

## NEWLY RECORDED SPECIES OF BOLETACEAE FROM PAKISTAN

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### Abstract

Family Boletaceae is characterized by tubular hymenium that contains simple/compound, minute, broad or hexagonal tubes that some times may be radial, elongated or nearly gill-like, and mostly fusiform or elongated spores. The present describes 5 new records of the members of the family Boletaceae viz., *Aureoboletus gentilis*, *Boletus reticulatus*, *B. edulis*, *B. subtomentosus* and *Chalciporus piperatus* from Gilgit-Baltistan. Of these, *A. gentilis*, *B. reticulatus* and *B. subtomentosus* are reported for the first time from Pakistan.

### Introduction

Phylum Basidiomycota is a common group of fungi that has worldwide distribution. It includes more than 22,244 species (Hawksworth *et al.*, 1995). This phylum is large and divers, comprising of forms commonly known as mushrooms, boletus, puffballs, earthstars, stinkhorns, birds nest fungi, jelly fungi, bracket or shelf fungi, rust and smut fungi (Alexopolus *et al.*, 1996). Members of Basidiomycota are characterized primarily by the production of sexual spores (basidiospores) that are produced on the surface of a basidium. Many members have septal structures called a clamp connection. No other group of fungi has these.

Several members of Basidiomycota are well known plant pathogens, whereas others are important for their food value or because of scents, tastes, colours, and toxic properties of a wide variety of secondary products (Gallois *et al.*, 1990). In contrast to more than 22,244 species reported from different parts of the world, only about 630 species have been reported from Pakistan (Ahmad *et al.*, 1997). Gilgit-Baltistan area appears to be generally ignored by pervious workers despite the climate is suitable for growth of Basidiomycota. The present report describes 5 new records of the members of the family Boletaceae from Gilgit-Baltistan including 3 new records for Pakistan.

### Materials and Methods:

Samples of basidiomycetous fungi were collected from different areas of Gilgit-Baltistan. These fungi were photographed in their natural habitat and macroscopic details along with altitude and latitude (using a GPS model Lowrance ifinder) were recorded. The samples were brought to Department of Biological Sciences, Karakoram International University, Gilgit and identified up to species level after reference to Ahmad *et al.*, (1999), Demoulin & Mirriott (1981), Surcek (1988), Buczacki (1989), Leelavathy & Ganesh (2000), Razaq *et al.*, (2012) Swann & Taylor (1993) and Shibata (1992). The specimens were dried at room temperature to make a herbarium for future reference. An Olympus B x51 microscope equipped with bright field and camera Olympus DP 12 was used to examine and photographs the

### Results

During the present work, three species viz., *Aureoboletus gentilis*, *Boletus reticulatus*, *B. edulis*, *B. subtomentosus* and *Chalciporus piperatus* were recorded. These species have been recorded for the first time from Gilgit-Baltistan, whereas, *A. gentilis*, *B. reticulatus* and *B. subtomentosus* appeared to be new records from Pakistan not hitherto reported.

*Aureoboletus gentilis* (Quél.) Pouzar, *Česká Mykol.* 11: 48 (1957)

### Synonymy:

*Aureoboletus cramesinus* Secr. ex Watling, *Trans. & Proc. Bot. Soc. Edinb.* 40(1): 118 (1965) [1964-65]

*Boletus cramesinus* Secr., *Mycogr. Suisse* 3: 39 (1833)

*Boletus gentilis* (Quél.) Sacc., *Syll. fung.* (Abellini) 6: 8 (1888)

*Boletus granulatus* var. *tenuipes* Cooke, *Grevillea* 12(no. 62): 43 (1883)

*Boletus sanguineus* subsp. *gentilis* (Quél.) Quél., *Compt. Rend. Assoc. Franç. Avancem. Sci.* 12: 510 (1883)

*Boletus sanguineus* var. *gentilis* Quél., *Compt. Rend. Assoc. Franç. Avancem. Sci.* 12: 504 (1884) [1883]

*Boletus tenuipes* (Cooke) Massee, *Brit. Fung.-Fl.* (London) 1: 281 (1892)

*Ixocomus gentilis* (Quél.) Quél., *Fl. mycol. France* (Paris): 413 (1888)

*Pulveroboletus cramesinus* (Secr. ex Watling) M.M. Moser ex Singer, *Pilze Mitteleuropas* (Stuttgart) 6: 12 (1966)

*Pulveroboletus gentilis* (Quél.) Singer, *Farlowia* 2: 300 (1945)

*Viscipellis gentilis* (Quél.) Quél., *Enchir. fung.* (Paris): 156 (1886)

*Xerocomus gentilis* (Quél.) Singer, *Annls mycol.* 40(1/2): 43 (1942)

**Distinguishing characters:** Cap 5-12cm wide, sticky then streaked and wrinkled when drying. Stem 5-8 cm long, tapering towards base, cylindrical, sticky and with watery droplets when wet. Tubes and pores golden yellow. Tubes decurrent with large and angular pores. Smell pleasant. Flesh soft, whitish. Spores sub-spindle-shaped, smooth, 11-15x4-5µm in size (Fig. 1. A-C).

