

NOTES

Caribbean Journal of Science, Vol. 40, No. 1, 139-144, 2004
Copyright 2004 College of Arts and Sciences
University of Puerto Rico, Mayagüez

An Updated Checklist of the Discomycetes for the Dominican Republic and the Caribbean Region

SHARON A. CANTRELL^{1*}, TERESA ITURRIAGA² AND DONALD H. PFISTER³ ¹*Science & Technology, Universidad del Turabo, P. O. Box 3030, Gurabo, P. R. 00778, USA*, ²*Universidad Simón Bolívar, Apartado 89000, Sartenejas, Baruta, Edo. Miranda, Venezuela*, ³*Harvard University Herbaria, 22 Divinity Ave., Cambridge, MA 02138, USA* *Corresponding author e-mail: scantrel@suagm.edu

ABSTRACT.—An expedition to the Dominican Republic to survey discomycetes was conducted in January 2002. In this expedition, 111 discomycete samples were collected: 22 Pezizales, 81 Helotiales, 6 Ostropales and 2 Rhytismatales. This field trip added 39 new reports for the Dominican Republic. To date, 79 species of discomycetes are known in the Dominican Republic in the following orders: 34 Pezizales, 42 Helotiales, 2 Ostropales and 1 Rhytismatales. The great majority (87%) of these species are our new reports for the Dominican Republic and about 38% are new for the Greater Antilles and the Caribbean region. Most of the species of discomycetes known in the Dominican Republic are of tropical origin. Some of the reports are discomycete species from north temperate regions: *Morchella*, *Gyromitra*, *Helvella*, *Pseudoplectania nigrella*, *Plectania melastoma*, *Leotia viscosa*, *Podophacidium xanthomelum* and *Lachnum virgineum*. Based on our work from Dominican Republic, we can conservatively predict 20% of the material collected should represent new records and new taxa.

KEYWORDS.—Pezizales, Helotiales, Ostropales, Rhytismatales

Ascomycota with apothecial ascomata, the discomycetes, are commonly referred to as the cup-fungi. This fruit body shape was traditionally used to group species into orders and families but recent molecular phylogenies show discomycetes are a highly diverse group (Cantrell 1996; Eriksson & Winka 1997; Gargas & Taylor 1995; Gern-

andt et al. 2001; Korf 1973; Pfister & Kimbrough 2000). Boudier (1885) made the first distinction between the two larger groups of discomycetes based on the presence or absence of an operculum (a lid) at the ascus tip. In recognition of this difference in ascus dehiscence, he proposed two large sections, the operculatae and inoperculatae discomycetes. In the operculate discomycetes there is a single order -Pezizales. There are five commonly accepted orders in the non-lichenized inoperculate discomycetes: Cyrtariales (not represented in the Caribbean region and restricted to the Southern Hemisphere), Helotiales, Leotiales, Ostropales, and Rhytismatales (Hawksworth et al. 1995; Korf pers. comm.; Korf & Lizoñ 2000). Pfister and Kimbrough (2000) recognize several other orders.

The Dominican Republic is part of the Greater Antilles in the insular Caribbean and is considered one of the biodiversity "hotspots" of the world (Myers et al. 2000). In this region the discomycetes have been poorly studied, particularly the inoperculate discomycetes. Early works of Hispaniola include Berkeley (1852), Ciferri (1929) and Benjamin & Slot (1969). Pfister (1974) prepared a checklist of 70 species of Pezizales for the Caribbean area. Other works and the number of species reported in the literature for the Greater Antilles are summarized in Table 1.

The senior author has collected discomycetes in the Dominican Republic sporadically for the past 6 years. In January 2002, the authors conducted a field trip to the Dominican Republic, in which, 111 discomycete samples were collected: 22 Pezizales, 81 Helotiales, 6 Ostropales and 2 Rhytismatales. These recent collections are deposited in the Herbarium of the Jardín Botánico Nacional de Santo Domingo and in the Farlow Herbarium of Harvard University. To date, 79 species of discomycetes are known in the Dominican Republic in the following orders: 34 Pezizales, 42 Helotiales, 2 Ostropales and 1 Rhytismatales (Table 2). The great majority (87%) of these species are our new reports for the Dominican Republic and about 38% are new for

TABLE 1. List of species for the Greater Antilles based on the literature.

