

day grub duration, consumed on an average, 18 and 30 aphids respectively. The aphid consumption of the third and fourth instars with one dry grub period was 30 and 31 while it was 42 and 45 for those having 2 days grub stage. In order to complete the grub duration, a grub had to feed upon 126 aphids on an average in a period of about 6 days. Fully grown grub attaches itself to leaf surface with the help of the posterior end of the abdomen and pupates. The pupal period lasts on an average for 3.3 days. The adult is more or less spherical with orange red elytra bearing a number of irregular black spots. The beetles of this species measured 5.1 ± 0.28 mm in length and 2.8 ± 0.13 mm in breadth while the adults of *C. septempunctata* were 7.2 ± 0.35 mm in length and 4.9 ± 0.32 mm in breadth.

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A NEW SPECIES OF *PANEOLUS* FROM INDIA

DURING the survey of Mushrooms of South West India, the species of *Paneolus* was collected from Kottayam, Kerala State, which was tentatively identified as *P. campanulatus* (Fr.) Quelet, on the basis of its morphological characters. The subsequent detailed microanatomical characterization, however, revealed that the present specimen of *Paneolus* differed from *P. campanulatus* in having (1) smaller basidiospores than those reported for¹ *P. campanulatus*; (2) presence of numerous incrustated pleurocystidia which are reported¹ to be absent for later; (3) presence of two types of pileocystidia, which are of only one type in the later¹ and, (4) presence of pear-shaped bi or tetrasporic basidia in the present specimen as against the broadly clavate and only tetrasporic basidia reported¹ in the later species. In the authors' opinion this is a significant difference which warrants a separate accommodation of the present specimen in a new species, which is named as *Paneolus indicus* and is described below along with its Latin diagnosis.

Paneolus indicus sp. nov. Sathe and Daniel (Figs. 1 and 2)

HABIT : Coprinoid.

PILEUS : 1.5-1.8 cm broad; campanulate, obtusely umbonate; smoke grey, dark smoke grey on umbo; smooth; fleshy; non-striate; margin entire, splitting with age, inflexed when dry; appendiculate with white veil; pileal surface: an epithelium (cellular

consisting of isodiametric cells, $14.3-22.88 \times 11.44-12.87 \mu\text{m}$, thin walled, hyaline, pileocystidia finger-shaped with uneven outline, broadly strangulate at base, $42.9-45.76 \times 5.73-11.44 \mu\text{m}$, thin walled, hyaline, weakly cyanophilous, few pleurocystidial type also present; pileal hairs absent; context thin fleshy. $90-125 \mu\text{m}$ thick

