naumov *in* Mater. Mikol. Fitopat. Ross. **5**: 3. 1926.

≡ *Phoma exigua* Desm. f. sp. *linicola* (Naumov & Vass.) Malcolmson & E. G. Gray *in* Trans. Br. mycol. Soc. **51**: 619. 1968.

= *Phoma belgica* Cash *in* Syll. Fung. **26** [Supplementum universale Pars XI; cur. A. Trotter, rev. E. K. Cash; Johns. Repr. Corp., New York]: 934, 1972.

H ≡ *Phoma linicola* Em. Marchal & Verplancke *in* Bull. Soc. r. Bot. Belg. **59**: 22. 1926 [not *Phoma linicola* Bubák *in* Annln naturh. Hofmus. [Mus.] Wien **28**: 203. 1914; not *Phoma linicola* Naumov *in* Mater. Mikol. Fitopat. Ross. **5**: 3. 1926].

= *Diplodina lini* Moesz *in* Magy. bot. Lap. **29**: 35–38. 1930.

Note: Morphologically the causal organism of Foot Rot of flax resembles the ubiquitous *Phoma exigua* Desm. var. *exigua*. However, apart from its pathogenicity to flax, it can be distinguished by its general appearance in vitro, see Maas l.c. For descriptions see also Muskett & Colhoun, Dis. Flax 39–44. 1947 and Malone & Muskett *in* Proc. int. Seed Test. Ass. **29**(2) [= Handb. Seed Health Test. Ser. 4, Fasc. 1]: 319–321. 1964. This fungus produces antibiotic 'E' (in plate cultures demonstrable by oxidation with alkali), just like typical strains of *P. e.* var. *exigua*, see Boerema & Höweler *in* Persoonia **5**(1): 15–28. 1967 and Boerema *in* Trans. Br. mycol. Soc. **67**: 294. 1976. For disease symptoms see Muskett & Colhoun l.c.

PHYTOPHTHORA ERYTHROSEPTICA Pethyb. var. *ERYTHROSEPTICA*

Phytophthora erythroseptica Pethybridge *in* Scient. Proc. R. Dubl. Soc. II, **13**: 547–548. 1913, var. *erythroseptica* [varietal name to be cited without an author's name, cf. Seattle Code Art. 26; see note].

Note: For the original description of the causal organism of Pink Rot of potato tubers see also Waterhouse *in* Mycol. Pap. **122**: 16–17. 1970. For characteristics in vitro see Waterhouse *in* Mycol. Pap. **92**: 10. 1963. This fungus is not restricted to the potato, but may also produce distinct disease symptoms on other plants, as tulips (Shanking) and 'calla lilies', *Zantedeschia* spp. (Leaf Blight, Rhizome Rot). *P.*

erythroseptica var. *pisi* Bywater & Hickman, which causes a Soft Rot in pea roots, is presently recognized as a separate infraspecific taxon, see Bywater & Hickman *in* Trans. Br. mycol. Soc. **42**: 513–524. 1959 and Waterhouse *in* Mycol. Pap. **92**: 10. 1963. The causal agent of potato pink rot must therefore be indicated as *P. erythroseptica* var. *erythroseptica*, a varietal name which was already automatically established (autonym) in 1926 by the publication of *P. erythroseptica* var. *atropae* Alcock (*in* Pharm. J. **116**: 232. 1926; at present considered to be not significantly different from var. *erythroseptica*). For a review of the literature on pink rot of potatoes see Boyd *in* Rev. Pl. Path. **51**: 303–304. 1972.

PHYTOPHTHORA INFESTANS (Mont.) de Bary

Phytophthora infestans (Mont.) de Bary *in* Jl R. agric. Soc. II, **12**: 240. 1876.

≡ *Botrytis infestans* Montagne *in* l'Institut [J. univ. Sci. Soc. sav. Sect. 1] **1845**: 313. 1845; *in* Bull. Soc. philomath. Paris **1845**: 98–100. 1845; amplified description apud Berkeley *in* Jl R. hort. Soc. **1**: 30. 1846 [reprinted *in* Phytopath. Class. **8**. 1948].

f. sp. *INFESTANS* [A special form automatically established by the publication in 1963 of f. sp. *thalictri* (G. W. Wils. & J. J. Davis) Waterhouse, see note.]

