

## Notes on Unrecorded Fleshy Fungi of *Cordyceps* in Korea

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### 韓國產 冬蟲夏草屬의 未記錄種

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**Abstract:** More than 40 samples of the genus *Cordyceps* were collected and investigated. Among them, six species were confirmed as unrecorded ones in Korea. Unrecorded species were *Cordyceps alboperitheciata*, *Cordyceps discoideocapitata*, *Cordyceps intermedia*, *Cordyceps nigrella*, *Cordyceps roseostromata* and *Cordyceps scarabaecicola*.

**Keywords:** *Cordyceps*, Stromata, Stalk, Ascus, Part-spores.

Because of the shortage of study on the genus *Cordyceps*, only six species were recorded as *Cordyceps* in Korea (Kor. Soc. Mycol., 1978; Lee and Hong, 1985). This was caused by the poor distribution of those fungi and the environmental conditions which were necessary for their growth.

During the period of 1984~1985, the distribution of a large group of the genus *Cordyceps* was investigated and studied. As for a reference, *Cordyceps* which is a genera of Clavicipitales has the characteristics as follows:

*Cordyceps* (Fries) Link, *Handbuch zur Erkennung der...Gewächse* 3:347(1833).

Stromata stalked, fertile head club-shaped, ovoid or subglobose, fleshy, perithecia more or less immersed, asci narrowly cylindrical, ascospores thread-like, breaking up into short rod-like part-spores while still within the ascus. The species are all parasitic.

#### Materials and Methods

Collections preserved formerly and gathered

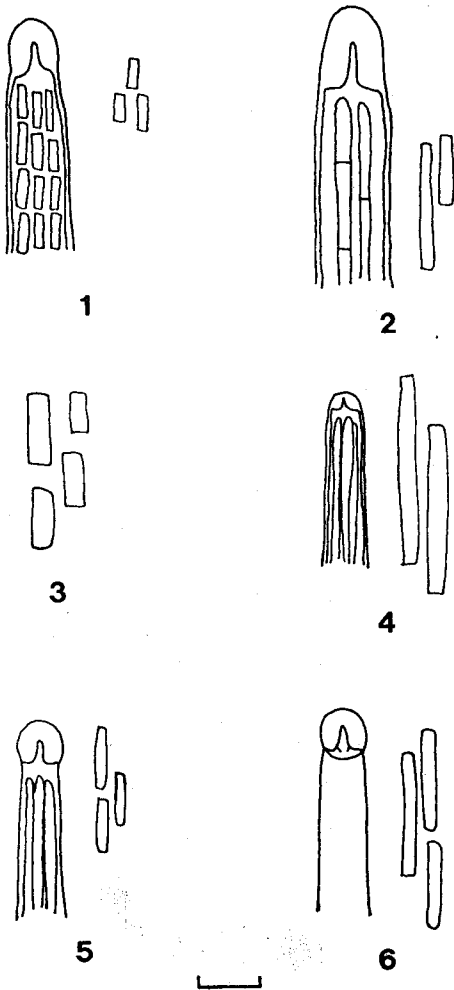
during 1984~1985 which are in dried or soaked storage were tentatively examined. Ordinarily 4% (v/v) formalin solution was used on immersion. But the fungi of tough texture were kept dry in a refrigerator and when fully dried by suction, and they were conserved in bottles with naphthalene. They are stocked in the Laboratory, Department of Microbiology, Seoul National University.

For microscopy freehand sections were enough for routine observation. This was done by holding the small specimen fragment in a pith and slicing with a single-edged razor blade under a dissecting microscope. When mounting sections formalin-glycerine water (1:1 v/v) was usually dropped and on dried materials 5% KOH solution was followed for the purpose of reswelling the shrunk tissues.

Line drawings were made at  $\times 1000$  or  $\times 1500$ . Color names in descriptions were cited from Chapter XVIII Color Terms in the "Botanical Latin" without proper standards. Finally every bibliographic inquiry was simply stated by means of inscribing authors, page and years within

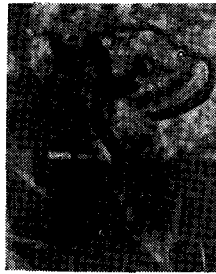
PLATE B

PLATE A



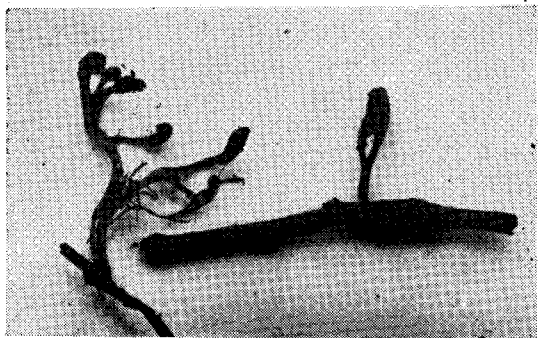
1

2



3

5



4

**Explanation of Plates**

Plate A : Microscopic structures of 1. *Cordyceps alboperitheciata*; 2. *Cordyceps discoideocapitata*; 3. *Cordyceps intermedia*; 4. *Cordyceps nigrella*; 5. *Cordyceps roseostromata*; 6. *Cordyceps scarabaeicola*; scale: 5  $\mu$ m

Plate B : Photographs of 1. *Cordyceps alboperitheciata*; 2. *Cordyceps intermedia*; 3. *Cordyceps nigrella*; 4. *Cordyceps roseostromata*; 5. *Cordyceps scarabaeicola*; scale : 1. 1.4 cm; 2. 1.2 cm; 3. 1 cm; 4. 1 cm; 5. 1 cm

parentheses.

