CZECH MYCOLOGY
Publication of the Czech Scientific Society for Mycology

Volume 49 April 1997 Number 3–4

Fungi of the Kilimanjaro — II
Octospora kilimanjarensis sp. nov., a new species of the section Neottiellae (Discomycetes, Pezizales)

JIŘÍ MORAVEC

P. O. Box 17/A, CZ-679 04 Adamov u Brna,
Czech Republic

Moravec J. (1997): Fungi of the the Kilimanjaro — II. Octospora kilimanjarensis sp. nov., a new species of the section Neottiellae (Discomycetes, Pezizales).– Czech Mycol. 49: 149–161

Octospora kilimanjarensis sp. nov. is described from a rain forest of the Kilimanjaro, Tanzania. The taxonomy is discussed and *Octospora kilimanjarensis* is placed in the section *Neottiellae* Caillet et Moyene of the bryophilous genus *Octospora* Hedwig. The new species is compared with other four related species of the section, *Octospora* albocincta (Berk. et Curt. ap. Berk.) Caillet et Moyne, *Octospora rutilans* (Fr.) Dennis et Itzerott, *Octospora vivida* (Nylander) Dennis et Itzerott and *Octospora aplanodictyon* (Kobayasi) J. Moravec based on *Aleuria aplanodictyon* Kobayasi. The latter is here reported for the first time from Central Europe (Czech Republic). Features of the new species are illustrated by line drawings and SEM photomicrographs. Ascospore ornamentation of the other species treated here has also been studied and line drawings of their ascospores accompany the paper.

Key words: *Octospora kilimanjarensis* sp. nov., *Octospora* sect. Neottiellae, Discomycetes, taxonomy.

Moravec J. (1997): Houby Kilimandžára — II. *Octospora kilimanjarensis* sp. nov., nový druh sekce *Neottiellae* (Discomycetes, Pezizales).– Czech Mycol. 49: 149–161

Octospora kilimanjarensis sp. nov. je popsána z deštného pralesa Kilimandžára v Tanzánii. Nový druh je zařazen do sekce *Neottiellae* Caillet et Moyne rodu *Octospora* Hedwig. Její taxonomie je diskutována a *O. kilimanjarensis* je srovnávána s ostatními čtyřmi příbuznými druhy této sekce — *Octospora albocincta* (Berk. et Curt. ap. Berk.) Caillet et Moyne, *Octospora rutilans* (Fr.) Dennis et Itzerott, *Octospora vivida* (Nylander) Dennis et Itzerott a *Octospora aplanodictyon* (Kobayasi) J. Moravec. Posledně jmenovaná je zde poprvé uvedena z České republiky a tím poprvé i ze střední Evropy. Charakteristické znaky nového druhu jsou detailně vyobrazeny perokresbou a SEM mikrofotografiemi askospor; ornamentika ostatních zde uvedených druhů byla rovněž studována a perokresby askospor doplňují článek.

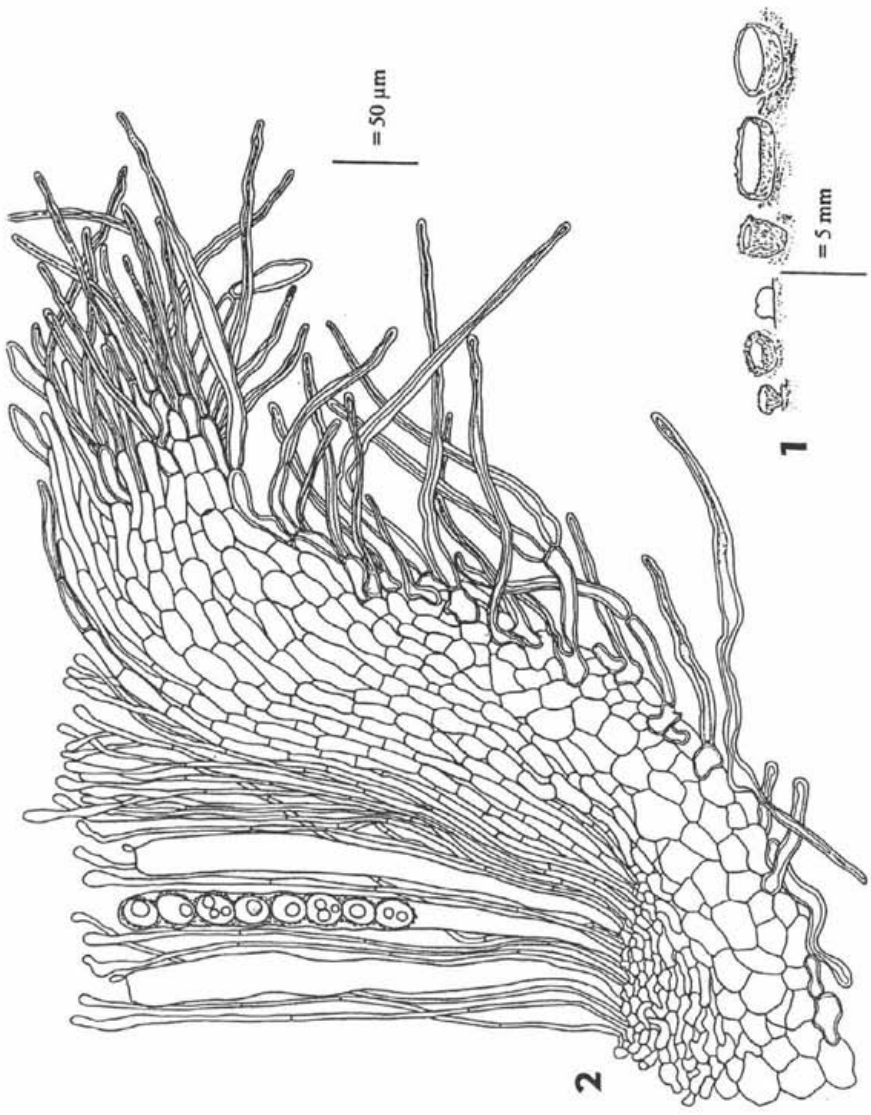
The present paper links up freely with the previously published first part of the contribution on discomycetes found in the mountainous area of the Kilimanjaro (J. Moravec 1978). During the author's second visit to the area in December 1995 mostly inoperculate discomycetes and several species of *Scutellinia* were found. One bryophilous discomycete collected on a path through a mountainous rain forest in the direction of Mandara Hut (2,700 m) is described as a new taxon here:

