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The Higher Fungal Flora in the Areas of Mt. Daesung and Mt. Daeduck

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大成山과 大德山 地域의 高等菌類

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ABSTRACT: More than 300 specimens of higher fungi were collected from both Mt. Daeduck and Mt. Daesung areas in Kangwon Province during the period from 13 to 19 August, 1990. These fungi were identified and classified into 4 orders, 15 families, 35 genera, 52 species and 1 variety. Dominant species were considered to be *Collybia confluens* in Tricholomataceae, and *Russula emetica* in Russulaceae of Agaricales, and *Phlogiotis hevelloides* in Auriculariales throughout our survey areas. *Phlogiotis hevelloides* (Fr.) Martin. (장미주걱목이) and *Pseudohydnum gelatinosum* (Scop. ex Fr.) P. Karst. (혓바늘목이) were newly described in Korea.

KEYWORDS: ***Phlogiotis hevelloides, Pseudohydnum gelatinosum.***

It has been reported that the survey reports for the higher fungal flora in Korean mountains were included; Mt. Jiri (Park and Cho, 1986, 1988, 1989, 1990) and Mt. Jogye (Hong and Jung, 1977) in Jun-La Province, Mt. Moohak in Kyungsang Province (Park *et al.*, 1987), Mt. Hanla in Jeju Island (Cho *et al.*, 1987) and the forest of Kwangneung in Kyunggi Province and Mt. Daeam, Mt. Gaebang and Mt. Chiak in Kangwon Province (Kim *et al.*, 1982). Through a survey trip around Mt. Daesung and Mt. Daeduk in Kangwon Province, the higher fungi, mushrooms, was generally collected during the summer of 1990. These two mountains are located along with Mt. Taebaik, covering natual forests with much abundant broad leaves, coniferous and the mixed forests.

On account of a long drought and high temperature of forests around Mt. Daesung and Mt. Daeduk, the authors did not collect more samples as compared with any other areas. Although the fungal flora was very poor in this area, the mushrooms could be found in the coniferous broad leaves and the mixed forests.

This paper is contributed to the informational distribution on the higher mycological flora of Mt. Daesung and Mt. Daeduk in Kangwon Province. The three kinds of sites, Hanso-ri, Changjook-dong and Kohan-ri near the areas of two mountains, were choosen for the collection of the higher fungi and for fungal flora. As a result of this survey, 314 specimens were totally collected and alone all these were assorted into three groups as Aphyllophorales, and Agaricalres in Basidiomycotina, and some in Ascomycotina. All the mushrooms belorging to Basidiomycetes were identified and classified into 13 families, 33 genera, 49 species and 1 variety, and Ascomycetes into 2 families, 2 genera and 3 species, respectively.

List and Descriptions

The identification and clssification of the collected fungi Ascomycotina were referred to several references (Imazeki & Hongo, 1987; Imazeki and Hongo, 1989; Kim *et al.*, 1990; Imazeki *et al.*, 1988; Park *et al.*, 1987). The results of servey investigation around Mt. Daeduk were shown in Table I.

It was found that Basidiomycotina was composed of 3 orders, 13 families, 33 genera, 49 species and 1 variety. According to the rank of classification, there were 6 families, 12 genera and 33 species of Agaricales; 6 families, 12 genera, 14 species and 1 variety in Aphyllophorales; 1 family, 2 genera, 2 species in Auriculariales. Dominant species in Tricholomataceae was *Collybia confluens,* and *Russula emetica* in Russulaceae throughout survey areas.

Ascomycotina of all large quantity was inspected and then there were classified into 1 oder, 2 families, 2 genera and 3 species. Among this survey, dominant species in Heterobasidiae was *Phlogiotus hevelloides.* Porticularly, this spcies was abundantly distributed under the shading mixed forest in Mt. Deasung.

