

A checklist of marine fungi from Australia

Sally C. Fryar^{1*}, Kevin D. Hyde² & David E.A. Catcheside¹

¹ Flinders University, College of Science and Engineering, GPO Box 2100, Adelaide SA 5001, Australia.

² Center of Excellence in Fungal Research, Mae Fah Luang University, Chiang Rai 57100, Thailand.

*CORRESPONDENCE TO: sally.fryar@flinders.edu.au

ABSTRACT - A checklist of non-lichenized marine fungi in Australia is presented. From 1954 to 2020 a total of 121 species in 93 genera were observed. Most species were ascomycetes, with only three basidiomycetes. Of these ascomycetes, most were seen in their sexual state (93 species) compared with their asexual state (21 species).

KEY WORDS - biodiversity, fungal diversity

Introduction

The first record of a marine fungus in Australia appears to be of a lichen occurring on seashells (Santesson 1939). However, the first records of non-lichenized marine fungi were by Cribb and Herbert (1954) in Tasmania. Subsequently, Cribb and Cribb (1955, 1956, 1960, 1969) expanded our knowledge of marine fungi in Australia and were among the first in the world to study mangrove fungi. After this time a number of researchers examined marine fungi in Australia, notably Kohlmeyer, Volkmann-Kohlmeyer and Kohlmeyer (Kohlmeyer 1972, 1973a, 1984, 1986, Kohlmeyer and Volkmann-Kohlmeyer 1987, 1989, 1991) and later Hyde (Hyde 1990, 1992a,b, 1995, Hyde and Nakagiri 1991) during the 1990s. The majority of these studies were focused in Queensland with some work also in New South Wales and Victoria.

Marine fungi include any fungus that is recovered repeatedly from marine habitats because: 1) it is able to grow and/or sporulate (on substrata) in marine environments; 2) it forms symbiotic relationships with other marine organisms; or 3) it is shown to adapt and evolve at the genetic level or be metabolically active in marine environments (Pang et al. 2016). These are distinct from 'marine-derived fungi' which are merely fungi isolated from a marine environment such as sediments but are not necessarily active or reproducing in marine habitats (Pang et al. 2016, Jones et al. 2019).

Materials and methods

A total of 48 publications, including papers, books and monographs in which Australian marine fungi have been cited, were reviewed. All records of non-lichenized marine fungi in Australia have been listed in the checklist below.

Results

A total of 121 marine fungal species in 93 genera have been reported from Australia. Most species were ascomycetes, with only three basidiomycetes. Of these ascomycetes, most were seen in their sexual state (93 species) compared with their asexual state (21 species). *Halosphaeriopsis mediosetigera* was present as both the sexual and asexual states. Three ascomycete yeasts have been recorded, and one basidiomycete yeast. Only two non-yeast basidiomycetes have been recorded in Australian marine waters *Halocyphina villosa* and *Nia vibrissa*.

The majority of records are from Queensland (QLD) and New South Wales (NSW), with only limited records from Victoria (VIC), Tasmania (TAS), South Australia (SA), North Territory (NT) and Western Australia (WA).

Marine fungi in Australia have been found on a range of substrates: macroalgae, dead wood, sand grains, foraminifera, sea foam, live coral, marine animals as pathogens, samphire, mangrove roots, mangrove wood, and mangrove bark. The most commonly sampled substrate is mangrove wood and roots.

Discussion

Although this review has found records of 121 marine fungal species, it is highly likely that there are significantly more species of marine fungi in Australian waters. Most of Australia's coastline has not been sampled for marine fungi and only a portion of the substrates and habitats where marine fungi have been found in studies elsewhere have been examined.

Seagrass beds are extensive marine ecosystems in Australia's coastline (Larkum et al. 2018). Despite numerous studies showing marine fungi abundant on seagrasses (Mateo and Romero 1996, Panno et al. 2013), it appears that no studies have ever reported marine fungi from seagrasses in Australia. Similarly, many taxa have not been sequenced for a proper identification and it is likely that if strains were sequenced, the checklist of marine fungi from Australia would increase.