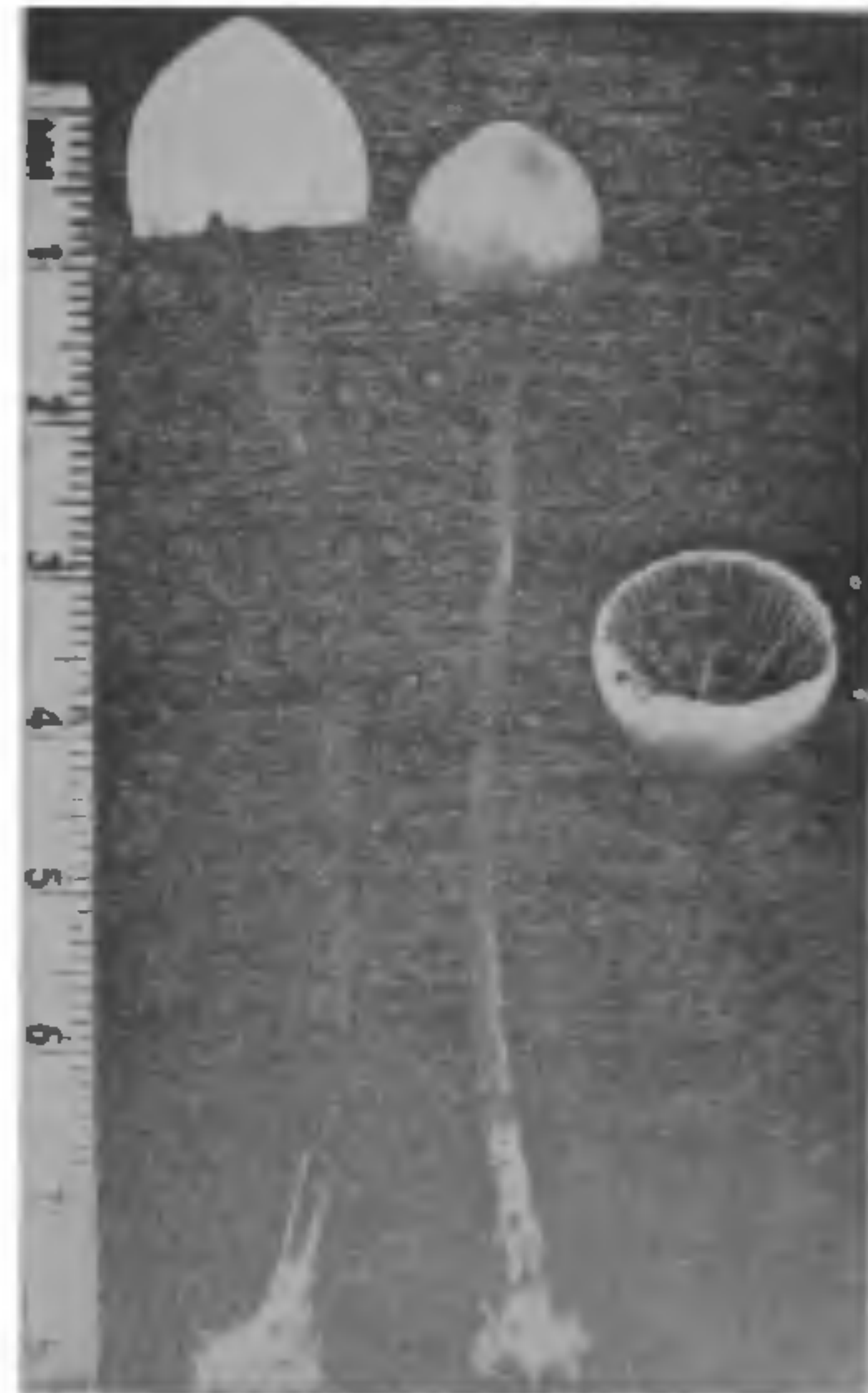


FIG. 1. Habit photograph.

LAMELLAE : Adnate, 1 mm broad, unequal with lamellulae 2 lengths; non-separable; black; fleshy; $45.76-57.2 \mu\text{m}$ wide at base, $42.9-51.48 \mu\text{m}$ wide at edge; spaced at $180-281.25 \mu\text{m}$ interval; hymenophoral trama regular with parallel hyphae; lamellar surface euhymenial, subhymenium not differentiated; pleurocystidia numerous, pear-shaped, $22.88-31.46 \times 11.44-17.16 \mu\text{m}$, surface incrustated, arising from trama, strongly cyanophilous but few not taking stain; yellowish in 5% KOH; few dextrinoid and few inamyloid in Melzer.

STIPE : 8-9 cm long, 0.2-0.3 cm broad; greyish-sepia; central; cylindrical; cartilagenous; hollow; shining; caulocystidia similar to pileocystidia, $34.32-48.62 \times 5.72-8.58 \mu\text{m}$; thin walled, hyaline, weakly cyanophilous; inamyloid in Melzer.

HYPHAL SYSTEM : Monomitric with thin walled parallel hyphae, yellowish elsewhere and greyish sepia (faint) in stipe; $2-4 \mu\text{m}$ broad in pileus and lamellae, in stipe both, narrow ($4.30-7.15 \mu\text{m}$ broad) and broad ($8.58-17.16 \mu\text{m}$ broad) hyphae present, hyphae septate and with clamp connections, weakly cyanophilous, inamyloid in Melzer.

