The rust fungi (Uredinales) of Guyana

J.R. Hernández[1], M.C. Aime[2] and T.W. Henkel[3]

[1] USDA/ARS, Systematic Botany and Mycology Lab, 10300 Baltimore Ave., Beltsville, Maryland, USA 20705-2350; e-mail: jose@nt.ars-grin.gov
[2] USDA/ARS, Systematic Botany and Mycology Lab, 10300 Baltimore Ave., Beltsville, Maryland, USA 20705-2350; e-mail: cathie@nt.ars-grin.gov
[3] Department of Biological Sciences, Humboldt State University, 1 Harpst St., Arcata, CA, 95521; email: twh5@humboldt.edu

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This compilation of the rust fungi of Guyana is based on collections made recently in Guyana, specimens in the US National Fungus Collection (BPI), and literature reports. Here, 55 species of Uredinales are recorded for Guyana, including 20 new records for the country and four new species: *Malupa pakaraimensis, Ravenelia guyanensis, Uredo baruensis,* and *Uromyces neotropicalis*. A host-fungus list by plant family is provided.

Keywords: biodiversity, *Malupa pakaraimensis,* neotropical, Pakaraima mountains, *Ravenelia guyanensis, Uredo baruensis, Uromyces neotropicalis.*

The rust fungi of Guyana (formerly British Guiana) were first documented from collections made by F.L. Stevens (Sydow 1925). Stevens collected parasitic fungi during the summer of 1922 in different locations of Guyana, including Georgetown, the Demerara-Essequibo railroad, Coverden, Tumatumari, and Kartabo. He sent the rust collections to Sydow, who reported 29 rust species from the country (Sydow 1925). Stevens published notes and descriptions of the non-rust collections from that trip (Stevens 1923) and provided details on collecting dates and locations for all specimens. Dennis (1970) treated fungi of Venezuela and surrounding countries, including Guyana. His reports of 21 rust fungi from Guyana were based on Sydow's treatment of Stevens' collections.

This study reports on Uredinales collected from an area of extensive, primary tropical forest in the Pakaraima Mountains of west-central Guyana near the Venezuelan and Brazilian borders, and in the coastal capital, Georgetown. The vegetation in the Pakaraima Montane Region is Dry Evergreen Forest and consists of a high canopy forest dominated by *Dicymbe corymbosa* and *Eperua* spp. (Caesalpinoideae, Fabaceae), as well as species of *Cassia, Chrysophyllum, Micrandra, Dimorphandra, Ormosia,* and *Qualea* (Fanshawe 1952).

Georgetown is located in the highly disturbed Coastal Region (Fanshawe 1952) where much of the flora has been introduced.

In addition to the recent collections, more than eighty specimens of rusts from Guyana housed in the U.S. National Fungus Collection (BPI) were examined. As a result, 55 species are recorded for Guyana in this paper, including four new species and 20 new records for the country. Finally, a host-fungus list arranged by plant family is provided.

Materials and Methods

Fresh collections were made in the Upper Potaro River Basin in the west-central Pakaraima Mountains (general area: 5° 16' N, 59° 54' W) and Georgetown, Guyana between June 23–July 13, 2003 (JRH & MCA), and December 29, 2003 – January 13, 2004 (MCA). For a detailed description of the Upper Potaro site see Henkel (2003). Collections were pressed in a conventional plant press and slowly dried by suspension over a camp fire. Also, collections of rusts from Guyana made previously, now housed in the U.S. National Fungus Collection, were examined. Material was mounted in aqueous lactic acid and examined using a Zeiss Axioplan 2 microscope with bright-field optics. Size ranges in species descriptions are based on at least 20 measurements of each structure. Digital images were taken using a Nikon Coolpix 995 and a Nikon DXM 1200. Specimens from all recent Guyana collections by the authors were deposited in BRG (University of Guyana, Georgetown) and BPI (U.S. National Fungus Collection, Beltsville, Maryland). Authority names are based on recommendations given in Authors of Fungal Names (CABI): http://www.index-fungorum.org/FungalNameAuthors.pdf. Roman numerals indicating rust stages (0: spermogonial; I: aecial; II: uredinial; III: telial) observed on collections, are given after collection numbers. Nomenclators are based in general on Hennen *et al.* (2005) and Lindquist (1982) and on references cited for individual species.

Results and Discussion

This treatment of Uredinales of Guyana greatly expands our knowledge of rusts of that country and the neotropics in general. Stevens collected in five localities in Guyana and found 29 different species of rust fungi (Sydow 1925). Sydow (1925) suggested that the region was likely poor in this group of fungi. However, our collections that were made over a relatively short period of time in only two areas in Guyana nearly doubles the number of rusts known from that country and includes four new species. This suggests that the area is

rich in Uredinales and that collecting in other parts of Guyana will likely yield many additional species.

Species are treated alphabetically by genus. Each name is followed by synonyms, a list of specimens examined, hosts, distribution, and comments where needed. Descriptions and images of many species are available at http://www.ars.usda.gov/main/site_main.htm?modecode=12-75-39-00.

Aecidium rionegrense Henn., Hedwigia 43: 166. 1904.

Specimens examined. – GUYANA: Wismar, on Annonaceae undet., 14 July 1922, F.L. Stevens 273 (BPI 153220, BPI 153222, BPI 153223) I; Demerara-Essequibo railroad, on Annonaceae undet., 15 July 1922, F.L. Stevens 355 (BPI 153221, BPI 153217) I; Penal Settlement, on Annonaceae undet., 25 July 1922, F.L. Stevens 681 (BPI 153219, BPI 153218) I; Brazil: Amazonas, Manaos, on *Guatteria schomburgkiana* Mart., May 1902, Ule (BPI 153224) I, Syntype.

Hosts and distribution. – On *Guatteria schomburgkiana* (Annonaceae) from Brazil and undetermined Annonaceae from Brazil and Guyana (Farr *et al.* n.d., Sydow 1925).

Batistopsora crucis-filii Dianese, R.B. Medeiros & L.T.P. Santos, Fitopatol. Bras. 18: 437. 1993.

Specimens examined. – GUYANA: Pakaraima Mountains, Upper Potaro River, old Ayanganna airstrip, on *Annona* sp., 28 June 2003, J.R. Hernández 2003-085 (BPI 863563) II–III.

Hosts and distribution. – On *Annona* spp. (Annonaceae) from Brazil (Buriticá 1999, Dianese *et al.* 1993, Farr *et al.* n.d.) and west-central Guyana. This is the first record for Guyana.

Cerotelium sabiceae Buriticá & J.F. Hennen, Rev. Acad. Colomb. Cienc. 23: 419. 1999.

= *Physopella sabiceicola* (Arthur) Buriticá & J. F. Hennen, Rev. Acad. Colomb. Cienc. 23: 419. 1999.

≡ *Uredo sabiceicola* Arthur, Mycologia 7: 325. 1915.

Specimens examined. – GUYANA: Pakaraima Mountains, Upper Potaro River, mining area, on *Sabicea glabrescens* Benth., 26 June 2003, J.R. Hernandez 2003-076 (BPI 863562) II; Pakaraima Mountains, Grandmother's Creek, on *Sabicea glabrescens* Benth., 4 July 2003, J.R. Hernández 2003-113 (BPI 863565) II.

Hosts and distribution. – On *Sabicea* spp. (Rubiaceae) from Brazil, Puerto Rico, Trinidad & Tobago (Buriticá 1999, Farr *et al.* n.d.), and west-central Guyana. This is the first record for Guyana.

Chaconia ingae (Syd.) Cummins, Mycologia 48: 602. 1956.

≡ *Maravalia ingae* Syd., Mycologia 17: 257. 1925.
= *Bitzea ingae* (Syd.) Mains, Mycologia 31: 38. 1939.
= *Maravalia utriculata* Syd., Ann. Mycol. 23: 314. 1925.
= *Uredo excipulata* Syd. & P. Syd., Ann. Mycol. 2: 350. 1904.
= *Uromyces ingicola* Henn., Hedwigia 43: 157. 1904.
= *Uromyces ingicola* Henn., Hedwigia 48: 1. 1908. *nom. illeg.*
= *Uromyces porcensis* Mayor, Mém. Soc. Sci. Nat. Neuchâtel. 5: 459. 1913.
= *Ravenelia whetzelii* Arthur, Mycologia 9: 64. 1917.
= *Uromyces ingaeiphilus* Speg., Revista Argent. Bot. 1: 140. 1925.
= *Uredo mogy-mirim* Viégas, Bargantia 5: 85. 1945.
[*Uromyces ingae* Lagerh. in Arthur. Mycologia 9: 65. 1917. *nom. nud.*]

Specimens examined. – GUYANA: Pakaraima Mountains, Grandmother's Creek, on *Inga* sp., 4 July 2003, J.R. Hernández 2003-110 (BPI 863574) II; Pakaraima Mountains, Upper Potaro River, area near old Ayanganna airstrip, on *Inga* sp., 8 July 2003, J.R. Hernández 2003-123 (BPI 863575) II; Vreed en Hoop, on *Inga* sp., 1 Aug. 1922, F.L. Stevens 715 (BPI 143227) Lectotype, (BPI 018887) Isolectotype, III.

Hosts and distribution. – On *Inga* spp. (Fabaceae) from Mexico to Argentina (Cummins 1978, Farr *et al.* n.d., Hernández & Hennen 2003, Ono & Hennen 1983, Sydow 1925).

Coleosporium ipomoeae (Schwein.) Burrill, Bull. Illinois State Lab. Nat. Hist. 2: 217. 1885.

= *Coleosporium fischeri* Mayor, Mém. Soc. Sci. Nat. Neuchâtel. 5: 550. 1913.
≡ *Uredo ipomoeae* Schwein., Schriften Naturf. Ges. Leipzig 1: 70. 1822.
= *Caeoma ipomoea* Link, Sp. Pl. 6: 14. 1822.
= *Coleosporium guaraniticum* Speg., Anales Soc. Ci. Argent. 17: 95. 1884.
= *Uredo ipomoeae-pentaphyllae* Henn., Hedwigia 35: 252. 1896.
= *Aecidium dominicanum* Gonz. Frag. & Cif., Bol. Real Soc. España Hist. Nat. Madrid 26: 250. 1926.
= *Uredo vicosiana* Thurst., Mycologia 32: 306. 1940.
= *Peridermium ipomoeae* Hedgc. & N.R. Hunt, Mycologia 9: 239. 1917.

Specimens examined. – GUYANA: Tumatumari, on *Ipomoea glabra* (Aubl.) Choisy, 8 July 1922, F.L. Stevens 56 (BPI 132260, BPI 132261, BPI 132265, BPI 132266) II.

Hosts and distribution. – On species of *Argyreia, Calonyction, Convolvulus, Hewittia, Ipomoea, Jacquemontia, Merremia, Operculina, Quamoclit, Rivea* (Convolvulaceae) and *Pinus* (Pinaceae) widespread in North, Central, South America, the Caribbean and several countries from Africa and Asia (Farr *et al.* n.d., Sydow 1925).

Coleosporium plumeriae Pat., Bull. Soc. Mycol. France 18: 178. 1902.

= *Uredo domingensis* Berk., Ann. Mag. Nat. Hist. 9: 9. 1852.
≡ *Coleosporium domingensis* (Berk.) Arthur, Amer. J. Bot. 5: 329. 1918.
= *Uredo plumeriicola* Henn., Hedwigia 43: 161. 1904.

Specimens examined. – GUYANA: Georgetown, on *Plumeria rubra* L., 12 July 2003, J.R. Hernández & M.C. Aime 2003-130 (BPI 844177) II.

Hosts and distribution. – On *Plumeria* spp. (Apocynaceae) from the Caribbean Islands, Central America, Mexico, northern South America, and the United States (Florida, Hawaii). It also has been reported from Micronesia and in a greenhouse in Canada (Farr *et al.* n.d.), and from Nigeria (Hernández *et al.* 2005). This is the first record for Guyana.

Coleosporium vernoniae Berk. & M.A. Curtis, Grevillea 3: 57. 1874.

