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NEW COMBINATIONS IN *IRPEX* (APHYLLOPHORALES, BASIDIOMYCETES)

HEIKKI KOTIRANTA & REIMA SAARENOKSA

Abstract: Forty-eight species of the genera *Flaviporus* Murrill, *Junghuhnia* Corda and *Steccherinum* Gray are combined to *Irpex* Fr.: Fr. In our concept the genus *Irpex* is characterised with poroid, irpicoid or hydnoid hymenophore, dimitic hyphal system with clamped or simple septate generative hyphae, skeletal hyphae, thick-walled cystidia of tramal origin, cyanophilous hyphae, relatively small spores and white rot.

Key words: Basidiomycetes, *Flavodon*, *Flaviporus*, *Irpex*, *Junghuhnia*, *Steccherinum*, taxonomy

Heikki Kotiranta, Finnish Environment Institute, Research Department, P.O. Box 140, FIN-00251 Helsinki, Finland
Reima Saarenoksa, Department of Ecology and Systematics, P.O. Box 65, FIN-00014 University of Helsinki, Finland

Some time in the past when mainly macroscopical characteristics were used in classification, tens of taxa with predominantly dentate hymenophore were included in *Irpex* Fr.: Fr. (e.g. Maas Geesteranus 1974). Subsequently the concept of the genus has shrunken, as variable microscopy has lead into exclusion of one species after another from it into smaller, more natural genera. During the recent decades *Irpex* has been a genus with one species only, viz. the type species *Irpex lacteus* (Fr.: Fr.) Fr. until Niemelä (1998) combined *Steccherinum oreophilum* Lindsey & Gilb. in *Irpex*. At present the genus is characterised by irpicoid hymenophore, dimitic hyphal system, simple septate or clamped generative hyphae, relatively small spores, large encrusted cystidia and white rot. There are, however, two other boreal genera which bear almost the same combination of characters, viz. the poroid genus *Junghuhnia* Corda and the odontioid or hydnoid genus *Steccherinum* Gray. Microscopically the species of all those genera are extremely similar; so similar, that even a trained mycologist has great difficulties (or it may be impossible) to decide in which genus a particular species belongs if only a microscopic view is seen. All are dimitic with cyanophilous hyphae, have small spores and large encrusted skeletocystidia. Moreover, all are white-rot fungi. The genus *Steccherinum* contains species with clamped generative hyphae and species with simple septate generative hyphae (see, e.g., Eriksson *et al*. 1984), whereas the species of *Junghuhnia* all have clamped generative hyphae.

Jan Vesterholt (in Knudsen & Hansen 1996) made the solution to combine the North European *Junghuhnia* species into *Steccherinum*, because of the similarities in microstructure. He also mentioned, that *Irpex* 'is already also closely related, mainly separated by the absence of clamp connections'. However, there are already species in *Steccherinum* without clamps, or with very few clamp connections only [*S. aridum* Svrček, *S. subcrinale* (Peck) Ryvarden and *S. vagum* Burds. & Nakasone]. Vesterholt's (in Knudsen & Hansen 1996) main argument not to combine *Steccherinum* and *Junghuhnia* into *Irpex* was that there should not be too 'many disturbing changes in nomenclature'.

Parmasto (1995: 849) included *Steccherinum* into *Irpex*, and Niemelä (1998) was of the opinion that the genera *Irpex*, *Flavodon*, *Junghuhnia*, *Flaviporus* and *Steccherinum* could be lumped together. The tropical genus *Flavodon* Ryvarden is monotypic, with the type species *Irpex flavus* Klotzsch. The genus *Flaviporus* Murrill (see Ginns 1980) is also predominantly tropical and distinguished from *Junghuhnia* only by its vivid

colour (Ryvarden & Gilbertson 1993). However, according to our concept, only two species of *Flaviporus* belong to *Irpex*, viz. *Flaviporus brownii* (Humb.) Donk (type of the genus) and *F. semisupiniformis* (Murrill) Ginns.

Steccherinum is an older name than *Irpex*, but the latter was sanctioned by Fries and must be adopted if the two genera are merged (see Niemelä 1998: 95). We do not see any reason why not combine the *Steccherinum* species into *Irpex*, which is an old, very well-known and very widely used generic name for almost 180 years. Moreover, it is short and easily memorable.

