MYCOTAXON

Northern *Antrodiella* species:
the identity of *A. semisupina*,
and type studies of related taxa

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Abstract—Type collections of *Antrodiella* (Basidiomycota, polypores) from Europe, North America and Siberia were studied. The current concept of *Antrodiella semisupina* includes many species; the European taxon is *A. pallescens*, comb. nov., while *A. semisupina* sensu typi occurs in North America. The identity of *A. romellii* was clarified and an epitype was selected to supplement its poor-quality holotype. *A. serpula*, comb. nov. is an earlier name for *A. hoehnelii*. In addition, the following new combinations are made: *A. leucoxantha* (=*A. genistae*), *A. subradula* (type from Siberia), *A. pachycheiles* (type from eastern U.S.A.), and *A. ellipsospora* (type from Siberia). *A. beschidica* and *A. farinacea* are reduced to the synonymy of *A. pallescens*; *A. thompsonii* is accepted as a good species. *Antrodiella ichnusana*, described from the Mediterranean, is reported from North Europe. Several other *Antrodiella* species are discussed. Spores are illustrated and their dimensions are given for the 17 accepted species. Gloeocystidia are considered an unreliable character for delimiting species in *Antrodiella*.

Key words—taxonomy, nomenclature, polyporoid clade

Introduction

The genus *Antrodiella* was described by Ryvarden & Johansen (1980) for *Polyporus semisupinus* and a few related East African species. The number of species grew rapidly, and at present 58 names are included in *Antrodiella* (Index Fungorum 2006). The genus has now become widely accepted. Vampola & Pouzar (1996), Ryvarden (2003) and Dai (2004) have published summarising articles on the genus. Johannesson et al. (2000) showed with ca. ten European species that they form a monophyletic group.

While studying specimens of *Antrodiella* it soon became evident that there are misconceptions and older names that cause changes in the current nomenclature. All the Nordic species are included, but when searching for correct species names, many North American and Siberian taxa were also reviewed.

Materials and methods

The work is mostly based on type and other herbarium materials, but North and Central European species have been studied extensively in the field, too. Collections in the herbarium H (Helsinki) served for the basis of the study, and the listed specimens are preserved in H unless otherwise indicated. Type materials and reference specimens were obtained from the herbaria BPI, HMAS, HUBO, K, KUO, L, NY, NYS, OULU, PAC, PC, PRM, and S.

The basic mountant medium used was Cotton Blue (abbreviated CB): 0.1 mg aniline blue (Merck 1275) dissolved in 60 g pure lactic acid. CB+ means cyanophily, CB(+) weak but distinct cyanophilous reaction, CB– acyanophily. Amyloid vs. dextrinoid reaction was studied in Melzer's reagent (IKI): 1.5 g KI, 0.5 g I, 22 g chloral hydrate, aq. dest. 20 ml; IKI– means neither amyloid nor dextrinoid reaction. Also 5% KOH was used for mountant; KOH– meaning almost unchanged. Spore and other measurements were made and illustrations were drawn in CB. As a rule 30 spores were measured from each specimen selected for closer scrutiny. Measurements were done using ×1000 or ×1250 magnification, phase contrast illumination and oil immersion; eyepiece scale bar with 1-µm-grid was used, and dimensions were estimated subjectively with an accuracy of 0.1 µm.

Following symbols are used for spore measurements: L=mean length, W=mean width, Q=L/W, i.e. average length divided by average width, Q'=length/width ratio of individual spores, n=number of spores measured from given number of specimens, for instance 90/3 means 90 spores measured from 3 specimens. In presenting the variation of spore size and Q', the whole range is given in parentheses; the 90% range excluding the extreme 5% of values from both ends is given without parentheses; in case these values are identical, parentheses are omitted. MycoBank (http://www.MycoBank.org) accession numbers for the new combinations are given in parentheses after the species title in question.

The genus *Antrodiella*

Antrodiella sensu stricto is microscopically well defined and easily recognizable. However, some species now addressed to *Antrodiella* may fit better in other genera, e.g. *A. fissiliformis* and *A. ussurii*. Together with *Junghuhnia, Steccherinum, Flaviporus*, and perhaps *Irpex* and *Flavodon, Antrodiella* makes a complex, whose phylogenetic relationships are still unclear. In an analysis by Binder et al. (2005) *Antrodiella, Junghuhnia, Steccherinum* and *Ceriporiopsis* belong to the same lineage within the polyporoid clade.

Typical species of *Antrodiella* have annual, leathery tough basidiocarps with a tendency to effused growth, although thin, fingernail-shaped or spathulate pilei develop commonly. Context is thin and almost white, and overall colour is white to cream, with hues of tan, grey, orange and yellow. These are white-rot fungi, and strikingly many are successor species (Niemelä et al. 1995), which appear on trees previously decayed by certain other fungi. Such ecological links offer good hints for identification.

Species are often difficult to separate because of the small size of the basidiocarps and their fairly uniform microscopy. Hyphal structure and pore size can provide useful

information, but spore dimensions are the key character. Spores of *Antrodiella* are small, subglobose, ellipsoid or short cylindrical. Hyphal system is dimitic, generative hyphae mostly with clamp connections, and skeletal hyphae narrow but thick-walled with a capillary lumen. The skeletals of context/subiculum may have occasional branches, and then the structure approaches trimitic. Typical to the genus is that skeletal walls are slightly cyanophilous, unlike in *Antrodia*, but in a similar way as in *Junghuhnia* and *Steccherinum*. In some species they are weakly amyloid or dextrinoid. Hymenial cells are small, basidia with 4 sterigmata, usually short clavate, basidioles similar but shorter, and cystidioles poorly differentiated, similar to basidioles but with a tapering apex. Gloeocystidia have been reported from several species, but they tend to be inconspicuous. We will discuss that feature later on.

The very small spore size, about 3–4×2 μm, makes their measuring troublesome, and satisfactory results can only be achieved with phase contrast microscope, oil immersion, ×1000 or ×1250 magnification, and viscid mountant in which the spores stay still—we are using Cotton Blue in lactic acid. Melzer's reagent and even more KOH let freely floating spores vibrate and roll continuously, and no exact dimensions can be measured. It is theoretically impossible to reach the resolution of 0.1 μm using visible light, but such distances can be subjectively estimated with a 1-μm-grid eyepiece. Measuring 30 spores from each specimen results in a tolerably small error when comparing average spore sizes between specimens and species (Parmasto & Parmasto 1987). In objects of this size, the eye easily catches different shapes, and, indeed, our measurement values agree with visible differences. Small systematic deviations may exist between individual observers, and so the measurements made by a single person are the most comparable.

Type species of the genus

Antrodiella semisupina (Berk. & M.A. Curtis) Ryvarden
  in Ryvarden & Johansen, Prelim. Polypore Fl. East Africa: 261, 1980. *Polyporus semisupinus*
  Berk. & M.A. Curtis, in Berkeley, Grevillea 1:50, 1872. Holotype: 'Herb. Berk. 1879.
  Grev. 1:50. 1872. 5860 *Pol. (Anoderm.) semisupinus* [faint: N.S.]. Nov. Angl. Sprague'
  (K, studied).

Basidiocarps effused-reflexed with ca. 1×2 cm resupinate parts, and fingernail-shaped caps, projecting 4–6 mm, 1 mm thick at base, broadly attached and downcurved, margin sharp, when dry hard. Overall colour brownish cream with some mouse grey on upper side close to the attachment, and brown, translucent patches at bruised edges; however, colours have certainly changed in the old specimen. Pores round to angular (5–)6–8(–9) per mm, orifices regular or minutely denticulate; tubes in older (central) parts merged together, split, and pores then larger than given above. Hyphal system dimitic; generative hyphae clamped and thin-walled, skeletal hyphae dominating in all parts, flexuous, translucent, fairly thick, (2–)3–4.2(–5) μm diam., thick-walled, CB–, IKI– and KOH–, in tube trama subparallel and glued together. No cystidia, no gloeocystidia; angular crystal clusters abound among the hyphae. Hymenial cells ca. 11–13.3×3.2–4.7 μm, basidia with 4 sterigmata. Spores (2.6–)2.7–3.3(–3.4)×(1.7–)1.8–2.3(–2.5) μm, thin-walled, CB–, IKI–, almost egg-shaped, ventral side clearly rounded, not straight and never concave; no guttulae.

Specimens Examined—**U.S.A.** (see type).

The name *Antrodiella semisupina* has traditionally been addressed in Europe to the pileate or effused-reflexed species, typically growing on and around dead basidiocarps of *Fomes fomentarius* (L. : Fr.) J. Kickx f. However, after studying the type of *Polyporus semisupinus*, a different picture unfolded.

The collection includes two pieces of wood glued on a small sheet of paper, one piece broken and its fungus lost, the other bearing two small basidiocarps, which arise directly from wood. The host is most probably *Quercus* (of the *Q. rubra* group, teste Tuuli Timonen & Pirkko Harju, H) and the wood is white-rotted, with no mention or remnants of any preceding fungus. Even though small and over 100 years old, the specimen is in a fairly good condition, fertile, and most of the essential characteristics can be observed.

Pores size of the type specimen of *P. semisupinus* and the European specimens so called are fairly similar. A clear difference is seen in spores: they are shorter and slightly thicker in the type than in the European '*A. semisupina*'. The difference (Fig. 1) can be seen from the shape even without measuring. The lack of cyanophily in the skeletals of the holotype is deviating within the genus: *Antrodiella* species typically have a slight but clear CB+ reaction in their skeletal hyphae, which links them with the genera *Steccherinum* and *Junghuhnia*; cyanophily of the skeletals is distinct in the European '*A. semisupina*'. Anyhow, general habit and the other microscopic characters of the holotype are so similar to the other species in the group that we have no basis to propose a separation of *A. semisupina* sensu typi from the rest.

The identity of *P. semisupinus* sensu typi should be solved from further collections and field notes in eastern North America (New England), the area where the species was described. For instance, host characteristics and possible links with preceding other fungi would be of interest. The detailed description of *P. semisupinus* by Overholts (1953) matches very well with the type (for instance spores '2.5–3×2–2.5 µ', no mention of link with *Fomes fomentarius*) but not with the species so named in Europe.

All this means that the epithet *semisupina* is inapplicable for the taxon growing almost invariably on wood decayed by *Fomes fomentarius* and usually arising from its dead basidiocarps. Of the species known to us, *A. semisupina* sensu typi comes closest to *A. faginea*.

Notes on *Antrodiella* species

Antrodiella americana Ryvarden & Gilb.

Mycotaxon 19:138, 1984. *Poria aestivalis* Overh., Bull. Penn. Agric. Exp. Sta. 418:20, 1942 (nom. inval.: ICBN (St Louis) Art. 36.1). Holotype: *Poria aestivale* [sic] Overholts, U.S.A., Pennsylvania, Cook Forest, *Fagus grandifolia*, 23.VI.1932 Overholts & White 14364 (PAC 0237862, studied).

