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Check-list for scientific names of common parasitic fungi. Series 2c: Fungi on field crops: pulse (legumes) and forage crops (herbage legumes)

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Abstract

This list is a continuation of Series 2a and 2b (Neth. J. Pl. Path. 82 (1976) 193–214 and 83 (1977) 165–204), an 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

In the preceeding parts of Series 2 of this check-list[1] (Boerema and Verhoeven, 1976, 1977), an account is given of the nomenclature of common parasitic fungi on the field crops: beet and potato; caraway, flax and oilseed poppy; barley, maize, oats, rye, wheat and various important cultivated grasses. In the present publication, Series 2c, the scientific names of common fungi on various pulse and forage crops (legumes and herbage legumes) are treated.

The hosts include:

dwarf beans:	(varieties of *Phaseolus vulgaris* L.)
dwarf French bean	
dwarf haricot bean	
field (broad) beans:	(varieties of *Vicia faba* L.)
broad bean	
horse bean	
pigeon bean	
small-seeded broad bean	
field pea	(*Pisum sativum* subsp. *arvense* (L.) A. & G.)

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[1] Series 1 deals with the scientific names of common parasitic fungi on trees and shrubs (Boerema and Verhoeven, 1972, 1973).

peas (garden-)	(varieties of *Pisum sativum* L. subsp. *sativum*)
blue pea	
brown marrowfat pea	
garden pea	
maple pea for human consumption	
marrowfat pea	
white pea	
black medick or yellow trefoil	(*Medicago lupulina* L.)
clovers:	
alsike clover or Swedish clover	(*Trifolium hybridum* L. subsp. *hybridum*)
berseem or Egyptian clover	(*Trifolium alexandrinum* L.)
crimson clover	(*Trifolium incarnatum* L.)
Persian clover	(*Trifolium resupinatum* L.)
red clover	(*Trifolium pratense* L.)
subterranean clover	(*Trifolium subterraneum* L.)
white clover (Dutch clover)	(*Trifolium repens* L.)
lucernes:	
purple alfalfa (Am.)	(*Medicago sativa* L. subsp. *sativa*)
variegated alfalfa (Am.)	(*Medicago sativa* subsp. *varia* (Martyn) Arcang.)
lupins:	
blue lupin	(*Lupinus angustifolius* L.)
sweet lupin and yellow lupin	(varieties of *Lupinus luteus* L.)
serradella	(*Ornithopus sativus* Brot.)
vetches e.g.:	
common vetch	(*Vicia sativa* L. subsp. *sativa*)
hairy vetch	(*Vicia villosa* Roth)
white sweet clover (white melilot)	(*Melilotus albus* Med.)

The fungi are again selected in agreement with the Committee for Dutch Names of Plant Diseases ('Commissie voor Nederlandse Namen van Planteziekten') of the Netherlands Society of Plant Pathology.

To simplify the text, various symbols and abbreviations are used. These are fully explained in the first part of this series (Boerema and Verhoeven, 1976). References in that paper to Articles of the 'Seattle Code' may also be read as references to the same Articles of the recently published 'Leningrad Code' (Stafleu et al., 1978).

Generally only well known synonyms, including their basionyms, are listed. The notes in the text give additional information on the nomenclature and refer to recent papers containing descriptions and data on pathogenicity and hosts. The recognized scientific names should be used in the official publications of the Netherlands Society of Plant Pathology[2] and the Netherlands Ministry of Agriculture and Fisheries.

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[2] See, for instance, the recently published list of Dutch names of diseases of agricultural crops (Gewasbescherming 10(1), 1979).

Samenvatting

Verantwoording van de wetenschappelijke namen van algemeen voorkomende parasitaire schimmels.
Serie 2c: Schimmels bij akkerbouwgewassen: peulvruchten en vlinderbloemige voeder- en groenbemestingsgewassen

In alfabetische volgorde wordt de nomenclatuur behandeld van de parasitaire schimmels bij erwten, stambonen en veldbonen, alsmede bij diverse klavers inclusief honingklaver en hopperupsklaver, lupinen, luzerne, serradella en wikken. Deze naamgeving zal worden gebruikt in de officiële publikaties van de Nederlandse Plantenziektenkundige Vereniging en het Ministerie van Landbouw en Visserij.

References

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Boerema, G. H. & Verhoeven, A. A., 1977. Check-list for scientific names of common parasitic fungi. Series 2b: Fungi on field crops: cereals and grasses. Neth. J. Pl. Path. 83: 165–204.

Stafleu, F. A., Demoulin, V., Greuter, W., Hiepko, P., Linczevski, I. A., McVaugh, R., Meikle, R. D., Rollins, R. C., Ross, R., Schopf, J. M. & Voss, E. G., 1978. International Code of Botanical Nomenclature adopted by the twelfth International Botanical Congress, Leningrad, July 1975. Regnum veg. 97.

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ASCOCHYTA FABAE Speg.

Ascochyta fabae Spegazzini *in* An. Mus. nac. Hist. nat. B. Aires **6** (= II^a, **3**): 321, 322. 1899.

= *Ascochyta pisi* var. *foliicola* (Sacc. & El. Marchal) Wollenweber & Hochapfel *in* Z. ParasitKde **8**: 605. 1936.

≡ *Ascochyta pisi* f. *foliicola* Saccardo & El. Marchal *in* Revue mycol. **7**: 148. 1885.

* = *Ascochyta pisi* var. *fabae* Sprague apud Yu *in* Phytopathology **37**: 213. 1947.

Note: One of the two fungi causing Leaf Spot of field (broad) beans. The other causal organism is *Cercospora zonata* Wint. (q.v.). *A. fabae* may also attack the petioles, stems and pods of the plants, see e.g. Sundheim *in* Acta Agric. scand. **23**: 43–51. 1973. In inoculation experiments other leguminous plants also appeared to be susceptible to this fungus, see Beaumont *in* Trans. Br. Mycol. Soc. **33**: 346–347. 1950. For data on the synonymy of *A. fabae* and the characteristics in vivo and in vitro see Boerema & Dorenbosch *in* Stud. Mycol. **3**: 19, 38–39. 1973, Yu l.c.: 210–212 and Beaumont l.c. In culture it greatly resembles *A. pisi* Lib. (q.v.), but it can always be distinguished by the larger conidia (in vitro mostly 17–22 × 4–5 µm, always two- or more-celled by 'distoseptation', see the note under *A. pisi*). Both fungi produce a crystalline toxic metabolite, 'ascochytine', see Iwai & Mishima *in* Chemy Ind. **4**: 186–187. 1965 and Verona & Treggi *in* Agricoltura ital., Pisa **66** (II, **21**): 311–314. 1966.

ASCOCHYTA PISI Lib.

V *Ascochyta pisi* Libert *in* Pl. crypt. Ard., Fasc. 1, No. 59 [often erroneously listed as No. 12]. 1830; *in* Mém. Soc. r. Sci. Agric. Arts, Lille **1829–30**: 176. 1831 [in both cases as '*Ascoxyta pisi*', see note].

≡ *Ascospora pisi* (Lib.) Fuckel *in* Jb. nassau. Ver. Naturk. **23–24** [= Symb. mycol.]: 44. 1870 ["1869 und 1870"] [misapplied; Libert initially also used the name *Ascospora* for *Ascox(ch)yta* as appeared from original material in Libert's herbarium at Brussels].

= *Ascochyta pisicola* (Berk.) Saccardo *in* Sylloge Fung. **3**: 397. 1884.

≡ *Sphaeria pisicola* Berkeley apud Currey *in* Trans. linn. Soc. Lond. **22** (4): 334. 1859 [as '*Sphaeria (Depazea) pisicola*'].

= *Phyllosticta robergei* Desmazières *in* Pl. cryptog. France II [ed. 3], Fasc. 14, No. 685. 1859.

Note: This causal organism of Leaf and Pod Spot of field and garden peas represents the type of the form-genus *Ascochyta* Lib. Electron-microscopic studies [Brewer & Boerema *in* Proc. K. ned. Akad. Wet. (Sect. C) **68**: 86–97. 1965; Boerema & Bollen *in* Persoonia **8**: 111–144. 1975] have shown that the septation of the conidia in this species is an essential part of the conidial development (distoseptation) which explains why *A. pisi* in vivo and in vitro always produce a high percentage of 2- or more-celled conidia. This feature can be used to differentiate genuine *Ascochyta* species from pseudoforms, i.e. *Phoma* species, the pycnidia of which may in vivo contain a variable percentage of septate conidia, but in culture produce mainly 1-celled conidia (Boerema & Bollen l.c.). The name of the genus was originally spelled as '*Ascoxyta*', but was changed to *Ascochyta* by Link, Handb. Erk.

Gew. **3**: 381. 1833. This linguistically correct spelling was followed by Libert *in* Annls Sci. nat. (Bot.) II, **7**: 121–125. 1837 and later by others [Sprague & Johnson *in* Mycologia **42**: 529. 1950]. Characteristics in vivo and in vitro, as well as other synonyms of *A. pisi* are given by Boerema & Dorenbosch *in* Stud. Mycol. **3**: 18–19, 39. 1973. Characters differentiating this organism from *Mycosphaerella pinodes* (Berk. & Blox.) Vestergr. (stat. con. *Ascochyta pinodes* L. K. Jones) and *Phoma medicaginis* var. *pinodella* L. K. Jones) Boerema (syn. *Ascochyta pinodella* L. K. Jones) can be found in L. K. Jones *in* Bull. N. Y. St. agric. Exp. Stn **547**: 1–46. 1927; Wehlburg, Onderz. Erwtenanthracnose [Diss., Baarn] 10–12. 1932; Hare & Walker *in* Res. Bull. agric. Exp. Stn Univ. Wis. **150**: 15–20. 1944; and Handb. Seed Health Testing [Ed. Int. Seed Test. Ass.] III Working Sheets 16. 1964, 42 and 49. 1968. Sprague *in* Phytopathology **19**: 917–932. 1929 emended the description of *A. pisi* to include species described from other leguminous plants. However, comparative studies, e.g. by Ondřej *in* Biológia, Bratisl. **23**: 803–818. 1968 and **25**: 679–690. 1970, have shown that different *Ascochyta* species occur on leguminous plants, which are readily differentiated by conidial dimensions (in *A. pisi* in vitro mostly 11–16 × 3–4 µm), host relations and cultural characteristics (see e.g. *A. fabae* Speg., *A. punctata* Naumov and *A. viciae-villosae* Ondřej). *A. pisi* produces, just as *A. fabae*, a crystalline toxic metabolite, 'ascochytine', see Iwai & Mishima *in* Chemy Ind. **4**: 186–187. 1965 and Verona & Treggi *in* Agricoltura ital., Pisa **66** (II, **21**): 311–314. 1966.

ASCOCHYTA PUNCTATA Naumov

Ascochyta punctata Naumov *in* Bull. angew. Bot. **6**: 204. 1913.

Note: This species commonly occurs on cultivars of the common vetch (spots on leaves, stems and pods; Am.: Leaf and Pod Spot). For differentiating characters against other *Ascochyta* species on leguminous plants see Ondřej *in* Biológia, Bratisl. **23**: 803–818. 1968. Cultures of *A. punctata* are characterized by a yellow discolouration of the media; pycnidia usually do not develop in culture. In older literature, this fungus has often been misidentified as *A. viciae* Lib., a different species which occurs on the wild bush vetch, *Vicia sepium* L. (see Ondřej l.c.). Sprague *in* Phytopathology **19**: 917–932. 1929 regarded the various *Ascochyta* species described from *Vicia* spp. only as forms of *A. pisi* Lib. (q.v.) and therefore emended the description of the latter. *A. punctata* and *A. pisi*, however, are always readily distinguishable by their conidial dimensions [in *A. punctata* in vitro within the range 18–40(44) × 6–10 µm], host relations and cultural characteristics. See also Ondřej *in* Biológia, Bratisl. **25**: 679–690. 1970.

ASCOCHYTA VICIAE-VILLOSAE Ondřej

Ascochyta viciae-villosae Ondřej *in* Biológia, Bratisl. **23**: 815. 1968.

Note: This species causes spots on leaves, stems and pods of cultivars of hairy vetch (Am.: Leaf and Pod spot); incidentally it may also attack cultivars of the common vetch. The fungus can readily be distinguished from *A. punctata* Naumov (q.v.) by the conidial dimensions (in vitro mostly 18–29 × 2.5–3.5 µm) and cultural characteristics (greenish mycelium, no discolouration of the medium, abundant sporulation). For differentiating characters against other *Ascochyta* species on leguminous plants see Ondřej l.c.In older literature the fungus was frequently misidentified as *A. viciae* Lib. or *A. pisi* Lib., see the note under *A. punctata*.

AUREOBASIDIUM CAULIVORUM (Kirchn.) W. B. Cooke

Aureobasidium caulivorum (Kirchn.) W. B. Cooke *in* Mycopath. Mycol. appl. **17**: 37. 1962.

≡ *Gloeosporium caulivorum* Kirchner *in* Z. PflKrankh. **12**: 13. 1902.

≡ *Kabatiella caulivora* (Kirchn.) Karakulin *in* Notul. syst. Inst. cryptog. Horti bot. petropol. **2**: 108. 1923.

