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THE SORDARIACEAE OF INDONESIA

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(With 12 Text-figures)

A survey is given of the Sordariaceae of Indonesia. The family is represented by seven genera containing 18 species in all. The new genus *Zygopleurage* Boedijn is introduced. *Pleurage longicollis* (Ames) Boedijn, *Bombardia caudata* (Curr.) Boedijn, and *Zygopleurage zygospora* (Speg.) Boedijn are proposed as new combinations.

Formerly practically all dung-inhabiting Sphaeriales with dark-coloured ascospores were placed in the family of the Sordariaceae. In this family were brought together such genera as *Sordaria*, *Pleurage*, *Coniochaeta*, *Hypocopra*, *Bombardia*, *Delitschia*, *Sporormia*, and *Pleophragmia*.

Cain (3) in a paper on the coprophilous Sphaeriales of Ontario discussed all these genera without trying to place them in families. He considered *Pleurage* to be a synonym of *Sordaria*, whilst he introduced the new genus *Zygospermella*.

Cl. Moreau (14) in his latest publication on this subject excluded *Hypocopra*, *Delitschia*, *Sporormia*, and *Pleophragmia*, while accepting the following genera as belonging to the Sordariaceae, viz. *Sordaria*, *Bombardioidea*, *Pleurage*, *Neurospora*, *Gelasinospora*, *Coniochaeta*, *Bombardia*, and *Triangularia*.

All these genera, with the exception of *Coniochaeta*, are certainly related to each other, agreeing, as they do, in having spores with a germ-pore. In *Coniochaeta* the ascospores have a germ-slit, hence the genus is here excluded from the Sordariaceae.

Moreau in the same paper further assumed that the species of *Pleurage* with many-spored asci were mere forms of those which possess 8-spored asci. However, as long as this assumption has not been proved by cultural methods showing that forms with many-spored asci can be derived from such with 8-spored asci, and vice versa, I am not prepared to accept the theory.

From Indonesia nine species of *Sordaria*, mostly described by Cesati (4) and Penzig & Saccardo (17) were mentioned in literature. Later authors showed that none of the species mentioned belonged to *Sordaria*, and the majority not even to the Sordariaceae at all, as is shown in the following list.

1. *Sordaria botryosa* Penz. & Sacc. = *Bombardia pulvis-pyrius* (Penz. & Sacc.) Höhn.
2. — *caudata* (Curr.) Sacc. = *Bombardia caudata* (Curr.) Boedijn.
3. — *caulicola* Ces. = *Anthostomella caulicola* (Ces.) Sacc.
4. — *microspora* Ces. = *Rosellinia microspora* (Ces.) Sacc.

5. *Sordaria oblectans* Ces. = *Rosellinia oblectans* (Ces.) Cooke.
6. — *pachydermatica* Ces. = *Rosellinia* or *Coniochaeta.*
7. — *punctiformis* Ces. = *Coniochaeta.*
8. — *sarawacensis* Ces. = *Pleurage?*
9. — *tjibodiana* Penz. & Sacc. = *Coniochaeta?*

My own studies in dung-inhabiting fungi of Indonesia yielded 18 species of Sordariaceae, and, since the group is cosmopolitan, I expect that most species will prove to occur in that region.

SORDARIACEAE

Mycelium in substratum well-developed. Perithecia pyriform, subconical to more or less elongate, immersed to superficial, glabrous to more or less hairy, the neck mostly rather short. Perithecial wall brown, semitranslucent or opaque. Hairs solitary or agglutinated into fascicles. Asci with 4, 8, 16, 32, 64, 128, 256, or 512 spores, thin-walled, with a ring-like thickening at the more or less flattened apex, and with a refractive sphere in one genus. Paraphyses thread-like or monilioid, soon deliquescent. Spores uniseriate, biseriate, or conglobate, at first hyaline, then dark to black, mostly smooth, rarely with low ribs or pitted, 1-celled and surrounded by a gelatinous layer, or 2-celled, with one, rarely two, germ-pores, and with gelatinous appendages (secondary appendages) at the poles; in the 2-celled forms, one cell ellipsoid and black, the other cylindrical, colourless, and empty (primary appendage); sometimes two black cells are developed, either one at each pole of the cylindrical spore, or both united into a 2-celled body in the middle of the spore.

Mostly growing on dung, sometimes on dead vegetable matter.

NEUROSPORA Shear & Dodge

Neurospora Shear & Dodge *in* J. agr. Res. **34**: 1025. 1927.

Perithecia pyriform, dark brown, glabrous, immersed to superficial. Asci 4- or 8-spored, cylindrical, short-stalked, with ring-like thickening at the apex. Paraphyses thread-like, soon deliquescent. Spores uniseriate, ellipsoid, dark brown, with longitudinal, sparingly anastomosing pale-coloured low ribs, with a germ-pore at each pole. Perithecia found only in cultures. Conidial fructifications, belonging to the form-genus *Monilia*, predominating.

On every kind of vegetable matter, especially when recently heated or burned.

The first person to report on a *Neurospora* from the tropics was Möller (13) who gave a full account of the life-history of what he called *Melanospora erythraea*, a species now currently known as *Neurospora erythraea* (A. Möll.) Shear & Dodge. However, from his record (pp. 75–80) it is quite obvious that he originally studied a fungus with 4-spored asci, viz. *Neurospora tetrasperma* Shear & Dodge, while the material he got at a later date (p. 81) was a species with 8-spored asci, *Neurospora sitophila* Shear & Dodge. The diagnosis Möller gave (p. 294) combines the characters of both species mentioned above, hence *Neurospora erythraea* should be discarded.

NEUROSPORA SITOPHILA Shear & Dodge

Neurospora sitophila Shear & Dodge *in* J. agr. Res. **34**: 1026. 1927.

Perithecia more or less immersed to nearly free, dark brown, globose to subglobose, 322–414 μ in diam., with a broad short neck, 57–80 μ long, 80–115 μ broad. Asci 8-spored, cylindrical, short-stalked, thin-walled with a ring-like thickening at the more or less truncate apex, 190–199 × 15–19 μ. Spores uniseriate, ellipsoid, dark brown, with pale, sparingly anastomosing longitudinal ribs and a germ-pore at each pole, 22–31 × 12–17 μ. Paraphyses seen only in the young stage.

JAVA: Bogor, Dec. 1953, *Boedijn*, in cultures of the conidial state.

The following is the conidial fructification.

MONILIA SITOPHILA (Mont.) Sacc.

Penicillium sitophilum Mont., Syll. cryptog. 301. 1856. — *Monilia sitophila* (Mont.) Sacc. *in* Michelia **2**: 359. 1880.

Colonies of a bright orange colour, powdery to cottony, several centimeters thick, by confluence often covering very large areas. Mycelial threads branched and septate, 8–12 μ broad. Conidiophores not sharply delimited from the vegetative hyphae, more or less dichotomously branched, the ultimate branches richly septate and falling apart into separate cells which constitute the conidia. Conidia variable as to shape and size, either subglobose, ellipsoid, or cylindrical, whilst those, originating from the place where previously two branches divaricated, possess a short appendage; thin-walled, 7–17 (–32) × 6–11 μ. All aerial parts contain the orange pigment as minute granules.

