

TYLOPILUS PSEUDOSCABER – AN ADDITION TO INDIAN MYCOFLORAKANAD DAS¹, J.R. SHARMA² AND DEEPA MISHRA²¹*Botanical Survey of India, SHRC, P.O. Rajbhawan, Gangtok - 737 103*
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Macrofungal explorations in the different parts of Sikkim have been undertaken by the senior author since 2008. Based on the collections, some new species (Das & al., 2010; Das & al., 2011; Das & Verbeken, 2011; Das & Verbeken, 2012) have been established and a couple of new records (Das, 2010; Das & Mishra 2010a & b; Das & Sharma, 2010; Das & al., 2010; Das & Verbeken, 2012; Das & Zhao, 2012) have been reported from this state. Recently, while working on the North district of Sikkim, Shingba *Rhododendron* Sanctuary (covering an area of 43sq km situated in the temperate to subalpine region of Yumthang valley and rich with temperate silver fir and species of *Rhododendron*) was surveyed thoroughly and a number of wild mushrooms were collected. Macro- and micromorphological investigations followed by the literature survey revealed that two of these collections belong to an interesting taxon namely *Tylophilus pseudoscaber* and is reported herein for the first time from India with its detailed description supported by illustrations.

Macromorphological characterization was made from the fresh basidiomata. Field photographs of the fresh specimens were taken with the aid of Nikon D300s. Colour codes and terms mainly follow Colour identification chart of the Flora of British fungi (1969). Specimens were allowed to dry with a field drier. In the laboratory, micromorphological characters were recorded from the dry samples mounted in a mixture of 5% KOH, 1% Phloxin, Congo red and 30% Glycerol and Melzer's reagent. Drawings (micromorphological structures) were made at 1000 × magnification. Basidium length excludes the length of sterigmata. Spore measurements are recorded based on that of twenty basidiospores. Spores are measured in side view and measurements are given as KDa-KDc-KDb × KDx-KDz-KDy in which KDa = minimum value for the length of measured collections, KDb = maximum value for the length of measured collections, KDc = mean value for the length of measured collections and KDx = minimum value for the width of measured collections, KDy = maximum value for the width of measured collections, KDz = mean value for the width of the measured collections. Quotient of spore indicates length-width ratio ($Q = L/W$) and is presented here as Qa-Qc-Qb where Qa = minimum quotient value amongst measured collections, Qb = maximum quotient value amongst measured collections, Qc = mean quotient value amongst measured collections. Herbarium name follows Holmgren & al. (1990).

Tylophilus pseudoscaber (Secretan) Smith & Thiers, The Boletes of Michigan: 96. 1971. *Boletus pseudoscaber* Secretan, Mycogr. Suisse 3:13. 1833. **(Fig.1 & 2)**

Pileus 55 - 90mm in diam., convex becoming planoconvex with maturity, surface dry, velutinous to subtomentose, smooth to finely areolate, Cigar brown (16) at the centre, paler up to Hazel (27) towards margin; margin entire, decurved. Pore surface depressed near the juncture of stipe with age, dingy yellow to reddish brown, becoming greenish blue to grayish brown after bruising; pores circular, 2 - 3 per mm. Tubes 1.2 - 1.5mm long, white to pale cream (3C), becoming greenish blue when bruised or exposed, then brownish gray. Stipe 57 - 90 × 17 - 20mm, subventricose to clavate, dry, with longitudinal irregular veins (not forming reticulation), solid-stuffed, Cigar brown (16) or concolorous to pileus but whitish towards base. Pilear context 10 - 20mm thick in the centre, tapering at margin, soft, white to pale cream (3C), bluing initially after exposure, then becoming Clay pink (30) to Reddish brown and finally grayish black. Pileipellis staining Blood red (41) with KOH, context turning Apricot (47) with KOH, Dark green (60) with FeSO₄. Odour pungent. Taste mild. Spore print dark reddish brown.