Note: For a comprehensive description of the Blight fungus of potato and other Solanaceae (e.g. tomato) see Waterhouse *in* Mycol. Pap. **92**: 12. 1963. Waterhouse (l.c.) distinguishes a f. sp. *thalictri* within the species, which is adapted to *Thalictrum* (Ranunculaceae), originally described as *Phytophthora thalictri* G. W. Wilson & J. J. Davis *in* Bull. Torrey bot. Club **34**: 392. 1907. The original descriptions of the basionym of *Phytophthora infestans* are quoted by Waterhouse *in* Mycol. Pap. **122**: 25–27. 1970. For disease symptoms, history and biology of this most important potato pathogen see e.g. Butler & Jones, Pl. Path. 514–524. 1949 and Brooks, Pl. Dis. 96–100. 1953. The extensive literature on the tuber phase of the disease has recently been summarized by Boyd *in* Rev. Pl. Path. **51**: 300–303. 1972.

PLASMOPARA CRUSTOSA (Fr.) Jörst.

Plasmopara crustosa (Fr.) Jörstad [Jørstad] *in* Skr. norske Vidensk-Akad. [Mat.-naturv. Kl.] II [= Ny Serie], **10**: 12. 1963.

≡ *Botrytis crustosa* Fries, Syst. mycol. **3** [Sect. 2]: 403. 1832.

≡ *Peronospora crustosa* (Fr.) Fries, Summ. veg. Scand. [2] 493. 1849.

= *Plasmopara umbelliferarum* (Casp.) Schroeter ex Wartenweiler *in* Annls mycol. **16**: 252. 1918.

≡ *Peronospora umbelliferarum* Caspary *in* Ber. Verh. K. preuss. Akad. Wiss. Berl. **1855**: 328. 1855.

= *Plasmopara nivea* Auct. [see note]

Note: In literature Downy Mildew of caraway and other Umbelliferae is usually referred to as *Plasmopara nivea* '(Unger) Schroeter' *in* Cohn, Krypt.-Fl. Schles. **3**(1): 237. 1885; based on *Botrytis nivea* Mart. as described and illustrated by Unger, Exanth. Pfl. 171. 1833, which has been interpreted as relating to the *Plasmopara* occurring on Umbelliferae. The original description of *Botrytis nivea* Martius, Fl. crypt. Erlang. 342. 1817, however, refers to the *Peronospora* occurring on *Capsella*, Cruciferae = *Peronospora parasitica* (Pers. ex Grev.) Fr.

PLEOSPORA BJOERLINGII Byford

Pleospora bjoerlingii Byford *in* Trans. Br. mycol. Soc. **46**: 614. 1963.

H ≡ *Pleospora betae* Björling *in* Bot. Notizer **1944**: 218–220. 1944 [not *Pleospora betae* Nevodovsky, Grib. ross. Exs. No. 247. 1915 = *Pleospora calvescens* (Fr.) Tul.].

stat. con. *PHOMA BETAE* Frank

Phoma betae Frank *in* Z. Rübenzuckerind. **42**: 904–906. 1892.

= *Phyllosticta betae* Oudemans *in* Ned. kruidk. Archf II, **2**: 181. 1877.

= *Phyllosticta spinaciae* Zimmermann *in* Verh. naturf. Ver. Brünn **47**: 87. 1909.

= *Phoma spinaciae* Bubák & Krieger apud Bubák *in* Annls mycol. **10**: 47. 1912.

Note: This fungus is well known as one of the causal organisms of Black Leg of beet, but it is also parasitic to spinach and further occurs on various wild Chenopodiaceae, see Boerema & van Kesteren *in* Gewasbescherming **3**: 66–67. 1972. The synonymy of the conidial state is discussed by Boerema & Dorenbosch *in* Stud. Mycol. **3**: 7–8, 22–23. 1973. For description of both states and notes on the disease of beet see Booth *in* C.M.I. Descr. pathog. Fungi Bact. 149. 1967 [as '*P. björlingii*']. For infection of sugarbeet seed see Gambogi & Byford *in* Ann. appl. Biol. **82**: 31–40. 1976. For cultural characters see Boerema & Dorenbosch l.c.

