

RUST FUNGI (UREDINALES) FROM CAPE VERDE ISLANDS

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SUMMARY

Twenty-three rust taxa of which seven are new to Macaronesia and twelve new to Cape Verde Islands are reported. The total number of rust taxa known from these islands is now twenty-seven. *Eragrostis barrelieri* represents a new host genus for *Puccinia cynodontis*.

RESUMEN

Se reportaron veintitres taxones de roya de los cuales siete son nuevos en Macaronesia, y doce son nuevos en las islas de Cabo Verde.

El número total de taxones de roya conocidos en estas islas es ahora veintisiete.

Eragrostis barrelieri representa un nuevo género huésped para *Puccinia cynodontis*.

INTRODUCTION

The rust flora of the Cape Verde Islands is by far the less investigated in Macaronesia. Since Montagne (1860) published on *Aecidium cressae* DC. only seven more species have been recorded (cf. Gjaerum, 1974). In Novem-

ber 1976 I got the opportunity, together with Per Sunding, Botanical Museum, University of Oslo, to visit some of the islands. At Santo Antão we were collecting 6 days, at São Vicente 9 days, at São Nicolau five days, and at Santiago four days (cf. Sunding, 1981). The greater part of the host plants were identified by Sunding, but some hosts belonging to Poaceae were identified by H.J. Conert, Forschungsinstitut Senckenberg, West-Germany (F.G.R.).

Some rust specimens were sent me by W. Lobin, Forschungsinstitut Senckenberg, and some other specimens were found when examining the phanerogams collected by Ø.H. Rustan and Chr. Brockmann, Botanical Museum, University of Oslo, during their excursion in winter 1981-1982.

The nomenclature follows Hansen & Sunding (1985). The material is deposited in the herbarium of the Botanical Museum, University of Oslo (O), but parts of some specimens are kept at the herbarium of NPPI.

I want to thank the botanists mentioned above for placing their material at my disposal. Especially I want to thank Per Sunding and H.J. Conert for help with the host identification. I also want to thank Per Sunding for good cooperation during the excursion.

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ENUMERATION OF SPECIES

Cerotelium fici (Butl.) Arth., Bull. Torrey Bot. Club 44: 509, 1917.

Syn. *Uredo fici* Cast. ex Desm., Fl. Crypt. 1662, 1848; *Kuehneola fici* Butl., Annls mycol. 12: 79, 1914.

On *Ficus carica* L. (Moraceae).

S: Antão, on the road from Montano Forte de Leite down to Ribeira do Paul, 1.200 m., II.

S. Vicente, at the W side of Monte Verde, 550 m., II.

The urediniospores match well with those found in the Canaries where it is reported from the four westernmost islands (Jorstad, 1958). It is also reported from Madeira and the Azores.

This fig rust seems to follow the host nearly everywhere where it is cultivated. It has not previously been reported from Cape Verde Islands.

Melampsora euphorbiae (Schub.) Cast., Obs. Pl. Acotyl. 2: 18, 1843.

Syn. *M. helioscopiae* Wint. in Rabh. Krypt.-Fl., Ed. 2, I, 1: 240, 1882; *M. gelmii* Bres., Bull. Soc. Bot. Ital. p. 75, 1897; *M. ricini* Pass. ex Noronha, Agron. Lusif. 14: 242, 1952.

On *Euphorbia tuckeyana* Steud. ex Webb (Euphorbiaceae).

S. Antão, on the road from Montano Forte de Leite to Ribeira do Paul, 1.310 m., II.

S. Nicolau, below Monte Gordo, 900-950 m., II; on the summit of Monte Gordo, 1.200 m., II; on Monte Joaquim, 610 m., II; on the road down to Fragata, 730 m., II; W slope of Monte Deserto, 950-970 m., leg. P. Sunding, II.

Santiago, SW slope of Pico da Antónia, 1.050-1.100 m., II.

On *Ricinus communis* L. (Euphorbiaceae).

S. Antão, on the road from Cova to Ribeira do Paul, 780 m., II; Lombo Cebide Vila at the road junction to Chã de Pedra, 890 m., II.