= *Uredo elephantopodis* Schwein., Schriften Naturf. Ges. Leipzig 1: 70. 1822.
≡ *Coleosporium elephantopodis* (Schwein.) Thüm., Mycol. Univ. No. 953. 1878.
= *Uredo elephantopodis* Henn., Hedwigia 35: 253. 1896. *hom. illeg.*
= *Aecidium vernoniae-mollis* Mayor, Mém. Soc. Sci. Nat. Neuchâtel. 5: 570. 1913.

Specimens examined. – GUYANA: Pakaraima Mountains, Upper Potaro River, mining area, on *Elephantopus mollis* Kunth, 26 June 2003, J.R. Hernández 2003-074 (BPI 844164) II; Pakaraima Mountains, Upper Potaro River, old airstrip, on *E. mollis*, 28 June 2003, J.R. Hernández 2003-091 (BPI 844167) II–III; Pakaraima Mountains, Upper Potaro River, old Ayanganna airstrip, on *E. mollis*, 4 Jan. 2004, M.C. Aime 2429 (BPI 844180) II; Pakaraima Mountains, Upper Potaro River, old Ayanganna airstrip, on *E. mollis*, 8 Jan. 2004, M.C. Aime 2453 (BPI 844183) II.

Hosts and distribution. – On species of *Elephantopus, Lachnorhiza, Pseudoelephantopus, Vernonia* (Asteraceae) and *Pinus* (Pinaceae) from North, Central, South America, the Caribbean and China (Farr *et al.* n.d.). This is the first record for Guyana.

Crossopsora stevensii Syd., Mycologia 17: 255. 1925.

= *Uredo mandevillae* Mayor, Mém. Soc. Sci. Nat. Neuchâtel. 5: 591. 1913.
≡ *Malupa mandevillae* (Mayor) Buriticá, Rev. Acad. Colomb. Cienc. 20: 187. 1996.

Sydow (1925) described *Crossopsora stevensii* on *Mandevilla scabra* Schumann from Rockstone, Guyana 17 July 1922, F.L. Stevens 490 and 491.

Hosts and distribution. – On *Mandevilla* spp. (Apocynaceae, Apocynoideae) from Central America, the Caribbean, and Colombia (Buriticá 1999, Farr *et al.* n.d., Sydow 1925).

Dasyspora gregaria (Kunze) Henn., Hedwigia 35: 231. 1896.

≡ *Puccinia gregaria* Kunze, Weigelt. Exsicc. 1827.
= *Dasyspora foveolata* Berk. & M.A. Curtis, J. Acad. Nat. Sci. Philadelphia 2: 281. 1853.

= *Puccinia winteri* Pazschke, Hedwigia 31: 96. 1892.
= *Puccinia (Dasyspora) flaveolata* (Berk. & M.A. Curtis) Henn., Hedwigia 34: 95. 1895.
= *Dicaeoma winteri* (Pazschke) Kuntze, Rev. Gen. Pl. 3: 471. 1898.

Specimens examined. – GUYANA: Kartabo, on Annonaceae undet., 23 July 1922, F.L. Stevens 589 (BPI 116392) III Holotype; (BPI 116391) III Isotype.

Hosts and distribution. – On *Xylopia* spp. (Annonaceae) and undetermined Annonaceae from Central, North, and South America (Farr *et al.* n.d., Sydow 1925).

Desmella aneimiae Syd. & P. Syd., Ann. Mycol. 16: 241. 1918.

= *Uredo gymnogrammes* Henn., Hedwigia 34: 337. 1895.
= *Uredo aneimiae* Henn., Hedwigia 35: 255. 1896.
= *Caeoma mbatobiensis* Speg., Anales Soc. Ci. Argent. 17: 96. 1884.
= *Caeoma superficiale* Speg., Anales Soc. Ci. Argent. 17: 96. 1884.
= *Uredo blechnicola* Henn., Hedwigia 43: 165. 1904.
= *Uredo nephroleptidis* Dietel, Mém. Soc. Sci. Nat. Neuchâtel. 5: 576. 1913.
= *Desmella gymnogrammes* Syd. & P. Syd., Ann. Mycol. 16: 242. 1918.
= *Desmella mbatobiensis* Syd. & P. Syd., Ann. Mycol. 16: 241. 1918.
= *Desmella superficialis* Syd. & P. Syd., Ann. Mycol. 16: 242. 1918.
= *Desmella superficialis* Kern, Contr. Reed Herb. p. 164. 1975.

Specimens examined. – GUYANA: Pakaraima Mountains, Upper Potaro River, mining area, on *Thelypteris opulenta* (Kaulf.) Fosberg, 26 June 2003, J.R. Hernández 2003-078 (BPI 844165) II; Pakaraima Mountains, Upper Potaro River, mining area, on *Thelypteris* sp., 26 June 2003, J.R. Hernández 2003-069 (BPI 844163) II; Pakaraima Mountains, Airstrip, on *Thelypteris* sp., J.R. Hernández 2003-127 (BPI 844175) II.

Hosts and distribution. – On *Anemia* (Schizaeaceae), *Athyrium* and *Dryopteris* (Dryopteridaceae), *Blechnum* (Blechnaceae), *Cyclosorus* and *Thelypteris* (Thelypteridaceae), *Dennstaedtia* (Dennstaedtiaceae), *Gymnogramma, Pityrogramma,* and *Pteris* (Pteridaceae), *Nephrolepis* (Nephrolepidaceae) from Mexico to Argentina and the Caribbean (Farr *et al.* n.d.). This is the first record for Guyana.

Dicheirinia guianensis Cummins, Bull. Torrey Bot. Club 64: 39. 1937.

Specimens examined. – GUYANA: Bonishiki Landing, Arawau River, North West District, on *Lonchocarpus nicou* (Aubl.) DC., 16 July 1934, W.A. Archer H-256 (BPI 143120) 0-I-II-III Isotype; intercepted at New York, on *Lonchocarpus* sp., 3 June 1938, Insp. Hodson (BPI 143119, BPI 143118, BPI 143117) 0-I-II-III.

Hosts and distribution. – On *Lonchocarpus* spp. (Fabaceae) from French Guiana and Guyana (Farr *et al.* n.d., Spaulding 1961).

Dietelia portoricensis (Whetzel & Olive) Buriticá & J.F. Hennen, Flora Neotropica 24: 15. 1980.

≡ *Endophylloides portoricensis* Whetzel & Olive, Am. J. Bot. 4: 51. 1917.
≡ *Cronartium portoricensis* (Whetzel & Olive) Sacc. & Trotter, Syll. Fung. 23: 851. 1925.
= *Aecidium expansum* Arthur, Mycologia 7: 317. 1915.

Specimens examined. – GUYANA: Coverden, on *Mikania* sp., 5 Aug. 1922, F.L. Stevens 756 (BPI 147220, BPI 147221) III.

Hosts and distribution. – On *Mikania* spp. (Asteraceae) from Central, North and South America, the Caribbean (Buriticá 1991, Farr *et al.* n.d., Sydow 1925). Whiteside (1966) reported this species from Zimbabwe.

Endophyllum circumscriptum Whetzel & Olive var. ***circumscriptum,*** Am. J. Bot. 4: 49. 1917.

= *Aecidium circumscriptum* Schwein. ex Berk. & M.A. Curtis, J. Acad. Nat. Sci. Philadelphia 2: 283. 1853.
= *Aecidium cissi* G. Winter, Hedwigia 23: 168. 1884.
= *Aecidium guttatum* Kunze, Weigelt Exsicc. s.n. 1827.
≡ *Endophyllum guttatum* (Kuntze) Syd. & P. Syd., Ann. Mycol. 18: 179. 1920.

Specimens examined. – GUYANA: Coverden, on *Cissus sicyoides* L., 4 Aug. 1922, F.L. Stevens 745 (BPI 147439, BPI 147326) III; Coverden, on *Cissus* sp., 4 Aug. 1922, F.L. Stevens 738 (BPI 147443, BPI 147444) III.

Hosts and distribution. – On *Cissus* spp. (Vitaceae) from Central, North, South America, and the Caribbean (Farr *et al.* n.d., Sydow 1925).

Endophyllum decoloratum (Schwein.) Whetzel & Olive, Am. J. Bot. 4: 49. 1917.

≡ *Aecidium decoloratum* Schwein., J. Acad. Nat. Sci. Philadelphia 2: 283. 1854.
= *Aecidium pumilio* Kunze, Weigelt Exsicc. s.n. 1827.
≡ *Endophyllum pumilio* (Kunze) Syd. & P. Syd., Ann. Mycol. 28: 179. 1920.
= *Aecidium wedeliae* Earle, Muhlenbergia 1: 16. 1901.
≡ *Endophyllum wedeliae* (Earle) Whetzel & Olive, Am. J. Bot. 4: 49. 1917.
= *Aecidium clibadii* Syd., Ann. Mycol. 1: 333. 1903.

Specimens examined. – GUYANA: Coverden, on *Clibadium* sp., 4 Aug. 1922, F.L. Stevens 737 (BPI 147480, BPI 147481) III; Coverden, on *Clibadium* sp., 5 Aug. 1922 F.L. Stevens 754 (BPI 147479, BPI 147482) III.

Hosts and distribution. – On species of *Clibadium, Sphagneticola,* and *Wedelia* (Asteraceae) from Central and South

America and the Caribbean (Buriticá & Pardo-Cardona 1996, Farr *et al.* n.d., Sydow 1925).

Endophyllum stachytarphetae Whetzel & Olive, Am. J. Bot. 4: 50. 1917.

≡ *Aecidium stachytarphetae* Henn., Hedwigia Beibl. 38: 71. 1899.

Specimens examined. – GUYANA: Pakaraima Mountains, Upper Potaro River, old Ayanganna airstrip, on *Stachytarpheta cayennensis* (L.C. Rich.) Vahl, 2 July 2003, J.R. Hernández 2003-104 (BPI 844169) III; Tumatumari, on *Stachytarpheta* sp., 10 July 1922, F.L. Stevens 131 (BPI 108549, BPI 108550) III.

Hosts and distribution. – On species of *Stachytarpheta* (Verbenaceae) from Central, South America and the Caribbean (Farr *et al.* n.d.)

Two specimens (BPI 108549, BPI 108550 – both *Stevens 131*) originally were identified as *Puccinia urbaniana* Henn. (Sydow 1925), which is a microcyclic rust producing two-celled teliospores. These were reidentified as *Endophyllum stachytarphetae* that produces telia and one-celled, hyaline, catenulate teliospores, which morphologically resemble sori of species of *Aecidium*. This is the first record for Guyana.

Kweilingia divina (Syd.) Buriticá, Rev. Acad. Colomb. Cienc. 22: 330. 1998.

≡ *Angiopsora divina* Syd., Ann. Mycol. 34: 71. 1936.
≡ *Dasturella divina* (Syd.) Mundk. & Khesw., Mycologia 35: 203. 1943.
= *Dasturella oxytenantherae* Sathe, Sydowia 19: 149.
= *Physopella inflexa* (S. Ito) Buriticá & J.F. Hennen, Rev. Acad. Colomb. Cienc. 19: 56. 1994.
≡ *Uredo inflexa* S. Ito, J. Agr. Coll. Tohoku Imp. Univ. 3: 247. 1909.
= *Uredo ignava* Arthur, Bull. Torey Bot. Club 45: 121. 1919.
≡ *Dicaeoma ignavum* (Arthur) Arthur & Fromme, N. Amer. Fl. 7: 341. 1920
≡ *Puccinia ignava* (Arthur) Arthur, Bot. Gaz. 73: 65. 1922.
≡ *Physopella ignava* (Arthur) Buriticá, Rev. Acad. Colomb. Cienc. 20: 204. 1996.
= *Aecidium thaungii* A.A. Carvalho, J.F. Hennen, & Figueiredo, Summa Phytopathologica 27: 261. 2001.
≡ *Aecidium randiicola* Thaung, Trans. Brit. Mycol. Soc. 66: 107. 1976.

Specimens examined. – GUYANA: Rockstone, on *Bambusa* sp., 17 July 1922, F.L. Stevens 447 (BPI 077911; BPI 155116) II; Coverden, 4 Aug. 1922, F.L. Stevens 720 (BPI 077907, BPI 077908, BPI 155118) II.

Hosts and distribution. – On species of *Arthrostylidium, Bambusa, Dendrocalamus, Ischurochloa, Lingnania, Phyllostachys, Pseudosasa, Sinocalamus* (Poaceae) from North, South America, Asia, and the Caribbean (Farr *et al.* n.d., Sydow 1925).

