

## Contribution to the Checklist of Soil-inhabiting Fungi in Korea

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**A total of 82 genera and 271 species of soil-inhabiting fungi including saprobic, nematode-trapping, and arbuscular mycorrhizal but plant pathogenic fungi published hitherto in South Korea are listed with the information on geographic location, habitat, vegetation when available, and relevant literatures.**

**KEYWORDS:** Arbuscular mycorrhizae, Biodiversity, Microfungi, Nematode-trapping fungi

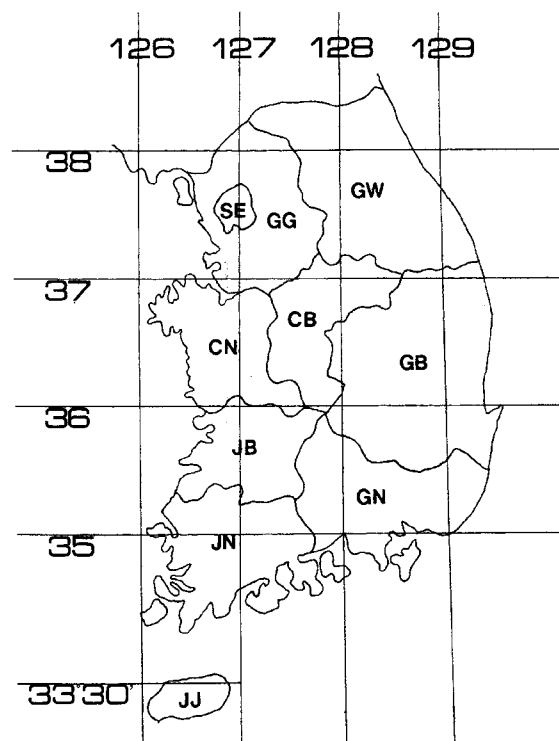
Fungi are the major component of the soil microflora regardless of their smaller population compared to those of bacteria or actinomycetes, and act key roles in decomposition, recycling organic residues and soil fertility. Fungi isolated from soil or soil components are variously called such as soil-borne, soil-inhabiting, or simply soil fungi which comprise saprophytes, mycorrhizal symbionts and parasites of all major categories of fungal species.

From early 1940 to 1970's numerous works had been carried out worldwide on soil-inhabiting fungi. Various studies on soil mycoflora associated with crop fields or specific vegetation have also been taken place in Korea, and much information about the nature of soil fungal communities, especially those related with crops have been produced. Interest concerning "Biodiversity" has been amplified in various fields of biological science after the Convention of Biological Diversity held in Rio de Janeiro in 1992 drawn by the United Nations Conference on Environment and Development (UNEP, 1992). The field of mycology, in fact, was already conscious of the issue (Hawksworth, 1991) and some strategies and methodology on fungal diversity study have been proposed. Although they are very much biased on tropics (Hyde, 1997), they agreed the species inventory to be the basic tool for the natural science and be the footstep or basic requirement for further biodiversity studies in terms of ecosystems and populations. Therefore, extensive literature review has been initiated to gather records up to now on Korean soil mycoflora to provide the basic inventory for further studies in the area of soil fungi and to encourage more studies in fungal diversity.

### Materials and Methods

All the major scientific journals published in Korea up to

the year of 2001 have been extensively investigated. Fungi on soil surfaces or from soil cores, mycorrhizal fungi, and nematode-tapping fungi were counted in the present paper but plant pathogenic fungi were excluded. The taxonomic status is followed by CABI Bioscience database (CABI Bioscience, 2002), and the authorities of taxa as suggested by Kirk and Ansell (1992). None of the specimens were re-examined to confirm their identity, and are thus



**Fig. 1.** Geographic information about Provinces in South Korea: CB for Chungcheongbuk-do, CN for Chungcheongnam-do, GG for Gyeonggi-do, GB for Gyeongsangbuk-do, GN for Gyeongsangnam-do, GW for Gangwon-do, JB for Jeollabuk-do, JN for Jeollanam-do, JJ for Jeju-do, and SE for Seoul.

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given as originally recorded. Fungi identified as species in the original paper are treated as a species. Geographic information was derived by provincial areas (Fig. 1). LocU indicates where the locality is unspecified in the original paper. Habitats are mostly followed by original description except for agricultural fields. Rice-growing field was described as paddy field, other vegetable-growing field as upland with the name of crops when available, and greenhouse. HabU is used when there was no habitat information available.

**Checklist.** The fungi are divided in major groups as mitosporic fungi, Ascomycota, Zygomycota. Species are alphabetically listed followed by the information on locality, habitats, vegetation if available, and related literatures.

