

## MYCOTAXON

<http://dx.doi.org/10.5248/118.257>

Volume 118, pp. 257–264

October–December 2011

***Arrasia rostrata* (Basidiomycota),  
a new corticioid genus and species from Italy**ANNAROSA BERNICCHIA<sup>\*1</sup>, SERGIO P. GORJÓN<sup>2</sup> & KAREN K. NAKASONE<sup>3</sup><sup>1</sup>Dipartimento di Scienze e Tecnologie Agroambientali,  
Università degli Studi di Bologna, Via Fanin 42, 40127 Bologna, Italy<sup>2</sup>Centro de Investigación y Extensión Forestal Andino Patagónico,  
Área de Protección. CC 14, 9200 Esquel, Chubut, Argentina<sup>3</sup>Center for Forest Mycology Research, U.S. Forest Service,  
One Gifford Pinchot Drive, Madison, WI 53726-2398 USA\*CORRESPONDENCE TO: [annarosa.bernicchia@unibo.it](mailto:annarosa.bernicchia@unibo.it)

ABSTRACT — An unusual corticioid species with distinctive large basidiospores that develop a distal refractive rostrum when fully mature is described as new. It grows on living bark of *Juniperus phoenicea* on the Italian island of Sardinia. Because it is morphologically distinct from any known genus of corticioid fungi, the new genus *Arrasia* is proposed to accommodate it.

KEY WORDS — dendrotheloid fungi, Italy

**Introduction**

Many new species of polypores and corticioids have recently been described from Sardinia: *Aleurodiscus ilexicola* Bernicchia & Ryvarden, *Antrodiella ichnusana* Bernicchia et al., *Antrodia sandaliae* Bernicchia & Ryvarden, *Echinodontium ryvardenii* Bernicchia & Piga, *Neolentiporus squamosellus* (Bernicchia & Ryvarden) Bernicchia & Ryvarden, *Phellinus juniperinus* Bernicchia & S. Curreli, and *Vararia maremmana* Bernicchia. Sardinia may be a refugium from the last glacial period, as demonstrated by the presence of *Piloporia sajanensis* (Parmasto) Niemelä, previously known as a boreal species, or the occurrence of *Echinodontium ryvardenii*, while other species of *Echinodontium* Ellis & Everh. are known from North America and Asia.

Conservation International (CI 2007) lists the Mediterranean Basin as a “Biodiversity Hotspot.” Several basidiomycete species associated with Mediterranean juniper forests are *Echinodontium ryvardenii*, *Hyphoderma etruriae* Bernicchia, *Lenzitopsis oxycedri* Malençon & Bertault, *Peniophora*

*junipericola* J. Erikss., *Phellinus juniperinus*, *Trametes junipericola* Manjón et al., and *Vararia maremmana*. Recently, a striking corticioid species was discovered from Sardinia growing on living bark of *Juniperus phoenicea* L. (*Cupressaceae*). This new species is here fully described and illustrated; because it has no close relatives in any described corticioid genus, a new genus is proposed.

## Materials & methods

For light microscopic studies, samples were mounted in 3% potassium hydroxide (KOH), Melzer's reagent (IKI), and 0.1% cotton blue in 60% lactic acid to determine cyanophily of basidiospore walls. Crystalline deposits were dissolved in a 50% HCl solution to individualize microscopical elements. Line drawings were made with a camera lucida attachment. Specimens are deposited in HUBO, CFMR, and SALA.

## Taxonomy

### *Arrasia* Bernicchia, Gorjón & Nakasone, **gen. nov.**

MYCOBANK MB 561760

*Basidiomata effusa, adnata, tenuissima, levia, tenuiter farinosa, margine distincto. Systema hypharum monomiticum; hyphae generativae fibulatae, tenuitunicatae et ramosae. Dendrohyphidia filamentosa, ramosa, fibulata. Basidia suburniformia deinde subclavata, flexuosa, fibulata, tetraspora. Basidiosporae hyalinae, leviter crassitunicatae, leves, cyanophylae, inamyloideae, indextrinoideae, subfusioideae vel biapiculatae, parte distali se extendente ad rostrum crassitunicatum et refractivum.*

TYPE SPECIES: *Arrasia rostrata* Bernicchia, Gorjón & Nakasone

ETYMOLOGY: the genus is dedicated to Luigi Arras, mycologist and friend, who is always present during the mycological excursions across Sardinia.