Annual, resupinate, soft-looking but difficult to tear apart, when dry cardboard-like, basidiocarps irregularly roundish. Sterile margin fibrous, white. Pores (1–)2–4(–5) per mm, cream-coloured or honey yellow; orifices lacerate. Section: subiculum cream-coloured, tubes honey-coloured or resinous-looking. Dimitic, generative hyphae with clamps, skeletals CB(+), IKI–, KOH–, in subiculum interwoven, (2.1–)2.2–3.1(–3.5)
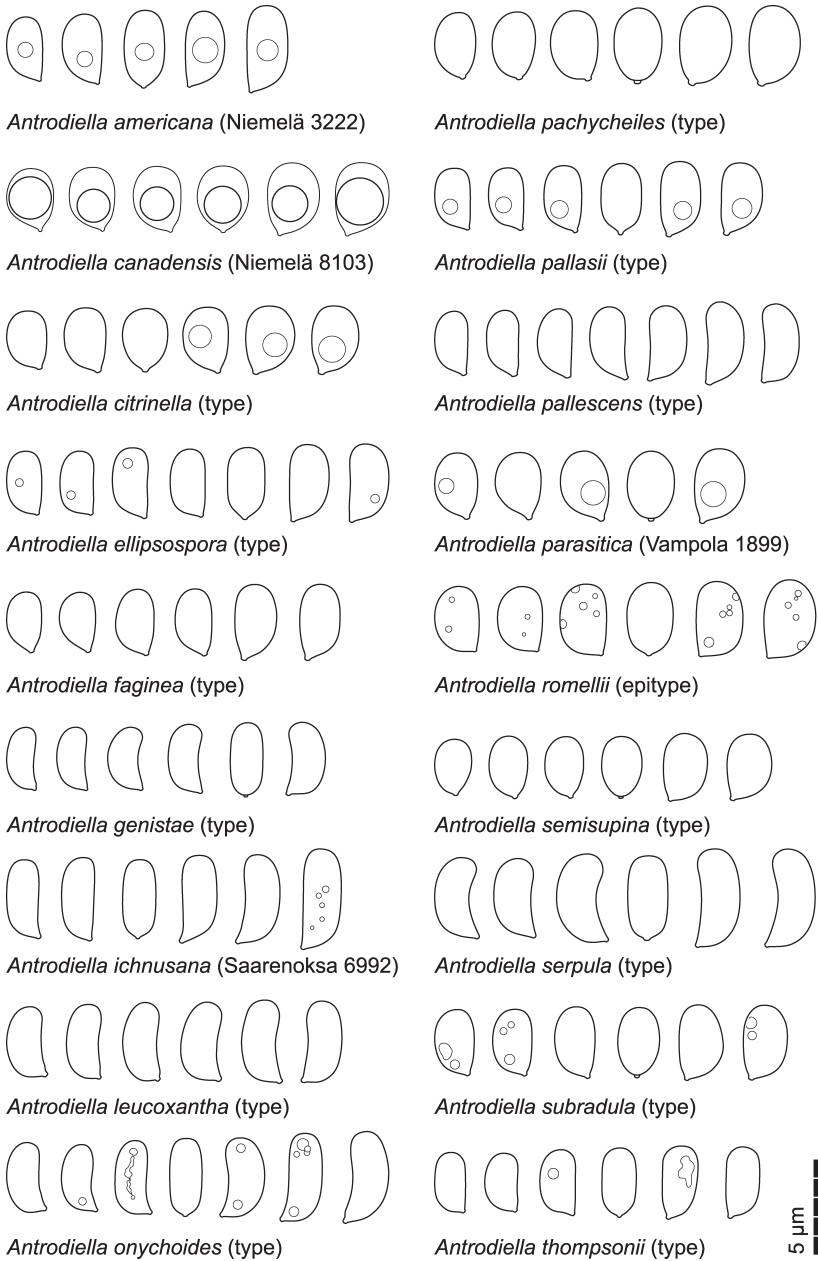
Figure 1. Spores of *Antrodiella* species.

Table 1. Spore measurements of *Antrodiella* species treated in this paper.

Asterisk (*) marks specimens with gloeocystidia. Currency sign (¤) marks specimens whose ITS has been sequenced by Johannesson et al. (2000). Column ***n*** gives the number of spores / specimens measured, if applicable. Summarising data of *A. pallescens* exclude *A. beschidica* and *A. farinacea*.

Species / specimen	n	L variation	L	W variation	W	Q' variation	Q
semisupina	**70/1**	**(2.6-)2.7-3.3(-3.4)**	**3.00**	**(1.7-)1.8-2.4(-2.5)**	**2.09**	**1.3-1.6**	**1.44**
americana	**130/4**	**(3.1-)3.2-4.4(-4.7)**	**3.72**	**(1.7-)1.9-2.3**	**2.05**	**(1.5-)1.6-2.1**	**1.81**
holotype	30	3.1-3.9	3.42	1.9-2.2(-2.3)	2.03	1.5-2.0(-2.1)	1.69
Niemelä 17.X.1976	40	(3.2-)3.3.-4.3(-4.4)	3.72	(1.7-)1.8-2.3	2.02	(1.6-)1.7-2.1	1.84
Niemelä 3332	30	3.2-4.0(-4.2)	3.53	(1.8-)1.9-2.2(-2.3)	2.06	(1.5-)1.6-1.9	1.72
Niemelä 6656	30	(3.8-)3.9-4.7	4.20	1.9-2.3	2.11	1.8-2.1	1.72
canadensis	**100/3**	**(3.0-)3.1-3.9(-4.0)**	**3.43**	**(2.2-)2.4-3.0(-3.1)**	**2.64**	**(1.1-)1.2-1.4**	**1.30**
Anttila 18.VIII.1993	30	3.1-3.8(-3.9)	3.43	2.4-3.0(-3.1)	2.69	(1.1-)1.2-1.3	1.27
Niemelä 8103	40	(3.0-)3.1-3.7	3.34	(2.2-)2.4-2.9	2.58	1.2-1.4	1.30
Penttilä 1321¤	30	3.3-4.0	3.57	(2.3-)2.4-3.0	2.66	1.3-1.4	1.34
citrinella	**160/4**	**(2.8-)2.9-3.4(-3.7)**	**3.14**	**(2.0-)2.1-2.6(-2.8)**	**2.31**	**(1.1-)1.3-1.5**	**1.36**
isotype	60	3.0-3.5(-3.7)	3.21	(2.0-)2.2-2.7(-2.8)	2.36	(1.1-)1.2-1.5	1.36
Laurila & Renvall 1982	30	2.8-3.3	3.05	2.1-2.5	2.26	1.2-1.5	1.35
Niemelä 6640	40	(2.8-)2.9-3.3(-3.5)	3.07	(2.0-)2.1-2.5(-2.6)	2.28	(1.2-)1.3-1.5	1.35
Penttilä 1223	30	3.0-3.4	3.15	(2.1-)2.2-2.5(-2.6)	2.30	1.3-1.4(-1.5)	1.37
ellipsospora	**70**	**3.2-4.0(-4.1)**	**3.51**	**(1.7-)1.8-2.1(-2.3)**	**1.95**	**(1.6-)1.7-2.0(-2.1)**	**1.80**
faginea	**646/37**	**(2.5-)2.8-3.7(-4.5)**	**3.20**	**(1.6-)1.8-2.2(-2.4)**	**1.97**	**(1.4-)1.5-1.8(-2.3)**	**1.62**
holotype*,¤	60	(2.9-)3.0-3.9(-4.3)	3.26	1.8-2.1	1.96	1.5-1.9(-2.0)	1.66
Dai 1077	30	(2.9-)3.0-3.7(-3.9)	3.29	(1.9-)2.0-2.3	2.09	1.5-1.7	1.58
Erkkilä 535	30	(2.8-)2.9-3.7(-3.9)	3.18	1.8-2.1	1.96	1.5-1.8	1.62
Kulju 7001*	32	(2.8-)2.9-3.7	3.16	1.7-2.0	1.85	(1.5-)1.6-1.9(-2.2)	1.71
Savola 18.IX.2003	30	2.9-3.6(3.9)	3.22	1.8-2.2(-2.3)	2.03	1.5-1.7(-1.8)	1.59
Niemelä 6867	30	2.9-3.4(-3.5)	3.13	1.8-2.2	1.99	(1.4-)1.5-1.7(-1.7)	1.57
Renvall 3217*,¤	30	(2.9-)3.0-3.6	3.24	(1.7-)1.8-2.2	1.97	1.5-1.9	1.64
Renvall 3347*,¤	30	2.9-3.4(-3.6)	3.15	(1.7-)1.8-2.1(-2.2)	1.90	1.5-1.8	1.66
Romell 24.VIII.1910*	30	3.0-3.5(-3.6)	3.23	1.9-2.3	2.08	1.5-1.7	1.56
Saarenoksa 18786	30	2.8-3.7(-3.8)	3.16	(1.7-)1.8-2.2	1.96	(1.4-)1.5-1.8	1.61
Saarenoksa 21687*	30	(3.0-)3.2-3.9(-4.0)	3.46	1.9-2.3(-2.4)	2.11	1.5-1.8(-1.9)	1.64
ichnusana	**150/5**	**(3.9-)4.0-5.2(-5.4)**	**4.55**	**(1.7-)1.8-2.1(-2.2)**	**1.95**	**(2.0-)2.2-2.6(-2.8)**	**2.33**
Bernicchia 7694	30	(4.1-)4.3-5.2(-5.3)	4.74	(1.8-)1.9-2.2	2.02	(2.0-)2.1-2.6	2.35
Saarenoksa 6992	30	4.0-5.3(-5.4)	4.64	1.7-2.2	1.93	2.2-2.7(-2.8)	2.40
Saarenoksa 11090	30	3.9-5.1	4.37	(1.7-)1.8-2.0	1.88	2.1-2.6	2.32
Saarenoksa 13892	30	(3.9-)4.0-5.2(-5.4)	4.45	1.8-2.1(-2.2)	1.94	2.1-2.5	2.29
Saarenoksa 16390	30	(4.0-)4.1-4.9(-5.1)	4.54	1.8-2.1(-2.2)	1.98	(2.0-)2.1-2.6	2.29
leucoxantha	**412/9**	**(2.9-)3.2-4.5(-5.6)**	**3.89**	**1.5-1.9(-2.1)**	**1.71**	**(1.7-)1.9-2.7(-2.9)**	**2.23**
lectotype*	62	(3.2-)3.4-4.7(-5.6)	3.89	(1.5-)1.6-2.0	1.79	(1.8-)1.9-2.5(-2.9)	2.17
lectotype of genistae	70	(2.9-)3.0-4.1(-4.3)	3.53	1.5-1.9(-2.0)	1.71	(1.7-)1.8-2.3(-2.4)	2.07
Jakobsson 918*	30	3.7-4.8(-5.3)	4.12	1.5-1.8(-2.1)	1.65	(2.1-)2.2-2.8	2.47
PRM 854493	30	(3.1-)3.2-3.8	3.47	1.5-1.8(-1.9)	1.65	(1.8-)1.9-2.4	2.10
PRM 871821	30	3.4-4.5(-5.0)	3.96	1.5-1.9	1.71	2.1-2.5(-2.6)	2.31
PRM 889755*	40	3.4-4.2(-4.3)	3.85	(1.6-)1.7-1.9(-2.0)	1.80	(1.9-)2.0-2.4	2.14
PRM 890852	30	3.2-3.9(-4.0)	3.46	(1.5-)1.6-1.9	1.75	1.8-2.3	1.98
Saarenoksa 58589	60	(3.3-)3.5-4.4(-4.5)	3.85	(1.5-)1.6-1.8(-1.9)	1.68	(2.1-)2.2-2.5(-2.6)	2.29
Särkkä 50	60	(3.5-)3.7-4.7	4.14	1.5-1.8(-1.9)	1.66	(2.1-)2.2-2.9	2.50
onychoides	**180/5**	**(3-)3.2-4.8(-5.3)**	**3.86**	**(1.5-)1.6-1.9(-2.4)**	**1.75**	**(1.6-)1.8-2.7(-3.0)**	**2.21**
holotype	60	(3.7-)3.8-4.9(-5.1)	4.31	1.6-1.9(-2.0)	1.77	(2.1-)2.2-2.7	2.44
Niemelä 3227	30	3.0-4.0(-4.3)	3.39	(1.5-)1.6-1.8	1.70	1.7-2.3(-2.4)	1.99
Saarenoksa 24791	30	(3.0-)3.1-4.3(-5.3)	3.64	(1.6-)1.7-1.9	1.78	(1.7-)1.8-2.2	1.99
Saarenoksa 45791	30	(3.1-)3.2-4.9(-5.3)	3.89	(1.5-)1.6-2.1(-2.4)	1.81	(1.6-)2.0-2.4	2.15

Table 1 continued.