Note: In phytopathological literature this causal organism of clover Scorch (Am.: Northern Anthracnose) is commonly known as *Kabatiella caulivora.* However, the studies by W. B. Cooke l.c.: 1–43 and Hermanides-Nijhof *in* Stud. Mycol. **15**: 141–177. 1977, have shown that the genera *Aureobasidium* Viala & Boyer (1891) and *Kabatiella* Bubák (1907) cannot be sharply differentiated in culture and therefore should be combined. For the cultural characteristics of *A. caulivorum* see Hermanides-Nijhof l.c.: 149. Generally scorch is an important disease in Europe of red clover only, cultivars of which show wide differences in susceptibility. Descriptions of the disease on red clover can be found in Butler & Jones, Pl. Path. 471–473. 1949 and Sampson & Western, Dis. Br. Grasses herb. Leg., ed. 2, 66–67. 1954. A somewhat similar disease of red clover with which scorch has at times been confused is Anthracnose (Am.: Southern Anthracnose), caused by *Colletotrichum trifolii* S. M. Bain & Essary (q.v.). For a review of the extensive literature on *A. caulivorum*, including information on other clovers which occasionally have been found attacked by the fungus, see Massenot & Raynal *in* Annls Phytopath. **5**: 88–92. 1973. In Australia and North America the fungus recently caused considerable losses in several cultivars of subterranean clover, see Helms *in* Aust. J. agric. Res. **26**: 511–520, 647–655. 1975, and Helms *in* Phytopathology **65**: 197–201. 1975.

BOTRYTIS CINEREA Pers. ex Nocca & Balb.

rn *Botrytis cinerea* Pers. ex Nocca & Balbis, Fl.Ticinensis **2**: 367. 1821; 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 Grey Mould, which includes a group of morphologically almost inseparable conidial states, is also discussed in Series 2a of this check-list [*in* Neth. J. Pl. Path. **82**: 198. 1976]. Petersen *in* Mycotaxon **2**: 159 (151–165). 1975 pointed out that the name *B. cinerea* Pers. was first revalidated by Nocca & Balbis l.c. [see also Petersen *in* Mycotaxon **1**: 163 (149–188). 1975], therefore the author-citation 'Pers. ex Pers.' given in check-list 2a must be replaced by 'Pers. ex Nocca & Balbis'. Under suitably humid conditions *B. cinerea* may attack all pulse and forage crops. On field (broad) beans and vetches it plays a relatively minor role in causing Chocolate Spot, the major cause of which is *Botrytis fabae* Sardiña (q.v.). The ascomycete *Botryotinia fuckeliana* (de Bary) Whetzel ≡ *Sclerotinia fuckeliana* (de Bary) Fuckel, is in literature usually cited as the perfect state of *B. cinerea*; but not all isolates of the *Botrytis cinerea*-complex belong to *B. fuckeliana.* According to Polach & Abawi *in* Phytopathology **65**: 657–660. 1975, *B. fuckeliana* may play a major role in the epidemiology of grey mould of dwarf beans. For descriptions and illustrations of *B. cinerea* see Ellis, Dematiac. Hyphom. 179–180. 1971 and Ellis & Waller *in* C.M.I. Descr. pathog. Fungi Bact. 431. 1974. The occurrence of microconidia (*Myrioconium* sp.) is reported by Brierley *in* Bull. misc. Inf. R. bot. Gdns Kew **1918** (4): 129–146. 1918.

BOTRYTIS FABAE Sardiña

Botrytis fabae Sardiña *in* Mems R. Soc. esp. Hist. nat. **15**: 291. 1929.

Note: The major cause of Chocolate Spot of field (broad) beans and vetches. This fungus can be distinguished from the above listed *B. cinerea* Pers. ex Nocca & Balb., which is also occasionally associated with chocolate spot, by the relatively large conidia and small sclerotia, see e.g. Sundheim *in* Acta Agric. scand. **23**: 43–51. 1973. For descriptions and illustrations of *B. fabae* see Ellis, Dematiac. Hyphom. 183–184. 1971; Gerlach & Rudnick *in* NachrBl. dt. PflSchutzdienst., Stuttg. **24**: 115–117. 1972; and Ellis & Waller *in* C.M.I. Descr. pathog. Fungi Bact. 432. 1974. The occurrence of microconidia (*Myrioconium* sp.) is reported by Harrison & Hargreaves *in* Trans. Br. mycol. Soc. **69**: 332–335. 1977. Data on the biology of the fungus are summarized by Bremer *in* Z. PflKrankh. PflPath. PflSchutz **61**: 402–404. 1954; see also Ellis & Waller l.c. The role of seed-borne infection in the epidemiology of *B. fabae* on field beans has been studied by Harrison *in* Trans. Br. mycol. Soc. **70**: 35–40. 1978.

CERCOSPORA ZONATA Wint.

Cercospora zonata Winter *in* Bolm a. Soc. broteriana [Bolm Soc. broteriana] 2: 49. 1883; *in* Hedwigia **23**: 191. 1884.

= *Cercospora fabae* Fautrey apud Roumeguère *in* Fungi sel. exs., Cent. 56, No. 5588. 1891; *in* Revue mycol. **13**: 13. 1891.

Note: One of the two fungi causing Leaf Spot of field (broad) beans. The leaf spots can be differentiated from those caused by *Ascochyta fabae* Speg. (q.v.) by having a slightly raised chocolate-coloured encircling ridge. The fungus is also recorded from other species of *Vicia*, see Chupp, Monogr. Cercospora 342. 1953. For a detailed description and other synonyms see Chupp l.c. An illustration of conidia and conidiophores together with a short description can be found in Ellis, More dematiac. Hyphom. 264. 1976.

CHALARA ELEGANS Nag Raj & B. Kendr.

Chalara elegans Nag Raj & B. Kendrick, Monograph Chalara 111. 1975.

= *Thielaviopsis basicola* (Berk. & Br.) Ferraris *in* Fl. ital. crypt. **1** (8): 233–234. 1912.

≡ *Torula basicola* Berkeley & Broome *in* Ann. Mag. nat. Hist. II, **5**: 461. 1850 [= Not. Br. Fungi].

Note: The causal organism of Black Root Rot of plants in over fifteen families, including most legumes and herbage legumes. It is commonly known under the name *Thielaviopsis basicola*, which refers to the characteristic chlamydospore state of the fungus. The preferred name *Chalara elegans* is based on the phialidic form of sporulation, which gives more information about the natural affinity of the fungus, see the "Monograph of *Chalara* and allied genera" by Nag Raj & Kendrick (l.c.; 200 pp.). In older literature, erroneously a metagenetic relation with the ascomycete *Thielavia basicola* Zopf is supposed see the documentation in Series 1b of this check-list [*in* Neth. J. Pl. Path. **79**: 177. 1973]. For descriptions of *C. elegans* see Subramanian *in* C.M.I. Descr. pathog. Fungi Bact. 170. 1968; Ellis, Dematiac. Hyphom. 31–32. 1971; and Nag Raj & Kendrick l.c. Strains are known differing in cultural characters and pathogenicity, see e.g. Stover *in* Can. J. Res., Sect. C,

28: 445–470. 1950. For cultural characters see also Rawlings *in* Ann. Mo. bot. Gdn **27**: 561–598. 1940. Lists of hosts are given by Johnson *in* J. agric. Res. **7**: 289–300. 1916 (under '*Thielavia basicola*') and *in* J. agric. Res. **58**: 856–858. 1939.

COLLETOTRICHUM LINDEMUTHIANUM (Sacc. & Magn.) Scribn.

Colletotrichum lindemuthianum (Sacc. & Magn.) Scribner *in* Orchard Gdn **11**: 193–194. [Oct.] 1889 [*in* Rep. Chf Sect. Veg. Path. U. S. Dep. Agric. **1887**: 364. 1888, Scribner already pointed out that the fungus was most probably a *Colletotrichum*].

≡ *Gloeosporium lindemuthianum* Saccardo & Magnus *in* Michelia **1**(2): 129. 1878.

H ≡ *Colletotrichum lindemuthianum* (Sacc. & Magn.) Briosi & Cavara *in* Funghi parass. Fasc. 2, No. 50. 1889 [see note].

Note: Well known as causal organism of Anthracnose of dwarf beans, but it has also been found on various other leguminous plants. Stevenson *in* Pl. Dis. Reptr **40**: 831. 1956 made it plausible that Scribner's publication (1889 l.c.) of the combination *C. lindemuthianum* antedates that of Briosi & Cavara (l.c.). For descriptions, hosts, disease symptoms, specialization, transmission and other data see Butler & Jones, Pl. Path. 603–607. 1944; Aćimović *in* Zašt. Bilja **15**(79): 229–281. 1964; and Mordue *in* C.M.I. Descr. pathog. Fungi Bact. 316. 1971. Infections of seeds and seedlings are treated by e.g. Champion *in* Revue Agriculture **322**: 3–4. 1969 (seed-testing) and Meirleire *in* Phytoma **179** [June]: 26–28. 1966. New races of *C. lindemuthianum* pathogenic to previously resistant cultivars of dwarf beans are frequently reported, see e.g. Hoffmann, Schnock & Krüger *in* Z. PflKrankh. [PflPath.] PflSchutz **81**: 490–493. 1974. Some of the physiologic races can be differentiated by their morphological and cultural characteristics. The fungus is always readily distinguishable from *C. gloeosporioides* (Penz.) Penz., the conidial state of the plurivorous *Glomerella cingulata* (Ston.) Spauld. & Schrenk [check-list 1a *in* Neth. J. Pl. Path. **78**, Suppl. 1: 17. 1972] by its slow growth and dark pigmentation in culture, see von Arx *in* Tijdschr. PlZiekt. **63**: 171–190. 1957 and Ferraz *in* Agronomia lusit. **38**: 163–179. 1977.

COLLETOTRICHUM TRIFOLII S. M. Bain & Essary

Colletotrichum trifolii S. M. Bain & Essary *in* J. Mycol. **12**: 193. 1906.

Note: This fungus is well known as the causal organism of Anthracnose (Am.: Southern Anthracnose) of lucerne, red clover and serradella. Various other herbage legumes are also susceptible, but white clover, alsike or Swedish clover and subterranean clover are apparently resistant; see Kort *in* Versl. Meded. plziektenk. Dienst Wageningen **129** (Jaarb. 1955): 179–183. 1956. For a review of the literature on *C. trifolii*, including information on resistant cultivars of red clover and lucerne, see Massenot & Raynal *in* Annls Phytopath. **5**: 86–88. 1973. Since the fungus is primarily a high-temperature organism, anthracnose of forage crops is especially an important disease in warm countries. On red clover the disease may be confused with Scorch (Am.: Northern Anthracnose), caused by *Aureobasidium caulivorum* (Kirchn.) W. B. Cooke (q.v.). Morphologically *C. trifolii* resembles the plurivorous *C. gloeosporioides* (Penz.) Penz., the conidial state of *Glomerella cingulata* (Ston.) Spauld. & Schrenk [check-list 1a *in* Neth. J. Pl. Path. **78**, Suppl. 1: 17.

1972]. However, apart from its pathogenicity to leguminous plants and the absence of a perfect state, *C. trifolii* can be differentiated by its cultural characteristics, see von Arx *in* Phytopath. Z. **29**: 448. 1957 and Dingley *in* N. Z. Jl agric. Res. **8**: 911. 1965. The disease symptoms on lucerne, red clover and serradella are described [Dutch] and illustrated *in* Versl. Meded. plziektenk. Dienst Wageningen **92**: 70, 84, 92–93. 1961. See also Kort l.c. For other species of *Colletotrichum* recorded on leguminous plants (weakly pathogenic or saprophytic) see Massenot & Raynal l.c.: 84–86, and Raynal *in* Annls Phytopath. **9**: 193–203. 1977.

ERYSIPHE PISI DC. ex St.-Am.
rn *Erysiphe pisi* DC. ex de Saint-Amans, Fl. agén. 614. 1821.
dn ≡ *Erysiphe pisi* de Candolle in de Candolle & de Lamarck, Fl. fr. [ed. 3] **2**: 274. 1805.
V rn = *Erysiphe communis* (Wallr.) ex Schlechtendal, Fl. berol. Crypt. **2**: 168. 1824 [in or shortly before Aug.]; Link *in* C. Linn. Sp. Pl. [Ed. Willd.], ed. 4, **6**(1): 105. 1824 [month of publication not known]
[in both cases as '*Erysibe c.*'].
: Fries, Syst. mycol. **3** [Sect. 1]: 239. 1829 [combination ascribed to Schlechtendal] [rejected ambiguous name, see note].
dn ≡ *Alphitomorpha communis* Wallroth *in* Verh. Ges. naturf. Freunde, Berl. **1**: 31. 1819 [type on *Pisum* cf. Junell *in* Trans. Br. mycol. Soc. **48**: 541–542. 1965].

Note: This Powdery Mildew of peas, lucerne, vetches and other leguminous plants can be distinguished from *E. trifolii* Grev. (q.v.), which is more commonly found on herbage legumes, by the length and shape of the cleistothecial appendages. For descriptions see e.g. Blumer, Echte Mehltaupilze 216–219. 1967 and Kapoor *in* C.M.I. Descr. pathog. Fungi Bact. 155. 1967. The name *E. communis* accepted by Fries for this fungus has been used in many different senses and therefore should be rejected according to Art. 69 (ambiguous name); see the discussion by Junell l.c. In American literature the powdery mildews of leguminous plants are commonly treated according to the nomenclature of Salmon *in* Mem. Torrey bot. Club **9** [Monograph Erysiphaceae 292 pp.]. 1900, i.e. classified under '*Erysiphe polygoni* sensu lato'; see e.g. the recent study of Parmelee *in* Can. J. Bot. **55**: 1950–1953 [1940–1983]. 1977. In Europe *E. polygoni* DC. ex St.-Am. [sensu stricto] is only recorded on Polygonaceae, see Blumer l.c.: 220–222 and Junell *in* Symb. bot. upsal. **19** (1): 41. 1967. *Erysiphe pisi* shows marked host specialization which has led to the differentiation of four formae speciales. The host specialization is partly correlated with differences in size of the cleistothecia, see Blumer l.c.

f. sp. **MEDICAGINIS-LUPULINAE** [(Hammarl.) comb. nov.]
≡ *Erysiphe communis* f. sp. *medicaginis-lupulinae* Hammarlund *in* Hereditas **6**: 29. 1925.

