ADDITIONS TO THE POLYPORALES OF PAKISTAN

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Abstract

During a survey of macrofungi, nine species belonging to order Polyporales of Phylum Basidiomycota viz., Bjerkandera adusta, Fomes fomentarius, Heteroporus biennis, Laetiporus sulphureus, Phaeolus schwinitzii, Polyporus squamosus, Rigidoporus ulmarius, Royoporus badius and Trametes versicolor were collected for the first time from Gilgit-Baltistan. Of these, Bjerkandera adusta, Fomes fomentarius, Heteroporus biennis, Phaeolus schwinitzii, Rigidoporus ulmarius, Royoporus badius and Trametes versicolor appeared to be new records from Pakistan not hitherto reported.

Key words: New records, Polyporales, Gilgit-Baltistan, Pakistan.

Introduction

Phylum Basidiomycota of Kingdom Fungi has worldwide distribution and includes more than 31,000 species (Kirk et al., 2010). This phylum is a large and diverse group that comprises of 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 characteristically produce sexual spores i.e. basidiospores on the surface of a basidium. 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).

According to Hawksworth et al. (1995) there were about 22,000 species of basidiomycetous fungi. This number increase to more than 31,000 within 13 years (Kirk et al., 2008). This increase of about 9,000 species of basidiomycetous fungi indicates that there are numerous species of fungi that are still unknown to science. In contrast to more than 31,000 species reported from different parts of the world, only about 700 species have been reported from Pakistan (Ahmad et al., 1997; Sultana & Qureshi, 2007; U. Sultana et al., 2011). It means that there is a potential of recording several new species or new records from mycologically unexplored areas of Pakistan. The present report describes seven new records of the members of the order Polyporales from Pakistan.

Materials and Methods

Samples of fungi belonging to the order Polyporales of phylum Basidiomycota growing in different areas of Gilgit-Baltistan were photographed in their natural habitat and the macroscopic details were recorded. The samples brought to the Department of Biological Sciences, Karakoram International University, Gilgit, examined microscopically and identified up to species level after reference to Ahmad et al. (1997), Demoulin & Mirriott (1981), Surcek (1988), Buczacki (1989), Leelavathy & Ganesh (2000), Swann & Taylor (1993), Shibata (1992), Murakami (1993) and Sultana et al. (2011). Synonymy of the species confirmed from www.speciesfungorum.org. The specimens dried at room temperature to make a herbarium.

Results

During the present work, nine species of order Polyporales viz., Abortiporus biennis, Bjerkandera adusta, Rigidoporus ulmarius (Family Meruliaceae), Laetiporus sulphureus, Phaeolus schwinitzii (family Fomitopsidaceae), Fomes fomentarius, Polyporus squamosus, Royoporus badius and Trametes versicolor (Family Polyporaceae) were recorded for the first time from Gilgit-Baltistan. Of these, only Laetiporus sulphureus and Polyporus squamosus have been reported from Pakistan previously, whereas, the remaining five species appeared to be new records from Pakistan not hitherto reported (Ahmad et al., 1997; Sultana & Qureshi, 2007; Sultana et al., 2011). All the recorded species are described and illustrated herein.

Abortiporus biennis (Bull.) Singer, Mycologia, 36(1): 68 (1944)

Synonymy:
Boletus biennis Bull., Herb. Fr. 10: tab. 449 (1789)
Sistotrema biennis (Bull.) Pers., Syn. meth. fung. (Göttingen) 2: 550 (1801)
Hydnum biennis (Bull.) Lam. & DC., Fl. franç., Edn 3 (Paris) 2: 112 (1805)
Thelephora biennis (Bull.) Fr., Syst. mycol. (Lundae) 1: 449 (1821)
Daedalea biennis (Bull.) Fr., Syst. mycol. (Lundae) 1: 332 (1821)
Polyporus biennis (Bull.) Fr., Epicr. syst. mycol. (Upsaliae): 433 (1838)
Phylacteria biennis (Bull.) Bigeard & H. Guill., Fl. Champ. Supér. France (Chalon-sur-Saône), 2: 452 (1913)
**Distinguishing characters:** Fruit body 2-9cm, annual, bracket-like, almost smooth; initially soft and whitish, becoming hard and gray. Tubes 0.7cm deep, grayish. Pores 1-3mm, angular. Spore print white. Spores sub spherical-ellipsoid, smooth, 3-4x4-6µm in size, non-amylloid. Hyphal system monomitic.