S. Nicolau, Ribeira Brava, near Água das Patas, 420 m., II; below Monte Gordo, 970 m., II; Monte Gordo up to 1.170 m., II; Canto 560 m., II; near Ribeira do Chafariz, 730 m., II; Fragata 400 m., II.

M. euphorbiae is a widespread collective species, embracing a number of races or forms, often described as species, but slightly delimited morphologically. It has previously been reported on several *Euphorbia* spp. and on *R. communis* in the Canaries, Madeira and the Azores. On *E. tuckeyana*, endemic in the Cape Verde Islands, Chevalier (1935) reported it as *M. gelmii* from Sal, while *R. communis* is a new host for this rust in the archipelago.

Miyagia pseudosphaeria (Mont.) Jørst., Nytt Mag. Bot. 9: 78, 1962.

Syn. *Puccinia pseudosphaeria* Mont. in Barker-Webb & Berth. Hist. Nat. Iles Canar., III, 2: 89, 1840; *P. sonchi* Rob. ex Desm., Ann. Sci. Nat., Bot. III, 11: 274, 1849; *Peristemma pseudosphaeria* (Mont.) Jørst., Friesia 5: 280, 1956.

On *Sonchus daltonii* Webb (Asteraceae).

S. Nicolau, on the N side of Monte Gordo, 1.080 m., II.

On *S. oleraceus* L.

S. Antão, on the road from Cova to Ribeira do Paul, 990 m. and 1.150 m., II; on the road from Ribeira das Pedras to Cova, 750 m., and 880 m., II; on the road from Montano Forte de Leite to Ribeira do Paul, 1.150 m., II.

Santiago, Serra da Malagueta, 800 m., II.

S. Nicolau, on road from Cachaço, along path to Praia Branca, 570 m., 30.01.1982, Ø.H. Rustan (1892), II; on the SW slope on Monte Joaquim, 550 m. and 650 m., II.

S. Vicente, Monte Verde, on the W slope, 650 m., II.

The rust has a wide distribution on *Sonchus* spp. in Europe, Asia and in N. Africa, and it is also known from Uganda and New Zealand. In Macaronesia it is reported from the Azores, Madeira and the Canary Islands. It is described as *P. pseudosphaeria* from Tenerife, and type host is *S. radicans* Ait. *S. daltonii*, a new host for this rust species, is endemic in Cape Verde Islands. It belongs to the section *Dendrosonchus*.

On *S. oleraceus* (sect. *Eusonchus*) the fungus has been reported from Madeira (e.g. Bornmüller, 1903, as *P. sonchi*) and from the Azores (Gjaerum & Dennis, 1976). Jørstad (1958) also reported it on *S. oleraceus*, but the host is later found to be *S. teneriffae* Sch. Bip.

Phakopsora gossypii (Arth.) Hirats. f., Ured. Studies p. 266, 1955.

Syn. *Cerotelium gossypii* Arth., Bull. Torrey Bot. Club 44: 510, 1917;
Phakopsora desmium (Berk. & Br.) Cumm., Ibid. 72: 206, 1945.

On *Gossypium hirsutum* L. (Malvaceae).

Fogo, near village Ribeira Ilheu, 350 m., 17.02.1982, C. Brockmann (989/82), II + III.

This rust species is widely distributed on cotton, but it is new to the flora of Macaronesia.

Puccinia brachypodii Otth var. *brachypodii*, Mitth. Naturf. Ges. Bern p. 82, 1861.

Syn. *P. baryi* Wint. in Rabh. Krypt.-Fl., Ed. 2, I, 1: 178, 1882.

On *Trachynia distachya* (Hasselq. ex L.) Link (syn. *Brachypodium distachyum* (Hasselq. ex L.) PB.) (Poaceae).

