

NEW SPECIES OF OCTOSPORA AND SOME FURTHER
REMARKABLE BRYOPARASITIC PEZIZALES
FROM THE NETHERLANDS

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This article presents an overview of remarkable findings of bryoparasitic Pezizales in the Netherlands collected in the period 1995–2002. These collections provide further insight into the distribution, ecology, morphology and host relationships of the species described, some of which represent unknown taxa. Three new species are described, primarily or exclusively based on collections from the Netherlands: *Octospora neerlandica*, *O. fissidentis* and *O. nemoralis*. The following connections with host-mosses were observed: *Tortula ruralis* s. str., *T. ruraliformis*, *T. virescens* with *O. neerlandica*, and *Fissidens bryoides* with *O. fissidentis* as well as *O. nemoralis*. As a result of the intensive field survey, the number of species known from the Netherlands has increased from 14 to 40. This indicates that current knowledge on the distribution of bryoparasitic Pezizales is very incomplete in many countries.

At the end of the past century it became clear that the number of bryoparasitic Pezizales in the Netherlands, belonging to the genera *Octospora*, *Lamprospora* and *Neottiella*, was considerably higher than formerly presumed (Brouwer, 1999). Revision of critical findings revealed the presence of remarkable and sometimes formerly unknown species, for example *Octospora gemmicola* Benkert (Benkert, 1998a). Previously unknown associations with host-mosses were also observed. Many further interesting collections have been made since by the second author and examined by the first author. Some of these specimens again represented unknown taxa. As more specimens of these taxa became available for examination, the taxonomic significance of their characteristics could be more fully assessed. Three new species of *Octospora* as well as some additional species of more than just regional importance are therefore presented in the following text. Some additional collections from the Netherlands may also represent new taxa, but their relationship to other species requires further study.

Octospora neerlandica* Benkert & Brouwer, *spec. nov.

Apothecia 1–2 mm lata, margine membranaceo fimbriato-dentato. Hymenium aurantiacum. Ectoexcipulum ex textura globulosa-angulari, endoexcipulum ex textura intricata, margo ex textura porrecta. Asci cylindranei, 200–250 × 13–19 μm, octospori. Sporae uniseriatae, ellipsoideae, (15–) 16–19(–20) × (10–)11–12(–13) μm, gutta olearia magna 9–11 μm in diam. praeditae, saepe praeterea cum guttulis parvis; ornamentum e costis tenuibus, reticulum irregulare formantibus. Maculae forma irregulari, saepe elongatae, curvatae, dense completae toribus rugosis. Paraphysae plurimum rectae, ad apices 3–7 μm latae, vel paulum incurvatae.

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Muscihospitales *Tortularuralis* s. str., *T. ruraliformis* vel *T. virescens*; apparatus infectorii ad rhizoidea.

Holotypus: The Netherlands, Zeeland, Nieuw-Haamstede, on coastal sand-dunes with *Hippophae rhamnoides*-thickets, on stems of *Tortula ruraliformis*, 7.XI.1998, leg. E. Brouwer, det. D. Benkert (B 700007151, Samml. Benkert).

Etymology: after the country of its discovery.

Apothecia 1–2 mm in diameter, often situated directly on the stems of the moss, usually 1–3 on each plant, with a membranaceous, fimbriate margin; hymenium pale or pinkish-orange to orange, outside somewhat paler.

As in most other species of the genus the outer excipulum consists of a textura globulosa-angularis, whereas the inner parts of the excipulum represent a textura intricata, and the margin a textura porrecta. Asci cylindrical, 200–300 × 13–19 μm, 8-spored. Spores uniseriate, ellipsoidal, (15–)16–19(–20) × (10–)11–12(–13) μm, Q = 1.4–1.6, with one oil droplet of 9–11 μm in diameter, often accompanied by several smaller ones. Spore-ornamentation consisting of an irregular reticulum with very variably formed, often prolonged and curved, meshes; ridges of the ornament about 0.2–0.4 μm wide. The spore-surface within the meshes is densely wrinkled (Fig. 1). Paraphyses slender, mostly straight, sometimes slightly curved, at the apex enlarged up to 3–7 μm.

Ecology — Host-mosses: *Tortula ruralis* s. str., *T. ruraliformis* or *T. virescens*; the infection-cushions are developed on the rhizoids.

