A taxonomic study of *Puccinia* species on *Smilax* (Smilacaceae)

D. O. Eboh

Botany Department, University of Nigeria, Nsukka, Nigeria

Eboh, D. (1989). A taxonomic study of *Puccinia* species on *Smilax* (Smilacaceae). – Sydowia 41: 136–143.

Puccinia species on *Smilax* are critically examined. Nine species are recognized. *P. prainiana* Barcl. and *P. smilacis-chinae* P. Henn. are reduced to synonyms of *P. ferruginea* Lev. while *P. smilacissieboldii* Hirat., *P. smilacis-sempervirentis* Wang and *P. smilacicola* Saw. are reduced to synonyms of *P. henryana* Syd. An anamorph, *Aecidium smilacis* Schw. is transferred to *Puccinia caricis-blepharicarpae* Hirat.

Four rust genera, *Blastospora* Diet., *Puccinia* Pers., *Sphenospora* Diet., *Uromyces* (Link) Unger and two rust anamorphs, *Aecidium* and *Uredo*, have been reported on *Smilax* species. Of all these genera and form-genera, the genus *Puccinia* has the largest species representation.

The first comprehensive attempt at critical, taxonomic study of *Puccinia* species on *Smilax* was undertaken by P. & H. Sydow (1904). Ever since, contributions towards a better understanding of that genus on *Smilax* have been limited to re-assessment of known species, reports of new records and descriptions of new species (Arthur & Cummins, 1936; Boedijn, 1959; Cummins, 1935, 1940, 1941; Eboh, 1984; Hansford, 1938; Henderson, 1969; Hennen & Cummins, 1973; Hennings, 1901, 1904, 1907–8; Hiratsuka, 1941, 1942, 1943; Hiratsuka & Yoshinaga, 1935; Huguenin, 1967; Jørstad, 1959; Mayor, 1913; Morimoto, 1956; Ono & al. 1986; Sawada, 1943; Tai, 1947; Viennot-Bourgin, 1959; Yen, 1971).

The following criteria have been used by different workers to separate *Puccinia* species on *Smilax*: – presence of aecia; presence of uredinia; presence, number and position of germ pores in urediniospores; position and colour of telia; shape, size, wall thickness and septation of teliospores; presence of mesospores; colour, persistency, inflation and size of pedicels.

In this paper, a second attempt is made at a critical, taxonomic study of all the species of *Puccinia* reported on *Smilax*. Some of the criteria used by earlier workers for separating these species are rejected and new ones added. The absence of aecia or uredinia or both is dropped as a criterion for separation since these spore forms are present in some collections but were inadvertently overlooked.

The size of pedicel is inconsistent even within a species. This is quite evident in *P. kraussiana* Cke. Newly added criteria are the surface sculpturing of aeciospores, the colour of teliospores and the morphology of uredinia and telia.

Key for the Identification of Species of *Puccinia* on *Smilax*

1. Teliospores with conspicuously inflated pedicels 2
1. Teliospores with non-inflated pedicels 6
2. Teliospores with wall pronouncedly thicker at the apices ... 3
2. Teliospores with wall of uniform thickness 4
3. Teliospores narrowly ellipsoid, wall to 17 µm thick at the apices, mesospores present ..... *P. ferruginea*
3. Teliospores cylindrico-clavate, ellipsoid to obovoid, to 8 µm thick at the apices, mesospores absent ..... *P. citrina*
4. Mesospores present 5
4. Mesospores absent ..... *P. kraussiana*
5. Mesospores numerous, teliospores wall to 4 µm thick ..... *P. montisfontium*
5. Mesospores occasionally present ..... *P. merrillii*
6. Pedicels deciduous, aeciospores wall coarsely verrucose with cubical markings ..... *P. citricolor*
6. Pedicels persistent 7
7. Aeciospores wall echinulate, mesospores occasionally present ..... *P. parksiana*
7. Aeciospores wall verrucose, mesospores absent 8
8. Teliospores of two types, hyaline and non-leptosporic and light brown and leptosporic ..... *P. henryana*
8. Teliospores of one type 9
9. Teliospores subyaline to yellowish, with bilaminated septum, spores disarticulating into spore parts at maturity .. *P. lifuensis*
9. Teliospores light brown 10
10. Uredinia and telia blister-like, teliospores 2-celled to 4-celled ..... *P. poikilospora*
10. Uredinia and telia not blister-like, teliospores mostly 2-celled, occasionally 3-celled ..... *P. smilacis*

Descriptions and Notes

1. *Puccinia citrina* Sydow. – Monogr. Ured. 1: 634. 1904.