S. Antão, on road from Cova to Ribeira do Paul, 1.150 m., II.

This rust has been found on several species of *Brachypodium* s. lat. from Europe, eastwards to China and Japan and it is also reported from Morocco. Its main host is *B. sylvaticum* (Huds.) PB. In Macaronesia it has been reported on *B. sylvaticum* from S. Miguel in the Azores (Gjaerum & Dennis, 1976), and from the Canary Islands on *B. sylvaticum* and *T. distachya*, on the latter host from Tenerife, Palma and Hierro.

The aecial stage of *P. brachypodii* var. *brachypodii* has been found on *Berberis* spp., but most places the rust seems to be independent of the host-alternation (Jørstad, 1958).

Puccinia coronata Cda., Icon. Fung. 1: 6, 1873.

On *Polypogon viridis* (Gouan) Breistr. (syn. *P. semiverticillatus* (Forssk.) Hyl.) (Poaceae).

S. Antão, Chã de Pedra, 8.11.1976, P. Sunding, II; on track from Ribeira das Pedras to Cova, 220 m., II; Ribeira Caibos, 340 m., II.

In Macaronesia the crown rust has been reported from Madeira and several islands in the Azores and Canaries, but it is new to Cape Verde Islands. On *P. viridis*, Jørstad (1958, as *P. semiverticillatus*) found it in Gran Canaria and Tenerife (Canary Islands).

The aecial stage on this rust species has been found on *Frangula azorica* Tutin (Tutin & Warburg, 1932) in the Azores and on *Rhamnus crenulata* Ait. in the Canaries (Jørstad, op. cit.).

Outside Macaronesia *P. coronata* has a worldwide distribution. Cummins (1971) has listed four varieties in addition to var. *coronata* to which the rust on *Polypogon* belongs.

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

On *Cynodon dactylon* (Pers.) L. (Poaceae).

S. Antão, near Cova on road from Ribeira Grande, 1.250 m., II + III; 800 m., 16.11.1982, W. Lobin, II (+ III); Ribeira Caibos, 640 m., II.

S. Nicolau, below Cachaço, 600 m., II + III.

On *Eragrostis barrelieri* Dav. (Poaceae).

S. Antão, near Cova, 1.250 m., II.

This rust, new to the Cape Verde Islands, has been reported from Madeira and most of the Canarian Islands. It is circumglobal in temperate and warmer regions on *C. dactylon*, the main host.

Eragrostis is a new host genus for this rust, belonging to the same tribe as *Cynodon*, viz. Eragrostoideae.

Its aecial stage (*Aecidium plantaginis* Ces.) has been found on hosts belonging to several plant families (cf. Jørstad, 1958, Cummins, 1971), but it has never been found in Macaronesia.

Puccinia cyperi-tagetiformis Kern, Mycologia 11: 138, 1919.

Syn. *Uredo cyperi-tagetiformis* Henn., Bot. Jahrb. 34: 598, 1905.

On *Cyperus esculentus* L. (Cyperaceae).

S. Antão, on road from Ribeira das Pedras to Cova, 1.000 m., III.

S. Nicolau, Monte Gordo, N slope, 1.070 m., 23.11.1976, P. Sunding (3.779), III.

On *Cyperus* sp.

S. Antão, on road from Ribeira das Pedras to Cova, 500 m., II + III; 1.260 m., II + III; on road from Montano Forte de Leite to Ribeira do Paul, 1.300 m., II.

On *Pycreus polystachyus* (Rottb.) PB. (syn. *Cyperus polystachyus* Rottb.) (Cyperaceae).

S. Antão, Ribeira da Torre, 220, II.

Uredinospore wall slightly thickened at the apex, with a more or less distinct hyaline membrane, more distinctly echinulate at the apex than at the base of the spores, and with two equatorial pores.

P. cyperi-tagetiformis is a new rust in Macaronesia. It is widespread in the Americas. In Africa it is reported from the Ivory Coast, Guinea, Gabon, Ethiopia, Mozambique and Madagascar. It is also reported from India and China. *C. esculentus* seems to be a new host for this rust while *P. polystachyus* has been found infected with it in Porto Rico and Vieques.

Puccinia heterospora Berk. & Curt., J. Linn. Soc. London 10: 356, 1868.

