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New records and geographic distribution map of *Echinoporia* Ryvarden (Schizoporaceae, Basidiomycota) species in the Neotropics

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Abstract: The genus *Echinoporia* is characterized by the presence of chlamydospores originating from hairs in the pileus and margin, or the dissepiment edges. Two species of *Echinoporia* are found in America, *i.e.*, *E. aculeifera* and *E. inermis*. In a study of Neotropical polypores, several specimens of *Echinoporia* were collected in the Atlantic rainforest, São Paulo state. *Echinoporia inermis* is recorded for the second time in Brazil. *Echinoporia aculeifera* is recorded for the first time in São Paulo state. A distribution map of the genus in the Neotropics is presented.

Key words: Atlantic rainforest, *Hymenochaetales*, Neotropical polypores, xylophilous fungi

The genus *Echinoporia* Ryvarden was proposed to accommodate *Polyporus hydnophorus* Berk. & Broome, mainly because of the presence of a conidial state associated with the basidiomata (Ryvarden and Johansen 1980). According to the authors, *Echinodia* Pat. has been used as its generic name, however, this name was not validly published. Ryvarden (1984) added another species, *Echinoporia aculeifera* (Berk. & M.A. Curtis) Ryvarden, characterized by the presence of chlamydospores originating from hairs in the pilear surface and margin, or the dissepiments. It has been proposed that *Echinoporia* is related to *Schizopora* Velen. and *Hyphodontia* J. Erikss., due to the presence of imperforate parenthesomes (Langer 2002) and; thus, it has been included in the family *Schizoporaceae*, Hymenochaetales (Kirk *et al.* 2008).

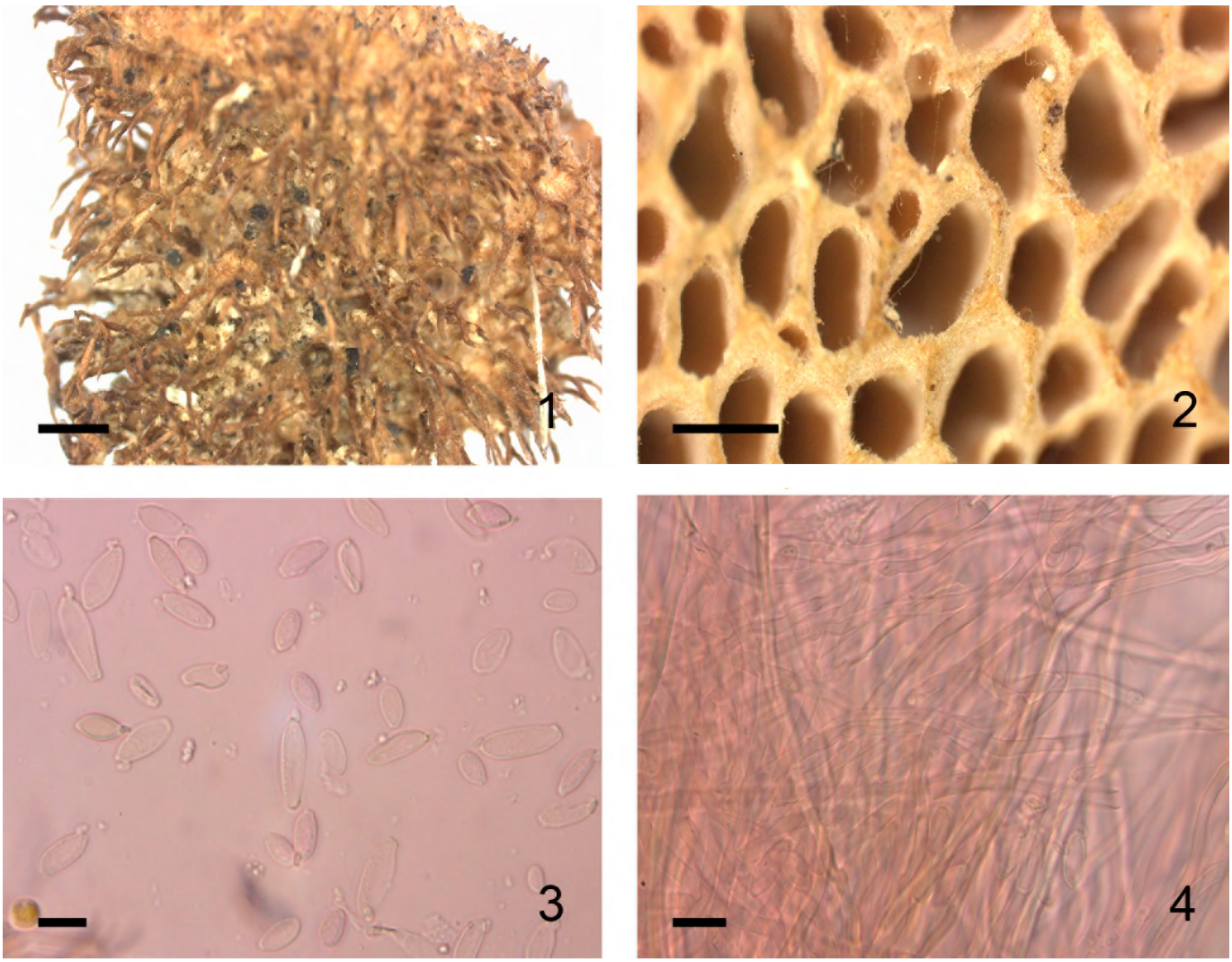
Coelho (2008), based on a single specimen, described *Echinoporia inermis* from Rio Grande do Sul state, Brazil. This new species also produces chlamydospores in the dissepiment edges and on the pilear surface, however, the pilear surface was described as "velutinous or with some agglutinated hyphae similar to hairs or scales" without the typical hairs of *E. aculeifera*. *Echinoporia inermis* also differs from *E. aculeifera* by its larger basidiospores [(4.5–)5.5–6.3 × 3.8–4.3(–5.0) µm in *E. inermis* and 3–4 × 2–3 µm in *E. aculeifera*]. Currently, the genus *Echinoporia* includes three accepted species (Kirk *et al.* 2008), *E. aculeifera* and *E. inermis* with Neotropical distribution (Wright 1983; Ryvarden 1984; Robledo and Rajchenberg 2007; Coelho 2008) and *E. hydnophora* with Paleotropical distribution (Núñez and Ryvarden 2001).

