UREDINALES FROM ASIA MINOR

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The majority of the fungi listed below have been collected by Dr. P. H. Davis in the course of his journeys in Asia Minor, especially in Turkey. Many of the specimens have been brought to my notice by members of the staff of the Botanic Garden, and to them thanks are due.

Asia Minor is undoubtedly a rich field for the uredinologist and one which is only partially tapped. Turkey, in particular, is imperfectly known in this respect, although towards the end of last century Bornmüller collected a number of rusts, and in recent years Gassner, Bremer, Gaumann and Petrak have contributed to the knowledge of the rust flora of the area.

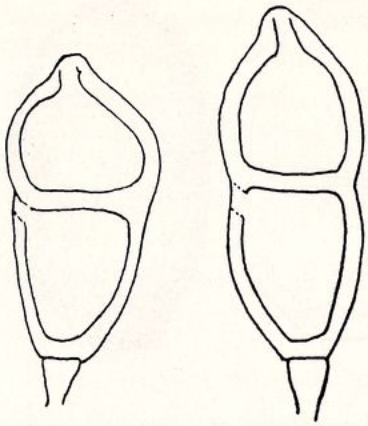

FIG. 1. Teleutospores of Puccinia heucherae var. saxifragae (Davis, 14816). ×500

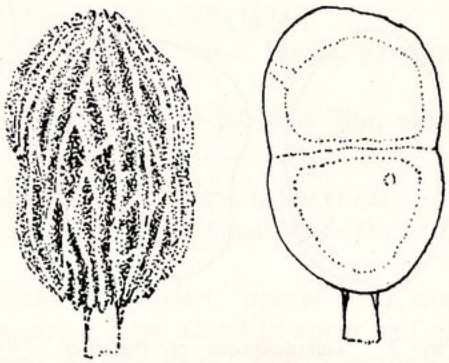

FIG. 2. Teleutospores of Puccinia graellsiae (Bornmüller 98). ×500

Puccinia heucherae (Schw.) Diet. var. **saxifragae** (Schlecht.) Savile in Canad. J. Bot. xxxii, 400–425 (1954).

On *Saxifraga sibirica* L.; Turkey: Prov. Bursa, Ulu dağ, 2400 m., *Davis* 14816.

Sori hypophyllous, 7–8 mm. in diameter. Teleutospores pulverulent 30–36×13–16 (34×14)μ slightly constricted at septum, apical papilla pronounced, very faintly longitudinally striate (only clearly visible in dry state). (Fig. 1.)

Puccinia graellsiae P. Magn. in Verh. zool.-bot. Ges. Wien, xlix, 93 (1899).

On *Graellsia saxifragifolia* (DC.) Boiss.; Persia occidentalis: in monte Elwend, *Bornmüller* 98.

Sori epiphyllous and hypophyllous, long covered by the silvery cuticle. Teleutospores pulverulent, 28–35×20–33 (31×22)μ scarcely constricted at the septum, surface with raised striae occasionally fusing to form elongate areolae, pores very indistinct, without papillae, upper pore lateral, lower pore superior near septum, stipe short. (Fig. 2.)

This species has hitherto been known only from the type collection in south eastern Persia. The distinct longitudinal striae on the teleutospore wall and the superior position of the pore in the lower cell are distinctive characters not represented in other cruciferous rust fungi.

Puccinia martianoffiana Thuem. in Bull. Soc. Imp. Nat. Mosc. 1877, 138 (*n.v.*).

On *Paeonia mascula* Mill. ; Turkey: Prov. Bitlis, dist. Kotum on Karz Dağ above Kamer, 2200 m., 24 Aug. 1954, *Davis* 24603.

Sori hypophyllous and sparsely epiphyllous, crowded on brown spots up to 2 cm. in diameter. Spermogonia not observed. Teleutospores almost black in mass, pulverulent, 26–33 × 17–33 (30 × 22)μ, ovate-oblong, not constricted, wall smooth, pores without papillae, upper pore apical, lower pore in upper half of cell, stipe very short. (Fig. 3.)

