

Two new species of *Phanerochaete* (Basidiomycotina, Aphyllophorales), and a key to species from subtropical and tropical areas

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Two new species of *Phanerochaete* are described, viz., *P. irpicoides* Hjortstam (Brazil) and *P. tuberculascens* Hjortstam (Africa, Burundi). A brief generic description, a checklist and a key to accepted species from subtropical and tropical area are provided.

Key words: Aphyllophorales, Basidiomycota, *Phanerochaete*, tropical species

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Introduction

Phanerochaete is still a necessary and convenient generic arrangement for many effused species of corticioid fungi without clamp-connections, whether these species have cystidial elements or not. Undoubtedly it is not a natural group and the genus will certainly be split in the future when DNA tests have been performed. As currently defined, *Phanerochaete* contains about 70 species, exclusive of *Phlebiopsis* Jülich (with about 10 species) and *Scopuloides* (Masse) Hjortstam & Ryvarden (2–3 species) of which 50 are known from subtropical and tropical areas. Species of *Phlebiopsis* and *Scopuloides* have not been included in the key (below). For distribution of these species see Hjortstam and Larsson (1995).

Phanerochaete P. Karst., Bidr. Känned. Finl. Nat. Folk 48: 426, 1889

Generic type: *Thelephora velutina* DC. : Fr.

Basidiomes generally large and conspicuous, resupinate, sometimes strongly attached to the substratum, but more commonly easily detachable. *Hymenophore* smooth, though often pilose from protruding cystidia, more rarely ornamented. *Colour* varying from white to yellow or even

reddish or brownish. Some species are discoloured with KOH, turning yellow, green, orange or red. *Subiculum* generally well developed, mainly whitish or yellowish, rarely red or brownish. *Mycelial strands (cords)* often present, whitish or yellowish or reddish. *Hyphal system* monomitic; hyphae without clamp-connections, but often with scattered single or multiple clamp-connections, mainly hyaline or yellowish, rarely brownish, thin-walled or in many cases with thickened walls or firm-walled. *Cystidia* present or absent, subulate to obtuse, smooth or encrusted, thin-walled or in some cases firm-walled. *Basidia* more or less clavate, often in a rather dense palisade, with four sterigmata and without a basal clamp-connection. *Spores* smooth, thin-walled, globoid to ellipsoid or cylindrical, rarely allantoid, mainly between 4–7 µm long, inamyloid, indextrinoid and acyanophilous.

Phanerochaete irpicoides Hjortstam sp. nov.

Basidioma resupinatum, laxe adnatum, expansum. Hymenophorum valde raduloides, irpicoides vel fere poroides, brunneolum; aculeis dentiformibus, 0.8 mm altis, quasi 1–2/mm, levibus. Margo indeterminatus, revolubilis. Chor-

dae nullae. Subiculum aliquantum tenue, hymenophorio concoloro vel plerumque fuscato. Systema hyphale monomiticum; hyphae basales distinctae, crassitunicatae, 5–6 µm latae, hyalinae, incrustatae; crystalliis subhyalinis. Cystidia sparsa, humile characteristica, tenuitunicata, initio obclavata, plus minus obtusa, raro subcapitata, tum fere subulata, 40 × 3–5 µm. Basidia anguste clavata, tenuitunicata, leviter constricta, (20–)25–30 × 4–5(–6) µm, 4 sterigmata. Sporae ellipsoideae, tenuitunicatae, 6–7(–8) × (2.75–)3–3.25(–3.5) µm, hyalinae, leves.

Holotypus: Brazil, São Paulo, Ubatuba, Ilha Anchieta, on wood, 17–18 Jan. 1987, *Ryvarden* 24235 (K (M) 67355. Isotypus: O.

Basidiome resupinate, loosely adnate. *Hymenophore* strongly raduloid to irpicoid or almost poroid, ochraceous to pale brown, not changing colour in KOH, ridges 0.8–1 mm high, about 1–2/ mm, mostly smooth. *Margin* indeterminate, revoluble. *Subiculum* rather thin, concolorous with the hymenophore or more commonly darker. *Cords* absent. *Hyphal system* monomitic; subicular hyphae distinct, thick-walled, 5–7 µm wide, often with right angle branching, hyaline to pale yellow, some strongly encrusted with subhyaline crystals; aculeal hyphae similar, hyaline, more or less interwoven; subhymenial hyphae thin-walled or with slight wall thickening, 3–4 µm wide, smooth; all hyphae without clamp-connexions. *Cystidia* apparently of one type, rare to almost lacking, insignificantly differentiated, thin-walled, at first obclavate, blunt, or more rarely subcapitate, then almost subulate, about 40 × 3–5 µm. *Basidia* narrowly clavate to clavate, thin-walled, slightly constricted, (20–)25–30 × 4–5(–6) µm, with four sterigmata and without a basal clamp-connexion. *Sporae* ellipsoid, 6–7(–8) × (2.75–)3–3.25(–3.5) µm, smooth, thin-walled, hyaline.

This species is reminiscent of *P. magnoliae* (Berk. & Curtis) Burds., but differs by its strongly irpicoid hymenophore, size and shape of the cystidia, and more directly ellipsoid spores. In *P. magnoliae* the spores are usually subcylindrical, slightly smaller and the cystidia are prominent, almost clavate and 60–100 µm long and 5–10 µm wide.

Phanerochaete tuberculascens Hjortstam sp. nov.

Basidioma resupinatum, effusum, arcte adnatum, circiter 0.1–0.4 mm crassum, plus minus distincte stratosum. *Hymenophorum* leve, moderate tuberculatum, pallide ochraceum vel rubescens; margine indeterminato vel leviter fibrilloso. *Chordae* nullae. *Subiculum* plus minus distinctum, albidum. *Systema hyphale* monomiticum; hyphae basales distincte, parallele dispositae, leves, tenuitunicatae vel crassiusculae, 5–8 µm latae, hyalinae vel plerumque pallide luteolae; fibulae nullae vel rariores. *Cystidia* absentes. *Basidia* plus minus clavata, vulgo constricta, 40–50 × 6–7 µm, 4 sterigmata. *Sporae* subglobosae, tenuitunicatae, leves, hyalinae, (5–)5.5–6.5(–7) × 4.4.75 µm.

