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# A world revision of *Massarina* (Ascomycota)

by

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With 46 figures

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**Abstract:** A world revision of the pyrenocarpous ascomycete genus *Massarina* (Lophiostomataceae, Pleosporales) accepting 43 species is presented. The genera *Epiphegia* and *Oraniella* are reinstated. Several species formerly classified in *Massarina* were found to belong to *Exarmidium,* of which *Xylopezia* is found to be a synonym. Several other species are excluded from the genus; most of them were found to be synonymous with other taxa, including many lichens. The following new combinations are proposed: *Anisomeridium grumatum* (Cooke) Aptroot, *Epiphegia microcarpa* (Fuckel) Aptroot, *Exarmidium biseptatum* (Sherwood) Aptroot, *E. excellens* (Rehm ex Saccardo) Aptroot, *E. hemisphaericum* (Fries:Fries) Aptroot, *E. inclusum* (Persoon) Aptroot, *Massarina igniaria* (C. Booth) Aptroot, *Pseudopyrenula staphyleae* (Petrak) Aptroot, *Splanchnonema quinqueseptatum* (M. Barr) Aptroot, *Wettsteinina corni* (Fuckel) Aptroot, and *W. xerophylli* (Ellis) Aptroot.

**Key words:** Ascomycetes, *Massarina,* Lophiostomataceae, Pleosporales, *Epiphegia, Oraniella, Xylopezia, Anisomeridium, Exarmidium, Pseudopyrenula, Splanchnonema, Wettsteinina,* lichens, revision.

## Introduction and History

The genus *Massarina* Saccardo (1883) was erected for species of pyrenocarpous ascomycetes segregated from *Massaria* De Notaris by having hyaline ascospores. Among the original species, the most common species of the genus as presently circumscribed, *M. eburnea* (Tulasne & C. Tulasne) Saccardo, was selected as lectotype of the genus by Clements and Shear (1931).

The genus was ranked in a separate family, the Massarinaceae Munk, by Munk (1956), but it is now regarded as belonging to the Lophiostomataceae Saccardo in the Pleosporales, according to Barr (1992).

Most species of *Massarina* are saprotrophs occurring on wood, with many representatives in aquatic or marine habitats. Little is known about host preferences, but most of the common species are known from a wide variety of hosts. However, some species appear to be restricted to, e.g., palms or *Dryas.*

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At present, 160 taxa are described in or combined into the genus, most of which were enumerated by Hyde (1995a), who also redescribed and illustrated the type species. Some species formerly classified in *Massarina* have already been transferred to various other genera, including the unrelated genera *Acrocordia* Massalongo and *Phragmoporthe* Petrak.

Several genera were treated as synonyms of *Massarina* by Petrak (1959), Bose (1961), Müller & Von Arx (1962), Von Arx & Müller (1975) and Kohlmeyer & E. Kohlmeyer (1979). Hyde (1995a) enumerates nine generic synonyms from the literature, but most of them differ considerably from *Massarina*. Among them, only the synonymy of *Bertiella* (Saccardo) Saccardo & Sydow and *Pseudodiaporthe* Spegazzini with *Massarina* could be confirmed.

Three regional revisions of the genus have been published. The revision of Bose (1961) covered most European species, and was supplemented with some extra-European species; the revision of Srinivasulu and Sathe (1974) only covered species known from India, while Barr (1992) treated the North American members of the genus. None of these revisions was exhaustive and many taxa remain for which only the original description, often dating back to the previous century, exists.

More recently, several *Massarina* species have been collected during explorations in the tropics, mainly in freshwater habitats (Hyde & Aptroot 1997b, Shearer & Hyde 1997) or on palms (Hyde & Aptroot 1997a). In order to confidently name these taxa, it became necessary to revise all species described in *Massarina* and similar genera.

## Material and methods

Nearly 1000 specimens labelled as species of *Massarina* were studied, including the types of most described taxa. Material was examined from as many taxa as possible, including those already redisposed or synonymized before the start of this study. All available material of the genus from the following herbaria was examined: ABL, BR, BRIP, C, CBS, CUP, FH, GZU, HKU (M), L, M, NY, UPS, herb. Berger (Kopfing, Austria) and herb. Jaklitsch (Wien, Austria); while selected material (mainly types) was investigated from: AMH, ASU, B, BERN, BP, BPI, CO, DAOM, DAR, G, H, HCIO, IMI, IMUR, K, LPS, NYS, PAD, PC, S, W and ZT. Because of the large number of specimens available, only selected material is listed for common species, including material from all countries from which specimens have been studied, as well as all identifiable exsiccata from published series.

Because most species are known only from herbarium material, most of the work was carried out with dried specimens. In addition, cultures available in the CBS collection were studied and fresh material was collected in the Netherlands, Germany, Belgium, France, Sweden, Switzerland, Canada and Papua New Guinea, but this led to a limited number of isolates. Some dried cultures were also studied, mainly preserved in the herbarium of IMI. Attempts to culture species using ascospores from dried specimens were unsuccessful. Cultures were studied on various standard media, including beerwort agar (2%) (MEA) and oatmeal agar (OA), often with sterilized *Lupinus* stems or *Fagus* twigs.

The available indices of published *Massarina* names were found to be incomplete. The list of names of *Massarina* species presented here was obtained by combining the published lists with an exhaustive study of the literature and annotations in the herbaria listed. The status of all names encountered was checked against the International Code of Botanical Nomenclature (ICBN, Greuter et al. 1994), and some were found to be either invalid or illegitimate. In this paper not only the illegitimate and invalidly published names are treated, but also herbarium names for which no publication could be traced. Some of these names have been incorrectly regarded by other authors as published, and therefore the recommendation not to mention hitherto unpublished names is not followed.

All material cited, including types, was examined unless otherwise indicated. All specimens were examined using an Olympus BH microscope, with Nomarski differential interference contrast. Hand sections and occasionally microtome sections were mounted in water, in which all measurements were made. Iodine reactions were observed in undiluted Lugol's solution (Merck 9261). A variety of other mounting media was used for comparison to evaluate the effect on morphology and dimensions, including 10% KOH, KOH followed by IKI, NaClO, Melzer's reagent, NaOH, lactophenol, cotton blue in lactic acid, Congo red, and Shear's reagent. Illustrations are from the types unless otherwise mentioned. All drawings were made with a camera lucida equipment at constant magnification, as indicated by the bars, which represent 10 $\mu$m in all figures.

## Results and discussion

Pyrenocarpous ascomycetes have comparatively few morphological characters and therefore all available characters must be taken into account. At the start of this study, no deliberate selection was made as to which characters were to be regarded as relevant at which level, because the same character can be a valuable generic criterion in certain groups or the product of infraspecific variation in another group. As expected, however, the structure of the hamathecium proved to be valuable in characterizing the genera belonging to the family Lophiostomataceae, as was found in related groups (Hawksworth 1985, Aguirre 1991, Aptroot 1991, 1995b).

Of the 160 *Massarina* names, only 43 are accepted here for species which occur on various plant substrata worldwide. The lectotype species, *M. eburnea* (Tulasne & C. Tulasne) Saccardo, is very common in Europe and North America, mostly on twigs of *Fagus sylvatica.* Some other species are fairly common and widespread. Most species, however, are only known from one or a few collections. Some of these may be rare, but they may also have been overlooked, due to their inconspicuous habit. Therefore, little can be said of the ecology and the distribution of the rarely collected species. However, relatively many species are known from freshwater habitats (Hyde & Aptroot 1997b) or from palms (Hyde & Aptroot 1997a).

All species of *Massarina* are characterized by septate pseudoparaphyses, hyaline, septate, fusiform to long-ellipsoid ascospores and bitunicate asci. The type species, *M. eburnea,* has an immersed, little developed ascoma wall and broadly fusiform, 3-septate ascospores with a thick gelatinous sheath. The majority of the species differs from the type species in various characters, especially the ascospore shape, which is often narrowly fusiform, and the shape and extension of the gelatinous sheath around the ascospores.

The descriptions given here contain only what are considered to be important diagnostic characters. These include ascospore shape, septation and dimensions and the presence/absence, shape and dimensions of the surrounding gelatinous sheath, hamathecium structures and dimensions and shape and dimensions of the ascomata and ostioles. Little variation was observed in the asci, except for the dimensions, which correlate with the ascospore dimensions, as all asci contain eight, irregularly biseriate ascospores. Peridium thickness and the degree of carbonization of the clypeus proved to be very variable (even within one specimen) and they are correlated with the degree of immersion of the ascomata, which is in itself often rather variable with-

in a species. In general, immersed ascomata are relatively thin-walled and little carbonized, whereas superficial ascomata are thick-walled and heavily carbonized. Erumpent ascomata are intermediate. For illustrations of peridium and clypeus structures of representative species see Hyde (1989, 1995a, 1995b) and Hyde & Aptroot (1997a, 1997b).

Some species of *Massarina* appear similar to species of other genera, especially *Astrosphaeriella* Sydow & P. Sydow, differing from their counterparts in *Massarina* only in a few characters, particularly the septate pseudoparaphyses (versus anastomosing trabeculae). Also, the reported anamorphs do belong to very different groups. Therefore, the species accepted here in *Massarina* may not form a monophyletic group. However, on the basis of morphological characters, no clear subdivision could be made. Future studies using ultrastructure or DNA analysis may be required.

No attempt has been made to survey other genera for species that may be better assigned to *Massarina.* Especially in the (currently not accepted) genus *Metasphaeria* Saccardo, numerous species have been described which might belong to *Massarina,* but additional species of *Massarina* may also be currently hidden in *Massariosphaeria* (E. Müller) Crivelli, *Mycosphaerella* Johanson, *Wettsteinina* Höhnel, or even the genera mentioned in Table I. Also the delimitation between the genera of the Lophiostomataceae (Barr 1992, Holm & Holm 1988), especially between *Lophiostoma* Cesati & De Notaris and *Massarina,* seems schematical rather than natural. However, before a more natural classification can be obtained, the other genera of the family should be revised and the distinguishing characters evaluated.

The species so far placed in *Massarina* are found to belong to very different groups (Tab. I). Among them are ten more or less lichenized species, belonging to unrelated genera like *Anisomeridium* (Müller Argoviensis) M. Choisy, *Pyrenula* Acharius, *Strigula* Fries and *Trypethelium* Sprengel. In addition, some species could not be satisfactorily assigned to any known genus.

Table I. Genera to which former *Massarina* species are disposed

*Acrocordia*
*Anisomeridium*
*Arthopyrenia*
*Cainia*
*Chaetomium*
*Diaporthe*
*Didymella*
*Didymosphaeria*
*Epiphegia*
*Exarmidium*
*Heterosphaeria*
*Keissleriella*
*Lophiostoma*
*Massaria*
*Melomastia*
*Mycosphaerella*
*Oraniella*
*Paraphaeosphaeria*
*Peridiothelia*
*Phaeodothis*
*Polymeridium*
*Pseudopyrenula*
*Pyrenula*
*Requienella*
*Splanchnonema*
*Strickeria*
*Strigula*
*Trypethelium*
*Wettsteinina*

Two unispecific genera, *Epiphegia* Nitschke ex G.H. Otth and *Oraniella* Spegazzini, are reinstated and briefly treated. Several species were found to belong to *Exarmidium* P. Karsten, of which *Xylopezia* Höhnel is found to be a synonym. This genus was recently treated as pyrenomycetous (Barr & Boise 1985), whereas its synonym had been treated as (excluded) discomycetous, partly by the same author (Sherwood-Pike & Boise 1986). Both revisions roughly cover the same set of species. Unfortunately, the little-known name *Exarmidium* has priority, whereas the epithets used in *Xylopezia* are older. Several other species are excluded from *Massarina,* and are most often found to be synonymous with other taxa.

**Key to some hyalophragmosporous pyrenomycete genera likely to be confused with *Massarina***

1a. Asci unitunicate; hamathecium filaments paraphyses with free tips ..... 2
1b. Asci bitunicate; hamathecium filaments indistinct, pseudoparaphyses or trabeculae, without free tips 3

2a. Asci always IKI-positive (blue), with pulvillus; ascospores uniseriate ..... *Discostroma*
2b. Asci usually IKI-negative, or only IKI-positive (blue) after pretreatment with KOH; ascospores irregularly biseriate ..... 3. *Exarmidium*

3a. Hamathecium filaments indistinct, hamathecium composed of dispersed remnants of the initial interascal tissue; ascospores often with pseudosepta (incomplete septa) in addition to eusepta ..... 5. *Wettsteinina*
3b. Hamathecium filaments distinct, pseudoparaphyses or trabeculae; ascospores usually with eusepta only ..... 4

4a. Hamathecium filaments trabeculae, anastomosing and with few septa, usually less than 1 μm wide 5
4b. Hamathecium filaments pseudoparaphyses, not anastomosing or only anastomosing above the asci, with many septa, usually more than 1.5 μm wide ..... 6

5a. Ascomata conical, often erumpent or superficial; ascospores with pointed ends, usually more than 30 μm long ..... *Astrosphaeriella*
5b. Ascomata pyriform, immersed; ascospores with rounded ends, less than 30 μm long 4. *Oraniella*

6a. Ascomata aggregated in dense clusters; ostioles with fused walls ..... 2. *Epiphegia*
6b. Ascomata single or in loose clusters; ostioles not fused ..... 1. *Massarina*

## 1. **Massarina** Saccardo, Syll. Fung. 2: 153. 1883

Type — *Massarina eburnea* (Tulasne & C. Tulasne) Saccardo, lectotype, fide Clements & Shear (1931) (≡ *Sphaeria pupula* var. *minor* Desmazières).

*Bertiella* (Saccardo) Saccardo & Sydow, Syll. Fung. 14: 19. 1899 ≡ *Bertia* subg. *Bertiella* Saccardo, Syll. Fung. 1: 584. 1882.

Type — *Bertiella macrospora* (Saccardo) Saccardo & Traverso, holotype (≡ *Massarina macrospora* (Saccardo) O. Eriksson & J.Z. Yue).

*Pseudodiaporthe* Spegazzini, An. Mus. La Plata 19: 359. 1909.

Type — *Pseudodiaporthe coffeae* Spegazzini, holotype (≡ *Massarina coffeae* (Spegazzini) Bose = *Massarina corticola* (Fuckel) L. Holm).

Stroma not well differentiated, sometimes forming an external clypeus around the ostiole, black, but often reduced. Ascomata single or aggregated, sometimes below a clypeus, pseudothecioid, sphaeroid, hemispherical, conical, globose or pyriform, black, smooth or irregularly roughened, immersed, erumpent or superficial. Subicu-

lum none. Peridium thin at base and sides, pale brown to black, consisting of a multicellular layer of brown, flattened hyphae (textura intricata), IKI-negative, KOH-negative. Hamathecium consisting of relatively wide (over 1 $\mu$m), septate pseudoparaphyses (not trabeculae), unbranched between the asci, but often branched and anastomosing above the asci, colourless, embedded in a gelatinous matrix, not inspersed with oil droplets, IKI-negative. Asci narrowly to broadly clavate (largely depending on the size of the ascospores), bitunicate, usually with a shallow, c. 2 $\mu$m wide, ocular chamber, dextrinoid (IKI-positive, brownish), with 8 ascospores which are irregularly biseriate. Ascospores fusiform to long ellipsoid, hyaline, asymmetrically or symmetrically 1-3(-7)-septate, constricted near the septum or not, without germ locus, often covered with a thin to thick gelatinous sheath and/or with polar gelatinous appendages; senescent ascospores remaining hyaline or more often becoming pale to dark brown, with or without minutely verrucose ornamentation. Anamorphs sometimes formed in culture or found in nature in close association, belonging to *Acrocalymma* Alcorn & J.A.G. Irwin, *Chaetophoma* Cooke, *Diplodia* Fries, *Periconia* Tode, *Phoma* Saccardo, *Stagonospora* (Saccardo) Saccardo, *Tetraploa* Berkeley & Broome, *Tumularia* Marvanová & Descals, or not identifiable.

**Distribution and ecology:** The 43 recognized species of the genus occur worldwide. Most species are saprophytes on plant material, especially wood and branches. Relatively common in marine or fresh-water habitats.

**Notes:** The remaining genera treated as synonyms of *Massarina* by Petrak (1959), Bose (1961), Müller & Von Arx (1962), Von Arx & Müller (1975), Kohlmeyer & E. Kohlmeyer (1979) or Hyde (1995a) and their type species are discussed below. The type species of all these genera, except *Phragmosperma marattiae* (Hennings) Theissen & Sydow, are also discussed in the main body of the text, under the respective genera, or in the annotated list of species. None of them was found to be congeneric with *Massarina*.

***Abaphospora*** Kirschstein, Ann. Mycol. 37: 98. 1939.

Type — *Abaphospora rhopalosperma* Kirschstein, holotype (≡ *Massarina rhopalosperma* (Kirschstein) E. Müller). This genus is a new synonym of *Strickeria* Koerber rather than of *Massarina,* with which it was synonymized by Müller & Von Arx (1962).

***Amphididymella*** Petrak, Bot. Jahrb. Syst. 141: 94. 1928.

Type — *Amphididymella adeana* Petrak, holotype (≡ *Massarina adeana* (Petrak) E. Müller). The type species was correctly synonymized by Yue & Eriksson (1985) with *Acrocordia gemmata* (Ach.) Massal. *Amphididymella* Petrak is therefore a synonym of *Acrocordia* Massalongo rather than of *Massarina,* with which it was synonymized by Petrak (1959).

***Clypeothecium*** Petrak, Ann. Mycol. 20: 183. 1922.

Type — *Clypeothecium weirii* Petrak, holotype. The type species was synonymized by Barr & Boise (1985) with *Exarmidium morthieri* (Fuckel) M. Barr & Boise, which is synonymized below with *Exarmidium hemisphaericum* (Fries: Fries) Aptroot; the genus therefore becomes a synonym of *Exarmidium* P. Karsten, as shown by Barr & Boise (1985); the synonymy with *Massarina* proposed by Von Arx & Müller (1975) is not tenable.

***Epiphegia*** Nitschke ex G.H. Otth, Mitth. Naturf. Ges. Bern 1870: 104. 1871.

Type — *Epiphegia alni* Nitschke ex G.H. Otth, holotype (≡ *Massarina alni* (Nitschke ex G.H. Otth) Saccardo = *Epiphegia microcarpa* (Fuckel) Aptroot). The genus *Epiphegia* is reinstated below.

***Holstiella*** Hennings, in Engler, Die Pflanzenwelt Ostafrikas, C: 33. 1895.

Type — *Holstiella usambarensis* Hennings, holotype (*"Massarina usambarensis"* (Hennings) Höhnel, nom. herb.). The type species represents the common pantropical lichen *Trypethelium eluteriae* Sprengel. Thus, *Holstiella* becomes a synonym of *Trypethelium* Sprengel rather than of *Massarina,* with which it was synonymized by Von Arx & Müller (1975).

***Massarinula*** Géneau de Lamarlière, Rev. Gén. Bot. 6: 321. 1894.

Type — *Massarinula quercina* Géneau de Lamarlière, holotype (≡ *Massarina quercina* (Géneau de Lamarlière) E. Müller). No material of the type species was found in PC. It was probably also not examined by Müller or Von Arx. Therefore, the application of this generic name, which was synonymized by Müller & Von Arx (1962) with *Massarina,* remains obscure. According to the description given by Müller & Von Arx (1962), this species could be a synonym of *Arthopyrenia punctiformis* Massalongo, and the genus would become a synonym of *Arthopyrenia* Massalongo.

***Oraniella*** Spegazzini, Anales Mus. Nac. Hist. Nat. Buenos Aires 19: 378. 1909.

Type — *Oraniella coffeicola* Spegazzini, holotype (≡ *Massarina coffeicola* (Spegazzini) Bose). The genus was synonymized with *Massarina* by Bose (1961). However, the type and only species belongs to the Melanommatales. It does not seem to be closely related to any other genus currently accepted in the order. It is reinstated with a single accepted species, *Oraniella coffeicola* Spegazzini.

***Parasphaeria*** Sydow, Ann. Mycol. 22: 297. 1924.

Type — *Parasphaeria contraria* Sydow, holotype (≡ *Massarina contraria* (Sydow) v. Arx & E. Müller). No material of the type species was found in either B, FH or S. Therefore, the type should be regarded as lost, possibly destroyed in Berlin during World War II. It was probably also not examined by Von Arx & Müller (1975). The application of the generic name remains obscure.

***Phragmosperma*** Theissen & Sydow, Ann. Mycol. 14: 450. 1916.

Type — *Phragmosperma marattiae* (Hennings) Theissen & Sydow, holotype (≡ *Micropeltis marattiae* Hennings). According to the description of the type, this fungus is a true foliicolous Dothidealean fungus, not even remotely related to *Massarina,* though it was cited as a synonym by, e.g., Kohlmeyer & E. Kohlmeyer (1979).

***Trematostoma*** (Saccardo) Shear, Mycologia 34: 273. 1942 ≡ *Zignoëlla* subgenus *Trematostoma* Saccardo, Syll. Fung. 2: 222. 1883.

Type — *Trematostoma morthieri* (Fuckel) Shear, holotype (≡ *Trematosphaeria morthieri* Fuckel ≡ *Massarina morthieri* (Fuckel) von Arx & E. Müller). The type species was found to be identical with *Exarmidium hemisphaericum,* and the genus becomes a synonym of *Exarmidium* P. Karsten, with which it was already synonymized by Barr & Boise (1985), but not with *Massarina,* as proposed by Von Arx & Müller (1975).

### Key to the species of *Massarina*

Mature, but hyaline ascospores should be examined for measurements, septation and gelatinous sheath, as these characters are often different in young and senescent ascospores.

1a. Ascospores (1-)3-7-septate ..... 2
1b. Ascospores 1-septate, at most with additional incomplete septa (pseudosepta) ..... 18

2a. Ascospores (3-)4-7-septate ..... 3
2b. Ascospores at most 3-septate ..... 7

3a. Ascospores 3-4-septate, (16-)21-24(-26)µm long ..... 1.31 *M. papulosa*
3b. Ascospores (3-)5-7-septate ..... 4

4a. Gelatinous sheath with up to 50 µm long appendages; ascospores (38-)45-60(-70) µm long ..... 1.25 *M. ingoldiana*
4b. Gelatinous sheath without appendages ..... 5

5a. Ascospores less than 35 (27-33) µm long ..... 1.44 *M.* sp. (undescribed)

5b. Ascospores more than 35 μm long ..... 6

6a. Ascospores 3-5 septate, 37-53 μm long ..... 1.30 *M. palmicola*
6b. Ascospores 5-7-septate, 43-50 μm long ..... 1.37 *M. talae*

7(2)a. Ascospores long ellipsoid to broadly fusiform ..... 8
7b. Ascospores (narrowly) fusiform ..... 14

8a. Ascomata aggregated below a clypeus, ascospores (16-)21-24(-26) μm long ... 1.29 *M. palmetta*
8b. Ascomata single ..... 9

9a. Ascospores long ellipsoid; gelatinous sheath expanding when membrane is broken ..... 10
9b. Ascospores broadly fusiform; gelatinous sheath missing or not normally expanding when broken 11

10a. Hamathecium filaments unbranched, more than 2 μm wide; ascospores 19-25 μm long .....
..... 1.35 *M. ricifera*
10b. Hamathecium filaments branched, less than 2 μm wide; ascospores 16-21 μm long .....
..... 1.14 *M. carolinensis*

11a. Ascospores with gelatinous sheath ..... 12
11b. Ascospores without gelatinous sheath, (25-)27-32(-35) μm long; ascospore wall 1-2 μm thick ....
..... 1.16 *M. cisti*

12a. Ascospores not or only slightly constricted at the septa, (25-)32-42(-50) μm long 1.20 *M. eburnea*
12b. Ascospores strongly constricted, at least at the median septum ..... 13

13a. Ascospores constricted at all septa, 42-50(-56) μm long; sheath not constricted 1.41 *M. velatispora*
13b. Ascospores constricted only at the median septum, (28-)33-45(-47) μm long; sheath also constricted at the median septum ..... 1.39 *M. thalassiae*

14(7)a. Ascospores without gelatinous sheath, 26-30 μm long; senescent (brownish) ascospores 1-septate
..... 1.23 *M. igniaria*
14b. Ascospores with gelatinous sheath; senescent (brownish) ascospores 3-septate ..... 15

15a. Gelatinous sheath with appendages; ascospores strongly curved, 32-35 μm long 1.4 *M. appendiculata*
15b. Gelatinous sheath without appendages; ascospores mostly straight ..... 16

16a. Ascospores mostly more than 25 [(17-)24-28(-33)]μm long ..... 1.1. *M. acrostichi*
16b. Ascospores mostly less than 25 μm long ..... 17

17a. Ascospores strongly constricted at the median septum, (15-)17-25(-28) μm long .....
.....1.36 *M. rubi* (3-septate material)
17b. Ascospores not or weakly constricted at the median septum, 20-24(-27) μm long 1.42 *M. waikanaënsis*

18(1)a. Ascospores long ellipsoid to ovoid or broadly fusiform ..... 19
18b. Ascospores fusiform ..... 28

19a. Ascospores ovoid, (22-)24-30 μm long; upper cell much larger than lower cell 1.10 *M. balnei-ursi*
19b. Ascospores long ellipsoid to broadly fusiform ..... 20

20a. Ascospores long ellipsoid, 50-65(-73) μm long; hamathecium filaments unbranched, more than 3 μm wide ..... 1.18 *M. cystophorae*
20b. Ascospores broadly fusiform; hamathecium filaments branched, less than 3 μm ..... 21

21a. Ascospores without gelatinous sheath ..... 22
21b. Ascospores with gelatinous sheath ..... 24

22a. Ascospores more than 35 (38-46) μm long ..... 1.32 *M. peerallyi*
22b. Ascospores less than 30 μm long ..... 23

23a. Ascospores straight, without pseudosepta, (20-)25-30 μm long ..... 1.11 *M. biconica*
23b. Ascospores curved, with pseudosepta, 25-31 μm long ..... 1.40 *M. thalassioidea*

24a. Ascospores very strongly constricted, often breaking into halves, (17-)19-22(-24) μm long .....
..... 1.24 *M. immersa*
24b. Ascospores not or less strongly constricted, not breaking into halves ..... 25

25a. Ascospores not constricted, without pseudosepta, 32-42 μm long 1.20 *M. eburnea* (1-septate material)
25b. Ascospores constricted, often with additional incomplete septa (pseudosepta)..... 26

26a. Upper ascospore cell bulging out above the septum; gelatinous sheath with appendages, expanding when the membrane is broken; ascospores 32-42 μm long..... 1.34 *M. ramunculicola*
26b. Upper ascospore cell not bulging out; gelatinous sheath without appendages, not expanding. 27

27a. Ascospores less than 40 [32-36] μm long..... 1.28 *M. moeszii*
27b. Ascospores mostly more than 40 [(34-)45-55(-59)] μm long..... 1.9 *M. australiensis*

28(18)a. Ostiole laterally flattened (slot-like)..... 29
28b. Ostiole rounded (flush, papillate or beak-like)..... 31

29a. Upper ascospore cell bulging out above the septum; ascospores without gelatinous sheath, 35-44 μm long ..... 1.26 *M. lignorum*
29b. Upper ascospore cell not bulging out; ascospores with gelatinous sheath..... 30

30a. Gelatinous sheath with conical appendages with an internal spine; ascospores 23-28 μm long... ..... 1.21 *M. fronsisubmersa*
30b. Gelatinous sheath without appendages; ascospores 52-56 μm long..... 1.19 *M. desmonci*

31a. Ostiole forming an up to 170 μm long beak; ascospores not or only slightly constricted at the septum, 19-22 μm long..... 1.43 *M. walkeri*
31b. Ostiole flush or papillate; ascospores constricted at the septum..... 32

32a. Ascospores without gelatinous sheath, upper cell never bulging out (when bulging out, go to 36) 33
32b. Ascospores with gelatinous sheath, upper cell bulging out or not..... 36

33a. Ascospores less than 25 μm long..... 34
33b. Ascospores mostly more than 25 μm long..... 35

34a. Ascospores strongly constricted, more than 4.5 μm wide, 16-23(-25) μmlong 1.22 *M. hepaticarum*
34b. Ascospores slightly constricted, less than 4.5 μm wide, (18-)23-25 μm long 1.15 *M. chamaecyparissi*

35a. Ascospores more than 35 (36-43) μm long..... 1.27 *M. macrospora*
35b. Ascospores less than 35 (24-32) μm long..... 1.8 *M. arundinariae*

36(32)a. Gelatinous sheath with more than 10 μm long, often curved, appendages..... 37
36b. Gelatinous sheath without appendages, at most with short, up to 10 μm long, extensions... 38

37a. Gelatinous appendages about twice as long as wide, continuous with a gelatinous sheath sur rounding the ascospores; ascospores 27-35(-39) μm long..... 1.6 *M. armatispora*
37b. Gelatinous appendages about 4 times as long as wide, not or little extending around the ascospores; ascospores 24-32 μm long..... 1.12 *M. bipolaris*

38a. Upper ascospore cell not bulging out above the septum..... 39
38b. Upper ascospore cell bulging out above the septum..... 41

39a. Ostiole pale, wide; ascospores less than 23 [(14-)16-19(-22)] μm long..... 1.2 *M. albocarnis*
39b. Ostiole dark, narrow; ascospores more than 23 μm long..... 40

40a. Ascospores less than 35 [(23-)26-29(-32)] μm long..... 1.3 *M. amphibia*
40b. Ascospore more than 35 [40-50] μm long..... 1.33 *M. purpurascens*

41a. Gelatinous sheath constricted at the septum; ascospores 22-29(-34) μm long... 1.5 *M. aquatica*
41b. Gelatinous sheath not constricted at the septum..... 42

42a. Ascospores mostly less than 25, [(15-)17-25(-28)] μm long.....1.36 *M. rubi*
42b. Ascospores mostly more than 25 μm long.....43

43a. Gelatinous sheath usually extending beyond the ascospore ends; ascospores (22-)25-34 μm long. ..... 1.7 *M. arundinacea*
43b. Gelatinous sheath not conspicuously extending..... 44

44a. Ascospores often curved, 29-35(-42) μm long; senescent (brown) ascospores 5-6-septate..... ..... 1.38 *M. tetraploa*
44b. Ascospores usually straight; senescent (brown) ascospores 3-4-septate..... 45

45a. Ostiole pale, wide, not papillate; ascospores (28-)32-35 μm long..... 1.13 *M. canadensis*
45b. Ostiole black, narrow, papillate; ascospores (22-)25-35(-40) μm long..... 1.17 *M. corticola*

1.1 **Massarina acrostichi** K.D. Hyde, Mycol. Res. 193: 437. 1989. Fig. 1.

Type — BRUNEI: Kampong Kapok Mangrove, on rhachis of *Acrostichum speciosum* (Pteridophyta). Hyde s.n., V 1987 (IMI 327274, holotype).

For additional illustrations see Hyde (1989).

Ascomata 300-600 μm diam., conical, immersed, with an erumpent ostiole. Hamathecium consisting of branched, septate pseudoparaphyses, sparsely anastomosing above the asci, filaments c. 2 μm wide. Ascospores fusiform, (1-)3-septate, (17-)24-28(-33) × 6-10 μm, with a median constriction, not constricted at the additional septa, middle cells equal, broader but shorter than end cells, ends pointed, surrounded by a 3-5 μm thick gelatinous sheath. Senescent ascospores pale brownish and ornamented with small warts. Conidiomata unknown. In vitro unknown.

**Distribution and ecology:** So far only known from Brunei, on decaying fern.
**Host plant recorded:** *Acrostichum speciosum* (Pteridophyta).

1.2 **Massarina albocarnis** (Ellis & Everhart) M. Barr, Mycotaxon 45: 210. 1992. Fig. 2.

≡ *Diaporthe albocarnis* Ellis & Everhart, Proc. Acad. Nat. Sci. Philadelphia 45: 140. 1893.

Type — CANADA: Ontario, London, on *Cornus* (Cornaceae). Dearness s.n., V 1891, distributed in Ellis & Everhart, North American Fungi 2820 (NY, lectotype, designated here; NY (2×), isotypes).

Ascomata 300-450 μm diam., rounded, immersed, with a wide, pale, erumpent ostiole. Hamathecium consisting of branched, septate pseudoparaphyses, sparsely anastomosing above the asci, filaments c. 2 μm wide. Ascospores fusiform, 1-septate, (14-)16-19(-22) × 4-6 mm, with a median constriction, cells equal, ends pointed, surrounded by a 1 μm thick gelatinous sheath, which may be protracted at the ends. Conidiomata unknown. In vitro unknown.

**Distribution and ecology:** So far only known from Canada, on branches of Betulaceae.

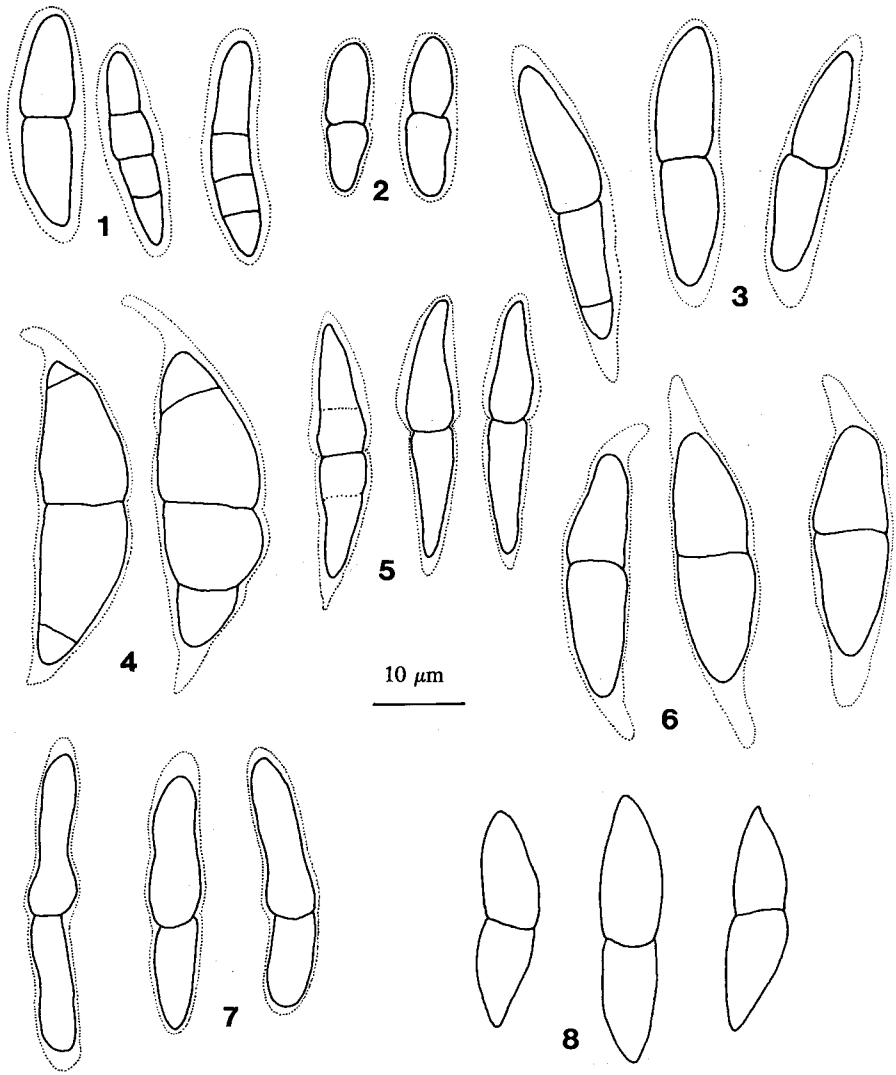
**Host plants recorded:** *Cornus* (Cornaceae) and *Ostrya virginiana* (Betulaceae).