Note: This powdery mildew of black medick (yellow trefoil) should not attack other species of *Medicago* (cf. Hammarlund l.c.).

f. sp. **MEDICAGINIS-SATIVAE** [(Hammarl.) comb. nov.]
≡ *Erysiphe communis* f. sp. *medicaginis-sativae* Hammarlund *in* Hereditas **6**: 29. 1925.

Note: Hammarlund l.c. found that this powdery mildew of (common) lucerne (subsp. *sativa*) also attacks the wild *Medicago sativa* subsp. *falcata* (L.) Arcang. (sickle medick).

f. sp. **PISI**[(Hammarl.) comb. nov.]

≡ *Erysiphe communis* f. sp. *pisi* Hammarlund *in* Hereditas **6**: 35. 1925.

Note: Powdery mildew of field and garden peas [includes the type of the species]. Other leguminous plants are apparently not susceptible for this special form, see Hammarlund l.c. and Blumer l.c. See further the bibliography given by Kapoor l.c.

f. sp. **VICIAE-SATIVAE** [(Hammarl.) comb. nov.]

≡ *Erysiphe communis* f. sp. *viciae-sativae* Hammarlund *in* Hereditas **6**: 33. 1925.

Note: This powdery mildew of common vetch can also attack the wild *Vicia sepium* L. (bush vetch) and *Vicia sylvatica* (wood vetch). Other species of *Vicia* have not been reported as being susceptible (cf. Hammarlund l.c.).

ERYSIPHE TRIFOLII Grev.

Erysiphe trifolii Greville, Fl. edin. 459. 1824.

Note: This common Powdery Mildew of clovers, lupins and other leguminous plants can be distinguished from *E. pisi* DC. ex St.-Am. (q.v.) by the much longer and occasionally dichotomously branched appendages of the cleistothecia. For description see e.g. Kapoor *in* C.M.I. Descr. pathog. Fungi Bact. 156. 1967. Blumer *in* Beitr. KryptogFlora Schweiz **7**(1): 208–224. 1933 treated this fungus as '*Erysiphe martii* sensu stricto'; see also Blumer, Echte Mehltaupilze 230–235. 1967. The name *E. martii* was introduced by Léveillé [*in* Annls Sci. nat. (Bot.) III, **15**: 166. 1851] for species with 'colourless' appendages occurring on plants of different families. This species-complex includes the types of various previously described species, and *E. martii* Lév. is therefore a superfluous name which must be rejected (Art. 63); see the discussion by Junell *in* Svensk bot. Tidskr. **61**: 209–210, 217. 1967, who concluded that *E. martii* must be regarded as an illegitimate synonym of the powdery mildew of Cruciferae, *E. cruciferarum* Opiz ex Junell. As noted above under *E. pisi*, American authors generally follow Salmon, *in* Mem. Torrey bot. Club **9** [Monograph Erysiphaceae 292 pp.]. 1900, who arranged all powdery mildews of leguminous plants under '*Erysiphe polygoni* sensu lato'; however, Parmelee *in* Can. J. Bot. **55**: 1953 [1940–1983]. 1977 accepted *E. trifolii* as a separate species. For hosts of *E. trifolii* see Blumer 1933 l.c. and Junell *in* Symb. bot. upsal. **19**(1): 47–48. 1967. Within the species, undoubtedly many host-related forms occur. However, the results of cross inoculation experiments recorded by different workers are so contradictory (see Blumer 1967 l.c.) that it is at present not opportune to attempt a differentiation of the species into separate formae speciales. For the disease on clover see Stavely & Hanson *in* Phytopathology **56**: 940–943, 957–962. 1966. See further the bibliography given by Blumer 1967 l.c. and Kapoor l.c.

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.

Note: For general descriptions of this most labile and variable species see Booth *in* C.M.I. Descr. pathog. Fungi Bact. 211. 1970; and Booth, Genus Fusarium 130–134. 1971. Within the species, numerous pathogenic formae speciales are recognized and many of these have been found to consist of different races, see e.g. Armstrong & Armstrong *in* Phytopathology **58**: 1242–1246. 1968; and Booth 1971, l.c. In the Netherlands the following occur on leguminous plants:

f. sp. *LUPINI* [Snyd. & Hans.]

Fusarium oxysporum f. sp. *lupini* Snyder & Hansen *in* Am. J. Bot. **27**: 66. 1940.

Note: Armstrong & Armstrong *in* Phytopathology **54**: 1232–1235. 1964 distinguish three races of this causal organism of Fusarium Wilt of lupins. The development of the fungus in resistant and susceptible varieties of yellow lupins has been studied in detail by Saaltink *in* Neth. J. Pl. Path. **69**: 3–75. 1963.

f. sp. *PHASEOLI* [Kendr. & Snyd.]

Fusarium oxysporum f. sp. *phaseoli* Kendrick & Snyder *in* Phytopathology **32**: 1013. 1942.

Note: The causal organism of Fusarium Yellows of dwarf beans; see the study by Kendrick & Snyder l.c.: 1010–1014.

f. sp. *PISI* [(Linf.) Snyd. & Hans.]

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

≡ *Fusarium orthoceras* var. *pisi* Linford *in* Res. Bull. agric. Exp. Stn Univ. Wis. **85**: 11. 1928.

Note: This specialized form has been differentiated in many races, see Hubbeling *in* Meded. Fak. LandbWet. Gent **39** (2): 991–1000. 1974 and Kraft & Haglund *in* Phytopathology **68**: 273–275. 1978.

In the Netherlands are distinguished:

Race 1, which causes the Fusarium Wilt of peas first described by Linford (l.c.: 1–44). This disease has been studied in the Netherlands by Schreuder *in* Tijdschr. PlZiekt. **57**: 175–206. 1951.

Race 2, the causal fungus of Fusarium Near-Wilt of peas, described by Snyder & Walker *in* Zentbl. Bakt. ParasitKde, Abt. II, **91**: 355–378. 1935. Hubbeling (l.c.) established that race 3, distinguished by Schreuder (l.c.) agrees with race 2. The near-wilt symptoms caused by this race, in the Netherlands indicated as 'Vroege vergeling' (Early Yellowing), appeared to be enhanced by the nematode *Rotylenchus robustus* (de Man), see Labruyère, Den Ouden & Seinhorst *in* Nematologica **4**: 336–343. 1959. For a bibliography of the literature on *F. oxysporum* f. sp. *pisi* see e.g. Lorenzini, Mannerucci, Triolo & Gambogi *in* Riv. Patol. veg., Pavia IV, **11**: 25–50. 1975.

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; in de Candolle & de Lamarck, Fl. fr. [ed. 3] **5** [6]: 110. 1815 ["1805"].

dn ≡ *Sclerotium crocorum* Persoon, Syn. meth. Fung. 119. 1801.

Note: This causal organism of Violet Root Rot, in phytopathological literature commonly known as *H. purpureum*, is also listed in Series 2a of this check-list [*in* Neth. J. Pl. Path. **82**: 200–201. 1976]. Its mycelial state represents the type of the form-genus *Rhizoctonia* DC. ex Fr. It is a soil-inhabiting fungus that attacks the underground parts of a wide range of plants, including various pulse and forage crops. For descriptions and illustrations of both states of the fungus 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.

LEPTOSPHAERULINA TRIFOLII (Rostr.) Petr. [sensu stricto]

Leptosphaerulina trifolii (Rostr.) Petrak *in* Sydowia **13**: 76. 1959.

≡ *Sphaerulina trifolii* Rostrup *in* Bot. Tidsskr. **22**: 265. 1899.

≡ *Pseudoplea trifolii* (Rostr.) Petrak *in* Annls mycol. **19**: 29. 1921.

≡ *Saccothecium trifolii* (Rostr.) Kirschstein *in* Krypt.-Fl. Mark Brandenb. **7** (3): 428. 1938.

Note: This species represents the causal organism of Burn (Am.: Pepper Spot) of clovers, a leaf spot disease which is especially common on white clover. Very similar fungi have been recorded on other leguminous plants, as well as on plants of the Cruciferae, Euphorbiaceae, Gramineae and Solanaceae. For this reason, Booth & Pirozynski *in* C.M.I. Descr. pathog. Fungi Bact. 146. 1967 treat *Leptosphaerulina trifolii* as a species of world-wide distribution with a very broad host range, including pathogenic as well as saprophytic strains. However, the detailed study of the characteristics of *L. trifolii* from clovers by Graham & Luttrell *in* Phytopathology **51**: 680–693. 1961 has shown that in vivo as well as in vitro it can actually be differentiated from those other fungi. For the characters used to differentiate this organism from *L. briosiana* (Pollacci) Graham & Luttrell (l.c.), primarily pathogenic on *Medicago* spp. (not yet recorded in the Netherlands), see also Barrière, Massenot & Raynal *in* Annls Phytopath. **6**: 341–347. 1974. In the field *L. trifolii* is generally restricted to *Trifolium* spp., but it appears to be capable of infecting other herbage legumes, see Graham & Luttrell l.c. Data on disease symptoms on clovers can be found in Sampson & Western, Dis. Br. Grasses herb. Leg., ed. 2, 72–73. 1954. See also O'Rourke, Dis. Grasses for. Legumes Ireland 61–63. 1976.

MYCOSPHAERELLA KILLIANI Petr.

Mycosphaerella killiani Petrak *in* Annls mycol. **39**: (322–)324. 1941 [not *Mycosphaerella trifolii* (P. Karst.) Moesz *in* Magy. tudom. Akad. Balkan-Kutat. Tud.

Eredm. **3**: 138. 1926].

≡ *Plowrightia trifolii* Killian *in* Revue Path. vég. Ent. agric. Fr. **10**: 219. 1923 [often erroneously cited as a new combination of the spermogonial state *dn Sphaeria trifolii* Persoon, Syn. meth. Fung. 30. 1801 ≡ *rn Sphaeria trifolii* Pers. ex Schweinitz *in* Schr. naturf. Ges. Leipzig **1** (= Syn. Fung. Car. sup.): 35. 1822: Fries, Syst. mycol. **2** (Sect. 2): 435. 1823].

≡ *Cymadothea trifolii* (Killian) Wolf *in* Mycologia **27**: 71(58–73). 1935 [as '(Pers.) comb. nov.', but referring to the perithecial state as described by Killian; see also note].

= *Dothidella trifolii* Bayliss-Elliott & Stansfield *in* Trans. Br. mycol. Soc. **9**: 226–227. 1924.

stat. con. *POLYTHRINCIUM TRIFOLII* Kunze ex Fic. & Schub.

rn *Polythrincium trifolii* Kunze ex Ficinus & Schubert, Fl. Geg. Dresd. [II] Krypt. 287. 1823.

: Fries, Syst. mycol. **3** (Sect. 2): 368. 1832.

dn ≡ *Polythrincium trifolii* Kunze in Schmidt & Kunze, Deutschl. Schwämme **5**: 5. 1816 [exs. No. 121].

Note: Causal organism of Black Blotch (Am.: Sooty Blotch) of clovers, in particular crimson, red, and white clover. For disease symptoms, biology, host range and descriptions of the conidial state and the spermogonia and perithecia, which are produced in stromata, see Wolf l.c., Sampson & Western, Dis. Br. Grasses herb. Leg., ed. 2, 70–72. 1954; and Booth & O'Rourke *in* C.M.I. Descr. pathog. Fungi Bact. 393. 1973. In these papers the fungus is named *Cymadothea trifolii* [with different incorrect author-citations, '(Pers.) Wolf', 'Wolf', '(Pers. ex Fr.) Wolf'; see the discussion by Laundon *in* Trans. Br. mycol. Soc. **60**: 324. 1973]. We follow Petrak l.c., von Arx *in* Sydowia **3**: 37–38. 1949 and Dennis, Br. Ascomycetes 364. 1968, who treat *Cymadothea* Wolf as only a section of *Mycosphaerella* Johans. The fungus was already placed in different ascomycete genera before the ascocarps were seen. Fries, Summ. Veg. Scand. [2] 387. 1849 suggested that the ascigerous state should be a species of *Dothidea*, *D. trifolii* Fr. [Θ; treated as comb. nov. of the spermogonial state *Sphaeria trifolii* Pers. ex Schw.]. Fuckel *in* Jb. nassau. Ver. Natuurk. **23–24** [= Symb. mycol.]: 218. 1870 ["1869 und 1870"] introduced the provisional name *Phyllachora trifolii* Fuckel [Θ] for the perfect state. Afterwards Saccardo, *in* Sylloge Fung. **9**: 1020. 1891, added a description to *Phyllachora trifolii* [as '(Pers.) Fuckel'] based on a herbarium specimen discussed by Cooke *in* Grevillea **13**: 63. 1885, but it is now known that this description is not in accordance with the characteristics of the perfect state of the fungus. Clover infected by *M. killiani* was found to be toxic to grazing animals, see the literature references given by Booth & O'Rourke l.c.