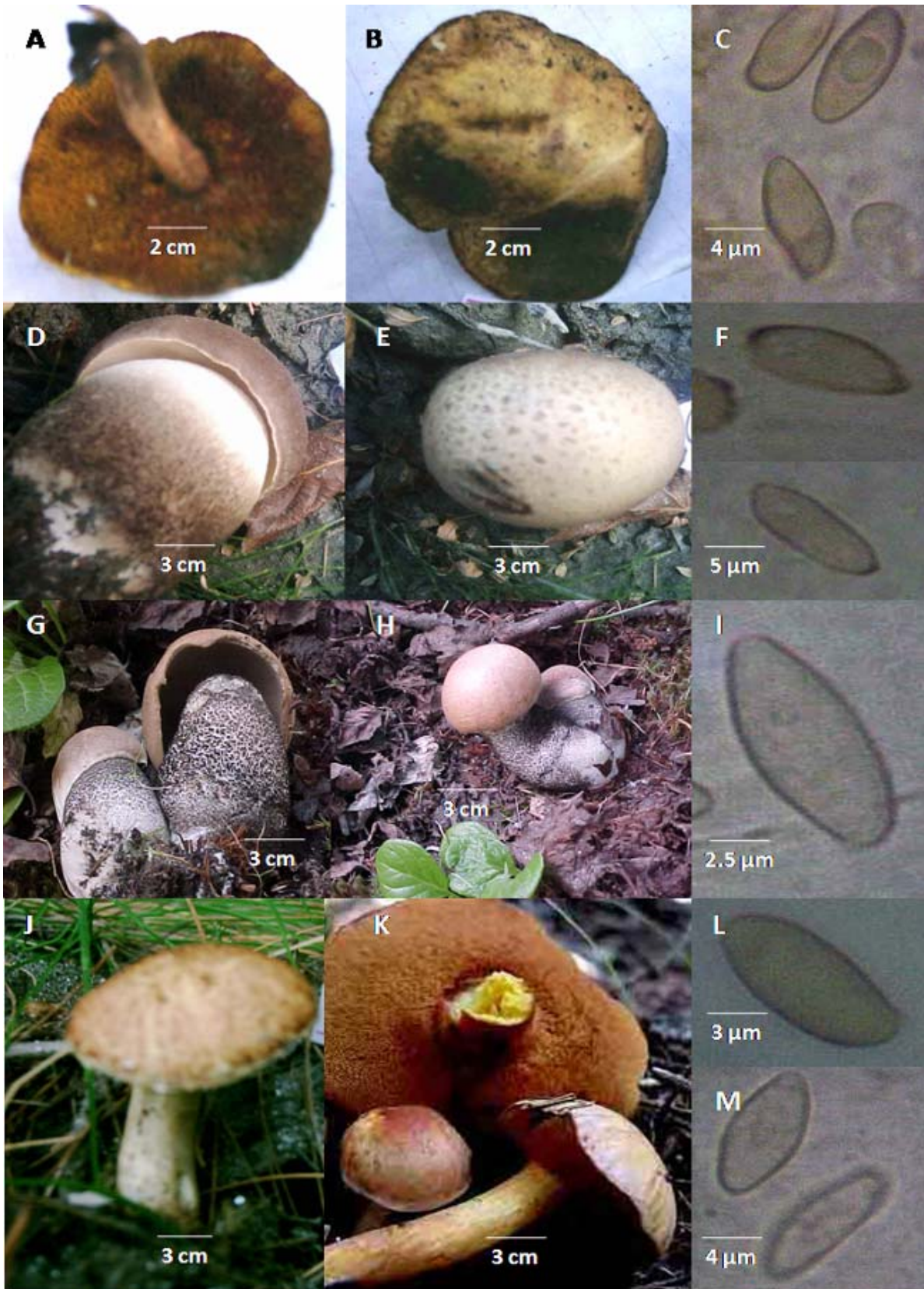


Fig. 1. *Aureoboletus gentilis* (A, B, C), *Boltus edulis* (D, E, E), *Boletus reticulatus* (G, H, I), *Boletus subtomentosus* (J, L), and *Chalciporus piperatus* (K, M).

