

Notes on Some New Species Including Unrecorded Species of the Laboulbeniales (Ascomycotina) Collected in Korea

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한국에서 채집된 총생자낭균류의 미기록종을 포함한 신종에 관하여

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ABSTRACT: Ten species under three genera of the Laboulbeniales in South Korea are treated in this paper. Of these, *Laboulbenia mudeungensis* Y. B. Lee on *Bembidion lissonotum* Bates and *Laboulbenia nogodanicus* Y. B. Lee on *Agonum buchanani* Hope and *Agonum* sp. are new to science. Two species under two genera of *Filariomyces* and *Misgomyces*, and four species of *Laboulbenia* are new to Korea. They are *Filariomyces forficulae* Shanor on *Labidura japonica* De Hann, *Misgomyces dyschirii* Thaxter on *Dyschirius ovicollis* Putzeys, *Chitonomyces iriomotensis* Majewski on *Laccophilus lewisius* Sharp, *Laboulbenia egens* Speg. on *Tachys gradatus* Bates, *Laboulbenia pedicellata* Thaxter on *Bembidion thermarum* Motschulsky and *Laboulbenia philonthi* Thaxter on *Philonthus wuesthoffi* Bernhaur. On the other hand, two species of *Laboulbenia* are collected from the hosts not previously recorded in Korea. They are *Laboulbenia flagellata* Peyritsch on *Platynus daimio* Bates and *Laboulbenia stenolophi* Speg. on *Philonthus longicornis* Stephens.

KEYWORDS: Laboulbeniales, *Filariomyces*, *Misgomyces*, *Laboulbenia*, Korea

The Laboulbeniales is a highly specialized fungus group of the Ascomycotina. All species of this fungus group are known as the obligate exoparasites of the Arthropoda, especially of insects, with the exception of a small number of species found of mites and milipedes. They are minute, mostly less than one millimeter long, and look like hairs or bristles of the insects own. They would be hardly utilized as a natural enemy of insects, because they do not appear to cause the death of the host insects. Members of the Laboulbeniales are widely distributed in the world and include above 2,000 known species under 133 genera, although the richest floras are found in tropical regions.

This fungus group classified in the order

Laboulbeniales at present was apparently first noticed by two French entomologists, Alex Laboulbene and August Rouget, in the 1840s but was not described formerly. Rouget (1850) treated this fungus in a brief account on "production parasite" found on several ground-inhabiting beetles. Three years later (1853), Camille Montagne and Charles Robin described the first two species of this fungus group, namely *Laboulbenia rougetti* Montagne et Robin and *L. geurinii* Montagne et Robin. One year before this publication, however, Mayr (1853) had published the figures of *Laoulbenia species* on *Nebia* (Coleoptera, Carabidae). but he considered them as abnormally developed hairs of the insect. The taxonomical system of the Laboulbeniales was first established by Thaxter (1908) and minor changes

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have been added to it up to the present.

Benjamin (1971) summarized the studies on the Laboulbeniales by Thaxter and others. He also provided a synopsis of the genera with a key to them, cited all pertinent literatures on this fungus group, and presented a guide of the collection and techniques for study of these fungi.

Tavares (1985) published the extensive book on the morphology, development, sexuality, origin and distribution of the Laboulbeniales. In this book, she added many own unpublished observations, proposed a new classification, presented a key for the determination of the genera and higher taxa, and completed the bibliography of this group of fungi. At the present, the most Laboulbeniologists are utilizing the classification of the Laboulbeniales and morphological nomenclature proposed by her (1985).

Study on the Laboulbeniales in Asia, a considerable number of species are included in Thaxter's monograph. It includes 18 species and two varieties under 6 genera from Japan. Sugiyama (1973~) published the floristic studies on the Laboulbeniales in various regions of Asia including Papea New Guinea. Terada (1976~) reported the studies on the Laboulbeniales of Taiwan and Japan. Lee, Y. B. (1986) reported also 461 species under 64 genera of the Laboulbeniales in Asia for doctor degree. Among these species and genera, one genus and seven species are new for science.

Concerning the Korean Laboulbeniales, 45 species and 3 new species under 14 genera are included in Lee's papers (1981, 1982a, 1982b, 1983, 1984, 1986, 1990, 1991, 1992a, 1992b).

The present authors started studying on the Laboulbeniales from March 1996 to March 1998 and collecting on the host-insects in various regions of Korea. As the results, they obtained two new species and eight species of the Laboulbeniales.

Descriptions of Species

1. *Chitonomyces iriomotensis* Majewski, Trans. Mycol. Soc. Japan 29: 254, 1988 (Fig. 3. 1 & 2).

