

## SOME INTERESTING NEPALESE RUST FUNGI

Halvor B. Gjørnum<sup>1</sup> and Erik Steineger<sup>2</sup>

Norway

Judging from the literature, the fungal flora of Nepal is poorly known. In his paper dealing with Himalayan fungi, Balfour-Browne (1955) published records of Nepalese fungi, among them also new species, belonging to different orders. Later Khadka & Shah (1967, 1968) and Khadka, Shah and Lawad (1968) recorded plant diseases in Nepal, mainly on cultivated plants, while Singh (1968) reported on parasitic fungi from the Kathmandu Valley. Recently Durrieu (1975) described two new rust species of the genus *Hemaspora*, and he (Durrieu 1975 a) also gave an account on the biogeography of the Nepalese fungal flora.

Information given here is on material collected by one of us (ES) during a visit to the Rolwaling Valley in East Nepal in 1973. The specimens are preserved at the Botanical Museum of Oslo.

*Aecidium montanum* Butl. Indian Forester 31: 676, 1905. On *Berberis* sp.  
Rolwaling, between Beding and Nangaon, 3800 m, 26 IX 1973 (E. S. 177/1), 0+I.

This rust species occurs in two different forms, one with pycnia and aecia in localized infections, and one with pycnia and aecia developing from a systemic mycelium. Joshi and Payak (1963, see also Cummins 1971) showed from infection experiments that the localized type belonged to *Puccinia brachypodii* Otth var. *poae-nemoralis* (Otth) Cumm. and H. C. Greene. Jörstad (1959) indicated that the systemic type belonged to the var. *arrhenatheri* (Kleb.) Cumm. and H. C. Greene. Both types are common in the Himalayas where they occur on several *Berberis* spp. Balfour-Browne (1955) reported it on *B. chitra* Lindl. from Dozam near Simikot in Nepal. In the material considered here, pycnia and aecia occur in small, localized groups and thus belong to the var. *poae-nemoralis*.

---

1 The Norwegian Plant Protection Institute, N 1432 Aas-NLH, Norway.  
2 Botanical Laboratory, University of Oslo, Blindern, Norway.

ULIN  
DS  
485  
HG  
K13  
+  
V.6  
1978

38 / *Kailash*

*Gymnosporangium cornutum* Kern. Bull. N. Y. Bot. Gard. 7:444, 1911.

On *Sorbus ursina* Decasine.

Rolwaling, near Beding, 3800 m, 20 IX 1973 (E. S. 97/1) 0+I.

The rust is widespread in North America and Europe, and also in Siberia, China, Japan and Korea. Sharif and Ershad (1966) reported the rust from Iran, but from other areas south of the Himalayas we have seen no record on this rust. Kern (1973) also mentioned Africa in the distribution area without giving a more exact locality. The rust species is new to Nepal, and the host seems to be new for this rust.

Compared with aeciospores from the same species on *S. aucuparia* L. from Norway, the aeciospores in the Nepalese specimen are more delicately verrucose.

*Phragmidium tuberculatum* J. Mull. Ber. D. Bot. Ges. 3:391, 1885.

On *Rosa sericea* Lindley.

Rolwaling, between Beding and Nangaon, 3850 m, 20 IX 1973 (E. S. 89/1), III.

This rust, which is common in Europe and Siberia, has been reported from Pakistan by Jörstad (1952) and S. Ahmad (1956 a). It is also known from Kamtchatka and China, and from the Americas, Africa and New Zealand, but has not been reported earlier from Nepal. The host is new for this rust species.

*Puccinia brachypodii* Otth var. *arrhernatheri* (Kleb.) Cumm. and H. C. Greene. Mycologia 58: 709, 1966.

On *Deyeuxia pulchella* (Griseb.) Hook. f. (syn. *Calamagrostis pulchella* Griseb.)

Rolwaling, Jomoi Gul Chhu, 3850 m, 5 x 1973 (E. S. 238/1), II + III.

Uredinia oval to oblong, light brown to brown. Paraphyses abundant, clavate, straight or curved. 12-18  $\mu$ m in diameter (Fig. 1a). Wall hyaline, 3-4  $\mu$ m thick, sometimes tapering at the base. Urediniospores ovoid to subglobose, 22-25 (-35) 14-23  $\mu$ m. Wall hyaline, c. 1  $\mu$ m thick, echinulate. Telia covered by epidermis, dark brown to black, loculate. Teliospores (Fig. 1b) clavate, rounded or truncate, rarely attenuated at apex, the lower cell longer than the upper, mostly 2-celled, but 3-celled teliospores occur, 36-59 13-19  $\mu$ m. Wall smooth, light brown, darker at the apex, c. 1  $\mu$ m thick, at apex thickened to 4(-6)  $\mu$ m. Pedicels short, brownish.