We intend to update this checklist when new records are published. Readers are encouraged to contact the corresponding author if there should be any amendments to this list.

Conclusion

Over 66 years, from 1954 to 2020, there have been 121 non-lichenized marine fungal species recorded from Australia. With further sampling across more habitats and substrates, this number is likely to increase significantly.

Checklist of species

Ascomycetes

Acrocordiopsis patilii Borse & K.D. Hyde

QLD - on dead mangrove trunk (Kohlmeyer and Volkmann-Kohlmeyer 1991)

Adomia avicenniae S. Schatz

NSW - on prop roots of *Avicennia marina* (Forssk.) Vierh. and *A. marina* var. *resinifera* (G.Forst.) Bakh (Schatz 1985)

Aigialus grandis Kohlm. & S. Schatz

QLD - on intertidal wood of mangrove *Ceriops* sp. and prop roots of *Rhizophora* sp. (Kohlmeyer and Volkmann-Kohlmeyer 1991, Hyde 1992a)

Aigialus parvus S. Schatz & Kohlm.

QLD - Intertidal wood from shore fortification (Kohlmeyer and Volkmann-Kohlmeyer 1991)

Aniptodera chesapeakensis Shearer & M.A. Mill.

NSW - on intertidal mangrove wood and driftwood (Hyde 1990)

Aniptodera mangrovei K.D. Hyde

NSW, VIC - on intertidal mangrove wood (Hyde 1990)

Annabella australiensis Fryar, Haelew. & D.E.A. Catch.

SA - on attached intertidal branch of mangrove *A. marina* (Fryar et al. 2019)

Antennospora quadricornuta (Cribb & J.W. Cribb) T.W. Johnson

QLD - on intertidal and subtidal wood of *A. marina* var. *resinifera* and unidentified wood (Cribb and Cribb 1956, 1969, Kohlmeyer 1984, Kohlmeyer and Volkmann-Kohlmeyer 1991)

Arenariomyces parvulus Jørg. Koch

QLD - on sand grains, debris, fruits of *Casuarina* sp., intertidal wood, leaves in a tidal pool, and foraminifera (Kohlmeyer and Volkmann-Kohlmeyer 1989, Kohlmeyer and Volkmann-Kohlmeyer 1991)

Ascocratera manglicola Kohlm.

NSW, QLD - on intertidal tree stump, wood of mangrove *Ceriops* sp. and a dead mangrove trunk (Kohlmeyer 1986, Hyde 1990, Kohlmeyer and Volkmann-Kohlmeyer 1991, Hyde 1992a)

Aspergillus restrictus G. Sm. (anamorph)

QLD - on live coral (Kendrick et al. 1982)

Aspergillus versicolor (Vuill.) Tirab. (anamorph)

QLD - on live coral (Kendrick et al. 1982)

Asteromyces cruciatus Moreau & V. Moreau ex Hennebert

SA, VIC - in sea foam (Boyd and Kohlmeyer 1982)

Belizeana tuberculata Kohlm. & Volkm.-Kohlm.

NSW, QLD - on intertidal wood, mangrove bark, and prop root (Kohlmeyer and Volkmann-Kohlmeyer 1987, 1991)

Biatriospora marina K.D. Hyde & Borse

QLD - on subtidal wood (Kohlmeyer and Volkmann-Kohlmeyer 1991)

Blodgettia bornetii E.P. Wright (anamorph)

QLD - in alga *Cladophora fuliginosa* Kützing (Cribb and Cribb 1969)

Candida maris (Uden & Zobell) S.A. Mey. & Yarrow (yeast)

QLD - cultured from sea water (Uden and Zobell 1962)

Candida torresii (Uden & Zobell) S.A. Mey. & Yarrow (yeast)

