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## Research article

# New lichenicolous fungi from the Netherlands, including the descriptions of *Echinothecium micareae* and *Lichenochora verrucariae*

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Recent finds of lichenicolous fungi from the Netherlands are described and discussed. *Echinothecium micareae* spec. nov. and *Lichenochora verrucariae* spec. nov. are described as new for science. An additional 31 species are reported for the first time from the Netherlands: *Abrothallus cladoniae*, *Arthonia diploiciae*, *A. rinodinicola*, *Cladophialophora cladoniae*, *Dacampia cyrtellae*, *Dactylospora microspora*, *Didymocyrtis cladoniicola*, *D. consimilis*, *D. physciae*, *Diplotomma parasiticum*, *Epithamnolia pertusariae*, *Gonatophragmium lichenophilum*, *Lichenohendersonia varians*, *Lichenostigma chlaroterae*, *L. cosmopolites*, *Nectria brutia*, *Nectriopsis physciicola*, *Niesslia cladoniicola*, *Opegrapha hochstetteri*, *O. opaca*, *Phaeoseptoria peltigerae*, *Phaeospora lecanorae*, *Polycoccum aksoyi*, *P. laursenii*, *Pronectria diplococca*, *Pseudocercospora lichenum*, *Stigmidium fuscatae*, *Tremella candelariellae*, *T. occultixanthoriae*, *Trimmatostroma acetabuli* and *Zwackhiomyces diderichii*. Notes are provided on these and some other interesting lichenicolous fungi. There are currently 240 species of lichenicolous fungi known from the Netherlands.

Keywords: Ascomycetes, biodiversity, fungi, lichens, taxonomy

## Introduction

An increasing number of amateur lichenologists are studying lichenicolous fungi in the Netherlands, resulting in numerous records of species that are recorded for the first time in the country or that are even newly described for science (Boers 2021, Crous et al. 2021, 2022a, b, Diederich et al. 2022, van der Kolk and Boers 2022). In this article, we report on further new lichenicolous fungi that were observed in the Netherlands throughout the past three years. Several specimens did not fit any description of existing species, and two of them are described here as new for science. Including the

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species reported here, there are now around 240 species of lichenicolous fungi known from the Netherlands.

## Material and methods

Lichenicolous fungi were collected by the authors or by other amateur lichenologists and studied with a stereo microscope (7–50× magnification) and light microscope (40–1000× magnification). In this paper, we include specimens that were recorded between 2021 and 2023 and that have not yet been published elsewhere before. All microscopical pictures in this paper have been photographed in water, unless otherwise stated. Specimens are kept in the herbaria of the authors. Holotypes of new species are deposited in Naturalis Biodiversity Center in Leiden, the Netherlands (L). All records of lichenicolous fungi in the Netherlands are also entered in web portals ([www.waarneming.nl](http://www.waarneming.nl) or [www.verspreidingsatlas.nl](http://www.verspreidingsatlas.nl)), often documented with pictures. These records are visualized on distribution maps on the website [www.verspreidingsatlas.nl](http://www.verspreidingsatlas.nl), updated weekly with newly added observations verified by expert lichenologists.

***Echinothecium micareae* Boers, Diederich & van der Kolk sp. nov. Fig. 1–2**

MycoBank no. MB852407.

### Diagnosis

Differs from *Echinothecium hypogymniae* by the narrower ascospores, 8–10 × 3–4 µm, and by a different host choice, *Micarea lignaria*.

**Type:** the Netherlands, Friesland, Drents Friese Wold, Aekingerzand, on *Micarea lignaria* on soil in inland dunes, 52°55'50.5"N, 06°17'45.2"E, 5 Feb. 2023, J. Boers 0014 (L – holotype; BR, herb. van der Kolk 3382 – isotypes).

### Etymology

From *Micarea lignaria*, the host lichen.

### Description

Vegetative hyphae superficial, forming a meshed reticulum on the host (thallus and apothecia), dark brown, branched, flexuous, septate, constricted at the septa, hyphal cells subglobose to elongated, 5–10 × 4–6 µm, wall sometimes with a coarse ornamentation. Ascomata perithecioid, black, partly immersed to superficial, arising from the hyphal network, subglobose to broadly ellipsoidal, 40–65 µm diam. Ascomatal wall composed of a single layer of brown isodiametric cells, sometimes with dark brown scattered ornamentation, 5.5–8.5 µm diam., rarely of two layers, the cells of the inner one more flattened (in section view) and paler. Hamathecium consisting of periphyses of the external formation, periphyses of the internal formation and pseudoparaphyses of type a (terminology following Roux and Pinault 2021); interascal paraphysoids not observed. Periphyses and pseudoparaphyses

consisting of two cells, 7.5–9.5 × 3.5–4.5 µm, the basal cell subspherical to subpyriform, 3.5–4.5 µm diam., the apical cell narrower, 2–3 µm wide, ellipsoidal or sometimes slightly curved. Hymenial gel I– and K/I–. Asci saccate, bitunicate, 23–32 × 10–12 µm, wall apically strongly thickened, with a distinct ocular chamber, wall I– and K/I–, epiplasma I+ orange-red, K/I+ orange-red, 8-spored, ascospores irregularly arranged within the ascus. Ascospores narrowly obovoid with a wider upper cell, hyaline, smooth, 1-septate, constricted at the septum, colourless, often with 3–5 large oil droplets when young (in water), becoming light brown with age and then also without oil drops, 8–10 × 3–4 µm.

### Ecology

Growing on the thallus and apothecia of *Micarea lignaria*. Infections of the new species are associated with bleaching discolorations of the host thallus granules.

### Distribution

The new species was first noticed during a field study on lichenicolous fungi in the Frisian part of the Dutch inland sand drift nature reserve Aekingerzand, part of the national park Drents Friese Wold. Examination of herbarium specimens of the host *Micarea lignaria*, deposited in the herbarium of Meise Botanic Garden (BR), resulted in additional records from the Azores and the Canary Islands. The frequency of *E. micareae* in these herbarium specimens suggests a widespread, but overlooked species.

### Notes

The new species is placed in *Echinothecium* due to presence of a dark-coloured hyphal network on the host tissue, the absence of paraphysoids and the presence of pseudoparaphyses of type a (Roux and Triebel 1994, Roux and Pinault 2021). The cells of the hyphal network are dark brown and sometimes have a coarse ornamentation, whereas in *Stigmidium* the hyphal cells are colourless or light brown and smooth (Roux and Triebel 1994). Species of *Sphaerellothecium* differ in the presence of interascal paraphysoids and the absence of pseudoparaphyses (Roux and Triebel 1994, Roux and Pinault 2021). Pseudoparaphyses of *Echinothecium micareae* consist of two unequal cells (similar to the periphyses) and belong to type a sensu Roux and Triebel (1994).

So far, this is the first species of *Echinothecium* or *Sphaerellothecium* described from *Micarea* as a host. Other species of *Echinothecium* differ in their host selection, but also in morphological characters. Compared to *E. micareae*, *E. hypogymniae* Zhurb. (growing on *Hypogymnia*) has broader ascospores (4.0–5.8 µm; Zhurbenko et al. 2019), *E. aerophilum* Alstrup & M. Cole (growing on *Alectoria*) has much longer ascospores (27–32 µm; Alstrup and Cole 1998), *E. reticulatum* Zopf. (growing on *Parmelia*) has ascomatal hyphal outgrowths and slightly larger ascospores (9.2–10.6 × 3.7–4.3 µm in *E. reticulatum*) (Zhurbenko et al. 2019), *E. rhizoplacae* Pinault and Roux (growing on *Rhizoplaca*) has broader asci (15–22 µm wide) and larger ascospores (10.5–12.5 × 5–6 µm; Roux and Pinault 2021) and *E. cladoniae* has



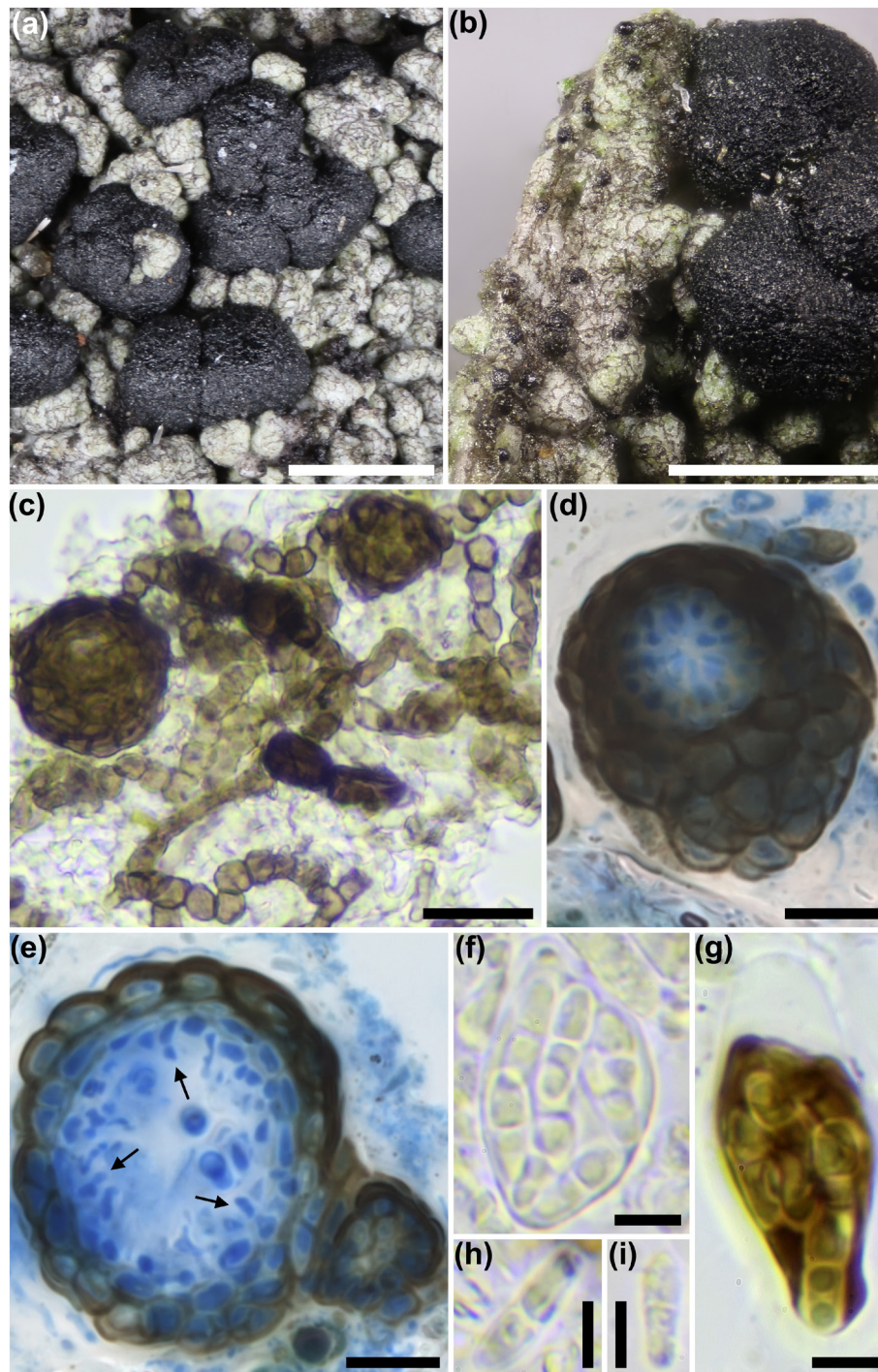


Figure 1. *Echinothecium micareae*. (a–b) Habitus on *Micarea lignaria*, (c) network of superficial hyphae and perithecia, in water, (d) top view of a perithecium showing periphyses around the ostiole and outer excipular cells stained in lactophenol cotton blue, (e) horizontal cross-section of perithecium stained in lactophenol cotton blue; arrows point at 2-celled pseudoparaphyses, (f) ascus with ascospores, in water, (g) ascus with ascospores in Lugol after pre-treatment with 10% KOH, (h–i) ascospores, in water. Scale bars: (a–b) = 500 μm, (c) = 20 μm, (d–e) = 10 μm, (f–i) = 5 μm.



