

SOUTH AFRICAN RUST FUNGI IV.

By

Ethel M. Doidge.

(Part III of this series appeared in *Bothalia*, Vol. III, Part IV, published April, 1939.)**Caeoma Lichtensteiniae** nov. sp.

Pycnidiis subepidermalibus, amphigenis v. petiolicolis, inter aecidiis sparsis, lenticularibus, melleis, 100–125 μ diameter. Aecidiis hypophyllis v. petiolicolis, singulis saepe epiphyllis, in epiphylo maculas fuscas generantibus, praecipue ad nervos evolutis, partibus matricis leniter tumefactis insidentibus et greges irregulares v. elongatos 2–15 mm. longos formantibus, dense confertis, 200–300 μ diameter., pallide aurantiacis, epidermide diu tectis, dein nudis epidermide rupta cinctis. Sporis variabilis, ovatis, oblongis, subglobosis v. angulatis, dense verrucosis, subhyalinis, 25–32 \times 15–22.5 μ , episporio 2.5–3 μ crasso.

Hab. in foliis petiolisque *Lichtensteiniae* sp., Salisbury, S. Rhodesia, leg. Eyles (1966) 14009.

Puccinia Antirrhini Diet. et Holw.

In *Hedwigia* 36 (1897) p. 298; Syd. Monogr. Ured. I (1904) p. 245.

Uredo-sori hypophyllous, brown, pulverulent; on the leaves circular to irregular in outline, scattered, in irregular groups, or in circles round primary sori, often becoming confluent, up to 1 mm. diameter; on stems more elongated and often coalescing to form long lines; surrounded by the torn epidermis. Uredospores globose to ellipsoid, yellow brown, briefly and rather closely echinulate, 22–30 \times 21–25 μ , episporio 1.5–2 μ thick, with 2–3 equatorial germ pores.

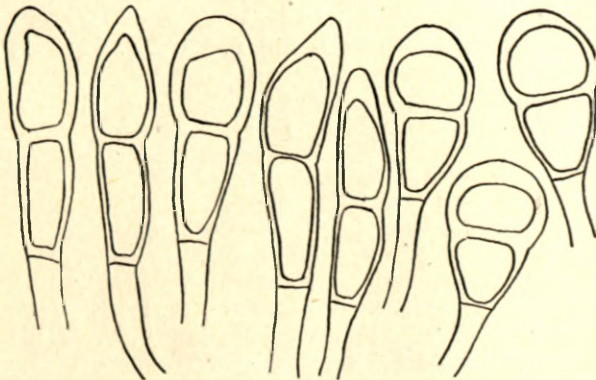


Fig. 1.—*Puccinia Antirrhini* Diet et Holw. Teleutospores, showing 5 spores of the pale, slender form on the left, and three of the darker, broader form.

Teleutosori amphigenous, mostly hypophyllous, on pale or dry indefinite leaf spots, similar to the uredo-sori but darker, pulvinate. Teleutospores calvate or oblong-calvate, of two distinct types. Slender form oblong or oblong-clavate, pale fuscous, 50–70 \times

16–17.5 μ , apex usually more or less acute, rarely somewhat rounded or truncate, strongly thickened up to 12 μ , occasionally 3-celled and up to 75 μ long. Shorter and stouter form clavate, chestnut brown, 32–52.5 \times 17.5–22.5 μ ; apex rounded or truncate, rarely acute, thickened up to 8 μ . Both forms smooth, constricted at the septum, tapering at the base, rarely somewhat rounded at the base, episore 1–2 μ thick, germ pore in the upper cell apical, obscure in the lower cell, pedicel subhyaline, up to 75 μ long, rarely up to 125 μ long, ca 7.5 μ thick. Both forms are to be found in the same sorus.

on leaves and stems of *Antirrhinum majus* L., Westville, Durban, *McClellan*, 30869; Port Elizabeth, *Lust*, 30816; East London, *Wilson Thompson*, 30865; Kidd's Beach, East London, *Venables*, 30866; Kirkwood, *Hess*, 30867; *Grahamstown*, *N. J. G. Smith*, 30868.

The *Antirrhinum* rust was not recorded as occurring in South Africa until September, 1939, when it occurred in epiphytotic form in the coast districts of Natal and the eastern Cape. The outbreak was recorded by Miss A. M. Bottomley in the public press at the end of 1940.