Holotypus: Burundi, T.Muramvya, Teza on wood, 20.XII.1978 *J. Rammeloo* 6159 (K). Isotypus: O, BR. Paratypi: ditto *J. Rammeloo* 6160 and from Burundi, Bururi, 4.II.1979 *J. Rammeloo* 6557 (K, O).

Basidiome resupinate, effused, closely adnate but loosening slightly at the margin, 0.1–0.4 mm thick, usually stratified. *Hymenophore* smooth or moderately tuberculate, pale yellowish or (particularly with age or in the herbarium) reddish brown. *Margin* abrupt or thinning out, not or slightly fibrillose. *Subiculum* more or less distinct, paler than the fertile part. *Cords* absent. *Hyphal system* monomitic; basal hyphae distinct, more or less parallel and densely arranged, smooth, thin-walled or those next to the substratum with slight wall thickening or with slight wall thickening, 5–8 µm wide, hyaline to pale yellowish, without or with occasional clamp-connexions; subhymenial hyphae narrower, 3–5 µm wide, without clamp-connexions. *Cystidia* absent. *Basidia* clavate, when fully developed sinuous or constricted, arranged in a rather dense layer, 40–50 × 6–7 µm, with four sterigmata and without a basal clamp-connexion. *Sporae* subglobose, smooth, thin-walled (in KOH slightly thick-walled), hyaline, (5–)5.5–6.5(–7) × 4.4.75 µm.

Microscopically this species is reminiscent of *P. tuberculata* (P. Karst.) Parmasto, but can readily be separated by broader subicular hyphae, denser basidial layer, and slightly broader and subglobose spores. *P. tumulosa* (P.H.B. Talbot) Hjortstam and *P. emplastra* (Berk. & Broome) Hjortstam are also fairly similar, but both have the subicular hyphae more or less intricately woven and narrower spores.

Key to tropical and subtropical species of Phanerochaete

1. Hymenophore hydroid, raduloid or irpicoid **Key 1**
1. Hymenophore smooth or rarely grandinioid to tuberculate **2**
2. Cystidia absent **Key 2**
2. Cystidia present **Key 3**

Key 1

1. Cystidia absent **2**
1. Cystidia present **3**
2. Basidiome ceraceous, hymenophore grandinioid, rosy, spores $4-5 \times 3 \mu\text{m}$. Africa (southern and eastern), New Zealand *rosea*
2. Basidiome hard and brittle, hymenophore hydroid to more rarely raduloid, tissue dense, hyphae more or less smooth, thin-walled, spores $4.5-6 \times 2.5-3.5(-4) \mu\text{m}$ (type of *Radulum subquercinum* Henn.). Seems to be pantropical *subquercina*
3. Hymenophore orange or yellowish, aculei almost cylindrical **4**
3. Hymenophore otherwise coloured, aculei differently shaped **5**
4. Hymenophore pale to deep orange, margin and cords reddish orange, spores $4-5 \times 2-2.5 \mu\text{m}$. USA (Florida), Brazil ?, Cameroon *chrysohorizon*
4. Hymenophore yellowish, $5-6 \times 3-3.5 \mu\text{m}$, cords whitish or absent, margin and subiculum white. USA (Florida), Australia? *omnivora*
5. Cystidia subulate, spores $6-8 \times 3-3.5 \mu\text{m}$. Brazil, known only from the type *irpicoides*
5. Cystidia obtuse. **7**
6. Aculei 1–2 mm long, spores $5.5-7 \times 2.5-3 \mu\text{m}$. USA (Florida), Brazil *magnoliae*
6. Aculei shorter, about 1 mm, spores $4.5-5.5 \times 2-2.5$. Iran and reported from Taiwan *aculeata*

Key 2

1. Subiculum tomentose, brownish, hymenophore pale brown, basal hyphae yellowish brown $5-7 \mu\text{m}$ wide, spores normally $4-6 \times 2.5-3.5 \mu\text{m}$. South America, Taiwan, Australia, New Zealand *singularis*
1. Subiculum not with a brownish tomentum, mainly whitish, basal hyphae more or less hyaline **2**
2. Spores ellipsoid to suballantoid and slightly sigmoid, $7-11 \times 2.3-3.5 \mu\text{m}$, hymenophore pale ochraceous to orange or brownish in old specimens. Hawaii? *jose-ferreira*
2. Spores ellipsoid or cylindric, never sigmoid **3**
3. Basal hyphae mainly thick-walled **4**
3. Basal hyphae mainly thin-walled or with slight wall thickening **6**
4. Hymenophore orange-yellow to yellowish brown, spores $7.5-9.5 \times 4.5-6 \mu\text{m}$. Canary Islands, known only from the type *andreae*
4. Spores smaller **5**
5. Basidiome cracking, hymenophore pale ochraceous to more or less reddish brown, spores $5.5-7 \times 3-3.5 \mu\text{m}$. Sri Lanka, known only from the type *emplastra*
5. Basidiome generally not cracking, hymenophore cream, spores $6-8 \times 3.5-4 \mu\text{m}$. USA (Louisiana) Burdsall (1985), Brazil?, Australia, New Zealand *corymbata*
- [5. Spores $5-6 \times 3.5 \mu\text{m}$. Known only from the type. India *Corticium albidocreum*]
6. Subicular hyphae mainly arranged parallel with the substratum **7**
6. Subicular hyphae more or less intricately woven **8**
7. Hymenophore creamish to pale ochraceous, subicular hyphae in a relatively open tissue, cords normally present, spores $5-6.5 \times 3-4 \mu\text{m}$. Cosmopolitan? *tuberculata*
7. Hymenophore pale yellowish, in the herbarium reddish brown, subicular hyphae in a dense tissue, cords absent, spores $(5-5.5-6.5(-7) \times 4.4-7.5 \mu\text{m}$. Africa (Burundi). *tuberculascens*

