

## The Aphylophorales of Mungyong Saejae

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To evaluate the establishment of Mungyong Saejae Natural Ecology Park located in the northwestern Gyongbuk Province, a scientific survey for the mushroom flora of the park was carried out from May to December of 1999. A checklist of the Aphylophorales collected from the park was prepared. The list included 67 species of 44 genera belonging to nine families in the Aphylophorales. Among them, seven species, *Antrodia malicola*, *Ceriporia purpurea*, *Oligoporus leucospongia*, *Perenniporia tephropora*, *Phanerochaete xerophila*, *Sistotrema diademiferum* and *Vuilleminia comedens*, were confirmed as new to Korea and are registered here as unrecorded species along with descriptions and microscopic drawings.

**KEYWORDS:** Mungyong Saejae, Aphylophorales, Unrecorded species

Mungyong Saejae Provincial Park which is located in Gyongbuk Province has been famous for the historical gateway leading to Hanyang from Yeongnam and the surrounding natural scenery along the pass. Recently, provincial authorities have been planning to promote the status of the provincial park and establish Mungyong Saejae Natural Ecology Park. As a part of preliminary investigation to evaluate the practical value and the environmental effect of the natural ecology park, a survey research for the fungal flora of higher fungi was carried out during eleven field trips throughout the park.

There has been no report on the distribution of the Aphylophorales in Mungyong Saejae until recently. Fresh basidiocarps were collected from different selected parts of Mungyong Saejae Provincial Park (Fig. 1) through periodical collection field trips from March to November in 1999. Total 329 specimens were collected and members of the Aphylophorales (Hymenomycetes, Basidiomycota) amounted to 45% of total fungal collections. They were systematically identified to the species to discover local mushroom flora of the Saejae area and part of the aphylophoroid diversity was discovered by the present study. Voucher specimens have been deposited in the Fungal Herbarium SFC (Seoul National University Fungal Collections) after the study.

Possibly due to artificial forestation and landscaping in areas, the aphylophoroid fungi appeared to be rather restricted in distribution. Certain species of polypores uncommon in the central part of Korea were often found from the Saejae area, and it was believed that Saejae might be an important diverging point of fungal flora between central and southern parts of Korea. Systematic and taxonomic studies on materials of the Aphylophorales collected from Mungyong Saejae were accomplished and some unrecorded native species were discovered. Identified species are described here with

new Korean names and drawings on their microscopic structures.

### Taxonomy

For the observation of specimens, laboratory techniques by Largent *et al.* (1977) and microscopic methods by Jung (1987) were applied. For the general taxonomy of the Aphylophorales, Donkian concept (Donk, 1964) was adopted. The classification system of Eriksson (1958) and Eriksson *et al.* (1973-1984), the systematics of Parmasto (1968) and the monograph of Burdsall (1985) were referred for corticioid fungi. Studies of Gilbertson and Ryvarden (1986, 1987) and Ryvarden and Gilbertson (1993, 1994) were referred for polypores and those of Lim and Jung (1999) for *Stereum*. Illustrations of Breitenbach and Kränzlin (1986), Imazeki and Hong (1965, 1989) and Imazeki *et al.* (1988) were frequently consulted for general fungi. For the search on fungal flora and distribution of Korean Aphylophorales, Jung (1994, 1995, 1996a, 1996b) and Lim *et al.* (1999) were always consulted.

### Family Corticiaceae 고약버섯과

1. *Cylindrobasidium evovens* (Fr.) Jülich 담자고약버섯  
Substrate: fallen branches of *Zelkova serrata*  
Locality: 2, 3, 7, 19  
Specimens: SFC 990319-03, SFC 990320-02,  
SFC 990326-08, SFC 991120-05
2. *Dacryobolus karstenii* (Bres.) Oberw.: Parm. 큰후추고약버섯  
Substrate: fallen or dead branches of *Pinus densiflora*  
Locality: 7, 11, 16, 21  
Specimens: SFC 990326-03, SFC 990326-34,  
SFC 990422-22, SFC 990521-14,  
SFC 991003-11, SFC 991120-21

