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Notes on Three Species of *Laboulbenia* Newly Collected in Korea

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Three species of the *Laboulbenia* are newly described from Korea. *Laboulbenia borealis* were collected from the sternites of the back abdomen of *Gyrinus japonicus*. *L. humilis* were collected from the upper side of the abdomen of *Chlaenius naeviger*. *L. benjaminii* were collected from the abdomen of *Stenolophus difficilis*.

KEYWORD: *Chlaenius naeviger, Gyrinus japonicus, Laboulbenia, Stenolophus difficilis*

The Laboulbeniales is a highly specialized fungus group of the Ascomyetes. All species of this fungus group are known as the obligate exoparasites of the Arthropoda, especially of insect, with the exception of a small number of species found on mites and millipedes. Members of the Laboulbeniales are widely distributed in the world and include above 2,000 known species under 133 genera, although the richest florae are found in tropical regions.

The first floristic work related to the Laboulbeniales of Korea were started by Yong-Bo Lee in 1981. The Korean Laboulbeniales were reported 64 species under 17 genera totally up to the present. In this paper, we want to report three species of *Laboulbenia* collected in Korea. This report includes their host, distribution, description and photos. Three species will be newly added to the mycological flora of Korea.

Description of Species

1. *Laboulbenia borealis* Speg., Ann. Mus. Nac. Hist. Nat. Buenos Aires 26: 468, 1915; Sugiyama, Ginkgoana 2: 43, 1973.

Total length to the top of perithecium 450~480 μm. Receptacles dark yellowish brown, with fine and dense black punctations, composed of basal and distal portions; basal portion consisting of five cells, 325~350 μm long, 45 μm thick; cell I and II forming a stalk, stalk tapering evenly towards the base, forming basaly a blackish conical foot; cell I cylindrical, 105~110 μm long, 30 μm thick at the distal end; cell II 110~130 μm long, 35 μm in diameter; cell III and IV stout, darker than the lower cells; cell III 70~75 μm long, 45 μm thick; cell IV inflated laterally, 45~50 μm long, 45 μm thick; cell V ellipsoidal, 25 μm long, 15 μm thick; distal portion of the receptacle composed of numerous hyaline filamentous branches, 300~325 μm long.

Perithecia concolorous with the receptacle, thickest at the base, becoming gradually thinner towards the narrowly rounded apex, more or less inflated laterally, forming a pair of short projections at the apex united to the receptacle on one lateral side of the basal half, 150~170 μm long except the stalk, 45 μm in diameter; apical projections pointed terminally, 4~5 μm long; stalk thickest at the distal end, more or less tapering towards the base, consisting of a large basal cell and a few distal cells, completely united to the third layer of the receptacle on lateral side, 90~95 μm long, 30~40 μm thick. Antheridium not observed.

Host genus: *Gyrinus* (Gyrinidae, Coleoptera).

Host species in Korea: *Gyrinus japonicus* Sharp (Gyrinidae, Coleoptera).

Distribution: Japan, Korea (new) and North and South America.

Specimen examined: Mt. Cheuiseo (Temple Tongdo), Yangsangun, Gyeongnam Province, 10 August, 1998, L-Y-1589 and 1591.

The present species is characterized by the slender stalk of the receptacle and the stout upper portion united to the perithecium. The numerous filamentous branches of the receptacle are also unique to this species. Thalli grew on the sternites of the back abdomen.

2. *Laboulbenia humilis* Thax., Proc. Amer. Acad. Arts Sci. 38: 42, 1902; Mem. Amer. Acad. Arts Sci. 13: 334, 1908; Terada, Mycoscience 37(3): 308, 1996.

