

New records of three species of *Peyritschiella* (*Laboulbeniomyces*) from India

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ABSTRACT

Three species of *Peyritschiella* are reported for the first time from India. These are *P. furcifera*, *P. hybrida* and *P. vulgata* found on *Philonthus* spp (*Insecta*, *Coleoptera*, *Staphylinidae*). Comprehensive description along with photographs of these species is provided.

Keywords: *Ascomycota*, *Coleoptera*, Compound antheridia, India, *Peyritschiella*, *Philonthus*

INTRODUCTION

Laboulbeniales, the most peculiar orders of *Ascomycota* are microscopic, obligate fungal ectoparasites of arthropods. More than 2300 species in about 145 genera (Weir and Hammond, 1997; Kirk, 2019; Haelewaters *et al.*, 2020) of this order are known to infect various groups of the arthropods especially insects, with the exception of a small number of species found from mites and millipedes and they are known from all continents except Antarctica (Weir and Blackwell, 2005; Lee *et al.* 2011; Santamaria *et al.*, 2017; Santamaria and Pedersen, 2021). In the past few years, many species of *Laboulbeniales* have been reported from India (Kaur *et al.*, 1993; Kaur and Mukerji, 1995, 1996a,b; Kaur, 2021). As part of this extensive study of the *Laboulbeniales* in India, the present paper deals with three species of *Peyritschiella* on *Philonthus* spp. (*Insecta*: *Coleoptera*: *Staphylinidae*), all of which are new to Indian mycoflora. The fan shaped receptacles, the terminal bottle shaped perithecia often with apical short projections and the horn shaped compound antheridia are the important and unique characters of this genus.

MATERIALS AND METHODS

The insects were collected from different habitats. These were fixed in 70% alcohol after separating from dirt, sand or other debris. Each insect was then screened under dissecting microscope for the presence of the fungi. For this, insect was first affixed to the slide and then the fungus was detached from it with fine, sharp, needles and then mounted in Hoyer's medium (gum arabic 30 g; chloral hydrate 200 g; glycerol 20 ml; distilled water 50 ml) on a clean slide.

TAXONOMY

Peyritschiella (Thaxter) Tavares

-*Dichomyces* Thaxter *Proc. Amer. Acad. Arts Sci.* **28**: 183 (1895)

Receptacle hyaline, variegately blackish brown, fan shaped, consisting of 4 layers of cells, each layer compressing a transverse series of cells, the number of cells and the width increasing from the base to the top; the third layer consisting of a single hyaline cell, forming a blackish rounded foot at the basal end, the second layer consists of three cells, the marginal cells often blackened, the third layer consists of 3-5 cells at middle portion and 4-7 cells at both lateral parts, the latter cells usually blackened and forming projections. The fourth layer comprising 10-30 cells, extending upwards at

both lateral ends. Appendages hyaline one celled, formed at the distal end of the receptacle. Perithecium hyaline, bottle shaped, formed on the middle portion of the distal plate of receptacle, often with apical short projections, two to five in each individual. A pair of horn-shaped compound antheridia formed at submarginal portion of the third layer of the receptacle.

Distribution: Africa, Europe, Japan, Madagascar, North & South America, Philippines, and Sumatra

The fan-shaped receptacles, the terminal bottle shaped perithecia and the horn-shaped antheridia are the important and unique characters of the present genus. The following three species have been isolated and described below:

1. *Peyritschiella furcifera* (Thaxter) Tavares, *Mycologia Memoir* **9**: 270, (1985), Majewski and Sugiyama, *Trans. Mycol. Soc. Japan* **30**: 77-78 (1989). *Dichomyces furcifer* Thaxter, *Proc. Amer. Acad. Arts. Sci.* **28**: 184 (1893), *Mem. Amer. Acad. Arts Sci.* **12**: 282 (1896) and **13**: 250 (1908), Sugiyama, *Ginkgoana* **2**: 28 (1973); Sugiyama and Shazawa, *Trans. Mycol. Soc. Japan* **18**: 272 (1977); Lee and Lee, *Kor. J. Mycol.* **9**: 4 (1981); Majewski, *Trans. Mycol. Soc. Japan* **29**: 48 (1985). **(Fig. 1 A-D)**