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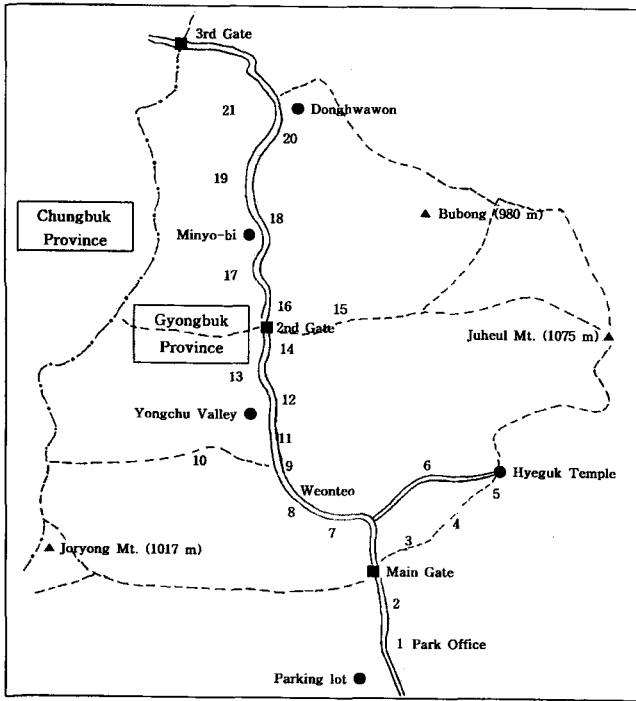


Fig. 1. Research area of Mungyong Saejae Provincial Park in Gyongbuk Province. 1-2. between Park Office and the Main Gate; 3-5. between the Main Gate and Hyeguk Temple; 6. between Josan and Hyeguk Temple; 7. Josan; 8. across Weonteo; 9. Palwang Rest Area; 10. Trail toward the Joryong Mt.; 11. Jumak; 12. across Yongchu Valley; 13. around Sanbuldyosim-bi; 14-16. around the Second Gate; 17. between the Second Gate and Minyo-bi; 18. across the Minyo-bi; 19-20. between Minyo-bi and Donghwawon; 21. Kwageogeupje-gil; - - -, hiking trails; —, main roads.

- 3. *Hyphoderma setigerum* (Fr.) Donk 목재고약버섯  
Substrate: fallen branches of a deciduous tree  
Locality: 15  
Specimens: SFC 990422-03, SFC 990623-08, SFC 990623-16
- 4. *Hyphoderma praetermissum* (Karst.) J. Erikss. et Strid. 희목재고약버섯  
Substrate: a fallen branch of *Pinus densiflora*  
Locality: 17  
Specimen: SFC 991120-01
- 5. *Hyphoderma radula* (Fr.) Donk 줄목재고약버섯  
Substrate: fallen branches of *Quercus* spp.  
Locality: 9, 20  
Specimens: SFC 990422-04, SFC 990911-46
- 6. *Hyphodontia alutaria* (Burt) J. Erikss. 둥근돌기고약버섯  
Substrate: fallen branches of *Pinus densiflora*  
Locality: 10, 16  
Specimens: SFC 990326-33, SFC 990521-05
- 7. *Hyphodontia crustosa* (Pers.: Fr.) Fr. 툼돌기고약버섯  
Substrate: fallen branches of *Pinus densiflora*

- Locality: 10, 11, 16  
Specimens: SFC 990505-03, SFC 991003-12
- 8. *Hypochnicium bombycinum* (Sommerf.: Fr.) J. Erikss. 후막고약버섯  
Substrate: a dead hardwood tree  
Locality: 11  
Specimen: SFC 990326-32
- 9. *Laeticorticium roseum* (Fr.) Donk 장미고약버섯  
Substrate: fallen trunks of *Zelkova serrata*  
Locality: 5, 9, 15  
Specimens: SFC 99320-29, SFC 990326-19, SFC 991003-24
- 10. *Peniophora incarnata* (Pers.: Fr.) Karst. 오렌지껍질고약버섯  
Substrate: a fallen branch of *Quercus aliena*  
Locality: 12  
Specimen: SFC 990326-22
- 11. *Peniophora quercina* (Fr.) Cooke 껍질고약버섯  
Substrate: a dead branch of *Quercus aliena*  
Locality: 7  
Specimen: SFC 990911-38
- 12. *Phanerochaete chrysorhiza* (Torr.) Budington et Gilbertson 침유색고약버섯  
Substrate: a fallen branch of *Quercus aliena*  
Locality: 7  
Specimen: SFC 990911-60
- 13. *Phanerochaete crassa* (Lév.) Burdsall 종이유색고약버섯  
Substrate: a dead branch of *Fraxinus rhynchophylla*  
Locality: 12  
Specimen: SFC 990911-48
- 14. *Phanerochaete sordida* (Karst.) J. Erikss. et Ryv. 유색고약버섯  
Substrate: fallen branches of deciduous trees  
Locality: 15, 16  
Specimens: SFC 990521-09, SFC 990623-10, SFC 991120-20
- 15. *Phanerochaete xerophila* Burdsall, Mycologia Memoir No. 10 pp. 141-143, 1985 마른유색고약버섯(신칭)  
Basidiocarps resupinate, effused, thin, adnate, ochraceous from young to old, entire at margin, cracking when dry; hyphal system monomitic, simple-septate, basal hyphae 3.5-4.5  $\mu\text{m}$  diam, subhymenium a compact texture porrecta oriented perpendicular to substrated surface; cystidia absent; basidia clavate, 42-52 $\times$ 5.7-6.8  $\mu\text{m}$ , with 4 sterigmata; basidiospores broadly ellipsoid, 7.4-7.9 $\times$ 3.5-3.9  $\mu\text{m}$ , inamyloid, acyanophilous.  
Substrate: a dead deciduous tree  
Locality: 13  
Specimen: SFC 990326-37
- 16. *Phlebia chrysocrea* (Berk. et Curt.) Burdsall 황금아교고약버섯