### Mitosporic fungi

- Acremonium* sp. - SE, paddy field (Min *et al.*, 1987) - CB, upland (Lee *et al.*, 1987a) - GW, forest (Hong and Min, 1982) - JJ, upland (Lee *et al.*, 1988) - LocU, upland (Lee *et al.*, 1990) - GW, forest, *Pinus densiflora* (Song and Min, 1991).
- Alternaria* sp. - GG, upland (Lee *et al.*, 1987b) - JJ, upland (Lee *et al.*, 1988) - LocU, upland (Lee *et al.*, 1990).
- Alternaria alternata* (Fr.) Keissl. - GB, SE, HabU (Min *et al.*, 1980b) - JB, sea soil (Hong and Min, 1981) - GW, forest, *Pinus densiflora* (Song and Min, 1991).
- Alternaria cheiranthi* (Lib.) P. C. Bolle - GG, HabU (Min, 1985).
- Alternaria chlamydospora* Mouch. - GG, HabU (Min, 1985).
- Arthrobotrys* sp. - GG, upland, *Panax ginseng* (Yoo *et al.*, 1981).
- Arthrobotrys arthrobotryoides* (Berl.) Lindau - GN, HabU, nematode trapping (Jeong, 1987) - CN, HabU, nematode trapping (Kim *et al.*, 1997) - GN, GB, greenhouse, nematode trapping (Kim *et al.*, 2001).
- Arthrobotrys brochopaga* (Drechsler) N.C. Schenck, W.B. Kendr. & Pramer - LocU, HabU, nematode trapping (Han *et al.*, 1990).
- Arthrobotrys conoides* Drechsler - LocU, upland, *Panax ginseng* (Park and Park, 1984) - GN, HabU, nematode trapping (Jeong, 1987) - GB, HabU, nematode trapping (Kim *et al.*, 1997) - GN, GB, mountain, upland, greenhouse, nematode trapping (Kim *et al.*, 2001).
- Arthrobotrys dactyloides* Drechsler. - LocU, HabU, nematode trapping (Han *et al.*, 1990) - CB, HabU, nematode trapping (Kim *et al.*, 1997) - GN, GB, mountain, greenhouse, nematode trapping (Kim *et al.*, 2001).
- Arthrobotrys oligospora* Fresen. - GN, HabU, nematode trapping (Jeong, 1987) - CB, HabU, nematode trapping (Kim *et al.*, 1997) - GN, GB, mountain, paddy field, upland, greenhouse, nematode trapping (Kim *et al.*, 2001).
- Arthrobotrys superba* Corda - GN, GB, greenhouse, nematode trapping (Kim *et al.*, 2001).
- Arthrobotrys vermicola* (R. C. Cooke & Satchuth.) Rifai - CN, HabU, nematode trapping (Kim *et al.*, 1997).
- Aspergillus clavatus* Desm. - CN, paddy field (Cho and Cheon, 1962) - GW, forest, *Pinus densiflora* (Song and Min, 1991).
- Aspergillus fischeri* Wehmer - CN, paddy field (Cho and Cheon, 1962).
- Aspergillus flavus* Link - GG, SE, paddy field (Min *et al.*, 1987) - CN, forest, *Phyllostachys reticulata* (Kim, 1979; Kim and Lee, 1980) - GW, forest, *Pinus densiflora* (Song and Min, 1991) - CB, GB, HabU (Min *et al.*, 1980b).
- Aspergillus flavus* var. *columnaris* Raper & Fennell - CB, SE, HabU (Min *et al.*, 1980b) - JB, sea soil (Hong and Min, 1981) - SE, paddy field (Min *et al.*, 1982b).
- Aspergillus fumigatus* Fresen. - CN, paddy field (Cho and Cheon, 1962) - CN, forest, *Phyllostachys reticulata* (Kim, 1979) - CB, GB, SE, HabU; GG, forest; JJ, forest (Min *et al.*, 1980b) - GG, SE, paddy field (Min *et al.*, 1987) - GW, forest, *Pinus densiflora* (Song and Min, 1991).
- Aspergillus giganteus* Wehmer - CN, forest, *Phyllostachys reticulata* (Kim, 1979; Kim and Lee, 1980).
- Aspergillus japonicus* Saito - CN, forest, *Phyllostachys reticulata* (Kim, 1979; Kim and Lee, 1980).
- Aspergillus japonicus* var. *japonicus* Saito - GB, SE, HabU (Min *et al.*, 1980b) - JB, upland (Hong and Min, 1981).
- Aspergillus niger* Tiegh. - CN, forest, *Phyllostachys reticulata* (Kim, 1979; Kim and Lee, 1980) - GW, forest, *Pinus densiflora* (Song and Min, 1991) - CB, GB, SE, HabU (Min *et al.*, 1980b) - JB, sea soil (Hong and Min, 1981) SE, paddy field (Min *et al.*, 1982b) - GN, greenhouse (Lee *et al.*, 2000).
- Aspergillus ochraceus* G. Wilh. - GW, forest, *Pinus densiflora* (Song and Min, 1991).
- Aspergillus oryzae* (Ahlb.) E. Cohn - CN, forest, *Phyllostachys reticulata* (Kim, 1979; Kim and Lee, 1980) - GG, forest; CB, GB, HabU (Min *et al.*, 1980b) - SE, paddy field (Min *et al.*, 1982b).
- Aspergillus repens* (Corda) Sacc. - SE, paddy field (Min *et al.*, 1987).
- Aspergillus* sp. - LocU, upland (Lee *et al.*, 1987a) - GG, upland (Lee *et al.*, 1987b) - JJ, upland (Lee *et al.*, 1988) - LocU, upland (Lee *et al.*, 1990) - GN, greenhouse (Lee *et al.*, 2000).
- Aspergillus sydowii* (Bainier & Sartory) Thom & Church - GN, SE, HabU (Min *et al.*, 1980b).
- Aspergillus terreus* Thom - CN, paddy field (Cho and Cheon, 1962) - GG, SE, paddy field (Min *et al.*, 1987) - GW, forest, *Pinus densiflora* (Song and Min, 1991).
- Aspergillus versicolor* (Vuill.) Tirab. - CN, forest, *Phyllostachys reticulata* (Kim, 1979; Kim and Lee, 1980) - GN, SE, HabU (Min *et al.*, 1980b) - GG, SE, paddy field

