

- culture, (ed.) T. A. Thorpe, *Proc. 4th Int. Cong. of Plant Cell and Tissue Culture*, IAPTC, Alberta, Canada, 1978, p. 287.
11. Bayliss, M. W., *Int. Rev. Cytol. (Suppl.)*, 1980, A11, 113.
  12. Larkin, P. J. and Scowcroft, W. R., *Theor. Appl. Genet.*, 1981, 60, 197.
  13. D'Amato, F. D., *CRC Crit. Rev. Plant Sci.*, 1985, 3, 73.
  14. Karp, A., In: *Genetic manipulation in plant breeding*, (eds) Horn, Jensen, Odenbach and Schidder, Walter de Gruyter and Co., Berlin, 1986, p. 547.
  15. Murashige, T. and Skoog, F., *Physiol. Plant.*, 1962, 5, 473.
  16. Sacristan, M. D. and Melchers, G., *Mol. Gen. Genet.*, 1969, 105, 317.

### LEUCOCOPRINUS FRAGILISSIMUS (BERK. & BR.) PAT., A NEW FIND IN ORISSA, INDIA

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MEMBERS of the genus *Leucocoprinus* are terrestrial in habitat. They are found mostly on forest debris and are sub-tropical in distribution. The genus contains thirteen well-defined species<sup>1,2</sup>. *L. cepaestipes* is a common species reported from Maharashtra, West Bengal, Gujarat and Madras<sup>3</sup>. In a survey of agaric flora of Orissa from 1980 to 1983 only *L. fragilissimus* was encountered. The species was earlier reported from Ceylon<sup>2</sup>.

Methodology: For taxonomic details and identification of the fungus, Pegler<sup>2</sup> was followed, while colour terminology was according to Ridgway<sup>4</sup>. The new record from India was ascertained using Manjula's<sup>3</sup> list of Basidiomycetes.

*Leucocoprinus fragilissimus* (Berk. & Br.) Pat., *Essai Taxon*: 171 (1900).

Pileus 3.5–5.5 cm broad, convex to planoconvex, fragile; surface yellow, glabrous, often covered with minute yellowish granules, with a circular brownish patch on the umbo; margin sulcate-striate, appendiculate. Lamellae free, sub-ventricose, moderately distant, collariate, thin, 2–2.5 mm broad, whitish

