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ON PHOMA MACROSTOMUM MONT., A UBIQUITOUS SPECIES ON WOODY PLANTS

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(With five Text-figures)

The synonymy, characteristics, and habitat of *Phoma macrostomum* are discussed. In vitro two varieties can be distinguished: variety *macrostomum* with reddish pigmented hyphae and variety *incolorata* (Horne) comb. nov. with colourless hyphae.

The comparative study of *Phoma*-isolates obtained in our diagnostic work on diseased plants has led to the recognition of various 'polyphagous' *Phoma* species; compare Boerema (1964, 1970), Boerema & *al.* (1965, 1968), Boerema & Höweler (1967), and Dorenbosch (1970). In this paper the synonymy, diagnostic characters, and habitat of a *Phoma* species occurring frequently on necrotic tissue of all kinds of trees and shrubs are treated.

The names of authors are abbreviated in accordance with Grummann's "Autorenliste" (1963: 59–74), and with Ainsworth's list (1961: 37–41). Herbaria and culture collections are coded according to Lanjouw & Stafleu (1959) and the list of abbreviations in the catalogue of the American Type Culture Collection (Ed. 8, 1968). Titles of journals are abbreviated in accordance with the "World List of Scientific Periodicals", 1963–1965.

Phoma macrostomum Mont. var. macrostomum

Phoma macrostomum Mont. *in* Annls Sci. nat. (Bot.) III, **11**: 52. 1849. — Lectotype: isotype, Salon, 1849, Castagne (Herb. Roussel, PC).

Phoma phyllostictoides Desm. *in* Pl. crypt. France II [ed. 3] Fasc. 14, No. 694. 1859.

Phoma herbarum f. *catalpae-capsularum* Sacc. *in* Michelia **2** (1): 93. 1880; *in* Sylloge Fung. **3**: 133. 1884.

Phoma herbarum f. *lilacis* Sacc. *in* Michelia **2** (1): 93. 1880; *in* Sylloge Fung. **3**: 133. 1884.

Phoma herbarum f. *rubi* Sacc. *in* Michelia **2** (1): 93. 1880; *in* Sylloge Fung. **3**: 133. 1884.

Phoma pomi Schulzer & Sacc. ["*Phoma* (*Aposphaeria*?) *pomi*"] *in* Hedwigia **23**: 109. 1884; not *Phoma pomi* Pass. *in* Atti Accad. naz. Lincei Rc. (Cl. Sci. fis. mat. nat.) **4** (2): 96. 1888 (see Brooks & Black *in* Phytopathology **2**: 63–72. 1912). — *Aposphaeria pomi* (Schulzer & Sacc.) Sacc. *in* Sylloge Fung. **3**: 177. 1884.

Phoma mororum Sacc. *in* Boll. mens. Bachicolt. II, **2**: 53–56. 1884; *in* Sylloge Fung. **3**: 95. 1884.

Phoma cicatricum Pass. *in* Atti Accad. naz. Lincei Rc. (Cl. Sci. fis. mat. nat.) **4** (2): 96. 1888.

Aposphaeria caricae Pass. ("*Apospheria*") *in* Atti Accad. naz. Lincei Rc. (Cl. Sci. fis. mat. nat.) **4** (2): 99. 1888.

Phyllosticta saxifragae Brunaud *in* Annls Soc. Sci. nat. Charente-Inférr. **1889**: 53. 1889 (or 1890?, not seen).

Phoma friesii Brunaud *in* Bull. Soc. bot. Fr. **36** (= II, **11**): 337. 1889.

Phyllosticta mali Prill. & Delacr. *in* Bull. Soc. mycol. Fr. **6**: 181. 1890; not *Phyllosticta mali* Briard, Fl. cryptog. Aube & Suppl. cat. Troyes 79. 1888 [= *Asteromella mali* (Briard) Boerema; see Boerema & Dorenbosch, 1965].

Phyllosticta limitata Peck *in* Rep. N.Y. St. Mus. nat. Hist. **50**: 115. 1897. — *Phoma limitata* (Peck) Boerema *apud* Boerema & Dorenbosch *in* Versl. Meded. plziektenk. Dienst **142** (Jaarb. 1964): 138. 1965.