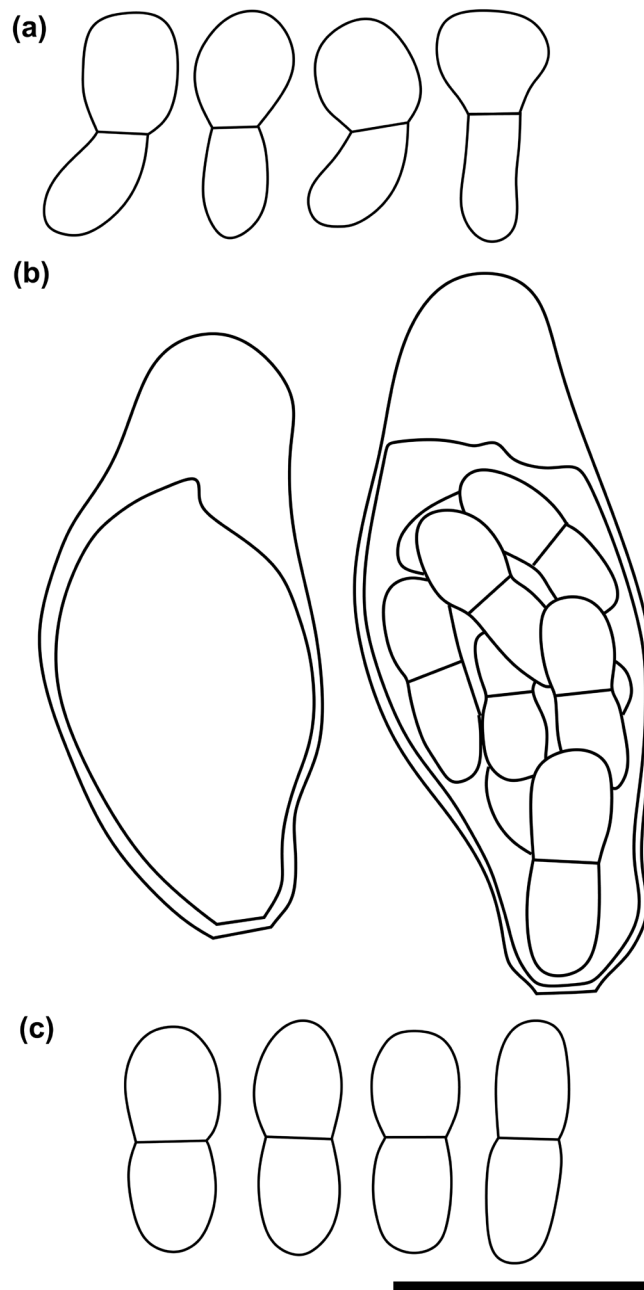


Figure 2. *Echinothecium micareae*. (a) Pseudoparaphyses of type a (the apical cell is narrower than the subspherical basal cell), (b) asci mounted in KOH, (c) ascospores. Scale bar = 10  $\mu$ m.

stiff brown perithecial setae and larger ascospores ( $11\text{--}13 \times 4\text{--}5$ ; Brackel 2010c).

### Additional specimens examined (all on *Micarea lignaria*)

The Netherlands: Friesland, Drents Friese Wold, Aekingerzand,  $52^{\circ}55'37.2''\text{N}$ ,  $06^{\circ}17'56.4''\text{E}$ , on soil in inland dunes, 11 Sept. 1993, A. Aptroot 33660 (BR). Portugal: Azores, São Miguel, Pico de Barrosa near Lagoa do Fogo, alt.

900 m, mountain area with heathland, July 1986, A. Aptroot 16344, 16353 (BR). Spain: Canary Islands, El Hierro, SSE of Frontera, Mirador de la Llanía, near mountain top, forest and open places with *Erica* shrubs,  $27^{\circ}44'17''\text{N}$ ,  $17^{\circ}59'49''\text{W}$ , alt. 1370 m, under an overhang of a rocky outcrop, on mosses, 27 Aug. 2009, D. Ertz 13741 (BR).

***Lichenochora verrucariae* van der Kolk sp. nov.**

**Fig. 3–4**

Mycobank no. MB852408.

### Etymology

From *Verrucaria viridula*, the host lichen.

### Diagnosis

Similar to *Lichenochora epimarmorata*, but differs by having 1(–3)-septate versus (0–)1-septate ascospores, and by growing on the thallus of *Verrucaria viridula* versus on apothecia of Teloschistaceae.

**Type:** the Netherlands, Gelderland, Nijmegen, Heilig Landstichting, on *Verrucaria viridula* on shaded marl wall,

51°49'09.12"N, 05°53'35.88"E, 16 Feb. 2023, H. van der Kolk 3705 (L – holotype).

### Description

Lichenicolous fungus growing on the thallus of *Verrucaria viridula*. Vegetative hyphae inconspicuous, scarce, hyaline, 2–3 µm broad. *Perithecia* appearing solitary on the host thallus or sometimes inducing galls up to 0.7 mm diam. that contain up to 15 perithecia. Perithecia sessile or slightly immersed, black, rough, subglobose to slightly pyriform, 120–200 µm diam. Exciple wall 10–20 µm thick, of textura

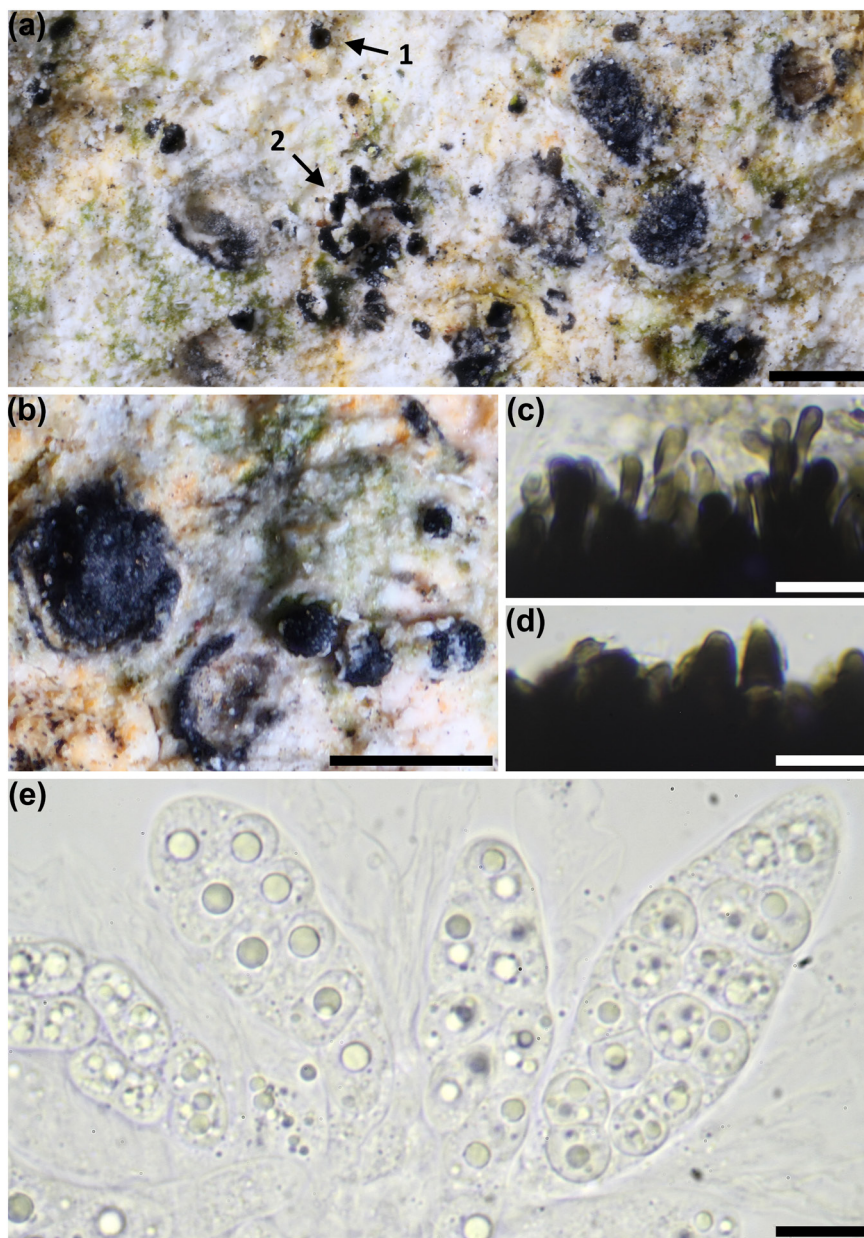


Figure 3. *Lichenochora verrucariae*. (a) Infection on *Verrucaria viridula*, with perithecia growing solitary (1) and clustered in a gall (2), (b) close-up of perithecia, with two perithecia of the host *Verrucaria viridula* on the left, (c) periphyses around the ostiole, (d) protruding excipular cells, (e) asci with ascospores. Note that the ascus on the right contains mature ascospores, whereas the other asci contain immature ascospores. Scale bars: (a–b) = 500 µm, (c–e) = 10 µm.

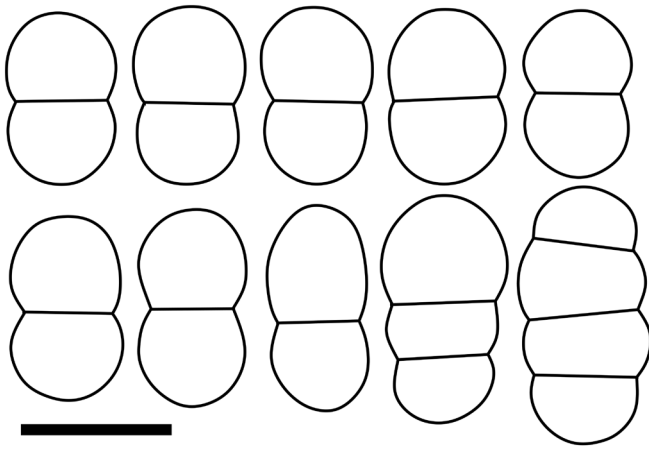


Figure 4. Mature ascospores of *Lichenochora verrucariae*. Scale bar = 10  $\mu\text{m}$ .

angularis, outer cells dark brown with a slight reddish tinge, some cells protruding and causing the perithecia to have a rough appearance, K+ brown-black with a slight olive tinge, inner cells pale brown to colourless. Periphyses present around the ostiole, light to dark brown, unbranched,  $10\text{--}25 \times 2\text{--}3 \mu\text{m}$ . Hymenium with numerous oil droplets. Paraphyses absent. Asci clavate, thin-walled, without visible structures at the apex, with curved stalk up to  $15 \mu\text{m}$  long, 8-spored, K-, K/I-,  $45\text{--}70 \times 13\text{--}19 \mu\text{m}$ . Ascospores biserially arranged, ellipsoid to broadly ellipsoid, smooth, hyaline, 1-septate, sometimes 2–3-septate, with rounded cells, constricted at the septum, sometimes slightly heteropolar, with many small and sometimes several larger oil droplets,  $(10.6\text{--})11.4\text{--}13.2(\text{--}13.8) \times (6.8\text{--})6.9\text{--}7.7(\text{--}8.2) \mu\text{m}$ , l/b =  $(1.5\text{--})1.5\text{--}1.8(\text{--}2.0)$  ( $n = 35$ ; only 1-septate ascospores; reported are values excluding the 10% highest and 10% lowest measurements, with the minimum and maximum of all measurements provided in parentheses). Pycnidia not observed.

#### Ecology

Growing on *Verrucaria viridula*, horizontally on a shaded marl wall on a graveyard.

#### Distribution

Currently known only from the type locality in the Netherlands.