**Season:** June-July.

**Occurrence:** It was collected from Mushkin forest, District Astore alt 2722m, N=35°18, E=74°42. It was also collected from Dichal nala, District Astore, alt 3144m, N=35°39, E=74°55.

**Ethnic uses/Importance:** Edible.

**Habit/Habitat:** Usually in small groups, on soil in old faire sites.

***Boletus edulis* Bull., *Herb. Fr.* 2: tab. 60 (1782)**

**Synonymy:**

*Leccinum edule* (Bull.) Gray, *Nat. Arr. Brit. Pl.* (London) 1: 647 (1821)  
*Dictyopus edulis* (Bull.) Forq., (1890)  
*Boletus solidus* Sowerby, *Col. fig. Engl. Fung. Mushr.* (London) 3: pl. 419 (1809)  
*Boletus esculentus*  $\beta$  *albus* Pers., (1825)  
*Boletus persoonii* Bon, *Docums Mycol.* 19(no. 74): 61 (1988)

**Distinguishing characters:** *Boletus edulis* has a variable shape and size. Cap 8-20cm, brown, smooth but slightly sticky when wet. Stem 3-23cm, stout, rarely bulbous below, reticulate above. Tubes and pores white to dirty yellowish. Tubes depressed. Pores small, round. Smell pleasant. Flesh fairly firm, white. Spores sub-spindle shaped, smooth, 14-17 x 5-6 $\mu$ m (Fig. 1. D-F).

**Season:** July- August.

**Occurrence:** The specimens were collected from Hunza valley, District Gilgit alt 1728m, N=36°17, E=74°38.

**Ethnic uses/importance:** Edible and good source for soup.

**Habit/Habitat:** Solitary or in small groups, on soil.

**Previous Report from Pakistan:** On soil, Shogran, Sharhan (Shibata, 1992; Ahmad *et al.*, 1997).

***Boletus reticulatus* Schaeff., *Fung. Bavar. Palat.* 4: 78 (1774)**

**Synonymy:**

*Boletus aestivalis* (Paulet) Fr., *Epicr. syst. mycol.* (Upsaliae): 422 (1838) [1836-1838]  
*Boletus edulis* f. *reticulatus* (Schaeff.) Vassilkov, *Bekyi Grib:* 18 (1966)  
*Boletus edulis* subsp. *reticulatus* (Schaeff.) Konrad & Maubl., *Icon. Select. Fung.* 4(2): pl. 398 (1926)  
*Boletus reticulatus* Schaeff., *Fung. Bavar. Palat.* 2: tab. 108 (1763)  
*Tubiporus aestivalis* Paulet, *Traité sur les Champignons Comestibles* (Paris): 371 (1793)  
*Versipellis aestivalis* (Paulet) Qué., *Enchir. fung.* (Paris): 158 (1886)

**Distinguishing characters:** Cap 6-12cm, first dome shaped then convex with, some scratches appearing on the surface. Stem 5-15cm long, stout, swollen below, white with brown or black scales on surface. Tubes and pores whitish. Tubes depressed with small and round pores. Spore print brown. Smell pleasant. Flesh firm, white. Spores sub-spindle-shaped, smooth 12-16x5-6 $\mu$ m in size (Fig. 1. G-I).