On *Wissadula amplissima* (L.) R.E. Fr. var. *rostrata* (Schum. & Thonn.) R.E. Fr. (Malvaceae).

S. Antão, on the track from Cova to Ribeira do Paul, 650 m., III.

P. heterospora has previously been reported on *Sida urens* L. from S. Antão (Chevalier, 1935). It is widespread on several malvaceous host genera in Asia, Africa and the Americas, and it is also found in Australia. *W. amplissima* var. *rostrata* is a new host for the rust in Macaronesia, but it has been reported on *W. amplissima* in Guatemala and some islands in the West Indies.

Puccinia hyparrheniicola Jørst. & Cumm. in Cummins, Bull. Torrey Bot. Club 83: 227, 1956.

On *Hyparrhenia hirta* (L.) Stapf. (syn. *Andropogon hirtus* L.) (Poaceae).

S. Antão. Near Cova, on the road from Ribeira Grande, 1.300 m., II; N slope in the crater of Cova, 1.250 m., II; Lombo Pelado, 1.250 m., II; on the road down to Ribeira Chã da Pedra, 890 m., II; on the track from Ribeira das Pedras up to Cova, 590 m., II; 88 m., II; on the track from Montano Forte de Leite to Ribeira do Paul, 1.300 m., II; 1.070 m., II.

Santiago. Serra da Malagueta, 930 m., II; 970 m., II + III; on the SW side of Pico da Antónia, 1.030 m., II.

S. Nicolau, on the N side of Monte Gordo, 1.000 m., II.

Three paraphysate rust species are reported on this host, viz. *P. andropogonis-hirti* Beltrán, *P. eritraensis* Paz. and *P. hyparrheniicola*. According to Cummins (1971) it is doubtful whether they can be distinguished in the uredineal stages. However, judging from his drawings, the urediniospores on *P. hyparrheniicola* are slightly thicker at their base. This is also the case in the specimens studied, and as the teliospores found in one of the Santiago specimens fit well the description given for *P. hyparrheniicola*, I have placed them all within the same species. The teliospores measure $33-43 \times 17-17,5 \mu\text{m}$, the side walls are about $1 \mu\text{m}$ thick while they at apex are thickened up to $4 \mu\text{m}$. As they develop in the uredinia, they are easily overlooked.

So far *P. hyparrheniicola* has been reported from the Canary Islands only, where it seems to be fairly common. Jørstad (1958) has recorded it on five of the islands. He also indicated that *Uredo andropogonis-hirti* Maire, reported from several places in the Mediterranean region, belongs to this species, while Cummins (op. cit.) placed it with *P. andropogonis-hirti*.

The host is widespread in the Mediterranean and Africa. In Macaronesia it is known in Madeira, most Canarian Islands and from seven of the Cape Verde Islands (Hansen & Sunding, 1985).

Puccinia levis (Sacc. & Bizz.) Magn. var. *tricholaena* (H. & P. Syd.) Rasmachar & Cumm., Mycol. Appl. 25: 44, 1965.

Syn. *Diorchidium tricholaenae* H. & P. Syd., Annls mycol. 10: 33, 1912.

On *Rhynchelytrum* sp. (Poaceae).

S. Antão, in the crater of Cova, 1.200 m., 14.11.1982, W. Lobin, II.

This rust, circumglobal in warmer areas, is new to the flora of Macaronesia.

Puccinia oahuensis Ell. & Ev., Bull. Torrey Bot. Club 22: 435, 1895.

On *Digitaria ciliaris* (Retz.) Koel. (Poaceae).

S. Antão, Ribeira de las Torres, II; on track from Ribeira das Pedras to Cova, 350 m., II, and 570 m., II + III; Ribeira Caibos, 640 m., II.

On *Digitaria nodosa* Parl.

S. Antão, Ribeira das Pedras, 340 m., II, Ribeira Caibos, 620 m., II.

On *Digitaria nuda* Schum.

