Phytotaxa 170 (2): 086–102
www.mapress.com/phytotaxa/

Article

ISSN 1179-3155 (print edition)
PHYTOTAXA
ISSN 1179-3163 (online edition)

http://dx.doi.org/10.11646/phytotaxa.170.2.2

Three new species of *Crinipellis* and one new variety of *Moniliophthora* (Basidiomycota, Marasmiaceae) described from the Republic of Korea

VLADIMÍR ANTONÍN[1], RHIM RYOO[2], KANG-HYEON KA[2] & HONG-DUCK SOU[2, 3]
[1]*Department of Botany, Moravian Museum, Zelný trh 6, CZ-659 37 Brno, Czech Republic; vantonin@mzm.cz*
[2]*Department of Forest Products, Korea Forest Research Institute, Seoul 130-712, Republic of Korea; rryoo@forest.go.kr, kasymbio@forest.go.kr*
[2, 3]*Department of Forestry, Kyungpook National University, Daegu 702-701, Republic of Korea; hongducksou@hotmail.com*

Abstract

Three new species of *Crinipellis* (Basidiomycota, Marasmiaceae), and one new variety of *Moniliophthora* are described from the Republic of Korea. *Crinipellis birhizomorpha* is characterized as having a short stipe arising from both substrate and rhizomorphs, and as forming rhizomorphs of two types, one forming abortive pilei; *C. pallidipilus* has golden brown, then distinctly pallescent pileus hairs, very long, hairy rhizomorphs of one type, and rather wide basidiospores in comparison with other species described here; and *C. wandoensis* has a brown to dark brown pileus, hairy rhizomorphs of one type, and both non-dextrinoid and slightly dextrinoid basidiospores. A new combination, *Moniliophthora conchata* is proposed. A new variety, *Moniliophthora conchata* var. *brevispora* differs from the type variety in having smaller basidiospores. Their detailed macro- and microscopic descriptions are given, and their taxonomic positions were confirmed using DNA studies. A key to the identification of *Crinipellis* and *Moniliophthora* taxa recorded in this country is also provided.

Key words: taxonomy, phylogeny

Introduction

Species of *Crinipellis* have been studied only in the last c. 15 years in East Asia. Several *Crinipellis* species have been described by Takahashi (2000, 2002, 2011). Antonín *et al.* (2009) published the first paper describing *Crinipellis* from the Republic of Korea. They described two new taxa, *Crinipellis rhizomaticola* Antonín *et al.* (2009: 433) and *C. nigricaulis* var. *macrospora* Antonín *et al.* (2009: 431), and recorded *C. zonata* (Peck 1872: 61) Saccardo (1887: 216) for the first time in this country. A large monograph of *Crinipellis* and *Moniliophthora* in Southeast Asia was published by Kerekes & Desjardin (2009).

The aim of this study was to carry out the phylogenetic analysis of the genus *Crinipellis sensu stricto* using large ribosomal subunit (LSU) and internal transcribed spacer (ITS) rDNA sequences, and compare molecular phylogeny and morphology-based classification data. In addition, the taxonomic positions of three new species of *Crinipellis* and one new variety of *Moniliophthora* were investigated, and descriptions of these are provided.

Material & Methods

Morphology—Macroscopic descriptions of collected specimens are based on fresh basidiocarps and have been provided by the first author. Colour abbreviations follow Kornerup & Wanscher (1983), and herbarium abbreviations follow Thiers (2013). Authors of fungal names are cited according to the Authors of Fungal Names page (http://www.indexfungorum.org/AuthorsOfFungalNames.htm). Microscopic features are described from dried material mounted in H_2O, 5% KOH, Melzer's reagent, and ammoniacal Congo Red, using an Olympus BX-50 light microscope (Tokyo, Japan) with a magnification of 1000×. For basidiospores, the factors E (quotient of length and width in any one spore) and Q (mean of E-values) are used. For lamellae, L is the number of entire lamellae and l is the number of lamellulae tiers between each pair of entire lamellae.

