

Antrodiella citrinella: a new polypore species

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A new polypore, *Antrodiella citrinella* Niemelä & Ryvarden, is described. It resembles *A. semisupina* (Berk. & Curtis) Ryv., but is more distinctly effused, has wider pores, smaller spores and a citric yellow colour. The species is reported from Norway (type), Finland, Poland and Yugoslavia, on *Picea abies* (all countries) and *Abies alba* (Poland only). Most collections were made beside dead fruit bodies of *Fomitopsis pinicola* (Swartz: Fr.) Karst., one adjoined *Gloeophyllum odoratum* (Wulf.: Fr.) Imaz., and were growing on brown-rot caused by them, although *A. citrinella* itself is considered to cause white-rot. The new species is illustrated, and the concept of the genus *Antrodiella* is discussed.

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Introduction

The establishment of the genus *Antrodiella* by Ryvarden & Johansen (1980) helped to settle the generic allocation of the so-called *Polyporus semisupinus* complex. The species of that group were earlier placed mainly in *Trametes* and *Antrodia*. They agree with *Trametes* in being white-rot causing fungi and in having a tough, light-coloured context, but differ in having much smaller spores and in lacking binding hyphae proper. Nor did *Antrodia* represent a good solution as it differs in the type of rot and the spore characters, and has a looser hyphal structure, which makes its fruit bodies fairly soft to corky.

According to the description (Ryvarden & Johansen 1980), characters distinguishing *Antrodiella* are soft waxy fruit bodies, which become hard and semi-translucent when dried, small spores (mostly less than 5 µm long) and a dimitic hyphal structure with occasionally branched skeletal hyphae. To these characters we might add white-rot and remarkably frequent (though not invariable!) association with certain other polypores, the species either growing on or near their dead fruit bodies.

Six species were transferred to the genus when it was described: *A. hunua* (Cunningh.) Ryv., *A. liebmannii* (Fr.) Ryv., *A. minutispora* (Reid, Thind & Chatr.) Ryv., *A. oleagina* (Overh.) Ryv., *A. semisupina* (Berk. & Curtis) Ryv. (type of the genus) and *A. straminea* (Bres.) Ryv. Three European taxa were placed in the genus later (Niemelä 1982): *A. hoehnelii* (Bres. ex Höhn.) Niemelä, *A. onychoides* (Egeland) Niemelä

and *A. romellii* (Donk) Niemelä. The last-mentioned is often considered a resupinate condition of *A. semisupina*. The simple-septate element was introduced into the genus with *A. onychoides*, but it is still a very homogeneous taxon.

The species described here was first collected by T. Niemelä in 1978 from two localities in Poland. Its close affinity to *A. semisupina* was evident from the beginning, but it was filed in the herbarium as an undescribed species, mainly because of the bright yellow colour and the growth on coniferous trees. Description was postponed, however, because of scanty collections. In 1980 more material emerged from Finland, and was reported as *Antrodiella* sp. (Kotiranta & Niemelä 1981). On reading of these finds, Dr Milica Tortić (Zagreb) kindly provided us with material from Yugoslavia and many notes on the species; in fact her find is now the oldest known to us. The beautiful new collection from Norway finally prompted this description.

Antrodiella citrinella Niemelä & Ryvarden n.sp.

Fructificatio resupinata, adnata; pori 3–4 (–5) per mm, facies citrina. Systema hypharum dimiticum, hyphae generatoriae fibulatae, hyphae skeletales crasse tunicatae usque solidae, sporae hyalinae, subglobosae, 3–3.4 × 2–2.5 µm.

Holotypus: Norway. Oslo, Maridalen, Vaggestein Forest Reserve, on *Picea abies* and dead *Fomitopsis pinicola*, 7.X.1982 Ryvarden 20563 (O, isotypi in H and K).

