

COPROPHILOUS FUNGI OF WEST PAKISTAN. PART IV

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Sixteen species have been recorded for the first time from Karachi on dung except *Podospora ostlingospora* and *Stachybotrys atra*, *Coprinus velox*, *Panaeolus fimicola*, *Penicillium ehrlichii*, *Perichaena corticalis*, *Peziza vesiculosa*, *Physarum pusillum*, *Psilocybe coprophila* and *P. merdaria* which have never been reported from West Pakistan.

Coprophilic fungi reported so far from West Pakistan are given in references 1-5, 7, and 9-12. In the present paper the species reported as new for West Pakistan are *Coprinus velox* Godey apud Gillet, *Panaeolus fimicola* (Fr.) Quèl, *Penicillium ehrlichii* Klebahn, *Perichaena corticalis* Rost; *Peziza vesiculosa* (Bull. ex Fr.) Kummer, *Physarum pusillum* Lister, *Psilocybe coprophila* (Bull. ex Fr.) Kummer, *Psilocybe merdaria* (Fr.) Ricken.

Materials and Methods

The collections examined during the present studies are deposited in the Mycological Herbarium of the PCSIR Laboratories. The herbarium numbers of these specimens are quoted at the end of each of the species described. The methods of study are the same as described in our previous paper^{3,4,5} Illustrations of diagnostic characters with other details are given in references 6,8,13,14,15 as well as other references quoted before.

(1) *Coprinus ephemerus* (Bull. ex Fr.) Fr. p. 252 Hym. Eur. p. 331. Bull. Brit. Mycol. Soc., 2 (1), 31 (1968).

Cap 1-2 cm wide, first panulate to nearly flat, delicately furrowed when young, with narrow prominent folds when old, tan to reddish brown in the centre, paler towards the margin. Gills so narrow as to appear only as raised lines, first white, later black and liquifying. Stem 3-6 cm long, 1-2 mm wide, white, hollow, very fragile. Spores black in mass ovate, cylindrical-elliptical 8-10 × 6-8 μ . Specimen examined: PCSIR Herb. No. 205. On cowdung.

(2) *Coprinus niveus* (Pers.) Fr. Epicr. p. 246.

Pileus white, oval when young, becoming campanulate when old, membranaceous, squamose, subpersistent, 2-3 cm in diameter. Stipe white, 3.5-7.5 cm long, 3.5-5 mm wide; lamellae subadnate. Basidiospores oval, 15.5 × 11.5 μ . Specimen examined: PCSIR Herb. No. 203. On cowdung.

(3) *Coprinus velox* Goday apud Gillet ch. F. p. 614 C. icon. Bull. Brit. Mycol. Soc., 2 (1), 32 (1968).

Pileus minute, up to 7.5 mm. Veil consisting of smooth, globose cells or if ornamented then only with low warts, all of the crystals can be removed with hydrochloric acid. Basidia 4-spored, composed of more than one cell. Basidiospores ellipsoid, 7-9 × 3.4-4.5 μ , always lacking an outer enveloping sac. Specimen examined: P.C.S.I.R. Herb. Nos. 206, 207. On cow and goatdung.

(4) *Memnoniella echinata* (Riv.) Galloway. Mycologia, 46, 632-46 (1954).

Hyphae hyaline, septate, Conidiophores without foot cell, septate, erect, dark coloured and warted with dark granules, 49-90 × 2.5-4 μ . Conidiophores slightly enlarged into rudimentary vesicle from which phialides are developed successively. Phialides 7.5-8.5 × 3.5-4 μ . Conidia one-celled, spherical, about 4.5 μ in diameter, with black pigment, warted, borne in basipetal succession in divergent, unbranched chains. Specimens examined: P.C.S.I.R. Herb. Nos. 106, 199. On cowdung. IMI No. 133804.

(5) *Panaeolus fimicola* Fr. Syst. Myc. Vol. I. p. 30 V Bull. Brit. Mycol. Soc., 2 (1), 35 (1968).

Stipes fragile, obsolete, 6-10 cm long, 2 mm broad; pileus 1-2.5 cm in diameter; basidiospores ovate, elliptic, 10.5-13.5 × 6.5-7.5 μ , distinctly grey under the microscope. Specimen examined: P.C.S.I.R. Herb. No. 202. On cowdung.

(6) *Penicillium ehrlichii* Klebahn Ber. deut. bot. Gesell., 48, 374-389 (1930).

Colonies on Czepek's agar with uneven margins, do not attain more than 2 cm, in two weeks time at room temperature white to pale yellow. Conidial structures limited in number no exudate; odor lacking; reverse in yellow shade. Penicilli few, very irregular in pattern, consisting of irregularly arranged phialides bearing short chains of Conidia. Phialides strongly divergent 10.5-14.5 × 2.5-3 μ , with comparatively long and barrow tips. Conidia elliptical 4.5-5 × 3.5-4 μ , with pointed ends, smooth walled; cleistothecia abundant, globose to oblong, 150-200 μ in diameter, ripening slowly, pseudo-parenchymatous. Asci 8-spored. Ascospores lenticular, with spinulose walls, shallow equatorial furrow and low marginal crests, 3-4 × 3-3.5 μ . Specimen examined: P.C.S.I.R. Herb No. 102. on cowdung.

(7) *Perichaena corticalis* Rost. Mon. 293 (1875).

Sporangia sessile, gregarious, flattened, hemispherical; peridium simple, opening by a lid; the upper part brown, the lower almost black, capitulum feebly developed, smooth, attached to the lid, and usually coming away with it, bringing the brilliantly yellow sporemass and leaving a delicate shining cupule adherent to the substratum; spores yellow, faintly warted, $11-12\mu$ in diameter. Specimen examined: P.C.S.I.R. Herb. No. 198. On cowdung. IMI No. 133808.