8. Hymenophore slightly greenish in KOH, spores cylindric $5.5-8 \times 2.25-2.75 \mu\text{m}$. Taiwan, known only from the type *intertexta*
8. Hymenophore negative in KOH, spores ellipsoid **9**
9. Hymenophore pale reddish brown, cracking, spores $4.5-5.5 \times 3-4.2 \mu\text{m}$ (in the original description). South Africa, known only from the type *tumulosa*
9. Hymenophore and spores otherwise **10**
10. Hymenophore pale brown, cracking, subicular hyphae intricately woven, spores $4.5-6 \times 3-3.5$ (original), $(5.5-6-7.5(-9) \times 3.5-4.5(-5.5) \mu\text{m}$ (Burdshall 1985). New Zealand, known only from the type *cordyline*
10. Hymenophore not brown, if brownish then spores larger **11**
11. Hymenophore sulphurous, yellowish cords present, spores $4-5.5 \times 2-2.5 \mu\text{m}$. Taiwan, known only from the type *lutea*
11. Hymenophore and spores otherwise **12**
12. Hymenophore yellowish white to greyish orange, spores $6-9 \times 3.5-4.5 \mu\text{m}$. USA (Arizona), Costa Rica *xerophila*
12. Hymenophore dull yellow, in the herbaria chestnut-brown, spores broadly ellipsoid $6-6.75(-8) \times 4-4.5(-5) \mu\text{m}$. Taiwan *tropica*
- [12. *On Citrus from India (Bengal), hymenophore yellowish-white, spores $5.5-7 \times 3.5-4.25 \mu\text{m}$* *citri*]

Key 3

1. Spores allantoid **2**
1. Spores ellipsoid to cylindric **4**
2. Cystidia metuloidal, spores $3.5-4.5 \times 1.2-1.5 \mu\text{m}$. USA (Florida), known only from the type *cana*
2. Cystidia cylindric, obtuse, smooth or lightly encrusted **3**
3. Cystidia often septate, lightly encrusted, spores $8.5-14 \times 3.5-5.5 \mu\text{m}$. Brazil *cacaina*
3. Cystidia not septate, usually smooth, spores narrower, $9-14 \times 2.5-3.5 \mu\text{m}$. USA (Arizona) *allantospora*
4. Wood distinctly discoloured red, hymenophore pale yellow to reddish, subiculum and cords reddish, spores $4.5-6 \times 2.5-3 \mu\text{m}$. Subtropical areas of the northern hemisphere *sanguinea*
4. Wood never discoloured red, subiculum otherwise, mainly white, but sometimes red or reddish brown **5**
5. Spores $(8-9-12 \times 4-6 \mu\text{m}$, cystidia subulate or sometimes obtuse, normally smooth. Madeira, Morocco, Australia *martelliana*
5. Spores smaller **6**
6. Hymenophore yellowish to orange, cords absent, cystidia of two kinds 1) heavily encrusted 2) nearly smooth, both cystidia with orange crystals, spores $5-5.5 \times 2.5-3 \mu\text{m}$. New Zealand, known only from the type *luteoaurantiaca*
6. Not with this combination of character **7**
7. Cystidia generally strongly encrusted, sometimes metuloidal **8**
7. Cystidia lightly encrusted or smooth **24**
8. Cystidia only apically encrusted **9**
8. Cystidia otherwise encrusted **10**
9. Hymenophore usually whitish, creamish to pale ochraceous, spores $4-5.5 \times 2-2.5 \mu\text{m}$ Borneo (type), Hawaii, Brazil, Colombia *australis*
9. Hymenophore ochraceous to pale red, spores $5-6 \times 2.75-3 \mu\text{m}$. Sri Lanka *flavocarnea*
10. Hymenophore and cords red or purple in KOH, subiculum yellowish or yellowish brown, subicular hyphae $6-8(-10) \mu\text{m}$ wide, cystidia $40-100 \mu\text{m}$ long, spores $(3.5-4-5.5(-6.5) \times 2-2.5(-3) \mu\text{m}$. Pantropical. (*P. borneensis* Jülich, hyphae as in *P. radicata*, but generally with thicker walls, cystidia $20-35 \mu\text{m}$ long) *radicata*

- [10. Hymenophore sulphur-coloured to mustard yellow, and with conspicuous chrome-yellow cords. Described from Brazil, but insufficiently known, holotype poor. *Corticium sulphurosum* Bres.]
10. Cords if present negative in KOH 11
11. Cords present 12
11. Cords absent, if present then hymenophore strongly pilose 14
12. Hymenophore light yellow to light orange, red in KOH, spores $4.5-6 \times 2.5-3 \mu\text{m}$. USA (Florida and Louisiana) *salmoneolutea*
12. Hymenophore otherwise coloured, negative or maybe pale brown in KOH 13
13. Hymenophore whitish to pale ochraceous, in the herbaria sometimes orange coloured, cystidia subulate, strongly encrusted, but apically nude, spores $5-7 \times 2.5-3 \mu\text{m}$. Distribution uncertain, but reported by several authors, mainly as *Peniophora (Phanerochaete) affinis* *laevis*
13. Hymenophore pale yellow to pale brownish yellow, sometimes pale brown in KOH, cystidia more or less obtuse, normally encrusted throughout, spores $4-5.5 \times 2.75-3.5 \mu\text{m}$. Jamaica, Puerto Rico, Mexico, Panama, Brazil *flava*
14. Cystidia subulate, with a nude apex *laevis*
14. Cystidia otherwise encrusted, subulate to obtuse 15
15. Hymenophore usually vinaceous red to brownish orange, strongly pilose by protruding cystidia, spores $5.5-7 \times 2.5-3.5 \mu\text{m}$. Jamaica, Morocco, Canary Islands *velutina*
15. Hymenophore otherwise coloured, not or less pilose 16
16. Hymenophore yellowish to pale olivaceous, greenish in KOH, spores $4.8-6.2 \times 3.3-4.3 \mu\text{m}$. Taiwan, known only from the type *subglobosa*
16. Hymenophore negative or reddish in KOH 17
17. With subulate strongly encrusted cystidia (metuloids) 18
17. Cystidia otherwise 19
18. Hymenophore creamish to greyish-yellow, basal hyphae thick-walled, cystidia often more than $10-12 \mu\text{m}$ wide, spores $5-7 \times 2.5-3.5 \mu\text{m}$. Jamaica, USA (Florida), Bermuda, Brazil? (*Phlebiopsis?*) *hiulca*
18. Hymenophore pale ochraceous with a brownish margin, basal hyphae mainly thin-walled, cystidia somewhat slender, spores $6-8 \times 3-3.5 \mu\text{m}$. New Zealand, known only from the type. A species of *Phlebiopsis?* *areolata*
19. Cystidia $50-100 \mu\text{m}$ long, lightly or more heavily encrusted 20
19. Cystidia generally shorter, $30-50 \mu\text{m}$ long, metuloidal but obtuse 22
20. Subicular hyphae thin-walled, cystidia generally up to $70 \mu\text{m}$ long, obtuse and strongly encrusted, spores $5-7 \times 2.5-3 \mu\text{m}$. Mexico, known only from the type? *exigua*
20. Subicular hyphae thick-walled 21
21. Basidiome usually firm membranous, cystidia smooth or encrusted, basal hyphae thick-walled, rigid, spores $5-7.5 \times 2.5-3.5 \mu\text{m}$. Cosmopolitan, but variable *sordida*
21. Basidiome rather soft, creamish to light buff, cystidia strongly encrusted, hyphae thin to firm-walled, spores $5.5-6 \times 2.5-3 \mu\text{m}$. Hawaii, known only from the type *mauiensis*
22. Spores cylindrical and often suballantoid, $8-12 \times 3-3.5 \mu\text{m}$. Africa (South Africa, Ethiopia, Kenya). *arenata*
22. Spores otherwise 23
23. Cystidia $5-6 \mu\text{m}$ wide, spores $5.5-6.5 \times 3-3.5 \mu\text{m}$. Mexico, USA (Florida), Brazil, Colombia *exilis*
23. Cystidia $7(-10) \mu\text{m}$ wide, spores $6-6.5 \times 3-4 \mu\text{m}$. Paraguay, Brazil *incrustans*
24. Cords present 25
24. Cords absent (margin sometimes fibrillose) 27
25. Cords bright red in KOH, spores $4.5-6 \times 2-2.5 \mu\text{m}$ (Burt $4-4.5 \times 2-2.5 \mu\text{m}$). USA (Florida), Jamaica, Argentina, Brazil, Australia *burtii*
25. Cords negative in KOH 26
26. Hymenophore reddish in KOH, with arboriform hyphae in the subiculum, spores $4.5-5.5 \times 2.5 \mu\text{m}$. Brazil. *subceracea*

