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Stray Studies in the Coronophorales (Pyrenomycetes) 1–3

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Abstract

1. A short review is given of the various opinions concerning the definition, structure and taxonomic position of the Coronophorales.

2. The pre-Friesean names *Sphaeria cupularis* and *Sph. tristis* are interpreted and typified. Several generally accepted epithets within *Nitschkia* (s. lat.) and *Acanthonitschkea* are shown to be younger synonyms, and are consequently replaced. Hints are given of the necessity to widen the scope of *Nitschkia* considerably, and the following new combinations are proposed: — *Acanthonitschkea foveolata* (Berk. & Curt. ex Berk.) Nannf., *A tristis* (Pers. ex Fr.) Nannf., *Nitschkia acanthostroma* (Mont.) Nannf., *N. broomeiana* (Berk.) Nannf., *N. confertula* (Schw.) Nannf., *N. grevillii* (Rehm in Starb.) Nannf., and *N. parasitans* (Schw.) Nannf. The genus *Cyathisphaera* Dumortier (1822) is typified by *C. berberidis*, which makes it a younger typonym of *Cucurbitaria* S. F. Gray (1821).

3. A number of doubtful or misunderstood species (24 in all) are discussed on the basis of type specimens and/or literature and interpreted as far as possible.

Introduction

The original purpose of these studies was to describe in a short joint paper two new species collected by Prof. Rolf Santesson and myself, independently of each other, during excursions in Kenya, that found by R. S. being of special interest as the first lichenicolous member of the *Coronophorales*. Due to the excessive number of genera described and commonly accepted, the new species could not be confidently placed without a critical revision of the generic delimitations. This revision was performed by the present writer, who meanwhile found that two of the oldest specific epithets had mostly been totally misunderstood and that the treatment of the European species was very unsatisfactory in the floristic handbooks. The problems of the taxomomic delimitation and position of the *Coronophorales* were also found worthy of renewed consideration. This expansion of the studies rendered our original plans impracticable and made it necessary to publish the results in two parts, the present part mainly elucidating some nomenclatural problems and relegating a number of ±obscure names into synonymy. The second instalment will treat morphology and "pattern of variation", and as an inevitable

conclusion the number of accepted genera will be highly reduced, the phylogeny of the *Coronophorales* will be discussed, and the two new species described (the lichenicolous one in a special chapter by R. S.), The European species of the "*Nitschkia* Group" and their distribution will be treated in detail.

1. Historical Review

The *Coronophorales* as a taxon was established by me (Nannfeldt 1932: 54–55) by combining the "Familie der Coronophoreen" (Höhnel 1907: 624–631; 1909*b*: 1505–1508; 1918: 130 as a subdivision of his "Allantosphaeriaceen") and the "subfamily *Nitschkieae*" (Fitzpatrick 1923: 23–67; 1924: 101–114), not attached to any family. I gave these two groups the rank of families, and placed the order as an aberrant member of the Ascohymeniales.

The features that in the first place distinguish Höhnel's group are the lack of a true ostiolum and the forcible discharge of the ascocarpic centre with all asci as a single body rupturing the ascocarpic wall, so that a large irregular opening is formed. Fitzpatrick's group, on the other hand, is characterized by the turbinate shape of the allegedly ostiolate ascocarps, which as a rule collapse apically into cup-shape. The two groups contained different genera but for *Fracchiaea*, which genus Höhnel (1918: 131) eventually regarded as an atypical member of his family and Fitzpatrick (1924) as a true but in some respects deviating member of his subfamily. At the same time Fitzpatrick was inclined to transfer to Höhnel's family all those species with cupulate ascocarps in which he found "a prominent intrusion of gelatinized cells which hang down as an inverted cone from the apex of the perithecium" as described by Höhnel for *Cryptosphaerella* and *Coronophorella*, and interpreted by him as their discharge mechanism.

Miller (1949: 121) treated the combined group as one family (*Nitschkiaceae*) and, in spite of the uniformly thin ascus walls, transferred it to the *Pseudosphaeriales*. By the way, it should be observed that the ascus figured by him as representing *Coronophora ootheca* does in fact show a species of *Coronophora*, but not *C. ootheca*, which is a *Pleurostoma* and does not belong here (cp. Shear 1937: 361–363).

Luttrell (1951: 103–105) accepted reluctantly my treatment "merely as a matter of convenience for the discussion of two possibly unrelated families of uncertain position", remarking that their affinities cannot be determined until their developmental morphology becomes known.

Munk (1953: 34–35, 96–100; 1957: 286–295), who paid special interest to this group, left it as an aberrant member of the Ascohymeniales, but could at that time "see no possibility of establishing any connection between the fungi here placed in *Coronophorales* and other fungi". He considered it a very natural group, whose division into two families was unmotivated, and detected in its peridial anatomy a most distinctive mark, viz. "the presence of small circular pores, ca. 1 μ diam.,

in the cell walls", which pores will in the ensuing be referred to as "Munk pores". He found also the genus *Bertia* to belong here, and in his flora of 1957 he could refer to the developmental studies by Luc (1952). His new monotypical genus *Rostrocoronophora* has, however, later proved to be a *Gnomonia* (pers. comm.; cp. also Sivanesan 1974: 40).

Arx & Müller (1954: 376–384; Müller & Arx 1962: 813–820) treated the group as an aberrant family (*Coronophoraceae*) of the *Plectascales*, which in their delimitation becomes a most heterogeneous assemblage of ascomycetes with non-ostiolate fruit-bodies.

