

FUNGI OF GREECE VII: NEW RECORDS OF RUST FUNGI

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ABSTRACT. Twenty-five species belonging to five genera of rust fungi are listed from Greece; five rusts are reported as new to the Greek flora. One new species of *Puccinia* (*P. melitellae* Pantidou & Henderson) and one of *Uredo* (*U. ebeni* Pantidou & Henderson) are described.

This paper follows the general pattern as those previously published by the authors and listed in the references. There are records of 25 species in 5 genera, including a new species of *Puccinia* and *Uredo*; a rare species of *Aecidium* is discussed; five rusts are reported for the Greek flora for the first time; there are 29 new host records.

The contractions O, I, II & III used in the citations are for spermogonia, aecia, uredosori and teleutosori respectively. The numbers in parentheses indicate the specimens in the University of Athens herbarium (ATHU-M) whence the Benaki Phytopathological Institute herbarium (MPIH) has been transferred; some duplicate specimens are in the Edinburgh herbarium (E).

Aecidium asperifolii Pers.

On *Onosma* sp. O, I, Dionisos, Attiki (1446).

Spermogonia a few; aecidia hypophyllous, in groups; aeciospores $22-27 \times 20-24 \mu\text{m}$ hyaline, thin-walled.

The collection most probably represents the O, I stage of the *Puccinia recondita* group which includes a number of taxa with the II, III stages on Gramineae.

The host genus is a first record for Greece but it appears to be a rare host for the rust everywhere. Previously published records are from the Urals and southern Siberia.

Aecidium on *Colchicum* (= ? *Uredo colchici-autumnalis* Guyot & Massenot).

On *Colchicum cupanii* Guss. I, Vouliagmeni, Attiki (1370).

Aecidia amphigenous, in groups on discoloured spots, rounded, orange, 1.5 mm, long-covered by the host epidermis, peridia white, lacerate; peridial cells hyaline, rhomboid, rectangular or oblong, some up to $60 \mu\text{m}$ in length, outer wall thin, inner wall densely echinulate and striate, forming a compact sheet around the aeciospores; aeciospores mostly globoid, $22-25 (-30) \times 20-23 (-30) \mu\text{m}$, wall thin $1.5-2.5 \mu\text{m}$, hyaline contents yellow-orange.

One rust reported on *Colchicum*, *Uromyces colchici* Mass. is a microform (III), but this is rare, found so far only in England and Holland. There is, however, a report by Guyot & Massenot (1958) of a rust on *Colchicum autumnalis* in southern France which they named *Uredo colchici-autumnalis* Guyot & Massenot. These authors found peridial cells but assumed that

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their material was uredial because the peridial cells were scarce, not forming a sheet and the spores were not in chains. It is tempting to equate our material with theirs but the well-developed acedial features of ours with a clear sheet of peridial cells renders this unwise. All material is scanty, Guyot & Massenet's collection was of one leaf with a spot bearing a few sori and our material also consists of one leaf with one spot bearing about 14 acedia on each surface.

***Coleosporium tussilaginis* (Pers.) Lév. (*Coleosporium campanulae* Lév.)**

On *Symphandra cretica* DC. II, III, Samaria, Kriti (1244).

The host species is entirely new for the rust. Most of the records of this rust on *Symphandra* are from the USSR (Caucasus, Georgia, Azerbaijan).

***Gymnosporangium tremelloides* Hartig**

On *Juniperus oxycedrus* L. III, Mt Olimbos, 1500 m (1506).

Teleutosori on living twigs in orange-brown masses covering the whole area of a fusiform gall-like swelling (10 cm in length, 2–3 cm high), the margin free, rather dentate, the outer surface rugose as with small scales, inside paler and very gelatinous; teleutospores two-celled, apex rounded or subtruncate, slightly or not constricted, wall 1–1.5 μm thick, the majority pale, a few orange-brown 45–60 \times 20–24 μm , each cell germinating with 1–2 germ tubes; pedicels mostly fragile, some very long up to 500 μm .

The first record for Greece on this rust species.

***Puccinia aristolochiae* (DC.) Winter**

On *Aristolochia microstoma* Boiss. & Spruner. Delphi, Mt Parnasos, (DMH 9757).

The rust is new for Greece. This systemic microform distorts the host and renders it sterile.

***Puccinia carthami* Corda**

On *Carthamus tinctorius* L. II, III, Erithrai, Voiotia (1249).

A new host record for Greece; it has been found previously on *Carthamus creticus*, *C. lanatus* and *C. syriacus*.

***Puccinia calcitrapae* DC., sens. lat.**

On *Centaurea salonitana* Vis. II, III, Attiki (993).

