

## NOTE

## Notes on two *Umbelopsis* species: *U. nana* and *U. vinacea* from Japan

Tsuneeo Watanabe<sup>1)</sup>, Yoshio Watanabe<sup>2)</sup>, Takema Fukatsu<sup>3)</sup> and Ryuichiro Kurane<sup>3)</sup>

<sup>1)</sup> Bioconsortia Program Laboratory, National Institute of Bioscience and Human-Technology, National Institute of Advanced Industrial Science and Technology, 1-1, Higashi, Tsukuba, Ibaraki 305-8566, Japan

<sup>2)</sup> Central Research Laboratories, Mercian Corporation, 9-1, Johnan 4 Chome, Fujisawa, Kanagawa 251-0057, Japan

<sup>3)</sup> National Institute of Bioscience and Human-Technology, National Institute of Advanced Industrial Science and Technology, 1-1, Higashi, Tsukuba, Ibaraki 305-8566, Japan

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*Umbelopsis nana* and *U. vinacea* isolated from soils in Nagano Pref., Japan were redescribed and illustrated.

Key Words—identification; morphology; *Umbelopsis nana*; *U. vinacea*; Zygomycotina.

Candidates of lignocellulose-decomposing fungi have been obtained from soil by the bait method with commercial toothpicks (*Betula* sp., 6.5 cm long). In this method, autoclaved commercial toothpicks are buried up to 4.5-cm deep in soil (nearly 30 g soil/100-ml glass vial) vertically for 7–30 days, then removed, washed under running tap water for at least 30 min, air-dried and plated on 7 ml of water agar (two toothpicks/plate). After incubation at 25°C for more than 1 d, single-hyphal tips that elongated from the substrates were isolated for pure cultures. Among more than 327 isolates examined, two species of *Umbelopsis* Amos and Barnett, *U. nana* (Linnem.) v. Arx and *U. vinacea* (Dixon-Stewart) v. Arx, are redescribed in this study because of the rarity of published records in Japan.

The genus *Umbelopsis* was established by Amos and Barnett (1966) with *U. versiformis* Amos & Barnett as the type species. Although this fungus was at first included in the Deuteromycotina, it is now accepted as a member of the Zygomycotina. The fungus is characterized by sporangiophores with vesicles bearing branches (pedicels) and apical single sporangia. Later, the type species was synonymized with *Mortierella nana* Linnem., a member of the Zygomycotina by Arx (1982), who nevertheless accepted the genus *Umbelopsis* and transferred *M. nana* and *M. roseo-nana* W. Gams & Gleeson to this genus. So far, seven species have been reported in this genus (Arx, 1982; Yip, 1986a, 1986b).

Living cultures were deposited at Bioconsortia Program Laboratory (stocked as TW with accession numbers), National Institute of Bioscience and Human-Technology, National Institute of Advanced Industrial Science and Technology, Ministry of Economy, Trade and Industry, and the Gene Bank, National Institute of Biological Resources, Ministry of Agriculture, Forestry and Fish-

eries (MAFF) at Tsukuba, Japan.

*Umbelopsis nana* (Linnem.) v. Arx Sydowia **35**: 20, 1982. Figs. 1–8

Colonies on potato-dextrose agar (PDA) after incubation for 6 d at 25°C, 28.5–31 mm in diam, white, non-aerial, velvety; reverse white. Sporangiophores erect, hyaline, simple or branched with a swollen vesicle bearing one to more than 10 branches verticillately and apical single sporangia, 4–42(–50) × 1.6–4 μm, vesicles 4–10 × 4–6 μm or often absent, branches gradually tapering toward apexes, 8–36(–54) μm long, mostly 1.2–1.6 μm wide basally, 0.8–1.6 μm apically. Sporangia (also termed conidia and sporangia by previous workers) one-spored, hyaline, globose, (3–)5–10(–16) μm in diam., often proliferated. Sporangiospores hyaline, globose, 1-celled, readily detached. Chlamydo-spores globose, mostly 12–16 μm in diam.

