TWO RUSTS ON TRIFOLIUM DUBIUM IN IRELAND

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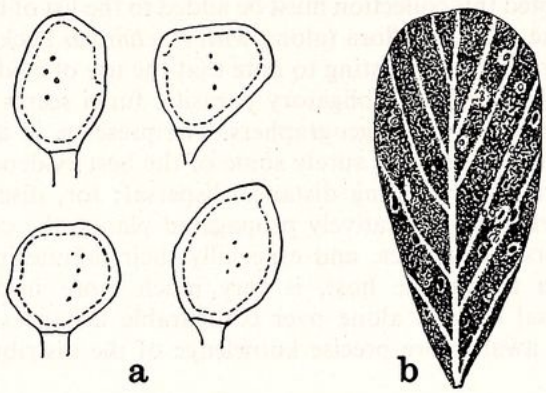
Uromyces minor Schroet.

A collection of what I regard as this species on *Trifolium dubium* Sibth. was first made by Mr. R. McIlwaine at Portadown, Co. Armagh in 1957 and again in the same locality in October 1958. On this abundant material the following account of the fungus is based.

Spermogonia absent. *Aecidia* scattered, or in groups of five or six, appearing on young leaves and maturing simultaneously with telia as though from a systemic mycelium, undoubtedly at least from the same mycelium, rather deeply sunk and long covered by epidermis, peridium slightly toothed at margin but otherwise not protruding beyond epidermis and entire; spores slightly angular 14–16·5 μ in diameter, wall verruculose. *Uredinia* absent. *Telia* scattered amongst aecidia, hypophyllous, long covered by silvery epidermis, spores subglobose to broadly elliptic with one apical or subapical pore with inconspicuous cap, wall smooth 1–2 μ thick, stipe short, spores 20–24 × 14–18 μ (Figure).



Uromyces minor on *Trifolium dubium*.
a, Teliospores (× 800) b, aecidia and telia on leaves. (× 4½)

This collection undoubtedly belongs to the *U. trifolii* group of species in the broad sense. Within this group the significance of the presence or absence of spore stages in the life cycle is notoriously difficult to assess. Spermogonia and uredospores are certainly lacking in the present collection and the most characteristic feature is the occurrence of mature aecidia and telia almost simultaneously. This then restricts possible species to opsis- and micro-forms. Micro-forms must be considered, as aecidia have been described occasionally with telia; Jørstad (1951) cites a case from Iceland. The described species which fit these requirements are *U. flectens* Lagerh., *U. nerviphilus* (Grog.) Hotson and *U. minor* Schroet. In Europe *U. flectens* is clearly defined as a microcyclic species and is usually considered to be completely synonymous with *U. nerviphilus*. However, *U. nerviphilus* sensu Arthur (1934) is an opsis-form, occurring on many

clovers in N. America. Jørstad's records of aecidia associated with telia on *T. repens* in Iceland and Norway probably belong to *U. nerviphilus* in this latter sense. Both *U. flectens* and *U. nerviphilus* sensu Arthur have larger teliospores (20–29 × 13–20 μ) than *U. minor* (18–20 × 14–17 μ) according to Guyot's (1957) measurements of European material. The Irish collections are somewhat intermediate in size (20–24 × 14–18 μ) between these two, but it should be noted that Arthur gives larger measurements for North American material of *U. minor* (18–26 × 13–19 μ) than are usual for European collections. Furthermore the sori of *U. nerviphilus* as the epithet implies, are grouped along the veins and the plant is deformed, whereas *U. minor* does not cause deformation and the sori are more scattered. In these two respects then the Irish collection is closer to *U. minor* than to *U. nerviphilus* sensu Arthur. However, as Dietel (1895) has clearly pointed out there appear to be two races within *U. minor*. In North America the aecidia appear with the telia and seem to repeat and the telia are long covered by the epidermis, whereas in Europe they precede the telia and do not repeat and the telia rupture the epidermis early. Moreover, in North America *T. dubium* is a host for *U. minor* whilst in Europe although it has been included in artificial inoculation experiments (Kobel, 1920) it has never been infected. The Irish collection must then be regarded as belonging to the North American race of *U. minor*. If this be accepted this collection must be added to the list of the "American element" in the Irish rust flora (along with *P. clintonii* Peck).

As a postscript it is interesting to note that the use of evidence from the distribution of specialized obligatory parasitic fungi seems to have been totally overlooked by plant geographers. The presence of a plant species with its specialized fungus is surely some of the best evidence for gradual colonization rather than long distance dispersal; for, discounting seed-borne pathogens and vegetatively propagated plants, the chance of long distance dispersal of spores, and especially their infinitesimal chance of alighting on a susceptible host, is very much more improbable than chance dispersal of seed alone over comparable distances. This line of research must await more precise knowledge of the distribution of these fungi.

Uromyces anthyllidis (Grev.) Schroet.

On *Trifolium dubium* Sibth. Sand dunes north west of Ballyvaughan, Co. Clare, 6 July 1958, DMH.4021.

Uredosori hypophyllous, very sparse, rusty cinnamon. *Uredospores* subglobose, finely echinulate, 18–23 × 18–22 μ, with 4–6 scattered pores.

This rust on *Trifolium dubium* has been recorded in Britain (but not in Ireland) as *U. jaapianus*, but it seems doubtful if it can be distinguished satisfactorily from *U. anthyllidis*. *Euphorbia portlandica* grows abundantly near the infected *Trifolium* at Ballyvaughan but no aecidia could be found on it.

References

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ADDENDUM

Since this note was written *Uromyces minor* has been recorded on *Trifolium molinerii* from Jersey by Frost in Trans. Brit. Mycol. Soc., 43, 695, 1960.