

Puccinia Prostii, Moug., and Uromyces Scillarum, Wint.

Two Rust Fungi from the Royal Botanic Garden, Edinburgh.

BY

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With Plates CXLII-CXLIII.

Puccinia Prostii, Moug.

Puccinia Prostii, Moug., has been recently recorded in Britain by Massee* on cultivated tulips, but no particular locality is given. Saccardo† states that it occurs on *Tulipa sylvestris*, Linn., and on *T. australis*, Link (*T. Celsiana*, DC.) in Italy and France.

This rust was recently found in the Royal Botanic Garden attacking a bed of *Tulipa sylvestris* and doing considerable damage to the plants which produced few flowers. The rust was present on the plants in 1913, and probably also in the previous years.

The sori, which occur on both surfaces of the leaf, are usually confined to one longitudinal half of the lamina (see Pl. cxlii), frequently on that portion directed towards the north. There is no discoloration of the leaf around the sori. In addition to teleutospores, spermogonia are abundantly produced on the leaves, although in the descriptions of the fungus given by Saccardo,† Sydow,‡ and Massee,* there is no mention of these. Two kinds of markings are obvious on the leaves:—

(1) Yellowish-brown areas, elliptical or circular in shape, in which the epidermis is apparently unbroken (*a*, Pl. cxliii, Fig. 1).

(2) Grey or slate-coloured, usually spindle-shaped, areas, many of which show a longitudinal slit from which the brownish-black masses of teleutospores are projecting (*b*, Pl. cxliii, Fig. 1).

It appears that the spermogonia are first produced and give rise to the yellowish-brown spots, and that later on teleutospores are formed on the same sorus. In the early stages of develop-

* G. Massee, assisted by I. Massee, *Mildews, Rusts, and Smuts* (1913), p. 139.

† Saccardo, *Sylogae Fungorum*, vii (1888), p. 732.

‡ Sydow, P. et H., *Monographia Uredinearum*, i (1904).

ment the areas remain yellowish-brown, but as the teleutospores approach maturity an air-space develops under the epidermis, and in consequence grey or slate-coloured spots are produced. The epidermis finally splits longitudinally, the edges turn slightly back and disclose the dark brown mass of teleutospores. It is frequently found that a slate-coloured area forms a circular or spindle-shaped ring around a yellowish-brown spot (c. Pl. cxliii, Fig. 1). It is evident that in these cases the development is centrifugal, the ripe teleutospores being first produced in the outer part of the sorus. It is quite possible that, in some cases, only spermogonia are developed in the area, and then the yellowish-brown colour remains unchanged. Spots have, however, been often found in which spermogonia and groups of young teleutospores are intermingled; and it is probable that, in the majority of cases, development commences with the formation of spermogonia and terminates in the production of teleutospores. Teleutospore sori, not in connection with spermogonia, have also been found. The mycelium, which is easily seen in a section of the leaf, consists of rather large hyphae, containing yellowish-brown granules. The spermogonia are amphigenous, yellowish-brown in colour, and flask-shaped, with slightly projecting necks, 120–140 μ in diameter (Pl. cxliii, Fig. 2). The spermatia are oval and unusually large, about $10 \times 5 \mu$. The teleutospore sori are amphigenous (Pl. cxliii, Figs. 3, 4); spores brown, scarcely constricted, covered with rather long hyaline spines $56\text{--}62 \times 17\text{--}19 \mu$; epispore rather thick, 2–3 μ ; pedicels variable, shorter or longer than the spore, up to 80 μ in length, hyaline, deciduous.

Uromyces Scillarum, Wint.

Uromyces Scillarum, Wint., the common *Scilla* rust, has been recorded on several species of *Scilla* and *Muscari*. In the British Isles it is frequently found on *Scilla festalis*, Salisb., and also occurs on *Scilla bifolia*, Linn., and *S. hispanica*, Mill.; up to the present, however, its occurrence on *Muscari* has not been recorded in this country.

It was found in the Royal Botanic Garden in May, forming the characteristic yellow spots on the leaves of *Muscari polyanthum*, Boiss., a species which hitherto has not been recorded as a host for this rust. As usual, the sori are often concentrically arranged on the rounded discoloured areas. The teleutospores, the only kind of spore produced, agree in size and form with those found on the other host species; in size they vary from $20\text{--}26 \times 16\text{--}18 \mu$. The characteristic faint lines found on the spore wall running from the apex to base can be frequently seen.

The rust frequently occurs on neighbouring plants of *Scilla*

festalis, but has not been discovered on *S. hispanica* or on several other species of *Muscari* growing in proximity to the diseased *M. polyanthum*.

Uromyces Ornithogali, Hazsl. which also occurs on *Muscari* sp., but which has not yet been recorded for Britain, is distinguished by the larger teleutospores bearing a hyaline apiculus.

I wish to express my thanks to Mr. W. B. Grove, who kindly confirmed the naming of the two species.

EXPLANATION OF PLATES CXLII-CXLIII.

Illustrating Dr. Malcolm Wilson's paper on *Puccinia Prostii*, Moug.

All the photographs refer to *Puccinia Prostii*, Moug.