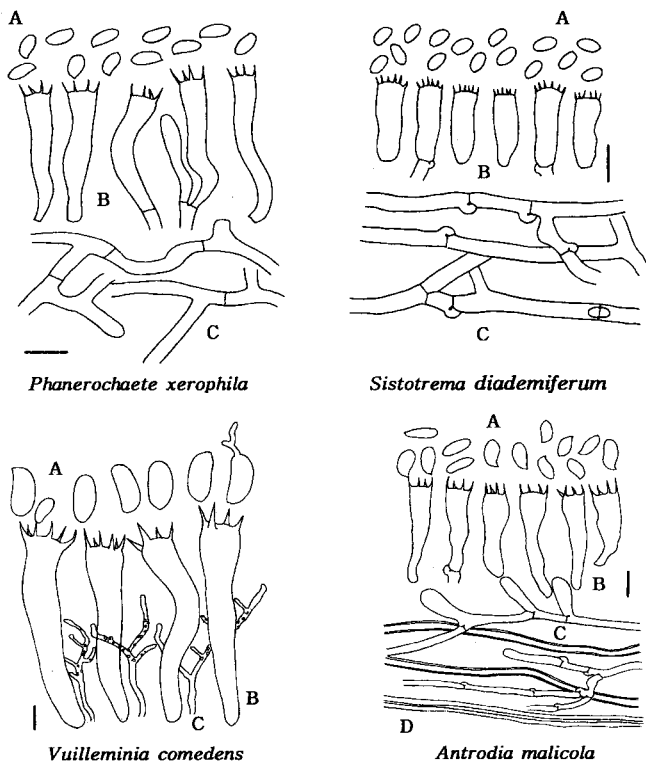


Fig. 2. Microscopic structures of unrecorded fungi (bars = 10  $\mu\text{m}$ ). *Phanerochaete xerophila*: A) basidiospores, B) basidia, C) subicular hyphae. *Sistotrema diademiferum*: A) basidiospores, B) basidia, C) subicular hyphae. *Vuilleminia comedens*: A) basidiospores, B) basidia, C) dendrohyphidia. *Antrodia malicola*: A) basidiospores, B) basidia, C) generative hyphae, D) skeletal hyphae.

Substrate: fallen branches of *Quercus aliena*

Locality: 4, 20

Specimens: SFC 990320-10, SFC 990422-19

17. *Plicaturopsis crispa* (Fr.) Reid 주름고약버섯

Substrate: fallen branches of *Quercus* sp. and *Castanea crenata*

Locality: 3, 13

Specimens: SFC 990320-08, SFC 990911-51

18. *Sistotrema* Fr., Syst. Mycol. I p. 426, 1821 단지고약버섯속(신칭)

Basidiocarps resupinate, subpileate, to stipitate, mostly white to cream-colored, soft; hymenium smooth, odontoid, or sometimes poroid; hyphae monomitic, all hyphae provided with clamps; cystidia mostly lacking; basidia urniform, mostly with 6-8 sterigmata; basidiospores smooth, globose, ellipsoid, or allantoid, inamyloid, acyanophilous.

*Sistotrema diademiferum* (Bourd. & Galz.) Donk, Fungus 26 p. 4, 1956 리본단지고약버섯(신칭)

Basidiocarps resupinate, effused, thin, adnate, whitish to cream-colored, arachnoid at margin, brittle when dry; hyphal system monomitic, nodose-septate, basal hyphae 5-5.7  $\mu\text{m}$  diam; cystidia absent; basidia urniform, 19-21 $\times$ 5.7-6.3  $\mu\text{m}$ ,

with 6 sterigmata; basidiospores ovoid, 5.1-5.7 $\times$ 2.9-3.4  $\mu\text{m}$ , inamyloid, acyanophilous.

Substrate: a fallen branch of *Quercus* sp.

Locality: 10

Specimen: SFC 990521-13

19. *Vuilleminia* Maire, Bull. Soc. Mycol. France 18 (suppl.): 81, 1902 새재고약버섯속(신칭)

Basidiocarps resupinate, effused, smooth to somewhat tuberculate, ceraceous, gelatinous when fresh, mostly cream-colored; hyphal system monomitic, nodose-septate; cystidia present or absent; dendrohyphidia usually numerous; basidia up to 100  $\mu\text{m}$  long or more; basidiospores large, allantoid or ellipsoid, inamyloid, acyanophilous.

