UREDINALES COLLECTED BY FRED J. SEAVER IN TRINIDAD*

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No attempt has heretofore been made to enumerate the rusts of Trinidad. The present list of 71 species makes a creditable beginning. Probably two or three times this number may be found when a more thorough exploration is made. Over 160 species are already known for the island of Porto Rico, and about the same number for Cuba. Porto Rico has not one tenth the area of Cuba, and Trinidad has not quite one half the area of Porto Rico, but has a diversified topography and nearness to the mainland that will doubtless largely compensate for lessened area.

The island of Trinidad lies so close to the coast of South America that it is more properly considered a part of the southern continent rather than of the northern. Its flora is excluded from the volumes of the North American Flora.

The collections made by Dr. Seaver were obtained during the six weeks between March 1 and April 14, 1921. The visit to the island was made in the company of Dr. N. L. Britton,[1] who supplied a preliminary determination of the hosts in the field. The hosts have since been checked over by Mr. Percy Wilson at the herbarium of the New York Botanical Garden.

It is worthy of note that although Dr. Seaver gave his chief attention to other groups of fungi, yet he was able to secure 169 collections of Uredinales, which have yielded 71 species of rusts, 3 being new, or 4 including the one supplied by Mr. Nowell, as well as quite a number that are little known.

In the following list space has been economized by omitting the exact localities, except for new species, and by referring to the page of the seventh volume of the North American Flora, where

* Contribution from the Botanical Department of Purdue University Agricultural Experiment Station.

[1] For a detailed account of this trip, see Journal of the New York Botanical Garden for May, 1921.

the synonymy can be found, so far as that work has been published. All collections, except the one noted, are to be credited to Dr. Seaver, and the date of collection is March–April, 1921. Numbers 26, 33, 39, 41, 46, 47, 50, 52–57, thirteen in all, or eighteen per cent, are short-cycle species, the remaining fifty-eight are various forms of long-cycle species.

1. COLEOSPORIUM IPOMOEAE (Schw.) Burr. N. A. F. 87

On *Ipomoea glabra* (Aubl.) Choisy, II, *3181, 3275, 3291; Ipomoea* sp., II, *3274, 3385*. A common rust in its uredinial stage throughout tropical America.

2. PHAKOPSORA CROTONIS (Cooke) Arth. N. A. F. 104

On *Croton gossypifolium* L., II, *3253, 3424; C. hirtus* L'Her., II, *3109*. This rust was described by P. Hennings (Hedwigia **35**: 251. 1896) under the name *Uredo crotonicola,* on *Croton granulosus* from Argentina.

3. PHAKOPSORA MEIBOMIAE Arth. Bull. Torrey Club **44**: 509. 1917

On *Meibomia supina* (Sw.) Britton, II, *3197; M. triflora* (L.) Kuntze, II, *2960*.

4. CEROTELIUM GOSSYPII (Lagerh.) Arth. N. A. F. 187

On *Gossypium* sp., II, *2953, 3388*.

5. RAVENELIA INDIGOFERAE Tranz. N. A. F. 144

On *Indigofera suffruticosa* Mill. (*I. Anil* L.), *3077*.

6. PROSPODIUM APPENDICULATUM (Wint.) Arth. N. A. F. 160

On *Tecoma Stans* (L.) Juss., III, *3406, 3430*.

7. **Prospodium suppressum** sp. nov.

O. Pycnia amphigenous, numerous, blackish-brown, inconspicuous, subcuticular, conic, small, about 100 μ broad and about same height; ostiolar filaments wanting.

