Neotropical Ascomycetes 13. *Cornipulvina* and *Erythromada*, two new genera from the Caribbean and elsewhere

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*Corinulvina ellipsoides* is described as a new genus and species in the family Boliniaceae, order Boliniales and *Erythromada lanciospora* is described as a new genus and species in the Sordariomycetidae. *Cornipulvina* is distinguished by irregular stromata with long rostrate necks and ellipsoid ascospores lacking a germ pore. *Erythromada* differs from similar scolecosporous genera in its superficial, clustered, ovoid ascomata and its nonseptate, wider ascospores. Phylogenetic analyses of nuclear 28S large subunit (LSU) sequences supports the establishment of both genera.

**Keywords:** Boliniaceae, Neotropics, Sordariomycetidae, systematics

**Introduction**

We are surveying terrestrial wood-inhabiting pyrenomycetes in the Neotropics (Huhndorf, 1997; Huhndorf and Fernández, 1998, 2005; Fernández and Huhndorf, 2004, 2005). In this paper we report two taxa as yet unknown to science. One taxon possesses ellipsoid, one-celled ascospores and distinctive superficial stromata while the other has scolecospores and clustered ascomata. New genera are created to accommodate these taxa.

**Material and methods**

Ascomata were mounted in water and replaced with lactophenol containing azure A. Measurements were made and images were captured of

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material in both mounting fluids. Ascomata were sectioned at 5 µm for light microscopy using techniques modified from Huhndorf (1991): the use of osmium tetroxide as a secondary fixative is discontinued, acetone is used for dehydration in place of ethanol and Spurr’s embedding medium replaces the Low Viscosity medium no longer available. Images were captured using photomicrography, bright field (BF), phase contrast (PH) and differential interference microscopy (DIC) and photographic plates were produced following the methods of Huhndorf and Fernández (1998). Abbreviations for collectors are SMH = S.M. Huhndorf, FAF = F.A. Fernández, ANM = A.N. Miller, DJL = D.J. Lodge and GJS = G.J. Samuels. When no collector is listed, the collector is identified by the collection number. All SMH collections are deposited in the Field Museum Mycology Herbarium (F). Latitude and longitude are given in degrees or calculated decimal equivalents. All specimens were collected from decorticated wood unless otherwise noted and dimensions given for the substrates are diameters.

**DNA extraction, PCR amplification, sequencing and sequence alignment**

Methods for DNA extraction, PCR amplification and sequencing of the LSU gene along with procedures for the alignment of LSU sequences have been fully described elsewhere (Huhndorf et al., 2004; Miller and Huhndorf, 2005).

**Phylogenetic analyses**

Portions of the 5’ and 3’ ends of the LSU gene along with the single spliceosomal intron, which occurred in *Linocarpon appendiculatum*, were excluded from all analyses. Nine ambiguously aligned regions were delimited and recoded as nine unequivocally coded characters using INAASE 2.3b (Luzoni et al., 2000). The remaining unambiguously aligned characters were subjected to a symmetric stepmatrix generated with the program STMatrix 2.2 (François Lutzoni & Stefan Zoller, Dept. of Biology, Duke University). Unequally weighted maximum parsimony analyses were conducted using PAUP* 4.0b10 (Swofford, 2002) as follows: constant characters were excluded, gaps were treated as missing, 20,000 random-addition replicates were implemented with TBR branch-swapping, MULTREES option was in effect, and zero-length branches were collapsed. Bootstrap support was estimated by performing 2000 bootstrap replicates (Felsenstein, 1985), each consisting of a heuristic search with 100 random-addition replicates using the above settings. Two members of the Xylariales were used as outgroup taxa.
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based on previous analyses (Huhndorf et al., 2004; Miller and Huhndorf, 2004, 2005).

Maximum likelihood analyses were conducted as above using PAUP* 4.0b10 except constant characters were included, 1000 random-addition replicates were implemented, and TBR branch-swapping was subjected to a reconnection limit of 12. The nucleotide substitution model calculated by Modeltest 3.7 (Posada and Crandell, 1998) was the GTR model (Rodríguez et al., 1990) with unequal base frequencies (freqA = 0.2442, freqC = 0.2145, freqG = 0.3164, freqT = 0.2249), a substitution rate matrix (A<–>C = 1.9111, A<–>G = 5.1823, A<–>T = 2.9437, C<–>G = 2.003, C<–>T = 15.2693, G<–>T = 1.000), a proportion of invariable sites = 0.4869, and a gamma distribution shape parameter = 0.5253.

