A new and effective formulation using antagonistic bacteria, *Burkholderia cepacia* YC5025 in vegetable oil was developed for the biocontrol of anthracnose. The bacterial population in the formulation was maintained to $5x10^7$ cfu/ml upto 60 days at room temperature. Control efficacy of the formulation for anthracnose was over 80% by spraying of diluted suspension(x1,000) in growth chamber tests. On the contrary, the bacterial suspension in distilled water or bacterial culture broth containing same number of spores as the formulation had low control efficacy around 40% even 2-weeks storage after preparation. The shelf-life of the formulation was longer than that of bacterial preparation using clay minerals such as talc or bentonite. The mechanisms of newly developed bacterial formulation are possibly the formation of water film on the surface of cucumber leaves and inactivation of the bacteria in the vegetable oils during storage. Further field tests and improvements with new liquid bacteiral formulation need to be done for practical application.

2-24. Isolation and development of *Bacillus subtilis* S1-0210 as a biocontrol agent of gray mold of strawberry

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Antagonistic effect of bacterial strains isolated from phylloplane of strawberry plants grown in greenhouse was tested on *Botrytis cinerea*. Among the promising bacterial strains, *Bacillus* sp. S1-0210 showed highest inhibition of mycelial growth of *B. cinerea* and a broad spectrum of antifungal activities against many plant pathogenic fungi *in vitro*. *Bacillus* sp. S1-0210 was identified as *Bacillus subtilis* based on the analysis of 18S rDNA as well as its biochemical characteristics. Application of wettable powder formulation of *B. subtilis* S1-0210 significantly reduced the incidence of gray mold on strawberry fruits during storage. Results showed that treatment of *B. subtilis* S1-0210 decreased the incidence of gray mold by 4.8% whereas the incidence in control was 77.9%, indicating that the formulation of *B. subtilis* S1-0210 will be practically applied on strawberry fruits as a biocontrol agent of gray mold during storage.

2-25. Occurrence of bacterial canker of sweet cherry caused by *Pseudomonas syringae* pv. *morsprunorum*

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Bacterial canker of sweet cherry (*Prunus cerasus* L.) was observed in farmers' orchard in Goesan, Chungbuk in 2003. Typical canker symptom occurred on the branches or twigs of sweet cherry in early spring and bacterial exudates oozed out of the cracked barks of diseased trees. Watersoaked brown symptom appeared on the leaves and severe infection caused thorough defoliation on the branches or twigs of sweet cherry. When cut the severely infected branches or twigs, irregular and rusty-colored symptoms in sapwood and heartwood were clearly found,

indicating that they could serve as specific symptoms of bacterial canker of sweet cherry. The gram negative, aerobic bacterium isolated from the lesion produced fluorescent pigments on King's B agar medium but did not grow at 37℃. The bacterium formed Levan-type colonies, and showed negative reactions in oxidase reaction, arginine dihydrolysis test, and pectolytic activity. Based on the biochemical and pathological characteristics, the causal organism was identified as *Pseudomonas syringae* pv. *morsprunorum*. This is the first report on bacterial canker of sweet cherry in Korea.

2-26. Screening of antifungal activities of *Bacillus thuringiensis* strains for the development of biocontrol agents of plant diseases

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An attempt was made to screen antifungal activities of *Bacillus thuringiensis* strains on various plant pathogens, *Botryosphaeria dothidea, Diaporthe actinidiae, Botrytis cinerea, Glomerella cingulata, Colletorichum cocodes, Sclerotinia sclerotiorum, Alternaria alternata, Helicobasidium mompa, Bipolaris coicis, Fusarium graminearum* and *Rhizoctonia solani*. Ten and forty-five strains of *B. thuringiensis* were isolated from animal feces in Korea and Japan, respectively. Inhibitory effects of the strains on the mycelial growth of the pathogens were examined on the mixed media of potato dextrose agar and nutrient agar. Approximately half of the strains inhibited the mycelial growth of one or more pathogens. Most of the pathogens were inhibited by any of the strains but *Fusarium graminearum* and *Rhizoctonia solani* were not inhibited at all. This is the first report that *B. thuringiensis* shows a potent antifungal activity on plant pathogens in Korea.

2-27. A two-component sensor kinase (GacS) mediated signal transduction pathway involved in production of antifungal compounds in *Pseudomonas chlororaphis* O6.

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*E. intermedium*Biocontrol activity of a *P. chlororaphis* rhizobacteium O6, depends to the synthesis of extracellular secondary metabolites and exoenzymes, thought to antagonize the pathogenicity of a variety of phytopathogenic fungi. The production of secondary metabolites and exoenzymes in O6, depends essentially on the GacS-mediated signal transduction pathway, which activates largely unknown signal transduction pathway. To exploit the GacS-mediated signal transdcution pathway involved in activation of *phz* genes that are necessary for biosynthesis of phenazine from *P. chlororaphis* O6, we cloned and sequenced the *phz* operon, *rpoS* gene encoding stationary specific sigma factor, *ppx* gene encoding polyphosphatase, and *lon* gene encoding lon protease. Expression of each gene in wild type and GacS mutant were analyzed by RT-PCR. Transcripts from *rpoS, phzI* enconing acylhomoserine lactone (AHL) synthase, and *phz* structural genes in the GacS mutant were reduced in each of these growth phases compared to the wild type.