QLD - cultured from sea water (Uden and Zobell 1962)

Caryospora australiensis Abdel-Wahab & E.B.G. Jones
VIC - on driftwood (Abdel-Wahab and Jones 2000)

Caryosporella rhizophorae Kohlm.
QLD - on prop root of *Rhizophora stylosa* Griff. (Kohlmeyer and Volkmann-Kohlmeyer 1991)

Ceriosporopsis halima Linder
NSW, QLD - on submerged wood (Cribb and Cribb 1956, Jones et al. 1972)

Chadefaudia balliae Kohlm.
VIC, WA - on macroalga *Ballia callitricha* (C. Agardh) Kützing (Kohlmeyer 1973a)

Chadefaudia corallinarum (P. Crouan & H. Crouan) E. Müll. & Arx
QLD - on alga *Jania adhaerens* J.V.Lamouroux (Cribb and Cribb 1969)

Chadefaudia gymnogongri (Feldmann) Kohlm.
NSW, TAS, QLD, SA - parasitic on macroalgae *Ptilonia australasica* Harvey, *Laurencia concinna* Montagne, *L. succisa* A.B. Cribb, *L. heteroclada* Harvey, *L. flexilis* Setchell, *L. tenera* C.K. Tseng, *L. pygmaea* Weber and *Gigartina intermedia* Suringa (Cribb and Herbert 1954, Cribb and Cribb 1955, 1960, Kohlmeyer and Kohlmeyer 1979)

Cirrenalia macrocephala (Kohlm.) Meyers & R.T. Moore (anamorph)
NSW - on submerged timber (Jones et al. 1972)

Corollospora gracilis Nakagiri & Tokura.
QLD - on sand grains attached to detritus (Kohlmeyer and Volkmann-Kohlmeyer 1991)

Corollospora maritima Werderm.
NSW, QLD, SA, VIC - on washed-up debris, washed-up leaves of seagrass *Posidonia australis* J.D. Hooker and *Amphibolis* sp., driftwood, sea foam, sand grains, bryozoan colonies, intertidal and subtidal wood, *Spirorbis* sp., and rhizomes of *Posidoni* cf. *ostenfeldii* Den Hartog (Kohlmeyer 1984, Bebout et al. 1987, Kohlmeyer and Volkmann-Kohlmeyer 1991)

Corollospora pulchella Kohlm., I. Schmidt & N.B. Nair
NSW, QLD, SA - on sand grains, washed up algae (*Sargassum* sp.) and seagrass (*P. australis*), sea foam, intertidal and subtidal wood and detritus (Kohlmeyer 1984, Kohlmeyer and Volkmann-Kohlmeyer 1991)

Corollospora trifurcata (Höhnk) Kohlm.
NSW, QLD, VIC - on submerged and intertidal wood, sea foam, and sand grains (Cribb and Cribb 1956, Kohlmeyer 1984)

Cremasteria cymatilis Meyers & R.T. Moore
NSW - on submerged timber (Jones et al. 1972)

Cryptovalsa halosarceicola K.D. Hyde
QLD - on intertidal decaying samphire *Tecticornia halocnemoides* (Nees) K.A. Sheph. & Paul G. Wilson (Hyde 1993)

Cytospora rhizophorae Kohlm. & E. Kohlm. (anamorph)
NT, QLD - on prop roots and trunks of mangroves *Rhizophora* sp. (Shaw 1989, Kohlmeyer and Volkmann-Kohlmeyer 1991)

Decaisnella formosa Abdel-Wahab & E.B.G. Jones
VIC - on sand in intertidal zone (Abdel-Wahab and Jones 2003)

Diatrypasimilis australiensis J.J. Zhou & Kohlm.
QLD - on dead intertidal prop root of *Rhizophora* sp. (Chalkley et al. 2010)

