

Aplopsora corni sp. nov. on *Cornus controversa* from Hokkaido, Japan

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Aplopsora corni sp. nov. is proposed for a rust fungus whose uredinial and basidial stage occurs on *Cornus controversa* (Cornaceae) in Hokkaido. This new species is separated by its larger urediniospores and probasidia from the morphologically closely related *A. nyssae* on *Nyssa aquatica* and *N. sylvatica* (Cornaceae) distributed in southern North America.

Key Words—*Aplopsora*; Chaconiaceae; Cornaceae; *Cornus*; Uredinales.

A rust fungus was found by the junior author on *Cornus controversa* Hemsley at Shizunai, Hokkaido in September 1991. Old uredinia and basidiosori were formed on adaxial surface of the leaves. The uredinia were minute, brownish, and scattered or in a small group on reddish brown lesions; and the basidiosori were minute, whitish, and loosely or densely aggregate on slightly discolored and diffused lesions.

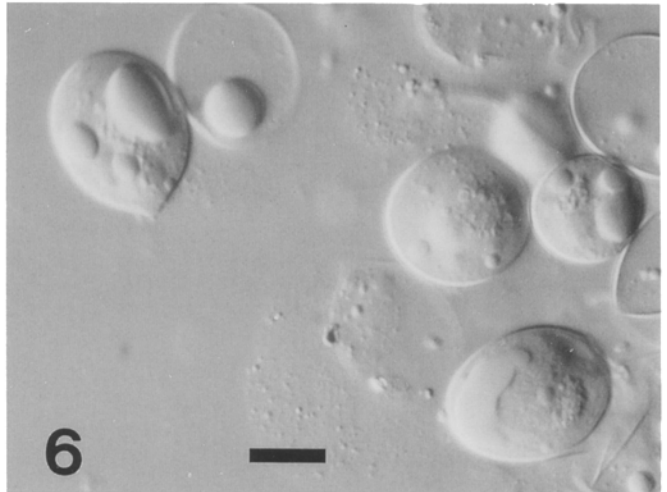