II. Uredinia at first (primary) amphigenous, interspersed with the pycnia in circular groups 2–4 mm. across on somewhat larger discolored spots, afterward (secondary) hypophyllous, scattered, minute, 0.1–0.2 mm. in diameter, soon naked, pulverulent, chestnut-brown; paraphyses few or wanting; urediniospores flattened laterally, seen from flattened side globoid or somewhat obovoid, 23–32 by 25–40 μ, seen from narrow side obovate, and apparently acute above; wall with a hygroscopic layer, the inner layer firm, cinnamon-brown, 3 μ thick, the cuticle and subcuticular layers colorless, verrucose-echinulate with close-set, blunt projections on the flattened sides, becoming much longer on the narrowed sides and, as the spores are ordinarily seen, appearing like a coarse fringe, 5–7 μ wide, extending around the spore, the pores 2, distinct, one in center of each flattened side.

III. Telia hypophyllous, in loose groups, at first bullate, soon naked, somewhat pulverulent, chocolate-brown, ruptured cuticle noticeable; teliospores ellipsoid, 21–24 by 25–34 μ, rounded above and below, slightly constricted at septum; wall dark chestnut-brown, uniformly 2–3 μ thick, sparingly and evenly verrucose; pedicel colorless, as long as spore, slender, tapering downward, the appendages obsolete.

On *Tabebuia* sp. (Bignoniaceae), Las Lilas, March 24–28, O, II, *3350* (type); Pointe Gourde, March 31, II, III, *3408;* Forest, Siparia Quarry, April 8, III, *3526;* Lady Chancellor Road, March 14, II, iii, *3180.* The group of species to which this new species belongs is imperfectly understood. There are probably quite a number of them, but at present the collections are frequently unnamed or listed under the genus *Uredo* or *Puccinia,* and have not been brought together for comparative study.

8. UROMYCES AFFINIS Wint. Hedwigia **24**: 259. 1885

On *Hypoxis decumbens* L., II, *3192, 3199, 3387.* The aecia and telia of this species were found in Missouri in 1883 by Demetrio, the earliest collection of the rust known, but so few urediniospores were present that they were not mentioned in the original description. Since that time many collections showing abundance of uredinia have been taken in the eastern United States, and recently the tropical collections, which show only uredinia and are usually reported under the names *Uredo Hypoxidis* (Bres.) P. Henn. and *Uredo globulosa* Arth., have been referred to the same species.

9. UROMYCES APPENDICULATUS (Pers.) Fries, N. A. F. 257

On *Phaseolus* sp., *3249*.

10. UROMYCES BIDENTICOLA (P. Henn.) Arth. Mycologia 9: 71. 1917

On *Bidens pilosa* L., II, *3075, 3190*.

11. UROMYCES COLUMBIANUS Mayor, Mém. Soc. Neuch. 5: 467. 1913

On *Melanthera aspera* (Jacq.) Steud., I, II, *3245;* II, *3239, 3301*.

12. UROMYCES DOLICHOLI Arth. N. A. F. 258

On *Cajan Cajan* (L.) Millsp., *3028, 3335, 3487*.

13. UROMYCES HEDYSARI-PANICULATI (Schw.) Farl. N. A. F. 248

On *Meibomia Scorpiurus* (Sw.) Kuntze, *3194; M. affinis* (Sch.) Kuntze, *3306*.

14. UROMYCES HOWEI Peck, N. A. F. 264

On *Asclepias Curassavica* L., II, *3304*.

15. UROMYCES JANIPHAE (Wint.) Arth. Mycologia 7: 190. 1915

On *Manihot Manihot* (L.) Cockerell, II, *3268, 3279, 3423*. Uredinia of this rust are common in tropical America, but the aecia and telia have only been found in Mexico.

16. UROMYCES LEPTODERMUS Sydow, N. A. F. 224

On *Lasaicis* sp., II, *3402, 3477*.

17. UROMYCES MAJOR Arth. (*Uredo ignobilis* Arth.), N. A. F. 225

On *Sporobolus indicus* (L.) R. Br., II, *3093*.

18. UROMYCES NEUROCARPI Diet. N. A. F. 258

On *Clitoria rubiginosa* Juss., II, III, *3206, 3292*.