PLEOSPORA PAPAVERACEA (de Not.) Sacc.

Pleospora papaveracea (de Not.) Saccardo *in* Syll. Fung. **2**: 243. 1883.

≡ *Cucurbitaria papaveracea* de Notaris, Sfer. ital. [1] 62. 1863.

stat. con. *DENDRYPHION PENICILLATUM* (Corda) Fr.

V *Dendryphion penicillatum* (Corda) Fries, Summ. veg. Scand. [2] 504. 1849 [as '*Dendryphium p.*'].

≡ *Brachycladium penicillatum* Corda, Icon. fung. **2**: 14. 1838.

V = *Dendryphion papaveris* (Saw.) Sawada *in* Spec. Publs Coll. Agric. natn. Taiwan Univ. **8** [Descr. Cat. Taiwan (Formosan) Fungi **11**]: 200. 1959 [as '*Dendryphium p.*'].

≡ *Helminthosporium papaveris* Sawada *in* J. nat. Hist. Soc. Taiwan **32**: 129. 1917.

Note: The perfect state of the Leaf Blight fungus of oilseed poppy has sometimes been confused with *Pleospora calvescens* (Fr.) Tul. = *Pyrenophora calvescens* (Fr.) Sacc., a species commonly occurring on various Chenopodiaceae, see Meffert *in* Z. Parasit-Kde **14**: 442–498. 1950. *P. papaveracea* has been isolated from a number of *Papaver* spp., see Schmiedeknecht *in* Arch. Mikrobiol. **28**: 404–416. 1958, but is unknown on plants of other genera. For descriptions of the fungus in vivo and in vitro see Meffert l.c., Schmiedeknecht l.c. and Ellis, Dematiac. Hyphom. 504–505. 1971. For disease symptoms see Meffert l.c. and Maas Geesteranus *in* Tijdschr. PlZiekt. **66**: 237–248. 1960. There exist controversial opinions on the pathogenicity of the fungus, compare e.g. Maas Geesteranus l.c. and Rădulescu & Persecă *in* Revue roum. Biol., Sér. bot. **9**: 19–33. 1964.

PUCCINIA CARI-BISTORTAE Kleb.

Puccinia cari-bistortae Klebahn *in* Z. PflKrankh. **9**: 157. 1899.

Note: The Rust occurring on caraway (spermogonia and aecidia) and some other Umbelliferae alternates with *Polygonum bistorta* or *Polygonum viviparum* (uredinia and telia), see Gäumann *in* Beitr. KryptogFlora Schweiz **12**: 883. 1959. It differs only slightly morphologically from other rusts alternating between Umbelliferae and species of *Polygonum* belonging to the subgenus *Bistorta* (see Gäumann l.c.). It is therefore also regarded as only a race of a polymorphous plurivorous species: *Puccinia bistortae* DC., see e.g. Wilson & Henderson, Br. Rust Fungi 160–162. 1966.

PYTHIUM IRREGULARE Buism.

Pythium irregulare Buisman, Root Rots caused by Phycomycetes [Diss. Univ. Utrecht] 38. 1927 [March]; *in* Meded. phytopath. Lab. Willie Commelin Scholten **11**: 38. 1927 [May].

Note: Girginkoç *in* Meded. LandbHogesch. Wageningen **51**(1): 1–61. 1951 showed that some strains of *P. irregulare* cause the symptoms of the Black Wood Vessel Disease of beet. All strains of the fungus were able to cause damping-off of beet seedlings : Black Leg. For both diseases see also Hull *in* Bull. Minist. Agric. Fish. Fd, Lond. **142**, ed. 2: 1–3, 36–37. 1960. As well as for beet the fungus has been frequently recorded in association with root rot of other plants, see e.g. van der Plaats-Niterink *in* Neth. J. Pl. Path. **81**: 24. 1975. The fungus produces a toxin, to which the beet has been shown to be especially susceptible, see Martin *in* Phytopath. Z. **50**: 235–249. 1964. The original description of *P. irregulare* by Buisman l.c. has been quoted by Waterhouse *in* Mycol. Pap. **110**: 27. 1968. For character differentiation from the other species see Waterhouse *in* Mycol. Pap. **109**: 1–15. 1967 [Key to *Pythium*].