Dyfolomyces mangrovei (K.D. Hyde) K.D. Hyde, K.L. Pang, Alias, Suetrong & E.B.G. Jones
QLD - on an intertidal twig of mangrove *Pemphis acidula* J.R. Forst & G. Forst. (Hyde 1992b)

Etheiophora blepharospora (Kohlm. & E. Kohlm.) Kohlm. & Volkm.-Kohlm.
QLD - on prop roots of *R. stylosa* and intertidal wood of *Ceriops* sp. (Kohlmeyer and Volkmann-Kohlmeyer 1991, Hyde 1992a)

Eutypa bathurstensis K.D. Hyde & Rappaz
QLD - on decorticated intertidal branches of *Avicennia* sp. (Hyde and Rappaz 1993)

Eutypella naqsii K.D. Hyde
QLD - on intertidal wood of mangrove *Avicennia* sp. (Hyde 1995)

Exophiala pisciphila McGinnis & Ajello (anamorph)
location not given, pathogenic on Salmon *Solmo salar* L. (Langdon and McDonald 1987)

Exserohilum rostratum (Drechsler) K.J. Leonard & Suggs (anamorph)
QLD - pathogenic on clams (*Tridacna crocea* Lamarck) and on living coral (Kendrick et al. 1982, Norton et al. 1994,)

Gloeosporidina cecidii (Kohlm.) B. Sutton (anamorph)
SA - on macroalga *Sargassum natans* (Linnaeus) Gaillon (Kohlmeyer 1972)

Haiyanga salina (Meyers) K.L. Pang & E.B.G. Jones
QLD - on subtidal wood and inside foraminifera (Kohlmeyer and Volkmann-Kohlmeyer 1991)

Halobyssothecium obiones (P. Crouan & H. Crouan) Dayar., E.B.G. Jones & K.D. Hyde
QLD - on submerged wood (Cribb and Cribb 1960)

Halographis runica Kohlm. & Volkm.-Kohlm.
QLD - on subtidal coral slabs (Kohlmeyer and Volkmann-Kohlmeyer 1992)

Haloguignardia decidua Cribb & J.W. Cribb
NSW, QLD - on driftwood and macroalga *Sargassum* sp. (Cribb and Cribb 1956)

Haloguignardia irritans (Setch. & Estee) Cribb & J.W. Cribb
QLD - substrate not specified (Cribb and Cribb 1956)

Haloguignardia longispora Cribb & J.W. Cribb
QLD - on macroalga *Sargassum* sp. (Cribb and Cribb 1956)

Haloguignardia tumefaciens (Cribb & Herbert) Cribb & J.W. Cribb
NSW, QLD, SA, TAS - on macroalga *Sargassum* sp. (Cribb and Herbert 1954, Cribb and Cribb 1956, 1960, Kohlmeyer 1971)

Halojulella avicenniae (Borse) Suetrong, K.D. Hyde & E.B.G. Jones
QLD - on submerged and intertidal wood and prop roots of *Avicennia* sp., and driftwood (Kohlmeyer and Volkmann-Kohlmeyer 1991, Hyde 1992a)

Halomassarina thalassiae (Kohlm. & Volkm.-Kohlm.) Suetrong, Sakay., E.B.G. Jones, Kohlm., Volkm.-Kohlm. & C.L. Schoch
QLD - on intertidal wood of *Ceriops* sp., prop roots of *R. stylosa*, root of *Rhizophora* sp., and driftwood (Kohlmeyer and Volkmann-Kohlmeyer 1991, Hyde 1992a)

Halorosellinia oceanica (S. Schatz) Whalley, E.B.G. Jones, K.D. Hyde & Læssøe
VIC - on intertidal mangrove wood (Hyde 1990)

Halosarpheia fibrosa Kohlm. & E. Kohlm.
NSW, QLD, VIC - on intertidal wood and prop roots, intertidal mangrove wood and driftwood (Kohlmeyer 1984, Hyde 1990, Kohlmeyer and Volkmann-Kohlmeyer 1991)