Octospora kilimanjarensis J. Moravec sp. nov.

Apothecia 1.5–4.5 (–7) mm diam., primum subglobosa, convexa vel doliiformia, sessilia vel raro substipitata, usque leniter patellaria, hymenio vivide aurantiaco vel ochraceo-aurantiaco, extus pallida, subtiliter albo-tomentosa vel subglabra, margineque dentato-fibrilloso, albo-fimbriato vel breviter fimbriato. Excipulum externum e textura subgloboso-angulari, margineque hyphis et pseudopilis hyalinis 70–220 (–300) × 6–12 μm, apicibus obtusis, usque 4.5 μm crassis, crasse tunicatis (parietibus 1–1.5–3 μm crassis). Excipulum internum (medulla) e textura epidermoidea vix intricata. Subhymenium textura pseudoangulari-intricata. Asci 290–350 × 18–26 (–30) μm, cylindracei, deorsum sensim attenuati, crasse tunicati, operculati, octospori, non amyloidei. Ascosporae late rotundato ellipsoideae vel late ellipsoideae, (18-) 19–22 (25.5) × 13.5–16.5 (–18.5) μm (ornamento excluso), plerumque 20.5 × 15.5 μm, guttula unica vel guttulis binis vel multis instructae, verrucis magnis donatae, vel irregulariter crasse reticulatae vel subreticulatae. Paraphyses filiformes, 2–3.5 μm diam., sparse septatae, rectae, apice sensim vel clavato-incrassatae (4–9.5 μm), substantia luteola impletae.

Habitat: Africa orientalis, mons Kilimanjaro, Tanzania borealis, ad terram inter muscos (*Pogonatum* sp., *Fissidens* sp., *Pleuridium* sp. et protonema), ad viam in silva virginea apud locum Mandara, 16. XII. 1995 leg. Jiří Moravec — holotypus in herbario mycologico Musei Brunensis (BRNM) et duplicatum (isotypus) in herbario privato J. Moravecii asservantur.

Apothecia 1.5–4.5 (–7) mm diam., sessile to less often substipitate, first subglobose, then barrel-shaped to shallowly cupulate, hymenium light orange or orange-ochraceous, outer surface pale, minutely covered with white adpressed hairs or almost glabrous, with a fibrillate-dentate fringed or inconspicuously fimbriate margin. Excipulum textura globulosa-angularis composed of globose or elongated to polygonal thick-walled cells; the cells measure 15–30–40 μm in diam and are strongly cyanophilic in the outermost layer, in the marginal part they are passing into articulate hyphae and cells from which hyaline, thick-walled, non-septate hairs originate in the outermost marginal part. Hairs (pseudopili) hyaline, 70–220 (–300) × 6–12 μm (up to 12 μm in their medial part), straight or flexuous or undulate, thick-walled (the walls in the lower parts 1–1.5 μm



Figs 1–2. *Octospora kilimanjarensis* sp. nov. **1.** Apothecia; **2.** Section of the marginal part of the apothecium. Holotype (BRNM).

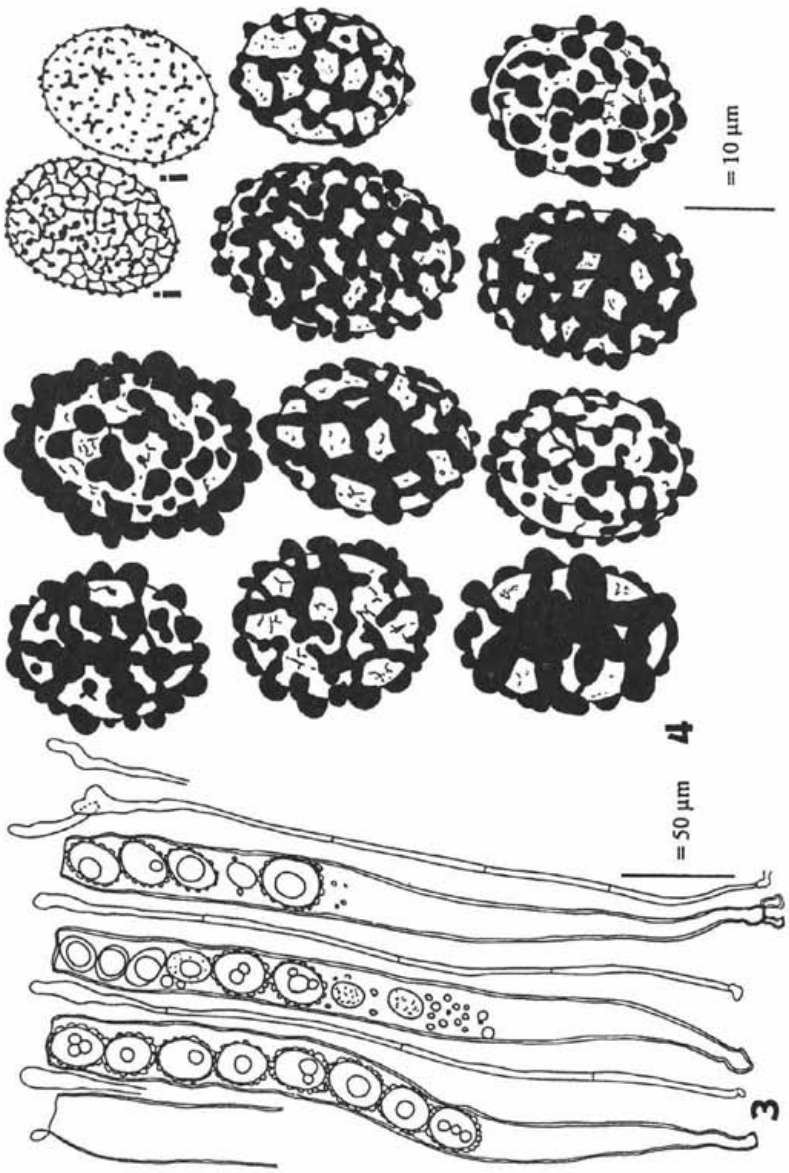
thick but conspicuously thicker in their upper parts where the walls are 2–3 μm thick and often connected (so the cyanophilic interspace is very thin), tapering into a narrow (usually 4.5 μm diam.) obtuse apex, originating from the elongate-bulbous cells with thinner walls. Medullary excipulum clearly differentiated, composed of an atypical textura epidermoidea of mostly elongated cells running horizontally and somewhat simulating an atypical textura subintricata.