PLATE CXLII.—Three leaves of *Tulipa sylvestris*, L. attacked by the fungus. The two leaves on the left show the upper surfaces, and the one on the right the under surface. About $\frac{2}{3}$ natural size.

PLATE CXLIII.

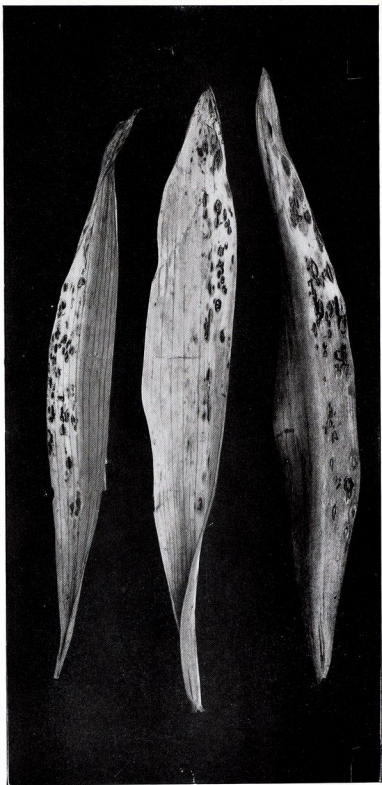
FIG. 1.—Portion of a leaf attacked by the fungus. *a*, yellowish-brown areas in which spermogonia and young teleutospores are present. *b*, mature teleutospore sori. *c*, ring-shaped mature teleutospore sorus surrounding young teleutospores and spermogonia. About $1\frac{1}{2}$ times natural size.

FIG. 2.—Transverse section of leaf of *Tulipa sylvestris* showing spermogonia. \times about 25.

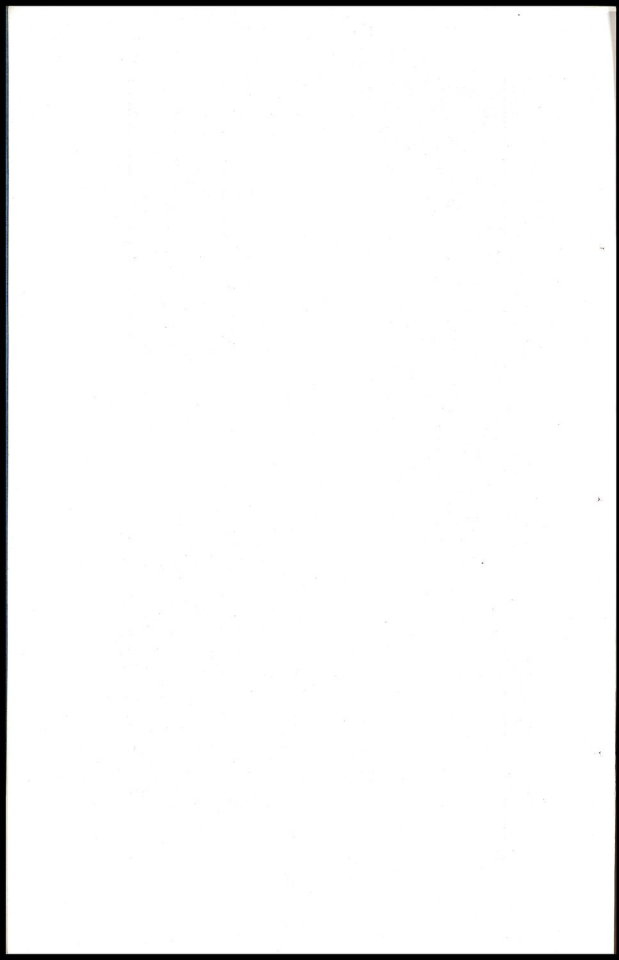
FIG. 3.—Transverse section of leaf of *Tulipa sylvestris* showing amphigenous teleutospore sori. \times about 70.

FIG. 4.—Transverse section of leaf of *Tulipa sylvestris* showing part of teleutospore sorus. \times about 165.

The plates are taken from photographs by Mr M. Y. Orr and Mr R. M. Adam of living specimens and preserved material in the Royal Botanic Garden, Edinburgh.



PUCCINIA PROSTII MOUG.



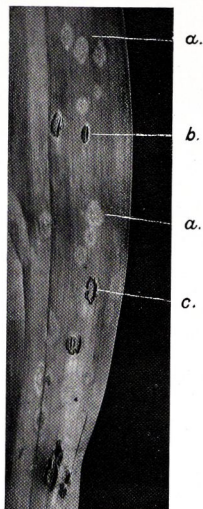


FIG. 1.

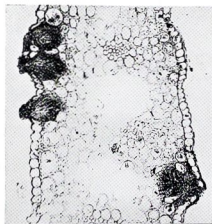


FIG. 2.

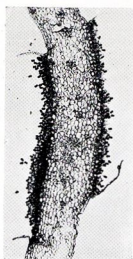


FIG. 3.

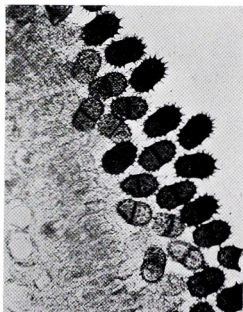


FIG. 4.