PYTHIUM MEGALACANTHUM de Bary sensu Buism.

Pythium megalacanthum de Bary sensu Buisman, Root Rots caused by Phycomycetes [Diss. Univ. Utrecht] 42, 43. 1927 [March]; *in* Meded. phytopath. Lab. Willie Commelin Scholten **11**: 42, 43. 1927 [May].

Note: This fungus is known in the Netherlands as the causal organism of 'Vlasbrand' or Flax Scorch. See van der Meer *in* Tijdschr. PlZiekt. **34**: 126–144. 1928 and Diddens, Onderzoekingen Vlasbrand [Diss. Univ. Amsterdam] 1931 [127 pp.]. Buisman l.c. concluded that the fungus agrees with the original description of *Pythium megalacanthum* de Bary *in* Abh. senckenb. naturforsch. Ges. **12**: 242–246. 1881 [for English version see Waterhouse *in* Mycol. Pap. **110**: 42. 1968]. However, several important aspects of the sexual apparatus of the 'Vlasbrand' fungus conflict with de Bary's description. Moreover the flax fungus does not produce sporangia as explicitly recorded for *P. megalacanthum* by de Bary *in* Bot. Ztg **39**(34): 539–544. 1881 [comp. Waterhouse l.c.]. Van de Plaats-Niterink, *in* Neth. J. Pl. Path. **81**: 30. 1975, attempted to elucidate the identity of the flax fungus but dit not succeed in isolating the fungus. For the characteristics of *P. megalacanthum* sensu Buisman see further Drechsler *in* Phytopathology **29**: 1018–1030. 1939 and Waterhouse *in* Mycol. Pap. **109**: 3. 1967.

PYTHIUM ULTIMUM Trow var. *ULTIMUM*

Pythium ultimum Trow *in* Ann. Bot. **15**: 300–301. 1901, var. *ultimum* [varietal name to be cited without author's name, cf. Seattle Code Art. 26; see note].

Note: This widely distributed species has an extensive host range, but is especially known as the cause of Watery Wound Rot of the potato, and as one of the causal

organism of Black Leg of beet seedlings. The original diagnosis of *P. ultimum* is quoted by Waterhouse *in* Mycol. Pap. **110**: 68. 1968. Within the species a separate variety described from *Chenopodium album* has been recognized: *P. ultimum* var. *sporangiiferum* Drechsler *in* Sydowia **14**: 107. 1960. The publication of this generally accepted variety has automatically established the varietal name *P. ultimum* var. *ultimum* (autonym). For differentiating characters see the key to *Pythium* published by Waterhouse *in* Mycol. Pap. **109**: 1–15. 1967. For a review of the literature on watery wound rot of potatoes see Boyd *in* Rev. Pl. Path. **51**: 304–305. 1972. For black leg of beet see e.g. Hull *in* Bull. Minist. Agric. Fish. Fd, Lond. **142**, ed. 2: 1–3, 1960.

RAMULARIA BETICOLA Fautr. & Lambotte

Ramularia beticola Fautrey & Lambotte apud Fautrey *in* Revue mycol. **19**: 54. 1897.

= *Ramularia betae* Rostrup *in* Bot. Tidsskr. **22**: 272. 1899 ["1898"].

Note: For description of this Leaf Spot fungus of beet in vivo and in vitro see Wenzel *in* Phytopath. Z. **3**: 524–527. 1931. For disease symptoms in comparison with other leaf spot diseases of beet see Wenzl *in* Pflanzenarzt **6**: 59–62. 1953. See also Wiesner *in* NachrBl. dt. PflSchutzdienst, Berl. II, **21** [= I, **47**]: 130–132. 1967.