Due to the just cited publications by Luc, Munk, and Arx & Müller, Luttrell (1955: 515, 525–527) became convinced that the *Coronophorales* form a natural group and that they definitely belong to his Pyrenomycetes.

Chadefaud (1959), who thinks that the unitunicate Ascohymeniales have evolved polyphyletically from the bitunicate Ascoloculares, suggests as possible three "éventails phylétiques". One of them ("éventail des Valsoïdes") beginning with certain typical (but anonymous) *Pleosporales* should lead via "Pléosporales valsoïdes" (*Valsaria* and *Myrmaecium*) to *Coronophorales* and perhaps further to *Diaporthales* (=*Valsales*) and *Diatrypales*. It should be observed that *Calosphaeria princeps*, whose ascus structure is referred to, does not belong to *Coronophorales* and that Chadefaud was not then aware of the true position of *Bertia* (cp. Chadefaud 1965: 134).

Carroll & Munk (1964) studying some lignicolous *Sordariaceae* s. lat. (i.e. incl. *Lasiosphaeriaceae* and *Coniochaetaceae*) found two tropical species of *Lasiosphaeria* provided with typical "Munk pores". In every Sordariaceous species examined by them the inner wall surface of emptied asci was found to show a network of longitudinal cytoplasmatic ribs (whereas such were not to be found in *Nectria, Xylaria, Hypoxylon, Diaporthe, Endothia, Diatrype,* and *Eutypa*). Such ribs had been observed only once before, viz. in *Bertia moriformis* (Chadefaud 1954), and this observation was confirmed by them. Chadefaud interprets this structure as an extreme extension of the "nasse apicale" of a bitunicate ascus, highly reduced in other respects. Basing their opinion also on some more similarities Carroll & Munk "suggest that the natural affinities of the *Coronophorales* are very close to the genus *Lasiosphaeria*".

In a recent taxonomic treatise of the Ascomycetes Müller & Arx (1973: 90–92) place *Coronophorales* (with *Coronophoraceae* as the only family) as an order within the (true or unitunicate) Pyrenomycetes, considering them as "a small group of pyrenomycetelike ascomycetes with some characteristics of the Plectomycetes: cleistothecial ascomata opening by a rupture induced by the 'Quellkörper' and the arrangement and morphology of the asci".

Just in time to be taken into account here, appeared a paper on the *Coronophorales* by Sivanesan (1974). It augments the *Nitschkia* group with two species (one

transferred and one new) and two monotypical genera based on them. The appended key to the genera accepted by him (14 in number) as well as his review of them is only an uncritical compilation.

2. Interpretation and Typification of Sphaerica cupularis and Sph. tristis and Some More Nomenclatural Problems

In the *Coronophorales*, three of the specific epithets in general use are pre-Friesean. As well known such epithets only too often cause almost insoluble problems as to interpretation and typification. *Sphaeria moriformis* Tode (1791), nowadays known as *Bertia moriformis* (Tode ex Fr.) deNot., is an exception. Its unique exterior makes it unmistakable and is well shown already in Tode's rather crude illustration. The other two epithets (*Sph. cupularis* and *Sph. tristis*) refer to species with smaller, less tuberculate ascocarps that even today with our much better knowledge and our much better lenses can hardly be kept apart from a number of similar by external inspection only.

The name **Sph.** (or **Nitschkia**) **cupularis** has mainly—until now—been used for a species that, due to the confusion about the epithet, was renamed *N. Fuckelii* by Nitschke (in Fuckel 1870: 165). This is well marked morphologically by its small ascocarps and allantoid spores and ecologically by its close association with *Nectria cinnabarina*. Fitzpatrick (1923: 30) tried to revive the use of Nitschke's name and restricted the name *N. cupularis* to another, previously little-noticed species (typified by Fries, Scler. Suec. 231) with larger ascocarps and longer, less curved spores, but both species have in European literature until now remained mixed-up under the latter name. As surmised already by the Tulasne Brothers (1865: 83; 1931: 77) and definitely proved by an isotype specimen (UPS!) the *Nectria* associate has a much older name in *Sph. parasitans* Schw. Its correct name becomes thus *N. parasitans*.[1]

When establishing his *Sph. cupularis*, Persoon (1796: 65) cited with a question-mark *Sph. Cucurbitula* Tode var. *β nigricans* Tode (1791: 39) as a synonym. Tode's fungus growing "in ramis deciduis Pinus [sic!] silvestris, vere" has certainly no connection with Persoon's species and is to be sure the species now known as *Scoleconectria cucurbitula* (Tode ex Fr.) Booth (1959: 15). In order to make our account complete it should be added that Fries, when treating *Sph. cupularis*, first (1817*a*: 113) declares that he dared not regard Tode's name as a synonym, and finally (1823: 416) cites it "fide Pers.". Nevertheless, it appears also later in more or less thoughtlessly compiled synonymy lists.

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[1] *Nitschkia parasitans* (Schw.) Nannf. **n. comb.** — Basionym: *Sphaeria parasitans* Schw., Trans. Amer. Phil. Soc. 2(4): 206 (1832).

By the way, it should be mentioned that Booth is decidedly wrong in identifying Tode's both varieties with the *Scoleconectria*, and his statement that "Tode did not mention the host" is only partly true. Tode's var. *α flavescens*, which "in variarum arborum ramis ramulisque demortuis tempore vernali abunde, & denso interdum agmine, provenit", can hardly be anything but *Nectria cinnabarina* (Tode ex Fr.) Fr., of which more characteristic specimens had been described as *Sph. cinnabarina* a few pages earlier (l.c. p. 9) and also depicted.