MYCOSPHAERELLA PINODES (Berk. & Blox.) Vestergr.

Mycosphaerella pinodes (Berk. & Blox.) Vestergren *in* Bih. K. svenska Vetensk-Akad. Handl. **22**: 15. 1896.

≡ *Sphaeria pinodes* Berkeley & Bloxam *in* Ann. Mag. nat. Hist. III, **7**: 454. 1861.

H ≡ *Mycosphaerella pinodes* (Berk. & Blox.) Stone *in* Annls mycol. **10**: 581. 1912.

≡ *Didymellina pinodes* (Berk. & Blox.) von Höhnel *in* Annls mycol. **16**: 67. 1918.

≡ *Didymella pinodes* (Berk. & Blox.) Petrak *in* Annls mycol. **22**: 16. 1924.

stat. con. *ASCOCHYTA PINODES* L. K. Jones

Ascochyta pinodes L. K. Jones *in* Bull. N. Y. St. agric. Exp. Stn **547**: 4. 1927 [as '*A. p.* (Berk. & Blox.) n. comb.'].

Note: One of the two causal fungi of Foot Rot of field and garden peas. The other causal organism of this disease is *Phoma medicaginis* var. *pinodella* (L. K. Jones) Boerema (q.v.; syn. *Ascochyta pinodella* L. K. Jones). On the leaves, stems and pods of peas, *M. pinodes* produces small purplish-brown spots (Am.: Mycosphaerella Blight). Baumann *in* NachrBl. dt. PflSchutzdienst, Berl. II, **8** (= I, **24**): 69–75. 1954 established that this fungus is also able to attack other leguminous plants. Furthermore, the fungus has also been isolated from non-leguminous plants, see e.g. Boerema *in* Versl. Meded. plziektenk. Dienst Wageningen **133** (Jaarb. 1958): 136–138. 1959. For descriptions of both states of the fungus and data on disease symptoms and biology see Punithalingam & Holliday *in* C.M.I. Descr. pathog. Fungi Bact. 340. 1972. The generic position of the perfect state has been discussed by van Warmelo *in* Bothalia **9** (1): 183–194. 1966. The conidial state represents a typical species of *Ascochyta* Lib.: distoseptate conidia, see the note under *A. pisi* Lib. and Boerema & Bollen *in* Persoonia **8**: 111–144. 1975. In vitro characteristics used to differentiate the fungus from *A. pisi* and *P. medicaginis* var. *pinodella* may be found in L. K. Jones l.c.: 1–46; Wehlburg, Onderz. Erwtenanthracnose [Diss., Baarn] 10–12. 1932; Hare & Walker *in* Res. Bull. agric. Exp. Stn Univ. Wis. **150**: 15–20. 1944; and Handb. Seed Health Testing [Ed. Int. Seed Test. Ass.] III Working Sheets 16. 1964, 42 and 49. 1968.

PERONOSPORA TRIFOLIORUM de Bary [sensu lato]

Peronospora trifoliorum de Bary *in* Annls Sci. nat. (Bot.) IV, **20**: 117–118. 1863 [lectotype on *Trifolium medium* L., see Liro, Mycoth. fenn. Etiketten [labels] 9 (No. 20). 1934].

= *Peronospora trifolii-hybridi* Gäumann *in* Beitr. KryptogFlora Schweiz **5** (4): 211. 1923.

≡ *Peronospora trifolii-repentis* f. *trifolii-hybridi* (Gäum.) Cherepanova *in* Nov. Sist. niz. Rast. **14**: 132. 1977.

= *Peronospora trifolii-repentis* H. Sydow apud Gäumann *in* Beitr. KryptogFlora Schweiz **5** (4): 215. 1923.

= *Peronospora trifolii-pratensis* Gustavsson *in* Op. bot. Soc. bot. Lund. **3** (1): 136. 1959.

≡ *Peronospora trifoliorum* f. *trifolii-pratensis* (Gust.) Cherepanova *in* Nov. Sist. niz. Rast. **14**: 132. 1977.

= *Peronospora meliloti* H. Sydow apud Gäumann *in* Beitr. KryptogFlora Schweiz **5** (4): 203–204. 1923.

Note: *P. trifoliorum* is treated here according to the 'old' species concept including those Downy Mildews on leguminous plants, which belong to the '*Effusae*-group', characterized by smooth oospores and a thin non-persistent, one-layered oogonium wall. Downy mildews on leguminous plants with more or less reticulate oospores are placed under *P. viciae* (Berk.) Casp. sensu lato (q.v.). Conidial fructifications of *P. trifoliorum* usually occur on the leaves (under-surfaces) of its host, in contrast with *P. viciae* which occurs on stems as well.

On cultivated and wild clovers, *P. trifoliorum* sensu lato embraces a large number of forms, apparently specialized on particular *Trifolium* species. Most of these host forms have been raised to specific rank on biometrical and minor morphological differences in the conidia and in the apices of the conidiophores by Gäumann l.c.: 210–216, Gustavsson l.c.: 133–141 and Rayss *in* Probleme act. Biol. Ştiinţe agric. **40**: 195–204. 1961; but Cherepanova l.c. [129–134] reduced some back to form rank. The differentiating criteria of these 'minor' species or forms are difficult to use in identification work and are of doubtful taxonomic value, see the discussion by Ramsfjell *in* Nytt Mag. Bot. **8**: 148. 1960, and Waterhouse in Ainsworth, Sparrow & Sussman, The Fungi IV B, 171–172. 1973. This is also the reason why in modern phytopathological literature only the name *P. trifoliorum* is usually used for downy mildews found on clovers. It would seem reasonable to consider the different minor taxa described from clovers as separate formae speciales of *P. trifoliorum*, but such a phytopathological differentiation requires in our opinion more evidence which could be obtained from comparative inoculation experiments.

The downy mildew of white sweet clover and other species of *Melilotus* is likewise regarded by Gäumann l.c. and Gustavsson l.c.: 132–133 as a separate species: *P. meliloti*. This downy mildew can thus be considered as a specialized host form of *P. trifoliorum* sensu lato, but additional comparative inoculation experiments are still needed.

f. sp. **MEDICAGINIS-SATIVAE** [f. sp. nov.]

= *Peronospora aestivalis* H. Sydow apud Gäumann *in* Beitr. Kryptog-Flora Schweiz **5**(4): 200–201. 1923.

Note: This special form which we propose to distinguish within *P. trifoliorum* sensu lato, includes the well-known downy mildew of lucerne and is characterized by its adaptation to the two subspecies of *Medicago sativa*. See Gustavsson l.c.: 130–131 and Faĭzieva *in* Uzbek. biol. Zh. **12** (5): 13–15. 1968 under the synonym *P. aestivalis*. In susceptible cultivars of lucerne, infection may be systemic causing stunting and yellowing of the new shoots, see e.g. Jones & Torrie *in* Phytopathology **36**: 1057–1059. 1946. For data on the development of conidial fructifications see Fried & Stuteville *in* Phytopathology **67**: 890–894. 1977. See also Waite *in* Utah Sci. **32**: 98–99. 1971. According to Rayss *in* Palest. J. Bot., Jerusalem Ser. **3**: 158. 1945 the downy mildews occurring on other *Medicago* spp. do not belong to the '*Effusae*-group' and therefore should not be arranged under *P. trifoliorum*.

PERONOSPORA VICIAE (Berk.) Casp. [sensu lato]

Peronospora viciae (Berk.) Caspary *in* Ber. Verh. preuss. Akad. Wiss. Berl. **1855**: 330. 1855.

≡ *Botrytis viciae* Berk. *in* Jl [R.] hort. Soc. **1**: 31. 1846 [type on *Vicia sativa* L.].

H ≡ *Peronospora viciae* (Berk.) Berkeley ex de Bary *in* Annls Sci. nat. (Bot.) IV, **20**: 112–113. 1863.

H ≡ *Peronospora viciae* (Berk.) Gäumann *in* Beitr. KryptogFlora Schweiz **5** (4): 218–219. 1923.

= *Peronospora viciae-sativae* Gäumann *in* Beitr. KryptogFlora Schweiz **5** (4): 219–220. 1923.

Note: *P. viciae* sensu lato includes those Downy Mildews on leguminous plants, which belong to the '*Reticulatae*-group', characterized by more or less reticulate oospores. For description of *P. viciae* in this 'old' species concept see Mukerji *in* C.M.I. Descr. pathog. Fungi Bact. 455. 1975. For the downy mildews on leguminous plants with smooth oospores see under *P. trifoliorum* de Bary sensu lato. Conidial fructifications of *P. viciae* may be found on the stems as well as on the undersides of the leaves of its hosts (*P. trifoliorum* occurs only on leaves). On field or broad beans, downy mildew is uncommon in Europe, but the cultivated vetches, especially common vetch, are frequently infected by downy mildew and may suffer severely. On cultivated and wild vetches, *P. viciae* sensu lato embraces a number of forms apparently specialized on particular *Vicia* species. These host forms are described as separate species in the biometric studies by Gäumann l.c.: 216–221 and Gustavsson *in* Op. bot. Soc. bot. Lund. **3** (1): 143–148. 1959. In our opinion, these host forms should be considered merely as formae speciales, but additional comparative inoculation experiments are needed before such a phytopathological differentiation can be made. See also the discussion under *P. trifoliorum.*

f. sp. **PISI** [(H. Syd.) comb. nov.]

≡ *Peronospora pisi* H. Sydow apud Gäumann *in* Beitr. KryptogFlora Schweiz **5** (4): 209. 1923.

Note: This specialized form represents the downy mildew of field and garden peas, which is prevalent in Western Europe and may reduce yield considerably in severe circumstances (Olofsson *in* Pl. Dis. Reptr **50**: 257–261. 1966). For the biology of *P. viciae* f. sp. *pisi* and the development of local and systemic infections see Mence & Pegg *in* Ann. appl. Biol. **67**: 297–308. 1971 and Pegg & Mence *in* Ann. appl. Biol. **66**: 417–428. 1970 and **71**: 19–31. 1972. Pod infections (usually associated with internal intumescences) are described by Snyder *in* Phytopathology **24**: 1358–1365. 1934.

PHOMA EXIGUA Desm. var. *EXIGUA*

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

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

Note: This is one of the two causal fungi of Blotch or Leaf Spot of dwarf beans, in phytopathological literature commonly known as *Ascochyta phaseolorum*. The other fungus is discussed under *Stagonosporopsis hortensis* (Sacc. & Malbr.) Petr. (syn. *Ascochyta boltshauseri* Sacc.). The synonymy of *A. phaseolorum* with *P. exigua* var. *exigua* has been proved by Boerema *in* Neth. J. Pl. Path. **78**: 113–115. 1972. *P. e.* var. *exigua* is a weak or wound parasite of world-wide distribution, and especially known by its occurrence in association with gangrene lesions of potato tubers, see Series 2a of this check-list [*in* Neth. J. Pl. Path. **82**: 203–204. 1976]. The wide host range of

'*A. phaseolorum*' has already been established by Crossan *in* Phytopathology **48**: 248–255. 1958 and Alcorn *in* Aust. J. biol. Sci. **21**: 1143–1151. 1968. In vivo a variable percentage of the conidia of the fungus may be 1-septate (varying between 4–85% according to the host), but in vitro the majority of the conidia is always non-septate. This explains the present arrangement of the fungus under the form-genus *Phoma*: the conidial septation in species of *Phoma* is a secondary process, whereas in true *Ascochyta* species the septation of the conidia is an essential part of the 'finishing' (completion) of the conidial development [see under *A. pisi* Lib., and Boerema & Bollen *in* Persoonia **8**: 111–144. 1975]. Descriptions, synonyms and hosts of *P. e.* var. *exigua* are given in Boerema & Höweler *in* Persoonia **5** (1): 15–28. 1967; Boerema & Dorenbosch *in* Stud. Mycol. **3**: 25–29. 1973; and Boerema *in* Trans. Br. mycol. Soc. **67**: 291–295. 1976. Typical strains of *P. e.* var. *exigua* produce an antibiotic 'E', which in plate cultures is demonstrable by oxidation with alkali, see Boerema & Höweler l.c. and Logan & O'Neill *in* Trans. Br. mycol. Soc. **55**: 67–75. 1970. The leaf spots caused by this fungus on dwarf beans are indistinguishable from those caused by *S. hortensis*. For descriptions of the disease symptoms and other data on the disease see Sneep *in* Tijdschr. PlZiekt. **51**: 1–16. 1945 and Hubbeling *in* Tuinbouwvoorlichting **3**: 39–41. 1955 (with colour plates).

PHOMA MEDICAGINIS Malbr. & Roum. var. *MEDICAGINIS*

Phoma medicaginis Malbranche & Roumeguère apud Roumeguère *in* Fungi gall. exs. No. 3675. 1886 and *in* Revue mycol. **8**: 91. 1886, var. *medicaginis* [varietal name to be cited without an author's name, Art. 26; name automatically established by the publication in 1965 of the varietal name *P. medicaginis* var. *pinodella* (L. K. Jones) Boerema (q.v.)].

= *Phoma herbarum* f. *medicaginum* Westend. ex Fuckel *in* Jb. nassau. Ver. Naturk. **23–24** [= Symb. mycol.]: 134. 1870 ["1869 und 1870"] [listed by Saccardo *in* Sylloge Fung. **3**: 133. 1884 as 'f. *medicaginis* Fuck.'].

