

NOTE

Keisuke Obase · Takahito Kobayashi
Toshizumi Miyamoto · Yutaka Tamai · Takashi Yajima

Inocybe nitidiuscula, new to Japan

Received: January 5, 2006 / Accepted: May 19, 2006

Abstract A species of the genus *Inocybe*, which has not been recorded previously in Japan, is described and illustrated as a new record. *Inocybe nitidiuscula* (Britzelm.) Sacc. belongs to the subgenus *Inocibium* (Earle) Singer.

Key words Agaricales · Cortinariaceae · *Inocybe nitidiuscula* · Japan

Introduction

In 2004, during a study of macrofungal flora on Mt. Usu volcano, Hokkaido, Japan (Obase et al. 2005), one species of the genus *Inocybe*, which was previously unknown from Japan (Kobayashi 2002a), was observed. Subsequent research revealed that it is *Inocybe nitidiuscula* (Britzelm.) Sacc., assigned to the subgenus *Inocibium* (Earle) Singer. *Inocybe nitidiuscula*, which has been synonymized with *I. friesii* and *I. tarda*, is widespread in Europe (Kuyper 1986) and in North America (Cripps 1997). It is usually associated with conifers, more rarely with hardwoods. In this article, it is described and illustrated based on specimens collected on the Mt. Usu volcano, Hokkaido, Japan.

The specimens cited in this article are deposited in the herbarium of the Hokkaido University Museum (SAPA) or in our laboratory (FORB). The description of the macroscopic features is based on fresh specimens. The color notations used are those from Munsell (2000). For microscopic observations, dried specimens were rehydrated in 10% NH₄OH and then examined. The microscopic features were drawn using a drawing adapter (Nikon, Tokyo, Japan). Fifty

individual spores, basidia, and each type of cystidia were measured in each sporocarp. Lengths measurements excluded the sterigmata for basidia and crystals for metuloids. We describe the size of each organ as the 95% population limits using the following formula: 95% population limits = $M \pm t \cdot SD$ (M = mean; t = t value for the calculation at the 95% population limits, in this case, 2.01; SD = standard deviation) (Breitenbach and Kränzlin 1991). If the maximum and minimum of the actual measurements were outside the 95% population limits, we describe these measurements in parentheses as outliers. The abbreviation L is the total number of lamellae that extend from the pileal margin to the stipe, counted around the whole circumference, the abbreviation l is the total number of lamellulae between two lamellae, and the abbreviation Q is the ratio of spore length to its width; IS (Kuyper 1986; Kobayashi and Courtcuisse 1993) and ISB (Kobayashi 2002b) are indexes of slenderness.

Taxonomy

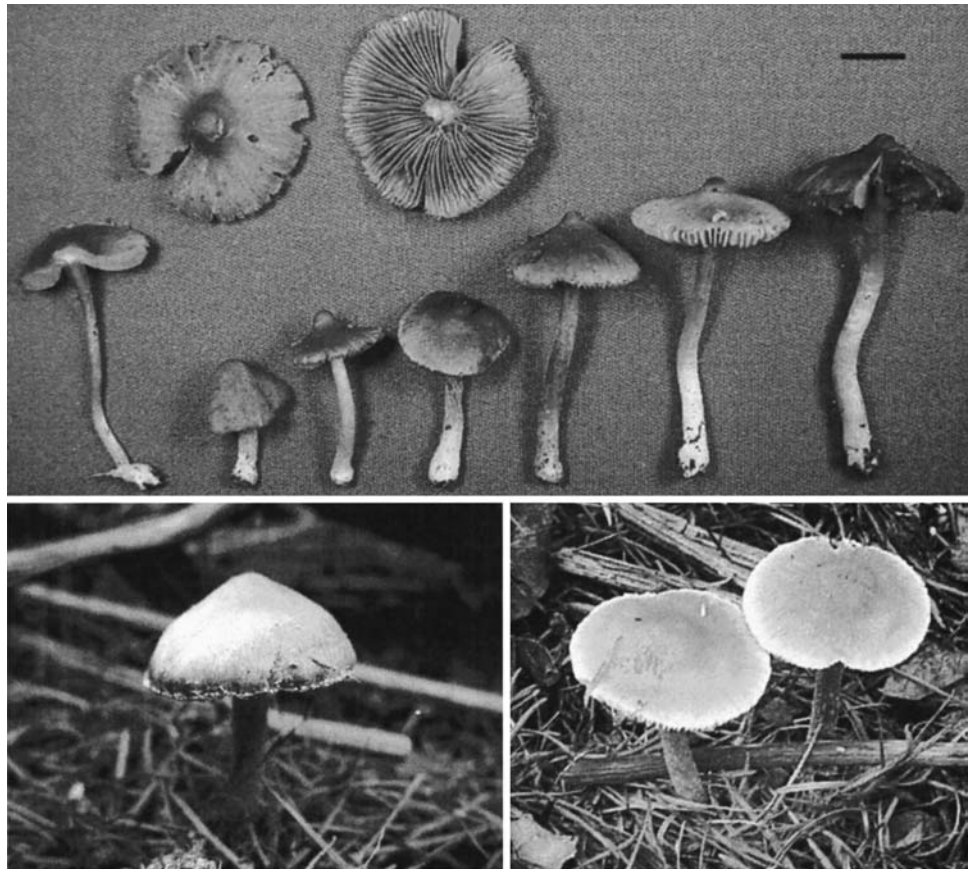
Inocybe nitidiuscula (Britzelmayr) Saccardo, Syll. Fung. 11:53, 1895.
= *Inocybe friesii* R. Heim, Le genre *Inocybe*: 319, 330, 1931.
= *Inocybe tarda* Kühner, Suppl. Bull. Soc. Nat. Oyonnax 9:6, 1955. Figs. 1–3