 Accepted by Genevieve Gates: 15 Apr. 2014; published: 22 May 2014

Acknowledgements

The collection trip by the first author and studies by the other authors were financed by a research project (FP 0801-2010-01) of the Korea Forest Research Institute. The laboratory studies of the first author were enabled by the support provided to the Moravian Museum by the Ministry of Culture of the Czech Republic as part of its long-term conceptual development program for research institutions (DKRVO, ref. MK000094862).

References

Aime, M.C. & Phillips-Mora, W. (2005) The causal agents of witches' broom and frosty pod rot of cacao (chocolate, *Theobroma cacao*) form a new lineage of Marasmiaceae. *Mycologia* 97: 1012–1022.
http://dx.doi.org/10.3852/mycologia.97.5.1012

Antonín, V. (2012) *Chaetocalathus* and *Crinipellis* (Basidiomycota, Marasmiaceae) from tropical Africa: taxonomic novelties. *Cryptogamie, Mycologie* 33: 395–410.
http://dx.doi.org/10.7872/crym.v33.iss4.2012.395

Antonín, V. (2013) Monograph of *Crinipellis* and *Chaetocalathus* in tropical Africa. *Fungus Flora of Tropical Africa* 3: 1–42.

Antonín, V. & Noodeloos, M.E. (2010) *A monograph of marasmioid and collybioid fungi in Europe*. Eching. 478 pp.

Antonín, V., Ryoo, R. & Shin, H.D. (2009) Marasmioid and gymnopoid fungi of the Republic of Korea. 1. Three interesting species of *Crinipellis* (Basidiomycota, Marasmiaceae). *Mycotaxon* 108: 429–440.
http://dx.doi.org/10.5248/108.429

Antonín, V., Sedlák, P. & Tomšovský, M. (2013) Taxonomy and phylogeny of European *Gymnopus* subsection *Levipedes* (Basidiomycota, Omphalotaceae). *Persoonia* 31: 179–187.
http://dx.doi.org/10.3767/003158513x674043

Bandala, V.M., Ryoo, R., Montoya, L. & Ka, K.H. (2012) New species and new records of *Crinipellis* from tropical and subtropical forests of the east coast of Mexico. *Mycologia* 104: 733–745.
http://dx.doi.org/10.3852/11-223

Berkeley, M.J. & Broome, C.E. (1875) Enumeration of the fungi of Ceylon. Part II. *Botanical Journal of the Linnean Society* 14: 29–141.

Berkeley, M.J. & Curtis, M.A. (1869) Fungi Cubenses (Hymenomycetes). *Botanical Journal of the Linnean Society* 10: 280–392.
http://dx.doi.org/10.1111/j.1095-8339.1868.tb00529.x

Douanla-Meli, C. & Langer, E. (2008) Phylogenetic relationship of *Marasmius mbalmayoensis* sp. nov. to the tropical African *Marasmius bekolacongoli* complex based on nuc-LSU rDNA sequence. *Mycologia* 100: 445–454.
http://dx.doi.org/10.3852/07-009r2

Doyle, M.F. (1987) The genus *Crinipellis* (Basidiomycetes, Agaricales, Tricholomataceae) in Illinois. *Nova Hedwigia* 44: 281–289.

Gardes, M. & Bruns, T.D. (1993) ITS primers with enhanced specificity for basidiomycetes - application to the identification of mycorrhizae and rusts. *Molecular Ecology* 2: 113–118.
http://dx.doi.org/10.1111/j.1365-294x.1993.tb00005.x

Kerekes, J.F. & Desjardin, D.E. (2009) A monograph of the genera *Crinipellis* and *Moniliophthora* from Southeast Asia including a molecular phylogeny of the nrITS region. *Fungal Diversity* 37: 101–152.

Kornerup, A. & Wanscher, J.H. (1983) *Methuen handbook of colour. Ed. 3*. Eyre Methuen, London. 252 pp.