Persoon's original description of *Sph. cupularis* is not sufficient for a definite identification, nor is the habitat ("passim prov. in ramis fagineis, frequentius in ramis *Tiliae* a DD. Schrader reperta"). Persoon repeated later (1801: 53) this description (with some slight stylistic alterations), but seems in some way to have changed his opinion about it as he now gives the habitat as "passim ad ramos *Carpini* et *Tiliae europaeae*". The species is evidently illustrated by "Tab. I Fig. 8–10", although the "Explicatio iconum" gives the name *Sph. cupulaeformis*. The figures show a cupulate member of the *Coronophorales*, but certainly not *N. parasitans*.

In Hb. Persoon (L) six specimens are filed as *Sph. cupularis*:—

(1) One (910, 270–402) is named and labelled by Chaillet and has the words "sed receptaculum nullum" added in Persoon's hand. It shows a *Tympanis* (probably *T. spermatiospora* (Nyl.) Nyl. on *Populus tremula*).

(2–3) Two specimens (910, 270–398 and –399) were sent by J. B. Mougeot. They are both *N. parasitans*, just as are the specimens distributed by him and Nestler in their "St. crypt. vog.-rhen." n. 771.

The three remaining specimens are labelled in Persoon's hand, but in two of them the name is followed by a question-mark.

(4) One (910, 270–591) with two labels ("*Sph. cupularis*?" and "Germania — In *Crataego*") is a very poor specimen bearing some few small groups of *N. parasitans*.

(5) The second (910, 270–401), inscribed only "*Sphaeria cupularis?*", shows a pycnidial state, externally not very dissimilar to *N. parasitans*.

(6) The third (910, 270–594) is very poor, labelled only "*Sphaeria cupularis*—Syn. fung. 53" and consists of a lichen-clad piece of aspen(?) bark (ca 2×3 cm) with part of the periderm fallen off, exposing some few groups of ascocarps not in the best condition; some more may be hidden under the loosening periderm. Half an ascocarp was studied under the microscope and revealed itself by the spores as *N. grevillii*.[1]

When first treating *Sph. cupularis*, Fries (1817*a*: 112) was in some doubt whether Persoon's name applied to his simultaneously described *Sph. conspersa* (i.e. *Tympanis conspersa* [Fr. ex] Fr.) or to the species he attached the name to: "Probably

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[1] *Nitschkia grevillii* (Rehm in Starb.) Nannf. **n. comb.** — Basionym: *Melanopsamma grevillii* Rehm in Starb., Bih. K. Sv. Vet.-Akad. Handl. 16(3:3): 5 (1890).
This is the correct name for *N. tristis* sensu Fuck. et Fitzp. (see below), the epithet commemorating the Swedish botanist A. Y. Grevillius.

it is this species that Persoon calls *Sph. cupularis*, for he does not write a word about the powder that is so characteristic of the next [i.e. *conspersa*]" (translated from the Swedish). Fries's description does not differ much from Persoon's, and he states that it grows on rotten twigs of *Castanea, Populus, Prunus spinosa* etc. (There is in S a Friesean specimen inscribed "*Sphaeria Cupularis*. P. (vera ni fallor)". To judge from the handwriting it was labelled at a very early date (perhaps even before the above paper). It was probably sent to O. Swartz († 1818). The fungus is *Tympanis conspersa* with unusually little powder!) Fries (l.c.) cited as the only synonym *Sph. Pruni* Schumacher (1803: 164), and later (1823: 416) a mark of exclamation seems to indicate that he has seen authentical material. Unfortunately, this is no longer extant, and although Schumacher's fungus was illustrated in "Flora danica" (Hornemann 1834, tab. 2159 fig. 2) as *Sph. cupularis* its precise identification is out of the question; it is very doubtful if it is of this kinship at all.

Sph. cupularis was next treated by Fries in his "Syst. Myc." (1823: 416–417). The description is materially unchanged. Also the basionym *Sph. cupularis* Pers. has now got an exclamation mark but a relevant specimen cannot be traced. Fries's "Scl. Suec. 231" is cited and—with strong doubts—Holl & Schmidt, Deutschl. Schw. 6, which latter is indeed very different. The UPS copy shows *Camarosporium laburni* Sacc. & Roumeg. on *Laburnum*. Desmazières (1860 n. 780) found in his copy the corresponding perfect state, "*Sph. laburni*"=*Cucurbitaria laburni* (Pers. ex Fr.) Ces. & de Not., and two copies in W contain also the same fungus. The description is supplemented by the following remarks: "Caespites subirregulares, stromate tenui nigro. Perithecia mollia, exacte globosa, sed saepius arcte collapsa reperiuntur exacte Pezizam e Ceracellis referentia, absque ostioli vestigio. Summa mihi videtur affinitas cum S. tristi." It should be observed that *Sph. cupularis* is placed in "Trib. XIII. Caespitosae" and *Sph. tristis* in "Trib. XVII. Byssisedae".

The next (and last) time Fries mentions *Sph. cupularis* is in "Summa Veg. Scand." (1849: 391), where he cites again "S. S. 231" and adds "non M. N., Fl. D. 2157 (should be 2159: 2). The reference "M. N." means Moug. & Nestl., St. crypt. vog.-rhen 771 and, as already mentioned, this number shows *N. parasitans*.