#### Notes

The new species is characterized by the small perithecia, the small, broad, consistently 8-spored asci, and the small, broad, 1-septate or rarely 2–3 septate ascospores. It is the first *Lichenochora* species reported from *Verrucaria*. Darmostuk (2021a) provided a worldwide key to lichenicolous fungi growing on *Verrucaria*, which did not include any *Lichenochora* species. It is easily distinguished from all other lichenicolous fungi known on *Verrucaria* by the perithecia containing numerous oil droplets and the broad, small, 1-septate ascospores. Compared to other *Lichenochora* species, *Lichenochora verrucariae* is most similar to *Lichenochora*

*epimarmorata* Nav.-Ros. *Lichenochora epimarmorata* differs in that the mature ascospores are sometimes aseptate, by slightly longer and more cylindrical asci ( $60\text{--}75 \times 12\text{--}14 \mu\text{m}$  versus  $45\text{--}70 \times 13\text{--}19 \mu\text{m}$  in *L. verrucariae*) and by a different ecology, growing in apothecia of Teloschistaceae (Navarro-Rosinés et al. 1998, Etayo and Navarro-Rosinés 2008).

## New or otherwise interesting species for the Netherlands

Species marked with \* are new to the Netherlands.

### \**Abrothallus cladoniae* R.Sant. & D.Hawksw.

A widely distributed species that has been reported from different species of *Cladonia*. In the Netherlands, the species was found growing on *Cladonia portentosa* (Fig. 5). The specimen fits well with the description in Zhurbenko and Pino Bodas (2017), having brown, 1-septate ascospores, measuring  $8.5\text{--}9.5 \times 3.5\text{--}4.0 \mu\text{m}$ , constricted at the septum and with easily disintegrating cells.

#### Specimen examined

The Netherlands: Noord-Holland, Texel, Bollekamer,  $53^{\circ}01'13.8''\text{N}$ ,  $04^{\circ}43'37.92''\text{E}$ , sandy soil in coastal dune, on *Cladonia portentosa*, 13 Nov. 2022, H. van der Kolk 3253 (herb. van der Kolk).

### \**Arthonia diploiciae* Calat. & Diederich

In the Netherlands this species was found on *Diploicia canescens* on a church wall in a coastal village on the Wadden island Texel (Fig. 6). *Arthonia diploiciae* is widely distributed in western European countries (Great Britain, Ireland, France, Portugal, Spain including the Canary Islands, Italy), but it is also known from Asia and a few locations in North America (Calatayud et al. 1995, Lendemer et al. 2009, Urbanavichus and Urbanavichene 2015). The species has small black ascomata that arise in clusters, typical of many lichenicolous *Arthonia* species, and induce brown spots on the thallus of its host (Cannon et al. 2020). It was described as having 4-spored asci (Calatayud et al. 1995, Cannon et al. 2020), but later also collections with 6–8 spored asci were reported (Hafellner 1995). Asci were also 6–8 spored in the Dutch specimen.

#### Specimen examined

The Netherlands: Noord-Holland, De Koog,  $53^{\circ}05'52.44''\text{N}$ ,  $04^{\circ}45'45''\text{E}$ , brick church wall, on *Diploicia canescens*, 30 May 2023, T. Schrier 0480 (herb. T. Schrier).

### \**Arthonia rinodinicola* Candan & Halici

*Arthonia rinodinicola* is a rarely reported, but widespread species, with previous records from Turkey and South Korea (Kondratyuk et al. 2016). In the Netherlands it was found on rocks of a coastal dike where the host lichen *Rinodina oleae* is very abundant (Fig. 7).



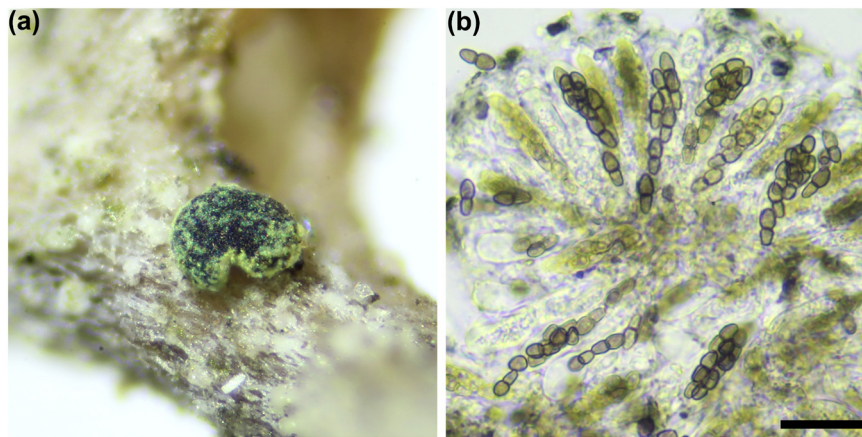


Figure 5. *Abrothallus cladoniae*. (a) Apothecium on *Cladonia portentosa*, (b) asci with ascospores (squashed apothecium). H. van der Kolk 3253. Scale bar (b) = 20  $\mu$ m.

#### **Specimen examined**

The Netherlands: Zeeland, Breskens, harbour, 51°23'51.36"N, 03°34'14.88"E, sea dike made from calcareous rocks, on *Rinodina oleae*, 8 Oct. 2023, H. van der Kolk 3824 (herb. van der Kolk).

#### **\**Cladophialophora cladoniae* (Diederich) Diederich**

This species was described from Luxembourg by [Diederich \(2010\)](#), and has later also been reported from Germany ([Brackel 2019](#)). In the Netherlands it has been found at two localities, both in coastal dunes, growing on *Cladonia foliacea* and *C. gracilis*, respectively ([Fig. 8](#)). It is easily overlooked due to the minuscule size of the sporodochia.



Figure 6. *Arthonia diploiciae*. Clusters of apothecia on *Diploicia canescens*. T. Schrier 0480.

#### **Specimens examined**

The Netherlands, Noord-Holland, Texel, Bollekamer, 53°01'13.8"N, 04°43'37.92"E, sandy soil in coastal dune, on *Cladonia foliacea*, 13 Nov. 2022, H. van der Kolk 3255 (herb. van der Kolk); the Netherlands, Friesland, Terschelling, West-Terschelling, 53°22'37.2"N, 05°14'34.8"E, sandy soil in coastal dune, on *C. gracilis*, 20 July 2022, J. Boers (herb. P. Diederich).

#### **\**Dacampia cyrtellae* Brackel**

The perithecioid ascomata and the similar pycnidia are immersed in the apothecial discs and thallus of *Lecania cyrtella*. Both the conidia and ascospores are muriform ([Brackel 2010a](#)). In Europe the species seems to be common in Germany, with a few additional reports from Belgium and Luxembourg ([Diederich et al. 2012](#), [Brackel 2010a, b](#)). In the Netherlands, it was found on *Lecania cyrtella* on *Sambucus nigra*. Recent finds suggest that the species is at least locally common in the Netherlands.

#### **Specimens examined**

The Netherlands: Noord-Holland, Naarden, Naardermeer, 52°17'31.2"N, 05°07'59.16"E, *S. nigra* on wood edge, on *L. cyrtella*, 29 Apr. 2023, T. Schrier 0455 (herb. T. Schrier). Utrecht, Nieuwegein, Laagraven, 52°02'37.68"N, 05°06'45.72"E, *Sambucus nigra* on wood edge, on *Lecania cyrtella*, 27 Nov. 2022, N. Schrier s.n. (herb. T. Schrier 0164).

#### **\**Dactylospora microspora* Etayo**

This species is characterized by the multisporous asci and the small-sized ascospores ([Ihlen et al. 2004](#)). In the Netherlands it was found growing on *Anisomeridium polypori* on a *Quercus* tree. The apothecia contained multisporous asci with brown, 1-septate ascospores, measuring  $6.0 \times 2.5$ – $3.0$   $\mu$ m. The species is widespread in Europe, with records in Spain, Italy, the United Kingdom and Norway ([Etayo 1991](#), [Hawksworth 1994](#), [Holien 2001](#), [Tretiach 2004](#), [Muchnik and Konoreva 2017](#)). It has been reported from various host lichens,

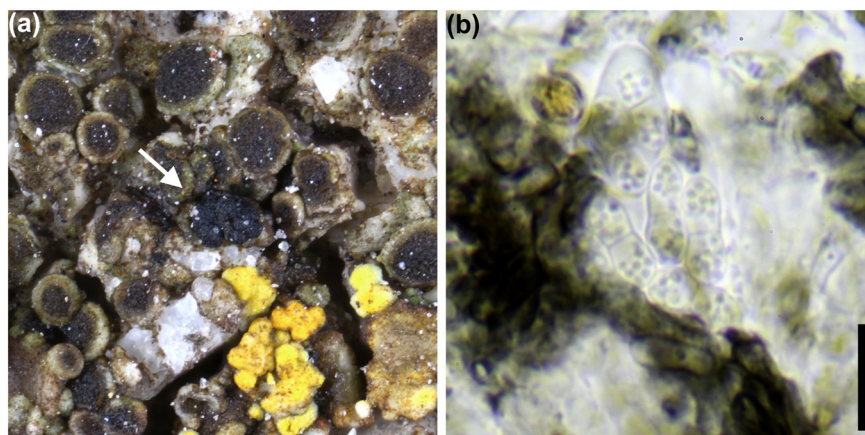


Figure 7. *Arthonia rinodinicola*. (a) Apothecia on *Rinodina oleae*, (b) ascus with ascospores. H. van der Kolk 3824. Scale bar (b) = 10  $\mu$ m.

including *Catinaria atropurpurea* (Etayo 1991, Muchnik and Konoreva 2017), *Megalaria pulvereae* (Holien 2001) and *Parmeliella triptophylla* (Hawksworth 1994).

#### Specimen examined

The Netherlands: Gelderland, Apeldoorn, Paleispark Het Loo, 52°13'59.16"N, 05°56'20.4"E, old *Quercus* tree in park, on *Anisomeridium polypori*, 13 May 2023, G. Berger (herb. G. Berger).

#### \**Didymocyrtis cladoniicola* (Diederich, Kocourk. & Etayo) Ertz & Diederich

This is a widespread species often recorded on *Cladonia* species, but frequently also on other hosts (Ertz et al. 2015). It differs from *Didymocyrtis foliaceiphila*, a species also growing on *Cladonia* species and known from the Netherlands, in having broader conidia (Diederich et al. 2007).

#### Specimens examined

The Netherlands: Gelderland, Garderen, 't Sol, 52°14'12.84"N, 05°43'47.28"E, sandy soil, on *Cladonia* spec., 19 Mar. 2023, H. van der Kolk 3425 (herb. van der Kolk). Limburg, Kerkrade,

50°51'33.48"N, 06°03'24.48"E, sandy soil near railroad, on *Cladonia furcata*, 13 Nov. 2021, H. van der Kolk 2366 (herb. van der Kolk); Kerkrade, 50°51'33.48"N, 06°03'24.48"E, wood from railroad, on *Cladonia* spec., 13 Nov. 2021, H. van der Kolk 2367 (herb. van der Kolk); Curfsgroeve, 50°52'14.52"N, 05°45'56.88"E, loamy soil, on *Cladonia* spec., 2 Dec. 2022, H. van der Kolk 3262 (herb. van der Kolk).

#### \**Didymocyrtis consimilis* Vain.

This species is characterized by subspherical, 1-guttulate conidia. Although the species was for a long time thought to be host specific on the *Caloplaca cerina* group, specimens with a similar morphology and ITS sequences have been found on other hosts (Ertz et al. 2015). It has not been unravelled to what extend specimens on different hosts belong to different species. The Dutch specimen was found on *Rusavskia elegans* and contained conidia measuring  $4.5\text{--}5.0 \times 3.5\text{--}4.0$   $\mu$ m (Fig. 9).

#### Specimen examined

The Netherlands: Zeeland, Breskens, harbour, 51°23'55.68"N, 03°34'06.6"E, rocky sea dam, on *Rusavskia elegans*, 17 Dec. 2021, H. van der Kolk 2575 (herb. van der Kolk).