Phyllosticta robinicola Hollós ("*P. robiniaecola*") *in* Annls hist.-nat. Mus. natn. hung. **8**: 2. 1910.

Phyllosticta taxi Hollós *in* Annls hist.-nat. Mus. natn. hung. **8**: 3. 1910.

Polyopeus purpureus var. *verus* Horne *in* J. Bot., Lond. **58**: 240. 1920.

MISAPPLICATIONS.—

Phoma mori Mont. [*Aposphaeria mori* (Mont.) Sacc.] *sensu* Wollenw. & Hochapf. *in* Z. ParasitKde **8**: 583. 1936, and *Aposphaeria pezizoides* Ell. & Ev., *Phoma morearum* Brunaud, *Phoma salicina* Westend., *Phoma euonymella* Brunaud, *Phoma cinerascens* Sacc. *sensu* Wollenw. & Hochapf. *in* Z. ParasitKde **8**: 583. 1936 (as syn. of "*P. mori*").

Phoma elliptica Fuck. ("*P. ellipticum*"; name change of *Hysterium samarae* Fr.) *sensu* Wollenw. & Hochapf. *in* Z. ParasitKde **8**: 586. 1936, and *Phoma platanoidis* Cooke *sensu* Wollenw. & Hochapf. *in* Z. ParasitKde **8**: 586. 1936 (as syn. of "*P. ellipticum*").

Phoma exigua Desm. *sensu* Brook *in* N.Z. Jl agric. Res. **11**: 242. 1968.

DESCRIPTIONS & ILLUSTRATIONS IN VITRO.—Horne *in* J. Bot., Lond. **58**: 240, 241. 1920 (*Polyopeus purpureus* var. *verus*); Wollenweber & Hochapfel *in* Z. ParasitKde **8**: 583–586, fig. 10. 1936 ("*Phoma mori*", misapplied); *in* Z. ParasitKde **8**: 586–587, fig. 11. 1936 ("*Phoma ellipticum*", misapplied); Boerema & Dorenbosch *in* Versl. Meded. plziektenk. Dienst **142** (Jaarb. 1964): 138–142, figs. 2, 3. 1965 (*Phoma limitata*).

DIAGNOSTIC CHARACTERS IN VIVO.—Pycnidia (Fig. 1) immersed to superficial, ferruginous to black, spherical-oval, 80–260 μ diam., with one distinct ostiole 10–30 μ in diam. Pycnidiospores (Fig. 2) hyaline, ellipsoid or oval, usually 1-celled, occasionally 2-celled, 4.2–8.5 × 2.1–3.8 μ (av. 6.3 × 3.1 μ).

DIAGNOSTIC CHARACTERS IN VITRO.—Pycnidia (Fig. 3) superficial or immersed in agar, ferruginous to black, spherical to subpyriform (pitcher-shaped), or irregular, sometimes with one or more neck-like outgrowths, size variable, mostly 100–230 μ (80–300 μ); ostioles 20–45 μ diam. Pycnidiospores (Fig. 4) hyaline, generally ellipsoid to reniform-oblong; 1-celled, 5–8 × 2–4 μ (av. 6.5–2.6 μ) or 2-(occasionally 3- or 4-)celled, 8.5–14 × 3–4 μ. The spore exudate is usually tinged pink. In old cultures the pycnidia may also contain swollen brown coloured spores (Fig. 5), nearly twice the size of the hyaline pycnidiospores.

The hyphae have red to violet pigment in the plasm and the guttules, rendering the fungus characteristically dull red-violet in culture.

HABITAT.—Ubiquitous on necrotic tissue of various parts of all kinds of woody plants; also incidental on herbaceous plants (see Table I). Very often associated with spots on leaves and fruits of apple. The fungus behaves like a weak parasite or wound parasite.