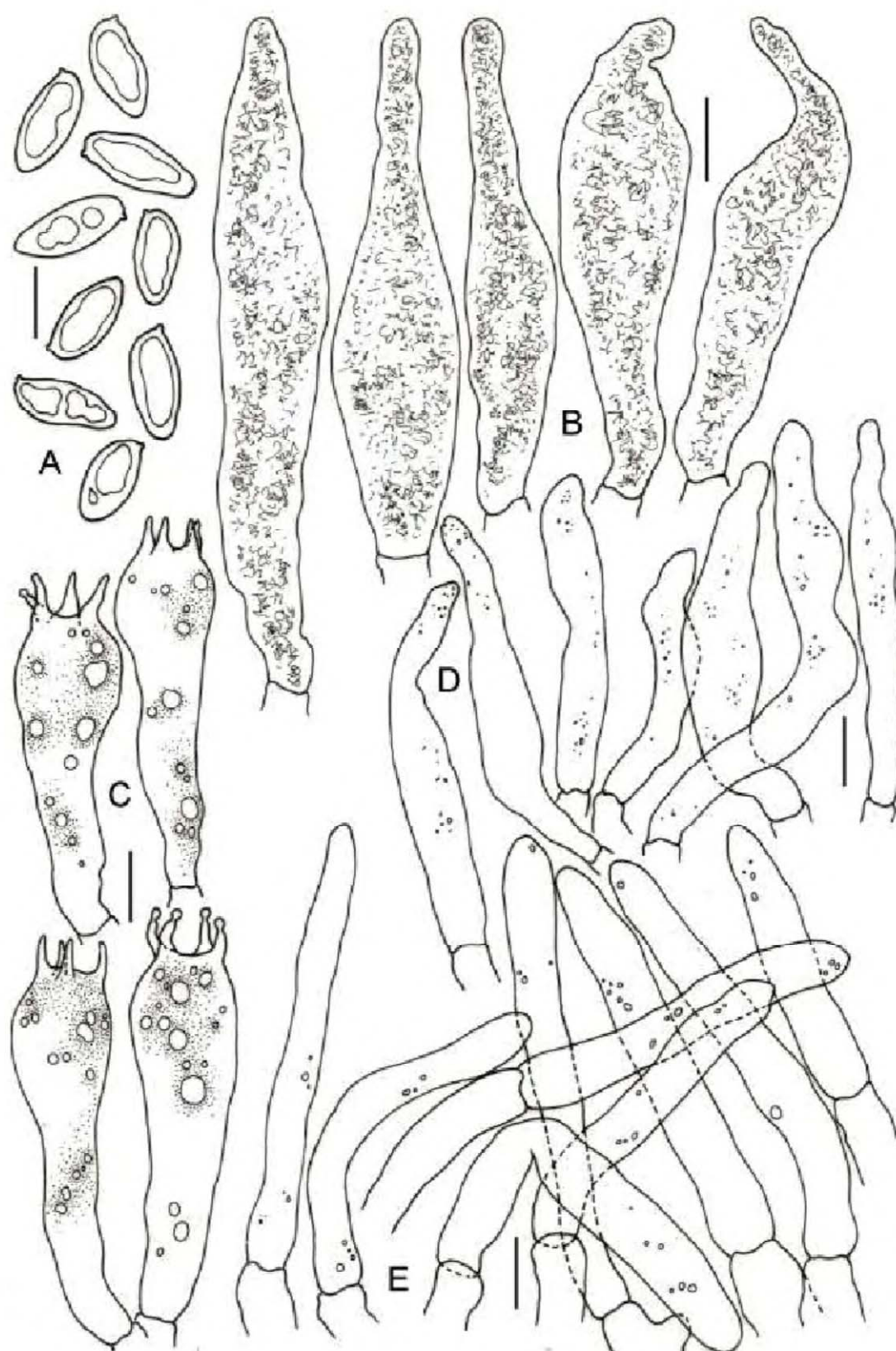


Fig. 1. *Tylopilus pseudoscaber* (Secretan) Smith & Thiers: **A.** Basidiospores; **B.** Hymenial cystidia; **C.** Basidia; **D.** Cross-section through stipitipellis showing the terminal cells; **E.** Radial section through pileipellis showing the terminal cells. Bars = 10 μ m. (KD-11 - 134, drawn by K. Das)



Fig. 2 - *Tylopilus pseudoscaber* (Secretan) Smith & Thiers: A & B. Dorsal and ventral view of fresh basidiomata

Basidiospores $12.7 - 14.2 - 17 \times 6.0 - 6.5 - 7.0\mu\text{m}$ ($Q = 1.89 - 2.26 - 2.57$), subfusoid to subcylindric to elliptic in face view, inequilateral in side view, thick-walled. Basidia $43 - 56 \times 13 - 17\mu\text{m}$, clavate, four-spored. Hymenial cystidia $60 - 85 \times 11 - 16\mu\text{m}$, Snuff brown (a: 17) in KOH, smooth, slightly thick-walled, fusoid to subfusoid, fusoid-ventricose, mostly with elongated tapering apex. Tube trama divergent hyphae up to $10\mu\text{m}$ wide, septate, branched. Pileus trama with interwoven hyphae; hyphae up to $15\mu\text{m}$ wide, septate, branched. Pileipellis a trichoderm, hyphal tip brownish in KOH, never encrusted, terminal cell $40 - 70 \times 6.5 - 9\mu\text{m}$, mostly tapering towards apex. Stipipellis as tangled trichoderm, hyphal tip brownish in KOH, terminal cell $35 - 70 \times 5 - 8\mu\text{m}$, subcylindric to subfusoid. Clamp connections absent.

