

## Notes on Two Species of the Laboulbeniales from Tibet

Yong-Bo Lee\*, Young-Hee Na and Chae-Kyu Lim<sup>1</sup>

Division of Science Education, College of Education, Chosun University, Gwangju 501-759, Korea

<sup>1</sup>Department of Herbal Medicine Resources Development, Naju College, Naju, Chonnam 520-713, Korea

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Two species of the Laboulbeniales based on the Tibetan collections are described. They are new to the mycological flora of Tibet. *Laboulbenia polyphaga* found on several parts of *Amara majuscula* was characterized by having the outer appendages not ramified and simple. *Peyritschiella protea* obtained on the lower abdomen of *Philonthus wuesthoffi*, had two perithecia and two antheridia produced on the third layer of receptacle.

**KEYWORDS:** *Laboulbenia*, Laboulbeniales, *Peyritschiella*, Tibet

The authors had an opportunity to collect the insect specimens from 30 June, to 20 July 2001 in Tibet. Tibetan Laboulbeniales has been poorly known. The specimens collected were immediately placed into 70% ethanol in small glass bottles. Preparation and identification were made after returned to Korea. Two species of the Laboulbeniales parasitic on two insect families, Carabidae and Staphylinidae, belonging to order Coleoptera were found.

For the preparation of thalli of the Laboulbeniales, we applied the method of Benjamin (1971).

The specimens examined are preserved in Chosun University.

### Description of Species

1. *Laboulbenia polyphaga* Thaxter, Proc. Amer. Acad. Arts Sci. 28: 165, 1893 et 13: 342, 1908; Spegazzini, Redia 10: 38, 1914; An. Mus. Nac. Hist. Nat. Buenos Aires 27: 60, 1915 et 29: 614, 1917; Picard, Bull. Soc. Mycol. France 29: 541, 1913; Sugiyama, Ginkgoana 2: 59, 1973; Sugiyama & Yamamoto, Trans. Mycol. Soc. Japan 23: 123, 1982; Huldén, Karstenia 23: 58, 1983; Sugiyama & Majewski, Trans. Mycol. Soc. Japan 26: 139, 1985; Lee, Kor. J. Plant Tax. 16(2): 169, 1986; De Kesel & Rammeloo, Belg. J. Bot. 124(2): 206, 1991; Majewski, Polish Bot. Stud. 7: 103, 1994 (Fig. 1, 2).

Total length to the top of perithecium 250~320  $\mu\text{m}$ . Receptacle consisting of the basal and distal portions; the basal portion cylindrical, composed of five cells and insertion cell, 190~260  $\mu\text{m}$  long, 40~60  $\mu\text{m}$  thick; cell I and II forming a stalk, hyaline, becoming gradually thinner towards the base, forming basally a blackish foot; cell I cuneiform, 2 times longer than board, 50~60  $\mu\text{m}$  long, 25~30  $\mu\text{m}$  thick; cell II up to 2.5 times longer than board, 70~80  $\mu\text{m}$  long, 45~50  $\mu\text{m}$  thick; cell III and IV isodia-

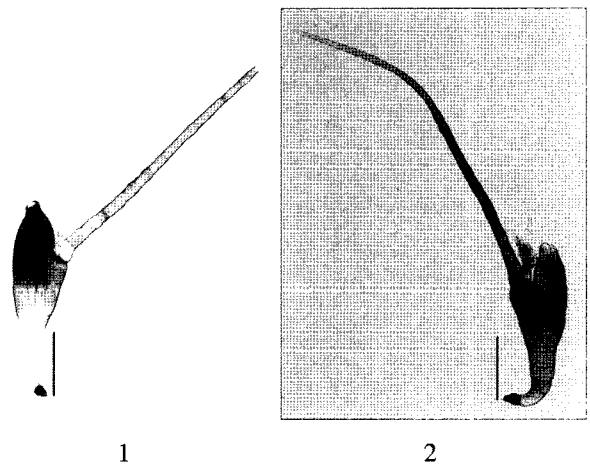
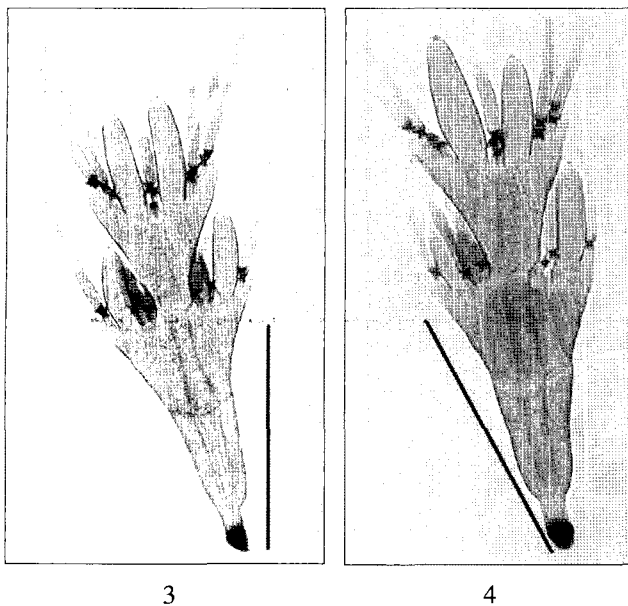