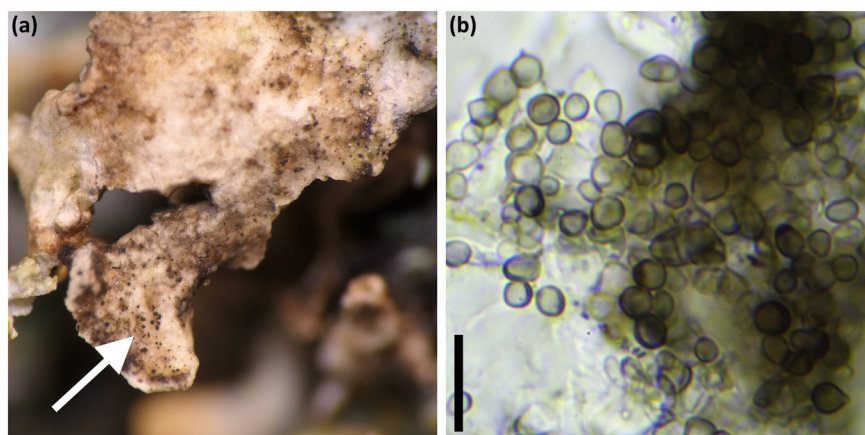


Figure 8. *Cladophialophora cladoniae*. (a) Sporodochia on discoloured thallus of *Cladonia foliacea*, (b) conidia. H. van der Kolk 3255. Scale bar (b) = 10  $\mu$ m.



**\**Didymocyrtis physciae* (Brackel) Hafellner**

*Didymocyrtis physciae* (synonym: *Pleospora physciae*) grows on *Physcia* species and is known from several European countries (Hafellner and Zimmermann 2010, Hafellner 2015). It causes discoloration of the host thallus, often with a reddish tinge, on which black perithecia develop that contain brown ascospores with 3–4 transverse septa and 0–3 longitudinal septa. In the Netherlands it has been found at multiple sites (Fig. 10).

**Specimens examined**

The Netherlands: Gelderland, Ooijpolder, 51°50'26.52"N, 05°54'30.96"E, roadside *Fraxinus excelsior*, on *P. adscendens*, 15 Feb. 2022, H. van der Kolk 2686 (herb. van der Kolk). Limburg, Kerkrade, 50°51'25.56"N, 06°02'60"E, *Quercus robur* in park, on *Physcia adscendens*, 13 Nov. 2021, H. van der Kolk 2378 (herb. van der Kolk).

***Dinemasporium strigosum* (Pers.) Sacc.**

This species is a common saprophyte on grasses, but has also been reported from various lichens, most frequently on *Peltigera* species, but also on *Parmelia sulcata*, *Pseudevernia furfuracea* and *Xanthoria parietina* (Sérusiaux et al. 2003, Brackel 2013). In the Netherlands it was found on *Protoparmeliopsis muralis* (Fig. 11).

**Specimen examined**

The Netherlands: Gelderland, Elspeet, graveyard, 52°17'06.72"N, 05°47'07.08"E, gravestone on graveyard, on *Protoparmeliopsis muralis*, 26 Dec. 2019, H. van der Kolk 1796 (herb. van der Kolk).

**\**Diplotomma parasiticum* (B.de Lesd.) Diederich, Cl.Roux et Van Haluwyn**

A lichenicolous *Diplotomma* species that most often grows on *Polyozosia dispersa* agg., especially *P. albescens* (Diederich et al. 2012). In the field it resembles *Arthonia apotheciorum*, a common lichenicolous species with black apothecia that also grows on *P. dispersa* agg. In the Netherlands it was found at multiple sites (Fig. 12).

**Specimens examined**

The Netherlands: Friesland, Schiermonnikoog, 53°28'23.16"N, 06°11'44.88"E, brick wall, on *Polyozosia albescens*, 18 Jan. 2023, L. Verboom (herb. L. Verboom). Gelderland, Hemmen, 51°56'03.48"N, 05°42'01.8"E, brick churchwall, on *P. albescens*, 28 Oct. 2023, R. Smits s.n. (herb. van der Kolk 3916).

***Epicoccum nigrum* Link**

This is a facultatively lichenicolous species that is widespread and also commonly occurs as a plant pathogen (Taguam et al. 2021). It can inhabit decaying thalli of various lichen species. In the Netherlands it has been found on *Protoparmeliopsis muralis*, *Glaucumaria rupicola*, *Physcia caesia* and *Xanthoparmelia loxodes* (Fig. 13).

**Specimens examined**

The Netherlands: Groningen, Delfzijl, Wadden Sea dike, 53°23'16.08"N, 06°53'24"E, sea dike made from granite rocks, on *Physcia caesia*, 26 Oct. 2022, H. van der Kolk 3197 (herb. van der Kolk); Delfzijl, Wadden Sea dike, 53°23'30.84"N, 06°53'14.64"E, sea dike made from granite rocks, on *Xanthoparmelia loxodes*, 26 Oct. 2022, H. van der Kolk 3198 (herb. van der Kolk); Delfzijl, Wadden Sea dike, 53°23'17.52"N, 06°53'25.08"E, sea dike made from granite rocks, on *Glaucumaria rupicola*, 26 Oct. 2022, H. van der Kolk 3199 (herb. van der Kolk); Delfzijl, Wadden Sea dike, 53°23'30.84"N, 06°53'15.36"E, sea dike made from granite rocks, on *G. rupicola*, 26 Oct. 2022, H. van der Kolk 3200 (herb. van der Kolk). Limburg, Born, Kasteel Born, 51°01'52.32"N, 05°48'39.24"E, bridge with granite stones, on *Protoparmeliopsis muralis*, 12 Nov. 2021, H. van der Kolk 2360 (herb. van der Kolk).

**\**Epithamnolia pertusariae* (Etayo & Diederich) Diederich & Suija**

This species was found on decaying thalli of *Cladonia caespiticia* (Fig. 14). It differs from *Epithamnolia brevicladoniae*, a species that also has been recorded on *Cladonia* from the Netherlands, in the conidia that are gradually tapering towards the apices (Suija et al. 2017).

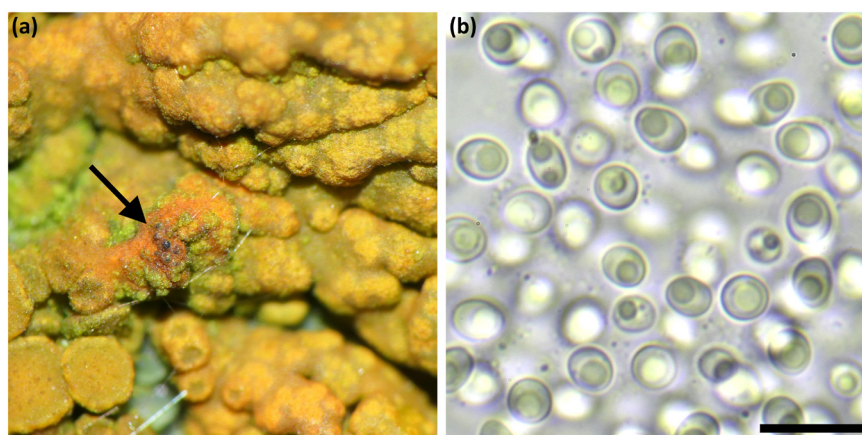


Figure 9. *Didymocyrtis consimilis*. (a) Black pycnidia on *Rusavskia elegans*, (b) conidia. H. van der Kolk 2575. Scale bar (b) = 10 µm.



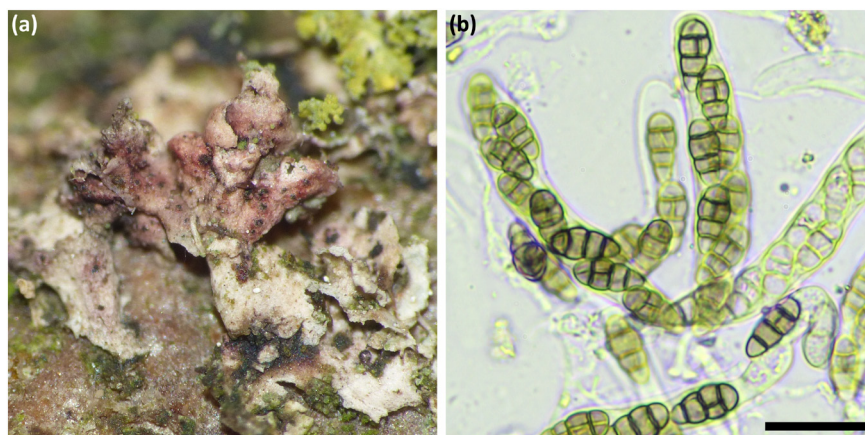


Figure 10. *Didymocyrtis physciae*. (a) Perithecia on decaying thallus of *Physcia adscendens*, (b) asci with ascospores. H. van der Kolk 2378. Scale bar (b) = 10  $\mu$ m.

#### **Specimen examined**

The Netherlands: Gelderland, Ede, Zuid Ginkel, 52°01'12.36"N, 05°44'42.72"E, sandy soil on ditch side in forest, on *Cladonia caespiticia*, 12 May 2023, H. van der Kolk 3550 (herb. van der Kolk).

#### **\**Gonatophragmium lichenophilum* F.Berger & U.Braun**

This species was described from *Xanthoria parietina* (Berger et al. 2015). In the Netherlands, it has been collected on a range of hosts, including *X. parietina* but also on *Blennothallia crispa*, *Candelaria concolor*, *Phaeophyscia orbicularis*, *Physcia tenella*, *Protoparmeliopsis muralis*, *Pyrenodesmia teicholyta* and *Variospora flavescens* (Fig. 15). All specimens from different hosts fit the original description and therefore this species should be considered as a generalist lichenicolous fungus.

#### **Specimens examined**

The Netherlands: Limburg, Kerkrade, Abdij Rolduc, 50°52'03.36"N, 06°04'51.24"E, brick wall, on *Protoparmeliopsis muralis*, 13 Nov. 2021, H. van der Kolk

2332 (herb. van der Kolk); Born, Kasteel, 51°01'52.32"N, 05°48'39.24"E, brick wall, on *Blennothallia crispa*, 12 Nov. 2021, H. van der Kolk 2333 (herb. van der Kolk). Utrecht, Houten, 52°02'30.84"N, 05°08'49.2"E, roadside trees, on *Xanthoria parietina*, *Physcia tenella* and *Candelaria concolor*, 19 Nov. 2023, N. Schrier s.n. (herb. T. Schrier 0769); Utrecht city, Laagraven, 52°02'58.56"N, 05°07'26.04"E, roadside trees, on *Phaeophyscia orbicularis*, 29 Dec. 2021, N. Schrier s.n.; Houten, 52°02'36.96"N, 05°08'13.56"E, roadside trees, on *Physcia tenella*, 11 Nov. 2023, T. Schrier s.n.; Vechten, 52°03'49.32"N, 05°10'24.24"E, on concrete wall, on *Pyrenodesmia teicholyta*, 22 Dec. 2021, N. Schrier s.n. Noord-Holland, Naarden, 52°17'46.68"N, 05°09'58.68"E, on brick wall, on *Variospora flavescens*, 11 Jan. 2023, T. Schrier 0249 (herb. T. Schrier).

#### **\**Lichenohendersonia varians* Calat. & Etayo**

This species has remarkable brown conidia that are up to 3-septate. It grows on saxicolous lichens, especially *Candelariella vitellina* and several species belonging to the Lecanorales, and has been reported from Spain and Ukraine (Calatayud and Etayo 2001, Khodosovtsev and Darmostuk

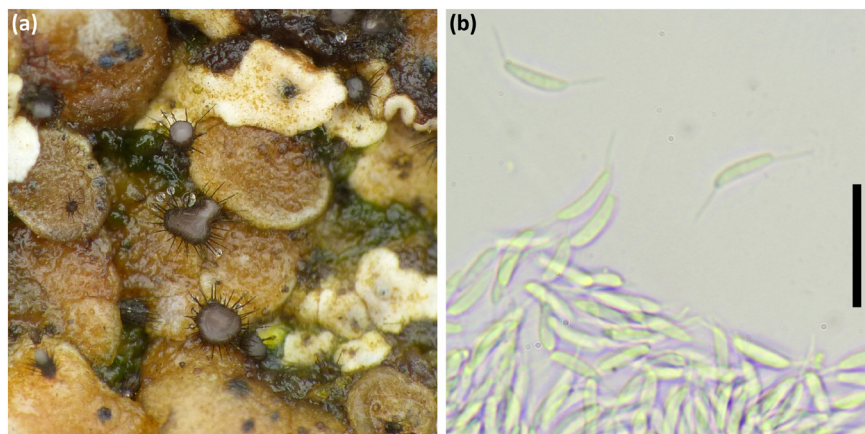


Figure 11. *Dinemasporium strigosum*. (a) Pycnidia on *Protoparmeliopsis muralis*, (b) conidia. H. van der Kolk 1796. Scale bar (b) = 20  $\mu$ m.