On the region from Ssari-che to the top of Mt. Daesung going down to Hanso-ri, in the community of *Quercus mongolia-Sasa borealis,* the higher fungal flora was included in *Stereum ostrea, Formitopsis officinalis, Coriolus versicolor, Ramarialopsis kunzei, Formitopsis rosea and Mycoasia copellandii.* It was found that *Collybia confluens, Clitocybe fragrans, Hydnum repandum* var. *album, Spathularia clavata, Inocybe asterospora, Hygrocybe miniata, Tyromyces sambuceus and Russula emetica* in the community of *Quercus mongolia-Euscaphis japonica; Phlogiotis hevelloides, Xerocomus subtomentus, Psathyrella candolleana, Thelephora palmata, Coriolus versicolor, Russula pseudodelica, Lactarius piperatus, Lactarius subpiperatus, Trametes dickensii, Oudemansiella platiphylla, Bisporella citrina, Russula mariae, Collybia peronata* and *Russula sororia* in the community of *Quercus mongolica-Acerpseudo-sieboldianum* Kom. were collected and identified.

On the region from Mt. Daesung to Changjookdong, it was investigated that 9 species such as *Panaeolus sphintrinus, Spathularia flavida, Collybia peronata, Spathularia clavata, Coriolus versicolor, Russula delica, Russula pseudodelica, Coltricia cinnamonea* and *Collybia dryophyla* in the community of *Larix leptolepis;* 7 species which was *Thlephor palmata, Cantharellus minor, Russula emetica, Russula mariae, Collybia butyracea, Lactarius hygrophoroides* and *Mycena pura* in the community of *Pinus densiflora-Quercus mongolia;* 6 species, *Pseudohydnum gelatinosum, Laccaria lccata, Laccaria amethystina, Suillus aruginascences, Marasmius maximus* and *Thelephora terrestris* in the community of *Laix leptolepis-Quercus mongolia* were also distributed.

On the region from Mt. Daesung to Hanso-ri, *Lentinus lepideus, Lactarius volemus, Streum ostrea, Russula bella, Collybia confluens, Russula lauroceasi, Pseudohydnum gelatinosum, Coriolus versicolor, Clitocybe gibba, Fomes fomentarius, Paxillus curtisii, Marasmiellus candidus, Tricholomopsis decora, Lyophyllum connatums, Xeromphalina campenella* and *Phlogiotis hevelloides* were identified.

The large amounts of specimens of *Spathularia clavata* and *Thelephora palmata* were collected on the region of Mt. Daesung to Hanso-ri and Chanjook-dong. The large number of specimens of *Phlogiotis hevelloides* was collected from Mt. Daesung to Hanso-ri and from the altitude of 600 m over of these region. *Lentinus lepideus, Paxillus curtisii* and *Tricholomopsis decora* were only found in the region of Mt. Daesung through Hanso-ri.

Mycorrhiza is considered to be one of types of symbiosis between higher plants and furgi existing in the complex forest ecosystem. Many higher fungal in forest are associated with certain types of trees. *Russula* 6 spp. and *Laccaria* 2 spp. were considered to be related as these ectomycorrhizal mushrooms. It was found that the fairy ring-fungi were *Collybia* 2 spp., *Spathularia* 2 spp. and *Russula* 2 spp.. Saprophytic fungi were identified as species of *Stereum, Paxillus, Mycoacia, Trametes, Coriolus, Tyromyces, Fomes* and *Fomitopsis* 2 spp., and the others collected from the soil, leaves and woods.

Edible fungi were included 21 species; *Oudemansiella platyphylla, Hygrocybe miniata* and *Pseudohydnum gelatinosum* and so on. Among these mushrooms, *Lentinus lepideus* was large, thick ba-

Table I. The higher fungal flora of Mt. Daeduk in Kangwon prefecture.