Thallus yellowish brown, $33\text{--}35 \times 125\text{--}140$ μm , arcuate. Cell I of the receptacle 2~3.5 times longer than breadth, forming about 40 μm long slender stalk of the thallus; cell II broader, slightly flattened; cell III, IV and V flattened, indistinct; cell VI very narrow in the lower part, cell VII short, usually isodiametric, longer than the indistinct cell VIII; cell IX slightly shorter than cell VII, bell-shaped. Perithecium $23\text{--}25 \times 60\text{--}70$ μm , slightly inflated in the middle part, tapering distally to a short, asymmetrical, strongly bent apex directed anteriorly; a nearly straight, tapering, directed obliquely upwards, 40 μm long outgrowth situated on the anterior sur-

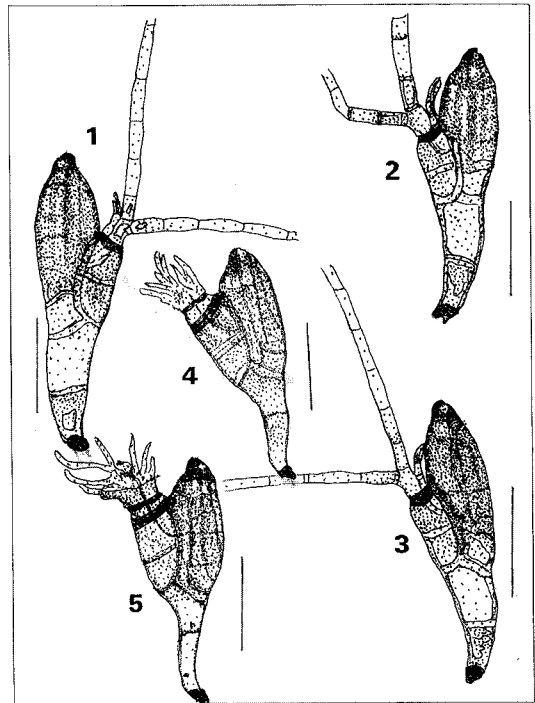


Fig. 1. 1, 2 & 3: *Laboulbenia nogodanicus* Y. B. Lee on *Agonum bucanani* Hope 4 & 5: *Laboulbenia mudengensis* Y. B. Lee on *Bembidion lissonotum* Bates. Scales: 100 μm .

face of the perithecial wall in the middle; usually the upper point of the perithecium not exceeding the top of cell.

Host genus: *Laccophilus* (Dytiscidae, Coleoptera)

Host species in Korea: *Laccophilus lewisius* Sharp

Distribution: Japan and Korea

Specimens examined: Pond Upo, Changnyoung, Kyeongnam Prov., 10 August 1996, L-Y-1322 and 1323; Pond Junam, Changwon, Kyeongnam Prov., 8 September 1996 L-Y-1470.

This species occurs only on the host's left hind foot between the claws (Majewski, 1988b), which was confirmed by the present work. With respect to this character as well as other morphological traits, it resembles *Chitonomyces ensiferus* Speg. Majewski (1988b) described this species as new to science.

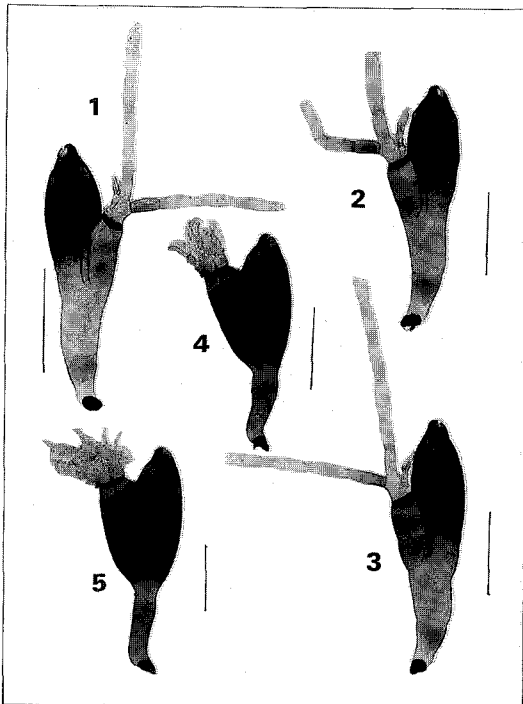


Fig. 2. 1, 2 & 3: *Laboulbenia nogodanicus* Y. B. Lee on *Agonum bucanani* Hope 4 & 5: *Laboulbenia mudeungensis* Y. B. Lee on *Bembidion lissonotum* Bates. Scales: 100 μ m.

2. *Filariomyces forficulae* Shanor, Amer. J. Bot. 39: 499, 1952; Ishikawa, Trans. Mycol. Soc. Japan 12: 38, 1966; Sugiyama, Ginkgoana 2: 34, 1973; Terada, Trans. Mycol. Soc. Japan 17(1): 27, 1976 (Fig. 3. 3).