Specimens examined. THE NETHERLANDS: Zeeland, Nieuw-Haamstede, on coastal sand-dunes with *Hippophae rhamnoides*-thickets, on stems of *Tortula ruraliformis*, 7.VIII.1998, leg. E. Brouwer (B 700007151, Samml. Benkert, holotype); Gelderland, Arnhem, on dry sandy soil along the south bank of the river Rhine at the centre of the city, on decaying and living parts of *Tortula ruraliformis*, 3.II.2002, leg. E. Brouwer (B, Samml. Benkert); Nijmegen, on low roof of a university building, in mixed cushions of *Ceratodon*, *Tortula*, *Grimmia*; host-moss *Tortula virescens*, 27.XII.1996, leg. E. Brouwer (Herb. E. Brouwer); Zuid-Holland, Wassenaar, on stems of *Tortula ruraliformis* on calcareous sand, on open, sandy soil along a pine-bush, 7.I.2000, leg. E. Brouwer (Herb. E. Brouwer). — SPAIN: Canary Islands, Gran Canaria, Zentralmassiv, beside the road to the Pico de las Nieves, c. 1700 m NN, in open wood of *Pinus canariensis* with sparse undergrowth, in small moss-cushions on bare soil among rock, host-moss *Tortula ruralis* s. str., 25.XII.2001, leg. E. & W. Huth (B, Samml. Benkert).

The spore-size and characteristic spore-ornamentation in combination with the host-moss makes *Octospora neerlandica* a very distinctive species. Mosses of the genus *Tortula* are very rarely infected by *Octospora*-species. Only the smooth-spored *O. crosslandii* (Dennis & Itzerott) Benkert, which is associated with a wide range of host-mosses, has been observed in association with *Tortula*-species, once with *T. brevis-sima* and once with *T. spec.*

Two species of *Lamprospora* are also associated with *Tortula ruralis* s.l. (*L. retispora* (Itzerott & Thate) Schumach. *L. tortulae-ruralis* Benkert), but can be distinguished by their globose spores as well as a different type of spore-ornamentation. *Lamprospora dictydiola*, associated with *Tortula muralis*, has subglobose spores and yet another type of spore-ornamentation.

The spore-ornamentation of *O. neerlandica* is remarkably similar to that of *Lamprospora seaveri* Benkert. This species, however, has globose spores and is associated with other moss species.

Although *Octospora neerlandica* is hitherto known only from the Netherlands and the Canary Islands, the wide distribution of its host-moss in Europe suggests that it

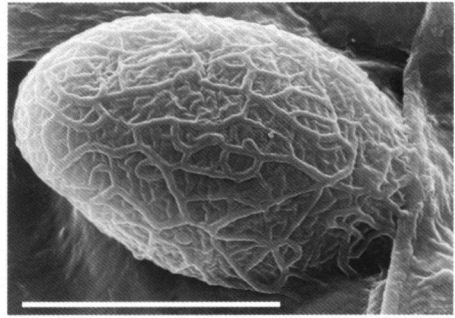
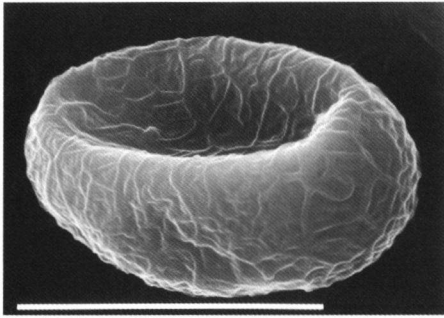


Fig. 1. *Octospora neerlandica*. SEM-photograph of spores; Nieuw-Haamstede 7.VIII.1998, holotype (left); Nijmegen 27.XII.1996 (right); scale 10 μm .