Carvalho *et al.* (2001) reported the discovery of *Kweilingia divina,* the teleomorph of *Uredo ignava,* for the first time in the Americas.

Malupa pakaraimensis J.R. Hern. & Aime **sp. nov.** – Figs. 1–6.

Uredinia abaxialia, sparsa, crocea ad ochracea, subepidermalia erumpentia, minuta, 0.2–0.5 mm diametro, paraphysibus peripheric is praeditis, cylindricis, basi connatis, lutescentibus hyalinis, incurvatis, 36–48 µm longis, 7.5–9.5 µm latis; urediniosporae 19–26.5 × 14.5–21.5 µm, globosae, obovoideae, vel ellipsoideae, episporio 1–1.5 µm, croceo ad cinnamomeo, fortiter echinulato, poris germinationis obscuris.

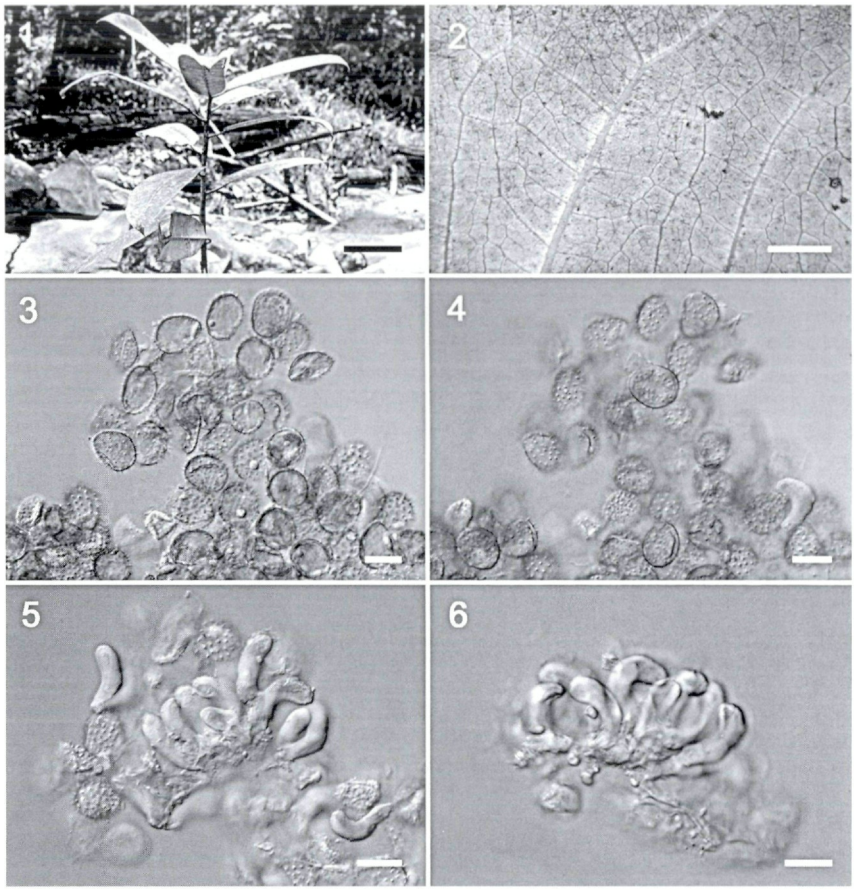
Holotypus. – GUYANA: Pakaraima Mountains, Grandmother's Creek, on *Ficus* sp. (Moraceae), 4 July 2003, J.R. Hernández 2003-114 (BPI 863951) II.

Uredinia hypophyllous, scattered, yellow ochraceous, minute, 0.2–05 mm across, subepidermal becoming erumpent, surrounded by cylindrical, peripheral, hyaline to yellowish, incurved, basally united paraphyses, 36–48 µm long by 7.5–9.5 µm wide. Urediniospores 19–26.5 × 14.5–21.5 µm, globose, obovoid or ellipsoid, wall 1–1.5 µm, yellowish to cinnamon brown, strongly echinulate, spines up to 2 µm high; germ pores not observed.

Etymology. – *Pakaraimensis,* referring to the mountains from which the holotype material was collected.

There are several other rusts on species of *Ficus* in the Americas. *Cerotelium fici* (E.J. Butler) Arthur produces urediniospores that are finely echinulate and with 3(–4) obscure equatorial germ pores. Urediniospores of *M. pakaraimensis* are less densely echinulate but with more conspicuous spines, and germ pores have not been observed. *Cerotelium ficicola* Buriticá & J.F. Hennen has urediniospores that measure 23–40 × 18–23 µm, and with 3–5 germ pores, while *M. pakaraimensis* has smaller urediniospores measuring 19–26.5 × 14.5–21.5 µm, and germ pores have not been observed. Urediniospores of *Phakopsora nishidana* S. Ito measure 18–24 × 16–19 µm and the wall is finely echinulate (Buriticá 1999) while spores of *M. pakaraimensis* measure 19–26.5 × 14.5–21.5 µm and have a strongly echinulate wall. *Uredo sawadae* S. Ito, on species of *Ficus* from Asia, produces uredinia without paraphyses and larger urediniospores (20–44 × 13–28 µm) than *M. pakaraimensis.*

Ficus is a member of the *Moraceae* and a number of other rusts are reported from that family. *Uredo artocarpi* Berk. & Broome (*Malupa artocarpi nom.inval.* in Salazar-Yepes *et al.* 2002) occurs on



Figs. 1–6. *Malupa pakaraimensis* on *Ficus* sp. (J.R. Hernández 2003-114, Holotype). **1.** Infected *Ficus* plant. Bar = 10 cm. **2.** Uredinia on the abaxial side of the leaf. Bar = 1 cm. **3.** Urediniospores, mainly median view. Bar = 20 µm. **4.** Urediniospores, mainly surface view. Bar = 20 µm. **5.** Paraphyses and urediniospores. Bar = 20 µm. **6.** Paraphyses. Bar = 20 µm.

species of *Artocarpus* and *Castilla,* and produces densely echinulate urediniospores, while *M. pakaraimensis* has urediniospores that are less densely but strongly echinulate. *Phakopsora mori* Buriticá & J.F. Hennen infects *Morus* and has uredinia with clavate to capitate paraphyses and spores with 2–3 equatorial germ pores, while *M. pakaraimensis* has cylindrical paraphyses and germ pores were not observed. *Uredo maclurae* Speg. [= *Physopella maclurae* Arthur 1906] on *Maclura* has clavate paraphyses and distinctive oblong, fusiform, to limoniform urediniospores measuring 28–35 × 14–18 µm, while *M. pakaraimensis* has cylindrical paraphyses and globose to ellipsoid urediniospores measuring 19–26.5 × 14.5–21.5 µm. Three

species of *Uredo* have been described on *Dorstenia*. *Uredo consanguinea* Syd. & P. Syd. on *Dorstenia multiformis* Miq. from Brazil, with reddish cinnamon brown, echinulate urediniospores, measuring 22–30 µm diam; *Uredo rubescens* Arthur on *Dorstenia* spp. from the Caribbean and South and Central America, with urediniospores ellipsoid, pale cinnamon brown, 24–32 × 18–24 µm, and closely and strongly echinulate (Gallegos & Cummins 1981); and *Uredo uncinata* F. Kern, Cif. & Thurst. on *Dorstenia* sp. from the Dominican Republic produces cinnamon brown, strongly uncinate urediniospores with spines up to 5 µm long and measuring 24–29 × 23–26 µm, while *M. pakaraimensis* has yellowish to cinnamon brown, strongly echinulate urediniospores measuring 19–26.5 × 14.5–21.5 µm.

A DNA sequence of the host internal transcribed spacer region nuclear rDNA (ITS) was obtained (GenBank accession no. DQ021881) and blasted (http://www.ncbi.nlm.nih.gov/BLAST/) to confirm host identification, although placement to species was not possible by morphology or sequencing. Numerous attempts to sequence rust DNA failed despite application of rust-specific nuclear rDNA primers (Aime unpublished).

Maravalia guianensis Y. Ono, Mycologia 76: 903. 1984.

Ono (1984) reported for the first time *Maravalia guianensis* from Guyana, Penal Settlement, 25 Sept. 1922, on *Faramea multiflora* A. Rich. ex DC., F.L. Stevens 627 (PUR F-18319).

Hosts and distribution. – On *Faramea multiflora* (Rubiaceae) from Guyana. Known only from the type (Farr *et al.* n.d., Ono 1984).

Phakopsora arthuriana Buriticá & J.F. Hennen, Rev. I. CN.E. 5: 180. 1994.

≡ *Phakopsora jatrophicola* Cummins, Mycologia 48: 604. 1956.
= *Uredo jatrophicola* Arthur, Mycologia 7: 331. 1915.
≡ *Malupa jatrophicola* (Arthur) Buriticá & J.F. Hennen, Rev. I.CN.E. 5: 180. 1994.
≡ *Phakopsora jatrophicola* (Arthur) Cummins, Bull. Torrey Bot. Club 64: 43. 1937.

Specimens examined. – GUYANA: Mahaica, on *Jatropha gossypifolia* L., 22 June 2003, J.R. Hernández 2003-051 (BPI 844156) II.

Hosts and distribution. – On species of *Jatropha* (Euphorbiaceae), from the Caribbean, North and South America (Buriticá 1999, Farr *et al.* n.d.). This is the first record for Guyana.

Phakopsora compressa (Mains) Buriticá & J.F. Hennen, Rev. I.CN.E. 5: 179. 1994.

≡ *Puccinia compressa* Arthur & Holw., Proc. Amer. Philos. Soc. 64: 157. 1925.
≡ *Angiopsora compressa* Mains, Mycologia 26: 129. 1934.
≡ *Physopella compressa* (Mains) Cummins & Ramachar, Mycologia 50: 742. 1958.
= *Uredo paspalicola* Henn., Hedwigia 44: 57. 1905.
≡ *Physopella paspalicola* (Henn.) Buriticá & J.F. Hennen, Rev. I.CN.E. 5: 179. 1994.
≡ *Puccinia paspalicola* (Henn.) Arthur, Manual Rusts U.S. & Canada p. 127. 1934.
= *Uredo stevensiana* Arthur, Mycologia 7: 326. 1915.

Specimens examined. – GUYANA: Peter's Hall, on *Paspalum conjugatum* P.J. Bergius, 5 July 1922, F.L. Stevens 25 (BPI 026816, BPI 026826) II; Georgetown, on *Paspalum virginatum* L., 2 July 1922, F.L. Stevens 17 (BPI 026851) II; Tumatumari, on *P. virginatum*, 8 July 1922, F.L. Stevens 31 (BPI 026852) II.

Hosts and distribution. – On species of *Paspalum* (Poaceae) from U.S.A. to northern Argentina and Chile (Buriticá 1999a, Farr *et al.* n.d.).

These collections (F.L. Stevens 17, 25 and 31) were originally identified as *Puccinia tubulosa* (= *Puccinia substriata* Ellis & Barthol. var. *substriata*) (Sydow 1925). That species produces uredinia without paraphyses, whereas *Ph. compressa* produces uredinia surrounded by peripheral paraphyses (*Malupa*-type). This is the first record for Guyana.

Phakopsora gossypii (Lagerh.) Hirats. f., Kasai Publ. Co. Tokyo p. 266. 1955.

≡ *Doassansia gossypii* Lagerh., J. Mycol. 7: 49. 1891.
= *Aecidium desmium* Berk. & Broome, J. Linn. Soc., Bot. 14: 95. 1875.
≡ *Uredo desmium* (Berk. & Broome) Petch, Ann. Roy. Bot. Gard. (Peradeniya) 5: 247. 1912.
≡ *Kuehneola desmium* (Berk. & Broome) Butler, Fungi and Dis. Plants p. 363. 1918.
≡ *Malupa desmium* (Berk. & Broome) Buriticá, Rev. I.CN.E. 5: 175. 1994.
= *Cerotelium desmium* Arthur, N. Am. Fl. 7: 698. 1925.
≡ *Cerotelium gossypii* (Arthur) Arthur, Bull. Torrey Bot. Club 44: 510. 1917.
≡ *Phakopsora gossypii* (Arthur) Hirats. f., Kasai Publ. Co. Tokyo p. 266. 1955.
= *Uredo gossypii* Lagerh., J. Mycol. 7: 48. 1891.
≡ *Chrysomyxa gossypii* (Lagerh.) Setch., Bot. Gaz. 19: 187. 1894.
= *Kuehneola gossypii* Arthur, N. Am. Fl. 7: 187. 1912.
≡ *Phakopsora gossypii* (Arthur) W.T. Dale, Commonw. Mycol. Inst. Papers 60: 4. 1955.
≡ *Phakopsora desmium* (Arthur) Cummins, Bull. Torrey Bot. Club 72: 206. 1945.