26. Hymenophore greenish in KOH, without arboriform hyphae, spores $4.5-6 \times 2-3 \mu\text{m}$. Brazil *carnosa*
27. Hymenophore greenish in KOH 28
27. Hymenophore not or otherwise coloured in KOH 29
28. Hymenophore dull yellow, spores $4.5-6 \times 2-3 \mu\text{m}$ *carnosa*
28. Hymenophore ivory-yellow or white, spores $3.8-4.5 \times 1.8-2.3 \mu\text{m}$. Taiwan, known only from the type *albida*
29. Subicular hyphae producing globose vegetative cells, spores $5.5-7(-8) \times 3-3.5 \mu\text{m}$. Puerto Rico, Taiwan *sacchari*
29. Subicular hyphae lacking such globose cells 30
30. Cystidia tubular, 60–150 μm long, thin-walled, spores $5.5-7 \times 3-4$. Iran sub *Phanerochaete macrocystidiata* Hallenb.). *chryso sporium*
30. Cystidia otherwise 31
31. With arboriform hyphae in the subiculum, cystidia mainly subulate, often few, spores $5.5-6.5 \times 3-3.5 \mu\text{m}$. Taiwan *ericina*
31. Without arboriform hyphae, cystidia subulate or obtuse 32
32. Subicular hyphae thin-walled or with a slight wall thickening, spores $6.25-8 \times 3-3.25 \mu\text{m}$. Taiwan *leptoderma*
32. Subicular hyphae thick-walled 33
33. Spores $5-7.5 \times 2.5-3.5 \mu\text{m}$ *sordida*
33. Spores $6.5-8.25 \times 3.5-4.5 \mu\text{m}$ *taiwaniana*

Checklist

Phanerochaete aculeata Hallenb., Iran. J. Pl. Path. 14: 62 (1978). Type: Iran, 12.VII.1976 *Hallenberg 1737* (GB).

P. affinis (Burt) Parmasto, Conspectus syst. corticiacearum: (Tartu) p. 84 (1968). Basionym: *Peniophora affinis* Burt, Ann. Mo. Bot. Gard. 12: 266 (1926). Type: USA, Vermont, 14.IX.1900 *E.A. Burt* (BPI). = *Phanerochaete laevis*.

P. alba H. Lin & Z.C. Chen, Taiwaniana 35: 97 (1990). Type: Taiwan, S. Lin (NTU-3407). According to the description and illustration, apparently a species of *Phlebiopsis*.

P. albida Sheng H. Wu, Acta Bot. Fenn. 142: 39 (1990). Type: Taiwan, on culm of Poaceae, 9.IX.1988 *Wu 880909-61* (H).

Corticium albidocreum Rehill & B.K. Bakshi, Indian Forest Bull. 242: 11 (1965). Type: India, on burnt bamboo, 20.I.1950 *K. Bagchee 5128* (K). = ?*Phanerochaete sordida*.

P. allantospora Burds. & Gilb., Mycologia 66: 780 (1974). Type: USA, Arizona, on *Platanus wrightii*, 23.IX.1971 *R. L. Gilbertson 10478* (CFMR).

P. andreae Burds. et al. Mycotaxon 54: 296 (1995). Type: Canary Islands, 5.XII.1987 (TFC).

P. arenata (P.H.B. Talbot) Jülich, Persoonia 10: 334 (1979). Basionym: *Peniophora arenata* P. H.

B. Talbot, Bothalia 4: 944 (1948). Type: South Africa, Natal, 1934 *W.G. Rump 34* (K).

P. areolata (G. Cunn.) Hjortstam & Ryvar den, Synopsis Fungorum (Oslo) 4: 59 (1990). Basionym: *Lopharia areolata* G. Cunn., N.Z. Dept. sci. industr. Res. Bull. 145: 331 (1963). Type: New Zealand, 5100 (P.D.D.).

P. australis Jülich, J. Linn. Soc. Bot. 81: 43 (1980). Type: Borneo, Sarawak, 14.III. 1978 *Jülich 78-1868* (L).

P. borneensis Jülich, Journ. Linn. Soc. Bot. 81: 43 (1980). Type: Borneo, Sarawak, 16 III. 1978 *Jülich 78-2157* (L). Nakasone et al. (1994) accepted this as an independent species.