***Puccinia Junci-oxycarpi* n. nom.**

Syn. *Puccinia Junci* (Strauss) Wint. var. *africana* Doidge in *Bothalia* II (1927), p. 116, on *Juncus oxycarpus* E. Mey., Hennops River, *Doidge*, 2039.

European material of *Puccinia Junci* is now available for comparison. (Sydow. Uredineen 2169, 2469 on *Juncus Gerrardus*). The European rust, *Puccinia Junci*, according to Sydow (Monogr. Ured. I, p. 643) occurs only in the coastal region of the Baltic and the North Sea. It has larger sori than the South African rust on *Juncus Oxycarpus* and the teleutospores are different. The South African rust has very minute sori and shorter teleutospores with apex usually rounded and less thickened than in *P. Junci*; mesospores are abundant. It also differs widely from other species of *Puccinia* on *Juncus* spp. described from Europe and North Africa.

I consider that the South African rust on *Juncus oxycarpus* should be regarded as a distinct species.

Puccinia Kuhnii (Krug.) Butl.

Ann. Myc. 12 (1914), pp. 81–82, fig. 4; Syd., Monogr. Ured. 4 (1924), p. 608.

Syn. *Uromyces Kuhnii* W. Krug., Bericht der Versuchs-Station für Zuckerrohr in West Java, Kagok-Tegal Heft I, Dresden (1890), p. 120; N. A. Cobb, Agric. Gazette of N.S. Wales (1893), p. 799.

Uredo Kuhnii Wakker et Went., De Ziekten van het suikerriet op Java, Leiden (1898), p. 144.

Uredo-sori hypophyllous, very rarely epiphyllous, on indefinite, elongated, pale yellow to purplish red leaf spots, arranged in series, oblong to linear, 0.5 to 1 mm. long, often becoming confluent and forming longer lines, partially veiled by the epidermis which ruptures early and exposes the powdery spore masses. Paraphyses fairly numerous, peripheral, clavate or cylindrical, straight or curved, sub-hyaline to brown with a wall 1–2 μ thick. Uredospores very variable in form and size, mostly ovate to pyriform, less frequently sub-globose, pale yellow to light chestnut brown, 25–42 \times 17–25 μ ; episore remotely echinulate, 1.5–2.5 μ thick, either of equal thickness throughout or thickened, at the apex up to 5 μ ; germ pores 4, equatorial.

Teleuto-sori hypophyllous, black, small, linear, or teleutospores developing in the uredo-sori. Teleutospores oblong to clavate, rounded or somewhat flattened at the apex, attenuate at the base, not constricted at the septum or very slightly so, pale yellow (mature 25–40 \times 10–18 μ ; pedicel short, hyaline. Paraphyses similar to those in the uredo-sori,

on leaves of *Saccharum spontaneum* L., Mount Edgecombe, Natal, *McMartin*, 30752.

This rust is not known as a disease of sugar cane in Natal, and has only recently been observed by Dr. McMartin on a variety of *Saccharum spontaneum* from Turkestan. Sydow (l.c.) points out that there are two forms of uredo-spores, which may occur in the same or in separate sori, one with epispore of even thickness, and one thickened at the apex. The uredo-spore with thickened apex was apparently taken by Kruger for the teleutospore of a *Uromyces*, and the rust described as *Uromyces Kuhnii* Krug. Wakker and Went pointed out that this was only a uredo-form, and the sugar cane rust was for many years known as *Uredo Kuhnii* Wakker et Went.

Teleutospores are rarely found, and are absent from the South African material. *Puccinia Kuhnii* is known in the uredo-stage in Java, India, Japan, Australia, Ceylon and the Philippines, occurring on *Saccharum officinarum* and several wild *Saccharum* spp.; but the teleuto-stage has only been recorded by Butler (l.c.) on *Saccharum spontaneum* collected in Burma.

Cobb illustrates 2-celled paraphyses, which have not been observed in the South African material; Butler thinks it possible, however, that the 2-celled body figured by Cobb was an immature teleuto-spore.

Puccinia McCleanii nov. sp.

Soris teleutosporiferis amphigenis, sparsis v. aggregatis, rotundatis v. oblongis plerumque transversalibus, minutis, usque 0.5 mm. longis, saepe nervis foliis limitatis atro-brunneis, mox nudis, pulverulentis, epidermide fissa cinctis v. semi-velatis. Teleutosporis oblongo-clavatis v. oblongis, apice plerumque rotundatis, saepe truncatis v. conico-angustatis, saepe oblique attenuatis, medio leniter constrictis, basi attenuatis, dilute flavo brunneis, levibus, $35-62.5 \times 12.5-20 \mu$, plerumque $50-56 \times 14-16 \mu$, episporio 1-1.5 crasso, apice leniter incrassato usque 4μ ; pedicello persistenti brunneolo, usque 45μ longo Paraphysibus nullis.