*Vuilleminia comedens* (Nees: Fr.) Maire, loc. cit. 새재고약버섯(신칭)

Basidiocarps resupinate, effused, adnate, initially developing under the bark, smooth to slightly tuberculate, white or cream-colored, gelatinous when fresh, ceraceous when dry, floccose at margin; hyphal system monomitic, nodose-septate, 2.5  $\mu\text{m}$  diam; cystidia absent; dendrohyphidia usually numerous, encrusted; basidia long, narrowly clavate, sinuous, 63-90 $\times$ 11-14  $\mu\text{m}$ , with 4 sterigmata; basidiospores large, allantoid, 17-20 $\times$ 7.4-7.9  $\mu\text{m}$ , inamyloid, acyanophilous.

Substrate: fallen branches of *Quercus* sp., *Betula schmidtii*, and other deciduous trees

Locality: 4 11, 12, 16

Specimens: SFC 990320-24, SFC 990326-21, SFC 990505-01, SFC 991003-05

Family Stereaceae 꽃구름버섯과

20. *Stereum sanguinolentum* (Alb. & Schw.: Fr.) Fr. 유혈꽃구름버섯

Substrate: a fallen branch of *Pinus densiflora*

Locality: 9

Specimen: SFC 990326-11

21. *Stereum hirsutum* (Willd.: Fr.) S.F. Gray 꽃구름버섯

Substrate: dead trees of *Quercus aliena*

Locality: 7, 18

Specimens: SFC 990911-16, SFC 991120-04

22. *Stereum peculiare* Boidin, Parmasto et Dhingra 꺾질고약버섯

Substrate: fallen and dead branches of *Quercus* spp.

Locality: 3, 11, 15

Specimens: SFC 990320-11, SFC 990326-25, SFC 990521-11, SFC 990623-21, SFC 990911-13, SFC 991003-09

23. *Stereum subtomentosum* Pouzar 갈색털꽃구름버섯

Substrate: fallen branches of *Acer* and *Quercus* spp.