**Additional material seen:** CANADA: Ontario, London, on Cornus (Cornaceae). Dearness s.n., IV 1890 (NY, topotype); same locality, host and collector, V 1892 (NY, topotype); same locality, host and collector, s.d. (NY, topotype); same locality, on *Ostrya virginiana* (Betulaceae). Dearness s.n., V 1892 (NY, paratype); same locality, host and collector, 1877 (NY, paratype).

1.3 **Massarina amphibia** Magnes & Hafellner, Biblioth. Mycol. 139: 89. 1991. Fig. 3.

Type — AUSTRIA: Steiermark, Totes Gebirge, Tauplitzalm, Großsee, on *Carex rostrata* (Cyperaceae). Magnes & Nograsek 58, VIII 1988 (GZU, holotype).

Ascomata 100-250 μm diam., rounded, immersed, with an erumpent ostiole. Hamathecium consisting of branched, septate pseudoparaphyses, sparsely anastomosing above the asci, filaments c. 2 μm wide, some seemingly periphysoid or extruding




Figs 1-8. Ascospores of *Massarina species:* 1. *M. acrostichi;* 2. *M. albocarnis;* 3. *M. amphibia;* 4. *M. appendiculata;* 5. *M. aquatica;* 6. *M. armatispora;* 7. *M. arundinacea* (type of *Leptosphaeria nigricans* f. *arundinis*); 8. *M. arundinariae.*

from the ostiole. Ascospores fusiform, 1-septate, (23-)26-29(-32) µm (4-)5-6(-7) µm, with a median constriction, cells equal, ends rounded, surrounded by a 2-3 µm thick gelatinous sheath, which may be protracted at the ends. Senescent ascospores 3-septate, pale brownish. Conidiomata unknown. In vitro slow growing, forming a whitish to grey, sterile aerial mycelium.

**Distribution and ecology:** As far as known, a boreo-alpine element in Europe, occurring on monocots and *Equisetum* near ponds.

**Host plants recorded:** *Carex nigra* and *C. rostrata* (Cyperaceae), *Equisetum fluviatile* (Equisetaceae), *Scirpus lacustris* (Cyperaceae), and *Typha latifolia* (Typhaceae).

**Additional material seen:** AUSTRIA: Steiermark, Graz, on *Typha latifolia* (Typhaceae). Scheuer 814, VI 1986 (GZU, sub *Massarina lacustris*); Wölzer Tauern, Goldbachsee, on *Carex rostrata* (Cyperaceae). Hafellner & Magnes 196, VII 1989 (GZU); Schladming, on *Carex rostrata* (Cyperaceae). Köckinger & Scheuer 018, IX 1987 (GZU); Totes Gebirge, Schwarzensee, on *Carex nigra* (Cyperaceae). Magnes 072, VIII 1988 (GZU); Hochschwab, Sackwiesensee, on *Equisetum fluviatile* (Equisetaceae). Magnes & Schreiner 053, VIII 1988 (GZU).

SWEDEN: Uppland, Vänge, on *Typha latifolia* (Typhaceae). K. & L. Holm 2766b (UPS, sub *Massarina lacustris*).

SWITZERLAND: Obwalden, Sarnen, on *Scirpus lacustris* (Cyperaceae). Leuchtmann s.n., VI 1982 (CBS 618.86, living culture, sub *Massarina lacustris*).

**Additional specimens agreeing in all characters, except that the ascospores are already 3-septate in early stages:** AUSTRIA: Steiermark, Krakau-Hintermühlen, Ettrachsee, on *Carex rostrata* (Cyperaceae). Hafellner & Magnes 234, VIII 1989 (GZU, sub *Massarina* sp. 1).

SWEDEN: Uppland, Uppsala-Näs, on *Typha latifolia* (Typhaceae). K. & L. Holm 2738b, IX 1982; 2743b, X 1982 (UPS, sub *Massarina lacustris*).

### 1.4 **Massarina appendiculata** Panwar, Purohit & Gehlot ex Aptroot, spec. nov.Fig. 4.

≡ *Massarina appendiculata* Panwar, Purohit & Gehlot, Sci. & Cult. 39: 357. 1973 [nom. inval, Art. 37.1, holotype location not unambiguously indicated].

Type — INDIA: Pachmarhi, on *Zizyphus rugosa* (Rhamnaceae). Panwar s.n., X 1971 (IMI 162206 (slides only), lectotype, here designated; also mentioned as syntype: JAC 103 ['JUML']).

Ascomata 250-550 μm diam., rounded, immersed, with an erumpent ostiole. Hamathecium consisting of unbranched or only sparsely branched, septate pseudoparaphyses, filaments c. 1 μm wide. Ascospores fusiform, 1-3-septate, slightly curved, 32-35 × 9-12 μm, with a median constriction, middle cells equal, end cells, when present, much smaller, ends pointed, surrounded by a 1-2 μm thick gelatinous sheath, which is much protracted and curved at the ends and c. 3-6 μm long. Conidiomata unknown. In vitro unknown.

**Notes:** This species shows similarities to the marine *M. armatispora.*

**Distribution and ecology:** So far only known from the type locality.

**Host plant recorded:** *Zizyphus rugosa* (Rhamnaceae).

### 1.5 **Massarina aquatica** J. Webster, Trans. Brit. Mycol. Soc. 48: 451. 1965.Fig. 5.

Type — BRITISH ISLES: Yorkshire, Hebden Bridge, Blake Dean, on submersed wood of *Alnus glutinosa* (Betulaceae). Webster 2747, IX 1964 (K, holotype, also dried culture; UPS, isotype ['2946']).

Anamorph: ***Tumularia aquatica*** (Ingold) Descals & Marvanová, Trans. Brit. Mycol. Soc. 89: 506. 1987 ≡ *Pyricularia aquatica* Ingold, Trans. Brit. Mycol. Soc. 26: 111. 1943 [as '*Piricularia*'] ≡ *Dactylella aquatica* (Ingold) Ranzoni, Farlowia 4: 360. 1953.

Type — BRITISH ISLES: Leicestershire, on submerged leaves of *Quercus* (Fagaceae). Ingold s.n., 1942 (CBS 212.46, living culture, ex type).

Ascomata 300-500 μm diam., rounded, erumpent or superficial, with a flush ostiole. Hamathecium consisting of branched, septate pseudoparaphyses, sparsely anasto-

mosing above the asci, filaments c. 1.5 μm wide. Ascospores fusiform, 1-septate, 22-29(-34) × (3.5-)4-5 μm, with a median constriction, upper cell often shorter but wider than lower cell, bulging out above the median septum, ends pointed, surrounded by a 1-3 μm thick gelatinous sheath which is constricted at the median septum and can be protracted at the ends and c. 2-3 μm long. Senescent ascospores 3-septate, pale brownish. Conidiomata hyphomycetous, belonging to *Tumularia aquatica* (Ingold) Descals & Marvanová. In vitro initially producing the anamorph, type culture now sterile.

**Notes:** Most ascocarps contain only 1-septate ascospores, but some ascocarps contain many 3-septate, but still colourless, ascospores.

**Distribution and ecology:** An aquatic species known from England, Mauritius and South Africa (Hyde & Aptroot 1997b). The anamorph is widely distributed in Europe, and strains in CBS are present from Austria and England.

**Host plants recorded:** *Alnus glutinosa* (Betulaceae) and Phragmites (Gramineae).

**Additional material seen:** MAURITIUS: Black River, on submerged wood. Hyde & Poonyth MAUR 25, VII 1995 (HKU (M)).

SOUTH AFRICA: Durban, Palmiet River, on submerged *Phragmites* (Gramineae). Steinke & Hyde 2154, XI 1994 (HKU (M)).

1.6 **Massarina armatispora** K.D. Hyde, Vrijmoed, Chinnaraj & E.B.G. Jones, Bot. Mar. 35: 325. 1992. Fig. 6.

Type — INDIA: Andaman Islands, Maya Bunder, on intertidal wood in mangrove. Chinnaraj, K.D.H. 494, III 1990. (BRIP 19711, holotype [sub *M. appendiculata*]).

For additional illustrations see Hyde et al. (1992).

Ascomata 350-450 μm diam., conical, immersed, with a long, papillate, erumpent ostiole. Hamathecium consisting of unbranched or only sparsely branched, septate pseudoparaphyses, filaments up to c. 3 μm wide. Ascospores fusiform, 1-septate, 27-35(-39) × (7-)8-10 μm, with a median constriction, upper cell larger and wider than lower cell, ends rounded, surrounded by a 1-2 μm thick gelatinous sheath, which is strongly protracted and often curved at the ends and c. 6-8 μm long. Conidiomata unknown. In vitro unknown.

**Notes:** This species shows similarities to the terrestrial *M. appendiculata,* but differs, e.g., by the relatively much larger end cells of the ascospores.

**Distribution and ecology:** So far only known from China and India, in mangrove.

**Additional material seen:** CHINA: Macau, Taipa Mangrove, on intertidal wood in mangrove. Vrijmoed, Hyde & Jones, KDH 820, X 1990 (BRIP 19712).

1.7 **Massarina arundinacea** (Sowerby : Fries) Leuchtmann, Sydowia 37: 179. 1985 ['1984']. Fig. 7.

≡ *Sphaeria arundinacea* Sowerby, English Fungi 3: tab. 336. 1801 : Fries, Syst. Mycol. 2: 429. 1823
≡ *Sphaeria striaeformis* subsp. *arundinis* Albertini & Schweinitz, Consp. Fung. Agro Niskiensi: 15. 1805

≡ *Pleospora arundinacea* (Sowerby : Fries) Fuckel, Jahrb. Nassauischen Vereins Naturk. 23-24: 137. 1870 ['1869'] ≡ *Melogramma arundinaceum* (Sowerby : Fries) Niessl, Hedwigia 13: 185. 1874 ≡ *Leptosphaeria arundinacea* (Sowerby : Fries) Saccardo, Nuovo Giorn. Bot. Ital. 7: 320. 1875 ≡ *Phaeosphaeria arundinacea* (Sowerby : Fries) Hedjaroude, Sydowia 22: 78. 1968.

Type — POLAND: On *Phragmites australis* (Gramineae). Albertini & Schweinitz s.n. (PH, holotype, not seen). No type material of this species was found in BPI.

*Sphaeria godinii* Desmazières, Ann. Sci. Nat. Bot., Sér. 3, 5: 44. 1846 ≡ *Leptosphaeria godinii* (Desmazières) Auerswald, Verz. Leipziger Tausch-Ver. 1866: 4. 1866 ≡ *Leptosphaeria arundinacea* f. *godinii* (Desmazières) Saccardo, Michelia 2: 65. 1882 ≡ *Leptosphaeria arundinacea* var. *godinii* (Desmazières) Saccardo, Syll. Fung. 2: 63. 1884 [often as 'godini'].

Type — FRANCE: on *Phragmites australis* (Gramineae). Desmazières s.n. (BR, holotype; no material found in PC). This synonymy was already indicated by Leuchtmann (1985).

*Leptosphaeria nigricans* f. *arundinis* Roumeguère, Fungi Selecti Exsiccati 4265. 1887.

Type — FRANCE: Rhône, Lyon, Parc de la Tête d'Or, on *Phragmites australis* (Gramineae). Therry s.n., 1887, distributed in Roumeguère, Fungi Selecti Exsiccati 4265 (PC (2×), isotypes). This synonymy was already indicated by Shoemaker & Babcock (1989).

*Trematosphaeria piskorzii* Petrak, Ann. Mycol. 25: 366. 1927 ≡ *Massarina piskorzii* (Petrak) Boise, Mycotaxon 22: 481. 1985.

Type — CZECH REPUBLIC: Weißkirchen, Sternberg, on *Phragmites australis* (Gramineae). Piskor s.n., V 1926 (W 10859, holotype), also distributed in Petrak, Flora Bohemiae et Moraviae Exsiccata 2298 (M, W, isotypes). New synonymy.

Ascomata 150-300 μm diam., globose, immersed below a clypeus or erumpent, often gregarious in rows, with an erumpent ostiole. Hamathecium consisting of sparsely branched, septate pseudoparaphyses, filaments c. 2 μm wide. Ascospores fusiform, 1-septate, (22-)25-34 × 3-6 μm, with a median constriction, upper cell equal in length but wider than lower cell, bulging out above the median septum, ends pointed, surrounded by a 1-2 μm thick gelatinous sheath, which can be protracted at the ends and c. 2-3 μm long. Senescent ascospores 3-septate, pale brownish. Conidiomata unknown, but the fungus is often found together with *Stagonospora elegans* (Berkeley) Saccardo & Traverso. In vitro rather fast growing, forming copious blackish grey aerial mycelium, not producing conidiomata, but ascocarps are sometimes formed after two months on stems.

**Distribution and ecology:** Throughout Europe, on *Phragmites* culms. Often abundantly present.

**Host plant recorded:** *Phragmites australis* (Gramineae).

**Additional material seen** (all on *Phragmites australis* (Gramineae): AUSTRIA: Steyr. Vasilyeva & Scheuer s.n., VII 1994 (GZU).

BELGIUM: Oudenaarde. Bosquinet s.n., XI 1855 (BR, sub *Sphaeria godinii*); Kortrijk. Collector unknown 270 (BR, sub *Sphaeria godinii*); locality unknown. Westendorp s.n. (BR, sub *Sphaeria godinii*).

BRITISH ISLES: Norfolk, Kings-Lynn. Plowright s.n., VI 1876, distributed in Thümen, Mycotheca Universalis 1256 (GZU).

CZECH REPUBLIC: Hranice. Petrak s.n., V 1942, distributed in Cryptogamae Exsiccatae Vindobonenses 4002 (GZU); Sternberg. Piskor s.n., V 1926 (GZU), also distributed in Petrak, Mycotheca Generalis 572 (GZU); Leipnik. Petrak s.n., VI 1942, distributed in Reliquiae Petrakianae 50 (GZU).

FRANCE: Locality unknown. Roumeguère s.n., distributed in Fungi Selecti Exsiccati 356 (BR, sub *Sphaeria godinii*).

NETHERLANDS: Gelderland, Neerijnen, Waaldijk. Aptroot 35851, IV 1995 (CBS); Flevoland, Erkemederstrand. Verkley 312, VIII 1995 (CBS).

SWEDEN: Bohuslän, Högås. Santesson 13964, VIII 1960 (UPS); Uppland, Dalby. K. & L. Holm 3374c, X 1984 (UPS); Bygdeå. Eriksson 2439c, VIII 1964 (UPS); Bondkyrka. Eriksson 2490a, IX 1964 (UPS); Hagn. Vestergren s.n., IV 1876 (UPS).

SWITZERLAND: Zürich, Andelfingen. Leuchtmann s.n., IX 1981 (CBS 619.86, living culture).

1.8 **Massarina arundinariae** (Ellis & Everhart) M. Barr, Mycotaxon 45: 211. 1992. Fig. 8.

≡ *Didymosphaeria arundinariae* Ellis & Everhart, North American Pyrenomycetes: 732. 1892 ≡ *Microthelia arundinariae* (Ellis & Everhart) O. Kuntze, Rev. Gen. Pl. 3(2): 498. 1898.

Type — USA, LOUISIANA: Lobbe's Wood near St. Martinsville, on *Arundinaria* (Gramineae). Langlois 2338 (NY, holotype).

Ascomata 250-400 μm diam., sphaeroid, immersed, with a papillate, erumpent ostiole. Hamathecium consisting of sparsely branched, septate pseudoparaphyses, filaments up to c. 2 μm wide. Ascospores fusiform, 1-septate, 24-32 × 6-7 μm, with a median constriction, cells equal, ends pointed, without a gelatinous sheath. Senescent ascospores 3-septate, pale brownish. Conidiomata unknown. In vitro unknown.

**Distribution and ecology:** So far only known from bamboo in N. America.

**Host plant recorded:** *Arundinaria* (Gramineae).

1.9 **Massarina australiensis** K.D. Hyde, Austral. Syst. Bot. 5: 113. 1992. Fig. 9.

Type — AUSTRALIA: Queensland, Millaa Millaa Falls, on submerged wood in freshwater. Hyde no. 14, I 1990 (BRIP 17157, holotype).

Ascomata 250-450 μm diam., conical, erumpent to superficial, with a flush ostiole. Hamathecium consisting of branched, septate pseudoparaphyses, sparsely anastomosing above the asci, filaments c. 2 μm wide. Ascospores broadly fusiform, 1-septate, often with 2 additional pseudosepta, (34-)45-55(-59) × (13-)15-20(-23) μm, with a median constriction, cells equal, ends rounded, without or with an inconspicuous gelatinous sheath. Conidiomata unknown. In vitro unknown.

**Notes:** This species is close to *M. thalassiae*.

**Distribution and ecology:** So far only known from Australia.

**Additional material seen:** AUSTRALIA: Queensland, Cow Bay, on submerged wood in freshwater. T.M. & K.D. Hyde 2287, 1996 (HKU (M)).

1.10 **Massarina balnei-ursi** (Rehm) K. Holm & L. Holm, Sydowia 38: 142. 1985. Fig. 10.

≡ *Melanopsamma balnei-ursi* Rehm, Oesterr. Bot. Z. 53: 10. 1903 [non *Lophiotrema balnei-ursi* (Rehm) Rehm].

Type — AUSTRIA: Tirol, Kaiser, Hinterbärenbad, on stems and wood of *Dryas octopetala* (Rosaceae). Rehm s.n., VIII 1902 (S, holotype).

Ascomata 300-600 μm diam., sphaeroid, erumpent to superficial, with a large, papillate (and in one case laterally flattened) ostiole. Hamathecium consisting of

branched, septate pseudoparaphyses, sparsely anastomosing above the asci, filaments c. 2 μm wide. Ascospores long ovate to broadly fusiform, 1-septate, (22-)24-30 × 9-10(-12) μm, with a median constriction, upper cell longer and broader than lower cell, ends rounded, with a 1-4 μm thick gelatinous sheath. Conidiomata unknown. In vitro unknown.

**Distribution and ecology:** As far as known a boreo-alpine element in Europe, occurring on *Dryas*.

**Host plant recorded:** *Dryas octopetala* (Rosaceae).

**Additional material seen** (all on *Dryas octopetala* (Rosaceae)): AUSTRIA: Steiermark, Grazer Bergland, Hochlantsch. Matzer & Nograsek 1327, IX 1990 (GZU); Dachstein-Massiv, Stoderzinken. Hafellner s.n., VII 1985 (GZU); same locality and host. Nograsek s.n., VII 1987 (GZU); Totes Gebirge, Tauplitzalm. Nograsek s.n., VIII 1988 (GZU).

SLOVENIA: Steiner Alpen, Kranska. Nograsek & Wetschnig s.n., VIII 1992 (GZU).

SVALBARD: Bröggerhalvöya. K. & L. Holm 5022f, VIII 1988 (UPS); Bünsow Land. K. & L. Holm 5130g, VIII 1988 (UPS).

SWEDEN: Torne Lappmark, Mt. Nuolja, Ridonjira. Holm & Nograsek s.n., VII 1986 (GZU); same locality, host and date, K. & L. Holm 4089b (UPS (2×) [as 'Njulla']); Mt. Nuolja, near summit. Holm & Nograsek s.n., VII 1986 (GZU); same locality, host and date, K. & L. Holm 4061g (UPS [as 'Njulla'); Kopparåsen. Nograsek s.n., VII 1986 (GZU); Abisko. Nograsek s.n., VII 1986 (GZU).

SWITZERLAND: Graubünden, S-charl. K. & L. Holm 3257a, 3256b, 3251b, 3316f, VIII 1984 (UPS); Albulapass. K. & L. Holm 3261d, 3295f, VIII 1984 (UPS); Samnaun. K. & L. Holm 3243a, VIII 1984 (UPS).

1.11 **Massarina biconica** Petch, Ann. Roy. Bot. Gard. (Peradeniya) 7: 305. 1922. Fig. 11.

Type — SRI LANKA: Peradeniya, Gangaruwa, on *Hevea brasiliensis* (Euphorbiaceae). Petch 5006, II 1917 (K, isotype).

Ascomata 500-800 μm diam., sphaeroid, immersed, with an erumpent ostiole. Hamathecium consisting of branched, septate pseudoparaphyses, anastomosing above the asci, filaments c. 2 μm wide. Ascospores broadly fusiform, 1-septate, 20-25(-30) × (7-)8-10(-12) μm, with a median constriction, upper cell slightly longer and broader than lower cell, ends rounded, without gelatinous sheath. Conidiomata unknown. In vitro unknown.

**Distribution and ecology:** So far only known from the type locality.

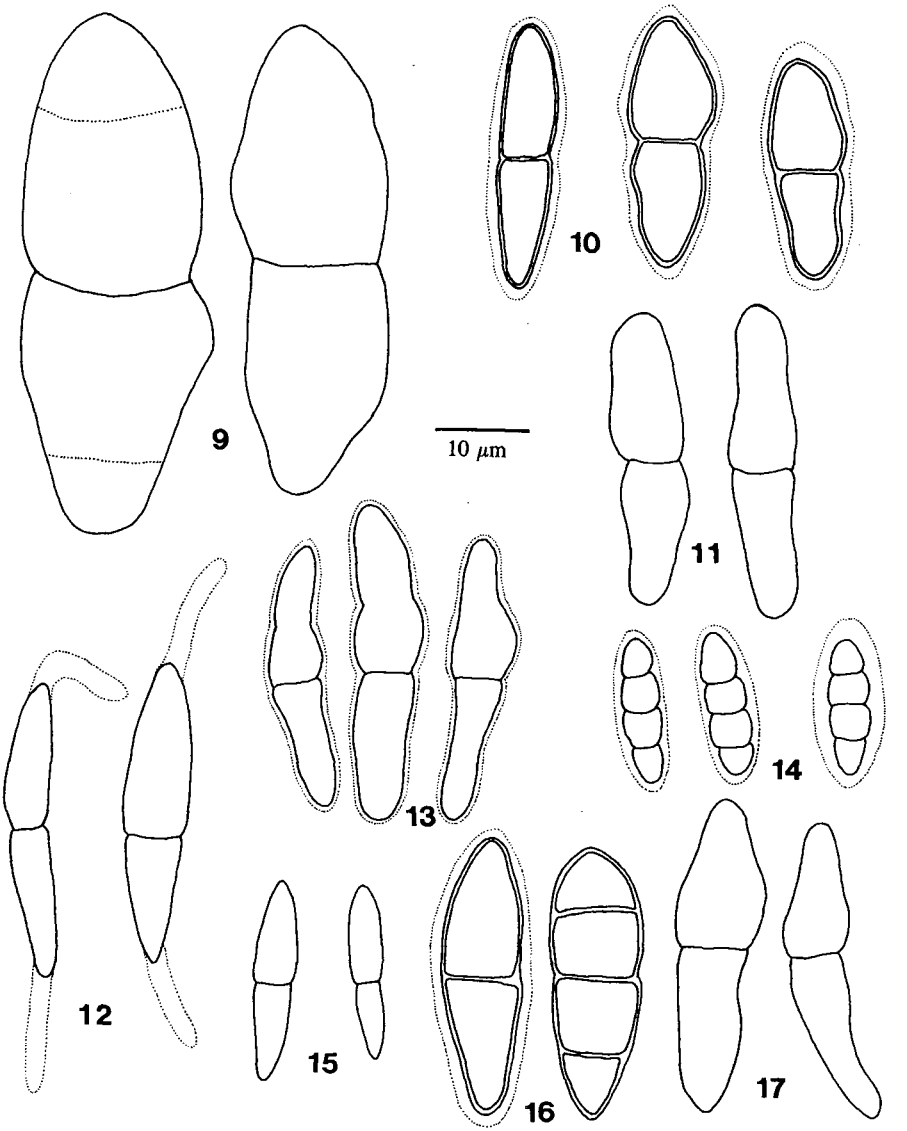
**Host plant recorded:** *Hevea brasiliensis* (Euphorbiaceae).

1.12 **Massarina bipolaris** K.D. Hyde, Nova Hedwigia 61: 131. 1995. Fig. 12.

Type — HONG KONG: Tai Po Country Park, on submerged wood. Hyde 1845, VIII 1993 (BRIP 21489, holotype).

For additional illustrations see Hyde (1995b).

Ascomata 350-500 μm diam., sphaeroid, immersed to erumpent, with a papillate, erumpent ostiole. Hamathecium consisting of branched, septate pseudoparaphyses, anastomosing above the asci, filaments up to c. 2 μm wide. Ascospores fusiform,




Figs 9-17. Ascospores of *Massarina* species: 9. *M. australiensis;* 10. *M. balnei-ursi;* 11. *M. biconica;* 12. *M. bipolaris;* 13. *M. canadensis;* 14. *M. carolinensis* (Aptroot 37501); 15. *M. chamaecyparissi;* 16. *M. cisti;* 17. *M. corticola.*

1-septate, 24-32 × 6-8 μm, with a median constriction, cells equal or upper cell slightly larger and wider than lower cell, ends pointed, surrounded by a 1 μm thick gelatinous sheath, which is strongly protracted and often curved at the ends and c. 4-7 μm long. Conidiomata unknown. In vitro unknown.

**Distribution and ecology:** An aquatic species known from Australia, Hong Kong, Malaysia and South Africa (Hyde & Aptroot 1997b).

**Additional material seen:** SOUTH AFRICA: Durban, Palmiet River, on submerged wood. Steinke & Hyde 2166 (BRIP).

1.13 **Massarina canadensis** (Ellis & Everhart) M. Barr, Mycotaxon 45: 211. 1992. Fig. 13.

≡ *Didymella canadensis* Ellis & Everhart, Proc. Acad. Nat. Sci. Philadelphia 42: 232. 1891 ≡ *Cercidospora canadensis* (Ellis & Everhart) O. Kuntze, Rev. Gen. Pl. 3: 453. 1898.

Type — CANADA: Ontario, London, on *Salix* (Salicaceae). Dearness 1378, I 1890 (NY, holotype).

Ascomata 200-300 μm diam., rounded, immersed, with a wide, pale, erumpent ostiole. Hamathecium consisting of branched, septate pseudoparaphyses, sparsely anastomosing above the asci, filaments c. 1.5 μm wide. Ascospores fusiform, 1-septate, (28-)32-35 × (6-)8-10 μm, with a median constriction, upper cell bulging out above the septum and slightly larger, ends pointed, surrounded by a 1-2 μm thick gelatinous sheath. Senescent ascospores 3-5-septate, pale brown, with a verruculose ornamentation. Conidiomata unknown. In vitro unknown.

**Distribution and ecology:** So far only known from Canada, on *Salix,* although it has been reported from other areas and hosts by Barr (1992).

**Host plant recorded:** *Salix* (Salicaceae).

**Notes:** Additional material cited by Barr (1992) belongs to various different species.

1.14 **Massarina carolinensis** Kohlmeyer, Volkmann-Kohlmeyer & O. Eriksson, Mycol. Res. 100: 400. 1995. Fig. 14.

Type — USA, NORTH CAROLINA: Carteret Co., Broad Creek, on *Juncus roemerianus* (Juncaceae). Kohlmeyer 5540, VIII 1994 (IMS, holotype, not seen; UME, isotype, not seen).

For additional illustrations see Kohlmeyer, Volkmann-Kohlmeyer & Eriksson (1995b).

Ascomata 150-200 μm diam., rounded, immersed, becoming erumpent when the host cortex desintegrates, with a wide, pale, erumpent ostiole. Hamathecium consisting of branched, septate pseudoparaphyses, sparsely anastomosing above the asci, filaments c. 1.5 μm wide. Ascospores long ellipsoid, 3-septate, 16.5-21 × 4.5-6.5 μm, constricted at the septa, all cells equal in length, ends rounded, surrounded by a 2-4 μm thick gelatinous sheath, which expands to form an even larger sticky mass when the enveloping membrane is broken. Conidiomata unknown. In vitro unknown.

**Notes:** The species was reported to be close to *M. ricifera,* but the hamathecium of *M. carolinensis* is described as consisting of dense, anastomosing, septate pseudoparaphyses, whereas the hamathecium of M. ricifera is said to consist of a few thick unbranched pseudoparaphyses. No authentic material has been seen from this recently described species. However, material matching the original description was found on bamboo in the mountains of Papua New Guinea.

**Distribution and ecology:** Described from standing culms in a salt marsh in N. Carolina. Recently also found on bamboo in the mountains at 2400 m alt. in Papua New Guinea.

**Host plants recorded:** Bambusoideae (Gramineae) and *Juncus roemerianus* (Juncaceae).

**Material examined:** PAPUA NEW GUINEA: Northern Province, Owen Stanley Range, Myola, on Bambusoideae (Gramineae). Aptroot 37501, X 1995 (CBS).

1.15 **Massarina chamaecyparissi** (Rehm) L. Holm & K. Holm, Karstenia 21: 66. 1981. Fig. 15.

≡ *Didymella chamaecyparissi* Rehm, in Voss, Verh. Zool.-Bot. Ges. Wien 34: 10. 1884.

Type — SLOVENIA: Ljubljana ['Laibach'], on *Lycopodium tristachyum* (Lycopodiaceae). Voss s.n., VIII 1883 (S, holotype; UPS, isotype slides) [host as '*Lycopodium complanatum* subsp. *chamaecyparissus*'].

*Metasphaeria lycopodina* Petrak, Ann. Mycol. 32: 426. 1934.

Type — CZECH REPUBLIC: Weißkirchen, Parchowitz, on *Lycopodium annotinum* (Lycopodiaceae). Petrak s.n., V 1929 (W 12052, holotype), also distributed in Flora Bohemiae et Moraviae exsiccata 2485 (W, isotype). Synonymy already recognized by L. & K. Holm (1981).

Ascomata 150-200 μm diam., conical, erumpent to superficial, with an inconspicuous flush ostiole. Hamathecium consisting of unbranched or sparsely branched, septate pseudoparaphyses, filaments c. 2 μm wide. Ascospores fusiform, 1-septate, (18-)23-25 × 3-4 μm, with a median constriction, upper cell somewhat broader than lower cell, ends pointed, without a gelatinous sheath. Senescent ascospores 1-3-septate, pale brown, with a verruculose ornamentation. Conidiomata unknown. In vitro unknown.

**Distribution and ecology:** As far as known a boreo-alpine element in Europe, occurring on *Lycopodium*.

**Host plants recorded:** *Lycopodium annotinum, L. complanatum* and *L. tristachyum* (Lycopodiaceae).

**Additional material seen** (all on *Lycopodium* species, Lycopodiaceae): SWEDEN: Dalarna, Garpenberg, on *L. annotinum*. K. & L. Holm 348a, VIII 1974 (UPS); Uppland, Bälinge, on *L. annotinum*. Nannfeldt s.n., X 1968 (UPS, sub *Metasphaeria lycopodina*); Västmanland, Västerfärnebo, on *L. complanatum*. Rosén s.n., IX 1980 (UPS); Dalarna, St. Kopparberg, on *L. complanatum*. K. & L. Holm 326d, VIII 1974 (UPS); Uppland, Åland, on *L. annotinum*. K. & L. Holm 2240k, IX 1980 (UPS); Dalby, Östbergstorpet, on *L. clavatum*. K. & L. Holm 1791a, VII 1979 (UPS); Dalby, Tunaskog, on *L. complanatum*. K. & L. Holm 2264b, X 1980 (UPS); Ekeby, on *L. annotinum*. K. & L. Holm 266a, VII 1974 (UPS).

1.16 **Massarina cisti** Bose, Phytopathol. Z. 41: 164. 1961. Fig. 16.

Type — FRANCE: Var, Plan d'Aups, on wood of *Cistus albidus* (Cistaceae). Hütter & Loeffler 2937, VI 1959 (ZT, holotype; CBS 266.62, living culture, ex type).

Ascomata 350-650 μm diam., hemispherical, superficial, with an inconspicuous flush ostiole. Hamathecium consisting of branched, septate pseudoparaphyses, sparsely anastomosing above the asci, filaments c. 2 μm wide. Ascospores broadly fusiform, (1-)3-septate, (25-)27-32(-35) × 9-11 μm, constricted at the septa, middle cells larger

and broader than end cells, ends rounded, without or with an inconspicuous gelatinous sheath, but with a 1-2 $\mu$m thick wall. Conidiomata coelomycetous, classified in *Chaetophoma* Cooke. In vitro forming copious white to grey aerial mycelium. Culture now sterile, but reported to form conidiomata by Bose (1961).

**Distribution and ecology:** So far only known from France, on branches of *Cistus*.

**Host plant recorded:** *Cistus albidus* (Cistaceae).

1.17 **Massarina corticola** (Fuckel) L. Holm, Symb. Bot. Upsal. 14 (3): 147. 1957. Fig. 17.

≡ *Trematosphaeria corticola* Fuckel, Jahrb. Nassauischen Vereins Naturk. 23-24: 162. 1870 ['1869'] ≡ *Zignoëlla corticola* (Fuckel) Saccardo, Michelia 1: 346. 1878 ≡ *Melomastia corticola* (Fuckel) Schroeter, in F. Cohn, Kryptogamenflora von Schlesien 2: 321. 1894.

Type — GERMANY: Hattenheim, Münchau, on bark of *Ulmus campestris* (Ulmaceae). Fuckel s.n., s.d. (UPS, isotype).

*Trematosphaeria mori* Fabre, Ann. Sci. Nat. Bot., Sér. 6, 15: 53. 1883 ≡ *Massarina mori* (Fabre) Boise, Mycotaxon 22: 482. 1985.

Type — FRANCE: Vaucluse, Sérignan, on wood of *Morus alba* (Moraceae). Fabre s.n., I 1882 (l'Harmas, holotype, not seen). New synonymy. The type was examined by Boise (l.c.). The species is synonymized here, based on her redescription.

*Sagedia bivinacea* Norman, Öfvers. Förh. Kongl. Svenska Vetensk.-Akad. 41(8): 36. 1884 ≡ *Porina bivinacea* (Norman) Zahlbruckner, Catalogus Lichenum Universalis 1: 367. 1922.

Type — NORWAY: Larvik, Andvik, on bark of *Ulmus* (Ulmaceae). Norman s.n., III 1882 (UPS, isotype). This synonymy was already mentioned by Santesson (1993).

*Metasphaeria myricae* Peck, New York State Mus. Bull. 38: 105. 1885 ['1884'] ≡ *Massarina myricae* (Peck) Berlese, Icones Fungorum 1: 120. 1894.