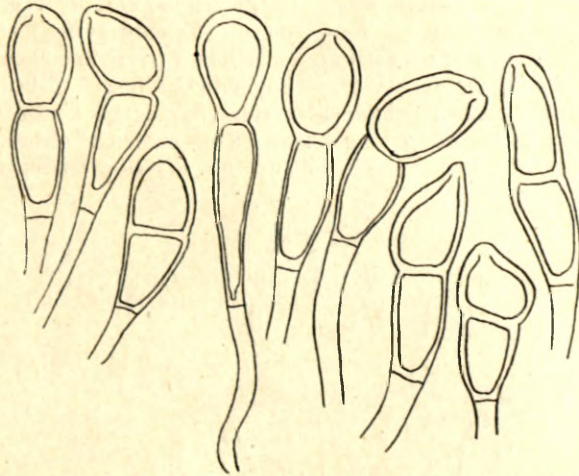


Fig. 2.—*Puccinia McCleanii* Doidge. Teleutospores.

Hab. in foliis *Gladioli Ludwigi* Poppe, Nottingham Road, leg. McClean, 30996.

This species differs in several respects from *P. Gladioli* Cast., which is recorded from the Mediterranean region. The teleutospore are more slender and lighter in colour, pale yellow brown; the lower cell paler, thinner-walled and concolorous with the pedicel. The apex is only slightly thickened, and is traversed by a conspicuous germ pore. There are no paraphyses. The teleutospores of *Puccinia Gladioli* are illustrated for comparison.

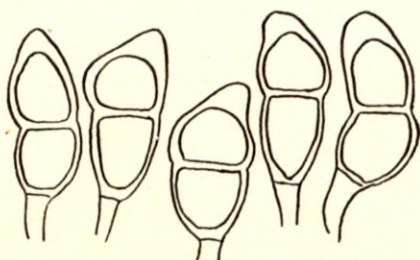


Fig. 3.—*Puccinia Gladioli* Cast. Teleutospores.

Puccinia Gladioli has not been recorded from South Africa, and there appears to be no record of its causing serious damage to cultivated varieties of *Gladiolus*. The "rust" which was first reported in commercial plantings of *Gladiolus* in Natal in 1929 and on several more recent occasions, mostly from the coast districts of Natal and the eastern Cape, is *Uromyces transversalis*. This species which is common on indigenous *gladiolus* spp., caused serious damage in commercial plantings of *Gladiolus* in the eastern Cape, Natal and the Transvaal during the seasons 1937–1938 and 1938–1939 when the rainfall was exceptionally heavy.

In Bothalia II (1927), p. 107, a species of *Puccinia* was described as *Puccinia Gladioli-crassifolii*. Unfortunately the host had been wrongly identified, and the material is too fragmentary for accurate diagnosis; the plant is definitely not a *Gladiolus* sp., but is probably a member of the family Iridaceae. It may be possible to collect this rust again and to identify the host correctly.

***Sphaerophragmium Artabotrydis* nov. sp.**

Soris teleutosporiferis hypophyllis, maculis orbicularibus brunneis v. astro-brunneis, usque 2 mm. diameter indeterminatis insidentibus, sparsis v. subgregariis, 0.5–1.5 mm., rarius usque 2 mm. diameter, rotundatis v. irregularibus, obscure brunneis v. atris, mox nudis en pulberulentis, epidermide fissa cinctis. Teleutosporis lateraliter appianatis ambitu suborbicularibus, ad septa constrictis, ex cellulis 4 (rarissime 3) compositis, brunneis, 30–35 μ v. usque 40 μ diameter, superficie appendiculis fuscis v. brunneolis ad apicem minute stellatim lobatis quasi glochidiatis, rarius simplicibus acutis leniter dilatatis v. uncinatis, 4–6 μ raro usque 10 μ longis laxe et irregulariter obsitis; cellulis singulis equalibus, episporio ca 1.5 μ crasso; pedicello hyalino, crasso persistenti, usque 90 μ longo, 7–10 μ crasso.