Fitzpatrick (1923: 33) chose the FH copy of Scler. Suec. 231 as the type of *Sph. cupularis*, which thus becomes a species of *Nitschkia* amply different from *N. parasitans*. A bound copy in UPS shows the same fungus, whereas a loose sample in Hb. Fries (UPS) bearing the same printed label but with "Lund" added in Fries's hand is *N. parasitans*. Can it be that Fries indeliberately just used a printed label for a later find of what he considered to be the same species, or is there another explanation? We know now (Holm & Nannfeldt 1962) (1) that an "ed. 2" of the Sceromyceti was issued by Fries in 1836, (2) that FH possesses a copy of the original edition, (3) that the bound copy in UPS belongs to the same, and (4) that Fries sent a copy of the second edition to Desmazières. When distributing

N. parasitans (as *Sph. cupularis*) in his exsiccatum Desmazières (1860 n. 780) states the spores of his fungus, which are described in detail, "sont identiques à celles du n° 231 de Fries". It seems thus probable that the fungus distributed in the second edition of Scler. Suec. is *N. parasitans* and that the loose specimen in UPS may belong to that edition.

The Tulasne Brothers (1865: 82, Tab. XIII figs. 14–21; 1931: 77), who undertook a careful study of *N. parasitans* (as *Sph. cupularis*) refer clearly to the original edition ("Scl. Suec. fasc. VII, no 231"), but it remains an open question, if they had personally studied it.

There are no more specimens in the Fries Herbarium collected by himself, but four by others. One, evidently of an early date and inscribed in Fries's hand "Sphaeria—Sub nomine S. cupularis misit Kunze", is *N. parasitans,* and so is another from L. Dufour: "611. Sph. cupularis? Pers.—in Aesculo". The remaining two samples, one from J. P. Guépin (on *Laburnum*) and one from Chaillet (on *Acer* and named with a questionmark) show two different Coelomycetes.

From the preceding paragraphs the following conclusions can be drawn:

(1) *Sph. Cucurbitula β nigrescens* Tode and *Sph. Pruni* Schum. have no connections with any of the species that have passed as *Sph. cupularis*.

(2) Persoon's concept of *Sph. cupularis* is not in the first place or mainly based on *N. parasitans,* although he left Mougeot's determinations without any sign of refutation. The common (mis)interpretation of *Sph. cupularis* is certainly highly influenced by Mougeot & Nestler's exsiccatum.

(3) The only specimen in Hb. Persoon labelled in his own hand without a questionmark cannot belong to the type material, as the substrate is not one of those originally given.

(4) Also Fries cannot mainly have had *N. parasitans* in mind when describing *Sph. cupularis* for then he would hardly have been able to suggest its "summa ... affinitas cum *S. tristi*". On the other hand, this phrase sounds very natural for the species distributed in (the original edition of) Scl. Suec. 231.

(5) All reasons are thus in favour of Fitzpatrick's typification of *Sph. cupularis* by the FH copy of Scl. Suec. 231 (ed. 1), which thus becomes the lectotype. Other copies of the same issue become then isolectotypes (N.B. so far as they contain the same fungus).

The name **Sphaeria** (or **Nitschkia** or **Calyculosphaeria**) **tristis** has for at least a centuary mainly been used in the sense of Fuckel (1870: 165, comp. Winter 1885: 104), so also by Fitzpatrick (1923: 48), viz. for the species distributed in Fuckel, F. rhen. 947, i.e. *N. grevillii,* the next to *N. parasitans* least rare of the European species.

The name *Sph. tristis* dates back to Tode (1791: 9, Tab. IX, fig. 67), who describes and illustrates a Pyrenomycete with globose, half-immersed ascocarps. There are certainly no specimens left of this fungus. It seems clear that it has no connection with any of the species that have later passed under this name. Fuckel (1870: 165–166) suggests that Tode's fungus may have been *Chaetosphaeria phaeostroma* (Dur. & Mont.) Fuck., nowadays known as *Chaetosphaerella phaeostroma* (Dur. & Mont.) Müll. & Booth. This seems not unlikely but can hardly be definitely proved.

The next to use the name is Persoon (1800: 49, Tab. XII, fig. 5; 1801: 87). He describes a fungus (on *Fagus* bark) with superficial, cupulate ascocarps, which fungus, in 1800, he considers to be the same as Tode's, although "saltem meis in speciminibus, sphaerulae ipsae ligno non sunt immersae, nec orificio plano pertusae". Next year he cites Tode's name with a question-mark.

In Hb. Persoon (L) five specimens are filed as *Sph. tristis*:—

(1) One (910, 269–822) on dead stems of *Brassica* sent by an anonymous German correspondent was annotated as "videtur nova" and is thus of little interest here. The fungus is *Gibberella pulicaris* (Fr.) Sacc. (det. L. Holm).

(2) Another specimen (910, 269–834) on twigs of *Acer pseudoplatanus* was sent by J. B. Mougeot as "*Sphaeria*". To this was added (by Persoon?) "*byssiseda*", which was later crossed over and changed by Persoon into "*tristis*". It shows the species much later described as *Sydowinula moravica* Petr., easily known by its bristly subiculum.

(3) A third (910, 269–1002) bears two labels "*Sphaeria tristis* Pers." and "in *Pado*", the first indisputably in Persoon's hand and the second possibly so. It is very poor, in a bad condition without spores and properly indeterminable, but it may be *Melanopsamma pomiformis* (Pers. ex Fr.) Sacc.

(4) The next specimen (910, 269–1008), with two labels in Persoon's hand "*Sphaeria tristis*" and "Prope Parisios lecta", is *N. collapsa* (Rom.) Chen.

(5) The last specimen (910, 269–833), with a single label "*Sphaeria tristis*" in Persoon's hand, shows a piece of *Fagus* (?) bark with the same *Sydowinula* as above.

