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SHORT COMMUNICATION

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Bambusicolous fungi in Japan (5): three species of *Tetraploa*

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Abstract Three species of *Tetraploa* collected from *Sasa*, or bamboos, are described and illustrated. Among them, *T. curviappendiculata* on *Sasa kurilensis* and *T. longissima* on *Pleioblastus chino* are compared with hitherto known species and described as new species. In the nomenclature, *T. javanica* is substituted for *T. biformis*, formerly reported from the dead bark of a broad-leaved tree in Japan, as a correct name.

Key words Bamboo · Hyphomycetes · *Sasa* · Taxonomy · *Tetraploa*

During investigation of microfungi that inhabit bamboos in Japan, numerous new or noteworthy fungi were encountered. Several of these have been described (Shirouzu and Harada 2004; Tanaka and Harada 2004, 2005; Tanaka et al. 2005). In this article, we report three species of *Tetraploa* Berk. & Broome.

The hyphomycete genus *Tetraploa* is characterized by conidia that consist of a main body and four appendages. Usually, species in this genus are known as saprophytes of herbaceous plants (Ellis 1949), but some species are found from rotten wood (Révay 1993), soil (Watanabe 2002), raindrops on leaves of *Acer* (Ando 1992), and liverworts (Ellis 1949). Eleven taxa are accepted in the genus (Arambarri et al. 1987; Ellis 1949; Matsushima and Matsushima 1996; Révay 1993; Rifai et al. 1988; Sharma 1978). Of these, only 1 species, *T. aristata* Berk. & Broome, is known to have a *Massarina* Sacc. teleomorph of pleosporalean ascomycete (Scheuer 1991). *Tetraploa aristata* and *T. ellisii* Cooke are widely distributed and reported from many countries, including Japan (Shirai and Hara 1927; Tubaki 1971), but other species, such as *T. abortiva* Aramb. & Cabello and *T. setifera* Révay, are recorded only from the type localities (Révay 1993).

We followed the methods in our previous paper (Hatakeyama and Harada 2004), but as to sterilized plant agar (SPA) culture, stems of eulalia (*Miscanthus sinensis* Anderss.) were used instead of tree peony (*Paeonia suffruticosa* Andr.). To stimulate sporulation, in addition to SPA, small agar pieces cut from colonies were incubated in Petri dishes (60 mm diameter) containing 10–15 ml sterilized distilled water (SDW) at 10°C under 12-h photoperiod.

All specimens, except for the type specimen of *Tetraploa biformis* K. Matsush. & Matsush., were kept at the Herbarium of Hirosaki University, Fungi (HHUF), and all isolates were deposited at culture collections (MAFF and JCM). The type specimen of *T. biformis* was borrowed from the Matsushima Fungus Collection (Kobe, Japan).

Tetraploa curviappendiculata Sat. Hatak., Kaz. Tanaka & Y. Harada, sp. nov.

Figs. 1–6, 18

Mycelia superficialia. Conidiophora micronematica, mosnonematica. Cellulae conidiogenae monoblasticae, incorporatae. Conidia ex uno corpore conidii et appendicibus quatuor composita, solitaria; corpus conidii 52–67(–75) × 15–22 µm, pallide brunneum vel brunneum, obclavatum vel anguste obpyriforme, ad basim rotundatum et verruculosum, ex 4–5 columnis compositum; columnae 7–13 µm crassae, 8–11-septatae, leviter constrictae ad septa; appendices 9–18(–22) × 2–5 µm, 0–1-septatae, inferiore pallide brunneae, superne hyalinae, laeves, eramosae, basi curvae.