Halosarpheia marina (Cribb & J.W. Cribb) Kohlm.
NSW, QLD, VIC - on intertidal wood and prop roots of *Rhizophora* sp. (Cribb and Cribb 1956, Kohlmeyer 1984, Hyde 1990, Kohlmeyer and Volkmann-Kohlmeyer 1991, Hyde 1992a)

Halosphaeria appendiculata Linder
QLD, VIC - on driftwood and intertidal mangrove wood (Cribb and Cribb 1956, Hyde 1990)

Halosphaeriopsis mediosetigera (Cribb & J.W. Cribb) T.W. Johnson
NSW, VIC, QLD - in sea foam and on submerged wood (Cribb and Cribb 1956, Kohlmeyer 1984)

Halosphaeriopsis mediosetigera anamorph (*Trichocladium achrasporum*) (Meyers & R.T. Moore) M. Dixon ex Shearer & J.L. Crane (anamorph)
QLD, VIC - on driftwood and intertidal mangrove wood (Cribb and Cribb 1969, Hyde 1990, Kohlmeyer and Volkmann-Kohlmeyer 1991)

Humicola alopallonella Meyers & R.T. Moore (anamorph)
NSW, QLD, VIC - on intertidal and subtidal mangrove wood, submerged timber, prop root and living coral (Jones et al. 1972, Kendrick et al. 1982, Hyde 1990, Kohlmeyer and Volkmann-Kohlmeyer 1991)

Kallichroma glabrum (Kohlm.) Kohlm. & Volkm.-Kohlm.
QLD - on intertidal wood of mangrove *A. marina* (Kohlmeyer and Volkmann-Kohlmeyer 1991)

Kallichroma tethys (Kohlm. & E. Kohlm.) Kohlm. & Volkm.-Kohlm.
NSW, QLD - on intertidal mangrove wood (Hyde 1990)

Kluyveromyces aestuarii (Fell) Van der Walt (yeast)
QLD - cultured from sea water (Uden and Zobell 1962)

Koralionastes ellipticus Kohlm. & Volkm.-Kohlm.

QLD - on subtidal coral slab (Volkmann-Kohlmeyer and Kohlmeyer 1992)

Koralionastes ovalis Kohlm. & Volkm.-Kohlm.

QLD - Subtidal coral slab (Volkmann-Kohlmeyer and Kohlmeyer 1992)

Koralionastes violaceus Kohlm. & Volkm.-Kohlm.

QLD - Subtidal coral slab (Kohlmeyer and Volkmann-Kohlmeyer 1990)

Leptosphaeria australiensis (Cribb & J.W. Cribb) G.C. Hughes

NSW, QLD, VIC - on driftwood, intertidal wood and prop roots of *Rhizophora* sp., *R. stylosa* and *A. marina*, and intertidal wood of *A. marinae* var. *resiniferae* (Cribb and Cribb 1955, 1969, Kohlmeyer 1984, Hyde 1990, Kohlmeyer and Volkmann-Kohlmeyer 1991, Hyde 1992a)

Lignincola laevis Höhnk

NSW, QLD - Submerged and intertidal wood, intertidal wood of *A. marina*, prop roots of *A. marina* var. *resinifera* and *R. stylosa* (Kohlmeyer 1983, Kohlmeyer 1984, Kohlmeyer and Volkmann-Kohlmeyer 1991, Hyde 1992a)

Lindra thalassiae Orpurt, Meyers, Boral & Simms

QLD - Beach detritus and inside shells of foraminifera (Kohlmeyer and Volkmann-Kohlmeyer 1991)

Lineolata rhizophorae (Kohlm. & E. Kohlm.) Kohlm. & Volkm.-Kohlm.