- (Min *et al.*, 1987) - GW, forest, *Pinus densiflora* (Song and Min, 1991).
- Aureobasidium* sp. - CB, upland (Lee *et al.*, 1987a).
- Botryotrichum* sp. - CB, upland (Lee *et al.*, 1987a).
- Botrytis* sp. - LocU, upland (Lee *et al.*, 1990).
- Cephalosporium* sp. - LocU, upland (Lee *et al.*, 1990).
- Chryso sporium pannorum* (Link) S. Hughes - SE, HabU (Min *et al.*, 1980b).
- Chryso sporium* sp. - LocU, upland (Lee *et al.*, 1990).
- Cladosporium cladosporioides* (Fresen.) G. A. de Vries - SE, paddy field (Min *et al.*, 1982b) - SE, paddy field (Min *et al.*, 1987).
- Cladosporium colocasiae* Sawada - GG, HabU (Min, 1985).
- Cladosporium herbarum* (Pers.) Link - CN, forest, *Phyllostachys reticulata* (Kim, 1979; Kim and Lee, 1980) - GG, greenhouse, *Arachis hypogaea* (Kim *et al.*, 1992).
- Cladosporium* sp. - GG, paddy field (Min *et al.*, 1987) - GG, upland (Lee *et al.*, 1987b) - LocU, upland (Lee *et al.*, 1990) - GN, greenhouse (Lee *et al.*, 2000).
- Cladosporium sphaerospermum* Penz. - GG, paddy field (Min *et al.*, 1987) - GG, HabU (Min, 1985).
- Curvularia lunata* (Wakker) Boedijn - GN, greenhouse (Lee *et al.*, 2000).
- Curvularia geniculata* (Tracy & Earle) Boedijn - CN, paddy field (Cho and Cheon, 1962).
- Cylindrocarpon* sp. - GN, upland (Lee *et al.*, 1987a).
- Dactylella lobata* Dudd. - GN, HabU, nematode trapping (Jeong, 1987).
- Doratomyces microsporus* (Sacc.) F. J. Morton & G. Sm. - GN, HabU (Min *et al.*, 1980b) - GN, greenhouse (Lee, 2001).
- Epicoccum* sp. - LocU, upland (Lee *et al.*, 1990).
- Epicoccum purpurascens* Ehrenb. - JN, upland (Lee *et al.*, 1987a).
- Fusarium oxysporium* Schltld. - CN, forest, *Phyllostachys reticulata* (Kim, 1979; Kim and Lee, 1980) - SE, paddy field (Min *et al.*, 1982b) - GN, nematode trapping (Jeong, 1987).
- Fusarium solani* (Mart.) Sacc. - CN, forest, *Phyllostachys reticulata* (Kim, 1979; Kim and Lee, 1980).
- Fusarium* sp. - JB, sea, upland, forest (Hong and Min, 1981). - GW, forest (Hong and Min, 1982) LocU, upland (Lee *et al.*, 1987a) - GG, upland (Lee *et al.*, 1987b) - JJ, upland (Lee *et al.*, 1988) - LocU, upland (Lee *et al.*, 1990).
- Geotrichum candidum* Link - GN, upland (Lee *et al.*, 1987a).
- Gliocladium roseum* Bainier - JB, forest, sea soil (Hong and Min, 1981).
- Gliocladium* sp. - LocU, upland (Lee *et al.*, 1990).
- Gliocladium solani* (Harting) Petch - GG, forest (Lee, 2001).
- Gliocladium viride* Matr. - GN, upland (Lee *et al.*, 1987a).
- Gonytrichum macrocladum* (Sacc.) S. Hughes - GN, upland (Lee and Go, 2000).
- Harposporium* sp. - GG, upland, *Panax ginseng* (Yoo *et al.*, 1981) - GN, GB, upland, greenhouse (Kim *et al.*, 2001).
- Harposporium anguillulae* Lohde - GN, HabU, nematode trapping (Jeong, 1987).
- Helminthosporium nodulosum* Berk. & M. A. Curtis - CN, forest, *Phyllostachys reticulata* (Kim, 1979; Kim and Lee, 1980).
- Hormodendrum pallidum* Oudem. - JN, forest, *Phyllostachys reticulata* (Kim, 1979; Kim and Lee, 1980).
- Humicola* sp. - LocU, upland (Lee *et al.*, 1987a) - GG, upland (Lee *et al.*, 1987b) - JJ, upland (Lee *et al.*, 1988) - LocU, upland (Lee *et al.*, 1990).
- Humicola veronae* De Bert. - GN, greenhouse (Lee, 2001).
- Malbranchea pulchella* var. *sulfurea* (Miehe) Cooney & R. Emers. - SE, paddy field (Min *et al.*, 1987).
- Monacrosporium cionopagum* (Drechsler) Subram. - CN, upland, *Capsicum annuum* (Kim *et al.*, 1992).
- Monacrosporium ellipsosporum* (Grove) R.C. Cooke & C.H. Dickinson. - GN, HabU, nematode trapping (Jeong, 1987) - GN, GB, upland, greenhouse, nematode trapping (Kim *et al.*, 2001).
- Monacrosporium gephyrophagum* (Drechsler) Subram. - GG, upland, *Brassica campestris* (Kim *et al.*, 1992).
- Monacrosporium* sp. - GN, GB, mountain, greenhouse (Kim *et al.*, 2001).
- Monacrosporium thaumasium* (Drechsler) de Hoog & Oorschot. - LocU, HabU, nematode trapping (Park *et al.*, 1993) - GN, GB, upland, greenhouse, nematode trapping (Kim *et al.*, 2001).
- Monilia sitophila* (Mont.) Sacc. - CN, forest, *Phyllostachys reticulata* (Kim, 1979; Kim and Lee, 1980).
- Mycogone* sp. - LocU, upland (Lee *et al.*, 1990).
- Papulaspora* sp. - LocU, upland (Lee *et al.*, 1990).
- Paecilomyces lilacinus* (Thom) Samson - JB, HabU (Hong and Min, 1981).
- Paecilomyces variotii* Bainier - SE, paddy field (Min *et al.*, 1982b).
- Penicillium aurantiocanadidum* Dierckx & Biourge - GG, HabU (Lee, 1992).
- Penicillium biforme* Thom - CN, paddy field (Cho and Cheon, 1962).
- Penicillium brefeldianum* B. O. Doidge - CN, paddy field (Cho and Cheon, 1962) - SE, paddy field (Min *et al.*, 1982b).
- Penicillium brevicompactum* Dierckx - SE, HabU (Min *et al.*, 1980a).
- Penicillium charlesii* G. Sm. - GW, forest, *Pinus densiflora* (Song and Min, 1991).
- Penicillium charlesii* var. *rapidum* S. Abe. - SE, HabU (Min *et al.*, 1980a).
- Penicillium chrysogenum* Thom - GB, HabU (Min *et al.*,