When first treating *Sph. tristis* Fries (1817*b*: 252) cites both Tode's and Persoon's descriptions and plates but adds: "The somewhat differing descriptions of the authors (comp. also Alb. & Schw.) give rise to the supposition that several species have been mixed up under this name" (translated from the Swedish). His description does not differ materially from Persoon's. In the description in "Syst. myc." (1823: 444) the attribute "astomis" is added to "perithecis", but otherwise there are no sensible changes. The citation of Persoon is now adorned with a mark of exclamation. The third (and last) time Fries mentions this species is in "S. veg. Scand." (1849: 388). Here, Tode is given as the author of the species, and "Scl. Suec. 386" is cited as well as "B.S. 181" (which means Berkeley, Notices of British Fungi, 1841: 361).

The "S.S. 386" fungus is the same *Sydowinula* as found in Hb. Persoon (at

least according to the UPS copy, which is the only one I have seen). The substrate is naked wood, inhabited also by *Eutypa lata* (Pers. ex Fr.) Tul.

Two samples evidently collected by Fries at a very early date are in LD (Hb. Agardh). Both are in a bad condition and indeterminable.

In Hb. Fries there are only two more samples, both sent by correspondents. One from C. Montagne ("Sphaeria tristis? Tode—Ad ramos carpini dejectos—in Ardennis") shows *Chaetosphaerella phaeostroma*. The second, labelled only "*Sphaeria tristis* P." in an unknown hand, is the same *Sydowinula* as above.

From the preceding paragraphs the following conclusions can be drawn:—

(1) *Sphaeria tristis* Tode has no connection with any of the species that have later passed under this name and has been supposed to be *Chaetosphaerella phaeostroma*.

(2) Persoon's and Frie's concepts of *Sph. tristis* are to a considerable extent based on the species later described as *Sydowinula moravica* Petr.

(3) Fuckel's (and Fitzpatrick's) interpretation of *Sph. tristis* cannot be upheld, as there is no evidence that either Persoon or Fries ever referred specimens of that species, i.e. *N. grevillii*, to *Sph. tristis*. Fries probably never saw (or noticed) it, and Persoon placed a sample of it with his *Sph. cupularis*.

(4) There exist two specimens (one from Persoon and one from Fries) that both could serve as types, viz. "L 910, 269–833" and "Scl. Suec. 386". It cannot be proved that Fries's descriptions in 1817 and 1823 were based on the "Scl. Suec." collection, for it is not cited in "Syst. Myc." and, moreover, Fries must have found this species (or what he thought to be this species) at least twice, for the figures "1, 2" in "S. veg. Scand." mean "Regio campestris" and "Regio fagineo-montana" resp. The probability seems much larger that Persoon's descriptions are based on his just cited specimen, and so I select it formally as the type. For reasons to be given in the next installment this species should be transferred to *Acanthonitschkea* and its correct name becomes thus *Ac. tristis*,[1] with *Sydowinula moravica* as a synonym.

Besides the cases treated above several specific epithets used by Fitzpatrick (1923, 1924), Arx & Müller (1954) and Müller & Arx (1962) have to be changed for taxonomical or purely nomenclatural reasons. The observed cases will be given below, in alphabetical order according to the epithets used by the said authors.

(1) **culcitella.** *Sph. acanthostroma* Mont. (1855), the type species of *Scortechinia* Sacc. & Berl. (1885), is a very characteristic species widely distributed in warmer

[1] *Acantonitschkea tristis* (Pers. ex Fr.) Nannf. **n. comb.** — Basionym: *Sphaeria tristis* Pers. [, Ic. descr. fung. 2: 49 (1800)] ex Fr., Syst. mycol. 2: 444 (1823).

countries. The name was thought by Arx & Müller (1954: 378) to be antedated by *Sph. culcitella* Berk. & Rav. "in Ravenel, Fungi Carol. Exsicc. No. 53 (1853)", but the latter is a *nomen nudum* and the date given is erroneous. Next year they (Müller & Arx 1955: 365) corrected the citation into "Fungi Carol. 4, No. 53 (1855) (?)" and accepted *acanthostroma* as the correct epithet. *Sph. culcitella* did in fact not get a valid description until in 1860 by Berkeley & Curtis.

Spegazzini (1888) got the capricious idea that *Sph. culcitella* should be the same species as *Scortechinia acanthostroma* Saccardo & Berlese (1885: 714), but different from Montagne's species, which should be referable to *Trichosphaeria*. On the other hand, Montagne's species, of which he had seen no authentic material was considered as synonymous to *Sph. foveolata* Berk. & Curtis. An authentic sample of the last-mentioned is in Spegazzini's herbarium (LPS) and shows that he was correct in synonymizing it with his "*Trichosphaeria acanthostroma*". It is in fact an *Acanthonitschkea* (vide p. 60 under *usambarensis*).

The diagnosis of *Sph. acanthostroma* Mont. is in itself sufficient to show its conspecificity with *Sph. culcitella*, and is further confirmed by Arx & Müller's (1954: 379) examination of the type of Montagne's species. For reasons to be given in the next instalment it should be transferred to *Nitschkia*, and its name becomes thus *N. acanthostroma*.[1]

Those who adhere to a narrower generic concept should observe that the year of birth of *Scortechinia* Sacc. & Berl. is 1885 and not 1891 as stated by Arx & Müller (who correctly give the year 1885 as the date of the combination *Sc. acanthostroma!*). Their conclusion (Müller & Arx 1955: 364) that it should be rejected as a later homonym because of *Scortechinia* Hook. (1887, *Euphorbiaceae*) is thus incorrect and should be reversed.