The present host represents a new host genus for this widespread rust.

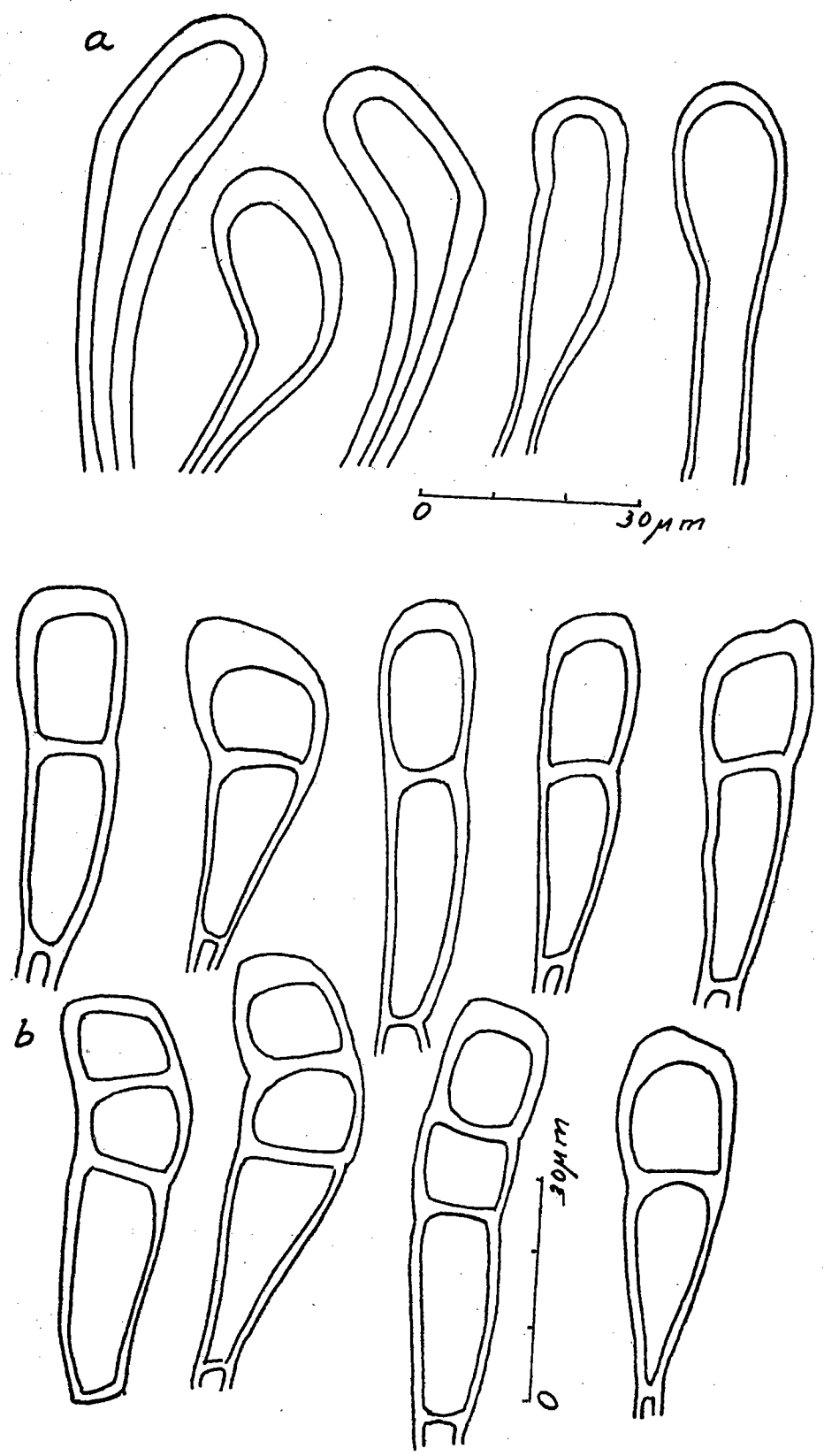


Fig. 1. *Puccinia brachypodii* var. *arrhenateri*; a uredinial paraphyses, b. teliospores.

JLIM  
DS  
485  
HG  
<13  
+  
1.6  
'978

*Puccinia brachypodii* Otth var. *poae-nemorialis* (Otth) Cumm. and H. C. Greene. *Mycologia* 58: 705, 1966.

On *Agrostis munroana* Aitch. & Hemsl.