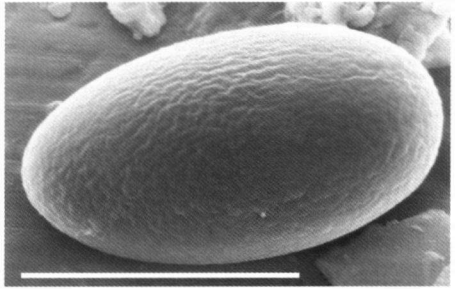
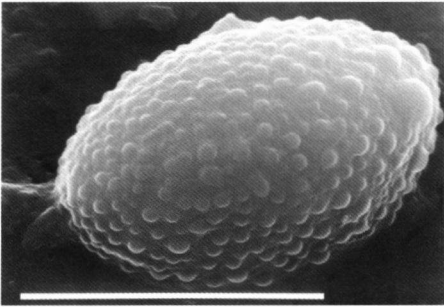


Fig. 2. *Octospora fissidentis*. SEM-photograph of spores; Arnhem 18.V.2001; scale 10 μm .

Fig. 3. *Octospora nemoralis*. SEM-photograph of spores; Arnhem 6.V.2001, holotype; scale 10 μm .

may occur more widely. *Tortula ruralis* is, for example, very common in Germany and grows there in similar places. Further investigation may reveal whether *O. neerlandica* has been overlooked in other countries or is actually limited to regions with an Atlantic climate.

Octospora fissidentis Benkert & Brouwer, *spec. nov.*

Apothecia 0.2–0.6 (–1.5) mm lata, discoidea, margine paulum fimbriato. Hymenium incarnatum.

Ectoexcipulum ex textura globulosa-angulari, endoexcipulum ex textura intricata, margo ex textura porrecta. Asci cylindratae, circiter $170\text{--}210 \times 13\text{--}16 \mu\text{m}$, octospori. Sporae uni- vel biseriatae, ellipsoideae-subfusiformes, $17\text{--}21 \times 9\text{--}10.5\text{--}(11) \mu\text{m}$, plurimum una gutta olearia magna $6\text{--}9 \mu\text{m}$ in diameter (interdum duo guttae $4\text{--}6 \mu\text{m}$) praeditae; ornamentum verrucis parvis globosis ($0.5\text{--}1.0 \mu\text{m}$ latis) formatum; saepius singulares verrucae majores insertae. Paraphysae rectae vel paulum incurvatae, ad apices $4\text{--}7 \mu\text{m}$ latae.

Muscus hospitalis *Fissidens bryoides*, apparati infectorii ad rhizoidea.

Holotypus: The Netherlands, Gelderland, Arnhem, city-park Immerloo, on shaded, damp, bare clay beneath *Crataegus monogyna* with *Fissidens bryoides* and *F. taxifolius*, 27.III.2002, leg. E. Brouwer, det. D. Benkert (B 700007150, Samml. Benkert).

Etymology: after the moss-genus *Fissidens*.

Apothecia 0.2–0.6(–1.5) mm in diameter, discoid, margin smooth or sometimes slightly crenulated; hymenium flesh-coloured to lilaceous pink, outside paler.

Outer excipulum consisting of textura globulosa-angularis, the inner excipulum of a textura intricata and the margin of a textura porrecta. Asci cylindrical, 170–210 × 13–16 μm , 8-spored. Spores uni- or biseriata, 17–21 × 9–10.5(–11) μm , Q = 1.8–2.0, ellipsoidal-subfusoid, mostly with one oil droplet of 6–9 μm in diameter, sometimes with two droplets of 4–6 μm in diam. Ornamentation of isolated, rounded or rarely somewhat elongated warts of mostly 0.5–1.0 μm in diameter, but sometimes a few warts are conspicuously larger (Fig. 2). Paraphyses very slender, mostly straight, sometimes slightly curved, apically enlarged to 4–7 μm .

Ecology — On shaded, damp, bare clay, partly covered with a moss carpet that consists mainly of *Fissidens bryoides* and *F. taxifolius*. Host-moss is *Fissidens bryoides*, the infection-cushions are developed on the rhizoids. No infection-cushions could be observed on the rhizoids of the accompanying *Fissidens taxifolius* and *F. exilis*.