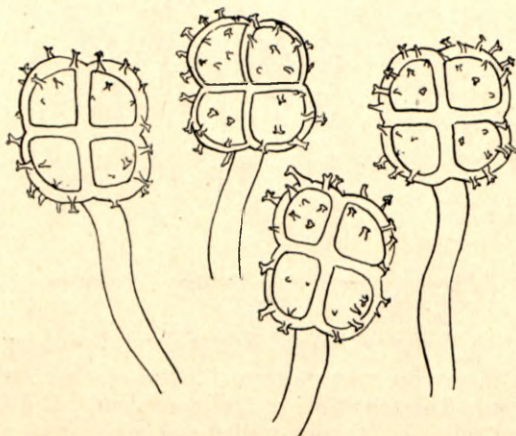


Fig. 4.—*Sphaerophragmium Artabotrydis* Doidge. Teleutospores.

Hab. in foliis *Artabotrydis Monteiroae* Oliv., Westville, Durban, leg. Howlett, 3076 l.

The teleutospores are very consistently 4-celled, the cross walls being at right angles to one another and the cells equal in size and similar in form. The surface view of the spore is a circle with flattened sides, the diameter along the cross walls measuring 30–35 μ and diagonally between them about 40 μ . The lateral view resembles the teleutospore of a *Puccinia* 30–35 μ long and ca 20 μ broad. There is apparently one germ pore at the apex of each cell.

This species differs widely from *Sphaerophragmium Chevalieri* Har. et Pat. (Buletto Myc. Fr. XXV (1909), p. 109) which occurs on Anonaceae in West Africa. The teleutospores of this species consist of 5–8 cells irregular in form and arrangement.

Uredo Scirpi-maritimi nov. sp.

Soris amphigenis plerumque hypophyllis, maculis atrobrunneis insidentibus, sparsis v. laxe seriatim dispositis, usque 1 mm. longis, dilute brunneis, diu epidermide inflata tectis. Sporis ellipsoideis v. ovatis, aureo-brunneis, dense minuteque verruculosis, 27·5–37·5 \times 15–22·5 μ ; episporie 2–2·5 μ crasso, poris germinationis 2–3 equatorialibus conspicuis praeditis.

Hab. in foliis *Scirpi maritimi* L., Uitenhage, leg. Zeyher (4422) 30904.

This rust was found on Zeyher's specimen in the phanerogamic herbarium; I am indebted to Dr. Dyer for pointing it out to me. It differs from *Uredo Scirpi-corymbosi* in the narrower, thicker-walled, verruculose uredospores. It approaches more nearly to the description of the Australian rust *Uredo Scirpi-nodosi* McAlp. I have not seen this species.

Uredo Cassiae-mimosoidis nov. sp.

Soris amphigenis, sparsis v. gregariis, rotundatis v. ellipticis, 0·5–0·75 mm. longis saepe confluendo irregularibus, ferrugineis, pustuliformibus, diu epidermide pallida tectis, dein ea fissa cinctis v. semi-velatis, pulverulentis. Sporis ovatis, ellipsoideis, subglobosis v. irregularibus, 21–27·5 \times 16–21 μ , densiuscule breviterque echinulatis, flavidis, episporio 1·75–2·5 μ crasso, poris germinationis 2–4, plerumque 3, equatorialibus conspicuis praeditis.

Hab. in foliis *Cassiae mimosoidis* L., Donkerpoort, Pretoria dist., leg. Doidge et Bottomley 29741.

Uredo Psoraleae-polystictae nov. sp.

Soris hypophyllis, sine maculis, sparsis v. laxe gregariis, rotundatis v. irregularibus minutis, ca 0·25 mm. diameter vel in nervos ellipticis usque 0·5 mm. longis, mox nudis, epidermide fissa cinctis, pulverulentis, ferrugineis. Sporis subglobosis, ovatis v. late ellipsoideis, tenuiter echinulatis, aureo-brunneis, 24–32·5 \times 20–22·5 μ ; episporio 2–3 μ crasso, poris germinationis 3 distinctis equatorialibus vel fere equatorialibus praeditis.

Hab. in foliis *Psoraleae polystictae* Benth., Durban, leg. McClean, 300994.

Uromyces Dolicholi Arth.

in Bull. Torrey Bot. Club 33 (1906), p. 27 and in Mycologia 7 (1915), p. 186.
Syn. *Uredo Dolichi* Arth. Bull. Torrey Bot. Club 33 (1906), p. 513.