Total length of the thallus ranges from 156.25-187.5 μ m. Receptacle hyaline, fan shaped, consisting of four layers of cells, 11-2.5-125 μ m long, the first layer is one celled, hyaline more or less longer than wide, form a blackish foot at the base, the second layer is composed of three cells, 25-31.25 μ m long and 18.75-25 μ m wide, the third layer comprising of 8-11 cells, the cells at the middle portion hyaline and at either lateral sides blackened forming long projections, the projections extending upwards and more or less exceeding the distal end of the fourth layer, the fourth layer is hyaline and almost equal to the third in width, usually composed of 11-14 cells separated by oblique septa. Perithecia hyaline, cylindrical, thickest at the base, becoming evenly thinner towards the rounded apex, formed at the distal end of the receptacle forming two short projections near the apex, usually two in each individual, 81.25-87.50 μ m long and 25-31.25 μ m wide. Compound antheridia are horn shaped, more or less brownish produced at submarginal position of either side of the third layer of the receptacle. Appendages hyaline, one celled, 37.5-50 μ m long.

The main features of this species are the narrow layer of the receptacle with broad black margin along both right and left side at lower portion; the tops of the lateral projections of the

receptacle not exceeding half of the perithecium and constant formation of two perithecia. The species has been isolated from the insect *Philonthus* sp. (*Coleoptera*, *Staphylinidae*). Earlier it has been reported from Ceylon (Sri Lanka), Europe, Japan, USA, Spain and from India this is the first report of its occurrence.

Remarks: The present species was isolated only during the monsoon season. The number of thalli varied from 15-32 per insect and these were encountered from legs and lower part of the body of the insect. Sometimes the fungus shows a lot of variation lacking the characteristic features, but normally the mature forms show close resemblance to type description.

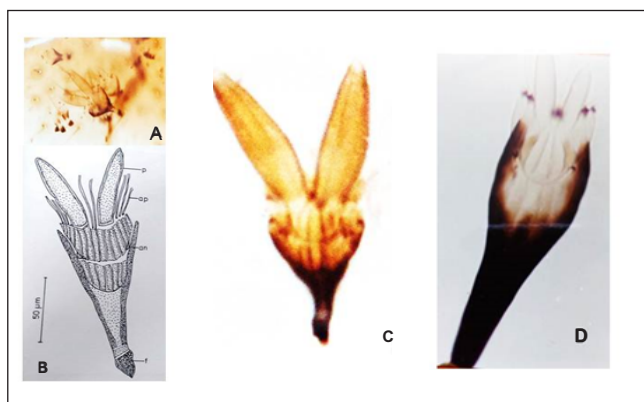


Fig. 1: *P. furcifera* : A. Abdomen of host showing number of thalli, B-C. Young thalli with perithecia (p), appendages (ap) and compound antheridia (an), D. A mature thallus.

2. *Peyritschiella hybrida* (Thaxter) Tavares (Fig. 2 A-C)

Receptacles, hyaline, fan shaped, consists of four layers of cells, 187.5-193.75 μm long, the first layer is composed of a single cell forming a small foot at the basal end. Foot is 12.5 μm long and 6.25-9.37 μm wide. The length of first layer is 18.75-25 μm and width is 9.37-12.5 μm , the second layer is 43.75-50 μm long and 37.5 μm wide. The third layer consists of 10-16 cells, median cells hyaline as compared to the marginal ones forming a long projection on either lateral side of the layer. The fourth layer is V-shaped in this species and tapering towards both lateral ends, free from the third layer and extending upwards at both lateral portions. Appendages are hyaline formed on the distal end of the fourth layer of the receptacle, 56.25-62.5 μm long and 3.12 μm thick. Perithecia bottle shaped, hyaline but with age the upper half of the perithecia become dark coloured as compared to the lower, located at middle portion of the distal plate of the receptacle, 2-5 in each individual, perithecia with apical projections near the termination 110-112.5 μm x 18.75-25 μm . Compound antheridia are horn shaped, above the base of the projections of the third layer of the receptacle 12.5-18.75 μm long and 6.25-9.37 μm thick.

