

Note

Materials for the rust flora of Japan VI*

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Ten rust species are reported with new information on range of distribution and host relations. Among these, *Puccinia fagopyricola* and *Uromyces junci* were new to Japan, and *Aecidium araliae* was newly found in northern Honshu. Additional collections were made of *Blastospora smilacis*, *Puccinia malvacearum* and *P. orbicula* in northern Honshu. New hosts were added to *Coleosporium solidaginis*, *C. tussilaginis*, *Phragmidium miyakeanum* and *Puccinia caricis*, and a new Japanese host to *Puccinia malvacearum*.

Key Words—distribution; fungal flora; new hosts; rust fungi.

51. *Coleosporium solidaginis* Thüm. ex Arthur, North Am. Fl. 7(2): 90–92, 1907; Harada, Trans. Mycol. Soc. Japan 25: 288, 1984.

Figs. 2, 3

Uredinia hypophyllous, rounded, 0.2–0.5 mm in diam, powdery and orange in color (fresh); urediniospores obovoid, broadly ellipsoid, or rectangular to rhomboid, 30–38 × 20–25 μm, wall 2.5–5 μm thick, verrucose.

Specimens examined: II on *Solidaster luteus* Greene ex Dress. Fukuoka-shi, Fukuoka Pref., Kyushu, 8 xii 1989, by F. Oziro (no. 19733); II on *S. luteus*. Hirosaki-shi, Aomori Pref., Honshu, 24 & 31 viii 1990, by Y. Harada (nos. 19986, 20002).

Note: *Solidaster luteus*, an ornamental plant raised from intergeneric hybrid between *Aster* and *Solidago*, is a new host for the fungus. The above identification is based on inoculations in 1990 by the author, as well as the morphological features; urediniospores of *Coleosporium solidaginis* from *Solidago gigantea* Ait. var. *leiophylla* Fern. were sown on *Solidaster luteus*, giving rise to new urediniospores on the latter in about 10 days.

52. *Coleosporium tussilaginis* (Pers.) Lév. in Orbigny, Dict. Univ. Hist. Nat. 12: 786, 1849; Kaneko, Rept. Totori Mycol. Inst. (Japan) 19: 62, 1981.

Fig. 1

Telia hypophyllous, compact, covered by the epidermis, typically rounded 0.5–1 mm in diam, but often coalesce to form an irregular shape, reddish brown (fresh); teliospores cylindrical, tapering below, 4-celled, 60–80 × 20–25 μm including an apical wall (20–25 μm thick). A few hypophyllous uredinia seen; urediniospores globose, ca. 25 μm in diam including verrucae.

Specimens examined: II, III on *Senecio pseudo-arnica*

Less. (Ezo-oguruma). Toinai, Esashi-cho, Esashi-gun, Hokkaido, 29 ix 1991, by Y. Harada (nos. 21134–21136).

Note: *Senecio pseudo-arnica* is a new host for the fungus. The above identification is based primarily on morphological features, and therefore inoculation experiments are needed to demonstrate its pathogenicity and host range.

53. *Blastospora smilacis* Dietel, Ann. Myc. 6: 223, 1908; Ito, Mycol. Fl. Japan 2(3): 5, 1950; Hiratsuka et al., The Rust Fl. Japan p. 266, 1992.

Syn. *Caeoma makinoi* Kusano, Bot. Mag. Tokyo 17: 15, 1903; Ito, Mycol. Fl. Japan 2(3): 359, 1950.

Specimens examined: O, I on *Prunus mume* Sieb. & Zucc. (Ume). Nango-mura, Sannohe-gun, Aomori Pref., Honshu, 15 vi 1990, by Y. Fukushi & Y. Harada (nos. 19823, 19824, 19826, 19827). II, III on *Smilax sieboldii* Miq. (Yama-kashu). Nango-mura, Sannohe-gun, Aomori Pref., Honshu, 17 ix 1990, by Y. Fukushi & Y. Harada (no. 19827).

Note: The rust in its *Caeoma* state typically produces a chloranthony on *Prunus mume* in June, then goes over to an alternate host, *Smilax sieboldii*. The genetic connection between *Caeoma makinoi* and *Blastospora smilacis* was experimentally proved by Ono et al. (1986). In Aomori Prefecture, the occurrence of the rust on *P. mume* was first found in June 1989 in an orchard at Nango-mura. Field observations there for many years strongly suggest that the rust fungus was newly brought into the orchard around 1987 along with infected *Prunus mume* trees from central Japan (Saitama Pref.). (Y. Fukushi: personal communication)

54. *Phragmidium miyakeanum* Hiratsuka, f., Trans. Totori Soc. Agr. Sci. 2: 242, 1931; Ito, Mycol. Fl. Japan 2(3): 39, 1950; Hiratsuka et al., The Rust Fl. Japan

* V: Trans. Mycol. Soc. Japan 29: 471–478, 1988.

