

Occurrence of the deadly *Amanita phalloides* in the Western Ghats of Kerala

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Amanita phalloides is considered a distinct species and reported as a dangerously poisonous mushroom containing atleast two amatoxins, alpha and beta-amanitin. A complete description of the species is given based on collections from Kerala.

Key Words : Death cap, systematics

Amanita phalloides (Vaill. ex Fr.) Secr., is not very rare in India. Nevertheless, it is uncommon enough and many Indian mycologists did not have the opportunity to see a fresh specimen. Several collections of a greyish *Amanita* were made during the course of our investigations on the macrofungal diversity of Kerala. Mycological examinations established that these specimens agreed with the description of *Amanita phalloides*. All collections for which habitat informations are recorded were made in association with *Acacia*.

Terminology, abbreviations and methodology are described as in Tulloss *et al* (1992). Colour codes are from Kornerup and Wanscher (1967). All anatomical studies were done on fresh materials collected by the authors. Microscopic examinations of tissues were made in 5% KOH, stained with 1% Congo Red. All the specimens are deposited in the Mycological herbarium of the Microbiology division under TBGRI (TBGT).

Amanita phalloides (Vaill. ex Fr.) Secr., *Mycol. Suisse*, 1: 8(1833).

= *Agaricus phalloides* (Vaill. ex Fr.) Syst., *Syst. Mycol.*, 1 : 13 (1821).

= *Venenarius phalloides* (Vaill. ex Fr.) Murr. in *Mycologia* 4 : 24 (1912).

= *Amanita phalloides* (Vaill. ex Fr.) E.J. Gilb. in *Bres., icon. mycol.* 21, sppl. 1 : 78 (1941).

Fig. 1, A-G

Pileus : 3.5-6.5 cm diam., convex to plane to depressed in age, with slight umbo ; surface 'grey' (4B1-4C1) to 'greyish beige' (4C2) or 'greyish brown' to 'yellowish brown' (5E3-5E4), streaked with innate radiating fibrils, sometimes becoming almost white when exposed to rain, the fibrils often splitting at places revealing the white context below in dry weather ; viscid to sub viscid when young, becoming dry and glistening when old, occasionally with a single large patch of white universal veil tissue on the cap which soon disappears ; margin irregular and undulating when old, nonappendiculate, non-striate but rimose in many, becoming upturned with age ; context white, up to 4 mm wide, not bruising or staining on exposure.

Lamellae : free, white during all stages of development or becoming very pale yellow with age, unchanging when bruised, up to 5 mm broad, ventricose, crowded with lamellulae of four lengths.

Stipe : 5-9 cm × 4-7 mm, central, equal or slightly tapering towards the apex, white with 'hair brown' (5E4) surface fibrils below the annulus ; context white, fibrous, unchanging ; annulus white, membranous, flaring, superior, striate on the upper