P. brunnea Sheng H. Wu, Acta Bot. Fenn. 142: 42 (1990). Type: Taiwan, Nantou, 700 m, on twig of angiosperm, 25.X.1988 *Wu 881025-23* (H). = *Phanerochaete singularis*.

P. burtii (Romell) Parmasto, Eesti NSV Tead. Akad. Toim. Biol. 16: 338 (1967). Basionym: *Peniophora burtii* Romell, Burt Ann. Mo. Bot. Gard. 12: 278 (1926). Type: USA, Ohio, 1898 *Lloyd 3823* (S).

P. bubalina Burds., Mycol. Memoir 10: 44 (1985). Type: Canary Islands, Tenerife, 8.I.1974 *L. Ryvar den 12356* (O). = *Hyphodermella corrugata* (Fr.) J. Erikss. & Ryvar den

P. cacaina (Bourdot & Galzin) Burds. & Gilb., Mycologia 66: 781 (1974). Basionym: *Peniophora cacaina* Bourdot & Galzin, Bull. Soc. Mycol. France 28: 397 (1913). Type: France, Aveyron, Febr. 1908 Galzin 2795, Bourdot 5473.

P. cana (Burt) Burdsall, Mycol. Memoir 10: 50 (1985). Basionym: *Peniophora cana* Burt, Ann. Mo. Bot. Gard. 12: 227 (1926). Type: USA, Florida, March 1923 Murrill 82 (BPI).

P. carnosa (Burt) Parmasto, Eesti NSV Tead. Akad. Toim. Biol. 16: 388 (1967). Basionym *Peniophora carnosa* Burt, Ann. Mo. Bot. Gard. 12: 325 (1926). Type: USA, New York, on *Juniperus nana*, 19.IX.1901 C.H. Peck, HMBG 56019 (BPI).

P. chordalis (Höhn. & Litsch.) Park.-Rhodes, Ann. Bot., London N.S. 20: 258 (1956). Basionym: *Peniophora chordalis* Höhn & Litsch., Sitzber. Akad. Wiss. Wien, Math.-nat. Kl. 115: 1598 (1906). Type: Austria, Niederösterreich, Wechsel, 2.VI.1906. = *Xenasma pruinatum* (Pat.) Donk.

P. chrysorhizon (Torrey) Bud. & Gilb., Southw. Natur. 17: 417 (1973). Basionym: *Hydnum chrysorhizon* Torrey, in Eaton Manual Bot. 309 (1822). Type: USA, Steward 237 in Herb. Torrey (NY).

P. chryso sporium Burds., Mycotaxon 1: 124 (1974). Type: USA, Arizona, 25. VIII.1971 Burdsall 6251 (CFMR). Anamorph: *Sporotrichum pruinatum* Gilman & Abbot, see further Stalpers (1984).

P. citri A.B. De, Mycotaxon 42: 29 (1991). Type: India, West Bengal, on *Citrus medica*, 21.X.1988 A.B. De (BRCMH C-881, portion K).

P. commixtoidea H. Lin & Z.C. Chen, Taiwania 35: 99 (1990). Type: Taiwan, S. Lin (NTU-3644). According to the description and illustration this seems to be a species of *Dendrothele*.

P. cordyline (G. Cunn.) Burds., Mycol. Memoir 10: 63 (30.I. 1985). Basionym: *Corticium cordyline* G. Cunn., Trans. R. Soc. New Zeal. 82: 323 (1954). Type: New Zealand, on *Cordyline australis*, G.T. Baytes 7405. (P.D.D.).

P. corymbata (G. Cunn.) Burds., Mycol. Memoir 10: 65 (1985). *Corticium corymbata* G. Cunn. Trans. R. Soc. New Zeal. 82: 324 (1954). Type: New Zealand, on *Brachyglottis repanda*, May 1952 G.H. Cunningham 11474. (P.D.D.).

P. crassa (Lév.) Burds. Mycol. Memoir 10: 67 (1985). Basionym: *Thelephora crassa* Lév. Ann. Sci. Nat. Bot. ser.III, 2: 209 (1844). Type: Vietnam (BPI). = *Porostereum crassum* (Lév.) Hjortstam & Ryvarden.

P. cremea (Bres.) Parmasto, Conspectus syst. corticiacearum: (Tartu) p. 84 (1968). Basionym: *Corticium cremeum* Bres., Fungi Trid. 2: 63 (1898). Type: Italy, Trento, in ramis *Sorbi aucupariae*, Aug 1893 Bresadola 556 (S). = *Phanerochaete sordida*.

P. cumulodentata (Nikol.) Parmasto, Conspectus syst. corticiacearum: (Tartu) p. 83 (1968). Basionym: *Radulum cumulodentatum* Nikol., in Fl. Plant. Crypt. 6: 87 (1961). = Nom. rej., not validly published

Radulum cumulodentatum Nikol., Mikol. Fitopatol. 4: 477 (1970). Type: Russia, Orel Reg., on *Sorbus aucuparia*, 27 Aug 1916 A.S. Bondarzew (LE). = *Phanerochaete magnoliae*.

Corticium decolorans P. Karst., Bidr. Känned. Finl. Nat. Folk 37: 144 (1882). Type: Finland, Mustiala, Salix, Oct 1879 P.A. Karsten 1405 (H). = *Phanerochaete velutina*.

P. emplastra (Berk. & Broome) Hjortstam, Kew Bull. 44: 306 (1989). Basionym: *Corticium emplastrum* Berk. & Broome J. Linn. Soc. Bot. 14: 70 (1875). Type: Sri Lanka, Central Prov., Dec 1868, no. 985 (K).

P. ericina (Bourdot) J. Erikss. & Ryvarden, Corticiaceae North Eur. 5: 1011 (1978). Basionym: *Peniophora ericina* Bourdot, Rev. Sci. Bourbonn. 23: 14 (1910). Type: France, Aveyron, on *Erica* sp., 9.IV.1910 Galzin 5442, Bourd. 8632, Lloyd 44574 (BPI).

P. exigua (Burt) Nakasone et al., Mycologia 90: 134 (1998). Basionym: *Peniophora exigua* Burt, Ann. Mo. Bot. Gard. 12: 224 (1926). Type: Mexico, Guernavaca, Murrill 377 (BPI).