Θ ≡ *Phoma herbarum* f. *medicaginum* Westendorp *in* Fungi europ. exs./Klotzschii Herb. mycol. Cont. (Ed. Rabenh.), Cent. 5, No. 455b. 1862 [in phytopathological literature often cited as '*P. herbarum* var. *medicaginis*'].

= *Ascochyta imperfecta* Peck *in* N. Y. St. Mus. Bull. [Bull. N. Y. St. Mus.] **157**: 21. 1912.

= *Phoma cuscutae* Negru & Verona *in* Mycopath. Mycol. appl. **30**: 308. 1966.

Note: The cultural characteristics, taxonomy and synonymy of this Black Stem fungus of lucerne (Am.: Spring Black Stem) have been discussed by Boerema, Dorenbosch & Leffring *in* Neth. J. Pl. Path. **71**: 79–89. 1965. These authors showed that the fungus can easily be differentiated from *P. medicaginis* var. *pinodella* (L. K. Jones) Boerema (q.v.) by its growth habit on agar-media. See also Boerema *in* Trans. Br. mycol. Soc. **67**: 296–298, 308–309. 1976. In phytopathological literature the fungus is often indicated as *Ascochyta imperfecta* (a name referring to the occasional occurrence of secondarily septate conidia, see note under *Phoma exigua* Desm. var. *exigua*) or *Phoma herbarum* 'var. *medicaginis*' (see also Boerema *in* Persoonia **6**: 36. 1970). Rössner *in* Phytopath. Z. **63**: 101–123. 1968 distinguished two forms within *P. medicaginis* var. *medicaginis* on account of the occurrence or absence of septate conidia and differences in conidial sizes: 'f. *macrospora*' and 'f *microspora*' (*nomina nuda). The principal host of *P. m.* var. *medicaginis* is lucerne, but incidentally it may also be found on other leguminous plants (Boerema & al. l.c.). For the disease symptoms on lucerne see e.g. Toovey, Waterston & Brooks *in* Ann. appl. Biol. **23**: 705–717. 1936. The fungus may be seed-borne on lucerne (Marasas & Bredell *in* Phytophylactica **5**: 89–94. 1973) and is also recorded as a contaminant of seeds of flax and rape (Lakshmanan & Vanterpool *in* Can. J. Bot. **45**: 847–853. 1967) as well as seeds of large dodder (Boerema, 1976 l.c.). The fungus produces a crystalline toxic metabolite, 'phomic acid', see Lakshmanan & Vanterpool l.c. and Lakshmanan & Vanterpool *in* Can. J. Bot. **45**: 1823–1830. 1967. For the effects of temperature, light, carbon and nitrogen nutrition on the formation of pycnidia and conidia see Chung & Wilcoxson *in* Mycopath. Mycol. appl. **44**: 297–308. 1971.

PHOMA MEDICAGINIS var. *PINODELLA* (L. K. Jones) Boerema

Phoma medicaginis var. *pinodella* (L. K. Jones) Boerema apud Boerema, Dorenbosch & Leffring *in* Neth. J. Pl. Path. **71**: 88. 1965.

≡ *Ascochyta pinodella* L. K. Jones *in* Bull. N. Y. St. agric. Exp. Stn **547**: 10. 1927.

= *Phoma trifolii* E. M. Johnson & Valleau *in* Bull. Ky agric. Exp. Stn **339**: 73–74. 1933.

Note: This is one of the two fungi involved in Foot Rot of field and garden peas (see also under *Mycosphaerella pinodes* (Berk. & Blox.) Vestergr.), which in phytopathological literature was formerly known as *Ascochyta pinodella* [the occasional occurrence of conidial septation (*Ascochyta*-like) is a secondary process, see the note under *Phoma exigua* Desm. var. *exigua*]. *P. medicaginis* var. *pinodella* is also the causal organism of Black Stem (Am.: Spring Black Stem) of red clover (syn. *Phoma trifolii*) and may also occur on other leguminous plants. *P. medicaginis* var. *pinodella* can be distinguished from the black stem organism of lucerne, *P. medicaginis* Malbr. & Roum. var. *medicaginis* (q.v.), by its general appearance in vitro, see Boerema, Dorenbosch & Leffring l.c. (pp. 79–89). See also Boerema *in* Trans. Br. mycol. Soc. **67**: 296–297, 308–309. 1976. In vitro characteristics for differentiating this fungus from the pea-parasites *Mycosphaerella pinodes* (stat. con. *Ascochyta pinodes* L. K. Jones) and *Ascochyta pisi* Lib., can be found in Jones *in* Bull. N. Y. St. agric. Exp. Stn **547**: 1–46. 1927; Wehlburg, Onderz. Erwtenanthracnose [Diss., Baarn] 10–12. 1932; Hare & Walker *in* Res. Bull. agric. Exp. Stn Univ. Wis. **150**: 15–20. 1944; and Handb. Seed Health Testing [Ed. Int. Seed Test. Ass.] III, Working Sheets 16. 1964, 42 and 49. 1968. As soil-borne organism *P. m.* var. *pinodella* is discussed by Dorenbosch *in* Persoonia **6**: 1–14. 1970 and Domsch & Gams, Pilze Agrarböden 119. 1970.

PHYSODERMA ALFALFAE (Lagerh. ex Magn.) Karling

Physoderma alfalfae (Lagerh. ex Magn.) Karling *in* Lloydia **13**: 44. 1950 [as '(Pat. & Lagerh.) nov. comb.'].

≡ *Urophlyctis alfalfae* (Lagerh.) ex Magnus *in* Ber. dt. bot. Ges. **20**: 296. 1902 [as '(v. Lagerheim *olim*) P. Magnus'].

*V*Θ ≡ *Cladochytrium alfalfae* Lagerheim apud Patouillard & Lagerheim *in* Bull. Herb. Boissier **3**: 62. 1895 [as '*Arfarfae*', correct spelling given by Lagerheim *in* Bih. K. svenska VetenskAkad. Handl. **24**, Afd. III (4): 7. 1898; nomen nudum, see note].

Note: The oldest name for this causal organism of Crown Wart of lucerne, *Cladochytrium alfalfae*, has been published by Lagerheim (l.c.) with reference to a not published paper in 'Zeitschr. f. Pflanzenkr., 1895' (see Magnus l.c., pp. 291–296). The reason for this is, that Lagerheim on closer investigation identified the crown wart organism of lucerne as a *Physoderma* species, which he thought to be identical with an earlier described pathogen from beet for which he introduced the combination *Physoderma leproides* (Trabut) Lagerh. (Lagerheim 1898 l.c.: 10). Magnus l.c. recognized the lucerne pathogen as a separate organism, which in his opinion belonged to the genus *Urophlyctis*. He adopted Lagerheim's epithet *alfalfae* and published a detailed illustrated description. Karling (l.c.) finally showed that there are no morphological grounds for maintaining *Urophlyctis* Schroet. (1889) as a separate genus from *Physoderma* Wallr. (1833). For descriptions, disease symptoms and data on the biology of *P. alfalfae* see Karling l.c. and Butler & Jones. Pl. Path. 452–456. 1949. See also Sampson & Western, Dis. Br. Grasses herb. Leg. ed. 2, 54–55. 1954; and Leath *in* Pl. Dis. Reptr **62**: 621–623. 1978.

PLEIOCHAETA SETOSA (Kirchn.) Hughes

Pleiochaeta setosa (Kirchn.) Hughes *in* Mycol. Pap. **36**: 39. 1951.

≡ *Ceratophorum setosum* Kirchner *in* Z. PflKrankh. **2**: 324–327. 1892.

= *Pestalotia lupini* Sorauer apud Wagner & Sorauer *in* Z. PflKrankh. 8: 269. 1898.

≡ *Mastigosporium lupini* (Sorauer) Cavara *in* Riv. Patol. veg., Padova **14**: 13. 1924.

Note: This causal organism of Brown Spot of lupins is also known to be parasitic on other Leguminosae, especially on woody plants (compare check-list 1a *in* Neth. J. Pl. Path. **78**, Suppl. 1: 37. 1972). For the symptoms of the brown spot disease of lupins and the characteristics of the fungus in vivo and in vitro see du Plessis & Truter *in* Sci. Bull. Dep. Agric. [For.] Un. S. Afr. **347**: 1–12. 1953. Descriptions of the fungus can also be found in Ellis, Dematiac. Hyphom. 263. 1971 and Pirozynski *in* Fungi Can. 12. 1974. The fungus represents the type species of *Pleiochaeta* (Sacc.) Hughes, but, as noted by Pirozynski l.c., according to Art. 75, the genus name *Pleiochaeta* is unfortunately illegitimate as a later spelling variant (homonym) of *Pleochaeta* Sacc. & Speg. (a genus of powdery mildews). Nevertheless we have for the present adopted the binomial *Pleiochaeta setosa*; the other genera listed not being appropriate.

PLEOSPORA HERBARUM (Fr. ex Fr.) Rabenh. var. *HERBARUM*

Pleospora herbarum (Fr. ex Fr.) Rabenhorst *in* Klotzschii Herb. mycol., ed. 2, Cent. 6, No. 547 [a–c]. 1857; *in* Bot. Ztg **15**: 428. 1857 [ref. Schlechtendal], var. *herbarum* [varietal epithet to be cited without an author's name, Art. 26; name automatically established (autonym) by the publication in 1961 of *P. herbarum* var. *occidentalis* Wehm., see note].

rn ≡ *Sphaeria herbarum* Fries ex Fries, Syst. mycol. **2**[Sect. 2]: 511. 1823 [not *S. herbarum* Persoon, Syn. meth. Fung. 78. 1801 ex Hooker, Fl. scot. **2**: 7. 1821, which species was deliberately not accepted by Fries].

dn ≡ *Sphaeria herbarum* Fries *in* K. [svenska] VetenskAkad. [nya] Handl. **39**: 109. 1818.

stat. con. *STEMPHYLIUM BOTRYOSUM* Wallr.

Stemphylium botryosum Wallroth; Fl. crypt. Germ. **2**: 300. 1833.

Note: This plurivorous fungus is recorded as parasitic on various leguminous plants (Ring Spot, lesions on leaves, petioles, stems, peduncles, flowers and pods), see e.g. Sampson & Western, Dis. Br. Grasses herb. Leg. ed. 2, 76–77. 1954; Booth & Pirozynski *in* C.M.I. Descr. pathog. Fungi Bact. 150. 1967; and Borges, Stanford & Webster *in* Phytopathology **66**: 749–753. 1975. The fungus is seed-borne; especially seeds of beans are often infected (Dutch: 'Roodneuzen', purple spots surrounded by a yellowish margin), see Doyer, Man. Det. Seed-borne Dis. 16. 1938 [under '*Macrosporium commune* Rabenh.', a rejected ambiguous name, cf. Groves & Skolko *in* Can. J. Res., Sect. C, **22**: 195. 1944]. *Pleospora herbarum* is the type species of the genus *Pleospora* Rabenh. ex Ces. & de Not. (nom. cons. and typ. cons., see Code, Appendix III); its conidial state represents the type species of the form-genus *Stemphylium* Wallr. For differentiation against *Stemphylium sarciniforme* (Cav.) Wiltsh. (q.v.; common causal organism of Ring Spot of red clover) and other *Pleospora* species with *Stemphylium*-states see Groves & Skolko l.c.: 190–199 and Simmons *in* Mycologia **61**: 1–26. 1969. See also Ellis, Dematiac. Hyphom. 165–168. 1971. The nomenclature and taxonomy of *P. herbarum* is discussed by Wehmeyer, Monograph *Pleospora* 38–39, 147–167. 1961 and Donk *in* Taxon **11**: 120–122. 1962. On account of herbarium specimens, Wehmeyer l.c. distinguished *P. herbarum* var. *occidentalis* Wehm. as a separate 'mountainous form' and synonymized at least sixty *Pleospora* names with the typical 'lowland form' *P. herbarum* var. *herbarum*. However, additional comparative cultural studies are required in order to interpret all these names, compare Simmons l.c. The nomenclature and synonymy of *S. botryosum* is discussed by Wiltshire *in* Trans. Br. mycol. Soc. **21**: 211–239. 1938. For a good description of both states and references to phytopathological literature see Booth & Pirozynski l.c. As a contaminant of seeds the fungus is treated by Malone & Muskett *in* Proc. int. seed Test. Ass. **29** (2) [= Handb. Seed Health Test. Ser. 4, Fasc. 1]: 322–323. 1964. Detailed data on the morphology of the conidial state and the cultural characteristics of the fungus are given by Neergaard, Dan. Alternaria and Stemphylium 361–379. 1945.

PSEUDOPEZIZA TRIFOLII (Biv.-Bern. ex Pers.) Fuckel

Pseudopeziza trifolii (Biv.-Bern. ex Pers.) Fuckel *in* Jb. nassau. Ver. Naturk. **23–24** [= Symb. mycol.]: 290. 1870 ["1869 und 1870"].

rn ≡ *Ascobolus trifolii* Biv.-Bern. ex Persoon, Mycol. eur. **1**: 342. 1822.
: Fries, Syst. mycol. **2** [Sect. 1]: 165. 1822.

dn ≡ *Ascobolus trifolii* Bivona-Bernardi, Stirp. rar. Sic. **4**: 27. 1816.

= *Pseudopeziza medicaginis* (Lib.) Saccardo *in* Malpighia **1**: 455. 1887.
≡ *Phacidium medicaginis* Libert *in* Pl. cryptog. Ard., Fasc. 4, No. 374. 1837.