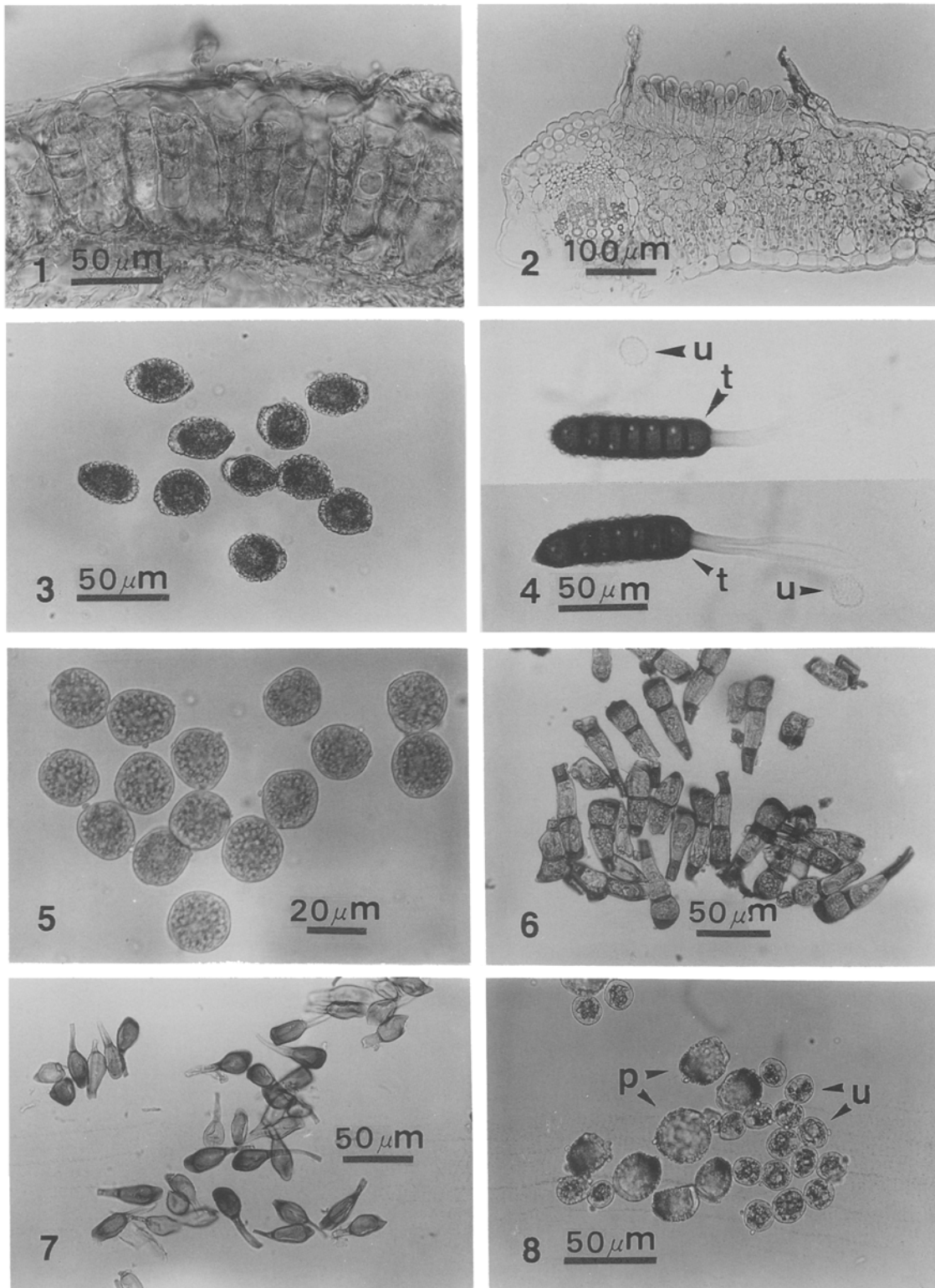


Fig. 1. *Coleosporium tussilaginis*: section through a telium (no. 21134).

Figs. 2, 3. *Coleosporium solidaginis*: 2, section through a uredinium; 3, urediniospores (no. 20002).