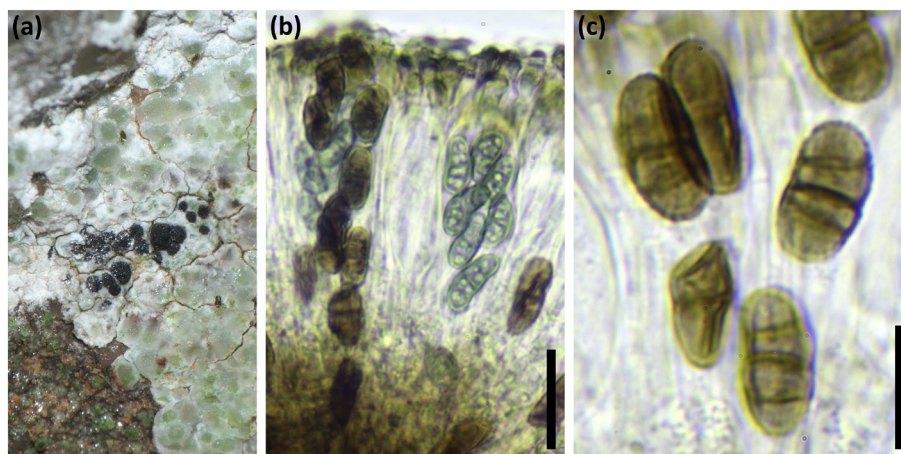


Figure 12. *Diplotomma parasiticum*. (a) Apothecia on *Polyozosia albescens*, (b) asci with ascospores, (c) mature ascospores. H. van der Kolk 3916. Scale bar (b) = 20  $\mu$ m; (c) = 10  $\mu$ m.

2016). The species was found in the Netherlands on decaying thalli of *Protoparmeliopsis muralis* (Fig. 16).

#### **Specimen examined**

The Netherlands: Limburg, Born, Kasteel Born, 51°01'52.32"N, 05°48'39.24"E, wall with granite stones, on *Protoparmeliopsis muralis*, 12 Nov. 2021, H. van der Kolk 2359 (herb. van der Kolk).

#### **\**Lichenostigma chlaroterae* (F.Berger & Brackel) Ertz & Diederich**

A widespread and often common species mainly inhabiting corticolous *Lecanora* (Ertz et al. 2014). Ascomata are extremely rare and absent in the Dutch specimen (Fig. 17).

#### **Specimen examined**

The Netherlands: Gelderland, Haarlo, Veldweg, 52°06'02.49"N, 06°35'09.42"E, roadside *Quercus robur*, on *Lecanora chlarotera*, 27 Apr. 2022, H. van der Kolk 3110 (herb. van der Kolk).

#### **\**Lichenostigma cosmopolites* Hafellner & Calat.**

This species was found on *Xanthoparmelia microspora* (Fig. 18), a lichen species that was imported with rocks from Peru. Hence, it is uncertain whether *Lichenostigma cosmopolites* should be considered native or whether it was also imported. It is common in Europe (Hafellner and Calatayud 1999) and should be searched for on native hosts in the Netherlands, especially on *Xanthoparmelia conspersa*.

#### **Specimen examined**

The Netherlands: Gelderland, Rozendaal, Delhuyzen, 52°02'01.32"N, 05°55'53.04"E, imported granite stones of monument, on *Xanthoparmelia microspora*, 24 Sept. 2022, P. Geyselings F090 (herb. P. Geyselings).

#### **\**Nectria brutia* Diederich & Puntillo**

*Nectria brutia* was found in the Netherlands on a gravestone on *Scytinium plicatile* (Fig. 19). Perithecia of the Dutch

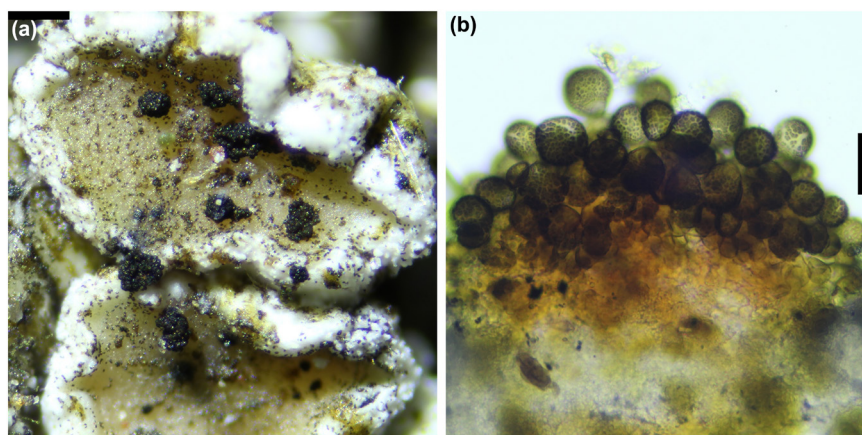


Figure 13. *Epicoccum nigrum*. (a) Sporodochia on apothecia of *Protoparmeliopsis muralis*, (b) section of sporodochium covered by mature conidia. H. van der Kolk 2360. Scale bar (b) = 20  $\mu$ m.



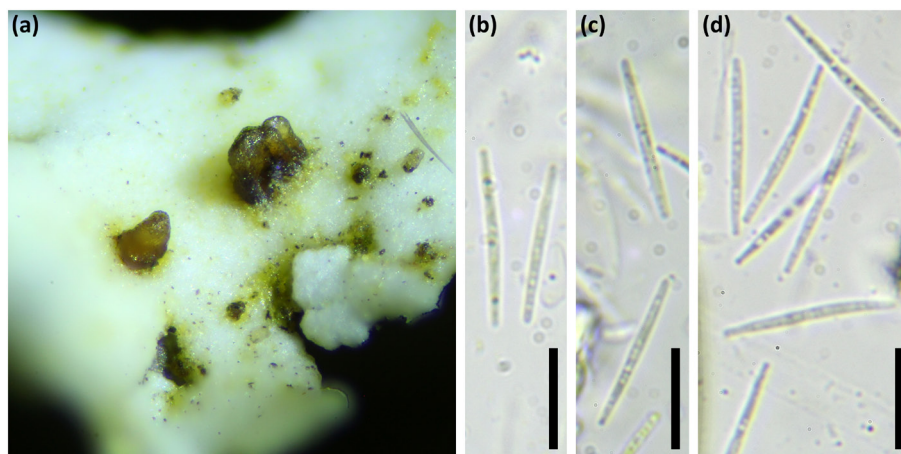


Figure 14. *Epithamnolia pertusariae*. (a) Pycnidia on a decaying squamule of *Cladonia caespiticia*, (b–d) conidia. H. van der Kolk 3550. Scale bar (b–d) = 10 µm.

specimen are dark reddish brown, 250–380 µm, without hairs, sessile or slightly immersed in the host thallus. Outer layer of perithecial wall of yellowish brown, subspherical cells, inner layer of smaller, more elongated colourless cells. Ascospores  $17.5\text{--}20.0 \times 6.0\text{--}7.0$  µm, colourless, smooth, often slightly constricted at the septum.

The morphology of the Dutch specimen fits well the original species description, which pointed out that the species does not belong to *Nectria* s. str. (Diederich and Puntillo 1995). It has only been reported from a few countries, on corticolous *Collema* species from Italy (Diederich and Puntillo 1995), on *Lathagrium auriforme* from Spain and on *Scytinium plicatile* from Portugal (de Silanes et al. 2009).

#### **Specimen examined**

The Netherlands: Zuid-Holland, Gorinchem, graveyard,  $51^{\circ}50'17.52''\text{N}$ ,  $04^{\circ}58'37.92''\text{E}$ , gravestone of calcereous rock on graveyard, on *Scytinium plicatile*, 11 Feb. 2023, M. Vervoort s.n. (herb. van der Kolk 3358).

#### **\*Nectriopsis physciicola D.Hawksw. & Earl.-Benn.**

*Nectriopsis physciicola* forms sessile, brown to reddish brown, hairy perithecia on *Physcia* species. It was found once on *Physcia tenella*.

#### **Specimen examined**

The Netherlands: Friesland, Harkema,  $53^{\circ}11'09.96''\text{N}$ ,  $06^{\circ}08'02.04''\text{E}$ , deciduous tree in village, on *Physcia tenella*, 18 Dec. 2021, J. Huizinga s.n. (herb. van der Kolk 2618).

#### **\*Niesslia cladoniicola D.Hawksw. & W.Gams**

A widespread lichenicolous species that has been reported from many different *Cladonia* species. In the Netherlands, the species was found on *C. rangiformis*.

#### **Specimen examined**

The Netherlands: Zeeland, Grevelingendam,  $51^{\circ}40'28.92''\text{N}$ ,  $04^{\circ}08'36.96''\text{E}$ , sea dike with pioneer vegetation with mosses

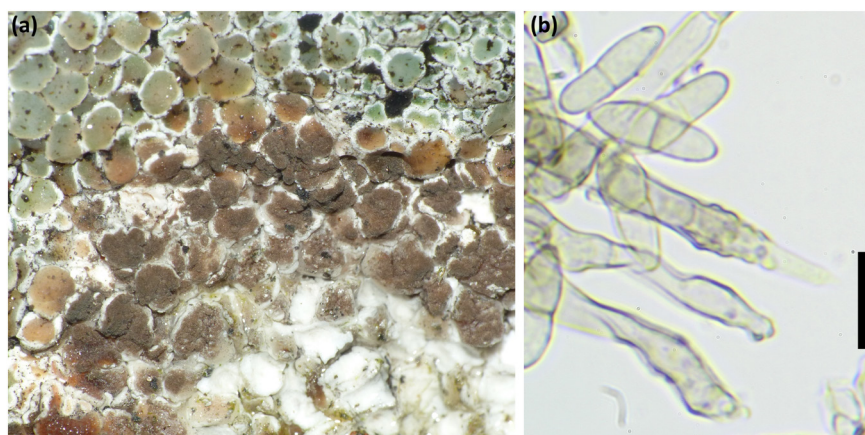


Figure 15. *Gonatophragmium lichenophilum*. (a) Infection on *Protoparmeliopsis muralis*, (b) Conidiophores and conidia. Note the conidigenous cells with prominent conidigenous loci. H. van der Kolk 2332. Scale bar (b) = 10 µm.



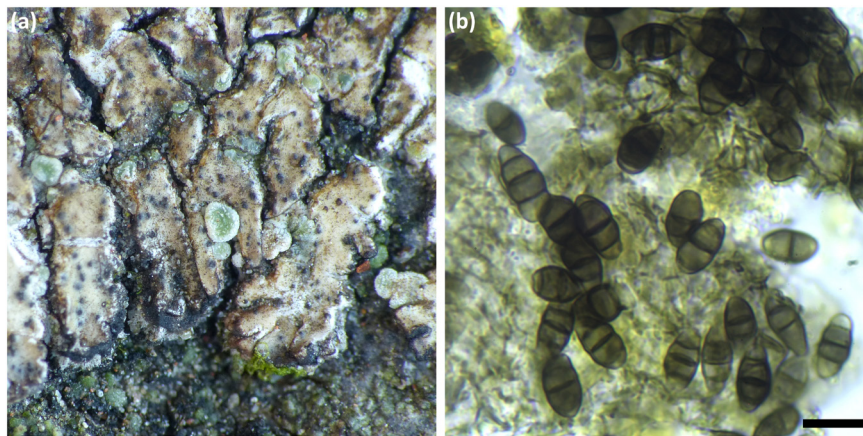


Figure 16. *Lichenohendersonia varians*. (a) Pycnidia on *Protoparmeliopsis muralis*, (b) conidia. H. van der Kolk 2359. Scale bar (b) = 10  $\mu\text{m}$ .

and lichens, on *Cladonia rangiformis*, 16 Dec. 2021, H. van der Kolk 2581 (herb. van der Kolk).