Specimens examined. THE NETHERLANDS: Gelderland, Arnhem, city-park Westerveld, on shaded clay in deciduous forest, with *Fissidens taxifolius* and *F. bryoides*, 6.V.2001, leg. E. Brouwer (Herb. Brouwer); idem, small *Populus*-plant near the Gelredome football-stadium, with *Fissidens bryoides*, on bare clay on heavily shaded parts without herbaceous undergrowth, 18.V.2001, leg. E. Brouwer (B, Samml. Benkert); idem, city-park 'Immerloo', on shaded, damp, bare clay beneath *Crataegus monogyna*, with *Fissidens bryoides* and *F. taxifolius*, 27.III.2002, leg. E. Brouwer (B 700007150, Samml. Benkert, holotype); idem, small wood plantation at the southwest edge of the city, with *Fissidens bryoides*, *F. taxifolius* and *F. exilis* on damp, shaded clay, 31.III.2002, leg. E. Brouwer (Herb. Brouwer).

Regarding spore-size and spore-ornamentation, *Octospora fissidentis* shows similarities with *O. similis* (Kirschst.) Benkert, *O. moravecii* K. B. Khare, and *O. heterosculpturata* T. Schumach. The spores of these species, however, are wider, ellipsoidal (not subfusiform), and their length-width ratio is less than 1.5 (about 1.9 in *O. fissidentis*).

Octospora heterosculpturata shares the heterosculpturate spores with *O. fissidentis*. It is, however, easily distinguished by wider spores, a smaller length-width ratio of the spores, a different host-moss and a different colour of the hymenium. The flesh-coloured or \pm violaceous hymenium of *O. fissidentis* is rather unusual within the genus, but is found in *O. rustica* (Velen.) J. Moravec, *O. lilacina* Seaver, and *O. canariensis* Benkert. These species are, however, very different in shape and size of their spores, spore-ornamentation and host-mosses.

The infection of a *Fissidens*-species by a member of the Pezizales is very remarkable, because no such infestation was known previously within the order Fissidentales. Even more surprising is that another new species, *Octospora nemoralis*, here described, has also been found to infect this host genus. The differences between these species are discussed below.

Octospora nemoralis* Benkert & Brouwer, *spec. nov.

Apothecia 0.2–1.5 mm lata, discoidea, margine paulum fimbriato. Hymenium pallide aurantiacum.

Ectoexcipulum ex textura globulosa-angulari, endoexcipulum ex textura intricata, margo ex textura porrecta. Asci cylindratae, 170–220 × 12–20 μm , octospori. Sporae plurimum uniseriatae, paulum biseriatae, ellipsoideae, rapiformes, sublaeves, (17–)18–21 × 8.5–10.5 μm , plurimum duabis guttis oleariis (6–8 μm et 2–6 μm latae) praeditae, paulum una gutta olearia circiter 8 μm lata praeditae. Paraphyses rectae vel paulum incurvatae, ad apices 3–8 μm latae.

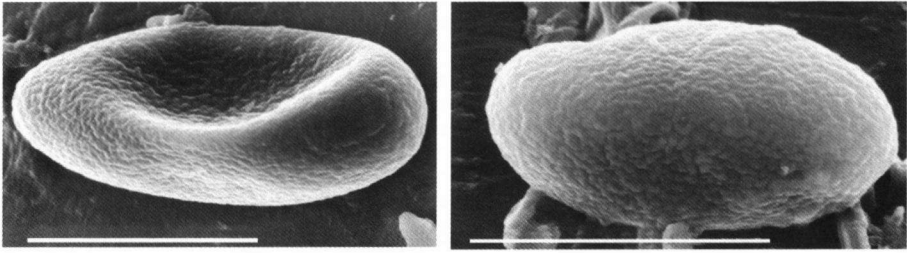


Fig. 4. *Octospora nemoralis*. SEM-photograph of spores; Arnhem 6.V.2001, holotype (left); Arnhem 24.III.2002 (right); scale 10 μm .

Muscus hospitalis: *Fissidens bryoides*, apparati infectorii ad rhizoidea, caules vel folia.

Holotypus: The Netherlands, Gelderland, Arnhem, city-park Westerveld, on shaded clay in deciduous forest, with *Fissidens bryoides*, *F. taxifolius*, and *F. exilis*, 6.V.2001, leg. E. Brouwer, det. D. Benkert (*B 70007152*, Samml. Benkert).

Etymology: after the occurrence in deciduous forest.

Apothecia 0.2–1.5 mm in diameter, discoid, with slightly fimbriate margin; hymenium pale orange to orange, outside paler.