Scientific name	Korean name	Habitat	Number of specimens	Mycorrhizal formation	Collection site		
					Hanso-ri	Changjook-dong	Kohan-ri
Agaricales	주름버섯목						
Tricholomataceae	송이버섯과						
Hygrocybe miniata	붉은무명버섯		7		0		
Lentinus lepideus	잣버섯	Broad leaves, caespitose	3				0
Lyophyllum connatum	흰주름깔대기 만가닥버섯	Mixed forest, scattered	1				0
Laccaria laccata	졸각버섯	Mixed forest, scattered	2	0		0	
Laccaria amethystina	자주졸각버섯	Mixed forest, fasciated	5	0		0	
Tricholomopsis decora	장식솔버섯	Broad leaves, caespitose	2				0
Clitocybe fragrans	흰삿갓깔대기버섯	*Larix leptolepis* forest, scattered	3		0		
Clitocybe gibba	흑깔대기버섯	Broad leaves, fasciated	5				0
Collybia confluens	밀버섯	*Larix leptolepis* forest, fasciated	21		0	0	
Collybia butyracea	버터애기버섯	Pinus, scattered	2			0	
Collybia dryophila	굽은애기무리버섯		1			0	
Collybia peronata	가랑잎애기버섯		2		0	0	
Oudemansiella platyphylla	넓은주름 긴뿌리버섯	Broad leaves	2		0		
Marasmiellus candidus	하얀마른가지버섯	Broad leaves	5				0
Marasmius maximus	큰낙엽버섯	Mixed forest, scattered	2			0	
Mycena pura	맑은애주름버섯	Pinus	1			0	
Xeromphalina campanella	아끼살이버섯	Broad leaves decay logs, fasciated	5				0
Coprinaceae	먹물버섯과						
Panaeolus sphinctrinus	레이스말똥버섯	Cow dungs, fasciated	4			0	
Psathyrella candolleana	족제비눈물버섯	Broad leaves, scattered	3		0		
Cortinariaceae	끈적버섯과						
Inocybe asterospora	삿갓땀버섯	*Larix leptolepis* forest	1		0		
Paxillaceae	우단버섯과						
Paxillus curtisii		Broad leaves frondose decay logs, caespitose	2				0
Boletaceae	그물버섯과						
Xerocomus subtomentosus	산그물버섯	Broad leaves, solitary	1		0		
Suillus aeruginascens	녹슬은그물버섯	Coniferous, scattered	3			0	
Russulaceae	무당버섯과						
Russula emetica	냄새무당버섯	*Larix leptolepis* forest, fasciated	11	0	0	0	
Russula mariae	수원무당버섯	Broad leaves, scattered	7	0	0	0	
Russula pseudodelica	흰무당버섯아재비	*Larix leptolepis* forest, scattered	7	0	0	0	
Russula sororia	회갈색무당버섯	*Larix leptolepis* forest, solitary	2	0	0		
Russula delica	푸른주름무당버섯	*Larix leptolepis* forest, scattered	2	0	0		
Russula laurocerasi	밀짚색무당버섯	*Larix leptolepis* forest, solitary	1	0			0

Table I. continued.

Scientific name	Korean name	Habitat	Number of specimens	Mycorrhizal formation	Collection site		
					Hanso-ri	Changjook-dong	Kohan-ri
Lactarius volemus	젖버섯	Mixed forest, solitary	1				0
Lactarius piperatus	후추젖버섯	Broad leaves, fasciated	7	0	0		
Lactarius subpiperatus		Broad leaves, fasciated	8	0	0		
Lactarius hygrophoides	흰주름젖버섯	Pinus, solitary	1			0	
Aphyllophorales	민주름버섯목						
Ramariaceae	싸리버섯과						
Ramariopsis kunzei	쇠뜨기버섯	Broad leaves frondose decay logs, solitary	1		0		
Cantharellaceae	꾀꼬리버섯과						
Cantharellus minor	애기꾀꼬리버섯	Pinus, scattered	4			0	
Corticiaceae	고약버섯과						
Stereum ostrea	갈색꽃구름버섯	Deciduous wood, fasciated	12		0		
Thelephoraceae	굴뚝버섯과						
Thelephora terrestris	사마귀버섯	Broad leaves, scattered					
Thelephora palmata	단풍사마귀버섯	Pinus, fasciated	2			0	
Hydnaceae	턱수염버섯과		6			0	
Mycoacia copelandii	긴송곳버섯	Broad leaves decay logs					
Hydnum repandum var. *album*	흰턱수염버섯	*Larix leptolepis* forest, solitary	2		0		
			2		0		
Polyporaceae	구멍장이버섯과						
Coltricia cinnamomea	톱니겨우살이버섯	*Larix leptolepis* forest, solitary	2			0	
Trametes dickensii	테미로버섯	Broad leaves frondose decay logs, fasciated	15		0		
Coriolus versicolor	구름버섯	Broad leaves frondose decay logs, fasciated	28		0	0	
Tyromyces sambuceus	명아주개떡버섯	Broad leaves frondose decay logs, fasciated	5		0		
Fomes fomentarius	말굽버섯	Broad leaves decay logs	2				0
Fomitopsis rosea	장미잔나비버섯	Broad leaves decay logs	2		0		
Fomitopsis officinalis	말굽잔나비버섯	Broad leaves decay logs	4		0		
Exidiaceae	좀목이과						
Pseudohydnum gelatinosum	헛바늘목이버섯	*Larix leptolepis* forest	3			0	0
Phlogiotis helvelloides	장미주걱버섯	Broad leaves, fasciated	25			0	0
Geoglossaceae	콩나물버섯과						
Spathularia clavata	넓적콩나물버섯	*Larix leptolepis* forest, fasciated	21		0	0	
Spathularia flavida	황금넓적콩나물버섯	*Larix leptolepis* forest, fasciated	25		0	0	
Helotiaceae	고무버섯과						
Bisporella citrina	황색황고무버섯	Broad leaves frondose decay logs, fasciated	23		0		

