UREDINALES FROM S.W. ASIA: II

D. M. HENDERSON

This short paper deals chiefly with collections of rust fungi made by Dr. P. H. Davis in Turkey in 1947 and 1949. Many had been named by the late Dr. G. R. Bisby and I am grateful to Dr. F. C. Deighton for the opportunity of examining this material, the first set of which is now in the Edinburgh Herbarium. I am indebted to several colleagues for having drawn my attention to rusted phanerogamic material and having assisted in determining host plants.

Coleosporium datiscae Tranz. in Trudy Bot. Gard. Tiflis, xi, 147 (1910).

On *Datisca cannabina* L.; Turkey: Antalya, 600 m., 11 Aug. 1947, *Davis* 13959.

II and III.

Coleosporium inulae Rabh. in Bot. Zeit. ix, 455 (1851).

On *Chrysophthalmum dichotomum* Boiss. & Held.; Turkey: Antalya, 1100 m., 26 Aug. 1947, *Davis* 14237.

Gymnosporangium confusum Plowr., Monogr. Brit. Ured. and Ustil. 232 (1889).

On *Crataegus orientalis* Bieb.; Turkey: Antalya, 1500 m., with *Juniperus excelsa* only, 30 Aug. 1947, *Davis* 14634.

On *Crataegus*; Turkey: Konya, 1000 m., 15 Aug. 1949, *Davis* 16206.

Both these collections bear very well developed peridia with characteristic transversely elongate striae on the lateral wall.

Hyalopsora polypodii (Diet.) Magn. in Ber. Deutsch Bot. Ges. xix, 582 (1901).

On *Cystopteris fragilis* (L.) Bernh.; Turkey: Antalya, 2300 m., 28 Aug. 1947, *Davis* 14380; Bursa, 2300 m., 13 Sept. 1947, *Davis* 14856.

II only, in both collections.

Melampsora epitea (K. & S.) Thuem. in Mitth. Forstl. Versuch. Oest. ii, 38(1879).

On *Salix* aff. *triandra* L.; Turkey: Antalya, 1000 m., 7 Aug. 1947, *Davis* 13909.

II only.

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

On *Euphorbia tinctoria* Boiss. & Huet; Turkey: Ankara, 10 July 1947, *Davis* 13208.

On *Euphorbia kotschyana* Fenzl; Turkey: Muğla, 1600 m., 6 Aug. 1947, *Davis* 14015; *ibid.*, 3 Aug. 1947, *Davis* 13892.

In the absence of telia, these collections can only be referred to the aggregate *M. euphorbiae*.

On *Euphorbia kotschyana* Fenzl; Turkey: Antalya, 1800 m., 28 Aug. 1947, *Davis* 14436.

II and III. Teliospores mostly 38–43 × 10–12 μ, apex unthickened.

Melampsora hypericorum (DC.) Wint. in Hedwigia, xix, 55 (1880).

On *Hypericum calycinum*; Turkey: Antalya, 15 Aug. 1947, *Davis* 14204. Uredospores only.

Melampsora lini (Ehrenb.) Lév. in Ann. Sci. Nat. 3 sér. viii, 376 (1847).

On *Linum catharticum* L.; Turkey: Muğla, 1600 m., 6 Aug. 1947, *Davis* 13803.

On *Linum seljukorum* Davis; Turkey: Konya, 7 Sept. 1947, *Davis* 14777.

On *Linum cariense* Boiss.; Turkey: Antalya, 1800 m., 30 Aug. 1947 *Davis* 14658.

All three collections with uredosori only.

Phragmidium tuberculatum J. Müll. in Ber. Deutsch Bot. Ges. iii, 391 (1885).

On *Rosa* sp.; Turkey: Isparta, 2100 m., 2 Aug. 1949, *Davis* 16053.

On *Rosa glutinosa* Sibth. & Sm.; Turkey: Antalya, 2100 m., 16 Aug. 1947, *Davis* 14201.

Puccinia acarnae Syd., Mon. Uredinearum, i, 130 (1902).

On *Cirsium acarna* L.; Turkey: Antalya, 1300 m., 27 Aug. 1947, *Davis* 14301; Muğla, 6 Aug. 1947, *Davis* 14013. Fig. 1.

Uredospores and teliospores in the same sorus. Uredospores 27–35 × 20–25 μ with three equatorial pores. Teliospores black, 35–45 × 25–30 μ, wall slightly thickened above, 2–3 μ thick, pedicel pale, up to 40 μ long.