Habit and Habitat: Solitary, scattered to gregarious on the ground in subalpine mixed (broad-leaf and coniferous) forests under *Abies densa* Griff.

Distribution: USA, UK and INDIA.

Specimens examined: India: Sikkim: Shingba *Rhododendron* Sanctuary: near Yumthang 3580m, N $27^{\circ}46'41.9''$ E $88^{\circ}42'38.2''$, 29.8.2011, K. Das, KD 11-134 (BSHC); *ibid.*, 1.9.2011, K. Das, KD 11 - 171 (BSHC).

Notes: *Tylopilus pseudoscaber* is a rare species in this locality and is characterized by its dark brown to grey subtomentose medium sized pileus, dingy yellow to reddish brown pore surface, white to pale cream tubes becoming greenish blue to brownish grey after exposure, concolorous stipe, and the context that initially becomes bluish then clay pink to reddish brown and finally greyish black after exposure (Besette & al., 2010; Smith & Thiers, 1971). Turning of pileipellis to blood red with the application of KOH is quite distinct (Besette & al., 2010). Morphology of Indian collections are in conformity with their American counterparts (Smith & Thiers 1971) except the hymenial cystidia which are somewhat longer in the present sample (pleurocystidia in the collection of Michigan are $50 - 65 \times 10 - 16\mu\text{m}$).

Allied species *Tylopilus porphyrosporus* (Fr. & Hök) A.H. Sm. & Thiers can be separated from the species in discussion by its smaller (40 - 70mm diam.) pileus, tubes that turn brown and never become blue or greenish blue (Smith & Thiers, 1971) when exposed or bruised and the context that also turns brown when exposed (Phillips, 2005) without an intermediate bluing.

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REFERENCES

- BESSETTE, A.E, W.C. ROODY AND A.R. BESSETTE. 2010. North American Boletes. Syracuse University Press, USA.
- DAS, K. 2010. *Kuehneromyces mutabilis* (Schaeff.) Singer & A.H. Sm.; a new record for India. *Phytotaxonomy* 10: 109 - 111.
- DAS, K. AND A. VERBEKEN. 2011. Three new species of *Lactarius* (Russulaceae) from Sikkim, India. *Cryptog. Mycol.* 32(4): 365 - 381.
- DAS, K. AND A. VERBEKEN. 2012. New species of *Lactarius* subg. *Plinthogalus* and new records of *Lactifluus* subg. *Gerardii* (Russulaceae) from Sikkim, India. *Taiwania* 57(1): 37 - 48.
- DAS, K. AND D. MISHRA. 2010a. *Leratiomyces squamosus* var. *thraustus* (Kalchbr.) Bridge & Spooner: a new record for India. *Phytotaxonomy* 10: 106 - 108.
- DAS, K. AND D. MISHRA. 2010b. *Pallus calongei* G. Moreno & Khalid - a new record for India. *Nelumbo* 51: 225 - 226.
- DAS, K. AND J.R. SHARMA. 2010. *Hericium cirrhatum* (Pers.) Nikol., a new record to Indian mycoflora. *Kavaka* 37: 47 - 49.
- DAS, K. AND R. ZHAO. 2012. Bird's Nest fungi in India: a new record from Sikkim. In: A. BIJU KUMAR, M.P. NAYAR, R.C. VERMA, C.K. PEETHAMBARAN (eds.), Biodiversity & Taxonomy. 61 - 68. Narendra Publishing House, New Delhi.
- DAS, K., J. STALPERS AND U. EBERHARDT. 2011. A new species of *Hericium* from Sikkim Himalaya (India). *Cryptog. Mycol.* 32(3): 285 - 293.
- DAS, K., K. VAN DE PUTTE AND B. BUYCK. 2010. New or interesting *Russula* from Sikkim Himalaya (India). *Cryptog. Mycol.* 31(4): 373 - 387.
- Flora of British fungi: Colour identification chart. 1969. Her Majesty's Stationery Office, Edinburgh.
- HOLMGREN, P.K., N.H. HOLMGREN AND L.C. BARNETT. 1990. Index Herbariorum. Part 1: Herbaria of the world, 86th ed. Bronx: New York Botanical Garden, USA.
- PHILLIPS, R. 2005. Mushrooms and other Fungi of North America. Firefly Books (U.S.) Inc., New York, USA. 319 pp.
- SMITH, A.H. AND H.D. THIERS. 1971. The Boletes of Michigan. University of Michigan Press, Ann Arbor, USA. 428pp.