Thallus 1150~2680 μ m long. Receptacles hyaline, olive-colored, filamentous, consisting of 33~54 cylindrical one-celled layers, forming a small blackish foot, tapering gradually toward the distal end, 25~45 μ m thick, 1150~2680 μ m long; each layer usually several times longer than breadth. Appendages hyaline, dichotomous, formed laterally on the receptacle except basal and distal portions, 5~10 in each individual, 5~10 μ m thick at the basal portion, 100~125 μ m long.

Perithecia hyaline, obclavate, short-stalked, formed laterally at middle or upper portion

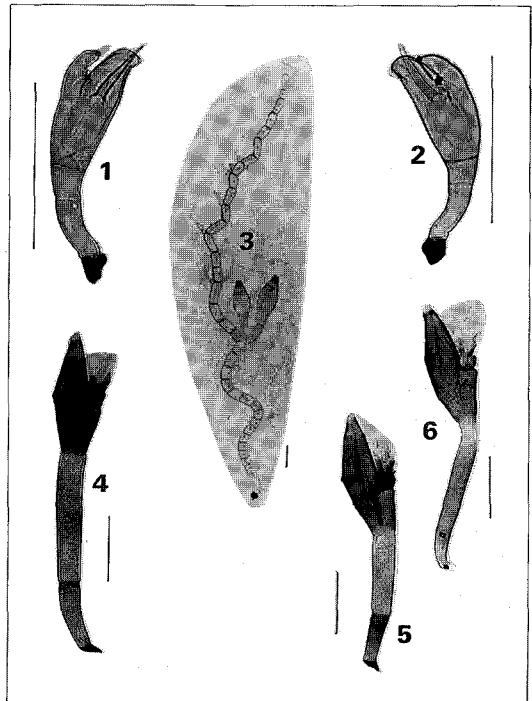


Fig. 3. 1 & 2: *Chitonomyces iriomotensis* Majewski on *Laccophilus lewisius* Sharp 3: *Filariomyces forficulae* Shanor on *Labidura japonica* De Haan 4, 5 & 6: *Laboulbenia egens* Spegazzini on *Tachys gradatus* Bates and *T. laetifica* (Bates) Scales: 100 μ m.

of the receptacle, becoming more or less blackish brown at apical portion with age, 1-6 in each individual, 35-75 μm thick, 80-150 μm long; stalk consisting of three superposed cells, free from the receptacle on lateral side, 20-40 μm thick, 50-110 μm long. Antheridia hyaline, cylindrical, tapering towards the distal end, formed singly or in pairs at the terminations of branches of appendages, 3-5 μm thick, 10-15 μm long.

Host genera: *Labidura* and *Prolabia* (Labiidae, Dermaptera)

Host species in Korea: *Labidura japonica* De Haan

Distribution: Japan, Korea and U. S. A.

Specimens examined: Jangsung, Cheonnam Prov., 4 September 1989, L-Y-0469; Hoidongri, Euisinmyeon, Jindo, Cheonnam Prov., 6 June 1996, L-Y-1239, 1240, 1241, 1242, 1243, 1244, 1245, 1246, 1247, 1248, 1249, 1250, 1251 and 1252.

This fungus occurred only on pygidium of male individuals of the host insects. Ample insect specimens belonging to other genera in the Dermaptera were examined but none of them was parasitized by the present fungus. Hosts were collected under the stone of streams.

3. *Laboulbenia egens* Speg., An. Soc. Cient. Argent. 85: 325, 1918; Hulden, Karstenia 25: 4, 1985; Majewski, Trans. Mycol. Soc. Japan 29: 39, 1988; Majewski, Polish Bot. Stud. 7: 113, 1994 (Fig. 3, 4, 5 & 6).

Total length to the top of Perithecium 310-500 μm . Thallus olivaceous brown, elongated. Receptacles consisting of the basal and distal portion; the basal portion cylindrical, composed of five superposed cells, tapering toward the base, forming a blackish foot, 30-40 μm thick, 205-415 μm long; cell I 18-20 μm thick, 55-100 μm long; cell II 23-30 μm thick, 100-250 μm long, cell I and especially cell II strongly elongated, forming slender stalk of the thallus; cell III 30-40 μm thick, 40-75

μm long; cell IV similar to cell V in shape and size, slightly elongated, cell IV 10-20 μm thick, 10-25 μm long, cell V 8-15 μm thick, 10-25 μm long; insertion cell blackish, slightly constricted, 18-20 μm thick, about 5 μm long; appendage composed of the basal cells and branchlets; the basal cells giving rise to many short branchlets, simple or divided (63-83 μm long); the posterior margin of the exterior basal cell protruding distally and the cell above blackened near the base.

Perithecium olivaceous brown, composed of the perithecium proper and a stalk; perithecium ovate, $\frac{3}{4}$ free, with straight apex hyaline, slightly protruding interior lips and with horizontal row of distinct protuberances on the exterior side of perithecium in its broadest part, 45-65 μm thick, 100-155 μm long stalk composed of a large basal cell and three distal cells, united from cell II to cell IV; the basal cell of stalk elongated but shorter than cell III.