Outer excipulum consisting of a textura globulosa-angularis, the inner excipulum of a textura intricata and the margin of a textura porrecta. Asci cylindrical, 170–220 \times 12–20 μm , 8-spored. Spores mostly uniseriate, rarely biseriate, (17–)18–21 \times 8.5–10.5 μm , $Q = 1.8$ –2.1, ellipsoidal-rapaceous, usually with two unequal oil droplets of 6–8 and 2–6 μm in diam. respectively, rarely with only one droplet of about 8 μm in diam., nearly smooth; under scanning electron microscope the spore-surface is slightly uneven (Fig. 3 & 4). Paraphyses straight or slightly curved, apically enlarged to 3–8 μm .

Ecology: growing on shaded clay among moss-carpet of *Fissidens bryoides* and *F. taxifolius*. Host-moss is *Fissidens bryoides*; the infection-cushions are developed on the stems, leaves and rhizoids of the moss; on the accompanying *Fissidens taxifolius* and *F. exilis* no infections could be observed.

Specimens examined. THE NETHERLANDS: Gelderland, Arnhem, city-park Westerveld, on shaded clay in deciduous forests, with *Fissidens bryoides*, *F. taxifolius*, and *F. exilis*, 6.V.2001, leg. E. Brouwer (*B 700007152*, Samml. Benkert, holotype); idem, with *Fissidens taxifolius* and *F. bryoides*, 24.III.2002, leg. E. Brouwer (Herb. Brouwer); Utrecht, Utrecht-city, fortress Rijnauwen at the southeast edge of the city, nowadays a monument and nature reserve; on edge of a rather recently dug hole (children's hut), in a young wood plantation, on heavy clay soil, with *Fissidens bryoides*, *F. taxifolius*, and *F. exilis*, 25.X.2002, leg. E. Brouwer (Herb. Brouwer).

Apart from the characteristic host-moss, *Octospora nemoralis* is mainly distinguished by features of the spores. Their ellipsoidal-rapaceous shape is very typical, the maximum spore-width is somewhat eccentric. The two oil droplets of the spores are mostly of unequal size, probably as a consequence of the spore-shape. The spores appear \pm smooth under a light microscope. However, observation with scanning electron microscope reveals that the surface of the spores is slightly uneven (Fig. 3 & 4). The spores of *Octospora leucoloma* Hedw.: Fr. and the closely related *O. gemmicola* Benkert are of almost identical shape but are slightly longer, 19–24 μm . Furthermore, *O. leucoloma* spores usually contain one oil droplet and *O. gemmicola* spores are somewhat more narrow ($Q = 2.1$ –2.4). Both species have smooth spores and very different host-mosses.

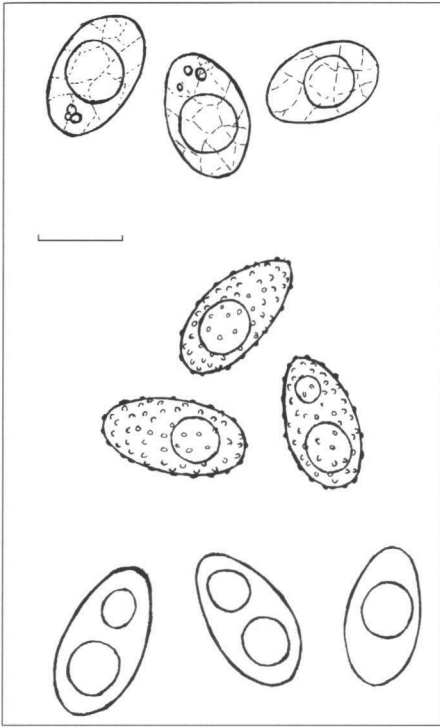


Fig. 5. Spores of *Octospora neerlandica* (above), *O. fissidentis* (center) and *O. nemoralis* (below), as seen under light microscope (oil immersion, 1000 \times); scale 10 μ m. Note: the spore-ornamentation of *O. neerlandica* is hardly visible under a light microscope.

Surprisingly, the spore-size of the two *Octospora*-species on *Fissidens* we present is almost equal. Nevertheless the species are easily distinguished by a number of other characteristics (see Table I). The most important differences are the first three mentioned in Table I.

Table I. Comparative characters of the two *Octospora* species associated with *Fissidens bryoides*.