Note: The causal organism of Leaf Spot (Am.: Common Leaf Spot) of herbage legumes. The spots also occur on the petioles and stems but not in great numbers. Originally this disease was ascribed to three different species of *Pseudopeziza*, viz. *P. trifolii*, *P. medicaginis* and *P. meliloti* Syd. However, Schüepp *in* Phytopath. Z. **36**: 220–231. 1959 showed that they do not differ essentially in morphology and cultural characters, but only in host relation. He distinguished five formae speciales which are listed below. It should be noted that Schmiedeknecht *in* Biol. Zentbl. **83**: 695–715. 1964 proposed to maintain the differentiation in three species, mainly on account of speculation on the phylogeny and systematic position of hosts and pathogens. *P. trifolii*, which represents the type species of the genus *Pseudopeziza* Fuckel, does not produce an imperfect state (see note under f. sp. *medicaginis-sativae*). The correct author citation of *P. trifolii* has been indicated by van Brummelen *in* Persoonia Suppl. **1**: 241. 1967.

f. sp. *MEDICAGINIS-LUPULINAE* [(Schmiedeknecht) Schüepp]

Pseudopeziza trifolii f. sp. *medicaginis-lupulinae* (Schmiedeknecht) Schüepp *in* Phytopath. Z. **36**: 228. 1959.

≡ *Pseudopeziza medicaginis* f. sp. *medicaginis-lupulinae* Schmiedeknecht *in* Phytopath. Z. **32**: 446. 1958.

Note: This form on black medick or yellow trefoil can also attack some other species of *Medicago*, but the lucernes are resistant to this form. See Schmiedeknecht 1958 l.c.

f. sp. *MEDICAGINIS-SATIVAE* [(Schmiedeknecht) Schüepp]

Pseudopeziza trifolii f. sp. *medicaginis-sativae* (Schmiedeknecht) Schüepp *in* Phypath. Z. **36**: 228. 1959.

≡ *Pseudopeziza medicaginis* f. sp. *medicaginis-sativae* Schmiedeknecht *in* Phytopath. Z. **32**: 446–447. 1958.

Note: Occurs commonly on both cultivated subspecies of lucerne and can also attack some other species of *Medicago*, but not black medick (yellow trefoil), see Schmiedeknecht 1958 l.c. The infection of lucerne may result in serious leaf fall. For the sporulation of f. sp. *medicaginis-sativae* see Schmiedeknecht *in* Phytopath. Z. **48**: 312–321. 1963 and **51**: 29–40. 1964. A pycnidial state, *Sporonema phacidioides* Desm., which was formerly believed to belong to this fungus, represents the imperfect state of *Leptotrochila medicaginis* (Fuckel) Schüepp (l.c.: 253–254), a fungus which causes Yellow Leaf Blotch of lucerne (not yet recorded in the Netherlands).

f. sp. *MELILOTI* [(Syd.) Schüepp]

Pseudopeziza trifolii f. sp. *meliloti* (Syd.) Schüepp *in* Phytopath. Z. **36**: 229. 1959.

≡ *Pseudopeziza meliloti* Syd. *in* Annls mycol. **34**: 396. 1936.

Note: White sweet clover (white melilot) represents one of the *Melilotus* spp. susceptible to this form. Various species of *Trigonella* spp. can also be infected. See the studies by Schüepp l.c. and Schmiedeknecht *in* Biol. Zentbl. **83**: 701–703. 1964.

f. sp. *TRIFOLII-PRATENSIS* [Schüepp]

Pseudopeziza trifolii f. sp. *trifolii-pratensis* Schüepp *in* Phytopath. Z. **36**: 229–230. 1959.

Note: Common on red clover, but berseem or Egyptian clover and crimson clover, as well as various wild clovers can also be infected. See Schüepp l.c.: 220–222 and Schmiedeknecht *in* Biol. Zentbl. **83**: 703–704. 1964. White clover and other cultivated clovers are not susceptible to this form.

f. sp. *TRIFOLII-REPENTIS* [Schüepp]

Pseudopeziza trifolii f. sp. *trifolii-repentis* Schüepp *in* Phytopath. Z. **36**: 230–231. 1959.

Note: The principal host of this form is white clover, but alsike clover or Swedish clover and Persian clover, and various wild clovers are also susceptible. See Schüepp l.c.: 220–222 and Schmiedeknecht *in* Biol. Zentbl. **83**: 703–704. 1964. Red clover and other cultivated clovers are not infected by f. sp. *trifolii-repentis*. The type of *Pseudopeziza trifolii* probably refers to this special form; the nomenclature of formae speciales, however, is not governed by the provisions of the botanical rules (Art. 4), therefore change of f. sp. *trifolii-repentis* into 'f. sp. *trifolii*' is not necessary (and not desirable).

PYTHIUM ULTIMUM Trow var. *ULTIMUM*

Pythium ultimum Trow *in* Ann. Bot. **15**: 300–301. 1901 [quoted *in* Mycol. Pap. **110**: 68. 1968], var. *ultimum* [varietal name to be cited without author's name, Art. 26; name automatically established (autonym) by the publication in 1960 of *P. ultimum* var. *sporangiiferum* Drechsl.].

Note: *P. ultimum* is a major root pathogen affecting a large number of plant species; compare the discussions of this fungus in Series 2a and 2b of the check-list [*in* Neth. J. Pl. Path. **82**: 208–209. 1976 and **83**: 190–191. 1977]. It is recorded as one of the main causes of Root Rot and Damping-off in pulse and herbage legumes; see Hendrix & Campbell *in* A. Rev. Phytopath. **11**: 88. 1973. Literature on *P. ultimum* to 1967 are summarized by Domsch & Gams, Pilze Agrarböden 127–128. 1970. Soil water and temperature greatly influence the incidence and severity of *Pythium* root rot, see e.g. Pieczarka & Abawi *in* Phytopathology **68**: 766–772. 1978. For other species of *Pythium* frequently isolated from roots of beans and peas see e.g. the literature references by van der Plaats-Niterink *in* Neth. J. Pl. Path. **81**: 24–25. 1975, and Pieczarka and Abawi *in* Phytopathology **68**: 409–416. 1978. For differentiating characters see the key to *Pythium* published by Waterhouse *in* Mycol. Pap. **109**: 1–15. 1967.

SCLEROTINIA SCLEROTIORUM (Lib.) de Bary

Sclerotinia sclerotiorum (Lib.) de Bary, Vergl. Morph. Pilze [= ed. 2 Morph. Physiol. Pilze, etc.] 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 causal organism of the Sclerotinia Disease or Sclerotinia Rot (Am.: Sclerotinia Wilt) attacks a wide range of plants, including leguminous plants such as dwarf beans (Am.: White Mold Disease) and peas. Clovers and other herbage legumes, however, are mostly attacked by the related species *S. trifoliorum* Erikss. (q.v.). Purdy *in* Phytopathology **45**: 421–427. 1955 has proposed a broad concept of *S. sclerotiorum* which includes *S. trifoliorum*, but this has not yet been generally accepted (see note under *S. trifoliorum*). More recently a separate genus was based on *S. sclerotiorum*: *Whetzelinia* Korf & Dumont l.c., but as noted in check-list 2a [*in* Neth. J. Pl. Path. **82**: 209. 1976] we support the proposal made by Buchwald & Neergaard *in* Friesia **10**: 96–99. 1973 to conserve the genus name *Sclerotinia* for the important pathogens as *S. sclerotiorum* and *S. trifoliorum*, which has preliminarily been accepted. For descriptions, other synonyms, hosts and other data of *S. sclerotiorum* see Buchwald *in* Friesia **3**: 319–327. 1947; Dennis *in* Mycol. Pap. **62**: 146–147. 1956; and Mordue & Holliday *in* C.M.I. Descr. pathog. Fungi Bact. 513. 1976. Factors affecting apothecium and ascospore production of *S. sclerotiorum* are discussed by e.g. Krüger *in* Z. PflKrankh. [PflPath.] PflSchutz **82**: 101–108. 1975 and Schwartz & Steadman *in* Phytopathology **68**: 383–388. 1978. The fungus also usually produces a microconidial (spermatial) state (*Myrioconium* sp.), see Mordue & Holliday l.c.

SCLEROTINIA TRIFOLIORUM Erikss. var. *TRIFOLIORUM*

Sclerotinia trifoliorum Eriksson *in* K. LantbrAkad. Handl. Tidskr. **19**: 41 (28–42). 1880, var. *trifoliorum* [varietal name to be cited without an author's name, Art. 26; name automatically established (autonym) by the publication in 1939 of the varietal name *S. trifoliorum* var. *fabae* Keay, see note].

Note: Parasitic on leguminous plants, and especially known as the cause of Rot (Am.: Sclerotinia Wilt, Root Rot) of clovers, lucernes and black medick or yellow trefoil. On field (broad) beans a separate variety with somewhat larger ascospores is recognized, *S. trifoliorum* var. *fabae* Keay [*in* Ann. appl. Biol. **26**: 228 (227–246). 1939; confirmed by Loveless *in* Ann. appl. Biol. **38**: 252–275. 1951], but this pathogen is not known in the Netherlands. Morphologically the apothecia of both varieties of *S. trifoliorum* show much resemblance with those of *S. sclerotiorum* (Lib.) de Bary (q.v.), but the sclerotia are smaller than in the latter and their development is usually slower. Furthermore, both species show diverse seasonal appearance in nature; the sclerotia of *S. trifoliorum* sensu lato germinate with apothecia chiefly in the autumn, those of *S. sclerotiorum* in spring or summer. In recent American literature, *S. trifoliorum* var. *trifoliorum* is often indicated as merely *S. sclerotiorum* according to the broader concept of *S. sclerotiorum* proposed by Purdy *in* Phytopathology **45**: 421–427. 1955. However, we agree with Korf & Dumont *in* Mycologia **64**: 248–251. 1972 that additional microanatomical studies are necessary before making a decision on the taxonomic status of both varieties of *S. trifoliorum*. The specific distinction between *S. trifoliorum* and *S. sclerotiorum* is supported by the electrophoretic, and mycelial-interaction studies of Wong & Willetts *in* Trans. Br. mycol. Soc. **61**: 167–178. 1973; *in* J. gen. Microbiol. **88**: 339–344. 1975 and **90**: 355–359. 1975. For the characteristics and biology of *S. t.* var. *trifoliorum* and the disease symptoms on clovers see Butler & Jones, Pl. Path. 461–466. 1949 and Sampson & Western, Dis. Br. Grasses herb. Leg. ed. 2, 55–60. 1954. Both these papers make reference to literature of *S. t.* var. *trifoliorum* on other hosts. Descriptions and hosts are also given by Buchwald *in* Friesia **3**: 313–318. 1947 and Dennis *in* Mycol. Pap. **62**: 148. 1956. The fungus usually produces a microconidial (spermatial) state (*Myrioconium* sp.), see Butler & Jones l.c.

STAGONOSPOROPSIS HORTENSIS (Sacc. & Malbr.) Petr.

Stagonosporopsis hortensis (Sacc. & Malbr.) Petrak *in* Annls mycol. **19**: 21. 1921.

≡ *Hendersonia hortensis* Saccardo & Malbranche *in* Michelia **2**(3): 629. 1882 [as '*Hendersonia (Stagonospora) hortensis*'].

≡ *Stagonospora hortensis* (Sacc. & Malbr.) Saccardo & Malbranche *in* Sylloge Fung. **3**: 446. 1884.

H ≡ *Ascochyta hortensis* (Sacc. & Malbr.) Jörstad [Jørstad] *in* Meld. St. plpatol. Inst. **1**: 74. 1945 [not. *A. hortensis* Kabát & Bubák *in Hedwigia* **44**: 353. 1905].

= *Ascochyta boltshauseri* Saccardo apud Boltshauser *in* Z. PflKrankh. **1**: 136. 1891; *in* Sylloge Fung. **10**: 303. 1892.

  ≡ *Stagonosporopsis boltshauseri* (Sacc.) Diedicke *in* Annls mycol. **10**: 141–142. 1912; *in* Krypt.-Fl. Mark Brandenb. **9**, Pilze 7: 400. 1915.

  ≡ *Stagonospora boltshauseri* (Sacc.) Grigoriu *in* Annls Inst. phytopath. Benaki II, **11**: 113. 1975.

Note: One of the two fungi causing Blotch or Leaf Spot of dwarf beans, commonly known in phytopathological literature as *Ascochyta boltshauseri*. The oldest name of this pathogen proved to be *Hendersonia hortensis* (cf. holotype in herb. Saccardo, PAD). In vivo this pathogen can be distinguished from the plurivorous *Phoma exigua* Desm. var. *exigua* (q.v.; syn. *Ascochyta phaseolorum* Sacc.), which causes similar blotch symptoms on dwarf beans, by its usually much larger conidia (up to 34 µm; in *P. e.* var. *exigua* not larger than 10–12 µm). On infected pods, leaves and stems, one-septate (*Ascochyta*-like) conidia of the fungus often predominate, but many non-septate (smaller; *Phoma*-like) and various two- or multiseptate (*Stagonospora*-like) conidia may also occur. In vitro the conidia of the fungus are mostly non-septate and *Phoma*-like, resembling those of *P. e.* var. *exigua*; but usually a few much larger septate conidia can also be found. In contrast with *P. e.* var. *exigua* the fungus does not produce antibiotic 'E'. It is certainly not a true *Ascochyta*, nor a true *Stagonospora*, because the typical species of both these form-genera produce septate conidia in vivo as well as in vitro [distoseptation, see discussion under *Ascochyta pisi* Lib., and Boerema & Bollen *in* Persoonia **8**: 111–144. 1975; for true *Stagonospora* spp. see Cunnell *in* Trans. Br. mycol. Soc. **39**: 21–47. 1956 and 40: 443–455. 1957]. The fungus belongs to a group of species which are related to *Phoma* and at present are best classified under *Stagonosporopsis* Died. For disease symptoms [in comparison with those caused by *P. e.* var. *exigua*] see Sneep *in* Tijdschr. PlZiekt. **51**: 1–16. 1945 and Hubbeling *in* Tuinbouwvoorlichting **3**: 39–41. 1955 (with colour plates). Descriptons of *Stagonosporopsis hortensis* are given by Sprague *in* Phytopathology **25**: 416–420. 1935; Petrak *in* Annls mycol. **41**: 190–195. 1943; and Grigoriu *in* Annls Inst. phytopath. Benaki II, **11**: 109–126. 1975.