Subhymenium thin but well differentiated as composed of smaller (3–6 μm diam.), strongly cyanophilic, inflated, hypha-like or almost angular cells. Asci cylindrical, 290–350 × 18–26 (–30) μm, thick-walled, gradually constricted towards the mostly simple truncate base, mostly eight-spored, non amyloid, operculate. Ascospores subglobose-ellipsoid to broadly ellipsoid, (18-) 19–22 (–25.5) × 13.5–16.5 (–18.5) μm (ornamentation excluded), mostly 20.5 × 15.5 μm (but the size of ascospores which were developed in asci containing a reduced number of ascospores may occasionally reach up to 25.5 × 18.5 μm), containing one large or rarely two or more smaller oil globules, possessing a perisporium mostly densely covered by cyanophilic, very large subglobose pustules or by wide ribs which form an irregular, mostly incomplete thick reticulum or a mixture of warts and ribs; the pustules and ribs measure 1.5–3.5 (–4.5) μm in diam. (but they may be thickened up to 7 μm) and in the optical section of the ascospores they are 1.5–2.6 (–3) μm high. The warts and ribs are usually so robust (and thus densely arranged) that the space in between them is very narrow or the mashes of the thick reticulum are very small. Paraphyses filiform, 2— 3.5 μm diam., sparsely septate, straight, usually enlarged up to 9.5 μm at their clavate or undulate and rarely branched tips, with a yellowish content.

Habitat : East Africa, Northern Tanzania, Mt Kilimanjaro, on soil among moss (*Pogonatum* sp., *Fissidens* sp., *Pleuridium* sp., or on almost bare soil with protonemata of a moss, on the path to Mandara Hut (2600 m) in a virgin rain forest, 16. XII. 1995 leg. Jiří Moravec — holotype BRNM (Mycological herbarium of the Moravian Museum, Brno, Czech Republic), isotype herbarium J. Moravec (J. Mor.).

O. kilimanjarensis is closely related to several other species of the section *Neottiellae* Caillet et Moyne (1987b), especially to *Octospora rutilans* (Fr.) Dennis et Itzerott and to *Octospora albocincta* (Berk.et Curt. ap. Berk.) Caillet et Moyne [= *Octospora catharinaea* (Mc Lennan et Halsey) Caillet et Moyne] but also to *Octospora vivida* (Nylander) Dennis et Itzerott and *O. aphanodictyon* (Kobayasi) J. Mor. All these species have been commonly treated under the generic names *Neottiella* (Cooke) Sacc. or *Leucoscypha* Boud. em. Rifai (1968). The hairs of the new species are very similar to those of *O. rutilans* but the ascospore ornamentation is much coarser. *O. albocincta* differs particularly by the ellipsoid to subfusoidal ascospores measuring 17–25 × 11–14 μm and bearing a perisporium which is covered by smaller warts and thinner crests mostly forming an almost regular reticulum.

Benkert (1987, 1994) identified *Neottiella catharinaea* Mc Lennan et Halsey in Proc. R. Soc. Victoria 49: 56, 1936 with *O. albocincta*. However, the former was characterized by Rifai (1968) as a well founded species (as *Leucoscypha catharinaea* (Mc Lennan et Halsey) Rifai; and he and also Caillet and Moyne (1987a, 1987b) kept these two taxa separated on the basis of different ascospore shape and