In a study of Neotropical polypores, *Echinoporia* specimens were collected in the Atlantic rainforest of São Paulo state, at the Parque Estadual da Cantareira (23°32′36″ S, 046°37′59″ W), Reserva Biológica do Alto da Serra de Paranapiacaba (23°46′00″–23°47′10″ S, 046°18′20″– 046°20′40″ W) and Parque Estadual Intervales (24°15′55″ S, 048°24′25″ W). Records of *Echinoporia* of the region were also revised and morphological analysis showed that these represented both species, *E. inermis* and *E. aculeifera*. We present notes on their morphology, a description of the studied material, and detailed records of *Echinoporia* in the region and a distribution map of the genus in the Neotropics.

Echinoporia aculeifera (Berk. & M.A. Curtis) Ryvarden *Mycotaxon* 20: 330, 1984.
≡ *Trametes aculeifera* Berk. & M.A. Curtis, *J. Linn. Soc., Bot.* 10(45): 319, 1868.
Figures 1–4, 9–11

The specimens collected were easily recognized in the field by their orange to brown hirsute pileus surface, with hydnoid processes (Figure 1) and by their beige to light-brown hymenial surface, with irregular to daedaloid pores and often dilacerate dissepiments (Figure 2).

Specimens examined: ARGENTINA. Catamarca: Dept. Paclín, stream Los Laureles, route 38, 30 km to N of La Merced, 08.IX.2007, 28°6′7.6″ S, 065°36′57″ W, alt. 1060 m snm, on dead branch, *Robledo 1737* (CORD); Salta: Dept. Sta. Victoria Oeste, Parque Nacional Baritu, road to Campo Grande, 09.V.2007, 22°26′10.8″ S, 064°43′40.2″ W, alt. 1190 m above sea level (a.s.l.) on dead branch, *Robledo 1426* (CORD); Dept. La Caldera, ground road linking route nine with Gral. Güemes, 20.II.2007, 24°40′20.4″ S, 065°22′4.8″ W, alt. 1349 m a.s.l., on dead branch, *Robledo 868* (CORD). BRAZIL. São Paulo: Mogi-Guaçu, Distrito Martinho Prado Júnior, Reserva Biológica de Mogi-Guaçu, 25.VIII.2009, *M.C. Abrahão 1657* (SP416885); 27.VIII.2009, *M.C. Abrahão 1022* (SP416886); 09.XII.2009, *M.C. Abrahão 1339* (SP416887); 02.II.2010, *M.C. Abrahão 1416* (SP416888); 24.VIII.2010, *M.C. Abrahão 1576* (SP416889); Parque Estadual da Cantareira, 24.VIII.2012, *V.*