Fig. 1 and 2. *Laboulbenia polyphaga* on *Amara majuscula* (Scales 100  $\mu\text{m}$ ).

metric, more darker than cell I and II, cell III 40~50  $\mu\text{m}$  long, 35~45  $\mu\text{m}$  thick; cell IV 40~45  $\mu\text{m}$  long, 35~40  $\mu\text{m}$  thick; cell V subtriangular, more or less longer than board, not connected with cell III, 15~25  $\mu\text{m}$  long, 15~20  $\mu\text{m}$  thick; insertion cell dark, constricted; the distal portion of the receptacle consisting of two branches arranged antero-posteriorly, outer appendage composed of elongated cells, simple, becoming darker with age up to 500~520  $\mu\text{m}$  long, inner appendage composed of a small basal cell and two branches not exceeding the top of perithecium, terminated in clusters of antheridia, 50~70  $\mu\text{m}$  long. Antheridia 25~45  $\mu\text{m}$  long, 10~15  $\mu\text{m}$  thick. Perithecium consisting of perithecium proper and stalk; perithecium proper blackish brown, ovate, half or slightly more free, blackened and more or less constricted near the apex, more or less inflated laterally, 150~210  $\mu\text{m}$  long, 45~75  $\mu\text{m}$  thick; the stalk consisting of a large basal cell and a few small distal cells, the basal cell usually isodiametric.

\*Corresponding author <E-mail: ybalee@chosun.ac.kr>



**Fig. 3 and 4.** *Peyritschiella protea* on *Philonthus wuesthoffi* (Scales 100  $\mu\text{m}$ ).

Host genera: *Abacetus*, *Aerogenidion*, *Amblystomus*, *Amara*, *Antarctia*, *Argutor*, *Badister*, *Bradycellus*, *Lecanomerus*, *Loxandrus*, *Nitobia*, *Olisthopus*, *Pangus*, *Pelmatelus*, *Phaetheratus*, *Platysma*, *Stenognathus*, *Stenolophus*, *Trichotichnus* and *Tropidosterus*

Host species in Tibet: *Amara majuscula* Chaudoin

Distribution: Cosmopolitan.

Specimens examined: Mt. Mani, Tibet, 20 July, 2001, L-Y-1573, 1574, 1576, 1577, 1578, 1579, 1580, 1581, 2034, 2035, 2036, 2037, 2038, 2039, 2040, 2041, 2042 and 2043

According to Tavares (1985), *L. polyphaga* belongs to *L. vulgaris* group. In this group, the basal cell of the inner appendage is much smaller than that of the outer appendage, there is a short, wedge-shaped V cell, and the upper receptacle and base of the perithecium are often enlarged. The appendages are usually simple, with few branches, and the inner appendage usually is very small.

Figures of typical specimens (Thaxter, 1896) showed two forms with the outer appendage not ramified, simple or branched on the basal cell. Majewski (1994) illustrated also specimens with the outer appendages branched on the suprabasal cell. The present specimens on *Amara majuscula* from Tibet have the outer appendages not ramified, simple. In spite of this difference, the tibetan fungus can be included in the present species because of the relatively large cell V, the lower part of the perithecium connected to the receptacle and antheridia produced on the tip of the inner appendage which never exceeded the top of perithecium. All specimens examined were found on several parts of the host insects. Infected hosts were collected in rotting hay of mountain meadow.

