

OCTOSPORA RUBENS AND OCTOSPORA RUSTICA  
IN THE NETHERLANDS  
(Pyronemataceae, Ascomycetes)

PETER BILLEKENS

Lodewijk van Nassaustraat 7, 5923 BC Venlo, The Netherlands

Two species of Ascomycetes, *Octospora rubens* and *O. rustica*, collected from the former Wambach clay pit in the municipality of Tegelen (prov. Limburg), are described and shown to be new to the Netherlands.

*Octospora rubens* (Boud.) Moser — Figs. 1, 2

*Humaria rubens* Boud., Bull. Soc. mycol. Fr. 12 (1896) 13. — *Humarina rubens* (Boud.) Seaver, North Amer. Cup-fungi (Operc.) (1928) 127. — *Humaria sanguinea* Vel., Monogr. Discom. Boh. (1934) 325. — *Octospora rubens* (Boud.) Moser, Ascomyceten. In: H. Gams, Kl. Kryptog.-Fl. Ila (1963) 110.

Apothecia sessile, solitary or in small groups, 1–3.8 mm in diam., 0.5–1 mm high, gymnohymenial. Receptacle hemispherical or cup-shaped, then lenticular or convex, pastel red (Methuen, 7A4; see Kornerup & Wanscher, 1978), pale red (Methuen, 7A3), when juvenile with pink bloom, never orange or yellow, demarcated from the hymenium by a broad, finely serrated rim via a change in colour; the margin projecting over the hymenium, finely tomentose, never torn. Hymenium concave, flat, later either flat or convex, granular, orange red (Methuen, 8A7), tomato red (Methuen, 8C8), greyish red (Methuen, 9C5), or cardinal (red) (Methuen, 10D8), when juvenile often with a pinkish bloom, but never orange or yellow. Hypothecium 10–30  $\mu\text{m}$  thick, clearly differentiated from medullary excipulum, cells sinuous, barrel-shaped, lobate, small, weakly cyanophilous, 2–8  $\mu\text{m}$  broad (textura intricata), with very fine, concentrated granules of reddish intracellular pigment. Medullary excipulum 40–50  $\mu\text{m}$  thick, towards the margin decreasing to 25  $\mu\text{m}$ ; cells small, lobate, subcylindrical, sinuous, irregular, thin-walled, weakly cyanophilous, 4–28  $\times$  2–5  $\mu\text{m}$  (textura intricata), with very fine concentrated granules of reddish intracellular pigment. Ectal excipulum easily distinguished from medullary excipulum, with very fine, diffuse granules of reddish intracellular pigment; 65–80  $\mu\text{m}$  thick at base, somewhat attenuating upwards to 50–60  $\mu\text{m}$ , then broadening again close to the margin up to 110–130  $\mu\text{m}$ , with a wedge-shaped zone of textura intricata to textura epidermoidea; the cells are subcylindrical, sinuous, lobate, or irregular, 10–30  $\times$  5–8  $\mu\text{m}$ ; at about 100  $\mu\text{m}$  from the top of the margin a deep layer of irregularly arranged, angular cells, 15–45  $\times$  5–9  $\mu\text{m}$  (textura prismatica), running parallel to the outer surface of the apothecium, terminating over the entire width of the very broad margin in clavate end-cells 25–60  $\times$  5.5–14  $\mu\text{m}$ ; the inner part of the margin projecting above the hymenium. Spores uniseriate, ellipsoid, hyaline, smooth, uninucleate, carminophobic, cyanophilous, mostly with a single large oil globule, sometimes with one large and several smaller ones, rarely

with two large globules,  $16.4\text{--}18.5 \times 11.1\text{--}12.7 \mu\text{m}$ . Asci (4- to) 8-spored, operculate, cylindrical, gradually narrowing towards the apo- or pleurothynchous base,  $214\text{--}276 \times 14\text{--}22 \mu\text{m}$ ; ending at different levels (range  $8\text{--}40 \mu\text{m}$ ), projecting above the paraphyses. Paraphyses straight or irregular, often branched,  $3.7\text{--}7.4 \mu\text{m}$ , at the top up to  $13.8 \mu\text{m}$ ; septate, often swollen at the septa, with homogeneous, round globules of reddish, intracellular, carotenoid pigment.