Uredo pamparum Spig. in Anal. Soc. Cientif. Argent. IX (1880), p. 173; Syd. Monogr. Ured. IV (1924), p. 585.

Uredo-sori amphigenous but mostly hypophyllous, scattered or crowded, minute, round to irregular, 0·3–0·5 mm. diameter; the epidermis ruptures at an early stage and exposes the cinnamon brown, pulverulent spore masses, which are surrounded by the torn fragments of the epidermis. Uredospores globose or subglobose, briefly echinulate, brown, 18–24 μ diameter, episporie about 1·5 μ thick, with 2–4, usually 3, equatorial germ pores.

[Teleuto-sori similar to the uredo-sori. Teleutospores oblong fusiform or clavulate, tapering to both ends, slightly thickened at the apex ($3-6\ \mu$) smooth, pale yellow or very light brown, $25-38 \times 8-15\ \mu$; epispore very thin, about $1\ \mu$; pedicel delicate, hyaline or subhyaline, up to $40\ \mu$ long.]

on leaves of *Cajanus Cajan* (L) Druce (= *Cajanus indicus* Spreng.) Winkle Spruit, Pole Evans, 1594, 1919.

Only uredo-sori are to be found on the South African material and according to Arthur (loc. cit.) all the early West Indian collections on this host show uredinia only. The South African specimens agree well with material collected in Domenico. (Ciferri-, *Mycoflora Domingensis exsiccata* n. 4). The description of the teleuto-sori is quoted from Sydow's *Monograph Ured.* II., p. 96. According to Arthur (*Mycologia* loc. cit.) it is probable that *Uredo Cajani* Syd. is also identical with the above species.

Uromyces Drimiopsidis nov. sp.

Sub *Uromyces Erythronii* v. *Drimiopsidis* nom. nud. in Herb. Kew.

Soris uredosporiferis amphigenis plerumque hypophyllis, sparsis v. laxe gregariis interdum subcircinatis, minutis, rotundatis v. oblongis, usque 1 mm. longis, epidermid diu tectis, dein ea fissa cinctis v. semi-velatis, pulverulentis, pallide cinnamomeo-brunneis. Uredosporis sobglobosis ovatis v. ellipsoideis, echinulatis, $20-25 \times 15-19\ \mu$; episporio $15-2\ \mu$ crasso. poris germinationis obscuris.

Soris teleutosporiferis conformis, obscure brunneis. Teleutosporis plerumque ellipsoideis, rarius ovatis v. subglobosis, pallide flavo-brunneis, $27.5-42.5 \times 15-22\ \mu$; apice rotandatis, incrassatione papilliformi dilutiore usque $8\ \mu$ alta et lata praeditis, lineis subrectis vel undulatis et subinde anastomosantibus obsitis; episporio $1-1.5\ \mu$ crasso, pedicello hyalino brevi.

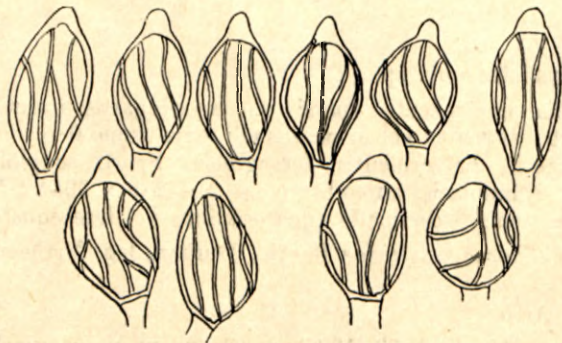


Fig. 5.—*Uromyces Drimiopsidis* Doidge. Teleutospores.

Hab. in foliis *Drimiopsis maculatae* Lindl., Botanical Gardens, Durban, leg. Medley Wood (688) 11125.

The label on the specimens in Kew Herbarium is apparently in Cooke's handwriting, but no author's name for *Uromyces Erythronii* var. *Drimiopsidis* is given, nor can I find any description of this variety.

The rust described above differs considerably from *Uromyces Erythronii* (DC) Pass. The latter has darker brown, broader and more frequently globose teleutospores with a very small, almost hyaline papilla about $3\ \mu$ and more rarely up to $4\ \mu$ long. The sculpturing of the episporium, which is ornamented with raised longitudinal ridges, is similar. An aecidial form is described for *U. Erythronii* but no uredo-stage.