Ultimately, the synonym *Orbicula Richenii* Rick (1904*a*: 245; 1904*b*: 406) needs some comment. Basing their opinion on their own copy of Rick, F. austro-amer. 1, H. & P. Sydow (1917: 180) referred it as a synonym to *Asterula cornicullariiformis* P. Henn., i.e. *N. acanthostroma*, and this synonymy has been repeated by all later authors. Rick's posterior remark (1905: 18), evidently unnoticed by the Sydows, may seem to make this interpretation problematic:—"In Fascikel I ist unter No. 1 an einzelne Adressen nicht *Orbicula Richenii* sondern *Trichosphaeria acanthostroma* Bres. gelangt". Fortunately, Rick's final description (1933: 136) of "*Chaetosphaeria acanthostroma* . . . (Exs. Rick, Fungi austro-amer. n° 1, ex parte)" settles the problem, for what he describes there is a very different fungus, a typical *Chaetosphaerella* with 4-celled spores and the median cells brown-walled. The three copies of Rick's exsiccatum seen by me (PAD, Hb. Rehm S, Hb. Syd. S) show all the correct fungus, i.e. *N. acanthostroma*.

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[1] *Nitschkia acanthostroma* (Mont.) Nannf. **n. comb.** — Basionym: *Sphaeria acanthostroma* Mont., Ann. Sci. Nat. Bot. 4(3): 126 (1855).

(2) **euomphala.** Starbäck (1893: 28; 1894: 26) pointed out that *Sph. conferta* Schw. (non Fr.) is a probable older synonym of *Sph. euomphala* Berk. & Curt. in Berk. (1876), but that he could not decide this as he was unable to find any ascocarps with their inner parts preserved in an isotype specimen in UPS labelled "*Sphaeria conferta* — Salem" in Schweinitz' own hand. My re-examination gave no better result.

Fitzpatrick (1923: 56) studied other parts of the same collection, viz. those in Hb. Schweinitz (1508 in PH) labelled "*Sphaeria confertula* L.v.S.—Salem" by himself and in Hb. Curtis (363 in FH), found them to agree with *Sph. euomphala* as to subiculum, ascocarps, and spores "Failure to find asci in the Schweinitzian specimens alone" deterred him "from stating unqualifiedly that the species are the same".

Shear (1939: 322–325) made a detailed study of the Schweinitz specimens extant in USA. He found that the specimen (in Hb. Collins) which had caused Ellis (1895: 25) to transfer the species to *Trematosphaeria* is of a later date, being collected in Pennsylvania (Bethlehem) and shows *Chaetosphaeria fusca* Fuck. (= *Chaetosphaerella fusca* (Fuck.) Müller & Booth). He re-examined the samples of *Sph. conferta* in FH and PH and found in a third Salem specimen (Hb. Michener in BPI) free spores and a few asci. He concluded "that there is no longer any reason to doubt that it is the same as *Nitschkia euomphala*", but considered that the use of Schweinitz' epithet would not be desirable "on account of the previous confusion in interpretation of Schweinitz' species". The present "Code of Nomenclature" does not permit this solution.

However, the epithet "*conferta* Schw." cannot be used. It was certainly validated by Fries in "Syst. myc." (1823: 444) but, by distraction, he used (l.c. p. 435) the same epithet for a new, totally different species on leaves of *Vaccinium uliginosum*, nowadays known as *Pyrenobotrys conferta* (Fr.) Theiss. & H. Syd. Schweinitz' *conferta* was unfortunately omitted in the index of that volume, and Fries did not become aware of the duplication, but Schweinitz (1832: 211) observed it and changed the epithet of his own species into *confertula*. As even this epithet is prior to *euomphala*, it affords the valid name of the species, which for reasons to be given in the next instalment is referred to *Nitschkia*. Its correct name becomes thus *N. confertula*.[1]

(3) **heterogenea.** As the result of Fitzpatrick's critical revision (1924) all true members of *Fracchiaea* are to be united into one species. According to him the monotype of the genus, *Fr. heterogenea* Sacc. (1873), offers the oldest specific epithet, but a much older name. *Sph. rasa* Berk. (1855), is listed as a probable synonym. He had studied the type but does not state clearly why he considered

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[1] *Nitschkia confertula* (Schw.) Nannf. **n. comb.** — Basionym: *Sphaeria confertula* Schw., Trans. Amer. Phil. Soc. 2(4): 211 (1832).

its identity doubtful. He had not observed that Petch (1912: 289–290; 1917: 333–334) had already studied the still older *Sph. broomeiana* Berk. (1854) and had found it to be a typical *Fracchiaea,* which he synonymized with *Fr. brevibarbata,* one of Fitzpatrick's synonyms of *Fr. heterogena.* Petch's description of the type specimen (K) leaves no doubt about the correctness of his conclusion. The correct name of the species becomes thus *Fr. broomeiana* (Berk.) Petch or, after transfer to *Nitschkia,* as motivated in the next instalment, *N. broomeiana.*[1]

(4) **macrobarbata.** See *usambarensis* below.

(5) **Massae.** See *usambarensis* below.

(6) **usambarensis.** As pointed out by Arx & Müller (1954: 381) *Acanthonitschkea macrobarbata* Fitzp. (1923) is a clear synonym of *Meliolopsis usambarensis* Rehm (1895), on which species Theissen (1917) based his monotypic genus *Euacanthe.*

According to an isotype specimen in UPS, *Sph. hystricula* Berk. & Br. (1873) from Ceylon affords an older synonym. But Petch's description (1912: 290) of "*Fracchiaea hystricula* (B. & Br.) Petch" drawn from two recent Ceylon gatherings, refers to a widely different species, combining the long ascocarpic bristles of *Acanthonitschkea* with large polysporous asci.