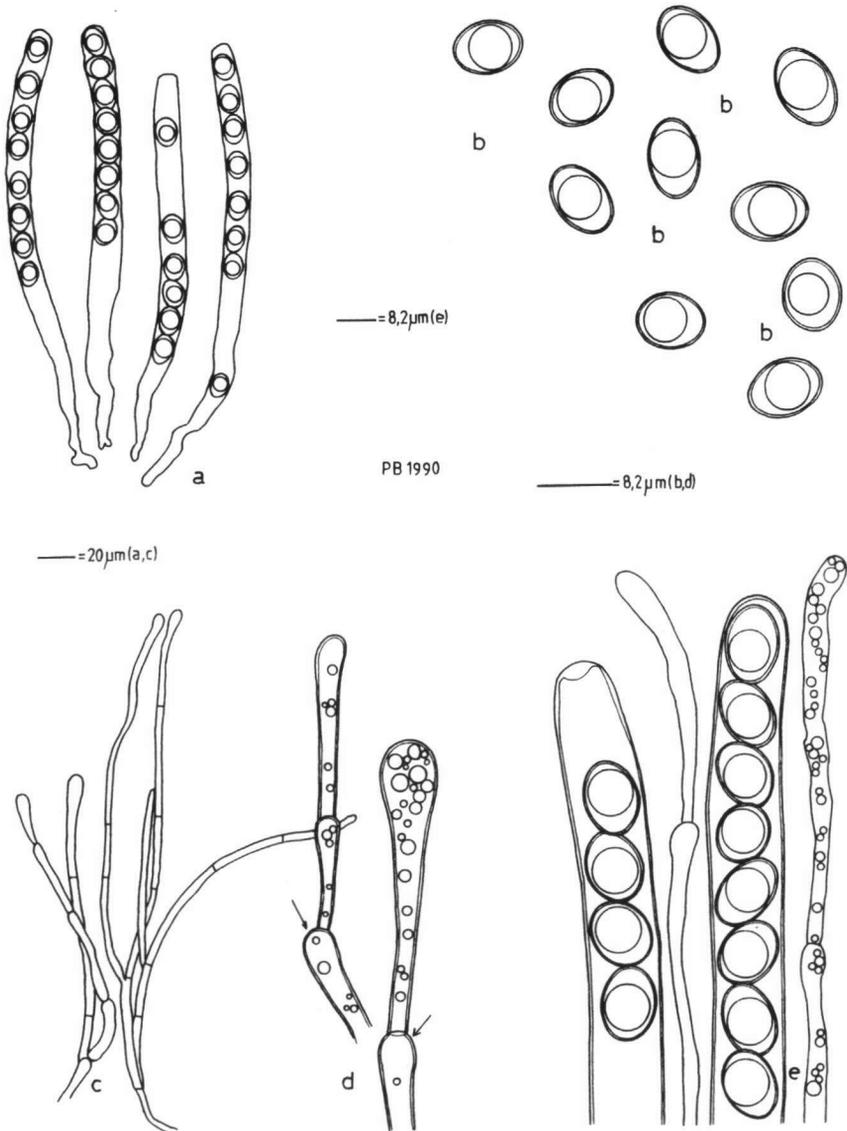


Fig. 1. *Octospora rubens*. a. Asci with contents; b. spores; c. paraphyses; d. upper parts of paraphyses with intracellular carotenoid pigment; e. parts of asci and paraphyses with one paraphysis showing contents.