SPECIMENS EXAMINED.—
Exsiccata: *Phoma macrostomum*, lectotype (Herb. Roussel, PC); *Phoma phyllostictoides*, isotype (Herb. Desmazières, PC); *Phoma herbarum* f. *catalpae-capsularum*, holotype (Herb. Saccardo, PAD); *Phoma herbarum* f. *rubi*, holotype (Herb. Saccardo, PAD); *Phyllosticta mali* Prill. & Delacr., holotype (Herb. Delacroix, VER[1]).
Cultures: *Phyllosticta limitata*, from leaf spots of apple, USA, isolated by Whetzel (CBS 115.12); "*Phoma ellipticum*" (misapplied), (Nr. 4992) from stem of *Rosa multiflora* 'Cathayensis', Germany, isolated by Wollenweber (CBS 297.36); "*Phoma exigua*" (misapplied), (Nr. 68109) from pre-harvest lenticel spot of apple, New Zealand, isolated by Brook (1968); and numerous Dutch isolates from all kinds of trees and shrubs (Table I), e.g. from apple branches (*Phoma limitata*, ATCC 16583, CBS 529.66 and CMI 118.020) and branch of elm (*Phoma limitata*, CBS 371.61).

Although the fungus frequently produces septate spores, especially in vitro, its sporogenesis places it in the form-genus *Phoma* Sacc., see Boerema (1965).

Its oldest known name, *Phoma macrostomum*, refers to the characteristic, usually wide, ostiole of the fungus; compare Boerema & Dorenbosch (1965). The original material of *P. macrostomum* in Herb. Roussel (PC), selected here as lectotype, consists of four pieces of *Hedera helix* stem with numerous pycnidia, each containing ellipsoid spores typical of the fungus growing in vivo (see 'Diagnostic characters' above). The microscopical characteristics of the type material have further been compared with Dutch material of the fungus on ivy; cultures from these were also studied (Table I).

The fungus appears to have been described in vitro for the first time by Horne (1920) as *Polyopeus purpureus* var. *verus*, type of the form-genus *Polyopeus*. The epithet 'purpureus' refers to the characteristic rose-purple colour of the mycelium in culture. Three other 'varieties' of *Polyopeus purpureus* distinguished by Horne did not show this pigmentation; they belong to *Phoma macrostomum* var. *incolorata*, discussed below. Both Horne and Kidd & Beaumont (1924) frequently isolated *Polyopeus purpureus* var. *verus* from "spotted" fruits of various commercial apple varieties. This type of injury caused by the fungus ('latent parasite', cf. Bondoux, 1967) is still well known; compare Boerema & Dorenbosch (1965), van Kesteren (1966), van der Scheer (1969), and Brook (1968, under the misapplied name *Phoma exigua*). The criterion of Horne's genus *Polyopeus* differentiating it from *Phoma* was thought to be the development of one or more tubular neck-like outgrowths on the pycnidia, which is common in cultures of *Phoma macrostomum* (see 'Diagnostic characters'); however, various *Phoma* species may occasionally show such (multi)rostrate pycnidia in vitro. Therefore we agree with Grove (1935: 162) that it is unreal and undesirable to base a separate genus on the occurrence of rostrate pycnidia.

The widespread occurrence of the fungus on various parts of all kinds of trees and shrubs was first recognized by Wollenweber & Hochapfel (1936). Because of small differences in the sizes of the spores and pycnidia in culture—which is a matter