Whereas the perithecia are found only in artificial cultures, the fungus in its conidial state is abundant throughout Indonesia. It grows on nearly every kind of dead vegetable matter, especially when recently heated or burned. In clearings where the jungle has been burned down to make place for a plantation, every bit of charred wood soon becomes thickly covered with this orange mould.

Monilia sitophila is extensively used especially in West Java in the manufacturing of a certain kind of cakes called "ontjom beureum" which consist of pressed-out seeds of *Arachis hypogaea*. These cakes are inoculated with the mould which by its enzymatic action renders them more digestable. The product offered for sale is wholly covered with the orange mould.

Heim, Nouvel, & Saccas (10) stated *Monilia sitophila* to be synonymous with *Coccospora aurantiaca* Wallr. However, this assumption must be based on an error, for Damon & Downing (7), who had studied the type of *Coccospora aurantiaca*, were able to demonstrate without any doubt that this species belonged to the Mycelia sterilia, being close to if not a member of *Sclerotium*.

SORDARIA Ces. & De Not.

Sordaria Ces. & De Not. *in* Comm. Soc. crit. ital. **1**: 225. 1863.

Perithecia more or less immersed, then nearly superficial, pyriform, dark-coloured, glabrous or sparingly hairy, rarely covered with tomentum. Asci 8-spored, cylindrical with a ring-like thickening at the apex. Paraphyses more or less monilioid, soon deliquescent. Spores uniseriate, rarely partly biseriate, 1-celled, ovoid to ellipsoid, at first hyaline, becoming black with maturity, surrounded by a gelatinous layer, rarely wholly covered with short gelatinous threads. One germ-pore at the base of the spore.

Mostly growing on dung, especially of herbivores, sometimes on dead vegetable matter. In a few cases isolated from seeds.

SORDARIA FIMICOLA (Rob. ex Desm.) Ces. & De Not.

Sphaeria fimicola Rob. ex Desm. *in* Ann. Sci. nat. (Bot.) ser. 3, **11**: 353. 1849. — *Sordaria fimicola* (Rob. ex Desm.) Ces. & De Not. *in* Comm. Soc. crit. ital. **1**: 226. 1863. — *Hypocopra fimicola* (Rob. ex Desm.) Sacc., Syll. Fung. **1**: 240. 1882. — *Fimetaria fimicola* (Rob. ex Desm.) Griff. & Seaver *in* North Amer. Fl. **3**: 69. 1910.

Hypocopra fimeti sensu Fuck. *in* Jb. nassau. Ver. Nat. **23–24**: 240. 1870.

Sordaria iowana Ell. & Holw. *in* J. Mycol. **4**: 65. 1888. — *Hypocopra iowana* (Ell. & Holw.) Sacc., Syll. Fung. **9**: 490. 1891.

Sordaria ostiolata Ell. & Ev. *in* Bull. Torrey bot. Cl. **24**: 458. 1897.

Perithecia pyriform, dark-coloured, glabrous, half way immersed in the substratum, 300–372 × 250–270 μ, neck up to 90 μ diam. Asci 8-spored, cylindrical, with ring-like thickening at the flattened apex, 143–162 × 15–18 μ. Paraphyses more or less monilioid, soon deliquescent. Spores obliquely uniseriate, olivaceous to nearly black, ellipsoid, rounded at the top, more or less acute at the base, with a germ-pore at the lower end, surrounded by a gelatinous layer, 17–20 × 10–12 μ.

JAVA: Bogor, Febr. 1954, *Boedijn*, on horse dung.

In this collection the spores are rather short, but otherwise the material agrees well with the current descriptions.

SORDARIA HUMANA (Fuck.) Wint.

Hypocopra humana Fuck. *in* Jb. nassau. Ver. Nat. **23–24**: 241. 1870. — *Sordaria humana* (Fuck.) Wint. *in* Bot. Z. **30**: 835. 1872. — *Hypocopra fimeti* var. *humana* (Fuck.) P. Karst. *in* Bidr. Känn. Finl. Nat. Folk **23**: 50. 1873. — *Fimetaria humana* (Fuck.) Griff. & Seaver *in* North Amer. Fl. **3**: 67. 1910.

Hypocopra fermenti Fuck. *in* Jb. nassau. Ver. Nat. **23–24**: 241. 1870. — *Sordaria fermenti* (Fuck.) Wint. *in* Abh. naturf. Ges. Halle **13**: 21. 1873.

Sordaria sphaerospora Ell. & Ev., North Amer. Pyren. 128. 1892. — *Hypocopra sphaerospora* (Ell. & Ev.) Sacc., Syll. Fung. **2**: 280. 1895.

Hypocopra fimicola var. *felina* Speg. *in* An. Mus. nac. Buenos Aires **19**: 341. 1909.

Sordaria papillosa Bayer *in* Acta Soc. Sci. nat. Morav. 1. 1924.

Perithecia pyriform, dark-coloured, glabrous, more or less immersed to nearly superficial, 390–483 × 264–380 μ, the neck 92–126 × 80–115 μ. Asci 8-spored, cylindrical, with a ring-like thickening near the more or less flattened top, 169–195 × 18–20 μ. Paraphyses monilioid, soon disappearing. Spores obliquely uniseriate, at first hyaline, then greenish, black at maturity, ovoid, rounded at the top, more acute at the base, with a germ-pore at the lower end and surrounded by a gelatinous layer, 23–27 × 14–16 μ.

JAVA: Bogor, May 1956, *Boedijn*, on rabbit dung.

The present species closely resembles *Sordaria fimicola*, but the spores are distinctly longer and, more especially, broader.

SORDARIA BARBATA Hansen — Figs. 1–5

Sordaria barbata Hansen *in* Vidensk. Medd. naturhist. For. 334. 1877. — *Hypocopra barbata* (Hansen) Sacc., Syll. Fung. **1**: 243. 1882.

Pleurage multicaudata Griff. *in* Mem. Torrey bot. Cl. **11**: 85. 1901. — *Sordaria multicaudata* (Griff.) Sacc., Syll. Fung. **17**: 603. 1905.

Perithecia pyriform, at first semi-immersed, then nearly superficial, covered with a pale grey tomentum, but the neck soon glabrous and black, 1 mm and more long, 0.5–1 mm broad, the neck 300–400 μ broad; old perithecia becoming wholly glabrous. Hairs of the tomentum hyaline to subhyaline, septate, sometimes branched, often slightly undulating, 30–75 × 2–4 μ. Asci and paraphyses forming a solid white mass which may be pressed out of the perithecium as a whole. Asci 8-spored, with a long undulating stalk, more or less cylindrical, often swollen in the middle, with a ring-like thickening at the apex which is distinctly attenuated, 512–640 × 47–62 μ. Paraphyses abundant, long, thread-like, hyaline, 4–6 μ wide, afterwards deliquescent. Spores at first uniseriate, later partly or irregularly biseriate, hyaline with coarse, granular contents when young, becoming yellow, then greenish, finally black, ellipsoid, with a germ-pore at the base, 47–57 × 25–34 μ, wholly covered with short gelatinous threads 4–5 μ long which at the poles may reach 6–9 μ.

JAVA: Bogor, March 1953, Jan. 1956, *Boedijn*, on horse dung.