19. UROMYCES PROËMINENS (DC.) Pass., N. A. F. 259

On *Chamaesyce hirta* (L.) Millsp., *2965, 2973, 3302, 3436, 3528*.

20. UROMYCES SCLERIAE P. Henn. N. A. F. 233

On *Scleria melaleuca* Schlecht. & Cham., II, *3299*. It has been reported from Cuba, Porto Rico, and southern Brazil.

21. UROMYCES WULFFIAE-STENOGLOSSAE Diet. Ann. Myc. **6**: 96. 1908

On *Wulffia baccata* (L. f.) Kuntze, I, *2971;* II, iii, *3244;* I, II, iii, *3231*.

22. PUCCINIA ACNISTI Arth. N. A. F. 471

On *Acnistus arborescens* Schlecht., I, *3178, 3227, 3524*.

23. PUCCINIA AEQUINOCTIALIS Holway, Ann. Myc. **3**: 22. 1905

On *Cydista aequinoctialis* (L.) Miers, II, *3092*.

24. PUCCINIA ANGUSTATOIDES R. E. Stone, N. A. F. 351

On *Rynchospora cyperoides* (Sw.) Mart., III, *2976*.

25. PUCCINIA ANTIOQUIENSIS Mayor, N. A. F. 347

On *Cyperus diffusus* Vahl, II, iii, *3337, 3393;* III, *3269*. The three collections show many 1-celled teliospores (mesospores), and the few teliospores found on *3337* and *3393* were all 1-celled, which would entitle these two collections to be entered under the genus *Uromyces*. The number of teliospores present are too few, however, to warrant the introduction of a new name.

26. PUCCINIA ARECHAVALETAE Speg. An. Soc. Ci. Arg. **12**: 67. 1881

On *Urvillea Seriana* (L.) H. B. K., *2966, 3133, 3139, 3345, 3479*.

27. PUCCINIA BIGNONIACEARUM Speg. An. Soc. Ci. Arg. **26**: 11. 1888

On *Bignoniaceae,* III, *3333, 3378*.

28. PUCCINIA CANNAE (Wint.) P. Henn. N. A. F. 380

On *Canna* sp., II, *3105, 3201, 3483; Maranta arundinacea* L., II, *2969, 3091, 3138, 3141, 3476*. The latter host has not before been reported.

29. PUCCINIA DEFORMATA Berk. & Curt. N. A. F. 294

On *Olyra latifolia* L., ii, III, *3474*.

30. PUCCINIA EUPATORII-COLUMBIANI Mayor, Mém. Soc. Neuch. **5**: 514. 1913

On *Eupatorium inulaefolium* H. B. K., II, III, *3587*.

31. PUCCINIA GOUANIAE Holway, Ann. Myc. **3**: 21. 1905

On *Gouania polygama* (Jacq.) Urban, II, *3027, 3457, 3090, 3254;* II, III, *3478, 3117*.

32. PUCCINIA HELICONIAE (Diet.) Arth. Bull. Torrey Club **45**: 144. 1918

On *Heliconia psittacorum* (L. f.) Kuntze, II, *3202; Heliconia* sp., II, *3525*.

33. PUCCINIA HETEROSPORA Berk. & Curt. Jour. Linn. Soc. **10**: 356. 1868

On *Abutilon giganteum* (Jacq.) Presl, *3458*.

34. PUCCINIA HYDROCOTYLES (Link) Cooke, Grevillea **9**: 14. 1880

On *Hydrocotyle Hazeni* Rose, II, *3426*.

35. PUCCINIA HYPTIDIS (M. A. Curt.) Tr. & Earle, N. A. F. 408

On *Hyptis capitata* (L.) Jacq., II, *2968*.

36. PUCCINIA HYPTIDIS-MUTABILIS Mayor, N. A. F. 410

On *Hyptis mutabilis* (A. Rich.) Briq., I, *3074, 3386;* II, *3107, 3189*.