On *Cirsium lappaceum* M.B. var. *microcephalum* Boiss.; Turkey: Muğla, 1800 m., 6 Aug. 1947, *Davis* 13793.

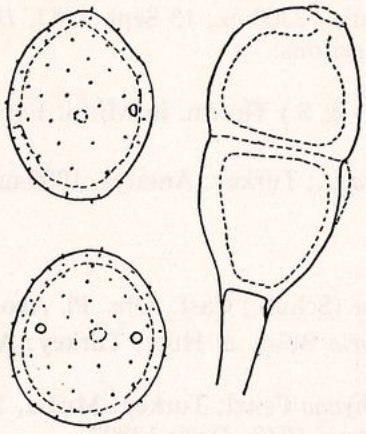

FIG. 1. Uredospores and teliospore of *Puccinia acarnae*; D.14013. (× 800)

Teliospores 42–48 × 26–30 μ, wall smooth, with a distinct papilla over the pore, which is apical in the upper cell and superior in the lower.

This collection agrees completely with typical *P. acarnae* on its type host *Cirsium acarna*, and there seems no good reason to exclude rusts on other thistles from this taxon. Rayss (1951) has recorded *P. acarnae* on *Cirsium phyllocephalum* Boiss. & Bl.

Puccinia ankarensis Bremer & Petrak in Sydowia, i, 249 (1947).

On *Lactuca brevirostris* Fenzl; Turkey: Antalya, 1400 m., 30 Aug. 1947, *Davis* 14692.

On *Lactuca cataonica* Boiss. & Hausskn.; Turkey: Prov. Tunceli, Hozat—Ovacik, 14 July 1957, *Davis* 31101.

Puccinia bulbocastani Fuckel, Symb. Myc. 52 (1869).

On *Carum ferulaceum* Sibth. & Sm.; Cyprus: between Drousha and Kato Arodhes, 2 May 1941, *Davis* 3278.

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

On *Centaurea iberica* Trevir.; Turkey: Antalya, 7 Aug. 1947, *Davis* 13933.

On *Acroptilon picris* Pall.; Turkey: Ankara, 10 Aug. 1947, *Davis* 13219.

Uredospores globose 23–27 μ in diameter with 2–3 equatorial pores. Teliospores 35–45 × 21–25 μ slightly constricted, wall slightly verrucose about 2·5 μ thick, pedicel short.

On *Carlina corymbosa* L.; Turkey: Antalya, 1600 m., 30 Aug. 1947, *Davis* 14688.

On *Echinops heldreichii* Boiss.; Turkey: Konya, 2 Sept. 1947, *Davis* 14581.

On *Carduus olympicus* Boiss.; Turkey: Bithynia, 1900 m., 13 Sept. 1947, *Davis* 14810.

On *Cirsium* sp.; Turkey: Konya–Kashnan, 7 Sept. 1947, *Davis* 14766.

Uredospore and teliospores amphigenous in common sori arranged in conspicuous concentric rings. Uredospores moderately and closely echinulate, subglobose, 25–28 μ diameter, wall 2–2·5 μ thick with three equatorial pores. Teliospores 35–45 × 23–30 μ, slightly constricted, wall indistinctly rough about 2·5 μ thick, upper pore apical, lower pore half depressed, pedicel 10–15 μ long, often completely deciduous.

If presumed host specificity is used as criterion at species level the last five collections would be dispersed to *P. cirsii*, *P. acroptili*, *P. carlinae* and *P. echinopsis*, all of which appear to me to be morphologically indistinguishable from typical *P. calcitrapae* on the type host *Centaurea calcitrapa*.

Puccinia chondrillina Bub. & Syd. in Oest. Bot. Zeitschr. lii, 94 (1902).

On *Chondrilla juncea* L.; Turkey: Antalya, 7 Aug. 1947, *Davis* 14230.

Uredospores subglobose, 20–26 μ in diameter with 2–3 equatorial pores without conspicuous hyaline caps. Teliospores 30–45 × 22–25 μ verrucose, verrucae arranged in indistinct lines, pore of upper cell apical, of lower inferior.

Puccinia coronata Corda, Icones Fung. i, 6 (1837).

On *Rhamnus oleoides* L. ssp. *tauricola* Davis; Turkey: Isparta, 2000 m., 2 Aug. 1949, *Davis* 15963.

Aecidia only, on fruit and leaves.

Puccinia cynodontis Desm. Exs. iii, No. 655. (1842).