<i>Octospora fissidentis</i>	<i>Octospora nemoralis</i>
spores ellipsoidal	spores ellipsoidal-rapaceous
spores clearly warted (light microscope, oil immersion)	spores almost smooth (light microscope, oil immersion)
hymenium flesh-coloured, violaceous	hymenium pale orange to orange
spores usually with two oil droplets of unequal size	spores mostly with one oil droplet
spores in ascus mostly uniseriate, rarely \pm biseriate	spores in ascus often biseriate

FURTHER REMARKABLE SPECIES

Lamprospora campylopodis W.D. Buckley, Trans. Brit. Mycol. Soc. 9 (1923) 44.

Apart from the closely related (and only questionably distinct) *Lamprospora australis* (McLennan & Cookson) Rifai, *L. campylopodis* is the only species known to infect the moss-genus *Campylopus*. The species was described from Great Britain (Buckley, 1923). Though specimens from the type locality were widely distributed in several exsiccates (Rabenhorst, Fungi eur. 658 et 1624; Broome, Fungi Brit. Exs. 285, mostly as *L. miniata* or *L. crouani*, respectively) it is little known. Only a single collection, from the Czech Republic (PRM, as *Lamprospora areolata*), was cited by Benkert (1987a). During the past 5 years, however, collections from Germany, France, Greece, Ireland and the Netherlands have been identified as *L. campylopodis*. It seems therefore, that the species is widely distributed in Europe, but obviously rare throughout.

Collection studied. THE NETHERLANDS: Overijssel, Denekamp, Bergvennen Nature reserve; on sediment of dried-out moorland pool, between *Campylopus pyriformis*, 14.IX.2000, leg. et det. E. Brouwer, conf. D. Benkert (Herb. E. Brouwer).

Lamprospora dictydiola Boud., Hist. Class. Discom. (1907) 68.

Though the host-moss *Tortula muralis* is very common in a range of habitats, *L. dictydiola* has been found exclusively among extensive populations on old walls. Apothecia can be found during wet and relatively warm periods in winter and late autumn, which might explain the apparent geographic limitation of this species to oceanic regions.

Collections studied. THE NETHERLANDS: Gelderland, on vertical part of a brick wall in city park Valkhof, Nijmegen, 29.XI.1996, leg. et det. E. Brouwer, conf. D. Benkert (Herb. E. Brouwer); Nijmegen, on old castle wall in city park Kronenburg, 5.XII.1996, leg. et det. E. Brouwer (Herb. E. Brouwer); Arnhem, on old garden wall at a heritage museum north of Arnhem, 10.X.2001, leg. et det. E. Brouwer (Herb. E. Brouwer).

Lamprospora faroensis Benkert, Z. Mykol. 53 (1987) 222.

When first described, *Lamprospora faroensis* (Benkert, 1987a) was known only from the Swedish type-collection, on *Ceratodon purpureus*. It has since been collected from only a few sites in Great Britain, Germany and the Netherlands, in all cases on the same host-moss. The Dutch collection is reported here.

Collection studied. THE NETHERLANDS: Gelderland, Haalderen, on thick moss cover on a paved path with much *Tortula ruralis* s.l. and some *Bryum* and *Barbula*, 27.XII.1997, leg. E. Brouwer, det. D. Benkert. The infections have been observed on the rhizoids of very young plants of *Ceratodon*, intermingled between the mosses mentioned above.

Lamprospora retispora (Itzerott & Thate) T. Schumach., Norsk. Polarinst. Skrift 185 (1986) 61.

Lamprospora retispora is well characterised by shape and ornamentation of the spores as well as by its association with *Tortula* spp. Although it is not rare in Germany (Benkert, 1995), there are very few records from other countries. In the Netherlands, *L. retispora* can be found on walls or on dry, sandy soil. The host-moss is predominantly *Tortula ruralis* s.l., with the exception of *T. virescens* in the collection of 30.XI.1996.