Pileus 8–36 mm broad, conical when young, later conico-convex, convex, plano-convex to almost applanate, mostly umbonate, with straight margin, surface dull, finely radially fibrillose, mostly brown (7.5YR 4/4, 5/4), sometimes reddish-brown (5YR 4/4), margin even, with whitish fibrils from the cortina when young. Lamellae ascending adnate, L = 26–34, l = 1–3, close to crowded, reddish-yellow (7.5YR 6/6), edges pinkish-white (7.5YR 8/2). Stipe 17–43 × 3–6 mm, somewhat enlarged at the base, solid to indistinctly fistulose, light reddish-brown (5YR 6/4) on the upper region, paler to whitish toward the base, whitish-pruinose on the upper third, smooth to longitudinally fibrillose be-

K. Obase · T. Miyamoto(✉) · Y. Tamai · T. Yajima
Laboratory of Forest Resource Biology, Division of Environmental Resources, Graduate School of Agriculture, Hokkaido University, Kita-9, Nishi-9, Kita-ku, Sapporo, Hokkaido 060-8589, Japan
Tel. +81-11-706-2536; Fax +81-11-706-2536
e-mail: tmiyamot@for.agr.hokudai.ac.jp

T. Kobayashi
The Hokkaido University Museum, Sapporo, Japan

Fig. 1. Carpophores of *Inocybe nitidiuscula*. Bar 1 cm



low. Cortina present in young specimens, later disappeared completely and left no remnants on stipe. Context whitish. Smell unpleasant. Taste unpleasant. IS = 8.3–19.3; ISB = 30.7–122.7.

Spores (8.5–)10.2–13.2(–13.5) × (5.8–)6.0–7.5(–7.7) μm, range of average value 11.4–12.0 × 6.6–6.9 μm, $Q = (1.4–)1.5–2.0(–2.2)$, range of average value 1.7–1.8, amygdaliform in side view, elliptical in front view, with or without small apiculus, smooth, yellowish-brown, thick-walled, with conical apex. Basidia 24.7–39.2(–41.8) × (8.2–)9.3–12.9(–13.1) μm, with 4 sterigmata, clavate, almost colorless. Pleurocystidia, metuloids, (64.3–)66.0–90.5(–99.6) × (14.0–)16.5–26.5(–27.8) μm, almost cylindrical to slenderly fusiform, colorless to slightly pale yellow wall, up to 2.0–3.0 μm thick, with apical crystals, abundant. Cheilocystidia of two types: (1) similar to pleurocystidia, abundant; (2) paracystidia, (12.6–)16.6–35.8(–40.1) × 11.8–25.5(–28.2) μm, clavate to pyriform, thin-walled, colorless, abundant. Caulocystidia of two types: (1) similar to pleurocystidia and cheilocystidia, present at the apex of stipe, descending to one-third, abundant; (2) thin-walled paracystidia, 15.6–49.9(–69.0) × (9.8–)9.9–26.5(–36.1) μm, clavate to pyriform, colorless, abundant. Pileipellis a cutis, uppermost layer up to 63 μm thick, composed of regular or subregular hyphae, 4.9–11.0 μm diameter, with orange-brown pigmentation, encrusted. Clamps abundant but not always at septa.

Habitat. Under the mature trees of *Larix kaempferi* (Lamb.) Carr. or *Abies sachalinensis* Masters. Gregarious. About 100–200 m elevation.