Uredosori not found; uredospores few in the mount, globoid, dark yellow, wall 1.5–2.5 μm thick, echinulate, pores 3 equatorial (?), 24–28 \times 18–24 μm ; teleutosori amphigenous, dark brown, erumpent, pulverulent, teleutospores irregular in shape and size 37–45 \times 18–27 μm , dark yellow, wall uniformly thick 2.5–3 μm , finely verrucose; pedicels hyaline, fragile.

This is a new specific host for Greece. The only other record of a rust on this host is from the Crimea and Caucasus (as *P. centaureae* DC.). Gäumann (1959) in infection experiments found this host to be negative to *P. hieracii*.

On *Centaurea raphanina* Sibth. & Sm. subsp. *raphanina*. II, III, Mt Psiloritis, 1100 m, Kriti (1256).

A new host species for this rust in Greece.

***Puccinia eryngii* DC.**

On *Eryngium maritimum* L. II, III, island of Lefkas (1495).

This is a new specific host for Greece.

***Puccinia hieracii* Mart.**

On *Hedypnois* sp. II, III, Kimi, Evvoia (1245).

The host is a new record for Greece.

***Puccinia jackyana* Gäm.**

On *Scorzonera* sp. O, I, II, III, Mt Erimanthos, 1800 m, Akhaia (557).

Spermogonia abundant, visible with naked eye, flask-shaped with long beaks, paraphysate, honey-coloured; aecidia hypophyllous from systemic mycelium, covering the leaf surface; peridia white, long, lacerate, uredosori absent, a few uredospores mixed with teleutospores, $23-27 \times 21-23 \mu\text{m}$, pores two, almost equatorial; teleutosori abundant, often on the same leaf with aecidia, brown-black, amphigenous, minute, erumpent, pulverulent; teleutospores irregular in shape, apex rounded or truncate, wall $1.5-2.5 \mu\text{m}$ thick, densely verrucose, pore apical, $30-45 \times 20-27 \mu\text{m}$; pedicels hyaline, fragile.

This collection is placed in *P. jackyana* following Jørstad (1961) who differentiated this species from *P. hieracii* by the presence of systemic aecidia. Our teleutospores are larger than those described by Jørstad for *P. jackyana* ($27-36 \times 17-20$ v. $30-45 \times 20-27 \mu\text{m}$).

This is the first record of the rust from Greece; the host is rather rare.

***Puccinia lagenophorae* Cooke**

On *Senecio vernalis* W. & K. I. III. island of Ithaki (1405).

This rust has been reported previously from the same locality (Pantidou, 1969a) but the host was misidentified as *Senecio vulgaris*.

***Puccinia melitellae* Pantidou & Henderson, spec. nov.**

Uredosori amphigeni, erumpentes, discreti, minuti, 0.5 mm diametro, castanei; uredosporae ovatae vel ellipsoideae, parvae, $18-25 \times 18-22 \mu\text{m}$; membrana $2.2-3 \mu\text{m}$ crassa, pallide flavida vel brunneola, dense echinulata, poris 3(-4) equatorialibus vel dispersis; teleutosori conformes sed plerumque hypophylli, obscure brunnei; teleutosporae late ellipsoideae vel subglobosae vix constrictae interdum apicibus truncatis, $28-34$ (-38) \times $20-24 \mu\text{m}$; membrana $2-3 \mu\text{m}$ crassa, brunneola, verrucis $0.8-1.2 \mu\text{m}$ diam., $1.8-3 \mu\text{m}$ distantibus, poro celluli superioribus subapicale, poro celluli inferioris prope septum pedicello breve, hyalino plerumque excentrico.

On *Crepis pusilla* (Somm.) Merxmüller. Malta, Ins. Gozo, 21 & 28 iv 1907, *Malta Flora Italica Exsiccata* 997 (holo. E).

Kriti, Kidonia, leg. Greuter, 28 iii 1962. [host labelled *Melitella rechingeri* Zaffran = *C. pusilla* fide Greuter, 1973] ATHU-M 990. Kastellorizo Is, 11 iv 1974, Greuter 11768 (E).

Melitella was a genus of Compositae in the eastern Mediterranean with only two species, *M. pusilla* in Malta and *M. rechingeri* in Crete. It is now reduced to a synonym of *Crepis pusilla*. *Puccinia melitellae* was first found on a collection of the Cretan species then, when the relationship of *Melitella* was being considered; the same rust was found on Sommer's isotype collection of *M. pusilla* in the Edinburgh herbarium (E).