Host genus: *Tachys* (Carabidae, Coleoptera)

Host species in Korea: *Tachys gradatus* Bates and *T. laetifica* (Bates)

Distributions: Asia, Africa, Europe and Central America

Specimens examined: Pond Upo, Changnyoung, Kyeongnam Prov., 11 August, 1996, L-Y-1314, 1315, 1316, 1317 and 1318; *ibid.*, 5 April 1997, L-Y-1542, 1543, 1548, 1549 and 1550.

This species is similar to *Laboulbenia pedicellata* Thaxter in having the protuberances on the exterior surface of the basal cell of the appendage. In papers on Laboulbeniales of Asia, this species was reported several times as *Laboulbenia tachys* Thaxter (Sugiyama, 1973, 1978; Sugiyama & Phanichapol, 1984; Lee *et al.*, 1982a; Lee, 1986; Lee & Sugiyama, 1984; Sugiyama & Majewski, 1985). Infected hosts occurred on pondside and grass field of mountain streams. Thalli were found on elytra, abdomen, legs and thorax etc.

4. *Laboulbenia flagellata* Peyritsch, Sitzungsber.

Kais. Akad. Wiss. Math-Natur wiss, Classe 68: 247, 1873; Thaxter, *Laboulbenia elongata*, Proc. Amer. Acad. Arts Sci. 24: 10, 1890; Spegazzini, Redia 10: 50, 1914; *ibid.* An. Mus. nac. Hist. nat. Buenos Aires: 623, 1917; Balazuc, Livre du Cinquantenaire de l'institute de Speleologie' Emile Racoyitza', Bucarest: 469, 1971; *ibid.* Bull. Soc. Linn. Lyon 43(2): 59, 1974; *ibid.* 51: 13, 1982; Suigiyama, Trans. Mycol. Soc. Japan 13: 261, 1972; *ibid.* Ginkgoana 2: 51, 1973; Lee, Kor. J. Mycol. 9(4): 184, 1981; Lee, Kor. J. Plant, Taxon, 16(2): 136, 1986; Santamaria, An. Jard. Bot. Madrid 42(2): 276, 1986; Majewski, Polish Bot. Stud. 7: 98, 1994.

Host genera: *Acanthogenius*, *Anchomenus*, *Anisodatylus*, *Argutor*, *Antisphodrus*, *Calatus*, *Colpodes*, *Coptodera*, *Lomosthenes*, *Macrochilus*, *Platynus*, *Pleurosoma*, *Pseudopristonychus*, *Onypterygia* and *Stomis* (Carabidae, Coleoptera).

Host species in Korea: *Agonum buchmanani* Hope, *Harpalus* sp.(1), *Harpalus* sp.(2), *Platynus daimio* Bates and *Pterostichus microcephalus* Motschulsky.

Distribution: Cosmopolitan

Specimens examined: Pond Upo, Changnyoung, Kyeongnam Prov., 10 August 1996, L-Y-1298, 1299, 1300, 1301, 1302, 1303; *ibid.*, 15 August 1996, L-Y-1324, 1325, 1326, 1327, 1328, 1329, 1330, 1331, 1332; *ibid.*, 18 August 1996, L-Y-1343, 1364, 1365, 1366, 1367, 1368, 1369, 1370, 1371, 1372, 1373, 1374, 1375, 1376, 1377, 1378; *ibid.* 5 April 1997, L-Y-1544, 1547; *ibid.*, 6 September 1997, L-Y-1554, 1555, 1556, 1557, 1558, 1559, 1560, 1561, 1562, 1563, 1564, 1565 and 1566.

This species was collected from *Platynus daimio* Bates. Thalli occurred on all parts of the host body, particularly often on elytra, the pronotum and the lower surface of the body.

5. *Laboulbenia mudeungensis* Y. B. Lee, sp. nov (Fig. 1. 4 & 5, Fig. 2. 4 & 5).

Thallus praeter cellulam I, II, et appendicem denigrata, 250–270 μ m longus. Recept-

aculum 200–220 μ m longum; cellula I et cellula II hyalina, cylindrica, angustior quam cellula III et cellula IV; cellula III et cellula IV in lata et longitudo aequales; cellula V triangula a septa cellulae III separata. Cellula insertionis annuloideus denigrata. Appendices interna et externa paulo aequales, 75–100 μ m longae. Perithecium ovatum, deorsum inflatum, fuscum, $\frac{1}{2}$ – $\frac{1}{4}$ liberum, 60–65 \times 110–130 μ m. Ascospores ca. 5 \times 55 μ m. Antheridia ignota.