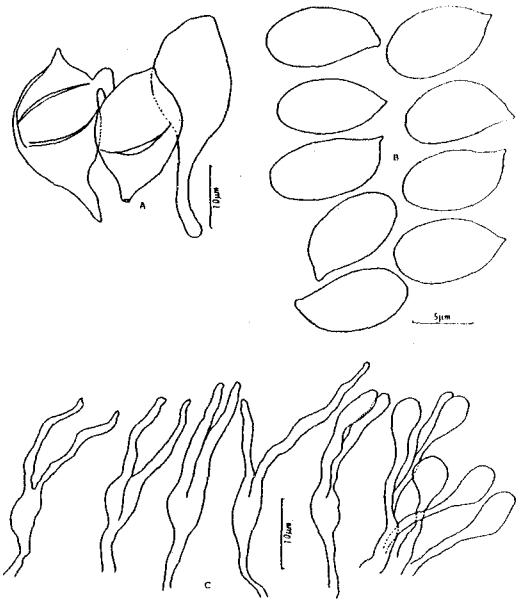

Fig. 1. *Phlogiotis helvelloides* (Fr.) Martin.
A: Pileus cutis (×600), B: Spores (×1,500), C: Basidia (×600).

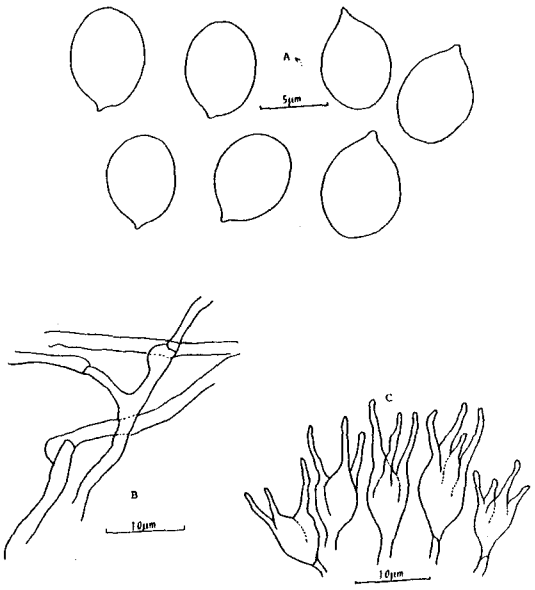

Fig. 2. *Pseudohydnum gelatinosum* (Scop. ex Fr.) P. Karst.
A: Spores (×1,500), B: Hyphae (×600), C: Basidia (×600).

sidiocarp and taste, and should be possible to use for artificial cultivation. Poisonous fungi were, total 4 species, *Panaeolus sphinctrinus, Inocybe asterospora, Russula mariae* and *Russula emetica.* However, Gastromycetes could not be found in this area.

As a result of this investigation, *Phlogiotis hevelloides* and *Pseudohydnum gelatinosum* were identified as unlisted species to Korea.

Exidiaceae 좀목이과

Phlogiotis 주걱목이속(新稱); (Bessay, E.A., Morphology and Taxanomy of Fungi, 454, 1950)

***Phlogiotis hevelloides* (Fr.) Martin. 장미주걱목이(新稱)**

Guepina hevelloides Fr., Kennedy. *Mycol.* 50: 874. 1958.