Specimen examined. – GUYANA: Georgetown, on cultivated *Gossypium* sp., 4 Jul. 1922, F.L. Stevens 20 (BPI 025912, BPI 025859) II.

Hosts and distribution. – On species of *Gossypium, Hibiscus* (Malvaceae), and *Montezuma* (Bombacaceae). Widespread in the Americas, Africa, Asia, and Oceania (Buriticá 1999a, Farr *et al.* n.d., Sydow 1925).

Puccinia arechavaletae Speg., Anales Soc. Ci. Argent. 12: 67. 1881.

≡ *Micropuccinia arechavaletae* (Speg.) Arthur & H. Jacks., N. Am. Fl. 7: 541. 1922.
= *Dicaeoma arechavaletae* (Speg.) Kuntze, Rev. Gen. Pl. 3: 467. 1898.
= *Caeomurus aeruginosus* Kuntze, Rev. Gen. Pl. 3: 449. 1898.
= *Uromyces pervius* Speg., Anales Soc. Ci. Argent. 17: 94. 1884.
= *Uromyces aeruginosus* Speg., Rev. Argent. Hist. Nat. 1: 175. 1891.
= *Puccinia serjaniae* Ellis & Everh., Erythea 5: 6: 1897.
= *Puccinia anguriae* Arthur & Cummins, Ann. Mycol. 31: 43. 1933.

Specimens examined. – GUYANA: Coverden, on *Cardiospermum* sp., 4 Aug. 1922, F.L. Stevens 734 (BPI 046552, BPI 046553, BPI 046554) III; Pakaraima Mountains, Upper Potaro River, near old Ayanganna airstrip, on *Serjania membranacea* Splitg., 5 July 2003, J.R. Hernández 2003-115 (BPI 844172) III; Pakaraima Mountains, Upper Potaro River, old Ayanganna airstrip, on *S. membranacea*, 4 Jan. 2004, M.C. Aime 2430 (BPI 844181) III.

Hosts and distribution. – On *Cardiospermum, Cupania, Paullinia, Serjania, Thouinia,* and *Urvillea* (Sapindaceae). Widespread in the Americas (Farr *et al.* n.d., Sydow 1925).

Viegas (1945) cited *Puccinia arechavaletae* on *Lonchocarpus* (Fabaceae). However, the identity of the rust and host or both are doubtful because all other records for this rust are on Sapindaceae.

Puccinia boutelouae (H.S. Jenn.) Holw., Ann. Mycol. 3: 20. 1905.

≡ *Diorchidium boutelouae* H.S. Jenn., Bull. Texas Exp. Sta. 9: 25. 1890.
≡ *Dicaeoma boutelouae* (H.S. Jenn.) Arthur, N. Am. Fl. 7: 319. 1920.
= *Puccinia gymnopogonis* P. Syd. & Syd., Monog. Ured. 1: 755. 1903.
≡ *Dicaeoma gymnopogonis* (P. Syd. & Syd.) Syd., Ann. Mycol. 20: 117. 1922.
= *Uredo chardonii* Kern, Sci. Surv. Porto Rico and Virgin Is. 8: 140. 1932.

Specimens examined. – GUYANA: Demerara-Essequibo Railway, on *Gymnopogon foliosus* (Willd.) Nees (= *Chloris foliosa* Willd.), 15 July 1922, F.L. Stevens 405 (BPI 072424, BPI 050927) III.

Hosts and distribution. – On *Aristida, Bouteloua, Cathestecum, Gymnopogon* (Poaceae) from Brazil, Costa Rica, El Salvador, Guatemala, Guyana, India, Mexico, Panama, Puerto Rico, U.S.A., and Virgin Islands (Farr *et al.* n.d., Hennen & Cummins 1956, Sydow 1925).

Puccinia canaliculata (Schwein.) Lagerh., Tromsø Mus. Aarsh. 17: 51. 1894.

≡ *Sphaeria canaliculata* Schwein., Trans. Am. Philos. Soc. II 4: 209. 1832.
= *Aecidium compositarum xanthii* Ellis, N. Am. Fungi 1018b. 1883.
= *Dicaeoma canaliculatum* Kuntze, Rev. Gen. Pl. 466. 1898.

Hosts and distribution. – On *Ambrosia, Bahia, Cosmos, Helianthus, Heliopsis, Senecio, Xanthium* (Asteraceae), *Cyperus, Dichromena, Kyllinga,* and *Pycreus* (Cyperaceae). Widespread in Africa, the Americas, and Asia (Farr *et al.* n.d., Sydow 1925).

Sydow (1925) reported *Puccinia canaliculata* on *Cyperus* sp. from Guyana, but no collection was cited.

Puccinia cenchri Dietel & Holw., Bot. Gaz. 24: 28. 1897. var. ***cenchri***

= *Uredo cenchriphila* Speg., Anales Mus. Nac. Hist. Nat. Buenos Aires 19: 316. 1909.

Specimens examined. – GUYANA: Georgetown, on *Cenchrus echinatus* L., 2 July 1922, F.L. Stevens 9 (BPI 055035, BPI 055050) II.

Hosts and distribution. – On species of *Anthephora, Cenchrus,* and *Pennisetum* (Poaceae) form Central, North, South America, the Caribbean, Africa, Asia, and Oceania (Farr *et al.* n.d., Sydow 1925).

Puccinia cnici-oleracei Pers. ex Desm., Catal. Pl. Omis, p. 24. 1823.

See synonyms in Hiratsuka *et al.* 1992.

Specimens examined. – GUYANA: Georgetown, on *Eleutheranthera ruderalis* (Sw.) Sch. Bip. (≡ *Melampodium ruderale* Sw.), 2 July 1922, F.L. Stevens 13 (BPI 063915, BPI 083633) III; Georgetown, Cheddi Jagan Airport, on *Emilia sonchifolia* (L.) DC., 24 June 2003, J.R. Hernández 2003-055 (BPI 844158) III.

Hosts and distribution. – On species of *Acanthospermum, Achillea, Acmella, Artemisia, Aster, Cacalia, Carduus, Centaurea, Chrysanthemum, Cineraria, Cirsium, Cnicus, Conyza, Dendranthema, Eleutheranthera, Emilia, Erigeron, Eupatorium, Galactites, Galinsoga, Gymnaster, Heteropappus, Inula, Kalimeris, Lactuca, Lagascea, Leucanthemum, Ligularia, Matricaria, Melampodium, Saussurea, Senecio, Sinacalia, Sonchus, Spilanthes, Synedrella, Vernonia, Wedelia* as well as several other genera in the Asteraceae. Widespread in Africa, the Americas, Asia, and Europe (Arthur 1924, Farr *et al.* n.d., Sydow 1925).

Puccinia commelinae Holw., Ann. Mycol. 2: 393. 1904.

Specimens examined. – GUYANA: Georgetown, on *Commelina erecta* L., 12 July 2003, J.R. Hernández & M.C. Aime 2003-131 (BPI 844178) II.

Hosts and distribution. – On species of *Commelina, Tradescantia,* and *Tripogandra* (Commelinaceae) from Argentina, Mexico, and the U.S.A. (Farr *et al.* n.d.). This is the first record for Guyana.

Puccinia cynodontis Lacroix ex Desm., Pl. Crypt. Ser. III No. 655. 1859.

Dennis (1970) reported *P. cynodontis* on *Cynodon* from Guyana, but gave no information about the source of this report.

Puccinia duthiae Ellis & Tracy, Bull. Torrey Bot. Club 24: 283. 1897.

= *Puccinia amphilophidis* Doidge, Bothalia 3: 496. 1939.
= *Dicaeoma duthiae* Syd., Ann. Mycol. 20: 117. 1922.
= *Aecidium berleriae* Doidge, Bothalia 3: 496. 1939.

Specimens examined. – GUYANA: Georgetown, Cheddi Jagan Airport, on *Bothriochloa bladhii* (Retz.) S.T. Blake, 24 June 2003, J.R. Hernández 2003-057 (BPI 844160) II.

Hosts and distribution. – On species of *Andropogon, Bothriochloa, Chrysopogon, Dichanthium,* and *Hyparrhenia* (Poaceae) from Mexico, northern South America, the Caribbean, Africa, Asia, and Australia (Buriticá & Pardo-Cardona 1996, Farr *et al.* n.d., Hennen & McCain 1993). This is the first record for Guyana.

Puccinia fallax Arthur, Publ. Carnegie Inst. Wash. 461: 103. 1935.

= *Uredo falliciosa* Arthur, Mycologia 7: 323. 1915.
= *Puccinia falliciosa* Arthur, Mycologia 9: 84. 1917.

Specimens examined. – GUYANA: Pakaraima Mountains, Grandmother's Creek, on *Palicourea* sp., 3 July 2003, J.R. Hernández 2003-107 (BPI 844171) II; 11 July 2003, J.R. Hernández 2003-125 (BPI 844173) II; 3 July 2003, M.C. Aime 2305 (BPI 844179) II–III; 9 Jan. 2004, M.C. Aime 2475 (BPI 844184) II–III.

Hosts and distribution. – On species of *Palicourea* and *Psychotria* (Rubiaceae) from Brazil, the Caribbean, and Papua New Guinea (Farr *et al.* n.d.). This is the first record for Guyana.

Puccinia helianthi Schwein., Schriften Naturf. Ges. Leipzig 1: 73. 1822.

= *Puccinia helianthorum* Schwein., Trans. Amer. Philos. Soc. II 4: 296. 1832.
= *Puccinia xanthifoliae* Ellis & Everh., J. Mycol. 6: 120. 1891.

= *Aecidium helianthi-mollis* Schwein., Schriften Naturf. Ges. Leipzig 1: 68. 1822.
= *Puccinia heliopsidis* Schwein., Schriften Naturf. Ges. Leipzig 1: 72. 1822.
= *Dicaeoma helianthi* Kuntze, Rev. Gen. Pl. III, 2: 469. 1898.
= *Dicaeoma heliopsidis* Kuntze, Rev. Gen. Pl. III 2: 469. 1898.
= *Puccinia viguierae* Peck, Bull. Torrey Bot. Club 12: 35. 1885.
= *Puccinia helianthi-mollis* Arthur, Rés. Sci. Congr. Intern. Bot. Vienne 344. 1906.
= *Dicaeoma helianthi-mollis* Arthur, Rés. Sci. Congr. Intern. Bot. Vienne 344. 1906.

Specimens examined. – GUYANA: Georgetown, on *Helianthis annuus* L., 12 July 2003, J.R. Hernández & M.C. Aime 2003-128 (BPI 844176) II–III.

Hosts and distribution. – On species of *Cynara, Helianthus, Heliopsis, Iva, Krigia,* and *Wedelia* (Asteraceae). Cosmopolitan, widespread in Africa, Asia, Australia, Europe, and the Americas (Farr *et al.* n.d.). This is the first record for Guyana.

Puccinia hyptidis (Lagerh.) Tracy & Earle, Mississipi Agric. Exp. Sta. Bull. 34: 86. 1895.

≡ *Gymnoconia hyptidis* Lagerh., Tromsø Mus. Aarsh. 17: 83. 1895.
≡ *Dicaeoma hyptidis* (Lagerh.) Arthur, N. Am. Fl. 7: 408. 1921.
= *Uredo hyptidis* M.A. Curtis, Am. J. Sci. II 6: 353. 1848.
≡ *Eriosporangium hyptidis* (M.A. Curtis) Arthur, N. Am. Fl. 7: 211. 1912.
= *Argotelium hyptidis* Arthur, Rés. Sci. Congr. Intern. Bot. Vienne p. 343. 1906.

Specimens examined. – GUYANA: Tumatumari, on Lamiaceae undet., 11 July 1922, F.L. Stevens 179 (BPI 123619, BPI 155101) II.