Mycelium superficial. Conidiophores micronematous, mononematous. Conidiogenous cells monoblastic, integrated, usually indistinguishable from creeping hyphae. Conidia consist of 1 body and 4 appendages, solitary; the body 52–67(–75) × 15–22 µm (mean = 63.3 × 18.9 µm, $n = 50$), length/width ratio (L/W) = 2.7–4.4 (mean = 3.4, $n = 50$), pale brown to brown, obclavate to narrowly obpyriform,

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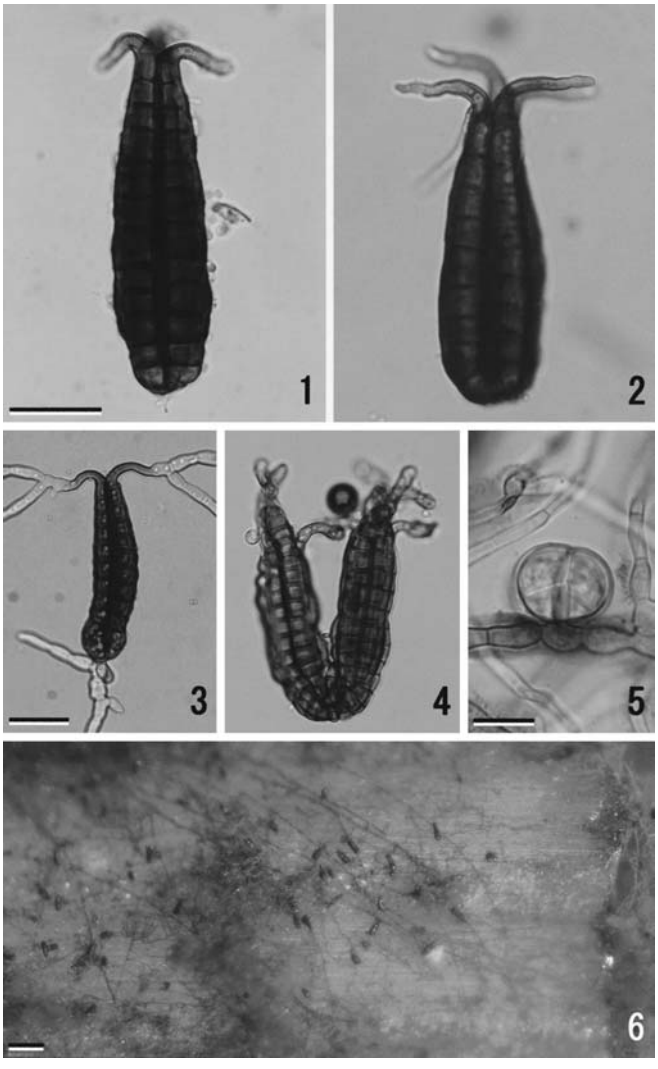

Figs. 1–6. *Tetraploa curviappendiculata.* **1, 2** Conidia; **3** Germinating conidium; **4** Aberrant conidium; **5** Conidium initial; **6** Conidia on sterilized plant agar (SPA) (**1** HHUF 28582; **2, 3, 5, 6** MAFF 239495 = JCM 12852; **4** HHUF 28589). *Bars* **1–4** 20 µm (**1, 2** same magnification; **3, 4** same magnification); **5** 10 µm; **6** 100 µm

rounded and verruculate at the base, consisting of 4–5 columns of cells; columns 7–13 µm wide, 8–11-septate, slightly constricted at septa; appendages 9–18(–22) × 2–5 µm (mean = 13.6 × 3.3 µm, $n = 50$), 0–1-septate, pale brown at the base and almost hyaline at the apex, smooth, unbranched, curved below.