Reference	Pezizales	Helotiales	Rhytismatales	Ostropales
Berkeley (1852), Dominican Republic	2			
Berkeley & Curtis (1868), Cuba	19	30	13	5
Seaver (1925), Puerto Rico	11	9		
Ciferri (1929), Dominican Republic	8			
Dennis (1954a), All Greater Antilles		32		
Dennis (1954b), Jamaica	7			
Benjamin & Slot (1969), Haiti	1	2	1	
Pfister (1974), Caribbean Area	70			
Stevenson (1975), Puerto Rico	30	18	4	3
Minter et al. (2001), Caribbean Area	117	171	28	451

the Greater Antilles and the Caribbean region. There were no previous reports of members of the Helotiales for the Dominican Republic; thus, all species listed in Table 2 in the Helotiales are new, and of these 17% are apparently new species. Seven species were previously reported within the Pezizales by Pfister (1974), these are: *Ascobolus scatigenus* (Berk. & M. A. Curtis) Brumm., *Cheilymenia coprinaria* (Cooke) Boud., *Cookeina speciosa* (Fr.:Fr.) Dennis, *C. tricholoma* (Mont.) O. Kuntze, *Coprobria granulata* (Bull.: Fr.) Boud., *Phillipsia dominicensis* (Berk.) Berk. and *Saccobolus glaber* (Pers.:Pers.) Lambotte. Seventy-six percent of the species found in the Dominican Republic have a tropical distribution. *Cookeina* and *Phillipsia* are two genera that are tropical in origin. An interesting finding is our collection of *Sarcoscypha javensis* Höhn., a pantropical species originally reported from Java and used by Harrington (1998) to study the phylogenetic relationship in the genus *Sarcoscypha*. Some of the more common and interesting discomycetes are shown in Figures 1-10.

Some reported species new to the Caribbean region are discomycetes species that are common in north temperate regions (24%) (Baroni et al. 1997). From the Pezizales we have collected representatives of several genera that are primarily known from north temperate regions. All these species were found under an endemic pine forest of *Pinus occidentalis* Schwartz at ca. 2000-2500 m. Two collections of a *Morchella* sp. near the *M. elata* Fr. complex probably represent a new species based on molecular results (O'Donnell, pers. comm.). Other

species of *Morchella* have been reported in the neotropics at high elevations in Mexico, Guatemala, Costa Rica, Argentina, Cuba and Venezuela (Gomez 1971; Guariglia 1987; Guzman et al. 1985). In the same habitat *Gyromitra esculenta* (Pers.) Fr., *G. infula* (Schaeff.:Fr.) Quél., and *Helvella macropus* (Pers.:Fr.) P. Karst. were also collected. We encountered a large number of fruiting bodies of *Pseudoplectania nigrella* (Pers.:Fr.) Fuckel, a montane species growing on litter among mosses in coniferous forests. This is the second report of this species in the Caribbean; previously reported from the Blue Mts. of Jamaica (Seaver 1951; Pfister 1974). *Plectania melastoma* (Sowerby:Fr.) Fuckel, a very common species in North America, was collected once in the pine forest in the Dominican Republic. Another interesting collection was a beautiful dark-green *Peziza*, which was found fruiting abundantly on buried rotten wood in a ravine surrounded by pine and fern forest in the Central Mountain range near Valle Nuevo in the Dominican Republic. This *Peziza* might represent a new species.

In respect to the orders Leotiales and Helotiales we found similar distributional patterns. The genus *Leotia* is very common in northeastern North America, where *L. lubrica* Pers. is the most frequently observed species. Our collections of *L. viscosa* Fr. are the first report of this genus in the insular Caribbean (Baroni et al. 1997). Another surprising finding was *Podophacidium xanthomelum* (Pers.) Kavina, a rare species from northern North America and Europe. This species was fruiting abundantly in the endemic pine forests in the Central Mountain