Total length to the perithecium 250–270 μ m. Thallus blackish brown except for cell I and cell II of receptacle. Receptacle 200–220 μ m long, slender; cell I hyaline, yellowish, up to 2 times longer than broad, 25–30 μ m thick at the distal end, 60–70 μ m long; cell II hyaline, yellowish, tapering basally, broadening distally, 50–55 μ m thick at the distal end, 50–55 μ m long; cell III blackish brown, slightly broader than long, 40–50 μ m thick, 35–40 μ m long; cell IV blackish brown, 40–50 μ m thick, 40–65 μ m long; cell V blackish brown, triangular, separated from the septum of cell III, 25–35 μ m thick, 35–45 μ m long. Insertion cell seems to be a blackish ring surrounding the cell IV, V, and two basal cells of inner and outer appendages, 45–50 μ m thick, 5–10 μ m long. Appendages composed of two basal cells and two large branches with septa on distal portion of basal cells; outer appendage similar to the inner one in shape and size, 75–100 μ m long, somewhat exceeding the top of perithecium. Perithecium opaque, blackish brown, ovate, straight, more or less inflated downward, $\frac{1}{2}$ – $\frac{1}{4}$ free, with apical darkening and protruding rounded posterior lips, 60–65 μ m thick, 110–130 μ m long. Stalk cell of perithecium concolorous with perithecium proper, 50 μ m thick, 40–45 μ m long. Antheridia not observed. Spores 55 \times 5 μ m.

Host genus: *Bembidion* (Carabidae, Coleoptera).

Host species in Korea: *Bembidion lissono-*

tum Bates.

Distribution: Korea

Specimens examined: An edge of the stream, Mt. Mudeung, Kwangju, 15 August 1980, L-Y-0079 (Holotypus); Cheonggae, Muan, Cheonnam Prov., 29 April 1981, L-Y-0095.

This new species seems to be related to *L. luxurians* Peyr., *L. murmanica* Huldén, *L. pedicellata* Thax., *L. tenera* Majewski and *L. vulgaris* Peyr. which occurred on genus *Bembidion* (Majewski, 1994), but it is distinguished from the latter by having the following features: 1) Insertion cell is consisted of a large dark ring surrounding the basal cells of appendages and the upper portion of receptacle. 2) Outer appendage is similar to inner one in shape and size. 3) The septa of appendages seem to be the small dark rings on two basal cells. Thalli were found on the margin of erytra of hosts.

6. *Laboulbenia nogodanicus* Y. B. Lee, sp. nov
(Fig. 1. 1, 2 & 3, Fig. 2. 1, 2 & 3).

Thallus praeter perithecium et cellulam insertionis fere hyalinus, 315~435 μm longus. Receptaculum 195~305 μm longum; cellula I 35~45 \times 45~65 μm ; cellula II ca. 2-plo longior quam latior, 50~80 \times 85~130 μm ; cellula III et cellula IV quam cellula II ca. 2-plo brevior, cellula III 35~45 \times 40~70 μm , cellula IV 35~40 \times 35~55 μm ; cellula V a cellula IV oblique, triangula ve ovata, a septa cellulae III separata. Appendix externa ex 2 ramis et cellulae basilari magnae composita, ca. 500 μm longa, appendix interna ex cellulae basilari parvae et antheridia composita. Antheridia 5 \times 20~25 μm . Perithecium denigratum, ovatum, paulo inflatum, ca. semiliberum. Ascospores ca. 5 \times 30 μm .

Total length to the perithecium 315~435 μm . Receptacle 195~305 μm ; cell I hyaline basally, somewhat blackish distally, 35~45 \times 45~65 μm ; cell II hyaline, yellowish, about 2 times longer than breadth, 50~80 \times 85~130

μm ; cell III somewhat blackish, longer than breadth, shorter than cell II, 35~45 \times 40~70 μm ; cell IV 35~40 \times 35~55 μm ; cell V triangular or ovate, hyaline, free from the septum of cell III, 15~20 \times 25~50 μm . Insertion cell dark, constricted, 5 \times 20~25 μm . Appendage up to 500 μm long: outer appendage composed of a large basal cell and two or three simple branchlets; inner appendage producing a simple branchlet and the antheridia including its stalk cell on a small basal cell, but, sometimes in the case of being not produced a simple branchlet on it producing the only antheridia including its stalk cell. Antheridia 5 \times 25 μm . Perithecium blackish brown, ovate, inflated laterally, 60~95 \times 125~180 μm (exclusive of the stalk), $\frac{1}{2}$ free, with apical blackish spots and protruding rounded posterior lips: stalk cell of perithecium similar to cell III in shape and size, 35~55 \times 50~60 μm . Spores 5 \times 30 μm .

Host genus: *Agonum* (Carabidae, Coleoptera)

Host species in Korea: *Agonum bucanani* Hope and *Agonum* sp. (?)