Hosts and distribution. – On species of *Hyptis* and *Mesosphaerum* (Lamiaceae), from U.S.A. to Argentina and the Philippines (Baxter 1961, Buriticá & Pardo-Cardona 1996, Farr *et al.* n.d., Sydow 1925).

Puccinia lygodii Arthur, Bull. Torrey Bot. Club 51: 55. 1924.

= *Milesina lygodii* Syd., Mycologia 17: 255. 1925.
= *Uredo lygodii* Har., J. Bot. 14: 117. 1900.
≡ *Milesia lygodii* (Har.) Buriticá, Rev. Acad. Colomb. Cienc. 20: 234. 1996.

Specimens examined. – GUYANA: Tumatumari, on *Lygodium volubile* Sw. (= *Lygodium micans* J.W. Sturm), 11 July 1922, F.L. Stevens 154 (BPI 148715) II, Holotype of *Milesina lygodii;* (BPI 148716, BPI 148118, BPI 155239) II, Isotypes.

Hosts and distribution. – On species of *Lygodium* (Schizaeaceae) from Central, North, South America and the Caribbean (Arthur

1924, Buriticá & Pardo-Cardona 1996, Farr *et al.* n.d., Hennen & McCain 1993, Sydow 1925).

Puccinia mikaniae H.S. Jack. & Holw., Mycologia 24: 124. 1932.

Specimens examined. – GUYANA: Pakaraima Mountains, Upper Potaro River, mining area, on *Mikania psilostachya* DC., 29 June 2003, J.R. Hernández 2003-095 (BPI 863564) I–III.

Hosts and distribution. – On species of *Mikania* (Asteraceae) from Brazil (Farr *et al.* n.d., Hennen *et al.* 1982). This is the first record for Guyana.

Puccinia obliquoseptata Vienn.-Bourg., Uredineana 5: 219. 1958.

= *Uredo bambusarum* Henn., Hedwigia 35: 255. 1896.
= *Uredo detenta* Mains, Bull. Torrey Bot. Club 66: 621. 1939.

Specimens examined. – GUYANA: Pakaraima Mountains, Upper Potaro River, on *Olyra micrantha* Kunth, 24 June 2003, J.R. Hernández 2003-059 (BPI 844162) II; Pakaraima Mountains, Upper Potaro River, riverside, on *O. micrantha*, 24 June 2003, J.R. Hernández 2003-098 (BPI 844168) II; Pakaraima Mountains, Upper Potaro River, old Ayanganna airstrip, on *O. micrantha*, 4 Jan. 2004, M.C. Aime 2431 (BPI 844182) II; Pakaraima Mountains, Upper Potaro River, old Ayanganna airstrip, on *O. micrantha*, 12 Jan. 2004, M.C. Aime 2493 (BPI 844185) II–III.

Hosts and distribution. – On *Olyra mycrantha* and *Olyra* sp. (Poaceae) from Brazil (Farr *et al.* n.d., Hennen *et al.* 1982). This is the first record for Guyana.

Puccinia paraënsis Dietel, Ann. Mycol. 6: 96. 1908.

Specimens examined. – GUYANA: Rockstone, on *Gouania* sp., 13 July 1922, F.L. Stevens 251 (BPI 068498, BPI 068499) II.

Hosts and distribution. – On species of *Gouania* spp. (Rhamnaceae) from Brazil (Farr *et al.* n.d., Hennen *et al.* 1982, Sydow 1925).

This collection was originally identified as *Puccinia gouaniae* Holw. (Sydow 1925), which produces triangular to globose urediniospores that are cinnamon brown, echinulate with distant spines, and with two germ pores. Herein it is re-identified as *Puccinia paraënsis* that produces urediniospores of similar size but which are obovate to subglobose, and lighter cinnamon brown and more densely spinulose than those of *P. gouaniae*. This is the first record for Guyana.

Puccinia scleriae (Pazschke) Arthur, Mycologia 9: 75. 1917.

≡ *Rostrupia scleriae* Pazschke, Hedwigia 31: 96. 1892.
≡ *Dicaeoma scleriae* (Pazschke) Arthur, N. Am. Flora 7: 349. 1920.
= *Aecidium passifloricola* Henn., Hedwigia 43: 168. 1904.

Specimens examined. – GUYANA: Pakaraima Mountains, airstrip, on *Passiflora garckei* Mast., J.R. Hernández 2003-126 (BPI 844174) I.

Hosts and distribution. – On species of *Rhynchospora*, *Scleria* (Cyperaceae) and *Passiflora* (Passifloraceae) from Central, South America, the Caribbean, and Asia (Farr *et al.* n.d.). This is the first record for Guyana.

Puccinia scleriicola Arthur, Mycologia 7: 232. 1915.

= *Dicaeoma scleriicola* Arthur, N. Am. Flora 7: 350. 1920.

Specimens examined. – GUYANA: Pakaraima Mountains, Grandmother's Creek, on *Scleria secans* (L.) Urb., 3 July 2003, J.R. Hernández 2003-106 (BPI 844170) II.

Hosts and distribution. – On species of *Scleria* (Cyperaceae) from the Caribbean, northern South America, and China (Farr *et al.* n.d.). This is the first record for Guyana.

Puccinia spegazzinii De Toni, Syll. Fung. 7: 704. 1888.

≡ *Puccinia australis* Speg., Anales Soc. Ci. Argent. 10: 8. 1880.
≡ *Dasyspora australis* (Speg.) Arthur, Rés. Sci. Congr. Intern. Bot. Vienne p. 346. 1906.
≡ *Micropuccinia spegazzinii* (De Toni) Arthur & H.S. Jack., Bull. Torrey Bot. Club 48: 41. 1921.
= *Puccinia melothriae* F. Stevens, Bot. Gaz. 43: 283. 1907.
= *Puccinia dubia* Mayor, Mém. Soc. Sci. Nat. Neuchâtel. 5: 482. 1913.

Specimens examined. – GUYANA: Mabaruma Compound, N.W. District, on *Mikania micrantha* Kunth, 11 July 1934, W.A. Archer (BPI 104098) III.

Hosts and distribution. – On species of *Mikania* (Asteraceae) from Central, North, South America and the Caribbean (Farr *et al.* n.d., Lindquist 1982). This is the first record for Guyana.

Puccinia subcoronata Henn., Hedwigia 34: 94. 1895.

= *Puccinia antioquiensis* Mayor, Mém. Soc. Sci. Nat. Neuchâtel. 5: 473. 1913.

Specimens examined. – GUYANA: Tumatumari, on *Cyperus diffusus* Vahl, 7 Oct. 1922, F.L. Stevens 137 (BPI 046254; BPI 105369) II; Pakaraima Mountains,

Upper Potaro River, Ayanganna old airstrip, on *Cyperus laxus* Lam., J.R. Hernández 2003-087 (BPI 844166) II.

Hosts and distribution. – On species of *Cyperus* (Cyperaceae) from South America (Farr *et al.* n.d., Pardo-Cardona 1994, 1998, Sydow 1925).

Puccinia substriata Ellis & Barthol., Erythea 5: 47. 1897. var. ***substriata***

= *Puccinia pilgeriana* Henn., Bot. Jahrb. Syst. 40: 226. 1908.
= *Puccinia penniseti* Zimm., Ber. Land-Forstw. Deutsch-Ostafrika p. 16. 1904.
= *Uredo paspalicola* Henn., Hedwigia 44: 57. 1905.
= *Uredo cubangoensis* Rangel, Mus. Rio de Janeiro Arg. 18: 160. 1916.
= *Puccinia tubulosa* Arthur, Am. J. Bot. 5: 464. 1918.
= *Puccinia paspalicola* Arthur, Manual Rusts U.S. & Canada p. 127. 1934.
= *Aecidium tubulosum* Pat. & Gaillard, Bull Soc. Mycol. Fr. 4: 97. 1888.
≡ *Dicaeoma tubulosum* (Pat. & Gaillard) Arthur & Fromme, N. Am. Fl. 7: 188. 1920.
= *Aecidium uleanum* Pazschke, Hedwigia 31: 95. 1892.
= *Aecidium solaniphillum* Speg. Anales Mus. Nac. Hist. Nat. Buenos Aires 23: 34. 1912.
= *Uredo setariae-onuri* Dietel, Rev. Sudamer. Bot. 4: 81. 1937.

Specimens examined. – GUYANA: Tumatumari, on *Paspalum virgatum* L., 8 July 1922, F.L. Stevens 31 (BPI 026852; BPI 106279; BPI 106280) II.

Hosts and distribution. – On species of *Chaetochloa, Digitaria, Echinochloa, Eriochloa, Ichnanthus, Panicum, Paspalum, Pennisetum, Setaria, Syntherisma, Trichachne, Valota* (Poaceae), *Physalis,* and *Solanum* (Solanaceae), widespread in the Americas and also in Africa and Asia (Farr *et al.* n.d., Sydow 1925).

Puccinia thaliae Dietel, Hedwigia 38: 250. 1899.

= *Puccinia cannae* (G. Winter) Henn., Hedwigia 41: 105. 1902.
= *Uredo cannae* G. Winter, Hedwigia 23: 172. 1884.
≡ *Dicaeoma cannae* (G. Winter) Arthur, N. Am. Flora 7: 380. 1920.
= *Uredo ischnosyphonis* Henn., Hedwigia 43: 164. 1904.

Specimens examined. – GUYANA: Georgetown (Botanical Garden), on *Canna indica* L., 22 June 2003, J.R. Hernández 2003-052 (BPI 844157) II; Kartabo, on *Canna* sp., 21 July 1922, F.L. Stevens 511 (BPI 107309) II.

Hosts and distribution. – On species of *Calathea, Ctenanthe, Ischnosiphon, Maranta, Thalia* (Marantaceae) and *Canna* (Cannaceae); widespread in the Americas as well as in Africa and Asia (Farr *et al.* n.d., Sydow 1925).

Ravenelia guyanensis J.R. Hern. **sp. nov.** – Figs. 7–10.

Spermogonia, aecia et uredinia ignota. Telia amphigena, 1–2 mm diametro, brunnea, subepidermalia, paraphysibus cylindraceis, exhyphoideis, cinnamomeis; teliosporae 60–72 × 48–60 µm, ex probasidialibus cellulis 3–4 quoquoversus compositae, cellulis 24–26 × 21.5–24 µm, episporio 4–5 µm, ad apicem usque 4.5–7.2 µm, cinnamomeo vel castaneo bruneo; cystidia globosa, hyalina, numero cellulis aequalia, pendula; pedicelus hyalinus, 2–3 hyphis compositus, 60–72 µm longus, 9–12 µm latus, caducus.

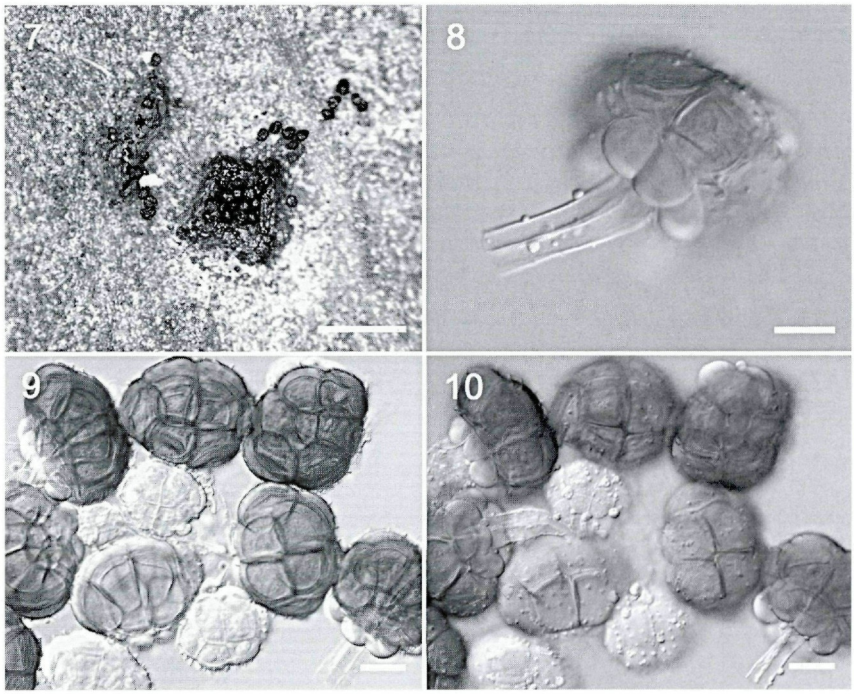
Holotypus. – GUYANA: Pakaraima Mountains, Upper Potaro River, old Ayanganna airstrip, on *Chamaecrista adiantifolia* (Spruce ex Benth.) H.S. Irwin & Barneby (Fabaceae), 28 June 2003, J.R. Hernández 2003-088 (BPI 863949) III.