TABLE 2. List of species for the Dominican Republic

Order Pezizales	
<i>Acervus flavidus</i> (Berk. & M. A. Curtis) Pfister	<i>Kompsoscypha</i> sp.#
<i>Ascobolus scatigenus</i> (Berk. & M. A. Curtis) Brumm.*	<i>Pachyella babingtonii</i> (Berk.) Boud.#
<i>Cheilymenia coprinaria</i> (Cooke) Boud.*	<i>Peziza</i> cf. <i>repanda</i> Per.: Fr.
<i>Cheilymenia thelebolooides</i> (Alb. & Schwein.: Fr.) Boud.	<i>Peziza</i> sp. nov.
<i>Cookeina speciosa</i> (Fr.:Fr.) Dennis**	<i>Phillipsia</i> cf. <i>hartmannii</i> (W. Phillips in Cooke) Rifai
<i>Cookeina tricholoma</i> (Mont.) O. Kuntze*	<i>Phillipsia crispata</i> Berk. & M. A. Curtis
<i>Cookeina venezuelae</i> (Berk. & M. A. Curtis) Le Gal	<i>Phillipsia domingensis</i> (Berk.) Berk.*
<i>Coprobria granulata</i> (Bull.: Fr.) Boud.*	<i>Plectania melastoma</i> (Sowerby:Fr.) Fuckel#
<i>Coprobria striata</i> (K. S. Thind, E. K. Cash & Pr. Singh) Waraith	<i>Plectania rhytidia</i> (Berk.) Nannf. & Korf
<i>Geopora septulta</i> (Fr.) Korf & Burds.#	<i>Pseudoplectania nigrella</i> (Pers.: Fr.) Fuckel
<i>Gyromitra esculenta</i> (Pers.) Fr.#	<i>Pulvinula</i> cf. <i>convexella</i> (P. Karst.) Pfister#
<i>Gyromitra infula</i> (Schaeff.:Fr.) Quél.#	<i>Pulvinula globifera</i> (Berk. & M. A. Curtis) Le Gal
<i>Helvella</i> cf. <i>atra</i> Holmsk.:Fr.	<i>Saccobolus glaber</i> (Pers.:Pers.) Lambotte*
<i>Helvella macropus</i> (Pers.:Fr.) P. Karst.#	<i>Sarcoscypha javensis</i> Höhn.#
<i>Humaria hemisphaerica</i> (F. H. Wiggers:Fr.) Fuckel#	<i>Scutellinia balansae</i> (Speg.) Gamundi
<i>Morchella</i> cf. <i>elata</i> Fr.#	<i>Scutellinia cubensis</i> (Berk. & M. A. Curtis) Gamundi
	<i>Scutellinia jungnerii</i> (Henn.) Clem.
	<i>Sphaerospora brunnea</i> (Alb. & Schwein.:Fr.) Svr̄ja & Kubička#
Order Helotiales	
<i>Arachnopeziza</i> sp.#	<i>Lachnum</i> sp. nov. 1
<i>Ascocoryne sarcoides</i> (Jacq.) J. W. Groves & D. E. Wilson	<i>Lachnum</i> sp. nov. 2
<i>Bisporella citrina</i> (Batsch:Fr.) Korf & S. E. Carp.#	<i>Lachnum</i> sp. nov. 3
<i>Chlorociboria aeruginosa</i> (Pers.) Seaver ex Rammamurthi, Korf & L. R. Batra#	<i>Lachnum</i> sp. nov. 4
<i>Cistella</i> sp. nov.#	<i>Lachnum virgineum</i> (Batsch:Fr.) P. Karst.#
<i>Diccephalospora rufocornea</i> (Berk. & Broome) Spooner#	<i>Lambertella</i> sp.
<i>Encoelia heteromera</i> (Mont.) Nannf.	<i>Lasiobelonium</i> sp. nov.
<i>Geoglossum</i> sp.	<i>Leotia viscosa</i> Fr.#
<i>Hyalorbilia inflatula</i> (P. Karst.) Baral & Marson	<i>Moellerodiscus</i> sp.
<i>Hyaloscypha aureliella</i> (Nyl.) Huhtinen#	<i>Mollisia</i> sp.
<i>Hymenoscyphus</i> cf. <i>fuscopurpureus</i> (Rehm) Dennis#	<i>Neodasyscypha</i> sp. nov.#
<i>Hymenoscyphus</i> cf. <i>lutescens</i> (Hedw.) W. Phillips#	<i>Orbilia</i> sp.
<i>Lachnellula calycina</i> Sacc.	<i>Orbiliaster</i> sp.
<i>Lachnum brasiliense</i> (Mont.) J. H. Haines & Dumont	<i>Podophacidium xanthomelum</i> (Pers.) Kavina#
<i>Lachnum euterpes</i> S. A. Cantell & J. H. Haines	<i>Polydesmia dumontii</i> (Korf) Korf#
<i>Lachnum fimbriiferum</i> (Berk. & M. A. Curtis) J. H. Haines	<i>Rhizodiscina lignyota</i> (Fr.) Hafellner
<i>Lachnum lanariceps</i> (Cooke & W. Phillips) Spooner	<i>Sorokina</i> sp.
<i>Lachnum pteridophyllum</i> (Rodway) Spooner	<i>Strossmayeria</i> sp.
<i>Lachnum sclerotii</i> (A. L. Sm.) J. H. Haines & Dumont	<i>Torrendiella</i> sp.
	<i>Trichoglossum hirsutum</i> (Pers.:Fr.) Boud.
	<i>Unguicularia</i> sp.
	<i>Unguiculariopsis</i> sp.
	<i>Vibrissea</i> sp.
Order Ostropales	Order Rhytismatales
<i>Ostropa</i> sp.#	<i>Coccomyces clusiae</i> (Lév.) Sacc.
<i>Stictis radiata</i> (L.) Pers.	