Collections studied. THE NETHERLANDS: Gelderland, Nijmegen, on mossy soil of a parking place of the St. Radboud-hospital, 30.III.1988, leg. et det. N.J. Dam, conf. D. Benkert (Herb. Dam; B, Samml. *Benkert*); idem, on a low roof of Nijmegen University, in mixture of *Amblystegium serpens*, *Ceratodon*, *Barbula*, *Bryum*, 30.XI.1996, leg. et det. E. Brouwer, conf. D. Benkert (Herb. E. Brouwer); Wageningen, on low concrete wall at the university of Wageningen, 17.I.1998, leg. et det. E. Brouwer (Herb. E. Brouwer); Zuid-Holland, Oostvoorne, on stabilised sand dunes, east of Lake Paddepoel, 17.IX.1998, leg. et det. E. Brouwer (Herb. E. Brouwer); Wassenaar, on shifting sand dunes at the coast, 7.I.2000, leg. et det. E. Brouwer (Herb. E. Brouwer).

Lamprospora tortulae-ruralis Benkert, *Z. Mykol.* 53 (1987) 244.

Lamprospora tortulae-ruralis is so far known exclusively to infect *Tortula ruralis* s.l. *Lamprospora retispora* also prefers this host-moss in the Netherlands and both species have more than once been found in the same location. It is yet unclear, however, whether these fungi prefer different host-taxa from the *Tortula ruralis* complex.

Collections studied. THE NETHERLANDS: Gelderland, Wageningen, on low concrete wall at the University of Wageningen, together with *Lamprospora retispora*, 17.I.1998, leg. et det. E. Brouwer (Herb. E. Brouwer); Arnhem, dry sandy soil along the river Rhine in the centre, 3.II.2002, leg. et det. E. Brouwer (Herb. E. Brouwer); Zuid-Holland, Wassenaar, on shifting sand dunes in the coastal dunes, 7.I.2000, leg. et det. E. Brouwer (Herb. E. Brouwer); Friesland, Vlieland, on coarse sand in shifting sand dunes, 1.XII.2002, leg. et det. E. Brouwer (Herb. E. Brouwer).

Lamprospora tuberculata Seaver, *Mycologia* 4 (1912) 47.

Lamprospora tuberculata, originally described from the USA, is apparently rare in Europe. It has been collected in France, Norway and Germany. Recently it has also been discovered in the Netherlands. Unfortunately the very sparse collection with only two apothecia and traces of moss plants did not allow identification of the host-moss.

Collection studied. THE NETHERLANDS: Gelderland, Nijmegen, city park Staddijk, in grassland in nature reserve, on loam sparsely covered with *Barbula* spec. and juvenile mosses, 25.X.1997, leg. et det. E. Brouwer, conf. D. Benkert (Herb. E. Brouwer).

Neottiella albocincta (Berk. & Curtis) Sacc., *Syll. Fung.* 8 (1889) 190.

This rare species was described as *N. atrichi* Benkert (Benkert, 1987b), before study of the type-specimen of *Peziza albo-cincta* Berk. & Curtis (deposited in K) showed this to provide an earlier name (Benkert, 1994). In Europe *N. albocincta* was hitherto known only from the Czech Republic, Ukraine, Germany, and France. Recent observations in Germany and the Netherlands show that it prefers \pm bare loam, that remains sparsely covered by *Atrichum undulatum* for several years. Most of these observations, including the Dutch one, were made in cemeteries where shade, trampling and a nutrient-poor soil inhibit plant growth.

Collection studied. THE NETHERLANDS: Gelderland, Arnhem, Velp, graveyard Heiderust; on fresh sandy soil, sometimes mixed with some loam, colonised for some years by mosses, always in the immediate vicinity of *Atrichum*, 31.X.1999, leg. et det. E. Brouwer, conf. D. Benkert (Herb. E. Brouwer).

***Octospora bridei* Caillet & Moyne, Bull. Soc. Myc. Fr. 103 (1987) 187.**

This species has been observed over a two year period in an area with loamy soil where several other rare *Octospora* and *Lamprospora* species and rare host-mosses were found. Apothecia were always found near *Ephemerum serratum*, but this relation was not further investigated.

Collection studied. THE NETHERLANDS: Gelderland, Nijmegen, on shaded side of a ditch in city park Staddijk, with *Ephemerum serratum* and *Fissidens exilis*, 2.V.1998, leg. et det. E. Brouwer (Herb. E. Brouwer).