Description and illustrations: Arthur & Cummins (1936).

Specimens examined. – On *Smilax* sp.: BRITISH NORTH BORNEO: Dallas, Kinabalu, 6 Nov. 1931, M. S. Clemens, PURF 16921; PHILIPPINE ISLANDS: Thermal Springs, Mt. Apo, Mindanao, 31 May 1924, Clemens 2026, PURF 5731; 31 May 1924, Clemens 2027, PURF 5732; on *S. zeylanica:* INDIA: Bombay: Monkey Hill, Khaudala, 4 Sept. 1951, H. Santapau No. 13338 ex M01624117.

The original description of the taxon did not include spermogonia and aecia. ARTHUR & CUMMINS (1936) first mentioned the presence of these stages.

2. *Puccinia citricolor* CUMM. – Mycologia 32: 360. 1940.

Description and illustrations: CUMMINS (1940).

Specimens examined. – On *Smilax* sp. (sterile): NEW GUINEA: Sattelberg. Bank of cart road above mission, 30 Nov. 1935, elevation 3,400′ above sea level, Clemens 1038, PURF 10119 (TYPE); Nordöstliches Neu-Guinea, Morobe-District, Sattelberg, Yunzaing, 25 April 1936, elevation 4,500′ above sea level, Clemens 2958, PURF 10120; Kajabit Mission vicinity mt. Bush, 16 Oct. 1939, elevation 2,000′ above sea level, Clemens 10768, PURF 10121; Nordöstliches Neu-Guinea, Morobe-Distrikt, Sattelberg, Yunzaing, 21 Aug. 1936, elevation 4,500′ above sea level, Clemens nr. Suppl., PURF 10122; on *Smilax juvenile*, Nordöstliches Neu-Guinea, Morobe-Distrikt, Sattelberg, Yunzaing, 17 July 1936, elevation 4,493′ above sea level, Clemens nr. Suppl. (same as nr. 3276), PURF 10123, on *Smilax* sp. (flower sterile), Morobe-Distrikt, Yunzaing, open trails sec. forest, 12 Aug. 1936, elevation 4,493′ above sea level, Clemens 3886 bis, PURF 10124; on S. *juvenile*, Nordöstliches Neu-Guinea, Morobe-District, Sattelberg, Yunzaing, 11 June 1936, elevation 4,493′ above sea level, Clemens 3276, PURF 10125; on *Smilax* sp., Morobe-District, Yunzaing, forest trails, 1 July 1936, elevation 4,493′ above sea level, Clemens 3484, PURF 10126; on *S. juvenile*, Nordöstliches Neu-Guinea, Morobe-District, Sattelberg, 18 Nov. 1935, elevation 3.000′ above sea level, Clemens 902, PURF 10127.

3. *Puccinia ferruginea* LÉV. – in Vaillant, Voyage de la Bonite, 204 (1839–46).

Syn.: *Puccinia prainiana* BARCL. – Sci. Mem. Med. Off. Army India 4: 3.1891.
Puccinia smilacis-chinae P. HENN. – Hedwigia 40: 125. 1901.

Description and illustrations: SYDOW (1904).