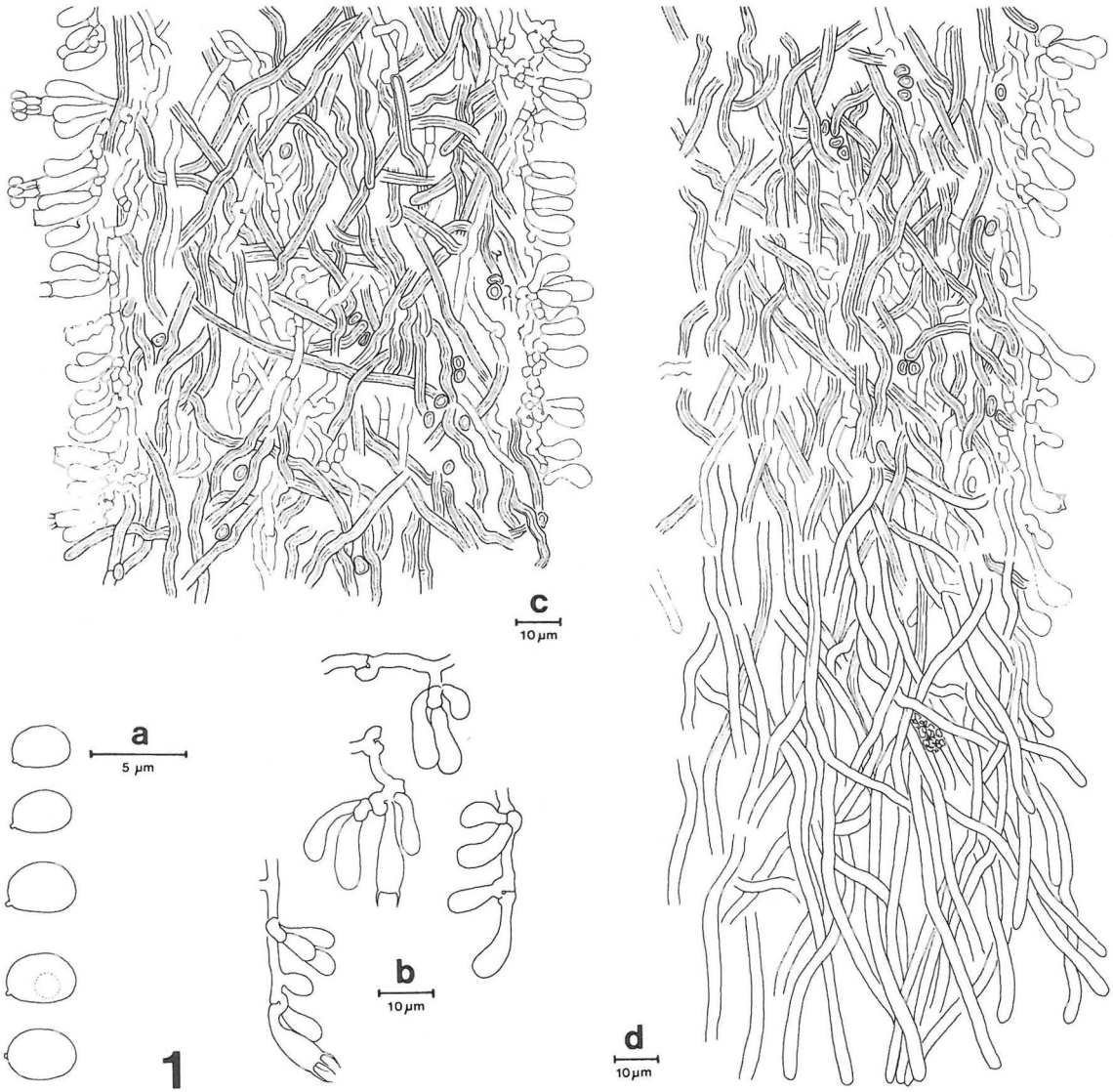