Tremiscus hevelloides (DC. ex Pers.) Donk, Dahnche, R.M. and Dahnche, S.M., 700 Pilze in Farbfotos, 672, 1978.

Tremiscus hevelloides (DC. ex Pers.) Donk, Svrcek, M., Mushrooms and Fungi, 272, 1983.

Fruitbody 1.0-7.0 cm wide and 2.5-10 cm high, spatulate to lingulate in shape, almost coiled into a cornet or funnel, parted on one side, elastically gelatinous. Smooth, later slightly wrinkled or veined outer surface is covered by hymenium which is whitish pruinose. Underside tapering into cylindrical or compressed lateral stipe, white tomentose at the base from the mycelial layer. Transparent, red-orange or flesh-pink to orange, the colouring on the underside is more vicid.

Spores 9.0-12×4.0-6.1 μm irregulary elliptical, somewhat flattened on one side, with distinct apiculus, smooth, hyaline. Spore print white. Basidia across, septa with clamps gelatinized.

Habitat: Solitary to clustered; on soil or much decayed coniferous, mixed forests, summer to fall. August 14, 1990, (No, M 706), Edible.

Distribution: Korea (Mt. Daesung, Chanjook-dong, Hanso-ri), Japan and North America.

한국어기재: 자실체는 깔대기형 숟가락형으로 표면은 담홍색 장미색, 적등색, 평활하고 갓끝은 굽은형, 조직은 젤라틴질이고 자실층은 아랫면에 있고 갓과 동일색이다. 대는 짧고, 편심형, 갓과 동일색이다. 포자는 대형, 유구형 타원형, 표면은 평활하고, 포자색은 흰색이다. 담자기는 대가있는 구형이다. 봄가을에 침엽수림내 지상, 썩은 나무에서 발생한다.