Spermogonia, aecia, and uredinia not seen. Telia amphigenous, 1–2 mm diam., chestnut brown, subepidermal becoming erumpent, with cylindric and incurved, cinnamon brown paraphyses; teliospores cinnamon brown to dark cinnamon brown, pale yellowish when young, 60–72 × 48–60 µm, from above oblong with 4 probasidial cells in length and 3 wide, frequently 2 central and 6 peripheral probasidial cells; probasidial cells 24–26 × 21.5–24 µm, wall echinulate, 4–5 µm thick on the sides and 4.5–7.2 µm at the top; cysts globose, hyaline, pendant, same number as probasidial cells; pedicel hyaline, of 2–3 hyphae, 9–12 µm wide, 60–72 µm long, usually deciduous.

Etymology. – *Guyanensis*, referring to the country of origin of the holotype material.

Three species of *Ravenelia* have been described on *Chamaecrista* (Hernández *et al.* n.d.): *Ravenelia cassiaecola* var. *berkeleyi* (Mundk. & Thirum.) Cummins & J.W. Baxter, *R. cassiaecola* G.F. Atk. var. *cassiaecola* and *R. uleana* Henn. These three species of *Ravenelia* produce uredinia, while none were observed in *R. guyanensis*. *Ravenelia cassiaecola* var. *berkeleyi* and *R. uleana* produce teliospores with smooth walls, and those of *R. cassiaecola* var. *cassiaecola* are smooth or occasionally each probasidial cell has one or a few low bead-like papillae. Teliospore walls of *R. guyanensis* are echinulate.

The basionym of *Chamaecrista adiantifolia* is *Cassia adiantidolia* Spruce ex Benth. Ten species of *Ravenelia* are described on *Cassia* (Hernández *et al.* n.d.). *Ravenelia cassiaecola* var. *berkeleyi* was discussed above. *Ravenelia densifera* J.F. Hennen & Cummins, *R. le-testui* Maubl., *R. macrocarpa* Syd. & P. Syd., *R. spinulosa* var. *papilifera* (Syd. & P. Syd.) Cummins & J.W. Baxter, *R. spinulosa* Dietel & Holw. var. *spinulosa*, and *R. stuhlmanni* Henn. have teliospores measuring more than 72 µm diam., while teliospores of *R. guyanensis* measure less than 72 µm diam. *Ravenelia microcystis*



Figs. 7–10. *Ravenelia guyanensis* on *Chamaecrista adiantifolia* (J.R. Hernández 2003-088, Holotype). **7.** Telia with teliospores, surrounded by dark epidermis of the host, and scattered teliospores. Bar = 0.3 mm. **8.** Teliospore with pedicel of two hyphae and pendant cysts. Bar = 10 µm. **9.** Teliospores, median view. Bar = 20 µm. **10.** Teliospores, surface view. Bar = 20 µm.

Pazschke has smooth teliospores and *R. faceta* H.S. Jack. & Holw. has teliospores that are apically lobed or furcated with cylindrical tubercles to 6 µm long. Teliospores of *R. guyanensis* are echinulate. *Ravenelia mirandensis* F. Kern & Thurst. produces uredinia and telia without paraphyses, and teliospores (42–) 50–58 (–62) µm diam, while *R. guyanensis* has cylindric, cinnamon brown, incurved telial paraphyses and teliospores are 60–72 × 48–60 µm.

Sphenospora kevorkianii Linder, Mycologia 36: 464. 1944.

= *Uredo nigropunctata* Henn., Hedwigia 35: 254. 1896.
= *Uredo epidendri* Henn., Hedwigia 35: 254. 1896.
= *Uredo cyrtopodii* Syd. & P. Syd., Bull Herb. Boissier II 1: 77. 1901.
= *Uredo wittmackiana* Henn. & Klitzing., Gartenflora 53: 397. 1904.
= *Uredo guacae* Mayor, Mém. Soc. Sci. Nat. Neuchâtel 5: 583. 1913.

Specimens examined. – GUYANA: Demerara-Essequibo railroad, on *Cyrtopodium* sp., 15 July 1922, F.L. Stevens 395 (BPI 154607, BPI 154608, BPI

154609, BPI 154610) II; intercepted at Miami (8393 I.H.), on *Rodriguezia* sp., 27 July 1959, B.P. Stewart (BPI 042270) II; intercepted at Miami (8394 I.H.), 27 July 1959, A.S. Mills (BPI 042271) II.

Hosts and distribution. – On species of *Cattleya, Cyrtopodium, Epidendrum, Ionopsis, Miltonia, Notylia, Oncidium, Prescottia, Rodriguezia, Stanhopea,* and *Zygostates* (Orchidaceae) from Central, North, South America and the Caribbean (Buriticá & Pardo-Cardona 1996, Farr *et al.* n.d., Hennen *et al.* 1982, Sydow 1925).

Sphenospora pallida (G. Winter) Dietel, Nat. Pfl. 11: 70. 1897.

≡ *Diorchidium pallidum* G. Winter, Grevillea 15: 86. 1887.
= *Uromyces taubertii* Henn., Bot. Jahrb. Syst. 15: 14. 1892.
= *Uredo dioscoreae* Henn., Hedwigia 35: 255. 1896.
= *Puccinia sphenospora* P. Syd. & Syd., Mon. Ured. 1: 838. 1907.
= *Uredo aristolochiae* F.C. Albuq., Pesq. Agropec. Bras. Ser. Agron. 6: 147. 1971.

Specimens examined. – GUYANA: Tumatumari, on *Dioscorea* sp., 9 July 1922, F.L. Stevens 91 (BPI 017651) II.

Hosts and distribution. – On species of *Dioscorea* (Dioscoreaceae) and *Smilax* sp. (Smilacaceae) from Central and South America (Farr *et al.* n.d., Hennen *et al.* 1982, Sydow 1925).

Uredo artocarpi Berk. & Broome, J. Linn. Soc., Bot. 14: 93. 1873.

= *Physopella artocarpi* Arthur, N. Am. Flora 7: 103. 1907.

Specimens examined. – GUYANA: Tumatumari, on *Artocarpus altilis* (Parkinson) Fosberg (≈ *Sitodium altile* Parkinson), 11 July 1922, F.L. Stevens 185 (BPI 156539) II.

Hosts and distribution. – On species of *Artocarpus* and *Castilla* (Moraceae) from northern South America, the Caribbean, India, Papua New Guinea, and the Philippines (Farr *et al.* n.d., Sydow 1925).

Salazar-Yepes *et al.* (2002) cited *Malupa artocarpi* (Berk. & Bres.) Salazar & Buriticá, but this transfer was not validly published.

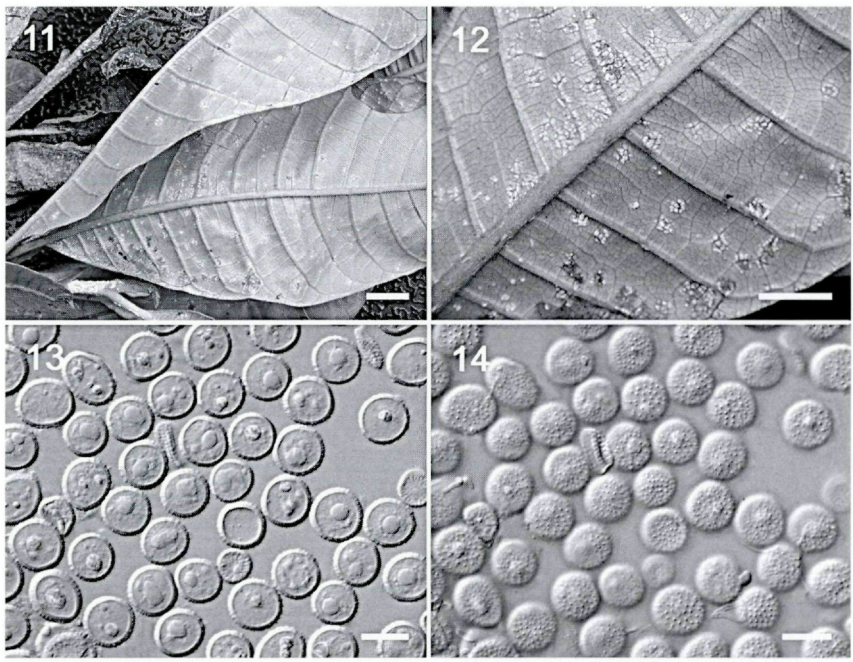
Uredo baruensis J.R. Hern. & Aime **sp. nov.** – Figs. 11–14.

Uredinia abaxialia, subepidermalia, erumpentia, alba vel flava, 1–1.5 mm diametro, inter nervos foliae disposita, segregata vel saepe concentrica aggregata; urediniosporae hyalinae, globosae vel subglobosae, 21.5–31 × 21.5–30 µm, episporio 2.5–3 µm, echinulato, poris germinationis obscuris.

Holotypus. – GUYANA: Pakaraima Mountains, Paluway Baru Creek, on *Chrysophyllum sparsiflorum* Klotzsch ex Miq. (Sapotaceae), 7 July 2003, J.R. Hernández 2003-120 (BPI 863952) II.

Uredinia hypophyllous, subepidermal becoming erumpent, white to yellowish, 1–1.5 mm diam., delimited by veins, isolated or in groups, frequently concentric, opposite side of leaf darkened, systemic in young branches causing distortion; no paraphyses observed; urediniospores hyaline, globose to subglobose, 21.5–31 × 21.5–30 µm, echinulate, cell wall 2.5–3 µm, germ pores not observed.

Etymology. – *Baruensis,* referring to the name of the creek where the holotype was collected.



Figs. 11–14. *Uredo baruensis* on *Chrysophyllum sparsiflorum* (J.R. Hernández 2003-120, Holotype). **11–12.** Pale uredinia on leaves. Bars = 2 cm. **13.** Urediniospores, median view. Bar = 25 µm. **14.** Urediniospores, surface view. Bar = 25 µm.

Three other rust fungi are recorded from *Chrysophyllum* spp. (Sapotaceae). *Crossopsora byrsonimatis* (Henn.) R.S. Peterson on *Byrsonima* spp. and *Chrysophyllum cainito* L. is known from South, Central, North America and the Caribbean. The *Malupa* anamorph of that species has peripheral paraphyses (Buriticá 1999), whereas *U. baruensis* has no paraphyses. *Uredo chysophylli* Syd. on *Chrysophyllum* sp. from Pará, Brazil, has ovoid, pyriform, to reniform urediniospores while those of the new species are globose. *Uredo chrysophyllicola* Henn. on *Chrysophyllum* sp. from São Paulo, Brazil, has subglobose, ovoid to ellipsoid urediniospores measuring

14–24 × 12–16 µm, while *U. baruensis* has globose urediniospores measuring 21.5–31 × 21.5–30 µm.

Eleven species of *Maravalia* are reported on Sapotaceae (Ono 1984). It is possible that *U. baruensis* is an anamorph of *Maravalia,* but none of the anamorphs of the eleven described species of *Maravalia* are similar to this new species. For *Maravalia bolivarensis* Y. Ono and *M. fici* (Mundk. & Thirum.) Y. Ono no anamorph is known. *Maravalia aulica* (Syd.) Y. Ono, *M. echinulata* (Rabenh.) Y. Ono, *M. gentilis* (Syd.) Y. Ono, *M. kevorkianii* (Cummins) Cummins & Y. Hirats., and *M. sapotae* (Mains) Y. Ono have anamorph spores with two germ pores near the hilum, *M. payenae* (Racib.) Y. Ono has anamorph spores with 3 or 4 germ pores adjacent to the hilum, and *M. mimusops* (Cooke) Y. Ono has anamorph spores with one germ pore near the hilum. No germ pores were observed in urediniospores of *Uredo baruensis*. *Maravalia lucumae* (Dietel) Y. Ono and *M. palaquii* (Cummins) Y. Ono have urediniospores with obscure germ pores, but *Maravalia lucumae* spores are (16) 20–24 (26) × 16–24 µm, while *U. baruensis* has urediniospores 21.5–31 × 21.5–30 µm. *M. palaquii* (Cummins) Y. Ono produces subglobose, obovoid to ellipsoid anamorph spores measuring (20) 21–30 × (15) 17–24 µm, while *U. baruensis* has globose to subglobose urediniospores measuring 21.5–31 × 21.5–30 µm.

