

Zeitschrift: Schweizerische Zeitschrift für Pilzkunde = Bulletin suisse de mycologie
Herausgeber: Verband Schweizerischer Vereine für Pilzkunde
Band: 44 (1966)
Heft: 6

Artikel: Osteina, a new genus of Polyporaceae
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DOI: <https://doi.org/10.5169/seals-937560>

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des Botanischen und Zoologischen Institutes war. Zahlreiche Forschungsreisen führten ihn von dort aus durch fast ganz Süd- und Mittelamerika, von Feuerland bis in das Amazonasgebiet, nach Bolivien, Peru, Kolumbien bis nach Mexiko, Reisen, die ihm die eingehende Erforschung der *Agaricales*-Flora dieser Länder ermöglichten. Sein besonderes Interesse wandte sich der patagonischen und der neotropischen Flora zu. Und die Ergebnisse dieser Forschungen ermöglichten Singer eine weitestgehende Verbesserung und Vervollkommnung seines Systems der Blätterpilze. 1949 (bzw. 1951) erschien das Werk «The Agaricales in Modern Taxonomy», eine Weiterentwicklung der oben erwähnten Arbeit aus den «Annales Mycologici», in der besonders die Arbeiten aus der Zeit in Nordamerika ihren Niederschlag finden. Dieses grundlegende Werk hat seither ganz entscheidend die Weiterentwicklung der Blätterpilzsystematik beeinflusst. 1962 konnte bereits eine weitere, nunmehr auf Grund der südamerikanischen Forschungen ebenso wie von Herbarstudien in Europa wesentlich überarbeitete Neuauflage erscheinen, die für alle Arbeiten auf diesem Gebiet für die Zukunft eine unentbehrliche Arbeitsgrundlage darstellt.

Nicht übergehen dürfen wir in diesem Zusammenhang auch Singers aktives Interesse am Phylogenieproblem. Singer hat auf diesem Sektor die Buchholtz-Lohwagschen Ideen weiterentwickelt. Und auch wer nicht seinen Ansichten folgen kann, muß zugeben, daß gerade durch Singers Aktivität auf diesem Felde von Vertretern aller Richtungen immer neue Gedanken in die Diskussion geworfen wurden, die sich auf das Gesamtproblem fruchtbringend auswirken und notwendig auch ihren Niederschlag in unseren heutigen Ansichten über das System finden.

Wohl kaum ein anderer Mykologe hat eine derartige Formenfülle aus verschiedensten Florengebieten zu Gesicht bekommen und verfügt gleichzeitig über so umfangreiche Typen- und Literaturkenntnisse. Seit 1950 ist er auch Mitglied der Nomenklaturkommission für Pilze und Flechten. Wohl wenige sind daher so berufen wie gerade Singer, die Entwicklung des *Agaricales*-Systems voranzutreiben. Möge er daher noch lange Freude und Genugtuung aus seiner Arbeit schöpfen. Und wohl alle, die ihn kennen, schließen sich unseren herzlichsten Wünschen für noch viele Jahre in bester Gesundheit und voller Schaffenskraft an! *M. Moser*

Osteina, a new genus of Polyporaceae

By M. A. Donk, Rijksherbarium, Leiden

The only species of *Osteina* Donk, gen. nov., is known in Europe and North America as *Polyporus osseus* Kalchbr., but *Polyporus obductus* Berk. is an earlier name for it. The combination *Osteina obducta* (Berk.) Donk, comb. nov., is proposed. The fungus has been successively placed in no less than five genera, but in none of these was it satisfactorily accommodated.

Polyporus osseus Kalchbr. is in many respects a remarkable fungus that has steadfastly defied proper classification. Briefly, the lignicolous fruitbody is stalked, usually cespitose, whitish, and dries bone-hard; the spores are white in a print.

Fries (1874: 541) placed the species in *Polyporus* trib. *Merisma* Fr. (“E trunco tuberculove communi explicantur pileoli numerosissimi, pilei primarii divisione orti ...”). When this subdivision became the modern genus *Grifola* S.F.Gray

emend., *Polyporus osseus* was retained in it by some authors. This disposition implies that the fruitbody is considered to be 'multipileate', i.e. that several to many caps arise from a common, often tuberous stalk. Pilát (1934: 25) emphasized the peculiar consistency by placing *Polyporus osseus* in a section of its own (*Grifola* sect. *Ossei* Pilát) and it is now commonly known in Europe as *Grifola osseus* (Kalchbr.) Pilát.

