

Research Note: Contribution to Mushroom Flora of Rawalpindi-Islamabad, Pakistan

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RESEARCH NOTE: CONTRIBUTION TO MUSHROOM FLORA OF RAWALPINDI – ISLAMABAD, PAKISTAN.

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ABSTRACT

Seven hymenomycetous fungi (mushrooms) were collected from the twin cities area during July 2008. These were identified as the members of the order Agaricales, class Basidiomycetes. They belong to five genera: **Clitocybe fragrans*, **Collybia cookie*, **Coprinus radians*, **Coprinus sterculinus*, **Volvariella bingensis*, *Volvariella parvula*, and *Termitomyces microcarpus*. Five of them, marked with asterisk were reported for the first time from Pakistan.

INTRODUCTION

The mushrooms appear in diverse habitats during rainy season and these are seasonal fungi. They also occur in spring when the snow melts. In fact they are the fruit of underground fungal mycelium. Species of mushroom are the indicators of the forest life support system (Stamets, 2000).

The occurrence or absence of fungal species is a helpful indicator to evaluate the ecosystem damage or ecosystem maturity. Data on the diversity of these species in different vegetation types is vital for planning and managing ecosystem biodiversity (Engola *et al.*, 2007). The knowledge of biodiversity at the community and species level is more important for monitoring the effectiveness and effects of natural and artificial disturbances (Packham *et al.*, 2002). Around 41,000 species of Mushrooms are identified (Deshmukh, 2004). Ahmad (1980), Khan *et al.* (1980). Khan (1982) published accounts on Agaricales of Pakistan . Sultana *et al.* (1996) gave an account of edible mushrooms. Sultan *et al.* 2002 published Macromyctes of Margala Hills.

Materials and Methods

Mushroom samples from different parts of Rawalpindi-Islamabad (33.6° North latitude, 73.07° East longitude) were collected during 2008, and were subjected to morphometric (cap, stipe and gills etc) and microscopic (hymenium, basidia and basidiospores; in water mounts and lactophenol) examination. Each specimen was identified to species level. The original measurements are given in description but the figures are magnified diagrammatically. The studied samples have been deposited with Plant Pathology Herbarium, PMAS Arid Agriculture University, Rawalpindi, Pakistan.

RESULTS

It is interesting to note that *Volvariella bingensis* was collected from very unusual place under the Chinese rose bush, Karachi Company Market (G-9 Markaz), Islamabad. The *Coprinus* growing on wood was kept in moist chamber in Plant Pathology laboratory collected from Loibher park. Other species of *Volvariella*, *Clitocybe*, *Termitomyces* were collected from Shamsabad,

Rawalpindi. Identified by comparing with the existing literature on the Fungi of Pakistan (Ahmad *et al.* 1997, Ahmad 1980).

Order: Agaricales (Mushrooms with gills);

Family: Coprinaceae

Coprinus radians (Desm.;Fr.) Fr.

Cap 2 – 3 cm, ochraceous, then turning paler, membranous, companulate then expanded with small mica – like granules, sulcate, margin striate; stipe 2- 5cm x 0.4- 0.8 cm, whitish, narrowing gradually upward under the cap, slightly broader at the base, arising from the thick network of golden to orangish mycelium. Spores darker, opaque, elliptical to fusiform with a germ pore at the tip and acuminate below $9 \times 4 \mu$ (Fig 1). It is not edible due to its size. Saprophytic growing all over the year. Growing in the flowering bed, around Lilly plants, Shamsabad, Rawalpindi, 30th July, 2010. AAUR no. 32.

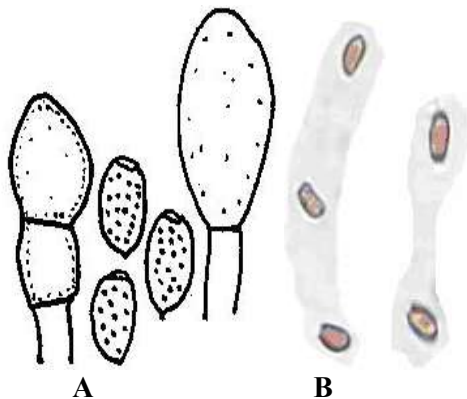


Fig 1. *Coprinus radians*: A, Diagrammatic Spores, Cystidia and B, microphotograph of spores.

Coprinus sterquilinus (Fr.) Fr.