SCLEROTINIA SCLEROTIORUM (Lib.) de Bary

Sclerotinia sclerotiorum (Lib.) de Bary, Vergl. Morph. Pilze [= ed. 2, Morph. Phys. Pilze, & c.] 56, 236. 1884.

≡ *Peziza sclerotiorum* Libert *in* Pl. cryptog. Ard. Fasc. 4, No. 326. 1837.

≡ *Whetzelinia sclerotiorum* (Lib.) Korf & Dumont *in* Mycologia **64**: 250. 1972.

stat. myc. *SCLEROTIUM VARIUM* Pers. ex S. F. Gray

rn *Sclerotium varium* Pers. ex S. F. Gray, Nat. Arr. Br. Pl. **1**: 591. 1821. : Fries, Syst. mycol. **2** [Sect. 1]: 257. 1822.

dn ≡ *Sclerotium varium* Persoon, Syn. meth. Fung. 122. 1801.

Note: This plurivorous parasite, the causal organism of Stalk Break of potato and *Sclerotinia* Disease or Rot of other plants, is also listed in Series 1a of the check-list (*in* Neth. J. Pl. Path. **78**, Suppl. 1: 44–45. 1972). A separate genus has recently been based on this species: *Whetzelinia* Korf & Dumont l.c. If one accepts the division of the original genus *Sclerotinia* Fuckel into different genera, the erection of a separate genus for the important pathogens as *S. sclerotiorum*, *S. trifoliorum* Erikss. and *S. minor* Jagger, is in accordance with the International Code of Botanical Nomenclature (Seattle Code, Art. 52; comp. Korf & Dumont l.c.). However, we support the proposal made by Buchwald & Neergaard *in* Friesia **10**: 96–99. 1973 to conserve the genus name *Sclerotinia* for the last mentioned species group. Therefore we are maintaining the well-known binomial *Sclerotinia sclerotiorum* pending the decision of the Permanent Nomenclature Committee for Fungi and Lichens. For descriptions, other synonyms and hosts see Buchwald *in* Friesia **3**: 319–327. 1947 and Dennis *in* Mycol. Pap. **62**: 146–147. 1956.

SEPTORIA CARVI H. Syd.

Septoria carvi H. Sydow *in* Annls mycol. **30**: 114. 1932.

Note: For description of this Leaf Spot pathogen of caraway see Jörstad [Jørstad] *in* Skr. norske Vidensk-Akad. [Mat.-naturv. Kl.] II [= Ny Serie] **22**: 71. 1965.

SPONGOSPORA SUBTERRANEA (Wallr.) Lagerh.

Spongospora subterranea (Wallr.) Lagerheim *in* J. Mycol. **7**: 104. 1892 ["1891"].

V ≡ *Erysiphe subterranea* Wallroth *in* Linnaea, Halle **16**: 332. 1842; Beitr. z. Bot. **1**: 118. 1842 [as '*Erysibe s.*'].

f. sp. *SUBTERRANEA* [A special form automatically established by the publication in 1958 of f.sp. *nasturtii* Tomlinson, see note.]

Note: For other synonyms of this causal agent of Powdery Scab of potato see Karling, Plasmodiophorales [ed. 2] 71–73. 1968. Karling cites the fungus as 'var. *subterranea* Tomlinson', but Tomlinson *in* Trans. Br. mycol. Soc. **41**: 491–498. 1958 did not divide the species into varieties but differentiated the causal organism of Crook Root of watercress as *Spongospora subterranea* f. sp. *nasturtii* Tomlinson, thus automatically creating a forma specialis based on the type of *S. subterranea*. For descriptions see Karling l.c. and Hims & Preece *in* C.M.I. Descr. pathog. Fungi Bact. 477. 1975. For disease symptoms on potato and summarized data on the biology, pathogenicity, occurrence on other plants etc. see Karling l.c. : 180–191 and Hims & Preece l.c.

SYNCHYTRIUM ENDOBIOTICUM (Schilb.) Perc.