- 1980a) - CN, forest, *Phyllostachys reticulata* (Kim and Lee, 1980).
- Penicillium citrinum* Thom. - CN, forest, *Phyllostachys reticulata* (Kim, 1979; Kim and Lee, 1980) - GB, HabU (Min et al., 1980a).
- Penicillium commune* Thom - CN, paddy field (Cho and Cheon, 1962) - CN, forest, *Phyllostachys reticulata* (Kim, 1979; Kim and Lee, 1980).
- Penicillium coryphilum* Dierckx - CN, paddy field (Cho and Cheon, 1962) - CN, forest, *Phyllostachys reticulata* (Kim, 1979; Kim and Lee, 1980).
- Penicillium chrysogenum* Thom - JB, forest (Hong and Min, 1981).
- Penicillium cyclopium* Westling - CN, forest, *Phyllostachys reticulata* (Kim, 1979; Kim and Lee, 1980) - GB, HabU (Min et al., 1980a) - SE, paddy field (Min et al., 1987) - GW, forest, *Pinus densiflora* (Song and Min, 1991).
- Penicillium decumbens* Thom - GB, HabU (Min et al., 1980a) - SE, paddy field (Min et al., 1982b).
- Penicillium echinulatum* Fassat. - GW, forest, *Pinus densiflora* (Song and Min, 1991) - GG, HabU (Lee, 1992).
- Penicillium frequentans* Westling - CN, JN, forest, *Phyllostachys reticulata* (Kim, 1979; Kim and Lee, 1980) - SE, HabU (Min et al., 1980a) - JB, sea (Hong and Min, 1981) - SE, paddy field (Min et al., 1982b) - GG, SE, paddy field (Min et al., 1987) - GW, forest, *Pinus densiflora* (Song and Min, 1991).
- Penicillium funiculosum* Thom - JN, forest, *Phyllostachys reticulata* (Kim, 1979; Kim and Lee, 1980) - JB, upland (Hong and Min, 1981) - SE, paddy field (Min et al., 1982b) - SE, paddy field (Min et al., 1987) - GW, forest, *Pinus densiflora* (Song and Min, 1991).
- Penicillium granulatum* Bainier - GW, forest, *Pinus densiflora* (Song and Min, 1991).
- Penicillium griseofulvum* Dierckx - GG, HabU (Lee, 1992).
- Penicillium implicatum* Biourge - SE, HabU (Min et al., 1980a) - JB, HabU (Hong and Min, 1981) - SE, paddy field (Min et al., 1982b).
- Penicillium janthinellum* Biourge - CN, forest, *Phyllostachys reticulata* (Kim, 1979; Kim and Lee, 1980) - CB, GB, GG, HabU (Min et al., 1980a) - SE, paddy field (Min et al., 1982b) - JB, forest (Hong and Min, 1981) - GW, forest (Hong and Min, 1982) - GW, forest, *Pinus densiflora* (Song and Min, 1991).
- Penicillium javanicum* J. F. H. Beyma - CN, paddy field (Cho and Cheon, 1962).
- Penicillium lilacinum* Thom - GW, forest, *Pinus densiflora* (Song and Min, 1991).
- Penicillium miczynskii* Zalewski - CN, paddy field (Cho and Cheon, 1962).
- Penicillium nigricans* Bainier ex Thom - CN, JN, forest, *Phyllostachys reticulata* (Kim, 1979; Kim and Lee, 1980) - GW, forest, *Pinus densiflora* (Song and Min, 1991).
- Penicillium notatum* Westling - CN, forest, *Phyllostachys reticulata* (Kim, 1979; Kim and Lee, 1980) - GB, SE, HabU (Min et al., 1980a).
- Penicillium ochrysogenum* (epithet not exist) - CN, forest, *Phyllostachys reticulata* (Kim, 1979).
- Penicillium oxalicum* Currie & Thom - SE, paddy field (Min et al., 1982b) - GW, forest, *Pinus densiflora* (Song and Min, 1991) - GB, SE, HabU (Min et al., 1980a).
- Penicillium pallidum* G. Sm. - CN, forest, *Phyllostachys reticulata* (Kim, 1979; Kim and Lee, 1980).
- Penicillium piceum* Rapper & Fennell - SE, paddy field (Min et al., 1982b) - GG, SE, paddy field (Min et al., 1987).
- Penicillium pseudocasei* S. Abe ex G. Sm. - CB, HabU (Min et al., 1980a).
- Penicillium puberulum* Bainier - GW, forest, *Pinus densiflora* (Song and Min, 1991) - JJ, forest (Lee, 1992).
- Penicillium purpurogenum* var. *rubri-sclerotium* Thom - SE, HabU (Min et al., 1980a).
- Penicillium purpurascens* (Sopp) Biourge - SE, HabU (Min et al., 1980a).
- Penicillium raistrickii* G. Sm. - CN, forest, *Phyllostachys reticulata* (Kim, 1979; Kim and Lee, 1980).
- Penicillium restrictum* J. C. Gilman & E. V. Abbott - CN, paddy field (Cho and Cheon, 1962) - CN, forest, *Phyllostachys reticulata* (Kim, 1979; Kim and Lee, 1980).
- Penicillium roqueforti* Thom - SE, paddy field (Min et al., 1982b).
- Penicillium rubrum* Sopp - GW, forest, *Pinus densiflora* (Song and Min, 1991) - GG, HabU (Lee, 1992).
- Penicillium rugulosum* Thom - JJ, forest (Lee, 1992).
- Penicillium sclerotiorum* Beyma - CN, forest, *Phyllostachys reticulata* (Kim, 1979; Kim and Lee, 1980).
- Penicillium* sp. - LocU, upland (Lee et al., 1987a) - GG, upland (Lee et al., 1987b) - JJ, upland (Lee et al., 1988) - LocU, upland (Lee et al., 1990) - LocU, upland, greenhouse (Kim et al., 1992).
- Penicillium spiculisporum* Lehman - CN, paddy field (Cho and Cheon, 1962).
- Penicillium spinulosum* Thom - CN, forest, *Phyllostachys reticulata* (Kim, 1979; Kim and Lee, 1980) - GG, HabU (Lee, 1992).
- Penicillium steckii* Zalewski - CN, forest, *Phyllostachys reticulata* (Kim, 1979; Kim and Lee, 1980).
- Penicillium stipitatum* Thom ex C. W. Emmons - CN, paddy field (Cho and Cheon, 1962).
- Penicillium stoloniferum* Thom - SE, HabU (Min et al., 1980a).
- Penicillium tardum* Thom - CN, paddy field (Cho and Cheon, 1962).
- Penicillium thomi* Maire - JN, forest, *Phyllostachys reticulata* (Kim, 1979; Kim and Lee, 1980).
- Penicillium variabile* Sopp - GW, forest, *Pinus densiflora* (Song and Min, 1991) - JJ, forest (Lee, 1992).