Locality: 4, 15, 20

Specimens: SFC 990320-19, SFC 990422-20, SFC 990505-25, SFC 990623-13

24. *Stereum gausapatum* Fr.: Fr. 흰테꽃구름버섯

Substrate: a fallen branch of *Quercus aliena*

Locality: 16

Specimen: SFC 991003-33

**25. *Xylobolus frustulatus* (Pers.: Fr.) Boid. 거북꽃구름버섯**

Substrate: dead wood of *Zelkova serrata*

Locality: 4

Specimens: SFC 990320-20

**Family Podoscyphaceae 배꽃버섯과**

**26. *Stereopsis burtianum* (Peck) Reid 애기꽃버섯**

Substrate: soil below *Pinus densiflora*

Locality: 16

Specimens: SFC 991003-26

**Family Meruliaceae 아교버섯과**

**27. *Merulius tremellosus* Fr. 아교버섯**

Substrate: lower part of dead *Pinus densiflora*

Locality: 9, 19

Specimens: SFC 990326-15, SFC 990422-23

**28. *Punctularia strigosozonata* (Schw.) Talbot 털가는주름버섯**

Substrate: dead *Quercus*

Locality: 5

Specimen: SFC 990320-27

**Family Coniophoraceae 마른버짐버섯과**

**29. *Coniophora arida* (Fr.) Karst. 큰버짐버섯**

Substrate: a fallen branch of *Pinus densiflora*

Locality: 11

Specimen: SFC 990911-57

**30. *Pseudomerulius aureus* (Fr.) Jül. 주름버짐버섯**

Substrate: fallen branches of *Pinus densiflora*

Locality: 7, 15, 16

Specimens: SFC 990326-04, SFC 990505-26,  
SFC 990623-17, SFC 991003-19

**Family Thelephoraceae 굴뚝버섯과**

**31. *Thelephora terrestris* Fr. 사마귀버섯**

Substrate: soil below a tree of *Pinus densiflora*

Locality: 11

Specimen: SFC 990911-56

**Family Hydnaceae 턱수염버섯과**

**32. *Lopharia mirabilis* (Berk. et Br.) Pat. 큰겹질버섯**

Substrate: fallen branches of broadleaf trees

Locality: 7, 12, 15

Specimens: SFC 990319-15, SFC 990623-11,  
SFC 990911-50

**33. *Steccherinum ochraceum* (Pers.) S.F. Gray 바늘버섯**

Substrate: fallen branches of broadleaf trees and *Acer ginnala*

Locality: 3, 16, 20

Specimens: SFC 990320-01, SFC 990422-21

**34. *Steccherinum rhois* (Schw.) Banker 솔바늘버섯**

Substrate: a fallen branch of a broadleaf tree

Locality: 11

Specimens: SFC 990505-05

**Family Hymenochaetaceae 소나무비늘버섯과**

**35. *Coltricia dependens* (Berk. et Curt.) Imaz. 벌질겨우살이버섯**

Substrate: unknown dead tree

Locality: 16

Specimen: SFC 990505-20

**36. *Coltricia cinnamomea* (Pers.) Murr. 톱니겨우살이버섯**

Substrate: fallen leaves

Locality: 9, 11

Specimens: SFC 990911-45, SFC 991003-37

**37. *Hymenochaete tabacina* (Sow.: Fr.) Lév. 소나무비늘버섯**

Substrate: fallen branches of *Quercus aliena*

Locality: 4, 9, 10, 15

Specimens: SFC 990320-22, SFC 990505-12,  
SFC 990623-20, SFC 990911-44

**38. *Hymenochaete intricata* Lloyd 기와소나무비늘버섯**

Substrate: fallen branches of various types of broad-leaf trees

Locality: 1, 7, 11, 20

Specimens: SFC 990319-05, SFC 990320-04,  
SFC 990326-09, SFC 990320-27,  
SFC 990422-07, SFC 990521-06,  
SFC 990623-06

**39. *Hymenochaete yasudai* Imaz. 무늬소나무비늘버섯**

Substrate: dead branches of *Pinus densiflora*

Locality: 1, 7

Specimens: SFC 990911-20, SFC 991003-02

**40. *Inonotus xeranticus* (Berk.) Imaz. et Aoshi. 금빛시루뻥버섯**

Substrate: fallen and dead branches of *Quercus* spp.

Locality: 17, 20

Specimens: SFC 990422-25, SFC 9901120-14

**41. *Phellinus gilvus* (Schw.: Fr.) Pat. 마른진흙버섯**

Substrate: fallen branches of *Quercus aliena*

Locality: 17

Specimen: SFC 990505-13

**Family Polyporaceae 구멍장이버섯과**

**42. *Abortiporus biennis* (Bul.: Fr.) Sing. 유관버섯**

Substrate: lower part of dead *Hibiscus syriacus*

Locality: 1

Specimen: SFC 990911-03

**43. *Antrodia malicola* (Berk. & Curt.) Donk, Persoonia 4: 340, 1966 사과주름구멍버섯(신칭)**

Basidiocarps effused-reflexed to sessile, 3 × 1.5 × 0.7 cm,

coriaceous to corky, hard when dry; upper surface cream to ochraceous, glabrous, sharp at margin; hymenophore pale cinnamon, poroid, pores roundish to sinuous, 1-2 per mm; hyphal system dimitic, generative hyphae nodose-septate, thin-walled, 2.8-3.5  $\mu\text{m}$  diam, skeletal hyphae predominant, thick-walled, 3.4-4.5  $\mu\text{m}$  diam; cystidia absent; basidia clavate 36-45  $\times$  6.8-8.5  $\mu\text{m}$ ; basidiospores cylindrical, 9.7-12  $\times$  3.4-4.5  $\mu\text{m}$ , hyaline, inamyloid.

Substrate: fallen branches of *Quercus* spp.

Locality: 5, 9, 11,

Specimens: SFC 990320-33, SFC 990326-13,  
SFC 990521-10, SFC 991003-23

Remark : This species is one of the most collected polypores in Korea. Its spores were slightly larger rather than european and north american species

**44. *Bjerkandera fumosa* (Fr.) Karst. 흰들레줄버섯**

Substrate: a fallen broadleaf tree

Locality: 21

Specimen: SFC 990422-27

**45. *Ceriporia purpurea* (Fr.) Donk, Konn. Nederl. Akad. Wetensch. Amst. Proc. Ser. C. 74 No. 1: 28, 1971 분홍그물구멍버섯(신칭)**

Basidiocarps resupinate, effused, then confluent, pale to

dark brownish purple; hymenophore poroid, pores roundish, 4-5 per mm; margin white, finely tomentose, narrowly sterile; hyphal system monomitic, simple-septate, thin- to somewhat thick-walled, 2.2-4.0 diam; basidia clavate, 17-21  $\times$  5.7-6.3  $\mu\text{m}$ , with 4 sterigmata; basidiospores allantoid, 5.7-6.5  $\times$  1.8-2.3  $\mu\text{m}$ , inamyloid.

Substrate: a fallen branch of *Quercus*

Locality: 11

Specimen: SFC 990505-02

**46. *Cerrena consors* (Berk.) Ko et Jung 송곳니단색털구름버섯(개칭)**

Substrate: fallen branches of *Quercus*

Locality: 7

Specimens: SFC 990911-59, SFC 991120-22

Remarks: This species has been treated as *Coriolus brevis* or *Trametes consors* until recently, but Ko and Jung (1999) transferred the species into the genus *Cerrena* based on molecular data of mitochondrial small subunit ribosomal DNA sequences, thus a new combination is proposed here.