On *Cynodon dactylon* (L.) Pers.; Turkey: Ankara, 10 July 1947, *Davis* 13216.

II and III present.

Puccinia graminis Pers., Syn. Meth. Fung. 228 (1801).

On *Berberis crataegina* DC.; Turkey: Isparta, 2200 m., 2 Aug. 1949, *Davis* 16052; Denizli, 300 m., 18 July 1947, *Davis* 13466.

Spermogonia and aecidia abundant in both collections.

Puccinia heldreichiana Diet. in Hedwigia, xxviii, 184 (1889).

On *Asphodelus microcarpus* Reichb.; Turkey: Antalya, 21 July 1949, *Davis* 15474a. Fig. 2.

Aecidia in dense clusters amphigenously arranged on the leaves. Aecidiospores 20–30 μ diameter, wall 2·5 μ thick. Telia sparse, foliicolous, long-covered by the grey epidermis. Teliospores 40–55 × 22–30 μ, slightly constricted, wall thin, up to 8 μ at apex, smooth, pore of upper cell apical, pore in lower cell superior, pedicel short.

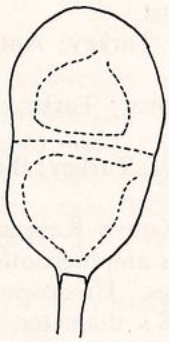

FIG. 2. Teliospore of *Puccinia heldreichiana*; D.15474a. (× 800)

Puccinia hieracii Mart., Prodr. F. Mosq., ed. 2, 227 (1817).

On *Hieracium pannosum* Boiss.; Turkey: Antalya, 16 Aug. 1947, *Davis* 14127.

Uredosori and telia present. The two pores in the uredospores are only slightly supra-equatorial whereas in typical *P. hieracii* they are markedly so. In this respect the collection approaches var. *hypochoeridis* (Oud.) Jørst.

On *Hieracium pannosum* Boiss.; Turkey: Konya, 2000 m., 1 Sept. 1947, *Davis* 14620.

This second collection bears only telia.

On *Taraxacum* sp.; Turkey: Bursa, 2300 m., 13 Sept. 1947, *Davis* 14051.

On *Taraxacum montanum* DC.; Turkey: Prov. Hakkari, Zab gorge, 2 Aug. 1954, *Davis & Polunin* (D.23818).

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

On *Micromeria fruticosa* (L.) Druce ssp. *brachycalyx* Davis; Turkey: Adana, 31 Aug. 1949, *Davis* 16469.

On *Calamintha alpina* (L.) Lam.; Turkey: Bithynia, 1900 m., 13 Sept. 1947, *Davis* 14835.

On *Calamintha origanifolia* (Lab.) Boiss.; Turkey: Antalya, 2200 m., 28 Aug. 1947, *Davis* 14327.

On *Mentha aquatica* L.; Turkey: Antalya, 1000 m., 7 Aug. 1947, *Davis* 13930.

On *Mentha longifolia* (L.) Huds.; Turkey: Antalya, 1100 m., 17 Aug. 1947, *Davis* 14086.

All five collections bear only uredospores, which, however, are quite typically elliptic, with four, more or less conspicuous, equatorial pores.

Puccinia mertensiae Peck in Bot. Gaz. vi, 227 (1881).

On *Omphalodes luciliae* Boiss.; Turkey: Isparta, 2300 m., 3 Aug. 1949, *Davis* 16027. Fig. 3a.

On *Omphalodes cilicica* Hausskn. & Siehe; Turkey: Konya, Kisyl Tepe, Aug. 1912, *Siehe*, Fl. Or. 183.

Telia hypophyllous, pulvinate, dark chocolate brown. Teliospores 30–35 × 24–28 μ slightly contracted at septum, wall strongly and closely verrucose, 3–3·5 μ thick. Pore of upper cell apical, pore of lower cell half depressed, pedicel hyaline, 10–15 μ long.

Puccinia mertensiae was described from North America on *Mertensia sibirica* and has since been recorded there on a number of species of that genus and a few species of related genera (Weiss, 1950). The present records are of particular interest as the species has only once been recorded in Eurasia, in Tadjistan—on *Mertensia dschagastanica* Reg. (Tranzschel, 1939).

Comparison with several North American collections fails to show any distinguishing features in the Turkish rust. It is noteworthy that *P. hydrophylli* on the related host family, Hydrophyllaceae, appears morphologically indistinguishable from *P. mertensiae*.