**Habit/Habitat:** Grows in groups overlapping, on trunks of dead or living trees.

**Season:** June-July.

**Occurrence:** Sultanabad, District Gilgit, alt 2120m, N=36°12', E=74°17'.

**Ethnic uses/importance:** Inedible.

**Bjerkandera adusta** (Willd.) P. Karst., Meddn. Soc. Fauna Flora fenn., 5: 38 (1879)

**Synonymy:**
Boletus adustus Willd., Fl. berol. prodr. 392 (1787)
Polytropos adustus (Willd.) Fr., Syst. mycol. (Lundae), 1: 363 (1821)

Leptoporus adustus (Willd.) QuéL., Enchir. fung. (Paris): 177 (1886)
Tyromyces adustus (Willd.) Pouzar, Folia geobot. phytotax. bohemoslov. 1: 370 (1966)
Grifola adusta (Willd.) Zmitr. & Malysheva, in Zmitrovich, Malysheva & Spirin, Mycena, 6: 21 (2006)

**Distinguishing characters:** Fruit body irregular, and effused but usually at least partly bracket like, annual, flat and velvety, downy above, then smoother, pores below and dark, margin at first paler, wavy. Tubes 0.2mm deep, gray-black. Pores 4-6mm, angular. Flesh whitish, fibrous, and leathery. Spores ellipsoid, smooth, 2.5-3x4-5.5µm. Hyphal system monomitic.

**Habit/Habitat:** Usually in fused masses, overlapping, on dead wood of broad-leaved trees.

**Season:** July-August.
Habit/Habitat: Solitary or in a small overlapping groups. On wood of broad leaved tree especially in base of trunk.

Season: July- August.

Occurrence: Sultanabad, District Gilgit, alt 2120m, N=36°12', E=74°17'.

Ethnic uses/importance: Inedible.

Leptoporus sulphureus (Bull.) Quél., Fl. mycol. France (Paris): 386 (1888)

Cladoderis sulphurea (Bull.) Bigeard & H. Guilli, Fl. Champ. Supér. France (Chalon-sur-Saône) 1: 408 (1909)


Grifola sulphurea (Bull.) Pilát, Beih. bot. Zbl., Abt. 2: 39 (1934)

Cladoderis sulphureus (Bull.) Teixeira, Revista Brasileira de Botânica 9(1): 43 (1986)

Distinguishing characters: Fruit body 10-30cm, annual, bracket-like, semicircular, broadly attached with substrate, often slightly wavy. Pore surface sulphur-yellow, paler when dry, then straw-coloured. Tubes 0.4mm deep, sulphur-yellow. Pores 3-5mm, rounded. Flesh cream, white when dry. Spores sub-spherical, smooth, 3.5-5x3-6µm, non-amyloid. Cystidia absent.

Habit/Habitat: Usually in large overlapping groups, on living broad-leaved trees.

Season: August- September.

Occurrence: Dashkin forest, District Astore, alt 3022m, N=35°27', E=74°46'.

Ethnic uses/importance: Edible when young, inedible when mature, causing dark reddish brown cubical rot.

Previous report from Pakistan: On the base of Quercus (Sultana et al., 2011).

Phaeolus schwinitzii (Fr.) Pat., Essai Tax. Hyménoy. (Lons-le-Saunier): 86 (1900)

Synonymy:

Polyporus schwinitzii Fr., Syst. mycol. (Lundae) 1: 351 (1821)

Polystictus schwinitzii (Fr.) P. Karst., Meddn Soc. Fauna Flora fenn. 5: 39 (1879)

Cladoderis schwinitzii (Fr.) Quél., Enchir. fung. (Paris): 169 (1886)

Inoderms schwinitzii (Fr.) Quél., Fl. mycol. France (Paris): 394 (1888)


Hapalopilus schwinitzii (Fr.) Ellis & Everh., J. Mycol. 5(1): 29 (1889)

Mucronoporus spongia (Fr.) Pat., Essai Tax. Hyménoy. (Lons-le-Saunier): 86 (1900)

Phaeolus spongia (Fr.) Pat., Essai Tax. Hyménoy. (Lons-le-Saunier): 86 (1900)
**Pyropolyporus fomentarius** (L.) Pat., *Ungulina fomentaria* Scindalma fomentarium (L.) Kuntze, Revis.