The spores ripen very slowly, and always in few asci at a time. Abortion of spores is frequent, and abnormally large (60–70 × 34–48 μ) or small (34–43 × 21–27 μ) ones are often to be found. Germination sometimes already takes place in the ascus, with short profusely septate threads. The hairs covering the perithecia in the collections mentioned above are shorter and paler than normal, but otherwise the material agrees well with the original description.

TRIANGULARIA Boedijn

Trigonia Beyma thoe Kingma *in* Cbl. Bakt. (2 Abt.) **89**: 736. 1933; not *Trigonia* Aubl., Hist. Pl. Gui. franç. **1**: 387. 1775. — *Triangularia* Boedijn *in* Ann. mycol., Berl. **32**: 302. 1934.

Perithecia pyriform, mostly glabrous, dark-coloured, superficial. Asci 8-spored, cylindrical, stalked, with ring-like thickening near the apex. Paraphyses thread-like, deliquescent. Spores uniseriate, at first 1-celled, ellipsoid, smooth, hyaline; afterwards an oblique cross-wall separates a small portion at the base of the spore; the upper portion grows out into a more or less triangular black cell with a germ-pore at the apex, while the basal portion remains hyaline, and becomes empty and flat.

On plant debris.

TRIANGULARIA BAMBUSAE (Beyma) Boedijn

Trigonia bambusae Beyma thoe Kingma *in* Cbl. Bakt. (2 Abt.) **89**: 736. 1933. — *Triangularia bambusae* (Beyma) Boedijn *in* Ann. mycol., Berl. **32**: 302. 1934.

Perithecia pyriform, superficial, nearly black, 250–400 × 150–300 μ, glabrous or with a few hairs. Asci 8-spored, cylindrical, with a ring-like thickening near the apex, 150–160 × 10–16 μ. Paraphyses thread-like, soon deliquescent. Spores uniseriate, at first 1-celled, ellipsoid, smooth and hyaline, later on flattened on one side and 2-celled through the formation of an oblique septum near the base, 18–21 × 8–14 μ.

JAVA: on a culm of bamboo (without further data; culture in C.B.S., Baarn).

PLEURAGE Fr. ex O. Kuntze

Schizothecium Corda, Icon. Fung. **2**: 29. 1838. — *Pleurage* Fr., Summa Veg. Scand. **2**: 418. 1849 (nom. prov.); *ex* O. Kuntze, Rev. Gen. Pl. **3**: 504. 1898.

Perithecia pyriform, more or less conical to elongated, immersed or nearly superficial, usually hairy, with the hairs either simple or agglutinated into fascicles. Perithecial wall brown, mostly semitranslucent; neck black and opaque. Asci with 4, 8, 16, 32, 64, 128, 256, or 512 spores, cylindrical, club-shaped to fusiform, with a ring-like thickening near the apex. Paraphyses thread-like to more or less monilioid, soon deliquescent. Spores uniseriate, biseriate to conglobate, at first typically club-shaped, smooth and hyaline; afterwards the swollen part of the spore separated by a cross-wall from the remainder, and transformed into a black, ellipsoid cell with an apical germ-pore; the cylindrical basal part hyaline and empty (primary appendage); secondary appendages gelatinous, homogenous, or fibrillar, issuing from the top of the spore and the end of the primary appendage, either singly or in rings. In some species creeping hyphae of the mycelium produce globose, hyaline microconidia on short phialides.

Mostly on dung, rarely on other substrata.

Some authors claim that *Schizothecium* Corda is an older name for the present genus and, therefore, must have priority. Cl. Moreau (14) indicated the existence of the earlier name *Schizothecium* Fenzl, but this is an error for *Schizotechium* Fenzl, which leaves Corda's generic name unendangered (see also Ames, 1). Even so, however, *Schizothecium* cannot be used for the present genus, as the original diagnosis, repeated below, supplies insufficient information, and is wholly ambiguous.

Schizothecium Corda. — Perithecium superficiale membranaceum dein lateraliter fissum. Nucleus gelatinosus, sporis continuis heterogeneis pedicellatis, floccis liberis brevibus mixtis, gelatinae immersis.

Nicht allein die eigenthümliche seitliche Spaltung der Perithecie charakterisirt diese Gattung, ihre wesentlicher Unterschied besteht in der Entstehung ihrer Sporen und im Baue ihres Nucleus. Die häutige, aus einer äusseren (fig. 105, 12a) aus grosszelligen Flocken und kleienähnlichen, einer mittleren dichtzelligen (fig. 12b), und einer inneren die Kernflocken bildenden Schichte (fig. 12c) bestehende Perithecie umschliesst dem schleimigen Sporenkern (fig. 7 fig. 9), welcher aus einem mit Molekülkornchen erfüllten Schleime besteht, in welcher die sich ablösenden Flocken der innersten Flockenschichte der Perithecie mit den grossen dunkel gefärbten ungetheilten nackten und kurzgestielten Sporen (fig. 8, 9) untermischt liegen. Jede Spore selbst besteht aus einer einfachen, schwach durchscheinenden im Querschnitte (fig. 10) etwas flachgedrückten, eiförmigen Sporenhaut (fig. 11) mit einigen Oeltropfen erfüllt. Der Sporenstiel ist hell, weiss und mithin von einer der Sporenhaut heterogenen Substanz.

1. *Sch. fimicolum* Tab. XIII fig. 105. — Solitarium conicum, atrum, dein plicatum, vel incurvum furfuraceum, sporis ovato-oblongis atrofuscis, pedicello tenui, albo, pellucido.

This vague description is equally applicable to the genus *Bombardia*, hence *Schizothecium* Corda is a nomen dubium which must be rejected. Fries did not know Corda's genus, but, thinking the name *Schizothecium* to be preoccupied, introduced the name change *Pleurage* which is equally incorrect. The next name to be considered is *Podospora* Ces., but most authors regard this as synonymous with *Sordaria*. Since *Pleurage* has been extensively used by Griffith and especially by Cl. Moreau, who gave a clear definition of the genus, I think it best to retain the name *Pleurage*, in spite of the fact that according to the Code it is unacceptable.

PLEURAGE APPENDICULATA (Auersw. ex Niessl) Cl. Moreau

Sordaria appendiculata Auersw. *ex* Niessl *in* Verh. Nat. Ver. Brünn. **10**: 188. 1872. — *Podospora appendiculata* (Auersw. ex Niessl) Niessl *in* Hedwigia **22**: 156. 1883. — *Podospora fimiseda* var. *appendiculata* (Auersw. ex Niessl) Winter *in* Rab., KryptFl. **1**: 170. 1887. — *Pleurage appendiculata* (Auersw. ex Niessl) Cl. Moreau, Genres Sordaria et Pleurage 246. 1953.

Sphaeria amphicornis J. B. Ell. *in* Bull. Torrey bot. Cl. **6**: 109. 1876. — *Sordaria amphicornis* (J. B. Ell.) Sacc., Syll. Fung. **1**: 235. 1882. — *Podospora amphicornis* (J. B. Ell.) Ell. & Ev., North Amer. Pyremomyc. 130. 1892. — *Pleurage amphicornis* (J. B. Ell.) O. Kuntze, Rev. Gen. Pl. **3**: 505. 1898.

Sphaeria eximia Peck *in* Rep. N.Y. State Mus. **28**: 78. 1876.