Analyses of Bayesian inference were conducted using MrBayes 3.1 (Ronquist and Huelsenbeck, 2003). The GTR model was implemented as above, and four independent runs, each consisting of four MCMC chains, were ran for 10,000,000 generations with trees sampled every 1000th generation resulting in 10,000 total trees. The first 1,000 trees, which extended well beyond the burn-in phase in each analysis, were discarded and the remaining 9,000 trees were used to calculate posterior probabilities.

**Results**

Maximum likelihood analyses of LSU sequences generated a single most likely tree (Fig. 1). This tree did not differ in topology from the single most parsimonious tree generated in unequally weighted maximum parsimony analyses (data not shown) except for the placement of *Leptosporella gregaria*. The establishment of two new genera for these recently discovered taxa is supported by both molecular and morphological data.

**Cornipulvina** Huhndorf, A.N. Mill., F.A. Fernández & Lodge, *gen. nov.*

*Etymology*: L. *cornis* = horned; *pullinus* = cushion, refers to the stromal structure.


*Typus generis*: *Cornipulvina ellipsoides* Huhndorf, A.N. Mill., F.A. Fernández & Lodge

Fig. 1. Phylogram of the single most likely tree (\(-\ln L = 4979\)) generated from a maximum likelihood analysis of 1205 bp of the 5' end of nuclear LSU rDNA for 28 ascomycete sequences. Thickened branches indicate Bayesian posterior probabilities \( \geq 95\% \) while numbers above branches refer to maximum parsimony bootstrap values \( \geq 50\% \). GenBank accession numbers follow taxon names.
**Cornipulvina ellipsoides** Huhndorf, A.N. Mill., F.A. Fernández & Lodge, sp. nov. (Figs. 2-10)

*Etymology:* Refers to the shape of the ascospores.

*Stroma* superficialis, forma irregularia, 1-7 mm diam; longirostria; extus fusca et intus fulva; textura mollia. *Perithecia* subglobosa, 400-500 µm diam, monostichich. Paries perithecis in sectione longitudinali 20-25 µm crassus, unistratiatus. *Papilla* longi-cylindracea, 250-275 µm lata, 200-1100 µm alta. *Paraphyses* angustae. *Asci* cylindracei, 55-65 × 5.5-6.5 µm, brevis-stipitati, annulo apicali brevi, 2-2.5 µm lata, 1-1.5 µm alta. *Ascosporiae* ellipsideo, 7-9 × 3.5-4 µm, nonseptatae, hyalinae, sine vagina vel appendicibus.

*Stroma* superficial, irregular shaped, from 1-7 mm wide, 0.8-0.9 mm high, with projecting long and short necks, outer surface brown to blackish with pale brown ostiolar and neck apices, internally pale brown, texture soft, composed of loosely packed pseudoparenchymatic cells. *Perithecia* subglobose, 400-500 µm diam., monostichous, with long to short necks. *Perithecial wall* in longitudinal section uniformly 20-25 µm thick, 1-layered, composed of polygonal to elongate pseudoparenchymatic cells (8-12 × 2-3.5 µm). *Ascomata* short to elongate, emergent from the stroma, new necks proliferating through locations of old, broken necks, 250-275 µm wide, 200-1100 µm long, ostioles circular, 25-30 µm diam., with periphyses. *Paraphyses* tapering, narrowing toward the apex, 1.5-2.5 µm wide, sparse, persistent, without gelatinous coating. *Asci* cylindrical, 55-65 × 5.5-6.5 µm, short stalked, numerous, basal and lateral, lining the peripheral wall of the centrum, unisericate, apex with a short, wide ring, 2-2.5 µm wide, 1-1.5 µm high, with 8 uniseriate ascospores. *Ascospores* ellipsoid, 7-9 × 3.5-4 µm, straight, hyaline, nonseptate, smooth, no germ pore seen, without sheath or appendages.

*Anamorph* not seen.

*Habitat:* On decorticated wood.

*Known distribution:* Brazil, Puerto Rico, Venezuela.


**Erythromada** Huhndorf, A.N. Mill., F.A. Fernández & Lodge, gen. nov.

*Etymology:* L. *Erythro* = red; *omada* = group, refers to the color and clustered habit of the ascomata.