Species in bold represent north temperate lineages.

*Reported by Pfister (1974)

**Previously reported as *Cookeina sulcipes* (Berk.) Kuntze by Pfister (1974).

#New report for the Greater Antilles



FIG. 1. *Pseudoplectania nigrella*.
 FIG. 2. *Morchella* spp.
 FIG. 3. *Phillipsia domingensis*.
 FIG. 4. *Acervus flavidus*.
 FIG. 5. *Peziza* spp.
 FIG. 6. *Helvella macropus*.
 FIG. 7. *Plectania melastoma*.
 FIG. 8. *Encoelia heteromera*.
 FIG. 9. *Podophacidium xanthomelum*.
 FIG. 10. *Lachnum pteridophyllum*.

range near Valle Nuevo. A very common species of *Lachnum*, *L. virgineum* (Batsch:Fr.) P. Karst., which grows on stems of *Rubus* in north temperate areas, was collected at high elevation in the Dominican Republic also on stems of *Rubus* sp. *Lachnellula calycina* Sacc. is also common species in North America associated with coniferous wood. This species was collected at high elevation on wood of *P. occidentalis*.

Based on our work from Dominican Republic and studies from other parts of the world, as Spooner (1987) for Australasia, we conservatively predict 20% of the material collected should represent new records and new taxa for the Dominican Republic. We can expect a higher number (25-75%) particularly for inconspicuous discomycetes, such as members in the Ostropales and Rhytismatales, and Dermateaceae, Hyaloscyphaceae and Orbiliaceae of the Helotiales. In this study, the rate of discovery observed for new species, 17%, shows that more extensive studies are needed. Even though most of the discomycetes found in the endemic pine forests are temperate species, more attention should be given to this habitat before growing agriculture in the area destroys it. The study of species belonging to these orders of discomycetes will contribute to ongoing research that is aimed at elucidating the origin of fungal species in the Greater Antilles.

Acknowledgements.—We would like to give our sincere gratitude to Martín Luciano De La Cruz and Omar Paino-Perdomo, who helped us with our field work in the Dominican Republic. We would like to give our sincere thanks to Ramón Elías Castillo of the Fundación Progreso for allowing the use of the Ebano Verde Reserve, Juan Gilberto Torres of Plan Sierra for allowing collecting in their facilities in San José de las Matas, Andrés Ferrer, from the Fundación Moscoso Puello, for the help given in obtaining permits and the use of facilities in Valle Nuevo and Milciades Mejías and Daisy Castillo of the Herbarium of the Jardín Botánico Nacional de Santo Domingo. This study was funded through an NSF BS&I SGER Grant to the Universidad del Turabo.