(8) *Peziza vesiculosa*. Bull. Herb. Fr. pl. 457. f.1. (1789).

Apothecia gregarious, at first closed and globose, gradually expanding and becoming deep cup-shaped with stem-like base, externally whitish or yellowish, with minute wart-like pustules, reaching a diameter of 6-8 cm; hymenium pale-brown, paler than the outside of the apothecium, asc cylindrical or subcylindric spores obliquely 1-seriate, ellipsoid, smooth, hyaline, $21-23 \times 10.5-11\mu$; paraphyses enlarged above. Specimen examined: P.C.S.I.R. Herb. Nos. 195, 196. On cowdung.

(9) *Physarum pusillum* (Berk. & Curt.) Lister Mycetozoa ed. 2.64 (1911).

Sporangia gregarious, small stipitate, globose, greyish white at first, becoming white as the spores are freed, with a brown base, the sporangium walls thin, stipe slender, longer than the sporangium, brown, rugose, merging into a shallow, cup, like base of the sporangium; capillitium white, spore mass black; spores brown; minutely warted $10.5-11.5\mu$ in diameter. Specimen examined P.C.S.I.R. Herb. No. 183. On cowdung. IMI No. 133805.

(10) *Pilobolus crystallinus* (Wigg.) Sacc. Syll. Fung., 7, 185 (1879).

Sporangiophore slender, yellowish, more or less transparent, apices swollen and club-shaped, 4-4.5 mm high, sporangium hemispherical about 310μ in diameter, black, cuticle verrucose reticulate, Columella bluish, containing numerous spores. Spores elliptical, $6-9 \times 3.5-4.5\mu$ light yellow. Specimen examined: P.C.S.I.R. Herb. No. 197. On goat-dung. IMI No. 133808.

(11) *Pilobolus kleinii* (Van Tiegh.) Sacc. Syll. Fung. VII, p. 185 (1879).

Sporangiophore 2.4 mm tall, apex ventricoinflated, thick, sporangiophore $84-110\mu$ across, arising from a triangular base with rhizoidal connections at both the angles; sporangium globose, spores broadly ellipsoid, $12-13 \times 6-7.5\mu$. Specimen examined; P.C.S.I.R. Herb. No. 194. On cowdung. IMI No. 133806.

(12) *Pilobolus longipus* (Van Tieghem) Sacc. Syll. Fung. p. 185 (1879).

Vesicle at the base of the stipe present, elongated, golden-yellow, 1-2 mm long. Sporangiohores usually 20.5-30 mm long; the sporangial vesicle broadly ellipsoid, some portions contain orange

substance. Sporangia semispherical, black, columella with round membrane, spores oval to spherical, similar, $10.5-12 \times 11.5-14\mu$, with thick, light blue-black membrane. Specimen examined: P.C.S.I.R. Herb. No. 189. On cowdung. IMI No. 133807.

(13) *Podospora ostilingospora* Cain. Can., J. Bot., 40, 456 (1962).

Perithecia $800-1200 \times 460-690\mu$, pyriform to ovate, black, covered with rough-walled, brown, flexuous hairs when young, hairs narrow and lighter towards the apex, bare at maturity; papillae, $350-450 \times 145-155\mu$, peridium thin, membranaceous to slightly coriaceous, brown, with patches. Asc 8-spored, clavate, small ring at apex, evanescent, stipe long. Ascospores biseriate, ellipsoid, $45-55 \times 25-33.5\mu$, exospore thick; primary appendage basal, cylindrical-clavate, $45-58\mu$ long and $6.5-8\mu$ wide near the distal end; upper secondary appendages forming two tufts, attached to opposite sides near the apex of the spores, tufts $40-45\mu$ long, their apices are evanescent, lower secondary appendage single lash-like, at the distal end of the primary appendage, measuring upto 105μ long and $5-5.5\mu$ wide at the base; germ pore apical, circular. Specimen examined: P.C.S.I.R. Herb. No. 95, On cowdung.

(14) *Psilocybe coprophila* Bull. Brit. Mycol. Soc., 2(1), 35 (1968).

Pileus when young white and downy, sub-hemispherical, clothed with little white superficial scales, brown, at length smooth and pale umber darker at the obtuse apex, slightly fleshy, Stem flexuous, slightly attenuated upwards, whitish, shining, at first scaly like the pileus, gills nearly plane, ventricose, brown. Basidiospores ellipsoid, $11.5-13 \times 7-9\mu$. Specimen examined: P.C.S.I.R. Herb, No. 204. On cowdung.

(15) *Psilocybe merdaria* (Fr.) Ricken Bull. Brit. Mycol. Soc., 2(1), 35 (1968).

Basidium composed of more than one cell. Basidiospores slightly angular or limoniform, $10-13 \times 7-9\mu$; fruiting-body lacking, farinaceous taste and smell and lack bluish tints, stipe white, floccose below ring. Specimen examined: P.C.S.I.R. Herb Nos. 200, 201. On cowdung.

(16) *Stachybotrys atra* Corda Agr. Expt. Sta. Bull. 315, 414 (1912).

Colonies spreading, mycelium hyaline, septate, with branches almost at right angles, and with oval, ellipsoid chlamydospores upto 12μ in dia, articulate with age. Conidiophores arise from aerial mycelium, almost hyaline near the base, branched, septate, slightly alternate toward the apex, bearing on the summit a whorl of papillate phialides; phialides $11-12 \times 5\mu$. Conidia single, smooth, elliptical, usually with acute end and mostly with two oil-drops, slightly coloured when young to fuliginous and black when mature. $10.5-12.5 \times$

5.5-7.5 μ . Specimen examined: P.C.S.I.R. Herb No. 104. On cowdung.

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