**Occurrence:**

**Season:**

**Diameter:** cylindrical, smooth, colourless.

**Flesh:** dry and hard, light brown. Spores 14-15x5-7 µm in diameter, non-amyloid. Hyphal system monomitic.

**Habit/Habitat:** On soil, usually in fused group.

**Ethnic uses/Importance:** It causes brown cubical decay, especially in old trees. Inedible.

**Fomes fomentarius** (L.) Fr., *Summa veg. Scand.*, Section Post. (Stockholm): 321 (1849)

**Synonymy:**

Boletus fomentarius L., Sp. pl. 2: 1176 (1753)


**Polyporus fomentarius** (L.) Fr., *Syst. mycol.*, (Lundae) 1: 374 (1821)


Scindalma fomentarium (L.) Kuntze, *Revis. gen. pl.*, (Leipzig) 3(2): 518 (1898)

**Ungulina fomentaria** (L.) Pat., *Essai Tax. Hyménomyc.* (Lons-le-Saunier): 102 (1900)


Elfvingiella fomentaria (L.) Murrill, *North. Polyp.*, (1914)

Pyropolyporus fomentarius (L.) Teng, *Chung-kuo Ti Chen-chun*, [Fungi of China]: 763 (1963)

**Distinguishing character:** Fruit body 10-15 cm, annual, depressed from above, irregular, warty and then smooth, concentrically zoned. Margin paler. Stem 2-3 cm, bulbous. Pore surface first yellowish, bruising brown, then brown. Tubes 0.5-1 mm deep, pores angular, 0.5-3 mm in diameter. Flesh brown. Spores ellipsoid, smooth, 3.5-4.5x5-7 µm in diameter, non-amyloid. Hyphal system monomitic.

**Habit/Habitat:** On soil, usually in fused group.

**Occurrence:**

**Season:**

**Dashkin, District Astore, alt 2486 m, N=35°28', E=74°40'.**

**It was collected from Manimark, District Astore, alt 3586 m, N=35°25', E=74°52'.**

**New Series**

**Synonymy:**

Boletus fomentarius Ls., Sp. pl. 2: 1176 (1753)


**Polyporus fomentarius** (L.) Fr., *Syst. mycol.*, (Lundae) 1: 343 (1821)

**Placodes fomentarius** (L.) Quél., *Enchir. Fung.*, (Paris): 171 (1886)


Scindalma fomentarium (L.) Kuntze, *Revis. gen. pl.*, (Leipzig) 3(2): 518 (1898)

**Ungulina fomentaria** (L.) Pat., *Essai Tax. Hyménomyc.* (Lons-le-Saunier): 102 (1900)


**Elfvingiella fomentaria** (L.) Murrill, *North. Polyp.*, (1914)

**Pyropolyporus fomentarius** (L.) Teng, *Chung-kuo Ti Chen-chun*, [Fungi of China]: 763 (1963)

**Distinguishing character:** Fruit body 14-17 cm, perennial, laterally attached, club shaped, surface pale gray to gray-brown. Margin rounded and light coloured. Tubes arranged in layers, each layer 2-6 mm thick. Pores minute, rounded, with thick walls which are whitish at first then brownish. Flesh dry and hard, light brown. Spores 14-15x5-7 µm in diameter, cylindrical, smooth, colourless.

