Mushroom Research **20 (2) : 125-128, 2011** ***Short communication***

Occurrence of two deadly lepiotas in Western Ghats of Kerala

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ABSTRACT

***Lepiota brunneoincarnata* and *Lepiota subincarnata* are reported as dangerously poisonous mushrooms containing deadly amatoxins. A complete description of these are provided based on collections from Kerala.**

Key words: : Deadly dapperling, *Lepiota brunneoincarnata*, *Lepiota subincarnata*, systematics

Amatoxin poisoning is a medical emergency characterized by a long incubation time lag, gastrointestinal and hepatotoxic phases, coma, and death. This mushroom intoxication is ascribed to 35 amatoxin-containing species belonging to three genera: *Amanita*, *Galerina*, and *Lepiota* (Enjalbert *et al*., 2002). Among severe mushroom intoxications, the amatoxin syndrome is of primary importance because it accounts for about 90% of fatality (Bresinsky & Besl, 1990). *Lepiota brunneoincarnata* Chod. & Mart. and *Lepiota subincarnata* J. Lange are reported to have caused serious poisonings in Europe (Ramirez *et al.*, 1993; Herraez *et al.*, 2002) and America (Hanies *et al*., 1986; Beug *et al.*, 2006; Beug, 2010; Mottram *et al*., 2010). Illustrated accounts of these species collected from Western Ghats of Kerala are presented. The descriptions are based on fresh specimens collected by the authors. Colour terminology used is that of Methuen (Kornerup & Wanscher, 1978). Microscopic characters were studied from free-hand sections mounted in 10% KOH, stained with 1% Congo red. Melzer's reagent, Cresyl blue and Cotton blue were used to study the nature of spores. The specimens are deposited at the Mushroom Herbarium of the Plant Systematics & Evolutionary Science Division, TBGRI {TBGT (M)}.

Lepiota brunneoincarnata Chod. & Mart., Bull. Soc. Bot. Geneve. 5:222. 1889. (Fig. 1 A-F).

Lepiota helveola Bres. Sensu Barla, Champ. Alpes Maritimes, p. 26, 1888.

Lepiota barlae Patouillard, Bulletin Soc. Myc. De France 19, p. 117, (non ss. Quelet) 1905.

Lepiota barlaeana Patouillard, Congr. Soc. Sav., p. 249, 1908.

Lepiota patouillardii, Saccardo et Trotter, Sylloge Fung. XXI, p. 17, 1912.

Pileus 2-5.5 cm (dia.), convex with an obtuse umbo; surface 'dark brown' to nearly black (6F4/7F4/7F6), with dark brown upright pyramidal squamules concentrated and continous at the disk, elsewhere disrupting in to concentric zones of appressed to recurved squamules on a whitish to grayish brown (6B2/ 6D3) background; margin entire. Lamellae free, moderately crowded, ventricose, up to 4 mm

Fig. 1. A-F. *Lepiota brunneoincarnata*. A. Habit x 1; B. Basidia; C. Spores; D. Cheilocystida; E. Cuticular elements-pileus; F. Cuticular elements-stipe

wide, white to 'yellowish white' (4A2), with lamellulae of varying lengths; edge concolorous to the sides. Stipe 3-4 cm x 3-5 mm, central, cylindric, equal with a slightly broader base, fistulose; surface 'greyish orange' (6B3) to 'greyish brown' 6D3), lower half with patches of squamules forming incomplete girdles on the stipe surface, concolorous with the squamules on the pileus. Annulus not observed. Spore print white. Context dull white, up to 3 mm wide, composed of parallel to interwoven, 7.5-21 µm wide hyphae. Spores (6) 8-9 (10) x (2.5) 3-4 (5) µm, oblong ellipsoid, strongly dextrinoid, wall not discolouring in Cresyl blue. Basidia (20) 25-28 x 7-8 µm, clavate, 4-spored, sometimes 2-spored. Lamella-edge sterile; cheilocystida in tufts, clavate to inflated clavate, sometimes septate, 18-32.5 x 8-10.5 µm, thin-walled, hyaline. Pleurocystida absent. Hymenophoral trama regular, hyaline. Subhymenium pseudoparenchymatous. Pielipellis a compact to discontinuous trichodermium, formed by more or less erect unbranched, clavate to cylindric elements, 29-141 x 10-11 µm, with a thickened brown wall. Hyphae with brown parietal pigment and clamp-connexions. Stipitipellis a cutis of cylindrical, hyaline hyphae with elements similar to the pileal surface.

Solitary to scattered, terrestrial, on soil rich in nutrients.

Specimens examined: India, Kerala State: Kollam District: Thenmala, 14 June 2005, No. 8944; Thiruvananthapuram District: TBGRI campus, 9 June 2008, No. 11024; 12 June 2008, No. 11073; 30 July 2008, No. 11553; 4 Aug. 2008, No. 11578; 11 June 2008, No. 11062.