**BASIDIOMATA** effuse, adnate, thin, white, smooth, finely farinaceous, with a distinct margin.

**HYPHAL SYSTEM** monomitic, hyphae clamped. **DENDROHYPHIDIA** filamentous, branched, clamped. **BASIDIA** suburniform at first, then flexuous, clavate to obclavate, sometimes with a basal lobe, basally clamped, with 4 sterigmata. **BASIDIOSPORES** broadly subfusiform to biapiculate, distal end elongating into a thick-walled rostrum, walls hyaline, slightly thickened, smooth, cyanophilous, inamyloid, nondextrinoid.

**REMARKS** — The distinctive feature of the new genus is the rostrate basidiospores.

### *Arrasia rostrata* Bernicchia, Gorjón & Nakasone, **sp. nov.**

PLATES 1–4

MYCOBANK MB 561761

*Basidiomata resupinata, effusa, adnata, tenuissima, 30 mm longa et 5 mm lata, laevia sed farinosa vel subgausapata in maturitate, subalba vel albocinerea, margine distincto. Systema hypharum monomiticum; hyphae generativae tenuitunicatae, fibulatae, 1.8–2.3 µm latae. Dendrohyphidia filamentosa, ramosa, fibulata ad basim. Cystidia desunt. Basidia primo suburniformia deinde subclavata, flexuosa, fibulata ad basim, tenuitunicata,*



PLATE 1. *Echinodontium ryvardeenii* (center) surrounded by circular to linear patches of *Arrasia rostrata* (Bernicchia 8087, holotype). Scale bar = 5 cm.

50–90 × 10–16  $\mu\text{m}$ , tetraspora. Basidiosporae hyalinae, laeves, leviter crassitunicatae, cyanophylae, inamyloideae, inextrinoideae, late subfusioideae vel biapiculatae, parte distali se extendente ad rostrum crassitunicatum et refractivum, 27–40 × 10–15  $\mu\text{m}$ . Ad corticem arborum coniferarum viventis.

TYPE: Italy, Sardinia, Nuoro province, Lanaittu valley, 180 m a.s.l., on bark in trunk and old branches of living *Juniperus phoenicea*, 30.III.2010, leg. A. Bernicchia, coll. 8087. Holotype in HUBO. Isotype in SALA et CFMR.

ETYMOLOGY: the name *rostrata* refers to the long refractive rostrum on the basidiospores.

BASIDIOMATA resupinate, effuse, small, circular to linear patches, becoming confluent, up to 30 × 5 mm, thin, up to 180  $\mu\text{m}$  thick, soft, white, smooth, initially finely farinaceous to subfelty, finally thickly farinaceous; margin abrupt, distinct.

HYPHAL SYSTEM monomitic with clamped generative hyphae. Subiculum thin, a dense tissue of hyphae and crystals; subicular hyphae 1.8–2.3  $\mu\text{m}$  in diam., clamped, moderately branched, walls hyaline, thin, encrusted with hyaline crystals. Subhymenium not observed. Hymenium a palisade of dendrohyphidia, basidia, and indistinct, collapsed hymenial elements obscured by crystals. DENDROHYPHIDIA filamentous, irregular, with short branches near

apex,  $40\text{--}62 \times 1.5\text{--}2 \mu\text{m}$ , clamped at base, walls hyaline, thin. CYSTIDIA absent. BASIDIA obclavate to suburniform at first, then flexuous, narrowly clavate to obclavate, occasionally with a lateral lobe near base,  $50\text{--}90 \times 10\text{--}16 \mu\text{m}$ , clamped at base, containing resinous globules, often lower part collapsed below a secondary septum, walls hyaline, thin, smooth, (2-)4-sterigmate, sterigmata stout, up to  $29 \times 5 \mu\text{m}$ . BASIDIOSPORES broadly subfusiform to bi-apiculate, initially distal end obtuse, later developing an extended, thick-walled, refractive rostrum or beak,  $27\text{--}40 \times 10\text{--}15 \mu\text{m}$ , rostrum  $8\text{--}14 \times 1.2\text{--}2 \mu\text{m}$  long, with a distinct, refractive, thick-walled apiculus, containing resinous material, walls hyaline, with distinct walls to slightly thick-walled, smooth, cyanophilous, not reacting in Melzer's reagent.