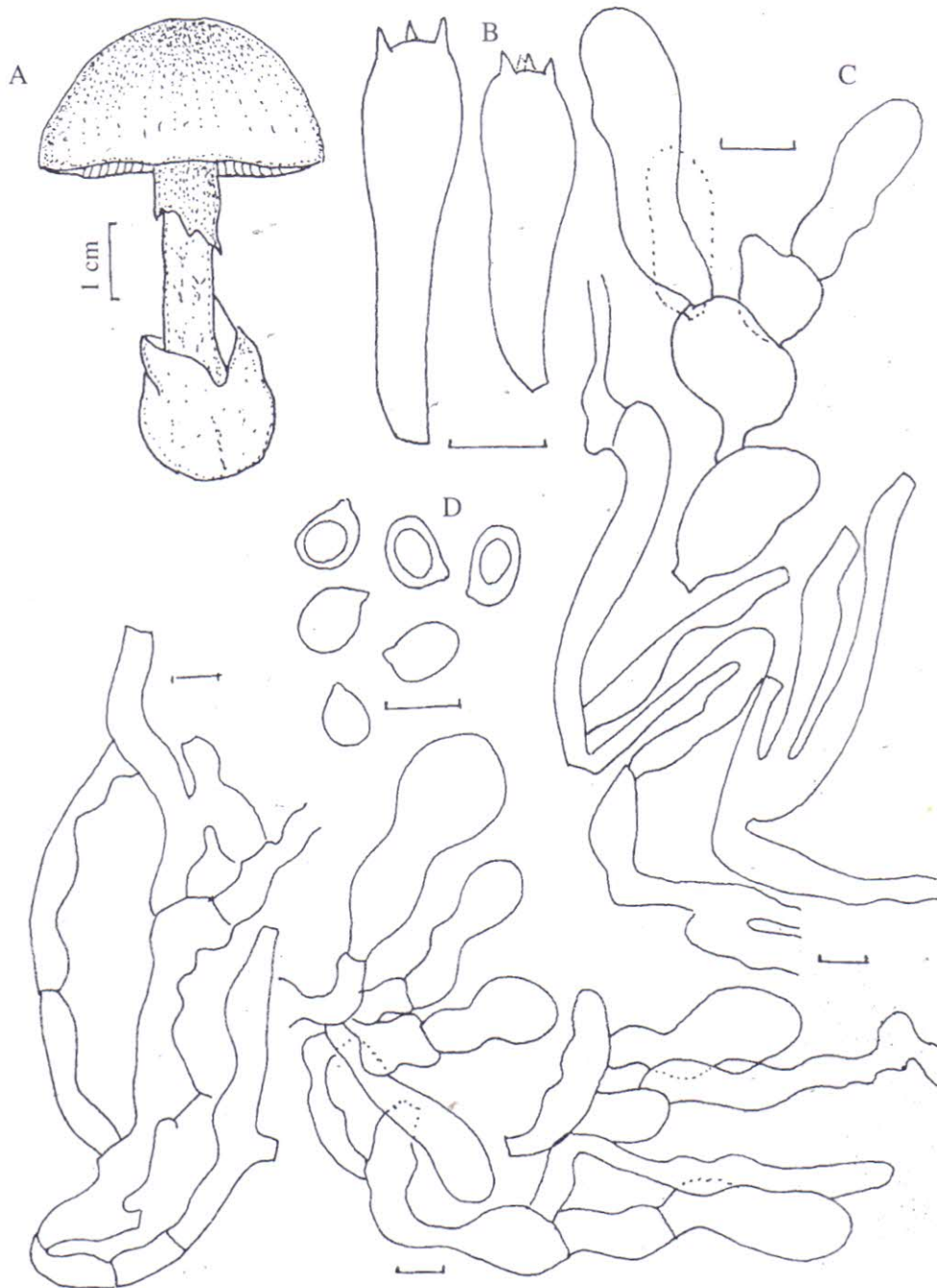


Fig. 1 : A-G. *Amanita phalloides*

Occurrence of the *Deadlyamanilia Phalloides* in the Western Ghats of Kerala.

A. habit $\times 1$; B. basidia ; C. hymenium and subhymenium ; D. spores ; E. universal veil from stipe base ; F. universal veil on pileal surface ; G. partial veil.

part, smooth below, eventually collapsing on the stipe ; basal bulb ovoid ; universal veil saccate, white membranous, 3-lobed, up to 3 cm high. Odour not characteristic. Taste not recorded. Macro chemical tests : H_2SO_4 on lamellae ; purplish colour is developed within seconds when a drop of conc.

H_2SO_4 is applied to the gills of fresh specimens. KOH on surface and context of fresh basidiocarps, negative. HCl and HNO_3 , negative.