There are already several other aphyllophoroid genera which include species with both simple septate and clamped generative hyphae (e.g., *Albatrellus* Gray, *Antrodiella* Ryvarden & I. Johans., *Athelia* Pers., *Botryobasidium* Donk, *Byssocorticium* Bondartsev & Singer *ex* Singer, *Gloeoporus* Mont., *Hyphodontia* J. Erikss., *Phlebia* Fr., *Polyporus* Adans.: Fr., *Sistotrema* Pers.: Fr.) and thus the new concept of *Irpex* proposed is not by any means exceptional. We must also keep in mind that in, *Byssocorticium*, *Lindtneria* Pilát and *Sistotrema*, for instance, there are species with poroid, irpicoid and smooth basidiocarps.

We do not include monomitic species into *Irpex*, because we think that a dimitic hyphal structure is fundamental for this genus, even if some other characteristics may come close to *Irpex* [e.g., *Steccherinum albofibrillosum* (Hjortstam & Ryvarden) Hallenb. & Hjortstam, *Steccherinum queletii* (Bourdot & Galzin) Hallenb. & Hjortstam are excluded from our concept of *Irpex*].

The following new combinations are proposed:

Irpex alaskensis (Lindsey & Gilb.) Kotir. & Saarenoksa, *comb. nov.*

Basionym: *Steccherinum alaskense* Lindsey & Gilb., Mycologia **71**: 1264. 1980 (1979).

Irpex aridus (Svrček) Kotir. & Saarenoksa, *comb. nov.*

Basionym: *Steccherinum aridum* Svrček, Česká Mykol. **27**: 205. 1973.

Steccherinum cremeoalbum Hjortstam, Mycotaxon **19**: 507. 1984.

Irpex basi-badius (Banker) Kotir. & Saarenoksa, *comb. nov.*

Basionym: *Steccherinum basi-badium* Banker, Mycologia **4**: 314. 1912.

Irpex bourdotii (Saliba & A. David) Kotir. & Saarenoksa, *comb. nov.*

Basionym: *Steccherinum bourdotii* Saliba & A. David, Cryptog. Mycol. **9**: 100. 1988.

Irpex brownii (Humb.) Kotir. & Saarenoksa, *comb. nov.*

Basionym: *Boletus brownii* Humb., Fl. Friberg.: 101. 1793.

Irpex ciliolatus (Berk. & M. A. Curtis) Kotir. & Saarenoksa, *comb. nov.*

Basionym: *Hydnum ciliolatum* Berk. & M. A. Curtis, Hook. J. Bot. **1**: 235. 1849.

Irpex collabens (Fr.) Kotir. & Saarenoksa, *comb. nov.*

Basionym: *Polyporus collabens* Fr., Hymenomyc. Eur.: 572. 1874.

Irpex conchiformis (Sacc.) Kotir. & Saarenoksa, *comb. nov.*

Basionym: *Hydnum conchiforme* Sacc., Syll. Fung. **6**: 458. 1888.

Irpex confragosus (Maas Geest. & Lanq.) Kotir. & Saarenoksa, *comb. nov.*

Basionym: *Steccherinum confragosum* Maas Geest. & Lanq., Persoonia **8**: 149. 1975.

Irpex crustaceus (Jungh.) Kotir. & Saarenoksa, *comb. nov.*

Basionym: *Laschia crustacea* Jungh., Verh. Batav. Genootsch. **17**(2): 75. 1838.

Irpex ethiopicus (Maas Geest.) Kotir. & Saarenoksa, *comb. nov.*

Basionym: *Steccherinum ethiopicum* Maas Geest., Persoonia **7**: 508. 1974.

Irpex fimbriatellus (Peck) Kotir. & Saarenoksa, *comb. nov.*

Basionym: *Polyporus fimbriatellus* Peck, N.Y. State Mus. Rept. **38**: 91. 1885.

Irpex fimbriatus (Pers.: Fr.) Kotir. & Saarenoksa, *comb. nov.*

Basionym: *Odontia fimbriata* Pers., Obs. Mycol. **1**: 88. 1796.

Irpex galeritus (Maas Geest.) Kotir. & Saarenoksa, *comb. nov.*

Basionym: *Steccherinum galeritum* Maas Geest., Persoonia **7**: 510. 1974.

Irpex gilvus (Maas Geest.) Kotir. & Saarenoksa, *comb. nov.*

Basionym: *Steccherinum gilvum* Maas Geest., Persoonia **7**: 512. 1974.

Irpex japonicus (Núñez & Ryvarden) Kotir. & Saarenoksa, *comb. nov.*

Basionym: *Junghuhnia japonica* Núñez & Ryvarden, Fungal Div. **3**: 112. 1999.