STEMPHYLIUM SARCINIFORME (Cav.) Wiltsh.

V *Stemphylium sarciniforme* (Cav.) Wiltshire *in* Trans. Br. mycol. Soc. **21**: 224–228. 1938 [as '*sarcinaeforme*'].

V ≡ *Macrosporium sarciniforme* Cavara *in* Dif. parass. **1890** (4): 1–8. 1890 [as '*sarcinaeforme*'].

Note: Known as the causal organism of Ring Spot of red clover (lesions on leaves and stems), see Sampson & Western, Dis. Br. Grasses herb. Leg. ed. 2, 74–76. 1954. The fungus is seed-borne. Other clovers and herbage legumes can also be attacked by *S. sarciniforme* (cf. Graham & Zeiders *in* Phytopathology 50: 757–760. 1960), but most records of ring spot on leguminous plants refer to *Pleospora herbarum* (Fr. ex Fr.) Rabenh. var. *herbarum*, stat. con. *Stemphylium botryosum* Wallr. (q.v.). For the distinction between these two fungi see Groves & Skolko *in* Can. J. Res., Sect. C, **22**: 195–196. 1944; Neergaard, Dan. Alternaria and Stemphylium 372, 382. 1945; and Ellis, Dematiac. Hyphom. 165–167. 1971.

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. 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: This ubiquitous soil-borne fungus is frequently reported in association with Root Rot and Damping-off of leguminous plants as dwarf beans, peas and lupins. Its nomenclature has already been discussed in Series 1a of the check-list [*in* Neth. J. Pl. Path. **78**, Suppl. 1: 49–50. 1972]. As causal organism of Black Scurf and Stem Canker of potato and Black Leg and Root Rot of beet, this fungus is also listed in check-list 2a [*in* Neth. J. Pl. Path. **82**: 210–211. 1976]. Literature up to 1965 is summarized by Parmeter, Biol. Pathol. Rhizoctonia solani [Proc. Symposium] 1970 [255 pp.]. For descriptions of both states and data on hosts, disease symptoms, pathogenicity and biology see Mordue *in* C.M.I. Descr. pathog. Fungi Bact. 406. 1974. The induction of the perfect state in vitro is discussed by Tu & Kimbrough *in* Phytopathology **65**: 730–731. 1975.

UROMYCES APPENDICULATUS (Pers. ex Pers.) Ung. var. *APPENDICULATUS*

V *Uromyces appendiculatus* (Pers. ex Pers.) Unger, Einfl. Bodens 216. 1836, var. *appendiculatus* [as '*U. appendiculata*', misapplied but validly published (Art. 55); varietal name to be cited without an author's name (Art. 26); see note].

rn ≡ *Uredo appendiculata* Pers. ex Persoon, Syn. meth. Fung. 221–222. 1801, subsp. *appendiculata* [as 'α *Uredo Phaseoli*'; see note].

dn ≡ *Uredo appendiculata* Persoon *in* Annln Bot. [Ed. Usteri] **15**: 17. 1795 [= Obs. mycol. **1**: 17. 1796], subsp. *appendiculata* [as 'α *Uredo Phaseoli*'; see note].

≡ *Hypodermium appendiculatus* (Pers. ex Pers.) Link *in* Ges. naturf. Freunde Berl. Mag. **7**: 28. 1815 [as '*Hypodermium (Uromyces)*'].

H ≡ *Uromyces appendiculatus* (Pers. ex Pers.) Fries, Summ. Veg. Scand. [2] 514. 1849.

H ≡ *Uromyces appendiculatus* (Pers. ex Pers.) Link ex Tulasne *in* Annls Sci. nat. (Bot.) IV, *2*: 185, 192. 1854 [misapplied; but validly published (Art. 55); in the text of Tulasne's paper the combination is also referred to Léveillé (*in* Annls Sci. nat. (Bot.) IV, **8**: 369–376. 1847; Orbigny, Dict. Hist. nat. **12**: 785–786. 1848), who, however, has not made a new combination in the way approved by the International Code, see Laundon *in* Taxon **16**: 194–195. 1967].

≡ *Puccinia phaseoli* (Pers. ex Pers.) Rebentisch, Prod. Fl. neom. 375. 1804.

≡ *Uromyces phaseoli* (Pers. ex Pers.) Winter *in* Hedwigia **19**: 37. 1880, var. *phaseoli* [in older American literature usually cited as 'var. *typica* Arth.', an inadmissible infraspecific epithet in 1934 introduced in Arthur's Manual of Rust, to indicate that it includes the type of the species (see Art. 24, Art. 26)].

= *Uromyces phaseolorum* Tulasne *in* Annls Sci. nat. (Bot.) IV, **2**: 88. 1854 [with reference to *Uredo appendiculata* α *Phaseoli* Pers.; epithet derived from the uredinial name *Uredo phaseolorum* de Candolle in de Candolle & de Lamarck, Fl. fr. (ed. 3) **5** (6): 63. 1815], apud de Bary *in* Annls Sci. nat. (Bot.) IV, **20**: 80. 1863.

Note: This common Rust of dwarf beans (uredinia and telia; rarely spermogonia and aecidia) was formerly generally known as *Uromyces phaseoli*, a name based on the infraspecific taxon (subspecies) *Uredo appendiculata* α *phaseoli* Pers., which, however, includes the type of *Uredo appendiculata* Pers. [Hylander, Jörstad (Jørstad) & Nannfeldt *in* Op. bot. Soc. bot. Lund **1**(1): 86. 1953; the other subspecies distinguished by Persoon (1801 l.c.) refer to *Uromyces pisi* (q.v.) and *Uromyces laburni* (DC.) Otth f. sp. *genistae-tinctoriae* (see check-list 1a *in* Neth. J. Pl. Path. **78**, Suppl. 1: 51–52. 1972)]. In this case, therefore, subsp. *phaseoli* must be changed to subsp. *appendiculata* (Art. 26), and the correct specific binomial of the bean rust is *Uromyces appendiculatus*. In older literature this combination has been ascribed to different authors ('Lév.', 'Link', 'Fr.'), but Unger (l.c.) appears to be the first who validly published the combination *Uromyces appendiculatus* [although misapplied to the rust on field beans, see Jörstad (Jørstad) *in* Nytt Mag. Bot. **6**: 136. 1958 and Art. 55]. The rust is not restricted to *Phaseolus* spp., but also recorded on other leguminous plants, as *Dolichos* and *Vigna* spp., see Guyot *in* Encycl. mycol. **29** [Urédinées 3 – *Uromyces*]: 481–505. 1957 [under *U. phaseoli*]. A rust on *Ramarizella strobiliformis*, recorded in Mexico, was thought at one time to be identical with the bean rust, but is now recognized as a separate variety: *U. appendiculatus* var. *punctiformis* (P. Syd.) Cummins *in* Mycotaxon **5**: 407. 1977. The publication of this variety has automatically established the varietal name *U. appendiculatus* var. *appendiculatus* (autonym). For descriptions, other synonyms and biology see Guyot l.c., Gäumann *in* Beitr. KryptogFlora Schweiz **12**: 340–341. 1959 [under *U. phaseoli*], Wilson & Henderson, Br. Rust Fungi 321–322. 1966 and Laundon & Waterston *in* C.M.I. Descr. pathog. Fungi Bact. 57. 1965.

UROMYCES FABAE (Grev.) de Bary ex Fuckel

Uromyces fabae (Grev.) de Bary ex Fuckel *in* Jb. nassau. Ver. Naturk. **23–24** [= Symb. mycol.]: 62. 1870 ["1869 und 1870"] [referring to de Bary *in* Annls Sci. nat. (Bot.) IV, **20**: 5–148. 1863, who however, used the combination *Uromyces fabae* only incidentally (Art. 34) as a synonym of the misapplied name *Uromyces appendiculatus* (Pers. ex Pers.) Unger (q.v.). Without doubt, de Bary's *Uromyces fabae* is derived from *Puccinia fabae* Grev. (see below), mentioned by Tulasne *in* Annls Sci. nat. (Bot.) IV, **2**: 89, 90. 1854 as synonymous with *U. appendiculatus*; see also Cummins & Stevenson *in* Pl. Dis. Reptr, Suppl. **237**: 186. 1956].

≡ *Puccinia fabae* Greville, Scott. crypt. Fl. **1**: 29. 1822.

≡ *Puccinia globosa* Greville, Fl. edin. 434. 1824 [name change].

= *Uromyces viciae-fabae* P. Karsten *in* Bidr. Känn. Finl. Nat. Folk **31** [= Mycol. Fen. 4]: 13. 1879 [with description of telia 'in Fennia australi freqventer obveniunt'; as '(Pers.) Schroet.' (see below), stating that *Uredo viciae-fabae* Persoon, Syn. meth. Fung. 221. 1801 refers to the telial state; Persoon, however, had described the uredo only, see note].

O = *Uromyces viciae-fabae* Otth *in* Mitt. naturf. Ges. Bern **1863**: 86. 1863 [telia not described, nom. nud.; as comb. nov. of the uredinial name *Uredo viciae-fabae* from Persoon (see above and the note) as adopted by the Candolle in de Candolle & de Lamarck, Fl. fr. (ed. 3) **5** (6): 69. 1815].

O = *Uromyces viciae-fabae* Schroeter *in* Hedwigia **14**: 161. 1875 [telia not described, nom. nud.; as comb. nov. of the uredinial name *Uredo viciae-fabae* Pers. (see above and the note)].

H = *Uromyces viciae-fabae* Jörstad [Jørstad] *in* Skr. norske Vidensk-Akad. [Mat.-naturw. Kl.] **9** [1933]: 144. 1934 [with reference to the description of the telial state as given by de Bary l.c.; as comb. nov. of the uredinial name *Uredo viciae-fabae* Pers. (see above and the note)].

Note: In recent literature this common Rust of field (broad) beans and vetches (uredinia and telia; spermogonia and aecidia common on some vetches, rare on field beans), is usually referred to as *Uromyces viciae-fabae*. The epithet of this name is derived from Persoon's *Uredo viciae-fabae* listed in the starting-point book (Syn. meth. Fung.). Jörstad [Jørstad], *in* Blumea **9**: 10. 1958, found some telia in a collection of *Uredo viciae-fabae* in Persoon's herbarium, which he selected as lectotype. However, Persoon had described the uredo only and not the telia; therefore *Uredo viciae-fabae* Pers. cannot be the basionym of the perfect state [paragraph 3 of the present Art. 59 (Leningrad Code); compare Deighton *in* Taxon **9**: 238–239 (231–241). 1960]. Description of the telia under the name *Uromyces viciae-fabae* was first given by P. Karsten (l.c.) in 1879. This means that the binomial *Uromyces fabae*, based on *Puccinia fabae* Greville (1822 l.c.), has priority. *U. fabae* is not restricted to *Vicia* spp., but has also been recorded on many other leguminous plants. Inoculation experiments have shown that the rust includes different specialized pathogenic forms (with overlapping host ranges) and many races. For a detailed account of host records and specialization see Guyot *in* Encycl. mycol. **29**

[Urédinées 3 – Uromyces]: 505–554. 1957. See also Gäumann *in* Beitr. KryptogFlora Schweiz **12**: 275–277. 1959, Wilson & Henderson, Br. Rust Fungi 323–326. 1966 [under *U. viciae-fabae*] and Laundon & Waterston *in* C.M.I. Descr. pathog. Fungi Bact. 60. 1965 [under *U. viciae-fabae*]. Full synonymy can be found in Guyot l.c.

UROMYCES PISI (DC.) Otth [sensu stricto]

Uromyces pisi (DC.) Otth *in* Mitt. naturf. Ges. Bern **1863**: 87. 1863.

≡ *Puccinia pisi* de Candolle *in* de Candolle & de Lamarck, Fl. fr. [ed. 3] **2**: 224. 1805.

H rn = *Uromyces pisi* (Pers.) ex Winter *in* Rabenh. Krypt.-Fl. [ed. 2], Pilze **1** [Lief. 3]: 163. 1882 [vol. dated "1884"].

dn ≡ *Uredo appendiculata* subsp. *pisi* Persoon *in* Annln Bot. [Ed. Usteri] **15**: 17. 1795 [= Obs. mycol. **1**: 17. 1796; as 'β *U. Pisi*'; concerns the telial state].

np = *Uromyces pisi-sativi* (Pers.) Liro *in* Bidr. Känn. Finl. Nat. Folk **65**: 100. 1908.

≡ *Uredo appendiculata* subsp. *pisi-sativi* Persoon, Syn. meth. Fung. 222. 1801 [as 'β *Uredo Pisi-sativi*'; concerns the telial state].