Pleurage superior Griff. *in* Mem. Torrey bot. Cl. **11**: 68. 1901. — *Sordaria superior* (Griff.) Sacc., Syll. Fung. **17**: 603. 1905.

Perithecia pyriform to subconical, brown, 380–483 × 253–345 μ, especially on the upper half covered with straight, brown, septate hairs, 46–69 × 3–4 μ, which at the top are often swollen to 5–6 μ. Asci 8-spored, more or less clavate, with ring-like thickening at the truncate apex, 201–227 × 26–32 μ. Paraphyses monilioid, deliquescent. Spores irregularly biseriate; spore-body proper ellipsoid, smooth, black at maturity, 27–35 × 12.5–17 μ, with a germ-pore at the apex; primary appendage cylindrical, hyaline, empty, 21–39 × 3–4 μ; with two long secondary appendages of a fibrillar structure, one at the apex of the spore-body, the other at the base of the primary appendage, tapering, sometimes slightly undulating, gelatinous, 38–84 × 2–3 μ.

JAVA: Bogor, April 1956, *Boedijn*, on horse dung.

PLEURAGE ANSERINA (Ces. ex Rab.) O. Kuntze

Sphaeria anserina Ces. *ex* Rab. *in* Hedwigia **1**: 116. 1857. — *Malinvernia anserina* (Ces. ex Rab.) Rab. *in* Hedwigia **1**: 116. 1857. — *Podospora anserina* (Ces ex Rab.) Niessl *in* Hedwigia **22**: 156. 1883. — *Sordaria anserina* (Ces. ex Rab.) Wint. *in* Abh. naturf. Ges. Halle **13**: 99. 1893. — *Pleurage anserina* (Ces. ex Rab.) O. Kuntze, Rev. Gen. Pl. **3**: 504. 1998. — *Bombardia anserina* (Ces. ex Rab.) Migula *in* Thomé, KryptFl. **10**: 123. 1913.

Sordaria penicillata Ell. & Ev. *in* J. Mycol. **4**: 78. 1888. — *Podospora penicillata* (Ell. & Ev.) Ell. & Ev., North Amer. Pyrenomyc. 131. 1892.

Perithecia pyriform, semi-immersed, brown, semitranslucent, sparingly hairy, 391–600 × 161–380 μ, with the neck black and opaque, 138–172 × 92–126 μ. Asci 4-spored, cylindrical, stalked, with ring-like thickening at the flattened apex, 169–195 × 20–24 μ. Paraphyses more or less monilioid, afterwards deliquescent. Spores uniseriate; spore-body proper ellipsoid, smooth, dark to black, 28–38 × 17–19 μ, with a germ-pore at the top; primary appendage cylindrical, hyaline, empty, 23–36 × 4–5 μ; with two long homogenous secondary appendages, one at the apex of the spore-body, the other at the end of the primary appendage, tapering, often curved, gelatinous, up to 78 μ long, 2–4 μ wide.

JAVA: Bogor, April 1956, *Boedijn*, on horse dung.

I failed to observe the small secondary appendages at the base of the primary appendage, but in all other characters the present collection fully agreed with *Pleurage anserina*.

PLEURAGE SETOSA (Wint.) O. Kuntze

Sordaria setosa Wint. *in* Abh. naturf. Ges. Halle **13**: 97. 1873. — *Philocopra setosa* (Wint.) Sacc., Syll. Fung. **1**: 249. 1882 — *Podospora setosa* (Wint.) Niessl *in* Hedwigia **22**: 156. 1883.

— *Pleurage setosa* (Wint.) O. Kuntze, Rev. Gen. Pl. **3**: 505. 1898. — *Bombardia setosa* (Wint.) Migula *in* Thomé, KryptFl. **10**: 128. 1913.
Podospora hirsuta Dangeard *in* Botaniste 345. 1907.

Perithecia pyriform, partly immersed, brown, semitranslucent, 667–805 × 494–530 μ, with numerous simple hairs near the base of the neck which is black, opaque, 207–264 × 92–126 μ. Asci about 128-spored, fusiform, short-stalked, attenuated near the truncate apex which shows a strong ring-like thickening, 240–262 × 63–77 μ, 18.5–35 μ wide at the apex. Paraphyses long, monilioid, disappearing at maturity. Spores conglobate; spore-body ellipsoid, smooth, dark to black, 21–24 × 11–13 μ, with a germ-pore at the top; primary appendage cylindrical, hyaline, empty, 4–6 × 1.5–3 μ, soon shrivelling; secondary appendages short, homogeneous, 8–16 × 1.5–3, one at the top of the spore-body, the other at the end of the primary appendage, also soon disappearing.
JAVA: Bogor, March 1956, *Boedijn*, on horse dung.

PLEURAGE CURVICOLLA (Wint.) O. Kuntze

Sordaria curvicolla Wint. *in* Hedwigia **10**: 161. 1871. — *Philocopra curvicolla* (Wint.) Sacc., Syll. Fung. **1**: 250. 1882. — *Podospora curvicolla* (Wint.) Rehm *in* Rab., KryptFl. **1**: 176. 1887. — *Pleurage curvicolla* (Wint.) O. Kuntze, Rev. Gen. Pl. **3**: 505. 1898.
Philocopra curvicolla var. *penicillato-setosa* Mouton *in* Bull. Soc. Bot. Belg. **25**: 145. 1886.

Perithecia pyriform, immersed, brown, semitranslucent, 500–550 × 319–348 μ' the neck black, opaque, 170–188 × 90–101 μ/ both the neck and the base of the perithecia are covered with brown hairs which are either solitary or agglutinated into more or less elongated, flat, triangular fascicles, the former being unbranched, septate, 17–24 × 2–3 μ, the latter 40–92 μ long and 10–17 μ broad at the base, with the separate threads sparingly septate and rather thick-walled. Asci about 256-spored, few in number, broadly claviform to nearly obovoid, with broadly rounded apex which shows a ring-like thickening, 153–176 × 102–112 μ. Paraphyses thread-like, soon deliquescent. Spores conglobate; spore-body smooth, ellipsoid, black, with a germ-pore at the top, 15–19 × 10–12 μ; primary appendage short-cylindrical, empty, hyaline, 5–7 × 2–3 μ; secondary appendages at top of spore and end of primary appendage, small, and soon disappearing.
JAVA: Bogor, July 1949, *Boedijn*, on goat dung.

Pleurage longicollis (L. Ames) Boedijn, *nov. comb.*

Schizothecium longicolle L. Ames *in* Sydowia **5**: 120. 1951 (basionym).

Perithecia pyriform to elongate, more or less immersed, brown, semitranslucent, sparingly hairy in the upper half, 575–862 × 368–540 μ, the neck dark, opaque, 115–241 μ broad. Asci about 512-spored, few in number, broadly ellipsoid, with rounded apex which shows a ring-like thickening, 374–390 × 102–140 μ. Paraphyses more or less thread-like, soon deliquescent. Spores conglobate; spore-body smooth, ellipsoid, black, 17–22 × 9–12 μ, with a germ-pore at the top; primary appendage short-cylindrical, hyaline, empty, 3–8 × 1.5–2 μ, soon shrivelling; secondary appendages small, soon disappearing.
JAVA: Bogor, March 1956, *Boedijn*, on goat dung.