P. exilis (Burt) Burds., Mycol. Memoir 10: 74 (1985). Basionym: *Peniophora exilis* Burt, Ann. Mo. Bot. Gard. 12: 239 (1926). Type: Mexico, Orizaba, 10-14.I.1910 Murrill 757 (BPI).

P. filamentosa (Berk. & M.A. Curtis) Burds., in Parker & Roane, Distr. Hist. Biota southern. Appalachians IV. Algae and Fungi p. 278 (1976). Basionym: *Corticium filamentosum* Berk. & M.A. Curtis, Grevillea 1: 178 (1873). Type: USA, Alabama, Peters 6119 (K).

P. flabelliradiata J. Erikss. & Hjortstam Corticiaceae North Eur. 6: 1073 (1981). Type: Norway, Akershus, 28.IX.1978 Ryvarden 17494. = *Leifia flabelliradiata* (J. Erikss. & Hjortstam) Ginns.

P. flava (Burt) Nakasone et al. Mycologia 90: 132 (1998). Basionym: *Coniophora flava* Burt, Ann. Mo. Bot. Gard. 4: 261 (1917). Type: Jamaica, W.A. & E.L. Murrill 1089 (NY).

P. flavidoalba (Cooke) S.S. Rattan, *Bibl. Mycol.* 60: 262 (1977). Basionym: *Peniophora flavidoalba* Cooke, *Grevillea* 8: 21 (1879). Type: USA, Georgia, Darien, on *Myrica cerifera*, *Ravenel* 2529, *Fung. amer. Exs.* 226 (NY). = *Phlebiopsis*.

P. flavocarnea (Petch) Hjortstam, *Mycotaxon* 54: 189 (1995). Basionym: *Corticium flavocarneum* Petch, *Ann. R. Bot. Gard., Peradeniya* 9: 288 (1925). Type: Sri Lanka, Hakgala, April 1915, No. 4672 (K).

P. fuscomarginata (Burt) Gilb., *J. Arizona Acad. Sci.* 7: 135 (1972). Basionym: *Peniophora fuscomarginata* Burt, *Ann. Mo. Bot. Gard.* 12: 335 (1926). Type: USA, Louisiana, St. Martinville, 15.VII.1897 *A.B. Langlois 100* (FH). = *Porostereum fuscomarginatum* (Burt) Hjortstam.

P. gigantea (Fr. : Fr.) S. S. Rattan, *Bibl. Mycol.* 60: 260 (1977). Basionym: *Thelephora gigantea* Fr. : Fr., *Syst. Mycol.* 1: 448 (1821). Type: Sweden, Femsjö, *E. Fries* (UPS). = *Phlebiopsis*.

P. globosa H. Lin & Z.C. Chen, *Taiwania* 35: 100 (1990). Type: Taiwan, S. Lin (NTU 2427). According to the description and illustration this seems to be a species of *Candelabrochaete* Boidin.

P. himalayensis (Dhingra) Sheng H. Wu, *Ann. Bot. Fenn.* 142: 45 (1990). Basionym: *Phlebiopsis himalayensis* Dhingra, *Nova Hedwigia* 44: 222 (1987). Type: India, West Bengal, 9.VIII.1980 *G.S. Dhingra 19202* (GB, isotype). = *Phlebiopsis*.

P. hiulca (Burt) Welden, *Mycotaxon* 10: 441 (1980). Basionym: *Peniophora hiulca* Burt, *Ann. Mo. Bot. Gard.* 12: 272 (NY). Type: Jamaica, Castleton Gardens, *W.A. & E.L. Murrill 71* (NY).

Peniophora hydnoides Cooke & Masee, *Grevillea* 16: 77 (1888). Type: England, Carlisle, Nov 1987 (K). = ?*Scopuloides rimosa* (Cooke) Jülich.

P. incrustans (Speg.) Rajchenb. & Wright, *Mycologia* 79: 255 (1987). Basionym: *Odontia incrustans* Speg. *An. Soc. Cient. Argent.* 90: 168 (1921). Type: Paraguay?, Asuncion, on *Citrus aurantium*, X-1919 (LPS).

P. insolita Burds. & Nakasone, *Mycologia* 73 (3): 467 (1981). Type: USA, Florida, *Liquidambar styraciflua*, 26.VII.1977 *H.H. Burdsall 9561* (CFMR). = *Candelabrochaete langloisii* (Pat.) Boidin.

P. intertexta Sheng H. Wu, *Acta Bot. Fenn.* 142: 45 (1990). Type: Taiwan, Wu 26.VII.1988 No. 880726-50 (H).

P. jose-ferreirae (D.A. Reid) D.A. Reid, *Acta Bot. Croat.* 34: 135 (1975). Basionym: *Corticium jose-ferreirae* D.A. Reid, *Rev. Biol.* 5: 140 (1965). Type: Portugal, 10.V.1964 *D.A. Reid* (K).

P. karstenii (Bres.) P. Karst., *Med. Soc. Fauna Fl. fenn.* 1: 162 (1889). Basionym: *Stereum karstenii* Bres., *Atti I. R. Accad. Agiati ser. III*, 3: 109 (1897). Type: Hungary, A. Kmet (S?). = *Dacryobolus karstenii* (Bres.) Oberw.

P. laevis (Pers. : Fr.) J. Erikss. & Ryvarden, *Corticaceae North Eur.* 5: 1007 (1978). Basionym: *Thelephora laevis* Pers. : Fr., *Syst. Mycol.* 1: 451 (1821). Type: *Corticium laeve* Fr. *Herb. M.J. Berkeley*, 1879 (K).

P. leprosa (Bourdot & Galzin) Jülich, *Persoonia* 10: 334 (1979). Basionym: *Peniophora radicata* ssp. *leprosa* Bourdot & Galzin, *Bull. Soc. Mycol. France* 28: 394 (1913). Type: France, Aveyron, on *Fagus* sp., 9.V.1908 *Galzin 3257*, *Bourdot 5637* (PC). = *Phanerochaete velutina*.

P. leptoderma Sheng H. Wu, *Acta Bot. Fenn.* 142: 45 (1990). Type: Taiwan, Hsinchu, 1000 m, on branch of angiosperm, 5.IV.1988 *Wu 880405-13* (TAI).

P. lutea (Sheng H. Wu) Hjortstam, *Mycotaxon* 54: 189 (1995). Basionym: *Efibula lutea* Sheng H. Wu, *Acta Bot. Fenn.* 142: 23 (1990). Type: Taiwan, Taipei, 17.IV.1988 *Wu 880417-5* (H).