A probable synonym is also *Fitzpatrickia Massae* nov. gen. et sp. described by Ciferri (1928: 29) from a piece of wood of unknown origin. The only tangible difference is the colour of the spores ("flavobrunneis usque ad fuscidulis").

The oldest synonym so far known is *Sph. foveolata* B. & C. ex Berk. (1868) from Cuba (see p. 58). The correct name of our species becomes thus *Ac. foveolata.*[2]

Finally, the generic name *Nitschkia* Otth needs some comments. The name is generally cited as published by Fuckel (1870: 185) but without the reservation that there it is a *nomen nudum.* Consequently also the names of its species are invalid. A generic description was first provided by Karsten (1873: 13). Saccardo (1873: 163) considered *Nitschkia* as a younger homonym of *Nitzschia* Hassall (1845) and coined the substitute name *Coelosphaeria,* but being based on Fuckel's *nomen nudum* this becomes another *nomen nudum.*

Cyathisphaera Dumortier (1822: 87) is an old name that Fitzpatrick (misspelling it "*Cyathisphaeria*") evidently at one time intended to make use of as seen from his "Explanation of Plates" (1923: 43), but this idea was eventually abandoned: —"Since *S. berberidis* and several other unrelated species are included the genus has no value. Moreover, it is impossible to use the name *Cyathisphaeria* to replace

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[1] *Nitschkia broomeiana* (Berk.) Nannf. **n. comb.** — Basionym: *Sphaeria broomeiana* Berk., Hooker's Journ. Bot. 6: 231 (1854).

[2] *Acanthonitschkea foveolata* (Berk. & Curt. ex Berk.) Nannf. **n. comb.** — Basionym: *Sphaeria foveolata* Berk. & Curt. ex Berk., Journ. Linn. Soc. 10: 387 (1868).

Nitschkia on account of uncertainty as to the identity of *S. cupularis* Pers." (l.c. p. 28). It is shown above (p. 53) that the interpretation of *Sph. cupularis* Pers. is an insoluble problem. Although the well-known and generally accepted name *Nitschkia* can hardly be threatened by *Cyathisphaera*, it seems nevertheless desirable to dispose of the latter name once for all, and so *Sph. berberidis* Pers. ex S. F. Gray (=*Cyathisphaera berberidis* Dum.) is here formally proposed as its type species, which makes *Cyathisphaera* a younger typonym of *Cucurbitaria* S. F. Gray (1821).

3. Additions to the Synonymy within Nitschkia and Acanthonitschkea together with Some Relegations from These Genera

By means of type specimens and/or literature it has become possible to elucidate several doubtful names, to add some hitherto unrecognized synonyms and to relegate some species from the genera in question, even if in these cases it has only rarely been possible to assign their proper position.

Most of Fitzpatrick's seven doubtful species of *Nitschkia* (1923: 34–36) can now be disposed of:—

(1) *Coelosphaeria anceps* Sacc. & Malbr. According to the type specimen (PAD) synonymous to *N. parasitans*.

(2) *C. crustacea* Karst. Does according to the type specimen (H) not belong to the *Coronophorales*.

(3) *C. granati* H. Fabre. Remains doubtful as the description is inadequate and no specimens have been seen. Such may, however, be extant in Fabre's herbarium, which is kept at his former estate (L'Harmas in Sérignan, Vaucluse) and available on the spot but from which loans are not sent out (Müller 1962: 119; Lundqvist 1972: 285).

(4) *C. media* Sacc. According to the type specimen (PAD) a synonym of *Ac. tristis*.

(5) *N. moravica* Niessl. No specimen seen, but the diagnosis points unequivocally at *N. parasitans*.

(6) *N. subconica* Feltg. According to Höhnel (1906: 1215–1216) synonymous to *Calosphaeria minima* Tul. and consequently no member of the *Coronophorales*.

(7) *C. suberis* Wint. According to the type specimen (COI) no member of the *Coronophorales*.

Other cases observed by me are the following, listed alphabetically according to their specific epithets:—

(8) *N. bambusarum* Rehm. According to an isotype specimen in W a unitunicate pyrenomycete but totally alien to the *Coronophorales*.

(9) *C. beccariana* Berl. & Pegl. Failing to find an authentical specimen Fitzpatrick (1923: 56–57) listed it as a doubtful synonym of *Tympanopsis euomphala* (i.e. *N. confertula*). Although no specimen with the relevant name is to be found in Hb. Saccardo (PAD) there is a fragmentary specimen labelled in Saccardo's hand "*Coelosphaeria pisana*—Spec. orig." that matches the description and illustration of *C. beccariana* (found "in selva pisana") so well that it can be surmised to be part of the same collection. Saccardo's specimen shows typical *N. confertula* in an advanced stage of development, only with the spores slightly longer than usual.

(10) *A. coloradensis* Cash & Davids. Judged from the specimens in W. B. Cooke, Mycob. N. Amer. 222 (S, UPS), which match the diagnosis, this fungus is definitely misplaced. The narrowly cylindrical asci have a relatively large, very characteristic apical apparatus: an apical cushion, from which a long perforated cylinder or, more exactly, a slightly tapering conical frustum (ca. 5×2 μm) hangs down. This does not stain with either Congo Red, Cotton Blue or Iodine.—The peridial cells are smaller than in the *Coronophorales* and devoid of "Munk pores". The proper place of this fungus seems to be in the *Diaporthales* s. lat.