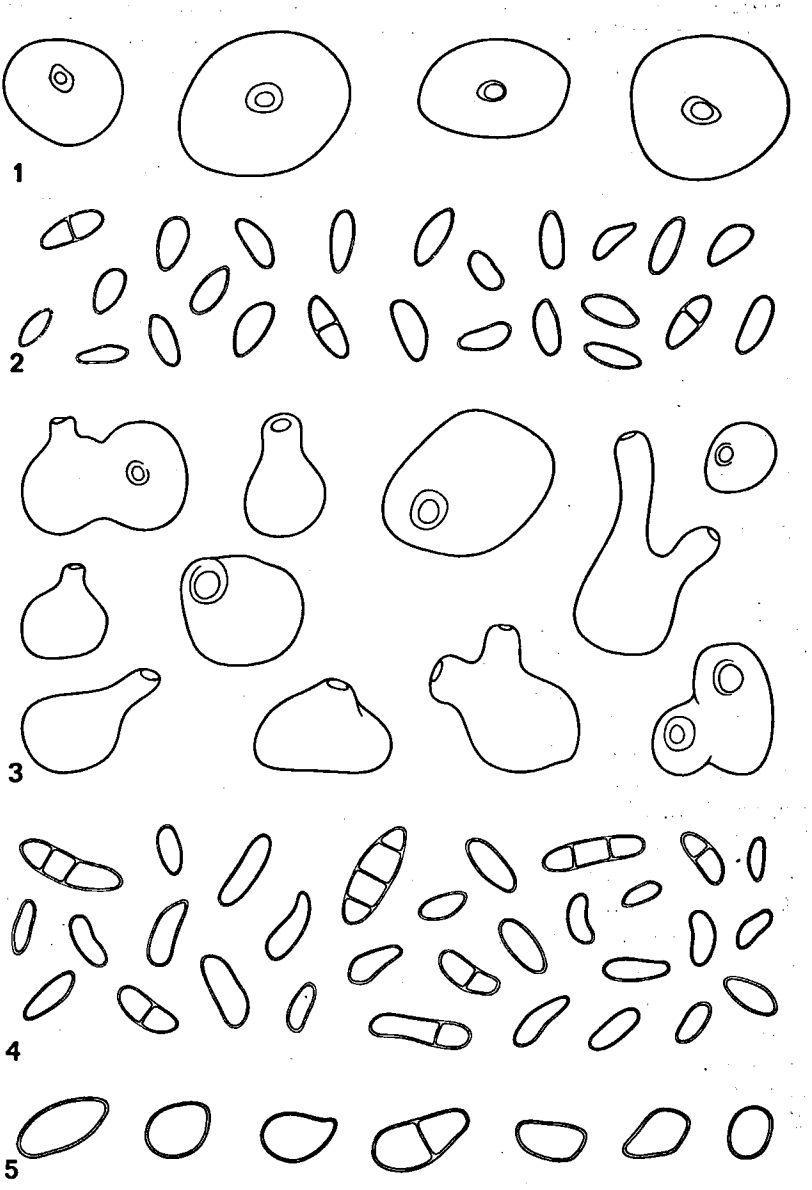
[1] Station centrale de Pathologie Végétale, Versailles; not listed by Lanjouw & Stafleu (1959).

TABLE I

HOSTPLANTS FROM WHICH PHOMA MACROSTOMUM HAS BEEN ISOLATED

Aceraceae	4	Hamamelidaceae	1	Rosaceae (cont.)	
Acer (2 + 1+)		*Hamamelis* (1)		*Prunus* (15)	
Anthurium (1)		Hippocastanaceae	1	*Pyrus* (27 + 2+)	
Apocynaceae	1	*Aesculus* (1)		*Rosa* (8)	
Vinca (1)		Iridaceae	1	*Rubus* (2)	
Araliaceae	2	*Freesia* (1)		*Sorbus* (4)	
Hedera (2)		Juglandaceae	4	*Stranvaesia* (1 + 1+)	
Berberidaceae	3	*Juglans* (4)		Salicaceae	6
Berberis (2)		Liliaceae	2	*Populus* (2)	
Mahonia (1)		*Convallaria* (1+)		*Salix* (4)	
Bignoniaceae	2	*Tulipa* (1)		Saxifragaceae	14
Catalpa (2)		Magnoliaceae	4	*Hydrangea* (5)	
Caprifoliaceae	13	*Magnolia* (4)		*Philadelphus* (2)	
Viburnum (8)		Moraceae	2	*Ribes* (7)	
Sambucus (5)		*Morus* (2)		Scrophulariaceae	2
Chenopodiaceae	2	Oleaceae	21	*Antirrhinum* (1)	
Beta (1)		*Forsythia* (2)		*Scrophularia* (1+)	
Chenopodium (1)		*Fraxinus* (12)		Solanaceae	5
Compositae	6	*Ligustrum* (1)		*Lycium* (3)	
Achillea (1)		*Syringa* (6)		*Solanum* (2)	
Chrysanthemum (2)		Orchidaceae	1	Taxaceae	1
Galinsoga (1)		*Pterocatleya* (1)		*Taxus* (1)	
Lactuca (1)		Papaveraceae	1	Thymelaeaceae	1
Solidago (1)		*Dicentra* (1)		*Daphne* (1)	
Cornaceae	2	Papilionaceae	6	Tiliaceae	1
Cornus (2)		*Colutea* (1)		*Tilia* (1)	
Corylaceae	2	*Laburnum* (1)		Ulmaceae	2
Alnus (1)		*Robinia* (3)		*Ulmus* (2)	
Corylus (1)		*Trifolium* (1)		Umbelliferae	5
Cucurbitaceae	1	Platanaceae	1	*Apium* (2)	
Cucumis (1)		*Platanus* (1)		*Heracleum* (1)	
Cupressaceae	1	Rosaceae	149	*Sium* (1 + 1+)	
Chamaecyparis (1)		*Cotoneaster* (3)		Urticaceae	2
Elaeagnaceae	1	*Crataegus* (4)		*Urtica* (2)	
Elaeagnus (1)		*Exochorda* (1)		Vitaceae	2
Ericaceae	3	*Fragaria* (3)		*Vitis* (2)	
Rhododendron (3)		*Malus* (73 + 3+)			
Guttiferae	2	*Mespilus* (1)			
Hypericum (2)		*Physocarpus* (1)			