Quélet (1886: 177) interpreted the fruitbody differently. At first he classified *Polyporus osseus* as a species of *Leptoporus* Quél., an extremely heterogenous taxon that contained *inter alia* a set of species that is still combined under the name *Tyromyces* Murrill. This disposition implied that Quélet regarded the fruitbody as sessile, since *Leptoporus* was one of the genera of his series Apodes ("sessiles basi dilatata, rarius attenuato-sessilis, frequentius resupinati"). When Murrill (1907: 32) redescribed *Polyporus obducens* Berk. (which is the same species as *P. osseus*), he misjudged the type collection and since he regarded the fruitbody as sessile, he made a mistake similar to that of Quélet by placing it in *Tyromyces*.

However, Quélet (1888: 404) very soon rectified his error by transferring *P. osseus* to *Leucoporus* Quél. In this genus he included the groups of *Polyporus brumalis* (Pers.) per Fr., *P. picipes* Fr., and *P. varius* (Pers.) ex Fr., all species that are currently placed in the genus *Polyporus* [Mich.] Fr., or more precisely, in *Polyporus* subgen. *Leucoporus* (Quél.) Maubl. and *Polyporus* subgen. *Melanopus* (Pat.) Maubl. (the latter restricted by the exclusion of *Polyporus squamosus* (Huds.) per Fr. and allies!). This disposition implied that Quélet had changed his mind and regarded the fruitbody of *Polyporus osseus* as 'unipileate' and stalked. Murrill (1915: 13) came independently to the same conclusion: when he described freshly collected North American specimens as a new species he placed this in his conception of the genus *Polyporus* which is almost identical with a current emendation of *Polyporus*. He called his material *Polyporus zelleri* Murrill.

It will be seen that the generic classification of the fungus recorded above depended completely on macroscopic features of the fruitbody. Even with this in mind the results were far from satisfactory. One of the characters of great importance is the fact that the fruitbody is *truly* stalked. A stalk is constantly present in the fruitbody initials and if a full-grown fruitbody appears occasionally to be sessile, this is only because the stalk had remained merely very short. This character tends to exclude the genus *Tyromyces* in the emendation now accepted by most European authors (e.g. Donk, minus *Laetiporus*). The species of this genus (which is still far from homogeneous) have effused, resupinate, or sessile fruitbodies, but these are *spuriously* stalked; i.e., the fruitbody may also occur in sessile or even more or less appressed to effused modifications (for these terms, cf. Donk, 1964: 206).

The truly stalked fruitbody is typical of two of the genera in which *Polyporus osseus* has been placed, viz. *Polyporus* and *Grifola*. This latter genus, as it appears in the monograph by Pilát, contains a very mixed assortment of species of which the most clearly foreign elements have now been excluded. As far as European species are concerned, these are, apart from some odd species, *Laetiporus* Murrill (type, *Polyporus sulphureus* (Bull.) per Fr.) and *Bondarzewia* Sing. (type, *Polyporus montanus* (Quél.) Cost. & Duf.). The restricted circumscription of the genus *Grifola*

I have in mind is the same as that of *Polypilus* P. Karst. emend. Donk (an incorrect name); its principal species are *Polyporus frondosus* (Dicks.) per Fr., *P. umbellatus* (Pers.) per Fr., and *P. giganteus* (Pers.) per Fr. I do not prophesy that these species will remain together indefinitely, but all have in common that they produce several to many caps from a common, rooting, and more or less tuberous stalk. The rooting base of the stalk is directly or indirectly (through an intermediary sclerotium) connected with subterranean parts of stems, stumps, or roots: the compound fruitbody typically does not grow directly from exposed surfaces of stems or wood. Moreover, the surface of the caps in *Grifola* is innately-fibrillose by mainly radiately arranged hyphae; in addition it is often faintly, but constantly, zonate, which is perhaps explained by the laceration of the surface layer caused by the rapid expansion of the cap. In these respects *Polyporus osseus* differs decidedly from *Grifola*. Where it appears to have 'multipileate' fruitbodies when well developed, closer inspection will reveal that the separate fruitbodies are 'unipileate', though often densely cespitose, and the surface of the cap is completely even: neither radiating hyphae are to be perceived even with a strong hand-lens nor is there the faintest indication of zonation. Moreover, the peculiar consistency, tough-fleshy and drying bone-hard, is scarcely matched in either *Polyporus* or *Grifola*.