HABITAT AND DISTRIBUTION — Known from Sardinia growing on bark of living *Juniperus phoenicea*, frequently in association with *Echinodontium ryvardeenii*.

ADDITIONAL SPECIMENS EXAMINED — ITALY. SARDINIA, NUORO PROVINCE, Lanaittu valley, 180 m a.s.l., on trunk and old branches of living *Juniperus phoenicea*, 14.XI.2009 leg. A. Bernicchia, coll. 8086, 8097; 03.II.2010, leg. L. Arras coll. 8557; 30.III.2010: leg. A. Bernicchia, coll. 7998, 8070, 8071, 8072, 8073, 8074, 8075, 8076, 8077, 8080, 8085.

COMMENTS — The most remarkable feature of *Arrasia rostrata* is its large, beaked basidiospores. In developing basidiospores still attached to the basidium, a distal knob forms that will develop into the rostrum. When fully mature, the rostrum is a straight, thick-walled, refractive structure. By the time the basidiospore is mature and the rostrum is fully developed, the basidium is empty and collapsed. The indistinct remnants of post-mature basidia can be observed if the crystalline matter is dissolved. The apiculus of mature basidiospores is refractive and thick-walled with a notched appearance.

*Arrasia rostrata* is probably related to the corticioid genus *Dendrothele* Höhn. & Litsch., which shares the same ecology (inhabiting bark of living trees), crustose basidiomata, suburniform basidia, and hymenial structure with many dendrohyphidia and abundant crystalline deposits (possibly an adaptation to dry and exposed habitats). *Dendrothele* is a polyphyletic genus with species distributed among several lineages in the hymenochaetoid, russuloid, corticioid, and agaricoid clades (Goranova 2003, Goranova et al. 2003, Bodensteiner et al. 2004). The type species, *Dendrothele papillosa* Höhn. & Litsch. [= *D. griseocana* (Bres.) Bourdot & Galzin], is included in the *Niaceae* Jülich within the *Agaricales* Underw. and closely related to the cyphelloid genera *Lachnella* Fr. and *Cyphellopsis* Donk. Recently, Nakasone & Burdsall (2011) and Gorjón et al. (2011) observed navicular basidiospores in *Dendrothele* species from New Zealand and Argentina, a feature previously also known in some cyphelloid genera. Convergences in morphological traits and habit seem to have occurred repeatedly, characterizing the artificial dendrotheloid group. However, no other