Two species of *Uredo* are cited on Sapotaceae. *Uredo labatiae* Speg. on *Labatia glomerata* (Miq.) Radlk from Argentina, has paraphysate uredinia and ellipsoidal to angular urediniospores. *Uredo confluens* Henn. on *Mimusops subsericea* Mart. from Brazil, has urediniospores with 2 germ pores adjacent to the hilum.

An additional rust on Sapotaceae is *Achrotelium lucumae* Cummins on *Lucuma nervosa* A. DC. from Cuba, which produces uredinia on hypertrophied tissues and urediniospores measuring 35–42 × 24–35 µm, whereas uredinia of *U. baruensis* do not cause hypertrophy and the urediniospores measure 21.5–31 × 21.5–30 µm.

A DNA sequence of the host ITS was obtained (GenBank accession no. DQ021882). Sequences of rust nuclear rDNA (internal transcribed spacer region-2 and the first 1KB of the 28S large subunit) were obtained (GenBank accession no. DQ021883).

Uromyces costaricensis Syd., Ann. Mycol. 23: 312. 1925.

Specimens examined. – GUYANA: St. Clair, on *Lasiacis sorghoidea* (Desv. ex Ham.) Hitchc. & Chase, 15 Aug. 1922, F. L. Stevens 887 (BPI 003529) II–III.

Hosts and distribution. – On species of *Lasiacis* and *Panicum* (Poaceae) from Central, North, South America, and the Caribbean (Farr *et al.* n. d., Gallegos and Cummins 1981, Hennen *et al.* 1982, Sydow 1925).

The collection F.L. Stevens 887 was originally identified as *Uromyces leptodermus* Syd. & P. Syd. (= *Uromyces setariae-italicae*) (Sydow 1925) which produces urediniospores measuring 22–34 × 18–29 µm, with 3–4 equatorial germ pores, and sphaerical, obovate or oblong, mostly angular teliospores measuring 20–30 × 16–24 µm. The rust in this collection was later re-identified as *Uromyces costaricensis* by Cummins (annotation in collection packet, BPI), which produces urediniospores measuring 21–32 × 16–25 µm, with 3–4 equatorial germ pores, and ellipsoid or narrowly obovoid teliospores measuring 22–34 × 14–20 µm. This is the first record for Guyana.

Uromyces euphorbiae Cooke & Peck, Annual Rept. New York State Mus. 25: 90. 1873.

= *Uredo proëminens* DC., Fl. France 2: 235. 1805.
≡ *Nigredo proëminens* (DC.) Arthur, N. Am. Flora 7: 259. 1912.
≡ *Uromyces proëminens* (DC) Pass., Fung. Eur. No 1795. 1873.
= *Trichobasis euphorbiaecola* Berk. & M.A. Curtis, J. Linn. Soc., Bot. 10: 357. 1869.
≡ *Uromyces euphorbiicola* (Berk. & M.A. Curtis) Tranzschel, Ann. Mycol. 8: 8. 1910.
= *Uredo myristica* Berk. & M.A. Curtis, Grevillea 3: 57. 1874.
= *Uredo pulvinatus* Kalchbr. & Cooke, Grevillea 9: 21. 1880.
= *Uredo euphorbiae* var. *minor* Arthur, Bull. Minnesota Acad. Nat. Sci. 2: 28. 1883.
= *Uromyces ellisianus* Henn., Hedwigia 37. 269. 1898.
= *Uromyces tordillensis* Speg., Anales Mus. Nac. Hist. Nat. Buenos Aires 6: 214. 1899.
= *Uromyces poinsettiae* Tranzschel, Ann. Mycol. 8: 11. 1910.
= *Uromyces poinsettiae* Speg., Bol. Acad. Nac. Ci. 29: 148. 1926.
= *Uredo acalyphae* Speg., Bol Acad. Nac. Ci. 29: 149. 1926.
= *Uredo tordillensis* Speg., Anales Soc. Ci. Argent. 12: 75. 1881.
= *Aecidium tordillense* Speg., Anales Soc. Ci. Argent. 12: 79. 1881.

Specimens examined. – GUYANA: Georgetown, Cheddi Jagan Airport, on *Euphorbia hirta* L., 24 June 2003, J.R. Hernández 2003-056 (BPI 844159) II.

Hosts and distribution. – On species of *Acalypha, Chamaesyce,* and *Euphorbia* (Euphorbiaceae). Cosmopolitan, widespread in the Americas, Africa, Asia, Europe, and Oceania (Farr *et al.* n.d.). This is a new record for Guyana.

Uromyces hedysari-paniculati (Schwein.) Farl. apud Ellis, N. Am. Fungi No. 246. 1879.

≡ *Puccinia hedysari-paniculati* Schwein., Schriften Naturf. Ges. Leipzig 1: 74. 1822.
= *Uromyces desmodii-leiocarpi* Henn., Hedwigia 48: 1. 1909.
= *Uredo desmodii-tortuosi* Henn., Hedwigia 35: 252. 1896.

= *Uromyces desmodii* Cooke, Hedwigia 17: 39. 1878.
= *Aecidium desmodii* Henn., Hedwigia 35: 259. 1896.
= *Uredo desmodiicola* Speg., Anales Mus. Nac. Hist. Nat. Buenos Aires 6: 234. 1898.
= *Uredo amagensis* Mayor, Mém. Soc. Sci. Nat. Neuchâtel 5: 584. 1913.
= *Uredo desmodii-leiocarpi* Henn., Hedwigia 41: 107. 1902.
= *Uromyces solidus* Berk. & Cooke, N. Am. Fungi No 567. 1873.
= *Uromyces desmodii* Thüm., Bull. Torrey Bot. Club. 6: 215. 1878.
= *Phragmidium hedysari* Schwein., Amer. Bor. Fungi No 2947. 1834.

Specimens examined. – GUYANA: Georgetown, on *Desmodium* sp., 12 July 2003, J.R. Hernández & M.C. Aime 2003-129 (BPI 863537) II.

Hosts and distribution. – On species of *Desmodium* and *Meibomia* (Fabaceae); widespread in Central, North, South America and the Caribbean (Buriticá & Pardo-Cardona 1996, Hennen *et al.* 1982, Farr *et al.* n.d., Lindquist 1982). This is the first record for Guyana.

Uromyces neotropicalis J.R. Hern. & Aime **sp. nov.** – Figs. 15–20.

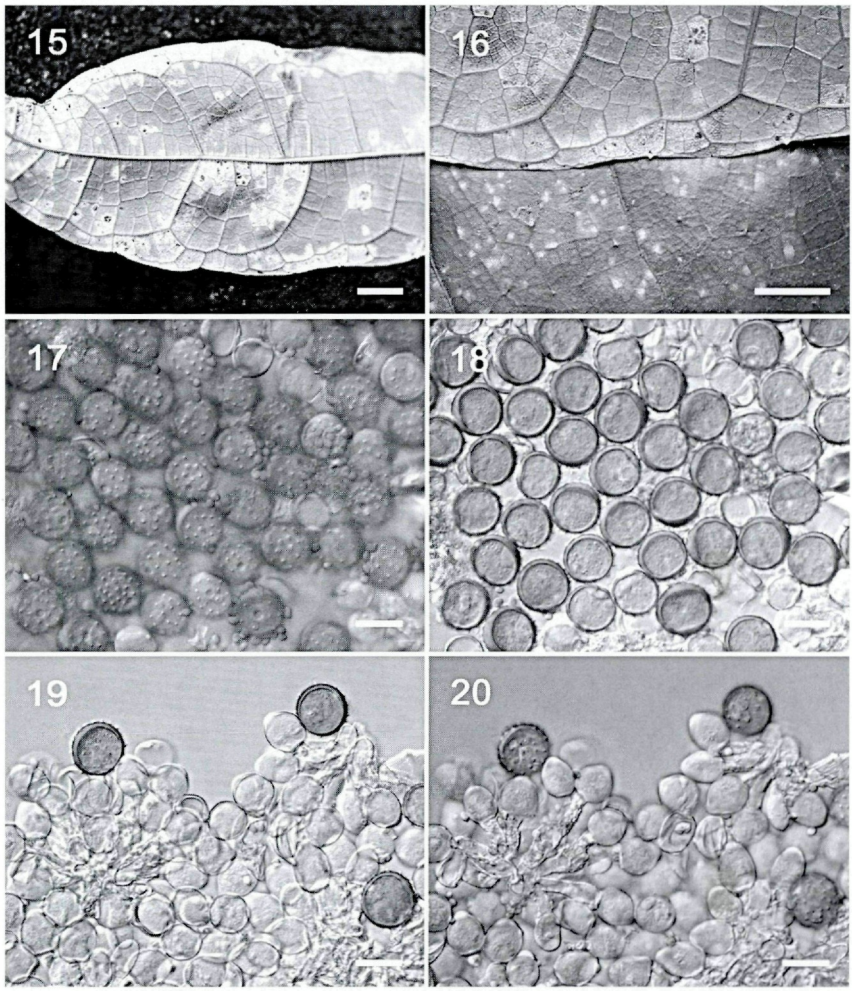
Uredinia abaxialia areae chlorinae insidentia, inter nervos foliae disposita, cinnamomea, 1–3 µm diametro, paraphysibus absentibus; urediniosporae globosae, 21.5–29 × 21.5–29 µm, episporio 2.5–3 µm, ad apice 3–7 µm, cinnamomeo, fortiter echinulato, 2 poris germinationis, equatorialibus. Telia similia urediniorum, pallentiora, teliosporae interdum in urediniis, 19–26.5 × 16.5–20 µm, globosae vel obovoideae, flavaeae vel cinnamomeae, laeves, episporio 1 µm, apice (1)2.5–3 µm; pedicellus hyalinus, 10–20 µm longus, 5–9 µm latus.

Holotypus. – GUYANA: Pakaraima Mountains, Grandmother's Creek, on Cucurbitaceae undet., 4 July 2003, J.R. Hernández 2003-112 (BPI 863950) II–III.

Uredinia abaxial, sometimes delimited by veins, corresponding to chlorotic areas on the upper and lower side of the leaves, cinnamon brown, 1–3 µm wide, without paraphyses; urediniospores dark cinnamon brown, globose, 21.5–29 × 21.5–29 µm, cell wall 2.5–3 µm thick, apex 3–7 µm thick, strongly echinulate, 2 equatorial germ pores. Telia similar to uredinia but lighter in color, teliospores sometimes produced in uredinia, 19–26.5 × 16.5–20 µm, globose to oblong, yellowish to cinnamon brown, cell wall smooth, 1 µm thick, apex (1) 2.5–3 µm; pedicel hyaline, 10–20 µm long, 5–9 µm wide, persistent.

Other specimens examined. – GUYANA: Pakaraima Mountains, Paluway Baru Creek, on *Cayaponia selysioides* C. Jeffrey (Cucurbitaceae), 7 July 2003, J.R. Hernández 2003-121 (BPI 863953) II; Ecuador: Bilsa Reserve, on Cucurbitaceae undet., 3 May 2004, M.C. Aime 2533 (BPI 864163) II–III.

Etymology. – *Neotropicalis*, referring to its Neotropical distribution.



Figs. 15–20. *Uromyces neotropicalis* on Cucurbitaceae (J.R. Hernández 2003-112, Holotype). **15.** Symptoms and sori on abaxial surface of a leaf. Bar = 1 cm. **16.** Chlorotic lesions on adaxial leaf surface, symptoms, and sori on abaxial surface. Bar = 1 cm. **17.** Strongly and sparsely echinulate urediniospores (and a few pale teliospores), surface view. Bar = 25 µm. **18.** Same as "17", median view. Bar = 25 µm. **19.** Yellowish to pale cinnamon brown, pedicellate teliospores (and a few darker urediniospores), median view. Bar = 25 µm. **20.** Same as "19", surface view. Bar = 25 µm.