### Descriptions

*Cordyceps alboperitheciata* Y. Kobayasi et D.

Shimizu 벌유충 동충하초 (Pl. A, 1 & B, 1)

*Cordyceps alboperitheciata* Y. Kobayasi et D.

Shimizu, *Bull. Natn. Sci. Mus.* 8(3):85 (1982); Kobayasi and Shimizu, *Icon. Veg. Wasps Pl. Worms*:192 (1983)

Stromata on one side of the abdomen of host, up to 1.5~2 cm high, with a white stalk about 10×5 mm, lower part of the stalk pale grayish white. Head white, finely dotted about 6 mm long. Asci 5 μm wide, apex 3 μm wide. Ascospores thread-like, part-spores 1.5~2×1 μm.

On the larvae of Coleoptera

Sample: A-54, Kwangnŭng

*Cordyceps discoideocapitata* Y. Kobayasi et D.

Shimizu 파리 동충하초 (Pl. A, 2)

*Cordyceps discoideocapitata* Y. Kobayasi et D.

Shimizu, *Bull. Natn. Sci. Mus.* 8(3):85 (1982); Kobayasi and Shimizu, *Icon. Veg. Wasps Pl. Worms*:192 (1983)

Stromata 3~4 mm long, concolorous with stalk. Stalk deep yellow, smooth, 0.7×1 mm wide. Asci 6 μm wide, apex 5~6 μm wide. Part-spores 6~9×1 μm.

On flies

Sample: A-60, Kwangnŭng

*Cordyceps intermedia* Imai 균핵 동충하초 (Pl. A, 3 & B, 2)

*Cordyceps intermedia* Imai, *Proc. Imp. Acad.*

*Tokyo* 10(10):677 (1934); Kobayasi and Shimizu, *Bull. Natn. Sci. Mus.* 5(2):84 (1960); Kobayasi and Shimizu, *Icon. Veg. Wasps Pl. Worms*:232 (1983)

Stromata usually solitary, 7~9 cm×2~4 mm, head green or black globe-shaped, with whitish stalk. Asci 240~300×7~8 μm, apex 5 μm wide. Part-spores 3~6×1.5~2 μm.

On sclerotia

Sample: A-52, Kwangnŭng

*Cordyceps nigrella* (Y. Kobayasi et D. Shimizu)

Y. Kobayasi et D. Shimizu 검은 동충하초 (Pl. A, 4 & B, 3)

*Cordyceps nigrella* (Y. Kobayasi et D. Shimizu)

Y. Kobayasi et D. Shimizu, *comb. nov.*: (= *C. nigra* Y. Kobayasi et D. Shimizu) in *Bull. Natn. Sci. Mus.* 9(1):13 (1983); Kobayasi and Shimizu, *Icon. Veg. Wasps Pl. Worms*: 145 (1983)

Stromata cylindrical, 20 mm long, dark-gray with hairless, smooth stalk 11×0.6 mm. Asci 3~5 μm wide, apex 3 μm. Part-spores large, 15~17×2 μm.

On the larvae of Coleoptera

Sample: A-55, Hongch'ŏn

*Cordyceps roseostromata* Y. Kobayasi et D.

Shimizu 붉은 동충하초 (Pl. A, 5 & B, 4)

*Cordyceps roseostromata* Y. Kobayasi et D.

Shimizu, *Bull. Natn. Sci. Mus.* 9(1):10 (1983); Kobayasi and Shimizu, *Icon. Veg. Wasps Pl. Worms*:202 (1983)

Stromata gregarious, upper part red, lower part white, head red club-shaped. Asci 3~3.5 μm, apex 2.5~3 μm. Part-spores 4~5×1 μm.

On the larvae of Lepidoptera

Sample: A-61, Kwangnŭng

*Cordyceps scarabaeicola* Y. Kobayasi 딱정벌레 동충하초 (Pl. A, 6 & B, 5)

*Cordyceps scarabaeicola* Y. Kobayasi, *Bull. Natn.*

*Sci. Mus.* 2(4):137 (1976); Kobayasi and Shimizu, *Icon. Veg. Wasps Pl. Worms*:237 (1983)

Stromata usually solitary on the head of host, 3~4 cm×2.5~4 mm, white or pale yellow. Stalk 1.5~2 cm, smooth. Asci 135~150×4~4.5 μm, apex 3 μm wide. Part-spores 10×1~1.5 μm.

On the adult of wasps or flies

Sample: A-62, Kwangnŭng

적 요

동충하초 속에 속하는 균류로 여겨지는 40여 개체의 표본을 관찰한 결과 6종의 한국산 미기록종이 동정되었기에 보고하는 바이다. 미기록 종은 벌유충 동충하초 (*Cordyceps alboperitheciata*), 파리 동충하초 (*Cordyceps discoideocapitata*), 균핵 동충하초 (*Cordyceps intermedia*), 검은 동충하초 (*Cordyceps nigrella*), 붉은 동충하초 (*Cordyceps roseostromata*), 딱정벌레 동충하초 (*Cordyceps scarabaicola*) 등이다. 여기에 인용된 표본은 서울대학교 미생물학과 표본실에 보관되어 있다.

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