Specimens examined. Japan: Hokkaido, Abuta-gun, Abuta-cho, Izumi, September 9, 2004, collected by K. Obase, FORBs04001 (FORB); September 16, 2004, collected by K. Obase, FORBs 04002 (FORB); September 22, 2004, collected by K. Obase, FORBs04003 (SAPA); September 17, 2005, collected by K. Obase, FORBs05001 (FORB); September 22, 2005, collected by K. Obase FORBs05002, FORBs05003, FORBs05004, and FORBs05005 (FORB); Sapporo, Sakura-yama, mixed forest dominated by *A. sachalinensis*, October 9, 2005, collected by Takah. Kobayashi, TAKK 05.10.9.11 (SAPA).

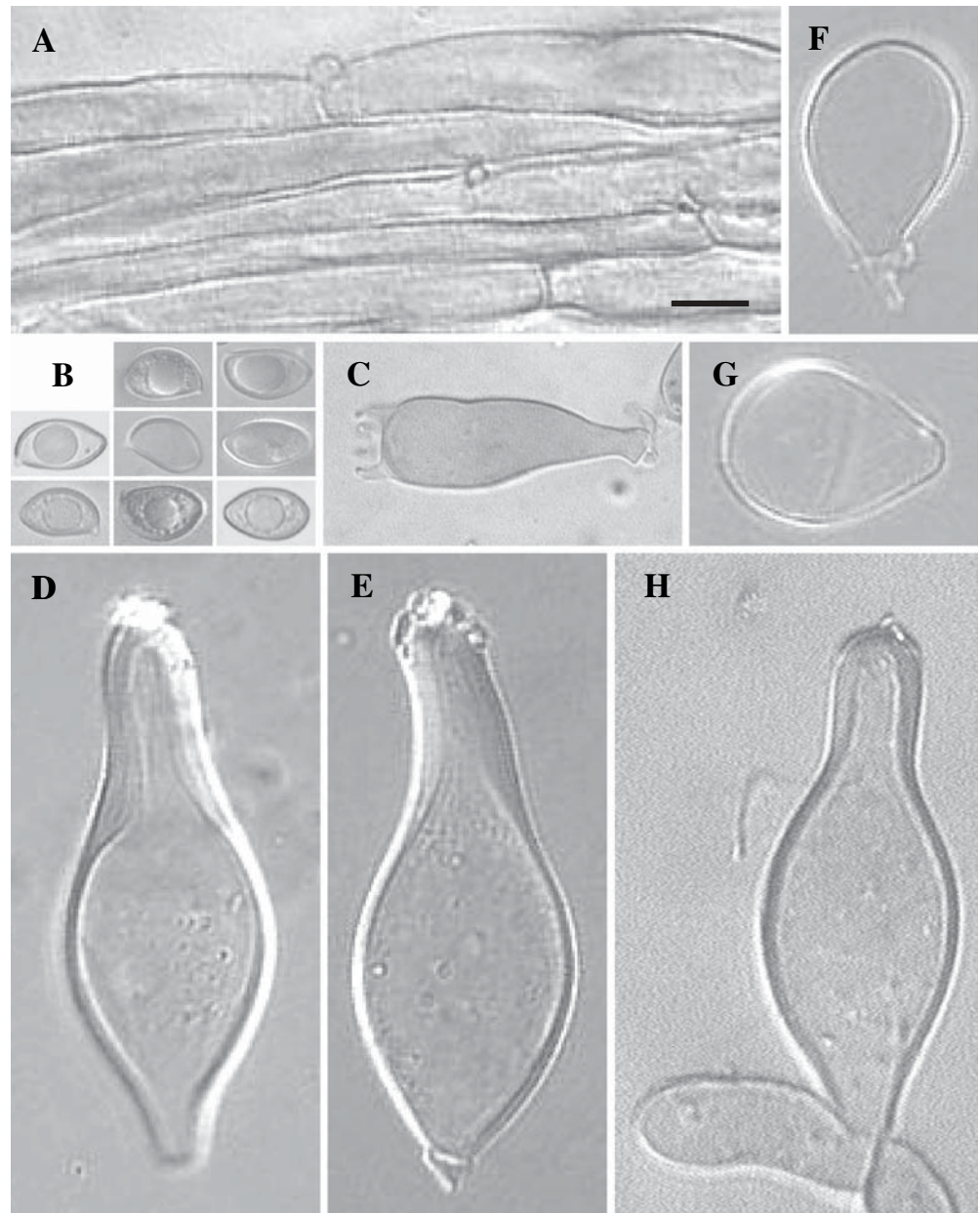
Japanese name: Usutsuya-tomayatake (new name) after meaning of Latin etymology *nitidiusculus* (= somewhat shining).