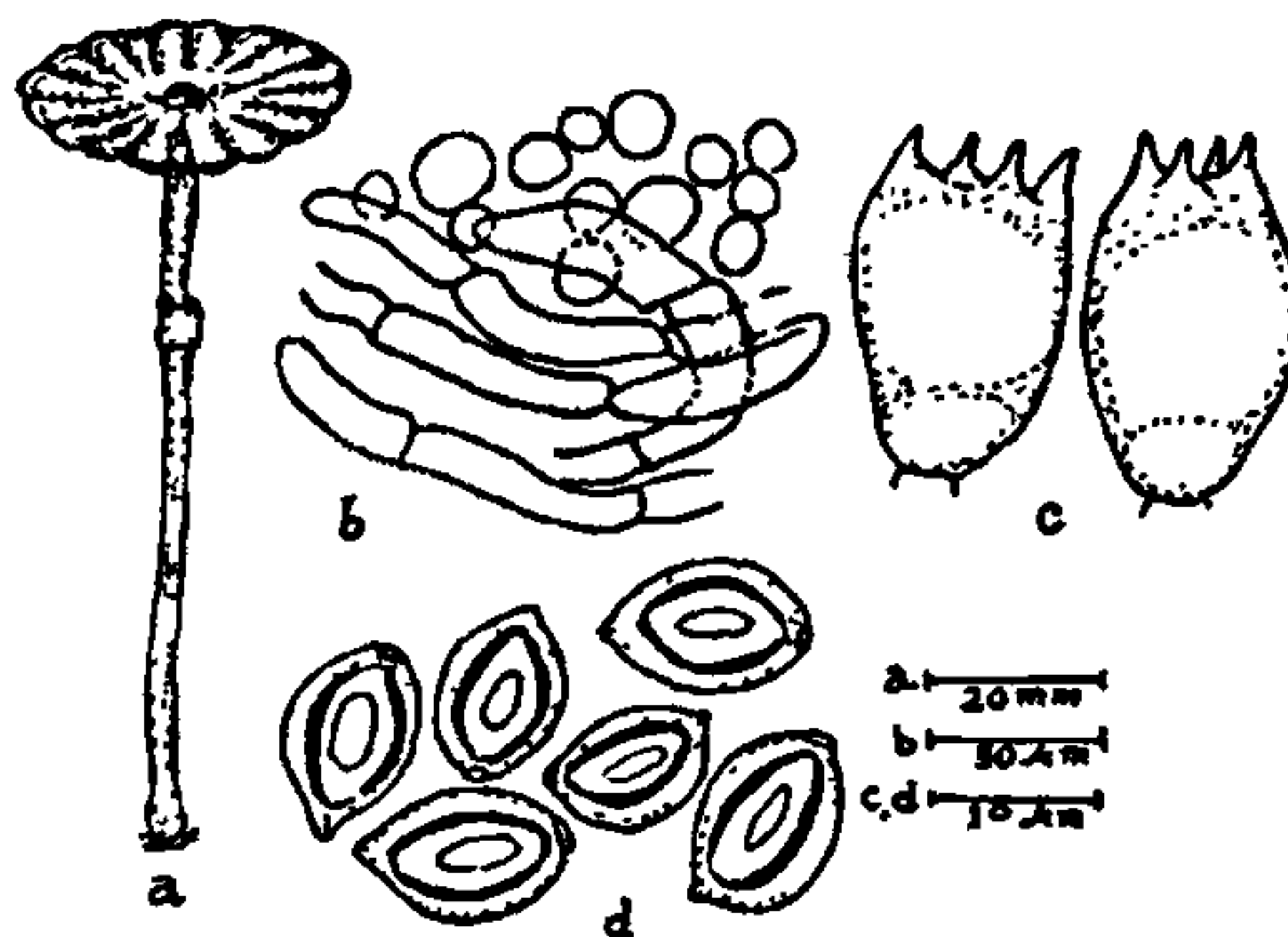


Figure 1a–d. *Leucocoprinus fragilissimus*. a. Habit; b. Pileal epicutis; c. Basidia, and d. Spore.

yellow; lamellulae absent. Stipe 80–110 × 2–2.5 mm, cylindrical, equal, sub-bulbous, pubescent, covered with powdery granules. Annulus superior, movable, falls with age, single, thin, yellowish, powdery. Context papery, white, subdeliquescent, unchanging, interwoven, thin-walled, hyaline hyphae of 8–21 μm diam. Spore print white. Spores 8–12.5 × 6.6–8.8 μm, ovoid to broadly ellipsoid (Q = 1.25 to 1.5), broad truncate germ pore, hyaline, smooth, complex wall, dextrinoid, with a large refractive oil guttule. Basidia 18–23 × 12–15.5 μm, subglobose to wedge-shaped, hyaline, four-sterigmate. Cystidia not traced out. Sub-hymenium layer poorly developed. Hymenophoral trama regular, hyaline hyphae 2.2–4.4 μm broad. Pileal epicutis thin-walled, hyaline, sphaerocyst, 13–21 μm diam., intermixed with hyaline hyphae 6.5–12.5 μm broad. Stipe tissue elongated, hyaline hyphae 10–20 μm broad. Clamp connections absent.

Basidiomata: Solitary, on leaf litter of *Shorea robusta* Gaertn.; Kiriburu Hill Top, District Keonjhar, Orissa; alt. 810 m; leg. M. K. Das; 9.7.1983; H.C.I.O. 36835.

The specimen is deposited at the Herbarium Cryptogamae Indiae Orientalis, Division of Mycology and Plant Pathology, IARI, New Delhi. This is the first report of the species from Orissa, India, and is a new Indian record.

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1. Singer, R., *J. Cramer*, 1975, 915.
2. Pegler, D. N., *Kew Bull.*, 1972, 27, 155.
3. Manjula, B., *Proc. Indian Acad. Sci. (Plant Sci.)*, 1983, 92, 81.
4. Ridgway, R., *Colour standard and colour nomenclature*, Washington DC., 1912, p. 43.

### EFFECT OF STREPTOMYCIN ON THE MORPHOLOGY OF COWPEA *RHIZOBIUM*

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THOUGH much work has been done on antibiotic resistance markers in different *Rhizobium* species<sup>1-3</sup>. Reports on morphological changes after acquisition of antibiotic resistance have been sparse<sup>4</sup>. It has been reported that a *Rhizobium trifolii* strain showed peculiar morphological changes during growth and that the rods changed into a spheroplast-like form<sup>4</sup>. The effect of streptomycin (100 µg/ml) on cowpea *Rhizobium* morphology is reported here.

Young cells of the wild-type parent (control) and mutant (modified, antibiotic-treated) were used for electron microscopic studies. There was shrinkage in both the cell membrane and the nucleus (figure 1). The overall shape of the wild-type cell was ellipsoidal, with a ratio of major to minor axis of 2.4 for cell membrane and 2.8 for the nucleus. The corresponding ratios in the mutant cell were 1.51 (cell membrane) and 1.66 (nucleus). It was also seen that the major and minor axes of the cell membrane were reduced by factors of 2.31 and 1.47 respectively, while major and minor axes of nucleus were reduced by factors of 1.79 and 1.06 respectively. The cell membrane was denser in the mutant cells. The space between nucleus and cell membrane, containing cytoplasm and other organelles, was drastically reduced in the mutant cells. The cell walls, which were less dense but of greater thickness in wild-type cells, were denser and thinner in the mutants. In a number of mutants, they were also fragmented.