2. *Peyritschiella protea* Thaxter, Proc. Amen. Acad. Arts. Sci. 35: 427, 1900; *Rheophila oxyteli* Cépède et Picard, Compt. Rend. Assoc. Franc. Avanc. Sci., 36 session, Reims 2: 783, 1907; Thaxter, Mem. Amer. Acad. Arts. Sci. 13: 260, 1908; Huldén, Karstenia 23: 62, 1983; Santamaria & Girbal, Anales Jardin Botanico De Madrid 44(1): 19, 1987; De Kesel & Haghebaert, Bull. Annl. Soc. r. belge Ent: 127: 263, 1991; Majewski, Polish Bot. Stud. 7: 175, 1994 (Fig. 3, 4).

Thalli 225–240  $\mu\text{m}$  long, 70–75  $\mu\text{m}$  wide, symmetrical, yellowish brown. Receptacle 200–220  $\mu\text{m}$  long, 65–70  $\mu\text{m}$  in the widest portion, consisting of four layers of cells; the first layer one-celled, cylindrical, hyaline, producing the blackish foot towards the base portion, 50–65  $\mu\text{m}$  long, 30– $\mu\text{m}$  thick; the second layer consisting of three parallel, long cells, both lateral cells with septum, 90–100  $\mu\text{m}$  long, 75–80  $\mu\text{m}$  thick; the third layer consisting of three long cells and several smaller cells giving rise to two antheridia and two perithecia and some appendages, 65–70  $\mu\text{m}$  long, 65–70  $\mu\text{m}$  thick; the fourth layer consisting of a large central cell and 14 smaller cells to two perithecia and more or less numerous appendages, cuneiform, concave at the distal end, 55–60  $\mu\text{m}$  long, 25–30  $\mu\text{m}$  thick.

Appendages hyaline, with deeply darkened, constricted septum at the basal portion connected to the receptacle, often as long or longer than the perithecium, 50–60  $\mu\text{m}$  long, 10  $\mu\text{m}$  thick.

Perithecia hyaline, pale yellow, cylindrical, rounded apex, stout and symmetrically inflated, formed on the third and fourth layer of the receptacle, two in each layer, thus four in each individual, 25–35  $\mu\text{m}$  long, 10  $\mu\text{m}$  thick.

Antheridia brownish, a pair of horn-shaped compound antheridia formed at submarginal portion of the third layer, 20–30  $\mu\text{m}$  long, 10–15  $\mu\text{m}$  thick.

Host genera: *Anotylus*, *Bledius*, *Manda*, *Oxytellus*, *Philonthus*, *Planeustomus* and *Strloxys* (Staphylinidae, Coleoptera)

Host species in Tibet: *Philonthus wuesthoffi* Bernhaur

Distribution: Algeria, Europe (in many European countries), U.S.A. and Tibet

Specimen examined: Mt. Mani, 8000m, June 30, 2001, L-Y-1571-1 and 1571-2.

When the figures of the typical specimens (Thaxter, 1900) were compared with those of the present specimens, they showed somewhat different forms; in typical specimens the fourth layer of the receptacle is asymmetrical, and has only one perithecium, more or less numerous appendages not exceeding the top of perithecium and the cells arranged parallel at the distal portion, whereas in present specimens it is symmetrical, and has two perithecia, some appendages exceeding the top of perithecia and the fourth layer concave at the middle portion.

In spite of the above-mentioned difference between

these specimens, the common traits characteristic of them include as follow; the first layer of receptacle consisting of a large cell, the second layer consisting of three or more cells, the two perithecia and the two antheridia produced on the third layer.

*Peyritschiella protea* more or less resembles *P. xyricola* (Thaxter, 1891), from which it is easily distinguished by the four perithecia and two antheridia produced on not only the fourth layer of receptacle but the third layer.

This species has a very variable thallus, both with respect to plant size and in the degree of development of the lateral lobes of the receptacle (Huldén, 1983; Santamaria et Girbalm 1987; Kesel et Haghebaertm 1991; Majewski, 1994).

Thalli occurred on the lower abdomen of the host.

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