Sequence data: The internal transcribed spacer (ITS) region including the 5.8S rDNA region in the nuclear rDNA of specimen FORBs4003 was sequenced. The GenBank accession number is AB244791.

Remarks

We compared the characteristics of our specimens with descriptions and illustrations in the literature (Kuyper 1986), including one isoneotype (Stangl 1983) and an illustrated book (Breitenbach and Kränzlin 2000). Each important macroscopic and microscopic feature of our specimens matched the published reports, so we identified our specimens as *Inocybe nitidiuscula*.

Fig. 2. *Inocybe nitidiuscula* (FORBs04003). **A** Pileipellis; **B** spores; **C** basidium; **D** pleurocystidium; **E** cheilocystidium; **F** paracystidium; **G** cauloparacystidium; **H** caulocystidium. Bar 10 μ m

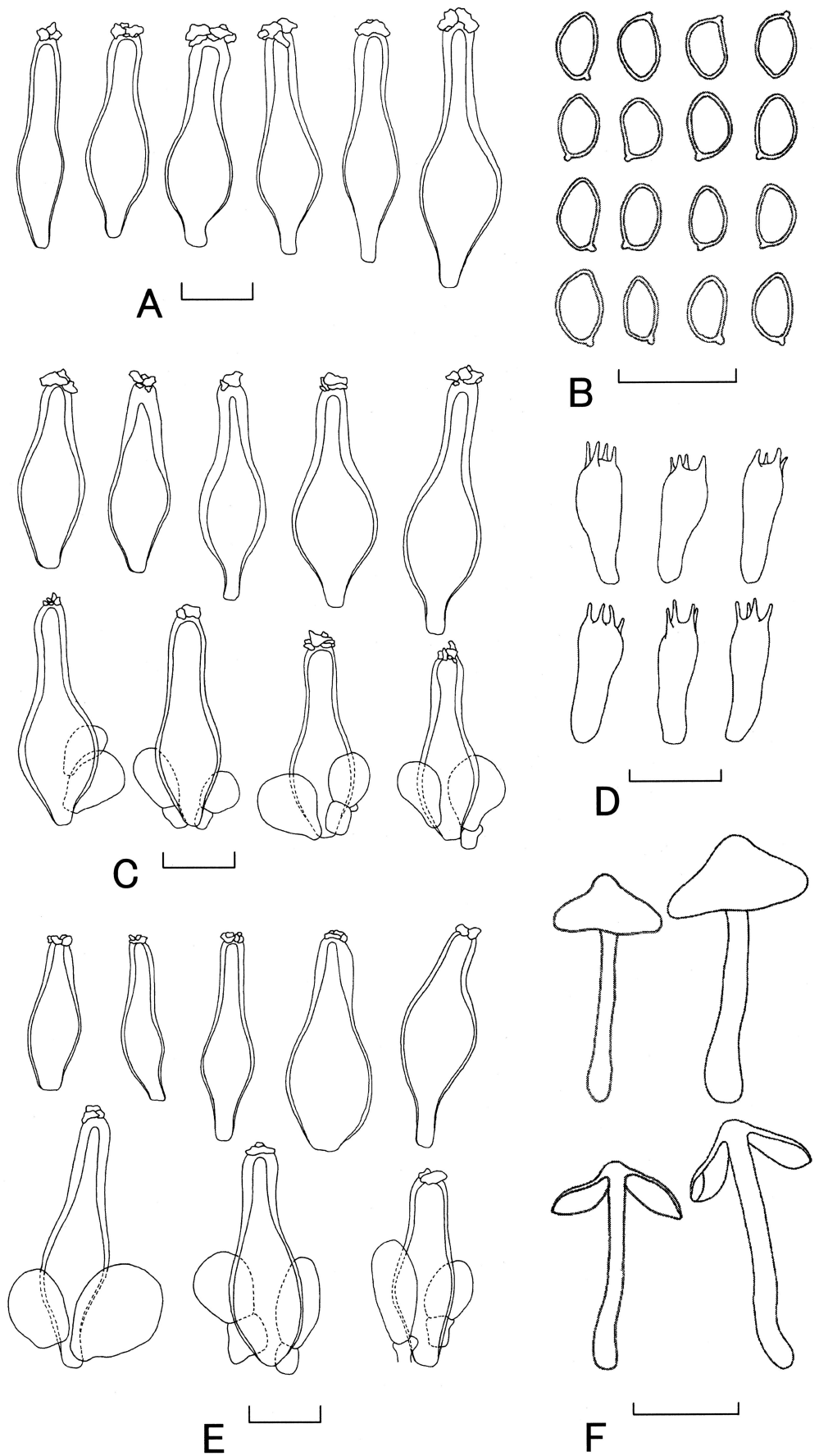


Kuyper (1986) and Stangl (1983, 1989) recognized *I. friesii* R. Heim as a synonym of *I. nitidiuscula*. This name has been used in several reports. *Inocybe nitidiuscula* belongs to the subgenus *Inocibium* (Earle) Singer (Singer 1986), which is characterized by having metuloids and smooth spores. *Inocybe nitidiuscula* can be confused with other species of *Inocibium*, in particular, *I. fuscidula* Velen and *I. leiocephala* Stuntz. Kobayashi (2005) reported *I. fuscidula* as a new record in Japan. The important characteristics of *I. nitidiuscula* differentiating it from these similar species are the lack of a distinctly bulbous base, the presence of a stipe with red tinges, the position of the caulocystidia on the stipe, and the size of the spores.

The senior author collected *I. nitidiuscula* in Switzerland [VD, Dorigny, October 8, 1993, collected by T.K., TAKK 931085 (SAPA); Pont de Nant, coniferous forest, September 13, 1994, collected by T.K., TAKK 94/37 (SAPA); VD, Froideville Montheron, coniferous forest, September 11, 1994, collected by T.K., TAKK 94.08-1 (SAPA)] and found that it closely matched the Japanese specimens in its features.