Type — USA, NEW YORK: Caroga, Fulton Co., on submersed branches of *Myrica gale* (Myricaceae). Peck s.n., VII 1884 (NYS, holotype; NYS, isotype). New synonymy.

*Metasphaeria ambigua* Berlese & Bresadola, Società degli Alpinisti Tridentini 14: 335. 1889 ['1888'] ≡ *Massarina ambigua* (Berlese & Bresadola) O.E. Eriksson, Non-lichenized Pyrenomycetes of Sweden: 7. 1992.

Type — ITALY: Trento, Val di Sole, on *Sambucus ebulus* (Caprifoliaceae). Berlese s.n. (PAD, holotype, not found). No type material of this species was found in PAD, and the type is presumably lost. The material cited below belongs to *Massarina corticola* and agrees well with the protologue.

Material seen: ITALY: Roma, Cessati Spiriti, on *Sambucus* (Caprifoliaceae). Saccardo s.n., XI 1903, distributed in Mycotheca Italiana 1488 (L, sub *Metasphaeria ambigua*).

*Massarina salicicola* Rehm, Ann. Mycol. 4: 397. 1906 [as 'salicincola'].

Type — GERMANY: Regensburg, Dechbetten, on *Salix* (Salicaceae). Rehm s.n., V 1879 (S, holotype). New synonymy.

*Pseudodiaporthe coffeae* Spegazzini, Anales Mus. Nac. Hist. Nat. Buenos Aires 19: 359. 1909 ≡ *Massarina coffeae* (Spegazzini) Bose, Phytopathol. Z. 41: 170. 1961.

Type — ARGENTINA: Jujuy, Orán, on *Coffea arabica* (Rubiaceae). Spegazzini 2459, III 1905 (LPS, holotype). New synonymy. This is the type species of *Pseudodiaporthe* Spegazzini.

*Trematosphaeria indigoferae* E. Müller & S. Ahmad, Biologia (Lahore) 4: 29. 1958 ≡ *Massarina indigoferae* (E. Müller & S. Ahmad) Boise, Mycotaxon 22: 481. 1985 [comb. inval., Art. 33.2, pagination of the publication of the basionym cited by Boise as '25-32'].

Type — PAKISTAN: Kagan Valley, Shogran, on *Indigofera gerardiana* (Leguminosae). Ahmad 14078, VII 1956 (ZT, holotype). New synonymy.

*Massarinula dickasonii* Wehmeyer, Mycologia 55: 324. 1963 ≡ *Massarina dickasonii* (Wehmeyer) S. Ahmad, Monogr. biol. Soc. Pakist. 5: 13. 1969.

Type — PAKISTAN: Punjab, Rawalpindi, on *Aster molliusculus* (Compositae). Dickason 1, IV-V 1927-1928 (DAOM 120207, holotype). New synonymy.

*Massarinula dubia* Wehmeyer & S. Ahmad, Biologia (Lahore) 10: 15. 1964 ≡ *Massarina dubia* (Wehmeyer & S. Ahmad) S. Ahmad, Monogr. Biol. Soc. Pakist. 5: 13. 1969.

Type — PAKISTAN: Changa Manga, on *Tamarix articulata* (Tamaricaceae). Ahmad 15385, II 1962 (DAOM, isotype, only slides). New synonymy.

*Didymosphaeria macrospora* V.G. Rao & Mani Varghese, Sydowia 32: 252. 1980 ['1979'], nom. illeg., Art. 53.1 [non Hino & Katumoto, 1959].

Type — INDIA: Kerala, Devikulam, on *Barleria* (Acanthaceae). Mani Varghese s.n., I 1976 (AMH 3873, holotype). This synonymy was already recognized by Aptroot (1995a).

*Massarina coniferarum* Butin, in Butin & Peredo, Biblioth. Mycol. 101: 37. 1986.

Type — CHILE: Valdivia, Isla Teja, on dead needles of *Pinus montana* (Pinaceae). Butin s.n., I 1983 (ZT, holotype). New synonymy.

For additional illustrations see Hyde & Aptroot (1997b).

Ascomata 250-500 μm diam., conical to hemispherical, immersed to erumpent or superficial, with an erumpent ostiole. Hamathecium consisting of branched, septate pseudoparaphyses, sometimes sparsely anastomosing above the asci, filaments c. 1-2 μm wide. Ascospores fusiform, 1-septate, (22-)25-35(-40) × (4-)5-7(-11) μm, with a median constriction, upper cell usually shorter but broader than lower cell, bulging out above the septum, ends pointed, without or with an inconspicuous gelatinous sheath. Senescent ascospores 1-3-septate, pale brown. Conidiomata unknown. In vitro forming sparsely white to pale brownish aerial mycelium. Cultures (CBS 154.93) now sterile, but reported to form immature conidiomata by Bose (1961).

**Distribution and ecology:** Widespread in Europe, North America and temperate Asia, also known from South America; recently found in tropical Asia and therefore possibly cosmopolitan, most often on wood and bark, but also on branches, culms, needles, palm stems and petioles and ascomycetes.

**Host plants recorded:** *Acer grandidentatum, A. platanoides* and *A. pseudoplatanus* (Aceraceae), *Alnus glutinosa, A. incana* and *A. viridis* (Betulaceae), *Apocynum androsaemifolium* (Apocynaceae), *Artemisia campestris* (Compositae), *Aster molliusculus* (Compositae), *Aucuba japonica* (Cornaceae), *Barleria* (Acanthaceae), *Coffea arabica* (Rubiaceae), *Fagus sylvatica* (Fagaceae), *Fraxinus excelsior* (Oleaceae), *Halesia diptera* (Rubiaceae), *Hypoxylon* (Xylariaceae, Ascomycota), *Indigofera gerardiana* (Leguminosae), *Ledum groenlandicum* (Ericaceae), *Morus alba* (Moraceae), *Myrica gale* (Myricaceae), *Pinus montana* (Pinaceae), *Populus candicans* and *P. tremuloides* (Salicaceae), *Quercus petraea* (Fagaceae), *Rhododendron ferrugineum* (Ericaceae), *Ribes montigenum* (Grossulariaceae), *Rudbeckia* (Compositae), *Salix fragilis, S. scouleriana* and *S.* cf. *viminalis* (Salicaceae), *Sambucus ebulus* (Caprifoliaceae), *Tamarix articulata* (Tamaricaceae), *Tilia americana* and *T. platyphylla* (Tiliaceae), *Trachycarpus fortunei* (Palmae), *Ulmus campestris* and *U. glabra* (Ulmaceae), *Vaccinium myrtillus* and *V. vitis-idaea* (Ericaceae).

**Selected additional material seen:** CANADA: Quebec, Gaspé Provincial Park, Mt. Albert, on *Ledum groenlandicum* (Ericaceae). Bigelow & Barr 2262a, VIII 1957 (NY).

USA, GEORGIA: Clarke Co., Athens, on *Aucuba japonica* (Cornaceae). Barr 6464, VII 1978 (NY, sub *Massarina leucosarca*); LOUISIANA: St. Tammany Parish, on *Halesia diptera* (Rubiaceae). Barr 6357, VI 1976 (NY, sub *Massarina microcarpa*); MAINE: Baxter State Park, on *Apocynum androsaemifolium* (Apocynaceae). Bigelow & Barr 3371b, VII 1962 (NY, sub *Massarina microcarpa*); Franklin Co., Carrabassett Valley, on *Rudbeckia* (Compositae). Barr 5855, VIII 1971 (NY, sub *Massarina microcarpa*); same locality, on *Alnus* (Betulaceae). Bigelow & Barr 5850c, VIII 1971 (NY, sub *Massarina leucosarca*); MASSACHUSETTS: Conway, on *Tilia americana* (Tiliaceae). Barr 4933, V 1967 (NY); MICHIGAN: Luce Co., Tahquamenon Falls State Park, on *Hypoxylon* (Xylariaceae, Ascomycota) on *Fagus sylvatica* (Fagaceae). Bigelow & Barr 5540d, IX 1969 (NY, sub *Massarina albocarnis*); UTAH: Summit Co., Wasatch National Forest, on wood of *Salix scouleriana* (Salicaceae). Rogerson s.n., VIII 1983 (NY, sub *Massarina* sp.); Iron Co., Cedar Mt., on wood of *Populus tremuloides* (Salicaceae). Bigelow & Barr 6091 (NY, sub *Massarina lignorum*); Cache Co., Cache National Forest, on *Ribes montigenum* (Grossulariaceae). Rogerson s.n., IX 1971 (NY).

MEXICO: Chihuahua, 28 km W of Basaseachic, on *Acer grandidentatum* (Aceraceae). Nash 37786, VII 1994 (ASU).

AUSTRIA: Oberösterreich, Schlögener Schlinge, on *Quercus petraea* (Fagaceae). Berger 8449, II 1995 (herb. Berger); same locality, on *Ulmus glabra* (Ulmaceae). Berger 7414, II 1994 (herb. Berger); same locality, on *Fraxinus excelsior* (Oleaceae). Berger 9461, XII 1995 (herb. Berger); Mühlviertel, Rannatal, on *Acer pseudoplatanus* (Aceraceae). Berger 7588, IV 1994 (herb. Berger); same locality and host, Berger 9372, X 1995 (herb. Berger); same locality, on *Acer platanoides* (Aceraceae). Berger 9220, IX 1995 (herb. Berger); Donautal, Donauleiten, on *Tilia* (Tiliaceae). Berger 3627, 8627, IV 1995 (herb. Berger); Kärnten, Koralpe, Pomseben, on *Vaccinium vitis-idaea* (Ericaceae). Remler s.n., VIII 1975 (GZU); Kärnten, Maltatal, on *Acer pseudoplatanus* (Aceraceae). Berger 9123, VIII 1995 (herb. Berger); Steiermark, Schladming, on wood of *Rhododendron ferrugineum* (Ericaceae). Vasilyeva & Scheuer s.n., IX 1994 (GZU, sub *Massarina* sp.); Schladminger Tauern, Kleinsölk-Obertal, on bark of *Acer pseudoplatanus* (Aceraceae). Scheuer 1840, VII 1988 (GZU, sub *Massarina* sp.); Feldbach, on wood. Scheuer s.n., II 1995 (GZU, sub *Massarina* sp.); Radkersburg, on wood. Wieser s.n., II 1994 (GZU, sub *Massarina* sp.); Salzburg, Pinzgau, Hollersbachtal, on wood of *Alnus incana* (Betulaceae). Scheuer s.n., 21 VII 1992 (GZU (2×), sub *Massarina* sp.); VIII 1992 (GZU (3×), sub *Massarina* sp.); Ötztaler Alpen, Untergurgl, on wood of *Alnus viridis* (Betulaceae). Scheuer 2744, VIII 1991 (GZU, sub *Massarina* sp.).

BRITISH ISLES: Kent, Toy's Hill, on wood. Lowen 110, X 1984 (NY).

DENMARK: Kolding, on *Populus candicans* (Salicaceae). Larsen s.n., III 1934 (C, sub *Massarina salicicola*); Uggeløse Skov, on *Salix* (Salicaceae). Munk s.n., III 1965 (C, sub *Massarina salicicola*); Lyngby Mose, on *Salix* cf. *viminalis* (Salicaceae). Munk s.n., II 1963 (C, sub *Massarina salicicola*).

GERMANY: Oestrich, along the Rhine, on bark and wood of *Salix fragilis* (Salicaceae). Fuckel s.n., distributed in Fungi Rhenani 2528 (G (2×), NY, UPS, authentic material, but not types, as often indicated); Hamburg, on *Tilia platyphylla* (Tiliaceae). Schröer 930, IX 1992 (CBS 154.93, living culture).

ITALY: Dolomiten, Passo di Rolle, on *Vaccinium myrtillus* (Ericaceae). Remler s.n., X 1976 (GZU); Roma, Cessati Spiriti, on *Sambucus* (Caprifoliaceae). Saccardo s.n., XI 1903, distributed in Mycotheca Italiana 1488 (L, sub *Metasphaeria ambigua*).

THE NETHERLANDS: Utrecht, Leusden, Den Treek, on *Tilia* (Tiliaceae). Aptroot 26608, IX 1989 (ABL).

SWEDEN: Uppland, Stockholm, on wood and bark of *Salix* (Salicaceae). Romell s.n., VIII 1893 (UPS); Jumkil, on dead twigs with bark of *Myrica gale* (Myricaceae). K. & L. Holm 5571g (UPS); Gotland, Hejdeträsk, on wood of *Salix repens* (Salicaceae). Vestergren s.n., VIII 1895 (UPS).

SWITZERLAND: Graubünden, Ramosch, on *Artemisia campestris* (Compositae). K. & L. Holm 3321c, IX 1984 (UPS); Jura, Biel, Twann, on *Fraxinus excelsior* (Oleaceae). Aptroot & v.d. Knaap 33827, I 1994 (CBS).

CHINA: Hubei, on *Trachycarpus fortunei* (Palmae). Taylor JP5281, 1995 (HKU).

PAPUA NEW GUINEA: Madang Province, S side of Ramu valley, 11 km W of Brahman Mission, logging site in tropical lowland rain forest, inside bark. Aptroot 36582, X 1995 (CBS).

1.18 **Massarina cystophorae** (Cribb & Herbert) Kohlmeyer & E. Kohlmeyer, Marine Mycology: 427. 1979.

≡ *Otthiella cystophorae* Cribb & Herbert, Pap. Dept. Bot. Univ. Queensland 3: 10. 1954 ≡ *Melanopsamma cystophorae* (Cribb & Herbert) S.P. Meyers, Mycologia 49: 485. 1957.

Type — AUSTRALIA: Tasmania, on *Cystophora retroflexa* (Phaeophyta). Cribb s.n. (not seen).

For illustrations see Kohlmeyer & Kohlmeyer (1979).

Ascomata 650-1000 μm diam., globose to turbinate, immersed to erumpent from galls, with a flush ostiole. Hamathecium consisting of unbranched, septate filaments, filaments c. 3-8 μm wide. Ascospores long ellipsoid, 1-septate, 50-65(-73) × (15-)16-23(-25) μm, with a median constriction, cells equal, ends rounded, with conspicuous, cap-like, c. 10 μm long gelatinous appendices at the ends, wall c. 2-3 μm thick. Conidiomata found associated in the same galls. Conidia hyaline, ellipsoidal, 3-4 × 2 μm. In vitro unknown.

**Notes:** No material of this species was found in BRIP, where Cribb apparently never deposited any material (Hyde, pers. comm.). The above description is based on the description and illustrations of type slides in Kohlmeyer & E. Kohlmeyer (1979). It is accepted here with some hesitation in *Massarina,* because it is reported to have very wide, unbranched hamathecium filaments.

**Distribution and ecology:** So far only known from Australia, where it grows on seaweeds.

**Host plants recorded:** *Cystophora retroflexa* and *C. subfarcinata* (Phaeophyta).

1.19 **Massarina desmonci** (Sydow & P. Sydow) K.D. Hyde & Aptroot, Nova Hedwigia 64: 493. 1997.

≡ *Leptosphaeria desmonci* Sydow & P. Sydow, Hedwigia 49: 79. 1909.

Type — BRAZIL: Parà, on dead petiole of *Desmoncus* (Palmae). Baker 217, I 1908 (S, holotype, not seen).

For illustrations see Hyde & Aptroot (1997a).

Ascomata 350-500 μm diam., hemispherical, immersed to erumpent, with a papillate, laterally flattened (slot-like) erumpent to superficial ostiole. Hamathecium consisting of branched, septate pseudoparaphyses, filaments up to c. 2 μm wide. Ascospores fusiform, 1-septate, 52-56 × 12-15 μm, with a median constriction, cells nearly equal, ends pointed, with a 1-2 μm thick gelatinous sheath. Conidiomata unknown. In vitro unknown.

**Distribution and ecology:** So far only known from the type, which has been examined recently by K.D. Hyde.

**Host plant recorded:** *Desmoncus* (Palmae).

## 1.20 **Massarina eburnea** (Tulasne & C. Tulasne) Saccardo, Syll. Fung. 2: 153. 1883. Fig. 18.

≡ *Sphaeria pupula* var. *minor* Desmazières, Pl. Cryptog. Fr. 2: 1764. 1851 ≡ *Massaria eburnea* Tulasne & C. Tulasne, Sel. Fung. Carpol. 2: 239. 1863 [non *Leptosphaeria eburnea* Niessl ≡ *Metasphaeria eburnea* (Niessl) Saccardo].

Type — FRANCE: Locality unknown, on *Fagus sylvatica* (Fagaceae). Desmazières 1764, 1851 (PC, lectotype, selected by Hyde 1995).

*Massaria eburnea* f. *betulae* Roumeguère, Fungi Gallici Exsiccati 1578. 1881; Roumeguère & Saccardo, Revue Mycol. 3(11): 44. 1881.

Type — BELGIUM: Malmédy, on *Betula alba* (Betulaceae). Libert s.n., distributed in Roumeguère, Fungi Gallici Exsiccati 1578; Reliquiae Mycologicae Libertianae 114 (L, NY, isotypes). New synonymy. The indicated host association of this forma is regarded as a description, as was probably the intention of the author.

*Massaria eburnea* f. *coryli* Jaczewski, Bull. Herb. Boissier 2: 671. 1894 [non *Massarina coryli* (P. Karsten) Saccardo].

Type — SWITZERLAND: Neuchâtel, Rochefort, on *Corylus avellana* (Betulaceae). Morthier, s.n. (not seen). Synonymy follows Jaczewski (1894). No material of this forma was found in G.

*Massaria eburnea* f. *platani* Jaczewski, Bull. Herb. Boissier 2: 671. 1894.

Type — SWITZERLAND: Bern, Steffisberg, on *Platanus* (Platanaceae). Otth, s.n. (not seen). Synonymy follows Jaczewski (1894). No material of this forma was found in BERN.

*Massarina eburnea* subsp. *salicis* P. Karsten, Hedwigia 23: 84. 1884.

Type — FINLAND: Mustiala, on inner side of bark of *Salix cinerea* (Salicaceae). Karsten s.n., IX 1884 (not seen). Synonymy probable. No material of this subspecies was found in H.

*Massaria lunulata* Tulasne & C. Tulasne, Sel. Fung. Carpol. 2: 241. 1863 ≡ *Massarina lunulata* (Tulasne & C. Tulasne) Saccardo, Syll. Fung. 2: 155. 1883.

Type — FRANCE: Dauphiné, on *Fagus sylvatica* (Fagaceae) Tulasne s.n., IX 1857 (PC, lectotype, designated here) [as '*lunula*' on the label]. New synonymy. This is a form of *Massarina eburnea* with 1-septate ascospores. Other syntypes from the same locality, but on *Acer pseudoplatanus* (Aceraceae), could not be found in PC.

? *Massarina polycarpa* (Füisting) Saccardo & Traverso, Syll. Fung. 22: 202. 1913 ≡ *Massaria polycarpa* Füisting, Flora, Jena 1868: 386. 1868.

Type — GERMANY: Münster, on *Corylus avellana* (Betulaceae). Füisting s.n. (M, holotype, not found). No material of this species was found in either B or M. It should be regarded as lost. According to the description, it is most probably a new synonym of *Massarina eburnea.*

*Cladosphaeria fuscidula* G.H. Otth, Mitth. Naturf. Ges. Bern 1868: 52. 1869.

Type — SWITZERLAND: Bern, Steffisberg, on *Fagus sylvatica* (Fagaceae). Otth s.n. (BERN, lectotype, designated here, although the description of a new forma *platani* of *Massarina eburnea* for one of the syntypes by Jaczewski (1894) could also be regarded as an implicit lectotypification of *C. fuscidula* by the other element). Synonymy already recognized by Jaczewski (1894).

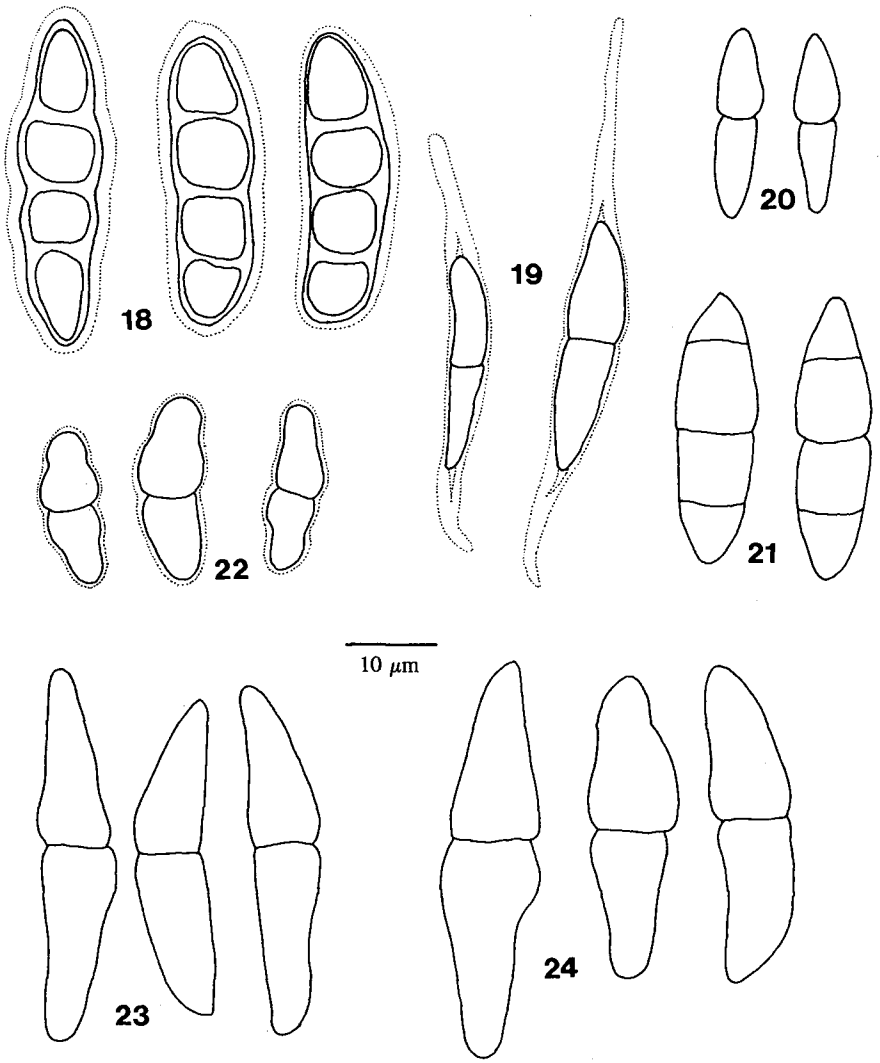
*Massaria eburnoides* Saccardo, Michelia 1: 41. 1879 ≡ *Massarina eburnoides* (Saccardo) Saccardo, Syll. Fung. 2: 153. 1883.

Type — ITALY: Conegliano, on *Corylus avellana* (Betulaceae). Spegazzini s.n., VI 1876 (PAD, holotype). Already synonymized with *M. eburnea* by Bose (1961).

*Massarina eburnoides* f. *quercus* Höhnel, Ann. Mycol. 15: 382. 1917.

Type — GERMANY: Sachsen, Königstein, on *Quercus* (Fagaceae). Krieger s.n., III 1890, distributed in Fungi Saxonici 536 (M, NY, isotypes). New synonymy. The publication of this forma has been overlooked by the various indices.

*Diaporthe leucosarca* Ellis & Everhart, Proc. Acad. Nat. Sci. Philadelphia 42: 233. 1890 ≡ *Massarina leucosarca* (Ellis & Everhart) M. Barr, Mycotaxon 45: 214. 1992.




Figs 18-24. Ascospores of *Massarina* species: 18. *M. eburnea;* 19. *M. fronsisubmersa;* 20. *M. hepaticarum;* 21. *M. igniaria;* 22. *M. immersa;* 36. *M. lignorum;* 24. *M. macrospora.*

Type — CANADA: Ontario, London, on *Carpinus caroliniana* (Betulaceae). Dearness 1696, V 1890 (NY, holotype), also distributed in Ellis & Everhart, North American Fungi 2743 (NY (4×), isotypes). New synonymy. This is a form of *Massarina eburnea* with 1-septate ascospores. Further additional material seen under this name (mostly reported by Barr, 1992) proved to belong to several different species.

*Metasphaeria corylina* Ellis & Holway, Bull. Lab. Nat. Hist. Iowa State Univ. 3: 43. 1895.

Type — USA, IOWA: Decorah, on *Corylus* (Betulaceae). Holway s.n., V 1892 (NY, holotype). New synonym, although Höhnel (1917) already suggested a relationship with *Massarina eburnoides.*

Massarina eburnella Saccardo, Bull. Soc. Mycol. France 12: 66. 1896.

Type — FRANCE: Saône et Loire, Rigny-sur-Arroux, on *Carpinus betulus* (Betulaceae). Flageolet 34 (PAD, holotype). New synonymy.

*Massarina pomacearum* Höhnel, Ann. Mycol. 15: 381. 1917.

Type — AUSTRIA: Wienerwald, Tullnerbach, on *Crataegus monogyna* (Rosaceae). Höhnel s.n., V 1916 (FH-Höhnel, holotype). New synonymy.

*Massarina berchemiae* Petrak, Sydowia 6: 355. 1952.

Type — USA, LOUISIANA: Monroe, on *Berchemia scandens* (Rhamnaceae). Shear P142, III 1940 (BPI, holotype; M, isotype), also distributed in Reliquiae Petrakianae 1050 (FH, GZU, L, M, isotypes). New synonymy.

For additional illustrations see Hyde (1995a).

Ascomata 450-800 μm diam., lens-shaped or conical to hemispherical, immersed, rarely erumpent, with a flush ostiole. Hamathecium consisting of branched, septate pseudoparaphyses, filaments c. 2 mm wide. Ascospores broadly fusiform, usually 3-septate (sometimes partly or only 1-septate; see below), (25-)32-42(-50) × (6-)9-11(-15) μm, not or slightly constricted at the septa, middle cells larger and broader than end cells, ends rounded, with a 2-4 μm thick gelatinous sheath, wall 1-2 μm thick. Conidiomata coelomycetous, classified in *Chaetophoma* Cooke, see Bose (1961) for a description. In vitro rather fast growing, up to 5 cm diam. in two weeks on OA, forming copious white to yellowish aerial mycelium. Cultures form conidiomata after two months, especially on *Fagus* twigs.

**Notes:** There exists a form of *Massarina eburnea* with 1-septate ascospores. However, some specimens (e.g. Barr 5848 and Bigelow & Barr 3369) show 1- and 3-septate ascospores in equal or unequal proportions. Therefore, no taxonomic status is attributed to this form. It is known throughout the range of distribution and hosts of *M. eburnea*. Material with 1-septate ascospores is enumerated separately below.

**Distribution and ecology:** Widespread and common in Europe and North America, predominantly on *Fagus,* but also on other trees and shrubs.

**Host plants recorded:** *Acer saccharum* (Aceraceae), *Alnus* (Betulaceae), *Berchemia scandens* (Rhamnaceae), *Betula alba* (Betulaceae), *Carpinus betulus* and *C. caroliniana* (Betulaceae), *Cornus* sp. (Cornaceae), *Corylus avellana* (Betulaceae), *Crataegus monogyna* (Rosaceae), *Fagus sylvatica* (Fagaceae), *Fraxinus* (Oleaceae), *Ostrya virginiana* (Betulaceae), *Platanus* (Platanaceae), *Quercus* (Fagaceae), *Salix cinerea* (Salicaceae) and *Ulmus campestris* (Ulmaceae).

**Selected additional material seen:** CANADA: Ontario, London, on *Ostrya* (Betulaceae). Dearness s.n., VI 1892 (NY, sub *Massarina leucosarca*).

USA, MAINE: Franklin Co., Carrabassett Valley, on cf. *Acer* (Aceraceae). Barr 5848, VIII 1971 (NY); Penobscot Co., Ambibejus Lake, on *Fagus sylvatica* (Fagaceae). Bigelow & Barr 3369, VII 1962 (NY); MASSACHUSETTS: Leverett, Mt. Toby, on *Cornus* sp. (Cornaceae). Bigelow & Barr 2959, VII 1961 (NY, sub *Massarina corni*); Conway, on *Ostrya virginiana* (Betulaceae). Barr 5304, VI 1969 (NY, sub *Massarina corni*); Northampton, on *Carpinus caroliniana* (Betulaceae). Ahles s.n., II 1980 (NY); NEW YORK: Alcove, on *Carpinus caroliniana* (Betulaceae). Shear s.n., 1893 (M); VERMONT: Lamoille Co., Stowe, on *Alnus* (Betulaceae). Bigelow & Barr 4680b, IX 1964 (NY).

BRITISH ISLES: Surrey, Shere, on *Fagus sylvatica* (Fagaceae). Capron s.n., I 1866, distributed in Cooke, Fungi Britannici Exsiccati 371 (NY (2×)); Bath, Bathford, on *Fagus sylvatica* (Fagaceae). Broome s.n., X 1880 (NY).

AUSTRIA: Steiermark, Graz, on *Fagus sylvatica* (Fagaceae). Scheuer s.n., V 1988, distributed in Plantae Graecenses 522 (GZU, L, M); Niederösterreich, Klosterneuburg, on *Fagus sylvatica* (Fagaceae). Petrak s.n., IV 1941, distributed in Mycotheca Generalis 451 (GZU, M, UPS); Hütteldorf, on *Fagus sylvatica* (Fagaceae). Niessl s.n., V 1913 (M); Wienerwald, Sparbach, on *Fagus sylvatica* (Fagaceae). Höhnel 3815, 1904 (M); Niederösterreich, Lunz, on *Corylus avellana* (Betulaceae). Petrak s.n., VII 1939, distributed in Mycotheca Generalis 1838 (GZU, M, UPS, sub *Massarina eburnoides*); Kärnten, Rosental, St. Margareten, on *Salix* (Salicaceae). Jaklitsch s.n., X 1995 (herb. Jaklitsch).

CZECH REPUBLIC: Weißkirchen, on *Corylus avellana* (Betulaceae). Petrak s.n., IV 1923, distributed in Flora Bohemiae et Moraviae Exsiccata 1620 (BR, C, M, sub *Massarina eburnoides*); Sternberg, on *Corylus avellana* (Betulaceae). Piskor s.n., V 1925 (M, sub *Massarina eburnoides*); Moravia, Brno ['Brünn'], Adamsthal, on *Fagus sylvatica* (Fagaceae). Niessl s.n., VIII 1883 (CUP-F 3050, M); Weißkirchen, on *Fagus sylvatica* (Fagaceae). Petrak s.n., V 1913 (C, L, M), also distributed in Flora Bohemiae et Moraviae Exsiccatae 737 (BR); Erzgebirge, Görkau, on *Fagus sylvatica* (Fagaceae). Kupka s.n., 1912 (M); 1913 (M); Böhmerwald, Eisenstein, on *Fagus sylvatica* (Fagaceae). Kupka s.n., 1916 (M).

DENMARK: S. Ruderhegn, on *Fagus sylvatica* (Fagaceae). Rostrup s.n., V 1890 (C).

FRANCE: Troyes, on *Corylus avellana* (Betulaceae). Briand 18 (PAD, sub *Massarina eburnoides*).

GERMANY: Brandenburg, Triglitz, on *Fagus sylvatica* (Fagaceae). Jaap s.n., III 1910, distributed in Fungi Selecti Exsiccati 427 (C, L, M); Silesia, Karlsbrunn, on *Fagus sylvatica* (Fagaceae). Niessl s.n., VIII 1880 (M), also distributed in Thümen, Mycotheca Universalis 1951 (BR, FH, GZU, L, M, NY); Sachsen, Königstein, on *Quercus* (Fagaceae). Krieger s.n., III 1890, distributed in Fungi Saxonici 536 (M, NY, in M sub *Massarina eburnoides* f. *quercus*); same locality, on *Corylus avellana* (Betulaceae). Krieger s.n., IV 1888, distributed in Fungi Saxonici 376 (M, NY, in M sub *Massarina eburnoides*); same locality, on *Fagus sylvatica* (Fagaceae). Krieger s.n., IV 1882 (M), also distributed in Fungi Saxonici 20 (M, NY), also distributed in Sydow, Mycotheca Marchica 452 (NY), also distributed in Rehm, Ascomyceten 697 (M, NY); Sachsen, Königsbrunn, on *Fagus sylvatica* (Fagaceae). Krieger s.n., IV 1882, distributed in Rabenhorst, Fungi Europaei 2767 (BR, L, M, NY); Oestrich, on *Betula* (Betulaceae). Fuckel, distributed in Fungi Rhenani 2445 (L, M); Winterberg, on *Fagus sylvatica* (Fagaceae). Magnus s.n., V 1889 (BR); Wiesbaden, on *Fagus sylvatica* (Fagaceae). Steppan 21228, V 1962 (M); same locality, host and collector 21229, VIII 1964 (M); same locality, host and collector 24238, VI 1964 (M); Münster, on *Fagus sylvatica* (Fagaceae). Nitschke s.n. (M).

ITALY: Locality unknown, on *Fagus sylvatica* (Fagaceae). Saccardo 201 (PAD).

NETHERLANDS: Gelderland, Gorssel, Almen, on *Fagus sylvatica* (Fagaceae). Aptroot 36063, VII 1995 (Herb. CBS); Utrecht, Soest, De Stompert, on *Fagus sylvatica* (Fagaceae). Aptroot & Hyde s.n., VIII 1996 (ABL, CBS, HKU); Soest, Pijnenburg, on *Fagus sylvatica* (Fagaceae). Aptroot 36057, VI 1995 (CBS); Amersfoort, Pinetum, on *Fagus sylvatica* (Fagaceae). Aptroot 36059, VII 1995 (CBS); Leusden, Den Treek, on *Fagus sylvatica* (Fagaceae). Aptroot 36025, VI 1995 (CBS); Baarn, on *Fagus sylvatica* (Fagaceae). Aptroot 36002, VI 1995 (CBS, dried culture); same locality and host. Dorsman & Van Luyk s.n., V 1924 (L); same locality and host. Van Luyk 4469, IV 1921 (L); same locality and host. Van Luyk 4347, V 1921 (L (2×)); Maartensdijk, on *Betula* (Betulaceae). Wakker s.n., 1882 (L).

POLAND: Gdynia, Orłowo, on *Fagus sylvatica* (Fagaceae). Kochman s.n., VII 1963, distributed in Mycotheca Polonica 430 (NY); Stanislav, on *Fagus sylvatica* (Fagaceae). Petrak s.n., II 1918, distributed in Fungi Polonici Exsiccati 440 (M), also distributed in Mycotheca Carpatica 120 (M).

SWEDEN: Småland, Femsjö, on *Fagus sylvatica* (Fagaceae). Romell 15783, IX 1890, distributed in Lundell & Nannfeldt, Fungi Exsiccati Suecici, Praesertim Upsalienses 775 (C, CBS).