- Penicillium velutinum* J. F. H. Beyma - CN, paddy field (Cho and Cheon, 1962) - CN, forest, *Phyllostachys reticulata* (Kim, 1979; Kim and Lee, 1980).
- Penicillium verrucosum* Dierckx - SE, paddy field (Min *et al.*, 1982b) - GG, SE, paddy field (Min *et al.*, 1987).
- Penicillium verruculosum* Peyronel - CN, paddy field (Cho and Cheon, 1962).
- Penicillium viridicatum* Westling - GW, forest, *Pinus densiflora* (Song and Min, 1991) - JJ, forest (Lee, 1992).
- Penicillium waksmanii* Zalewski - CN, forest, *Phyllostachys reticulata* (Kim, 1979; Kim and Lee, 1980).
- Phoma* sp. - GG, upland (Lee *et al.*, 1987b) - JJ, upland (Lee *et al.*, 1988) - LocU, upland (Lee *et al.*, 1990) - LocU, upland (Lee *et al.*, 1987a).
- Phytophthora* sp. - GG, upland (Lee *et al.*, 1987b) - LocU, upland (Lee *et al.*, 1990).
- Pythium* sp. - SE, paddy field (Min *et al.*, 1982b) - JJ, upland (Lee *et al.*, 1988) - LocU, upland (Lee *et al.*, 1990).
- Rhizoctonia* sp. - LocU, upland (Lee *et al.*, 1990).
- Rhodotorula rubra* (Schimon) F. C. Harrison - CN, forest, *Phyllostachys reticulata* (Kim, 1979; Kim and Lee, 1980).
- Sclerotinia* sp. - LocU, upland (Lee *et al.*, 1990).
- Scopulariopsis* sp. - GG, upland (Lee *et al.*, 1987b) - LocU, upland (Lee *et al.*, 1990).
- Sporotrichum thermophile* Apinis - GG, paddy field (Min *et al.*, 1987).
- Stachybotrys* sp. - LocU, upland (Lee *et al.*, 1990) - LocU, upland (Lee *et al.*, 1987a).
- Stemphylium* sp. - JJ, upland (Lee *et al.*, 1988) - LocU, upland (Lee *et al.*, 1990).
- Spicaria elegans* (Corda) Harz - CN, paddy field (Cho and Cheon, 1962).
- Thermomyces* sp. - LocU, upland (Lee *et al.*, 1990).
- Torula* sp. - LocU, upland (Lee *et al.*, 1990).
- Torulomyces* sp. - LocU, upland (Lee *et al.*, 1990).
- Trichoderma aureoviride* Rifai - SE, HabU (Lee and Lee, 1980) - SE, paddy field (Min *et al.*, 1982b).
- Trichoderma hamatum* (Bonord.) Bainier - SE, HabU (Lee and Lee, 1980) - CN, GG, upland, *Panax ginseng* (Lee and Lee, 1980) - CN, forest (Rhee and Hong, 1982, 1984).
- Trichoderma harzianum* Rifai - SE, HabU (Lee and Lee, 1980) - CN, GG, upland, *Panax ginseng* (Lee and Lee, 1980) - JB, sea, upland, forest (Hong and Min, 1981) - CN, forest (Rhee and Hong, 1982) - SE, paddy field (Min *et al.*, 1982b).
- Trichoderma koningii* Oudem. - CN, paddy field (Cho and Cheon, 1962) - SE, HabU (Lee and Lee, 1980) - GG, forest; - SE, HabU (Min *et al.*, 1980b) - JB, Forest (Hong and Min, 1981). - SE, paddy field (Min *et al.*, 1982b) - CN, forest (Rhee and Hong, 1982, 1984).
- Trichoderma lignorum* (Tode) Harz - CN, forest, *Phyllostachys reticulata* (Kim, 1979; Kim and Lee, 1980).
- Trichoderma* sp. - GG, upland (Lee *et al.*, 1987b) - JJ, upland (Lee *et al.*, 1988) - LocU, upland (Lee *et al.*, 1990) - LocU, upland (Kim *et al.*, 1992) - CN, CB, GB, upland, *Panax ginseng* (Shin and Lee, 1986) - LocU, upland (Lee *et al.*, 1987a) - GN, greenhouse (Lee *et al.*, 2000).
- Trichoderma polysporum* (Link) Rifai - CN, forest (Rhee and Hong, 1982, 1984).
- Trichoderma pseudokoningii* Rifai - CN, upland, *Panax ginseng* (Lee and Lee, 1980).
- Trichoderma viride* Pers. - CN, forest, *Phyllostachys reticulata* (Kim, 1979; Kim and Lee, 1980) - CN, GG, upland, *Panax ginseng* (Lee and Lee, 1980) - GB, HabU (Min *et al.*, 1980b) - CN, forest (Rhee and Hong, 1982, 1984).
- Trichothecium* sp. - LocU, upland (Lee *et al.*, 1990).
- Verticillium chlamydosporium* Goddard - GN, greenhouse (Lee, 2001).
- Verticillium albo-atrum* Reinke & Berthold - CN, forest, *Phyllostachys reticulata* (Kim, 1979; Kim and Lee, 1980).
- Verticillium* sp. - JJ, upland (Lee *et al.*, 1988) - LocU, upland (Lee *et al.*, 1990) - LocU, upland (Lee *et al.*, 1987a).
- Volutella* sp. - LocU, upland (Lee *et al.*, 1990).
- Wardomyces* sp. - LocU, upland (Lee *et al.*, 1990).

## Ascomycota

### Eurotiales

#### Trichocomaceae

- Emericella nidulans* (Eidam) Vuill. - GG, forest; CB, CN, HabU (Min *et al.*, 1980b) - JB, sea soil (Hong and Min, 1981).
- Emericella nidulans* var. *nidulans* (Eidam) Vuill. - GG, paddy field (Min *et al.*, 1987).
- Eupenicillium javanicum* (J. F. H. Beyma) Stolk & D. B. Scott - GB, SE, HabU (Min *et al.*, 1980a) - JB, HabU (Hong and Min, 1981) - SE, paddy field (Min *et al.*, 1982b) - GG, upland (Min *et al.*, 1987).
- Eupenicillium* sp. - GG, SE, paddy field (Min *et al.*, 1987) - GN, upland (Lee *et al.*, 1987) - LocU, upland (Lee *et al.*, 1990).
- Eurotium repens* de Bary - CN, forest, *Phyllostachys reticulata* (Kim, 1979) - GG, HabU (Min, 1986)
- Neosartorya fischeri* var. *fischeri* (Wehmer) Malloch & Cain - SE, paddy field (Min *et al.*, 1987).
- Talaromyces emersonii* Stolk - GW, forest, *Pinus densiflora* (Song and Min, 1991).
- Talaromyces flavus* var. *flavus* (Klöcker) Stolk & Samson - SE, paddy field (Min *et al.*, 1982b) - GG, paddy field (Min *et al.*, 1982a) - SE, upland (Min *et al.*, 1987).
- Talaromyces helicus* var. *major* Stolk & Samson - GG, paddy field (Min *et al.*, 1987).
- Talaromyces panasenkoi* Pitt - GG, paddy field (Min *et al.*, 1982a).

*Talaromyces* sp. - GG, SE, paddy field (Min et al., 1981).  
*Talaromyces stipitatus* (Thom) C. R. Benj. - SE, paddy field (Min et al., 1982b) - SE, GG, paddy field (Min et al., 1982a) - GG, SE, paddy field (Min et al., 1987) - GW, forest, *Pinus densiflora* (Song and Min, 1991).

*Talaromyces trachyspermus* (Samson & Abdel-Fattah) Yaguchi & Udagawa - SE, paddy field (Min et al., 1982b) SE, paddy field (Min et al., 1982a) - GN, greenhouse (Lee, 2001).

*Talaromyces ucrainicus* (Panaz.) Udagawa - SE, paddy field (Min et al., 1982b) - SE, paddy field (Min et al., 1987).

*Talaromyces vermiculatus* (P. A. Dang.) C. R. Benj. - CN, forest, *Phyllostachys reticulata* (Kim, 1979; Kim and Lee, 1980).

*Thermoascus aurantiacus* Miehe - GW, forest, *Pinus densiflora* (Song and Min, 1991).

## Hypocreales

### Hypocreaceae

*Hypomyces chrysospermus* Tul. & C. Tul. - JN, upland (Lee et al., 1987a).

### Nectriaceae

*Calonectria* sp. - LocU, upland (Lee et al., 1990).

*Nectria* sp. - CB, upland (Lee et al., 1987).

### Incertae sedis

*Emericellopsis mirabilis* (Malan) Stolk - GN, Greenhouse (Lee, 2001).

*Emericellopsis terricola* J.F.H. Beyma - SE, paddy field (Min et al., 1982b).

## Microascales

### Microascaceae

*Petriella sordida* (Zukal) G. L. Barron & J. C. Gilman - GN, greenhouse (Lee et al., 1998).

## Onygenales

### Arthrodermataceae

*Arthroderma* sp. - CB, upland (Lee et al., 1987a).

*Nannizzia grubyia* Georg, Ajello, Friedman & S. A. Brinkm. - JN, upland (Lee et al., 1987a).