Irpex labeosus (Maas Geest. & Lanq.) Kotir. & Saarenoksa, *comb. nov.*

Basionym: *Steccherinum labeosum* Maas Geest. & Lanq., Persoonia **8**: 154. 1975.

Irpex lacer (P. Karst.) Niemelä, *comb. nov.*

Basionym*: Physisporus lacer* P. Karst., Meddel. Soc. Fauna Flora Fennica **9**: 69. 1992.

Chaetoporus separabilimus Pouzar, Česká Mykol. **21**: 210. 1967.

Irpex laeticolor (Berk. & M. A. Curtis) Kotir. & Saarenoksa, *comb. nov.*

Basionym: *Hydnum laeticolor* Berk. & M. A. Curtis, Grevillea **1**: 99. 1873.

Irpex lanestris (Maas Geest.) Kotir. & Saarenoksa, *comb. nov.*

Basionym: *Steccherinum lanestre* Maas Geest., Persoonia **7**: 514. 1974.

Irpex litschaueri (Bourdot & Galzin) Kotir. & Saarenoksa, *comb. nov.*

Basionym: *Mycoleptodon litschaueri* Bourdot & Galzin, Hymenom. France: 441. 1928.

Irpex luteoalbus (P. Karst.) Kotir. & Saarenoksa, *comb. nov.*

Basionym: *Physisporus luteoalbus* P. Karst., Rev. Mycol. **9**: 10. 1887.

Irpex mukhinii (Kotir. & Y. C. Dai) Kotir. & Saarenoksa, *comb. nov.*

Basionym: *Steccherinum mukhinii* Kotir. & Y. C. Dai, Karstenia **38**: 74. 1998.

Irpex murashkinskyi (Burt) Kotir. & Saarenoksa, *comb. nov.*

Basionym: *Hydnum murashkinskyi* Burt, Ann. Missouri Bot. Garden **18**: 477. 1931.

Irpex narymicus (Pilát) Saarenoksa & Kotir., *comb. nov.*

Basionym: *Mycoleptodon narymicus* Pilát, Bull. Soc. Mycol. France **51**: 404. 1936.

Irpex nitidus (Pers.: Fr.) Saarenoksa & Kotir., *comb. nov.*

Basionym: *Poria nitida* Pers., Obs. Mycol. **2**: 15. 1799.

Irpex ochraceus (Pers.: Fr.) Kotir. & Saarenoksa, *comb. nov.*

Basionym: *Hydnum ochraceum* Pers., *in* Gmelin, Syst. Nat. **2**: 1440. 1792.

Non *Irpex ochraceus* Schwein.

According to the ICBN (Greuter *et al.* 2000, Arts 15.1, 45.3, 53.1) the new combination has priority against *Irpex ochraceus* Schwein.

Irpex peckii (Banker) Saarenoksa & Kotir., *comb. nov.*

Basionym: *Steccherinum peckii* Banker, Mycologia **4**: 314. 1912.

Irpex peruvianus (Maas Geest.) Saarenoksa & Kotir., *comb. nov.*

Basionym: *Steccherinum peruvianum* Maas Geest., Persoonia **9**: 496. 1978.

Irpex pseudozilingianus (Parmasto) Saarenoksa & Kotir., *comb. nov.*

Basionym: *Chaetoporus pseudozilingianus* Parmasto, Toim., Biol. Seer. **8**(2): 113. 1959.

Irpex rawakensis (Pers.) Saarenoksa & Kotir., *comb. nov.*

Basionym: *Hydnum rawakense* Pers., *in* Gaudichaud, Voy. Uranie: 175. 1827.

Irpex reniformis (Berk. & M. A. Curtis) Saarenoksa & Kotir., *comb. nov.*

Basionym: *Hydnum reniforme* Berk. & M. A. Curtis, J. Linn. Soc., Bot. **10**: 325. 1868.

Irpex resupinatus (G. Cunn.) Saarenoksa & Kotir., *comb. nov.*

Basionym: *Steccherinum resupinatum* G. Cunn., Trans. R. Soc. New Zealand. **85**: 596. 1958.

Irpex rhois (Schwein.: Fr.) Saarenoksa & Kotir., *comb. nov.*

Basionym: *Hydnum rhois* Schwein., Schrift. Naturf. Ges. Leipzig **1**: 103. 1822.

Irpex robustior (J. Erikss. & S. Lundell) Saarenoksa & Kotir., *comb. nov.*

Basionym: *Mycoleptodon robustior* J. Erikss. & S. Lundell, *in* Lundell & Nannfeldt, Fung. Exicc. Suec.: 26 (no. 2147). 1953.