Kropp, B.R. & Albee-Scott, S. (2012) *Moniliophthora aurantiaca* sp. nov., a Polynesian species occurring in littoral forests. *Mycotaxon* 120: 493–503.
http://dx.doi.org/10.5248/120.493

Moncalvo, J.M., Vilgalys, R., Redhead, S.A., Johnson, J.E., James, T.Y., Aime, C., Hofstetter, V., Verduin, S.J.W., Larsson, E., Baroni, T.J., Thorn, R.G., Jacobsson, S., Clémençon, H. & Miller, O.K. Jr (2002) One hundred and seventeen clades of euagarics. *Molecular Phylogenetics and Evolution* 23: 357–400.
http://dx.doi.org/10.1016/s1055-7903(02)00027-1

Patouillard, N. (1900) *Essai taxonomique sur les familles et les genres des Hyménomycètes*. Lucien Declume, Lons-Le-Saunier. 184 pp.
http://dx.doi.org/10.5962/bhl.title.40287

Peck, C.H. (1872) Report of the Botanist (1870). *Annual Report on the New York State Museum of Natural History* 24: 41–108.

Peck, C.H. (1885) Report of the Botanist (1884). *Annual Report on the New York State Museum of Natural History* 38: 77–138.

Ronquist, F. & Huelsenbeck, J.P. (2003) MRBAYES 3: Bayesian phylogenetic inference under mixed molds. *Bioinformatics* 19: 1572–1574.

http://dx.doi.org/10.1093/bioinformatics/btg180
Saccardo, P.A. (1887) *Sylloge fungorum. Vol. 5*. Abellini. 1144 pp.
Singer, R. (1943) A monographic study of the genera *Crinipellis* and *Chaetocalathus*. *Lilloa* 8(1942): 441–534.
http://dx.doi.org/10.5962/bhl.title.80010
Singer, R. (1955) Type studies on Basidiomycetes VIII. *Sydowia* 9: 367–431.
Singer, R. (1976) Marasmieae (Basidiomycetes – Tricholomataceae). *Flora Neotropica* 17: 1–348.
Singer, R. & Digilio, A.P. (1952) Pródromo de la flora agaricina Argentina. *Lilloa* 25: 5–461.
Stevenson, G. (1964) The Agaricales of New Zealand: V. *Kew Bulletin* 19: 1–59.
http://dx.doi.org/10.2307/4108283
Swofford, D.L. (2002) PAUP*: *Phylogenetic Analysis Using Parsimony (and other methods) 4.0b10*. Sinauer Associates, Sunderland. 142 pp.
Takahashi, H. (2000) Three new species of *Crinipellis* found in Iriomote Island, southwestern Japan, and central Honshu, Japan. *Mycoscience* 41: 171–182.
http://dx.doi.org/10.1007/bf02464328
Takahashi, H. (2002) Four new species of *Crinipellis* and *Marasmius* in eastern Honshu, Japan. *Mycoscience* 43: 343–350.
http://dx.doi.org/10.1007/s102670200050
Takahashi, H. (2011) Two new species of Agaricales and a new Japanese record for *Chaetocalathus fragilis* from Ishigaki Island, a southwestern island of Japan. *Mycoscience* 52: 392–400.
http://dx.doi.org/10.1007/s10267-011-0125-4
Thiers, B. (2013, continuously updated) *Index Herbariorum: A global directory of public herbaria and associated staff*. New York Botanical Garden's Virtual Herbarium. http://sweetgum.nybg.org/ih/ (Accessed: 10 October 2013).
Vizzini, A. (2008) Miscellanea. *Rivista Micologia* 51: 63–66.
Vizzini, A., Antonín, V. & Noordeloos, M.E. (2007) *Crinipellis pedemontana* sp. nov. (Agaricomycetes), a new basidiomycete from Italy. *Mycologia* 99: 786–791.
http://dx.doi.org/10.3852/mycologia.99.5.786
White, T.J., Bruns, T., Lee, S. & Taylor, J.W. (1990) Amplification and direct sequencing of fungal ribosomal RNA genes for phylogenetics. In: Innis, M.A., Gelfand, D.H., Shinsky, J.J. & White, T.J. (eds.) *PCR Protocols: a guide to methods and applications*. Academic Press, San Diego. pp. 315–322.
Wilson, A.W. & Desjardin, D.E. (2005) Phylogenetic relationships in the gymnopoid and marasmioid fungi (Basidiomycetes, euagaric clade). *Mycologia* 97: 667–679.
http://dx.doi.org/10.3852/mycologia.97.3.667