QLD - Intertidal wood, driftwood, branch and root of *Rhizophora* sp., and prop root of *R. stylosa* (Kohlmeyer and Volkmann-Kohlmeyer 1991, Hyde 1992a)

Lulworthia floridana Meyers

NSW - on submerged timber (Jones et al. 1972)

Lulworthia longispora Cribb & J.W. Cribb

QLD - on intertidal wood, bark, and prop roots (Cribb and Cribb 1955)

Lulworthia purpurea (I.M. Wilson) T.W. Johnson

NSW - on submerged timber (Jones et al. 1972)

Mangrovispora pemphii K.D. Hyde & Nakagiri

QLD - on intertidal roots of *Pemphis acidula* (Hyde and Nakagiri 1991)

Marinosphaera mangrovei K.D. Hyde

QLD - on intertidal wood, *Halosarcia* sp (samphire), and mangrove *Ceriops* sp. roots (Hyde 1992a)

Massarina cystophorae (Cribb & J.W. Herb.) Kohlm. & E. Kohlm.

TAS - on macroalga *Cystophorae retroflexae* (Labillardière) J. Agardh (Cribb and Herbert 1954)

Massarina lacertensis Kohlm. & Volkm.-Kohlm.

QLD - on submerged mangrove *R. stylosa* wood (Kohlmeyer and Volkmann-Kohlmeyer 1991)

Melanopsamma balani (G. Winter) Meyers

NSW, TAS - on algae on seashells (Kohlmeyer and Kohlmeyer 1979)

Melaspilea mangrovei Vrijmoed, K.D. Hyde & E.B.G. Jones

QLD - on intertidal *Pemphis acidula* (Vrijmoed et al. 1996)

Morosphaeria velatispora (K.D. Hyde & Borse) Suetrong, Sakay., E.B.G. Jones & C.L. Schoch

QLD - on dead prop roots of *R. stylosa* (Kohlmeyer and Volkmann-Kohlmeyer 1988, Kohlmeyer and Volkmann-Kohlmeyer 1991)

Natantisporea retorquens (Shearer & J.L. Crane) J. Campb., J.L. Anderson & Shearer

VIC - on intertidal mangrove wood (Hyde 1990)

Neocosmospora solani (Mart.) L. Lombard & Crous (anamorph)

WA - on infected farmed crustacian *Panulirus cygnus* George (Glazebrook et al. 1986)

Neptunella longirostris (Cribb & J.W. Cribb) K.L. Pang & E.B.G. Jones

NSW, QLD - on intertidal and subtidal wood of mangroves, including *A. Marina* var. *resinifera* (Cribb and Cribb 1956, Hyde 1990, Kohlmeyer and Volkmann-Kohlmeyer 1991)

Oceanitis unicaudata (E.B.G. Jones & Camp.-Als.) J. Dupont & E.B.G. Jones

NSW - on submerged wood (Kohlmeyer 1983)

Oceanitis viscidula (Kohlm. & E. Kohlm.) J. Dupont & E.B.G. Jones

QLD - on intertidal mangrove wood (Kohlmeyer and Volkmann-Kohlmeyer 1991)

Ocostaspora apilongissima E.B.G. Jones, R.G. Johnson & S.T. Moss

QLD - on subtidal roots of *Pandanus* sp. and other wood (Kohlmeyer and Volkmann-Kohlmeyer 1991)

Okeanomyces cucullatus (Kohlm.) K.L. Pang & E.B.G. Jones

location and substrate not specified (Kohlmeyer and Kohlmeyer 1979)

Ophiobolus australiensis T.W. Johnson & Sparrow

QLD - on mangrove *A. marina* var. *resinifera* (Cribb and Cribb 1956)

Panorbis viscosus (I. Schmidt) J. Campb., J.L. Anderson & Shearer

QLD - on mangrove *A. marina* root (Kohlmeyer and Volkmann-Kohlmeyer 1991)

Paraaniptodera longispora (K.D. Hyde) K.L. Pang, C.L. Lu, W.T. Ju & E.B.G. Jones

QLD - on submerged wood of *Osbornia octodonta* F. Muell. and prop root of *R. stylosa* (Kohlmeyer and Volkmann-Kohlmeyer 1991)