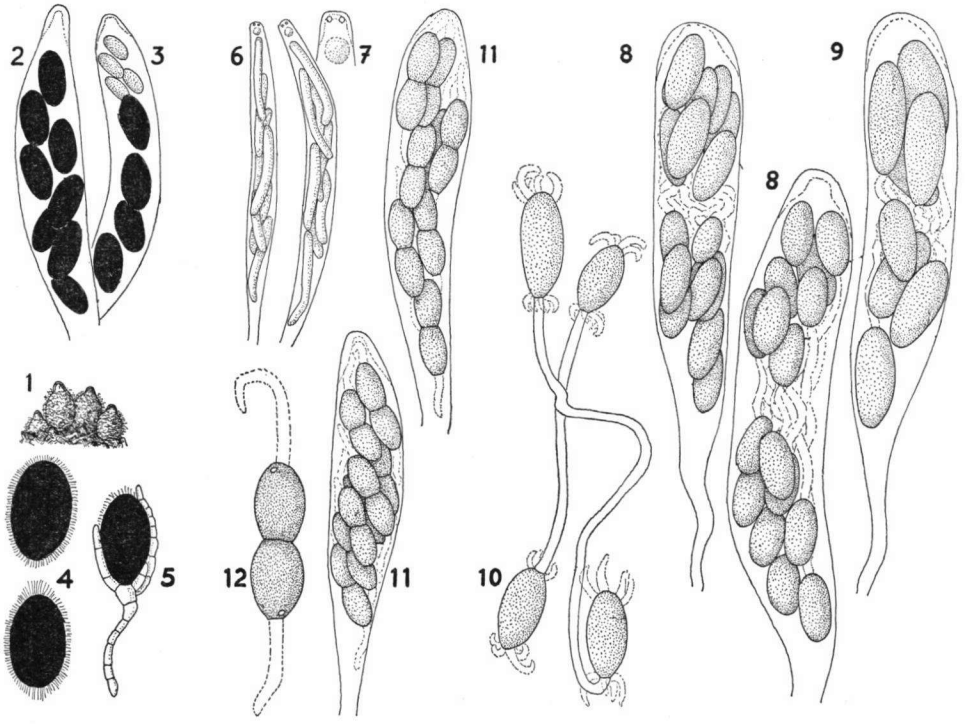
The necks of the perithecia in the present collection are rather short.

PLEURAGE VESTITA (Zopf) Griff.

Eusordaria vestita Zopf *in* Z. Naturw. **56**: 556. 1883. — *Podospora vestita* (Zopf) Rehm *in* Rab., KryptFl. **1**: 176. 1887. — *Pleurage vestita* (Zopf) Griff. *in* Mem. Torrey bot. Cl. **11**: 76. 1901. — *Bombardia vestita* (Zopf) Migula *in* Thomé, KryptFl. **10**: 126. 1911.

Perithecia pyriform, partly immersed to nearly superficial, brown, semitranslucent, glabrous, 600–750 × 350–400 μ, with the neck black, opaque, 190–200 × 90–102 μ. Asci 8-spored, more or less clavate, with ring-like thickening near the apex, 182–211 × 32–41 μ. Paraphyses thread-like, soon deliquescent. Spores biseriate, spore-body smooth, ellipsoid, black, with a germ-pore at the top, 28–35 × 17.5–20 μ; primary appendage long-cylindrical, empty, hyaline, 17–29 × 3.5–5 μ; with several secondary appendages measuring 8–20 × 1.5–2 μ arranged in rings round the top of the spore and at the end of the primary appendage, the latter ring being the smaller one.

JAVA: Bogor, July 1949, *Boedijn*, on goat dung.



Figs. 1–5. *Sordaria barbata* Hansen. — 1. Perithecia. — 2. Normal ascus. — 3. Ascus with four aborted spores. — 4. Ascospores covered with gelatinous threads. — 5. Germinating ascospore.

Figs. 6–7. *Bombardia manihotis* Fernier. — 6. Asci containing immature spores. — 7. Top of ascus enlarged to show the refractive sphere.

Fig. 8–10. *Zygopleurage zygospora* (Speg.) Boedijn. — 8. Two asci with normal spores. — 9. Ascus containing four spores with terminal cells of twice the normal size. — 10. Ascospores with the middle part of variable length.

Figs. 11–12. *Zygospermella insignis* (Mouton) Cain. — 11. Two asci. — 12. Ascospore enlarged to show the laterally placed germ-pores.

BOMBARDIA Fr.

Bombardia Fr., Summa Veg. Scand. **2**: 389. 1849.

Perithecia pyriform, ovoid to more or less elongate, with the base immersed in the substratum or nearly superficial, glabrous or hairy, dark, the neck black and opaque. Perithecial wall two- to three-layered; in the former case consisting of an outer layer of angular areas of thick-walled cells separated from each other by a tissue of thin-walled cells, and an inner layer of nearly hyaline elongate cells; in the latter, consisting of a thin, coloured outer layer, a thick, nearly colourless, cartilaginous median layer, and a thin inner layer of brown cells. Asci 8-spored, with a ring-like thickening at the apex and a refractive sphere just under the top. Paraphyses mostly very long, more or less monilioid, deliquescent. Spores biseriate, at first typically cylindrical, smooth and hyaline, with a short, gelatinous appendage at each pole; afterwards the top of the spore swells to form an ellipsoid, black cell, with a germ-pore at the apex, while the lower part remains cylindrical and hyaline, and becomes empty (primary appendage).

On dead vegetable matter and on dung.

The refractive sphere represents a character of extreme taxonomical importance, but, unfortunately, it gradually disappears in herbarium specimens.

BOMBARDIA COPROPHILA (Fr.) Kirschst.

Sphaeria coprophila Fr., Syst. mycol. **2**: 342. 1823. — *Hypoxylon coprophilum* (Fr.) Fr., Summa Veg. Scand. **2**: 384. 1849. — *Sordaria coprophila* (Fr.) Ces. & De Not. *in* Comm. Soc. crit. ital. **1**: 226. 1863. — *Podospora coprophila* (Fr.) Wint. *in* Rab., KryptFl. **1**: 172. 1887. — *Pleurage coprophila* (Fr.) O. Kuntze, Rev. Gen. Pl. **2**: 505. 1898. — *Bombardia coprophila* (Fr.) Kirschst. *in* KryptFl. Brandenb. **7**: 185. 1911. — *Lasiosordaria coprophila* (Fr.) Chenant. *in* Bull. Soc. mycol. France **24**: 87. 1919.

Cercophora mirabilis Fuck. *in* Jb. nassau. Ver. Nat. **23–24**: 245. 1870.

Sphaeria bovilla Cooke, Handb. Brit. Fungi **2**: 874. 1871.

Bovilla capronii Sacc., Syll. Fung. **2**: 360. 1883.

Pleurage albicans Griff. *in* Mem. Torrey bot. Cl. **11**: 79. 1901.