As long as the classification of the Polyporaceae, even in a restricted sense (cf. Donk, 1964: 278), is still partially artificial, the dispositions discussed above are understandable. In the more elaborate classification of the family that several authors are now working out step by step, however, none of the mentioned genera offers satisfactory accommodation. The above discussion tends to stress the isolated position of *Polyporus osseus* even without taking into consideration the internal structure of the fruitbody. Some years ago Aoshima & Furukawa (1963) remarked that the fungus had a characteristic hyphal system; they described it as follows:

"context hyphae thin to thick-walled, [branching] and frequently with short branchings to form a sclerotium-like tissue, with cross walls but no clamps observed, mostly 2.5–10 μ diam., but sometimes inflated up to 20 μ ; tramal hyphae [viz. of dissepiments] heterogenous with context, mostly thick-walled, frequently branched, sometimes agglutinated, 1.5–5 μ , sometimes irregularly inflated."

Adding to this my own observations it may be said that the hyphal structure of the context of the cap is truly and typically monomitic with clamps.¹ Very characteristic is that most generative hyphae become metamorphosed, sometimes by inflation but, usually more strikingly, by acquiring thick walls. This more readily suggests the situation in *Grifola* than that in *Polyporus sensu stricto* (*P. squamosus* and allies). The context of the cap in *Grifola* is (as far as is known) monomitic, whereas in *Polyporus* some kind of binding hyphae are found as an additional hyphal system. The essential difference between the hyphal make-up of *Polyporus osseus* and *Grifola* is that in the former the amount of hyphae that become thick-

¹ It will be seen that in contrast to Aoshima & Furukawa I report clamps. The two Japanese authors examined several collections from widely spaced localities. I am unable to account for this discrepancy.

walled is very large while the walls become incomparably thicker (the lumen is often almost thread-like) and are cartilaginous in nature. Finally the thick-walled hyphae are decidedly more intricately interwoven so that the whole mass suggests the inner structure of certain sclerotia.

This situation recalls the hyphal make-up of *Mycoleptodonoides* Nikol. as described by Maas Geesteranus (1961, 1962). Nevertheless, certain marked differences are readily seen. In *Polyporus osseus* the branching is much more frequent, the branches are shorter and far more intertwined (and perhaps still more densely compacted) and the sclerification of the walls is more general. Under a strong hand-lens the surface of the cap in *Polyporus osseus* is completely without 'structure' while in *Mycoleptodonoides* the surface is distinctly radially streaked by an innate fibrilosity.

Strongly cartilaginously thickened walls also occur in the genus *Cartilosoma* Kotlaba & Pouzar (1958) which its authors described as of soft-cartilaginous consistency when fresh but bone-hard when dried; the context is monomitic ("... hyphis monomiticis, hyalinis, ramificatis, saepe undulatis, parietibus incrassatis usque nodosis, nodoso-septatis"). In other respects, however, *Cartilosoma* is very different: the fruitbody is resupinate-appressed with a not very pronounced tendency to become barely reflexed along its margins.

I have termed this type of generative hyphae that acquire a very thick wall, sclerified (Donk, 1964: 237). Often the cells are rather short and the clamps malformed; the hyphae break off more or less easily along the septa. The sclerification of the walls in the three genera (*Osteina*, *Mycoleptodonoides*, *Cartilosoma*) is cartilaginous rather than gelatinous. All three genera are lignicolous and the resemblances between the context of the three genera may be interpreted as a result of convergence rather than as indicating relationship. Because of the chaotic state in which of the classification of the polypores still finds itself I refrain on this occasion from discussing the possible taxonomic position of *Osteina*.

Osteina Donk, gen. nov.

Grifolia sect. *Ossei* Pilát in Beih. bot. Cbl. 52: 25. 1934. – Monotype: *Grifola ossea* (Kalchbr.) Pilát.

Sporocarpus centro usque sublateraliter stipitatus (stipite interdum perbrevis pileoque ita pseudo-sessili), saepe caespitoso-connatus, albidus vel pallidus, annuus; superficie anodermi, laevi, glabra (sub lente minutissime pubescente), haud zonata; contextu in vivo tenaciter carnosus, in sicco duro (saepius osseo); tubis unistratosis; poris minutis, angulatis; dissepimentis tenuibus. Hyphae contextus pilei primo parietibus tenues, septatae et fibulatae, deinde plus minusve inflatae, pro maxima parte parietibus incrassatae, breviter multiramosae, compacte intertextae; parietibus denique valde crassae et cartilagineae, luminibus saepe filiformibus. Cystidia nulla. Basidia clavata, sterigmatibus apicalibus 2–4. Sporae oblongae, latere adaxiali applanatae, parvae (4–6 μ longae), parietibus tenuibus, laevibus, haud amyloideis. – Typus: species representata No. 961.87–708 in herbario Lugdun. Batav. sub nomine "*Polyporus osseus* Kalchbr."