37. **Puccinia** (?) **ignava** comb. nov. (*Uredo ignava* Arth.), N. A. F. 341

On *Bambos* sp., II, *2958, 3111*. Although the teliospores of this species are not known, it is highly probable that they will eventually be found to conform to the requirements of the genus *Puccinia,* and for convenience it is now so listed.

38. PUCCINIA IMPEDITA Mains & Holway; Arth. Mycologia **10**: 135. 1918

On *Salvia occidentalis* Sw., II, *2962, 3272.*

39. PUCCINIA LANTANAE Farl. Proc. Am. Acad. Sci. **18**: 83. 1883

On *Priva lappulacea* (L.) Pers., *2955, 2970, 3397.*

40. PUCCINIA LEONOTIDIS (P. Henn.) Arth. N. A. F. 407

On *Leonotis nepetaefolia* (L.) R. Br., II, *3273, 3354.*

41. PUCCINIA OBLIQUA Berk. & Curt.; Berk. Jour. Linn. Soc. **10**: 356. 1869

On *Metastelma* sp., *3188, 3448, 3488.*

42. PUCCINIA PALLESCENS Arth. (*Uredo pallida* D. & H.), N. A. F. 278

On *Zea Mays* L., II, *3103, 3110.* No teliospores of this rust have yet been found on corn (maize), and the aecia are unknown.

43. PUCCINIA RUELLIAE (Berk. & Br.) Lagerh. N. A. F. 415

On *Blechum Blechum* (L.) Millsp. (*B. Brownei* Juss.), II, *2957, 3096, 3195; Diantha pectoralis* (Jacq.) Gmel. (*Justicia pectoralis* Jacq.), II, *2954, 3191.* The second host is a new record for the species.

44. PUCCINIA SCLERIAE (Paz.) Arth. (*Aecidium passifloricola* P. Henn.) N. A. F. 349

On *Passiflora rubra* L., I, *3422.*

45. **Puccinia Seaveriana** sp. nov.

II. Uredinia amphigenous, sparsely grouped or singly on yellowish spots, irregularly rounded, 0.1–0.5 mm. across, at first bullate, soon naked, somewhat pulverulent, cinnamon- or chestnut-brown, ruptured epidermis conspicuous; paraphyses peripheral, abundant, strongly incurved, cylindric, sometimes inclined toward capitate, 10–15 by 40–50 μ, the wall thin, 1 μ, and pale or colorless below, much thickened above, 3–6 μ, and dark chestnut-brown; urediniospores broadly ellipsoid or globoid, 16–22 by 18–27 μ; wall cinnamon-brown, thin, 1–1.5 μ, closely and conspicuously echinulate, the pores 3, equatorial.

III. Telia not seen; teliospores in the uredinia oblong, 25–30 by 40–45 μ, rounded above and below, slightly or not constricted at septum; wall dark chestnut-brown, uniformly thick, about 3 μ, closely and noticeably verrucose; pedicel colorless, slender, fragile, once length of spore or shorter.

On *Oliganthes condensatus* (Less.) Schr. Bip. (*Carduaceae*), Lady Chancellor Road, March 14, II, *3179;* same, March 17, II, *3236;* same, March 21, II, *3283* (type); *Oliganthes Milleri*(?), western end of Monos Island, April 4, II, iii, *3459*. The hosts belong to the tribe Vernonieae, and are part of a genus comprising about eight species confined to tropical America. All the species are trees or shrubs, *Oliganthes condensatus* producing the largest individuals known among the composites. The rust is notable for its abundance of deeply colored paraphyses. Such structures have been recorded for only one other species on the tribe Vernonieae. Only a few teliospores were found. The type for the species has been chosen to show the most characteristic and best development of the uredinia, although the presence of teliospores could not be demonstrated. The few teliospores seen were on a collection which also had but few uredinia. The specific name is selected to give recognition to the devotion of the collector of this and other material which is the basis of this report, by which he has added greatly to the store of mycological knowledge.