Materials examined. Japan, Nagano Pref., cultures from forest soils at Mt. Takabotchi, Shiojiri, 19 Oct. 1999, collected and isolated by T. Watanabe, TW 99-454 (MAFF 238015), TW 99-457 (MAFF 238016), TW 99-481 (MAFF 238018) and from the uncultivated campus soil at Shinshu Univ. at Kamiina, 20 Oct. 1999, T. Watanabe, TW 99-485 (MAFF 238019).

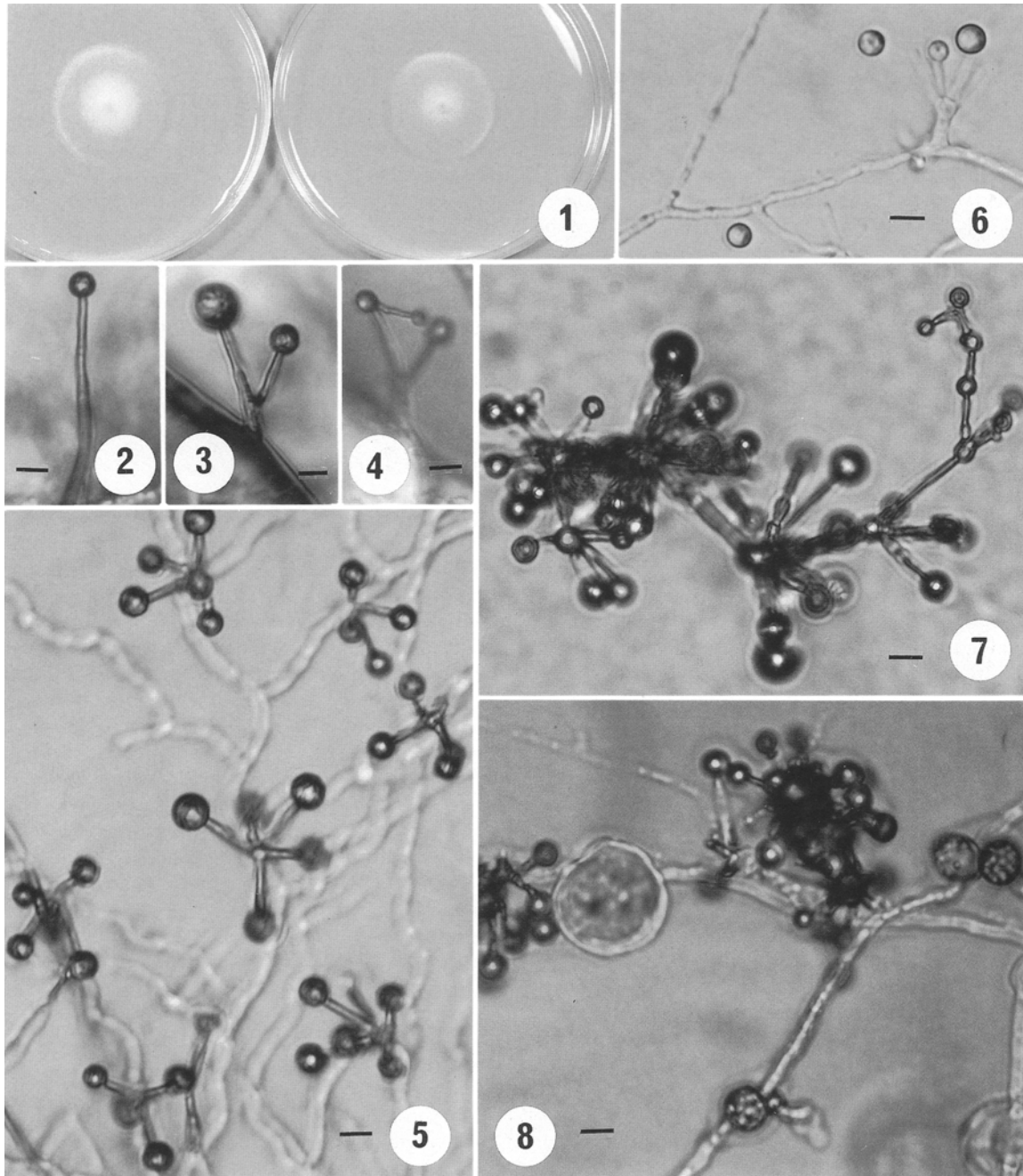
The fungus sporulated with abundantly proliferated and aggregated sporangiophores and sporangia (Fig. 7) with age. Variable morphological characteristics are noted in this species (Amos and Barnett, 1966; Kendrick et al., 1994), especially in the number of branches (pedicels) of sporangiophores (Figs. 2–7). For example, more than 10 sporogenous branches were common, and up to 25 observed on water agar cultures 3 mo after inoculation in this study. In addition, chlamydo-spores and intercalary spherical hyphal swellings were occasionally