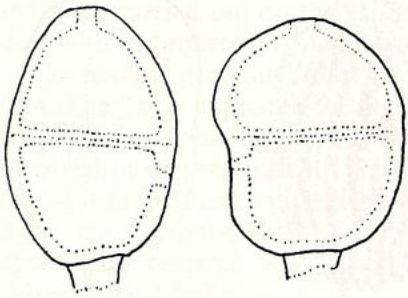

FIG. 3. Teleutospores of Puccinia martianoffiana (Davis, 24603). × 500

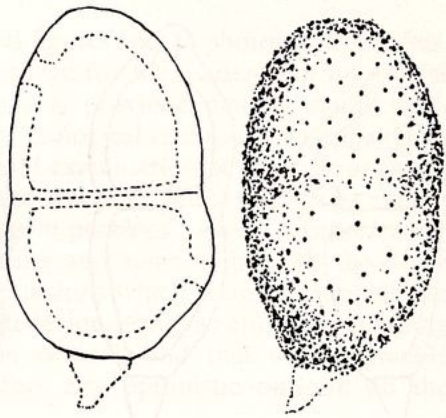

FIG. 4. Teleutospores of Puccinia calcitrapae on Phaeopappus salignus (Davis, 23920). × 500

According to Tranzschel (in Guyot, 1951 and 1953) this rust has been collected on only three occasions, twice in south central Siberia and once in the region of Murmansk, always on *Paeonia anomala*. Thus, in spite of the fact that the large infected spots with numerous crowded black sori render the rust quite conspicuous, it is little known. It seems justifiable to conclude that it is a genuinely rare rust species.

Puccinia ziziphorae Syd., Monographia Uredinearum, i, 304 (1902).

On *Ziziphora clinopodioides* M. Bieb.; Turkey: Kurdistan juxta Bash-kalah (Başkale), *A.H. Layard* 385.

On *Ziziphora ronnigeri* Nábělek; Turkey: Prov. Van, Kepir Dağ, 2800 m., July 1954, *Davis* 23338: Erek Dağ, 2000 m., July 1954, *Davis* 22967. (All uredo only.)

Uredosori hypophyllous. Uredospores slightly obovate with two equatorial pores, wall delicately echinulate, on *Z. clinopodioides* 22–29 × 17–20 (28 × 18)μ, on *Z. ronnigeri* (D.22967) 25–30 × 15–20 (29 × 18) μ.

There is no doubt that the fungi on the two host species are conspecific. Indeed, it is doubtful, as Sydow admits in the original account of *P. ziziphorae*, if this species is really distinct from *P. menthae*. Certainly they are very closely allied.

Puccinia menthae Pers. Syn. Meth. Fung., 227 (1801).

On *Satureia spicigera* Boiss.; Turkey: Prov. Tokat, Niksar–Karakas 1000 m., Sept. 1954, *Davis* 24899 (uredo only).

On *Satureia hortensis* L.; Turkey: Prov. Adana, dist. Feki, in Göksu gorge, 700 m., July 1952, *Davis* 19801 (uredo only).

Uredosori hypophyllous. Uredospores obovate faintly echinulate with two equatorial germ pores, 22–30×17–19 (27×18)μ.

Puccinia bupleuri Rud. in Linnaea, iv, 514 (1829).

On *Bupleurum croceum* Fenzl; Turkey: Prov. Kayseri, near Bakir dağ, 1200 m., June 1952. *Davis* 19185.

Only teleutosori are present. Teleutospores ovate, scarcely constricted 30–36×22–27 (32–25)μ, upper pore sub-apical, lower pore depressed half way, wall smooth 2–3μ thick, stipe deciduous.

A new host record. This collection is readily assignable to *P. bupleuri* as defined by Gaumann in his useful study of variation on different host species (Gaumann, 1939).

Puccinia cyani (DC.) Pass. in Rabh., Fungi Eur. 1767 (1874).

On *Centaurea ensiformis* P. H. Davis; Turkey: Prov. Muğla, Sandras Dağ, *Davis* 13510 (III only).

Teleutospores ovate, not constricted, 38–43×25–30 (40×28)μ, stipe deciduous.

Puccinia rhapontici Syd. in Monographia Uredinearum, i, 139 (1902).

On *Rhaponticum pygmaeum* DC.; Transjordan: Dhiban–Wadi Themed, *Davis* 9617 (III only).

Teleutosori hypophyllous, pulverulent, dark brown. Spores ovate, not constricted, 33–38×29–32 (36×31)μ, upper pore lateral in upper half of cell, lower pore depressed half-way, wall 3–5 (4)μ thick, distinctly verrucose pedicel very short, deciduous.