SWITZERLAND: Zürich, Rehalp, on *Fagus sylvatica* (Fagaceae). Bose s.n. (CBS 473.64, living culture); Bern, Bremgartenwald, on *Fagus sylvatica* (Fagaceae). Otth s.n., distributed in Wartmann & Winter, Schweizerische Kryptogamen 827 (M); Bern, Weissenburgbad, on *Fagus sylvatica* (Fagaceae). Otth s.n. (BERN, sub *Cladosphaeria fuscidula*); Zürich, Rumensee, on *Corylus avellana* (Betulaceae). Bose s.n., 1960 (CBS 201.66, living culture, sub *Massarina eburnoides*); Jura, Neuchâtel ['Neocomum'], on *Fagus sylvatica* (Fagaceae). Morthier s.n., distributed in Fuckel, Fungi Rhenani 2158 (BR, L, M, NY).

**Additional specimens representing otherwise typical material with relatively small ascospores of 25-30 μm long:** USA, GEORGIA: Clarke Co., Athens, on living twigs of *Fraxinus* (Oleaceae). Barr 6477, VII 1978 (NY, sub *Massarina microcarpa*); MASSACHUSETTS: Amherst, on *Carpinus caroliniana* (Betulaceae). Barr 4979, VII 1967 (NY, sub *Massarina leucosarca*); Conway, on *Carpinus caroliniana* (Betulaceae). Bigelow & Barr 2810, VIII 1960 (NY, sub *Massarina leucosarca*).

**Additional material seen with only 1-septate ascospores:** CANADA: Ontario, London, on *Carpinus caroliniana* (Betulaceae). Dearness 2112, V 1893 (NY, topotype of *Massarina leucosarca*); same locality, on *Acer saccharum* (Aceraceae). Dearness 967, VII 1891 (NY, sub *Massarina leucosarca*).

USA, VERMONT: Lamoille Co., Lake Mansfield, on *Fagus sylvatica* (Fagaceae). Bigelow & Barr 4353, VII 1964 (NY).

AUSTRIA: Lunz am See, on *Fagus sylvatica* (Fagaceae). Petrak s.n., VII 1939 (M); Hütteldorf, on *Ulmus campestris* (Ulmaceae). Niessl s.n., VIII 1917 (M, sub "*Massaria eburnea* f. *ulmi*" Niessl, nom. herb).

1.21 **Massarina fronsisubmersa** K.D. Hyde, Mycol. Res. 98: 724. 1994. Fig. 19.

Type — PAPUA NEW GUINEA: Western Province, Bensbach, on submerged leaf of *Livistona* (Palmae). Hyde 1392, V 1992 (BRIP 21393, holotype).

For additional illustrations see Hyde & Aptroot (1997a).

Ascomata 200-400 $\mu$m diam., conical, erumpent but often still covered by a thin layer of host tissue, with a papillate, laterally flattened (slot-like) superficial ostiole. Hamathecium consisting of branched, septate pseudoparaphyses, filaments c. 2 $\mu$m wide. Ascospores fusiform, 1-septate, 23-28 × 4-7 $\mu$m, with a median constriction, cells nearly equal, often with 2 large oil globules each, ends pointed, with a 1 $\mu$m thick gelatinous sheath which is drawn out at the ends in curved, 5-18 × 2-4 $\mu$m large appendices, each with an inner canal-like region appearing as an apical spine. Conidiomata unknown. In vitro unknown.

**Notes:** This species, with its conspicuously compressed ostioles, is reminescent of *Lohiostoma.*

**Distribution and ecology:** An aquatic species which is so far only known from Papua New Guinea.

**Host plants recorded:** *Livistona, Metroxylon sagu* (Palmae).

**Additional material seen:** PAPUA NEW GUINEA: Western Province, Wando, on submerged rachis of *Metroxylon sagu* (Palmae). Hyde 1366, V 1992 (HKU (M)).

1.22 **Massarina hepaticarum** (Crouan) Döbbeler, Mitt. Bot. Staatssamml. München 14: 197. 1978. Fig. 20.

≡ *Sphaeria hepaticarum* Crouan in Crouan & P. Crouan, Florule de Finistère: 25. 1867 ≡ *Physalospora hepaticarum* (Crouan) Saccardo, Syll. Fung. 1: 448. 1882.

Type — FRANCE: Finistère, on *Reboulia hemisphaerica* ['*Lunularia cruciata*'] (Hepaticae). Crouan s.n., III 1860 (CO, holotype).

For additional illustrations see Döbbeler (1978).

Ascomata 300-400 $\mu$m diam., globose, immersed, with an erumpent ostiole. Hamathecium consisting of sparsely branched, septate pseudoparaphyses, filaments c. 2-4 $\mu$m wide. Ascospores fusiform, 1-septate, 16-23(-25) × 5-8 $\mu$m, with a strong median constriction, cells nearly equal, ends pointed, without gelatinous sheath. Conidiomata unknown. In vitro unknown.

Distribution and ecology: So far only known from the type, on a liverwort in France.

**Host plant recorded:** *Reboulia hemisphaerica* (Hepaticae).

1.23 **Massarina igniaria** (C. Booth) Aptroot, comb. nov. Fig. 21.

Basionym: *Didymosphaeria igniaria* C. Booth, Trans. Brit. Mycol. Soc. 51: 803. 1968.

Type — INDIA: From culture of *Periconia igniaria* with unknown origin. Rai s.n., (IMI 128479, holotype).

Anamorph: ***Periconia igniaria*** E.W. Mason & M.B. Ellis, Mycol. Pap. 56: 104. 1953.

Type — BRITISH ISLES: Brundall, on *Phalaris arundinacea* (Gramineae). Ellis s.n., XII 1945 (IMI 9758, holotype).

Ascomata 250-400 $\mu$m diam., sphaeroid, superficial, with a papillate ostiole. Hamathecium consisting of branched, septate pseudoparaphyses, filaments c. 2 $\mu$m wide. Ascospores fusiform, 3-septate, 26-30 × 8-9 $\mu$m, with a median constriction, middle cells nearly equal or upper middle cell largest, middle cells larger than end cells, ends pointed, without gelatinous sheath. Senescent ascospores 1(-3)-septate, pale brown, with verruculose ornamentation. Conidiomata hyphomycetous, belonging to *Periconia igniaria* E.W. Mason & M.B. Ellis. In vitro forming the anamorph, which is more common than the teleomorph.

**Notes:** It was already realized by Aptroot (1995a), that this species is better classified in *Massarina* than in *Didymosphaeria.* It has colourless, 3-septate ascospores, which is also visible in the micrograph in the original publication. This in contrast to the drawings in the original publication, which show brown, 1-septate ascospores.

**Distribution and ecology:** So far only known from the type collection. All other specimens under this name studied (including living culture CBS 845.96 from Papua New Guinea and numerous dried cultures in IMI) only contain the anamorph, *Periconia igniaria,* which is cosmopolitan, known from all continents from a variety of substrata including soil, leaf litter and grasses.

1.24 **Massarina immersa** Döbbeler, Mitt. Bot. Staatssamml. München 14: 198. 1978. Fig. 22.

Type — SWITZERLAND: Wallis, Mörel near Brig, on *Polytrichum juniperinum* (Musci). Döbbeler 1225, IX 1973 (GZU, holotype; ZT, isotype).

For additional illustrations see Döbbeler (1978).

Ascomata 100-150 $\mu$m diam., globose, immersed, with an erumpent, often papillate ostiole. Hamathecium consisting of branched, septate pseudoparaphyses, anastomosing above the asci, filaments c. 1.5 $\mu$m wide. Ascospores broadly fusiform, 1-septate, (17-)19-22(-24) × 6-8 $\mu$m, with a strong median constriction along which the cells are sometimes broken, upper cells larger and broader than lower cell and bulging out above the septum, ends rounded, with a 1 $\mu$m thick gelatinous sheath. Senescent (brown) ascospores 3-septate. Conidiomata unknown. In vitro unknown.

**Notes:** In contrast to the original description, the ascomata were found to open on both sides of the moss leaves, with more ascomata opening on the dorsal than on the ventral side.

**Distribution and ecology:** So far only known from the type, from moss leaves in the Alps.

**Host plant recorded:** *Polytrichum juniperinum* (Musci).

1.25 **Massarina ingoldiana** Shearer & K.D. Hyde, Mycologia 89: 114. 1997.

Type — USA, WISCONSIN: Adams Co., Lemonweir River, on submerged wood. Shearer & Crane A-39-1, VII 1992 (ILLS, holotype, not seen).

For illustrations see Shearer & Hyde (1997).

Ascomata 200-500 μm diam., subglobose, immersed or becoming exposed when the covering host tissue desintegrates, with an erumpent, papillate ostiole. Hamathecium consisting of branched, septate pseudoparaphyses, anastomosing above the asci, filaments c. 1.5-3 μm wide. Ascospores fusiform, initially 1-septate, later becoming 3-5-septate, (38-)45-60(-70) × 7-12(-16) μm, with a slight median constriction, cells equal when 1-septate, end cells progressively smaller than median cells when 3-5-septate, ends rounded, with a large, 2-4 μm thick gelatinous sheath, which is drawn out at the ends in curved or coiled, up to 50 × 20 μm large appendices, which expands to form an even larger sticky mass when the enveloping membrane is broken. Conidiomata unknown. In vitro reported to produce identical ascomata (Shearer & Hyde 1997). A culture will be preserved in ATCC, but was not yet available for study.

**Distribution and ecology:** Known from submerged wood in Australia, Brunei, Malaysia and the USA (Florida, Illinois, Maine, Virginia and Wisconsin).

**Specimen seen:** BRUNEI: Temburong, on submerged wood. Hyde 1931, II 1994 (HKU).

1.26 **Massarina lignorum** (Wehmeyer) M. Barr, Mycotaxon 45: 215. 1992. Fig. 23.

≡ *Massarinula lignorum* Wehmeyer, in W.B. Cooke, Mycologia 41: 611. 1949.

Type — USA, CALIFORNIA: Siskiyou Co., Mount Shasta, on wood of *Acer glabrum* (Aceraceae). Cooke 20403, VIII 1947 (DAOM 120208, holotype).

Ascomata 600-1000 μm diam., hemispherical, superficial, with a papillate, laterally compressed (slot-like) ostiole. Hamathecium consisting of branched, septate pseudoparaphyses, filaments c. 1.5 μm wide. Ascospores fusiform, 1-septate, 35-44 × 10-12 μm, with a strong median constriction, upper cell slightly larger and broader than lower cell, bulging out above the septum, ends pointed, without gelatinous sheath. Conidiomata unknown. In vitro unknown.

**Notes:** This species resembles a *Lophiotrema,* with a conspicuous slot-like, compressed ostiole. The additional material from Utah (Bigelow & Barr 6091), which has been cited by Barr (1992), shows a rounded ostiole, albeit in irregular depressions, and it is *Massarina corticola.*

**Distribution and ecology:** So far only known from the type on *Acer* wood in California, although it has been erroneously reported from elsewhere in the USA.

**Host plant recorded:** *Acer glabrum* (Aceraceae).

1.27 **Massarina macrospora** (Saccardo) O.E. Eriksson & J.Z. Yue, Mycotaxon 27: 248. 1986. Fig. 24.

≡ *Bertia macrospora* Saccardo, Michelia 1: 452. 1878 ≡ *Bertiella macrospora* (Saccardo) Saccardo & Traverso, Syll. Fung. 19: 147. 1910 [non *Massaria macrospora* Saccardo].

Type — ITALY: Treviso, Cansiglio, on wood of *Fagus sylvatica* (Fagaceae). Saccardo s.n., X 1874, distributed in Mycotheca Veneta 651 (PAD, holotype).

For additional illustrations see Eriksson & Yue (1986).

Ascomata 600-1000 μm diam., somewhat irregularly hemispherical, superficial, with an inconspicuous, flush ostiole. Hamathecium consisting of branched, septate pseudoparaphyses, sparsely anastomosing above the asci, filaments c. 2 μm wide. Ascospores fusiform, 1-septate, 36-43 × 8-9 μm, with a median constriction, upper cell slightly larger and broader than lower cell, ends pointed, without gelatinous sheath. Senescent ascospores 3-septate, pale brown. Conidiomata unknown. In vitro unknown.

**Notes:** This is the type species of *Bertiella,* which has already been synonymized with *Massarina* by Eriksson & Yue (1986). The additional material found under this name (cited below) contains only a coelomycete.

**Distribution and ecology:** So far only known from the type locality.

**Host plant recorded:** *Fagus sylvatica* (Fagaceae).

**Additional material seen:** FRANCE: Saône et Loire, Rigny-sur-Arroux, on *Fagus sylvatica* (Fagaceae). Flageolet s.n. (PAD).

1.28 **Massarina moeszii** Tóth, Ann. Hist.-Nat. Mus. Natl. Hung. 53: 183. 1961. Fig. 25.

Type — HUNGARY: Budapest, Szentendrei Sziget Island in the Danube, on bark and wood of *Fumana procumbens* (Cistaceae). Tóth 2844, VI ['IV'] 1959 (BP, holotype).

Ascomata 500-900 μm diam., sphaeroid, somewhat irregularly verrucose, superficial (possibly initially erumpent), with a large, papillate ostiole. Hamathecium consisting of branched, septate pseudoparaphyses, sparsely anastomosing above the asci, filaments c. 2-3 μm wide. Ascospores broadly fusiform, 1-septate, 32-36 × 11-14 μm, with a median constriction, upper cell slightly larger and broader than lower cell, both cells partly with pseudosepta, ends rounded, without gelatinous sheath, wall c. 1.5 μm thick. Conidiomata unknown. In vitro unknown.

**Distribution and ecology:** So far only known from *Fumana* in Hungary.

**Host plant recorded:** *Fumana procumbens* (Cistaceae).

1.29 **Massarina palmetta** (Cooke) M. Barr, Mycotaxon 45: 216. 1992. Fig. 26.

≡ *Sphaeria palmetta* Cooke, Grevillea 7: 53. 1878 ≡ *Metasphaeria palmetta* (Cooke) Saccardo, Syll. Fung. 2: 177. 1883.

Type — USA, GEORGIA: Darien, on rachis of *Sabal palmetto* (Palmae). Cooke 2436, distributed in Ravenel, Fungi Americani Exsiccati 369 (NY, isotype).

*Massarina floridana* Petrak, Sydowia 5: 240. 1951 [non *Massarina floridana* Petrak, 1952].

Type — USA, FLORIDA: Lake Apopka, on petioles of *Sabal palmetto* (Palmae). Shear P108a, 17 XII 1941 (M, isotype), also distributed in Reliquiae Petrakianae 1227 (W 09484, holotype; GZU, L, M, isotypes). Synonymy already suggested by Barr (1992).

For additional illustrations see Hyde & Aptroot (1997a).

Ascomata 200-400 μm diam., sphaeroid to irregularly flattened, immersed below a black clypeus/stroma uniting several ascocarps, each with an erumpent, often papillate ostiole. Hamathecium consisting of branched, septate pseudoparaphyses, sparsely anastomosing above the asci, filaments c. 2-2.5 μm wide. Ascospores long ellipsoid, 1-3-septate, (16-)21-24(-26) × 6-8 μm, with a median constriction, cell nearly equal, when 1-septate both cells often with pseudosepta, ends rounded, with a c. 2 μm thick gelatinous sheath. Conidiomata unknown. In vitro unknown.

**Notes:** An additional specimen from Sarasota, cited by Barr (1992), belongs to a species of the Microthyriaceae; the specimen from Winter Park cited below is in agreement with the type.

**Distribution and ecology:** So far only known from the Southern USA.

**Host plant recorded:** *Sabal palmetto* (Palmae).

**Additional material seen:** USA, FLORIDA: Winter Park, on petioles of *Sabal palmetto* (Palmae). Shear P108, 9 XII 1941 (W 14623, sub *M. floridana;* no type, but original material which was not cited, but examined by Petrak).

1.30 **Massarina palmicola** K.D. Hyde & Aptroot, Nova Hedwigia 64: 499. 1997. Fig. 27.

Type — MALAYSIA: Pasoh Forest Reserve, on dead rachis of *Livistona* (Palmae). Hyde 1921, IX 1992 (BRIP, holotype).

For additional illustrations see Hyde & Aptroot (1997a).

Ascomata 300-400 μm diam., sphaeroid to irregularly flattened, immersed to erumpent, with an erumpent, papillate ostiole. Hamathecium consisting of branched, septate pseudoparaphyses, sparsely anastomosing above the asci, filaments up to c. 2.5 μm wide. Ascospores fusiform, (3-)5-septate, 37-53 × 10-12.5 μm, with a median constriction, upper middle cell largest and bulging out, end cells smallest, ends pointed, with a 1-2 μm thick gelatinous sheath, which may expand at the upper end. Conidiomata unknown. In vitro unknown.

**Distribution and ecology:** So far only known from a palm rachis in Malaysia.

**Host plant recorded:** *Livistona* (Palmae).

1.31 **Massarina papulosa** (Durieu de Maisonneuve & Montagne) Bose, Phytopathol. Z. 41: 176. 1961. Fig. 28.

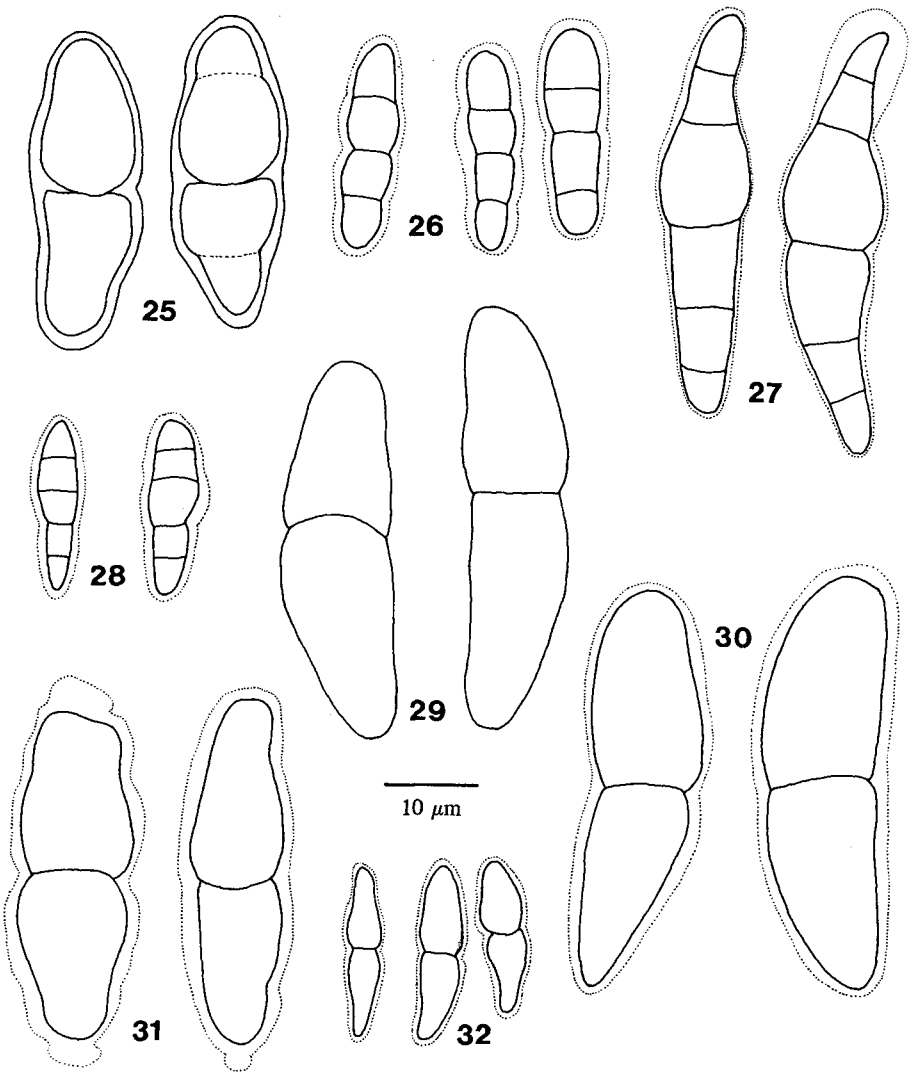
≡ *Sphaeria papulosa* Durieu de Maisonneuve & Montagne, Flore d'Algérie 1: 536. 1849 ≡ *Metasphaeria papulosa* (Durieu de Maisonneuve & Montagne) Saccardo, Syll. Fung. 2: 163. 1883.

Type — ALGERIA: On dead leaves of *Citrus aurantium* (Rutaceae). Durieu de Maisonneuve s.n. (PC, lectotype, Hyde & Aptroot 1997b; PC, isotype). Paratypes are mentioned below under additional material seen.

*Sphaeria calamina* Durieu de Maisonneuve & Montagne, Flore d'Algérie 1: 532. 1849 ≡ *Metasphaeria calamina* (Durieu de Maisonneuve & Montagne) Saccardo, Syll. Fung. 2: 178. 1883.

Type — ALGERIA: Bouzaréah, on *Arundo mauretanica* (Gramineae). Durieu de Maisonneuve s.n., III 1844 (PC, holotype). Synonymy already cited by Bose (1961).

*Massarina marcucciana* Auerswald & Rabenhorst, Unio Itineraria Cryptogamica 59. 1866 ≡ *Massaria marcucciana* (Auerswald & Rabenhorst) Auerswald & Rabenhorst, Fungi Europaei Exsiccati 2665. 1881




Figs 25-32. Ascospores of *Massarina* species: 25. *M. moeszii;* 26. *M. palmetta;* 27. *M. palmicola;* 28. *M. papulosa;* 29. *M. peerallyi;* 30. *M. purpurascens;* 31. *M. ramunculicola;* 32. *M. rubi.*

≡ *Metasphaeria papulosa* f. *marcucciana* (Auerswald & Rabenhorst) Berlese, Icones Fungorum 1: 140. 1894.

Type — ITALY: Sardinia, Alghero, on *Ampelodesmos tenax* (Gramineae). Marcucci s.n., VI 1866, distributed in Unio Itineraria Cryptogamica 59 (L (3×), M, isotypes), also distributed in Rabenhorst, Fungi Europaei Exsiccati 2665 (BR, L, isotypes). Synonymy cited by Bose (1961).

*Sphaeria peruviana* Cooke, Grevillea 8: 35. 1880 ≡ *Metasphaeria peruviana* (Cooke) Saccardo, Syll. Fung. 2: 164. 1883.

Type — PERU: Lima, on *Vitis vinifera* (Vitaceae). Cooke s.n., 1879 (K, holotype). Synonymy already cited by Bose (1961).

*Leptosphaeria pinnarum* Passerini, Rev. Mycol. (Toulouse) 2: 34. 1880 ≡ *Metasphaeria pinnarum* (Passerini) Saccardo, Syll. Fung. 2: 179. 1883.

Type — ITALY: Liguria, Bordighera, on leaves of *Phoenix dactylifera* (Palmae). Passerini s.n. (PARMA, holotype, not seen). Synonymy cited by Bose (1961).

*Sphaeria epipteridis* Cooke & Harkness, Grevillea 9: 8. 1880 ≡ *Metasphaeria epipteridis* (Cooke & Harkness) Saccardo, Syll. Fung. 2: 183. 1883 [as '*epipteridea*'].

Type — USA, CALIFORNIA: On stipes of *Pteridium aquilinum* (Pteridophyta). Harkness 1288 (K, lectotype, here designated). Synonymy already cited by Bose (1961). The lectotypification was necessary because the syntype cited in the original publication was annotated as belonging to the (unpublished) var. *tecta* by the original authors. Moreover, this specimen is a *Mycosphaerella* (see below).

*Sphaeria anisometra* Cooke & Harkness, Grevillea 9: 86. 1881 ≡ *Metasphaeria anisometra* (Cooke & Harkness) Saccardo, Syll. Fung. 2: 163. 1883 ≡ *Endophlaea anisometra* (Cooke & Harkness) Cooke, Grevillea 17: 89. 1889.

Type — USA, CALIFORNIA: on *Cupressus macrocarpa* (Cupressaceae). Harkness 1439 (K, lectotype, here designated). The lectotype is selected among various syntypes on other hosts. These are cited below, see additional material seen, except for the specimen (Harkness 1237) on pods of *Robinia* (Leguminosae), in which no ascospores were found. Synonymy already cited by Bose (1961).

*Metasphaeria spatharum* Cesati ex Saccardo, Syll. Fung. 2: 179. 1883 ≡ *Leptosphaeria spatharum* Cesati in Rabenhorst, Fungi Europaei Exsiccati 2530. 1881 [nom. inval., Art. 32.1, no description].

Type — ITALY: Napoli, Botanical Garden, on dead leaves of *Chamaerops humilis* (Palmae). Cesati s.n., distributed in Rabenhorst, Fungi Europaei Exsiccati 2530 (L, isotype). Synonymy already cited by Bose (1961).

*Sphaeria californica* Cooke & Harkness, Grevillea 13: 20. 1884 ≡ *Leptosphaeria californica* (Cooke & Harkness) Berlese & Voglino, in Saccardo, Syll. Fung., Addit. I-IV: 137. 1886.

Type — USA, CALIFORNIA: On *Sarothamnus scoparius* (Leguminosae). Harkness 2299 (K, lectotype, here designated). The lectotype is selected among various syntypes, mostly on other hosts. These are cited below, see additional material seen. Synonymy already cited by Bose (1961).

*Metasphaeria ferulae* Baccarini & Avetta, Annuario Reale Ist. Bot. Roma 1: 171. 1885.

Type — ITALY: Roma, Panisperna, on *Ferula communis* (Umbelliferae). Baccarini & Avetta s.n., VII 1884 (PAD, holotype). Synonymy already cited by Bose (1961).

*Metasphaeria algeriensis* Saccardo & Berlese, Rev. Mycol. (Toulouse) 8: 34. 1886.

Type — ALGERIA: On *Cirsium giganteum* (Compositae). Trabut 67 (PAD, lectotype, here designated). Synonymy already cited by Bose (1961).

*Metasphaeria janiculi* Passerini, Atti Reale Accad. Lincei, Rendiconti Cl. Sci. Fis., Ser. 4, 3: 10 [' # 58']. 1887.

Type — ITALY: Roma, Gianicolo, on dead leaves of *Euonymus japonica* (Celastraceae). Bagnis s.n. (PARMA, holotype, not seen). Synonymy cited by Bose (1961).

*Metasphaeria papulosa* subsp. *viridarii* Saccardo, Syll. Fung. 9: 838. 1891 [as '*papulata* ssp.'].

Type — ITALY: Roma, Villa Corsini, on leaves of *Euonymus japonica* [as '*europaeus*' in publication] (Celastraceae). Parotta s.n. (PAD, holotype), also distributed in Fungi Romani 27. Synonymy already cited by Bose (1961).

*Metasphaeria wheeleri* Linder, Mycologia 30: 665. 1938.

Type — USA, CALIFORNIA: Monterey Co., Santa Lucia Mts., Point Lobos Reserve, Gibson Dreek, on *Arceuthobium campylopodium* (Loranthaceae). Wheeler 4453, IX 1936 (FH, holotype). Synonymy already cited by Bose (1961).

*Massarina chrysopogonis* Atkinson, Cornell Univ. Agric. Exp. Sta. Bull. 3: 7. 1897.

Type — USA, ALABAMA: Lee Co., Auburn, on *Chrysopogon nutans* (Gramineae). Atkinson s.n., XI 1891 (CUP-A 2440, holotype). New synonymy.

*Zignoëlla senegalensis* Spegazzini, Anales Mus. Nac. Hist. Nat. Buenos Aires 26: 124. 1914.

Type — SENEGAL: Dakar, on decayed spathe of *Phoenix* (Palmae). Spegazzini 5031, XII 1913 (LPS, holotype, not seen). Synonymy cited by Hyde & Aptroot (1997a).

*Leptosphaeria jubaeae* Spegazzini, Bol. Acad. Nac. Ci. 25: 71. 1921.

Type — CHILE: Los Perales, on leaves and inflorescences of *Jubaea spectabilis* (Palmae). Spegazzini s.n., 1917 ('1918') (LPS, holotype, not seen). Synonymy cited by Hyde & Aptroot (1997a).

*Massarina eucalypti* L.A. Kantschaweli, Bolezni Rast. 17: 85. 1928 [as '*eucalipti*'].

Type — GEORGIA: Prov. Batum, Bacuriani ['Bucknari'], on *Eucalyptus* (Myrtaceae). Newodowski s.n., II 1912 (LE 34818, isotype). New synonymy.

? *Massarina oleina* S. Ahmad, Biologia (Lahore) 18: 101. 1972.

Type — PAKISTAN: Tret, on *Olea cuspidata* (Oleaceae). Ahmad 23586, IV 1972 (LAH, holotype, not seen). No material of this species was found in ZT, where many specimens from this author are kept. No material was sent on loan from LAH. According to the description, it is probably a synonym of *Massarina papulosa,* because of the 4-5-septate ascospores with thick sheaths.

For additional illustrations see Hyde & Aptroot (1997a).

Ascomata 100-300 μm diam., sphaeroid to irregularly flattened, immersed to erumpent, often papillate ostiole. Hamathecium consisting of branched, septate pseudoparaphyses, filaments c. 2 μm wide. Ascospores long ellipsoid to broadly fusiform, (3-)4-septate, (16-)21-24(-26) × 6-8 μm, with a constriction well below the middle at the primary septum, upper middle cell largest, end cells smallest, upper half wider than lower half, ends rounded, with a c. 1-2 μm thick gelatinous sheath. Conidiomata coelomycetous, classified in *Diplodia* Fries. In vitro forming greenish grey aerial mycelium. All cultures examined are sterile, but reported to form conidiomata by Bose (1961).

**Notes:** The following three species are not synonymous, although they were synonymized by Bose (1961):

*Leptosphaeria debeauxii* Saccardo & Roumeguère in Saccardo, Michelia 2: 318. 1882 ≡ *Metasphaeria debeauxii* (Saccardo & Roumeguère) Saccardo, Syll. Fung. 2: 182. 1883. Type - ALGERIA: Oran, on petiole of *Chamaerops humilis* (Palmae). Debeaux s.n. (PAD, holotype), also distributed in Roumeguère, Fungi Gallici Exsiccati 1241. This is a new synonym of *Anthostomella lucens* Saccardo.

*Sphaeria epipteridis* var. *tecta* Cooke & Harkness, nom. herb. Material examined: USA, CALIFORNIA: On stipes of *Pteridium aquilinum* (Pteridophyta). Harkness 1290 (K). This is a species of *Mycosphaerella.* The specimen was cited as syntype of the species in the original publication, but annotated as belonging to a different variety on the specimen.

*Metasphaeria papulosa* f. *limbalis* Gonzalez Fragoso, Mem. Real Soc. Esp. Hist. Nat. 9(3): 89. 1919.

Type — SPAIN: Cataluña, Centellas, on living leaves of *Buxus sempervirens* (Buxaceae). Caballero s.n., IV 1918 (L, isotype). This is a species of *Mycosphaerella* with the ascospores c. 10 × 3.5 μm.

**Distribution and ecology:** Widespread in Europe, North America and North Africa, predominantly occurring on leaves, but also on stems and bark of various herbaceous and woody plants.

**Host plants recorded:** *Acacia* (Leguminosae), *Ampelodesmos tenax* (Graminae), *Araucaria bidwellii* and *A. imbricata* (Araucariaceae), *Arceuthobium campylopodium* (Loranthaceae), *Arundo mauretanica* (Gramineae), *Chamaerops humilis* (Palmae), *Chrysopogon nutans* (Gramineae), *Cirsium giganteum* (Compositae), *Citrus aurantium* (Rutaceae), *Cupressus macrocarpa* (Cupressaceae), *Dracaena* (Agavaceae), *Eucalyptus globosus* (Myrtaceae), *Euonymus japonica* (Celastraceae), *Ferula communis* (Um-

belliferae), *Hedera helix* (Araliaceae), *Jasminum fruticans* (Oleaceae), *Jubaea spectabilis* (Palmae), *Mesembryanthemum edule* (Aizoaceae), *Mimulus glutinosus* (Scrophulariaceae), *Olea cuspidata* (Oleaceae), *Phoenix dactylifera* (Palmae), *Pteridium aquilinum* (Pteridophyta), *Rhododendron* (Ericaceae), *Robinia* (Leguminosae), *Rubus* (Rosaceae), *Sarothamnus scoparius* (Leguminosae), *Smilax mauretanica* (Smilacaceae), *Ulmus carpinifolia* (Ulmaceae) and *Vitis vinifera* (Vitaceae).

**Additional material seen:** USA, CALIFORNIA: On leaves of *Eucalyptus globosus* (Myrtaceae). Harkness 2308 (K (2×), paratypes of *Sphaeria anisometra*); On bark of *Eucalyptus globosus* (Myrtaceae). Harkness 1287, 2022, 2373, 2410 (K, paratypes of *Sphaeria anisometra*), also distributed in Ellis, North American Fungi 890 (K (3×), paratypes of *Sphaeria anisometra*); On stems of *Mimulus glutinosus* (Scrophulariaceae). Harkness 1445 (K, paratype of *Sphaeria anisometra*); On stems of *Rubus* (Rosaceae). Harkness 1262, 1486 (K, paratypes of *Sphaeria anisometra*); On leaves of *Dracaena* (Agavaceae). Harkness 1447 (K, paratype of *Sphaeria anisometra*); On branches of *Araucaria imbricata* (Araucariaceae). Harkness 2330, 2331 (2×), 2332 (K, paratypes of *Sphaeria californica*); On *Sarothamnus scoparius* (Leguminosae). Harkness 2396 (K, paratype of *Sphaeria californica*); On *Rhododendron* (Ericaceae). Harkness 2538 (K (3×), paratypes of *Sphaeria californica*); On leaves of *Euonymus* (Celastraceae). Harkness 2238, 2358 (K, paratypes of *Sphaeria californica*); On branches of *Euonymus* (Celastraceae). Harkness 2059, 2238 (3×) (K, paratypes of *Sphaeria californica*); On wood of *Acacia* (Leguminosae). Harkness 2194 (K, sub *Sphaeria anisometra*); On branches of *Acacia* (Leguminosae). Harkness 2355 (K, sub *Leptosphaeria californica*).

ALGERIA: Hammar, on dead leaves of *Hedera helix* (Araliaceae). Durieu de Maisonneuve s.n., I 1840 (PC, paratype); Alger, on dead leaves of *Smilax mauretanica* (Smilacaceae). Durieu de Maisonneuve s.n., I 1840 (PC, paratype); Same locality, substrate and collector, II 1840 (PC, paratype); Same locality, substrate and collector, III 1840 (PC, paratype); On *Mesembryanthemum edule* (Aizoaceae). Trabut 38 (PAD, paratype of *Metasphaeria algeriensis*).

FRANCE: Alpes Maritimes, Antibes, Villa Thuret, on leaves of *Araucaria bidwellii* (Araucariaceae). Müller s.n., IV 1959 (CBS 422.62, living culture); Antibes, Pimeau, on *Jasminum fruticans* (Oleaceae). Müller s.n., IV 1959 (CBS 472.64, living culture); Biot, on *Ulmus carpinifolia* (Ulmaceae). Müller s.n., IV 1959 (CBS 471.64, living culture).