observed in old cultures (Fig. 8).

The four isolates listed above were obtained by the toothpick bait method. Another isolate, TW 99-165, obtained from unidentified decayed wood in the same area on the same occasion was also identified as this species. It was obtained by plating small pieces (about 5 ×

5 × 5 mm) of washed wood on water agar after incubation for 2 d at 25°C.

Although this fungus was isolated from plant roots and soil (Amos and Barnett, 1966), and it is soilborne (Arx, 1982; Domsch et al., 1980), isolation from wood in this study may be rare.



Figs. 1–8. *Umbelopsis nana*. 1. Six-d-old PDA cultures of two isolates [TW 99-454 (left) and TW 99-481 (right)] in 9-cm plastic Petri dishes. 2. Simple sporangiophore bearing one sporangium. 3. Sporangiophore with 2 branches bearing big and ordinary sporangia. 4. Sporangiophore with 2 branches bearing one ordinary sporangium, and another proliferated sporangium. 5. Habit of sporulation showing sporangiophores with 4–6 branches and sporangia. 6. Sporangiophore with 4 branches after removal of sporangia, and detached single-spored sporangia. 7. Sporulation with abundantly proliferated and aggregated sporangiophores and sporangia. 8. Intercalary chlamydospores and empty hyphal swellings, and sporulation of abundant sporangiophores and sporangia. Scale bars: 10  $\mu$ m for Figs. 2–8.

In Japan, this fungus (as *Mortierella nana*) was reported as a member of soil mycoflora in larch forest in Sugadaira (Lee, 1972).

*Umbelopsis vinacea* (Dixon-Stewart) v. Arx Sydowia **35**: 20, 1982.

Colonies on PDA after incubation for 6 d at 25°C, 26 mm in diam, white, non-aerial, velvety; reverse white at first but gradually becoming pale purplish with age. Sporangiohores erect, hyaline, with a swollen vesicle bearing one to several branches verticillately or sympodially and apical single sporangia, 12–170(–200) × 1.8–3.2 μm, vesicles 4–8 μm in diam, branches gradually tapering toward apices, 44–102 μm long. Sporangia reddish brown, globose, many-spored, 7–13(–20) μm in diam, often proliferated. Sporangiospores hyaline, 1-celled, angular with 4–7 edges, 2–4 μm in diam.

Material examined: Japan, Nagano Pref., cultures from forest soils at Mt. Takabotchi, Shiojiri, 19 Oct. 1999, T. Watanabe, TW 99–463 (MAFF 238017).

This fungus was reported in Japan as *U. multispora* T. Watanabe (ATCC 38089 stocked as *Mortierella vinacea*) (Watanabe, 1977), but later synonymized with *U. vinacea* by Arx (1982).

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