The ciphers in the table refer to the number of isolates made of *Phoma macrostomum* (+ denotes var. *ineolorata*). In the period 1961–1969, 280 isolates were made from diseased or dead plant material distributed over 39 families and 73 genera of Phanerogams. These isolates were obtained from stems (144), leaves (59), roots (6), and seeds or fruits (71).



Figs. 1–5. *Phoma macrostomum* s. l. — 1. Pycnidia in vivo. — 2. Pycnidiospores in vivo. — 3. Pycnidia in vitro. — 4. Pycnidiospores in vitro. — 5. Swollen dark coloured spores from old pycnidia in vitro.

of phenotypes—they differentiated this pigmented fungus into two "species," which they described under the names "*Phoma mori*" and "*Phoma ellipticum.*" Both names were misapplied, as already noted by Boerema & Dorenbosch (1965). *Phoma* (*Aposphaeria*) *mori* proves to be the *Phomopsis*-state of *Diaporthe sociabilis* Nitschke, see von Höhnel (1910: 660) and Wehmeyer (1933: 119). According to Fuckel, Fungi rhen. Suppl. Fasc. 7, No. 2128 (1868) at M and G, *Phoma elliptica* ("*ellipticum*"; ≡ *Hysterium samarae*) is probably a species of *Dothichiza* (*Sclerophoma*; compare Petrak, 1923: 266, 267) and is in any case quite different from *P. macrostomum.* (No original material of *Hysterium samarae* has been preserved.)

Various other names listed by Wollenweber & Hochapfel as synonyms of "*P. mori*" and "*P. ellipticum*" are also misapplied. *Phoma morearum* [≡ *Phomopsis morearum* (Brunaud) Curzi & Barbaini] probably represents, like *Phoma mori*, the conidial state of *Diaporthe sociabilis. Phoma salicina*, on account of its recorded similarity with *Phoma malvacearum* Westend. (Westendorp, 1857: 564), is undoubtedly also a *Phomopsis* species (compare Grove, 1935: 103, 201, 223); probably it refers to the conidial state of *Diaporthe eres* Nitschke, see Wehmeyer (1933: 88, 89). *Phoma euonymella*, according to its description (Brunaud, 1889), is also a *Phomopsis* species and probably also belongs to the ubiquitous ascomycete *Diaporthe eres* (compare Wehmeyer, 1933: 76). The same is true of *Phoma cinerascens* [≡ *Phomopsis cinerascens* (Sacc.) Trav.] (see Saccardo, 1914: 306; Wehmeyer, 1933: 77; Grove, 1935: 186, 187) and *Phoma platanoidis* [≡ *Phomopsis platanoidis* (Cooke) Died.] (see Grove, 1935: 166; Wehmeyer, 1933: 64). According to the type specimen in FH and copies of N. Am. Fungi No. 3158 (1894) at FH, L, and PAD, *Aposphaeria pezizoides* is a species of *Plenodomus*, identical with *Plenodomus salicum* (Sacc.) Diedicke (1911: 140).