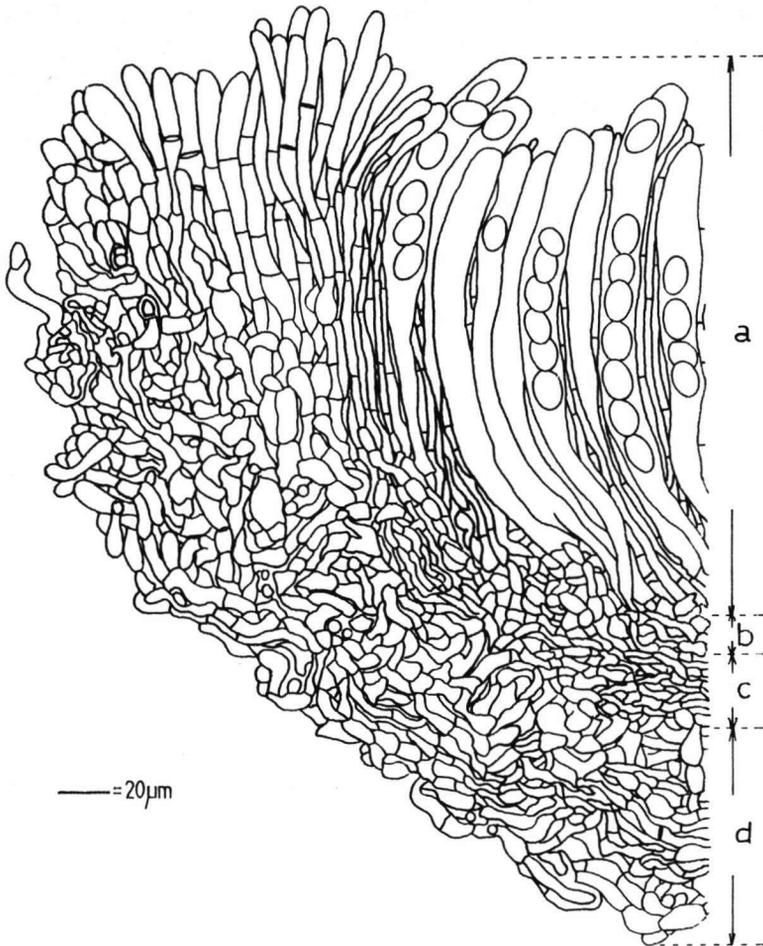


Fig. 2. *Octospora rubens*. Median section of margin of apothecium: a. hymenium; b. hypothecium; c. medullary excipulum; d. ectal excipulum.

**Habitat and distribution.** At the foot of an uncultivated slope, humus-deficient calcareous sand mixed with calcareous lime; associated with *Ceratodon purpureus* and *Atrichum undulatum*, close to *Robinia pseudoacacia*, *Cytisus scoparius*, and *Quercus robur* and amongst *Rumex acetosella*, *Jasione montana*, and *Tussilago farfara*; rather rare; fruiting throughout the year; Germany (Moser, 1963; Itzerott, 1981; Itzerott & Döbbler, 1982), United States (Seaver, 1928), Great Britain? (Dennis, 1978), France (Boudier, 1896; Grelet, 1932–1943; Caillet & Moyne, 1987), Czechoslovakia (Velenovský, 1934; Moravec, 1969) and now also the Netherlands.

**Collections examined.** The Netherlands: prov. Limburg, Tegelen, 17 Febr., 20 Mar., 28 Apr., 7 June and 19 Sept. 1990, *P. Billekens* (L and herbarium of the author).