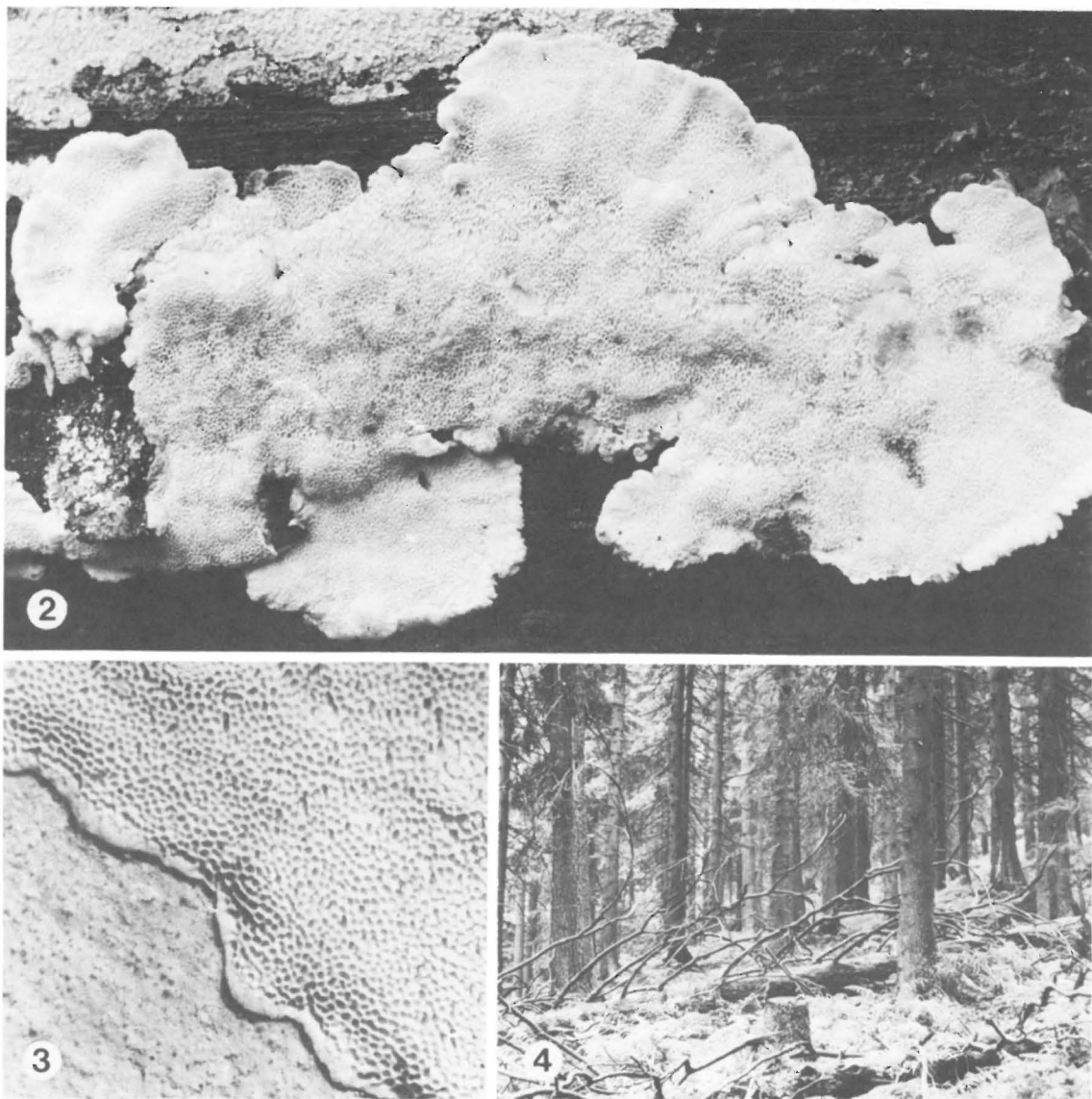