Fig. 4. *Phragmidium miyakeanum*: urediniospores (u) and teliospores (t) (no. 13068).

Figs. 5, 6. *Puccinia caricis*: 5, aeciospores (no. 22809); 6, teliospores (no. 22813).

Fig. 7. *Uromyces junci*: teliospores (no. 20341).

Fig. 8. *Aecidium araliae*: peridial cells (p) and urediniospores (u) (no. 20566).

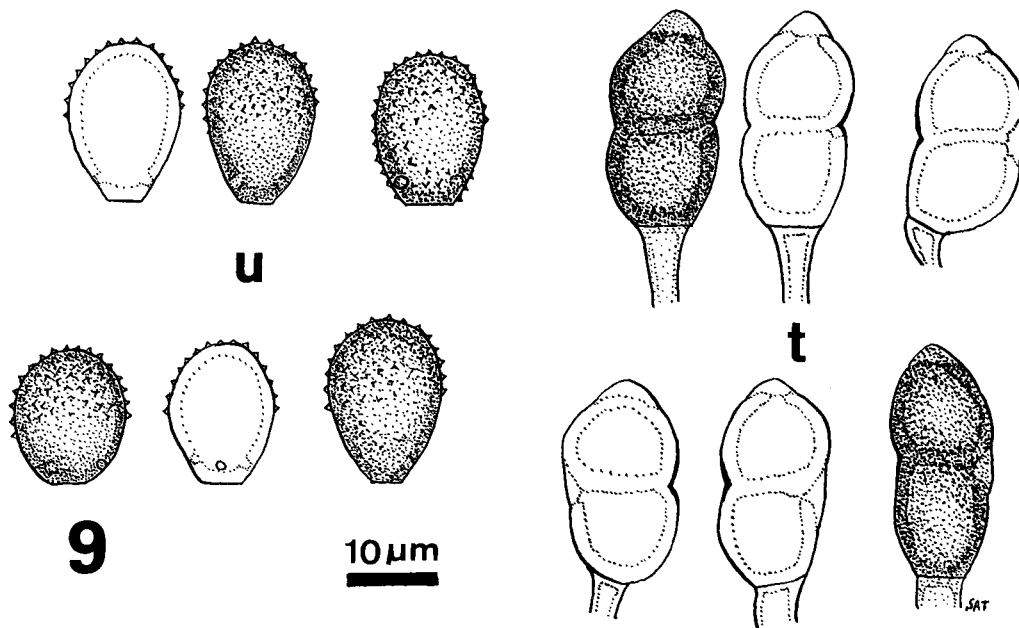


Fig. 9. *Puccinia fagopyricola*: urediniospores (u) and teliospores (t) (no. 19662).

p. 417, 1992.

Fig. 4

Telia hypophyllous, rounded, black, 0.2–0.6 mm in diam, teliospores cylindric, $60\text{--}100 \times 25\text{--}29 \mu\text{m}$ excluding the apical papilla (3–8 μm long), 5–7-septate, wall verrucose; pedicels 45–100 μm long and 13–15 μm wide at the maximum width; paraphyses clavate 60–110 \times 10–20 μm ; a few urediniospores seen in the telia, globose or obovoid, hyaline (dried), 16–23 \times 15–18 μm , wall echinulate.

Specimens examined: II, III on *Rubus idaeus* L. var. *aculeatissimus* C. A. Meyer (Ezo-ichigo). Uryu Exp. Forests, Hokkaido Univ., Horokanai-cho, Uryu-gun, Hokkaido, 10 ix 1982, by Y. Harada (no. 13068); II, III on *Rubus idaeus* var. *aculeatissimus*. Tomakomai Exp. Forests, Hokkaido Univ., Takaoka, Tomakomai-shi, Hokkaido, 26 ix 1987, by Y. Harada (no. 17757).

Note: *Rubus idaeus* var. *aculeatissimus* is a new host for the fungus. *Phragmidium rubi-idaei* (DC.) Karst., another rust fungus occurring on the same host, differs from *P. miyakeanum* in that its teliospores are mostly 7-septate, having much longer apical papilla (up to 15 μm long) and much longer pedicel (up to 165 μm long) (Hirat-suka et al., 1992; Ito, 1950).

55. *Puccinia caricis* Rebent., Fl. Neomarch. p. 356, 1804; Ito, Mycol. Fl. Japan 2(3): 183–184, 1950; Hirat-suka et al., The Rust Fl. Japan p. 619–620, 1992.