Rolwaling, Beding, 3700 m, 25 IX 1973 (E. S. 165/1), II.

Uredinial paraphyses (Fig. 2) clavate or capitate, often bent and with a pronounced neck, wall hyaline, 2-4  $\mu$ m thick.

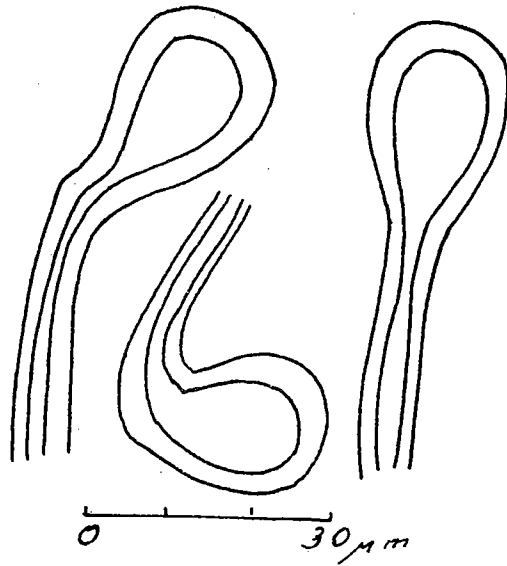


Fig. 2. *Puccinia brachypodii* var. *poae-nemorialis*, uredinial paraphyses.

S. Ahmad (1956) reported this rust on the same host from Kagan Valley in Pakistan.

*Puccinia fagopyricola* Jorst. *Nytt Mag. Bot.* 6: 137, 1958. Syn. *P. fagopyri* Barcl. (non *P. fagopyri* Haszl. = *P. convolvuli* Cast.) *J. Asiatic Soc. Bengal* 59: 107, 1890.

On *Fagopyrum* cf. *tataricum* (L.) Gaerth.

Rolwaling, Simigaon, 2000 m, 26 X 1973 (E. S. 349/1), II.

The buckwheat rust fungus of which *F. esculentum* Moench is the host for the type, has been reported several times from India, China and Korea. On *F. tataricum* it has been reported from Mussoori in India by Sydow, Mitter and Tandon (1937). The rust is new to Nepal.

*Puccinia menthae* Pers. *Syn. Meth. Fung.* p. 227, 1801.

On *Mentha*  $\times$  *piperita* L.

Kathmandu, 8 IX 1973 (E. S. 10), II.

This mint rust which has a world wide distribution is not only found on *Mentha* spp., but also on several species of other genera of the Lamiaceae.

Pandotra and Sastry (1969) have reported *M. × piperita* from Kashmir in the N.W. Himayalas. *P. menthae* is new to the Nepalese flora.

Cruchet (1906) who made cross infection experiments with this rust, found 8 biological forms. *M. × piperita* was infected only by the form occurring on *M. aquatica* L.

*Puccinia roscoae* Smith. J. Asiatic. Soc. Bengal 58: 237, 1889.

On *Roscoea purpurea* Smith.

Rolwaling, near Dharidunga, 2550 m, 12 IX 1973 (E. S. 30/1), II+III.

This rust has been reported several times from India on *Roscoea* spp., among them also on *R. purpurea* (Sydow, Mitter and Tandon 1937). Sydow and Mitter (1933) also recorded *Globba clarkei* Bak. as a host. From Yunnan in China Tai (1947) reported *R. intermedia* Gagnep. and *Camptandra yunnanensis* Loes. as hosts. The rust is new to the flora of Nepal.

*Uredo alpestris* Schroet. 53. Jahresber. Schles. Ges. f. vaterl. Kultur p. 117, 1875.

On *viola pilosa* Blume.

Rolwaling, in a meadow near Simigaon, 2700 m, 30 x 1973 (E. S. 372 /1).

In the Central European mountains this interesting rust species is common only on its type host *V. biflora* L.; on this host it also has been reported from the Japanese Rebun Island (Sydow, H. and P. 1913). It has also been reported from Japan on several other *Viola* spp. (e. g. Ito 1950), while in India *V. serpens* Wall. is the only known host (Sydow, Mitter and Tandon. 1937). *V. pilosa* is a new host for this rust species which is new to the Nepalese rust flora.

Dietel (1916) first pointed out that this rust species has two different types of urediniospores, a thin-walled spring and summer type, and a thicker-walled autumn type. In the present material only the latter type occurs (Fig. 3).