Figures 1–4. *Echinoporia aculeifera*.1. Basidiomes. 2. Hymenial surface. 3. Basidiospores and chlamydospores. 4. Generative hyphae. Scale Bar = 0.1 cm (1–2). Scale Bar = 10 µm. (3–4).

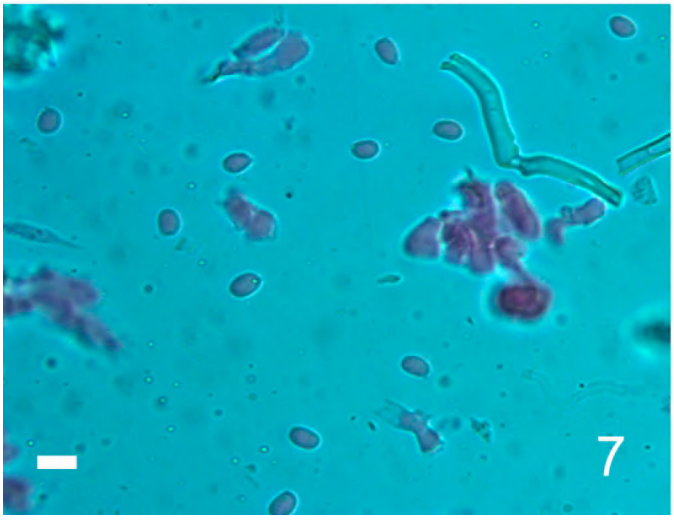
Motato-Vásquez & M. Westphalen 278 (SP). Paraná: Ponta Grossa, Parque Estadual de Vila Velha, 30.III.2013, 25°14′17″ S, 049°59′22″ W, alt. 960 m a.s.l., on living trunk, *D.F. Peralta, R. Ristow and O.S. Brito 13334* (SP445739).

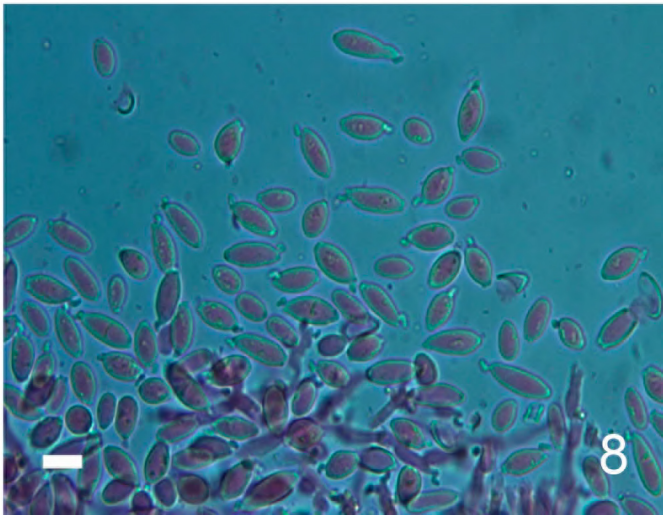
Notes on distribution (Figure 15): *Echinoporia aculeifera* is a species with Neotropical distribution, originally described from Cuba (Berkeley and Curtis 1869; Ryvarden 1984). It has been recorded from Central Argentina to USA. In Argentina, recorded in the Northwest and Northeast (Wright 1983; Robledo and Rajchenberg 2007). Further, it has also been recorded in the Northeast of Córdoba province on dead branches of *Schinus* sp., the southernmost record of the species (Robledo and Urcelay 2009). In Paraguay, it is known from Central Department Asuncion and Luque city and Paraguari Department (Popoff and Wright 1998). In Brazil, it has been recorded from Bahia (Torrend 1938; Góes-Neto 1999), Paraná (Rajchenberg and Meijer 1990; Ryvarden and Meijer 2002), Rio Grande do Sul (Rick 1960; Silveira and Guerrero 1991; Sobestiansky 2005) and São Paulo (Abrahão *et al.* 2012). The species has also been recorded in Venezuela (Ryvarden and Iturriaga 2001), Costa Rica (Carranza-Velásquez and Ruiz-Boyer 2005) and Jamaica (Ryvarden 2000). In USA, it is only known from Florida (Overholts 1953; Gilbertson and Ryvarden 1986). This work resulted in the second record of *E. aculeifera* in São Paulo state and the first record of the species in the Atlantic rainforest. Despite *Echinoporia aculeifera* being widely reported in the Neotropics, a more detailed geographic distribution has not been reported.