Synchytrium endobioticum (Schilb.) Percival *in* Centbl. Bakt. ParasitKde Abt. II, **25**: 445. 1909 ("1910").

≡ *Chrysophlyctis endobiotica* Schilbersky *in* Ber. dt. bot. Ges. **14**: 36. 1896.

= *Synchytrium solani* Massee, Dis. cult. Pl. Trees 98. 1910.

Note: For a detailed description of this obligate parasite causing the Wart Disease of potato see Karling, Synchytrium 188–192. 1964. It has been demonstrated experimentally that the fungus can also attack various other Solanaceae. The literature concerning wart disease of potato is very extensive; the majority of papers published relate to control and varieties of potatoes that are susceptible, immune or resistant. See e.g. the bibliography for the species given by Karling l.c. : 425–457. For a compilation of the disease symptoms, biology etc. see also Butler & Jones, Pl. Path. 499–507. 1949. For methods to establish numbers of resting sporangia in soil see e.g. Nelson & Olsen *in* Phytopathology **54**: 185–186. 1964 and Marcus *in* NachrBl. dt. PflSchutzdienst., Stuttg. **21**: 153–157. 1969.

THANATEPHORUS CUCUMERIS (Frank) Donk

Thanatephorus cucumeris (Frank) Donk *in* Reinwardtia **3**: 376. 1956.

≡ *Hypochnus cucumeris* Frank *in* Ber. dt. bot. Ges. **1**: 62. 1883.

= *Corticium solani* (Prill. & Delacr.) Bourdot & Galzin *in* Bull. trimest. Soc. mycol. Fr. **27**: 248. 1911.

≡ *Hypochnus solani* Prillieux & Delacroix *in* Bull. trimest. Soc. mycol. Fr. **7**: 220. 1891.

stat. myc. *RHIZOCTONIA SOLANI* Kühn

Rhizoctonia solani Kühn, Krankh. Kulturgew. 224. 1858.

= *Moniliopsis aderholdii* Ruhland *in* Arb. [K.] biol. Anst. Land- u. Forstw. **6** (1): 76. 1908.

Note: The nomenclature of this ubiquitous species, which causes diseases as Black Scurf and Stem Canker of potato and Black Leg and Root Rot of beet, is already discussed in Series 1a of the check-list (*in* Neth. J. Pl. Path. **78**, Suppl. 1 : 49–50. 1972). Literature to 1965 is summarized by Parmeter, Biol. Pathol. *Rhizoctonia solani* [Proc. Symposium] 1970 [255 pp.]. For description of both states and data on hosts. disease symptoms, pathogenicity and biology see Mordue *in* C.M.I. Descr. pathog. Fungi Bact. 406. 1974. For inducing the perfect state in vitro see Tu & Kimbrough *in* Phytopathology **65**: 730–731. 1975.

UROMYCES BETAE (Pers.) Tul. ex Kickx

Δ *Uromyces betae* (Pers.) Tul. ex Kickx, Fl. crypt. Fland. **2**: 74. 1867.

O ≡ *Uromyces betae* (Pers.) Tulasne *in* Annls Sci. nat. (Bot.) IV, **2**: 89. 154.

t ≡ *Uredo betae* Persoon, Syn. meth. Fung. 220. 1801 [see note].

V = *Uredo beticola* Bellynck apud Westendorp *in* Bull. Acad. r. Sci. Lett. Beaux-Arts Belg. [Bull. Acad. r. Belg. Cl. Sci.] II, **11**: 650. 1861 [as '*U. betaecola*'; description of telia, see note].