**Note:** The distributed exsiccate material of *Metasphaeria epipteridis* from GERMANY: Königstein, on stipes of *Pteridium aquilinum* (Pteridophyta). Krieger s.n., distributed in Fungi Saxonici 730 (L) belongs to a species of *Mycosphaerella*.

1.32 **Massarina peerallyi** K.D. Hyde & Aptroot, Nova Hedwigia 66: (in press). 1998. Fig. 29.

Type — MAURITIUS: Black River, on submerged wood. Hyde & Poonyth MAUR 51, VII 1995 (HKU, holotype).

For additional illustrations see Hyde & Aptroot (1997b).

Ascomata 200-250 μm diam., hemispherical, erumpent, with a papillate ostiole. Hamathecium consisting of branched, septate pseudoparaphyses, sparsely anastomosing above the asci, filaments c. 1.5-2 μm wide. Ascospores broadly fusiform, 1-septate, often curved, 38-46 × 10-12.5 μm, with a strong median constriction, upper cell slightly shorter and broader than lower cell, ends rounded, without gelatinous sheath. Senescent ascospores pale brown. Conidiomata unknown. In vitro unknown.

**Notes:** This species is similar to *M. thalassioidea,* but has larger ascospores.

**Distribution and ecology:** An aquatic species which is known from Australia, Mauritius and the Philippines (Hyde & Aptroot 1997b).

1.33 **Massarina purpurascens** K.D. Hyde & Aptroot, Nova Hedwigia 66: (in press). 1998. Fig. 30.

Type — AUSTRALIA: North Queensland, Atherton Tablelands, Clohesy River, on submerged wood. Hyde 362B, X 1990 (HKU, holotype).

For additional illustrations see Hyde & Aptroot (1997b).

Ascomata 300-750 μm diam., sphaeroid, immersed, often staining the surrounding wood purple, with a papillate ostiole. Hamathecium consisting of branched, septate pseudoparaphyses, sparsely anastomosing above the asci, filaments 2-4 μm wide. Ascospores fusiform, 1-septate, often curved, 40-50 × 13-17 μm, with a strong median constriction, upper cell slightly longer and broader than lower cell, upper end rounded, lower end pointed, with a 2-5 μm thick gelatinous sheath. Conidiomata coelomycetous, belonging to *Phoma,* probably to *Phoma* sect. *Plenodomus* (Preuss) Boerema, van Kesteren & Loerakker. Conidia hyaline, 2.5-3.5 × 1-1.5 μm, ellipsoid to ovoid, not guttulate. In vitro very slow-growing (3 cm diam. in 6 months), starting as a reddish-purplish aerial mycelium, after one month becoming greyish to blackish brown, forming conidiomata after 4 months.

**Distribution and ecology:** A usually aquatic species which is so far known from Australia and Papua New Guinea.

**Additional material seen:** PAPUA NEW GUINEA: Madang Province, foothills of Finisterre range, 40.8 km along road Madang-Lae, on submerged branch. Aptroot 36619, XI 1995 (CBS 204.96, also living culture); Central Province, Owen Stanley Range, Naduri, on grass roots (Gramineae). Aptroot 38134, X 1995 (CBS).

1.34 **Massarina ramunculicola** K.D. Hyde, Mycologia 83: 839. 1992 ['1991']. Fig. 31.

Type — THAILAND: Straits of Malacca, Ranong Mangrove, on immersed wood of *Rhizophora apiculata* (Rhizophoraceae). Hyde s.n., XI 1988 (BRIP 17082, holotype).

For additional illustrations see Hyde (1991).

Ascomata 450-550 μm diam., conical, immersed to erumpent, with an erumpent, papillate ostiole. Hamathecium consisting of branched, septate pseudoparaphyses, sparsely anastomosing above the asci, filaments up to c. 2.5 μm wide. Ascospores broadly fusiform, 1-septate, 32-42 × 11-18 μm, with a strong median constriction, upper cells equal, often bulging out near the septum, ends rounded, with a 3-5 μm thick gelatinous sheath, which bulges out at the ends to form hemispherical appendages of c. 5 μm diam. The sheath expands to form an even larger sticky mass when the enveloping membrane is broken. Senescent ascospores pale brown, often with two pseudosepta and with internal, longitudinally arranged, needle-like crystals. Conidiomata unknown. In vitro unknown.

Distribution and ecology: So far only known from mangroves in Thailand and Japan (Nakagiri 1993).

**Host plants recorded:** *Rhizophora apiculata* and *R. mucronata* (Rhizophoraceae).

**Additional material seen:** THAILAND: Straits of Malacca, Ranong mangrove, on immersed wood of *Rhizophora mucronata* (Rhizophoraceae). Hyde s.n., X 1988 (BRIP 17111, paratype).

1.35 **Massarina ricifera** Kohlmeyer, Volkmann-Kohlmeyer & O. Eriksson, Mycologia 87: 537. 1995.

Type — USA, NORTH CAROLINA: Carteret Co., Broad Creek, on *Juncus roemerianus* (Juncaceae). Kohlmeyer 5539, XII 1993 (IMS, holotype; UME, isotype, not seen).

For illustrations see Kohlmeyer, Volkmann-Kohlmeyer & Eriksson (1995a).

Ascomata 100-150 μm diam., sphaeroid, immersed, with a papillate, erumpent to projecting ostiole. Hamathecium consisting of unbranched, septate pseudoparaphyses, filaments c. 3 μm wide. Ascospores long ellipsoid, 3-septate, 19-25 × 5.5-7 μm, strongly constricted at all septa, middle cells shorter than end cells, lower end cell longer than upper end cell, ends rounded, with a two-layered, 2-4 μm thick gelatinous sheath, which expands to form an even larger sticky mass when the enveloping membranes are broken. Conidiomata unknown. In vitro unknown.

**Notes:** No material of this recently described species was seen. It may represent a true *Massarina,* but it may also belong to *Wettsteinina.* It is reported as close to *M. carolinensis,* but the hamathecium of *M. carolinensis* is described as consisting of dense, anastomosing, septate pseudoparaphyses, whereas the hamathecium of *M. ricifera* is said to be 'a few thick unbranched pseudoparaphyses'.

**Distribution and ecology:** So far known standing culms in a salt marsh in N. Carolina.

**Host plant recorded:** *Juncus roemerianus* (Juncaceae).

1.36 **Massarina rubi** (Fuckel) Saccardo, Syll. Fung. 2: 155. 1883. Fig. 32.

≡ *Massaria rubi* Fuckel, Jahrb. Nassauischen Vereins Naturk. 25-26: 303. 1871.

Type — GERMANY: Eberbach, on *Rubus fruticosus* (Rosaceae). Fuckel s.n., 1894 (G, holotype). Additional material found under this name (in C) belongs to two different species of *Didymella.*

*Massaria micacea* J. Kunze, in Winter in Rabenhorst, Krypt.-Fl. 1(2): 542. 1887 ≡ *Massaria micacea* J. Kunze, Fungi Selecti Exsiccati 95. 1875 [nom. inval., Art. 32.1, no description] ≡ *Massaria micacea* f. *tiliae-platyphyllae* J. Kunze, Fungi Selecti Exsiccati 95. 1875 [nom. inval., Art. 32.1, no description] ≡ *Massarina micacea* (J. Kunze) Saccardo, Syll. Fung. 9: 825. 1891.

Type — GERMANY: Thüringen, Eisleben, Unterissdorf, on *Tilia platyphylla* (Tiliaceae). Kunze s.n., IV 1875, also distributed as Fungi Selecti Exsiccati 95 (L, isotype). New synonymy. Additional material found under this name (from Denmark) belongs to *Epiphegia microcarpa.*

*Massaria polymorpha* Rehm, Ber. Naturf. Ges. Augsburg 26: 60. 1881 ≡ *Massarina polymorpha* (Rehm) Saccardo, Syll. Fung. 2: 155. 1883.

Type — ROMANIA: Transsylvania, Hunyad, Retyezát, Holcvárer, on *Rosa* (Rosaceae). Lojka s.n., VIII 1873, distributed in Rehm, Ascomyceten 242 (sub '*Sphäria intermixta*') (S, holotype). New synonymy.

*Massarina spiraeae* Bose, Phytopathol. Z. 41: 174. 1961 ≡ '*Metasphaeria sepincola* f. *spiraeae*' Petrak, nom. herb.

Type — CZECH REPUBLIC: Weisskirchen, on *Spiraea salicifolia* (Rosaceae). Petrak s.n., VI 1923 (ZT, holotype). New synonymy.

*Massarina eccentrica* M. Barr, Mycotaxon 46: 508. 1993 ≡ *Massarina eccentrica* M. Barr, Mycotaxon 45: 212. [nom. inval., Art. 37.1, type not unambiguous].

Type — CANADA: British Columbia, Vancouver Island, Sidney, Ardmore, on *Acer macrophyllum* (Aceraceae). Barr 7490 (NY, isotype). New synonymy. The ascocarps are not conspicuously eccentric, contrary to the name and the description.

Ascomata 150-350 μm diam., sphaeroid to globose or hemispherical, immersed to erumpent, rarely superficial, with an erumpent, papillate ostiole. Hamathecium consisting of branched, septate pseudoparaphyses, sparsely anastomosing above the asci, filaments c. 1-2 μm wide. Ascospores fusiform, 1-septate, sometimes a bit curved, (15-)17-25(-28) × 4-6(-7) μm, with a strong median constriction, upper cell usually slightly shorter but broader than lower cell and bulging out above the septum, ends pointed, with a c. 1-3 μm thick gelatinous sheath. Conidiomata unknown. In vitro slow-growing (2 cm diam. in 3 months), forming copious greyish to blackish brown aerial mycelium.

**Notes:** This species is resurrected here; Bose (1961) synonymized this species with *Epiphegia microcarpa.* As already indicated by Holm (1957), many different species have been preserved under this name, including *Lophiostroma nucula* (Fries : Fries) Saccardo and *Keissleriella sambucina* (Rehm) Höhnel. Most material of this species has been found under various other *Massarina* names.

**Distribution and ecology:** Widespread in Europe, North America and Asia. A specimen from temperate South America is somewhat aberrant (see below). Mostly on bark of trees and shrubs, often associated with other ascomycetes, also on wood and culms.

**Host plants recorded:** *Acer campestre, A. macrophyllum, A. saccharum* and *A. spicatum* (Aceraceae), *Amphisphaerella xylostei* (Amphisphaeriaceae, Ascomycota), *Artemisia vulgaris* (Compositae), *Asteromassaria* (Pleomassariaceae, Ascomycota), *Betula nana* (Betulaceae), *Colpoma* (Rhytismataceae, Ascomycota), *Diaporthe* (Diaporthaceae, Ascomycota), *Fagus sylvatica* (Fagaceae), *Fraxinus excelsior* (Oleaceae), *Hypoxylon* (Xylariaceae, Ascomycota), *Ilex verticillata* (Aquifoliaceae), *Lithocarpus densifolia* (Fagaceae), *Lonicera coerulea* and *L. xylosteum* (Caprifoliaceae), *Myrica* (Myricaceae), *Ostrya virginiana* (Betulaceae), *Populus grandidentata* and *L. tremula* (Salicaceae), *Quercus petraea* (Fagaceae), *Rhus typhina* (Anacardiaceae), *Rosa* (Rosaceae), *Rubus fruticosus* (Rosaceae), *Salix alba* (Salicaceae), *Spiraea salicifolia* (Rosaceae), *Tilia platyphylla* (Tiliaceae), *Ulmus glabra* (Ulmaceae), *Vaccinium vitis-idaea* (Ericaceae), *Viburnum alnifolium* and *V. lantana* (Caprifoliaceae).

**Selected additional material seen:** USA, CALIFORNIA: San Mateo Co., Boulder Creek Road, on *Myrica* (Myricaceae). Barr 5980a, XII 1971 (NY, sub *Massarina microcarpa*); same locality, on *Lithocarpus densifolia* (Fagaceae). Bigelow, Barr & Thiers 5976e, XII 1971 (NY, sub *Massarina microcarpa*); MASSACHUSETTS: Conway, on ascomycetes on *Populus grandidentata* (Salicaceae). Barr 6672, I 1980 (NY, sub *Massarina albocarnis*); Conway, on *Ostrya virginiana* (Betulaceae). Barr 5777, VI 1971 (NY, sub *Massarina corni*); Hampshire Co., Florence, on *Acer spicatum* (Aceraceae). Ahles 79916, IX 1974 (NY, sub *Massarina microcarpa*); Conway, on cf. *Diaporthe* (Diaporthaceae, Ascomycota) on *Rhus typhina* (Anacardiaceae). Barr 2864, XI 1960 (NY, sub *Massarina albocarnis*); Conway, on ascomycete on *Rhus typhina* (Anacardiaceae). Barr 6625, XI 1979 (NY, sub *Massarina albocarnis*); Conway, on ascomycete on *Ilex verticillata* (Aquifoliaceae). Barr 6634, XII 1979 (NY, sub *Massarina albocarnis*); Conway, on wood of *Acer saccharum* (Aceraceae). Barr 6034, III 1973 (NY, sub *Massarina albocarnis*); Conway, on *Salix alba* (Salicaceae). Barr 6310, IV 1976 (NY, sub *Massarina canadensis*); New Salem, on *Asteromassaria* (Pleomassariaceae, Ascomycota) on *Fagus sylvatica* (Fagaceae). Bigelow & Barr 5222b, VIII 1968 (NY, sub *Massarina albocarnis*); Hadley, on *Colpoma* (Rhytismataceae, Ascomycota) on *Quercus* (Fagaceae). Barr 6312, IV 1976 (NY, sub *Massarina albocarnis*); NEW HAMPSHIRE: White Mts. National Forest, on *Acer spicatum* (Aceraceae). Bigelow & Barr 3995b, VII 1963 (NY, sub *Massarina microcarpa*); VERMONT: Mt. Mansfield State Forest, on *Viburnum alnifolium* (Caprifoliaceae). Bigelow & Barr 4178a, VI 1964 (NY, sub *Massarina microcarpa*); Newfane, on *Hypoxylon* (Xylariaceae, Ascomycota) on *Fagus sylvatica* (Fagaceae). Barr 2982a, VII 1961 (NY, sub *Massarina albocarnis*).

AUSTRIA: Steiermark, Ennstal, on *Vaccinium vitis-idaea* (Ericaceae). Remler s.n., VI 1976 (GZU, sub *Massarina microspora*); Ennstaler Alpen, Gesäuse, on *Fagus sylvatica* (Fagaceae). Vasilyeva s.n., VII 1994 (GZU, sub *Massarina* sp.); Mariazell, on wood. Scheuer s.n., VII 1994 (GZU, sub *Massarina* sp.); Grazer Bergland, Schöcklgebiet, on *Lonicera xylosteum* (Caprifoliaceae). Magnes 415, IX 1991 (GZU, sub *Massarina* sp.); Graz, on *Rosa* (Rosaceae). Scheuer 1898, VI 1988 (GZU, sub *Massarina* sp.); Graz, Ruckerlberg, on *Salix* (Salicaceae). Scheuer 2545, III 1991 (GZU, sub Massarina sp.); Stubalpe, on *Amphisphaerella xylostei* (Amphisphaeriaceae, Ascomycota) on *Lonicera* (Caprifoliceae). Scheuer & Gruber s.n., V 1994 (GZU, sub *Massarina* sp.); Wien, Hütteldorf, on *Acer campestre* (Aceraceae). Niessl s.n., VIII 1913 (M, sub *Massarina* sp.); Wien, Rothneusiedl, on wood of *Robinia pseudacacia* (Leguminosae) or *Ulmus* (Ulmaceae). Jaklitsch s.n., X 1993; I 1994 (herb. Jaklitsch); Kärnten, Rosental, St. Margareten, on *Fraxinus excelsior* (Oleaceae). Jaklitsch s.n., I 1995 (herb. Jaklitsch); same locality, on *Viburnum lantana* (Caprifoliaceae). Jaklitsch s.n., I 1995 (herb. Jaklitsch); Oberösterreich, Schlögener Schlinge, on wood of *Quercus petraea* (Fagaceae). Berger 9764, III 1996 (herb. Berger); Mühlviertel, Rannatal, on *Ulmus glabra* (Ulmaceae). Berger 7381, I 1994 (herb. Berger); same locality, on *Fraxinus excelsior* (Oleaceae). Berger 9276, X 1995 (CBS 268.96, 269.96, also living cultures; herb. Berger).

BRITISH ISLES: Yorkshire, Sheffield, Ranmoor-Fulwood, on *Acer* (Aceraceae). Aptroot 39173, IV 1996 (CBS).

DENMARK: Birkerød, on *Salix* (Salicaceae). Munk s.n., II 1963 (C (2×), sub *Massarina salicicola*); Sjaelland, Ermelunden, on *Rosa* (Rosaceae). Munk s.n., XI 1963 (C (2×), sub *Massarina polymorpha*).

FAEROES: Nolsoes have, Thorshavn, on *Rubus* (Rosaceae). Møller s.n., VII 1938 (C).

FINLAND: Lahti, on wood of *Populus tremula* (Salicaceae). Karsten 3618, III 1872 (H).

FRANCE: Corsica, Bastia, on twigs. Höhnel s.n., IV 1905 (FH-Höhnel, sub *Massarina* sp.).

GERMANY: Sachsen, Hoyerswerda, Knappensee, on dead branches of *Acer* (Aceraceae). Gams s.n., VII 1995 (CBS).

GREECE: Korfu ['Kerkyra'], Agios Gordis, on culm. Poier s.n., V 1989 (GZU, sub *Massarina* sp.).

SWEDEN: Härjedalen, Tännäs, on dead twigs of *Betula nana* (Betulaceae). Santesson s.n., VI 1992 (UPS, sub *Massarina* sp.); Uppland, on wood. Almquist s.n. (UPS, sub *Massarina* sp.); Skåne, Helsingborg, on *Fagus sylvatica* (Fagaceae). Hanson s.n., VII 1996 (C, CBS).

SWITZERLAND: Graubünden, S-charl, Val Tavrü, on *Lonicera coerulea* (Caprifoliaceae). K. & L. Holm 3310g, IX 1984 (UPS, sub *Massarina* sp.); Tamagura, on *Lonicera coerulea* (Caprifoliaceae). K. & L. Holm 3281b, VIII 1984 (UPS, sub *Massarina* sp.).

PAKISTAN: Naran, Kaghan Valley, on decorticated woody stems of *Artemisia vulgaris* (Compositae). Iqbal 507, VIII 1966 (CBS, sub *Massarina* sp.).

**Additional material with 3-septate ascospores, but which is otherwise identical:** TIERRA DEL FUEGO: Rio Grande, Estancia Rio Apen, on wood. Poelt s.n., I 1989 (GZU, sub *Massarina* sp.).

1.37 **Massarina talae** Spegazzini, Anales Mus. Nac. Hist. Nat. Buenos Aires, Ser. 2, 6: 278. 1899. Fig. 33.

Type — ARGENTINA: La Plata, Ensenada, on *Celtis talae* (Celtidaceae). Spegazzini 5577, 1889 (LPS, holotype).

Ascomata 400-550 μm diam., pyriform to hemispherical, erumpent to superficial, with a large, papillate ostiole. Hamathecium consisting of branched, septate pseudoparaphyses, anastomosing above the asci, filaments c. 1.5-2 μm wide. Ascospores fusiform, 5-septate, rarely 7-septate, 43-50 × 10-12(-14) μm, with a strong median constriction, upper half slightly longer and broader than lower half, end cells smallest, ends pointed, with a c. 1-2 μm thick gelatinous sheath. Conidiomata unknown. In vitro unknown.

**Distribution and ecology:** So far only known from *Celtis* branches in Argentina.

**Host plant recorded:** *Celtis talae* (Celtidaceae).

1.38 **Massarina tetraploa** Scheuer, Mycol. Res. 95: 126. 1991. Fig. 34.

Type — BRITISH ISLES: Exeter, Exminster Marshes, on dead leaves of *Carex acutiformis* (Cyperaceae). Scheuer 190, XI 1988 (GZU, holotype, also dried culture).

Anamorph: ***Tetraploa aristata*** Berkeley & Broome, Ann. Mag. Nat. Hist., Ser. 2, 5: 459. 1850.

Type — BRITISH ISLES: King's Cliffe, on grass. Berkeley s.n., 1850 (not seen).

Ascomata 150-250 μm diam., sphaeroid to globose, immersed, with an erumpent, papillate ostiole. Hamathecium consisting of branched, septate pseudoparaphyses, richly anastomosing above the asci, filaments c. 1-2 μm wide. Ascospores fusiform, 1-septate, often curved, 29-35(-42) × 5-6(-7) μm, with a strong median constriction, upper cell usually slightly shorter but broader than lower cell and bulging out above the septum, ends pointed, with a c. 3-7 μm thick gelatinous sheath. Senescent ascospores pale brownish, (5-)6-septate, usually with two additional septa in the upper half and three in the lower half. Conidiomata hyphomycetous, belonging to *Tetraploa aristata* Berkeley & Broome. In vitro slow-growing (2 cm diam. in one month), forming copious greyish to blackish aerial mycelium in which after 2 months the conidia are formed.

**Distribution and ecology:** The teleomorph is so far only known from *Carex* in the British Isles, whereas the anamorph is common and widespread on various substrata.

**Host plant recorded:** *Carex acutiformis* (Cyperaceae).

**Additional material seen:** BRITISH ISLES: Exeter, Exminster Marshes, on dead leaves of *Carex acutiformis* (Cyperaceae). Scheuer 293, I 1989 (GZU, paratype and topotype).

1.39 **Massarina thalassiae** Kohlmeyer & Volkmann-Kohlmeyer, Canad. J. Bot. 65: 575. 1987. Fig. 35.

Type — BELIZE: Carrie Bow Cay, on submerged marine wood. Kohlmeyer 4804a, XII 1985 (FH, isoype, slides only ['4804b']).

For additional illustration see Read, Moss & Jones (1994).

Ascomata 200-450 μm diam., pyriform to sphaeroid, immersed to erumpent, with a large, papillate ostiole. Hamathecium consisting of branched, septate pseudoparaphyses, anastomosing above the asci, filaments c. 1.5-2 μm wide. Ascospores broadly fusiform, 1-3-septate, (28-)33-45(-47) × (9.5-)11-14(-15) μm, with a strong median constriction, only slightly constricted at the additional septa, cells equal when 1-septate, end cells smaller than middle cells when 3-septate, ends rounded, with a c. 2-4 μm thick gelatinous sheath, which is constricted at the primary septum. Senescent ascospores becoming dark brown and verruculose. Conidiomata unknown. In vitro unknown.

**Notes:** This species is most closely related to *Massarina australiensis*. Senescent spores become dark brown and verruculose. The ultrastructure of asci and ascospore sheaths has been studied by Read, Moss & Jones (1994).

**Distribution and ecology:** So far known from e.g. Australia, Florida, Aldabra, India, Mexico (Baja California), the Galapagos Islands, Malaysia and Belize, so probably pantropical in mangroves.

**Host plants recorded:** *Avicennia germinans* (Verbenaceae), *Ceriops* (Rhizophoraceae), *Cocos nucifera* (Palmae), *Conocarpus erecta* (Combretaceae), *Laguncularia racemosa* (Combretaceae) and *Rhizophora mucronata* (Rhizophoraceae).

**Additional material seen:** AUSTRALIA: Queensland, Cairns, on *Ceriops* (Rhizophoraceae). Hyde 1715, IX 1989 (BRIP 19826, slide only).

1.40 **Massarina thalassioidea** K.D. Hyde & Aptroot, Nova Hedwigia 66: (in press). 1998. Fig. 36.

Type — AUSTRALIA: North Queensland, Atherton Tablelands, Millaa Millaa Falls, on submerged wood. Hyde 394, VII 1990 (HKU, holotype).

For additional illustrations see Hyde & Aptroot (1997b).

Ascomata 500-750 μm diam., conical to sphaeroid, immersed, with an erumpent, papillate to rostrate, up to 800 μm long, ostiole. Hamathecium consisting of branched, septate pseudoparaphyses, anastomosing above the asci, filaments c. 1.5-2.5 μm wide. Ascospores broadly fusiform, 1-septate, but often with 2 pseudosepta, 25-31 × 7-9 μm, with a strong median constriction, only slightly constricted at the pseudosepta, symmetrically septate, ends rounded, without gelatinous sheath. Senescent ascopores pale brown. Conidiomata unknown. In vitro unknown.

**Distribution and ecology:** An aquatic species which is so far known from Australia, Brunei and the Philippines.

**Additional material seen:** BRUNEI: Temburong, Kuala Belalong, on submerged wood. Hyde 1931 p.p., II 1994 (HKU).

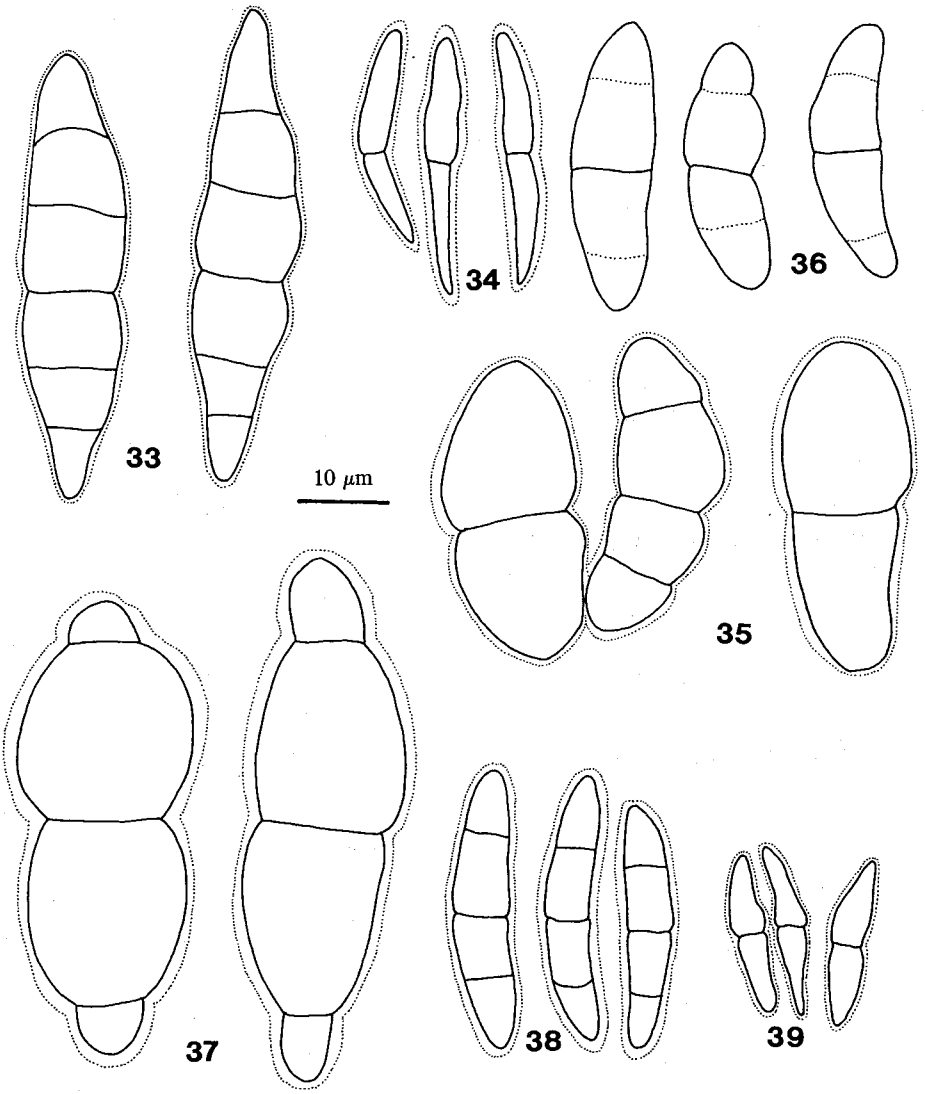
PHILIPPINES: Luzon, Los Baños, Mt. Makiling, on submerged wood. Hyde & Dalisay 2551, IX 1995 (HKU).

1.41 **Massarina velatispora** K.D. Hyde & Borse, Mycotaxon 27: 163. 1986 [as '*velataspora*', cited also several times by the authors as '*velatospora*']. Fig. 37.

Type — SEYCHELLES: on intertidal *Rhizophora mucronata* (Rhizophoraceae). Hyde s.n., XII 1983 (IMI 297770, holotype).

For additional illustrations see Hyde (1991).

Ascomata 700-1200 μm diam., conical to sphaeroid or globose, immersed to erumpent, with an erumpent, papillate ostiole. Hamathecium consisting of branched, septate pseudoparaphyses, anastomosing above the asci, filaments c. 1-2 μm wide. Ascospores broadly fusiform, 3-septate (1-septate only when young), 42-50(-56) × 14-16(-19) μm, with a strong median constriction, also strongly constricted at the additional septa, upper half usually slightly larger and broader than lower half, end cells much smaller than middle cells and more or less hemispherical, ends rounded, with a c. 2-6 μm thick gelatinous sheath, which expands to form an even larger sticky mass when the enveloping membrane is broken. Senescent ascospores becoming dark brown, purplish in mass. Conidiomata unknown. In vitro growing slowly, forming aerial mycelium which is initially white, but becomes purplish later on, ascomatal initials are formed, but do not mature (Hyde 1991).




Figs 33-39. Ascospores of *Massarina* species: 33. *M. talae;* 34. *M. tetraploa;* 35. *M. thalassiae;* 36. *M. thalassioidea;* 37. *M. velatispora;* 38. *M. waikanaënsis;* 39. *M. walkeri.*

**Distribution and ecology:** So far known from Australia, Bali, Belize, Brunei, India, Malaysia, Martinique, Mauritius, Sumatra, the Philippines, Trinidad, Thailand and the Seychelles, thus pantropically distributed in mangroves.

**Host plants recorded:** *Aegiceras corniculatum* (Myrsinaceae), *Avicennia alba* (Verbenaceae), *Rhizophora apiculata, R. mangle, R. mucronata* and *R. stylosa* (Rhizo-

phoraceae), *Sonneratia alba, S. caseolaris* and *S. griffithii* (Sonneratiaceae) and *Xylocarpus granatum* (Meliaceae).

**Additional material seen:** THAILAND: Ranong, on intertidal *Rhizophora apiculata* (Rhizophoraceae). Hyde 1741, XI 1988 (BRIP 17083 ['19851' on slide]).

1.42 **Massarina waikanaënsis** (G.S. Ridley) Shoemaker & C.E. Babcock, Canad. J. Bot. 67: 1581. 1989. Fig. 38.

≡ *Phaeosphaeria waikanaënsis* G.S. Ridley, New Zealand J. Bot. 26: 417. 1988.

Type — NEW ZEALAND: Wellington, Waikanae, on wood. Ridley 198172, II 1982 (PDD 50261, holotype).

For additional illustrations see Shoemaker & Babcock (1989).

Ascomata 200-250 μm diam., globose to sphaeroid, erumpent to superficial, with a flush ostiole. Hamathecium consisting of branched, septate pseudoparaphyses, filaments c. 2-3 μm wide. Ascospores fusiform, 3-septate, 20-24(-27) × 5-6 μm, with a slight median constriction, not constricted at the additional septa, primary septum median, upper middle cell broader than lower middle cell, but not bulging out, end cells smaller than middle cells, ends rounded, with a c. 2-4 μm thick gelatinous sheath. Conidiomata unknown. In vitro unknown.

**Notes:** This species, as well as *M. walkeri* only doubtfully belong to *Massarina,* as they share many characters with *Leptosphaeria* Cesati & De Notaris. However, it has been deliberately excluded from that genus by the monographer, Shoemaker (1984).

**Distribution and ecology:** So far only known from wood in New Zealand.

1.43 **Massarina walkeri** Shoemaker, C.E. Babcock & J.A.G. Irwin, Canad. J. Bot. 69: 569. 1991. Fig. 39.

Type — AUSTRALIA: Queensland, Gatton, Hunter River, cultivated from *Medicago sativa* (Leguminosae). Irwin UQ109, VII 1987 (BRIP 15938, dried cultures and slides; CBS 257.93, living culture; IMI 320072, badly preserved dried culture, all isotypes).

Anamorph: **Acrocalymma medicaginis** Alcorn & J.A.G. Irwin, Trans. Brit. Mycol. Soc. 88: 163. 1987.

Type — AUSTRALIA: Queensland, Hermitage, from stem of *Medicago sativa* (Leguminosae). Irwin 19591, III 1972 (BRIP, not seen).

Ascomata 150-250 μm diam., globose to sphaeroid, superficial, with a large, papillate to beak-like, up to 170 μm long ostiole. Hamathecium consisting of branched, septate pseudoparaphyses, anastomosing above the asci, filaments c. 1-1.5 μm wide. Ascospores fusiform, 1-septate, 19-22 × 4.5-5.5 μm, with a slight median constriction, upper cell longer and broader than lower cell, slightly bulging out, ends pointed, with a c. 1-2 μm thick gelatinous sheath. Senescent ascospores 3-septate, middle cells dark brown, end cells smaller, pale brown, ends becoming more rounded. Conidiomata coelomycetous, belonging to *Acrocalymma medicaginis* Alcorn & J.A.G. Irwin. In vitro usually producing the anamorph, only once the teleomorph was produced, in a culture from which the species was described.

**Notes:** This species, as well as the preceding one, only doubtfully belong to *Massarina,* as they share many characters with *Leptosphaeria* Cesati & DeNotaris. However, it has been deliberately described in another genus by the monographers of *Leptosphaeria,* Shoemaker and Babcock. In addition, the associated anamorph reported would suggest exclusion.

**Distribution and ecology:** So far only known from the type locality.

**Host plant recorded:** *Medicago sativa* (Leguminosae).

1.44 **Massarina** sp. (undescribed)

This undescribed species is characterized by the 5-7-septate ascospores of c. 27-33 × 9-12 μm. For a formal description additional material is required.

**Host plant recorded:** *Ulmus glabra* (Ulmaceae).

**Specimen seen:** AUSTRIA: Oberösterreich, Mühlviertel, Rannatal, on *Ulmus glabra* (Ulmaceae). Berger 8542, III 1995 (herb. Berger).

2. **Epiphegia** Nitschke ex G.H. Otth, Mitth. Naturf. Ges. Bern 1870: 104. 1871

Type — *Epiphegia alni* Nitschke ex G.H. Otth, holotype (≡ *Massarina alni* (Nitschke ex G.H. Otth) Saccardo = *Epiphegia microcarpa* (Fuckel) Aptroot).

The genus *Epiphegia* is reinstated here to accommodate a species which combines the ascocarp organization of *Phragmoporthe* Petrak (ascocarps grouped in stromatic tissues) with the internal structures of *Massarina* (bitunicate asci, pseudoparaphyses, hyaline, septate ascospores). Consequently, this fungus was previously assigned to both (and other) genera. For illustrations and a description of *Phragmoporthe* see Reid & Booth (1967).

For a description see below under *E. microcarpa.*

**Distribution and ecology:** The genus contains one species that is widespread in Europe and North America, occurring on various trees and shrubs.