Specimens examined. – On *Smilax aspera* L.: INDIA: Mussoori, Utter Pradesh, 6 June 1940, G. W. Padwick, US-0094232, PURF 15852; Chaupatia, 12 April 1970, R. S. Mathur, PURF 18153; Pathan Basti, Chankrata, 21 April 1967, M. A. Rau, PURF 17961; Kalika, Kumaon, 18 March 1961, M. A. Rau, PURF 17960; Mussoone, June 1930, Oct. 1932, J. H. Nutter and R. N. Taudon, PURF 9697; on *S. elegans*, Ranikhet, 25 May 1907, E. J. Butler, US-0094233, PURF 5727; on *Smilax* sp., Ramgash, Kumaon, May 1920, F. J. F. Shaw, US-0094229; Yercaud, 25 Feb. 1965, R. Swaminathan and V. Raghunathan, US-0094228; on *S. china*, State of Mereana, 25 Mai 1948, K. S. Gopalkrishnan ex U.N.D. 011112; CEYLON: on *S. zeylanica*, April 1915, T. Petch, PURF 5726; CHINA: Prov. Chekiang, Oct. 1928, F. L. Tai 2822, PURF 5729; on *S. sieboldi* MIQ., Fujain, 7 June 1980, Zhuang Jian-yun, HMAS 41745, PURF 19911; on *Smilax* sp., Yung Hsien, Kwangsi Prov., 3 July 1933, S. Y. Cheo 2315, PURF 11558; Chiu Hua Shan, Anhwei Prov., 10 Nov. 1932, S. Y. Cheo 1525, PURF 11559; on *S. arisanensis* HAY., Fujian, 20 Sept. 1980, Zhuang Jian-yun 208, HMAS 41736, PURF 19906; on *S. bracteata* PRESL., Fujian, 17 Sept. 1980, Zhuang Jian-yun 57, HMAS 41737, PURF 19907; on *S. china*, Fujian, 1 Sept. 1979, Zhuang Jian-Yun 4, HMAS 41738, PURF 19908; Toin Leong San, S. of Mei-hsien E. Kwantung prov., June 1936, E. D. Merrill 1238 ex MO 1214344; on *S. ferox* WALL. ex KUNTH, Fujian, 5 Sept. 1980, Zhuang Jian-yun 109, HMAS 41741, PURF 19909; on *S. lanceaefolia* RAXB var. *opaca* A. D. C., Fujian, 14 Sept. 1980, Zhuang Jian-yun 167, HMAS 41744, PURF 19910; on *S. china* L.: FORMOSA: Taichung, 11 Aug. 1945, PURF 15377; on *S. aspera:* HIMALAYA: Mossy Falls below Landaw, 23 Oct. 1934, R. R. Stewart, PURF 10607; on

S. aspera: SRI LANKA: Hakgala, 26 April 1915, T. Petch, PURF 5725; on *Smilax* sp.: NEW GUINEA: Galumba-Finangan, Morobe, Ramu R., wet bush mountain elevation 4,500′ above sea level, 25 April 1940, Clemens PURF 10159; on *S. china:* HONG-KONG: Tai Po Shan, D. M. Henderson, PURF 18128.

Urediniospore wall lamination which was reported by HENDERSON (1969) as "very distinct" for this taxon was not seen. He probably saw it in fresh material.

4. *Puccinia henryana* SYD.-Monogr. Ured. 1: 633. 1903.

Syn.: *Puccinia smilacis-sempervirentis* WANG. – Bull. Mus. Hist. Nat. (Paris) 10: 523. 1938.
Puccinia smilacis-sieboldii HIRAT. – Bot. Mag. Tokyo 56: 377. 1942.
Puccinia smilacicola SAW. – Trans. Taiwan Nat. Hist. Soc. 30: 100. 1943.

Description and illustrations: SYDOW (1904).

Specimens examined. – On *Smilax* sp.: CHINA: Fan Ching Shan, Kweichon Prov., 7 Sept. 1931, S. Y. Cheo 366, E. B. Mains; Chiu Hua Shan, Anhwei Prov., 10 Oct. 1932, S. Y. Cheo 1165, E. B. Mains, PURF 11556: on *S. china* var. ?, Kwangtung, on roadside, Pan Kah Shan, 2–30 Nov. 1932, Tsang, W. T. 20868 ex MO 1146750.

This is the first report of the uredinial state of this taxon. Uredinia amphigenous, pulverulent, dirty white, sharing the same sorus with circinnately arranged telium; urediniospores hyaline, broadly ellipsoid to obovoid, fragile-looking, 23.8–37.4 × 17–22.1 µm; wall finely echinulate, up to 3.2 µm thick.

The presence of two types of teliospores, hyaline, non-leptosporic, and light brown leptosporic, singles out this species among other species of *Puccinia,* that are associated with *Smilax*. The function of the hyaline teliospores is unknown.

5. *Puccinia kraussiana* CKE. – Grevillea 10: 126. 1882.

Syn.: *Puccinia smilacis-kraussianae* YEN. – Revue Mycol. 36: 109. 1971.

Description and illustrations: SYDOW (1904).