46. **Puccinia solanita** (Schw.) comb. nov. (*Aecidium solanitum* Schw. Jour. Acad. Sci. Phila. II, 2: 283. 1853; *Puccinia claviformis* Lagerh. Tromsö Mus. Aarsh. 17: 53. 1895)

On *Solanum* sp., *3295*. The type collection for *Aecidium solanitum* is amply represented in the Schweinitz herbarium at the Philadelphia Academy of Science. An examination of this material shows that it bears a short-cycle rust, identical in appearance with *Puccinia claviformis*. The collection has also been examined by Mr. Percy Wilson and Dr. J. K. Small of the New York Botanical Garden, and they pronounce the host to be a species of *Solanum*, possibly *S. Melongena* L.

47. PUCCINIA SPEGAZZINII DeToni in Sacc. Syll. 7: 704. 1888

On *Mikania micrantha* H. B. K., *3527; Mikania* sp., *2956, 3135, 3228, 3312*.

48. PUCCINIA STRIOLATA (Speg.) Arth. (*P. macropoda* Speg.) N. A. F. 387

On *Iresine Celosia* L., I, II, *3137*.

49. PUCCINIA SUBSTRIATA Ell. & Barth. N. A. F. 289

On *Eriochloa punctata* Ham., II, *3193*.

50. PUCCINIA SYNEDRELLAE P. Henn. Hedwigia **37**: 277. 1898

On *Synedrella nodiflora* (L.) Gaertn., *2964, 3271, 3586; Emilia sonchifolia* (L.) DC., *3073*.

51. PUCCINIA TUBULOSA (Pat. & Gaill.) Arth. (*Uredo paspalicola* P. Henn.) N. A. F. 288

On *Paspalum paniculatum* L., ii, *3112; Paspalum* sp., II, *2961, 3185; Syntherisma digitata* Hitchc., II, *3339*. The aecia of this species occur on *Solanum torvum* and closely related hosts.

52. PUCCINIA URBANIANA P. Henn. Hedwigia **37**: 278. 1898

On *Valerianodes cayennensis* (Vahl) Kuntze, *2967, 2972, 3255*.

53. ENDOPHYLLUM CIRCUMSCRIPTUM (Schw.) Whetzel & Olive, Am. Jour. Bot. **4**: 49. 1917

On *Cissus sicyoides* L., *3267*.

54. ENDOPHYLLUM DECOLORATUM (Schw.) Whetzel & Olive, l. c.

On *Clibadium surinamense* L., *3177, 3270*.

55. ENDOPHYLLUM WEDELIAE (Earle) Whetzel & Olive, l. c.

On *Wedelia trilobata* (L.) Hitchc., *3087*.

56. ENDOPHYLLOIDES PORTORICENSIS Whetzel & Olive, l. c.

On *Mikania* sp., *3136, 3523*.

57. PUCCINIOSIRA PALLIDULA (Speg.) Lagerh. N. A. F. 127

On *Triumfetta* sp., *3079, 3248b, 3252, 3310*.

58. UREDO ADENOCALYMMATIS P. Henn. Hedwigia **35**: 249. 1896

On Bignoniaceae, *3203, 3340*. This rust, both in its spores and paraphyses, has a close resemblance to species which have been

referred to the genus *Prospodium*. The paraphyses are notable for their scimitar shape, sharp points, and cross walls. It has been reported on *Pyrostegia venusta*, as well as on the type genus.

59. UREDO COMMELYNAE Kalchbr. Grevillea **11**: 24. 1882

On *Commelina elegans* H. B. K., *3390*.

60. UREDO CYATHULAE Mayor, Mém. Soc. Neuch. **5**: 584. 1913

On *Cyathula achyranthoides* (H. B. K.) Moq., *3334*.