Note: There is some doubt about the author citation of this Rust of beet. Jörstad [Jørstad] *in* Blumea **9**: 9. 1958 found some telia in the apparent type material of *Uredo betae* in Persoon's herbarium and concluded that the species should be cited as *Uromyces betae* (Pers.) Tul. (see also Jörstad *in* Nytt Mag. Bot. **6**: 136. 1958). In a later paper by Jörstad & Gjaerum *in* Nytt Mag. Bot. **21**: 71. 1969 the author citation is given as '(Pers.) Lév.', referring to Léveillé *in* Annls Sci. nat. (Bot.) III, **8**: 375. 1847. However, Laundon *in* Taxon **16**: 194–195. 1967 showed that Léveillé did not make new combinations in the way which is approved by the International Code. Deighton *in* Taxon **9**: 237. 1960 states that Persoon did not describe telia under *Uredo betae* and therefore this cannot be the basionym of the telial state (paragraph 3 Art. 59, Seattle Code). The rust then should be cited as *U. betae* Kickx and based on the material examined by Kickx (1867 l.c.) which bore the perfect state; see Laundon l.c. and Punithalingam *in* C.M.I. Descr. pathog. Fungi Bact. 177. 1968. However, by accepting Kickx as author of *Uromyces betae*, there is still an older legitimate basionym viz. *Uredo beticola* Bellynck apud Westendorp (1861 l.c.), which should mean that *Uromyces betae* is no more the correct name for this species! At present there is much discussion about paragraph 3 of Art. 59. Pending further conclusions of the 'Committee on Art. 59' we have adopted the name *Uromyces betae* with the author citation '(Pers.) Tul. ex Kickx'. For other synonyms of perfect and imperfect states see Punithalingam l.c. For description and dates on hosts, distribution, biology etc. see Punithalingam l.c., Wilson & Henderson, Br. Rust Fungi 315–316. 1966 and Gäumann *in* Beitr. KryptogFlora Schweiz **12**: 310–311. 1959.

VERTICILLIUM ALBO-ATRUM Reinke & Berth.

Verticillium albo-atrum Reinke & Berthold *in* Unters. bot. Lab. Univ. Göttingen **1**: 75. 1879.

Note: Both the organisms involved in *Verticillium* Wilt, *V. albo-atrum* and *V. dahliae* Kleb. (see below), are discussed in Series 1a of the check-list (*in* Neth. J. Pl. Path. **78**, Suppl. 1: 54–55. 1972). A review on the extensive literature on the diseases caused by these fungi has recently been given by Pegg *in* Rev. Pl. Path. **53**: 157–182. 1974. For

description of *V. albo-atrum* see Hawksworth & Talboys *in* C.M.I. Descr. pathog. Fungi Bact. 255. 1970.

VERTICILLIUM DAHLIAE Kleb.

Verticillium dahliae Klebahn *in* Mycol. Cbl. **3**: 66. 1913.

Note: See under *V. albo-atrum* Reinke & Berth. For description see Hawksworth & Talboys *in* C.M.I. Descr. pathog. Fungi Bact. 256. 1970.

Postscript

Since this manuscript was prepared for publication the book 'More Dematiaceous Hyphomycetes' by M. B. Ellis (CMI, Kew) has appeared. This book includes descriptions of the Leaf Spot fungus of beet, *Cercospora beticola* Sacc., the potato Leaf Blotch fungus, listed under the illegitimate later homonym *Mycovellosiella concors* (Casp.) Deighton (*in* Mycol. Pap. **137:** 21. 1974), and the causal organism of Skin Spot of potato which is assigned to the genus *Polyscytalum* Riess (see this check-list p. 202):

POLYSCYTALUM PUSTULANS (Owen & Wakef.) M. B. Ellis

Polyscytalum pustulans (Owen & Wakef.) M. B. Ellis, More Dematiac. Hyphom. 159. 1976.

≡ *Oospora pustulans* Owen & Wakefield *in* Kew Bull. **1919:** 297. 1919.

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Samenvatting

Verantwoording van de wetenschappelijke namen van algemeen voorkomende parasitaire schimmels.
Serie 2a: Schimmels bij akkerbouwgewassen: biet en aardappel; karwij, vlas en blauwmaanzaad

In alfabetische volgorde wordt de nomenclatuur behandeld van de parasitaire schimmels bij hakvruchten en handelsgewassen. Deze naamgeving zal worden gebruikt in de officiële publikaties van de Nederlandse Planteziektenkundige Vereniging en het Ministerie van Landbouw en Visserij.

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