Species / specimen	n	L variation	L	W variation	W	Q' variation	Q
Salonen 26.IX.2000	30	(3.2-)3.3-4.5	3.72	1.5-1.9(-2.0)	1.67	2-2.5(-3.0)	2.23
pachycheiles	**120/1**	**(3.1-)3.3-4.2(-4.4)**	**3.67**	**(2.0-)2.2-2.8(-3.1)**	**2.45**	**(1.3-)1.4-1.7**	**1.50**
pallasii	**190/6**	**(2.9-)3.0-3.7(-3.9)**	**3.23**	**(1.6-)1.8-2.1(-2.3)**	**1.93**	**(1.4-)1.5-1.9**	**1.67**
isotype¤	30	(2.9-)3.0-3.8	3.34	1.8-2.2	1.98	1.5-1.9	1.69
Kujala & Eriksson 9416	30	2.9-3.7(-3.8)	3.29	1.8-2.1(-2.2)	1.99	1.5-1.8	1.65
Niemelä 2143	30	2.9-3.3(-3.4)	3.12	(1.6-)1.7-2.0	1.85	1.5-1.9	1.69
Niemelä 6580	40	(2.9-)3.0-3.7(-3.8)	3.21	1.8-2.1(-2.2)	1.93	(1.4-)1.5-1.9	1.66
Niemelä 6617	30	(2.9-)3.9-3.5(-3.6)	3.21	1.7-2.0	1.90	1.5-1.8(-1.9)	1.68
Niemelä 7139	30	(2.9-)3.0-3.7(-3.9)	3.24	(1.7-)1.8-2.3	1.94	1.5-1.8	1.67
pallescens	**361/11**	**(2.9-)3.0-4.1(-4.8)**	**3.47**	**(1.6-)1.7-2.0(-2.3)**	**1.84**	**(1.5-)1.7-2.2(-2.5)**	**1.89**
lectotype	60	(3.0-)3.1-4.1(-4.8)	3.54	(1.6-)1.7-2.0(-2.1)	1.81	(1.7-)1.8-2.2(-2.5)	1.96
holotype of beschida¤	30	(3.1-)3.2-4.0(-4.1)	3.49	1.8-2.1	1.93	1.7-2.0(-2.1)	1.81
holotype of farinacea¤	30	2.9-3.5(-3.8)	3.10	1.6-1.9	1.78	1.6-1.9(-2.0)	1.74
Haikonen 15652	30	(3.4-)3.5-4.2	3.89	1.7-2.1	1.88	(1.8-)1.9-2.2	2.07
Jakobsson 1516	30	3.0-3.6(-3.7)	3.33	1.7-2.0	1.85	1.7-2.0	1.81
Miettinen 7972	30	(2.9-)3.0-3.9(-4.0)	3.29	(1.6-)1.7-1.9	1.75	(1.6-)1.7-2.2	1.87
Niemelä 2788	30	(3.0-)3.1-4.3(-4.6)	3.63	1.7-2.3	1.96	1.7-2.1(-2.4)	1.85
Niemelä 5548	30	3.2-3.8	3.42	1.7-2.1	1.84	1.7-2.0	1.86
Niemelä 6280	30	(3.0-)3.1-3.7(-3.8)	3.32	1.7-2.1	1.92	(1.5-)1.6-1.9	1.73
Niemelä 6705*	30	(3.1-)3.2-3.7(-3.8)	3.41	1.7-2.0	1.84	1.7-2.0(-2.1)	1.85
Niemelä 7363	30	(3.3-)3.5-4.4(-4.6)	3.91	1.8-2.0	1.92	1.8-2.3	2.05
Renvall 3337¤	30	3.0-3.5(-3.7)	3.20	1.6-1.9	1.76	1.6-2.0	1.82
Renvall 3360¤	31	(2.9-)3.0-3.7(-3.8)	3.17	1.7-1.8	1.76	1.7-2.1	1.80
parasitica	**191/6**	**(3.0-)3.2-4.1(-4.3)**	**3.63**	**(2.0-)2.2-2.9(-3.0)**	**2.50**	**(1.1-)1.2-1.8(-2.0)**	**1.45**
holotype¤	30	(3.0-)3.1-3.9(-4.1)	3.48	(2.3-)2.4-3.0	2.67	(1.1-)1.2-1.5(-1.6)	1.30
Dunger 13711	40	(3.2-)3.3-4.0(-4.1)	3.63	(2.1-)2.2-2.8	2.45	(1.2-)1.4-1.7	1.48
exsiccati Vampola	31	(3.2-)3.3-4.2(-4.3)	3.73	2.0-2.7	2.25	(1.3-)1.4-2.0	1.66
Vampola 1886	30	3.2-3.8(4.0)	3.52	2.3-2.8	2.50	(1.2-)1.3-1.6(-1.7)	1.39
Vampola 1899	30	(3.2-)3.3-4.1	3.65	(2.2-)2.3-2.9(-3.0)	2.62	1.3-1.5	1.40
Vampola 1901	30	3.3-4.0(-4.1)	3.77	2.3-2.7(-2.8)	2.51	(1.3-)1.4-1.7	1.50
romellii	**371/11**	**(3.0-)3.4-4.4(-5.1)**	**3.84**	**(2.2-)2.3-2.9(-3.1)**	**2.55**	**(1.2-)1.3-1.7(-2.0)**	**1.51**
epitype¤	41	(3.3-)3.4-4.0	3.71	2.3-2.7	2.49	1.3-1.6(1.7)	1.48
Jahn 1970	30	(3.7-)3.8-4.3(-4.4)	4.03	2.5-2.9(-3.0)	2.75	(1.3-)1.4-1.6	1.47
Kinnunen 1120	30	(3.9-)4.0-5.1	4.44	2.3-3.0(-3.1)	2.59	1.6-1.9(-2.0)	1.71
Laurila 9.IX.1937	30	3.2-3.9(-4.2)	3.56	2.2-2.7	2.37	1.3-1.6(-1.7)	1.50
Niemelä 5.IX.1971	40	(3.3-)3.4-4.2(-4.3)	3.97	2.3-2.7(-2.8)	2.56	1.4-1.7	1.55
Niemelä 6095	40	(3.2-)3.3-3.9(-4.0)	3.61	(2.2-)2.3-2.7(-2.8)	2.47	(1.2-)1.3-1.6	1.46
Niemelä 6757	30	4.0-4.5(-4.8)	4.29	(2.4-)2.5-3.0	2.72	1.5-1.7	1.58
Saarenoksa 11587	30	3.6-4.3(-4.4)	3.97	2.4-2.7(-2.8)	2.56	1.4-1.7	1.55
Saarenoksa 24293¤	40	3.3-4.0(-4.1)	3.63	(2.2-)2.3-2.7(-2.8)	2.49	1.3-1.6(-1.7)	1.46
Toresson 22.X.1995	30	(3.3-)3.4-4.0(-4.1)	3.80	(2.2-)2.5-2.9(-3.0)	2.71	1.3-1.5(-1.7)	1.40
isotype of subradula	30	(3.0-)3.3-4.1(-4.2)	3.72	2.2-2.6(-2.7)	2.43	(1.2-)1.3-1.7	1.53
serpula	**260/6**	**(3.3-)3.6-5.0(-5.7)**	**4.12**	**(1.6-)1.8-2.2(-2.5)**	**1.95**	**(1.8-)1.9-2.4(-2.7)**	**2.11**
holotype	60	(3.9-)4.0-5.3(-5.4)	4.59	(1.8-)1.9-2.4(-2.5)	2.09	1.9-2.6(-2.7)	2.20
Niemelä 3278	40	(3.3-)3.8-4.9(-5.7)	4.17	(1.7-)1.8-2.2	1.91	(1.8-)2.0-2.6	2.18
Niemelä 5529	30	3.6-4.5	3.96	1.8-2.2	1.97	1.8-2.2(-2.3)	2.01
Niemelä 6015	30	3.7-4.4(-4.5)	3.98	1.8-2.1	1.98	1.9-2.1(-2.2)	2.01
Niemelä 6899	40	(3.4-)3.6-4.7(-4.8)	3.90	1.7-2.2(-2.3)	1.89	(1.8-)1.9-2.3	2.08
Saarenoksa 18686¤	60	(3.5-)3.6-4.7(-5.0)	3.93	(1.6-)1.7-2.0(-2.2)	1.86	(1.8-)1.9-2.4(-2.6)	2.11
subradula	**60/1**	**3.1-3.9(-4.1)**	**3.49**	**2.0-2.3(-2.4)**	**2.18**	**(1.3-)1.5-1.8(-1.9)**	**1.60**
thompsonii*	**60/1**	**(2.8-)2.9-3.6(-3.8)**	**3.15**	**(1.6-)1.7-2.0**	**1.79**	**1.6-1.9(-2.0)**	**1.76**

μm, in tube trama subparallel, (2.2–)2.6–3.8(–4) μm, lumen distinct. Cubical crystals sometimes scattered on hyphae. No distinct cystidioles; gloeocystidia prominent, 15–60×4–8 μm, yellow, crowded at tube bottoms and scattered in hymenium deep in the tubes. Basidia with 4 sterigmata. Spores ellipsoid, thin-walled, CB–, IKI–, (3–)3.2–4.4 (–4.7)×(1.8–)1.9–2.3 μm.

SPECIMENS EXAMINED—**Finland.** Varsinais-Suomi: Tammisaari, 17.X.1976 Niemelä. Uusimaa: Vantaa, 1985 Niemelä 3222. Etelä-Häme: Lammi, 1999 Niemelä 6656. **U.S.A.** (see type).
— Finnish collections from *Corylus avellana+Pseudochaete tabacina.*

Of the studied *Antrodiella* species, Johannesson et al. (2000) found *Antrodiella americana* to be fairly distant from the others. Pores are slightly larger in the type than in European materials, originally 2 per mm, merging together and then 1–1.5 per mm; in Europe the measurements usually give 2–3 pores per mm. Spores of the American material are slightly smaller than in North Europe (Tab. 1), but well within the range and similar in shape. It may be difficult to find enough evidence to split this into two taxa. *Antrodiella americana* is a successor of *Pseudochaete tabacina* (Sowerby) T. Wagner & M. Fisch., usually fruiting on its dead basidiocarps.

Antrodiella canadensis (Overh.) Niemelä

Karstenia 45:75, 2005. *Polyporus canadensis* Overh. in Lowe, Mycotaxon 2:45, 1975. Holotype: Canada, Ottawa, Dow's Swamp, on spruce stump, 16.IX.1933 Groves 16860 (PAC, studied).

This species was described and illustrated by Niemelä (1985).

SPECIMENS EXAMINED—**Canada** (see type). **Finland.** Kainuu: Suomussalmi, 21.VIII.1993 Anttila. Koillismaa: Salla, 2005 Niemelä 8103. Pohjois-Karjala: Lieksa, 1989 Penttilä 1321.
— Finnish collections from *Pinus sylvestris.*

The complicated nomenclature of this taxon was discussed by Ryvarden & Gilbertson (1984), who renamed it as *Antrodiella overholtsii* Ryvarden & Gilb. because in their opinion the original description was not validly made. Niemelä et al. (2005) accepted the above-listed protologue as valid, and transferred the old name in the genus *Antrodiella*. Johannesson et al. (2000) studied the phylogeny of *P. canadensis* together with several *Antrodiella* species.

Antrodiella citrinella Niemelä & Ryvarden

Karstenia 23:26, 1983. Holotype: Norway, Oslo, *Picea abies* + dead *Fomitopsis pinicola*, 7.X.1982 Ryvarden 20563 (O, isotype H, studied).

The species was described and illustrated by Niemelä & Ryvarden (1983).

SPECIMENS EXAMINED—**Finland.** Etelä-Häme: Lammi, 1989 Renvall 1982. Kittilän Lappi: Kolari, 1999 Niemelä 6640. Pohjois-Karjala, Lieksa, 1989 Penttilä 1223. **Norway** (see type).
— All from *Picea abies+Fomitopsis pinicola.*

Antrodiella citrinella is characterised by bright yellow colour, roundish spores, and by its growth on wood previously brown-rotted by *Fomitopsis pinicola* (Sw. : Fr.) P. Karst. The
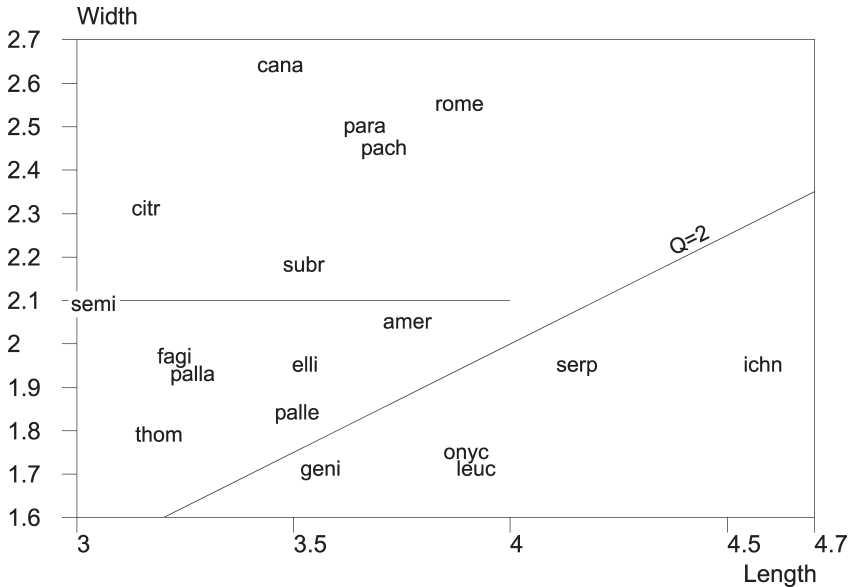
Figure 2. Average spore size of *Antrodiella* species. Species are abbreviated according to 4 to 5 first letters of their epithets. Lines group species into narrow-spored (Q>2), small-spored (width below 2.1 µm) and wide-spored groups.

commonest host is spruce, but also pine, birch, aspen and alder are accepted, provided that the preceding species was there. Often *A. citrinella* fruits directly on the dead basidiocarps of *F. pinicola.*

Antrodiella ellipsospora (Pilát) Niemelä & Miettinen, **comb. nov.** (MB500769)

>Basionym: *Leptoporus wynnei* f. *ellipsosporus* Pilát, Bull. Soc. Mycol. France 52:306, 1937. *Leptoporus ellipsosporus* (Pilát) Romagn., Bull. Soc. Mycol. France 60:88, 1944. Lectotype: Russia, Sayany, Arasuk, *Pinus* [*cembra* subsp.] *sibirica*, 1.IX.1932 [B.I.] Krawtzew (PRM 25017, studied). Selected as type by Kotlaba & Pouzar (1989:39).