P. melitellae is very closely allied to the large group of species described on *Crepis* and resembles *P. crepidis* itself in the coarsely verrucose, rather small, roundish teleutospores. However, from the rusts of this group it does appear to differ in the higher number of uredospore pores and the frequently low position of the pore in the upper cell of the teleutospore.

It is unfortunate that we have no information on the aecidial stage of this rust to enable us to assign it more closely to either the brachy-forms or the auteu-forms of the rusts of this affinity on Compositae but collections at flowering time suitable for phanerogamic botanists rarely include those early-developing stages.

***Puccinia opopanax* Ces.**

On *Opopanax chironium* (L.) W. Koch. Delphi, Mt Parnassos (DMH 9752 & 9753).

This is a new specific host for Greece. The first collection bears laminar uredinia and particular telia, the second uredinia only. The uredospores have three equatorial pores and are gradually thicker-walled towards the apex.

***Puccinia pimpinellae* (Str.) Rohl**

On *Pimpinella cretica* Poiret. III, island of Kithnos (1445).

Teleutospores on stems, black; teleutospores $30-37(-40) \times 22-24 \mu\text{m}$, wall $3-4 \mu\text{m}$ thick, dark brown, verrucose to reticulate; pedicels fragile or persistent, up to $38 \mu\text{m}$ long, mostly eccentric.

This rust has been reported once from the island of Salamis.

***Puccinia podospermi* DC.**

On *Scorzonera laciniata* L. Delphi, Mt Parnassos (DMH 9766).

This is a new generic host for the rust for Greece, but only spermatophytes and aecidia are present on the erect-standing, slightly deformed, host leaves and the specific identity of the rust is somewhat uncertain.

***Puccinia verruca* Thum.**

On *Centaurea acicularis* Sm. III, island of Samos (1232).

On *Centaurea psilocantha* Benth. & Hook. Delphi, Mt Parnassos (DMH 9742).

Both host species are new for *P. verruca*. On *C. psilocantha* the telia are up to 4 mm across and very conspicuous.

Puccinia sp.

On *Reichardia picroides* (L.) Roth. O, I, II, III, Chrisovitsi, Arkadhia (1404).

Spermogonia amphigenous in clusters, visible with naked eye, often together with aecidia, pale yellow to honey coloured; aecidia amphigenous, in clusters on pale spots, rounded, pale orange, peridia moderately developed; aeciospores pale yellow, pear-shaped or rounded, finely echinulate, $15-24 \times 15-18 \mu\text{m}$, uredosori and teleutosori on stems; uredospores few together with teleutospores, wall thin, yellow to dark yellow, densely echinulate, $20-24 \times 16-18 \mu\text{m}$, pores 2 or 3, equatorial; teleutosori in extensive crusts on stems, long covered by the grayish epidermis, then erumpent, pulverulent, brown-black; teleutospores irregular in shape, wall uniformly thick $3-3.5 \mu\text{m}$.

We have been unable to settle the identity of this collection satisfactorily but think it worth publishing a description. The rusted host material is of basal rosettes only so the identity cannot be absolutely certain. The rust is certainly close to the *P. crepidis* group. Our rust has been recorded in the USSR on *Reichardia dichotoma* as *P. picridi* Woron. but only uredinia and telia were described and the spores are larger than in our collection.

Uredo ebeni Pantidou & Henderson, *spec. nov.*

Uredosori abundi amphigeni, brunneoli, rotundati, usque ad 1 mm diametri; uredosporae magnitudine formaeque variabiles subglobose ellipsoideae hyalinae pallide flavae $27-30(-35) \times 18-24 \mu\text{m}$; membrana $2-3 \mu\text{m}$ crassa, echinulata, poris 3(-5) equatorialibus vel dispersis.

On *Ebenus cretica* L. Kriti. Ayia Irini, near Iraklion, 18 vi 1970 (1371—holo. ATHU-M)

No rust has previously been reported on *Ebenus* which is represented by two species in Greece one of which, *E. cretica*, is native to Crete.

Uromyces anthyllidis Schroet. (*Uromyces guerkeanus* P. Henn.)

On *Lotus cytisoides* L. II, III, island of Nisiros (1448).

On *Medicago littoralis* Rohde. II, III, island of Nisiros (1449).

Both are new specific hosts for Greece.

Uromyces doricus Maire

On *Silene ungeri* Fenzl. II, III, Mt Olitsikas, Ipiros (1059).