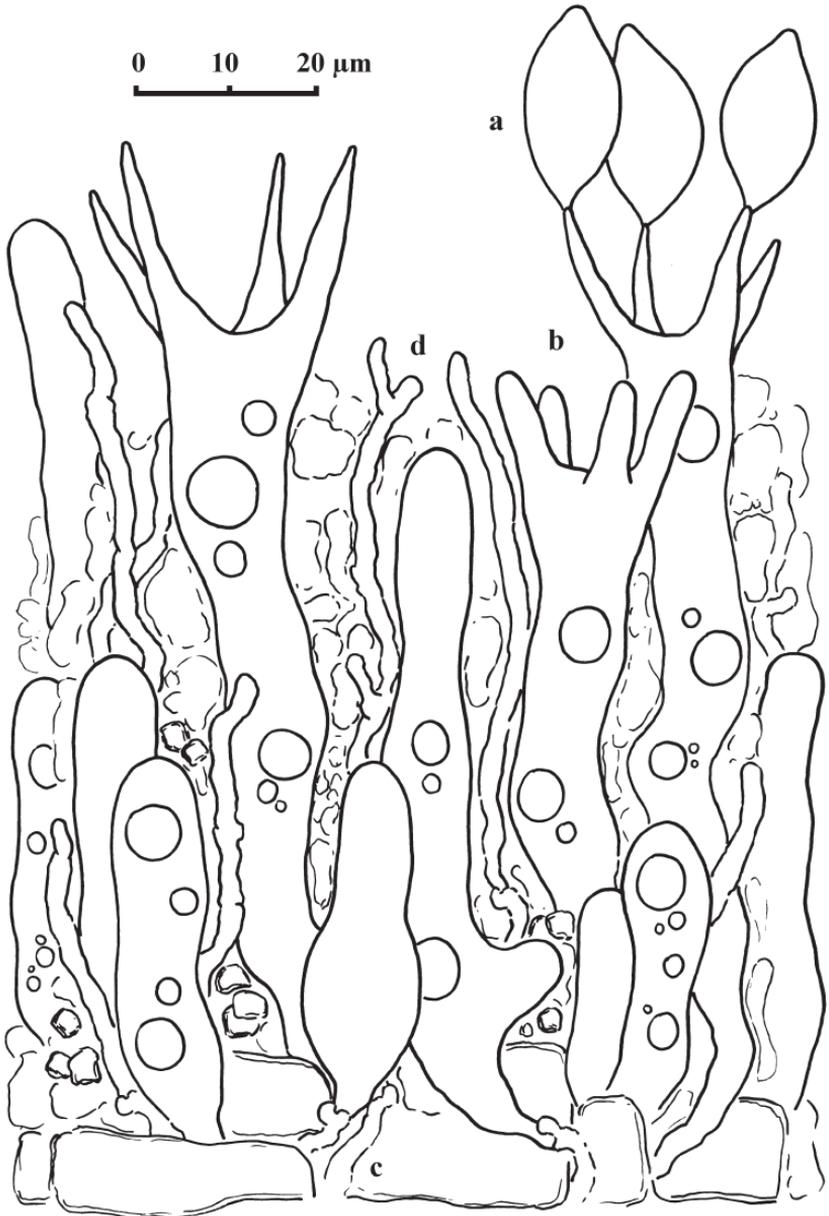


PLATE 2. *Arrasia rostrata*. Hymenial elements (Bernicchia 8087, holotype).  
a) immature basidiospores, b) basidia, c) generative hyphae, d) dendrohyphidia

basidiospores with a refractive rostrum are known in *Dendrothele* or any other corticioid species.