Pileate, white to cream-coloured, hard when dry. Caps fingernail-shaped, strongly curved when dry, 10 mm wide, up to 2 mm thick, projecting 5 mm, surface matt, margin sharp. Pores 7–9 per mm, orifices entire, walls not appearing fragile. Section: context cream-coloured, hard when dry, tubes concolorous. Dimitic, generative hyphae with clamp connections, 2–3.2 µm in diam., skeletals CB(+), IKI–, interwoven and dominating except close to substrate and tube mouths, in subiculum (2.6–)3–3.5(–3.8) µm in diam., in tube trama 2.2–3(–3.3) µm, lumen narrow and indistinct in subicular skeletals, wide to narrow in trama. Basidia with 4 sterigmata, 8.5–12×3.7–4.6 µm. Spores ellipsoid to short cylindrical, thin-walled, CB–, IKI–, 3.2–4(–4.1)×1.8–2.1(–2.3) µm, ventral side convex, flat, or slightly concave.

>Specimens Examined—**Russia** (see type).

Pilát (1937) described *Leptoporus wynnei* f. *ellipsosporus* from a specimen collected by Krawtzew from *Pinus cembra* subsp. *sibirica* in Siberia. Romagnesi (1944) raised the form to species rank as *Leptoporus ellipsosporus*. Kotlaba & Pouzar (1989) and Ryvarden & Gilbertson (1994: 696) showed the type to belong to the *Antrodiella semisupina* complex; they also discussed the complicated nomenclature of this taxon. We restudied the lectotype. It is small and young but in a rather good condition. Substrate is strongly brown-rotted gymnosperm wood, *Pinus sibirica* according to the label, supported by microscopic analysis (by Pirkko Harju, H). Macroscopy, gymnosperm host and spore size point towards *Antrodiella pallasii*, but that species has shorter, uniguttulate spores, narrower skeletals with distinct lumen in subiculum, and it is a follower of *Trichaptum abietinum* (Pers. : Fr.) Ryvarden, a white-rot fungus. *Antrodiella faginea* has clearly shorter and more ellipsoid spores and it grows on angiosperms. *Antrodiella pallescens* comes closest microscopically; its spores are slightly narrower and more uniformly straight cylindrical. Ecology is different: *A. pallescens* is restricted to angiosperm hosts and follows *Fomes fomentarius,* which is a white-rot fungus. We accept Pilát's taxon as a good species, and hence make the necessary combination. Yet new material is needed to establish the identity of this species.

Antrodiella faginea Vampola & Pouzar

Czech Mycol. 49:25, 1996. Holotype: Czech Rep., Moravia: Jihlava, Zborná, Ptačí vrch, alt. 637 m, *Fagus sylvatica,* 5.VII.1990 Vampola (PRM 842925, studied).

= ?*Antrodiella micra* Y.C. Dai, Mycotaxon 89:393, 2004. Holotype: China, Jilin, Antu, Changbaishan Nat. Res., *Populus+Phellinus gilvus,* 19.IX.1998 Dai 2998 (IFP, not studied).

Annual, pileate, effused-reflexed or resupinate, leathery, when dry hard. Caps fingernail-shaped, spathulate, flabelliform or even substipitate, 5–20 mm wide, up to 3 mm thick, projecting 2–20 mm, surface matt, cream-coloured, light ochraceous yellow or even greyish, somewhat hygrophanous, margin sharp and often incised; resupinate area 10–150 ×5–40 mm, roundish or ellipsoid, neighbouring areas later merging together. Pores cream-coloured, sometimes with purple-greyish patches at older centre and close to the attachment, (5–)6–8 per mm, orifices entire. Section: context cream, homogeneous, when dry hard, tubes concolorous. Dimitic, generative hyphae with clamps, skeletals CB(+), IKI– or faintly amyloid in tube trama, KOH–, in context/subiculum radially subparallel, (2.4–)2.7–4.2(–5.5) μm in diam., in tube trama tightly interwoven but not agglutinated, (1.8–)2.3–3.2(–4) μm, lumen wide to narrow in context skeletals, indistinct in subiculum, capillary in trama. Crystal clusters seen in between hyphae; occasional hyphal pegs. Cystidioles with conical apex; gloeocystidia 9–18×3.6–6 μm, sometimes common, in other specimens occasional or evidently absent, weakly differentiated, resembling juvenile basidia, often present at tube bottoms in old hymenium. Basidia with 4 sterigmata. Spores ellipsoid, thin-walled, CB–, IKI–, (2.5–)2.8–3.7(–4.5)×(1.6–)1.8–2.2(–2.5) μm, sometimes tapering to proximal apex, ventral side flat or a little convex.

SPECIMENS EXAMINED—**China.** Jilin: Antu, Changbai, *Acer*, 1993 Dai 1077; *Betula*, 1993 Dai 1074. **Czech Rep.** (see *type). **Finland.** Uusimaa: Helsinki, *Populus+Phellinus punctatus*, 1985 Erkkilä 535; *Salix+P. punctatus*, 1986 Saarenoksa 18786;

Salix+Pseudochaete tabacina, 1994 Saarenoksa 9694. Sipoo, *Alnus*, 1985 Saarenoksa 10185; *Betula*, 1987 Saarenoksa 26687; *Populus*, 1993 Saarenoksa *8093; *Salix+P. punctatus*, 1985 Saarenoksa 11185; *Sorbus+P. punctatus*, 1984 Saarenoksa *34384. Kirkkonummi, *Corylus+P. punctatus*, 1985 Saarenoksa 12995. Tuusula, *Corylus+Inonotus radiatus*, 1987 Saarenoksa 21687. Vantaa, *Prunus*, 1993 Renvall *3217; *Salix+P. conchatus*, 18.IX.2003 Savola. Etelä-Häme: Lammi, *Populus*, 1993 Renvall *3347. Pohjois-Karjala: Ilomantsi, *Betula+Pycnoporus cinnabarinus*, 2003 Penttilä 14342. Kainuu: Kuhmo, *Populus*, 1998 Miettinen *330, 373, 460, 495, *500, 599, 612, 623, 691; +*Phellinus tremulae*, 355, *365, 517, *674, 693, 723; +*Phellinus populicola*, *444, *600; +*Inonotus rheades*, *458. Oulun Pohjanmaa: Oulu, *Alnus*, 2001 Kulju *7001. Kittilän Lappi: Kittilä, *Salix+P. conchatus*, 2000 Niemelä 6867. **Sweden.** Torne Lappmark: Jukkasjärvi, *Betula*, 1910 Romell 14658 (S). **Ukraine.** Zakarpats'ka Oblast: Delovoye ("Trebušany"), *Fagus*, 1937 Pilát (H ex PRM 488786).

—Specimens marked with an asterisk (*) bear gloeocystidia.

Antrodiella faginea resembles *A. pallescens*, but the former is more commonly effused and pilei are thinner or spathulate. Hyphal structure is identical, but spores are thicker and often shorter (Figs. 1 and 3), with convex to straight ventral side, not concave like in *A. pallescens*; different shapes are seen in the Q values (Fig. 4). In the study of Johannesson et al. (2000) these two species were clearly separated on the basis of their ITS sequences.

Spore size of *A. faginea* comes also close to *A. pallasii* (Fig. 2), which grows on gymnosperms rotten by *Trichaptum*, and has slightly smaller spores and narrower subicular skeletals. Basidiocarps of the latter are yellowish, and tubes tend to split and therefore have lacerate orifices. *Antrodiella semisupina* sensu stricto resembles *A. faginea* as well, and their identities should be reconsidered when the American taxon becomes better known.

Antrodiella faginea is rather common throughout Finland. It is found in a wide variety of biotopes, ranging from small branches of deciduous trees in herb-rich forests in the hemiboreal southern coast, to aspen trunks in old-growth forests of boreal North Finland. The shape ranges from substipitate to strictly resupinate, and the occurrence of gloeocystidia in the basidiocarps varies. Consequently, it was suspected that several species might be involved, and detailed microscopic studies were made on the Finnish collections and Central European type material. We found no support of the existence of several species: there was no covariance between the area of occurrence, ecology, growth habit, or microscopy of the studied specimens. Johannesson et al. (2000) found Czech specimens to have identical to almost identical ITS sequences with Finnish specimens.

It also became clear that gloeocystidia are an unreliable character for identification purposes, since only 15 out of 38 specimens studied in detail bore them. Even if present they are usually inconspicuous and difficult to observe. One of the specimens (Renvall 3217) sequenced by Johannesson et al. (2000) and found to belong to *A. faginea* had practically no gloeocystidia whereas two others, including the type, bore plenty of them.

Antrodiella faginea seems to be a successor species of some *Hymenochaetaceae* species, most commonly *Phellinus conchatus* (Pers. : Fr.) Quél*., P. punctatus* (P. Karst.) Pilát and *P. tremulae* (Bondartsev) Bondartsev & P.N. Borisov. The author O.M. found it much more commonly from trunks with *P. tremulae* than any other polypore species

in his study of over one thousand aspen trunks in Central Finland. Yet many finds show no connection to species of *Hymenochaetaceae,* and the link to a preceding species is evidently weaker than in, for instance, *A. pallescens* or *A. citrinella*.

Antrodiella micra was described from China (Dai 2004) as a species related to *A. faginea* but lacking gloeocystidia and being resupinate. These variable characters may not suffice for the separation of a species. Moreover, the growth on *Phellinus* fits well with *A. faginea*. We propose that *A. micra* represents *A. faginea*. The Chinese *faginea* specimens reported here are pileate and agree well with European material, although having a slightly larger average spore size.

Antrodiella ichnusana Bernicchia, Renvall & Arras

in Bernicchia, *Polyporaceae* s.l.: 127, 2005. Paratypes: Italy, Sardinia, Arzana (Nuoro), Villagrande, *Alnus glutinosa*, 30.XI.2003 Bernicchia & Arras 7694, 7695 (H ex KUO & HUBO, studied).

Annual, resupinate, soft leathery, when dry hard, basidiocarps 15–30×8–15 mm, irregularly roundish, usually emerging solitarily. Sterile margin narrow, fibrous, in young specimens hygrophanous. Pores (3–)4–5(–6) per mm, when fresh cream-coloured and hygrophanous, when dry dark cream-coloured or tan; orifices entire. Section: subiculum cream-coloured, tubes concolorous. Dimitic, generative hyphae with clamps, skeletals uniform, CB(+), IKI–, KOH–, interwoven in all parts but not agglutinated, 2–3.2 μm in diam. Crystal clusters sometimes present in between hyphae; no distinct cystidioles or gloeocystidia. Basidia with 4 sterigmata. Spores cylindrical, straight or a little drooping at apicular end, thin-walled, CB–, IKI–, (3.9–)4–5.1(–5.4)×(1.7–)1.8–2.1(–2.2) μm.

SPECIMENS EXAMINED—**Finland.** Uusimaa: Helsinki, 1993 Haanpää 1023, 1324, 1325; 1993 Niemelä 5671; 1987–1995 Saarenoksa 6992, 8390, 8491, 9295, 9391, 9490, 9594, 9991, 10291, 10591, 11090, 11695, 12791, 13892, 15790, 16190, 16290, 16390, 19792, 30190. Sipoo, 1990–1995 Saarenoksa 5195, 12395, 26390; 2004 Niemelä 7743. **France.** Sardinia, Nuoro: Lago Alto Flumendosa, 2000 Ryvarden 43171 (O, H). Savoie: Valmorel, *Acer*, 5.XI.1997 Pieri. **Italy** (see types). **Netherlands.** Zuid-Holland: Oostvoorne, *Quercus*, 1963 Donk 12501 ("*Poria romellii*", L 963.243123).

—Host *Alnus*, unless otherwise indicated. Only selected specimens are listed from Finland.