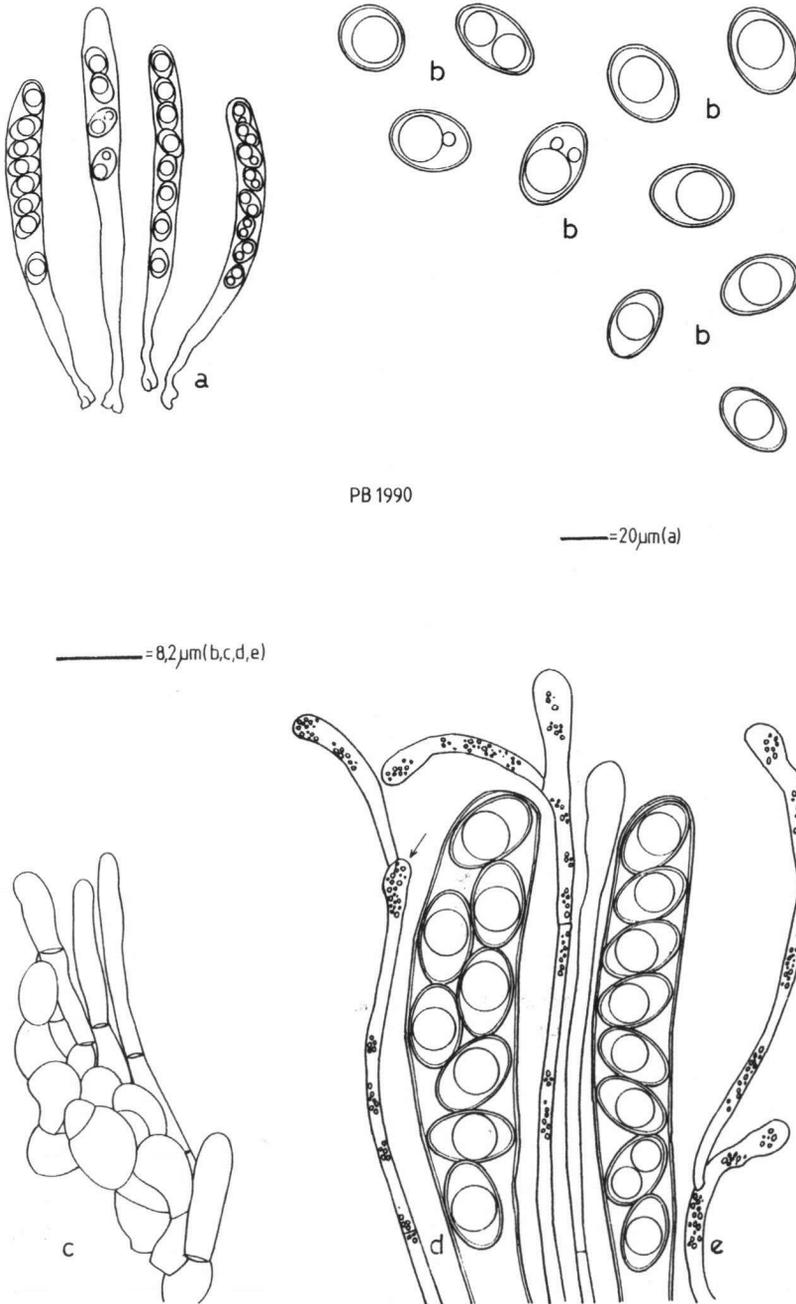


Fig. 3. *Octospora rustica*. a. Asci with ascospores; b. spores; c. ectal excipular cells with terminal, clavate end-cells forming the margin; d. upper halves of asci with contents; e. upper parts of paraphyses with intracellular carotenoid pigment.

The original description (Boudier, 1896) with accompanying illustrations of this species – under the name of *Humaria rubens* Boud. – as well as subsequent descriptions (Boudier, 1905–1910; Seaver, 1928; Grelet, 1932–1943; Velenovský, 1934 - as *Humaria sanguinea* Vel.; Moser, 1963; Moravec, 1969), with or without illustrations, agree well, as far as habitat, colour, size, macroscopic structure of receptacle, and most of the hymenial microscopic characters are concerned. However, some differences have to be noted. It is very puzzling that none of the above authors has stated anything about the crumbly structure of the hymenium which is caused by asci and paraphyses ending irregularly at different levels. This can even be seen with the help of a hand lens. Plate 396C of Boudier (1905–1910) shows a somewhat granular structure, but this is not mentioned in the text. In all specimens studied, this feature is clearly visible, in young as well as in fairly old fruit-bodies. Most of the above authors did not study excipular structures of *Octospora rubens*. Itzerott (1981) and Caillet & Moyne (1987), however, did, with Itzerott describing the ectal excipulum of *O. rubens* as *textura globulosa* or *angularis* and noting that it is mixed with broad hyphae. In addition, he observed a thick medullary excipulum and a hypothecium of *textura intricata*, whereas Caillet & Moyne classified the medullary and ectal excipula as *textura intricata*.

In the present study, both hypothecium and medullary excipulum were found to consist of tissues of *textura intricata*. The ectal excipulum can be clearly distinguished by a transition between *textura intricata* and *textura epidermoidea*, and by wider hyphae than in the medulla (5–8  $\mu\text{m}$  vs. 2–5  $\mu\text{m}$ ). Comparison of these data with those from the literature corroborates Itzerott's experience that within a single species the structure of excipulum and hypothecium is variable; *Octospora rubens* is no exception! This comparison also shows that the Dutch material most closely resembles that studied by Caillet & Moyne (1987) from the French Jura.

### *Octospora rustica* (Vel.) Moravec — Figs. 3, 4

*Humaria rustica* Vel., Monogr. Discom. Boh. (1934) 327. — *Octospora libussae* Svrček & Kubička, Česká Mykol. 17 (1963) 65. — *Octospora rustica* (Vel.) Moravec, Česká Mykol. 23 (1969) 226.

Apothecia sessile, solitary or in groups; 0.5–2.2 mm in diam., 0.3–0.8 mm high, gymnohymenial. Receptacle invariably disc- or cup-shaped, margin smooth or very finely serrated, with outermost margin directed towards the substrate, almost smooth, very finely pruinose, occasionally with a few very obscure excipular hairs, unicolorous, not projecting over the hymenium. Hymenium smooth, invariably convex or nearly flat, pale orange (Methuen, 5A3), light orange (Methuen, 5A4), melon yellow (Methuen, 5A6), orange (Methuen, 5A7), dark orange (Methuen, 5A8), golden yellow (Methuen, 5B7), (Methuen, 11A6), or pastel pink (Methuen, 11A4). Hypothecium cells small, barrel-shaped, lobate, irregularly angular, 3–20  $\times$  2–8  $\mu\text{m}$  (*textura intricata*), with concentrated very small granules of orange-yellow intracellular pigment. Medullary excipulum cells inflated, lobate, regularly or irregularly rectangular, 4–32  $\times$  2–17  $\mu\text{m}$  (*textura intricata*), with very small granules of concentrated orange-yellow intracellular pigment. Ectal excipulum cells isodiametrically subglobose or polygonal to irregularly angular, 10–40  $\times$  6–30  $\mu\text{m}$  (*textura globulosa* to *textura angularis*), without intracellular and membrane pigment; 100–175  $\mu\text{m}$  from the margin cells become abruptly rectangular, 44–60  $\times$  9–15