Perithecia globose-pyriform to more or less elongate, semi-immersed to nearly superficial, blackish brown, 512–800 × 288–510 μ, with the neck black, 103–210 μ broad, and near their apex either hairy or verrucose. The hairs are pale brown to subhyaline, 1- to 2-celled, with pointed tip and often strongly swollen base, united into small groups of 23–45 × 9–7 μ. Sometimes the hairs are almost absent, being replaced by protruding groups of cells, giving the perithecial wall a warty appearance. Asci 8-spored, numerous, cylindrical, with a long, often undulating stalk and a ring-like thickening at the slightly attenuated apex, 146–270 × 13–22 μ; refractive sphere under the apical ring, 4–5 μ in diam. Paraphyses numerous, very long, hyaline, 2–3 μ wide, afterwards deliquescent. Spores at first biseriate, then often irregularly uniseriate, long-cylindrical when immature, hyaline and with a gelatinous secondary appendage at each pole; later on the top part of the spore is transformed into a smooth, ellipsoid, black cell, 18–25 × 9–14 μ, with a germ-pore at its apex, whilst the cylindrical, hyaline lower part, measuring 24–41 × 3–5.5 μ, becomes the empty primary appendage; secondary appendages tapering, 8–9.5 × 2–3 μ, soon disappearing.

JAVA: Bogor, July 1949, *Boedijn*, on goat dung; March 1953, *Boedijn*, on horse dung.

Like in most species of *Bombardia*, the spores ripen slowly and not simultaneously, so that one and the same ascus may contain both immature and mature spores. In a perithecium there are often only a few ripe spores, but the immature ones are liberated just as well, and they are perfectly capable of germinating.

BOMBARDIA MANIHOTIS Fernier — Figs. 6–7

Bombardia manihotis Fernier *in* Rev. Mycol. **19** (Suppl. colon. No. 1): 2, 6. 1954.

Perithecia pyriform, semi-immersed, brown, 700–750 × 500–540 μ, the neck 150–180 μ broad. Asci 8-spored, cylindrical, stalked, with a ring-like thickening at the flattened apex, 173–192 × 13–18 μ; refractive sphere just under the top, 4–5 μ in diam. Paraphyses thread-like, soon deliquescent. Spores irregularly biseriate, at first cylindrical, hyaline, mostly curved near the base, later on consisting of a smooth, ellipsoid, black cell with a germ-pore at the apex, 17–21 × 8–11 μ, and a cylindrical, hyaline, empty primary appendage, 16–25 × 5–6 μ; secondary appendages small, gelatinous, one at the top of the spore, the other at the end of the primary appendage, fugacious.

JAVA: Bogor, April 1956, *Boedijn*, on dead stems of *Manihot utilissima*.

BOMBARDIA ARACHNOIDEA (Niessl) Cain

Podospora arachnoidea Niessl *in* Hedwigia **35**: 143. 1896. — *Sordaria arachnoidea* (Niessl) Sacc. & Syd. *in* Sacc., Syll. Fung. **14**: 492. 1899. — *Pleurage arachnoidea* (Niessl) Griff. *in* Mem. Torrey bot. Cl. **11**: 73. 1901. — *Bombardia arachnoidea* (Niessl) Cain *in* Univ. Toronto Stud. biol. No. 38: 73. 1934.

Perithecia globose-pyriform, more or less immersed to nearly superficial, brown, hairy to nearly glabrous, 342–390 × 258–282 μ, the neck darker, 72–120 × 54–60 μ. Asci 8-spored, cylindrical, short-stalked, with a ring-like thickening at the more or less flattened top, 143–170 × 10–13 μ; refractive sphere just under the apex of the ascus. Paraphyses thread-like, soon deliquescent. Spores irregularly biseriate, at first cylindrical and hyaline, 27–40 × 3–5 μ, afterwards consisting of a smooth, ellipsoid, black cell with a germ-pore at the top, 15–18 × 8–10 μ, and a cylindrical, hyaline, empty primary appendage, 20–25 × 3–5 μ; secondary appendages rather long, gelatinous, tapering, 10–37 × 1.5–2.5 μ, one at the top of the spore, the other at the end of the primary appendage.

JAVA: Bogor, June 1949, *Boedijn*, on horse dung.

It is with some hesitation that the material mentioned is assigned to the present species, because the authors quoted above describe the perithecia as being much larger. However, there is no discrepancy as to all other characters.

BOMBARDIA PULVIS-PYRIUS (Penz. & Sacc.) Höhn.

Rosellinia pulvis-pyrius Penz. & Sacc. *in* Malpighia **11**: 393. 1897. — *Bombardia pulvis-pyrius* (Penz. & Sacc.) Höhn. *in* S.B. Akad. Wiss. Wien (Math.-naturw. Kl., I Abt.) **118**: 1487. 1909.
Sordaria botryosa Penz. & Sacc. *in* Malpighia **11**: 394. 1897. — *Bombardia botryosa* (Penz. & Sacc.) Höhn. *in* S.B. Akad. Wiss. Wien (Math.-naturw. Kl., I Abt.) **118**: 1486. 1909.

Perithecia gregarious, ovoid, superficial, blackish brown, 500–600 × 300–350 μ, glabrous. Asci 8-spored, cylindrical, stalked, with a ring-like thickening at the more or less flattened top, 150–200 × 10–14 μ; refractive sphere just under the apex of

the ascus. Paraphyses long, thread-like, soon deliquescent. Spores irregularly biseriate, at first, cylindrical and hyaline, 36–42 × 3–4 μ, afterwards consisting of a smooth, ellipsoid, black cell with a germ-pore at the top, 16–19 × 9–11 μ, and a cylindrical, hyaline, empty primary appendage, 14–20 × 3–4 μ; secondary appendages gelatinous, 6–8 μ long, one at the top of the spore, the other at the end of the primary appendage; both the primary and secondary appendages soon disappearing.

Java: Tjibodas, 1896, *Penzig*, on dead branches; Dec. 1930, *Boedijn*, on dead stems.

In his note, von Höhnel (11) felt inclined to regard the present species as a mere form of *B. botryosa*. This is certainly correct, but I have chosen the name *Bombardia pulvis-pyrius*, because that name has page priority.

Bombardia caudata (Curr.) Boedijn, *nov. comb.*

Sphaeria caudata Curr. *in* Trans. Linn. Soc. Lond. (Bot.) **22**: 320. 1859 (basionym). — *Sordaria caudata* (Curr.) Sacc., Syll. Fung. **1**: 236. 1882.

Perithecia conical, partly immersed or nearly superficial, brown, up to 0.5 mm in diam. Asci 8-spored, cylindrical, stalked, with a ring-like thickening at the top, 150 × 14–15 μ; refractive sphere just under the apex of the ascus. Paraphyses thread-like, soon deliquescent. Spores biseriate, at first cylindrical and hyaline, 30–40 × 6 μ, afterwards consisting of a smooth, ellipsoid, black cell with a germ-pore at the top, 17–24 × 9–10 μ, and a cylindrical, hyaline, empty primary appendage, 30–32 × 4–5 μ; secondary appendages short, pointed, soon disappearing.

Java: Tjibodas, *Penzig*, on rotten wood.

Description partly after Penzig & Saccardo (17), partly after Dennis & Wakefield (8), as no recent collections were available.

Zygopleurage Boedijn, *nov. gen.*

Perithecia pyriformia, superficialia, nuda. Asci late cylindraceo-clavati, stipitati, superne subtruncati, octospori. Sporae biseriatae, initio longe vermiformes, dein utrumque ad finem cellulam ellipsoideam nigram gignentes. Cellulae terminales poro germinativo apiculi appendicibusque parvis digitiformibus munitae. — Typus generis: *Sordaria zygospora* Speg.