**47. *Cerrena unicolor* (Fr.) Murr. 단색털구름버섯**

Substrate: a fallen branch of *Quercus* sp. and a fallen trunk of *Zelkova serrata*

Locality: 16, 19

Specimens: SFC 990505-16, SFC 991120-06

**48. *Daedalea dickinsii* (Berk.: Cooke) Yasuda 등갈색미로버섯**

Substrate: a fallen trunk of *Quercus aliena*

Locality: 20

Specimen: SFC 990422-18

**49. *Daedalea quercina* Fr. 미로버섯**

Substrate: a fallen trunk of *Quercus aliena*

Locality: 19, 20

Specimens: SFC 991120-13, SFC 991120-23

**50. *Daedaleopsis tricolor* (Bull.: Fr.) Bond. et Sing. 삼색도장버섯**

Substrate: dead branches of *Castanea crenata*

Locality: 5, 17

Specimens: SFC 9900320-25, SFC 990505-10,  
SFC 991120-13

**51. *Datronia mollis* (Sommerf.: Fr.) Donk 삼색도장버섯**

Substrate: dead trees of *Acer* sp., *Zelkova serrata* and unknown hardwood

Locality: 5, 17, 19

Specimens: SFC 990320-31, SFC 990505-15,  
SFC 991120-07

**52. *Fomitopsis pinicola* (Swartz.: Fr.) Karst. 소나무잔나비버섯**

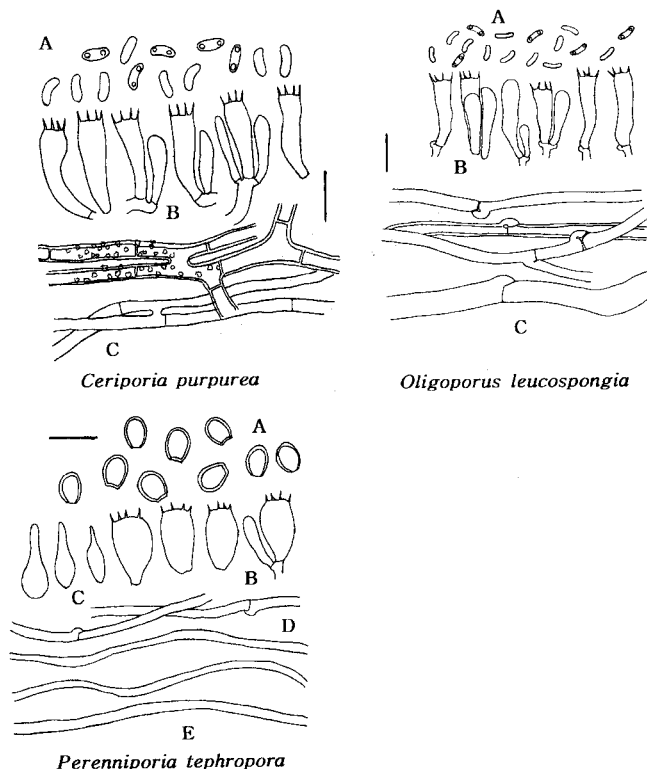
Substrate: a fallen tree of *Pinus densiflora*

Locality: 7

Specimen: SFC 990422-17

**53. *Irpex lacteus* Fr. 기계충버섯**

Substrate: various types of dead deciduous trees



**Fig. 3.** Microscopic structures of unrecorded fungi (bars = 10  $\mu\text{m}$ ). *Ceriporia purpurea*: A) basidiospores, B) basidia, C) generative hyphae *Oligoporus leucospongia*: A) basidiospores, B) basidia, C) generative hyphae *Perenniporia tephropora*: A) basidiospores, B) basidia, C) cystidioles, D) generative hyphae, E) skeletal hyphae.

Locality: 2, 4, 9, 20, 11

Specimens: SFC 990319-02, SFC 990320-21,  
SFC 990422-06, SFC 990623-19

**54. *Junghuhnia nitida* (Fr.) Ryv. 살색구멍버섯**

Substrate: a dead branch of *Salix* sp.

Locality: 10

Specimen: SFC 990521-02

**55. *Lenzites betulina* (L.:Fr.) Fr. 조개껍질버섯**

Substrate: dead trees of *Quercus* spp.

Locality: 5, 8, 11

Specimens: SFC 990319-14, SFC 990320-26,  
SFC 990326-26, SFC 990911-36

**56. *Microporus vernicipes* (Berk.) Kuntze 메꽃버섯부치**

Substrate: fallen trees of *Acer* sp. and *Quercus* spp.

