

A new species of *Arthonia* is a pest in an orchid nursery

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Abstract: The lichen *Arthonia orchidicida* is described as new to science from the leaves of orchids in a nursery. It is a pest organism, as it is affecting the habitus of the plants and diminishing the vitality of small plants. No prophylax is known and the lichen has to be regularly removed by rubbing it off manually. It is the first lichen reported to cause economic damage. It occurs in the Netherlands, but its country of origin is unknown.

Keywords: economic damage, exotic, greenhouse, invasive species, lichenized fungi, taxonomy

Introduction

Lichens form a harmless group of organisms of little economic importance. None of the economic uses reported so far are considered deleterious, with the possible exception of a few cases where animals devoured lichens which were poisonous to them (e.g. Cook *et al.* 2007; Dailey *et al.* 2008).

In March 2010 several public and private greenhouses in the Netherlands were visited by the author in search of the sources of distribution of invasive exotic lichens and bryophytes. In one of the private orchid nurseries the author was shown halls full of orchids overgrown by a thin filmy organism believed to be a fungus. This film had to be regularly removed manually, especially before the orchids were put out in displays or before selling them. The causative agent was usually not detrimental to the health of the orchid, except in some cases where the orchids were small and slow-growing. With a hand lens it soon became clear that the causal agent was actually a lichen, richly fruiting and also with abundant pycnidia.

Although most affected orchids easily survived the attack by this lichen, there is considerable economic damage, as no prophylax

is known and the lichen has to be removed manually, causing more time to be spent on each individual plant.

The lichen is a species of *Arthonia* with a coccoid alga. The apothecia and internal structures are strongly reminiscent of *A. muscigena* Th. Fr. (Smith *et al.* 2009), a species that can occur on a wide variety of substrata, including bark, rock and polyester, but is not known from living leaves. However, the material differs from true *A. muscigena* in several characters.

As no description of such a taxon could be found, and as it was also unknown to some specialists consulted, the species is described below as new to science.

Materials and Methods

The study is based on material collected by the author in March 2010. The specimens are deposited in ABL, with some duplicates in E and LG. The morphology of all specimens was studied using an Olympus SZX7 stereomicroscope and an Olympus BX50 compound microscope with differential interference contrast optics and photomicrographs taken with an attached Nikon Coolpix 995 digital camera. Chemistry was investigated in short-wave UV.

The New Species

Arthonia orchidicida sp. nov.

Arthoniae muscigenae similis sed pycnidiis globosis vel cylindricis, conidiis ellipsoideis, thallo minutae disperso albogriseo.

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FIG. 1. *Arthonia orchidicida*, holotype. A, habitus on living plant of *Dendrobium delicatulum* in greenhouse.

Typus: The Netherlands, Prov. Utrecht, Hollandse Rading, in greenhouse in orchid nursery, on living leaves of *Dendrobium delicatulum*, 1 March 2010, A. Aptroot 68979 (ABL—holotypus; E, LG—isotypes).

(Figs 1 & 2)

Thallus foliicolous, whitish grey, consisting of irregular, flattened, corticate granules on an inapparent to pale brown hypothallus, with a coccoid alga.

Ascomata numerous, dark brown to black, globose to slightly applanate, superficial on the thallus surface, c. 0.1–0.3 mm diam. *Epithymenium* olive-brown, colour intensifying in K, consisting of tangentially oriented hyphae originating from the hymenium. *Hamathecium* not interspersed, IKI+ reddish. *Hypothecium* dark brown, K+ olive. *Asci* nearly globose, often lying loose. *Ascospores* 8 per ascus, 9–11 × 3–5 µm, clavate, hyaline, 1-septate with septum strongly acentral above middle, not ornamented.

Pycnidia numerous, dark brown, globose to cylindrical and occasionally branched, c. 0.1 mm diam., wall K+ olive. *Conidia* ellipsoidal, hyaline, 1–1.5 × 2 µm.

Chemistry. No secondary substances detected; UV–.