Figs 3–4. *Octospora kilimanjarensis* sp. nov. **3.** Asci and paraphyses; **4.** Ascospores under oil immersion + CB. Holotype (BRNM). (i = immature ascospores)

ornamentation. Therefore, I have examined the collection of *N. catharinaea* from the type locality (Australia: Victoria, Hilton Rd., Ferny Creek, Dandenong Ranges, epiphytic on the moss *Atrichum ligulatum* (syn. *Catharinaea muelleri*) 24. VIII. 1945 leg. J. H. Willis (comm. G. Beaton 110), herb. K (M): 38652, which

was examined and illustrated by Rifai (1968) under the generic name *Leucoscypha*. I have found that although the ascospore ornamentation of the collection of *N. catharinaea* is coarser and more irregular than those of *O. albocincta* as illustrated by Rifai (1968), Pant and Tewari (1977) (under *Leucoscypha*) and Benkert (1994) (under *Neottiella*), there is a clear and conspicuous difference between the ascospore shape and ornamentation of *N. catharinaea* and those of *O. kilimanjarensis*. I have found the size of the ascospores of the Australian collection (those normally developed in the prevalent eight-spored asci) to be 20–26 × 10.5–13.5 μm [several anomalous ascospores which developed in asci with a reduced number (2–4) reached up to 29 × 15 μm] and found their shape, in accordance with Rifai's description and illustration, to be ellipsoid to fusoid-ellipsoid to fusoidal, and the ascospore ornamentation much finer than that of *O. kilimanjarensis*. A great number of ascospores of *N. catharinaea* possess almost regular and a considerably fine reticulum whilst other ascospores bear irregular ribs, crests, and enlarged warts. However, the ribs, crests, and warts are 0.5–2 (–2.5) μm in diam. and 0.5 —1.5 (–1.8) μm high and thus do not reach the huge size of those on the ascospores of *O. kilimanjarensis*. Moreover, the space in between the warts and ribs is much larger or the mashes of the reticulum are much broader than the narrow space and mashes in the huge ascospore ornamentation in *O. kilimanjarensis* (compare figs. 4 and 7).

I have also examined a collection of *O. albocincta* from Germany: Potsdam, on *Atrichum undulatum*, 24. X. 1987 leg. Dieter Benkert (BHU, J. Mor.). The ascospores of the collection are usually ellipsoid and slightly or more conspicuously constricted towards their poles, 18–22.5 (–24) × 10.5–13 (–14) μm, and the perisporium is mostly almost regularly reticulated, a certain number of ascospores bears a very fine irregular reticulum similar to that on the ascospores of *O. rutilans*. A certain number of ascospores, however, possess isolated ribs and warts of the same shape and arrangement as those on the ascospores of the collection of *O. catharinaea* treated above. Although the warts and ribs are finer (0.5–1.3 (–1.7) μm in diam. and 0.4–0,8–1.4 μm high) than those on ascospores of *O. catharinaea*, the type of ornamentation is the same on most ascospores in both species.

The ascospore ornamentation of all these species is obviously developed in a similar way. The immature ascospores are covered by fine warts or fine crests. They may persist as the only warts at spore maturity in *O. vivida*, or crests and ribs of the variable shaped reticulum in *O. rutilans* and also, though in a very fine version, in *O. aphanodictyon*, or may develop either to huge warts or ribs of the very variably shaped thick reticulum in *O. kilimanjarensis* and more rarely and much finer in *O. albocincta*.

Regarding *Octospora aphanodictyon* comb. nov. (basionym: *Aleuria aphanodictyon* Kobayasi, Ann. Rep. Inst. Fermentation Osaka, 3: 39, 1967) [= *Neottiella*

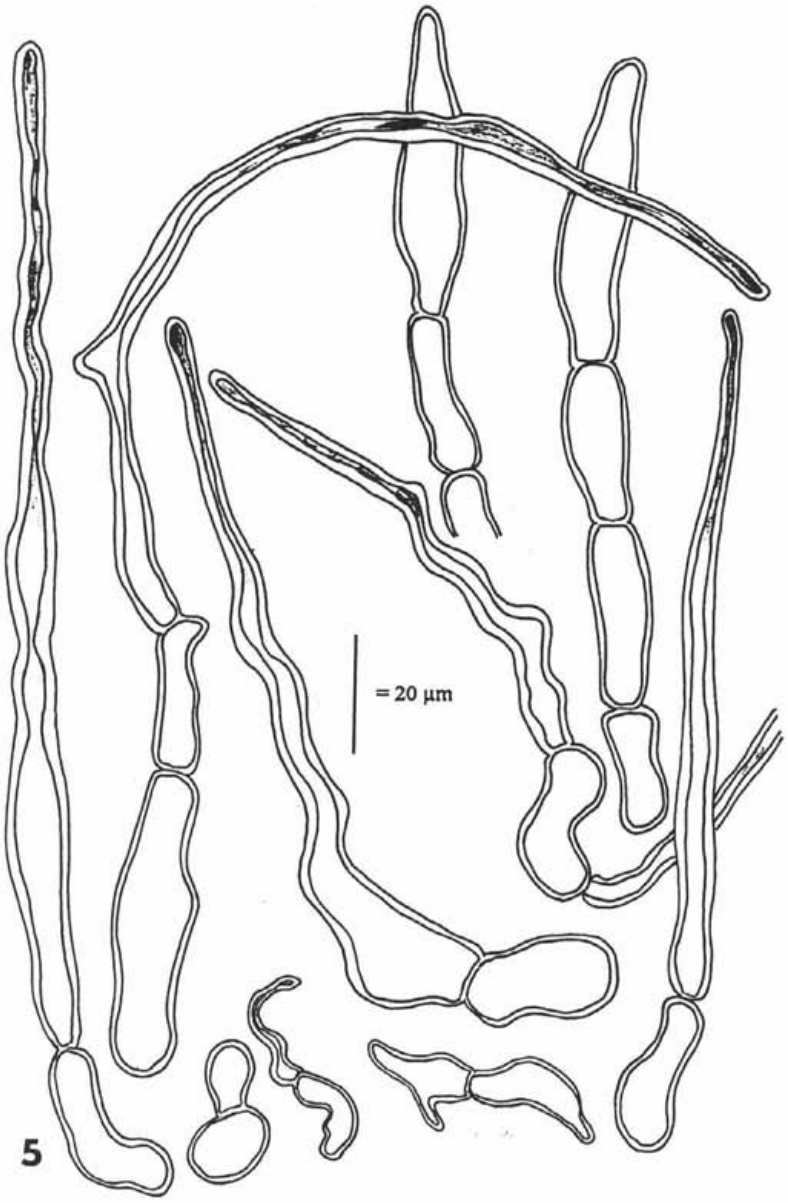


Fig 5. *Octospora kilimanjarensis* sp. nov. Hairs (pseudopili). Note strongly cyanophilic pigment. Holotype (BRNM).