Locality: 13, 15, 16

Specimens: SFC 990326-38, SFC 990505-22,  
SFC 990623-07, SFC 991003-10

**57. *Oligoporus leucospongia* (Cke. & Harkn.) Gilbn. et Ryv., Mycotaxon 22: 365, 1985 찬송등버섯(신칭)**

Basidiocarps sessile, dimidiate, solitary, projecting up to 2 cm, soft, then firm; upper surface white, even, tomentose, sterile below at margin; hymenophore whitish to pale buff, poroid, pores circular to angular, 4-5 per mm; hyphal system monomitic, nodose-septate, thin- to thick-walled, 5-7  $\mu\text{m}$  diam; cystidia absent; basidia clavate, 21-24  $\times$  3.4-4.5  $\mu\text{m}$ , with 4 sterigmata; basidiospores allantoid, 4.3-4.8  $\times$  1.2-1.3  $\mu\text{m}$ , inamyloid.

Substrate: lower part of a living *Ginkgo*

Locality: 1

Specimens: SFC 990319-01

**58. *Perenniporia tephropora* (Mont.) Ryv., Norw. J. Bot. 19: 233, 1972 잣빛흰구멍버섯(신칭)**

Basidiocarps more or less resupinate, sometimes with an obliquely reflexed fruitbody up to 1 cm broad, woody; upper surface slightly developed, dark or black, glabrous, thick and round at margin; hymenophore buff, gray, or dull brown, poroid, pores round to angular, 7-8 per mm; tube stratified, with thin to somewhat thick dissepiments; hyphal system dimitic, generative hyphae nodose-septate, thin-walled, 2-4  $\mu\text{m}$  diam, skeletal hyphae abundant, thick-walled, 2-3  $\mu\text{m}$  diam; cystidia absent; basidia clavate, 13-15  $\times$  7.8-8.3  $\mu\text{m}$ , with 4 sterigmata; basidiospores ellipsoid to truncate, thick-walled, 6.3-7.4  $\times$  5.2-6.8  $\mu\text{m}$ , hyaline to somewhat yellowish, dextrinoid.

Substrate: a dead tree of *Quercus* sp.

Locality: 18

Specimen: SFC 990422-26

Remarks: Macroscopically, the SFC specimen generally agrees well with the description of the literature (Gilbertson and Ryvarde, 1987) except for the size of pores, but microscopically, the basidia are broader and the basidiospores are much larger than those described in the literature, which

suggests that it can be a species of its own. However, for a final determination, more collections need to be made and also authentic specimens are supposed to be examined for comparison.

**59. *Porodiscus pendulus* (Schw.) Murr. 그물코버섯**

Substrate: dead deciduous trees

Locality: 3, 19, 20

Specimens: SFC 990320-06, SFC 990422-14,  
SFC 990505-24, SFC 991120-09

**60. *Schizopora flavipora* (Kooke) Ryv. 크림좀구멍버섯**

Substrate: dead trees of *Pinus densiflora*

Locality: 7, 16

Specimens: SFC 990326-06, SFC 991003-34

**61. *Trametes conchifer* (Schw.: Fr.) Pil. 조개구름버섯**

Substrate: a dead branch of *Ulmus* sp.

Locality: 8

Specimen: SFC 991003-43

**62. *Trametes hirsuta* (Wulf.: Fr.) Pil. 흰구름버섯**

Substrate: dead hardwood

Locality: 20

Specimen: SFC 990422-08

**63. *Trametes multicolor* (Schaeff.) Tul. 밤색송편버섯**

Substrate: lower part of a dead *Ginkgo*

Locality: 1

Specimen: SFC 990911-02

**64. *Trametes suaveolens* (L.) Fr. 송편버섯**

Substrate: lower part of a living *Alnus japonica*

Locality: 5

Specimen: SFC 990320-28

**65. *Trametes versicolor* (L.: Fr.) Pil. 구름버섯**

Substrate: dead trees of various *Quercus* spp.

Locality: 5, 7

Specimens: SFC 990320-14, SFC 990422-12,  
SFC 990505-17, SFC 990521-01,  
SFC 990911-14, SFC 991003-06,  
SFC 991120-16

**66. *Trichaptum abietinum* (Fr.) Ryv. 옷솔버섯**

Substrate: dead trees of *Pinus densiflora*

Locality: 5, 7, 15

Specimens: SFC 990320-34, SFC 990326-01,  
SFC 990505-21

**67. *Trichaptum bifforme* (Fr.) Rvy. 테옷솔버섯**

Substrate: a fallen branch of *Quercus aliena*

Locality: 15

Specimen: SFC 990623-02

## Conclusion

From the Mungyong Saejae Provincial Park of Gyongbuk Province, fungal flora of higher fungi was regularly searched for the first time. Members of the Aphyllophorales (Hymenomycetes, Basidiomycota) amounted to 148 speci-