**\**Opegrapha opaca* Nyl.**

See notes under *Opegrapha rupestris*.

**Specimen examined**

The Netherlands: Zuid-Holland, Gorinchem, graveyard, 51°50'20.04"N, 04°58'39.36"E, on calcareous gravestone on graveyard, on *Verrucaria nigrescens*, 28 Dec. 2017, H. van der Kolk s.n.

**\**Opegrapha hochstetteri* Coppins**

See notes under *Opegrapha rupestris*.

**Specimens examined**

The Netherlands: Flevoland, Kraggenburg, 52°40'23.88"N, 05°55'46.56"E, concrete wall, on *Verrucaria muralis*, 6 Jan. 2022, G. Berger s.n. (herb. van der Kolk 3411). Friesland, Terschelling, 53°23'59.64"N, 05°20'32.28"E, concrete wall in forest, on *Verrucaria viridula*, 13 June 2016, H. van der Kolk 0601 (herb. van der Kolk). Gelderland, Nijmegen,

Heilig Landstichting, 51°49'06.24"N, 05°53'29.4"E, marl of house on graveyard, on *Verrucaria muralis*, 1 June 2023, J. Boers s.n. (herb. van der Kolk 3539).

***Opegrapha rupestris* Pers.**

Coppins et al. (2021) showed that four species of lichenicolous *Opegrapha* with 3-septate ascospores grow on Verrucariaceae in Great Britain and Ireland. *Opegrapha pulvinata* grows on *Dermatocarpon miniatum*, a lichen not occurring in the Netherlands. *Opegrapha hochstetteri* grows on *Verrucaria hochstetteri* and *V. muralis*, has predominantly 6-spored asci, and ascospores measuring 15.0–19.0  $\times$  4.7–6.0  $\mu\text{m}$ . *Opegrapha opaca* grows on *Verrucaria nigrescens* and *V. viridula*, has 4–6-spored asci and ascospores measuring 12.5–17.3  $\times$  3.4–4.8  $\mu\text{m}$ . *Opegrapha rupestris* grows on *Bagliettoa* species, has 8-spored asci, and ascospores measuring 14–22  $\times$  5–8  $\mu\text{m}$ . Outside Great Britain and Ireland, *Opegrapha rouxiana* is another lichenicolous species growing on *Polyblastia*, differing from the other four species by the much larger ascospores, measuring 24.5–30.5  $\times$  8.5–10.0  $\mu\text{m}$  (Navarro-Rosinés and Hladun 1995).

We revised part of the Dutch material of *Opegrapha rupestris* s.l. and concluded that *Opegrapha hochstetteri*, *O. opaca* and *O. rupestris* occur in the Netherlands. However,

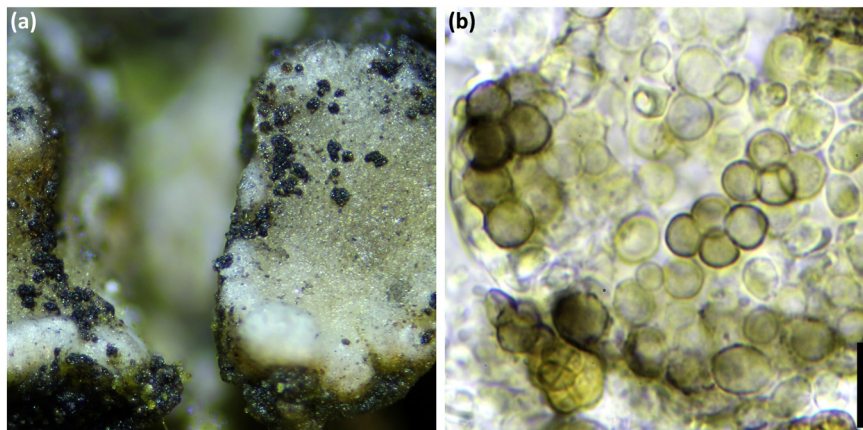


Figure 17. *Lichenostigma chlaroterae*. (a) Pycnidia on *Lecanora chlarotera*, (b) conidia. H. van der Kolk 3110. Scale bar (b) = 10  $\mu\text{m}$ .

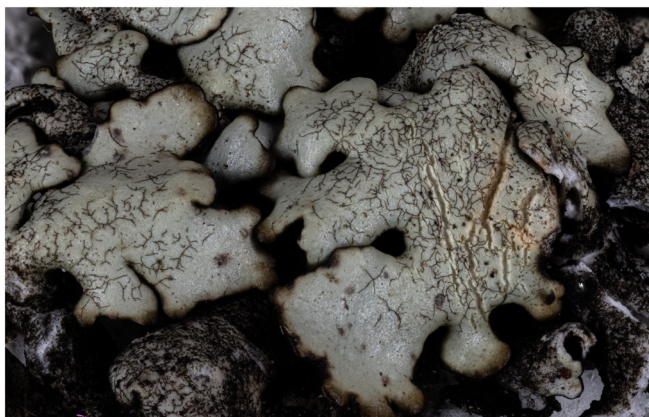


Figure 18. *Lichenostigma cosmopolites*. Infection on *Xanthoparmelia microspora*. P. Geysels F090. Photo by Peter D'Joos.

there are several inconsistencies with the descriptions in Coppins et al. (2021). *Opegrapha rupestris* was also found growing on *Polyblastia dermatodes*, and *Opegrapha hochstetteri* on *Verrucaria viridula*. Moreover, several specimens of *Opegrapha hochstetteri* had apothecia with an exposed disk and predominantly 8-spored asci (although always at least some 6-spored asci were present). Given the variation within each species, and the overlap in hosts, we recommend that future studies of this group include DNA analyses to support the current species delimitation.

#### Specimen examined

The Netherlands: Drenthe, Zuidwolde, begraafplaats, 52°40'32.16"N, 06°25'06.96"E, on calcareous gravestone on graveyard, on *Polyblastia dermatodes*, 12 Feb. 2022, H. van der Kolk 2688 (herb. van der Kolk).

#### *Paranectria oropensis* (Ces.) D.Hawksw. & Piroz.

This is a very common species in the Netherlands that is usually found on various corticolous lichens. In most specimens the distinct perithecia and ascospores easily reveal its identity. We encountered several specimens of an unknown *Acremonium*-like

fungus with large and predominantly 1-septate conidia, co-occurring with perithecia of *Paranectria oropensis*, suggesting that they may represent the asexual stage of this species. Interestingly, the conidia in the Dutch material differ from the anamorph described by Brackel (2015), where the conidia are described as predominantly 3-septate, and measuring 25.0–30.0 × 4.7–5.7 µm (when released from the conidiogenous cells) or 34.0–38.9 × 9.9–11.7 µm (when agglomerated in pale pinkish masses). In contrast, the Dutch material contains conidia that are predominantly 1-septate (rarely 3-septate) and measure 15.0–25.0 × 5.5–7.5 µm (Fig. 20).

#### Specimen examined

The Netherlands, Gelderland, Doetinchem, Kruisbergsche Bosschen, 51°59'57.48"N, 06°15'34.56"E, *Quercus robur* in mixed forest, on various lichens, 23 Oct. 2021, H. van der Kolk 2528 (herb. van der Kolk).

#### \**Phaeoseptoria peltigerae* Punith. & Spooner

This species was found in the Netherlands on several different hosts. A specimen on *Peltigera rufescens* had conidia measuring 19.0–26.0 × 3.0–3.5 µm, longer than in the holotype (13.0–19.0 × 3.0–3.5 µm; Fig. 21; Punithalingam and Spooner 1997). A specimen with conidia longer than those of the holotype was also reported previously by Zhurbenko (2013). Further studies are needed to unravel whether populations with differently sized conidia represent distinct species. Besides *Peltigera rufescens*, we collected the species also on *Protoparmeliopsis muralis* and *Trapelia placodioides*, indicating that *Phaeoseptoria peltigerae* (in the broad sense) is not restricted to *Peltigera* as a host. All hosts were in a poor shape and often decaying, which could have made them more susceptible for infection by this fungus.

#### Specimens examined

The Netherlands: Gelderland, Elspeet, graveyard, 52°17'04.92"N, 05°47'06"E, sandy soil on graveyard, on *Peltigera rufescens*, 3 Nov. 2021, H. van der Kolk 2287 (herb. van der Kolk). Utrecht, Leersum, 52°00'36.72"N, 05°25'42.6"E,

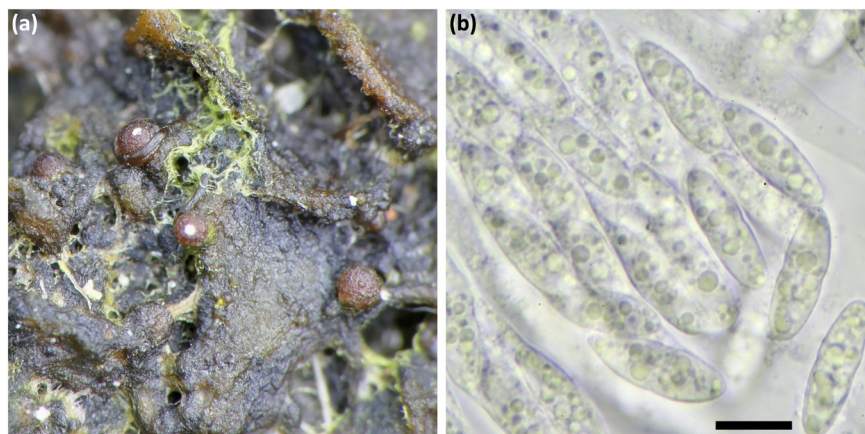


Figure 19. *Nectria brutia*. (a) Perithecia on *Scytinium plicatile*, (b) asci with ascospores. H. van der Kolk 3358. Scale bar (b) = 10 µm.



granite on traffic hill, on *Protoparmeliopsis muralis*, 18 Jan. 2021, L. Verboom (herb. L. Verboom); Utrecht, Park Bloeyendaal, 52°05'35.88"N, 05°08'53.16"E, brick wall, on *Trapelia placodioides*, 1 Jan. 2023, N. Schrier s.n. (herb. T. Schrier 0216).

#### \**Phaeospora lecanorae* Eitner

This species has only rarely been reported and generally grows on *Polyozosia dispersa* (Sérusiaux et al. 1999, Khodosovtsev et al. 2007), on which it was also found in the Netherlands (Fig. 22). The Dutch specimen had brown, 3-septate ascospores, measuring  $14.5\text{--}17.5 \times 5.8\text{--}6.7 \mu\text{m}$ . The similar *Phaeospora parasitica* has larger ascospores and grows on *Rhizocarpon*. The similar *Lasiosphaeriopsis lecanorae* also has larger ascospores and grows on *Lecanora polytropa* (Pérez-Ortega and Halici 2008).

#### Specimen examined

The Netherlands: Gelderland, Heerwaarden, uiterwaarden Waal, 51°50'00.24"N, 05°23'51.72"E, stem of old *Populus* in river floodplain, on *Polyozosia dispersa*, 22 Feb. 2023, H. van der Kolk 3426 (herb. van der Kolk).

#### \**Polycoccum aksoyi* Halici & V. Atienza

This species was found on *Aspicilia grisea* on an old granite sea dike, with the following characteristics: Young perithecia in the Dutch specimen first completely immersed, later semi-immersed. Perithecia  $\pm 170 \mu\text{m}$  diam., black around the ostiole, lower half pale brown and base almost colourless. Periphyses and pseudoparaphyses present, abundant,  $1.5\text{--}3.0 \mu\text{m}$  wide. Asci  $50\text{--}60 \times 13\text{--}16 \mu\text{m}$ , 8-spored. Ascospores  $12.5\text{--}14.5 \times 5.5\text{--}6.0 \mu\text{m}$ , 1-septate, light brown, often slightly constricted at the septum, smooth-walled.