aphanodictyon (Kobayasi) Dissing, Korf et Sivertsen in Dissing and Sivertsen, Mycotaxon 16: 458, 1983, = *Leucoscypha borealis* Eckblad, Nytt. Mag. Bot. 15: 52–53, 1968, = *Octospora borealis* (Eckblad) Caillet et Moyne, Bull. Soc. Myc. Fr. 103 (3): 218, 1987], the recombination into the genus *Octospora* formally made here is in accordance with the concept of the genus *Octospora* by Dennis and Itzerott (1973). The examined collection [Czech Republic: Moravia, Blatiny near Sněžné na Moravě, Českomoravská vrchovina (Bohemian-Moravian Heights), c. 600 m, on soil among moss and needles in spruce forest, 17. IX. 1987 leg. Jiří Moravec (J. Mor.)] represents the first collection in Central Europe. The find is surprising as the fungus was reported only from Norway, Greenland and Alaska (Kobayasi 1967, Eckblad 1968, Dissing and Sivertsen 1983).

Besides the much coarser ascospore ornamentation and the different shape and size of the ascospores discussed above, also the hairs of *O. kilimanjarensis* are shorter and not so copious and densely interwoven as those in *O. albocincta* of which the apothecial margin is formed by compact fascicles of densely interwoven and much longer (up to 450 μm) hairs. Moreover, the asci and paraphyses of *O. kilimanjarensis* are wider. Also the habitat seems to be different. Whilst *O. albocincta* was usually found growing often epiphytically in the leaf axils of living moss of the genus *Atrichum*, apothecia of *O. kilimanjarensis* and other species of the section grow on soil among other species of mosses. All 25 apothecia of the type collection of *O. kilimanjarensis* were found on soil among moss (*Pogonatum, Fissidens* and *Pleuridium*) but none was seen growing directly on the moss. The other three species are confined to *Polytrichum* and *Oligotrichum*.

The bryophilous habitat of these four related species was discussed in detail by Benkert (1994) who provided a key to their identification (under *Neottiella*) and SEM photomicrographs of their ascospores.

Regarding the systematic position of these species, I follow Dennis and Itzerott (1973), Itzerott (1974), and Caillet and Moyne (1987a, 1987b) and keep them in the genus *Octospora* Hedw. as members of the section *Neottiellae* Caillet and Moyne (1987 b). In this broader concept first presented by Dennis and Itzerott (1973), the genus includes also those species treated here which previously were and still are commonly classified in *Neottiella* or *Leucoscypha* p. p.

I fully agree with the reasons and discussion given by Dennis and Itzerott (1973), as I can confirm their arguments from my experience. The reason that these species have been treated under the generic name *Neottiella* [in the narrower concept which covers only the species treated here — e.g. Dissing and Sivertsen (1983), Benkert (1994)], or *Leucoscypha* [which in the wider sense covers also species possessing a pure white hymenium, with the type *Leucoscypha leucotricha* (Alb. et Schw.: Fr.) Boud. and also species of *Rhodoscypha* Dissing et Sivertsen — e.g. Harmaja (1977), Svrček (1981) and others], lies especially in the fact that they differ from other species of *Octospora* by the thick-walled apothecial hairs.