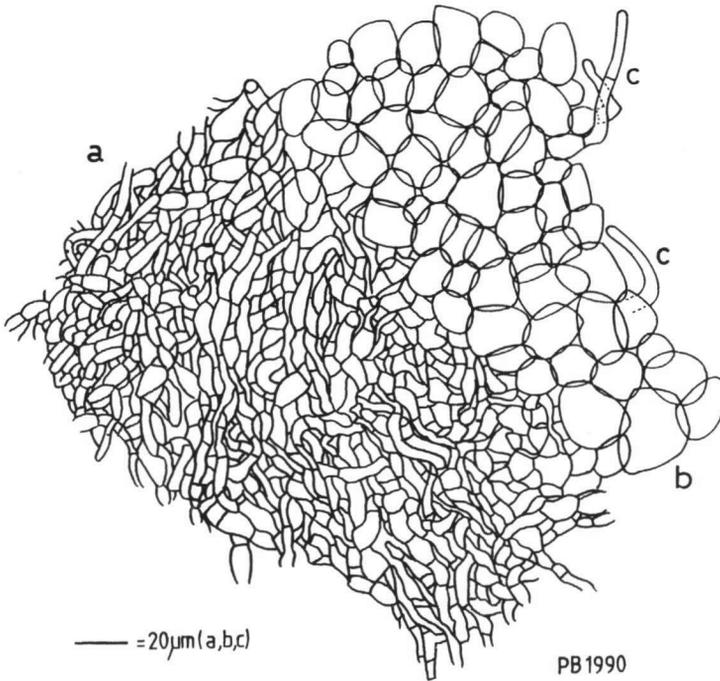


Fig. 4. *Octospora rustica*. a. Medullary excipulum; b. ectal excipulum; c. hyphoid hairs.

µm (textura prismatica); in the narrow margin which does not project over the hymenium these cells terminate in clavate end-cells,  $40\text{--}100 \times 8\text{--}17$  µm, with scattered hyphoid hairs. Hairs  $50\text{--}175 \times 5\text{--}8$  µm, hyaline, hyphoid, straight or sinuous, rounded at extremities; thin-walled (wall  $0.4\text{--}0.8$  µm), without septa or uni- to triseptate, with a  $10\text{--}12.5$  µm thick, bulbous base. Spores uni- or biserial, ellipsoid, carminophobic, uninucleate, with one or occasionally two large oil globules, or with one large oil globule accompanied by one to three smaller; smooth,  $15\text{--}17.8 \times 7.6\text{--}11.9$  µm. Asci (4- to) 8-spored, operculate, cylindrical or occasionally clavate, non-amyloid, gradually narrowing to a pleurorhynchous base; comparatively small (compare Figs. 1a and 3a),  $144\text{--}212 \times 12\text{--}21$  µm. Paraphyses branching, occasionally forked; narrower below,  $4.9\text{--}8.4$  µm, broadening gradually towards upper ends, where they become club-shaped or irregular,  $12\text{--}20$  µm broad, septate, sometimes swollen at septa; varying from small to very small grains of orange-yellow intracellular carotenoid pigment, present over the entire length of the paraphyses.

**Habitat and distribution.** With regard to habitat, see *O. rubens* above. Rare; fruiting throughout the year; France (Caillet & Moyne, 1987), Germany (Itzerott, 1981), Great Britain (Dennis, 1978), Czechoslovakia (Velenovský, 1934; Svrček & Kubička, 1963; Moravec, 1969), Greenland (Dissing, 1982), and the Netherlands (this report).

**Collections studied.** The Netherlands: prov. Limburg, Tegelen, 28 Feb., 22 Mar., 6 May, 23 Sept. and 10 Oct. 1990, *P. Billekens* (L and herbarium of the author).