Uromyces Holubii nov. sp.

sub *Uromyces liliacearum* Ung. in Herb. Kew.

Soris teleutosporiferis hypophyllis maculis fuscis ellipticis insidentibus, in greges ellipticos 9–16 mm. longis et 3–6 mm. latos circinatim dispositis, mediocribus, mox confluentibus, epidermide diu tectis dein ea fissa cinctis v. semivelatis, pulvinatis v. sub-pulverulentis, brunneis. Teleutosporis castaneo-brunneis, quoad formam variabilis, globosis, late ellipsoideis v. ovatis, saepe irregularibus, apice rotundatis non incrassatis, basi rotundatis, levibus, $42\text{--}52.5 \times 32.5\text{--}40\ \mu$ vel ca. $45\ \mu$ diameter, episporio crasso, $7.5\text{--}10\ \mu$ pedicello hyalino apice brunneo, persistenti, usque $25\ \mu$ longo, $5\text{--}7.5\ \mu$ lato.

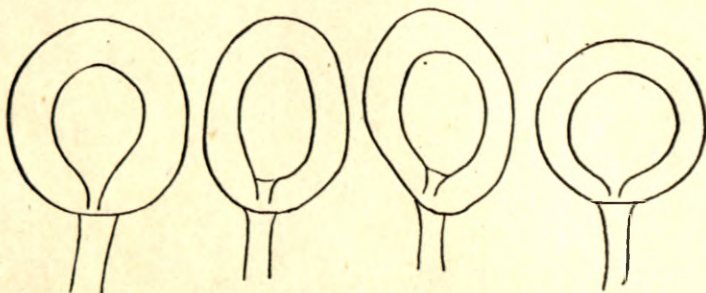


Fig. 6.—*Uromyces Holubii* Doidge. Teleutospores.

Hab. in foliis Liliaceae indet (*Dracaena* sp.) Lishumo Valley, Zambesi, leg. Holub ex herb M. C. Cooke.

This rust somewhat resembles *Uromyces prupureus* Lagh., described on an undetermined Liliaceous plant from Angola, but differs in having larger spores and thicker episporium. It differs in many respects from *Uromyces liliacearum* Ung.

The type specimen is in Kew herbarium; a small fragment of the type is filed at Pretoria. (Cryptogamic herb. no. 30887).

Uromyces Setariae-italicae (Diet.) Yoshino

in Bot. Mag. Tokyo 20 (1906), p. 247; Syd. Monogr. Ured. II (1910) 339–340, Pl. XIII, fig. 171.

Uredo-sori amphigenous but mostly hypophyllous, scattered or seriate in longitudinal rows, minute, oblong, up to 0.5 mm. long, surrounded by the torn epidermis, pulverulent, cinnamon brown. Uredospores globose, sub-globose or ovate, finely and rather sparsely echinulate, yellow-brown, $22\text{--}34 \times 18\text{--}26\ \mu$; episporium about $1.5\ \mu$ thick and with 3–4 equatorial germ pores.

[Teleuto-sori mostly hypophyllous, scattered or in groups, minute, round or oblong, long covered by the epidermis, inconspicuous, greyish black. Teleutospores globose, ovate or oblong, often angular, rounded or truncate at the apex, not thickened or only very slightly so, smooth, yellow or yellow-brown, $20\text{--}30 \times 16\text{--}24\ \mu$; episporium $2\text{--}3\ \mu$ thick; pedicel hyaline or subhyaline, about equal to the spore in length.]

on leaves of *Setaria pallidifusca* Stapf et Hubb., Tweedie, Mogg, 11648 ; Nottingham Road McClean, 31003.

on *Setaria verticillata* Beauv., Groenkloof, Pretoria, Pole Evans, 9050 ; Muden, Doidge, 23212.

This species has been recorded on *Setaria glauca*, *S. intermedia*, *S. italica* with its variety *germanica*, *S. verticillata* and *S. viridis* from Japan and East India. The uredo-stage of the South African collections agrees exactly with the specimens from Poona (Sydow, Uredineen 2148-2149) on *S. italica* and from the Philippines (Fungi Malayana Baker No. 296). The latter specimen is labelled *Uromyces Setariae-italicae* (Diet.) Yoshino but no teleuto-spores can be found on the material. According to Sydow (loc. cit.) this fungus is usually found in the uredoform and the teleuto-stage is comparatively rare. Only the uredo has been found in South Africa ; the description of the teleutostage is quoted from Sydow's Monograph.