2.1 **Epiphegia microcarpa** (Fuckel) Aptroot, comb. nov. Fig. 40.

Basionym: *Massaria microcarpa* Fuckel, Jahrb. Nassauischen Vereins Naturk. 23-24: 154. 1870 ['1869'] ≡ *Massarina microcarpa* (Fuckel) Saccardo, Syll. Fung. 2: 154. 1883.

Type — GERMANY: Oestrich, on *Carpinus betulus* (Betulaceae). Fuckel s.n., 1894 (G, holotype).

*Massaria coryli* P. Karsten, Symb. Mycol. Fennicae 6: 33. 1870 [non *Massaria eburnea* f. *coryli* Jaczewski] ≡ *Massarina coryli* (P. Karsten) Saccardo, Syll. Fung. 2: 154. 1883.

Type — FINLAND: Mustiala, on *Corylus avellana* (Betulaceae). Karsten s.n. (not seen). No type material of this species was found in H, but the material examined from the same host (but from Bosnia) belongs to *Epiphegia microcarpa,* with which it was synonymized by Bose (1961, sub *Massarina microcarpa*).

*Epiphegia alni* Nitschke ex G.H. Otth, Mitth. Naturf. Ges. Bern 1870: 104. 1871 ≡ *Massaria alni* (Nitschke ex G.H. Otth) Jaczewski, Bull. Herb. Boissier 2: 671. 1894 ≡ *Massarina alni* (Nitschke ex G.H. Otth) Saccardo, Syll. Fung. 11: 332. 1895.

Type — SWITZERLAND: Bern, Steffisberg, on *Alnus glutinosa* (Betulaceae). Otth s.n. (BERN, holotype).

*Cucurbitaria alnea* Peck, New York State Mus. Bull. 28: 75. 1876 ≡ *Otthia alnea* (Peck) Saccardo, Syll. Fung. 1: 740. 1882 ≡ *Gibberidea alnea* (Peck) Wehmeyer, Canad. J. Res., Sect. C. 20: 586. 1942 ≡ *Massarina alnea* (Peck) L. Holm, Svensk Bot. Tidskr. 62: 226. 1968 ≡ *Byssophaeria alnea* (Peck) M. Barr, Mycotaxon 20: 27. 1984.

Type — USA, NEW YORK: Karner ['Center'], on *Alnus* (Betulaceae). Peck s.n., V 1874 (NYS, holotype). New synonym, although this synonymy was already supposed by e.g. Holm (1968).

? *Valsa alnicola* Cooke & Massee, Grevillea 16: 47. 1888 ≡ *Calospora alnicola* (Cooke & Massee) Saccardo, Syll. Fung. 9: 872. 1891 ≡ *Massarina alnicola* (Cooke & Massee) Berlese, Icones Fungorum 1: 118. 1894 ≡ *Phragmoporthe alnicola* (Cooke & Massee) Petrak, Ann. Mycol. 38: 209. 1940.

Type — BRITISH ISLES: London, Kew Botanical Gardens, on *Alnus glutinosa* (Betulaceae). Cooke s.n., 1887 (K, holotype, not seen).

*Massarina ploettneriana* Hennings, Verh. Bot. Vereins Prov. Brandenburg 41: 98. 1899 ≡ *Phragmoporthe ploettneriana* (Hennings) Petrak, Ann. Mycol. 32: 354. 1934.

Type — GERMANY: Brandenburg, Rathenow, on *Alnus glutinosa* (Betulaceae). Ploettner s.n., IV 1899 (B, holotype). New synonymy. This species was synonymized by Petrak (1941) with *Phragmoporthe conformis* (Hennings) Petrak. It was also synonymized with *Massarina alnea.*

For additional illustrations see Bose (1961).

Stroma black, forming an irregular to conical carbonaceous mass below the bark of the host in which the ascomata are immersed in groups of 1-8, reaching the surface through slits in the bark. Ascomata 500-750 μm diam., globose to sphaeroid, immersed, with papillate, erumpent ostioles which may form a brownish disc at the surface of the stroma. The ostioles are usually fused with their walls. Hamathecium consisting of sparse branched, cellular pseudoparaphyses, filaments up to c. 2 μm wide. Ascospores broadly fusiform to long ellipsoid, 3-septate (only young 1-septate), (18-)22-26(-30) × 6-8.5 μm, not constricted at the septa, primary septum median, middle cells equal and shorter but broader than end cells, ends rounded, without gelatinous sheath. Conidiomata unknown. In vitro forming greyish white aerial mycelium, remaining sterile.

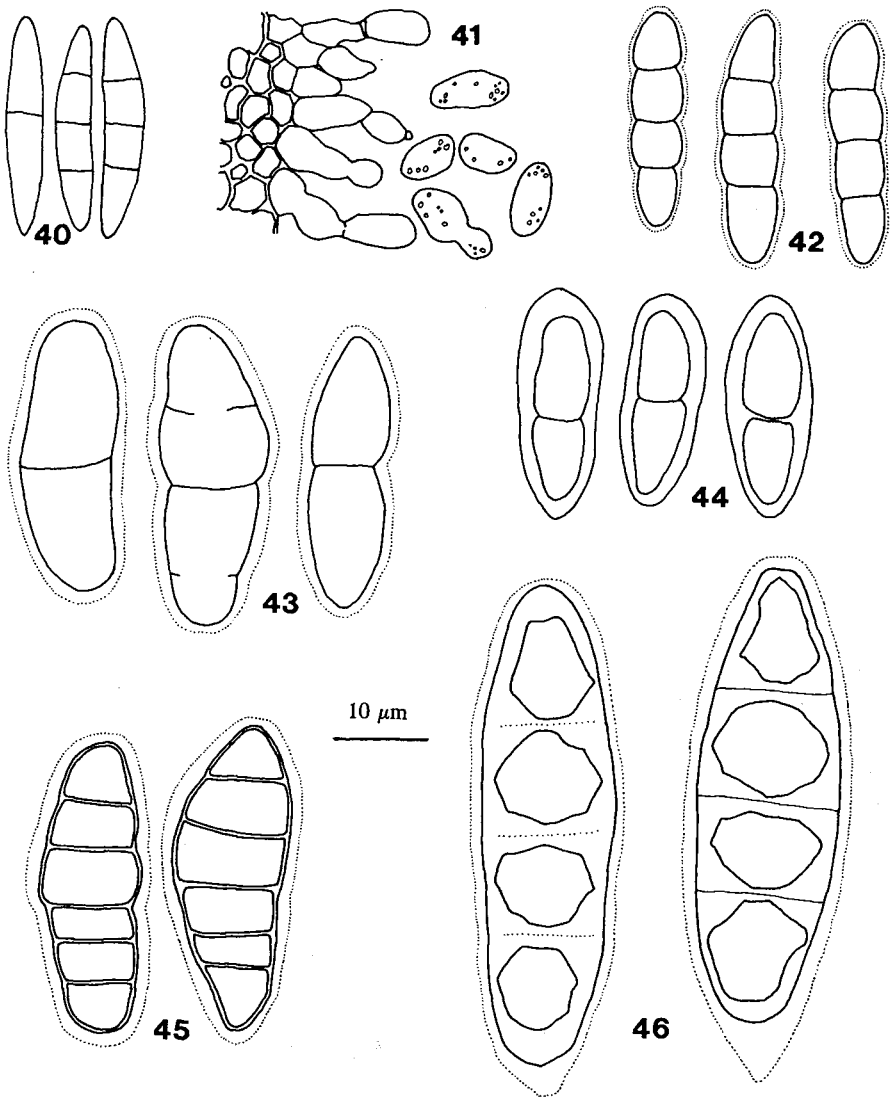
**Notes:** This species has been synomymized with *Phragmoporthe conformis* (Berkeley & Broome) Petrak by Petrak (1941). *Phragmoporthe* differs from *Epiphegia,* however, in the ascus tip, which shows the refractive ring characteristic of the Diaporthaceae.

Material of *Phragmoporthe conformis* examined: NETHERLANDS: Den Haag, on *Alnus glutinosa* (Betulaceae). Destrée s.n., 1893, distributed in Rehm, Ascomyceten 1139 (L, sub '*Metasphäria*' [sic] *conformis*).

A further species, which has been synonymized by e.g. Reid & Booth (1967) with *Phragmoporthe conformis,* viz. *Sphaerulina alni* A.L. Smith, differs in the polysporous asci and the 1-septate ascospores. It is a new synonym of *Gnomonia ditopa* (Fries) Monod.

Material of *Gnomonia ditopa* examined: BRITISH ISLES: Ayrshire, West Kilbride, on *Alnus glutinosa* (Betulaceae). Boyd s.n., IV 1918 (K, holotype of *Sphaerulina alni*); NETHERLANDS: Amsterdam, Vliegenbosch, on *Alnus glutinosa* (Betulaceae). Van Luyk 4400, III 1921 (L, sub *Massarina ploettneriana*).

An additional synonym, according to Bose (1961), is *Sclerodothis sepincola* (Berkeley & Broome) Petrak, Ann. Mycol. 19: 41. 1921 ≡ *Metasphaeria sepincola* (Berkeley & Broome) Saccardo, Syll. Fung. 9: 836. 1891, nom. illeg., Art. 53.1 [non *Metasphaeria sepincola* (Fries) Saccardo 1883]. This species is said, e.g. by Bose (1961), to be based on *Sphaeria sepincola* Berkeley & Broome. The latter authors, however,




Figs 40-46. Ascospores (40, 42-46) and conidiogenous cells with conidia (41). 40. *Epiphegia microcarpa;* 41. *Exarmidium hemisphaericum* (CBS 259.96); 42. *Oraniella coffeicola;* 43. *Wettsteinina corni;* 44. *Anisomeridium grumatum;* 45. *Splanchnonema quinqueseptatum;* 46. *Pseudopyrenula staphyleae.*

only listed an existing species called '*Sphaeria sepincola*', undoubtedly referring to *Sphaeria saepincola* Fries. The latter species is accepted, e.g. by Eriksson (1992), as *Saccothecium saepincola* (Fries : Fries) Fries.

**Distribution and ecology:** Widespread in Europe and North America, on dead branches and bark of various trees and shrubs.

**Host plants recorded:** *Aesculus* (Hippocastanaceae), *Alnus glutinosa* and *A. incana* (Betulaceae), *Betula alba* (Betulaceae), *Carpinus betulus* (Betulaceae), *Corylus avellana* (Betulaceae), *Juglans regia* (Juglandaceae), *Rhus typhina* (Anacardiaceae), *Tilia cordata* (Tiliaceae).

**Additional material seen:** USA, CALIFORNIA: Marin Co., Muir Woods, on *Aesculus* (Hippocastanaceae). Barr 5951b, XII 1971 (NY, sub *Massarina microcarpa*); MASSACHUSETTS: Conway, on *Rhus typhina* (Anacardiaceae). Barr 6548, IV 1979 (NY, sub *Massarina microcarpa*).

AUSTRIA: Wienerwald, Tullnerbach, on *Betula alba* (Betulaceae). Höhnel s.n., V 1915 (FH-Höhnel, sub *Massarina microcarpa*); Hütteldorf, on *Betula* (Betulaceae). Niessl s.n., IX 1908 (C, M, sub *Massarina eburnea*); Wulfersberg, on *Betula* (Betulaceae). Niessl s.n., 1912 (M, sub *Massarina eburnea*); Salzburg, Pinzgau, Obersulzbachtal, on bark of *Alnus incana* (Betulaceae). Scheuer s.n., 22 VII 1992 (GZU, sub *Massarina* sp.).

BOSNIA: Herzegowina, Jabloniza, on *Corylus avellana* (Betulaceae). Höhnel s.n. IV 1903 (FH-Höhnel, sub *Massarina coryli*).

DENMARK: Kolding, on *Tilia cordata* (Tiliaceae). Larsen s.n., II 1932 (C, sub *Massarina micacea*).

NETHERLANDS: Noord-Holland, Vogelenzang, on *Alnus glutinosa* (Betulaceae). Van Luyk 1219, VI 1929 (CBS, sub *Massarina ploettneriana*).

SWITZERLAND: Tessin, Brione, on *Juglans regia* (Juglandaceae). Bazzigher s.n., III 1955 (CBS 420.62, living culture).

## 3. **Exarmidium** P. Karsten, Mycol. Fenn. 2: 29. 1873

Type — *Exarmidium hysteriiforme* (P. Karsten) P. Karsten, holotype.

*Xylopezia* Höhnel, Ann. Mycol. 15: 308. 1917.

Type — *Xylopezia hemisphaerica* (Fries : Fries) Sherwood, holotype (≡ *Exarmidium hemisphaericum* (Fries : Fries) Aptroot). New synonymy.

*Clypeothecium* Petrak, Ann. Mycol. 20: 183. 1922.

Type — *Clypeothecium weirii* Petrak, holotype (= *Exarmidium hemisphaericum* (Fries : Fries) Aptroot). Synonymy follows Barr & Boise (1985).

*Trematostoma* (Saccardo) Shear, Mycologia 34: 273. 1942 ≡ *Zignoëlla* subgenus *Trematostoma* Saccardo, Syll. Fung. 2: 222. 1883.

Type — *Trematostoma morthieri* (Fuckel) Shear, holotype (≡ *Massarina morthieri* (Fuckel) v. Arx & E. Müller = *Exarmidium hemisphaericum* (Fries : Fries) Aptroot). Already synonymized by Barr & Boise (1985).

The genus *Exarmidium* was recently revised by Barr & Boise (1985). It is characterized by, e.g., unitunicate asci, free paraphyses, long ellipsoid and irregularly biseriate, hyalophragmosporous ascospores. During my revision of *Massarina,* many specimens were found to belong to this genus, including the type species of the genera *Clypeothecium* and *Trematostoma,* which were synonymized with *Exarmidium* by Barr & Boise (1985). In addition, all species accepted in *Xylopezia* by Sherwood & Boise (1986) are placed here in *Exarmidium.* This genus was recently treated as pyrenomycetous (Barr & Boise 1985), whereas *Xylopezia* had been treated as (excluded) discomycetous, partly by the same author (Sherwood-Pike & Boise 1986), but the connection was apparently not noticed. Both revisions roughly treat the same set of species. Unfortunately, the genus *Exarmidium* has priority, whereas the epithets used in *Xylopezia* are older.

The genus *Exarmidium* is described well in both papers cited above. It is especially characterized by ascomata which start perithecium-like, usually with a concave top, but become exposed, revealing a small disc. Its most enigmatic character is the iodine reaction of the ascus tip, which is reported to be only present in some specimens. However, a positive bluing can often be observed when applying IKI (Lugol) after pretreatment with 10% KOH. This iodine reaction indicates that the genus belongs to the unitunicate ascomycetes, and seems to be most appropriately classified in the Hyponectriaceae Petrak (Barr & Boise 1985). Its synonym *Xylopezia* was listed by Eriksson & Hawksworth (1993) as belonging to an unknown family in the Dothideales.

For descriptions of the genus, see Barr & Boise (1985) and Sherwood & Boise (1986, sub *Xylopezia*).

**Notes:** The specimens often cause a white or pinkish discoloration of the wood, which is UV-positive (whitish). This character has not been commented upon before and makes some specimens somewhat reminiscent of species of *Mycomicrothelia* Keissler (Hawksworth 1985).

**Key to the species of *Exarmidium***

1a. Ascomata aggregated below a clypeus ..... 3.4 *E. hysteriiforme*
1b. Ascomata solitary ..... 2

2a. Ascospores 2-septate ..... 3.1 *E. biseptatum*
2b. Ascospores 3-5-septate ..... 3

3a. Ascospores in majority less than 12 µm long ..... 3.2 *E. excellens*
3b. Ascospores in majority more than 12 µm long ..... 4

4a. Ascomata black; ascospores in majority more than 17 µm long ..... 3.3 *E. hemisphaericum*
4b. Ascomata dark brown; ascospores in majority less than 17 µm long ..... 3.5 *E. inclusum*

### 3.1 **Exarmidium biseptatum** (Sherwood) Aptroot, comb. nov.

Basionym: *Xylopezia biseptata* Sherwood, Brittonia 38: 39. 1986.

Type — USA, OREGON: Lake Co., Picture Rock Pass, on wood of *Juniperus occidentalis* (Cupressaceae). Sherwood s.n., VI 1984 (BPI, holotype, not seen).

For a description of this species see Sherwood & Boise (1986, sub *Xylopezia biseptata*).

**Distribution and ecology:** Up to now only known from the type locality in Oregon; the material from New Jersey shows that the species is more widespread.

**Host plants recorded:** *Chrysothamnus nauseosus* (Compositae), *Juniperus occidentalis* (Cupressaceae), *Quercus* (Fagaceae).

**Material seen:** USA, NEW JERSEY: Newfield, on wood of *Quercus* (Fagaceae). Ellis s.n., II 1880 (NY, sub *Sphaeria diaphana*).

### 3.2 **Exarmidium excellens** (Rehm ex Saccardo) Aptroot, comb. nov.

Basionym: *Zignoëlla excellens* Rehm ex Saccardo, Michelia 1: 347. 1878 [as 'excellans'] ≡ *Trematosphaeria excellens* (Rehm ex Saccardo) Rehm, Ber. Naturf. Ges. Augsburg 26: 72. 1881 ≡ *Winteria excellens* (Rehm ex Saccardo) Saccardo, Syll. Fung. 2: 225. 1883 ≡ *Xylopezia excellens* (Rehm ex Saccardo) Boise, Brittonia 38: 41. 1986.

Type — AUSTRIA: Längenthal, on *Pinus cembra* (Pinaceae). Rehm s.n., VIII 1874, distributed in Rehm, Ascomyceten 285-2; GERMANY: Partenkirchen, on conifer wood. Arnold s.n., VIII 1874, distributed in Rehm, Ascomyceten 285-1 (two syntypes, not seen).

For a description of this species see Sherwood & Boise (1986, sub *Xylopezia excellans*).

**Distribution and ecology:** So far only known from the syntypes. The new record from Papua New Guinea was rather unexpected and extends the distribution range to the Southern Hemisphere. However, the ecology, withered wood in alpine areas, is identical.

**Host plant recorded:** *Pinus cembra* (Pinaceae).

**Material seen:** PAPUA NEW GUINEA: Simbu Prov., Mount Wilhelm area, along new road from Gembogl to Goroka, on wood. Aptroot 32869, VIII 1992 (CBS).

### 3.3 **Exarmidium hemisphaericum** (Fries : Fries) Aptroot, comb. nov. Fig. 41.

Basionym: *Stictis hemisphaerica* Fries : Fries, Syst. Mycol. 2: 196. 1823 ≡ *Xylographa hemisphaerica* (Fries : Fries) Fuckel, Jahrb. Nassauischen Vereins Naturk. 29-30: 27. 1876 ≡ *Odontotrema hemisphaericum* (Fries : Fries) Rehm, in Rabenhorst, Krypt.-Fl. 1(3): 205. 1888 ≡ *Xylopezia hemisphaerica* (Fries : Fries) Sherwood, Brittonia 38: 41. 1986.

Type — SWEDEN: On wood. Fries s.n. (UPS, holotype, not seen).

*Trematosphaeria morthieri* Fuckel, Jahrb. Nassauischen Vereins Naturk. 25-26: 306. 1871 ≡ *Zignoëlla morthieri* (Fuckel) Saccardo, Michelia 1: 347. 1878 ≡ *Trematostoma morthieri* (Fuckel) Shear, Mycologia 34: 273. 1942 ≡ *Massarina morthieri* (Fuckel) v. Arx & E. Müller, Stud. Mycol. 9: 77. 1975 ≡ *Exarmidium morthieri* (Fuckel) M. Barr & Boise, Mycotaxon 23: 238. 1985.

Type — FRANCE: Jura, on wood of *Picea abies* (Pinaceae). Morthier 184, III 1866 (G, holotype), also distributed in Fuckel, Fungi Rhenani 2447. New synonymy. This is the type species of *Trematostoma* Shear, which becomes a synonym of *Exarmidium*.

*Sphaeria soluta* Cooke & Ellis, Grevillea 5: 54. 1876 [as '*solutae*'] ≡ *Zignoëlla soluta* (Cooke & Ellis) Saccardo, Syll. Fung. 2: 216. 1883 ≡ *Zignoëlla diaphana* var. *soluta* (Cooke & Ellis) Ellis & Everhart, North American Pyrenomycetes: 188. 1892.

Type — USA, NEW JERSEY: Newfield, on wood of *Pinus* (Pinaceae). Ellis 2408 (NY, not seen). According to the topotype examined, this is a new synonym of *Exarmidium hemisphaericum*, but it had already been synonymized with *Massarina morthieri* by Shear (1942). Material seen: USA, NEW JERSEY: Newfield, on wood of *Thuja* (Cupressaceae). Ellis s.n., V 1881 (NY, topotype).

*Sphaeria albocincta* Cooke & Ellis, Grevillea 7: 9. 1878 ≡ *Zignoëlla albocincta* (Cooke & Ellis) Saccardo, Syll. Fung. 2: 224. 1883 ≡ *Conisphaeria albocincta* (Cooke & Ellis) Cooke, Grevillea 16: 88. 1888 ≡ *Zignoëlla diaphana* var. *albocincta* (Cooke & Ellis) Ellis & Everhart, North American Pyrenomycetes: 187. 1892.

Type — USA, NEW JERSEY: Newfield, on wood of *Thuja occidentalis* (Cupressaceae). Ellis 2866, IV 1877 (NY, holotype; NY, isotype). This is a new synonym of *Exarmidium hemisphaericum*, but it had already been synonymized with *Massarina morthieri* by Shear (1942).

*Clypeothecium weirii* Petrak, Ann. Mycol. 20: 183. 1922 ≡ *Exarmidium weirii* (Petrak) Petrak, Ann. Mycol. 27: 401. 1929.

Type — USA, IDAHO: Kooskia, on *Thuja plicata* (Cupressaceae). Weir 16638, V 1920 (W, holotype, not seen). This synonymy follows Von Arx & Müller (1975). This is the type species of *Clypeothecium* Petrak,

which becomes a synonym of *Exarmidium,* rather than of *Massarina,* with which it was synonymized by Von Arx & Müller (1975).

*Massarina juniperi* Bose, Phytopathol. Z. 41: 165. 1961.

Type — SWITZERLAND: Graubünden, Arosa Isla, on wood of *Juniperus nana* (Cupressaceae). Müller s.n., VII 1959 (ZT, holotype). New synonymy.

*Massarina azadirachticola* Purohit & Joshi, Curr. Sci. 51: 238. 1982 [nom. inval, Art. 37.1, holotype location not unambiguously indicated].

Type — INDIA: Rajasthan, Jodhpur, on wood of *Azadirachta indica* (Meliaceae). Purohit s.n., III 1979 (IMI 236247, lectotype, here designated; also mentioned as syntype: JAC 732 ['JUML']). New synonymy.

For a description of this species see Barr & Boise (1985, sub *Exarmidium morthieri*) and Sherwood & Boise (1986, sub *Xylopezia hemisphaerica*). A living culture of *E. hemisphaericum* (CBS 259.96) produced an apparently undescribed coelomycetous anamorph, which cannot be assigned to any known genus. It can be described as follows: Conidioma globose, solitary or confluent, thin-walled, blackish to olivaceous, without differentiated ostiole, opening by dissolution or rupture of the wall, superficial to partly immersed in the agar. Wall cells variable, thin- to thick-walled, hyaline to greenish brown, in layers of 1 to 4 cells. Conidiogenous cells broadly lageniform or ampulliform, discrete, holoblastic, occasionally with a percurrent proliferation, c. 7-12 × 4.5-5.5 μm. Conidia hyaline, irregularly ellipsoid, mostly 6-9 × 3-4 μm, with few small oil droplets near the ends, pale yellowish brown in mass, partly once or repeatedly (on separate loci) budding to form new conidia in a yeast-like fashion.

**Distribution and ecology:** Widespread in Europe and North America, also in Asia. On withered wood, mostly of conifers and *Sambucus.* The report from CHILE in Butin & Peredo, Bibliotheca Mycologica 101: 39, 1986 (sub *Massarina morthieri*) was a misidentification. The specimen (Valdivia, on *Pinus radiata* (Pinaceae). Peredo s.n., X 1974 (CBS, sub *Massarina morthieri*)) belongs to *Arthopyrenia plumbaria* (Stizenberger) R.C. Harris, for which it represents a range extension from N. America to S. America.

**Host plants recorded:** *Abies concolor* (Pinaceae), *Azadirachta indica* (Meliaceae), *Ceanothus velutinus* (Rhamnaceae), *Cistus symphytifolius* (Cistaceae), *Juniperus nana* (Cupressaceae), *Picea abies* (Pinaceae), *Pinus cembra, P. lambertiana* and *P. ponderosa* (Pinaceae), *Pseudotsuga menziesii* (Pinaceae), *Quercus* (Fagaceae), *Sambucus nigra* (Caprifoliaceae), *Thuja occidentalis* and *T. plicata* (Cupressaceae) and *Vaccinium* (Ericaceae).

**Additional material seen:** CANADA: British Columbia, Vancouver Island, Sidney, on dry wood on the seashore. Aptroot 35181, VIII 1994 (CBS); Vancouver, on wood. Aptroot 34725, VIII 1994 (CBS).

USA, DELAWARE: Faulkland, on wood of *Thuja* (Cupressaceae). Commons 789, III 1887 (NY (2×), sub *Zignoëlla diaphana*); MONTANA: Mt. Helena, on wood of *Pseudotsuga menziesii* (Pinaceae). Anderson & Kelsey 14 (NY, sub *Zignoëlla diaphana*); NEW JERSEY: Newfield, on wood of *Thuja occidentalis* (Cupressaceae). Ellis 2866a, III 1877 (NY, topotype of *Sphaeria albocincta*); same locality, host and collector, V 1882 (NY (3×), sub *Sphaeria diaphana*); same locality, host and collector, III 1878 (NY, sub *Sphaeria diaphana*); same locality, host and collector, V 1881 (NY, sub *Sphaeria* sp.); same locality, on wood of *Quercus* (Fagaceae). Ellis s.n., II 1880 (NY, sub *Sphaeria diaphana*); same locality, on wood of *Pinus* (Pinaceae). Ellis s.n., II 1879 (NY, sub *Sphaeria diaphana*), also distributed in North American Fungi 781 (NY, as on 'oak', sub *Sphaeria diaphana,* see also below sub *Exarmidium inclusum*); WASHINGTON: On wood. Suksdorf 250, XII 1883 (NY, sub *Sphaeria diaphana*).

CANARY ISLES: La Palma, Mirador La Cumbrecita, on wood of *Cistus symphytifolius* (Cistaceae). Korf, Denison, Kohn & Sherwood 758, I 1976 (CUP-MM 758).

FRANCE: Dépt. Nord, Camiers, Les Dunes, on wood of *Sambucus nigra* (Caprifoliaceae). Aptroot 33531, VII 1993 (CBS).

ITALY: Ortler Alps, on wood of *Pinus cembra* (Pinaceae). Rehm s.n. (NY, sub *Sphaeria diaphana*).

NETHERLANDS: Friesland, Schiermonnikoog, on wood of *Sambucus nigra* (Caprifoliaceae). Aptroot 40001, 40003, 40008, IX 1996 (ABL, CBS); Ameland, on wood of *Sambucus nigra* (Caprifoliaceae). Aptroot 36302, IX 1995 (CBS, also living culture 259.96).

### 3.4 **Exarmidium hysteriiforme** (P. Karsten) P. Karsten

For a description and documentation of this species, see Barr & Boise (1985). No material was studied during this revision of *Massarina*.

### 3.5 **Exarmidium inclusum** (Persoon) Aptroot, comb. nov.

Basionym: *Peziza inclusa* Persoon, Mycol. Eur. 1: 307. 1822 ≡ *Stictis inclusa* (Persoon) Fries, Summa Veg. Scand. 2: 373. 1849 ≡ *Patellaria inclusa* (Persoon) P. Karsten, Mycol. Fenn. 1: 236. 1871 ≡ *Pseudostictis inclusa* (Persoon) Lambotte, Fl. Mycol. Belg. 261. 1880 ≡ *Odontotrema inclusum* (Persoon) P. Karsten, Acta Soc. Fauna Fl. Fenn 2(6): 146. 1885 ≡ *Xylopezia inclusa* (Persoon) Sherwood, Brittonia 38: 42. 1986.

Type — GERMANY: On wood of *Salix caprea* (Salicaceae). Persoon s.n. (L, holotype, destroyed). The type was reported as lost in the mail by Sherwood & Boise (1986).

*Sphaeria diaphana* Cooke & Ellis, Grevillea 5: 53. 1876 ≡ *Zignoëlla diaphana* (Cooke & Ellis) Saccardo, Syll. Fung. 2: 220. 1883 ≡ *Psilosphaeria diaphana* (Cooke & Ellis) Cooke, Grevillea 16: 50. 1887 ≡ *Exarmidium diaphanum* (Cooke & Ellis) M. Barr & Boise, Mycotaxon 23: 239. 1985.

Type — USA, NEW JERSEY: Newfield, on wood of *Quercus* (Fagaceae). Ellis 2407, I 1876 (NY, isotype). New synonymy. This fungus is not identical with *Exarmidium hemisphaericum,* with which it was synonymized by Shear (1942) [sub '*Massarina morthieri*']. Additional material seen in NY was partly this species, but for the most part *Exarmidium hemisphaericum.* In addition specimens preserved under this name proved to belong to *Exarmidium biseptatum, Julella sericea* (Massalongo) Coppins and to the lichen *Anisomeridium subprostans* (Nylander) R.C. Harris.

*Sphaeria (Urnularia) minutissima* P. Karsten, Hedwigia 22: 41. 1883 ≡ *Zignoëlla minutissima* (P. Karsten) Saccardo, Syll. Fung. 2, Add.: 62. 1883.

Type — FINLAND: Turku ['Åbo'], on deciduous wood. Karsten 3853, V 1861 ['1882' in publication] (H, holotype). New synonymy.

*Zignoëlla minutissima* subsp. *clavispora* P. Karsten, Meddeland. Soc. Fauna Fl. Fenn. 11: 140. 1884.

Type — FINLAND: Saksola, Padasjoki, on wood. Vainio s.n., 1872 ['1877' in publication] (H, holotype). New synonymy.

*Zignoëlla jurana* Saccardo & Berlese, Atti Ist. Veneto Sci., Ser. 6, 3: 19. 1885.

Type — SWITZERLAND: Neuchâtel, on wood of *Lonicera* (Caprifoliaceae). Morthier s.n., VI 1879 (PAD, holotype). New synonymy.

*Zignoëlla translucens* P. Karsten, Hedwigia 27: 102. 1888.

Type — FINLAND: Vaasa, Lahti, on wood of *Picea abies* (Pinaceae). Karsten 4042, VIII 1867 (H, holotype; H, isotype ['4043']). New synonymy.

For a description of this species, see Barr & Boise (1985, sub *Exarmidium diaphanum*) and Sherwood & Boise (1986, sub *Xylopezia inclusa*).

**Distribution and ecology:** Widespread in Europe and North America. On withered wood, mostly of angiosperms, rarely on stems.

**Host plants recorded:** *Acer pseudoplatanus* (Aceraceae), *Amelanchier* (Rosaceae), *Aplopappus* (Compositae), *Astragalus* (Leguminosae), *Betula alba* (Betulaceae), *Calluna vulgaris* (Ericaceae), *Cornus* (Cornaceae), *Fagus sylvatica* (Fagaceae), *Lonicera* (Caprifoliaceae), *Phyllodoce* (Ericaceae), *Picea abies* (Pinaceae), *Platanus* (Platanaceae), *Populus* (Salicaceae), *Potentilla* (Rosaceae), *Quercus* (Fagaceae), *Salix caprea* (Salicaceae).

**Additional material seen:** USA, NEW JERSEY: Malaga, on wood of *Cornus* (Cornaceae). Ellis s.n., II 1877 (NY, sub *Sphaeria diaphana*); Newfield, on wood of *Quercus* (Fagaceae). Ellis s.n., II 1879, distributed in North American Fungi 781 (NY, sub *Sphaeria diaphana,* see also above sub *Exarmidium hemisphaericum*).

AUSTRIA: Steiermark, Schladminger Tauern, Kleinsölk-Obertal, on *Acer pseudoplatanus* (Aceraceae). Scheuer 1839, VII 1988 (GZU).

4. **Oraniella** Spegazzini, Anales Mus. Nac. Hist. Nat. Buenos Aires 19: 378. 1909

Type — *Oraniella coffeicola* Spegazzini, holotype (≡ *Massarina coffeicola* (Spegazzini) Bose).

This genus is reinstated here to accommodate a single species of an unidentified family in the Melanommatales. The genus was synonymized with *Massarina* by Bose (1961), but differs, e.g., by the hamathecium.

For a description see below under *O. coffeicola.*

**Distribution and ecology:** The only species of the genus is found on branches of *Coffea* in South America.

4.1 **Oraniella coffeicola** Spegazzini, Anales Mus. Nac. Hist. Nat. Buenos Aires 19: 378. 1909. Fig. 42.

≡ *Massarina coffeicola* (Spegazzini) Bose, Phytopathol. Z. 41: 172. 1961.

Type — ARGENTINA: Jujuy, Orán, in wood and bark of *Coffea arabica* (Rubiaceae). Spegazzini 1218, III 1905 (LPS, holotype).

Stroma absent. Ascomata 100-300 μm diam., pyriform to sphaeroid, immersed, with a large, erumpent, papillate to beak-like, up to 200 μm long ostiole. Hamathecium consisting of anastomosing trabeculae, filaments c. 1-1.5 μm wide. Ascospores fusiform, 3-septate, 22-27 × 6-7(-9) μm, with slight constrictions at the septa, middle cells shorter but broader than end cells, ends rounded, with a c. 1-2 μm thick gelatinous sheath. Conidiomata unknown. In vitro slow-growing, producing whitish to grey aerial mycelium, remaining sterile, but formation of ascomata was reported by Bose (1961).

**Notes:** This fungus belongs to the Melanommatales and is the type species of *Oraniella* Spegazzini. It is characterized by hyaline, 3-septate ascospores, trabeculae and pyriform, beaked ascomata. It does not seem to be closely related to any other genus currently accepted in the order. Therefore, the genus is reinstated here with a single species. The additional material seen is a sterile culture.

**Distribution and ecology:** So far only known from South America.

**Host plant recorded:** *Coffea arabica* (Rubiaceae).

**Additional material seen:** COLOMBIA: On *Coffea arabica* (Rubiaceae). Collector unknown, 1959 (CBS 418.62, living culture).

## 5. **Wettsteinia** Höhnel, Sitzungsber. Kaiserl. Akad. Wiss., Math.-Naturwiss. Cl. Abt. 1, 116: 126. 1907

Type — *Wettsteinina gigaspora* Höhnel, holotype.

This genus has recently been revised by Shoemaker & Babcock (1987). Several species described in *Massarina* match the generic circumscription of *Wettsteinina* perfectly.