Inocybe nitidiuscula is reported to associate with *Picea*, *Pinus*, *Larix*, *Quercus*, *Corylus*, *Carpinus*, *Fagus*, *Salix*, and *Dryas* (Kuyper 1986; Cripps 1997). In this study, we observed it under a canopy of mature *L. kaempferi* and *A. sachalinensis*. Members of the genus *Inocybe* are ectomycorrhizal fungi, which are symbiotic with woody plant species.

Fig. 3. *Inocybe nitidiuscula*.
A Pleurocystidia; **B** spores;
C cheilocystidia and
 paracystidia; **D** basidia;
E caulocystidia and
 paracystidia; **F** carpophores.
 Bars **A–E** 20 μ m; **F** 20 mm



References

- Breitenbach J, Kränzlin F (1991) Fungi of Switzerland, vol 3. Edition Mykologia Lucerne, Lucerne
- Breitenbach J, Kränzlin F (2000) Fungi of Switzerland, vol 5. Edition Mykologia Lucerne, Lucerne
- Cripps CL (1997) The genus *Inocybe* in Montana aspen stands. *Mycologia* 89(4):670–688
- Heim R (1931) Le genre *Inocybe*. *Encycl Mycol* 1:1–429, 35 pls
- Kobayashi T (2002a) The taxonomic studies of the genus *Inocybe*. *Nova Hedwigia Beih* 124:1–246
- Kobayashi T (2002b) Notes on genus *Inocybe* of Japan: I. *Mycoscience* 43:207–211
- Kobayashi T (2005) Notes on genus *Inocybe* of Japan: III. *Mycoscience* 46:184–191
- Kobayashi T, Courtecuisse R (1993) Two new species of *Inocybe* from Japan. *Mycotaxon* 46:27–33
- Kühner R (1955) Complements a la “Flore analytique.” V. *Inocybe* leiosporés cystidiés – especes nouvelles ou critiques. *Mém Hors Sér* 1 Suppl Bull Soc Nat Oyonnax 9:3–95
- Kuyper TW (1986) A revision of the genus *Inocybe* in Europe. 1. Subgenus *Inosperma* and the smooth-spored species of subgenus *Inocybe*. *Persoonia Suppl* 3:1–247
- Munsell Color Company (2000) Munsell soil color charts, revised washable edition. Gretag Macbeth, New Windsor, NY
- Obase K, Tamai Y, Miyamoto T, Yajima T (2005) Macrofungal flora on the volcano Usu, deforested by 2000 eruptions. *Euras J For Res* 8(2):65–70
- Saccardo PA (1895) *Sylloge fungorum omnium hucusque cognitorum*. XI. Patavii 1–753
- Singer R (1986) *The Agaricales in modern taxonomy*, 4th edn. Koeltz Scientific Books, Koenigstein, Germany
- Stangl J (1983) *Inocybe nitidiuscula* (Britz.) Sacc. *Int J Mycol Lichenol* 1(2):161–168
- Stangl J (1989) Die Gattung *Inocybe* in Bayern. *Hoppea* 46:5–388