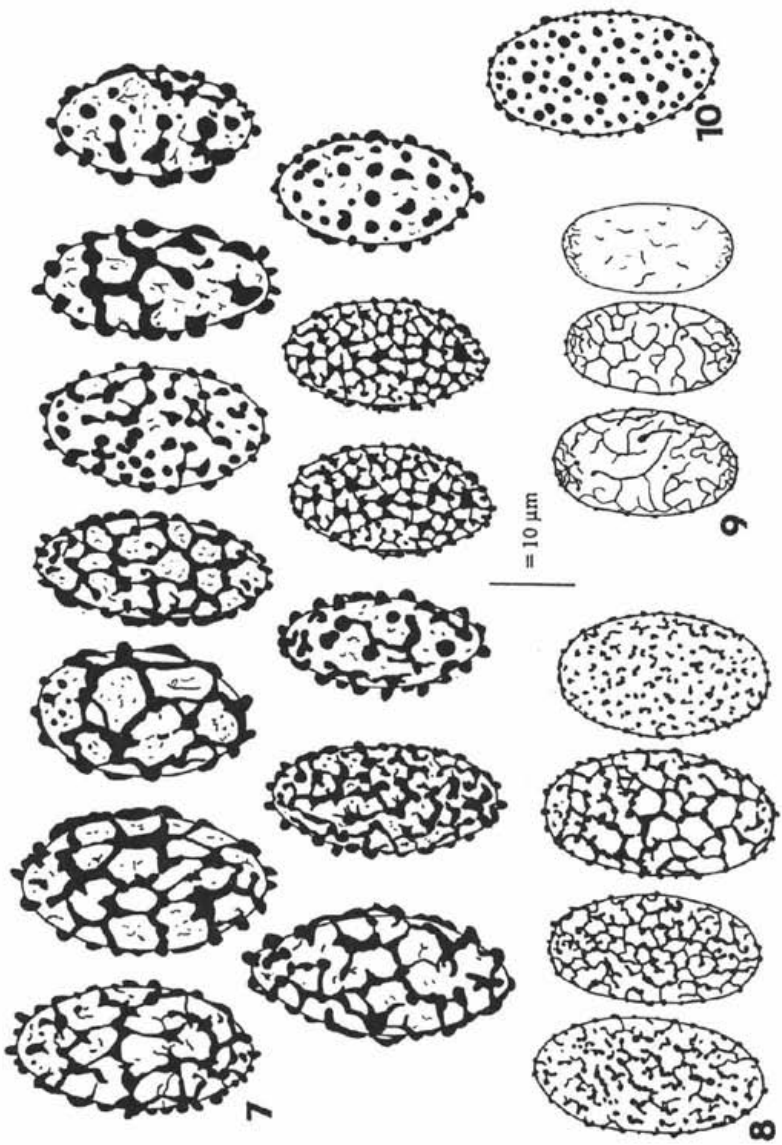
However, apothecia of all species of *Octospora* possess a fimbriate white margin of white anchoring hyphae, forming often dentate fringes; in several other species these may also be considered simple hairs although they have mostly thinner walls. In fact, the excipulum of *O. leucoloma* Hedw. and *Octospora humosa* (Fr.) Dennis consists of a similar structure as it is in the species of the section *Neottiellae*, including simple (though shorter and thin-walled) hairs. In *O. kilimanjarensis* and *O. albocincta* but also in *O. humosa*, *O. leucoloma* and some other species the ectal excipulum may simulate rather a pseudoparenchymatic layer (except the outermost hypha-like elements) consisting of globose to polygonal cells than a tissue of a textura intricata as commonly stated. Caillet and Moyne (1987a) made groups on the basis of the excipular structure, but how complicated this may be is seen in the examples of *O. axillaris* (Nees.:Fr.) Moser and *O. leucoloma* which the cited authors treated in a group where both the ectal and medullary layer are "prosenchymatous". However, their microphotograph Pl. II. fig. 2 and 3 shows clearly angular cells in the excipulum which is in accordance with my examination. The problem is also that it is difficult to name tissue in usual terms and these authors help themselves with expressions like "textura intricata globuleuse" etc. Similarly, it is difficult also to define the medullary structure when it may also simulate subglobose cells or is rather of a textura epidermoidea than intricata or "subintricata" as in *O. kilimanjarensis*. The presence of angular cells in both the ectal (except the overlaying anchoric hyphae) and medullary excipulum is more or less conspicuous in several other species as well, e. g. *Octospora libussae* Svrček et Kubička, *Octospora rustica* (Velen.) J. Moravec, *Octospora tetraspora* (Fuck.) Korf and others. Therefore, as in many other genera of Pezizales , the excipular structure itself cannot justify the generic delimitations or, as also other features may not correlate, it is even difficult to use such subjective features for groups at infrageneric level. Moreover, apothecia of *Octospora hetieri* (Boud.) Dennis et Itzerott have a pseudoparenchymatic excipulum and thick-walled, almost "typical" pointed (but hyaline) hairs whilst other features of this species, including the smooth ascospores, are characteristic of *Octospora*. *Octospora grimmiae* Dennis et Itzerott possesses a truly horizontally running textura intricata and similar apothecial hairs as those present in species of the section *Neottiellae*. The presence of apothecial hairs does not correlate with the ascospore character, as for instance the mentioned *O. hetieri* has smooth ascospores whilst apothecia of several other species possessing ornamented ascospores may be either hairy (those of the section *Neottiellae*) or hairless [*Octospora melina* (Velen.) Dennis et Itzerott, *Octospora meslini* (Le Gal) Svrček et Kubička, *Octospora phagospora* (Flag. et Lort.) Dennis et Itzerott and others]. A more detailed discussion also covering the history of the taxonomy based on this subjective distinction when the type species of *Octospora*, *O. leucoloma*, was placed into *Neottiella* whilst both *O. rutilans* and *O. humosa* in *Humaria*

(= *Octospora*), is given by Dissing and Itzerott (1973). Thus, we can only speculate whether the species of the section *Neottiellae* deserve a more isolated position — as a subgenus.

The result is also supported by the bryophilous habitat of all the species of the genus which was described in detail by Dennis and Itzerott (1973) and Caillet and Moyne (1987a). Many species grow often in leaf axils of different species of mosses which are often specific for individual *Octospora* species usually infecting the protonemata and causing rhizoid galls. The host-parasite interface has been studied by Döbbeler and Itzerott (1981) and Döbbeler (1979) who also keep all the bryophilous species in the wide concept of the genus *Octospora*.

On the other hand, species of the genus *Leucoscypha* [which accepted here in the narrow sense does not include the species with coloured apothecia containing carotenoid pigments, placed here into *Octospora* section *Neottiellae* (= *Neottiella*)], differ in important features, especially the habitat, as they are not confined to moss. The generic lectotype species *L. leucotricha* has been collected on bare acid soil, on decaying wood and twigs (only occasionally and probably secondarily within moss), and all collections of *Leucoscypha virginea* Rifai come from decaying wood. Also the pure white hymenium possessing no carotenes and the long, hyaline, almost pointed stiff setae combined with the fusoid ascospores containing four guttules indicate that *Leucoscypha* is a well separated genus. The carminophilic nuclei of the spores and other cells which were found in *L. leucotricha* as well as in *Leucoscypha rutilans* = *Octospora rutilans* lead Harmaja (1977) to keep the genus *Leucoscypha* in the wide concept previously formally proposed by Rifai (1968) by his emendation and adopted by Korf (1972) in which also the species with coloured apothecia here treated in the section *Neottiellae* of *Octospora* are included. It is not clear how valuable the feature (carminophilic reaction) is for the generic delimitation, and, if carminophilic nuclei could also be found in other species of *Octospora*. Dissing and Sivertsen (1983) keep the genus *Leucoscypha* separated for those species having a white hymenium and not being associated with moss and, moreover, founded a new non-bryophilous genus *Rhodoscypha* Dissing et Sivertsen based on *Peziza ovilla* Peck. This classification is acceptable, and I agree that also the genus *Inermisia* Rifai is well separated. These authors, however, recognize *Neottiella* as the independent genus for species treated here in the section *Neottiellae* of *Octospora*.