Cap broadly conical narrowing at the tip, elliptic to cylindrical, shaggy, 2-3 cm long and 4 - 6 cm dia, surface grooved and fleecy, whitish, becoming light gray. Stipe short and thin, 2 – 3 cm. Gills ascending, free, white then reddening & blackening in space with exterior grooves

prominent on the surface. Margin uneven or wavy. Cheilocystidia clavate, simple some time narrow at their tips. Basidiospores, blackish, elliptical, opaque, smooth, with prominent germ pore, $20 \times 12 \mu$. It looks like a miniature of *Coprinus comatus*; the identification character which separate it from *C. comatus* by having a rounded ring present at the base of the stipe (Fig 2). On deteriorating wood kept in moist chamber in the plant pathology lab. AAUR no 14.



Fig 2. *Coprinus sterquilinus*: Diagrammatic spores, cystidia & mushrooms and B photograph showing separating ring at the base.

Family: Tricholomataceae

Clitocybe fragrans (With.)Kummer

Cap 1-3 cm, deeply depressed centrally, lemon pale color, comparatively in the depression; color fading with age, margin striate, becoming curved or umblicate on drying; stipe cylindrical, slender, 2 - 4 cm, concolorous, slightly darker at the base; gills lemon color, sloping, basidium $24.6-25 \times 7-7.5 \mu$; four sterigmata 3.5; basidiospores 8×4 , hyaline and white in mass, unequalaterally acuminate (Fig 3). Growing in the flowering bed around Lilly plants, Shamsabad, Rawalpindi, 30th July, 2010. AAUR no. 35.

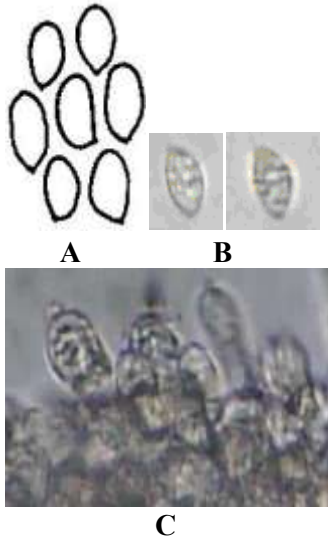


Fig 3. *Clitocybe fragrance*: A diagrammatic; B microphotograph of two spore; C Hymenium showing basidia.

***Collybia cookie* (Bres.) J.D. = *C. cirrhata* (Pers.) Quel. var. *cookie*. Bres.**

Cap 10 – 15, convex slightly depressed in the centre, milky white, stipe 5cm long, selender, flattened below; Gills white, crowded, basidium hyaline 20 -24 x 8 μ , with minute 4 sterigmata; basidiospores 4 – 7 x 2.5- 3.5 μ , unequally compressed, rough, hyaline (Fig 4). Growing on wood stump, Shamsabad, Rawalpindi, 30th July, 2010. AAUR no . 36.

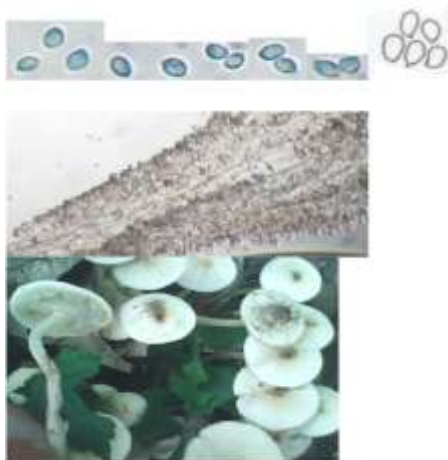
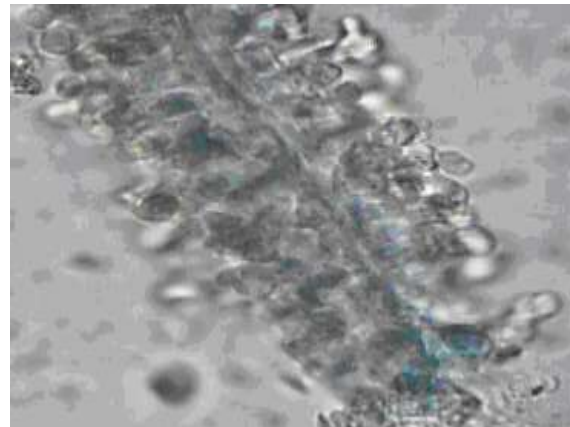


Fig 4. *Collybia cookie*: spores, Hymanium & mushroom.