Total length to the top of perithecium 237.5~325 μm. Receptacle amber-colored, streaked or spotted, composed of basal and distal portions; basal portion consisting of five cells and insertion cell, 152.5~175 μm long, 27.5~30 μm thick; cell I contrasting pale, cylindrical, longer than the other cells, at least 4 times longer than breadth, 75~87.5 μm long, 20 μm thick; cell II darker than cell I,

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up to 1.4 times longer than breadth, 37.5 μm long, 27.5 μm thick; cell III and cell IV isodiametric or slightly elongated and nearly same size, cell III 22.5 μm long, 20~22.5 μm thick, cell IV 20 μm long, 17.5~20 μm thick; cell V small, oval, 10~15 μm long, 5~7.5 μm thick; insertion cell relatively narrow, dark, thick; distal portion consisting of the outer and inner appendages arranged anterior-posteriorly; the outer appendage simple, curved outwardly, the basal three septa distinct, other above very pale, no blackening or constriction, up to 82.5~150 μm long, 5 μm thick; the inner appendage usually three celled, the terminal cell a narrow, flask-shaped antheridium, but occasionally replaced by a short sterile branch, 37.5 μm long, 2.5~3.75 μm thick.

Perithecia olive-brown, convex, composed of the perithecium proper and the perithecial stalk, tapering distally towards the top, free from the receptacle at the base three fourth, outwardly oblique lips, the stalk consisting of the basal cell (cell VI) and the subbasal cell (cell VII) inflated outwardly. Antheridia 20~25 μm long, 1.5~2 μm thick.

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

Host species in Korea: *Chlaenius naeviger* Morawitz (Carabidae, Coleoptera).

Distribution: China (Hong Kong), Japan (Okinawa) and Korea (Mt. Baegwoon).

Specimen examined: Mt. Baegwoon, Chungdaeri, Ganjeonmyeon, Guryegun, Cheonnam Province, 16 August, 2001, L-Y-1582.

The main feature of this species is the remarkable pattern of the olive-brown perithecia and amber-colored, streaked or spotted receptacles, with a contrasting pale cell I. Terada's materials (1996) showed cell I and cell II of this fungus as shorter and stouter than Thaxter's (1908). The morphological features of the Korean materials nearly agreed with Thaxter's description. Thalli occurred on the upper side of the host's abdomen.

3. *Laboulbenia benjaminii* Bala., Bull. mens. Soc. Linn. Lyon 43: 15, 1974; Majewski, Polish Bot. Stud. 7: 88, 1994; De Kesel, Sterbeeckia 18: 27, 1998.

Total length to the top of perithecium 247.5 μm. Thallus yellowish-brown. Receptacle rather stout, composed of basal and distal portions; the basal portion consisting of five cells and insertion cell, 162.5 μm long, 37.5 μm thick; cell I usually bent outwardly, up to 2 times longer than breadth, 42.5 μm long, 20 μm thick; cell II broader in its distal portion, septum II/IV much longer than septum II/III, oblique, 50 μm long, 37.5 μm thick; cell III and IV slightly elongated, cell III 42.5 μm long, 35 μm thick, cell IV 45 μm long, 35 μm thick; cell V small, oval, 22.5 μm long, 15 μm thick; insertion cell dark, thick, constricted, 5 μm long, 17.5 μm thick; the distal portion consisting of two appendages arranged anterior-posteriorly; the outer appendage simple, straight, composed of elongated cells, it broke in this specimen (Fig. 1C); the inner appendage short, its basal cell not over half as long as the outer basal cell, giving rise to branches which are 2~3 times divided and terminating in a cluster of antheridia. Antheridia pro-