**Season:** June-July.

**Occurrence:** It is collected from Dichal nala, District Astore, alt 3135m, N=35°39, E=74°55.

**Ethnic uses/Importance:** Edible.

**Habit/Habitat:** Usually in small groups, on soil.

***Boletus subtomentosus* L., *Sp. pl.* 2: 1178 (1753)**

**Synonymy:**

*Leccinum subtomentosum* (L.) Gray, *Nat. Arr. Brit. Pl.* (London) 1: 647 (1821)  
*Rostkovites subtomentosus* (L.) P. Karst., *Revue mycol., Toulouse* 3(no. 9): 16 (1881)  
*Versipellis subtomentosus* (L.) Qué., *Enchir. fung.* (Paris): 158 (1886)  
*Xerocomus subtomentosus* (L.) Qué., *Fl. mycol. France* (Paris): 418 (1888)  
*Ceratomyces subtomentosus* (L.) Murrill, *Mycologia* 1(4): 153 (1909)  
*Xerocomopsis subtomentosus* (L.) Reichert, *Palest. J. Bot., Rehovot Ser.* 3: 229 (1940)  
*Boletus lanatus* Rostk., in Sturm, *Deutschl. Fl.*, 3 Abt. (Pilze Deutschl.) 5: 77 (1844)  
*Boletus subtomentosus* var. *lanatus* (Rostk.) Smotl., *Sber. K. böhm. Ges. Wiss. Prag, Math.-Naturwiss. Cl.*: 38 (1912)  
*Xerocomus lanatus* (Rostk.) Singer, *Farlowia* 2: 296 (1946)  
*Boletus striipes* Fr., *Hymenomyc. eur.* (Upsaliae): 502 (1874)  
*Boletus leguei* Boud., *Bull. Soc. mycol. Fr.* 10(1): 62 (1894)  
*Xerocomus subtomentosus* var. *leguei* (Boud.) Maire, *Treb. Mus. Ciènc. nat. Barcelona, sér. bot.* 15(no. 2): 41 (1933)  
*Boletus subtomentosus* f. *leguei* (Boud.) Vassilkov, in Novin (Ed.), *Ecologiya i Biologiya Rastenii Vo.vtochnoevropeskot Lesotundry [Ecology and Biology of Plants of the East-European Forest Tundra], Pt. 1* (Leningrad): 57 (1970)  
*Xerocomus leguei* (Boud.) Montegut ex Bon, *Docums Mycol.* 14(no. 56): 16 (1985)  
*Xerocomus ferrugineus* var. *leguei* (Boud.) Bon, *Docums Mycol.* 24(no. 93): 50 (1994)  
*Boletus subtomentosus* var. *marginalis* Boud., *Icon. Mycol.* (Paris) 2: tab. 72 (1907)  
*Xerocomus subtomentosus* f. *xanthus* E.-J. Gilbert, *Bull. trimest. Soc. mycol. Fr.* 47: 142 (1931)  
*Boletus xanthus* (E.-J. Gilbert) Merlo, *I Nostri Funghi*, I Boleti, Edn 2 (Genoa): 50 (1980)  
*Xerocomus xanthus* (E.-J. Gilbert) Curreli, *Riv. Micol.* 32(1-2): 31 (1989)

**Distinguishing characters:** Cap 5-11cm, downy, becoming flat with cracks appearing on the cap surface. Stem 3-8cm long and slender with no dots or faint ribbing. Tubes and pores yellow, then olive-green. Tubes adnate, with large and angular pores. Spore print brown. Smell indistinct. Flesh soft, Lemon-yellow, brownish in stem. Spores sub-spindle shaped, smooth, 10-13x4-5µm in size, pale yellow (Fig. 1. J, L).

**Season:** September- October

**Occurrence:** Specimens were collected from Dashkin (panote col), District Astore, (Gilgit), alt 2711m, N=35°29, E=74°47.

**Ethnic uses/Importance:** Edible.

**Habit/Habitat:** Usually in small groups, on soil in broad-leaved trees and mixed woods.

***Chalciporus piperatus* (Bull.) Bataille, Bull. Soc. Hist. nat. Doubs 15: 39 (1908)**

**Synonymy:**

*Boletus piperatus* Bull., *Herb. Fr.* 10: tab. 451, fig. 2 (1790)

*Boletus piperatus* Bull., *Herb. Fr.* 10: tab. 451, fig. 2 (1790) var. *piperatus*

*Ceromyces piperatus* (Bull.) Murrill, *Mycologia* 1(4): 150 (1909)

*Ixocomus piperatus* (Bull.) Quél., *Fl. mycol. France* (Paris): 414 (1888)

*Leccinum piperatum* (Bull.) Gray, *Nat. Arr. Brit. Pl.* (London) 1: 647 (1821)

*Suillus piperatus* (Bull.) Kuntze, *Revis. gen. pl.* (Leipzig) 3(2): 535 (1898)

*Viscipellis piperata* (Bull.) Quél., *Enchir. fung.* (Paris): 157 (1886)

**Distinguishing characters:** Cap 4-8cm, usually drying very soon, sticky at first. Stem 4 cm long and 1 cm thick, equal, slender, silky. Tubes decurrent, rusty in colour, with large and angular pores. Smell indistinct. Flesh fairly

soft yellowish. Spore sub-spindle shaped, smooth, 8-11x4-5µm in size (Fig. 1. K, M).

**Season:** July-August.

**Occurrence:** It was collected from Dichal nalla, District Astore, alt 3522m, N=35°77, E=74°87, and Mushkin forest, alt 2645m, N=35°29, E=74°43, and Lashtang forest, alt 2787m, N=35°29, E= 74°43.

**Ethnic uses/Importance:** Edible.

**Habit/Habitat:** Usually in groups, on soil with broad-leaved trees.

**Previous Report from Pakistan:** On soil, under conifers and broad-leaved trees; Shogran, Sharan (Ahmed *et al.*, 1997; Sultana *et al.*, 2011),

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