P. luteoaurantiaca (Wakef.) Burds., *Mycol. Memoir* 10: 93 (1985). Basionym: *Corticium luteoaurantiacum* Wakef., *Kew Bull. Misc. Inf.* 1915: 372. Type: New Zealand, 1914 *W.N. Cheeseman 17455* (K).

P. macrocystidiata Hallenb., *Iran. J. Pl. Path.* 14: 65 (1978). Type: Iran, Gorgan, *Hallenberg 1618*. = *Phanerochaete chrysosporium* Burds.

P. macrospora (Bres.) Parmasto, *Conspectus syst. corticiacearum*: (Tartu) p.84 (1968). Basionym: *Peniophora macrospora* Bres. in Bourdot & Galzin, *Bull. Soc. Mycol. France* 28: 396 (1913). Type: France, Allier, 27.VII.1905 *Bourdot 4024* (PC).

P. magnoliae (Berk. & M.A. Curtis) Burds., *Mycol. Memoir* 10: 95 (1985). Basionym: *Radulum magnoliae* Berk. & M.A. Curtis, *Hooker's J. Bot.* 1: 236 (1949). Type: USA, South Carolina on *Magnolia glauca*, *May Curtis 1097* (K).

P. mauiensis Gilb. & Adask., *Mycotaxon* 49: 384 (1993). Type: Hawaii, on *Eugenia jambos*, *J.E. Adaskaveg 1462* (BPI).

P. monomitica (G. Cunn.) Sheng H. Wu & Popoff, *Mycotaxon* 54: 167 (1995). Basionym:

Duportella monomitica G. Cunn., Trans. R. Soc. New Zeal. 85: 98 (1957). Type: New Zealand, Auckland, on *Leptospermum scoparium* 16644 (P.D.D.). = *Porostereum monomiticum* (G. Cunn.) Hjortstam & Ryvarde.

P. omnivora (Shear) Burds. & Nakasone, Mycotaxon 7: 17 (1978). Basionym: *Hydnum omnivorum* Shear, J. Agric. Res. 30: 476 (1925). Type: USA, Texas, Sep 1903 *Shear 5267* (BPI).

P. pallida Parmasto Eesti NSV Tead. Akad. Toim. Biol. 16: 388, (1967). Type: Russia 28.IX.1961 *Parmasto 14686*.

P. parmastoi Sheng H. Wu, Acta Bot. Fenn. 142: 49 (1990). Type: Taiwan, *Wu No. 880313-6* (TAI). = *Phanerochaete sacchari*.

P. pelliculosa (P.H.B. Talbot) Jülich, Persoonia 10: 334 (1979). Basionym: *Peniophora pelliculosa* P.H.B. Talbot, Bothalia 6: 63 (1951). Type: Africa, Krantzkop, Dec. 1935 *W.G. Rump No. 450* (K). Seems to be the same as *Phanerochaete sordida*.

P. phosphorescens (Burt) Welden, Mycotaxon 10: 445 (1980). Basionym: *Peniophora phosphorescens* Burt, Ann. Mo. Bot. Gard. 12: 273 (1926). Type: Jamaica, *A.E. Wright 1909* (FH). = *Phanerochaete velutina*, fide Burdsall (1985).

P. pruni (Lasch) S.S. Rattan, Bibl. Mycol. 60: 258 (1977). = *Hyphodontia pruni* (Lasch) Svrcek.

P. radicata (Henn.) Nakasone et al., Sydowia, Ann. Mycol. Ser. II, 46: 46 (1994). Basionym: *Corticium radicatum* Henn., Engler Pflanzenwelt Ost-Afrikas, Lieferung 1, Theil C., p. 54 (1895). Type: Africa, Usambara, Nderema, im Urwald auf morschen Baumstümpfen, *Holst 2314* (S, isotype).

P. radulans Hallenb., Iran. J. Pl. Path. 14: 67 (1978). Type: Iran, 3.VII.1976 *L. & N. Hallenberg & D. Ershad* (GB). = *Phanerochaete subquercina*.

P. raduloides J. Erikss. & Ryvarde, Corticiaceae North Eur. 5: 1015 (1978). Type: Finland, on *Corylus avellana*, 26.IX.1970 *T. Niemelä* (H). = *Phanerochaete magnoliae*.

P. ravenelii (Cooke) Burds. Mycol. Memoir 10: 104 (1985). Basionym: *Peniophora ravenelii* Cooke, Grevillea 8: 21 (1879). Type: USA, South Carolina, *Ravenel*. (K). A species of *Phlebiopsis*.

P. rimosa (Cooke) Burds., Mycol. Memoir 10: 107 (1985). Basionym: *Peniophora rimosa* Cooke, Grevillea 9: 94 (1881). Type: Coed Coch, on bark, Oct. 1880 (K). = *Scopuloides rimosa* (Cooke) Jülich

P. rosea (Henn.) Buchanan & Hood, New Zeal. J. Bot. 30: 105 (1992). Basionym: *Grandinia rosea* Henn., Engl. Bot. Jahrb. 38: 108 (1907). Type: Tanzania, Ost-Usambara, Aug. 1903 *Eichelbaum 72 C* (S).

P. sacchari (Burt) Burds., Mycol. Memoir 10: 113 (1985). Basionym: *Peniophora sacchari* Burt, Ann. Mo. Bot. Gard. 12: 328 (1926). Type: Puerto Rico, on *Saccharum officinarum*, *J.A. Stevenson 1204* (BPI).

P. sacrata (G. Cunn.) Taylor, New Zeal. J. Agric. Res. 24: 373 (1981). Basionym: *Peniophora sacrata* G. Cunn., Trans. R. Soc. New Zeal. 83: 274 (1955). Type: New Zealand, *Leptospermum scoparium*, Jan. 1953 *J.D. Atkinson 11845* (P.D.D.). = *Gloeocystidiellum sacratum* (G. Cunn.) Stalpers & P.K. Buchanan.