Perithecia more or less pyriform, immersed with the base to superficial, brown, glabrous, the wall semitranslucent, and the neck black and opaque. Asci 8-spored, long-clavate, stalked, with a ring-like thickening at the apex. Paraphyses more or less monilioid, soon deliquescent. Spores irregularly biseriate, at first long-cylindrical, smooth, colourless, afterwards developing two terminal, ellipsoid, black cells which remain connected with the long, often undulating, hyaline middle part of the spore, and possess a germ-pore at the free end; secondary appendages gelatinous, arranged in rings round the top and base of the coloured cells.

When the spores are set free, the dark terminal cells soon separate, while the thread-like connective portion and the secondary appendages disappear. Since each dark cell acts as a spore, the originally 8-spored asci actually produce 16 spores.

Zygopleurage zygospora (Speg.) Boedijn, *nov. comb.* — Figs. 8–10

Sordaria zygospora Speg. *in* Michelia **1**: 227. 1878 (basionym). — *Philocopra zygospora* (Speg.) Sacc., Syll. Fung. **1**: 251. 1882. — *Podospora zygospora* (Speg.) Niessl *in* Hedwigia **22**: 156. 1883. — *Pleurage zygospora* (Speg.) O. Kuntze, Rev. Gen. Pl. **3**: 505. 1898.

Perithecia pyriform, semi-immersed, brown, semitranslucent, 600–1020 × 378–630 μ, the neck black, opaque, 133–180 μ broad, and the cells of the perithecial wall brown, angular, 3–7 μ long. Asci 8-spored, more or less clavate, stalked, with ring-like thickening at the flattened top, 286–305 × 44–56 μ. Spores irregularly biseriate, at first long-cylindrical, mostly variously bent and undulating, afterwards developing two terminal, ellipsoid, black cells, 35–44 × 15–22 μ, which remain connected with the very long, 4–6 μ wide, contorted, hyaline, and seemingly empty middle part of the spore, and possess a germ-pore at their free end; secondary appendages arranged in rings, the larger one round the apex of the black cells, the smaller one round their base.

JAVA: Bogor, July 1949, March 1956, *Boedijn*, on dung of rabbits, goats, sheep.

When mature the asci look as if they contain 16 spores in two groups of eight, but in reality these are the terminal cells which become disconnected only after they have been discharged, loosing in the process the secondary appendages.

Spore-abortion is not rare, and asci containing groups of small and large terminal cells are often seen. Also, the asci may contain four spores, of which the terminal cells measure 44–60 × 18–23 μ.

ZYGOSPERMELLA Cain

Zygospermum Cain *in* Univ. Toronto Stud. biol. No. 38: 73. 1934; not *Zygospermum* Thwaites ex Baill., Etud. gén. Euphorb. 620. 1858. — *Zygospermella* Cain *in* Mycologia **27**: 227. 1935.

Perithecia globose-pyriform, immersed or becoming superficial, glabrous or hairy, dark brown, opaque, with short neck. Asci 8-spored, cylindrical, stalked, with a ring-like thickening at the apex. Paraphyses thread-like, deliquescent. Spores biseriate, at first cylindrical and hyaline, then through inflation of the central portion developing a two-celled dark body, with a laterally placed germ-pore at the free end of each ellipsoid cell; the remainder of the spore-body extending as primary appendage on either side of the two central cells.

ZYGOSPERMELLA INSIGNIS (Mouton) Cain — Figs. 11–12

Delitschia insignis Mouton *in* Bull. Soc. Bot. Belge **36** (C.R. 2): 13. 1897. — *Zygospermum insigne* (Mouton) Cain *in* Univ. Toronto Stud. biol. No. 38: 76. 1934. — *Zygospermella insignis* (Mouton) Cain *in* Mycologia **27**: 227. 1935.

Perithecia globose-pyriform, more or less immersed, glabrous, blackish brown, about 500–600 μ in diam., with short neck. Asci 8-spored, cylindrical, stalked, with a ring-like thickening at the distinctly flattened apex, 204–247 × 31–39 μ. Paraphyses thread-like, deliquescent. Spores biseriate, at first more or less cylindrical and hyaline, through inflation of the central portion very soon developing a two-celled dark body, measuring 44–67 × 14–21 μ, and with a laterally placed germ-pore at the free end of each ellipsoid cell; the remainder of the spore-body extending as primary appendage on either side of the two central cells, 32–45 × 5–8 μ.

JAVA: Bogor, Febr. and March 1956, *Boedijn*, on dung of sheep and rabbits.

DISCUSSION

In the Sordariaceae as here delimited, I would admit the following genera: *Neurospora*, *Gelasinospora*, *Bombardioidea*, *Sordaria*, *Triangularia*, *Pleurage*, *Bombardia*,

Zygopleurage, and *Zygospermella*. Of these, *Gelasinospora* and *Bombardioidea* have as yet not been collected in Indonesia.

The genera *Coniochaeta*, *Hypocopra*, *Delitschia*, *Sporormia*, and *Pleophragmia*, which are often considered also to belong to the present family, are to be excluded.

When trying to arrange the genera according to their relationships, the best course is to follow Chenantais (5) and Fernier (9) who used especially the spore-characters as the leading principle in building up their system.

In my opinion *Neurospora* is the most primitive genus. Its ascospores are 1-celled, and possess two germ-pores, while the ornamentation consists of low, longitudinal, sparingly anastomosing ribs. Perithecia, however, are rare, and as yet practically known only from cultures. It is the conidial state which is predominantly found in nature, belonging to the form-genus *Monilia*. With the exception of a few genera, in which inconspicuous microconidia can be found, all others lack conidial fructifications.

The next genus, *Gelasinospora*, is closely related to *Neurospora*, with which it share the 1-celled ascospores with two germ-pores, but their ornamentation consists of pits instead of ribs.

Very close, too, is *Bombardioidea*, a genus proposed by Cl. Moreau (14) to accommodate *Sordaria bombardioidea*. Superficially, *Bombardioidea* resembles *Sordaria*, but differs in (i) its perithecia which are coriaceous and of a peculiar shape, and (ii) its spores which possess two germ-pores.

Sordaria, as opposed to *Bombardioidea*, has a more or less membranous perithecial wall, and the ascospores possess only one germ-pore which is situated at their base.

Triangularia is a genus that can be derived from *Sordaria*, and, indeed, the 1-celled, ellipsoid, colourless immature spores of the former do resemble those of the latter very closely. In the course of the development, however, an oblique cross-wall separates a small portion at the base of the spore, whilst the upper portion grows out into a more or less triangular black cell with a germ-pore at its apex. A most distinctive feature is that the basal cell remains colourless, and becomes empty and flat.

This last-named character furnishes a bridge between *Triangularia* and *Pleurage*. In the latter, the spores also possess a hyaline basal cell which is even separately known as the primary appendage, because it is so much more pronounced. The immature spores of *Pleurage* are typically claviform, consisting of an ellipsoid upper portion and an elongated, stem-like lower portion. With age the two parts become separated by a cross-wall, and the upper one turns black and develops a germ-pore at its apex. A further difference from *Triangularia* are the gelatinous secondary appendages which are found at the top of the spore and the end of the primary appendage.