**Habit/Habitat:** Solitary on the dead woods.

**Polyporus squamosus** (Huds.) Fr., *Syst. mycol.*, (Lundae) 1: 343 (1821)

**Synonymy:**

Boletus squamosus Huds., *Fl. Angl.*, Edn., 2 2: 626 (1778)

**Polyporus squamosus** (Huds.) Fr., *Syst. mycol.*, (Lundae) 1: 343 (1821)

**Polyporus squamosus** (Huds.) Fr., *Syst. mycol.*, (Lundae) 1: 343 (1821)


**Cerioporus squamosus** (Huds.) Quél., *Enchir. Fung.*, (Paris): 167 (1886)

**Melanopus squamosus** (Huds.) Pat., *Essai Tax. Hyménomyc.* (Lons-le-Saunier): 80 (1900)

**Favolus squamosus** (Huds.) A. Ames, *Annls mycol.*, 11(3): 241 (1913)


**Distinguishing character:** Fruit body semicircular, cap 4-8 cm, first slightly convex then flattened, becomes irregular, covered with brown scales, whitish between the scales, margin slightly in-rolled. Stem short brownish-black at base, lateral, 2-4 cm, tapering slightly downward. Tubes 0.7 mm deep, cream, decurrent. Pores 0.01-0.02 mm, irregularly angular. Flesh white-cream, leathery, and tough. Spores elongated, smooth, 4.5-6 x 10-12 µm in size (Fig. 1 E-H).

**Season:** July-August.

**Occurrence:** It was collected from Manimark, District Astore, alt 3586 m, N=35°25', E=74°40'.

**Ethnic uses/Importance:** Inedible.

**Habit/Habitat:** Usually solitary. On old woods.

**Previous report from Pakistan:** On living and dead trees of *Juglans regia* in Shogran, Kaghan (Sultana & Qureshi, 2007).


**Synonymy:**

Boletus badius Pers., *Syn. meth. fung.*, (Göttingen), 2: 523 (1801)


**Distinguishing characters:** Cap 4-8 cm, first slightly convex then flattened, becomes irregular, covered with brown scales, whitish between the scales, margin slightly in-rolled. Stem short brownish-black at base, lateral, 2-4 cm, tapering slightly downward. Tubes 0.7 mm deep, cream, decurrent. Pores 0.01-0.02 mm, irregularly angular. Flesh white-cream, leathery, and tough. Spores elongated, smooth, 4.5-6 x 10-12 µm in size (Fig. 1 E-H).

**Season:** July-August.

**Occurrence:** It was collected from Manimark, District Astore, alt 3586 m, N=35°25', E=74°40'.

**Ethnic uses/Importance:** Inedible.

**Habit/Habitat:** Usually solitary. On old woods.

**Previous report from Pakistan:** On living and dead trees of *Juglans regia* in Shogran, Kaghan (Sultana & Qureshi, 2007).
Habit/Habitat: In small trooping groups, on dead broad-leaved trees.

Season: April-May.

Occurrence: Specimens were collected from Rama forest, District Astore, alt 2711m, N=35°29, E=74°47.

Ethnic uses/Importance: Inedible.

**Trametes versicolor** (L.) Lloyd, *Mycol. Notes* (Cincinnati) 65: 1045 (1921)

Synonymy:
- *Poria versicolor* (L.) Scop., *Fl. carniol.*, Edn 2 (Wien) 2: 468, 592 (1772)
- *Polyporus versicolor* (L.) Fr., *Observ. mycol.* (Havniae) 2: 260 (1818)
- *Sistotrema versicolor* (L.) Tratt., *Fungi austr. exsicc.* 2: 55 (1830)
- *Coriolus versicolor* (L.) Quél., *Enchir. fung.* (Paris): 175 (1886)

Distinguishing characters: Fruit body 3-7cm wide, 1-2cm thick; overall fruit bodies 12-8cm, concentrically zoned, white in colour. Surface mostly brown. Pore surface at first white then cream. Tubes 0.05-0.1mm deep, white or cream in colour. Pores 3-5mm, angular. Spores cylindrical, smooth, 1.5-3x5-6μm in size, non-amyloid. Cystidia absent. Hyphal system trimitic.

Habit/Habitat: Dense groups of overlapping fruit bodies laterally attached to the trunks of broad-leaved trees.

Season: June-July.

Occurrence: Jalalabad, District Gilgit, alt 2048, N=36°70, E=74°40.

Ethnic uses/importance: Inedible; causing decay of tree trunks.

References

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