### Onygenaceae

*Emmonsia capsulata* Kwon-Chung - CB, upland (Lee et al., 1987a).

## Pleosporales

### Sporormiaceae

*Westerdykella multispora* (Saito & Minoura) Cejp & Milko - SE, paddy field (Min et al., 1982b) - SE, GG, GW, paddy field (Min et al., 1982a) - GW, forest, *Pinus densiflora* (Song and Min, 1991).

## Sordariales

### Chaetomiaceae

*Corynascus sepedonium* (C. W. Emmons) Arx - GN,

greenhouse (Lee et al., 1998).

*Chaetomium brasiliense* Bat. & Pontual - GN, greenhouse (Lee et al., 1998).

*Chaetomium funicola* Cooke - CN, forest, *Phyllostachys reticulata* (Kim, 1979; Kim and Lee, 1980).

*Chaetomium globosum* Kunze - CN, forest, *Phyllostachys reticulata* (Kim, 1979; Kim and Lee, 1980) - SE, paddy field (Min et al., 1982b) - SE, GG, paddy field (Min et al., 1982a) - GN, greenhouse (Lee et al., 2000; Lee, 2001).

*Chaetomium indicum* Corda - GN, greenhouse (Lee et al., 1998).

*Chaetomium* sp. - JB, HabU (Hong and Min, 1981) SE, paddy field (Min et al., 1987) - CB, upland (Lee et al., 1987a).

*Chaetomium subspirale* Chivers - GG, paddy field (Min et al., 1987).

*Thielavia fragilis* (Natarajan) Arx - GN, greenhouse (Lee et al., 1998).

### Sordariaceae

*Neurospora sitophila* Shear & B. O. Doidge - GW, forest, *Pinus densiflora* (Song and Min, 1991).

## Zygomycota

### Entomophthorales

#### Meristacraceae

*Meristacrum* sp. - GN, GB, upland, greenhouse (Kim et al., 2001).

## Glomales

### Acaulosporaceae

*Acaulospora appendicula* Spain, Sieverd. & N.C. Schenck - JN, greenhouse (Sohn and Kim, 1991).

*Acaulospora bireticulata* Rothwell & Trapper - CN, near coast, *Phragmites communis*; GB, near coast, *Digitaria sanguinalis* (Eom and Lee, 1989) - CB, near stream, *Persicaria thunbergii* (Eom and Lee, 1990) - JN, greenhouse (Sohn and Kim, 1991).

*Acaulospora denticulata* Sieverd. & S. Toro - JN, greenhouse (Sohn and Kim, 1991).

*Acaulospora elegans* Trappe & Gerd. - JN, greenhouse (Sohn and Kim, 1991) - CB, around open field, leguminous plants; GG, around roadway, leguminous plants (Ahn et al., 1992).

*Acaulospora foveata* Trappe & Janos - JN, greenhouse (Sohn and Kim, 1991).

*Acaulospora laevis* Gerd. & Trappe - GB, CB, GG, around roadway, open field; JB, around valley, leguminous plants (Ahn et al., 1992).

*Acaulospora longula* Spain & N. C. Schenck - GB, mountain (Lee et al., 1993).

*Acaulospora morrowiae* Spain & N. C. Schenck - CB, mountain (Lee et al., 1993).

*Acaulospora myriocarpa* Spain, Sieverd. & N. C. Schenck -

CB, HabU, *Cassia mimosoides* var. *nomame* (Lee *et al.*, 1991).

*Acaulospora rehmi* Sieverd. & S. Toro - JN, greenhouse (Sohn and Kim, 1991).

*Acaulospora rugosa* J. B. Morton - CB, GN, mountain (Lee *et al.*, 1993).

*Acaulospora scrobiculata* Trappe - GG, reclaimed land, *Calamagrostis epigeios*, *Artemisia scoparia* (Koh and Lee, 1984) - CB, near stream, *Persicaria thunbergii* (Eom and Lee, 1990) - CN, SubU, *Cassia mimosoides* var. *nomame* (Ka *et al.*, 1990a) - GB, CB, GG, around roadway, open field, leguminous plants (Ahn *et al.*, 1992).

*Acaulospora* sp. - GN, Greenhouse (Park *et al.*, 1999) - GB, around roadway, leguminous plants (Ahn *et al.*, 1992).

*Acaulospora spinosa* C. Walker & Trappe - GN, greenhouse (Park *et al.*, 1999) - CB, pot soil, *Chrysanthemum morifolium*, *Impatiens balsamina*, *Lycopersicon esculentum* (Lee *et al.*, 1991) - GB, CB, GG, around roadway, open field, leguminous plants (Ahn *et al.*, 1992).

*Acaulospora undulata* Sieverd. - JB, around valley, leguminous plants (Ahn *et al.*, 1992).

#### Glomaceae

*Glomus albidum* C. Walker & L.H. Rhodes. - GG, reclaimed land, *Calamagrostis epigeios*, *Lotus corniculatus*, *Artemisia scoparia*, *Imperata cylindrical* (Koh and Lee, 1984) - CB, near stream, *Persicaria thunbergii* (Eom and Lee, 1990) - CB, GG, around roadway; JB, around valley, leguminous plants (Ahn *et al.*, 1992).

*Glomus aggregatum* N.C. Schenck & G.S. Sm. - CN, SubU, *Cassia mimosoidea* var. *nomame* (Ka *et al.*, 1990a).

*Glomus ambisporum* G.S. Sm. & N.C. Schenck - CN, SubU, *Cassia mimosoidea* var. *nomame* (Ka *et al.*, 1990a) - JN, greenhouse (Sohn and Kim, 1991).

*Glomus caledonium* (T.H. Nicolson & Gerd.) Trappe & Gerd. - GG, reclaimed land, *Calamagrostis epigeios*, *Artemisia scoparia* (Koh and Lee, 1984) - JN, greenhouse (Sohn and Kim, 1991) - CB, HabU, *Petasites japonicus* (Lee *et al.*, 1991) - GB, CB, around roadway, open field, leguminous plants (Ahn *et al.*, 1992).

*Glomus clarum* T.H. Nicolson & N.C. Schenck - JB, regional park, *Cryptomeria japonica* (Eom and Lee, 1989) - GN, HabU (Lee *et al.*, 1993).

*Glomus clavispurum* (Trappe) R.T. Almeida & N.C. Schenck - GB, SubU; CB, SubU; CN, SubU (Eom *et al.*, 1992) - CB, forest, *Thuja orientalis*; GN, forest, *Cryptomeria japonica*; JJ, near crater, *Miscanthus* sp. (Koo *et al.*, 1992).

*Glomus constrictum* Trappe - GG, reclaimed land, *Calamagrostis epigeios* (Koh and Lee, 1984).