Cultural characteristics: Conidia usually germinated from the apex of appendages on glucose agar [GA; 20 g glucose (Wako, Osaka, Japan), 20 g agar, and 1000 ml distilled water] at room temperature. Colonies on potato dextrose agar (PDA; Difco, Detroit, MI, USA) attaining a diameter of about 2.5 cm within 4 weeks at 20°C in the dark, velvety in appearance, Mouse Grey (5E3; Kornerup and Wanscher 1978) with whitish entire margin (1 mm); reverse Beaver (5F4); no pigment produced. Colonies on malt extract agar (MA; Difco) attaining a diameter of 1.5–2.0 cm within same condition, plane in appearance, Dark Green (30F6) with entire margin; reverse similar; no pigment produced. On SPA, abundant conidia were produced on the eulalia stems at 20°C within 1 month. In SDW abundant sporulation occurred at 10°C within 2 weeks. The shape and size of conidia in vitro are quite identical with those found in nature (conidial body 60–70 × 17–18 µm; columns 8–9-septate; appendages 14–25 µm long).

Etymology: "*curviappendiculata*" from Latin *curvi* and *appendiculatus,* referring to the appendages curved below.

Holotype: HHUF 28582.

Materials examined: On culms of *Sasa kurilensis* (Rupr.) Makino & Shibata: Mt. Kudoji, Hirosaki, Aomori, 140°25′ E, 40°31′ N, May 9, 2003, Y. Harada (HHUF 28582; culture MAFF 239495 = JCM 12852); Aseishigawa Dam, Kuroishi, Aomori, 140°41′ E, 40°34′ N, May 2, 2003, K. Tanaka (HHUF 28583); Zatouishi, Hirosaki, Aomori, 140°26′ E, 40°31′ N, Nov. 8, 2003, K. Tanaka and T. Shirouzu (HHUF 28584); Kozawa, Hirosaki, Aomori, 140°26′ E, 40°33′ N, Oct. 25, 2002, Y. Harada (HHUF 28586); Dec. 21, 2002, Y. Harada and K. Tanaka (HHUF 28585); Akaiwa, Funadamari, Isl. Rebun, Hokkaido, 141°03.4′ E, 45°23.2′ N, June 2, 2004, K. Tanaka (HHUF 28588); Matsukitai, Hirosaki, Aomori, 140°29′ E, 40°33′ N, Nov. 29, 2003, K. Tanaka and N. Asama (HHUF 28589); Dec. 7, 2003, K. Tanaka and N. Asama (HHUF 28590; culture MAFF 239496); Notsukefuuren Park, Bekkai, Notsuke-gun, Hokkaido, 145°14′ E, 43°31′ N, Sept. 9, 2003, K. Tanaka and S. Hatakeyama (HHUF 28591). On culms of *Sasa senanensis* (Franch. & Sav.) Rehder: Tsukuba Univ. Sugadaira Montane Research Center, Nagano, 138°20′ E, 36°31′ N, Apr. 10, 2004, T. Shirouzu (HHUF 28587). Dried culture specimens: grown on culms of eulalia, from MAFF 239496 (HHUF 28598) and MAFF 239495 = JCM 12852 (HHUF 28599).

Notes: This fungus resembles *Tretospeira ugandensis* (Hansf.) Piroz., the type species of *Tretospeira* Piroz., in conidial shape, but does not fit within the generic concept of *Tretospeira*; i.e., *Tetraploa* produces micronematous conidiophores with monoblastic conidiogenesis, whereas *Tretospeira* produces macronematous, erect conidiophores with enterotretic conidial succession (Ho et al. 2000; Pirozynski 1972).

Appendages of *T. curviappendiculata* are curved below. This feature is remarkable in *T. curviappendiculata* because most species of *Tetraploa* have erect appendages (Ellis 1949; Révay 1993). However, *T. curviappendiculata* is suitably classified in the genus *Tetraploa* by monoblastic and integrated conidiogensis, conidial body composed of four columns, and appendages developed from each column independently. *Tetraploa curviappendiculata* is also distinguished from all other species in the longer and numerously septate conidial body.

Aberrant conidia having 6–10 columns or V-shaped are observed on some specimens (HHUF 28589–28591), but single-conidium cultures from these aberrant conidia produced typical conidia, which consist of 4–5 columns and curved appendages in vitro.

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