P. salmoneolutes Burds. & Gilb. Mycologia 66: 787 (1974). Type: USA, Florida, on *Carya* sp., 14.VII.1972 (BPI).

P. salmonicolor (Berk. & Broome) Jülich Persoonia 8: 294 (1975). Basionym: *Corticium salmonicolor* Berk. & Broome, J. Linn. Soc. Bot. 14: 71 (1873). Type: Sri Lanka, Peradenia, 4.XI.1867, Herb. Berk. 3968 (K). = A species of *Erythricium* J. Erikss. & Hjortstam and is comparatively similar to *E. laetum* (P. Karst.) J. Erikss. & Hjortstam.

P. sanguinea (Fr.) Pouzar, Česká Mykol. 27: 26 (1973). Basionym: *Thelephora sanguinea* Fr., Elench. fung. 1: 203 (1828). Type: Sweden (?), det. by E. Fries (E).

P. septocystidia (Burt) J. Erikss. & Ryvarde, Corticiaceae North Eur. 5: 1021 (1978). Basionym: *Peniophora septocystidia* Burt, Ann. Mo. Bot. Gard. 12: 260 (1926). Type: Jamaica, W.A. Murrill & W. Harris 860, 12-14.I. 1909 (BPI). = *Candelabrochaete septocystidia* (Burt) Burds.

P. singularis (G. Cunn.) Burds., Mycol. Memoir 10: 121 (1985). Basionym: *Corticium singulare* G. Cunn., Trans. R. Soc. New Zeal. 82: 325 (1954). Type: New Zealand, on *Litsea calicaris*, 17.VI.1950 *J.M. Dingley 19589* (P.D.D.).

P. sordida (P. Karst.) J. Erikss. & Ryvarde, Corticiaceae North Eur. 5: 1023 (1978). Basionym: *Corticium sordidum* P. Karst., Medd. Soc. Fauna Fl. Fenn. 9: 65 (1882). Type: Fennia, Mustiala, 21.X.1865 *P.A. Karsten 1512* (H).

P. stereoides Sheng H. Wu, Mycotaxon 54: 168 (1995). Type: Taiwan, Taipei, on branch of angiosperm, 25.VII.1991 (N.M.N.S.). Seemingly a species of *Porostereum* and is reminiscent of *P.*

monomiticum (G. Cunn.) Hjortstam & Ryvar-
den and *P. perplexum* (D.A. Reid) Hjortstam & Ryvar-
den.

P. subceracea (Burt) Burds., Mycol. Memoir
10: 128 (1985). Basionym: *Corticium subcer-
aceum* Burt, Ann. Mo. Bot. Gard. 13: 239 (1926).
Type: USA, Pennsylvania, Trexlertown, *W.
Herbst* 76 (NY).

P. subglobosa Sheng H. Wu, Acta Bot. Fenn.
142: 49 (1990). Type: Taiwan, Taipei, on bark of
living *Melaleuca leucadendron* 18.IX.1987 *Wu*
870918 (H).

P. subiculosa (Burt) Burds., Mycol. Memoir
10: 130 (1985). Basionym: *Peniophora subiculo-
sa* Burt, Ann. Mo. Bot. Gard. 12: 259 (1926). Type:
Mexico, Cuernavaca, Tepeite River, 28.XII.1909
Murrill 396 (BPI). = *Phanerochaete flava*, fide
Nakasone et al. (1998)

P. subquercina (Henn.) Hjortstam, Windahlia
17: 58 (1987). Basionym: *Radulum subquercinum*
Henn., Monsunia I, Fungi 2: 46 (1899). Type: Java,
Salek, 11.IX.1897 *E. Nyman* (S).

P. sulphurina (P. Karst.) Bud. & Gilb., The
Southwest. Naturalist 17: 417 (1973). Basionym:
Tomentella sulphurina P. Karst., Bidr. Känned.
Finl. Nat. Folk 48: 420 (1889). Type: Finland, Jala-
sjärvi, *P.A. Karsten* (H). = *Ceraceomyces sul-
phurinus* (P. Karst.) J. Erikss. & Ryvar-
den.

Corticium sulphurosum Bres., Annl. mycol.
(Berlin) 18: 47 (1920). Type: Brazil, Bahia, *Torrend*
59 (S).

P. taiwaniana Sheng H. Wu, Acta Bot. Fenn.
142: 52 (1990). Type: Taiwan, Miaoli, 1900 m, on
fallen branch of angiosperm, 24.VIII.1988 *Wu*
880824-17 (H).

P. tropica (Sheng H. Wu) Hjortstam Mycotax-
on 54: 189 (1995). Basionym: *Efibula tropica*
Sheng. H. Wu., Acta Bot. Fenn. 142: 25 (1990).
Type: Taiwan, Taipei, on *Ficus virgata*,
3.XII.1987 *Wu* 871203 (TAI). Generic type of
Efibula Sheng H. Wu.

P. tuberculata (P. Karst.) Parmasto, Conspec-
tus syst. corticiacearum: (Tartu) p. 83 (1968). Ba-

sionym: *Corticium tuberculatum* P. Karst., Hed-
wigia 35: 45 (1896). Type: Finland, Mustiala,
7.X.1895 *P.A. Karsten* 1503 (H).

P. tumulosa (P.H.B. Talbot) Hjortstam, Myco-
taxon 54: 189 (1995). Basionym: *Corticium tumu-
losum* P.H.B. Talbot, Bothalia 4: 941 (1948). Type:
South Africa, Pretoria, 27.IV.1937 *K.A. Landsdell*
28897 (K).

P. velutina (DC. : Fr.) P. Karst., Krit. Öfvers.
Finl. Basidsv. Tillägg 3: 33 (1898). Basionym:
Thelephora velutina DC. : Fr., Elenchus fung. 1:
203 (1828). Type: See Burdsall (1985).

P. viticola (Schwein. : Fr.) Parmasto, Eesti NSV
Tead. Akad. Toim. Biol. 16 (4): 389 (1967). Basio-
nym: *Thelephora viticola* Schwein. : Fr., Elench.
fung. 1: 205 (1828). Type: 691-87-Syn. Fung. Sa-
lem-Beth. (PH). = Closely related to *Globulicium*
Hjortstam?

P. xerophila Burds., Mycol. Memoir 10: 141
(1985). Type: USA, Arizona, on *Prosopis veluti-
na*, 26.II.1971 *R.L. Gilbertson* 10082 (CFMR).

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gards to tropical and subtropical species. – Windahlia
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46: 44–62.
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chum*. – Stud. Mycol. 24: 1–105.