61. UREDO MACULANS Pat. & Gaill. Bull. Soc. Myc. Fr. **4**: 98. 1888

On *Pfaffia iresinoides* (H. B. K.) Kuntze, *3076, 3250, 3303*.

62. UREDO MANDEVILLAE Mayor, Mém. Soc. Neuch. **5**: 591. 1913

On *Mandevilla tomentosa* (Vahl) Kuntze, *3258, 3285, 3297*.

63. UREDO RUBESCENS Arth. Mycologia **7**: 327. 1915

On *Dorstenia Contrajerva* L., *3078, 3475*.

64. UREDO TRICHILIAE Arth. Mycologia **9**: 90. 1917

On *Trichilia trinitensis* A. Juss., *3305, 3421*.

65. UREDO VICINA Arth. Mycologia **7**: 325. 1915

On *Wedelia Jacquini* Rich., *3432*.

66. UREDO VITICIS Juel, Bih. K. Sv. Vet.-Akad. Handl. **23**(3)[10]: 26. 1897

On *Vitex* sp., *3293*.

67. **Aecidium Alibertiae** sp. nov.

O. Pycnia epiphyllous, numerous in circular groups on discolored spots 4–10 mm. across, prominent, subepidermal but appearing subcuticular, flattened-conic, large, 160–210 μ in diameter, 65–80 μ high; hymenium flat; ostiolar filaments wanting.

I. Aecia hypophyllous, opposite the pycnia, short-cylindric, 0.3–0.4 mm. in diameter, deep-seated, extending half way through the leaf; peridium colorless, the margin coarsely lacerate, fragile; peridial cells in front view angularly ellipsoid or oblong, in side view lanceolate, strongly overlapping, 16–20 by 30–40 μ, the outer wall thin, 1–2 μ, smooth, the inner wall thicker, 2–5 μ, moderately

and closely verrucose; aeciospores globoid, 21–26 by 23–29 μ; wall pale or cinnamon-brown, 1.5–2 μ thick, finely and closely verrucose.

On *Alibertia* sp. (Rubiaceae), Piarco savanna, March 15, *3204;* Piarco savanna, south of Dabadie, March 21, *3286* (type); Meara savanna, March 22, *3296*. The species is remarkable for the large pycnia, that are formed beneath the thin epidermis, but above the thick palisade cells. They are morphologically similar to subcuticular pycnia.

68. AECIDIUM BRASILIENSE Diet. Hedwigia **36**: 35. 1897

On *Cordia cylindrostachya* R. & S., *3106, 3246, 3251, 3277*.

69. AECIDIUM BYRSONIMATIS P. Henn. Hedwigia **34**: 101. 1895

On *Byrsonima verbascifolia* Rich. (?), *3200*.

70. **Aecidium delicatum** sp. nov.

O. Pycnia amphigenous, in small close groups, punctiform, honey-yellow, noticeable, subepidermal, globoid, about 125 μ in diameter.

I. Aecia hypophyllous, surrounding the pycnia, somewhat circinating, on yellowish spots 1–2 mm. across, low and broad, 0.5–0.8 mm. in diameter; peridium delicate, erect, finely erose; peridial cells oblong in surface view, rhomboidal in side view, slightly overlapping, 26–32 μ long, the wall colorless, the inner wall 3–5 μ thick, finely verrucose, the outer wall thinner, smooth; aeciospores globoid or ellipsoid, 16–24 by 20–30 μ; wall colorless, thin, 1 μ, minutely and closely verrucose.

On *Eucharis* sp. (Amaryllidaceae), Port of Spain, no date, collected by Nowell and communicated by Seaver. Little comparative study has been made of the rusts on Amaryllidaceous hosts. Their identity is made especially difficult by the collection of single stages and on hosts not fully determined.

71. AECIDIUM TOURNEFORTIAE P. Henn. Hedwigia **34**: 338. 1895

On *Tournefortia tomentosa* Mill., *3278*.

INDEX TO UREDINALES

(New or newly combined names are in **bold face** type)