### 5.1 **Wettsteinina corni** (Fuckel) Aptroot, comb. nov. Fig. 43.

Basionym: *Massaria corni* Fuckel, Jahrb. Nassauischen Vereins Naturk. 25-26: 303. 1871 ≡ *Massarina corni* (Fuckel) Saccardo, Syll. Fung. 2: 154. 1883 [non *Massaria corni* (Montagne) Saccardo 1883].

Type — GERMANY: Johannisberg, on *Cornus sanguinea* (Cornaceae). Fuckel 179, 1871 (NY, isotype).

*Massaria winteri* Rehm, Hedwigia 22: 60. 1883 ≡ *Massarina winteri* (Rehm) Höhnel, Ann. Mycol. 15: 381. 1917.

Type — SWITZERLAND: Zürich, on *Cornus* (Cornaceae). Winter s.n., IX 1878, distributed in Kunze, Fungi Selecti Exsiccati 338 (NY, isotype, sub *Massarina corni*), also distributed in Fungi Helvetici 38 (L, isotype, sub *Massarina corni*). New synonymy.

Stroma absent. Ascomata 200-300 μm diam., globose to sphaeroid, immersed, often almost without carbonization, with a pale, up to 100 μm wide, broad, flush ostiole which is visible from above. Hamathecium consisting of rounded, oily cells, which are the remnants of the initial interascal tissue, cells up to 1-1.5 μm wide. Ascospores broadly fusiform to long ellipsoid, (1-)3-septate, the 2 secondary septa often not completely closed (pseudosepta), 25-33(-38) × 7-11(-13) μm, with slight constrictions at the septa, middle cells shorter but broader than end cells, ends rounded, with a 2-5 μm thick gelatinous sheath. Conidiomata coelomycetous, belonging to *Coniothyrium* Corda s.l. In vitro slow-growing, producing whitish to grey aerial mycelium, remaining sterile, but the formation of conidiomata and ascomata was described by Bose (1961).

**Distribution and ecology:** Widespread in Europe, exclusively on *Cornus*. All collections from North America, including the specimen cited by Barr (1992), proved to belong to other *Massarina species*, mainly *M. eburnea* and *M. rubi*.

**Host plant recorded:** *Cornus sanguinea* (Cornaceae).

**Additional material seen** (all on *Cornus sanguinea* (Cornaceae)): AUSTRIA: Wien, Hütteldorf. Niessl s.n., XI 1910 (C, CUP-F 3449).

CZECH REPUBLIC: Moravia, Weißkirchen. Petrak s.n., VIII 1920, distributed in Flora Bohemiae et Moraviae Exsiccata 1619 (BR, C).

GERMANY: Sachsen, Leipzig. Winter s.n., IX 1874 (C); Eisleben. Winter s.n., VIII 1870 (L); Nossen. Krieger s.n. VII 1883, distributed in Fungi Saxonici 19 (NY); same locality and collector, VIII 1882, distributed in Rehm, Ascomyceten 698 (NY).

POLAND: Carpathian Mts, Beskidy, Cab. Petrak s.n., IX 1925, distributed in Mycotheca Carpathica 459 (M, NY).

SWITZERLAND: Zürich. Winter s.n., IX 1878, distributed in Fungi Helvetici 38 (L, this is an isotype of *Massaria winteri*); also distributed in Kunze, Fungi Selecti Exsiccati 338 (NY, also an isotype of *M. winteri*); Graubünden, Alvaschein. Müller s.n., VIII 1959 (CBS 419.62, living culture); Bern, Rubigen. Müller s.n., V 1959 (CBS 496.64, living culture).

**Note:** The published exsiccatum: GERMANY: Brandenburg, Charlottenburg, on *Cornus sanguinea* (Cornaceae). Sydow s.n., VI 1884, distributed in Mycotheca Marchica 542 (NY) contains only a *Guignardia* sp.

## 5.2 **Wettsteinina dryadis** (Rostrup) Petrak, Sydowia 1: 322. 1947.

≡ *Massarina dryadis* Rostrup, Fungi Groenlandiae: 560. 1888 ≡ *Pleospora dryadis* (Rostrup) Petrak, Hedwigia 68: 221. 1929 ≡ *Massaria dryadis* (Rostrup) Lind, Biol. Meddel. Kongel. Danske Vidensk. Selsk. 11: 75. 1934.

Type — GREENLAND: Shannon-Oerne, on leaves of *Dryas octopetala* (Rosaceae). Rostrup 3, 1869-1870 (C, holotype).

For a description see Shoemaker & Babcock (1987).

**Distribution and ecology:** A distinct boreo-alpine element, occurring in Europe and North America, always on leaves of *Dryas.*

**Host plants recorded:** *Dryas drummondii, D. integrifolia* and *D. octopetala* (Rosaceae).

**Selected additional specimens seen** (all on leaves of *Dryas* spp. (Rosaceae)): CANADA: Hudson Bay, on *D. integrifolia.* Macoun s.n., VII 1910 (C).

GREENLAND: Danmarks Havn, on *D. octopetala.* Lundager s.n., VII 1908 (C); Same locality and host. Hartz s.n., 1892 (C); Cape Hamilton, on *D. octopetala.* Nygaard s.n., VI 1921 (C); Wright Bay, on *D. octopetala.* Nygaard s.n., VI 1921 (C); Washington Land, on *D. octopetala.* Koch s.n., VIII 1921 (C); John Murray Island, on *D. octopetala.* Wulff s.n., VII 19178 (C (2×)); Gunnar Andersen Valley, on *D. octopetala.* Wulff s.n., VII 1917 (C).

ICELAND: Hof, on *D. octopetala.* Davidsson 439, VI 1899 (C); same origin, no. 532 (C); same locality, host and collector, no. 70, V 1899 (C).

NORWAY: Kongiaard, on leaves of *Dryas octopetala* (Rosaceae). Rostrup s.n., VII 1887 (C).

SWITZERLAND: Corviglia, St. Moritz, on leaves of *Dryas octopetala* (Rosaceae). Wehmeyer s.n., VII 1953 (CBS 448.54, living culture).

## 5.3 **Wettsteinina lacustris** (Fuckel) Shoemaker & Babcock, Canad. J. Bot. 67: 1595. 1989.

≡ *Massarina lacustris* (Fuckel) Leuchtmann, Sydowia 37: 181. 1985 ['1984'] ≡ *Sphaeria lacustris* Fuckel, Jahrb. Nassauischen Vereins Naturk. 27-28: 22. 1873 ≡ *Metasphaeria lacustris* (Fuckel) Saccardo, Syll. Fung. 2: 173. 1883 ≡ *Leptosphaeria lacustris* (Fuckel) Winter, in Rabenhorst, Krypt.-Fl. 1(2): 451. 1887.

Type — GERMANY: Budenheim, on dead leaves of *Typha angustifolia* (Typhaceae). Fuckel s.n. (G, holotype), also distributed in Fungi Rhenani 2436.

For a description see Shoemaker & Babcock (1989).

**Notes:** As already mentioned by Shoemaker & Babcock (1989), most of the material listed under this name, e.g. by Leuchtmann (1985), belongs to *Massarina,* but the type is a *Wettsteinina.*

**Distribution and ecology:** So far only known from the type locality.

**Host plant recorded:** *Typha angustifolia* (Typhaceae).

5.4 **Wettsteinina mirabilis** (Niessl) Höhnel, Sitzungsber. Kaiserl. Akad. Wiss., Math.-Naturwiss. Cl., Abt. 1, 116: 635. 1907.

Synonyms placed in *Massarina* include the following:

*Massarina gigantospora* Rehm, in Voss, Verh. Zool.-Bot. Ges. Wien 37: 216. 1887 ≡ *Wettsteinina gigantospora* (Rehm) Höhnel, Sitzungsber. Kaiserl. Akad. Wiss., Math.-Naturwiss. Cl., Abt. 1, 116: 129. 1907.

Type — SLOVENIA: Postojna ['Adelsberg'], on *Chamaespartium sagittale* (Leguminosae). Stapf s.n., XI 1886, distributed in Rehm, Flora Exsiccata Austro-Hungariae 1235 (W, holotype, not seen). Synonymy according to Shoemaker & Babcock (1987).

*Massarina spectabilis* Ade, Hedwigia 64: 319. 1923.

Type — GERMANY: Unterfranken, Gambach, on *Dictamnus fraxinella* (Rutaceae). Ade s.n., V 1920 (GZU, isotype). New synonymy.

*Massaria moenana* Ade, Hedwigia 64: 297. 1923 ≡ '*Massarinula moenana*' (Ade) Rehm, nom. herb.

Type — GERMANY: Aschaffenburg, Mainufer, on *Verbascum nigrum* (Scrophulariaceae). Ade s.n., X 1913 (GZU, holotype). This is also a new synonym of *Wettsteinina mirabilis* (Niessl) Höhnel, although it was described in the same publication as the above species, but in a different genus.

For a description, see Shoemaker & Babcock (1987).

**Distribution and ecology:** Widespread in Europe and North America, on stems of herbaceous plants.

**Host plants recorded:** *Adonis vernalis* (Ranunculaceae), *Artemisia borealis* and *A. campestris* (Compositae), *Bupleurum ranunculoides* (Umbelliferae), *Campanula caespitosa* (Campanulaceae), *Centaurea nervosa* (Compositae), *Chamaespartium sagittale* (Leguminosae), *Dictamnus fraxinella* (Rutaceae), *Euphorbia cyparissias* (Euphorbiaceae), *Hieracium bupleuroides* (Compositae), *Primula auricula* (Primulaceae), *Trifolium* (Leguminosae), *Urtica* (Urticaceae), *Valeriana tripteris* (Valerianaceae), *Verbascum nigrum* (Scrophulariaceae) and *Vincetoxicum officinale* (Asclepiadaceae).

**Additional material seen:** SWITZERLAND: Glarus, Schwändi, on *Vincetoxicum officinale* (Asclepiadaceae). Müller s.n., 1949 (CBS 459.51, living culture); Zermatt, on *Trifolium* (Leguminosae). Wehmeyer s.n., 1953 (CBS 449.54, living culture).

5.5 **Wettsteinina xerophylli** (Ellis) Aptroot, comb. nov.

Basionym: *Leptosphaeria xerophylli* Ellis, Amer. Naturalist 17: 316. 1883 ≡ *Sphaerulina xerophylli* (Ellis) Cooke, Grevillea 18: 79. 1890 ≡ *Massarina xerophylli* (Ellis) M. Barr, Mycotaxon 45: 217. 1992.

Type — USA, NEW JERSEY: Willow Grove, on dead leaves of *Xerophyllum asphodeloides* (Liliaceae). Ellis s.n., V 1882 (isotype), also distributed in North American Fungi 1340 (NY, lectotype, designated here; NY (3×), isotypes).

*Leptosphaeria hysterioides* Ellis & Everhart, Bull. Washburn Lab. Nat. Hist. 1: 4. 1884 ≡ *Heptameria hysterioides* (Ellis & Everhart) Cooke, Grevillea 18: 32. 1889 ≡ *Massarina hysterioides* (Ellis & Everhart) Berlese, Icones Fungorum 1: 119. 1894.

Type — USA, WASHINGTON: Yakima Co., on dead leaves of *Xerophyllum tenax* (Liliaceae). Suksdorf 48, IX 1883, distributed in Reliquiae Suksdorfianae 28 (S, isotype). Already synonymized with *Leptosphaeria xerophylli* Ellis by Shoemaker (1984).

For a description, see Shoemaker (1984, sub *Leptosphaeria xerophylli*).

**Distribution and ecology:** Widespread in North America, always on dead *Xerophyllum* leaves.

**Host plants recorded:** *Xerophyllum asphodeloides, X. douglasii* and *X. tenax* (Liliaceae).

**Additional material seen:** USA, MONTANA: Deer Lodge, on dead leaves of *Xerophyllum douglasii* (Liliaceae). Kelsey 145, VI 1887 (NY (3×)); NEW JERSEY: Willow Grove, on dead leaves of *Xerophyllum asphodeloides* (Liliaceae). Ellis s.n., V 1880 (NY, topotype); OREGON: Clackamas Co., Mt. Hood National Forest, on dead leaves of *Xerophyllum* (Liliaceae). Huhndorf 113, VIII 1992 (NY).

## 6. Annotated alphabetical list of *Massarina* species and their disposition

6.1 ***Massarina acrostichi*** K.D. Hyde. Accepted species, see 1.1.

6.2 ***Massarina adeana*** (Petrak) E. Müller, in Müller & Von Arx, Beitr. Krypt.-Fl. Schweiz 11(2): 297. 1962 ≡ *Amphididymella adeana* Petrak, Bot. Jahrb. Syst. 141: 94. 1928 ≡ *Massarinula adeana* (Petrak) Petrak, Sydowia 13: 7. 1959.

Type — CANARY ISLES: Tenerife, Anaga, Las Carboneros, on wood of *Pyrus communis* (Rosaceae). Ade s.n., V 1926 (W 17243, lectotype, designated by Yue & Eriksson 1985).

This is a specimen of *Acrocordia gemmata* (Acharius) Massalongo, with which the species was already synonymized by Yue & Eriksson (1985). It is the type species of *Amphididymella* Petrak, which is therefore a synonym of *Acrocordia* Massalongo rather than of *Massarina,* with which it was synonymized by Petrak (1959). The two remaining syntypes seen from the same locality, host, date and collector both belong to *Amphisphaeria* sp., as was indicated already by Yue & Eriksson (1985).

6.3 ***Massarina albizziae*** S. Ahmad, Biologia (Lahore) 17: 83. 1971.

Type — PAKISTAN: Lahore, Ravi Reserve, on *Albizzia lebbek* (Leguminosae). Ahmad 22140, VIII 1970 (LAH, holotype, not seen).
No material of this species was found in ZT. According to the description, this species has pigmented ascospores. Therefore it probably does not belong to *Massarina.*

6.4 ***Massarina albocarnis*** (Ellis & Everhart) M. Barr. Accepted species, see 1.2. Most additional material seen (partly reported by Barr, 1992) proved to belong to different species.

6.5 ***Massarina almeidana*** Sousa da Camara, Revista Agron. (Lisbon) 17: 8. 1929.

Type — PORTUGAL: (LISVA, holotype, not seen).

No material of this species was found in LISE, it is probably in LISVA, from where no material has been received. Its identity remains uncertain.

6.6 ***Massarina alnea*** (Peck) L. Holm. This is a synonym of 2.1 *Epiphegia microcarpa.*

6.7 ***Massarina alni*** (Nitschke ex G.H. Otth) Saccardo. This is a synonym of 2.1 *Epiphegia microcarpa.*

6.8 ***Massarina alnicola*** (Cooke & Massee) Berlese. Synonymized here with 2.1 *Epiphegia microcarpa* (see above). Not identical with *Phragmoporthe conformis* (Berkeley & Broome) Petrak, with which it was synonymized by Petrak (1941).

6.9 ***Massarina alpina*** Katumoto, J. Jap. Bot. 56: 388. 1981.

Type — UGANDA: Nyamuleju-Nyabitiba, Mount Ruwenzori, on *Arundinaria alpina* (Gramineae). Kobayashi s.n., VII 1974 (YAM 23385, holotype, not seen).

No answer was received upon a request for the loan of material from YAM. According to the description, this species has rounded ascospores. Therefore it probably does not belong to *Massarina.*

6.10 ***Massarina ambigua*** (Berlese & Bresadola) O.E. Eriksson. No type material of this species was found in PAD, and the type is presumably lost. Other material seen, which agrees well with the protologue, belongs to 1.17 *Massarina corticola.* It is therefore treated as a probable synonym of the latter species.

6.11 ***Massarina amphibia*** Magnes & Hafellner. Accepted species, see 1.3.

6.12 ***Massarina appendiculata*** Panwar, Purohit & Gehlot. Accepted species, see 1.4.

6.13 ***Massarina aquatica*** J. Webster. Accepted species, see 1.5.

6.14 ***Massarina armatispora*** K.D. Hyde, Vrijmoed, Chinnaraj & E.B.G. Jones. Accepted species, see 1.6.

6.15 ***Massarina arundinacea*** (Sowerby : Fries) Leuchtmann. Accepted species, see 1.7.

6.16 ***Massarina arundinariae*** (Ellis & Everhart) M. Barr. Accepted species, see 1.8.

6.17 ***Massarina australiensis*** K.D. Hyde. Accepted species, see 1.9.

6.18 ***Massarina australis*** Bose, Phytopathol. Z. 41: 173. 1961.

Type — SOUTH AFRICA: Cape Province, near Knysna, on wood of branches. Schüepp 72, X 1959 (ZT, holotype).

Examination of the type shows that this is a specimen of the lichen *Anisomeridium tamarindi* (Fée) R.C. Harris on wood.

6.19 ***Massarina azadirachticola*** Purohit & Joshi. This is a new synonym of 3.3 *Exarmidium hemisphaericum* (Fries : Fries) Aptroot.

6.20 ***Massarina balnei-ursi*** (Rehm) K. Holm & L. Holm. Accepted species, see 1.10.

L. & K. Holm (1986) mentioned as a possible synonym: *Amphisphaeria anaxaea* Spegazzini, in Saccardo, Michelia 2: 249. 1882 ≡ *Melanopsamma anaxaea* (Spegazzini) Saccardo, Syll. Fung. 2: 579. 1883.

Type — ITALY: Belluno, on stems of *Dryas octopetala* (Rosaceae). Spegazzini 5819, IX 1879 (LPS, holotype). Examination of the type shows that this is a new synonym of *Didymosphaeria futilis* (Berkeley & Broome) Fuckel, as already anticipated in a footnote by L. & K. Holm (1986).

6.21 ***Massarina bambusina*** Teng, Sinensia 7: 512. 1936.

Type — CHINA: Szechuan, on Bambusoideae (Gramineae). Teng s.n. (not seen).

According to the description and illustration, this might represent an additional species of *Massarina*.

6.22 ***Massarina berchemiae*** Petrak. This is a new synonym of 1.20 *Massarina eburnea*.

6.23 ***Massarina biconica*** Petch. Accepted species, see 1.11.

6.24 ***Massarina bipolaris*** K.D. Hyde. Accepted species, see 1.12.

6.25 ***Massarina bosei*** Pande & V.G. Rao, J. Econ. Taxon. Bot. 14: 160. 1990.

Type — INDIA: Maharashtra, Sindhudurg, Amboli Ghat, on dead twigs. Jadhav s.n., I 1982. (AMH 7154, holotype).

The type specimen is badly preserved. It contains *Chaetomium globosum* Kunze, *Heterosphaeria patella* (Tode : Fries) Greville and *Didymosphaeria conoidea* Niessl, probably also *Diaporthe eres* Nitschke.

6.26 ***Massarina brunaudii*** Bose, Phytopathol. Z. 41: 173. 1961 ≡ *Metasphaeria spartii* Brunaud, J. Hist. Nat. Bord. Sud-Ouest 41: 3. 1887 [non *Massarina spartii* Passerini, 1888].

Type — FRANCE: on *Spartium junceum* (Leguminosae). Collector unknown (not seen).

No material of this species was found in either PAD, PC or ZT. Only the living culture in CBS could be examined, which is sterile and cannot be identified. No species of *Massarina* was ever recorded on *Spartium*. However, specimens of *Cainia desmazieresii* Moreau & E. Müller ex Krug and *Montagnula spartii* (Castagne) Aptroot with young, colourless ascospores have sometimes been taken for a *Massarina* (see *Massarina maritima*).

Material seen: FRANCE: Alpes Maritimes, on *Spartium junceum* (Leguminosae). Müller 2939, VI 1959 (CBS 256.62, living culture).

6.27 ***Massarina canadensis*** (Ellis & Everhart) M. Barr. Accepted species, see 1.13.

6.28 ***Massarina capparidicola*** Kar & Maity, Canad. J. Bot. 48: 1295. 1970 [as '*capparicola*'].

Type — INDIA: West Bengal, Purulia, Raghunathpur, on *Capparis horrida* (Capparidaceae). Maity PCC720, II 1966 (DAOM 126814, isotype).

This is an immature pyrenocarpous ascomycete of uncertain affinities. It can be described as follows: Exciple pale. Asci dextrinoid, probably unitunicate, resembling *Exarmidium*. Ascospores immature, biseriate, ellipsoid, hyaline, 3-5-septate, 16-18 × 7-8 μm.

6.29 ***Massarina carolinensis*** Kohlmeyer, Volkmann-Kohlmeyer & O. Eriksson. Accepted species, see 1.14.

6.30 ***Massarina chamaecyparissi*** (Rehm) L. Holm & K. Holm. Accepted species, see 1.15.

6.31 ***Massarina chrysopogonis*** Atkinson. This is a new synonym of 1.31 *Massarina papulosa.*

6.32 ***Massarina cisti*** Bose. Accepted species.

6.33 ***Massarina clypeata*** (Petrak) E. Müller, in Müller & Von Arx, Beitr. Krypt.-Fl. Schweiz 11(2): 297. 1962 ≡ *Amphididymella clypeata* Petrak, Sydowia 6: 399. 1952 ≡ *Massarinula clypeata* (Petrak) Petrak, Sydowia 13: 7. 1959.

Type — USA, FLORIDA: Winter Park, on wood of *Andromeda ferruginea* (Ericaceae). Shear 840, II 1945 (W 12139, lectotype, designated here; M, W 05949, isotypes).

Examination of the type shows that this is the lichen *Anisomeridium biforme* (Borrer) R.C. Harris, of which the species is a new synonym.

6.34 ***Massarina coccifera*** Bose, Phytopathol. Z. 41: 164. 1961.

Type — FRANCE: Antibes, on branches of *Quercus coccifera* (Fagaceae). Müller s.n., IV 1959 (ZT, holotype).

Most ascocarps in the type belong to *Peridiothelia fuliguncta* (Norman) D. Hawksworth. A few ascocarps belong to an unidentifiable *Arthopyrenia* with ornamented spores with roughly the same dimensions (17-19 × 7-8 μm).

6.35 ***Massarina coccodes*** (P. Karsten) O.E. Eriksson & J.Z. Yue, Mycotaxon 27: 251. 1986 ≡ *Leptosphaeria coccodes* P. Karsten, Fungi Fennici Exsiccati 963. 1870 ≡ *Metasphaeria coccodes* (P. Karsten) Saccardo, Syll. Fung. 2: 174. 1883.

Type — FINLAND: Turku 'Åbo'; 'Mustiala' according to the description', on *Calamagrostis* (Gramineae). Karsten s.n., distributed in Fungi Fennici Exsiccati 963 (H, lectotype, designated here).

This is a species of *Lophiostoma,* related to or identical with *L. semiliberum* (Desmazières) Cesati & De Notaris. The ostioles vary between round and slit-like to even somewhat branched.

6.36 ***Massarina coffeae*** (Spegazzini) Bose. This is a new synonym of 1.17 *Massarina corticola.* It is the type species of *Pseudodiaporthe* Spegazzini.

The additional material found under this name (cited below) belongs to *Mycomicrothelia subfallens* (Müller Argoviensis) D. Hawksworth.

Additional material seen: COLOMBIA: Boyacá, Chocontá-Aguaclara Road, km 94, on branch. Dumont, Carpenter, Sherwood & Molina 4539 (NY).

6.37 ***Massarina coffeicola*** (Spegazzini) Bose. Accepted as 4.1 *Oraniella coffeicola* Spegazzini.

6.38 ***Massarina colebrookeae*** Srinivasulu & Sathe, Sydowia 26: 84. 1974 ['1972'].

Type — INDIA: Aurangabad, Mahabaleshwar, on *Colebrookea oppositifolia* (Labiatae). Srinivasulu s.n., X 1967 (MAH 1200, holotype, not seen).

No material of this species was received on loan from MAH. According to the description, this species has unbranched paraphyses. Therefore it probably does not belong to *Massarina.* It may be a synonym of *M. kamatii,* described from the same host in the same country.

6.39 ***Massarina coniferarum*** Butin. This is a new synonym of 1.17 *Massarina corticola.*

6.40 ***Massarina conspurcata*** (Wallroth) Smarods, Fungi Latvici Exsiccati 630. 1935 ≡ *Sphaeria conspurcata* Wallroth, Flora Cryptogamica Germaniae: 3775. 1833 ≡ *Massaria conspurcata* (Wallroth) Saccardo, Syll. Fung. 2: 11. 1883.

Type — GERMANY: On *Prunus padus* (Rosaceae). Wallroth s.n., distributed in Flora Cryptogamica 3775 (not seen).

According to the published exsiccate specimen cited below [on which the combination in *Massarina* was made], this is a new synonym of *Massaria inquinans* (Tode : Fries) De Notaris.

Material seen: LATVIA: Vidzeme, Riga, on *Prunus padus* (Rosaceae). Smarods s.n., V 1935, distributed in Fungi Latvici Exsiccati 630 (M).

6.41 ***Massarina contraria*** (Sydow) v. Arx & E. Müller, Stud. Mycol. 9: 77. 1975 ≡ *Parasphaeria contraria* Sydow, Ann. Mycol. 22: 297. 1924 [the basionym volume cited by Von Arx & Müller as '24', which does not render the combination invalid, as it can be interpreted as a typing error].

Type — NEW ZEALAND: Otago, Lake Harris Track, on leaves of *Aciphylla lyallii* (Umbelliferae). Reid 1058, V 1921 (B, holotype, not found).

No material of this species was found in either B or S. Therefore the type should be regarded as lost, possibly destroyed in Berlin during World War II. It is the type species of *Parasphaeria* Sydow, the application of which remains obscure.

6.42 ***Massarina corni*** (Fuckel) Saccardo. Accepted as 5.1 *Wettsteinina corni* (Fuckel) Aptroot.

6.43 ***Massarina corticola*** (Fuckel) L. Holm. Accepted species, see 1.17.

6.44 ***Massarina coryli*** (P. Karsten) Saccardo. No type material of this species was found in H, but the material examined from the same host (but from Bosnia) belongs to 2.1 *Epiphegia microcarpa,* with which the species was synonymized by Bose (1961).

6.45 ***Massarina cosmicola*** Chiplonkar, Sydowia 22: 275. 1969 ['1968', as '*cosmosicola*'].

Type — INDIA: Bombay, Poona, Katraj, on *Cosmos sulphureus* (Compositae). Chiplonkar s.n., VIII 1966 (AMH ['MACS'] 479, holotype; IMI 162541, isotype).

No identifiable fungus was found on the type material of this species, probably due to deterioration following preservation.

6.46 ***Massarina cystophorae*** (Cribb & Herbert) Kohlmeyer & E. Kohlmeyer. Accepted species, see 1.18.

6.47 ***Massarina desmonci*** (Sydow & P. Sydow) K.D. Hyde & Aptroot. Accepted species, see 1.19.

6.48 ***Massarina dianthi*** Riofrío, Mem. Real Soc. Esp. Hist. Nat. 15: 386. 1929.

Type — SPAIN: Huesca, Campo, on *Dianthus monspessulanus* (Caryophyllaceae). Riofrío s.n. (not seen).

No material of this species was found in MA. According to the description, this species has 6-septate ascospores. Therefore it probably does not belong to *Massarina.*

6.49 ***Massarina dickasonii*** (Wehmeyer) S. Ahmad. This is a new synonym of 1.17 *Massarina corticola.*

6.50 ***Didymosphaeria dochmia*** (Berkeley & Broome) Saccardo, Syll. Fung. 1: 706. 1882 ≡ *Sphaeria dochmia* Berkeley & Broome, Ann. Mag. Nat. Hist., Ser. 2, 9: 323. 1852 ≡ *Microthelia dochmia* (Berkeley & Broome) O. Kuntze, Rev. Gen. Pl. 3(2): 498. 1898.

Type — BRITISH ISLES: North Somerset, Batheaston, on twigs of *Ulmus* (Ulmaceae). Collector unknown, I 1851 (K, holotype).

The type of this species is an immature specimen of unknown affinities. According to Aptroot (1995a), this is probably a species of *Massarina* with the following characters: Ascomata erumpent, c. 1 mm diam., wall of strongly compressed cells, c. 100 μm thick. Ostiole c. 70 μm wide. Hamathecium gelatinous, inspersed with oil droplets. Ascospores 3-septate, fusiform, hyaline, 17.5-19.5 × 5-6.5 μm, ends pointed.

6.51 ***Massarina dryadis*** Rostrup. Already accepted by Shoemaker & Babcock (1987) in *Wettsteinina* as 5.2 *Wettsteinina dryadis* (Rostrup) Petrak.

6.52 ***Massarina dryopteridis*** Bose, Phytopathol. Z. 41: 169. 1961 [as '*dryopteri*'].

Type — SWITZERLAND: Graubünden, Oberhalbstein, on dead fronds of *Dryopteris filix-mas* (Pteridophyta). Müller 2549, VI 1955 (ZT, holotype).

This is a species of *Paraphaeosphaeria.* The additional material represents other species of this genus.

Additional material seen: USA, MASSACHUSETTS: Hampshire Co., Amherst, on dead fronds of *Osmunda regalis* (Pteridophyta). Digby 32, VII 1979 (NY); same locality, on dead fronds of *Osmunda claytoniana* (Pteridophyta). Digby 31B, VII 1979 (NY, sub *Massarina osmundae*); same locality, on dead fronds of *Osmunda cinnamomea* (Pteridophyta). Digby 49C, VIII 1979 (NY, sub *Massarina osmundae*).

6.53 ***Massarina dubia*** (Wehmeyer & S. Ahmad) S. Ahmad. New synonym of 1.17 *Massarina corticola.*

6.54 ***Massarina eburnea*** (Tulasne & C. Tulasne) Saccardo. Accepted species, see 1.20. It is the type of *Massarina.*

6.55 ***Massaria eburnea*** f. ***betulae*** Roumeguère. New synonym of 1.20 *Massarina eburnea.*

6.56 ***Massaria eburnea*** f. ***coryli*** Jaczewski. Synonym of 1.20 *Massarina eburnea,* according to Jaczewski (1894).

6.57 ***Massaria eburnea*** f. ***platani*** Jaczewski. Synonym of 1.20 *Massarina eburnea,* according to Jaczewski (1894).

6.58 ***"Massaria eburnea*** f. ***ulmi"*** Niessl, nom. herb. New synonym of 1.20 *Massarina eburnea.*

6.59 ***Massarina eburnea*** subsp. ***salicis*** P. Karsten. Probably synonymous with 1.20 *Massarina eburnea.*

6.60 ***Massarina eburnella*** Saccardo. New synonym of 1.20 *Massarina eburnea.*

6.61 ***Massarina eburnoides*** (Saccardo) Saccardo. As already indicated by Bose (1961), this is a synonym of 1.20 *Massarina eburnea.*

6.62 ***Massarina eburnoides*** f. ***quercus*** Höhnel. New synonym of 1.20 *Massarina eburnea.* The publication of this forma was overlooked by the various indices.

6.63 ***Massarina eccentrica*** M. Barr. New synonym of 1.36 *Massarina rubi.*

6.64 ***Massarina emergens*** (P. Karsten) L. Holm, Symb. Bot. Upsal. 14(3): 149. 1957 ≡ *Sphaeria emergens* P. Karsten, Fungi Fennici Exsiccati 853. 1869 ≡ *Zignoëlla emergens* (P. Karsten) Saccardo, Michelia 1: 346. 1878 ≡ *Keissleriella emergens* (P. Karsten) Bose, Phytopathol. Z. 41: 191. 1961.

Type — FINLAND: Mustiala, on wood of *Populus tremula* (Salicaceae). Karsten 3616, IV 1870 (H, lectotype, here designated), also distributed in Fungi Fennici Exsiccati 853 (H, isotype).

Accepted here as *Keissleriella emergens* (P. Karsten) Bose. Part of the material filed under this name belongs to other species, e.g. *Lophiostoma nucula* (Fries: Fries) Saccardo.

6.65 ***Massarina eucalypti*** L.A. Kantschaweli. New synonym of 1.31 *Massarina papulosa.*

6.66 ***Massarina eugeniae*** Srinivasulu & Sathe, Sydowia 26: 84. 1974 ['1972'].

Type — INDIA: Aurangabad, Mahabaleshwar, on *Syzygium jambolanum* [as '*Eugenia jambulina*'] (Myrtaceae). Srinivasulu s.n., X 1967 (MAH 1201, holotype, not seen).

No material of this species has been received from MAH. According to the description, this species has unbranched paraphyses. Therefore it probably does not belong to *Massarina.*

6.67 ***Massarina flageoletiana*** Saccardo, Grevillea 21: 66. 1893 [as '*Massaria flageoletiana*'].

Type — FRANCE: Saône et Loire, Rigny-sur-Arroux, on *Viburnum opulus* (Caprifoliaceae). Flageolet s.n., I 1893 (PAD, holotype), also distributed in Roumeguère, Fungi Selecti Exsiccati 6359 (NY (2×), isotypes).

This is a new synonym of *Massaria lantanae* (G.H. Otth) Shoemaker & Leclair. It represents material of this species with asci with 8 ascospores.

6.68 ***Massarina floridana*** Petrak (1951). As already suggested by Barr (1992), this is a synonym of 1.29 *Massarina palmetta.*

6.69 ***Massarina floridana*** Petrak, Sydowia 6: 7. 1952 [nom. illeg., Art. 53.1, non *Massarina floridana* Petrak 1951].

Type — USA, FLORIDA: Wekiwa Spa, on *Staphylea rufa* (Staphyleaceae). Shear P787 p.p., I 1947 (W 06039, holotype).

The type contains three different fungi, viz. *Anisomeridium tamarindi* (Fée) R.C. Harris, *Diatrypella* sp. and *Microsphaeropsis* sp. The first species shows much resemblance to the protologue, but differs, e.g., by the 1-septate, ellipsoid instead of 3-septate, angular ascospores. It may be that the original material was senescent. Therefore *Massarina floridana* Petrak [1952] may be considered, with some hesitation, as a new synonym of *Anisomeridium* cf. *tamarindi* (Fée) R.C. Harris.

6.70 ***Massarina fronsisubmersa*** *K.D. Hyde. Accepted species, see 1.21.*

*6.71* ***Massarina gigantospora*** Rehm. According to Shoemaker & Babcock (1987), this is a synonym of 5.4 *Wettsteinina mirabilis* (Niessl) Höhnel.

6.72 ***Massarina gloeospora*** (Berkeley & Currey) M. Barr, in Barr, Rogerson, Smith & Haines, New York State Mus. Bull. 459: 9. 1986 ≡ *Sphaeria gloeospora* Berkeley & Currey, in Berkeley & Broome, Ann.

Mag. Nat. Hist., Ser. 3, 7: 16. 1861 ≡ *Leptosphaeria gloeospora* (Berkeley & Currey) Saccardo, Syll. Fung. 2: 25. 1883 ≡ *Trichometasphaeria gloeospora* (Berkeley & Currey) Holm, Symb. Bot. Upsal. 14(3): 144. 1957 ≡ *Keissleriella gloeospora* (Berkeley & Currey) Bose, Phytopathol. Z. 41: 190. 1961 [non *Massarinula gloeospora* Hino & Katumoto].

Type — BRITISH ISLES: Fleetwood, on *Artemisia absinthium* (Compositae). Bloxam s.n. (K, holotype).

The type now contains only a coelomycete.

6.73 ***Massarina graminicola*** Mundkur & S. Ahmad, Mycol. Pap. 18: 4. 1946.