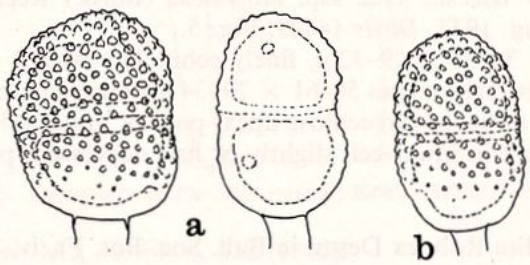

FIG. 3. Teliospores of *Puccinia mertensiae*; a, Davis 16027; b, Fungi of Western Colorado 194. (× 800)

Puccinia physospermi Pass. in Rabh. Fungi Eur. 1969 (1875).

On *Cnidium* aff. *orientalis* Boiss.; Turkey: Antalya, 100 m., 26 Aug. 1947, *Davis* 14285; *ibid.*, 24 Aug. 1947, *Davis* 14439; Isparta, 1000 m., 30 July 1949, *Davis* 15874. Fig. 4.

Telia only, hypophyllous. Teliospores 36–48 × 23–26 μ slightly constricted at septum, wall irregularly thickened rendering it undulate in outline, 3–3·5 μ thick.

P. physospermi belongs to a closely interrelated group of species including *P. plicata* and *P. microcincta*, several of which could probably be reduced to synonymy on full investigation. They are all microcyclic with characteristically undulate-walled teliospores and probably derive from the macrocyclic species *P. cnidii*.

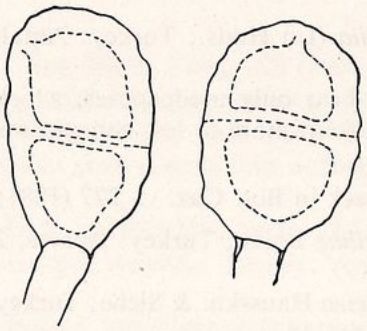

FIG. 4. Teliospores of *Puccinia physospermi*; D.14285. (× 800)

Puccinia pimpinellae (Str.) Röhl., Deutschl. Fl. ed. 2, iii, 131 (1813).

On *Pimpinella* sp.; Turkey: Antalya, 100 m., 26 Aug. 1947, *Davis* 14280.

On *Pimpinella cretica* Poir.; Turkey: Lydia, Ilidja in rupestribus, 29 May 1906, *Bornmüller* 9522.

Puccinia polygoni-amphibii Pers., Syn. Meth. Fung. 227 (1801).

On *Polygonum* sp., Turkey: Antalya, 1000 m., 7 Aug. 1947, *Davis* 13929a.

Uredospores 23–27 × 18–22 μ moderately and closely echinulate, with two supra-equatorial pores. Teliospores 30–35 × 17–20 μ, smooth, apex 5–7 μ thick.

Puccinia pulvinata Rabenh. in Hedwigia, x, 20 (1871).

On *Echinops viscosus* DC. ssp. *bithynicus* (Boiss.) Rech. f.; Turkey: Antalya, 27 Aug. 1947, *Davis* 14429. Fig. 5.

Uredospores 30–34 × 29–32 μ, finely echinulate with 2 slightly supra-equatorial pores. Teliospores 56–61 × 29–34 μ, constricted at septum, wall smooth except at finely verruculose apex, pore of upper cell apical with a hyaline cap, pore in lower cell slightly or half depressed, pedicel hyaline, 20–25 μ long.

Puccinia recondita Rob. ex Desm. in Bull. Soc. Bot. Fr. iv, 798 (1857).

On *Triticum vulgare* L.; Turkey: Antalya, 1700 m., 7 Aug. 1947, *Davis* 13747.

Puccinia sessilis Schneid. ex Schroet. in Abh. Schles. Ges. Vaterl. Cult. Nat. Abt. 19 (1870).

On *Phalaris arundinacea* L.; Turkey: Antalya, 1000 m., 7 Aug. 1947, *Davis* 13908.

Uredosori only, aparaphysate; spores 28–32 × 23–25 μ, echinulate, with 6–7 scattered pores.