mens and were identified to the species according to recent classification systems for the discovery of local fungal flora of the Saejae area. The checklist amounted to 67 species belonging to nine families Corticiaceae, Stereaceae, Podocyphaceae, Meruliaceae, Coniophoraceae, Thelephoraceae, Hydnaceae, Hymenochaetaceae and Polyporaceae of the Aphyllophorales. Among them, two genera, *Sistotrema* and *Vuilleminia*, and seven species, *Phanerochaete xerophila*, *Sistotrema diademiferum*, *Vuilleminia comedens* of the Corticiaceae, *Antrodia malicola*, *Oligoporus leucospongia*, *Ceriporia purpurea* and *Perenniporia tephropora* of the Polyporaceae were confirmed as new taxa to Korea and are added here to the list of the Korean Aphyllophorales. Distribution of the Aphyllophorales appeared to be rather restricted and species of polypores uncommon to other districts were often found from the Saejae area. The Saejae area seemed to have a unique fungal flora of its own and species coming from both central and southern parts of Korea were sometimes found, suggesting that Saejae might be an important diverging point of Korean fungal flora.

### Acknowledgments

This work was supported by the BK21 Project and Young Woon Lim was supported by the BK21 Research Fellowship.

### References

- Breitenbach, J. and Krnzlin, F. 1986. Fungi of Switzerland, Vol. 2. Non-gilled fungi: Heterobasidiomycetes, Aphyllophorales, Gasteromycetes. Verlag Mykologia, Lucerne.
- Burdsall, H. H. 1985. A contribution to the taxonomy of the genus *Phanerochaete*. J. Cramer, Braunschweig.
- Donk, M. A. 1964. A conspectus of the families of Aphyllophorales. *Persoonia* **3**: 199-324.
- Eriksson, J. 1958. Studies in the Heterobasidiomycetes and Homobasidiomycetes-Aphyllophorales of Muddus National Park in North Sweden. *Symb. Bot. Upsal.* **16**: 1-172.
- \_\_\_\_\_ and Ryvarden, L. 1973-1976. The Corticiaceae of North Europe, Vols. 2, 3, 4. Fungiflora, Oslo.
- \_\_\_\_\_, Hjortstam, K. and Ryvarden, L. 1978-1984. The Corticiaceae of North Europe, Vols. 5, 6, 7. Fungiflora, Oslo.
- Gilbertson, R. L. and Ryvarden, L. 1986-1987. North American polypores, Vols. 1, 2. Fungiflora, Oslo.
- Imazeki, R. and Hongo, T. 1965. Colored illustrations of fungi of Japan, Vol. II. Hoikusha Publishing Co., Osaka.
- Imazeki, R. and Hongo, T. 1989. Colored illustrations of mushrooms of Japan, Vol. II. Hoikusha Publishing Co., Osaka.
- Imazeki, R., Otani, Y. and Hongo, T. 1988. Fungi of Japan. Yamakei Publishers, Tokyo.
- Jung, H. S. 1987. Wood-rotting Aphyllophorales of the southern Appalachian spruce-fir forest. Bibliotheca Mycologica Band 119, J. Cramer, Berlin-Stuttgart.
- \_\_\_\_\_. 1994. Floral studies on Korean wood-rotting fungi (II)-on the flora of the Aphyllophorales (Basidiomycotina). *Kor. J. Mycol.* **22**: 62-99.
- \_\_\_\_\_. 1995. Taxonomic study on Korean Aphyllophorales (I)-on some unrecorded genera and species. *Kor. J. Mycol.* **23**: 266-274.
- \_\_\_\_\_. 1996a. Taxonomic study on Korean Aphyllophorales (II)-on some unrecorded species. *Kor. J. Mycol.* **24**: 228-236.
- \_\_\_\_\_. 1996b. Taxonomic study on Korean Aphyllophorales (III)-on some unrecorded corticioid fungi. *Kor. J. Mycol.* **24**: 265-273.
- Ko, K. S. and Jung, H. S. 1999. Phylogenetic re-evaluation of *Trametes consors* based on mitochondrial small subunit ribosomal DNA sequences. *FEMS Microbiol. Lett.* **170**: 181-186.
- Largent, D. L., Johnson, D. and Watling, R. 1977. How to identify mushrooms to genus, III. Microscopic features. Mad River Press, Eureka.
- Lim, Y. W., Hong, S. G. and Jung, H. S. 1999. Taxonomic study on Korean Aphyllophorales (IV)-on some unrecorded wood-rotting fungi. *Kor. J. Mycol.* **27**: 68-72.
- \_\_\_\_\_ and Jung, H. S. 1999. Taxonomic study on Korean *Stereum*. *Kor. J. Mycol.* **27**: 349-353.
- Parmasto, E. 1968. Conspectus systematis Corticiacearum. Tartu.
- Ryvarden, L. and Gilbertson, R. L. 1993-1994. European polypores, Parts 1-2. *Synop. Fung.* **6**: 1-743.