Specimens examined. – On *Smilax kraussiana* MEISN.: SIERRA LEONE: Kamabai, 28 Jan. 1939, F. C. Deighton 1787, PURF 9715; on *Smilax* sp.: JAVA: Bojor, April 1900, Raciborski 30, US-0094231; in botanical garden of Bogor, July, F. Höhnel, US-0094230; on *S. perfoliata* LOUR.: INDIA: Mysore: between Uchangi and Byagadhalli, 19 Aug. 1970, C. Saldanha, T. R. Ramamoorthy HFP514, ex MO 2334111; Yercaud, 25 Feb. 1965, R. Swaminathan and V. Raghunathan US-0094228; on *S. kraussiana:* NIGERIA: Umuko, Ukehe, Nsukka, 28 March 1979, Eboh 205, PURF 19512; Mambilla Plateau, Aug. 1985, Eboh 208; Obudu Cattle Ranch, 8 March 1985, Eboh 207; Ajalli, near St. Matthew Catholic Church, on a roadside near Ogba stream, 28 Dec. 1983, Eboh 206.

Puccinia smilacis-kraussianae described by YEN (1971) has urediniospores with germ pores. It was on this basis that the taxon was separated from *P. kraussiana*. This author has, however, found up to 3 germ pores in the urediniospores of *P. kraussiana* and has, therefore, reduced *P. smilacis-kraussianae* to synonym of *P. kraussiana*.

6. *Puccinia lifuensis* HUGUENIN. – Bull. Trim. Soc. Mycol. Fr. 83: 944. 1967.

Description and illustrations: HUGUENIN (1967).

There was no specimen available for examination. This study is based on the original description. This taxon is closer to *P. citricolor* except that the latter has larger aeciospores, urediniospores and teliospores. It also has non-inflated, deciduous pedicels. *P. lifuensis* has aeciospores with uniformly thickened wall and teliospores with bilaminated septum which causes a disarticulation of the 2 cells of the spore.

7. *Puccinia merrilli* P. HENN. – Hedwigia 47: 251. 1907–8.

Spermogonia epiphyllous, intermixed with aecia, globose to conical, subepidermal, up to 160 µm high, up to 150 µm wide. – Aecia epiphyllous, in clusters, in hypertrophied host tissue, very deeply seated in the mesophyll, deeper than spermogonia, globose with distinct easily separable peridium; aeciospores ellipsoid, subhyaline, 32.3–42.5 × 23.8–32.3 µm, wall verrucose, up to 1.7 µm thick, slightly thicker at the apex and base, up to 3.4 µm thick; germ pores 5, equatorial. – Uredinia sharing sori with telia, tardily exposed, broadly ellipsoid to globose; urediniospores obovoid to broadly ellipsoid, yellowish green, 32.3 – 42.5 × 23.8 – 25.5 µm, wall echinulate, up to 1.8 µm thick.

Specimens examined. – On *Smilax bracteata* PRESL.: PHILIPPINES: Rosales and vicinity, Pangasinan prov., Luzon, 1–14 Feb. 1925, Clemens 5902, PURF 5722; on *Smilax* sp., Adouay, Benguet prov., Luzon, 24 Feb. 1925, Clemens 4984; Surigao, 6 April 1927, C. A. Wenzel 2619 ex MO971188; on *S. pralifera:* INDIA: Ganhati, Assam, 1968, K. L. Singh 31, PURF 17843.

This is the first report and description of spermogonia and aecia and the first description of uredinia of this taxon.

8. *Puccinia montisfontium* HUGUENIN. – Bull. Trim. Soc. Mycol. Fr. 83: 946. 1967.

Description and illustrations: HUGUENIN (1967).

This study is based on the original description. There was no specimen available for examination. The main characteristic feature of this taxon is the position of the telia, which are deeply tucked away in the subepidermal layer, the epidermis at that site being raised and cone-shaped.

9. *Puccinia parksiana* Cumm. – Mycologia 27: 608. 1935.

Description and illustration: Cummins (1935).

Specimens examined. – On *Smilax vitiensis* Seeman: FIJI: Near Suva, May 1926, H. E. Parks 8500, PURF 5733 (TYPE); on *Smilax* sp., Viti Levu, 7 June 1927, H. E. Parks, PURF 54811; on *Smilax* sp.: AUSTRALIA: Forest near Captain's Feat, 10 Feb. 1955, E. Gaubs, PURF 89546.