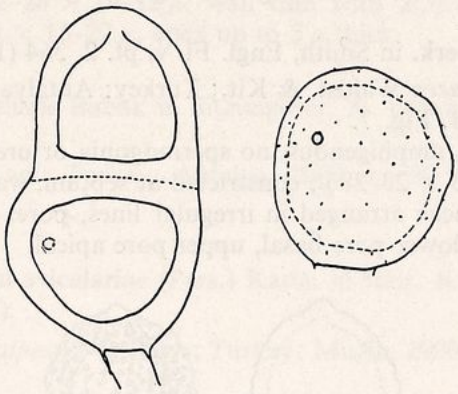

FIG. 5. Teliospore and uredospore of *Puccinia pulvinata*; D.14429. (× 800)

Puccinia syriaca Syd., Mon. Uredinearum, i, 211 (1902).

On *Crucianella glauca* A. Rich.; Iran: Durud, 1800 m., 22 May 1940, *Koelz* 15752. Fig. 6.

Telia only, black pulvinate, hypophyllous. Teliospores 36–42 × 18–22 μ, slightly constricted at septum, apex with a somewhat conspicuous hyaline cap 4–5 μ thick over the apical pore, lower pore superior, spore wall smooth, pedicel hyaline 40–60 μ long.

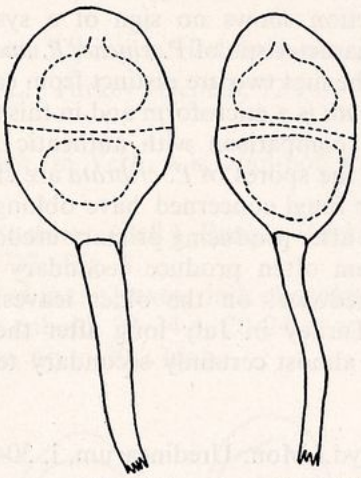

FIG. 6. Teliospores of *Puccinia syriaca*; Koelz 15752. (× 800)

Puccinia tanaceti DC., Fl. Fr. ii, 222 (1805).

On *Tanacetum praeteritum* (Horwood) Heywood ssp. *massicyticum* Heywood; Turkey: Antalya, 7 Aug. 1947, *Davis* 13743; Muğla, 6 Aug. 1947, *Davis* 13805.

Uredospores 25–28 × 22–26 μ, wall echinulate with three equatorial pores. Teliospores 40–50 × 20–25 μ, somewhat constricted, wall thin, thickened to 5 μ at apex, faintly rough, pore of upper cell apical, pore of lower cell superior; pedicel hyaline, persistent, up to 90 μ long.

Puccinia cristata Kom. originally collected from Turkestan on *Richteria pyrethroides* (= *Chrysanthemum richteria* Benth.) is obviously very close to *P. tanaceti* but differs in having a strongly roughened teliospore apex.

Puccinia vincae Berk. in Smith, Engl. Fl. v, pt. 2, 364 (1836).

On *Vinca herbacea* Waldst. & Kit.; Turkey: Antalya, 1600 m., 27 July 1949, *Davis* 15731. Fig. 7.

Telia scattered, amphigenous, no spermogonia or uredospores present. Teliospores 35–45 × 23–28 μ, constricted at septum, wall about 2μ thick, with coarse verrucae arranged in irregular lines, pores with conspicuous hyaline papillae, lower pore basal, upper pore apical.

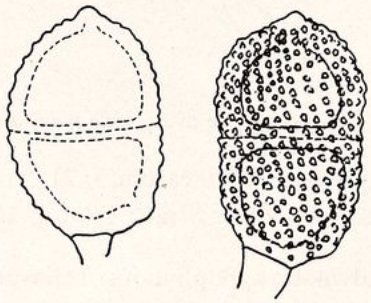

FIG. 7. Teliospores of *Puccinia vincae*; D.15731. (× 800)

There has been considerable confusion of *Vinca* rusts in the few years since Gassner described *P. anatolica* (see Bremer, 1957).

The present collection shows no sign of a systemic host-deforming mycelium which is characteristic of *P. vincae*, *P. anatolica* and *P. cribrata*. It seems doubtful if the first two are distinct from each other and both are brachyforms. *P. cribrata* is a microform and in this respect agrees with the Davis collection but comparison with authentic material (Jaap, Fungi Se l. 579) shows that the spores of *P. cribrata* are characteristically fusoid whereas all the other fungi concerned have oblong-elliptic spores. However the brachyforms after producing primary uredo- and teleutosori from the systemic mycelium often produce secondary teleutosori and, it is frequently stated, uredosori on the older leaves. This collection was made in Southern Turkey in July long after the primary sori would have matured and is almost certainly secondary teleutosori on localized mycelium.