Fig 1. Anatomical details of *Antrodiella citrinella*. a) spores, b) basidia and basidioles, c) section through upper dissepiment, d) dissepiment edge in vertical section (drawn from the type).

Fruit body annual, resupinate or very narrowly reflexed, adnate, (0.3—) 2—7 × (0.3—) 1—2 cm wide, elastic and tough when fresh, corky to hard when dry. Pileoli minute, occurring only exceptionally and attached to effused parts, projecting 1—2 mm from substrate, upper surface matted, straw-coloured. Effused margin sharply delimited, often expanding locally in a semicircular fashion; sterile margin often distinct, ca. 1 mm wide, pubescent (under lens), paler than the

pores. Pore surface pale to bright citric yellow when fresh, fading somewhat when drying, pores round, sometimes intermixed with a few elongated ones, 3—4 (—5) per mm, mouths minutely dentate (under lens). Tubes concolorous with pore surface, up to 1 mm long. Subiculum and context white or straw, cottony corky, ca. 0.5 mm thick. The fruit bodies tend to roll inwards when drying, and when they are growing actively, bruised parts slowly turn brownish.



Figs. 2—4. *Antrodiella citrinella*. — 2: Fruit body, photographed in situ, $\times 2$ (Poland, 1978 Niemelä 1387, H). — 3: Close-up of the pore surface and margin, $\times 5$ (type, freeze-dried specimen). — 4: Growth site of the first Central European find (Poland, Babiogórski National Park, alt. 1200 m).

Hyphal system dimitic, generative hyphae with clamp connections, 2—4 μm wide, skeletal hyphae totally dominating in trama and context, thick-walled to almost solid, 2—5 μm wide and with a distinct lumen when mounted in Melzer's reagent. Cystidia not seen. Basidia clavate and with 4 sterigmata, 8—10 \times 4—6 μm . Spores subglobose, smooth, thin-walled, inamyloid, acyanophilous, with a large oil-drop, 3.0—3.4 \times 2.0—2.5 μm .

On coniferous hosts, often already attacked by *Fomitopsis pinicola* (Swartz.: Fr.) Karst., found in the Southern boreal and Hemiboreal zones and their altitudinal counterparts. Causes rot of the delignifying type, but this is mostly masked by the preceding effects of *F. pinicola*.

Distribution and ecology

Specimens examined

Norway. Oslo (see type). **Finland.** *Etelä-Häme.* Padasjoki, Vesijako Nature Reserve, *Picea abies* with *Fomitopsis pinicola* and *Tyromyces tephroleucus*, 20.IX.1980 Kotiranta 2564 & Koski (herb. Kotiranta; discussed by Kotiranta & Niemelä 1981). **Poland.** *Woj. kielckie.* Święty Krzyż, Świętokrzyski Park Narodowy, fallen log of *Abies alba*, 3.X.1978 Niemelä 1405—1406 (H). — *Woj. krakowskie.* Zawoja, Babiogórski Park Narodowy, fallen trunk of *Picea abies*, strongly decayed by *Fomitopsis pinicola*, 28.IX.1978 Niemelä 1387 (H). **Yugoslavia.** *Hrvatska.* Varaždin E, Plitvička Jezera National Park, Čorkova Uvala, log of *Picea abies*, 7.X.1976 Tortić 30576 (ZA, H).