The type description of this species refers to specimens from Lebanon on *Rhaponticum pygmaeum* DC.(=*R. pusillum* Boiss.). The range of dimensions of teleutospores is considerable according to Sydow's account: 24–35μ in diameter, rarely 35–46×20–24μ. The only specimen at hand for comparison, *Bornmüller* 11294 on *R. pygmaeum*, represents the lower part of this range with teleutospores mostly 28×26μ. The Davis collection on the contrary represents the upper range of variability. *P. rhapontici* approaches *P. cyani* but from the few specimens available seems to differ in broader spores with more pronounced verrucosity.

Puccinia calcitrapae DC., Fl. Fr. ii, 221 (1805).

On *Phaeopappus salignus* C. Koch; Turkey: Prov. Hakkâri, Cilo Dağ, *Davis* 23920.

On *Phaeopappus kotschyi* Boiss.; Persia: Kandavan (Elburz), *Davis* 809.

On *Centaurea squarrosa* Roth; Turkey: Szandschak Gumuschkane, *Sintenis* Iter Orient. 7407c.

Only teleutospores are present in these three collections. Teleutospores slightly constricted, wall delicately spinulose 34–40×20–24 (28×23)μ, upper pore lateral, lower pore depressed almost half-way. (Fig. 4.)

These collections are indistinguishable from European collections of *P. calcitrapae* which occurs on many genera of Compositae. *P. phaeopappi* Maire (in Bull. trim. Soc. myc. Fr. xxi, 149, 1905) described on *Phaeopappus kotschyanus* (=*kotschyi*) from the Cilician Taurus belongs to the group of Puccinias on Compositae with ovate non-constricted spores and is most closely allied to *P. montana*.

Puccinia persica Wettst. in Hedwigia, xxvi, 115, 1887.

On *Centaurea kermanensis* Bornm.; Persia: Prov. Kerman, 2000 m., *Bornmüller* 4365 (III only).

Teleutosori hypophyllous, 1–1·5 mm. in diameter. Teleutospores pulverulent chocolate brown in mass, broadly obovate, scarcely constricted at septum, 36–40×28–31 (37×30)μ, wall verruculose, 6–7μ thick, upper pore subapical, lower pore in upper half of cell, stipe very short. (Fig. 5.)

This species was originally described on *Centaurea carduiformis* from Persia, and has since been recorded on a number of species of *Centaurea* and *Phaeopappus*. It appears most closely allied to *Puccinia calcitrapae* but differs in larger teleutospores with very thick walls.

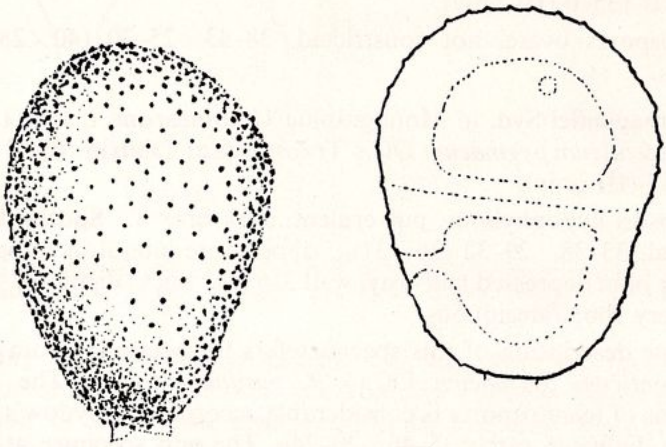

FIG. 5. Teleutospores of Puccinia persica (Bornmüller 4365). ×500

Phragmidium tuberculatum J. Mull. in Ber. deutsch. bot. Ges. iii, 391 (1885).

On *Rosa* sp.; Turkey: Vil. Muğla, Baba dağ, above Fethiye, 1050 m., *Davis* 13697.

Uredospores 20–24×20–26 (21×19)μ. wall finely verrucose 1·5–2μ thick, with conspicuous internally projecting thickenings.

Teleutospores 5–8, (7)-celled, 70–100×32–36 (80×34)μ, wall coarsely tuberculate, apiculus up to 30μ long, tuberculate, stipe gradually broadening below, 110–140 (120)μ long.

This species is closely related to *Phragmidium rosae-lacerantis* Diet. and according to Tranzschel (in Jørstad, 1952) the species grade into one another and may not be distinguishable.