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

On *Ziziphora clinopodioides* M.B. var. *canescens* Benth.; Turkey: Antalya, 31 Aug. 1947, *Davis* 14526.

Uromyces acantholimonis Syd. in Ann. Myc. iv, 28 (1906).

On *Acantholimon echinus* Bunge; Turkey; Antalya, 1200 m., 27 Aug. 1947, *Davis* 14428.

On *Acantholimon acerosum* Willd.; Turkey: Muğla, 1600 m., 6 Aug. 1947, *Davis* 14011.

On *Acantholimon olivieri* J. & Sp.; Iran: Durud, 1500 m., 23 May 1940, *Koelz* 15794.

Uromyces fabae de Bary in Ann. Sci. Nat. 4 Sér., xx, 80 (1863).

On *Vicia* sp.; Turkey: Antalya, 1000 m., 7 Aug. 1947, *Davis* 13924.

Uredospores 22–28 × 19–22 μ, wall thin with 2(3) equatorial pores. Teliospores 27–35 × 15–27 μ, apex up to 5 μ thick.

Uromyces onobrychidis Bubak in Sitzungsber. K. Böhm. Ges. Wiss. xlvi, 7 (1902).

On *Onobrychis* sp.; Turkey: Antalya, 2000 m., 30 Aug. 1947, *Davis* 14689.

Uromyces polygoni-avicullariae (Pers.) Karst. in Bidr. Känned. Fin. Nat. Folk. iv, 12 (1879).

On *Polygonum alpestre* C. Mey.; Turkey: Muğla, 2000 m., 5 Aug. 1947, *Davis* 14044.

Uromyces punctatus Schroet. in Abh. Schles. Ges. Vaterl. Cult. Nat. Abth. 1869–72, 10 (1870).

On *Astragalus* sp. (subgenus *Tragacantha*); Turkey; Antalya, 2100 m., 28 Aug. 1947, *Davis* 14371.

On *Astragalus* sp. (subgenus *Tragacantha*); Turkey: Konya, 2000 m., 2 Sept. 1947, *Davis* 14590.

On *Astragalus gummifer* Lab.; Turkey: Antalya, 2100 m., 1 Sept. 1947, *Davis* 14671.

Uromyces rumicis (Schum.) Wint. in Hedwigia, xix, 37 (1880).

On *Rumex patientia* L.; Turkey: Denizli, 12 July 1947, *Davis* 13226.

Uromyces salsolae Reich. in Verh. k.k. zool-bot. Ges. Wien, xxvii, 842 (1877).

On *Petrosimonia brachiata* (Pall.) Bunge; Turkey: Konya-Kayacik, 6 Sept. 1947, *Davis* 14727. Fig. 8.

Telia deeply embedded in the leaves, dark chocolate brown. Teliospores subglobose to slightly cuboid, 28–34 × 20–24 μ, apex 6–9 μ thick, wall smooth, pedicel hyaline, up to 20 μ long.

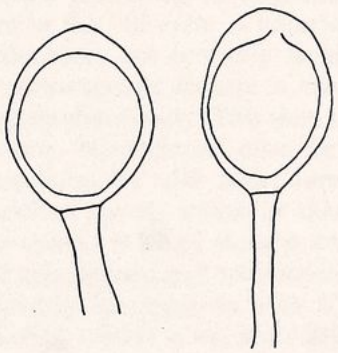

FIG. 8. Teliospores of *Uromyces salsolae*; D.14727. (× 800)

Uromyces thapsi (Opiz) Bub. in Fungi Bohemici, 96 (1906).

On *Verbascum splendidum* Boiss.; Turkey: Antalya, 1100 m., 7 Aug. 1947, *Davis* 14222.

Aecidia only; aecidiospores 19–24 × 15–18 μ, wall 1·5–2 μ thick, minutely verrucose.

Uromyces trifolii-repentis (Cast.) Liro in Acta Soc. Fauna Fl. Fenn. xxix, 15 (1906).

On *Trifolium physodes* Stev. ex M.B.; Turkey: Antalya, 7 Aug. 1947, *Davis* 14227.

Uromyces viciae-craccae Const. in Ann. Mycol. ii, 251 (1904).

On *Vicia gregaria* Boiss. & Heldr.; Turkey: Antalya, 2400 m., 31 Aug. 1947, *Davis* 14522.

Uredospores subglobose, 20–26 μ in diameter, echinulate. Teliospores 25–30 × 24–27 μ with longitudinally elongate striae.

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