Apart from *Polyopeus purpureus* var. *verus* discussed above, Wollenweber & Hochapfel (l.c.) further mention as synonyms: *Aposphaeria caricae*, *Phoma cicatricum*, *Phoma mororum*, and *Phyllosticta saxifragae.* Original material of these four species is not known to be in existence (not in PARMA, PAD, or PC), but the diagnoses accord well with the characteristics of *Phoma macrostomum* in vivo. Considering that Wollenweber & Hochapfel's interpretation was based on isolates from the hosts mentioned in the diagnoses of these species (*Ficus*, *Morus*, and *Saxifraga* species) we accept their interpretation.

The name *Phoma* (*Aposphaeria*) *pomi*, enumerated in our list of synonyms, has also been adopted from Wollenweber & Hochapfel's study. They listed this species in the synonymy of "*Phoma striaeformis*," a misapplied name for the non-pigmented variety of *Phoma macrostomum* dealt with on p. 55. Original material of *P. pomi* is not known to be in existence (not in PAD), but its original diagnosis corresponds with the characteristics of *P. macrostomum* in vivo. However we cannot agree with Wollenweber & Hochapfel's arrangement of this species under the non-pigmented variety. Only a study of cultures makes it possible to differentiate the pigmented and non-pigmented forms. Moreover, in our experience the pigmented variety is by far the most frequently isolated form of *P. macrostomum* (see Table I).

The identification of *Phoma phyllostictoides* with *P. macrostomum* is based on the study of isotype-material (see 'Specimens examined') collected on legumes of *Colutea*

arborescens; it proved to contain many pycnidia typical of *P. macrostomum*. We isolated the fungus ourselves from the same substratum (Table I).

The holotype material of *Phoma herbarum* f. *catalpae-capsularum* and *P. herbarum* f. *rubi* (see 'Specimens examined') also showed numerous pycnidia characteristic of *P. macrostomum*. They were compared with similar Dutch material of *P. macrostomum* from *Catalpa* and *Rubus* (tested by isolation; Table I). The material on which Saccardo based *P. herbarum* f. *lilacis* (from *Lilac* = *Syringa*) was not present in Saccardo's herbarium (PAD). The description of the spores, however, points to *P. macrostomum*, which we have repeatedly isolated from dead branches of *Syringa* spp. (Table I).

The synonymy of *Phoma friesii*, *Phyllosticta robinicola* ("*robiniaecola*") and *Phyllosticta taxi* with *Phoma macrostomum* is also based on comparison of their diagnoses with the characteristics of *P. macrostomum* on the same hosts (*Ligustrum*, *Robinia* and *Taxus* species; compare Table I). The original material on which Brunaud based the description of *Phoma friesii* has not been preserved, while the type material of *Phyllosticta robinicola* and *P. taxi* described by Hollós was lost during the Second World War (information Museum of Natural History in Budapest).

The synonyms *Phyllosticta mali* and *Phyllosticta* (*Phoma*) *limitata* described from leaf spots of apple have been discussed extensively by Boerema & Dorenbosch (1965). The holotype-material of *Phyllosticta mali* was examined (Boerema & Dorenbosch, l.c. Fig. 1); of *Phyllosticta* (*Phoma*) *limitata* a typical American isolate was studied (see 'Specimens examined'). For the phytopathological literature on *P. macrostomum* in association with leaf spots of apple we also refer to Boerema & Dorenbosch, l.c.

Finally we note that because of its occurrence on apple leaves the fungus has often been confused with *Phoma prunicola* (Opiz) Wollenw. & Hochapf., see Boerema & *al.* (1965, 1968) and Morgan-Jones (1967). Recently Brook (1968) confused the fungus with *Phoma exigua* Desm., which is quite different, see Boerema & Höweler (1967).