Figs. 5, 6

Aecia cupulate, hypophyllous; aeciospores globose or subglobose, contents yellow (fresh), 20–24 \times 19–21 μm , wall thin, with small granules (2–3 μm in diam).

Uredinia hypophyllous, elliptical, soon naked, brown and powdery; urediniospores obovoid, broadly ellipsoid or subglobose, contents yellowish brown, 25–30 \times 20–24 μm , wall ca. 1 μm thick, echinulate, with (2–)3

equatorial pores.

Telia hypophyllous, elliptical or rounded, 200–300 μm in diam, soon naked, blackish brown and compact, surrounded with the torn epidermis; teliospores broadly clavate, rounded or truncate at the apex, tapering below, 45–60 \times 15–20 μm , wall at the apex ca. 5 μm thick.

Specimens examined: O, I on *Urtica platyphylla* Wedd. (= *U. takedana* Ohwi) (Ezo-irakusa). Shinzanzawa, Owasawa, Hirosaki-shi, Aomori Pref., Honshu, 17 v 1977, by Y. Harada (nos. 22809, 22810); II on *Carex fedia* Nees var. *miyabei* (Franch.) T. Koyama (Birodosuge). Cultured by aeciospore inoculations, 4 & 17 vi 1977, by Y. Harada (nos. 22811, 22812); III on *C. fedia* var. *miyabei*, Cultured by aeciospore inoculations, 20 viii 1977, by Y. Harada (no. 22813).

Note: *Carex fedia* var. *miyabei* is a new host for the fungus. The genetic connection between aecia on *Urtica platyphylla* and uredinia and telia on *Carex fedia* var. *miyabei* was first supposed from field observations and then proved by inoculations in 1977 by the author.

56. *Puccinia fagopyricola* Jørgst. Nytt Mag. Bot. 6: 137, 1958.

Syn. *Puccinia fagopyri* Barcl., J. Asiatic Soc. Bengal 59: 107, 1890.

Fig. 9

Uredinia hypophyllous, rounded, early naked, reddish brown, powdery, 0.5–1.5 mm in diam, paraphysate; urediniospores globose or obovoid, light brown, 20–27.5 \times 14–21 μm , wall 1.5–2 μm thick, echinulate with 2(–3) pores near the base.

Telia hypophyllous, rounded, 0.3–0.8 mm in diam, blackish brown, powdery; teliospores broadly ellipsoid, constricted at septa, brown, 27.5–40 \times 15–20 μm , wall 2–2.5 μm at sides and 4 μm at the apex, pore of the upper

cell apical, of the lower cell near the septum; pedicels short and fragile.

Specimens examined: II, III on *Fagopyrum cymosum* Meissn. (Shukkon-soba). Experiment farm, Faculty of Agriculture, Kyoto Univ., Sakyo-ku, Kyoto-shi, Honshu, 6 xi 1989, by M. Tsuda & Y. Harada (nos. 19662, 19665, 19667, 19668); II, III on *Fagopyrum esculentum* Moench. (Soba). Cultured by urediniospore inoculations, 20 iii 1990, by S. Hoshino (nos. 19739-19743).

Note: The fungus was newly found in Japan. So far it has been recorded from India, China and Korea. Since a few years ago, it has been found on *Fagopyrum cymosum* in an experimental field at Kyoto University, with severe defoliation. The rust appears to have recently been introduced into Japan by means of infected plants of *Fagopyrum cymosum*, which are perennial with stout rhizomes.

57. *Puccinia malvacearum* Mont., Hist. Fis. Polit. Chili 8: 43, 1852; Harada, Trans. Mycol. Soc. Japan 25: 289-290, 1984; Hiratsuka et al., The Rust Fl. Japan p. 798, 1992.

Specimens examined: III on *Althaea rosea* Cav. (Tachi-aoi). Tomino-cho, Hirosaki-shi, Aomori Pref., Honshu, 8 vi 1990, by Y. Harada (nos. 19897-19899); Bunkyo-cho, Hirosaki-shi, 26 vii 1992, by Y. Harada (nos. 21473, 21474); Hamayokosawa, Ajigasawa-machi, Nishitsugaru-gun, Aomori Pref., Honshu, 8 vii 1990, by Y. Harada (nos. 19969, 19970). III on *Malva neglecta* Wallr. (= *M. rotundifolia* (non L.) sensu Makino) (Hai-aoi, Zeniba-aoi). Bunkyo-cho, Hirosaki-shi, 8 xii 1990, by Y. Harada (no. 20349). III on *Malva sylvestris* L. var. *mauritanica* Mill. (Zeni-aoi). Ninohe-shi, Iwate Pref., Honshu, 6 viii 1991, by Y. Harada (no. 21079); Omachi, Hirosaki-shi, 30 vi 1991, by Y. Harada (nos. 20666, 20668).