*Polycoccum aksoyi* has been described as having intrascalar filaments, but we have only observed periphyses and

pseudoparaphyses. Pictures of filaments in Halici et al. (2007) and Darmostuk and Golovenko (2016) do, however, resemble the filaments that were observed in the Dutch material (Fig. 23). *Endococcus rugulosus* differs in having broader ascospores with a distinct ornamentation.

#### Specimen examined

The Netherlands: Groningen, Delfzijl, Wadden Sea dike, 53°23'17.52"N, 06°53'25.08"E, sea dike made from granite rocks, on *Aspicilia grisea*, 26 Oct. 2022, H. van der Kolk 3194 (herb. van der Kolk).

#### \**Polycoccum laursenii* Zhurb.

This species has narrower ascospores than other *Polycoccum* species, and is currently known from a few locations in North America, Europe and Asia (Zhurbenko and Alstrup 2004, Zhurbenko and Pino-Bodas 2017). In the Netherlands, *P. laursenii* was found on the squamules of a *Cladonia* species on a green roof substrate (Fig. 24). It had blackish perithecia that arose singly and were partly submerged. Asci were cylindrical, 8-spored and uniseriate. Ascospores were medium brownish-olive, soleiform with a narrower lower cell, with verrucose walls, and measure  $8.0\text{--}9.5 \times 3.5\text{--}4.0 \mu\text{m}$ .

#### Specimen examined

The Netherlands: Utrecht, Utrecht, Papendorp, 52°03'59.4"N, 05°04'54.12"E, green roof on top of parking lot, on *Cladonia* spec., 24 Apr. 2023, N. Schrier s.n. (herb. van der Kolk 3458).

#### \**Pronectria diplococca* Kocourk., Khodos., Naumovich, Vondrák & Motiej.

This species is characterized by its 1-septate ascospores, with strongly constricted septa often developing secondary septa perpendicular to the primary septum. The ascospores sometimes aggregate and can then disintegrate into simple

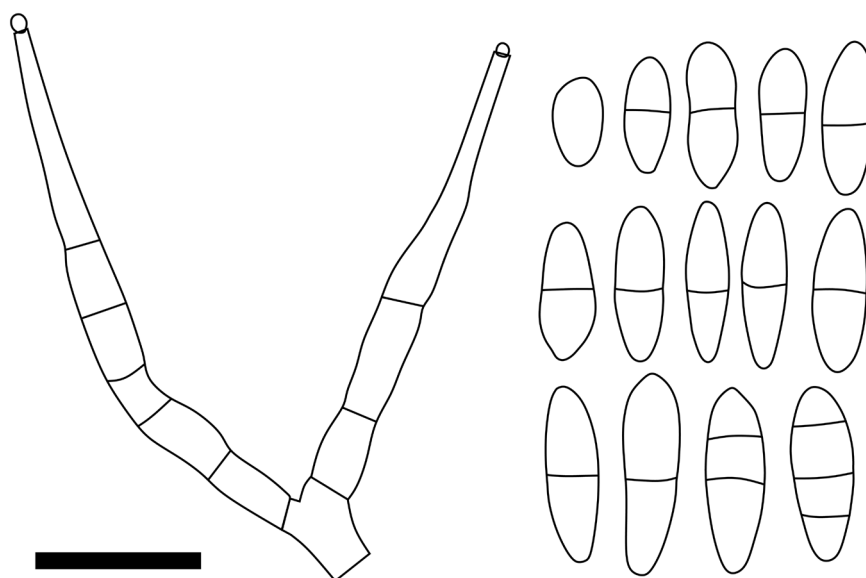


Figure 20. *Paranectria oropensis*. Conidiophore and conidia, based on H. van der Kolk 2528. Scale bar =  $20 \mu\text{m}$ .



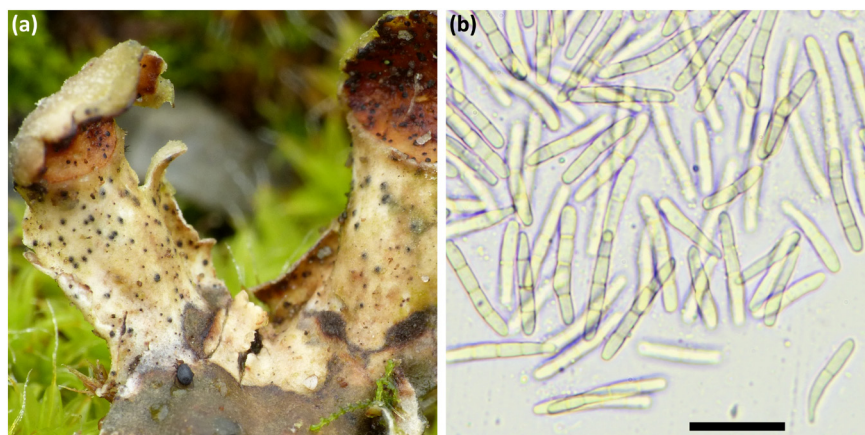


Figure 21. *Phaeoseptoria peltigerae*. (a) Pycnidia on *Peltigera rufescens*, (b) conidia. H. van der Kolk 2287. Scale bar (b) = 20  $\mu$ m.

globose cells (Khodosovtsev et al. 2012). So far, this species was known from *Blennothalia crispa*, *Enchylium tenax* and *Enchylium* sp. in Ukraine, on *E. coccophorum* and *B. crispa* in the Czech Republic, on *Leptogium* sp. in Germany, on *Lathagrium* cf. *auriforme* in Austria and on *Collema* sp. in Greece (Khodosovtsev et al. 2012, Wagner and Schacherer 2019, Brackel and Döbbeler 2020, Darmostuk 2021b, Darmostuk and Sira 2022). The Dutch specimen was found on *Scytinium turgidum* on church walls in a city (Fig. 25). The ascospores of the Dutch specimen were 1-septate and measured  $12.0\text{--}12.5 \times 8.7\text{--}9.3 \mu\text{m}$ . The perithecia were fully submerged in the host thallus, only revealing a reddish-brown ostiolar region on the host surface and were accompanied by an *Acremonium*-type anamorph.

#### Specimen examined

The Netherlands: Utrecht, Utrecht, Binnenstad,  $52^{\circ}05'25.8''\text{N}$ ,  $05^{\circ}07'21.36''\text{E}$ , sandstone church wall, on *Scytinium turgidum*, 20 Jan. 2022, N. Schrier s.n. (herb. T. Schrier 0006).

#### \**Pseudocercospora lichenum* (Keissl.) D.Hawksw.

This lichenicolous species has been reported from several host lichens, including *Lobaria* and *Loxospora* (Etayo

and Diederich 1996). In the Netherlands it was found on *Lecanora* in a coastal habitat (Fig. 26).

#### Specimen examined

The Netherlands: Groningen, Rottumerplaat,  $53^{\circ}32'13''\text{N}$ ,  $06^{\circ}30'14''\text{E}$ , wooden fence, on *Lecanora* spec., 12 Feb. 2023, J. Boers 0012 (herb. van der Kolk).

#### \**Stigmidium fuscatae* (Arnold) R.Sant.

This species is widespread throughout Europe and North America (Calatayud and Triebel 2003, Etayo and Breuss 1998, Kossowska and Szczepańska 2013). The Dutch specimen was found on *Acarospora fuscata* on an imported granite rock (origin unknown). It is unclear whether the species was imported with the rock or appeared spontaneously. The host, *Acarospora fuscata*, is a native and widespread lichen in the Netherlands. The ascospores of the Dutch specimen were 1-septate and measured  $9.2\text{--}11.4 \times 3.8\text{--}4.4 \mu\text{m}$ .

#### Specimen examined

The Netherlands: Utrecht, Nieuwegein, Plettenburg,  $52^{\circ}01'59.16''\text{N}$ ,  $05^{\circ}06'01.8''\text{E}$ , granite rocks (recently

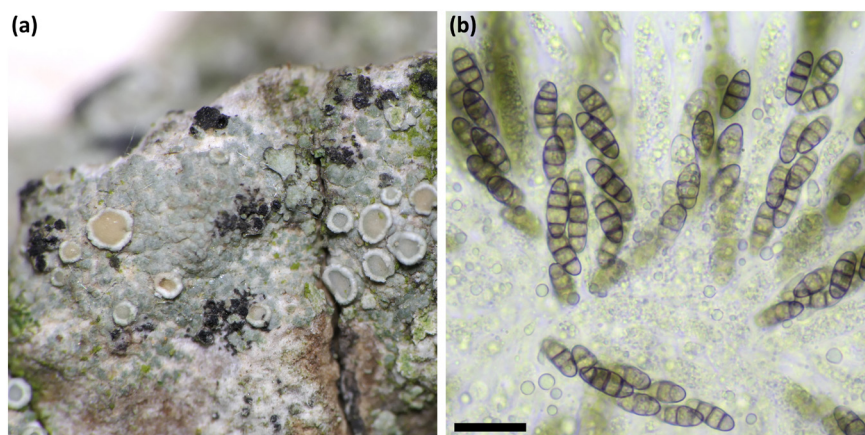


Figure 22. *Phaeospora lecanorae*. (a) Groups of black perithecia on *Polyozosia dispersa*, (b) asci with ascospores. H. van der Kolk 3426. Scale bar (b) = 20  $\mu$ m.

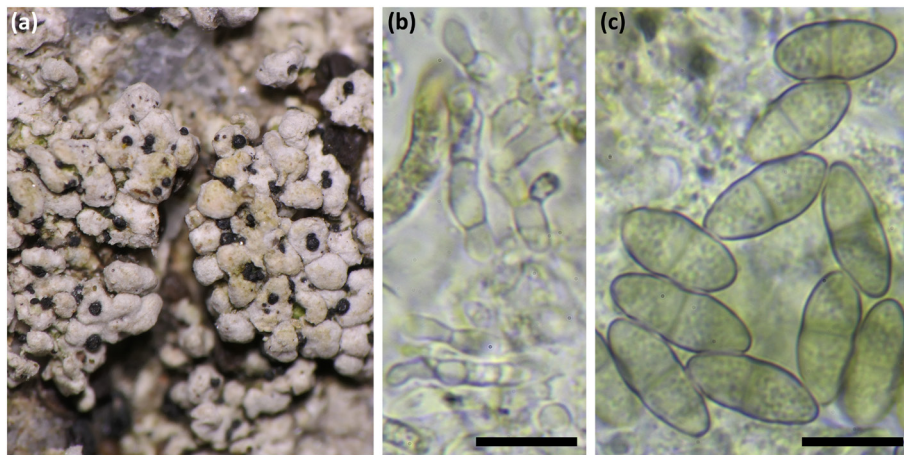


Figure 23. *Polycoccum aksoyi*. (a) Perithecia on *Aspicilia grisea*, (b) periphyses, (c) ascospores. H. van der Kolk 3194. Scale bars (b–c) = 10  $\mu$ m.

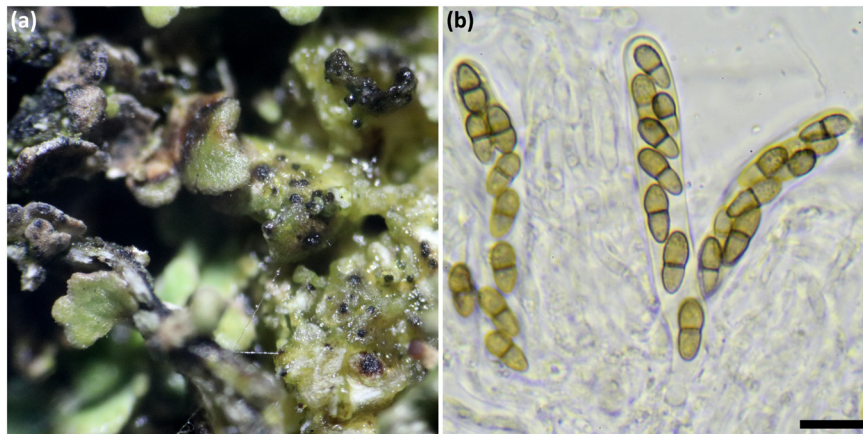


Figure 24. *Polycoccum laursenii*. (a) Perithecia on squamules of a *Cladonia* species, (b) asci with ascospores. H. van der Kolk 3458. Scale bar (b) = 10  $\mu$ m.