Distribution: Korea

Specimens examined: A valley of Mt. Dukeu, Gucheondong, Cheonbuk Prov., 10 May 1981, L-Y-0108; a valley of Mt. Duryun, Haenam, Cheonnam Prov., 30 May 1981, L-Y-0135, 0136, 0137, 0138, 0139 and 0141; a valley of temple Whaeom, Nogodan in Mt. Chiri, Cheonnam Prov., 13 June 1981, L-Y-0162, 0163 (holotypus), 0164, 0165, 0166 and 0167.

The main features of this species are the blackish perithecium and the hyaline, brownish stalk cell. Outer appendage is producing two or three simple branchlets on a large basal cell. Inner appendage is producing antheridia including its stalk cell and a simple branchlet on a small basal cell, but, sometimes it is the case that a simple branchlet is not produced, in that case of, the only antheridia including its stalk cell is produced. This species is closely related to *Laboulbenia*

agoni Sugiyama. It is distinguished from the latter by the divided shape of outer appendage, the length of antheridia including its stalk cell that is not reached to the apex of perithecium and the straight, inflated downward perithecium.

7. *Laboulbenia pedicellata* Thaxter, Proc. Amer. Acad. Arts Sci. 27: 44, 1892; Huld n, Karstenia 23: 58, 1983; Santamaria, An. Jard. Bot. Madrid 42(2): 279, 1986; Majewski, Polish Bot. Stud. 7: 114, 1994 (Fig. 4. 1 & 2).

Total length to the top of perithecium 260~340 μ m. Thallus brownish yellow. Receptacle consisting of the basal and distal portion; the basal portion elongated, cylindrical, composed of five superposed cells, tapering toward the

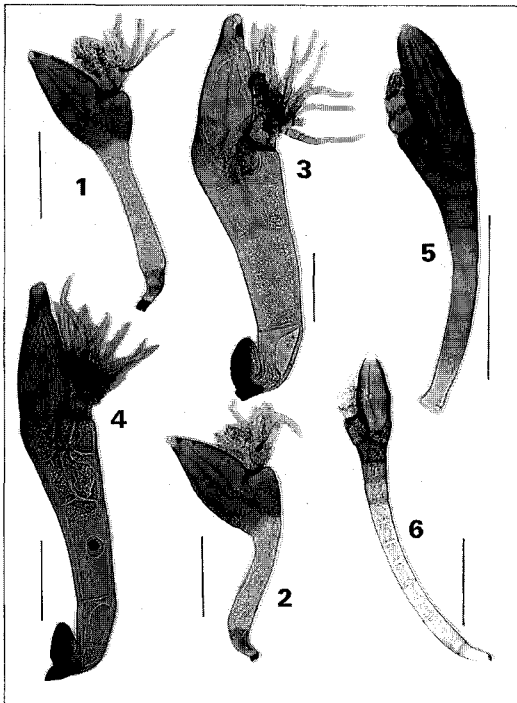


Fig. 4. 1 & 2: *Laboulbenia pedicellata* Thaxter on *Bembidion thermarum* Motschulsky and *B. morawitzi* Csiki. 3 & 4: *Laboulbenia philonthi* Thaxter on *Philonthus wuesthoffi* Bernhauer 5 & 6: *Misgomyces dyschirii* Thaxter on *Dyschirius oviceollis* Putzeys Scales: 100 μ m.

base, forming a blackish foot, stout or slender, variable in shape and size of cells 180~260 μ m long, cell I cuniform, 15~30 μ m thick, 30~50 μ m long; cell II stout, 35~50 μ m thick, 75~150 μ m long, 2~5 times longer than breadth, slender, cylindrical, often narrowed and nearly hyaline in the upper half; cell III isodiametric, slightly elongated, rarely up to 2 times longer than breadth, 15~35 μ m thick, 35~50 μ m long; cell IV similar to cell V in size, cell IV isodiametric, 10~15 μ m thick, 15~20 μ m long, cell V usually narrower, 10~15 μ m thick, 15~20 μ m long; insertion cell constricted, dark, 15 μ m thick, 5~7.5 μ m long; the distal portion of receptacle composed of two basal cells and appendages; basal cell of outer appendage externally inflated, subtending a ramified branch, its branches numerous, hyaline, the exterior branchlet with black septum and external blackening in the lower part, fragile; basal cell of inner appendages smaller than the outer ones, subtending several ramified branchlets directed upwards. Antheridia produced on short inner branchlets. Branchlets in mature thalli usually not exceeding the top of perithecium.

Perithecium dark, brownish, composed of the perithecium proper and a stalk; perithecium ovate, 55~95 μ m thick, 110~125 μ m long, about $\frac{2}{3}$ ~ $\frac{3}{4}$ free from the receptacle, with subapical darkening, somewhat producing interior lips; stalk composed of a large basal cell and some distal cells, united from the distal portion of cell II to the interiorly lateral portion of cell III.

Spores about 5 \times 50 μ m

Host genera: *Bembidion* and *Dyschirius* (Carabidae, Coleoptera)

Host species in Korea: *Bembidion thermarum* Motschulsky and *B. morawitzi* Csiki.