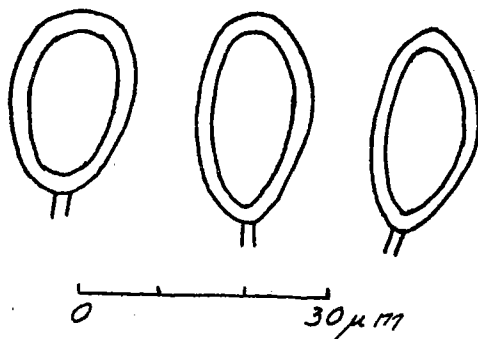


Fig. 3. *Uredo alpestris*.

This dimorphism in the urediniospores indicates relationships to the fern rust genera *Uyalopsora* and *Uredinopsis*.

*Uromyces geranii* (DC.) Lév. Ann. Sci. Nat. Bot. ser. 3, 8:371, 1847.  
 On *Geranium* sp.  
 Rolwaling, Shakpa, NE of Simigaon, 2700 m, 30x 1973 (E. S. 373/1),  
 (II+) III.

This rust, which is new to the rust flora of Nepal, is widespread in the northern hemisphere.

Urediniospores were scarce so late in the season.

REFERENCES

- Ahmad, S. 1956. Uredinales of West Pakistan. *Biologia* 2:26-101.  
 — — 1956 a. Fungi of West Pakistan. Biol. Soc. Pakistan, Monograph No. 1, Lahore.
- Balfour-Brown, E.L. 1955, Some Himalayan Fungi. *Bull. British Mus. (Nat. Hist.) Bot.* 1:189-218.
- Butler, E. J. and G. R. Bisby, rev. Vasudeva, R. S. 1960. The fungi of India. New Delhi.
- Cruchet, M. P. 1907. Contribution à l'étude biologique et quelques Puccinias sur Labiées. *Centralbl. Bakt., Parasitenk. u. Inf. Krankh.* 2. Abt. 17:212-224, 395-411, 497-505, 674-684.
- Cummins, G. B. 1971. The rust fungi of cereals, grasses and bamboos. Berlin-Heidelberg-New York.
- Dietel, P. 1916. Über die systematische Stellung *Uredo alpestris* Schröt. *Annal. mycol.* 14: 98-99.
- Durrieu, G. 1975. Deux nouveaux *Hamasporea* (Uredinales) de l'Himalaya. *Mycotaxon* 2: 205-208.  
 — — 1975 a. Les champignons phytopathogènes de Népal. Aspects biogéographiques. *Bull. Soc. Hist. Nat. Toulouse* 111: 112-117.
- Ito, S. *Mycological flora of Japan. II Basidiomycetes, No. 3. Uredinales-Pucciniaceae, Uredinales imperfecti.* Tokyo.
- Joshi, L. M. and Payak, M. M. 1963. A *Berberis aecidium* in Lahaul Vally, Western Himalayes. *Mycologia* 55: 247-250.
- Jörstad, I. 1952. Parasitic fungi, chiefly uredineae, from Tirich Mir in the state of Chitral, N. Pakistan. *Nytt Mag. Bot.* 1:71-87.  
 — — 1959. Notes on some Asiatic Uredinales. *Nytt Mag. Bot.* 7:129-144.
- Kern, F. D. 1973. A revised taxonomic account of *Gymnosporangium*. Pennsylvania State University Press.
- Khadka, B. B. and Shah, S. M. 1967. Preliminary list of Plant diseases recorded in Nepal. *Nepalese J. Agric.* 2:47-76.  
 — — 1968. Preliminary list of plant diseases recorded in Nepal. *FAO Plant Prot. Comm. S. E. Asia and Pacific Reg. Tech.*

OLIM  
 DS  
 485  
 HG  
 K13  
 +  
 V.6  
 1978

- Doc. No. 62. Bangkok.
- Khadka, B. B., Shah, S. M. and Lawat, K. 1968. Plant diseases list in Nepal (a supplementary list.) Ibid. Tech. Doc. No 66. Bangkok.
- Pandotra, V. R. and Sastry, K. S. M. 1969. Fungi on medicinal and aromatic plants in the North-West Himalayas-V. Proc. Indian Acad. Sci., Sect. B, 70; 88-97.
- Singh, S. C. 1968. Some parasitic fungi collected from the Kathmandu Valley (Nepal). Indian Phytopath. 21:23-30.
- Sydow, H., Mitter, J. H. and Tandon, R. N. 1937. Fungi indici-III. Annal. mycol. 35:222-243.
- Sydow, H. and P. Ein Beitrag zur Kenntnis der partasitischen Pilzflora des nördlichen Japans. Annal. Mycol. 11:97-118.
- Tai, F. L. 1947. Uredinales of Western China. Farlowia 3:95-139.