S. Antão, on track from Cova to Porto do Paul, 880 m., II + III, and 970 m., II.

S. Nicolau, on Monte Deserto, 970 m., II + III.

This rust, occurring on several species of *Digitaria* (incl. *Syntherisma*) and circumglobal in warm areas, is new to the rust flora of Macaronesia.

On *D. ciliaris* it is reported from Uganda, Taiwan and the Philippines, but *D. nodosa* and *D. nuda* are new host for this rust species. The former is distributed in N. Africa through Somalia and Ethiopia to Pakistan, the latter in tropical Africa and Mauritius, and also in Brazil.

Puccinia tuyutensis Speg., Fungi Argent. 4: 25, 1881.

Syn. *P. cressae* (DC.) Lagh., Bol. Soc. Brot. 1889 p. 131, *Aecidium cressae* DC., Fl. Fr. 6: 89, 1815.

On *Cressa cretica* L. (Convolvulaceae).

Santiago, near Praia de S. Francisco, 12.11.1979, W. Lobin, I.

P. tuyutensis was the first rust fungus ever reported from the archipelago

(Montagne 1860, as *Aecidium cressae*). He gave no locality, but it might be Sal (Gjaerum, 1974) which at that time was the only locality known. It is widespread in the Mediterranean, both in Europe and Africa and continuing eastwards to India. In the Americas it has been recorded from New Mexico, Arizona and California (USA), Mexico, Chile and Argentina. *C. cretica* is its main host, but also other *Cressa* species are involved.

Puccinia unica Holw. var. *bottomleyae* (Doidge) Cumm. & Husain, Bull. Torrey Bot. Club 93: 60, 1966.

Syn. *P. bottomleyae* Doidge, Bothalia 3: 498, 1939.

On *Aristida adscensionis* L. (Poaceae).

S. Antão, Cova, 1.200 m., II.

On *Aristida cardosoi* Coutinho.

S. Antão, on track from Ribeira das Pedras to Cova, 340 m., II.

This rust, originally described from S. Africa, has been found also in Uganda and Ethiopia. Outside Africa it has been reported from Spain, India and Queensland. Jørstad (1958) reported it as *P. bottomleyae* on *A. adscensionis* from Tenerife and Gomera in the Canary Islands. The rust is new to the flora of Cape Verde Islands.

Puccinia versicolor Diet. & Holw. in Holway, Bot. Gazette 24: 28, 1897.

On *Andropogon gayanus* Kunth (Poaceae).

S. Nicolau, Ribeira do Chafaris, 730 m., II.

On *Heteropogon contortus* (L.) PB. ex Roem. & Schult. (Poaceae).

S. Nicolau, N slope of Monte Gordo, 930 m., II; Canto, on track to Fragata, 730 m., II.

Santiago, Serra da Malagueta, E of the summit, 930 m., II; SW slope of Pico da Antónia, 1.040 m., II.

P. versicolor is a new member of the Macaronesian rust flora. It is widespread in tropical and subtropical areas in Central and South America, Africa, Asia from Pakistan to Japan, and also in Australia. *H. contortus* seems to be its main host. In Europe Jørstad (1962) found it in Mallorca, and he indicated that *P. cesatii* Schroet. f. *heteropogonis* Beltrán on *H. allionii* (DC.)

Roem. & Schult (= *H. contortus*) reported from Spain by González Fragoso (1924) might belong to *P. versicolor*.

Its aecial stage (*Aecidium plectroniae* Cke.) occurs on species of *Canthium* (Rubiaceae) and *Lantana* (Verbenaceae), but it has not been found in Macaronesia.

Tranzschelia discolor (Fuck.) Tranz. & Litv., Bot. Zhurn. 24: 248, 1939.

Syn. *Puccinia discolor* Fuck., Fungi Rhen. 2.121, 1867; *P. prunispinosae* Pers. f. *discolor* (Fuck.) E. Fisch, Beitr. Krypt. fl. Schweiz II, 2: 156, 1904; *T. pruni-spinosae* (Pers.) Diet. var. *discolor* (Fuck.) Dunegan, Phytopathology 28: 424, 1938.