Distribution: Africa, America, Asia, and Europe

Specimens examined: Pond Upo, Changnyong, Kyeongnam Prov., 18 August 1996,

L-Y-1341, 1342, 1345, 1362; 20 August 1996, L-Y-1379, 1380, 1381, 1382; Pond Junam, Changwon, Kyeongnam, Prov., 8 September 1996, L-Y-1481, 1482, 1483, 1484, 1485, 1486, 1487, 1488, 1489, 1490; Pond Upo, Changnyoung, Kyeongnam Prov., 6 September 1997, L-Y-1567, 1568, 1569 and 1570.

This species is close to *Laboulbenia egens* Speg. (Majewski, 1994). However, this species is distinguished from the latter in having the perithecium without distinct protuberance. Hosts were collected in the vicinity of pond, river and lake. Thalli grew on all parts of the host body. On some hosts they occurred together with the thalli of other *Laboulbenia* species.

8. *Laboulbenia philonthi* Thaxter, Proc. Amer. Acad. Arts Sci. 28: 174, 1893; Majewski, Polish Bot. Stud. 7: 119, 1994 (Fig. 4. 3 & 4).

Total length to the top of perithecium 430~575 μm . Thallus brown to olivaceous brown. Receptacles consisting of the basal and distal portions; the basal portion cylindrical, composed of five superposed cells, tapering toward the base, forming a small blackish foot, 60~80 μm thick, 285~390 μm long; cell I more or less elongated, often with indistinct blackish lateral swelling or without it, 45~60 μm thick, 75~125 μm long; cell II up to 2 times longer than breadth, 60~80 μm thick, 115~166 μm long; cell III 40~55 μm thick, 55~65 μm long; cell IV shorter, nearly isodiametric, 30~45 μm thick, 40~45 μm long; cell V same height of cell IV, in young thalli distinctly obtriangular, later becoming oval, 20~25 μm thick, 40~45 μm long; insertion cell constricted, dark; the distal portion of receptacle composed of numerous hyaline filamentous branches and the basal cells of appendages numerous 125~170 μm long; appendages simple or seldom divided, straight, tapering to thin hyaline distal parts; one or two lower cells of every branchlet isodiametric, in-

flated, and separated by dark septa. Perithecia brown or olivaceous brown, ovate, nearly completely free, darkened below the apex, 60~80 μm thick, 160~220 μm long; stalk composed of a large basal cell and a few distal cells, united to the cell III and cell IV, 40~60 μm thick, 95~110 μm long.

Host genera: *Gabrius*, *Paragabrius* and *Philonthus* (Coleoptera, Staphilinidae)

Host species: *Philonthus wuesthoffi* Bernhauer

Distribution: Europe, Turkey, North and Central America, Korea

Specimens examined: Pond Upo, Changnyoung, Kyeongnam Prov., 25 July 1996, L-Y-1261, 1262, 1263, 1264, 1265, 1266, 1267; ibid., 10 August 1996, L-Y-1284, 1285, 1286; ibid. 11 August 1996, L-Y-1337; ibid., 18 August 1996, L-Y-1348, 1349, 1350, 1351, 1352, 1353, 1354, 1355, 1356 and 1357.

The present species is closely related to *Laboulbenia barbara* Middlehoek et Boelens. However, this species is distinguished from *L. barbara* by the characteristic dark septa of the appendages. The specimens were found on the moist ground and grass, stagnant water around the pond. Thalli were usually present on host abdomen, head, elytra or legs.

9. *Laboulbenia stenolophi* Speg., Redia 10: 65, 1914; An. Mus. nac. Hist. Nat. Buenos Aires 27: 64, 1915; Terada, Trans. Mycol. Soc. Japan 17(1): 30, 1976; Lee & Sugiyama, Trans. Mycol. Soc. Japan 25: 252, 1984; Lee, Kor. J. Plant Taxon. 16(2): 54, 1986.

Total length to the top of perithecium 195~220 μm long, the widest portion of thalli 65~75 μm . Receptacle hyaline, olivaceous, composed of the basal and distal portions; the basal portion cylindrical, consisting of five cells, 135~150 μm , 35~40 μm thick; cell I gradually tapering towards the base, forming basally a blackish conical foot; cell II rather variable in length, 40 μm long, 35~40 μm

thick; cell III 35~45 μm long, 25~30 μm thick; cell IV 35 μm long, 20 μm thick; cell V 20 μm long, 10~13 μm thick; the distal portion of the receptacle composed of two hyaline branches, 100~110 μm long, each branch divided once or twice at the basal portion.

Perithecium hyaline, ovate, becoming narrower toward the apex, united to the receptacle at the basal half or less, 100~125 μm long except for the stalk, 45~55 μm thick; the stalk consisting of a large basal cell and few small distal cells arranged transversely, 30 μm long, 29 μm thick, completely united to cell II and cell III. Antheridia formed on the inner branches of the distal receptacle, 15 \times 5 μm .