***Termitomyces microcarpus* (Berk. & Br.) Heim.**

Cap varies in size 2 - 4 cm, flesh, slightly grayish to white, companulate, convex then spread like umbrella with 2 - 5 incisions at the margin, umbonate , comparatively darker than the rest of the cap, cuticle dry and whitish. Stipe shorter than the other species because it was arising from the upper layer of the soil. Stipe 3 – 5 cm or more, slender, whitish, with or without minute ring. Under the cap the white gills almost free, crowded, unequal, flesh white, soft odour and flavour insignificant. Spores white or hyaline elliptical, smooth 5 – 7 x 4- 5 (6) μ (Fig 5). Commonly found in green area of Islamabad, especially in Shakarparian; collected from grassy ground, on woody stump, Shamsabad, Rawalpindi, 30th July, 2010. AAUR no. 38.



A



B

C

Fig 5. *Termitomyces microcarpus*: A, Hymenium, B, mushroom; C micrograph of three overlapping spores.

Family Pluteaceae***Volvariella bingensis*** (Beeli) Schaffer.

Cap of dry specimen 12 – 16 cm dia., umbonate, surface smooth, pale cream, margin not seriate; gills pinkish to light brown, crowded, of three length, of 2 cm broad. Stipe comparatively short, cylindrical, 8 x 1- 1.5 cm, bulbous at the base, yellowish white, smooth. Volva free, context white, arising centrally from the basal cup or volva, consisting of three broad triangular petal like pieces, externally imprinted with more or less rounded, brown shining spots, the margin smooth or wavy. Odour and taste unpleasant. Subhymenial layer pseudoparenchymatous. Pleurocystidia well developed, thin walled with granular contents, trama inverse. Basidiospores smaller, globose to subglobose, mostly looking like heart shaped or triangular with a smallest protuberant, guttulate, ocher colour, 5 – 7 x 5 – 6 μ . Basidia clavate, bearing four sterigmata, up to 4 μ . Long (Fig 6). Growing on soil under the bush of Chinese rose, Karachi Company (G-9 markaz) Islamabad, July 2008. AAUR no. 33.

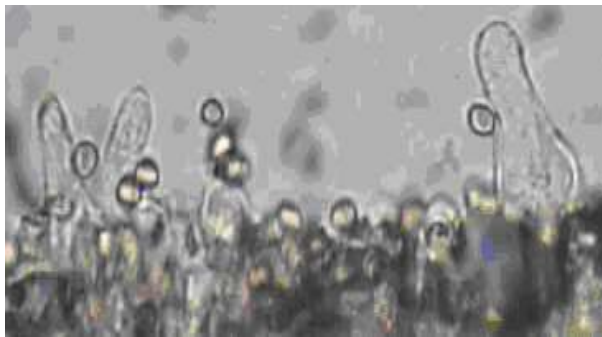
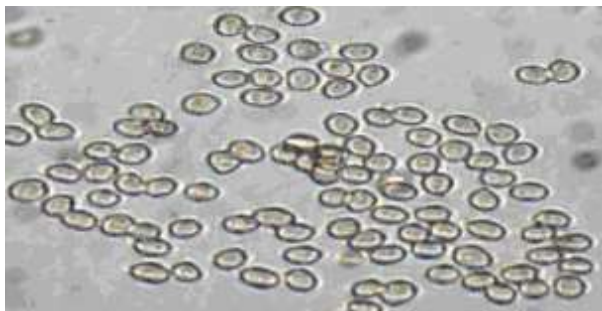
**A****B****C****D**

Fig 6. *Volvariella bingensis*: A, Hymenium showing protruding cystidia; B, spores; C & D mushroom, showing lower and upper side with volva at the base.

Volvariella parvula (Weinm.) Speg.

Cap lightest pinkish white, 9 mm- 1.5 cm dia, conico –campanulate, umbonate, and glistening surface. Gills free, crowded, pinkish, of two lengths, Stipe concolour, slender, cylindrical, 1.5 cm long, smooth, thickened at the base; volva at the base consists of three pointed sepals like fleshy leaves, 5 mm long; pleurocystidia frequent, fusoid, ventricose, hyaline, thin walled; basidia clavate with 4 sterigmata; basidiospores subglobose, acuminate, hyaline, smooth, lightest pink in mass, 4.5 – 6 x 4.5 μ (Fig 7). Growing in the flowering bed, around Lilly plants, Shamsabad, Rawalpindi, 30th July, 2010. AAUR no. 34.



Fig 7. *Volvariella parvula*: Mushroom showing upper and lower side (gills) and volva at the base.

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