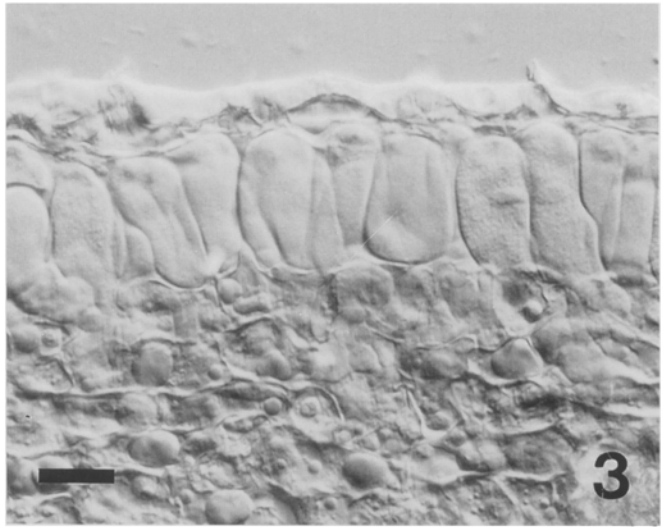
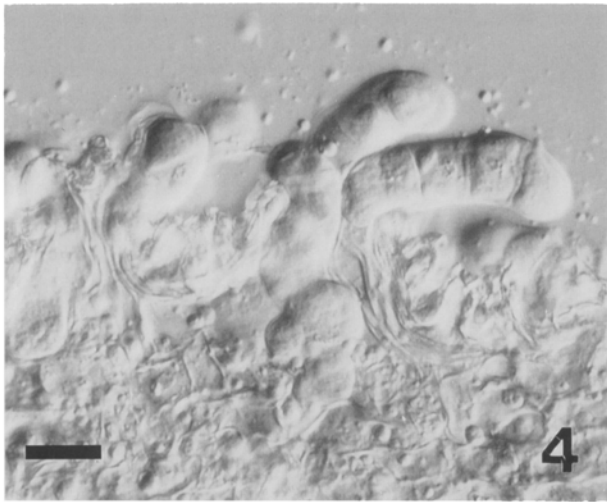
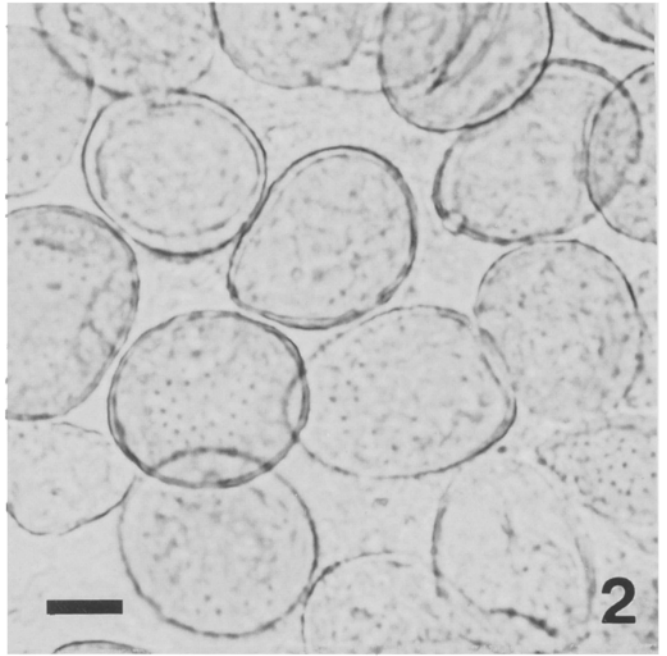
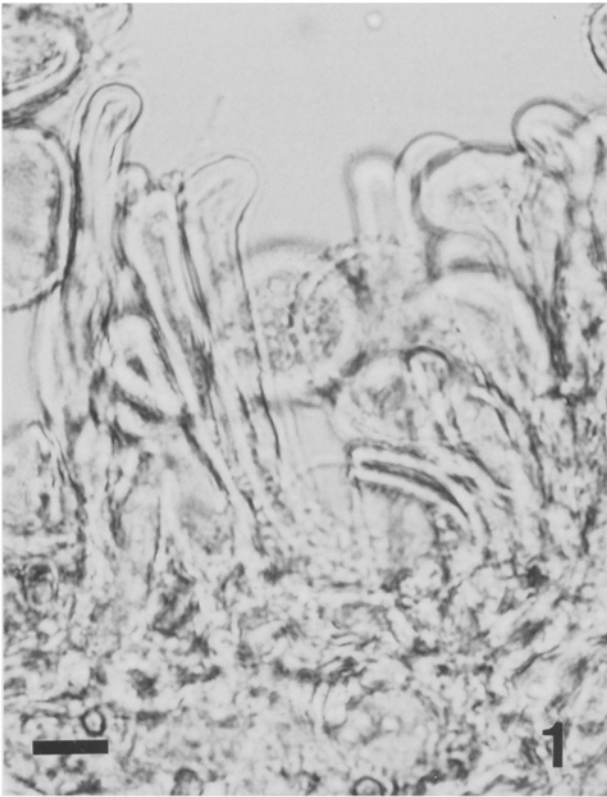
The uredinia (Fig. 1) were subepidermal, becoming exposed and surrounded by paraphyses at the periphery. The paraphyses (Fig. 1) were cylindrical, up to 60 μm long, not or weakly inflated and often incurved at the distal end and united at the base. The wall was evenly 2–3 μm thick or slightly thickened at the distal end and yellowish brown. The urediniospores (Figs. 1, 2) seemed to be formed directly from the sporogenous cells, not being intercalated by a pedicel cell. Because the sori were old and almost collapsed, however, no detailed examination to determine the exact mode of urediniosporogenesis was possible. The spores were broadly ellipsoid or obovoid-ellipsoid and (22–)25–30 \times 18–24 μm in size. The wall was evenly 1–1.5 μm thick, light cinnamon-brown and completely echinulated. Six germ pores were scattered over the wall.