***Octospora ithacaensis* (Rehm) K. B. Khare, Norw. J. Bot. 22 (1975) 111.**

Octospora ithacaensis is one of the few known Pezizales-species to grow on liverworts. Although described from North America, it has since been found in the Netherlands (Schweers, 1945; Maas Geesteranus, 1969) and in Germany (Benkert, 1998b). Recently, this very rare species has been found on two sites approximately 30 kilometres north of the original Dutch locality. On both sites, a large population of the host-moss has been present for many years.

Collections studied. THE NETHERLANDS: Gelderland, Arnhem, on living thalli of *Marchantia polymorpha* in the garden of heritage museum, 10.X.2001, leg. et det. E. Brouwer. (Herb. E. Brouwer); Velp, at upper parts of *Marchantia polymorpha*, at graveyard Heiderust, 31.V.2002, leg. et det. E. Brouwer (Herb. E. Brouwer).

***Octospora lilacina* (Seaver) Svrček & Kubička, Čes. Mykol. 17 (1961) 61.**

Svrček & Kubička (1961) reported the first localities of *Octospora lilacina* in Europe and Kubička (1979) observed that this species is widely distributed in Southern Moravia. In Germany about 15 localities for *O. lilacina* were confirmed by the first author (Benkert, 1995, partly), and Engel & Hanff (1985) published a colour photograph of German material. Also some specimens were collected in Switzerland (B. Senn-Irlet, J. Gilgen) and in Great Britain (Brouwer, 1999). Although it was not known from the Netherlands, Brouwer (1999) showed that *O. lilacina* was not rare near the city of Nijmegen. The numerous records from the Czech Republic, Germany, and the Netherlands indicate that *O. lilacina* may be widely distributed in Europe and that the very small apothecia, immersed in moss-protonema, are easily overlooked.

Collections studied. THE NETHERLANDS: Zuid-Limburg, Ravensbos, near Valkenburg, in dry river source, 30.IX.1997, leg. et det. E. Brouwer, conf. D. Benkert; Gelderland, Beek near Nijmegen, 12.IV.1997, leg. et det. E. Brouwer, conf. D. Benkert (Herb. E. Brouwer); Nijmegen, loamy wall along path in wood near the Duivelsberg, on protonema, 8.V.1997, leg. et det. E. Brouwer, conf. D. Benkert (Herb. E. Brouwer; B. Samml. Benkert); Doesburg, on car track in wood of Bingerden castle estate, 11.VII.1998, leg. et det. E. Brouwer, conf. D. Benkert (Herb. E. Brouwer); Nijmegen, nature reserve De Bruuk, on loam of upturned tree-trunc, 24.X.1998, leg. et det. E. Brouwer, conf. D. Benkert (Herb. E. Brouwer).

***Octospora phagospora* (Flageolet & Lorton) Dennis & Itzerott, Kew. Bull. 28 (1973) 17.**

This inconspicuous species is apparently rare in the Netherlands. Although potential growth sites were intensively surveyed, only two small collections were made. These, and two further collections from Germany, were found on loam or sandy clay on shaded sites. On three of these sites, the species was accompanied by *Octospora lilacina*.

Collections studied. THE NETHERLANDS: Zuid-Limburg, Nijmegen, on the edge of small, loamy path in deciduous forest near Plasmolen, 21.IV.1998, leg et det. E. Brouwer (Herb. E. Brouwer); Overijssel, Windesheim, on disturbed clay, covered with young mosses, at Windesheim estate, 8.IX.2000, leg. et det. E. Brouwer (Herb. E. Brouwer).

Two further remarkable species from the Netherlands (*Lamprospora maireana* Seaver and *L. tuberculatella* Seaver) are mentioned in Benkert (2002).

POSTFACE

The inconspicuous and macroscopically similar apothecia of the bryoparasitic species of Pezizales are seldom collected. Distribution and ecology of most of the species are therefore inadequately known. As a result of the present intensive survey in the Netherlands, especially in the surroundings of Nijmegen, this is now one of the countries with the highest number of recognised taxa of bryoparasitic Pezizales. These countries are Germany (55 taxa), the Netherlands (45 taxa, mainly collected by E. Brouwer), France (42 taxa), the Czech Republic (38 taxa), Norway (35 taxa, mainly collected by R. Kristiansen) and Great Britain (26 taxa).

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