Penicillium bilaiae Chalab. (anamorph)

TAS - on boat ramp (substrate not specified) (Capon et al. 2007)

Penicillium restrictum J.C. Gilman & E.V. Abbott (anamorph)

QLD - on living coral (Kendrick et al. 1982)

Periconia prolifica Anastasiou (anamorph)

NSW, QLD, VIC - on root of *Rhizophora* sp and intertidal wood (Kohlmeyer 1984, Hyde 1990, Kohlmeyer and Volkmann-Kohlmeyer 1991)

Phialophora bubaki (Laxa) Schol-Schwarz (anamorph)

QLD - on living coral (Kendrick et al. 1982)

Phialophorophoma* cf. *litoralis (anamorph)

NSW, VIC - on intertidal mangrove wood (Hyde 1990)

Phialophorophoma litoralis Linder (anamorph)

QLD - on exposed dead root of mangrove *A. marina* var. *resinifera* (Cribb and Cribb 1955)

Piricauda pelagica T. Johnson (anamorph)

QLD - on driftwood (Hyde 1992a)

Pontogeneia valoniopsidis (Cribb & J.W. Cribb) Kohlm.

QLD - on macroalga *Valoniopsis pachynema* (G. Martens) Børgesen (Cribb and Cribb 1960)

Pseudopithomyces chartarum (Berk. & M.A. Curtis) Jun F. Li, Ariyaw. & K.D. Hyde (anamorph)

QLD - on living coral (Kendrick et al. 1982)

Pseudoplatystomum scabridisporum (Abdel-Wahab & E.B.G. Jones) Thambug. & K.D. Hyde

VIC - on driftwood (Abdel-Wahab and Jones 2000)

Purpureocillium lilacinum (Thom) Luangsa-ard, Houbraken, Hywel-Jones & Samson (anamorph)

QLD - on living coral (Kendrick et al. 1982)

Pyrenographa xylographoides Aptroot

QLD - on wood of mangrove *Ceriops tagal* (Pers.) C.B. Rob. (Aptroot 1991, Alias et al. 1996)

Quintaria lignatilis (Kohlm.) Kohlm. & Volkm.-Kohlm.

QLD - on mangrove wood and trunk (Kohlmeyer and Volkmann-Kohlmeyer 1991, Hyde 1992a)

Rhizophila marina K.D. Hyde & E.B.G. Jones

QLD - on intertidal wood and prop roots of mangrove *R. stylosa* (Kohlmeyer and Volkmann-Kohlmeyer 1991)

Rimora mangrovei (Kohlm. & Vittal) Kohlm., Volkm.-Kohlm., Suetrong, Sakay. & E.B.G. Jones

QLD - on intertidal mangrove bark (Kohlmeyer and Volkmann-Kohlmeyer 1991)

Saagaromyces abonnis (Kohlm.) K.L. Pang & E.B.G. Jones

NSW, QLD, VIC - on intertidal *O. octodonta*, prop roots and intertidal wood of mangroves *R. stylosa* and *A. marina*, and intertidal wood (Hyde 1990, Kohlmeyer and Volkmann-Kohlmeyer 1991, Hyde 1992a)

Saagaromyces glitra (J.L. Crane & Shearer) K.L. Pang & E.B.G. Jones
NSW, QLD, VIC - on intertidal wood of mangrove *Ceriops* sp. and unidentified mangrove
(Hyde 1990, Hyde 1992a)

Sammeyersia grandispora (Meyers) S.Y. Guo, E.B.G. Jones & K.L. Pang
NSW, QLD, VIC - on unidentified intertidal mangrove wood and intertidal wood of mangroves
A. marina var. *resinifera*, *Bruguiera gymnorhiza* (L.) Lam., *C. tagal*, *Excoercaria agallocha*
L., and *R. stylosa* (Leightly 1980, Hyde 1990)