A species which in view of the development of its spores deserves special mention is *Pleurage dagobertii* Moreau. The spores develop essentially in the same manner as described above, but the ellipsoid portion is at the base of the spore, and the primary

appendage at the top. Consequently, the germ-pore is also at the base. Another difference is the lack of secondary appendages.

The remaining three genera can be derived from *Pleurage*, from which they differ in that the immature spores rather than being clavate are more or less long-cylindrical.

In *Bombardia* the apical portion of the originally cylindrical and hyaline spore swells to a dark ellipsoid cell with a germ-pore at the top. Consequently, the ripe spores of *Bombardia* and *Pleurage* are practically the same, except for the secondary appendages which are usually small and inconspicuous in the former genus. However, a character which distinguishes *Bombardia* from all other genera of the Sordariaceae is the presence of a refractive sphere in the top of the ascus.

The spores in *Zygopleurage* are originally also long-cylindrical and hyaline, but then two dark ellipsoid cells are formed, one at each end of the spore, which till after the discharge remain connected by the colourless middle part of the spore. The germ-pores are situated at the free ends of the dark cells, and both cells possess secondary appendages.

In *Zygospermella* the central portion of the spore inflates to form two dark cells in juxtaposition, with at the free end of each ellipsoid cell a primary appendage and a laterally placed germ-pore which is never seen opposite a primary appendage.

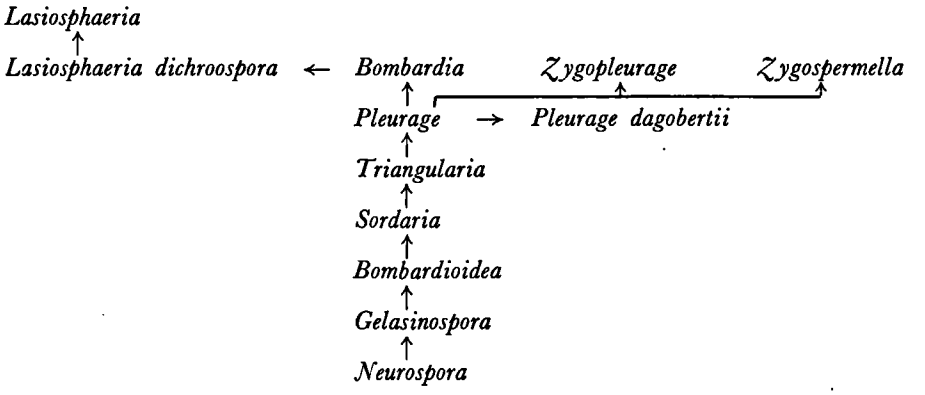


Diagram illustrating suggested relationships among genera of Sordariaceae.

When trying to connect the Sordariaceae with other groups, it is of interest to point out that there is a remarkable resemblance between *Bombardia* and *Lasiosphaeria*. Both genera have in common that (i) the asci possess a refractive sphere below their apex, and (ii) the spores are long-cylindrical. In *Lasiosphaeria dichroospora* Ell. & Ev. a cross-wall separates a large cell from the remainder of the spore-body. Although this cell, unlike the situation in *Bombardia*, does not swell, it does become dark-coloured, hence the specific name. In other species of *Lasiosphaeria* several cross-walls divide the spore which in most cases takes on a pale colour.

The ripening of the spores in *Bombardia* is extremely slow and irregular, whilst immature spores frequently show septation. They are even discharged when still immature, but that does not impair their capacity to germinate. These characters provide additional evidence of the great resemblance between *Bombardia* and *Lasiosphaeria*. In this connection it should also be remembered that many species of the former, as is the rule in those of the latter, are found on dead vegetable matter.

The above diagram is suggested to illustrate the possible relationships among the genera of the family. Apart from some additions, the scheme is based on the work of Chenantais and Fernier.

I hereby wish to thank Prof. Dr H. C. D. de Wit, Wageningen, for his help in preparing the Latin diagnosis.

REFERENCES

1. AMES, L. M. (1951). A new cellulose decomposing fungus. *In* Sydowia **5**: 120–123.
2. ARX, J. A. VON & E. MÜLLER (1954). Die Gattungen der amerosporen Pyremomyceten. *In* Beitr. KryptFl. Schweiz **11**: 281–293, 296–299, figs. 84–86, 88.
3. CAIN, R. F. (1934). Studies on coprophilous Sphaeriales in Ontario. *In* Univ. Toronto Stud. biol. No. 38: 1–126, 96 figs.
4. CESATI, V. (1878). Mycetum in itinere Borneensi lectorum a cl. Beccari enumeratio. *In* Atti Accad. Sci. fis. mat. Napoli **8** (3): 1–28, 4 pls.
5. CHENANTAIS, J. E. (1919). Etudes sur les Pyrénomycètes. *In* Bull. Soc. mycol. France **35**: 46–98, 113–139, 4 pls.
6. —— (1920). Sillon et pores germinatifs. Ibidem **36**: 29–33.
7. DAMON, S. C. & M. H. DOWNING (1954). Taxonomic studies on the genus *Coccospora*. *In* Mycologia **46**: 209–221, 2 figs.
8. DENNIS, R. W. G. & E. M. WAKEFIELD (1946). New or interesting British fungi. *In* Trans. Brit. mycol. Soc. **29**: 147.
9. FERNIER, H. (1954). Un *Bombardia* nouveau sur Manioc. Remarques sur l'anatomie de la paroi périthéciale de quelques *Bombardia* et la différenciation des ascospores chez les Sordariacées. *In* Rev. Mycol. **19** (Suppl. col.): 9–19, 6 figs.
10. HEIM, R., J. NOUVEL & A. SACCAS (1949). Sur un nouveau *Penicillium* à haut pouvoir antibiotique. *In* Bull. Acad. Belg. Cl. Sci., ser. 5, **35**: 42–49.
11. HÖHNEL, F. VON (1907). Fragmente zur Mykologie. *In* S.B. Akad. Wiss. Wien (Math.-nat. Kl., I Abt.) **116**: 116–120, 1 pl.
12. —— (1909). Fragmente zur Mykologie. Ibidem **118**: 1485–1487.
13. MÖLLER, F. A. G. J. (1901). Phycomyceten und Ascomyceten. *In* Bot. Mitth. Tropen Heft 9: 75–82, 294, pl. 2 fig. 34.
14. MOREAU, CL. (1953). Les genres *Sordaria* et *Pleurage* (Encycl. mycol. **25**).
15. MOREAU-FROMENT, M. (1956). Les *Neurospora*. *In* Bull. Soc. bot. France **103**: 678–738.
16. OVEREEM-DE HAAS, C. & D. VAN (1922). Verzeichnis der in Niederländisch Ost-Indien bis dem Jahre 1920 gefundenen Myxomycetes, Fungi und Lichenes. *In* Bull. Jard. bot. Buitenz., ser. 3, **4**: 31, 33.
17. PENZIG, O. & P. A. SACCARDO (1904). Icones Fungorum javanicorum **1**: 8–10, pl. 6 fig. 2; **4**: pl. 7 fig. 1–2.