Cummins (1935) described and reported only the telial stage. He speculated that the rust was microcyclic, but I could find spermogonia, aecia and uredinia. This rust is macrocyclic and autoecious.

Spermogonia amphigenous but mostly hypophyllous, subepidermal, globose to nearly pyriform, up to 190 µm high, up to 220 µm wide. – Aecia amphigenous but mostly hypophyllous, globose, associated with spermogonia; aeciospores polygonal, ellipsoid, attenuating at both ends, subhyaline, 49.3 – 64.6 × 27.2 – 34 µm; wall echinulate, evenly thickened, up to 5.1 µm thick; peridium firmly adherent to the host tissue. – Uredinia arising subepidermally then erumpent, light brown, globose or irregularly globose, pulverulent, tardily exposed, solitary or located in the centre of telial concentric rings; urediniospores obovoid to broadly ellipsoid, greenish yellow to nearly golden, 42.5 – 51 × 30.6 – 35.7 µm; wall strongly echinulate, echinulae of a cone-on-a bulbous base type, up to 3.4 µm thick, pores 4, equatorial.

10. *Puccinia poikilospora* Cumm. – Bull. Torrey Bot. Club 67: 69. 1940.

Description and illustration: Cummins (1940).

Specimens examined. – On *Smilax spinosa* Mill.: GUATEMALA: Jutiapa, 21 Dec. 1938; J. R. Johnston 1425, PURF 48934 (TYPE); on *S. jalapensis* Schlecht., Dept. Quezaltenango, above Mujuliá, between San Martin Chile Verde and Colomba, alt. about 1800 m; in damp, dense, mixed forest on white sand slopes, 1 Feb. 1941, Paul C. Standley 85509, PUR 50502.

This is the only taxon in the group of *Puccinia* on *Smilax* that has blister-like uredinia and telia and teliospores that vary from 2-celled to 4-celled.

11. *Puccinia smilacis* Schw. – Schr. Nat. Ges. Leipzig 1: 72. 1822.

Description and illustrations: Schweinitz (1822).

Specimens examined. – On *Smilax bona-nox* L.: MEXICO: Mex. 80.63 miles W. of Cd. Mante in San Louis Potosi, 21 Sept. 1963, Cummins 63–121, PUR 60677; Mex. 80, 10 miles east of Cd. del Maiz., San Louis Potosi, 11 April 1962; Cummins 62–215, PUR 60678; about 25 miles, east of Cd. del Maiz, San Louis Potosi on Mex. Highway 80, 27 Sept. 1965, Joe F. Hennen 65–176, PUR 60889; on *Smilax* sp., Lower Santa Rosa Canyon, N. L. 60 west of Linaus, 2 Sept. 1969, Cummins 69–73, PUR 62879; Oaxaca, 18 Oct. 1899, PUR 30850; Jalapa, State of Oaxaca, 2 Oct. 1898, Holway 3206,

PUR 30848; Jalapa, 2 Oct. 1898, Holway 3206, PUR 57540; Jalapa, 5 Oct. 1898, Holway 3207, PUR 30849; State of San Louis Potosi, 35.9 miles east of San Louis Potosi (east traffic circle) on Mex. Hwy 86, edge of Oakwoods, alt. 5,100 ft. 29 Oct. 1967, Joe F. Hennen and David Rodriguez 67–364, PUR 63614; State of Tamaulipas, 10 miles west of Gomaz Parias, trail to Rancho del Cielo, 6–8 Nov. 1974, Joe F. Hennen and Pablo Buritica 74-122, PUR 66218; on *Smilax* sp.: JAMAICA: Mandeville, 24 Feb. 1915, Holway 230, PUR 30852; on *S. domingensis* WILLD.: PORTORICO: Mariecio, 16 Mar. 1916, H. H. Whetzel and Edgar W. Olice 348, PUR 30767; on *S. Havanensis* JACQ.: CUBA: San Antonio de los Banos, 11 June 1916, John R. Johnston 783, PUR 30822: on *Smilax* sp.: USA: Texas: Texas Hwy 147, camp ground ± 3 miles south of Tex. Hwy 103, Angelina National Forest, 12 Sept. 1969, Cummins 69–108; 2 miles S. of Sherman, 25 Aug. 1966, Joe F. Hennen 66–32; on *S. arisanensis* HAY.: CHINA: Fujian, 20 Sept. 1980, Zhuang Jian-Yun 209, HMAS 41818.

