

stands of 65 to 75, 60 to 70, and 55 to 60%, respectively. The addition of rice bran(1 %) to loamy sand in the field resulted in a 10-fold increase in propagule numbers of the three isolates within 10 days of application.

2-42. Production of mass microorganisms by using simple liquid culture facility to fit the field scale test.

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The fermentation process and subsequent processing determine the efficacy of a bioherbicide propagule. Large batches of biomass of the mycoherbicide agent for white clover, *Sclerotium* sp.(BWC98-105) was produced in simple liquid fermentator in 5 gallons vessels(Model No. 8087, Dabo Inc., Korea) with oxygen supply(DPH16000, FineTech Inc., Korea) simulating industrial conditions by utilizing commercially available, inexpensive ingredients (10 % rice bran). The maximum biomass yield of *Sclerotium* sp.(BWC98-105) was obtained after 5 days of air pumped incubation at room temperature condition(22-28 °C). By using this simple facility, it could get fragmented or proliferated greatly and attained maximum mycelia biomass. The biomass of mycoherbicide agent consisted of hyphae devoid of spores. Biomass mycelia of the fungus 99% survival at room temperature after 2 mo. A thorough understanding of the effects of fermentation and formulation on viability and virulence is required to guide these processes. After an economical yield level of bioherbicide propagule has been achieved in a fermentation process, formulation becomes a critical factor which influences product efficacy. Because the fermentation must be stopped at a point when virulence/viability are optimum, the live bioherbicide propagule must be stabilized, formulated, and packaged.

2-43. Damages caused by infection with viruses in cut-flower production of *Lilium x fomolongi*

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Viral disease symptoms were investigated in the field grown Longiflorum hybrid cultivars, and the damages caused by infection with *Lily mottle virus* (LMoV) and *Cucumber mosaic virus* (CMV) were assessed by comparing growth of plants produced from seeds of Longiflorum hybrid cultivar both infected by artificial inoculation and free from infection with those viruses. Dominant symptom caused by spontaneous infection with LMoV and CMV in the field was mottle combined with chlorotic stripe on leaves. LMoV developed brownish necrotic lesion on floral leaves. The incidence of viral disease by mixed infection with LMoV, CMV or *Lily symptomless virus* (LSV) in the field grown Longiflorum hybrid cultivar, cultivated for more than 6 years, was 80 to 84 percent. In comparison with virus-free plants, plants doubly infected with CMV and LMoV by artificial

inoculation decreased stem length by 14 percent and fresh weight by 38 percent. In conclusion, flower quality and the stem length of Longiflorum hybrid cultivar were affected by LMoV and CMV infection.

2-44. Antimicrobial active clones from soil metagenomic library.

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Soil metagenome is untapped total microbial genome including that of the majority of unculturable bacteria present in soil. We constructed soil metagenomic library in *Escherichia coli* using DNA directly extracted from two different soils, pine tree rhizosphere soil and forest topsoil. Metagenomic libraries constructed from pine tree rhizosphere soil and forest topsoil consisted of approximately 33,700 clones and 112,000 clones with average insert DNA size of 35-kb, respectively. Subsequently, we screened the libraries to select clones with antimicrobial activities against *Saccharomyces cerevisiae* and *Agrobacterium tumefaciens* using double agar layer method. So far, we have a clone active against *S. cerevisiae* and a clone active against *A. tumefaciens* from the forest topsoil library. *In vitro* mutagenesis and DNA sequence analysis of the antifungal clone revealed the genes involved in the biosynthesis of antimicrobial secondary metabolite. Metagenomic libraries constructed in this study would be subject to search for diverse genetic resources related with useful microbial products.

2-45. Internet-based Information System for Agricultural Weather and Disease and Insect fast management for rice growers in Gyeonggi-do, Korea

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The Gyeonggi-do Agricultural Research and Extension Services has developed a web-site (www.epilove.com) in collaboration with EPINET to provide information on agricultural weather and rice disease and insect pest management in Gyeonggi-do. Weather information includes near real-time weather data monitored by automated weather stations (AWS) installed at rice paddy fields of 11 Agricultural Technology Centers (ATC) in Gyeonggi-do, and weekly weather forecast by Korea Meteorological Administration (KMA). Map images of hourly air temperature and rainfall are also generated at 309m x 309m resolution using hourly data obtained from AWS installed at 191 locations by KMA. Based on near real-time weather data from 11 ATC, hourly infection risks of rice blast, sheath blight, and bacterial grain rot for individual districts are estimated by disease forecasting models, BLAST, SHBLIGHT, and GRAINROT. Users can diagnose various diseases and insects of rice and find their information in detail by browsing thumbnail images of them. A