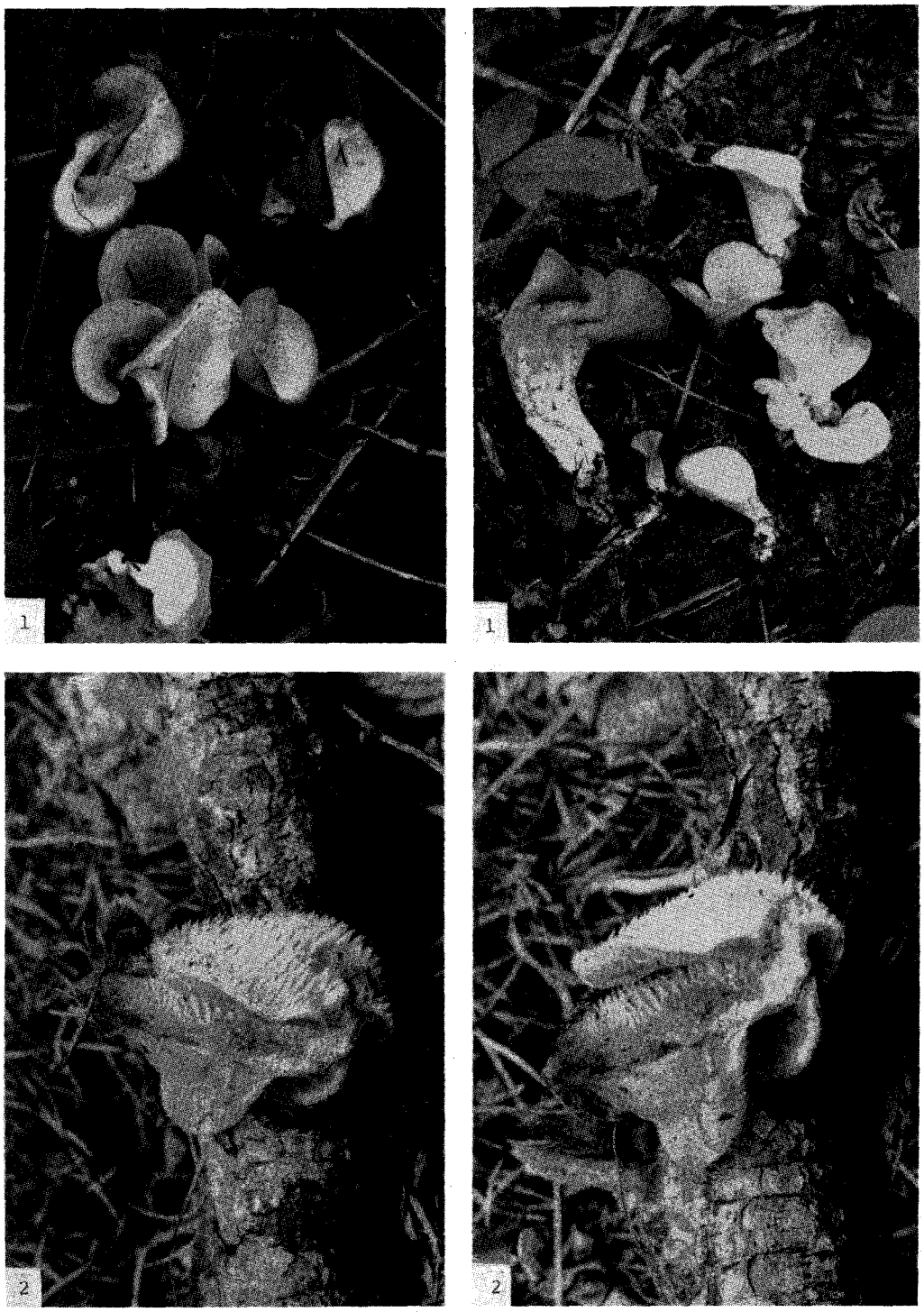

Plate 1. 1: *Phlogiotis helvelloides* (Fr.) Martin, 2: *Pseudohydnum gelatinosum* (Scop. ex Fr.) P. Karst.

Pseudohydnum 혓바늘목이속(新稱); Rick, *Ann. Mycol.* 2: 409, 1904.

***Pseudohydnum gelatinosum* (Scop. ex Fr.) P. Karst. 혓바늘목이(新稱)**

Protohydnum gelatinosum (Fr.) Karst., Bessay, E.A., Morphology and Taxanomy of Fungi, 454, 1950.

Pseudohydnum gelatinosum (Scop. ex Fr.) P. Karst., Dahncke, R.M. Dahncke, S.M., 700 Pilze in Farbfotos, 626, 1978., Svrcek, M., Mushrooms and Fungi, 271, 1983.

Fruitbody 2.0-8.0 cm with and 1.0 cm thick, lingulate or fan-shape, attached to the dead wood of stumps or decaying coniferous trunks, upper surface rough-furfuraceous, usually milky-white, sometimes slightly tingled with blue, softly gelatinous, translucent. In dry conditions the fruitbody shrink from losing moisture, becoming hard and horny, white over blush or violet-grey and greish to dark brown. Spore print is white.

Spores 5.0-8.0×4.5-6.5 μm, globose to subglobes, broadly ellipsoid, smooth, colourless, white. Basidia 10-18×7.0-9.0 μm, longitudially septae 3-4 epibasidia. Hyphae 1.5-2.0 um across, septa with clamps.

Habitat: Clustered; Coniferous forest, summer to fall, August 15, 1990, (No, M 713), Edible.

Distribution: Korea (Mt. Daesung, Ssari-che), North America.

한국어기재: 자실체는 소형이며 반원형 부채형, 젤라틴질, 윗부분은 담갈색 갈흑색 아래면은 백색 황백색이고 장원추형의 혓바늘같은 돌기가 밀집되었고, 자실층은 돌기의 전면에 있으며 담자기는 대가있는 구형이고 포자는 유구형이다. 여름에 침엽수의 그루터기, 뿌리 부근에 발생한다.

摘 要

1990年 8月 13日부터 19日까지 江原道 大德山과 大成山一帶에서 自生하는 韓國産 高等菌類 314標本을 採集하여 同定한 結果 Basidiomycotina에 33屬 49種 1變種, Ascomycotina에 2屬 3種을 分類하였으며 韓國産 未記錄種으로 確認한 것은 다음과 같으며 이들에 대하여 普通名을 新稱하였다 ; *Phlogiotis hevelloides* (Fr.) *Pseudohydnum gelatinosum*.

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