The most distinct effect of mutation by streptomycin on cowpea *Rhizobium* was the change in size and shape. This is in agreement with the earlier observation of peculiar morphological changes in

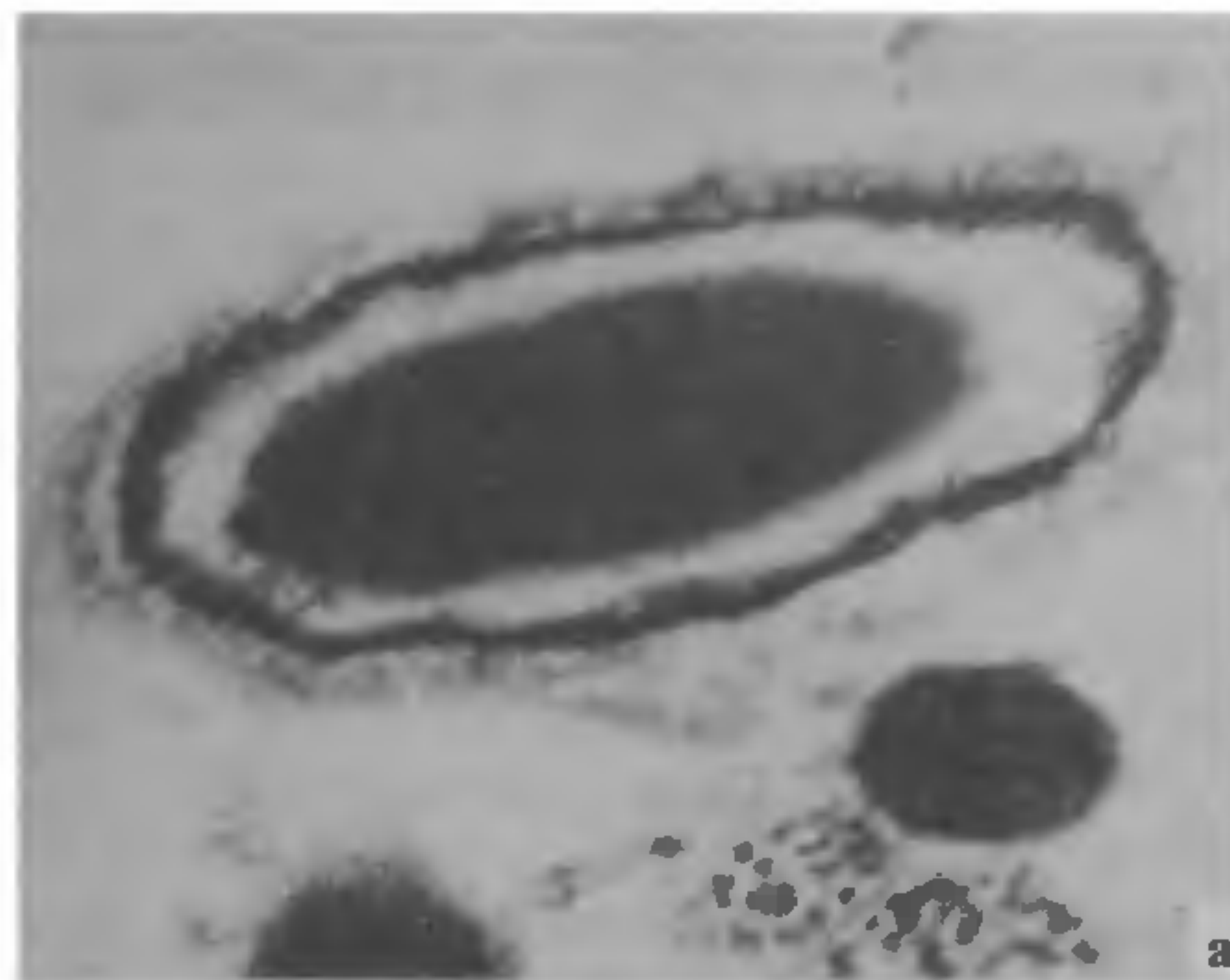


Figure 1a,b. Morphological differences between streptomycin (100 µg/ml) treated mutant (b), and wild type mutant (a).

*Rhizobium trifolii* after mutation with high levels (1000 µg/ml) of streptomycin<sup>4</sup>.

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1. Danso, S. K. A., Habte, M. and Alexander, M., *Can. J. Microbiol.*, 1973, 19, 1450.
2. Obaton, M., *Bull. Ecol. Res. Commun. (Stockholm)*, 1973, 17, 170.
3. Schwinghamer, K. A. and Dudman, W. F., *J. Appl. Bacteriol.*, 1973, 36, 263.
4. Zclazna-Kowalska, *Microbiol. Polonica*, 1973, 26, 233.