(11) *Fracchiaea coniferarum* v. Höhn. From a study of the type specimen (FH) Fitzpatrick (1924: 112) concluded that this species is "more closely allied to *Coronophora* than to *Fracchiaea*". He had certainly missed a short note by Höhnel (1918: 139) as he does not comment upon it, for in this note Höhnel stresses that as shown by the asci his species is a true *Fracchiaea* and not a *Coronophora*. I have studied a poor isotype specimen (in W) and join Fitzpatrick's conclusion. The mode of growth, the shape of the ascocarps, and their irregular collapsing are typical of *Coronophora* and so are, in my opinion, the asci too. Awaiting a strongly needed revision of that genus, the taxonomic evaluation of Höhnel's species remains an open question.

(12) *F. depressa* Petch. Not seen by me. The ascocarps are described as subglobose, depressed and collapsing when dry, which is only rarely the case in *N. broomeiana*. Otherwise there are no tangible differences, and so the two names are tentatively treated as synonymous.

(13) *N. dissipata* Kirschst. The type (and only) specimen (in B) shows twigs of *Prunus padus*, all over bearing fructifications of *Dermea padi* (A. & S. ex Fr.) Fr. (mostly in its *Micropera* state), and this is clearly the fungus Kirschstein described.

(14) *Wallrothiella fraxinicola* Feltg. According to Höhnel (1206: 1215) the type specimen shows it to be synonymous to *Winterina tuberculifera* (i.e. *N. grevillii*). His determination was evidently based exclusively on literature, and the taxonomy of *Nitschkia* was in a chaotic state before Fitzpatrick's monograph. But if Feltgen's data on ascocarp size ("0.4–0.5 mm breit") and spores ("cylindrisch oder

länglich-elliptisch, 1zellig, hyalin, mit meist 4 einreihig liegenden Oeltropfen, 8–11/2.5–3") can be relied on, Höhnel's determination remains still exact.

(15) *Nectria (Gibbera) hippocastani* Otth. According to Höhnel (1920: 118–119) his examination of part of the type specimen showed Otth's name to be a *nomen confusum,* being based on "*N. cupularis*" combined with asci and spores of *Melanomma pulvis-pyrius* (Pers. ex Fr.) Fuck. Otth's phrase "stroma carnosum, pulvinatum, e dilute miniato fuscescens" points straight at a *Nectria* stroma with *N. parasitans,* which species is moreover known to be a rather common inhabitant of *Aesculus.*

(16) *Coronophora macrosperma* Fuck. After studying the type specimen without finding the concerned fungus, and ignorant of Höhnel's detailed re-descriptions (1907: 626–627; 1918: 137–138), Petrak & Sydow (1929: 91) put forward the loose suggestion that it might be synonymous with *F. heterogenea* (i.e. *N. broomeiana*). This is completely refuted by Höhnel's studies, and his opinion that it is a species of *Coronophora* seems well founded.

(17) *Sydowinula moravica* Petr. According to Müller & Arx (1955: 369; 1962: 816) a synonym of *N. collapsa.* In spite of Petrak's meticulous description they did not observe such conspicuous discrepancies as the dark subicular spines and the smaller allantoid spores. It is instead *A. tristis.*

(18) *Nitschkia nervincola* Rehm in sched. In spite of Fitzpatrick's ill-judged generic name (*Rostronitschkia*) this species is not related to the *Coronophorales.* Petrak (1940: 236–237; 1951: 176) regards it as a *Eutypa,* but its definite position will certainly not be in that genus.

(19) *Melanopsamma numerosa* Fautr. After studying part of the type collection (Roumeg., F. sel. exs. 5629), Höhnel (1919: 571–572) considered it synonymous to "*Winterina tristis*". To judge from a collection by Höhnel himself, distributed in Rehm, Ascom. 1743 as *N. tristis,* he used this epithet for *N. cupularis* s. orig. Two isotypes of Fautrey's species (in UPS) confirm Höhnel's determination.

(20) *Coelosphaeria pisana* Sacc. in sched. See *C. beccariana* above.

(21) *Herpotrichia rehmiana* P. Henn. & Kirschst. According to two isotypes (S) another synonym of *N. cupularis* s. orig. Kirschstein (1911: 287) himself synonymized it with *N. tristis,* which name in his sense means the same.

(22) *Sphaeria tristis* var. sporidiis majoribus B. & Br. According to the description and a probable isotype specimen (in W) a synonym of *N. collapsa.* — By the way it may be noted that a sample (in S) from Ch. E. Plowright labelled "*Sphaeria tristis* var. *longispora*" is *N. cupularis* s. orig.

(23) *Echusias vitis* "(Schulzer)" Hazsl. Höhnel (1920: 130–131) has proved that Hazslinszky's description of his fungus (and the new genus based on it) points

exactly at *Fracchiaea*, mentioning even the singular arrangement of the ascospores. He considers it specifically distinct from *Fr. heterogenea* because of its long-stalked asci, and suggests it to represent a form of *Fr. brevibarbata* with slightly larger spores. In view of Fitzpatrick's illuminating studies on this complex we can now safely dismiss it as a mere synonym of *N. broomeiana*. The alleged basionym (*Gibbera vitis* Schulzer) was shown to be widely different but remained unidentified.

(24) *Nitschkia winteriana* Sacc. Fitzpatrick's interpretation (1923: 50) of this name as a synonym of his "*Calycculosphaeria tristis*" (i.e. *N. grevillii*) was based on the description only. The type specimen (PAD) confirms it.

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