Echinoporia inermis G. Coelho,
Fungal Planet: 23, 2008.
Figures 5–8, 12–14

The new specimens collected present a particular glabrous surface (Figure 5). In section the context is white and cottony. The pore surface has pores of irregular shape (Figure 6). Chlamydospores are present in the dissepiment edges, and we could confirm also their presence in the hyphal ends of the pilear surface. We also studied the holotype (ICN139389) and found it to be consistent with the original description.

Specimens examined: BRAZIL. São Paulo: São Paulo, Parque Estadual Intervales, 05.II.2013, *M. Westphalen & V. Motato-Vásquez 422/13, 423/13* (SP445675, SP445674); Serra da Cantareira, 1965, *Singer, R. & Furtado, J.S.* (SP95445); Santo André, Reserva Biológica do Alto da Serra de Paranapiacaba,

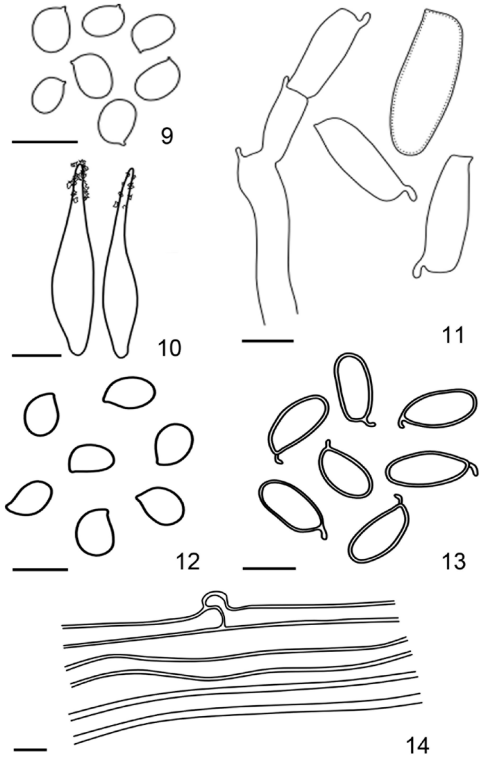




Figures 5–8. *Echinoporia inermis.* 5. Basidiomes. 6. Hymenial surface. 7. Basidiospores. 8. Chlamydospores. Scale Bar = 0.1 cm (5–6). Scale Bar = 10 µm (7–8).

27.X.1987, *M. Capelari & R. Maziero 1725* (SP307387); 10.VII.1989, *M. Capelari 2057* (SP307356); *ibid*., 11.IV.1990, *M. Capelari, L.K. Okino & A.M. Gugliotta 3307* (SP307332); 7.VI.1990, *M. Capelari & L.K. Okino 3423* (SP307397); 28.VIII.1990, *M. Capelari & L.K. Okino 3529* (SP307450); 23.V.1991, *A.M. Gugliotta 128; 130; 137* (SP307437; SP307317; SP307384); 10.VII.1991, *L.K. Okino 167* (SP307340); 19.IX.1991, *L.K. Okino*, *R. Carrenho & M. Capelari 242*; *246; 247* (SP307342; SP307309; SP307354); 19.VI.1997, *M.P . Fonsêca 341; 344* (SP307355; SP307327); 9.VII.1997, *M.P . Fonsêca 355* (SP307313); 13.VII.1997, *M.P. Fonsêca 368* (SP307329); 24.V.2011, *C. Sanchez 11* (SP445741); .15.VI.2011, *C. Sanchez 27, 38, 39* (SP445742, SP445740, SP445743); 03.XI.2011, *A.M. Gugliotta 1503, 1505* (SP417381, SP417382). Rio Grande do Sul: Santa Maria, Boca do Monte, FEPAGRO, 01-VIII-2006, *Coelho, G. 494-5* (ICN139389 Holotype).