Host genera: *Anoplogeni* and *Stenolophus* (Carabidae, Coleoptera) and *Philonthus* (Staphylinidae, Coleoptera).

Host species in Korea: *Anoplogeni cyaneus* Hope and *Philonthus longicornis* Stephens

Distribution: Italy, Germany, Tunisia, Taiwan, Bali Island and Korea

Specimens examined: Pond Upo, Changnyoung, Kyeongnam Prov., 10 August 1996, L-Y-1283-1, 1283-2.

This species is closely related to *L. anoplogeni* Thaxter. However, *L. stenolophi* is distinguished from the latter by two cells of the fourth layer of receptacle. In *L. anoplogeni* the fourth layer is composed of more than two cells. Thalli occurred on the protium of *Philonthus longicornis*.

10. *Misgomyces dyschirii* Thaxter, Proc. Amer. Acad. Arts Sci. 35: 443, 1900 et Mem. Amer. Acad. Arts Sci. 35: 443, 1900 et Mem. Amer. Acad. Arts Sci. 13: 430, 1908 et 16: 291, 1931; Sugiyama, Ginkgoana No. 2: 69, 1973; Huld n, Karstenia 23: 60, 1983; Majewski, Polish Bot. Stud. 7: 126, 1994 (Fig. 4. 5 & 6).

Total length to the top of perithecium 238~380 μm . Receptacle reddish brown, consisting

of basal and distal portions: basal portion cylindrical, gradually tapering toward the base, producing a blackish conical foot, consisting of 10~14 superposed layers, 30~40 μm thick, 175~300 μm long; cell I longer than breadth, stalk-like; the upper cells thicker than length except for the terminal one; terminal cell longer than breadth, inflated distally, blackened at the distal end, composed of 5~6 small cells arranged irregularly; distal portion of the receptacle consisting of a few to many thin filamentous branches, branches dichotomous, 55~65 μm long. Solitary perithecia formed at the distal end of subterminal cell of the receptacle, concolorous with the receptacle, united to the receptacle on lateral side of the small basal portion, inflated symmetrically on lateral side, narrowly rounded at the apex, 30~40 μm thick, 80~90 μm long; stalk flat, composed of single cell, completely united to the receptacle on lateral side.

Host genus: *Dyschirius* (Carabidae, Coleoptera)

Host species in Korea: *Dyschirius ovicollis* Putzeys

Distribution: Europe (France, Italy, German, Poland), North Africa, Asia and North America

Specimens examined: Pond Upo, Changnyoung, Kyeongnam Prov., 15 August 1996, L-Y-1338, 1339, 1340; ibid., 25 August 1996, L-Y-1383, 1384, 1385, 1386, 1387 and 1388.

The present species is characterized by the reddish thalli and the receptacle composed of many one-celled layers. Hosts were collected from the plant remains of pondside.

적 요

본 논문은 우리나라에서 충생자낭균류의 자원을 발굴하고 동정하여 신종과 미기록종의 표본을 확보 및 보존하기 위하여 1996년 3월부터 1998년 4월까지 연구한 결과이다.

본 연구를 통해 3속 10종이 채집되어 추가되었

다. 그들 중에서 *Laboulbenia*에 속하는 2종은 신종으로 동정되었으며 2속 2종과 4종은 미기록, 그리고 2종은 기존에 보고되었던 숙주와 다른 숙주에서 채집되었다.

신종과 그들의 숙주는 다음과 같다.

Laboulbenina mudeungensis Y. B. Lee on *Bembidion thermarum* Bates, *Laboulbenia nodananicus* Y. B. Lee on *Agonum buchanani* Hope and *Agonum* sp.

미기록속(*Filariomyces*, *Misgomyces*)과 종, 그들의 숙주들은 다음과 같다.

Filariomyces forficulae Shanor on *Labidura japonica* De Haan.

Misgomyces dyschirii Thaxter on *Dyschirius ovicollis* Putzeys

Chitonomyces iriomotensis Majewski on *Lacophilus lewisius* Sharp

Laboulbenia egens Speg. on *Tachys gradatus* Bates.

Laboulbenia pedicellata Thaxter on *Bembidion thermarum* Motschulsky.

Laboulbenia philonthi Thaxter on *Philonthus wuesthoffi* Bernhaur.

기존에 보고되었던 숙주와 다른 숙주에서 채집된 종들과 숙주들은 다음과 같다.

Laboulbenia flagellata Peyritsch on *Platynus daimio* Bates.

Laboulbenia stenolophi Spegazzini on *Philonthus longicornis* Stenphens.

이상의 결과, 우리나라의 총생자낭균류는 16속 56종이 기록되며, 그들중에서 특산종(신종)은 5종이 된다.

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