Savoryella longispora E.B.G. Jones & K.D. Hyde
QLD - on intertidal mangrove wood (Hyde 1992a)

Savoryella melanospora Abdel-Wahab & E.B.G. Jones
VIC - on driftwood (Abdel-Wahab and Jones 2000)

Savoryella paucispora (Cribb & J.W. Cribb) J. Koch
QLD - on submerged wood (Cribb and Cribb 1960)

Sclerococcum haliotrephum (Kohlm. & E. Kohlm.) Ertz & Diederich
NSW, QLD, VIC - on intertidal wood, intertidal wood of *R. stylosa*, intertidal branch of *O.*
octodonta, prop root of *Rhizophora* sp., intertidal *Ceriops* sp. and on *Rhizophora mangle* L.
(Kohlmeyer 1983, Hyde 1990, Kohlmeyer and Volkmann-Kohlmeyer 1991, Hyde 1992a)

Spathulospora adelpha Kohlm.
SA, VIC, WA - on macroalga *B. callitricha* (Kohlmeyer 1973b, Kohlmeyer and Kohlmeyer
1975, Kohlmeyer 1983, Inderbitzin et al. 2004)

Spathulospora calva Kohlm.
SA, VIC, WA - on macroalga *B. callitricha* (Kohlmeyer 1973b, Kohlmeyer and Kohlmeyer
1975, Kohlmeyer 1983)

Spathulospora phycophila A.R. Caval. & T.W. Johnson
SA, VIC - on macroalga *B. callitricha* and *B. scoparia* (Cavaliere and Johnson 1965,
Kohlmeyer 1973b, Kohlmeyer and Kohlmeyer 1975, Kohlmeyer 1983, Inderbitzen et al. 2004)

Swampomyces armeniacus Kohlm. & Volkm.-Kohlm.
QLD - on intertidal mangrove wood and prop roots of *A. marina* (Kohlmeyer and Volkmann-
Kohlmeyer 1991, Hyde and Nakagiri 1992)

Swampomyces triseptatus K.D. Hyde & Nakagiri
QLD - on mangrove wood (Hyde 1992a, Hyde and Nakagiri 1992)

Sydowia polyspora (Bref. & Tavel) E. Müll. (anamorph)
QLD - on living coral (Kendrick et al. 1982)

Torpedospora radiata Meyers
QLD - on driftwood, intertidal mangrove wood (Kohlmeyer and Volkmann-Kohlmeyer 1991)

Tunicatispora australiensis K.D. Hyde
NSW, VIC - Intertidal mangrove wood (Hyde 1990)

Verruculina enalia (Kohlm.) Kohlm. & Volkm.-Kohlm.
QLD, VIC - on intertidal wood (Kohlmeyer 1984, Hyde 1990, Kohlmeyer and Volkmann-Kohlmeyer 1991)

Zalerion maritima (Linder) Anastasiou (anamorph)
NSW - on submerged timber (Jones et al. 1972)

Basidiomycetes

Bandonia marina (Uden & Zobell) A.M. Yurkov, X.Z. Liu, F.Y. Bai, M. Groenew. & Boekhout (yeast)
QLD - cultured from sea water (Uden and Zobell 1962)

Halocyphina villosa Kohlm. & E. Kohlm.
VIC - on intertidal mangrove wood (Hyde 1990)

Nia vibrissa R.T. Moore & Meyers
NSW, QLD, SA, VIC - in sea foam and on intertidal wood of mangrove *A. marina* (Kohlmeyer 1983, Kohlmeyer and Volkmann-Kohlmeyer 1991)

Acknowledgements

We thank Allison Walker (Acadia University, Nova Scotia, Canada), Ka-Lai Pang (Institute of Marine Biology, National Taiwan Ocean University), and Mohamed Abdel-Wahab (Sohag University, Egypt.) for pre-submission review.

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