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Puccinia eriocyclae sp. nov. on *Eriocycla stewartii* from Northern Pakistan

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***Puccinia eriocyclae* is described and illustrated from Northern Pakistan, Naltar Valley.**

Key Words——*Eriocycla stewartii*; Northern Pakistan; *Puccinia eriocyclae*; rust fungus.

Eriocycla stewartii (Dunn.) Wolff. was found infected with a rust fungus, during the survey of rust fungi of Northern Pakistan, Naltar Valley (Fig. C), by the authors in October 1991. The host plant is an annual herb of Umbelliferae (Apiaceae) and common at an altitude of 900–1800 m in Swat, Murree Hills, Kashmir and Salt Range (Nasir and Ali, 1972).

No rust fungus has been reported on *E. stewartii* (Ahmad, 1956, 1969). The present rust species, *Puccinia eriocyclae*, is different from other rusts known on other members of the family Umbelliferae.

Puccinia eriocyclae Khalid & Iqbal, sp. nov. Figs. A-D

Spermogonia aeciaque ignota. Uredinia hypophylla, dispersa, rotunda, luteobrunnea, 0.2–0.6 mm diam, pulverulenta. Urediniosporae aureoluteae, obovoideae vel ellipsoideae, 15–30 × 21–28 μm, parietibus pallide luteis usque ad 1 μm crassis aequaliter echinulatis; pori tres, fere equatoriales. Telia hypophylla, atrobrunnea, dispersa, pulverulenta, usque ad 0.5 mm diam. Teliosporae ellipsoideae vel late ellipsoideae, atrobrunneae, 31–38 × 21–26 μm, parietibus usque ad 1.0 μm crassis costatis; costae curvatae, ramificatae, anastomosantes vel tuberculatae; sporae nonnullae cum cellulis proximis costis anastomosantibus praeditis, sed cellulis distalibus cum costis tuberculatis. Porus superior apicalis, porus inferior prope septum. Pedicellus persistens, transparens, usque ad 20 μm longus.

Holotypus: II, III on *Eriocycla stewartii* (Dunn.) Wolff., Northern Pakistan, Gilgit Agency, Naltar Valley, October 8, 1991, A. N. Khalid AM-91-13, Depositus in SHI Mycological Herbarium, Punjab University, A. N. Khalid. Isotypus: NPP Herbarium.