Uromyces anthyllidis (Grev.) Schroet. in Hedwigia, xiv, 162 (1875).

On *Lotus villosus* L.; Lebanon: Choueifat, 23 Apr. 1943, *Davis* 5475; Cyprus: Rizokarpass, 19 Feb. 1941, *Davis* 2211 (II and III).

On *Hymenocarpus nummularius* DC.; Transjordan: Wadi Heidan (Moab), 26 Apr. 1945, *Davis* 9606 (III only).

Uredospores ovate, faintly verruculose, 22–25 × 19–23 (23 × 22)μ wall with 4–6 pores (on *Lotus*). Teleutospores: on *Lotus*, 18–24 × 17–20 (22 × 20)μ, wall strongly and irregularly verrucose, 3·5μ thick, pore apical; on *Hymenocarpus*, rather irregularly shaped, 21–26 × 16–22 (23 × 21)μ, wall verrucose, 3–4μ thick, pore apical.

This species differs from *Uromyces pisi* (DC.) Otth *sensu lato*, including *U. striatus* Schroet. and *U. euphorbiae-corniculatae* Jordi (= *U. loti* Blytt), in the irregular arrangement of verrucae on the teleutospores; verrucae are also more pronounced in *U. anthyllidis* and the spore walls tend to be thicker. Rayss (1951) has recorded this species on *Lotus villosus* in Palestine. According to Guyot (1951a) the eurasiatic species of *Lotus* are parasitised by *Uromyces loti* Blytt, whereas on the circum-mediterranean species *U. anthyllidis* occurs.

Two other species of *Uromyces* have been recorded on *Lotus* from Asia Minor: *U. gurkeanus* P. Henn. and *U. handelii* Bubak. I have not seen material of either, but from descriptions it seems doubtful if they could be distinguished from *U. anthyllidis* and *U. pisi*.

U. anthyllidis has been noted by Magnus (1900) from Jericho. *U. hymenocarpi* Jaap described on *Hymenocarpus circinatus* from Dalmatia is generally considered a synonym of *U. anthyllidis* and from the description in Saccardo (Sylloge Fungorum, xxiii, 649) seems indistinguishable from that species.

Uromyces bupleuri Magnus in Verh. zool.-bot. Ges. Wien, xlix, 87–103 (1899).

On *Bupleurum linearifolium* DC.; Persia: Aschabad, in monte Sulukludagh, *Sintenis* 473; Turkey: Prov. Van, near Hoşap, Aug. 1954, *Davis* 24531.

Teleutospores globular to broadly ellipsoidal 23–29 × 18–22 (25 × 20)μ, wall smooth, conspicuously thickened at apex (up to 8μ), pedicel very long 55–110μ (mostly c. 100) hyaline persistent.

The type description refers to the host as *Bupleurum graminifolium* DC., but as this specific epithet was never used by De Candolle it was probably a mistake for *B. linearifolium* DC. Hitherto the known distribution of this species has been south-east Persia (the type locality), North Africa (four records) and southern Spain (three records) (Guyot 1938).

Gymnosporangium confusum Plowr., Monograph British Ured. Ustil. 232 (1889).

On *Crataegus orientalis* M. Bieb.; Turkey: Prov. Konya, Karanje deri, *Juniperus excelsa* dominant, *J. oxycedrus* rare, 2 Sept. 1941, *Davis* 14631; Prov. Isparta, dist. Sütçüler, 30 July 1949, *Davis* 15884.

On *Crataegus oxyacantha* L.; Turkey: Vil. Muğla, Baba dağ, 1050 m., *Juniperus excelsa* frequent, *J. oxycedrus* rare, 30 July 1947, *Davis* 13694.

In all these collections the peridial cells are transversely striate. Aecidiospores 26 × 24μ with 6–7 pores, wall up to 3·5μ thick.

Gymnosporangium clavariiforme (Pers.) DC. Fl. Fr. ii, 217 (1805).

On *Cotoneaster nummularia* F. & M.; Turkey: Prov. Konya, Karanje deri, 2000 m., *Juniperus excelsa* dominant, *J. oxycedrus* rare, 2 Sept. 1947, *Davis* 14592.

Peridial cells minutely punctate, aecidiospores $27 \times 25\mu$, pores 6–7, wall up to 4μ thick.

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