Note: Additional collections from northern Honshu, with *Malva neglecta* Wallr. as a new Japanese host for the fungus. The collections from Aomori Pref. will give the northern limit of the range of distribution of the rust fungus in Japan. In Aomori, the occurrence of the rust has been increasing very rapidly in the past several years.

58. *Puccinia orbicula* Peck & Clinton, in Peck, 30 Ann. Rep. N. Y. State Mus. p. 53, 1879; Ito, Mycol. Fl. Japan 2(3): 334, 1950; Hiratsuka et al., Rust Fl. Japan p. 892, 1992.

Specimen examined: II, III on *Prenanthes tanakae* Franch. & Savat. (O-nigana). Lake Tazawa, Tazawakomachi, Senpoku-gun, Akita Pref., Honshu, 7 x 1990, by Y. Harada (no. 19708).

Note: Newly found in Akita Pref. as an additional collection from northern Honshu. So far only a few collections have been made of the fungus from the area (Hiratsuka, 1980).

59. *Uromyces junci* (Desm.) Tul., Ann. Soc. Nat., Ser. 4, 2: 146, 1854; Sydow, Monogr. Ured. 2: 287-289, 1910; Guyot, Genre *Uromyces* 1: 234-250, 1930.

Fig. 7

Telia amphigenous or caulicolous, minutely elliptical, compact and blackish brown, surrounded with the torn epidermis, 0.3-0.6 × 0.1-0.3 mm; teliospores subglobose to broadly ellipsoid, brown or pale brown, 20-26 (-33) × 13-18 μm, wall thickened at the apex (5-8 μm); pedicels persistent, light brown to almost hyaline below, 20-38 μm long.

Specimens examined: III on *Juncus tenuis* Willd. (Kusa-i). Kawamukai, Biratori-cho, Saru-gun, Hokkaido, 15 x 1990, by Y. Harada (nos. 20333, 20341, 20344); Exp. Farm. Hokkaido Univ., Shizunai-cho, Shizunai-gun, Hokkaido, 26 ix 1991, by Y. Harada (no. 20979). II, III on *J. tenuis*, Nagadai, Azigasawa-machi, Nishitsugaru-gun, Aomori Pref., Honshu, 12 ix 1993, by T. Iwama & Y. Harada (no. 21897); Nijikai, Owani-machi, Minamitsugaru-gun, Aomori Pref., 11 x 1993, by Y. Harada (no. 22126); Ichinowatari, Hirosaki-shi, Aomori Pref., Honshu, 19 xi 1993, by Y. Harada et al. (no. 22214).

Note: The species was newly found in Japan. So far it has been known from Europe, Africa and North America (Guyot, 1938).

60. *Aecidium araliae* Sawada ex Ito & Murayama, Trans. Sapporo Nat. Hist. Soc. 17: 171, 1943; Ito, Mycol. Fl. Japan 2(3): 374, 1950; Kakishima, Yamaoka & Sato, Ann. Tshukuba Bot. Gard. 4: 50, 1986.

Spermogonia epiphyllous or rarely hypophyllous, globose but slightly depressed, 100 × 80 μm, ostiolar paraphyses acicular, 80-100 × 2.5 μm.

Aecia hypophyllous or rarely epiphyllous, cup-shaped, 450-600 μm in diam, 300-400 μm deep; aeciospores globose or subglobose, 15-20 μm in diam, contents yellow (fresh), wall uniformly thin, with granules 2-4 μm in diam; peridial cells rectangular, rhomboid or subglobose, 23-33 × 20-25 μm, wall prominently verrucose.

Fig. 8

Specimens examined: O, I on *Aralia elata* Seem. (Taranoki). Hitotsumori Park, Akita-shi, Akita Pref., Honshu, 11 vi 1991, by Y. Harada (nos. 20566, 20590).

Note: The fungus was newly found in northern Honshu. Other than Taiwan, its type locality, a few collections have been made of the fungus in Kyushu and Ryukyu, southern Japan, on *Agalma lutchuense* Nakai = *Schefflera octophylla* (Lour.) Harms (Fukanoki), *Aralia elata*, and *Textoria trifide* Nakai = *Dendropanax trifidus* (Thunb.) Makino (Kakuremino) (Hiratsuka, 1952; Hiratsuka et al., 1985).

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