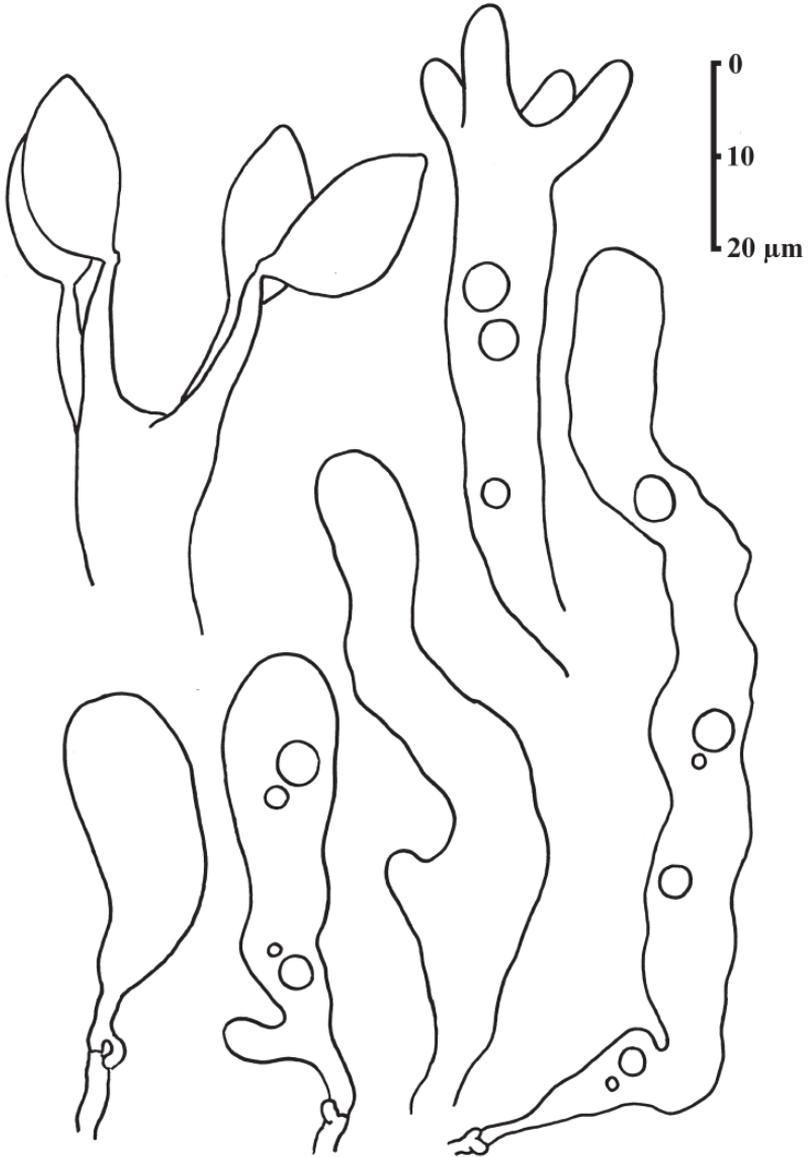


PLATE 3. *Arrasia rostrata*. Basidia and immature basidiospores.  
(Bernicchia 8087, holotype)

It is also interesting to note that some basidiospores in *Vararia* P. Karst. (such as in *Vararia investiens* (Schwein.) P. Karst.) develop an empty amyloid part separated by a septum in the proximal region (close to the sterigma attachment). The biological function, if any, of this structure is unknown.