The species was described recently from Italy (Bernicchia 2005). However, the existence of this taxon was well known in Finland since the second half of the 1980s. Mr Reima Saarenoksa (Helsinki) collected it repeatedly and made field observations in seaside alder forests around Helsinki. Those annotated materials were preserved in the Botanical Museum of the University of Helsinki under the provisional name 'Antrodiella alni Saarenoksa', referring to its growth on *Alnus glutinosa*. Growth sites are moist seaside forests with rich mull or mud soil and dense and tall field layer of *Filipendula, Aegopodium, Urtica, Equisetum, Lysimachia, Rubus*, etc. In addition to *Alnus*, also *Prunus padus, Salix caprea, Sambucus racemosa, Acer platanoides*, and scattered birch and spruce grow in the area. Basidiocarps develop on thin (1–2 cm diam.) fallen branches. These field notes were compiled from herbarium labels and personal discussions with Reima Saarenoksa, of which we are grateful. At present, the species is known in Finland only along the southern coastline of the metropolitan area. Records from France and the Netherlands are new.
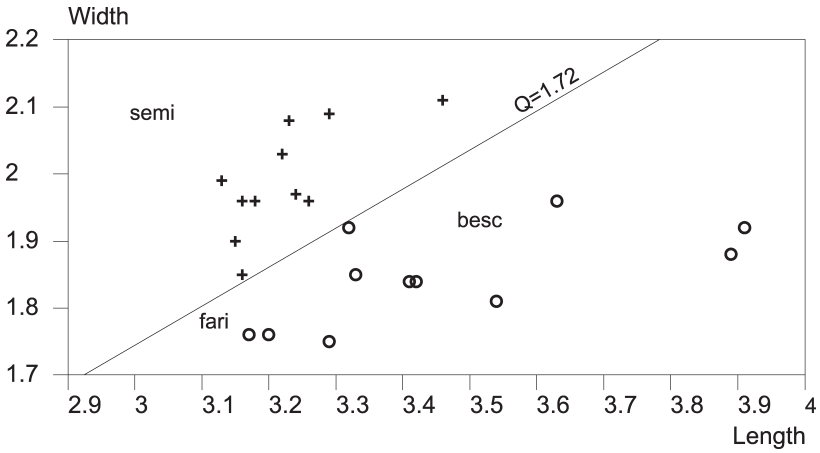
Figure 3. Average spore sizes of individual specimens of *A. faginea* (+), *A. pallescens* (○), *A. semisupina*, *A. farinacea* and *A. beschidica* (abbreviated by their epithets).
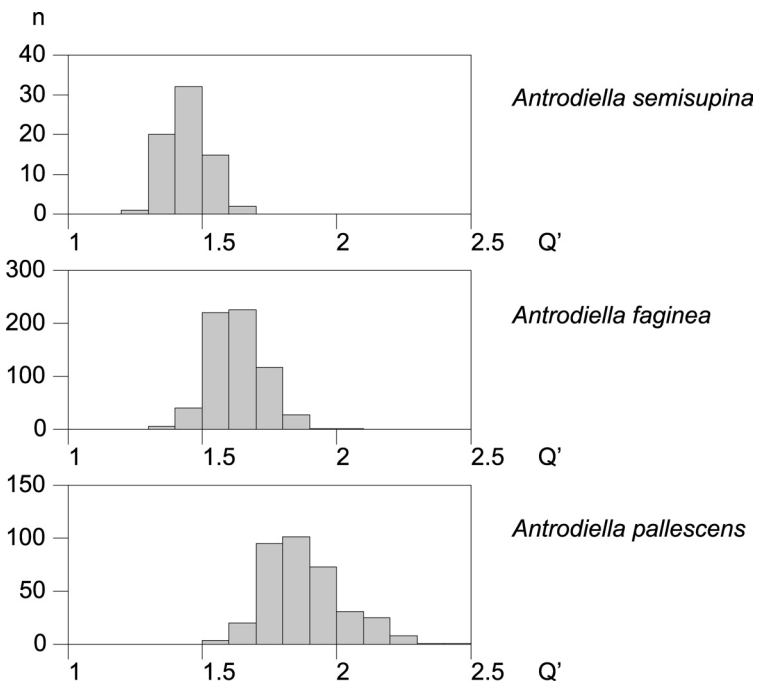

Figure 4. Histograms of Q' values (length/width ratio of individual spores) of three closely related *Antrodiella* species (n=number of spores).

At first sight *A. ichnusana* resembles very much *A. romellii*, and often the two are collected side by side in the same habitats. In the field, the species is separated from *A. romellii* by its larger pores. Under the microscope, the striking difference is the cylindrical spore shape of *A. ichnusana*, versus broadly ellipsoid in *A. romellii* (Fig. 1).

Antrodiella leucoxantha (Bres.) Miettinen & Niemelä, **comb. nov.**

(MB500772)

> Basionym: *Polyporus leucoxanthus* Bres., Mycologia 17:73, 1925. **Lectotype** (designated here): U.S.A., Virginia, Great Falls, on *Robinia pseudoacacia*, 23.IX.1921, coll. J.R. Weir 21127, det. G. Bresadola (BPI US0211632, studied).
>
> = *Coriolus hoehnelii* subsp. *genistae* Bourdot & Galzin, Bull. Soc. Mycol. France 41:145, 1925. *Coriolus genistae* Bourdot & Galzin, Bull. Soc. Mycol. France 41:145, 1925. Lectotype: '*Coriolus genistae* nob., sur genêt, bois de pins, environs d'Epinal (Vosges), XII.1904, leg. Galzin, det. H. Bourdot' (herb. Bourdot 3975, PC, studied). Selected as type by Donk (1974:264).

Annual, pileate with minute caps, 4–10 mm wide, projecting 3–5 mm from wood, 1–2 mm thick at base, downcurved, when fresh white, when dry cream or straw-coloured and hard, smooth and matt above, margin sharp. Pores round, 5–6(–7) per mm, orifices regular, not denticulate. Section: context and subiculum white, tubes cream-coloured. Hyphal system dimitic, generative hyphae with clamps, thin-walled, skeletals dominating in all parts, thick-walled and with a distinct lumen, in context/subiculum (2.1–)2.6–4 (–5.6) μm in diam., in tube trama (2–)2.5–3.3(–3.7) μm, IKI– or slightly amyloid, CB(+), KOH–. Gloeocystidia mostly absent, sometimes present, 13–21×5.5–9 μm, clavate, distinct but not prominent; cystidioles like basidioles but with a tapering, fairly blunt apex. Basidia with 4 sterigmata. Spores narrow, cylindrical, thin- and smooth-walled, IKI–, CB–, (2.9–)3.2–4.5(–5.6)×1.5–1.9(–2.1) μm, almost always clearly curved with concave ventral side.

> SPECIMENS EXAMINED—**Czech Rep.** Bohemia: Karlštejn, *Quercus*, 1996 Landa (PRM *889755). Roztoky, *Quercus*, 1996 Pouzar (PRM 890582). Zbořený Kostelec, *Quercus*, 1980 Kotlaba (PRM 871821). **Finland.** Uusimaa: Helsinki, *Populus*, 1989 Saarenoksa 58589. Keski-Pohjanmaa: Nykarleby, *Betula*, 1994 Jakobsson *918. Raahe, *Betula*, 1993 Särkkä 50. **France** (see type of *C. genistae*). **Slovakia.** Kalná Roztoka, *Fagus*, 1987 Kotlaba & Pouzar (PRM 854493). **U.S.A.** (*lectotype & same data BPI US0211634).
>
> Excluded from the description above: 'Rossia, Wasilienka, *Polyporus leucoxanthus* Bres., on *Populus tremula*' (BPI US0211633). * = gloeocystidia observed.

Ryvarden (1988) showed *Polyporus leucoxanthus* to belong to the *Antrodiella semisupina* complex. Original collections in BPI include three packages, all marked as syntypes. Two of them (US0211632 = Weir 21127, and US0211634) are Weir's collections from *Robinia pseudoacacia* in Virginia, U.S.A., and one from *Populus tremula* in "Rossia, Wasilienka", now possibly Ukraine. The excluded syntype, with scanty spores, may represent *Antrodiella pallescens*.

US0211632 (Weir 21127) was the only specimen mentioned by number in Bresadola's (1925) description, and, even though small, it is in good condition and fertile. Annotations show that this was the specimen that Ryvarden (1988) examined for his type studies. Therefore it is here selected as the **lectotype** of *Polyporus leucoxanthus*.

US0211634 is obviously its duplicate, and similar in all respects. The lectotype specimen is indisputably an *Antrodiella*, characterised by small spores, dimitic hyphal structure and faintly cyanophilous skeletal hyphae. Spores are too narrow for the American *Antrodiella semisupina*, and too curved for *A. pallescens* (Fig. 1). Nothing points towards any other preceding fungus. *Robinia* is not mentioned as a host of *Fomes fomentarius* (predecessor of *Antrodiella pallescens*) or *Inonotus radiatus* (Sowerby: Fr.) P. Karst. (predecessor of *Antrodiella serpula*) (Gilbertson & Ryvarden 1986, Ryvarden & Gilbertson 1993), and it is fairly sure that neither *Fomes* nor *Inonotus* was growing on the tree.

Spores in the lectotype remind those of *Antrodiella onychoides*, *A. ichnusana* (a strictly resupinate species with larger pores, spores almost straight), and also *A. genistae* and *A. serpula* (= *A. hoehnelii*, see later), although they are usually longer in the last-mentioned species. Cap surface of *A. serpula* is rough with warts sharp to touch, while it is smooth in the present lectotype specimen. The minute pilei of the lectotype are perfectly developed with good tubes and sharp edge; in *A. serpula* such small pilei are juvenile nodules only, and its fully developed basidiocarps are more robust. Skeletal hyphae of *A. serpula* are thicker than in *A. leucoxantha*. For these reasons we don't consider them to be conspecific.

The identity versus *A. genistae* needed a detailed study. Spores are slightly longer in *A. leucoxantha*. Pore size is the same, and no striking differences were found in the other characters. When further European collections were studied, the differences in spore size became less significant: all transitions were present, and spore measurements in North European collections were even closer to the American type *(leucoxantha)* than to the European one *(genistae)*. So the slight difference between *A. genistae* and *A. leucoxantha* does not run along the continents. The material of this taxon was the most heterogeneous among the studied taxa, deserving further study.

The two names were published the same year, but *P. leucoxanthus* has priority (the March–April issue of Mycologia vol. 17, 1925) over *P. genistae* (second issue of Bull. Soc. Mycol. France vol. 41, 1925, date of publication 1 Sep 1925).

Antrodiella onychoides is strikingly similar to this species, e.g. in its spore characteristics. Ryvarden & Gilbertson (1993) suggested that *A. onychoides* may be just a haploid form of *A. genistae*.

Antrodiella onychoides (Egeland) Niemelä

Karstenia 22:11, 1982. *Polyporus onychoides* Egeland, Nyt Mag. Naturvidensk. 51:92, 1913.
Holotype: '*Polystictus onychoides* Egel. n. sp., [Norway,] Vestre Aker: Ekely, *Fraxinus*, 26.XII.1912' (O 55295, studied).

Annual, pileate with minute caps or effused-reflexed, 4–35 mm wide, projecting 3–7 mm from wood, 1–2 mm thick at base, downcurved, white to cream-coloured, smooth and matt above, margin sharp, when dry hard. Pores round, 5–8 per mm, orifices regular, not denticulate. Hyphal system dimitic, generative hyphae without clamps, thin- to slightly thick-walled, skeletals dominating in all parts except upper subiculum, thick-walled and with distinct lumen, in context/subiculum (2.2–)3.1–4(–4.6) μm in diam., in tube trama (2.5–)2.9–3.4(–4) μm, IKI– or slightly amyloid, CB(+), KOH– or swelling. No cystidia. Basidia with 4 sterigmata. Spores narrow, cylindrical, thin- and smooth-walled, IKI–, CB–, (2.9–)3.2–4.5(–5.6)×1.5–1.9(–2.1) μm, curved with a concave ventral side.

SPECIMENS EXAMINED—**Finland.** Uusimaa: Helsinki, *Betula*, 1985 Niemelä 3227; *Alnus*, 1991 Saarenoksa 24791; *Salix/Alnus*, 1991 Saarenoksa 45791. Satakunta: Hämeenkyrö, *Prunus padus*, 26.X.2000 Salonen. **Norway** (see type).

Antrodiella onychoides is the only consistently clampless *Antrodiella* species described so far. It reminds closely *A. leucoxantha* in its ecology (usually on branches of angiosperms in fertile habitats), macroscopy (small, whitish, pileate basidiocarps) and microscopy (the only difference being in generative hyphae). Relationships of these taxa would deserve further study; *Polyporus onychoides* is their oldest name, although we consider synonymy of these names unlikely. The sometimes reminiscent *A. pallescens* differs in not having clearly curved spores, and its subicular skeletal hyphae have an indistinct lumen.

Antrodiella pachycheiles (Ellis & Everh.) Miettinen & Niemelä, **comb. nov.**

(MB500774)

Basionym: *Polyporus pachycheiles* Ellis & Everh., Proc. Acad. Nat. Sci. Philadelphia 1894:322, 1894. **Lectotype** (designated here): '*Polyporus pachycheiles*', [U.S.A., Jew Jersey, *Acer rubrum*, Nov. 1893] (NY, isolectotype BPI US0305581, both studied).