Note: Refers to the Rust of field and garden peas (uredinia and telia), which alternates with *Euphorbia* species, especially *E. cyparissias* L. (spermogonia and aecidia). However, the rust is independent of host alternation; it generally overwinters by means of the uredospores. Hylander, Jörstad [Jørstad] & Nannfeld *in* Op. bot. Soc. bot. Lund **1** (1): 93–95. 1953 use the name *Uromyces pisi* as a collective name for the various leguminous rusts which have proved to produce aecidia on *Euphorbia cyparissias* and allies. Wilson & Henderson, Br. Rust Fungi 330–334. 1966 follow this line. However, we do not believe that this is quite correct, because the leguminous rusts in question can be distinguished by the sculpture of the teleutospores and by the number of pores as well as the dimension of the uredospores, see Gäumann *in* Beitr. KryptogFlora Schweiz **12**: 356–358. 1959. *U. pisi* sensu stricto is also recorded on *Lathyrus*, *Orobus* and *Vicia* spp., see Guyot *in* Encycl. mycol. **29** [Urédinées 3 – *Uromyces*]: 213–237. 1957. The data on specialization are still confusing; apparently different races as well as host-related specialized forms occur, see Guyot l.c. and Gäumann l.c. For descriptions and the biology of *U. pisi* sensu stricto see Guyot l.c., Gäumann l.c., and Laundon & Waterston *in* C.M.I. Descr. pathog. Fungi Bact. 58. 1965, who discussed this rust under the synonym *Uromyces pisi-sativi* [the subspecific epithet *pisi-sativi*, although used by Persoon in the starting-point book (Syn. meth. Fung.) has no priority in the specific rank, Art. 60].

UROMYCES STRIATUS Schroet.

Uromyces striatus Schroeter *in* Abh. schles. Ges. vaterl. Cult., Abth. Naturw. u. Med. **1869–72**: 11. 1870.

Note: This Rust of black medick or yellow trefoil and lucerne (uredinia and telia) alternates with *Euphorbia* spp., especially *E. cyparissias* L. (spermogonia and aecidia). Many other species of *Medicago* and some yellow-flowered species of *Trifolium* are also susceptible. The common cultivated clovers are resistant. Overwintering may take place by means of uredospores, which makes the rust independent of host alternation. For a detailed account on the host records of this rust see Guyot *in* Encycl. mycol. **29** [Urédinées 3 – *Uromyces*]: 429–456. 1957. Hylander, Jörstad [Jørstad] & Nannfeldt *in* Op. bot. Soc. bot. Lund. **1** (1): 93–95. 1953 and Wilson & Henderson, Br. Rust Fungi 330–337. 1966 consider this rust as a race of *U. pisi* (DC.) Otth, which produces similar spermogonia and aecidia on *Euphorbia* spp. Parmelee *in* Can. J. Bot. **40**: 491–510. 1962, however, showed that *U. striatus* can always be distinguished by the smaller number and equatorial position of the pores in its uredospores and the striate wall sculpturing of its teleutospores in contrast to the punctate teleutospores of *U. pisi.* For descriptions and reviews of the numerous literature data on *U. striatus* see Guyot l.c., Parmelee l.c., and Laundon & Waterston *in* C.M.I. Descr. pathog. Fungi Bact. 59. 1965. According to Viennot-Bourgin *in* Revue Mycol. **42**: 322–339. 1978, a different rust, *Uromyces magnusii* Kleb., occurs on lucerne in the mediterranean regions.

UROMYCES TRIFOLII (Hedw. f. ex DC.) Fuckel

Uromyces trifolii (Hedw. f. ex DC.) Fuckel *in* Jb. nassau. Ver. Naturk. **23–24** [= Symb. mycol.]: 63. 1870 ["1869 und 1870"].

≡ *Puccinia trifolii* R. A. Hedwig ex de Candolle in de Candolle & de Lamarck, Fl. fr. [ed. 3] **2**: 225. 1805 [lectotype on *Trifolium repens*, see Walker *in* Mycotaxon **7**: 423–435. 1978].

= *Uromyces flectens* Lagerheim *in* Svensk bot. Tidskr. **3**: 36. 1909.

Note: We follow Walker l.c., accepting *U. trifolii* as the most appropriate name for the microcyclic Rust of cultivated and wild white clover (only telia). The name *U. trifolii* has also been used for the macrocyclic rust of white clover, *U. trifolii-repentis* Liro ex Liro var. *trifolii-repentis* (q.v.), and in particular for the macrocyclic rust of red clover, *U. trifolii-repentis* var. *fallens* (Arth.) Cummins (q.v.). Jörstad *in* Nytt Mag. Bot. **14**: 19–30. 1967 and Laundon *in* Mycotaxon **3**: 133–161. 1975 have proposed to reject the name *U. trifolii* under Art. 69 and Art. 70. Walker l.c., however, showed that all the available de Candolle material of *Puccinia trifolii* (≡ *Uromyces trifolii*) refers to the microcyclic rust of white clover; the selected lectotype is labelled '*Puccinia trifolii* in *Trifolio repente*' and corresponds with the original description. Therefore we have adopted Walker's conclusion that there is no reason to reject the name *U. trifolii.* Other names most commonly used for this microcyclic telial rust are *U. flectens* described by Lagerheim l.c. and *U. nerviphilus* (Grogn.) Hotson [*in* Publs Puget Sound mar. biol. Stn **4**: 368. 1925; basionym *Puccinia nerviphila* Grognot, Pl. crypt. Saône-et-Loire 154. 1863]. These names have also been used to varying degrees in different senses. Walker l.c. found the authentic material of *U. flectens* to be identical with *U. trifolii.* Laundon l.c. adopted the name *U. nerviphilus* for the microcyclic telial rust of white clover, but this name is rejected by Walker l.c. in the absence of its type specimen and because essential details of fungal morphology and host identity were not given in the original description. The teleutospores of the microcyclic *U. trifolii* and the two macrocyclic varieties of *U. trifolii-repentis* are morphologically very similar, but those of *U. trifolii* are usually somewhat more verrucose. The telia of both species are usually easily distinguished, because those of *U. trifolii-repentis* are small and scattered on the leaves, whereas those of *U. trifolii* form large aggregates chiefly along nerves and on petioles and stems. *U. trifolii* can be characterized as a perennial rust: the mycelium hibernates in the rhizome and buds, see Kobel *in* Centbl. Bakt. ParasitKde Abt. II, **52** (9/12): 221–227. 1920 (under *U. flectens*). Inoculation experiments by Kobel l.c. have shown that *U. trifolii* from white clover is also able to attack other species of *Trifolium*; see also Guyot *in* Encycl. mycol. **29** [Urédinées 3 – *Uromyces*]: 330–339. 1957 and Gäumann *in* Beitr. KryptogFlora Schweiz **12**: 330, 351. 1959 (both under *U. flectens*). For descriptions of the telia and teleutospores of *U. trifolii* see Guyot l.c., Gäumann l.c., Wilson & Henderson, Br. Rust Fungi 328. 1966 (under *U. nerviphilus)* and Walker l.c.

UROMYCES TRIFOLII-REPENTIS Liro ex Liro var. *TRIFOLII-REPENTIS*

Uromyces trifolii-repentis Liro ex Liro *in* Bidr. Känn. Finl. Nat. Folk **65**: 94. 1908, var. *trifolii-repentis* [telial state described as comb. nov. of the aecidial name *Aecidium trifolii-repentis* Castagne, Obs. Pl. Acotyl. Ured. **1**: 33. 1842, comp. Art. 59; the combination was already made by Liro *in* Acta Soc. Fauna Flora fenn. **29** (6): 15. 1906 but without a description of the telial state [*0*]; the varietal name is automatically established (autonym) by the publication in 1977 of *U. trifolii-repentis* var. *fallens* (Arth.) Cummins, and must be cited without an author's name, Art. 26].

≡ *Uromyces trifolii* var. *trifolii-repentis* (Liro ex Liro) Arthur, Man. Rusts 304. 1934.

= *Uromyces trifolii-hybridi* H. Paul, Krypt. Forsch. **2**: 50. 1917.

Note: This macrocyclic autoecious Rust was originally described from white clover (spermogonia, aecidia, uredinia, telia), but at present the name *U. trifolii-repentis* is also applied to morphologically similar rusts on other clovers, see e.g. the hosts listed by Guyot *in* Encycl. mycol. **29** [Urédinées 3 – *Uromyces*]: 315–330. 1957. It can be differentiated from *U. trifolii-repentis* var. *fallens* (Arth.) Cummins (q.v.), main host red clover, by the number and location of the pores in the uredospores, see Laundon *in* Trans. Br. mycol. Soc. **61**: 83–87. 1973 (mean number of pores less than 4, percentage spores with only equatorial pores greater than 60%). The biology of the host-forms of *U. t.-r.* var. *trifolii-repentis* on white clover and alsike clover or Swedish clover (syn. *U. trifolii-hybridi*) was studied by Kobel *in* Centbl. Bakt. ParasitKde Abt. II, **52** (9/12): 218–221. 1920. These host-forms can be regarded as specialized, biologically different, pathogenic forms (separate formae speciales). The form on white clover may be confused with the perennial rust of white clover, *Uromyces trifolii* (Hedw. f. ex DC.) Fuckel (q.v.), which, however, only produces telia [microcyclic; syn. *Uromyces flectens* Lagerh.]. For descriptions of *U. t.-r.* var. *trifolii-repentis* see Guyot l.c., Gäumann *in* Beitr. KryptogFlora Schweiz **12**: 347–349. 1959 [under the names *U. trifolii-hybridi* and *U. trifolii-repentis*] and Wilson & Henderson, Br. Rust Fungi 337–339. 1966 [under '*U. trifolii*'; misapplied].

UROMYCES TRIFOLII-REPENTIS var. *FALLENS* (Arth.) Cummins

Uromyces trifolii-repentis var. *fallens* (Arth.) Cummins *in* Mycotaxon **5**: 407. 1977 [neotype on *Trifolium pratense* L.].

≡ *Nigredo fallens* Arthur *in* N. Am. Flora **7** (3): 254 1912 [telial state described as comb. nov. of the uredinial name *Uredo fallens* Desmazières *in* Pl. cryptog. France (ed. 1) No. 1325. 1843 and *in* Annnls Sci. nat. (Bot.) III, **3**: 357. 1845, comp. Art. 59].

≡ *Uromyces fallens* (Arth.) Kern ex Bartholomew, Handb. N. Am.

Ured. 61. 1918 [name based on the uredinial name *Uredo fallens* Desm. (see above); Kern *in* Phytopathology **1**: 6. 1911 gives no description of the telial state [*0*], but Bartholomew l.c. listed Arthur's *Nigredo fallens* as a synonym of the combination made by Kern].

≡ *Uromyces trifolii* var. *fallens* (Arth.) Arthur, Man. Rusts 305. 1934 [as comb. nov. of the uredinial name *Uredo fallens* Desm., see above].

Note: The name *U. trifolii-repentis* var. *fallens* refers to a macrocyclic autoecious Rust which in the field is probably restricted to red clover (spermogonia, aecidia, uredinia, telia). Records on other clovers may concern different specialized forms [compare Guyot *in* Encycl. mycol. **29** (Urédinées 3 – *Uromyces*): 314. 1966] or may be due to confusion with the related *U. trifolii-repentis* Liro ex Liro var. *trifolii-repentis* (q.v.) [compare Laundon *in* Trans. Br. mycol. Soc. **61**: 83–87. 1973]. *U. t.-r.* var. *fallens* is generally similar to var. *trifolii-repentis* except in the number and location of the pores in the uredospores, see Laundon l.c. and Cummins l.c. (mean number of pores greater than 4, percentage spores with only equatorial pores less than 40%). In older literature this macrocyclic rust of red clover is commonly referred to as *U. trifolii* (Hedw. f. ex DC.) Fuckel (q.v.), which, however, according to its lectotype, refers to the microcyclic telial rust of white clover [syn. *U. flectens* Lagerh.], see Walker *in* Mycotaxon **7**: 423–435. 1978. The uredinial state is prevalent in *U. t.-r.* var. *fallens* which can overwinter by means of uredospores and uredomycelium, see Kobel *in* Centbl. Bakt. ParasitKde Abt. II, **52** (9/12): 217. 1920. For descriptions see Laundon 1973 l.c. [uredospores; under *U. fallens*]; Gäumann *in* Beitr. KryptogFlora Schweiz **12**: 345–347. 1959 [under '*U. trifolii*'; misapplied] and Wilson & Henderson, Br. Rust Fungi 326–327. 1966 [under *U. fallens*].

VERTICILLIUM ALBO-ATRUM Reinke & Berth.

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

Note: Both organisms involved in Verticillium Wilt, *V. albo-atrum* and *V. dahliae* Kleb. (listed below) may attack herbage legumes. Both species are typical plurivorous parasites [compare check-list 1a (*in* Neth. J. Pl. Path. **78**, Suppl. 1: 54–55. 1972) and 2a (*in* Neth. J. Pl. Path. **82**: 211–212. 1976)]. However, isolates of *V. albo-atrum* from lucerne evidently show some host specificity, see Heale & Isaac *in* Ann. appl. Biol. **52**: 439–451. 1963. Various European cultivars of lucerne are moderately to highly *Verticillium* wilt-resistant, see e.g. Graham, Peaden & Evans *in* Pl. Dis. Reptr. **61**: 337–340. 1977. A review on the extensive literature on the diseases caused by both *Verticillium* species has 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. Centbl. [Mycol. Zentbl.] **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.