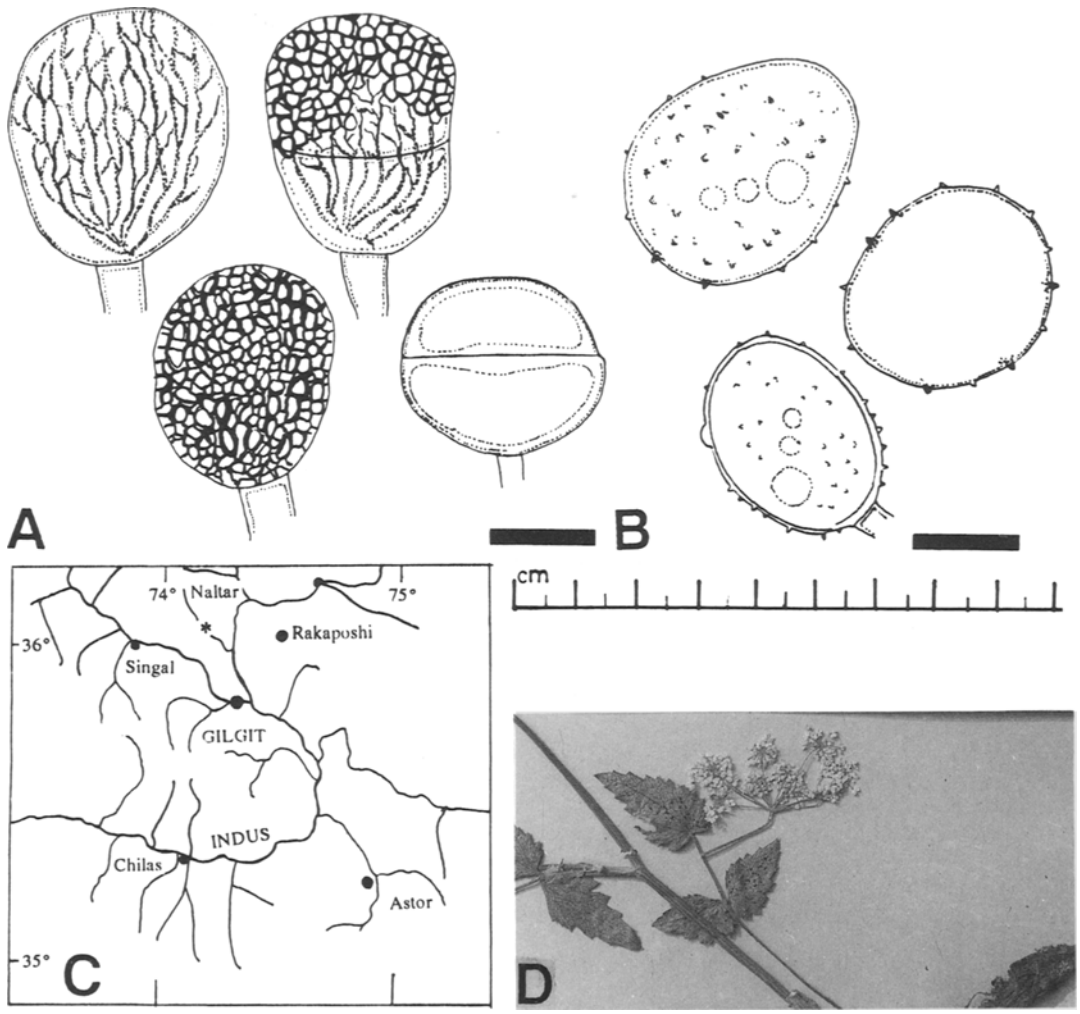
Spermogonia and aecia unknown. Uredinia hypophyllous, scattered, rounded, yellowish brown, 0.2–0.6 mm across, pulverulent. Urediniospores golden yellow, obovoid-ellipsoid, 15–30 × 21–28 μm, walls evenly echinulate, pale yellow, up to 1 μm thick, germ pores 3, approximately equatorial. Telia hypophyllous, blackish-brown, scattered, powdery, up to 0.5 mm in diam, teliospores ellipsoid to broadly ellipsoid, dark brown, 31–38 × 21–26 μm, wall with ridges or folds, up to 1.0 μm thick; ridges curved and with anastomosing branching or tuberculate; some spores with ridges anastomosing in lower cells and tuberculate in upper cells; germ pores of upper cells apical and of lower cells near the septum. Pedicels persistent, transparent, up to 20 μm long.

Many species of *Puccinia* on members of the family Umbelliferae are known to have ridges or folds on the wall of teliospores but *P. eriocyclae* is different from all the known species with alveolate-tuberculate teleutospore walls that occur on the Umbelliferae. Most teliospores had walls with tuberculae and wavy ridges or folds which occasionally anastomose. The teliospore wall (Fig. A) had a mixture of characters: in lower cells wavy ridges on the wall anastomose, and the upper cells are tuberculate.

Based on the published description, the ridges of *P. rugulosa* Tranz. are almost parallel and anastomose (Wilson and Henderson, 1966), whereas ridges or folds in walls of teliospores of *P. eriocyclae* are wavy, thick and anastomose profusely. Furthermore, teliospores of *P. eriocyclae* are about 10 μm shorter than those of *P. rugulosa*. In a few cases in which teliospores are tuberculate, *P. eriocyclae* appears similar to *P. smyrnii* Biv.-Bern., but in *P. eriocyclae* the tuberculate pattern of wall ornamentation is finer and more closely built than in *P. smyrnii*. Teliospores of *P. smyrnii* are 10 μm longer than our species.

The other two species of *Puccinia*, viz., *P. microsphincta* Lindr. and *P. plicata* Kom., are described to form "undulato-tuberculatis" teliospores on Umbellifereae. Only the teliospores are described for both species (Saccardo, 1902, 1905), whereas in this new rust fungus, urediniospores are also known. Teliospores of *P. microsphincta* are about 15 μm longer than *P. eriocyclae*. In addition the teliospore wall is thicker in both cases (Saccardo, 1902, 1905) than in our rust fungus.

The very unique feature which clearly delimits *P. eriocyclae* from previously known species of *Puccinia* on Umbelliferae is the occurrence of ridges or folds and tuberculae on the wall together in the same teliospores



Figs. A–D. *Puccinia eriocyclae* and map showing type locality.
A: Teliospores showing ridges or folds and tuberculate wall, B: Urediniospores, C: Map showing type locality, (*) Naltar, D: Telia and uredinia on the lower leaf surface of *Eriocycla stewartii* (scale bar: A, B = 10 μm).

(ridges in lower cells and tuberculae in upper cells).

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