Remarks. The apothecia and internal structures are strongly reminiscent of *Arthonia muscigena* (Smith *et al.* 2009), but the new species differs by the ubiquitous presence of pycnidia which are sessile to stalked rather

than occasional and immersed and contain ellipsoid instead of bacilliform conidia. The thallus is also different: it is whitish grey and granular with large interstices with or without an apparent hypothallus rather than green and more or less continuous. The species grows on several species of the *Orchidaceae* in glasshouses in which the temperature is always between 10 and 25 °C.

Additional material studied. **The Netherlands**: same locality as the type, but on *Vanda*, A. Aptroot 68980 (ABL).

Discussion

The origin of this first economically detrimental lichen remains obscure. There are numerous foliicolous *Arthonia* species described from the tropics (see e.g. Lücking 2008), but none are closely related and all contain a trentepohlioid instead of a coccoid photobiont. Many orchid species in this orchid nursery have been directly imported from tropical regions, such as Costa Rica, Ecuador and Malaysia. Importation on orchids is considered more likely than adaptation of a temperate species.

Lichens are otherwise rare in greenhouses. Most greenhouses visited by the author as part of this survey yielded only some occasional nitrophytes on concrete [often including *Caloplaca citrina* (Hoffm.) Th. Fr.], usually near the entrance. There are few literature records of lichens in greenhouses. Culberson (1963) reported an unidentified sterile crust in Paris now known to be *Lepraria lobificans* Nyl. (Laundon 1992: 330), Poelt (1968) *Cladonia coniocraea* (Flörke) Spreng. and an unidentified *Lepraria* in Berlin and Aptroot & Honegger (2006) *Bacidia delicata* (Larbal. ex Leight.) Coppins in Zürich. The latter species is also present in the greenhouse of Utrecht, where it covers many trunks. Burger's Bush in Arnhem contains foliicolous *Fellhanera bouteillei* (Desm.) Vězda on many palms and ferns. An unidentified *Cladonia* resembling *C. subradiata* (Vain.) Sandst. is present among mosses in the greenhouse from which the new species is described here. Macrolichens observed in

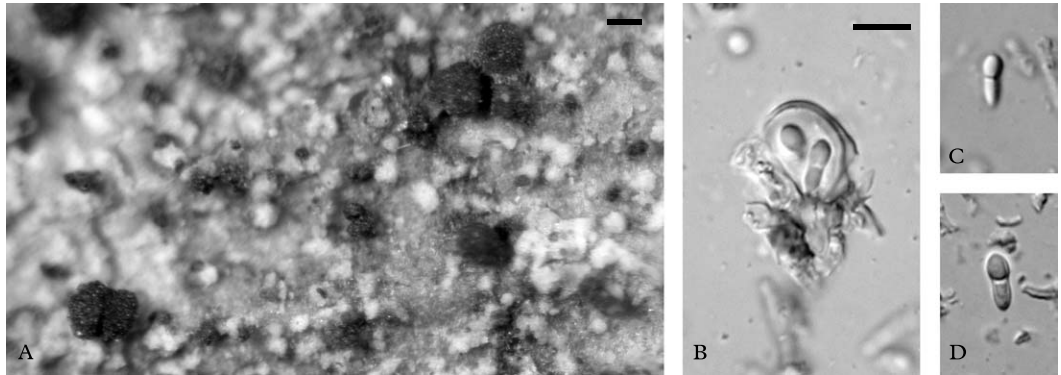


FIG. 2. *Arthonia orchidicida*, parts of the holotype. A, thallus with few apothecia and numerous pycnidia (size of picture *c.* 1.2 × 2 mm); B, ascus with two remaining ascospores; C & D, discharged ascospores. Scales: A = 100 µm; B, (C & D same scale) = 10 µm.

other greenhouses (e.g. *Usnea* spp.) have been transplanted from the wild on bark or branches and they invariably are slowly dying, which is the typical response for transplanted lichens. Occasionally (e.g. in Kew Gardens) a whole suite of tropical micro-lichens can be observed on the smooth bark of palms or *Yucca* trees (Aptroot 1993), shortly after they have been imported directly from tropical countries. These lichens are not spreading onto other stems or other substrata and are generally very short-lived.

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