Fruitbody centrally to almost laterally stalked (stalk may be short and fruitbody appear sessile), white or pallid, annual; surface anoderm, glabrous, smooth (very minutely pubescent), azonate; context tough-fleshly when fresh, drying hard to often bone-hard; tubes 1-layered; pores minute, angular; dissepiments thin. Hyphae of context of cap at first thin-walled, septate, with clamps, then often

more or less inflating, for the largest part however becoming thick-walled, much branched at short distances, compactly intertwined; walls becoming very thick and of cartilaginous appearance, the lumina often almost thread-like. Cystidia absent. Basidia club-shaped with 2–4 apical sterigmata. Spores oblong, adaxially flattened, small (4–6 μ long); walls thin, smooth, non-amyloid. – Etymology: ὀστέϊνος, made of bone.

Type-species. – *Polyporus osseus* Kalchbr. as represented by material in herbarium Leiden, L 961. 87–708 (genotype).

Only species. – *Osteina obducta* (Berk.) Donk, *comb. nov.*

Polyporus obductus Berk. in Lond. J. Bot. 4: 304. 1845 (basionym). – *Tyromyces obductus* (Berk.) Murrill in N. Am. Flora 9: 32. 1907. – *Grifola obducta* (Berk.) Aosh. & Furuk. in Trans. mycol. Soc. Japan 4: 91 fs. 1, 2. 1963. – Monotype: “British North America” [= Canada], leg. Richardson (h. Hook. in K, BPI). – Fide [Bres. apud] Lloyd, Mycol. Writ. 4 (Syn. Apus Pol.): 383. 1915 & Bres. in Annl. mycol. 18: 67. 1920 = *Polyporus osseus*.

Polyporus osseus Kalchbr. in Math. term. Közl. 3: 217 pl. 1 f. 2. 1865; Kalchbr. (“Mspt.”) in Rab., Fungi europ. No. 706. 1865 (with description) [cf. in Hedwigia 4: 141. 1865]. – *Leptoporus osseus* (Kalchbr.) Quél., Ench. Fung. 177. 1886. – *Leucoporus osseus* (Kalchbr.) Quél., Fl. mycol. France 404. 1888. – *Grifola ossea* (Kalchbr.) Pilát in Beih. bot. Cbl. 52: 58 fs. 7, 8, pls. 9, 10. 1934. – Type: Hungary, Szepes Olaszi (perhaps distributed by Rab., Fungi europ. No. 706).

Polyporus zelleri Murrill, West. Polyp. 13. 1915. – Holotype: U.S.A., Washington, Seattle, leg. Zeller 146 (NY). – Fide Overh., Polyp. U.S. 226, 227. 1953 = *Polyporus osseus*.

Descriptions and illustrations. – Kalchbr., l. c.; Fr., Hym. europ. 541. 1874; Kalchbr., Ic. sel. Hym. Hung. 54 pl. 34 f. 2. 1877; Lloyd, Mycol. Writ. 3 (Syn. stip. Pol.): 191 f. 496. 1912; Shope in Ann. Missouri bot. Gdn 18: 360 pl. 29 f. 3. 1931; – all as *Polyporus osseus*; Pilát, l. c. & in Atl. Champ. Eur. 3: 53 f. 13, pls. 14–16. 1936; – as *Grifola ossea*; Overh., Polyp. U.S. 226 pl. 37 f. 225, pl. 44 f. 263, pl. 100 f. 566, pl. 131 fig.; – as *Polyporus osseus*; Aosh. & Furuk., l. c.; – as *Grifola obducta*.

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Bemerkungen zur Gattung *Hygroaster* Singer 1955

Von E. Horak, EAFV-ETH, Birmensdorf, Schweiz

Nachdem R. Singer im Jahre 1961 die Kombination *Hygroaster asterosporus* (Lange) Singer (= *Omphalia asterospora* Lange 1930) vorschlug, mußte sich auch der europäische Mykologe mit einer bislang nur aus dem subtropischen Venezuela beschriebenen Gattung vertraut machen.

Das heute vor einem Jahrzehnt aus der Taufe gehobene Taxon *Hygroaster* Singer basiert auf einem von Dennis 1949 in der Umgebung von Trinidad (Vene-