*Glomus diserticola* Trappe, Bloss & J. A. Menge - GN, HabU (Lee *et al.*, 1993).

*Glomus dimorphicum* Boyetchko & J.P. Tewari - CN, regional park, *Cassia mimosoides* var. *nomame* (Ka *et al.*, 1990b).

*Glomus etinucatum* Becker & Gerd. - CB, pot soil, *Sinningia speciosa* (Lee *et al.*, 1991).

*Glomus fecundisporum* N. C. Schenck & G. S. Sm - GB, mountain (Lee *et al.*, 1993).

*Glomus glomerulatum* Sieverd. - CB, HabU, *Zoysia japonica* (Lee *et al.*, 1991) - CB, around gas station, leguminous plants (Ahn *et al.*, 1992).

*Glomus geosporum* (T.H. Nicolson & Gerd.) C. Walker - CN, SubU, *Cassia mimosoides* var. *nomame* (Ka *et al.*, 1990a).

*Glomus heterosporum* G.S. Sm. & N.C. Schenck - JJ, near crater, *Miscanthus* sp. (Koo *et al.*, 1992).

*Glomus hoi* S.M. Berch & Trappe - JN, greenhouse (Sohn and Kim, 1991).

*Glomus intraradices* N.C. Schenck & G.S. Sm. - JB, regional park, *Cryptomeria japonica* (Eom and Lee, 1989).

*Glomus liquidambaris* (C.G. Wu & Z.C. Chen) R.T. Almeida & N.C. Schenck - GB, SubU; JN, SubU (Eom *et al.*, 1992) - GB, coal mine, *Lespedeza bicolor* (Koo *et al.*, 1992).

*Glomus occultum* C. Walker - JB, regional park, *Cryptomeria japonica* (Eom and Lee, 1989).

*Glomus manihotis* R.H. Howeler, Sieverd. & N.C. Schenck - CB, near stream, *Persicaria thunbergii* (Eom and Lee, 1990).

*Glomus microcarpum* Tul. & C. Tul. - GB, HabU, *Poncirus trifoliata* (Lee *et al.*, 1991).

*Glomus mosseae* (Nicolaj & Gerd.) Gerd. & Trappe - CN, SubU, *Cassia mimosoidea* var. *nomame* (Ka *et al.*, 1990a).

*Glomus pulvinatum* (Henn.) Trappe & Gerd. - GG, reclaimed land, *Calamagrostis epigeios*, *Lotus corniculatus*, *Artemisia scoparia*, *Imperata cylindrical* (Koh and Lee, 1984) - CB, near stream, *Persicaria thunbergii* (Eom and Lee, 1990) - CB, around gas station, leguminous plants (Ahn *et al.*, 1992).

*Glomus rubiforma* (Gerd. & Trappe) R.T. Almeida & N.C. Schenck - CB, SubU (Eom *et al.*, 1992) - JJ, SubU, *Rosa multiflora* (Koo *et al.*, 1992) - GB, GG, around roadway, open field; CB, around gas station, leguminous plants (Ahn *et al.*, 1992).

*Glomus scintillans* S. L. Rose & Trappe - GB, CB, around roadway, leguminous plants (Ahn *et al.*, 1992).

*Glomus sinuosum* (Gerd. & B.K. Bakshi) R.T. Almeida & N.C. Schenck - GB, SubU (Eom *et al.*, 1992) - JN, SubU, *Celtis sinensis*; JJ, SubU, *Rosa multiflora* (Koo *et al.*, 1992).

*Glomus* sp. - GG, reclaimed land, *Calamagrostis epigeios*, *Lotus corniculatus*, *Artemisia scoparia*, *Imperata cylindrical* (Koh and Lee, 1984) - GN, Greenhouse (Park *et al.*, 1999) - JB, around valley, leguminous plants (Ahn *et al.*, 1992).

*Glomus taiwanense* (C.G. Wu & Z.C. Chen) R.T. Almeida & N.C. Schenck - CB, SubU (Eom *et al.*, 1992) - GN, forest, *Cryptomeria japonica*; JJ, SubU, *Rosa multiflora*;

JJ, near crater, *Miscanthus* sp. (Koo et al., 1992).

*Glomus tortuosum* N. C. Schenck & G. S. Sm. - CB, pot soil, *Monstera deliciosa*, *Nandina domestica* (Lee et al., 1991) - GB, around roadway, leguminous plants (Ahn et al., 1992).

*Sclerocystis pachycaulis* C.G. Wu & Z.C. Chen - JN, greenhouse (Sohn and Kim, 1991).

### Gigasporaceae

*Gigaspora decipiens* I.R. Hall & L.K. Abbott - CB, near stream, *Persicaria thunbergii* (Eom and Lee, 1990) - JN, greenhouse (Sohn and Kim, 1991) - CB, HabU, *Morus alba* (Lee et al., 1991).

*Gigaspora gigantea* (T.H. Nicolson & Gerd.) Gerd. & Trappe - CB, near stream, *Persicaria thunbergii* (Eom and Lee, 1990) - JN, greenhouse (Sohn and Kim, 1991).

*Gigaspora margarita* W. N. Becker and I. R. Hall - CB, near stream, *Persicaria thunbergii* (Eom and Lee, 1990) - CN, SubU, *Cassia mimosoides* var. *nomame* (Ka et al., 1990a) - KN, greenhouse (Park et al., 1999).

*Scutellospora aurigloba* (I.R. Hall) C. Walker & F.E. Sanders - JB, regional park, *Cryptomeria japonica* (Eom and Lee, 1989) - JN, greenhouse (Sohn and Kim, 1991).

*Scutellospora calospora* (T.H. Nicolson & Gerd.) C. Walker & F.E. - JN, greenhouse (Sohn and Kim, 1991) - CB, HabU, *Cassia mimosoides* var. *nomame* (Lee et al., 1991) - CB, around temple, around gas station; JB, around valley, leguminous plants (Ahn et al., 1992).

*Scutellospora coralloidea* (Trappe, Gerd. & H.H. Ho) C. Walker & F.E. Sanders - CN, SubU, *Cassia mimosoides* var. *nomame* (Ka et al., 1990a) - JN, greenhouse (Sohn and Kim, 1991).

*Scutellospora erythropha* (Koske & C. Walker) C. Walker & F.E. Sanders - CB, near stream, *Persicaria thunbergii* (Eom and Lee, 1990).

*Scutellospora gilmorei* (Trappe & Gerd.) C. Walker & F.E. Sanders - GB, near coast, *Digitaria sanguinalis* (Eom and Lee, 1989).

*Scutellospora gregaria* (B. Schenk & T.H. Nicolson) C. Walker & F.E. Sanders - CB, near stream, *Persicaria thunbergii* (Eom and Lee, 1990).