The basidiosori (Fig. 3) were subepidermal, becoming exposed by developing pro- and metabasidia from the underlying hymenium and often appeared cinereous or tomentose due to abundantly developed metabasidia and basidiospores. Neither paraphysis nor peridium was present in the sori. The probasidia (Fig. 3) were one-celled, formed in one-layer, laterally free, oblong or cylindrical, 43–68 \times 15–24 μm in size, thin-walled and colorless. The probasidia were laterally free, but firmly attached on the hymenium. No meristematic cells that gave rise to the probasidia were apparent in the hymenium. The seemingly young sori appeared as a whitish waxy crust and mature ones tomentose with continuous

gradation between these as observed on the specimen indicated that the probasidium developed into the metabasidium by continuous apical elongation. The metabasidia (Figs. 4 and 5) were four-celled, cylindrical, slightly curved and 58–75 \times 14–22 μm in size (excluding subtending and collapsed probasidial portions). The apex of the metabasidial spicula were often rounded (Fig. 5) as opposed to the acute-pointed ones usually observed in many basidiomycetous fungi. The basidiospores (Fig. 6) were obovoid or obovoid-ellipsoid and 19–24 \times 16–20 μm in size.

The pro- and metabasidial characteristics suggest that this fungus is taxonomically closely related to such genera of the Chaconiaceae (Cummins and Hiratsuka, 1983) as *Aplopsora*, *Ceraceopsora*, *Chaconia*, *Chrysoceelis*, *Goplana*, *Ochropsora* and *Olivea*, whose probasidium does not possess a pedicel. Not all species of these rust genera are known over their complete life cycle or with regard to the structural characteristics of the sori at each stage. Combination of currently available, even though fragmental, structural-morphological characteristics of the sori and the spores at respective life-cycle stages circumscribe and separate these genera (Cummins and Hiratsuka, 1983; Kakishima et al., 1984; Ono and Hennen, 1983; Ono, 1984).

Thus, this common taxonomic practice causes serious difficulty in classification and identification of a fungus whose life cycle and associated sori and spores are incompletely known. In order to overcome this difficulty, assumed taxonomic importance is placed on 1) presence or absence of meristematic basal cells which give rise to probasidia, 2) external or internal formation of metabasidia (namely, whether the metabasidium forms by apical extension of the probasidium or replaces the probasidium without any appreciable morphological change), and 3) gelatinous nature of the basidial sori. These characteristics are subsidiary to the "major" taxo-



nomic characters in the taxonomy of these genera. These probasidial characteristics are often useful to circumscribe species; however, their significance in generic or suprageneric taxonomy has not been fully justified.

Another practical solution for this taxonomic difficulty is to employ host(s) as the key character(s), the reason for this being based on assumed high host specificity of rust fungi. Host plant(s) can often serve as a powerful key in identification of rust species, especially in a local rust flora. This is, however, equally unjustified in its universal use in generic or suprageneric taxonomy.

The above arguments apply to taxonomic consideration of the fungus under discussion. Because of poor circumscription of the above-mentioned genera and incomplete information on the life cycle and associated sorus structure and spore morphology of this fungus, it is not possible to assign it to any one of the genera with certainty. Paraphysate uredinia, seemingly sessile urediniospores, laterally free one-celled probasidia and metabasidium formation by continuous apical elongation of probasidium are the characteristics of the fungus under discussion and these characteristics resemble those of *Aplopsora nyssae* Mains that occurs also on the cornaceous trees *Nyssa aquatica* L. and *N. sylvatica* Marsh (Mains, 1921). Because of the morphological resemblance of the fungus to *A. nyssae* and because of the close host relationship of both fungi, we place it in the genus *Aplopsora*. However, both urediniospores and probasidia are significantly larger in this fungus (see the above description) than *A. nyssae* (urediniospores 16–26 × 13–17 μm; probasidia 29–40 × 7–15 μm; Mains, 1921). Consequently, we consider this fungus to be new and propose a new name, *Aplopsora corni*, for it:

***Aplopsora corni* Y. Ono et Y. Harada, sp. nov.**

Figs. 1–6

Spermogonia et aecia adhuc ignota. Uredinia hypophylla, minuta, sparsa vel minute aggregata, subepidermalia, erumpentia, paraphysibus peripheralibus, cylindraceutis, usque ad 60 μm longis, parietibus 2–3 μm crassis, flavo-brunneis. Urediniosporae sessiles, late ellipsoideae vel obovato-ellipsoideae, (22–)25–30 × 18–24 μm, parietibus 1–1.5 μm crassis, dilute cinnamomeo-brunneis, echinulatis, poris germinationis 6 sparsis. Basidiosori hypophylli, minuti et aggregati, primo subepidermales et ceracei, tandem erumpentes et tomentosi. Probasidia unicellularia, unistrata, lateraliter discreta, oblonga vel cylindraceuta, 43–68 × 15–24 μm, parietibus hyalinis et tenuibus. Metabasidia quadricellularia, cylindraceuta, 58–75 × 14–22 μm, parietibus hyalinis et tenuibus. Basidiosporae obovoideae vel obovato-ellipsoideae, 19–24 × 16–20 μm.

Holotype: On *Cornus controversa* Hemsley (Cornaceae), Hokkaido, Shizunai-gun, Shizunai-cho, Experimental Farm of Hokkaido University, 26 Sept. 1991. Y. Harada (IBA-6686) in Fac. Educ., Ibaraki Univ.; isotype in Herb. Fac. Agr., Hirosaki Univ.).

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Figs. 1–6. *Aplopsora corni* sp. nov. on *Cornus controversa* (holotype: IBA-6686) (Figs. 1 and 2 by bright field optics; Figs. 3–5 by interference phase-contrast optics). Fig. 1. Vertical section of uredinium. Cylindrical and apically incurved paraphyses are present at the periphery. Fig. 2. Urediniospores. Fig. 3. A layer of immature probasidia beneath the host epidermis. Fig. 4. Metabasidia formed *in situ* by continuous apical extension of probasidia. Fig. 5. Three metabasidia in which two proximal cells are already collapsed. Two distal cells of one metabasidium are about to form basidiospores on round-ended spicula. Fig. 6. Basidiospores detached from metabasidia. Scale: 10 μm in Figs. 1, 2, and 6; 20 μm in Figs. 3–5.