Phoma macrostomum var. **incolorata** (Horne) Boerema & Dorenb., *comb. nov.*

Polyopeus purpureus var. *incoloratus* Horne *in* J. Bot., Lond. **58**: 240. 1920 (basionym).
Polyopeus purpureus var. *latirostratus* Horne *in* J. Bot., Lond. **58**: 240. 1920.
Polyopeus purpureus var. *nigrirostratus* Horne *in* J. Bot., Lond. **58**: 240. 1920.

MISAPPLICATIONS.—
Phoma striaeformis Dur. & Mont. *sensu* Wollenw. & Hochapf. *in* Z. ParasitKde **8**: 587. 1936, and *Phoma petiolorum* Desm., *Phoma petiolorum* f. *juglandis* Brunaud, *Phoma depressa* Berk. & Br., *Phoma planiuscula* Sacc., *Cytispora abnormis* Berk. & Curt. [*Phoma abnormis* (Berk. & Curt.) Sacc.], *Phoma siliquastri* Sacc., *Phoma pomi* Schulzer & Sacc. [*Aposphaeria pomi* (Schulzer & Sacc.) Sacc.], *Phoma mespili* Oudem., *Phoma bismarckii* Kidd & Beaum. *sensu* Wollenw. & Hochapf. *in* Z. ParasitKde **8**: 587. 1936 (as syn. of "*P. striaeformis*").
Phoma aceris-negundinis Arcangeli *sensu* Wollenw. & Hochapf. *in* Z. ParasitKde **8**: 590. 1936, and *Phoma fraxinifolii* Allesch. *sensu* Wollenw. & Hochapf. *in* Z. ParasitKde **8**: 590. 1936 (as syn. of "*P. aceris-negundinis*").

DESCRIPTIONS & ILLUSTRATIONS IN VITRO.—Horne *in* J. Bot., Lond. **58**: 240, 241. 1920 (*Polyopeus purpureus* var. *incoloratus*, *P. purpureus* var. *latirostratus*, *P. purpureus* var. *nigrirostratus*); Wollenweber & Hochapfel *in* Z. ParasitKde **8**: 587–590, fig. 12. 1936 ("*Phoma striaeformis*", misapplied) *in* Z. ParasitKde **8**: 590–591, fig. 13. 1936 ("*Phoma aceris-negundinis*", misapplied).

DIAGNOSTIC CHARACTERS.—Morphologically similar to variety *macrostomum*, but in vitro easily distinguished by the absence of reddish pigment in the hyphae.

HABITAT.—This variety occurs in the same habitats as *P. macrostomum* var. *macrostomum*, i.e. it is found especially on necrotic tissue of woody plants, such as stems, leaves, and fruits. However it appears to be less widely distributed than *P. macrostomum* var. *macrostomum*.

SPECIMENS EXAMINED.—

Cultures: "*Phoma striaeformis*" (misapplied), (Nr. 3197) from twig of *Robinia pseudoacacia*, Germany, isolated by Wollenweber (CBS 300.36); and from bud of apple, Switzerland, isolated by Geigy (CBS 369.52); and various isolates of *Phoma macrostomum* var. *incolorata* from different trees and shrubs in the Netherlands (Table I).

Because this fungus can be distinguished from *P. macrostomum* var. *macrostomum* only by the absence of red-violet pigment in the hyphae, we think it in accordance with the purpose of the artificial system of the Deuteromycetes to consider it merely a variety of *P. macrostomum* (compare Boerema & Höweler, 1967).

Three strains (phenotypes) of this non-pigmented variety of *Phoma macrostomum* appear to have been described from England by Horne (1920) as successively *Polyopeus purpureus* var. *incoloratus* (with narrow rostra), *P. purpureus* var. *latirostratus* (with wide rostra) and *P. purpureus* var. *nigrirostratus* (with black rostra). The new combination *Phoma macrostomum* var. *incolorata* has been based on the first mentioned infraspecific taxon. Horne's isolates were made from "spotted" apples; it should be noted, however, that the pigmented *Polyopeus purpureus* var. *verus* (= *Phoma macrostomum* var. *macrostomum*) occurs much more frequently in association with "spotted" apples in England than the non-pigmented strains (cf. Kidd & Beaumont, 1924: 105).