Irpex roseotingens (Hjortstam & Ryvarden) Saarenoksa & Kotir., *comb. nov.*

Basionym: *Schizopora roseotingens* Hjortstam & Ryvarden, Mycotaxon **20**: 142. 1984, as '*roseo-tingens*'.

Irpex russus (Maas Geest. & Lanq.) Saarenoksa & Kotir., *comb. nov.*

Basionym: *Steccherinum russum* Maas Geest. & Lanq., Persoonia **8**: 159. 1975.

Irpex scalaris (Maas Geest. & Lanq.) Saarenoksa & Kotir., *comb. nov.*

Basionym: *Steccherinum scalare* Maas Geest. & Lanq., Persoonia **8**: 160. 1975.

Irpex scruposus (Maas Geest. & Lanq.) Saarenoksa & Kotir., *comb. nov.*

Basionym: *Steccherinum scruposum* Maas Geest. & Lanq., Persoonia **8**: 161. 1975.

Irpex semisupiniformis (Murrill) Saarenoksa & Kotir., *comb. nov.*

Basionym: *Tyromyces semisupiniformis* Murrill, Bull. New York Bot. Garden **8**: 148. 1912.

Irpex subcrinalis (Peck) Saarenoksa & Kotir., *comb. nov.*

Basionym: *Hydnum subcrinale* Peck, N. Y. State Mus. Bull. **168**: 27. 1913.

Irpex subochraceus (Bononi & Hjortstam) Saarenoksa & Kotir., *comb. nov.*

Basionym: *Steccherinum subochraceum* Bononi & Hjortstam, Mycotaxon **25**: 467. 1986.

Irpex subrawakensis (Murrill) Saarenoksa & Kotir., *comb. nov.*

Basionym: *Steccherinum subrawakense* Murrill, Bull. Torrey Bot. Club **67**: 275. 1940.

Irpex tenuis (Burds. & Nakasone) Saarenoksa & Kotir., *comb. nov.*

Basionym: *Steccherinum tenue* Burds. & Nakasone, Mycologia **73**: 472. 1981.

Irpex vagus (Burds. & Nakasone) Saarenoksa & Kotir., *comb. nov.*

Basionym: *Steccherinum vagum* Burds. & Nakasone, Mycologia **73**: 473. 1981.

Irpex willisii (Maas Geest.) Saarenoksa & Kotir., *comb. nov.*

Basionym: *Steccherinum willisii* Maas Geest., Persoonia **7**: 527. 1974.

Irpex zeylanicus (Maas Geest.) Saarenoksa & Kotir., *comb. nov.*

Basionym: *Steccherinum zeylanicum* Maas Geest., Proc. K. Ned. Akad. Wet., C. **77**: 484. 1974.

Irpex zonatus (Bres.) Saarenoksa & Kotir., *comb. nov.*

Basionym: *Poria zonata* Bres., Mycologia **17**: 77. 1925.

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REFERENCES

ERIKSSON J., HJORTSTAM K. & RYVARDEN L. 1984. The Corticiaceae of North Europe. **7**. *Schizopora–Suillosporium*. Fungiflora, Oslo.

GINNS J. 1980. The genus *Flaviporus* Murrill (Polyporaceae). *Canad. J. Bot.* **58**: 1578–1590.

GREUTER W., MCNEILL J., BARRIE F. R., BURDET H. M., DEMOULIN V., FILGUEIRAS T. S., NICOLSON D. H., SILVA P. C., SKOG J. E., TREHANE P., TURLAND N. J. & HAWSKWORTH D. L. 2000. International Code of Botanical Nomenclature (Saint Louis Code) adopted by the Sixteenth International Congress St. Louis, Missouri, July–August 1999. *Regnum Veg.* **138**: 1–474.

KNUDSEN H. & HANSEN L. 1996. Nomenclatural notes to Nordic Macromycetes. 1 & 3. *Nordic J. Bot.* **16**: 211–221.

MAAS GEESTERANUS R. A. 1974. Studies in the genera *Irpex* and *Steccherinum*. *Persoonia* **7**: 443–581.

NIEMELÄ T. 1998. *Steccherinum bourdotii* in North Europe. *Fol. Cryptog. Estonica* **33**: 93–97.

PARMASTO E. 1995. Corticioid fungi, a cladistic study of a paraphyletic group. *Canad. J. Bot.* (suppl. **1**): S843–S852.

RYVARDEN L. & GILBERTSON R. L. 1993. European polypores **1**. *Abortiporus–Lindtneria*. Synopsis Fungorum 6. Fungiflora, Oslo.

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