With the help of Itzerott's data, it was relatively easy to identify the material. The combination of characters immediately led to *O. rustica*. There is a great similarity between excipulum structure, hairs, asci, and paraphyses in the photographs (Figs. 1/10 and 18) in Itzerott's paper and my camera lucida drawings. One of Itzerott's illustrations clearly shows the broad medullary excipulum to consist of *textura intricata*. This is clearly demarcated from the broad *textura globulosa/angularis* of the ectal excipulum, to which virtually invisible hyphoid hairs are attached. Anatomically, and partly also morphologically, the above description corresponds well with Moravec's (1969) description of *Octospora libussae* Svrček & Kubička, especially his fig. 3.3 shows many striking similarities. There are no apparent differences between *O. rustica* and *O. libussae*, and I therefore agree with Caillet & Moyne (1987) in treating the latter name as a synonym of *O. rustica*. Anatomically, *O. rustica* is a very homogeneous and well-defined species.

The two species described are new records for the Netherlands. This, together with other previously described species (Billekens, 1985, 1988, 1989, 1990) justify the hope that more new records of Ascomycetes may be expected from the Dutch province of Limburg.

#### ACKNOWLEDGEMENTS

I wish to extend my thanks to Dr. J. van Brummelen (Leiden) for literature search and discussions, Dr. C. Bas (Leiden) for literature search, Mr. J. W. M. Jagt (Venlo) for translation into English of the manuscript, and the Sanders & Geraedts company (Swalmen) for access to the former clay pit.

#### REFERENCES

- Billekens, P. 1985. *Caloscypha fulgens*: een bekerzwam uniek in Nederland. *Natuurhist. Maandbl.* 74 (12): 231–234.
- Billekens, P. 1988. *Lamprospora macracantha*, een minuscule bekerzwam in de grote wereld. *Natuurhist. Maandbl.* 77 (6): 116–119.
- Billekens, P. 1989. Nieuwe bekerzwammen voor Nederland: *Tricharina boudieri* en *Tricharina ochroleuca*. *Natuurhist. Maandbl.* 78 (2): 26–30.
- Billekens, P. 1990. Nieuwe bekerzwammen voor Nederland II: *Aleuria bicucullata*, *Cheilymenia aurea* en *Cheilymenia raripila*. *Natuurhist. Maandbl.* 79 (9): 221–228.
- Boudier, E. 1896. Description de quelques nouvelles espèces de discomycètes de France. *Bull. Soc. mycol. Fr.* 22: 13, pls. 1, 2.
- Boudier, E. 1905–1910. *Icones Mycologicae*. Paris, Lausanne, reprint ed. 1981.
- Caillet, M. & G. Moyne. 1987. Contribution à l'étude du genre *Octospora* Hedw. ex S.F. Gray (Pezizales). Espèces à spores elliptiques ou fusiformes. *Bull. Soc. mycol. Fr.* 103: 200–202.
- Dennis, R.W.G. 1978. *British Ascomycetes*. Ed. 2. Vaduz: 57.
- Dissing, H. 1982. Operculate Discomycetes (Pezizales) from Greenland. In: G.A. Laursen & J.F. Ammirati, Arctic and Alpine Mycology. Washington D.C.
- Grelet, L.-J. 1932/43. Les Discomycètes de France d'après la classification de Boudier. Reprint ed. 1979.
- Itzerott, H. 1981. Die Gattung *Octospora* mit besonderer Berücksichtigung der Pfälzer Arten. *Nova Hedwigia* 34: 265–280.
- Itzerott, H. & P. Döbbler. 1982. *Octospora meslinii* und *O. rubens* (Pezizales), zwei weitere bryophile Gallbildner. *Mitt. Bot. München* 18: 201–212.
- Kornerup, A. & J.H. Wanscher. 1978. *Methuen handbook of colour*. Ed. 3. London.
- Moravec, J. 1969. Někteří operkulární diskomycety nalezené v okresech Mladá Boleslav a Jičín. *Česká Mykol.* 23: 222–235.

- Moser, M. 1963. Ascomyceten. In: H. Gams, Kl. Kryptog.-Fl. Band IIa.
- Seaver, F.J. 1928. The North American Cup-fungi (Operculates). New York.
- Svrček, M. & J. Kubička. 1963. Druhý příspěvek k operkulárním discomycetům z okolí rybníka Dvořišť v jižních Čechách. Česká Mykol. 17: 61–70.
- Velenovský, J. 1934. Monographia Discomycetum Bohemiae. Pragae.