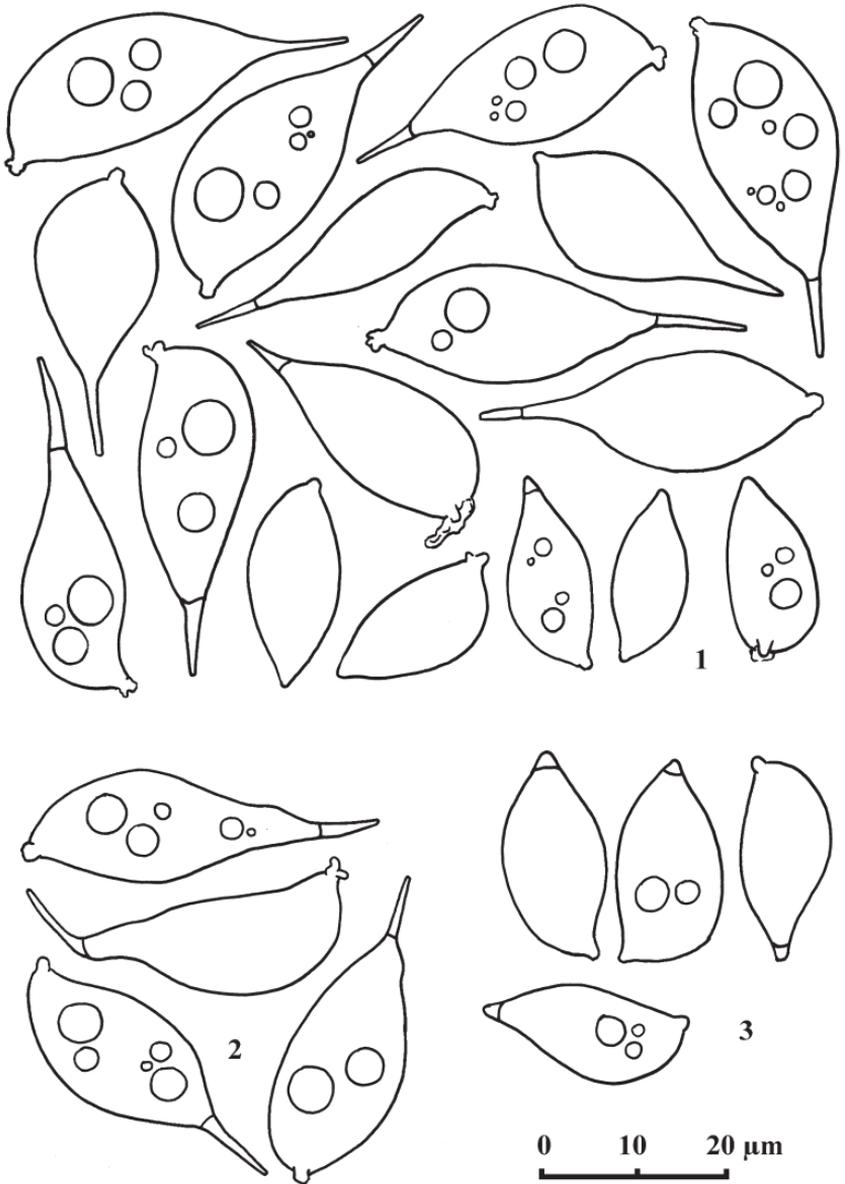


PLATE 4. *Arrasia rostrata*. Mature basidiospores with a well developed rostrum and immature (right and center right) basidiospores. (1: Bernicchia 8087, holotype; 2: Bernicchia 8074; 3: Bernicchia 8071)

Morphological similarities may also be drawn with some genera belonging to *Vuilleminiaceae* Maire, *Punctulariaceae* Donk, and *Corticaceae* Herter. Among the *Vuilleminiaceae*, *Vuilleminia* Maire, *Australovuilleminia* Ghobad-Nejhad & Hallenb., and *Cytidia* Quél. all share the saprophytic habit growing on attached recently dead angiosperm wood (not known from coniferous substrata), basidiomes that are usually gelatinous and decorticating, and allantoid to ellipsoid basidiospores. Members of the *Punctulariaceae*, *Punctularia* Pat., *Punctulariopsis* Ghobad-Nejhad, and *Dendrocorticium* M.J. Larsen & Gilb., grow on fallen angiosperm wood and all species have ellipsoid basidiospores. Genera in the *Corticaceae*, as delimited by Ghobad-Nejhad et al. (2010), show a more ecological and morphological complexity, but none display the features that characterize *Arrasia rostrata*. Preliminary molecular studies indicate that *Arrasia rostrata* fits no existing homobasidiomycete genus or order thus far recognized (data not shown); further analyses are still required.

#### Acknowledgments

Nils Hallenberg and Alina G. Greslebin acted as presubmission reviewers and their comments are acknowledged. We thank Luigi Arras and Marco Facchini for their help, Giovanni Consiglio for revision of Latin diagnosis, and Cristina Spinelli for the colour photo. The Council of Lanusei (Sardinia, Italy) supported AB and SPG on some collecting trips. Karl-Henrik Larsson and Ellen Larsson sequenced *Arrasia rostrata* and conducted a preliminary molecular analysis, and we are very grateful for their comments about the molecular relationship of the new species.

#### Literature cited

- Bodensteiner P, Binder M, Agerer R, Moncalvo JM, Hibbett DS. 2004. Phylogenetic diversity of cyphelloid forms in the *Homobasidiomycetes*. *Molecular Phylogenetics and Evolution* 33(2): 501–515. <http://dx.doi.org/10.1016/j.ympev.2004.06.007>
- CI [Conservation International] 2007. Biodiversity hotspots. (accessed online 09.Jun.2011). <http://www.biodiversityhotspots.org/xp/hotspots/mediterranean/Pages/default.aspx>
- Ghobad-Nejhad M, Nilsson RH, Hallenberg N. 2010. Phylogeny and taxonomy of the genus *Vuilleminia* (*Basidiomycota*) based on molecular and morphological evidence, with new insights into the *Corticiales*. *Taxon* 59: 1519–1534. <http://dx.doi.org/10.1007/s11557-010-0674-5>
- Gorjón SP, Greslebin AG, Rajchenberg M. 2011. *Dendrothele latenavicularis* sp. nov. (*Lachnellaceae*, *Basidiomycota*) from the Patagonian Andes. *Mycotaxon* 117: 101–108 <http://dx.doi.org/10.5248/117.101>
- Goranova G. 2003. Phylogenetic analyses of rDNA sequences indicate the corticioid genus *Dendrothele* is highly polyphyletic. Master of Arts, Clark University, Worcester
- Goranova G, Binder M, Hibbett DS. 2003. Molecular phylogenetics indicate that the corticioid genus *Dendrothele* is highly polyphyletic. *Inoculum* 54: 22.
- Nakasone KK, Burdsall HH Jr. 2011. The genus *Dendrothele* (*Agaricales*, *Basidiomycota*) in New Zealand. *New Zealand Journal of Botany* 49(1): 107–131. <http://dx.doi.org/10.1080/0028825X.2010.512636>