LITERATURE CITED

- Baroni, T. J., D. J. Lodge, and S. A. Cantrell. 1997. Tropical Connections: Sister species and species common between the Caribbean and the Eastern United States. *McIlvainea* 13:4-19.
- Benjamin, C. R., and A. Slot. 1969. Fungi of Haiti. *Sydowia* 23:125-163.
- Berkeley, M. J. 1852. Enumeration of some fungi from Santo Domingo. *Ann. Mag. Nat. Hist.* II. 9:209-201.
- Berkeley, M. J., and M. A. Curtis. 1868. On a collection of fungi from Cuba. Part. II. Including those belonging to the families Gasteromycetes, Coniomycetes, Hyphomycetes, Phycomycetes, and Ascomycetes. *J. Linn. Soc. (Bot.)* 10:280-392.
- Boudier, E. 1885. Nouvelle classification naturelle des discomycetes Charnus. *Bull. Soc. Mycol. Fr.* 1:91-120.
- Cantrell, S. A. 1996. Phylogenetic relationships in the family Hyaloscyphaceae (Helotiales, Discomycetidae, Ascomycotina). Ph.D. diss., University of Georgia.
- Ciferri, R. 1929. Mycoflora Domingensis Integrata. *Quaderno* 19:1-539.
- Dennis, R. W. G. 1954a. Operculate Discomycetes from Trinidad and Jamaica. *Kew. Bull.* 9:409-421.
- Dennis, R. W. G. 1954b. Some inoperculate Discomycetes of Tropical America. *Kew. Bull.* 9:289-348.
- Eriksson, O. E., and K. Winka. 1997. Supraordinal taxa of Ascomycota. *Myconet* 1:1-16.
- Gargas, A., and J. W. Taylor. 1995. Phylogeny of Discomycetes and early radiations of the apothecial Ascomycotina inferred from SSU rDNA sequences data. *Exp. Mycol.* 19:7-15.
- Gernandt, D. S., J. L. Platt, J. F. Stone, J. W. Spatafora, A. Holst-Jensen, R. C. Hamelin, and L. Kohn. 2001. A nuclear ribosomal DNA small subunit phylogeny of the Helotiales and Rhytismatales. *Mycologia* 93:915-933.
- Gomez, L. D. 1971. Un nuevo Discomycete operculado de América Central: *Morchella herediana*, nov. sp. *Darwiniana* 16:417-426.
- Guariglia, M. 1987. Primer reporte del género *Morchella* para Venezuela. *Acta Bot. Venez.* 15:19-21.
- Guzman, G., M. F. Torres, H. Logemann, J. Argueta, and I. Sommerkamp. 1985. Fungi from Guatemala. I. A new species of *Morchella*. *Mycologia Helvetica* 1:451-459.
- Harrington, F. A. 1998. Relationships among *Sarcoscypha* species: evidence from molecular and morphological characters. *Mycologia* 90:235-243.
- Hawksworth, D. L., P. M. Kirk, B. C. Sutton, and D. N. Pegler. 1995. *Ainsworth & Bisby's Dictionary of the Fungi*. Eighth Ed. IMC, CAB International, UK.
- Korf, R. P. 1973. Discomycetes and Tuberales. In *The Fungi, An Advanced Treatise* 4A, eds. G. C. Ainsworth, F. K. Sparrow and A. S. Sussman, 249-319. New York: Academic Press.
- Korf, R. P. and P. Lizoň. 2000. Validation of Nannfeldts ordinal name Helotiales. *Mycotaxon* 75:501-502.
- Minter, D. W., M. Rodríguez-Hernández, and J. Mena-

- Portales. 2001. *Fungi of the Caribbean. An annotated checklist*. UK: PDMS Publishing.
- Myers, N., R. A. Mittermeier, C. G. Mittermeier, G. A. B. da Fonseca, and J. Kent. 2000. Biodiversity hotspots for conservation priorities. *Nature* 403:853-858.
- Pfister, D. H. 1974. Notes on Caribbean Discomycetes. V. A preliminary annotated checklist of the Caribbean Pezizales. *J. Agriculture of the University of Puerto Rico* 58:358-378.
- Pfister, D. H. and J. W. Kimbrough. 2000. Discomycetes. In *The Mycota: A comprehensive treatise on fungi as experimental systems for basic and applied research*, ed. D. J. McLaughlin, E. G. McLaughlin and P. A. Lemke, 257 - 281. New York: Springer-Verlag.
- Seaver, F. J. 1925. Studies in tropical Ascomycetes. III. Porto Rican Cup-fungi. *Mycologia* 18:45-50.
- Seaver, F. J. 1951. *The North American Cup Fungi (Inoperculates)*. New York: Publ. by the author.
- Spooner, B. M. 1987. Helotiales of Australasia: Geoglossaceae, Orbiliaceae, Sclerotiniaceae, Hyaloscyphaceae. *Biblioth. Mycologica* 116:1-711.
- Stevenson, J. A. 1975. *Fungi of Puerto Rico and the American Virgin Islands. Contribution of Reed Herbarium No. 23*, Baltimore, Maryland.