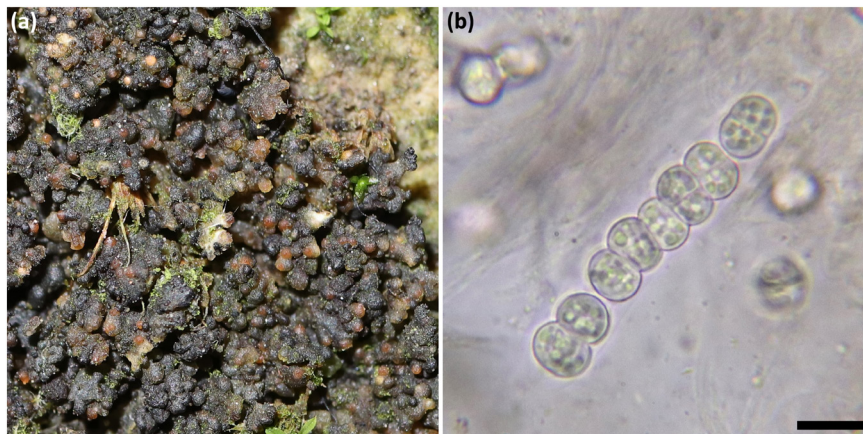


Figure 25. *Pronectria diplococca*. (a) Perithecia on *Scytinium turgidum*, (b) ascus with ascospores. T. Schrier 0006. Scale bar (b) = 10  $\mu$ m.



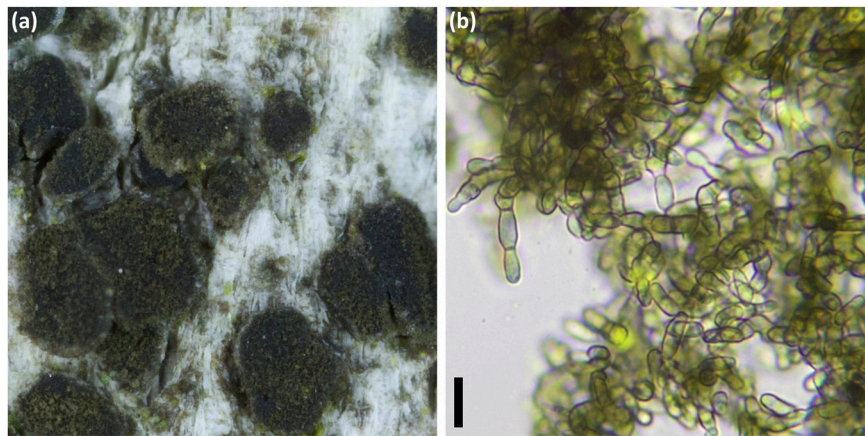


Figure 26. *Pseudocercospora lichenum*. (a) Infection on *Lecanora* sp., (b) conidiophores and conidia. J. Boers 0012. Scale bar (b) = 10  $\mu$ m.

imported), on *Acarospora fuscata*, 4 Mar. 2023, N. Schrier s.n. (herb. T. Schrier 0391).

#### \**Tremella candelariellae* Diederich & Etayo

This species grows on the thallus and apothecia of *Candelariella* species and is widespread in Europe and North America (Diederich et al. 2022). The Dutch specimen deviates from typical collections by the infected thallus granules becoming brown (Fig. 27).

##### *Specimen examined*

The Netherlands: Noord-Holland, Texel, IJzeren Kaap, 53°04'41.88"N, 04°53'48.48"E, sea dike made from basalt pillars, on *Candelariella vitellina*, 3 March 2023, H. van der Kolk 3402 (herb. van der Kolk).

#### \**Tremella occultixanthoriae* Diederich, Geyselings & Millanes

This species was recently described from Belgium (Diederich et al. 2022). Targeted searches aimed to find

this species resulted in two records in the Netherlands, both on gravestones richly covered in the host *Xanthoria parietina* (Fig. 28). *Tremella occultixanthoriae* could very well prove to be a common species, but it is challenging to find since it usually inhabits the lower thallus surface of *X. parietina*.

##### *Specimens examined*

The Netherlands: Drenthe, Dwingeloo, 52°49'53.76"N, 06°21'52.2"E, gravestone on graveyard, on *Xanthoria parietina*, 18 Aug. 2022, J. Boers (BR). Zeeland, Breskens, 51°23'32.28"N, 03°32'57.12"E, gravestone on graveyard, on *Xanthoria parietina*, 8 Oct. 2023, H. van der Kolk 3827 (herb. van der Kolk).

#### \**Trimmatostroma acetabuli* Diederich

This species forms a reticulate network of conidiophores and conidial chains on deteriorated lobes of *Pleurosticta acetabulum* (Fig. 29). It was described from Luxembourg (Diederich 2021), and it is also known from France and Germany.

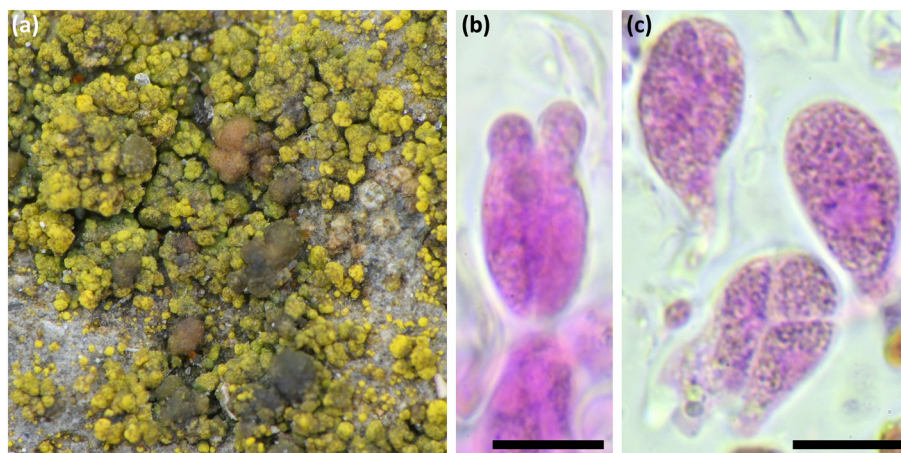


Figure 27. *Tremella candelariellae*. (a) Galls on *Candelariella vitellina*, (b–c) basidia stained in phloxine after pre-treatment with 10% KOH. H. van der Kolk 3402. Scale bar (b–c) = 10  $\mu$ m.



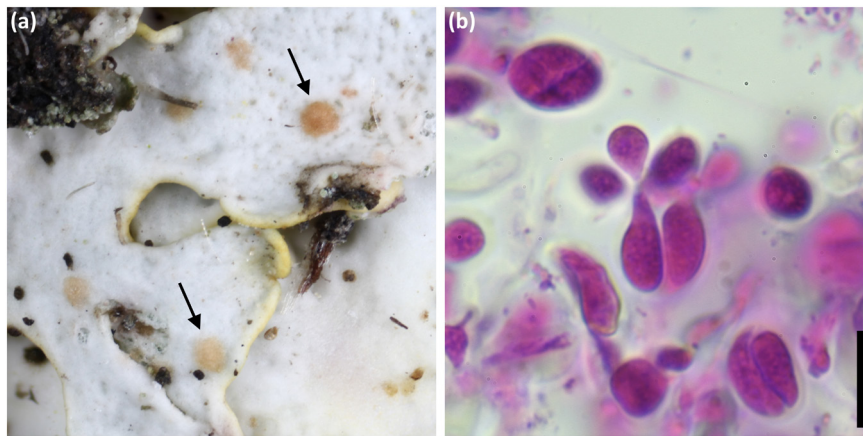


Figure 28. *Tremella occultixanthoriae*. (a) Galls on the lower thallus surface of *Xanthoria parietina*, (b) basidia with conidia stained in phloxine after pre-treatment with 10% KOH. H. van der Kolk 3827. Scale bar (b) = 10 µm.

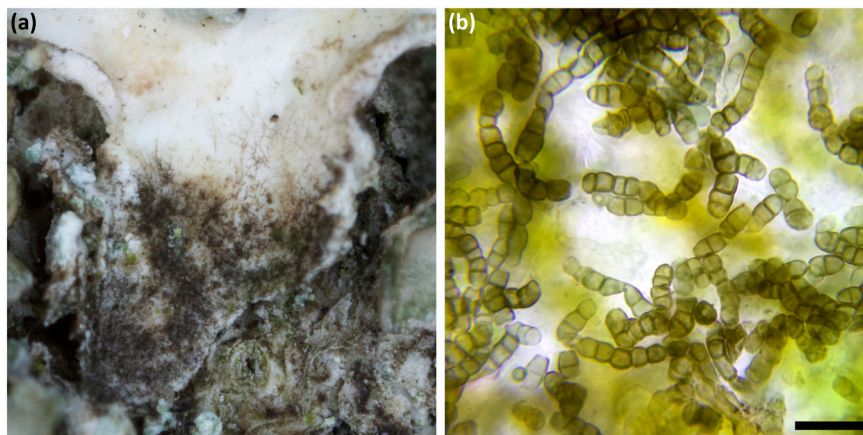


Figure 29. *Trimmatostroma acetabuli*. (a) Infection on decaying lobe of *Pleurosticta acetabulum*, (b) conidiophores and conidia. J. Boers 0013. Scale bar (b) = 20 µm.

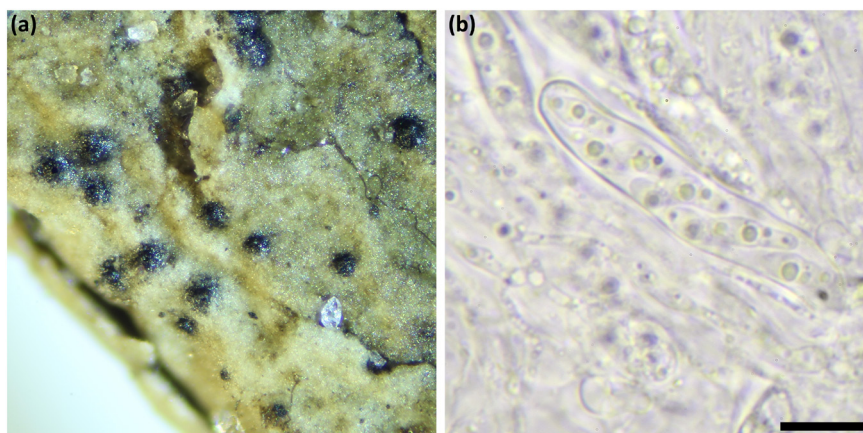


Figure 30. *Zwackhiomyces diderichii*. (a) Perithecia on *Cladonia furcata*, (b) asci with ascospores. H. van der Kolk 3261. Scale bar (b) = 10 µm.

### Specimen examined

The Netherlands: Drenthe, Havelte, 52°46'00.12"N, 06°14'51.36"E, roadside oak (*Quercus robur*) trees, on *Pleurosticta acetabulum*, 22 Jan. 2023, J. Boers 0013 (herb. van der Kolk).

### \**Zwackhiomyces diderichii* D. Hawksw. & Iturr.

This species forms black perithecia on *Cladonia* (Zhurbenko and Pino-Bodas 2017). In the Netherlands it was recorded on two sites, growing on *Cladonia furcata* and *C. portentosa*, respectively (Fig. 30).

### Specimens examined

The Netherlands: Drenthe, Veenhuizen, 53°01'50.52"N, 06°25'12.72"E, sandy road verge, on *Cladonia furcata*, 22 Nov. 2022, J. Boers s.n. (herb. van der Kolk 3261). Noord-Holland, Texel, Bleekersvallei, 53°03'58.32"N, 04°44'16.44"E, sandy soil in coastal dune, on *C. portentosa*, 3 Mar. 2023, H. van der Kolk 3413 (herb. van der Kolk).

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