Uredosori and teleutosori amphigenous, the first orange, the second brown-black, erumpent, pulverulent; uredospores $24-27 \times 22-24 \mu\text{m}$, wall $1.5-2 \mu\text{m}$ thick, finely echinulate, pores 3 or 4 with pore-plugs ?mostly equatorial or two equatorial, the third superequatorial; teleutospores $24-30 \times 24-26 \mu\text{m}$, wall $3-4.5 \mu\text{m}$ thick, dark brown, finely and densely verrucose with a broad pale papilla at the apex making the wall up to $6 \mu\text{m}$, germ pore apical; pedicels hyaline, fragile.

Silene ungeri has not been reported before with rust. This collection seems close to *U. doricus* which was described originally from Greece by R. Maire on *S. paradoxa* L. and was also found on *S. fabarioides* Hausskn. in this country (Pantidou & Henderson 1969).

Uromyces muscari (Duby) Lév.

On *Strangweia spicata* Sibth. & Sm. III, Mt Ainos, Kefallinia (1030).

Teleutosori amphigenous, 0.5 mm, in oblong clusters arranged concentrically, erumpent, pulverulent, often confluent in cinnamon to brown masses; teleutospores $18-30 \times 14-20 \mu\text{m}$, subglobose, ellipsoid or angular, wall uniformly thick $1.5-2.5 \mu\text{m}$; pedicels hyaline, deciduous or persistent and up to $33 \mu\text{m}$ long.

The genus appears to be new for the rust. *Bellevia* is often cited as a synonym to *Strangweia* but no rust has been reported on *B. spicata*.

On *Muscari parviflorum* Desf. Psihiko, Athens (1508). This seems to be the first record on this host species which is rare.

On *Muscari neglectum* Guss. subsp. *pulchellum*. Mt Parnassos (DMH 9733). A new specific host for Greece.

On *Scilla bifolia* L., Mt Parnassos (DMH 9763). The host is new for Greece.

Uromyces ornithogali Lév.

On *Gagea lutea* (L.) Ker. III, Trikkala, Korinthia (1450).

Teleutosori abundant covering the leaf surface, up to 3 mm, often confluent, erumpent, pulverulent, dark brown; teleutospores $30-36(-39) \times 18-26 \mu\text{m}$; wall $2-3 \mu\text{m}$ thick, brown, verrucose, the verrucae in lines, apical papilla pale, $2 \mu\text{m}$; pedicels hyaline, fragile.

This is a new rust for Greece.

Uromyces proeminens (DC.) Lév.

On *Euphorbia chamaesyce* L. I, II, III, Rion, Patrai (1451).

Aecidia systemic, covering the lower leaf surface, orange; peridia white; aeciospores pale yellow, ellipsoid or angular $15-18 \times 12-14 \mu\text{m}$, wall $1.5 \mu\text{m}$ thick; aecial cells hyaline, outer wall thin, inner wall echinulate; uredosori few, cinnamon, mainly hypophyllous; uredosores mostly globose $18-20 \times 18 \mu\text{m}$, wall $2-3 \mu\text{m}$ thick, echinulate, pores 5 scattered; teleutosori abundant, amphigenous, 1 mm diam., dark brown, erumpent, pulverulent; teleutospores $18-20 \times 15-16 \mu\text{m}$, wall $2-2.5 \mu\text{m}$ thick, finely verrucose, the verrucae more or less in lines, papilla small, pale; pedicels hyaline, fragile.

In our collection the teleutospores are much smaller than those reported by Gümman for this species ($18-20 \times 18 \mu\text{m}$ v. $18-28 \times 13-20 \mu\text{m}$).

This rust has been reported by Maire & Politis (1940) on the same host from Thessalia with only aecidia and from Attiki with only teleutosori.

Uromyces punctatus Schroet.

On *Astragalus hellenicus* Boiss. II, III, Mt Parnis, Attiki (1447).

Uredosori few; uredosores larger than the teleutospores, $22-27 \times 15-20 \mu\text{m}$, wall $2-2.5 \mu\text{m}$ thick, yellow, minutely verrucose, pores 3-5; teleutosori amphigenous, dark brown, erumpent, pulverulent, often confluent, covering the leaf surface; teleutospores $15-20 \times 15-18 \mu\text{m}$, dark brown, wall $1.5-2 \mu\text{m}$ thick, verrucose, the verrucae more or less in lines; pedicels hyaline, fragile.

The host belongs to the subgen. *Astragalus*, *A. nummularius* group. *U. punctatus* is part of the *U. pisi* complex but this collection, although with the few uredo pores of that complex, bears some resemblance to the *U. anthyllidis* complex in lacking an apical teleutospore papilla.

***Uromyces trifolii* (DC.) Lév.**

On *Trifolium ochroleucum* Hudson. II, III, Parga, Ipiros (1496).

This is a new specific host for Greece.

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