*Scutellospora heterogama* (T.H. Nicolson & Gerd.) C. Walker & F.E. Sanders - CN, SubU, *Cassia mimosoides* var. *nomame* (Ka et al., 1990a) - CB, around temple; GB, around roadway, open field (Ahn et al., 1992).

*Scutellospora pellucida* (T.H. Nicolson & B. Schenk) C. Walker & F.E. Sanders - CN, regional park, *Cassia mimosoides* var. *nomame* (Ka et al., 1990b).

*Scutellospora* sp. - CB, around temple, gas station, roadway; GB, around roadway; JB, around valley, leguminous plants (Ahn et al., 1992).

*Scutellospora verrucosa* (Koske & C. Walker) C. Walker & F. E. Sanders - GB, GG, around road way, open field; CB, around temple, leguminous plants (Ahn et al., 1992).

## Mucorales

### Cunninghamellaceae

*Cunninghamella elegans* Lendn. - CN, forest, *Phyllostachys reticulata* (Kim, 1979; Kim and Lee, 1980) - JB, HabU (Hong and Min, 1981) - JN, upland (Lee et al., 1987a).

*Cunninghamella* sp. LocU, upland (Lee et al., 1990) - LocU, upland, *Capsicum annuum*, *Arachis hypogaea* (Kim et al., 1992).

### Mortierellaceae

*Mortierella alpina* Peyronel - CN, forest, *Phyllostachys reticulata* (Kim, 1979; Kim and Lee, 1980).

*Mortierella elongata* Linnem - JN, forest, *Phyllostachys reticulata* (Kim, 1979; Kim and Lee, 1980).

*Mortierella isabellina* Oudem. - CN, forest, *Phyllostachys reticulata* (Kim, 1979; Kim and Lee, 1980).

*Mortierella ramanniana* var. *angulispora* (Naumov) Linnem. - CN, forest, *Phyllostachys reticulata* (Kim, 1979; Kim and Lee, 1980).

*Mortierella* sp. - GW, forest (Hong and Min, 1982) - JJ, upland (Lee et al., 1988) - LocU, upland (Lee et al., 1990) - GN, upland (Lee et al., 1987a).

### Mucoraceae

*Absidia cylindrospora* Hagem - LocU, upland, *Capsicum annuum*, *Citrullus lanatus* (Kim et al., 1992).

*Absidia* sp. - LocU, upland (Lee et al., 1990) - GN, greenhouse; LocU, upland (Kim et al., 1992).

*Mucor circinelloides* Tiegh. - CN, forest, *Phyllostachys reticulata* (Kim, 1979; Kim and Lee, 1980).

*Mucor fragilis* Bainier - CN, JN, forest, *Phyllostachys reticulata* (Kim, 1979; Kim and Lee, 1980).

*Mucor hiemalis* Wehmer - CN, forest, *Phyllostachys reticulata* (Kim, 1979; Kim and Lee, 1980).

*Mucor racemosus* Bull. - CN, forest, *Phyllostachys reticulata* (Kim, 1979; Kim and Lee, 1980).

*Mucor* sp. - JB, sea, forest, upland (Hong and Min, 1981) - GW, forest (Hong and Min, 1982) - JJ, upland (Lee et al., 1988) - LocU, upland (Lee et al., 1990) - GW, forest, *Pinus densiflora* (Song and Min, 1991).

*Rhizopus arrhizus* A. Fisch. - GG, upland (Min et al., 1987).

*Rhizopus nigricans* Ehrenb. - CN, forest, *Phyllostachys reticulata* (Kim, 1979; Kim and Lee, 1980).

*Rhizopus oryzae* G. Winter - CN, forest, *Phyllostachys reticulata* (Kim, 1979; Kim and Lee, 1980) - CB, upland (Lee et al., 1987a).

*Rhizopus* sp. GG, upland (Lee et al., 1987b) - JJ, upland (Lee et al., 1988) - LocU, upland (Lee et al., 1990) - GG, paddy field (Min et al., 1987) - LocU, upland, *Capsicum annuum*, *Arachis hypogaea* (Kim et al., 1992).

*Zygorhynchus heterogamus* (Vuill.) Vuill. - CN, forest, *Phyllostachys reticulata* (Kim, 1979).

*Zygorhynchus moelleri* Vuill. - CN, forest, *Phyllostachys reticulata* (Kim, 1979; Kim and Lee, 1980) - JB, forest



(Hong and Min, 1981) - SE, paddy field (Min *et al.*, 1982b) - GG, paddy field (Min *et al.*, 1987) - GN, upland (Lee *et al.*, 1987a).

*Zygorhynchus* sp. - GW, forest (Hong and Min, 1982) LocU, upland (Lee *et al.*, 1990).

#### Phycomycetaceae

*Phycomyces* sp. - GG, upland (Lee *et al.*, 1987b).

#### Incertae sedis

*Complexipes moniliformis* C. Walker - CN, park, *Cassia mimosoides* var. *nomame* (Ka *et al.*, 1990b).

#### Zoopagales

#### Zoopagaceae

*Cystopage lateralis* Drechsler - GN, GB, upland, greenhouse (Kim *et al.*, 2001).

#### Discussion

A total of 82 genera and 271 species were reported, in which unidentified species were counted as one species. When taking soil-borne pathogenic fungi into consideration, the total number would become more. However, the totality of recorded species still seems to be far lesser from the reality of soil-inhabiting species in Korea. Especially compared with macrofungi (mushrooms) of which about 1000 species are known and are most thoroughly studied group of fungi in Korea (Lee, 1994). Majority of information about soil-inhabiting fungi drawn in the current paper was by-products of soil microorganism oriented researches and only a few studies were carried for the exploration of fungal diversity.

Ehrlich and Wilson (1991) once predicted that a quarter of the living organisms on the earth would be lost within 50 years. Korea is not exempted in the case, which has accomplished rapid industrialization and urbanization causing the destruction of many natural habitats for living microorganisms. Being aware of the preservation of natural resources or possible genetic sources for future use, the inventory of mycoflora is necessary to provide the basic information about indigenous fungal population.

Most of habitats of soil-inhabiting fungi studied were very much biased to agricultural fields such as uplands, paddy fields or greenhouses, in which the mycoflora does not reflect its natural composition because of the application of fertilizer, fungicide, and human labor: hence further studies in Korean soil mycoflora need to be varied in natural niches or habitats. Many of the fungi listed in this contribution were isolated using artificial media, which means they are culturable. References were, however, found only in the literature not in the culture collection. Since many of living microorganisms are currently considered as genetic resources for food and medicinal use, it is indeed important to maintain them *ex situ* in culture collections for future application, especially under the cir-

cumstance of rapid destruction of natural habitation. Although the preservation of unique habitats as a whole, together with their assemblages of diverse microorganisms and substrates obviously most recommendable (Rossman, 1997).

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