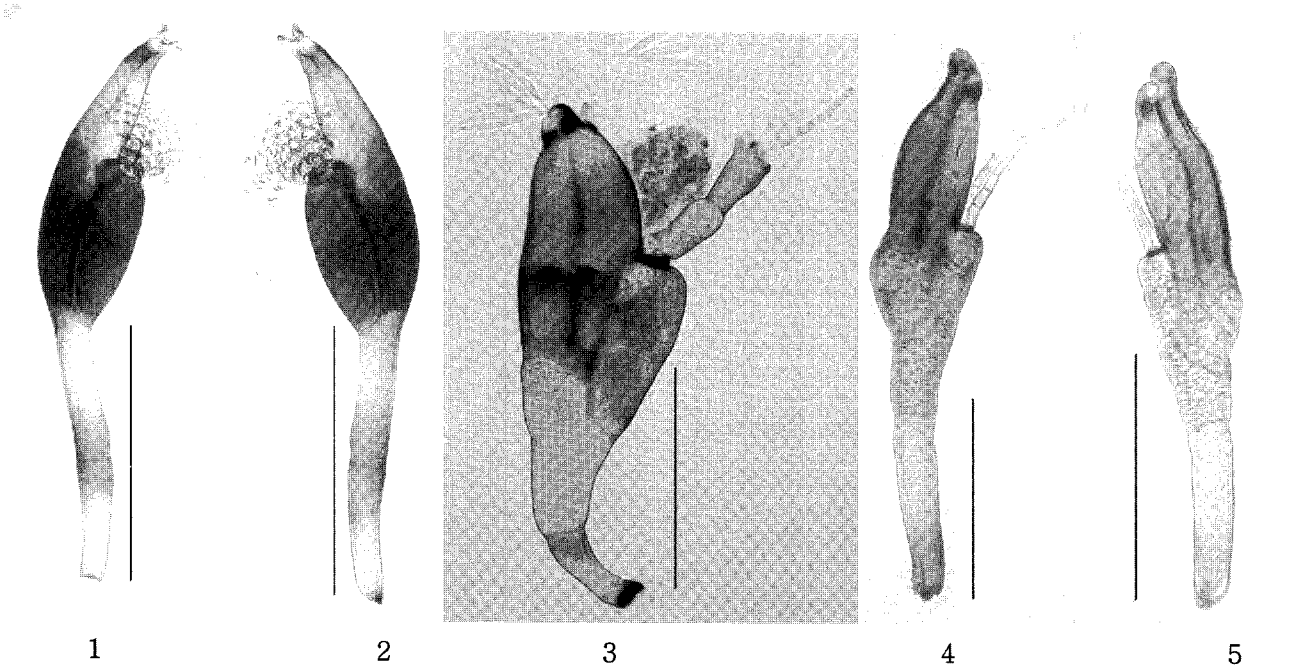

Fig. 1 & 2. *Laboulbenia borealis* Spegazzini on *Gyrinus japonicus* Sharp (scale: 200 μm). **3.** *L. benjaminii* Balazuc on *Stenolophus difficilis* Hope (scale: 100 μm). **4 & 5.** *Laboulbenia humilis* Thaxter on *Chlaenius naeviger* Morawitz (scale: 100 μm).

liferate into short, evanescent branchlets.

Perithecium composed of the perithecial proper and the stalk consisting of two cells; perithecial proper ovate, half free, usually slightly asymmertrical, with convex posterior margin and prominent, rounded posterior lips, the blackish subapical portion, 120 μm long, 57.5 μm thick; the basal cell (cell VI) of the perithecial stalk flattened, oblique, 25 μm long, 32.5 μm thick, two subbasal cells (cell VII, VIII) smaller than the basal cell.

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

Host species in Korea: *Stenolophus difficilis* Hope (Carabidae, Coleoptera).

Distribution: Belgium, France, Korea and Poland.

Specimen examined: Mt. Baegwoon, Gwangyang, Cheonnam Province, 10 August, 1996, L-Y-1253.

This species was collected under the small stones of the narrow stream surrounded by the deciduous broad-leaved forest and about 600 m height above the sea level of Mt. Baegwoon in the west. *Laboulbenia benjaminii* known only from the host genus *Badister* Schellenberg (Balazuc, 1974; Majewski, 1994; Kesel, 1998). The genus *Stenolophus* was recorded as a host of this species for the first time from Korea. Thalli grew the abdomen.

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