Notes on distribution (Figure 15): This is the second record of the species since its original description in Rio Grande do Sul (Coelho 2008) and the first record of the species in two localities of São Paulo state: Parque Estadual da Serra da Cantareira and Parque Estadual Intervales. *Echinoporia inermis* remains so far an endemic species from eastern and southeastern Brazil and, although there is not much information available, the few records seem to indicate that the species is restricted to the Atlantic rainforest, and probably it has a wider distribution within this biome.



Figures 9–14. *Echinoporia aculeifera.* 9. Basidiospores. 10. Cystidia. 11. Chlamydospores. 12–14. *Echinoporia inermis.* 12. Basidiospores. 13. Chlamydospores. 14. Generative and skeletal hyphae. Scale Bar = 5 µm.

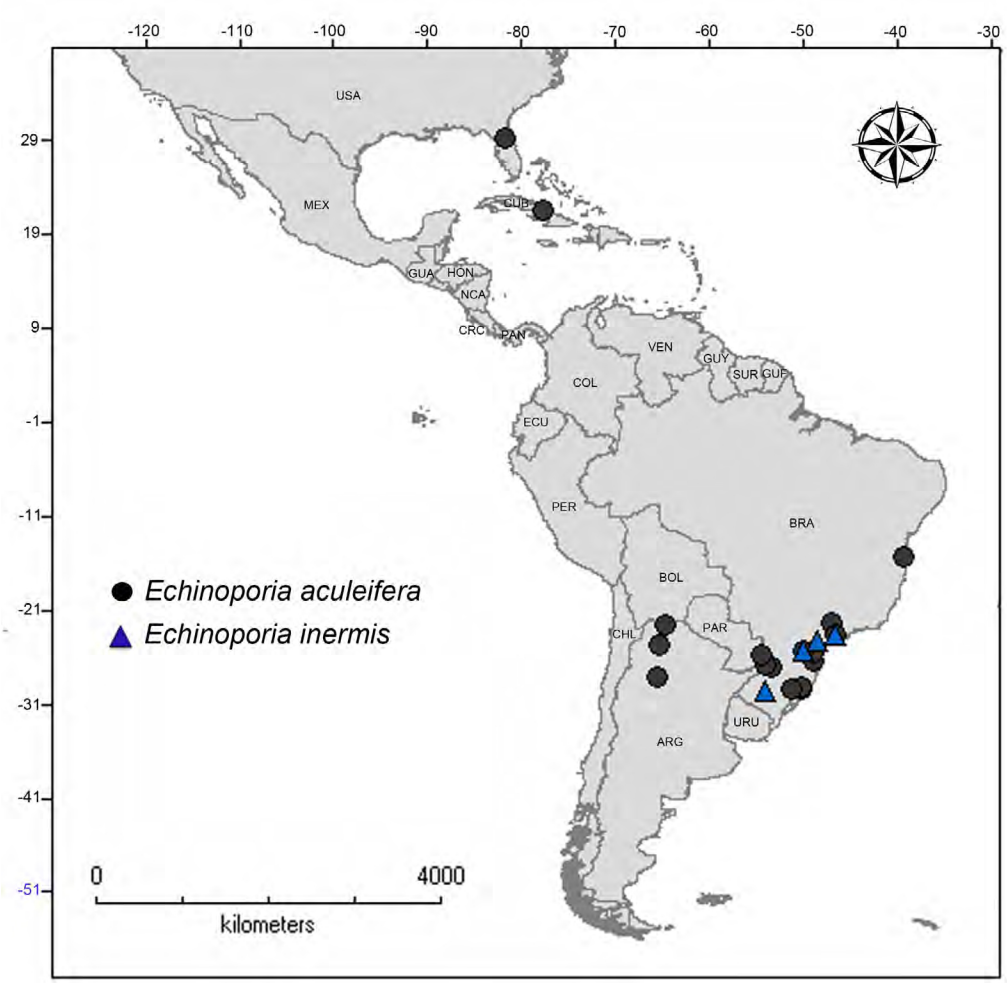


Figure 15. Geographic distribution map of *Echinoporia* Ryvarden species in the Neotropics.

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