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**Erythromada lanciospora** Huhndorf, A.N. Mill., F.A. Fernández & Lodge, sp. nov.  
(Figs. 11-26)

*Etymology*: *lanciospora* = spore armed with a lance or point


*Ascomata* obpyriform to ovoid, 400-550 µm diam., 500-700 µm high, not collapsing when dried; superficial, numerous, clustered on a basal stroma, nonpapillate, surface glabrous, slightly roughened, red brown appearing striate at the apex. *Ascomatal wall* of *textura angularis-globosa* in surface view; in longitudinal section 70-90 µm thick at the sides, thicker at the base where it is part of the basal stroma; 2-layered, inner layer composed of thick-walled pseudoparenchymatic to scleroplectenchymatic cells (6-12 × 3-7 µm), elongate, compressed and flattened towards the centrum, outer layer composed of polygonal to isodiametric and intermittently melanized cells. *Ascomatal apex* broadly rounded, ostiole circular, 30-60 µm wide, periphysate. *Paraphyses* tapering, 4.5-7.5 µm wide at the base, narrowing toward the apex, 1.5-3.5 µm wide, abundant, persistent, without gelatinous coating. *Asci* curved fusiform to widely falcate (narrower at the apex and base, wide in the middle); 120-185 × 15-25 µm, short-stalked, numerous, basal and lateral, lining the peripheral wall of the centrum, unitunicate, apex with a large, cylindrical ring, 2.5-3.5 µm wide, 1.7-2.8 µm high, with 8 tetraseriate ascospores. *Ascospores* long fusiform to falcate, apical end pointed, basal end tapering and pointed, (60-) 70-100 (-110) × 3.5-5.2 µm, slightly curved, hyaline, smooth, nonseptate, without sheath or appendages.

*Anamorph*: phialidic, from culture (culture from SMH4377 subsequently died). Not seen on the substrate. *Conidiophores* on CMA mononematous, branched, hyaline to pale brown, septate. *Conidiogenous cell* a phialide, cylindrical, narrowing to the apex, 25-35 × 1.5-3.5 µm, with a single apical collarette, 2-2.5 µm wide, 1-2.5 µm deep, not proliferating percurrently. *Conidia* hyaline, cylindrical to clavate, rounded at the apex with a truncate base, nonseptate, 9-13 × 2-2.5 µm.

Figs. 2-10. *Cornipulvina ellipsoides*. 2, 3. Stromata on the substrate. 4. Paraphyses. 5. Ascospores. 6. Ascus apex showing ring. 7. Longitudinal section through stroma. 8. Ascus. 9. Longitudinal section through stromal and perithecial wall. 10. Longitudinal section through apex of perithecial neck. Figs. 2, 3 by photomacrography; Figs. 4, 6, 7, 10 by PH; Figs. 5, 8, 9 by DIC. All figures from holotype SMH1378. Bars: 2, 3 = 1 mm; 7 = 500 µm; 9, 10 = 50 µm; 4-6, 8 = 10 µm.
Habitat: On dead wood and bark.

Known distribution: Costa Rica, Ecuador, French Guiana, Puerto Rico.


Discussion

Both of these taxa were first recognized from Puerto Rican collections and subsequently found in other neotropical areas. Based on morphological characters the taxonomic position of both genera was not readily apparent. *Cornipulvina* has stromata and long necks that suggested an affiliation with the *Thyridiaceae*. The ascospores of *Erythromada* resembled *Rimacomas jamaicensis* Huhndorf, F.A. Fernández, J.E. Taylor, & K.D. Hyde (Huhndorf et al., 2001) or *Duradens* Samuels & Rogerson (Samuels and Rogerson, 1990) but the ascomata are superficial not immersed to erumpent, as in these other genera. The analyses of LSU sequences shows that *Cornipulvina* is related to taxa in the *Boliniales* while *Erythromada* clustered in a large unsupported group of *Sordariomycetidae* that is near taxa in the *Chaetosphaeriales* (Fig. 1).

*Cornipulvina* has a soft-textured stroma similar to some members of *Camarops* and *Apiocamarops*, but differs in its monostichous perithecia with very long, superficial necks. Immersed long necks are often found in members

of the Boliniaceae with large stromata where the perithecia are polystichous. Ascospores in Cornipulvina are one-celled ellipsoid in shape, similar to some members in the family but not noticeably flattened and also differing in lacking an apparent germ pore.

Several sclecosporous taxa occur in the large unsupported Sordariomycetidae group that contains Erythromada. Most closely related, with strong bootstrap support is Rimaconus jamaicensis. The overall group also contains Leptosporella gregaria Penz. & Sacc., Duradens sp. and Linocarpon appendiculatum K.D. Hyde but their relationships to Erythromada are unclear (Fig. 1). All five taxa have elongate, hyaline ascospores but L. gregaria and L. appendiculatum differ in spores that are narrower while Duradens has wider spores and Rimaconus has wider, septate spores. Erythromada differs from all of these taxa by having superficial, clustered, ovoid ascomata rather than erumpent, conical ones. Also in the group is Lasiosphaeriella nitida Huhndorf & F.A. Fernández which has superficial, clustered, ovoid ascomata but differs from the other taxa in having wide, allantoid ascospores (Huhndorf and Fernández, 1999).

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References


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