On *Prunus persica* (L.) Batsch. (Rosaceae).

S. Antão, on the road from Cova down to Ribeira do Paul, 770 m., II; on the road from Montano Forte de Leite down to Ribeira do Paul, II; Ribeira do Paul, along path to Pico da Cruz, 10.01.1982, Ø.H. Rustan (1456), II.

The widespread peach rust is new to the rust flora of Cape Verde. In Macaronesia it is reported on *P. persica* and *P. domestica* from the Canary Islands, Madeira and the Azores, in the Canaries also on *P. communis*. It seems independent of the host-alternation with *Anemone* spp., as it is in the Canaries (Jørstad, 1958).

Uredo marmoxaiae Speg., Anal. Mus. Nac. Hist. Nat. B. Aires 26: 121, 1915.

Syn. *U. betivora* P. Magn. in Bornm., Engl. Bot. Jahrb. 33: 412, (nom. nud.); P. Magn. ex P. & H. Syd., Monogr. Ured. 4: 495, 1924.

U. betae-patellaris Guyot & Malenç., Trav. Inst. Sci. Chérif., Ser. Bot. 11: 144, 1957.

On *Patellifolia patellaris* (Moq.) S., F.-L. & W. (syn. *Beta patellaris* Moq.) (Chenopodiaceae).

S. Vicente, at the W side of Monte Verde, 520-620 m.; at the N side of Monte Verde, 200 m.; Assomada da Baleila, 380 m.; Gon Alto, near the summit, 500 m.; E side of Pico Santa Luzia, 250 m., P. Sunding.

On *Patellifolia procumbens* (Chr. Sm. ex Hornem.) S., F.-L. & W.

S. Nicolau, Morro Alto, 300 m.

This rust species, easily recognized on its longitudinal, hyaline ridges

over the germ pores, was described on *B. procumbens* from Gran Canaria in the Canaries. Later it has been found mostly on *P. patellaris* at Gran Canaria, Lanzarote, Tenerife and Gomera in the Canaries and in Morocco and it has also been refound on *P. procumbens* at Gran Canaria. Most Canarian localities are in the lowlands, often near the coast, the highest altitude known so far is 300-400 m. (Gjaerum, 1974 a). In the Cape Verde Islands I never found it near the coast, the reason for which might be the dry climate.

Uromyces anthyllidis Schroet., Hedwigia 14: 172, 1875.

On *Lotus brunneri* Webb (Fabaceae).

S. Nicolau, pass between Monte Gordo and Monte Deserto, 920 m., II + III; Monte Deserto, 950-970 m., 25.11.1976, P. Sunding, II + III.

On *Lotus coronillaefolius* Webb.

S. Vicente, Monte Verde, 700 m., II.

On *Lotus purpureus* Webb.

S. Nicolau, Monte Gordo, 930 m., II + III; Ribeiro do Chafariz, near the pass, 730 m., II + III.

On *Lotus* sp.

S. Antão, Cova, S-SW slope, 1.220 m., 04.01.1982, Ø.H. Rustan (1296, 1297), II.

Brava, Monte Fontainhas, 24.02.1982, C. Brochmann (1142, 1143), II.

Urom. anthyllidis was reported by Gjaerum (1974) on *L. coronillaefolius* from the same locality as now, while *L. brunneri* and *L. purpureus*, both endemic to the Cape Verde Islands, are new hosts for this rust.

Uromyces bidenticola Arth., Mycologia 9: 71, 1917.

Syn. *Uredo bidentis* P. Henn., Hedwigia 35: 251, 1896; *Uredo bidenticola* P. Henn., ibid. 37: 279, 1898.

On *Bidens pilosa* L. (Asteraceae).