Pileipellis : filamentous, undifferentiated hyphae 3-9 μm diam., gelatinized, mostly radially arranged ;

oleiferous hyphae scattered. **Pileus context** : filamentous, closely packed undifferentiated hyphae, 3-18 μm diam., interwoven, branched, lacking clamp connexions. **Lamella trama** : bilateral, divergent from a narrow central strand, hyphae cylindrical to inflated, mainly cylindrical on the central strand, inflated up to 28 μm diam., thin-walled, hyaline. **Subhymenium** : cellular, basidia arising directly from the inflated cells of the trama or from small inflated cells arising singly or in chains of two from the inflated cells of trama. **Basidia** : 34.5-40.5 \times 9-10.5 μm , 4 spored, with the sterigma up to 6 μm long, thin-walled ; clamps not observed. **Universal veil** : On the pileus : filamentous, undifferentiated, septate hyphae, 1.5-7.5 μm diam., branched. At stipe base, exterior surface : longitudinally arranged fascicles of branched, filamentous, undifferentiated hyphae 4.5-9 μm diam., oleiferous hyphae occasional. **Partial veil** : filamentous, undifferentiated hyphae, 1.6-4 μm diam., inflated cells common, terminal or in chains, clavate to broadly clavate, 12.8-62.4 \times 7.2-16 μm . oleiferous hyphae occasional, often branched, in coils and knots. **Stipe context** : acrophysalidic, filamentous, undifferentiated hyphae, 2.5-7.2 μm diam., acrophysalides 50-212.5 \times 15-27.5 μm , oleiferous hyphae 4.8-9.6 μm diam.

Basidiospores : [180/9/6] (5.5-) 8.8-10.5 (-11.2) \times (5-) 6.5-7.5 (-8.8) μm [L = (8-) 8.5-9.5 (-10) \times (5) 6.5-7.5 (8) μm ; L' = 8.9 μm ; W = (5) 6.5-7.5 (8) μm ; W' = 6.5 μm ; Q = (1.15-1.27) 1.35-1.45 (-1.51) ; Q' = 1.37], weakly amyloid to amyloid, hyaline, thin-walled, subglobose to broadly ellipsoid, smooth. Color in deposit white.

Distribution and Habitat :

India, Kerala state, Perayam, Thiruvananthapuram, in *Acacia* plantations, in troops on ground among leaf litter.

Collections examined :

19 April 2004, S7086 ; 20 April 2004, S7087 ; 21 April 2004, S7093 ; 22 April 2004, S7097 ; 28 April 2004 ; 29 April 2004, S7107.

Amanita phalloides is placed in the SUBGENUS *Lepidella* (E. J. Gillb.) Ves. *Emend* Corner & Bas section *Lepidella* (Fr.) Quel. of the GENUS *Amanita* by virtue of its ellipsoid, amyloid spores, non-striate pileal margin and saccate volva. *Amanita phalloides* is generally recognized by the brass green to yellow or greyish to olive colours of the pileus, white lamellae when fresh, the white stipe with an enlarged bulbous base and the well developed, free, marginal volva (Ammirati *et al.*, 1977). The specimens collected from Kerala were greyish brown to yellowish brown, some times becoming almost white at the disc, without any traces of green. According to Krieger (1936), the cap of the true *A. phalloides* should be green. But Murrill (1914) described the pileus colour as varying from pure white to yellow i.e., yellowish green, green, grey, brown or blackish. In all other aspects, material from Kerala is identical with the Californian material described by Ammirati *et al.* (1977). A purplish colour developed within seconds when a drop of conc. H_2SO_4 was applied to the gills of fresh specimens. Lange and Hora (1963) claim that this colour reaction is specific for *A. phalloides*.

A. phalloides is reported to be associated with Oaks (Ammirati *et al.*, 1997) ; conifers (Pamerleau, 1966) and *Acacia* (Pegler, 1977). Materials from Kerala were associated with *Acacia mangium*. *A. phalloides* is very rare in the Western Ghats of Kerala and forms the first report of the species from southern India. The only report of *A. phalloides* from India is from Uttar Pradesh (Bhatt *et al.*, 1999).

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