At this occasion, I wish to note that *Leucoscypha pallida* (Spooner) Brummelen (1995) has in my opinion nothing to do with the species of the genus *Leucoscypha*. Brummelen (1995) was obviously not aware of the fact that this fungus, based on *Svrcekomyces pallidus* Spooner (1987), was previously transferred to the genus *Sowerbyella* as *Sowerbyella pallida* (Spooner) J. Moravec (1985b). The genus *Sowerbyella* (see also the key in J. Moravec 1988) well matches Spooner's fungus due to the large stipitate apothecia, which do not possess a fringed margin but



Figs 7–10. Ascospores under oil immersion + CB. **7.** *Octospora albocincta* (Berk. et Curt. ap. Berk.) Caillet et Moyne [collection of *Neottiella catharinaea* Mc Lennan et Halsey (Beaton 110, K (M) 38652]; **8.** *Octospora rutilans* (Fr.) Dennis et Itzerott., Czech Republic, Bohemia Mt. Krkonoše, Petrovy kameny 1. IX. 1986 leg. A. Vágner (J. Mor.); **9.** *O. aphanodictyon* (Kobayasi) J. Mor., Czech Republic: Moravia, Blatiny near Sněžné na Moravě, 17. IX. 1987 leg. Jiří Moravec (J. Mor.); **10.** *Octospora vivida* (Nylander) Dennis et Itzerott., Czech Republic, Bohemia, Mladá Boleslav, Radouč 2. XI. 1995 leg. R. Knížek (J. Mor.).

an entire and blunt one, excipular structure possessing no hairs but only thin-walled hyphae overlaying a typically parenchymatous zone of globose cells like in all other species of *Sowerbyella* and never in *Leucoscypha* (including "*Neottiella*"), the hymenium fading to dirty white with brownish patches, and the ascospores bearing warts or spine-like ribs which are conspicuously enlarged and protruding

at the ascospore poles — a typical feature of *Sowerbyella* as well as the same origin and development of the ornamentation on immature ascospores (compare the drawings in J. Moravec 1985a and 1985b). The ascospores are rather similar to those of *Sowerbyella polaripustulata* J. Moravec (1985a).

ACKNOWLEDGEMENTS

I wish to thank to Dr. Zdeněk Pouzar for reviewing the manuscript and to Dr. Mirko Svrček (Prague) for kindly correcting the Latin diagnose. I am also obliged to Dr. Brian M. Spooner (Kew) and curators of the K herbarium and also to Dr. Dieter Benkert (Berlin) for arranging loans of the type and other material. My special thanks belong to Mr. Jiří Lhotecký who provided the SEM microphotographs.

REFERENCES

BENKERT D. (1987): Neottiella atrichi (= N. catharinaea) in Europa. – Beiträge zur Kenntnis der Pilze Mitteleuropas 3: 407–411.

BENKERT D. (1994): Beiträge zur Kenntnis bryophiler Pezizales-Arten. 2. Die Identität von Peziza albo-cincta Berk. & Curt. – Beiträge zur Kenntnis der Pilze Mitteleuropas 9: 131–138.

BRUMMELEN J. VAN (1995): A world-monograph of the genus Pseudombrophila (Pezizales, Ascomycotina). – Libri Botanici 14: 1–117. IHW-Verlag.

CAILLAND M. and MOYNE G. (1987a): Contribution à l'étude du genre Octospora Hedw. ex S. F. Gray (Pezizales) Espèces à spores elliptiques ou fusiformes. – Bull. Soc. Mycol. Fr. 103 (3): 179–226.

CAILLAND M. and MOYNE G. (1987b): Contribution à l'étude du genre Octospora Hedw. ex S. F. Gray (Pezizales). Écologie et morfologie. – Bull. Soc. Mycol. Fr. 103 (4): 277–304.

DENNIS R. W. G. and ITZEROT H. (1973): Octospora and Inermisia in Western Europe. – Kew Bull. 28: 5–23.

DISSING H. and SIVERTSEN S. (1983): Operculate discomycetes from Rana (Norway) 5. Rhodoscypha gen. nov. and Rhodotarzetta gen. nov. – Mycotaxon, Ithaca, 16: 441–460.

DÖBBELER P. (1979): Untersuchungen an moosparasitischen Pezizales aus der Verwandtschaft von Octospora. – Nova Hedwigia, Braunschweig, 31 (4): 817–864.

DÖBBELER P. and ITZEROTT H. (1981): Zur Biologie von Octospora libussae und O. humosa, zwei im Moosprotonema wachsenden Pezizales. – Nova Hedwigia, Braunschweig, 34: 127–136.

ECKBLAD F. E. (1968): The genera of the operculate Discomycetes. – Nytt. Mag. Bot. 15: 1–191.

HARMAJA H. (1977): Leucoscypha ovilla n. comb., a species new to Europe, found in northern Finland. – Karstenia 17: 73–76.