Basidiocarps pileate, flabelliform, spathulate or floriform, with constricted base, 1–1.5 cm wide, 2–3 mm thick, projecting ca. 1 cm from substrate, dry pilei downcurved. Upper surface matt with minute radial streaks, light ochraceous yellow; bruised margin apricot, chestnut or dark brick-coloured, margin sharp. Poroid surface pale ochraceous or dark cream, pores round and very small, 7–8(–9) per mm, orifices regular. Section: context cream-coloured, tubes cream to tan. Hyphal system dimitic; generative hyphae clamped and thin-walled, skeletal hyphae dominating in all parts, flexuous, translucent, with indistinct lumen, in context thick, (2.5–)3.6–4.6(–5.6) μm, in trama (2.6–)2.9–3.7(–4.3) μm in diam., thick-walled, IKI–, CB(+), and swelling (commonly >6 μm) and in some areas dissolving in KOH, subparallel in context, and interwoven but not agglutinated in tube trama. Thin-walled hymenial cystidia found irregularly, mostly slightly subulate and projecting a little, 10-14.5×3.4-4.6 μm; angular crystals common among the hyphae. Basidia with 4 sterigmata. Spores ellipsoid, thin-walled, CB–, IKI–, (3.1–)3.2–4.3(–4.4)×(2–)2.2–3.1 μm, ventral side straight or more often a little rounded, never concave; no guttulae.

SPECIMENS EXAMINED—**U.S.A.** (see type).—Omitted from the description above, but good specimen of the species: '*Polyporus pachycheiles?*', U.S.A., Vermont, Newfane, [cf. *Betula*], 4.IX.1917 A. Hibbard 18995' (BPI US0305580).

Ellis & Everhart (1895) mention only one specimen in their description of *Polyporus pachycheiles.* Specimens matching the description are found in NY and BPI. The former is larger, in good condition, and was considered as the type by Lloyd. Thus the specimen in NY is selected as the **lectotype** of *Polyporus pachycheiles.* The specimen in BPI is evidently its duplicate, and its character data has been combined with the lectotype when making descriptions.

Polyporus pachycheiles has usually been reduced to the synonymy of *A. semisupina* (Overholts 1953, Lowe 1975, Gilbertson & Ryvarden 1986). However, *Polyporus pachycheiles* can be separated from *A. semisupina* sensu typi and *A. pallescens* by several macro- and microscopic characters. In our opinion, this is a well-defined species within

the genus, characterised by flabelliform shape, fairly bright colours, and small pores. In the microscope it stands out among similar other species by the large spores (about the size of *A. romellii*, which is resupinate) and the skeletal hyphae that swell strongly and even dissolve in KOH. The lectotype bears in places thin-walled hymenial cystidia that do not stain any differently from the rest of the hymenium in IKI or CB. In specimen 0305580, there are pear-shaped, vesicular cystidia in the hymenium, probably just a secondary feature of a senescent basidiocarp.

Antrodiella pallasii Renvall, Johannesson & Stenlid

> Mycol. Research 104: 95, 2000. Isotype: Finland, Sompion Lappi, Savukoski, *Picea abies*, 25.VIII.1992 Renvall 2990 (H, studied).

Annual, effused-reflexed or resupinate, light yellow when young, white when old and then often with violet-grey patches, tough but thin and appearing fragile when young, hard when dry. Caps fingernail-shaped, typically in rows of up to 20 cm, single caps 5–20 mm wide, projecting 2–10 mm, up to 2 mm thick; resupinate area 5–100 mm across, neighbouring areas later merging together, sterile margin distinct, white. Pores (5–)6–8 per mm, orifices finely toothed. Section: context/subiculum white to cream-coloured, usually less than 1 mm thick, tubes cream to yellowish, tube layer 0.5–2 mm. Dimitic, generative hyphae with clamps, skeletals CB– to CB(+), IKI– or faintly amyloid, KOH–, in subiculum (1.8–)2.7–3(–3.7) μm in diam., in tube trama subparallel, (2–)2.3–2.9(–3.2) μm, lumen capillary and visible or indistinct in subiculum, wide in trama, structure appearing almost monomitic in lower trama. Crystal clusters among hyphae common, oily substance present as small droplets. No cystidia or cystidioles seen. Basidia with 4 sterigmata. Spores ellipsoid, thin-walled, CB–, IKI–, (2.9–)3–3.7 (–3.9)×(1.6–)1.8–2.1(–2.3) μm, ventral side typically flat, sometimes a little convex or concave, often with an oil drop.

> SPECIMENS EXAMINED—**Finland.** Perä-Pohjola: Rovaniemi, *Picea*, 1960 Eriksson 9416 (UPS). Kittilän Lappi: Kittilä, *Picea*, 1980–2001 Niemelä 2143, 6580; *Pinus*, Niemelä 7139. Kolari, *Picea*, 1999 Niemelä 6617. Sompion Lappi (see type).
> —All on dead *Trichaptum abietinum*.

Antrodiella pallasii is a strict follower of *Trichaptum abietinum* and possibly other *Trichaptum* species. It is well defined by small spores, narrow skeletal hyphae and gymnosperm hosts. *Antrodiella parasitica* is similarly associated with *T. abietinum*, but has much wider spores. Spore size of *A. pallasii* comes close to *A. faginea*, which is found on angiosperm hosts and has clearly thicker skeletal hyphae. Gymnosperm-associated *A. ellipsospora* has slightly wider spores and thicker skeletal hyphae.

Antrodiella pallescens (Pilát) Niemelä & Miettinen, **comb. nov.**

(MB500770)

> Basionym: *Coriolus pallescens* Pilát, Bull. Soc. Mycol. France 48:15, 1932. Lectotype: Sweden, Torne Lappmark: Jukkasjärvi, Björkliden, *Betula*, 1.IX.1909 Romell 14653 (S, studied). Selected by Ryvarden (1974:279).
> = *Antrodiella beschidica* Vampola & Pouzar, Czech Mycol. 49:23, 1996. Holotype: Czech Republic, Moravia, Moravskolezské Beskydy, Jablunkov, *Abies alba*, 7.IX.1969 Pouzar (PRM 682098, studied).

= *Antrodiella farinacea* Vampola & Pouzar, Czech Mycol. 49:29, 1996. Holotype: Slovakia, Banská Bystrica, Badín, *Ulmus glabra*, 30.IX.1994 Vampola (PRM 842927, studied).

Annual, pileate, effused-reflexed or resupinate, leathery, when dry hard. Caps shelf- or fingernail-shaped, 10–40 mm wide, up to 5 mm thick, projecting 5–30 mm, surface matt, cream-coloured, often with faint tan or mouse grey zones or greyish all over, margin sharp; resupinate area 20–100×10–50 mm, roundish or ellipsoid, neighbouring areas later merging together. Pores cream-coloured, (4–)6–8 per mm, orifices entire. Section: context cream-coloured, homogeneous, when dry hard, tubes concolorous. Dimitic, generative hyphae with clamp connections, 2.3–3.3 μm, skeletals CB(+), IKI–, in context/subiculum radially subparallel, (2–)3–4.6(–5.4) μm in diam., in tube trama tightly interwoven but not agglutinated, (2–)2.4–3.2(–4.1) μm, lumen wide to narrow in context skeletals, indistinct in subiculum, capillary in trama. Crystal clusters occasional. Cystidioles poorly differentiated with conical apex; gloeocystidia mostly absent but seen in one specimen; hyphal pegs present. Basidia with 4 sterigmata. Spores short cylindrical or ellipsoid, thin-walled, CB–, IKI–, (2.9–)3–4.1(–4.8)×(1.6–)1.7–2(–2.3) μm, rarely tapering, ventral side flat or (longest spores) a little concave.

Specimens Examined—**Czech Rep.** (type of *A. beschidica*). **Finland.** Uusimaa: Mäntsälä, *Betula*, 1993 Haikonen 15652. Etelä-Häme: Kuru, *Betula*, 2003 Miettinen 7972. Koski, *Betula*, 1982 Niemelä 2788. Lammi, *Betula*, 1993 Renvall 3338; *Alnus*, 1993 Renvall 3360. Keski-Pohjanmaa: Nykarleby, *Betula*, 1995 Jakobsson 1516. Pohjois-Karjala: Lieksa, *Betula*, 1991 Niemelä 5548. Sompion Lappi: Sodankylä, *Betula*, 1998 Niemelä 6280. Kittilän Lappi: Kittilä, *Betula*, 2000 Niemelä *6705. Perä-Pohjola: Rovaniemi, *Alnus*, 2003 Niemelä 7636. **Slovakia** (type of *A. farinacea*). **Sweden** (see type).
  —All Finnish collections with *Fomes fomentarius*. * = gloeocystidia observed.

Finding a name for the *Antrodiella* species growing on dead basidiocarps of *Fomes fomentarius* turned out to be a nomenclatural puzzle. The names *Polyporus pachycheiles* (Ellis & Everhart 1895), *P. leucoxanthus* (Bresadola 1925) and *Trametes subscutellata* (Murrill 1910) have been referred to the *A. semisupina* complex (Murrill 1907, Lowe 1975, Overholts 1953, Ryvarden 1985, 1988); we studied their types and prefer to keep them separate.

The name *Polyporus pallescens* was used from time to time for the European '*Antrodiella semisupina*'. Originally *P. pallescens* Fr. : Fr. (Fries 1818) was a name for the species that is now known as *Bjerkandera fumosa* (Pers. : Fr.) P. Karst. (Donk 1974). Karsten (1881a) transferred the epithet to his newly described genus *Tyromyces* as *T. pallescens* (Fr. : Fr.) P. Karst., and later the same year (Karsten 1881b) he created still another combination, *Bjerkandera pallescens* (Fr. : Fr.) P. Karst. These were mere technical new combinations of the old Friesian name, without descriptions or comments on the identity of the species.

Karsten's herbarium (in H), however, reveals that his concept of the taxon changed in the course of time (Lowe 1956), and it seems that in his later years Karsten abandoned to use the epithet for *Bjerkandera fumosa*, and coined it to the European '*A. semisupina*'. He also sent a specimen (Lowe 1956:119) of this kind to Romell in Stockholm (S). That, and own collections from Swedish Lapland, prompted Romell (1911) to describe a new species, *Polyporus pallescens* Romell ('*P. pallescens* Karst.') for the fungus growing on dead *Fomes fomentarius*. The description is clear, specimens good for typification are

listed, and *P. pallescens* Fr. : Fr. is excluded. All the elements for a good description of a new species were there, except the unfortunate name which is a homonym of *Polyporus pallescens* Fr. : Fr.

Pilát (1932) seems to be the first to transfer *Polyporus pallescens* Romell to a new genus. In that paper the following subheading is found: "**Coriolus pallescens** Karsten, sensu Romell, Hymen. of Lappl., p. 19, nec Fries! f. *resupinata* m[ihi]" [bold face and italics original]. Then description of the resupinate form follows, and a Siberian specimen from *Salix* is listed (coll. Ziling 233). By doing this, Pilát in fact validated the Romellian *pallescens* by creating the nomen novum *Coriolus pallescens* Pilát, based on the description and collections of Romell and, via Romell, also of Karsten; simultaneously he described a new form from Siberian material. The correct citation is *Coriolus pallescens* Pilát, rather than Karsten (who did not describe the species but only sent a specimen so named to Romell) or Romell (who was not mentioned as the author in Pilát's description; ICBN (St Louis) Art. 46.4).

Consequently, the identity of *Coriolus pallescens* Pilát should be searched from the collections by Romell and/or Karsten. Fortunately good specimens exist. In Helsinki (herb. H) there are two such specimens—Herb. Karsten nos. 718 and 1846, both of which agree with the present species concept. In Stockholm (S) there are several specimens collected by Romell from Swedish Lapland; Ryvarden (1974) selected one of them as lectotype. That material is good quality and a typical representative of the species.

Antrodiella beschidica was described in Vampola & Pouzar (1996) from material collected from *Abies alba*. In spite of this unusual host, we consider this to be *A. pallescens*, as was already done by Johannesson et al. (2000) on the basis of identical ITS sequences. Spores and other microscopy agree in these two materials. *Fomes fomentarius*, the predecessor of *A. pallescens*, occasionally grows on *Abies alba*, but no such link was mentioned in the holotype collection.

Antrodiella farinacea was described from Slovakia from an elm tree (Vampola & Pouzar 1996). Type material consists of young, effused-reflexed basidiocarps with fingernail-shaped pilei. The nearly lacrymoid spores would match better with *A. faginea*, but spores typical of *A. pallescens* were also present. In the study of Johannesson et al. (2000), this grouped clearly among *A. pallescens*.

Anrodiella pallescens is very similar to *A. faginea*. Aside slightly different ecology, the only clear difference is in the spores, which are in *A. faginea* ellipsoid, never cylindrical, and have higher Q'-values (Figs. 1, 3 & 4).

Antrodiella parasitica Vampola

Česká Mykologie 45:10, 1991. Holotype: Czech Republic, Moravia: Řásná, NW of Telč, alt. 675 m, *Picea abies*, on living basidiocarps of *Trichaptum abietinum*, 10.V.1990 Vampola (PRM 842842, studied).