Remarks: Widely distributed in Asia on various species of *Philonthus* and *Spatulonthus* (*Staphylinidae*); also reported in North and Central America and in a few European countries (Try *et al.* 2017)

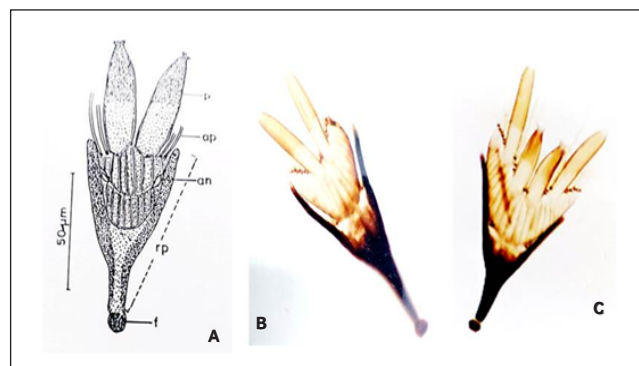


Fig. 2: *P. hybrida*: A-B. Young thallus showing two perithecia (p), compound antheridia (an) appendages (ap), receptacle (rp) and foot (f). C. A mature thallus

3. *Peyritschiella vulgata* (Thaxter) Tavares *Mycologia Memoir* **9**: 271, (1985), *Dichomyces vulgatus* Thaxter, *Proc. Amer. Acad. Arts. Sci.* **35**: 424 (1899), *Mem. Amer. Acad. Arts Sci.* **13**: 251 (1908) and **16**: 250 (1931), Sugiyama, *Ginkgoana* **2**: 29 (1973); Sugiyama and Shazawa, *Trans. Mycol. Soc. Japan* **18**: 272, 275 (1977); Lee *et al.*, *Kor. J. Mycol.* **10**: 1 (1982); Majewski and Sugiyama, *Trans Mycol. Soc. Japan* **26**: (1985); Santamaria and Girbal, *Anales Del. Jard. Bot. De Madrid* **19**: 44 (1987); Majewski, *Trans. Mycol. Soc. Japan* **29**: 49 (1988). (Fig. 3 A-C)

Total length of the thallus is 212-225 μm , receptacle hyaline, fan shaped, consists of 4 layers of cells 150-162.5 μm long and 100-112.5 μm wide. The first layer is composed of a single cell forming a small rounded foot at the basal end, 12.5-18.75 μm wide and 25 μm long. The second layer comprises of three cells 25-37.5 μm wide, 50-56.25 μm long; the median cells hyaline compared to margin cells, which are somewhat blackened. The third layer is composed of 9-20 cells, median few cells are hyaline and marginal cells are blackened and form a long projection extending upwards often exceeding the distal end of the fourth layer. The fourth layer is composed of many cells, hyaline, tapering gradually towards both lateral ends, free from the third layer and extending upwards at both lateral portions. Appendages are hyaline and cylindrical, one celled formed on the distal end of fourth layer of the receptacle, with black basal septa. Perithecia are bottle shaped, hyaline become brownish with age, thickest at the base, located at middle portion of the distal plate of the receptacle, 2-5 in each individual narrowly rounded at the apex with a pair of short projections near the termination, 37.5-44 μm long, compound antheridia are horn-shaped above the base of the projections of the third layer of the receptacle, 12.5 μm long.

Remarks: The important characteristic of this species is the broad receptacle with long projections on both lateral sides. The species was collected only in the monsoon season Whenever it was observed, it was found growing vigorously on the host and formed 15-20 thalli on one insect. Earlier it has been reported from Africa, Australia, Europe, Japan, Mexico, Siberia and USA.

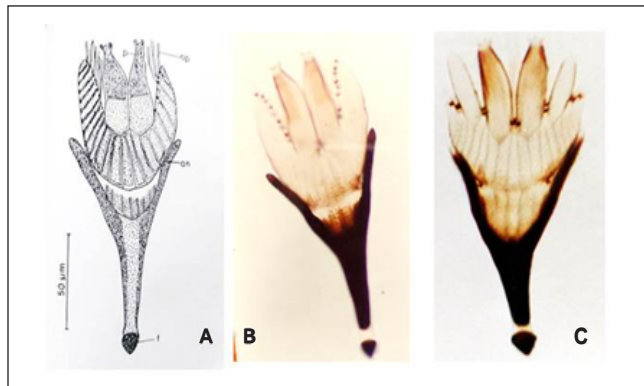


Fig. 3: *Peyritschiella vulgata*: A-B. A young thallus showing two perithecia (p), appendages (ap), compound antheridia and foot (f), C. A mature thallus

CONCLUSIONS

The *Laboulbeniales* is very fascinating and challenging group of fungi. Although the order contains more than 2000 species, there are many which are still awaiting description. India with its range of climate and insects has a lot of potential for the occurrence of these fungi. Future work will include collection of insects from various habitats and screening them for these unique and interesting fungi.

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