Eight species of *Uromyces* are cited in the new world on Cucurbitaceae (Monoson & Rogers 1978, Kern *et al.* 1933, Jørstad 1956). *Uromyces pentastriatus* Viégas on species of *Cayaponia* and *Trianosperma,* has teliospores with striate verrucose cell walls, while in *U. neotropicalis* the teliospore walls are smooth. *Uromyces*

poliotelis Syd. on *Anguria* has ovoid, oblong to lanceolate oblong teliospores measuring 35–50 × (18) 25–33 µm, while *U. neotropicalis* produces globose to oblong teliospores measuring 21.5–29 × 21.5–29 µm. *Uromyces novissimus* Speg. on species of *Abobra, Cayaponia, Cucurbitella, Fevillea, Melothria, Pittiera,* and *Trianosperma,* has chestnut brown teliospores measuring 28–35 (50) × (20) 25–30 µm and with a broadly papillate apex (5–8 µm), while *U. neotropicalis* produces teliospores that are smaller and with an apical wall (1) 2.5–3 µm thick. *Uromyces corallocarpi* Dale on *Corallocarpus* sp. produces teliospores with a finely verrucose apex 2.5–5 µm thick, while in *U. neotropicalis* the teliospore apex is smooth. *Uromyces anguriae* H. S. Jack & Holw. on species of *Anguria* and *Gurania,* and *Uromyces ratus* H. S. Jack & Holw. on species of *Cayaponia,* have teliospores with a 6–12 µm thick umbo, while *U. neotropicalis* has teliospores with an umbo up to 3 µm thick. *Uromyces guraniae* Mayor on *Gurania* spp. produces urediniospores measuring 19–26 × 15–19 µm which are light cinnamon brown and moderately echinulate, and cinnamon brown teliospores measuring 16–22 × 15–19 µm, with an apex 4–7 µm thick. *Uromyces cayaponiae* Henn. on species of *Cayaponia* produces only uredinia, with larger (32–40 × 28–36 µm), more densely verrucose urediniospores than those of *U. neotropicalis* which are 21.5–29 × 21.5–29 µm, dark cinnamon brown and strongly echinulate. *Uromyces ratoides* Jørst. has teliospores that are fusiform to ellipsoid and measure 39–80 × 16–33 µm whereas teliospores of *U. neotropicalis* are globose to oblong and measure 19–26.5 × 16.5–20 µm, with an apex (1) 2.5–3 µm thick.

The host of the holotype collection has been examined by the botanists J.H. Kirkbride (ARS) and M. Nee (NY) and both identified it as a member of the family Cucurbitaceae. The host has alternate, petiolate leaves with a simple, elliptic blade, cuneate base, and long aristate apex, glabrous, with pinnate venation, margins entire with scattered, short teeth; tendrils opposite to the leaves, branched, glabrous. Kirkbride and Hernández examined all of the South American Cucurbitaceae collections in the US National Herbarium (US), Department of Botany, Smithsonian Institution, Washington, DC, and did not find any species with the above combination of characters although several species of *Gurania* and *Helmonthia* were similar. Nee examined all of the South American Cucurbitaceae collections in the herbarium (NY) of the New York Botanical Garden, and did not find any species represented in the herbarium with the above combination of characters. A DNA sequence of the host ITS from the type specimen was obtained (GenBank accession no. DQ021884) and blasted (http://www.ncbi.nlm.nih.gov/BLAST/) to

confirm Cucurbitaceae as host family, although placement to genus or species was not possible. A 1KB sequence from the 5' end of the 28S nuclear large subunit DNA (for MCA 2533) was deposited in GenBank (accession no. DQ021885).

Uromyces scleriae Henn., Hedwigia Beibl. 38: 67. 1899.

Specimens examined. – GUYANA: Plantation Vryheid, on *Scleria macrophylla* J. Presl & C. Presl (as *Scleria microcarpa* Salzm. ex Schltdl.), 13 Feb. 1924, D.H. Linder 935 (BPI 016389) II–III; Kartabo, on *Scleria melaleuca* Rchb. ex Schltdl. & Cham., 23 July 1922, F.L. Stevens 616 (BPI 016382, BPI 016383) II.

Hosts and distribution. – On species of *Scleria* (Cyperaceae) from South America, the Caribbean, and Nigeria (Farr *et al.* n.d., Hennen *et al.* 1982, Sydow 1925).

Uromyces setariae-italicae Yoshino, Bot. Mag. (Tokyo) 20: 247. 1906.

= *Aecidium brasiliense* Dietel, Hedwigia 36: 35. 1897.
= *Uredo panici* Henn., Hedwigia 43: 165. 1904.
= *Uromyces leptodermus* Syd. & P. Syd., Ann. Mycol. 4: 430. 1906.
= *Puccinia panicicola* Arthur, Bull. Torrey Bot. Club 34: 586. 1907.
= *Uromyces eriochloae* Syd., P. Syd. & E.J. Butler, Ann. Mycol. 5: 492. 1907.
= *Nigredo leptoderma* Arthur, N. Am. Fl. 7: 224. 1912.
= *Uredo eriochloana* Sacc. & Trotter, Syll. Fung. 21: 810. 1912.
= *Uredo panici-maximi* Rangel, Arc. Mus. Rio Janeiro 18: 160. 1916.
= *Uredo panici-prostrati* Syd. & P. Syd., Ann. Mycol. 4: 444. 1906.
= *Uredo eriochloae* Syd. & P. Syd., Ann. Mycol. 4: 444. 1906.
= *Uredo isachnes* Syd. & P. Syd., Ann. Mycol. 4: 444. 1906.
= *Uredo panici-villosi* Petch, Ann. Roy. Bot. Gard. (Peradeniya) 7: 295. 1922.
= *Uredo eriochloae* Speg., Anales Mus. Nac. Hist. Nat. Buenos Aires 19: 319. 1909.
= *Uredo henningsii* Sacc. & D. Sacc., Syll. Fung. 17: 456. 1905.
= *Uredo melinidis* Kern, Mycologia 30: 550. 1938.
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Specimens examined. – GUYANA: Georgetown, Lemada Canal, on *Panicum barbinode* Trin., 2 Aug. 1922, F.L. Stevens 717 (BPI 014240) II.

Hosts and distribution. – On species of *Brachiaria, Cyrtococcum, Echinochloa, Eragrostis, Eriochloa, Melinis, Ottochloa, Panicum, Paspalidium, Pennisetum, Setaria, Stenotaphrum, Urochloa* (Poaceae), and *Cordia* (Boraginaceae). Cosmopolitan, widespread in the Africa, the Americas, Asia, Europe, and Oceania (Cummins 1978, Farr *et al.* n.d., Lindquist 1982, Sydow 1925).

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Specimens examined. – GUYANA: Georgetown, on *Sporobolus indicus* (L.) R. Br. (≡ *Agrostis indica* L.), 2 July 1922, F.L. Stevens 15 (BPI 017672, BPI 017673, BPI 017678) III; Georgetown, Cheddi Jagan Airport, on *Sporobolus jacquemontii* Kunth, 24 June 2003, J.R. Hernández 2003-058 (BPI 844161) II.

Hosts and distribution. – On species of *Sporobolus* (Poaceae) from Africa, Asia, the Caribbean, Mexico, and Oceania (Cummins 1971, Farr *et al.* n.d., Sydow 1925).

Uromyces wulffiae-stenoglossae Dietel, Ann. Mycol. 6: 96. 1908.

Specimens examined. – GUYANA: Wismar, on *Wulffia baccata* (L.) Kuntze, 14 July 1922, F.L. Stevens 282 (BPI 019509) II–III.

Hosts and distribution. – On species of *Wulffia* (Asteraceae) from South America and the Caribbean (Farr *et al.* n.d., Sydow 1925).

List of Uredinales of Guyana by Host Family

ANNONACEAE

Annona sp.
Batistopsora crucis-filii

Annonaceae undet.
Aecidium rionegrense
Dasyspora gregaria

APOCYNACEAE

Mandevilla scabra
Crossopsora stevensii

Plumeria rubra
Coleosporium plumeriae

ASTERACEAE

Clibadium sp.
Endophyllum decoloratum

Elephantopus mollis
Coleosporium vernoniae

Eleutheranthera ruderalis
Puccinia cnici-oleracei

Emilia sonchifolia
Puccinia cnici-oleracei

Helianthis annuus
Puccinia helianthi

Mikania micrantha
Puccinia spegazzini

Mikania psilostachya
Puccinia mikaniae

Mikania sp.
Dietelia portoricensis

Wulffia baccata
Uromyces wulffiae-stenoglossae

COMMELINACEAE

Commelina erecta
Puccinia commelinae

CANNACEAE

Canna indica
Puccinia thaliae

Canna sp.
Puccinia thaliae

CONVOLVULACEAE

Ipomoea glabra
Coleosporium ipomoeae

CUCURBITACEAE

Cayaponia selysioides
Uromyces neotropicalis

Cucurbitaceae undet.
Uromyces neotropicalis

CYPERACEAE

Cyperus diffusus
Puccinia subcoronata

Cyperus ferax
Puccinia canaliculata

Cyperus laxus
Puccinia subcoronata

Cyperus sp.
Puccinia canaliculata

Scleria macrophylla
Uromyces scleriae

Scleria melaleuca
Uromyces scleriae

Scleria secans
Puccinia scleriicola

DIOSCOREACEAE

Dioscorea sp.
Sphenospora pallida

EUPHORBIACEAE

Euphorbia hirta
Uromyces euphorbiae

Jatropha gossypifolia
Phakopsora arthuriana

FABACEAE

Chamaecrista adiantifolia
Ravenelia guyanensis

Desmodium sp.
Uromyces hedysari-paniculati

Inga sp.
Chaconia ingae

Lonchocarpus nicou
Dicheirinia guianensis

Lonchocarpus sp.
Dicheirinia guianensis

LAMIACEAE

Lamiaceae undet.
Puccinia hyptidis

MALVACEAE

Gossypium sp.
Phakopsora gossypii

MORACEAE

Artocarpus altilis
Uredo artocarpi

Ficus sp.
Malupa pakaraimensis

ORCHIDACEAE

Cyrtopodium sp.
Sphenospora kevorkianii

Rodriguezia sp.
Sphenospora kevorkianii

PASSIFLORACEAE

Passiflora garckei
Puccinia scleriae

POACEAE

Bambusa sp.
Kweilingia divina

Bothriochloa bladhii
Puccinia duthiae

Cenchrus echinatus
Puccinia cenchri* var. *cenchri

Cynodon sp.
Puccinia cynodontis

Gymnopogon foliosus
Puccinia boutelouae

Lasiacis sorghoidea
Uromyces costaricensis

Olyra micrantha
Puccinia obliquoseptata

Panicum barbinode
Uromyces setariae-italicae

Paspalum conjugatum
Phakopsora compressa

Paspalum virginatum
Phakopsora compressa
Puccinia substriata var. ***substriata***

Sporobolus indicus
Uromyces tenuicutis

Sporobolus jacquemontii
Uromyces tenuicutis

RHAMNACEAE

Gouania sp.
Puccinia paraënsis

RUBIACEAE

Faramea multiflora
Maravalia guianensis

Palicourea sp.
Puccinia fallax

Sabicea glabrescens
Cerotelium sabiceae

SAPINDACEAE

Cardiospermum sp.
Puccinia arechaveletae

Serjania membranacea
Puccinia arechaveletae

SAPOTACEAE

Chrysophyllum sparsiflorum
Uredo baruensis

SCHIZAEACEAE

Lygodium volubile
Puccinia lygodii

THELYPTERIDACEAE

Thelypteris opulenta
Desmella aneimiae

Thelypteris sp.
Desmella aneimiae

VERBENACEAE

Stachytarpheta cayennensis
Endophyllum stachytarphetae

Stachytarpheta sp.
Endophyllum stachytarphetae

VITACEAE

Cissus sicyoides
Endophyllum circumscriptum var. ***circumscriptum***

Cissus sp.
Endophyllum circumscriptum var. ***circumscriptum***

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