S. Antão, on the track from Cova down to Ribeira do Paul, 720-1.170 m., II, 950 m., II + III.

S. Vicente, on the W side of Monte Verde, 700 m., II.

S. Nicolau, on the road from Cachaço to Monte Gordo, 950 m., II; on the N side of Monte Gordo, 1.000 m., II.

The rust is widespread in tropical and subtropical areas, but previously not reported from Cape Verde Islands. The host, common in Macaronesia, is regularly infected with this rust. In the Americas it is recorded on other *Bidens* spp., and in West Indies also on *Cosmos caudatus* H.B.K. *B. pilosa* is also the main host of *Uromyces bidentis* Lagh., a microcyclic species occurring in tropical America.

The two *Uromyces* species, the brachyform *Urom. bidenticola* Arth. and the microcyclic *Urom. bidentis* Lagh. have often been confused. Both occur, even on the same host specimen, in the Americas. *Urom. bidenticola* occurs from Argentina to southern U.S. and Bermuda. In subtropical and tropical areas in the eastern Hemisphere it mainly occurs in the uredineal stage. Telia have been reported by Ito (1950). Also Bouriquet & Bassino (1965) and Ragnathan & Ramakrishnan (1972) mentioned telia from Madagascar (as *Urom. bidentis* Lagh.) and the Madras State of India, respectively. In the specimen from S. Antão teliospores (Fig. 1) measured $29-40 \times 18-27 \mu\text{m}$ with apex thickened up to $6.5 \mu\text{m}$. Most teliospores had germinated.

Uromyces blainvilleae Berk., J. Linn. Soc. Bot. London 14: 92, 1875.

On *Blainvillea gayana* Cass. (Asteraceae).

Santiago, Mt. João Teves, E of S. Jorge, 17.12.1981, C. Brockmann (427/81), III.

The teliospores are subglobose to globose, $31-35 (-38) \times 27-32 \mu\text{m}$, wall verrucose, dark brown, $4 \mu\text{m}$ thick, apex including the pale brown, verrucose papilla thickened up to $11 \mu\text{m}$.

Urom. blainvilleae has been reported on several *Blainvillea* spp. from Brazil, Senegal, Sudan, Ethiopia, Sri Lanka and India. Mayor (1964) reported it on *B. gayana* from Senegal and Eboh (1978) on *Aspilia africana* (Pers.) C.D. Adams from Nigeria. It is a new member of the Macaronesian rust flora.

From India Chavan & Bakare (1973) described *Urom. satarensis* on *B. latifolia* DC. separating it from *U. blainvilleae* in having smaller teliospores ($(20-24.5 (-28) \times (20-) 24 (-26.5) \mu\text{m})$ with a $2.5-4 \mu\text{m}$ thick wall. Mayor (op. cit.) when discussing the Senegal specimen, measured the teliospores to $21 (23-26) 28 \times 21 (23-26) 28 \mu\text{m}$ with a $3-4 \mu\text{m}$ thick wall. He also studied other specimens, among them an Indian specimen on *B. latifolia* with spores of the sa-

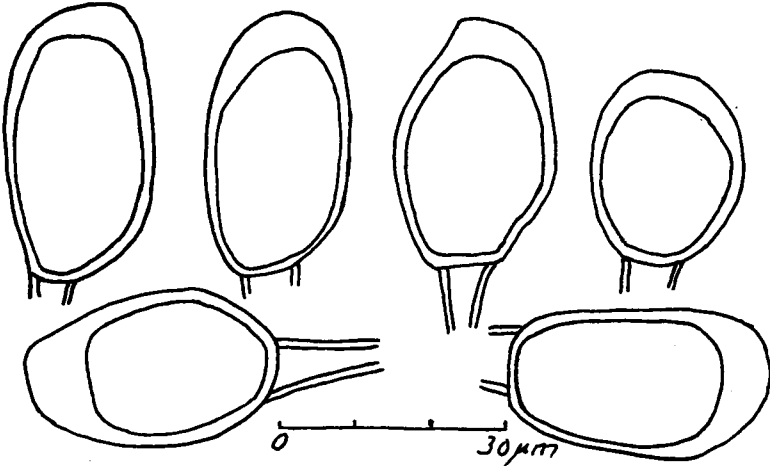


Fig. 1: *Uromyces bidenticola*, teliospores.

me size and wall thickness. The Sydows (1910) who studied specimens of *B. latifolia* and *B. rhomboideae* Cass. (= *B. latifolia*) from Sri Lanka, Ethiopia and Brazil, measured the teliospores to $28-35 \times 20-32 \mu\text{m}$. Ragnathan and Ramakrishnan (1972) reported *Urom. blainvilleae* on *B. rhomboideae* from Coimbatore in India. They had also seen the type specimen and found the telio-spores to be $22-33 \times 17-28 \mu\text{m}$ and apex with the papilla up to $12 \mu\text{m}$.