Type — PAKISTAN: Punjab, Ladhar, on *Eleusine flagellifera* (Gramineae). Ahmad 922, VIII 1944 (LAH, holotype, not seen).

No material of this species was found in ZT, where many specimens of Ahmad are kept. No material was sent on loan from LAH. According to the description, this species has 5-septate to submuriform ascospores. It does probably not belong to *Massarina*.

6.74 ***Massarina grumata*** (Cooke) M. Barr, Mycotaxon 45: 214. 1992 ≡ *Didymosphaeria grumata* Cooke, in Saccardo, Syll. Fung. 1: 714. 1882 ≡ *Sphaeria grumata* Cooke, in Ellis, North American Fungi 185. 1877 [nom. nud.] ≡ *Didymosphaeria grumata* Cooke, in Rehm, Ascomyceten 441. 1878 [nom. nud.] ≡ *Microthelia grumata* (Cooke) O. Kuntze, Rev. Gen. Pl. 3(2): 498. 1898.

Type — USA, NEW JERSEY: Newfield, on *Lyonia ligustrina* (Ericaceae). Ellis 2234, VII 1874 (NY, lectotype, selected by Aptroot 1995a) also distributed in North American Fungi 185, V 1877 (CUP-A, FH, L, NY (2×), NYS, S (3×), UPS, isotypes), also distributed in Rehm, Ascomyceten 441, VII 1877 (H, NY, isotypes), also distributed in Thümen, Mycotheca Universalis 460, 1875 (BR (2×), FH, FH-Höhnel, L, NY (2×), W, isotypes). Fig. 44.

The specimens cited above are regarded as isotypes rather than topotypes because they had been collected before the species was described and they are undoubtedly part of one population or even one or two collections. In addition, there may have been some errors with the collecting dates. This fungus is a slightly lichenized species of *Anisomeridium*. The thallus is UV-negative, the ostioles are apical, the asci are cylindrical with a small ocular chamber and contain 8 ascospores, the paraphysoids are branched and anastomosing above the asci, the ascospores are ornamented with small warts and measure 20-28 × 8-11 µm, and the thalli are surrounded by conidiomata with rod-like conidia of c. 8 × 1 µm. The species seems to be different from all other species known in the genus, but it is close to *Anisomeridium terminatum* (Nylander) Aptroot. Therefore the following new combination is proposed here: ***Anisomeridium grumatum*** (Cooke) Aptroot, comb. nov., basionym: *Didymosphaeria grumata* Cooke in Saccardo, Syll. Fung. 1: 714. 1882.

6.75 ***Massarina hepaticarum*** (Crouan) Döbbeler. Accepted species, see 1.22.

6.76 ***Massarina himalayensis*** E. Müller, Sydowia 11: 461. 1958 ['1957', as '*himalayense*'.

Type — INDIA: Himalaya, Gahrwal, Bhuna, on branches and spines of *Rosa webbiana* (Rosaceae). Müller s.n., VI 1957 (ZT, holotype, sub '*hymalayense*').

This is a species of *Didymella*, although it was synonymized with *Massarina polymorpha* by Bose (1961).

6.77 ***Massarina hysterioides*** (Ellis & Everhart) Berlese. As already indicated by Shoemaker (1984), this is a synonym of 5.5 *Wettsteinina xerophylli* (Ellis) Aptroot (as *Leptosphaeria xerophylli* Ellis).

6.78 ***Massarina igniaria*** (C. Booth) Aptroot. Accepted species, see 1.23.

6.79 ***Massarina immersa*** Döbbeler. Accepted species, see 1.24.

6.80 ***Massarina indigoferae*** (E. Müller & S. Ahmad) Boise. New synonym of 1.17 *Massarina corticola*.

6.81 ***Massarina ingoldiana*** Shearer & K.D. Hyde. Accepted species, see 1.25.

6.82 ***Massarina jasminicola*** Viswanathan, in Viswanathan & Tilak, Mycopathologia 13: 239. 1960.

Type — INDIA: Bombay State, Poona, on *Jasminum malabaricum* (Oleaceae). Viswanathan 2942, II 1959 (CBS, ZT, isotypes).

This is a species of *Didymella*.

6.83 ***Massarina juniperi*** Bose. This is a new synonym of 3.3 *Exarmidium hemisphaericum*.

6.84 ***Massarina kamatii*** Tilak & Jadhav, Sydowia 25: 64. 1972 ['1971'].

Type — INDIA: Mysore, on *Colebrookea oppositifolia* (Labiatae). Srinivasulu s.n., 1966 (MUH, not seen).

No material of this species has been received from MUH. According to the description, this species has 5-septate ascospores and massive, superficial pseudostromata. It probably does not belong to *Massarina*. The illustration is strongly reminescent of a *Leptosphaeria* species. Moreover, it may be identical with *M. colebrookeae,* described from the same host in the same country.

6.85 ***Massarina lacertensis*** Kohlmeyer & Volkmann-Kohlmeyer, Austral. J. Mar. Freshwater Res. 42: 92. 1991.

Type — AUSTRALIA: Queensland, Lizard Island, on submerged wood of *Rhizophora stylosa* (Rhizophoraceae). Kohlmeyer & Volkmann-Kohlmeyer 5301a, XI 1989 (DAR 65695, holotype).

This species does not belong to any described genus known to me. Although it is not mentioned in the description, the ascomata are immersed in an extensive, thick, black stroma.

6.86 ***Massarina lacustris*** (Fuckel) Leuchtmann. Accepted as 5.3 *Wettsteinina lacustris* (Fuckel) Shoemaker & Babcock.

6.87 ***Massarina lantanae*** C. Ramesh, Indian Bot. Reporter 11: 2. 1993 ['1992'] [non *Massaria lantanae* (G.H. Otth) Shoemaker & LeClair].

Type — INDIA: Maharashtra, on *Lantana camara* (Verbenaceae). Ramesh s.n. (LFM 70, holotype, not seen).

No information is available about the type. This fungus might be identical with *M. mucosa,* described from the same host from the same country, and thus belong to *Didymella*.

6.88 ***Massarina leucosarca*** (Ellis & Everhart) M. Barr. This is a form of 1.20 *Massarina eburnea*, of which it is a new synonym, with 1-septate ascospores.

6.89 ***Massarina lignorum*** (Wehmeyer) M. Barr. Accepted species, see 1.26.

6.90 ***Massarina ligustri*** (G.H. Otth) Saccardo, Syll. Fung. 11: 332. 1895 ≡ *Cladosphaeria ligustri* G.H. Otth, Mitth. Naturf. Ges. Bern 1870: 105. 1871 ≡ *Massaria ligustri* (G.H. Otth) Jaczewski, Bull. Herb. Boissier 2: 672. 1894.

Type — SWITZERLAND: Bern, Steffisburg, on *Ligustrum vulgare* (Oleaceae). Otth s.n. (not seen).

No material of this species was found in BERN. According to the description, the species has greenish ascospores. It does probably not belong to *Massarina*.

6.91 ***Massarina lonicerae*** Bose & E. Müller, Indian Phytopathol. 20: 124. 1967.

Type — INDIA: Uttar Pradesh, Chaubattia, Ranikhet, on *Lonicera quinquelocularis* (Caprifoliaceae). Bose s.n., V 1966 (ZT, holotype, not found).

No material of this species was found in ZT, although it was explicitly mentioned in the original publication that the type was deposited there. Therefore it should be regarded as lost. It may have been a species of *Massarina*, and if so, it could be close to or identical with 1.37 *M. talae* or with the undescribed 1.44 *Massarina* sp., because of the large, 5-7-septate ascospores.

6.92 ***Massarina lunulata*** (Tulasne & C. Tulasne) Saccardo. New synonym of 1.20 *Massarina eburnea,* representing material with 1-septate ascospores.

6.93 ***Massarina macra*** Vestergren, Bot. Not. 1897: 257. 1897.

Type — SWEDEN: Uppsala, Slottsbacken, on *Acer platanoides* (Aceraceae). Vestergren s.n., X 1896 (S, lectotype; S, isotype).

This is a species of *Massaria,* close to or identical with *M. lantanae* (G.H. Otth) Shoemaker & LeClair, characterized by hyaline ascospores of 62-71 × 20-24 μm, which are arranged by 4-7 in the ascus.

6.94 ***Massarina macrospora*** (Saccardo) O.E. Eriksson & J.Z. Yue. Accepted species, see 1.27.

6.95 ***Massarina mamma*** (G.H. Otth) Saccardo, Syll. Fung. 11: 332. 1895 ≡ *Cladosphaeria mamma* G.H. Otth, Mitth. Naturf. Ges. Bern 1869: 37. 1869 ≡ *Massaria mamma* (G.H. Otth) Jaczewski, Bull. Herb. Boissier 2: 672. 1894.

Type — SWITZERLAND: Bern, Bremgartenwald, on *Lonicera nigra* (Caprifoliaceae). Otth s.n. (not seen).

No material of this species was found in BERN. Its identity remains unknown.

6.96 ***Massarina marcucciana*** Auerswald & Rabenhorst. As already mentioned by Bose (1961), this is a synonym of 1.31 *Massarina papulosa.*

6.97 ***Massarina maritima*** Bose, Phytopathol. Z. 41: 173. 1961.

Type — FRANCE: Alpes Maritimes, Antibes, on *Spartium junceum* (Leguminosae). Müller 2933, IV 1959 (ZT, holotype).

This is a new synonym of *Cainia desmazieresii* Moreau & E. Müller ex Krug, partly young material with many hyaline ascospores, but also partly well developed.

6.98 ***Massarina micacea*** (J. Kunze) Saccardo. New synonym of *Massarina rubi.*

6.99 ***Massarina microcarpa*** (Fuckel) Saccardo. Accepted as 2.1 *Epiphegia microcarpa.*

6.100 ***Massarina microspora*** Passerini, Atti Reale Accad. Lincei, Rendiconti Cl. Sci. Fis., Ser. 4, 7: 45. 1891.

Type — ITALY: Parma, Collecchio, on *Pinus sylvestris* (Pinaceae). Passerini s.n. (PARMA, holotype, not seen).

No type material was available for study. According to the description, the ascocarps are minutely pilose. The species probably does not belong to *Massarina.* The additional material seen on *Larix* is *Arthopyrenia punctiformis* Massalongo; the living culture is sterile.

Additional material seen: AUSTRIA: Nier.. [illegible], on *Larix* (Pinaceae). Höhnel s.n., VI 1900 (FH-Höhnel).

FRANCE: Alpes Maritimes, Biot, on *Lavandula stoechas* (Labiatae). Müller s.n., IV 1959 (CBS 421.62, living culture).

6.101 ***Massarina moeszii*** Tóth. Accepted species, see 1.28.

6.102 ***Massarina mori*** (Fabre) Boise. New synonym of 1.17 *Massarina corticola.*

6.103 ***Massarina morthieri*** (Fuckel) v. Arx & E. Müller. New synonym of 3.3 *Exarmidium hemisphaericum.*

6.104 ***Massarina mucosa*** Panwar & Kaur, Kavaka 4: 77. 1977 ['1976'].

Type — INDIA: Rajasthan, Mount Abu, on *Lantana camara* (Verbenaceae). Panwar s.n., IX 1974 (IMI 192160, holotype).

The very sparse type shows that this is probably a species of *Didymella* with mostly 1-septate ascospores of c. 16 × 5 μm. *Massarina lantanae* is described from the same host from the same country and might be identical.

6.105 ***Massarina myricae*** (Peck) Berlese. New synonym of 1.17 *Massarina corticola.*

6.106 ***Massarina nigroviridula*** Rehm, Leafl. Philipp. Bot. 6: 2263. 1914.

Type — PHILIPPINES: Luzon, Los Baños, on *Derris elliptica* (Leguminosae). Baker 2182, XII 1913 (S, holotype).

The type specimen contains two common pantropical lichens, viz. *Pyrenula marginata* Hooker and *Pyrenula aspistea* (Acharius) Acharius. The protologue gives very few characters, and does not mention ascospore dimensions, lichenization, or the presence or absence of oil droplets in the hamathecium. Moreover the ascospores were given as hyaline, whereas they are pale brown in the first and medium brown in the latter species. The only decisive character (ascoma size, given to be 1 mm), shows that this should be regarded as a new synonym of *Pyrenula marginata* Hooker.

6.107 ***Massarina oleicola*** Pande & V.G. Rao, J. Econ. Taxon. Bot. 14: 160. 1990 [as '*oleaicola*'].

Type — INDIA: Maharashtra, Pune, on *Olea cuspidata* (Oleaceae). Yadav s.n., I 1977. (AMH 4134, holotype, [sub '*oleaecola*']).

The distoseptate ascospores (24-29 × 11-13 μm) and the oily hamathecium consisting of cellular pseudoparaphyses with cells 5-8 × 2-3 μm show that this is a species of *Requienella,* most probably *R. seminuda* (Persoon : Fries) Boise, although the ascospores are colourless, whereas they are brown in that species. However, the ascospores may have been young. The species is already known from *Olea.* However, the distribution range is herewith extended to Asia. It was so far known from Europa and North America.

6.108 ***Massarina oleina*** S. Ahmad. According to the description, this is probably a synonym of 1.31 *Massarina papulosa,* because of the 4-5-septate ascospores with thick sheaths.

6.109 ***Massarina operculicola*** M. Morelet, Bull. Soc. Sci. Nat. Archéol. Toulon & Var 36: 14. 1980.

Type — FRANCE: Entrecasteaux, on bark gall on branch of *Pinus halepensis* (Pinaceae). Morelet 1276, II 1978 (herb. Morelet, Champenoux ['PFN'], holotype ['CNRF 898', 'INRA, Nancy']; CBS 178.90, living culture ['M 175']; CBS 179.90, living culture ['M 163, 1977'], isotypes).

This is a new synonym of the barely lichenized *Polymeridium subcinereum* (Nylander) R.C. Harris, with a range extension to Europe. It was so far known from North America, South America Africa and Asia. There exists no correlation between the presence of the bark gall and the presence of the fungus, which is strictly superficial.

6.110 ***Massarina oplismeni*** Katumoto & Y. Harada, Trans. Mycol. Soc. Japan 20: 421. 1979.

Type — JAPAN: Bonin Islands, Hahajima, Mount Chibusa, on leaves of *Oplismenus compositus* (Gramineae). Harada 188, XII 1977 (YAM, holotype, not seen).

No material has been sent on loan from YAM. According to the description, the species has a massive, often linear, stroma in which the ascocarps are immersed. Moreover the ascospores are ellipsoid. It probably does not belong to *Massarina*.

6.111 ***Massarina orientalis*** (Wehmeyer & S. Ahmad) S. Ahmad, Monogr. Biol. Soc. Pakistan 5: 13. 1969 ≡ *Massarinula orientalis* Wehmeyer & S. Ahmad, Biologia, Lahore 10: 15. 1964.

Type — PAKISTAN: Muzzafarabad, Loon Bagla, on wood. Ahmad 16594, VII 1963 (DAOM, isotype, slide only).

This is a species of *Didymella*.

6.112 ***Massarina palmetta*** (Cooke) M. Barr. Accepted species, see 1.29.

6.113 ***Massarina palmicola*** K.D. Hyde & Aptroot. Accepted species, see 1.30.

6.114 ***Massarina papulosa*** (Durieu de Maisonneuve & Montagne) Bose. Accepted species, see 1.31.

6.115 ***Massarina parasitica*** Bose & E. Müller, Indian Phytopathol. 18: 343. 1965.

Type — INDIA: Himalaya, Chaubettia, Ranikhet, Kumaon, on living leaves of *Michelia duthei* (Magnoliaceae). Roy s.n., VII 1962 (ZT, holotype).

This is a new synonym of the lichen *Strigula smaragdula* Fries : Fries (syn. *Strigula elegans* (Fée) Müller Argoviensis). The type shows rich material of this species, which is a common, widespread foliicolous lichen.

6.116 ***Massarina peerallyi*** K.D. Hyde & Aptroot. Accepted species, see 1.32.

6.117 ***Massarina penicillata*** (Saccardo) Saccardo, Syll. Fung. 2: 156. 1883 ≡ *Massaria penicillata* Saccardo, Michelia 1: 404. 1878.

Type — ITALY: Montello, on *Cytisus nigricans* (Leguminosae). Saccardo s.n., IX 1877 (PAD, holotype).

This is a new synonym of *Keissleriella sambucina* (Rehm) Höhnel, characterized, e.g., by the black setae around the ostiole.

6.118 ***Massarina piskorzii*** (Petrak) Boise. New synonym of 1.7 *Massarina arundinacea*.

6.119 ***Massarina ploettneriana*** Hennings. New synonym of 2.1 *Epiphegia microcarpa*.

6.120 ***Massarina plumigera*** (Ellis & Everhart) Saccardo & Trotter, Syll. Fung. 22: 202. 1913 ≡ *Massaria plumigera* Ellis & Everhart, North American Pyrenomycetes: 404. 1892.

Type — USA, NEW JERSEY: Newfield, on *Viburnum lentago* (Caprifoliaceae). Ellis 679, XI 1879 (NY, holotype).

As already indicated by Shoemaker & LeClair (1975), this is a synonym of *Massaria lantanae* (G.H. Otth) Shoemaker & LeClair.

Selected additional material seen: CANADA: Ontario, London, on *Corylus americana* (Betulaceae). Dearness s.n., IV 1912 (NY), also distributed in Bartholomew, Fungi Columbiani 4826 (NY (4×), as '*plumingera*'); same locality, host and collector, V 1912, distributed in Rehm, Ascomyceten 2044 (NY); same locality, on *Viburnum lentago* (Caprifoliaceae). Dearness s.n., VII 1892 (NY); XII 1891 (NY); VIII 1895 (NY).

USA, NEW HAMPSHIRE: Hillsboro Co., on *Hamamelis virginiana* (Hamamelidaceae). Rogerson s.n., VIII 1956 (NY); NEW YORK: Albany, Shakers, on *Viburnum recognitum* (Caprifoliaceae). Smith 32148,

32149, X 1961 (NY); Alcove, on *Hamamelis virginiana* (Hamamelidaceae). Shear s.n., IV 1893 (NY), also distributed in New York Fungi 356 (NY (5×)); VIRGINIA: Rock Creek, on *Hamamelis* (Hamamelidaceae). Shear s.n., V 1903 (M), also distributed in Reliquiae Petrakianae (L); Arlington Farm, on *Viburnum dentatum* (Caprifoliaceae). Shear s.n., III 1929 (NY).

6.121 ***Massaria plumigera*** var. ***tetraspora*** Dearness & House, New York State Mus. Bull. 188: 35. 1916.

Type — USA, NEW YORK: Albany, on *Viburnum* (Caprifoliaceae). House s.n., II 1915 (NYS, holotype, not seen).

As already indicated by Shoemaker & LeClair (1975), this is a synonym of *Massaria lantanae* (G.H. Otth) Shoemaker & LeClair. The combination in *Massarina* was apparently never made for this variety.

Additional material seen: CANADA: Ontario, Brant Co., S. of Hatchley, on *Viburnum acerifolium* (Caprifoliaceae). Cain 12963, V 1938 (C, L).

6.122 ***Massarina polycarpa*** (Füisting) Saccardo & Traverso. According to the description, it is most probably a new synonym of 1.20 *Massarina eburnea*.

6.123 ***Massarina polymorpha*** (Rehm) Saccardo. New synonym of 1.36 *Massarina rubi*.

6.124 ***Massarina pomacearum*** Höhnel. New synonym of 1.20 *Massarina eburnea*.

6.125 ***Massarina psidii*** Chona, Mungal & Kapoor, Indian Phytopathol. 10: 150. 1957.

Type — INDIA: Delhi, Azadpur, on wood of *Psidium guajava* (Myrtaceae). Kapoor 24203, X 1955 (HCIO, holotype).

This is a species of *Mycosphaerella*.

6.126 ***Massarina purpurascens*** K.D. Hyde & Aptroot. Accepted species, see 1.33.

6.127 ***Massarina pustulata*** Hino & Katumoto, Bull. Fac. Agric. Yamaguchi Univ. 6: 54. 1955.

Type — JAPAN: Hondo, Nagato, on *Sasa veitchii* subsp. *tyugokensis* (Gramineae). Hino & Katumoto s.n. (YAM, holotype, not seen).

No material has been received on loan from YAM. According to the description, this species has simple paraphyses. Therefore it probably does not belong to *Massarina*.

6.128 ***Massarina quercina*** (Géneau de Lamarlière) E. Müller, in Müller & v. Arx, Beitr. Krypt.-Fl. Schweiz 11(2): 296. 1962 ≡ *Massarinula quercina* Géneau de Lamarlière, Rev. Gén. Bot. 6: 321. 1894.

Type — FRANCE: Fontainebleau, on *Quercus pedunculata* (Fagaceae). Géneau de Lamarlière s.n. (not seen).

No material of this species was found in PC. It is the type species of *Massarinula* Géneau de Lamarlière, the application of which remains obscure. According to the original description, the species could be a synonym of *Arthopyrenia punctiformis* Massalongo, and the genus would then become a synonym of *Arthopyrenia* Massalongo. The description by Müller & Von Arx (1962) is virtually identical with the original description and it is not clear if they studied original material.

6.129 ***Massarina quinqueseptata*** M. Barr, Mycotaxon 45: 217. 1992. Fig. 45.

Type — USA, CALIFORNIA: Tehama Co., Battle Creek Crossing, on *Sambucus caerulea* (Caprifoliaceae). W.B. & V.G. Cooke 60783b p.p., X 1981 (NY, holotype).

This is a species of *Splanchnonema* with asymmetrically 4-5-septate ascospores of c. 30 × 10 μm. It does not agree with any of the species mentioned in Barr (1993). Therefore the following combination is proposed here for this species: **Splanchnonema quinqueseptatum** (M. Barr) Aptroot, comb. nov., basionym: *Massarina quinqueseptata* M. Barr, Mycotaxon 45: 217. 1992.

6.130 ***Massarina raimundoi*** Rehm, Leafl. Philipp. Bot. 6: 2263. 1914.

Type — PHILIPPINES: Luzon, Los Baños, on *Citrus nobilis* (Rutaceae). Raimundo s.n., X 1913, sub Baker 1868. (S, holotype).

The type now contains only a coelomycete.

6.131 ***Massarina ramunculicola*** K.D. Hyde. Accepted species, see 1.34.

6.132 ***Massarina rhopalosperma*** (Kirschstein) E. Müller, in Müller & v. Arx, Beitr. Krypt.-Fl. Schweiz 11(2): 297. 1962 ≡ *Abaphospora rhopalosperma* Kirschstein, Ann. Mycol. 37: 98. 1939.

Type — GERMANY: Niederbayern, Eisenstein, on *Prunus avium* (Rosaceae). Kirschstein s.n., VII 1937 (B, holotype).

The type contains many small and few larger ascomata. The large ascomata are mature and belong to a species of *Strickeria,* probably *S. nitida* (Ellis & Everhart) Kuntze, with uniseriate, brown, muriform ascospores of c. 21 × 8 µm. The small ascomata contain young, colourless, 1-septate ascospores. Hamathecium and ascocarp wall of all ascomata are identical, and in the larger ascomata also some young, colourless, 1-septate ascospores can be found. Therefore this is a new synonym of *Strickeria* cf. *nitida.* As this is the type species of *Abaphospora* Kirschstein, this genus becomes a synonym of *Strickeria* Koerber rather than of *Massarina,* with which it was synonymized by Petrak (1959).

6.133 ***Massarina ribesiella*** (Nylander ex Vainio) D. Hawksworth, Bull. Brit. Mus. (Nat. Hist.), Bot. 14: 163. 1985 ≡ *Verrucaria ribesiella* Nylander ex Vainio, Meddeland. Soc. Fauna Fl. Fenn. 10: 195. 1883 ≡ *Didymosphaeria ribesiella* (Nylander ex Vainio) Vainio, Acta Soc. Fauna Fl. Fenn. 49(2): 149. 1921 ≡ *Microthelia ribesiella* (Nylander ex Vainio) Zahlbruckner, Catalogus Lichenum Universalis 8: 79. 1931 ≡ *Microthelia macularis* f. *ribesiella* (Nylander ex Vainio) Keissler, in Rabenhorst, Krypt.-Fl. 9, 1(2): 37. 1936 ≡ *Mycomicrothelia macularis* f. *ribesiella* (Nylander ex Vainio) Keissler, in Rabenhorst, Krypt.-Fl. 9, 1(2): 36. 1936 ≡ *Phaeodothis ribesiella* (Nylander ex Vainio) Aptroot, Nova Hedwigia 60: 357. 1995.

Type — RUSSIA: Karelia, Viborg, on *Ribes grossularia* (Grossulariaceae). Vainio s.n., 1875 (H-NYL 858, lectotype, designated by Hawksworth (1985), not seen; IMI 250042, type slide).

Redisposed by Aptroot (1995b) as *Phaeodothis ribesiella* (Nylander ex Vainio) Aptroot.

6.134 ***Massarina ricifera*** Kohlmeyer, Volkmann-Kohlmeyer & O. Eriksson. Accepted species, see 1.35.

6.135 ***Massarina rubi*** (Fuckel) Saccardo. Accepted species, see 1.36, although it was synonymized with *Epiphegia microcarpa* by Bose (1961).

6.136 ***Massarina salicicola*** Rehm. New synonym of 1.17 *Massarina corticola.*

6.137 ***Massarina salicicola*** var. ***minor*** Batista & Maia, Brotéria Ci. Nat. 29: 134. 1960 [as '*Massaria salicinicola*', illustrations sub '*Massarina salicinicola*' and '*Massariaa* [sic] *salicinicola*'].

Type — BRAZIL: Bahia, Serrinha, on unidentified stems. Batista 11646, III 1959 ['959'] (URM 16277, holotype ['IMUR 16234']).

The type contains normal specimens of two common pantropical lichen species, viz. *Trypethelium aeneum* (Eschweiler) Zahlbruckner and *Trypethelium tropicum* (Acharius) Müller Argoviensis. It is most probable that this is a new synonym of the latter species, *T. tropicum,* although so many mistakes occur in the published description, that it cannot be ruled out that both species were included in the protologue.

6.138 ***Massarina sarcostemmatis*** Ramakrishnan, J. Madras Univ., Sect. B, 23: 147. 1953.

Type — INDIA: Chingleput, Tambaram, Christian College, on *Sarcostemma brevistigma* (Asclepiadaceae). Subramanian s.n., IV 1953 (MUBL 891, holotype, not seen).

No material of this species was available for study. According to the description, the 1-septate ascospores show three constrictions, viz. at the septa and also in the middle of the cells. The species probably does not belong to *Massarina;* the illustration is reminescent of certain species of *Arthopyrenia,* e.g. *A. cinchonae* (Ach.) Müll. Arg.

6.139 ***Massarina sivanesanii*** Subhedar & V.G. Rao, Indian J. Mycol. Pl. Pathol. 15: 180. 1986 ['1985', as '*sivanesami*'].

Type — INDIA: Goa, Anmod, ['Castle Rock'], on stems of *Abrus precatorius* (Leguminosae). Subhedar s.n., XII 1974 (AMH 2672, holotype ['2672b']).

No fungus was present on the stems on the part of the holotype sent on loan, only *Physalospora abrussae* Subhedar & V.G. Rao on the leaves.

6.140 ***Massarina spartii*** Passerini, Atti Reale Accad. Lincei, Rendiconti Cl. Sci. Fis., Ser. 4, 4: 60. 1888.

Type — ITALY: Parma, San Marino del Taro, on *Sarothamnus scoparius* (Leguminosae). Passerini s.n. (PARMA, holotype, not seen).

No material of this species was available for study. According to the description, the ascospores are brown. The species is most probably a synonym of either *Cainia desmazieresii* Moreau & E. Müller ex Krug or *Montagnula spartii* (Castagne) Aptroot.

6.141 ***Massarina spectabilis*** Ade. New synonym of 5.4 *Wettsteinina mirabilis* (Niessl) Höhnel.

6.142 ***Massarina spiraeae*** Bose. New synonym of 1.36 *Massarina rubi*.

6.143 ***Massarina staphyleae*** Petrak, Sydowia 6: 7. 1952. Fig. 46.

Type — USA, FLORIDA: Wekiwa Spa, on *Staphylea rufa* (Staphyleaceae). Shear P787 p.p., I 1947 (W 06032, holotype).

This is a species of *Pseudopyrenula* Müll. Arg. in the Trypetheliaceae. It has larger ascospores than any species known in the genus. Therefore the following new combination is proposed here: ***Pseudopyrenula staphyleae*** (Petrak) Aptroot, comb. nov., Basionym: *Massarina staphyleae* Petrak, Sydowia 6: 7. 1952.

Although the family consists mainly of lichenized species, this species is not lichenized. There is only one other non-lichenized species known in the genus, the recently described *Pseudopyrenula papuana* Aptroot (Aptroot et al., 1997), which differs, e.g., by the pointed, acuminate ostioles and the smaller ascospores.

6.144 ***Massarina syringae*** Kirschstein, Ann. Mycol. 33: 213. 1935.

Type — GERMANY: Brandenburg, Krossen an der Oder, Friedhof Baudach, on *Syringa vulgaris* (Oleaceae). Kirschstein s.n., IV 1908 (B, holotype).

This is a new synonym of *Melomastia mastoidea* (Fries : Fries) Schroeter.

6.145 ***Massarina talae*** Spegazzini. Accepted species, see 1.37.

6.146 ***Massarina taphrina*** (Fries) O.E. Eriksson, Non-lichenized Pyrenomycetes of Sweden: 7. 1992 ≡ *Sphaeria taphrina* Fries, Syst. Mycol. 2: 465. 1823 ≡ *Teichospora taphrina* (Fries) Fuckel, Jahrb. Nassauischen Vereins Naturk. 25-26: 305. 1871.

Type — SWEDEN: Småland, Femsjö, on wood. Fries s.n. (UPS-Fries, lectotype, Eriksson 1992).

Examination of the type shows that this is a lignicolous specimen of the lichen *Anisomeridium biforme* (Borrer) R.C. Harris of which the species is a new synonym.

6.147 ***Massarina tetraploa*** Scheuer. Accepted species, see 1.38.

6.148 ***Massarina thalassiae*** Kohlmeyer & Volkmann-Kohlmeyer. Accepted species, see 1.39.

6.149 ***Massarina thalassioidea*** K.D. Hyde & Aptroot. Accepted species, see 1.40.

6.150 ***Massarina tiliae*** (W. Phillips & Plowright) Saccardo, Syll. Fung. 2: 154. 1883 ≡ *Massaria tiliae* W. Phillips & Plowright, Grevillea 10: 72. 1882.

Type — BRITISH ISLES: Forres, on *Tilia* (Tiliaceae). Keith s.n., V 1880 (K, holotype, not found).

No material of this species could be found in K and the type should be regarded as lost. According to the description, the ascospores are very large, viz. 40-60 µm long. It is probably a species of *Massaria*, e.g. *M. inquinans* (Tode : Fries) De Notaris, rather than a *Massarina*.

6.151 ***Massarina tricellularis*** Panwar & Kaur, Curr. Sci. 44: 523. 1975 [as *'tricellula'*].

Type — INDIA: Rajasthan, Mount Abu, on *Lantana camara* (Verbenaceae). Panwar s.n., VIII 1974 (IMI 188026, holotype).

This is a new synonym of *Melomastia mastoidea* (Fries : Fries) Schroeter.

6.152 ***'Massarina usambarensis'*** (P. Hennings) Höhnel, nom. herb. ≡ *Holstiella usambarensis* P. Hennings, in Engler, Die Pflanzenwelt Ostafrikas, C: 33. 1895.

Type — TANZANIA ['Ostafrika']: Dodo, on branches. Holst s.n. (FH-Höhnel, lectotype, designated here).

This is a new synonym of the common pantropical lichen *Trypethelium eluteriae* Sprengel. As it is the type species of *Holstiella* P. Hennings, this genus becomes a synonym of *Trypethelium* Sprengel and not of *Massarina*, with which it was synonymized by Von Arx & Müller (1975). It is remarkable that the copious algae and strikingly yellow coloration of the pseudostromata have been overlooked by Hennings, Höhnel, Müller and Von Arx. The lectotype selected is the only specimen known to have survived World War II, as Hennings had sent duplicates to Von Höhnel. The other syntypes perished in B.

6.153 ***Massarina velatispora*** K.D. Hyde & Borse. Accepted species, see 1.41.

6.154 ***Massarina viburnicola*** (Crouan) Rossman, Mycotaxon 8: 550. 1979 ≡ *Nectria viburnicola* Crouan, in Crouan & P. Crouan, Florule du Finistère: 39. 1867 ≡ *Calonectria viburnicola* (Crouan) Saccardo, Michelia 1: 311. 1878.

Type — FRANCE: Finistère, on *Viburnum tinus* (Caprifoliaceae). Crouan s.n., V 1865 (CO, holotype).

*Calonectria macrospora* Saccardo & Spegazzini, Michelia 1: 251. 1878.

Type — ITALY: Conegliano, on *Vitis vinifera* (Vitaceae). Spegazzini s.n., I 1878 ['1876'], distributed in Saccardo, Mycotheca Veneta 1275 (BR, isotype). Synonymy already indicated by Rossman (1979).

*Calonectria tarvisina* (Spegazzini) Spegazzini ex Saccardo, Syll. Fung. 2: 540. 1883 ≡ *Calonectria macrospora* subsp. *tarvisina* Spegazzini, Michelia 1: 464. 1879.

Type — ITALY: Treviso, on *Gleditsia triacantha* (Leguminosae). Spegazzini 1689, II 1878 (LPS, holotype, as '*tarvisima*'). Synonymy already indicated by Rossman (1979).

The above three type specimens belong to a single species of uncertain affinity, described by Rossman (1979).

6.155 ***Massarina viswanathae*** Roy, Dwivedi & Sulka, Proc. Natl. Acad. Sci. India, B 1958: 67. 1958 [as '*viswanathi*'].

Type — INDIA (not seen).

No material of this species was found in AMH or HCIO. Its identity remains unknown.

6.156 ***Massarina waikanaënsis*** (G.S. Ridley) Shoemaker & C.E. Babcock. Accepted species, see 1.42.

6.157 ***Massarina walkeri*** Shoemaker, C.E. Babcock & J.A.G. Irwin. Accepted species, see 1.43.

6.158 ***Massarina winteri*** (Rehm) Höhnel. This is a new synonym of 5.1 *Wettsteinina corni* (Fuckel) Aptroot.

6.159 ***Massarina xerophylli*** (Ellis) M. Barr. Accepted as 5.5 *Wettsteinina xerophylli* (Ellis) Aptroot.

6.160 ***Massarina yezoënsis*** Hino & Katumoto, Icones Fungorum bambusicolorum Japonicorum: 188. 1961.

Type — JAPAN: Hokkaidô, Prov. Iburi, Oiwake, on *Sasa kurilensis* (Gramineae). Hino s.n., IX 1956 (YAM, holotype, not seen).

No material was received on loan from YAM. According to the description, this species has simple paraphyses. Therefore it probably does not belong to *Massarina*.

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