Annual, strictly resupinate, leathery, when dry brittle hard, basidiocarps small, mostly 5–15×5–30 mm, patchy, gregarious on living or recently dead *Trichaptum*. Sterile margin narrow to absent. Pores (4–)5–6(–7) per mm, cream-coloured; orifices entire or a little lacerate. Section: subiculum cream-coloured, tubes concolorous. Dimitic, generative hyphae mostly with clamps but simple septa also seen, skeletals rather uniform, CB(+), in places weakly amyloid, KOH–, interwoven in all parts, but not agglutinated, (2.1–

)2.5–3.3(–3.8) µm in diam, with a variably visible lumen. Crystal clusters sometimes present in between tramal hyphae; no distinct cystidioles or gloeocystidia. Basidia with 4 sterigmata. Spores ellipsoid or even subglobose, thin-walled, CB–, IKI–, (3.2–)3.3–4 (–4.1)×(2.2–)2.3–2.9(–3.2) µm, ventral side convex.

SPECIMENS EXAMINED—**Czech Rep.** Moravia: Radostín, Vampola 1899; Polyp. Exs. Čechosl. 39. Řásná (see type). Loučky, 1990 Vampola 1886. Komárovice, 1990 Vampola 1901. **Finland.** Uusimaa: Sipoo, 1995 Jakobsson 1247. **Germany.** Sachsen: Oderwitz, 1984 Dunger 13711.
—All on *Picea abies*+*Trichaptum abietinum*.

Basidiocarps of this species are completely resupinate and typically very small. The species name is well selected, because *A. parasitica* mostly grows on still-living basidiocarps of *Trichaptum abietinum*. Vampola (1991) described *A. parasitica* from an extensive Central European material as having broadly ellipsoid spores and bearing gloeocystidia. We were unable to find gloeocystidia in specimens of *A. parasitica* despite extensive search. The hymenial cells of the species are big and stain fairly strongly in CB and IKI, especially the young basidia, which also project somewhat above the hymenium. These cells may be mistaken for gloeocystidia, but a careful examination reveals that some of them bear sterigmata and in fact do not stain differently from the other hymenial cells. Even without gloeocystidia, the species is rather easy to identify based on its spore characters and ecology. The type specimen is mostly clamped, but bears frequent simple septa especially in the hymenium. This is untypical for most *Antrodiella* species. One Finnish specimen (Jakobsson 1247) is clampless throughout, but agrees otherwise with the Central European material. Is the presence or absence of clamps less determining for this species than for most other *Antrodiella*?

Antrodiella romellii (Donk) Niemelä

Karstenia 22:11, 1982. *Poria romellii* Donk, Persoonia 5:84, 1967. Holotype: '*Boletus byssinus* Schrad. (Fungus nascens), Herb. Pers.' (L 0117094, studied). **Epitype** (designated here): Finland, Uusimaa, Tammisaari, 1987 Niemelä 4018 (L, isoepitype H).

Annual, resupinate, soft leathery, when dry hard, basidiocarps 30–60×10–30 mm, irregularly roundish, usually emerging solitarily. Sterile margin narrow, matt, hygrophanous especially in upper half of the basidiocarp. Pores 5–7 per mm, when fresh hygrophanous translucent or (after dry period) cream-coloured, when dry cream-coloured or with an apricot tint; orifices entire. Section: subiculum 0.1–0.5 mm, cream-coloured, tubes concolorous or darker. Dimitic, generative hyphae with clamps, skeletals rather uniform, CB(+), IKI–, 1.7–3.7 µm in diam., in subiculum with spaced and interwoven structure, basal layer almost monomitic; tramal hyphae interwoven, agglutinated; skeletals with variably visible lumen. crystal clusters sometimes present in between hyphae; hyphal tips at orifices often slightly inflated; no clear cystidioles or gloeocystidia. Spores ellipsoid, thin-walled, CB–, IKI–, (3–)3.4–4.4(–5.1)×(2.2–)2.3–2.9 (–3.1) µm, ventral side convex or (rarely) flat, never concave.

SPECIMENS EXAMINED—**Finland.** Varsinais-Suomi: Tammisaari, *Corylus*, 5.IX.1971 Niemelä; see epitype. Turku, *Quercus*, 1937 Laurila 720, 721. Uusimaa: Helsinki, *Alnus*, 1993 Saarenoksa 24293. Sipoo, *Alnus*, 1987 Saarenoksa 11587. Etelä-Häme: Kuru, *Betula*,

2003 Miettinen 7919. Lammi, *Corylus*, 1997 Niemelä 6095; *Populus*, 2003 Miettinen 7488. Kittilän Lappi: Kittilä, *Betula*, Niemelä 6757. **Russia.** "Sibiria, Wasjuganje", *Betula*, 1934 Krawtzew W 115 (PRM 811661). **Sweden.** Uppland: Norra Warleda, *Corylus*, VIII.1970 Jahn. Kalmar, *Corylus*, 22.X.1995 Toresson.

The species is characterised by resupinate basidiocarps, large spores and agglutinated tramal hyphae. *Antrodiella pachycheiles* has similar spores, but it is pileate, its hyphal structure is different and skeletals swell and eventually dissolve in KOH. *Antrodiella subradula* (see below) is fairly similar but its spores are shorter and narrower and its tramal hyphae are separate, not agglutinated.

Donk (1967) proposed the name *Poria romellii* for a resupinate species that was featured by Romell (1926) and Eriksson (1949) as '*Poria byssina* (Schrad.) Fr.' In a thorough analysis Donk concluded that the name *P. byssina* must be typified elsewhere, and hence he gave a nomen novum, *Poria romellii*, for the taxon now included in *Antrodiella*. Donk emphasised that his species concept was based on texts and illustrations by Romell and Eriksson—and, in particular, the 'excellent' drawing by Eriksson (1949, Fig. 1). Accordingly, he designated the holotype (L 0117094) from the specimens that Romell and Eriksson had studied and identified in Persoon's herbarium.

We restudied the holotype; the specimen is a young basidiocarp, substerile, and partly mould-contaminated. Salient characters could be seen, however. There are 3–4 thin, resupinate, cream-coloured basidiocarps arising from the bark of (evidently) *Corylus avellana*. Pores are round, (5–)6–7 per mm. Only collapsed basidia with four sterigmata, and a few turgid spores (3.8–4.7×2.7–2.8 µm) were found. Hyphal system is dimitic, generative hyphae thin-walled and clamped, skeletals weakly cyanophilous and 2.2–3(–3.8) µm thick, no basal layer, no gloeocystidia. Trama is largely monomitic due to the young age of the basidiocarp; tramal tissue is dense and hyphae are subparallel. These characters match with the description and drawing by Eriksson (1949) and with the present concept of the species.

Since the type material is scanty and in a poor condition, its value as research material is inferior in a group where exact spore dimensions are the most important criteria for a species concept. In order to settle the identity of the species, we here select an **epitype** for *Poria romellii*, specimen Niemelä 4018 (L, H). This specimen is strikingly similar to the holotype, and in a good fertile condition. It was studied and sequenced by Johannesson et al. (2000) in their study of *Antrodiella*. Epitype's nuclear ribosomal RNA internal transcribed spacer (ITS) is deposited in GenBank (acc. no. AF126899).

Donk's concept of *Poria romellii* was mixed: we studied another specimen (L 0194116), determined by Donk, collected in 1963 by him in the Netherlands from a fallen branch of *Quercus*. That specimen has larger pores (3–5 per mm) and much narrower spores, about 3.7–4.8×1.9–2.3 µm, and it seems to be conspecific with the newly (Bernicchia 2005) described *Antrodiella ichnusana*; see its notes.

Antrodiella serpula (P. Karst.) Spirin & Niemelä, **comb. nov.**

(MB500771)

Basionym: *Bjerkandera serpula* P. Karst., Meddel. Soc. F. Fl. Fennica 14:79, 1887. Holotype: Finland. '*Bjerkandera serpula* Karst., Särkijärvi, ad *Pol. radiatum* et cort. *Alni*, m. Sept. 1886' (Herb. P.A. Karsten 4015, H, studied).

= *Polyporus hoehnelii* Bres. ex Höhnel, Sitzungsber. Kaiserl. Akad. Wiss. Wien, Math. Naturwiss. Kl. 121(1):344, 1912. Holotype: Austria. '*Polyporus höhnelii* Bres., typus!, ad *Carpinum*, leg. v. Höhnel' (BPI US0211065, studied).

= *Polyporus rufopodex* Romell, Svensk Bot. Tidskr. 6:641, 1912. Holotype: Sweden, Östergötaland, Simostorp, IX.1912 Haglund (Herb. Romell 13497, S; according to Ryvarden 1974, not studied).

Annual, pileate or effused-reflexed, leathery, when dry very hard. Caps at first nodulose, fully grown shelf-shaped or triangular in section, 10–60 mm wide, 5–20 mm thick, projecting 5–25 mm, surface matt or minutely hairy, when dry rough to touch, yellow, margin fairly sharp and yellow; resupinate area small and irregular in shape. Pores yellow or cream-coloured, 4–6(–7) per mm, orifices entire, serrate or dentate. Section: context cream-coloured, homogeneous, when dry hard, 2–8 mm thick; tubes concolorous or yellowish. Dimitic, generative hyphae with clamps, skeletals distinctly CB+, IKI–, in context interwoven, (2–)3–5.2(–6) μm in diam., in tube trama parallel, (2.8–)3–4.4 (–5.3) μm, especially in context and upper trama robust-looking, very thick-walled and with a distinct, wide lumen. Small, sandy or cubical crystals sometimes present on hyphae. Cystidioles with a conical apex; gloeocystidia evidently absent. Basidia with 4 sterigmata. Spores short cylindrical, thin-walled, CB–, IKI–, (3.3–)3.6–5(–5.7)×(1.6–) 1.8–2.2(–2.5) μm, curved along their whole length.

Specimens Examined—**Austria** (type of *P. hoehnelii*). **Czech Rep.** Bohemia: Sázava, *Fagus*, 1991 Niemelä 5529. **Estonia.** Pärnumaa: Koonga, *Corylus*, 1996 Niemelä 6015. **Finland.** Uusimaa: Helsinki, *Alnus*, 1986 Saarenoksa 18686. Etelä-Häme: Lammi, *Corylus*, 1985 Niemelä 3278; 2000 Niemelä 6899. Tammela (type of *B. serpula*).

—All on dead *Inonotus radiatus*, except type of *P. hoehnelii* (not indicated).

This is the most robust of the *Antrodiella* species treated here. Under the microscope it stands out in having thick skeletal hyphae, which often ramify in the context and are strikingly parallel in tube trama, and which are more strongly cyanophilous than in the other species.

While studying the specimens of Karsten, one of us (W.S.) found that the type of *Bjerkandera serpula* in fact represents the present species. The specimen is small but fertile, and it is growing on remnants of *Inonotus radiatus*. A closer study on spores and other microscopy confirmed this result. Holotype was depicted in Karsten's Icones (Karsten 1891), but even though coloured this lithograph is not very illustrative.

This is one of the best-known species in the genus, belonging to its narrow-spored group (Fig. 2). The yellow basidiocarps usually arise from angiosperm wood decayed by *Inonotus radiatus*. Hyphal structure is more robust than in most species of the genus, but in the phylogram by Johannesson et al. (2000) its position is in the core of the genus, close to *A. pallescens* (the European '*A. semisupina*'). The type of *Polyporus hoehnelii* is sterile, but agrees with the current concept of the species, e.g. in having the same characteristic hyphal structure as the type of *A. serpula*.

Pilát (1936–1942) doubtfully linked *Bjerkandera serpula* to *Trametes hoehnelii* (Bres. ex Höhn.) Pilát in the Index of his book, but did not treat the matter in the text and so the reasons for his conclusion are not known. Lowe (1956) studied the type, but could not agree with Pilát's proposal and left the decision open.

Donk (1974) lists *Polyporus scaber* Velen. 1922 as a synonym of the species, but the name is an illegitimate homonym of *P. scaber* Bres. (Bresadola 1920).

Antrodiella subradula (Pilát) Niemelä & Miettinen, **comb. nov.**

Basionym: *Coriolus subradula* Pilát, Bull. Soc. Mycol. France 51:366, 1936. Lectotype: 'Sibiria, Distr. Tara, *Salix* sp., IX.1929 Ziling 233' (PRM 811662, studied). Selected as type by Donk (1974:370).