Spermogonia and aecia are hosted by species of *Apocynum*. This taxon is more or less restricted to the Americas and Caribbeans.

Acknowledgments

My appreciation goes to Prof. JOE HENNEN of Purdue University, West Lafayette, Indiana, in whose laboratory this research was carried out. To the curators of U.S. Dept. of Agriculture, National Fungus Collections (BPI) and Museum National d'Histoire Naturelle, Laboratoire de Cryptogamie (C) who loaned some specimens to me, I am also grateful. The financial support was provided by the Fulbright Fellowship Programme.

References

ARTHUR, J. C. & G. B. CUMMINS (1936). Philippine Rusts in the Clemens Collection, 1923–1926, I. – Philippine Journ. of Science 59 (3): 446.

BOEDIJN, K. B. (1959). The Uredinales of Indonesia. – N. Hedwigia 1: 479.

CUMMINS, G. B. (1935). Notes on some species of the Uredinales. – Mycologia 27: 608–609.

— (1940), Description of tropical rusts, II. – Bull. Torrey Bot. Club. 67: 69.

— (1941). Uredinales of New Guinea. – Mycologia 33: 382.

EBOH, D. O. (1984). A taxonomic survey of Nigerian rust fungi: Uredinales Nigerianenses – III. – Mycologia 76: 179–189.

HANSFORD, C. G. (1938). Annotated host list of Uganda parasitic fungi and plant diseases – V. – East Afric. Agric. Journ. 3: 319–324.

HENDERSON, D. M. (1969). Rusts from various sources. – Notes Roy. Bot. Gard. Edinburgh 29: 377–387.

HENNEN, J. F. & G. B. CUMMINS (1973). The Mexican species of *Puccinia* (Uredinales). – Bol. Soc. Mex. Mic. 7: 59–88.

HENNINGS, P. (1901). Einige neue japanische Uredineae II. – Hedwigia 40: 124.

— (1904). Fungi Amazonici. Cl. Ernesto Ule, collecti. – Hedwigia 43: 164.

— (1907–8). Fungi Philippinenses – I. – Hedwigia 47: 251.

HIRATSUKA, N. (1941). Uredinales of Okinawa Island. – Trans. Sapporo Nat. Hist. Soc. 17: 26.

— (1942). Uredinales collected in Korea V. – Bot. Mag. (Tokyo) 56: 53–61.

— (1943). Uredinales of Formosa. – Mem. Tottori Agric. Coll. 7: 27.

HIRATSUKA, N. & T. YOSHINAGA. (1935). Uredinales of Shikoku. – Mem. Tottori Agric. Coll. 2: 275.

HUGUENIN, B. (1967). Micromycètes du Pacifique Sud. (Sixième contribution). Uredinales de Nouvelle Caledonie (II). – Bull. Trim. Soc. Mycol. Fr. 83: 941–951.

JØRSTAD, I. (1959). Notes on some Asiatic Uredinales. – Nytt. Mag. Bot. 7: 137.
MAYOR, E. (1913). Contribution a l'étude de Uredinales de Colombie. – Mem. Neuchâtel Sci. Nat. 5: 442–599.
MORIMOTO, Y. (1956). Notes on the rust fungi collected from Amami – Ohshima. – Journ. Jap. Bot. 31: 41.
ONO, Y., M. KAKISHIMA, A. KUDO, & S. SATO (1986). *Blastospora smilacis*, a teleomorph of *Caeoma makinoi*, and its sorus development. – Mycologia 78: 253–262.
SAWADA, K. (1943). Descriptive catalogue of Taiwan Fungi. Pt. IX. – Taiwan Agr. Res. Inst. Rep. 86: 130.
SYDOW, P. & H. SYDOW (1904). Monographia Uredinearum I. – Fratres Borntraeger, Leipzig.
TAI, F. L. (1947). Uredinales of Western China. – Farlowia 3: 95–139.
VIENNOT- BOURGIN, G. (1959). Etude des Micromycètes parasites recoltés en Guinée.- Ann. Inst. Nat. Agron. 45: 45.
YEN, JO-MIN (1971). Les Uredinées du Gabon. – Revue Mycol. 36: 106–109.