Wollenweber & Hochapfel (1936) also studied some isolates of this colourless variety of *Phoma macrostomum*. On account of small differences in the sizes of the pycnidia—which are conditioned phenotypically—they distinguished two "species," described under the misapplied names "*Phoma striaeformis*" and "*Phoma aceris-negundinis*." Examination of a specimen of *Phoma striaeformis*, issued by Desmazières [Pl. crypt. France II (ed. 3) Fasc. 2, No. 59 (1853) in PC] showed that this name refers to a species of *Phomopsis* [*P. striaeformis* (Dur. & Mont.) Grove (1917: 65)], which is probably identical with the conidial state of *Diaporthe eres* Nitschke; compare Wehmeyer (1933: 82) and Grove (1935: 215). According to the isoytypes Erb. crittog. ital. II No. 1379 (PAV and PISA), *Phoma aceris-negundinis* is also a

Phomopsis species, similar to *Phomopsis pustulata* (Sacc.) Died., the conidial state of *Diaporthe pustulata* (Desm.) Sacc., see Wehmeyer (1933: 153–155) and Grove (1935: 166, 167).

Various other names listed by Wollenweber & Hochapfel as synonyms of "*P. striaeformis*" likewise appear to refer to *Phomopsis* species: *Phoma petiolorum* [≡*Phomopsis petiolorum* (Desm.) Grove (1917: 60)], represents the conidial state of *Diaporthe oncostoma* (Duby) Fuck., see Wehmeyer (1933: 143). According to the type and two other specimens in FH, *Cytospora* (*Phoma*) *abnormis* is also identical with the *Phomopsis*-state of *Diaporthe oncostoma*. *Phoma petiolorum* f. *juglandis*, judging by the description of the fruitbodies (Brunaud, 1889), is also a species of *Phomopsis*. It probably is the conidial state of the ubiquitous species *Diaporthe eres*; compare Hamond (1931: 146) and Wehmeyer (1933: 89). The same is true of *Phoma mespili*, the type of which is preserved at L. *Phoma siliquastri* is probably the *Phomopsis*-state of *Diaporthe medusaea* Nitschke; compare Saccardo (1884: 68) and Wehmeyer (1933: 101 et seq.). Finally *Phoma depressa* [≡ *Fusicoccum depressum* (Berk. & Br.) Grove (1935: 254)] and *Phoma planiuscula* [≡ *Phomopsis planiuscula* (Sacc.) Sacc. (1915: 135)] refer to a *Phomopsis* species similar to the conidial state of *Diaporthe perjuncta* Niessl; compare Wehmeyer (1933: 117, 118) and Grove (1935: 254).

Phoma bismarckii, also listed by Wollenweber & Hochapfel as a synonym of "*P. striaeformis*," was described by Kidd(-Owen) & Beaumont (1924: 104) as being quite different from *Polyopeus purpureus* = *Phoma macrostomum*. The description points to *Phoma prunicola* (Opiz) Wollenw. & Hochapf., often found in association with apples; see Wollenweber & Hochapfel (1936: 595–597) and Boerema & *al.* (1965).

The characteristics of *Phoma* (*Aposphaeria*) *pomi* agree closely with those of *P. macrostomum*. Whether it belongs to the colourless variety of this fungus, as suggested by Wollenweber & Hochapfel (as syn. of "*P. striaeformis*"), however, is uncertain and can be decided only from data on the growth in vitro. Therefore *P. pomi* is taken as a synonym of the much more widely distributed *P. macrostomum* var. *macrostomum*.

Finally, according to its original diagnosis *Phoma fraxinifolii*, mentioned by Wollenweber & Hochapfel as synonym of "*P. aceris-negundinis*," is a pycnidial fungus with true sporophores, so that it cannot belong to *P. macrostomum*.

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