Judging from the descriptions of various authors the two species in question seem very similar and might be conspecific. A comparison of the material including the types will probably solve the problem.

Uromyces clignyi Pat. & Har., J. Bot. 14: 237, 1900.

On *Heteropogon contortus* (L.) PB: ex Roem. & Schult. (Poaceae).

S. Antão, on track from Cova to Porto do Paul, 1.040 m., II.

S. Vicente, Monte Verde, near the summit, 700 m., II.

The species is new to the rust flora of Macaronesia. Occurring on several genera of the Andropogonoideae of the Poaceae it has a wide distribution from Africa to India, Philippines and China, Australia, Central America, Mexico and West Indies. On *H. contortus* it is reported from Pakistan, India and New Caledonia. The aecial stage of *Urom. clignyi*, known as *Aecidium hartwegiae* Thüm. (syn. *A. chlorophyti* Pat. & Har., *A. chlorophyti* Kalchbr., *A. crini* Kalchbr.), occurs on hosts belonging to Amaryllidaceae and Liliaceae.

Uromyces euphorbiae Cooke & Peck in Peck, Annal. N.Y. State Mus. 25: 90, 1873.

Syn. *Urom. proëminens* Lév., Ann. Sci. Nat., Bot. III, 8: 371, 376, 1847; *Urom. euphorbiicola* Tranz., Annlis mycol. 8: 8, 1910.

On *Euphorbia prostrata* Ait. (Euphorbiaceae).

Santiago, near S. Jorge, 30.11.1982, W. Lobin, I + II + III.

Urom. euphorbiae, a new species to the rust flora of Cape Verde Islands, is widely distributed in warmer and temperate regions. In Macaronesia it has previously been reported on *E. prostrata* from the Canary Islands (La Palma and Gomera) and Madeira, from Madeira also on *E. chamaesyce* L. So far it has not been found in the Azores.

Uromyces setariae-italicae Yosh., Bot. Mag. Tokyo 20: 247, 1906.

Syn. *U. leptodermus* H. & P. Syd., Annls mycol. 4: 430, 1906.

On *Setaria adhaerens* (Forssk.) Chiov. (Poaceae).

S. Vicente, Monte Verde, near the summit, 700 m., II + III and at the W slope, 520 m., II.

S. Nicolau, Monte Joaquim, on the SW slope, II + III.

Urom. setariae-italicae is new to the Cape Verde Islands, but it is known in the Azores, Madeira and the Canaries, in Madeira also on *S. adhaerens*. Outside this area it is circumglobal in warm regions, occurring on several graminicolous host genera.

GENERAL REMARKS

In the present paper are reported 23 rust taxa, 7 of which are new to the flora of Macaronesia and 12 are new to the Cape Verde Islands. In addition four species, viz. *Aecidium asperifolii* Pers. on *Echium hypertropicum* Webb (Santiago), *Phakopsora zizyphi-vulgaris* Diet. on *Zizyphus mauritiana* Lam. (Santiago), *P. maydis* Ber. on *Zea mays* L. (S. Vicente), and *P. recondita* Rob. ex Desm. on a Poaceae (S. Vicente) have been reported earlier (cf. Gjaerum, 1974).

On S. Antão 16 taxa are known, on S. Nicolau 10, on S. Vicente 9, on Santiago 8, and on Sal, Fogo and Brava only one taxon of each island is known. From the three islands S. Lucia, Boavista and Maio no rust has been reported.

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