ITZEROTT H. (1974): Scheibenpilze in Moosen. – Microcosmos 293–297. Stuttgart.

KOBAYASI Y. and al. (1967): Mycological studies of the Alaskan Arctic. – Ann. Rep. Inst. Fermentation, Osaka, 3: 1–13

KORF R. P. (1972): Synoptic key to the genera of the Pezizales. – Mycologia 64: 937–994.

MORAVEC J. (1978): Fungi of Kilimanjaro – I. Discomycetes, Pezizales. – Čes. Mykol., Praha, 32: 70–78.

MORAVEC J. (1985a): A taxonomic revision of the genus Sowerbyella Nannfeldt (Discomycetes, Pezizales). – Mycotaxon, Ithaca, 23: 483–496.

MORAVEC J. (1985b): A taxonomic revision within the genus Sowebyella. – Mycol. Helvet. 1 (6): 427–442.

MORAVEC J. (1988): A key to the species of Sowerbyella (Discomycetes, Pezizales). – Čes. Mykol., Praha, 42: 193–199, tab. VII-X.

PANT D. C. and TEWARI V. P. (1977): Observations on two species of Leucoscypha. – Trans. Brit. Mycol. Soc. 68 (3): 439–441.

RIFAI M. A. (1968): The Australasian Pezizales in the herbarium of the Royal Botanic Gardens Kew. – Verh. Koninkl. Nederl. Akad. Wetensch., Nat. 57 (3): 1–295.

SVRČEK M. (1981): Katalog operkulátních diskomycetů (Pezizales) Československa I. (A – N). – List of Operculate discomycetes (Pezizales) recorded from Czechoslovakia I. (A – N). – Čes. Mykol., Praha, 35 (1): 1–24.

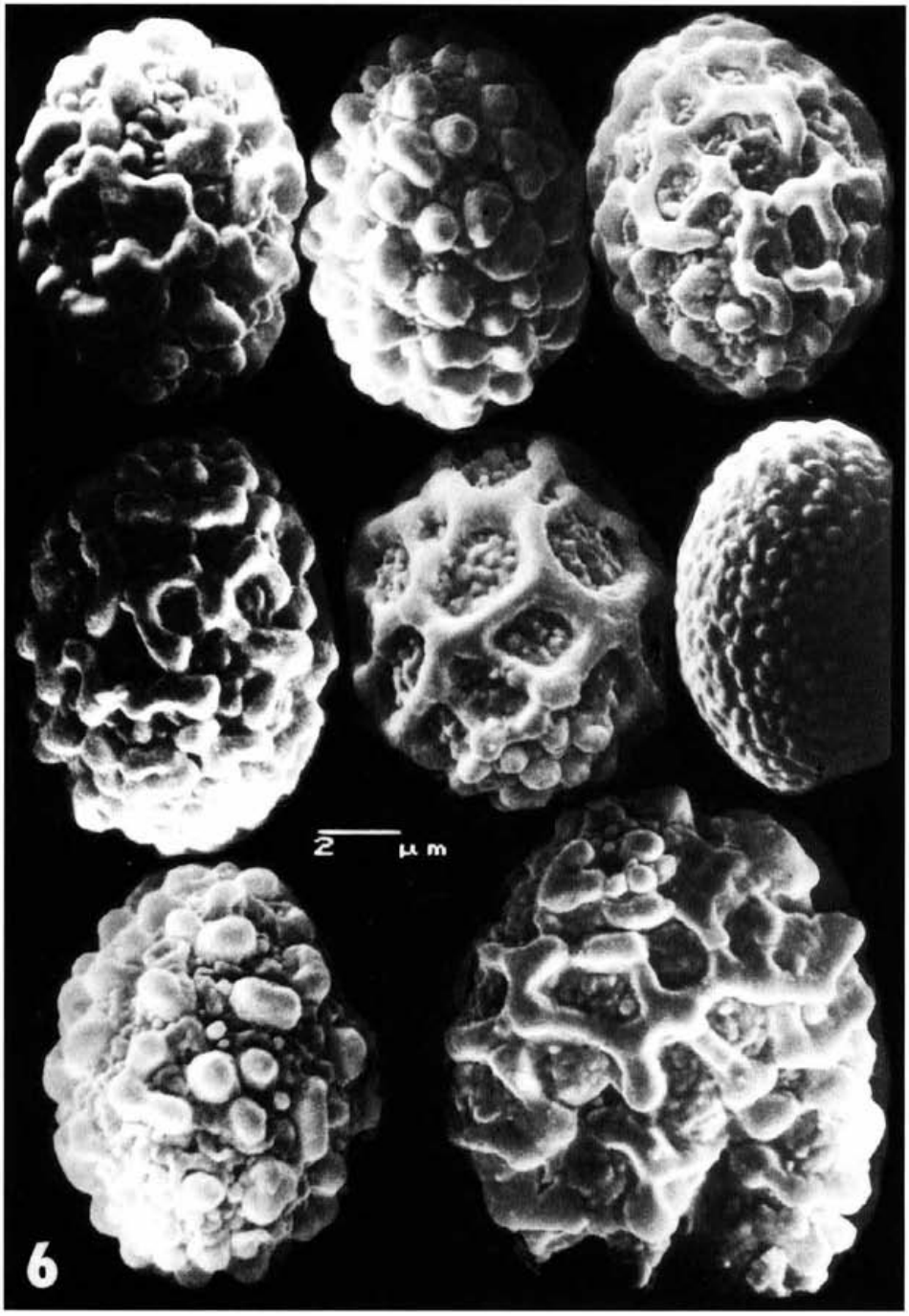


Fig 6. *Octospora kilimanjarensis* sp. nov. SEM photomicrographs of ascospores.