Annual, resupinate, when dry hard, basidiocarp ca. 6–15×5–10 mm, irregularly roundish. Sterile margin very narrow or absent. Pores (2–)3–5 per mm, cream-coloured, variably sized; orifices entire. Section: subiculum straw-coloured, tubes dark cream-coloured. Dimitic, generative hyphae with clamps, skeletals CB(+), IKI–, in subiculum (3–)3.7–4.6(–5.4) μm in diam. and in KOH swelling to up to 5.3–6 μm; in tube trama (2.2–)2.6–3.5 μm, tightly interwoven and agglutinated in upper trama and subparallel close to orifices. Crystals abundant in subiculum, mostly as small rhomboidal plates or prisms. No gloeocystidia, cystidioles 9–10.9×4–4.5 μm, inconspicuous with nipple-like apex. Basidia with 4 sterigmata. Spores ellipsoid, thin-walled, CB–, IKI–, (3.2–)3.3–3.9(–4.1)×(2–)2.1–2.3(–2.4) μm, ventral side convex or (rarely) flat, never concave.

SPECIMENS EXAMINED—**Russia** (see type).

Pilát (1936) returned to the form that he originally described as *Coriolus pallescens* f. *resupinata* (Pilát 1932) by raising it to species rank as *Coriolus subradula*. Two Siberian specimens were listed, one from *Betula* (Krawtzew W 115) and another from *Salix* (Ziling 233). If the specimen from *Betula* had been selected as type, this would be an older name for *Poria romellii*. However, Donk (1974:370) lectotypified both *Coriolus pallescens* f. *resupinata* and *Coriolus subradula* according to the specimen from *Salix* (Ziling 233). Pilát himself had written 'Typus!' on the label of the collection from *Betula* (W 115), but that was not published, and so Kotlaba & Pouzar (1989) were misled when they accepted this as the type (they later corrected their interpretation: F. Kotlaba & Z. Pouzar 1992, in herb.). This taxon is without doubt an *Antrodiella*, but spore dimensions do not match with any species that we know (Tab. 1, Fig. 2). Therefore we accept *A. subradula* as a good species in *Antrodiella*. The lectotype specimen was illustrated in Pilát (1936, Pl. 7:3, magnification ×8, not indicated in the paper).

The lectotype specimen is a small but very fertile, resupinate basidiocarp, resembling *Antrodiella romellii* but with larger pores (5–7 per mm in *A. romellii*), and having shorter and narrower spores. *Antrodiella faginea* is also fairly similar, but its spores and pores are smaller, and skeletal hyphae appear thicker. More material is needed.

Antrodiella thompsonii Vampola & Pouzar

Czech Mycology 49: 27, 1996. Holotype: *Poria*, Canada, Ontario, Lake Temagami, on *Populus grandidentata*, 26.VIII.1930 G.E. Thompson (PRM 810111, ex herb. L.O. Overholts).

Annual, resupinate, woody hard, 1–2 mm thick. Sterile margin almost nonexistent, i.e. pores extend to the edge; pore surface tan with darker brown flecks, pores angular, regular, 7–9 per mm. Section: subiculum thin but very distinct, 0.1–0.2 mm thick, creamy white, with a dense and homogeneous structure, tubes brownish and oily-looking, colour contrast strong between subiculum and tubes. Dimitic; generative hyphae with clamp connections, skeletals weakly but clearly cyanophilous, with a clearly

Table 2. Key characters of *Antrodiella* species treated in this paper.

Group	Species	Ecology	Macroscopy	Pore size (per mm)	Hyphal structure	Spores (L×W in μm)
	americana	angiosperm wood decayed by *Pseudochaete tabacina*	resupinate, yellow, pores soon splitting	large (2–4)	CB(+) to CB+, clear gloeocystidia abundant (15–60×4–8 μm), skeletals rather narrow, mostly 2.2–3.1 μm in subiculum, with a clear lumen	narrow ellipsoid to cylindrical, uniguttulate (3.72×2.05)
	ellipsospora	type on brown-rotted *Pinus sibirica*	half-resupinate, white to cream-coloured	small to very small (7–9)	weak CB(+), skeletals rather robust in subiculum (3–3.5 μm), lumen indistinct	narrow ellipsoid (3.59×1.95)
Small ellipsoid spores	*faginea*	various deciduous trees, often associated with *Hymenochaetae.*	half-resupinate, pores white to cream-coloured	small (6–8)	CB(+), skeletals robust in subiculum (2.7–4.2 μm), lumen indistinct, gloeocystidia sometimes present	ellipsoid, not curved (3.20×1.97)
W ≤ 2.1 μm	*pallasii*	associated with *Trichaptum abietinum*, on gymnosperms	half-resupinate, yellowish, pore mouths often lacerate, splitting	small (6–8)	CB– to weak CB(+), subicular skeletals rather narrow, mostly ≤ 3 μm, tramal skeletals with large lumen	ellipsoid, belly often straight, uniguttulate (3.23×1.93)
L < 4 μm	*pallescens*	associated with *Fomes fomentarius*	half-resupinate, pores white to cream-coloured	small (6–8)	CB(+), skeletals robust in subiculum (3–4.6 μm), lumen indistinct	straight/slightly curved belly (3.47×1.84)
Q ≤ 2	*semisupina*	type on *Quercus*	half-resupinate, orange tints	small (6–8)	CB–, hyphae flexuose, (2–)3–4.2(–5) μm	egg-shaped (3.00×2.09)
	thompsonii	type on *Populus*	resupinate, pores resinous	very small (7–9)	CB– to CB(+), tramal hyphae strongly agglutinated, skeletals 2.5–4 μm, gloeocystidia present	broad cylindrical to ellipsoid (3.15×1.79)

Group	Species	Substrate / habitat	Fruitbody	Spore size	Microscopy	Spore shape (Q)
Slender spores Q > 2 W ≤ 2 μm	ichnusana	on branches of *Alnus*	resupinate, white to straw-coloured, hygrophanous	relatively large (4–5)	CB(+), skeletals narrow, with a clear lumen, 2–3.2 μm	rather straight (4.55×1.95)
	leucoxantha	various deciduous trees	half-resupinate, whitish	medium (5–6)	CB(+), subicular skeletals rather large (2.6–4 μm), lumen distinct, gloeocystidia occasional	always curved (3.89×1.71)
	onychoides	various deciduous trees	half-resupinate, whitish	medium to small (5–8)	CB(+), no clamps, skeletals 3.1–4 μm in subiculum, with a distinct lumen	always curved (3.86×1.75)
	serpula	associated with *Inonotus radiatus*	pileate to half-resupinate, yellowish when old	medium (4–6)	CB+, skeletals very robust, commonly > 5 μm in subiculum, lumen distinct	always curved (4.12×1.95)
	canadensis	on gymnosperms	pileate, white, greyish upper surface when dried	medium (5–6)	CB–, monomitic or almost so, hyphae thin- to thick-walled, 2.2–5.4 μm, subicular hyphae with finger-like, refractive branches	broad ellipsoid to subglobose, uniguttulate (3.43×2.64)
	citrinella	associated with *Fomitopsis pinicola*, usually gymnosperms	half-resupinate, yellow when fresh, colour fading upon drying	relatively large (4–5)	CB(+), skeletals with a clear lumen, rather narrow, 2.3–3.7 μm	broad ellipsoid to subglobose (3.14×2.31)
Wide spores W >> 2 μm	pachycheiles	type on *Acer*, also *Betula*	half-resupinate, straw-coloured	small (7–8)	CB(+), skeletals wide, 3.6–4.6 μm in subiculum, swelling & dissolving in KOH, thin-walled cystidia	broad ellipsoid (3.67×2.45)
	parasitica	gymnosperms decayed by *Trichaptum abietinum*	resupinate, straw-coloured, orifices entire to lacerate	medium (5–6)	CB(+), tramal tissue dense, robust hymenium staining strongly in CB & IKI, basidia robust, skeletals 2.5–3.3 μm	broad ellipsoid, often uniguttulate (3.63×2.50)
	romellii	deciduous wood, often fallen branches	resupinate, cream-coloured or with apricot tint	medium to small (5–7)	CB(+), tramal hyphae agglutinated, skeletals 1.8–3.5, basidia robust	broad ellipsoid (3.84×2.55)
	subradula	type on *Salix*	resupinate, white	relatively large (3–5)	CB(+), skeletals rather narrow, 2.5–3.5 μm, not agglutinated	relatively narrow ellipsoid (3.49×2.18)

visible lumen, IKI–, KOH–. Subiculum with 5–20 μm thick basal layer of subparallel and glued-together generative hyphae; subiculum proper homogeneous with very tightly packed, interwoven, but separate hyphae, skeletals (1.8–)2.3–3.8(–4.2) μm. Tube trama with tightly interwoven hyphae, glued throughout into inseparable, glassy structure, skeletals 2–3.2 μm in diam. Cystidioles with a conical apex, hymenium with few and poorly differentiated gloeocystidia, 10–12×4–6.5 μm, best seen in IKI. Basidia with 4 sterigmata. Spores ellipsoid or short cylindrical, thin- and smooth-walled, IKI–, CB–, (2.8–)2.9–3.6(–3.8)×(1.6–)1.7–2 μm, ventral side flat, seldom slightly convex, almost never concave.

SPECIMENS EXAMINED—**Canada** (see type).

This seems to be a well-defined species, to us known from the type locality only. Externally it is characterised by resupinate habit, very small pores, and, in particular, the colour contrast between almost white subiculum and oily brownish tubes. Microscopic structure resembles that of *A. romellii* by its tightly glued hyphae of tube trama; this agglutination is even stronger than in *A. romellii*. Skeletal hyphae are fairly narrow. In the hymenium gloeocystidia can be seen, but they are not prominent and do not suffice for identification. The short cylindrical spores come closest to those of *A. pallescens*, but the other characters disagree.

Trametes subscutellata Murrill

Mycologia 2:191, 1910. **Lectotype** (designated here): *Trametes subscutellata*. Jamaica, Moneague to Union Hill, 17–18.I.1909 W.A. Murrill 1129 (NY, studied). Lowe (in herb.) and Ryvarden (1985) called this as 'type' and in the convolute there is a note 'part of type' by Murrill; hence this must be considered to be the lectotype.

Ryvarden (1985) considered this to be a synonym of *Antrodiella semisupina*. The type specimen is from Jamaica, i.e. subtropical Caribbean. The specimen is half-resupinate, button-shaped, whitish to straw-coloured, with small pores 8–9 per mm. Hyphal system is dimitic with branching skeletals (3.2–5 μm) that stain relatively strongly in CB for an *Antrodiella* species, and swell a little (up to 8 μm) but remain distinct in KOH. We could not find any hymenium in good condition, and only a few spores were found, broadly ellipsoid, within the range of 2.7–4.3×2–2.8 μm. The identity of this species should be solved based on collections from the Caribbean. We do not think it is conspecific with *A. semisupina*, whose skeletals are flexuous, CB–, or with *A. pallescens*, which has narrower spores and a more northerly distribution.

Discussion

Identifying species of *Antrodiella* is often difficult, since differences between the species are small. In Table 2 we summarise the main characters of all the species treated here. The species have been sorted into three groups based on their spore characters (see also Fig. 2).

Gloeocystidia have been used to delimit species (for instance *Postia leucomallella* (Murrill) Jülich) and even genera *(Gloeocystidiellum)* in *Aphyllophorales.* The exact meaning of the term varies greatly in the literature, sometimes used only for plasma-rich special cells that arise from subhymenium (like in *Antrodiella*), sometimes also for

the terminal ends of gloeoplerous tramal hyphae that penetrate into the hymenium. Clémençon (2004) summarised the different types of these cells and their exact terms.

Here we use the term gloeocystidium for those thin-walled hymenial cystidia that stain more yellow or refract more strongly in IKI than other hymenial cells, and become deep blue-tinted in Cotton Blue. They are a good and constant character in some species (for instance, *Antrodiella americana*), but our work shows that they are unreliable in several other species of the genus. *A. faginea*, whose description was largely based on the presence of gloeocystidia, does not seem to bear them commonly. A similar case is *A. leucoxantha*, in which gloeocystidia are found only in some specimens. Of the studied tens of collections of *A. pallescens*, gloeocystidia were found in just one, otherwise typical specimen. One of the key characters of *A. parasitica* is said to be the presence of gloeocystidia (Vampola 1991). However, we could not find any clear cystidia in the studied specimens, rather just yellow-tinted hymenial cells.

Indeed, in all the *Antrodiella* species where gloeocystidia have been reported— except *A. americana*—they are weakly differentiated, rare, and often difficult to verify. They are commonly associated with senescent hymenium at tube bottoms. Difference between poorly differentiated gloeocystidia and thin-walled hymenial cystidia that do not stain in IKI *(A. pachycheiles)* is vague. We stick to the term gloeocystidia, since it has been traditionally used in this context. Other types of abnormal sterile cells are also commonly present in senescent basidiocarps, such as vesicular cells and projecting hyphoid elements. In our mind, taxonomic conclusions in *Antrodiella* should not be based on presence or absence of cystidia alone, although they may be a useful character among the others.

Acknowledgements

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