Little can be said about the distribution on the basis of the present finds. The North European localities lie in the Southern boreal zone (Finland) or its transition to the Hemiboreal zone. The Finnish locality was described in detail by Kotiranta & Niemelä (1981). In their virgin state, these forests are spruce-dominated and relatively humid, and the same goes for the Norwegian locality. It is noteworthy that the Polish finds were made in mountainous and fairly well-drained areas. The locality of Święty Krzyż was a fir-dominated mixed forest, about 550 m above sea level. The find from Babia Góra was made in a pure stand of *Picea abies* (Fig. 4), not far from the upper timberline, at an altitude of 1200 m. The latter forest, in particular, resembles very closely the North European boreal spruce forests, and both Polish localities lie in the Orohemiboreal or Oroboreal altitudinal zones. The Yugoslavian collection was also made in a montane area. That region and its fungal flora were described by Tortić (1978, 1979) and Tortić & Kotlaba (1976). All this gives the impression that the species can be expected to be found anywhere in the North European spruce forests (excluding perhaps the northernmost areas), and in Central and South Europe particularly in the mountains.

All collections were made in protected forests. It seems that *A. citrinella* favours dense, shady biotopes with relatively humid microclimates. All fruit bodies were found growing on naked decayed wood, preferably on broken ends of big, fallen trunks, which were all relatively soft and almost disintegrating. In most cases association with *Fomitopsis pinicola* was observed. In Yugoslavia, Dr Tortić (personal communication) found some specimens of *A. citrinella* growing on a spruce stump, close by fruit bodies of *Gleophyllum odoratum* (Wulf.: Fr.) Imazeki. Fungal associations of this kind are known to occur among many polypores; species reported to grow fairly regularly in the vicinity of dead fruit bodies of certain other polypores are: *Antrodiella hoehnelii*, *A. semisupina*, *Aporpium caryae* (Schw.) Teix. & Rogers, *Junghuhnia pseudozilingiana* (Parm.) Ryv., *Gloeoporus dichrous* (Fr.) Bres., *Pycnoporellus fulgens* (Fr.) Donk and *Skeletocutis carneogrisea* David (Parmasto 1959, Jahn 1967, Niemelä 1978, 1980, 1981, David 1982). The true na-

ture of this mutualism is not known, but it may reflect mycoparasitism in the sense of Rayner and Todd (1979) and Lumsden (1981), similar to the case of *Phlebiopsis gigantea* (Fr.) Jülich, which kills and utilizes the mycelium of *Heterobasidion annosum* (Fr.) Bref., or the effect of *Trametes gibbosa* (Pers.: Fr.) Fr. on *Bjerkandera adusta* (Willd.: Fr.) Karst.

Discussion

The inclusion of the new species in *Antrodiella* is justified by its dimitic hyphal structure, small spores, yellowish colour and waxy soft tubes which turn rigid and semitranslucent when dry. The translucency of the dry tubes is not evident in the freeze-dried type collection, but can be seen in the others. It differs from the other European species (and most of the tropical ones, too) in the more globose spores. Further, it is separated from *A. semisupina* by the yellow colour, larger pores and more effused growth habit. *A. hoehnelii* is somewhat similar in colour, but has thicker fruit bodies with coarse pilei, longer spores and a hyphal structure which is mostly regarded as approaching trimitic. In addition, *A. semisupina* is fairly regularly associated with *Fomes fomentarius* (L.: Fr.) Fr. and *A. hoehnelii* with *Inonotus radiatus* (Sow.: Fr.) Karst. *A. romellii* differs from the new species in having narrower spores, smaller pores, shorter tubes, an ochraceous-cream colour, and a thinning margin; *A. citrinella* is characterized by a pronounced sterile edge (Fig. 3). *A. onychoides* is, of course, differentiated by the absence of clamp connections from the hyphal septa (Ryvarden 1976, Niemelä 1981).

There seems to be little risk of confusing *A. citrinella* with the other yellow resupinate polypores of the area. *Amyloporia* (*Antrodia*) *xantha* (Fr.) Bond. & Sing. differs in its amyloid skeletal, swelling in KOH, and longer spores. *Perenniporia tenuis* (Schw.) Ryv. has truncate, cyanophilous spores. *Tyromyces johnstonii* (Murr.) Ryv. is monomitic, which is also the case with *Anomoporia albolutescens* (Rom.) Pouz.

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