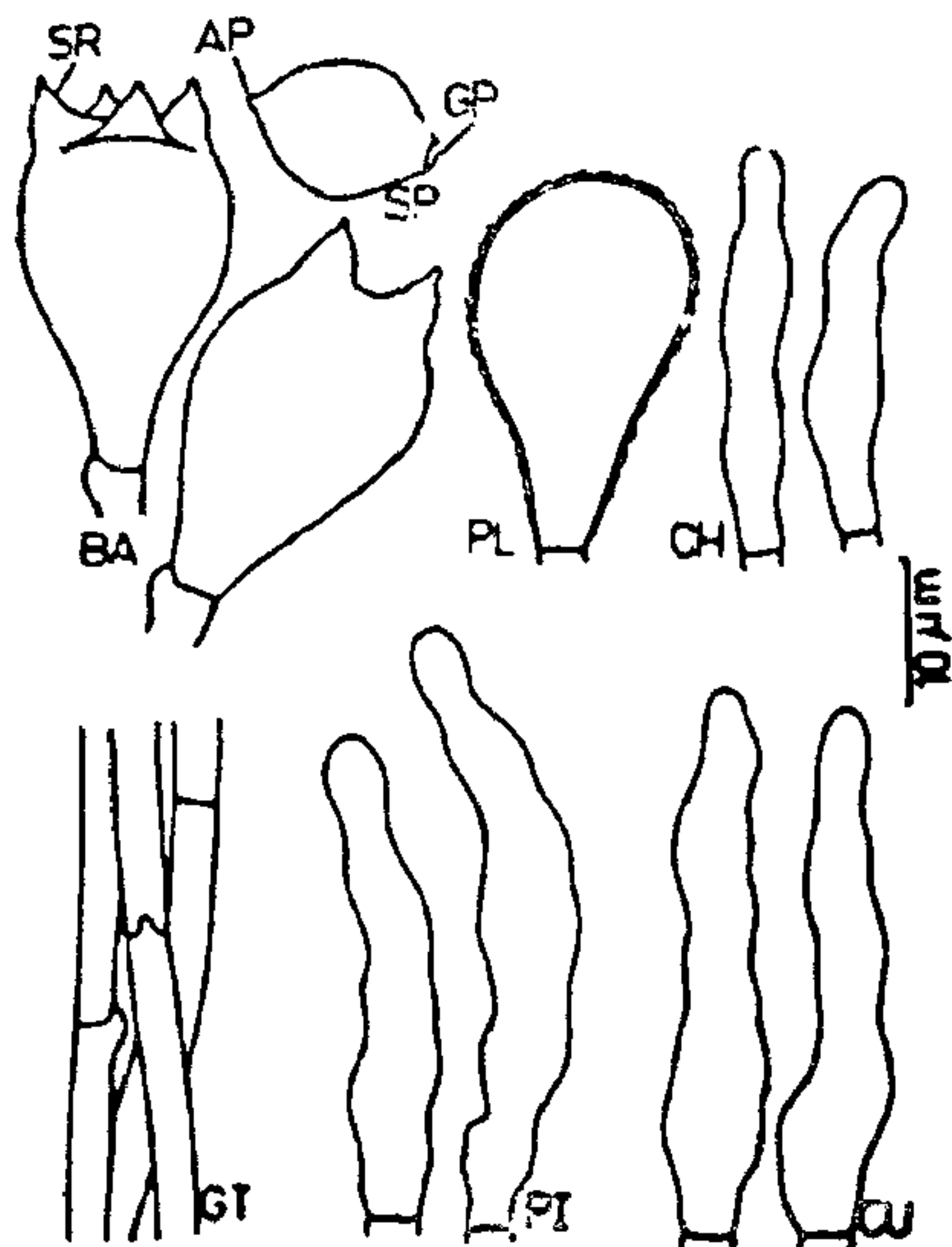


FIG. 2. Camera lucida drawing showing: SP—Spore; AP—Apicula; GP—Gerpore; BA—Basidia; SR—Sterigmata; PL—Pleurocystidia; CH—Cheilocystidia; GT—Gill Trama; PI—Pilocystidia; CU—Caulocystidia.

BASIDIA : (22.88–) 25.74 (–28.6) × (12.87–) 14.30 (–17.16) μm , $Q = 1.8$; bi to tetrasporic; pear-shaped; sterigmata 3.575–5.72 μm long, 3.575–5.005 μm broad; cyanophilous, inamyloid in Melzer.

SPORE PRINT : Leaden black (sooty).

BASIDIOSPORES : 12.87 (–14.30) × (8.58–) 10.00 (–11.44) μm , $Q = 1.285$; oval to broadly ellipsoidal—lemon-shaped with faintly hexagonal outline; wall brownish black, opaque; apicula lateral; not losing colour in sulfuric acid; gerpore truncate with callus, 2.145–2.86 μm wide.

HABITAT : On dung.

GROWTH TYPE : Solitary.

MATERIAL EXAMINED : AMH 4024 (M-609)
HOLOTYPE.

Latin diagnosis :

Paneolus indicus sp. nov. Sathe and Daniel

Species haec et *P. campanulatus* inter sese valde affines sunt, praeter characteres sequentes :

1. Basidiospora parvioribus; 2. Pilocystidis biformis; 3. Pleurocystidis pyriformibus numerosis; 4. Basidiis pyriformibus, bi vel tetrasporis.

Habitato: coprophilo.

Typus locus Kottayamum in Kerala, in parte Indiae austro-occidentali. Holotypus: AMH 4024 (M-609).

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REGENERATION OF PLANTS FROM APICAL MERISTEM TIPS OF SOME LEGUMES

COMPLETE plants have been regenerated from excised shoot apices of various cultivars of *Cicer arietinum*, *Lens esculentum*, *Pisum sativum*, *Phaseolus aureus*, and *P. mungo*. Of the various media tested, the best growth response and development of plants were obtained on Murashige and Skoog's medium supplemented with IAA (2 mg/l) + kinetin (0.5 mg/l). The percentage regeneration of plant was directly proportional to the size of the meristem.

Legumes (pulses) are the main source of dietary protein in India and South America. During the last decade, their yield has become almost static as there has been an enormous loss caused by various pathogens¹, especially viruses. The routine methods of plant improvement seem insufficient to cope with the situation. Therefore attempts are being made to resort to unconventional methods. In this connection, culture of excised meristems is an accepted method employed for obtaining virus free plants². The present communication is part of a project undertaken to explore the possibilities of employing the *in vitro* methods for crop improvement, and deals with the regeneration of entire plants from excised meristem of some pulses.

The seeds of various cultivars of Indian pulses, *i.e.*, *Pisum sativum* L. (cv. PG 3), *Phaseolus aureus* Roxb. (cv. ML 1, ML 5, G 65), *P. mungo* L. (cv. Mash 1-1), *Cicer arietinum* L. (cv. G 543, G 130, L 550) and *Lens esculentum* Moench (cv. L 9-12) were sown in pots under natural conditions. Two to three weeks after germination the shoot tips (1 cm) were removed, surface sterilized with chlorine water for about 15 min and