L.brunneoincarnata is placed in Sect. *Ovisporae* (L.Lange) Kuhner, on the basis of the differentiated terminal elements of the pileipellis hyphae and the ovo-ellipsoid spores. The species is characterized by the chestnut brown squamules on the pileus and stipe surfaces and microscopically by their large spores. The present collection from the Western Ghats of Kerala agrees well with the description of the species from Netherlands (Vellinga, 2001). *L.plumbicolor* (Berk. & Br.) Sacc., another common species in the Western Ghats belonging to Sect. *Ovisporae* (Pegler, 1986), is closely related with similar macro and micromorphogolgical characteristics, but differs in the distinctly elongate-ellipsoid to subamygdaliform spores with a slight apical attenuation. *L.brunneoincarnata* is a highly toxic species, causing just as *Amanita phalloides*, severe damage to the liver, which can result in death (Lincoff & Mitchell, 1970; Furia *et al.*, 1982; Calonge *et al.*, 1987; Meunier *et al.*, 1995; Epis *et al.*, 2010).

Fig. 2. A-F. *Lepiota subincarnata*. A. Habit x 1; B. Basidia; C. Spores; D. Cheilocystida; E. Cuticular elements-pileus; F. Cuticular elements-stipe

Lepiota subincarnata J. Lange, Fl. Agar. Dan. 5: V. 1940. (Fig. 2 A-F).

Lpiota josserandii Bon & Boiff. in Bull. Trimmest. Soc. Mycol. Fr. 90: 289. ('1974') 1975.

Leucoagaricus josserandii (Bon & Boiff.) Raithelhuber in Metrodiania 17: 75. 1989.

Lepiota subincarnata var. *josserandii* (Bon & Boiff.) Gminder in Beitr. Kenntn. Pilze Mitteleur. 12: 69. 1999.

Lepiota josserandii var. *rosaburnnea* Raithelhuber in Metrodiana 16: 42. 1988.

Pileus 1-3 cm (dia.), convex soon plano-convex to plane with a low obtuse umbo; surface 'cinnamon brown' to 'reddish brown' (6D6/8E6/8E7/8E8), disrupting except at the disk in to concentric squamules entire at the disk, scattered towards the margin, appressed to recurved when young distributed on a pinkish cream background; margin straight, entire, incised. Lamellae free, ventricose, up to 3 mm wide, creamy white becoming buff with age, close, with lamellulae of different lengths; edge entire, concolorous to the sides. Stipe 1.5-3.5 cm x 2-4 mm, central, cylindric, hollow, equal or slightly broader at the base, with white mycelial cods; surface concolorous with the pileus, with reddish brown appressed, floccose, patches of scales distributed as incomplete bands in lower half, smooth ad glabrous above; surface turns brown on handling. Annulus not persistent, fragmenting in to irregular floccose remnants of the partial veil. Spore print white. Context dull white, thin, composed of parallel to interwoven, 4-11 µm wide hyphae.

Spores (4.5) 5-6.5 (7) x 3-3.5 (4) µm, ellipsoid, dextrinoid, strongly cyanophilous, not mtachromatic in Cresyl blue. Basidia 16-21 x 5-6 µm, clavate, 4-spored, sometimes 2-spored. Lamella-edge sterile; cheilocystida abundant, clavate to inflated clavate, sometimes septate, 10-22.5 x 4-8.5 µm, thin-walled, hyaline. Pleurocystida absent. Hymenophoral trama sub regular, hyaline of thin-walled, 2-5 µm wide hyphae. Subhymenium pseudoparenchymatous. Pileal surface covered with erect elements, 33.2-150 x 6.5-11.5 m cylindric with rounded or attenuate apices, narrower in basal part, straight or twisted, with parietal brown pigment and brownish walls. Stipitipellis a cutis of cylindrical elements; squamules made up of elements similar to that of the pileus. Clamp-connexions present on all tissues.

Solitary to scattered, on soil rich in nutrients.

Specimens examined: India, Kerala State, Thiruvananthapuram District: TBGRI campus, 27 April 2005, No. 8756; 7 June 2005, No. 8898; Thannimoodu, 31 May 2006, No. 9703; 29 April 2010, No. 13192 .

This small species of *Lepiota* distinguished by it reddish brown scales on the pileus and stipe surfaces is the type species of Sect. *Ovisporae*. Collections from Kerala are in close agreement with those cited from Kenya (Pegler, 1977). *L. subincarnata* from Netherlands (Vellinga, 2001) differs in having larger spores. This is one of the several small *Lepiota* species that have lethal levels of amatoxins and like *L.brunneoincarnata* is very toxic, inducing gastrointestinal, hepatic and renal toxicity (Ge´rault, 1976, 1977; Enjalbert *et al*., 2002; Mottram *et al*., 2010).

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