

isolates collected in 2001 were A1 mating type. About 87.5% of the isolates collected in 2002, 89.8% in 2003 were determined as A1 mating type. The majority of the *P. infestans* isolates were A1 mating types. Changes of control efficacy of metalaxyl to potato late blight might be caused by the occurrence rate of moderately resistant isolates within A1 mating type.

## **2-06. Effects of ectomycorrhizal fungi on soil-borne plant pathogenic fungi in red pine seedlings**

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Disease suppression by ectomycorrhizal (ECM) fungi has been demonstrated on red pine seedlings. Culturing of pathogenic fungi on petri plates containing culture filtrates of ECM fungi showed that culture filtrates of the ECM fungus *Hebeloma cylindrosporum* may inhibit the mycelial growth of all tested soil-borne plant pathogenic (SBPP) fungi upto 60%. In order to examine the effects of ECM fungi on SBPP fungi and on red pine seedlings, both symbiotic and pathogenic fungi were inoculated into the soil with red pine seedlings by three inoculation methods; pre-inoculation of SBPP fungi 10 days before inoculation of ECM fungi, simultaneous inoculation of both fungi, post-inoculation of SBPP fungi 60 days after inoculation of ECM fungi. Seedling mortality, seedling growth, and ectomycorrhizal formation by the combined treatments were examined and compared. Pine seedlings were dead by the pre-inoculation of pathogenic fungi, except *Rhizina undulata* which required 9-12 days, within 6 days after inoculation. Among pathogenic fungi tested, *Fusarium oxysporum* was the most pathogenic with the mortality of 44%. However, no dead seedlings were shown by simultaneous inoculation of both fungi or pre-inoculation of ECM fungi. In addition, pine seedlings treated by simultaneous or post-inoculation of SBPP fungi were relatively higher than those treated by pre-inoculation in diameter at root crown and the number of ectomycorrhizal roots. There were no significant differences among inoculation methods in root length and dry weight of treated seedlings. It means that ECM fungi somehow play a role in protecting primary roots of red pine seedlings against invasion by the SBPP fungi.

## **2-07. Evaluation of fungicides to control of potato late blight in Korea**

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Potato late blight, caused by *Phytophthora infestans*, is one of the important diseases in potato cultivation areas. Though the incidence of late blight was depend on the inoculums and climatic condition in each fields, the foliar blight was reached to 100% under the severe disease pressure condition in 2003. Outbreak of foliar blight was concentrated from May and July and evaluation of ten fungicides to control of late blight was made at Daekwallryoung area in potato