dextrose broth, conidial germination was severely inhibited and the inhibition rates of TH-04, BA313, and CJ3 at 24 hours were 75%, 72%, and 68%, respectively. The inhibition rates at 48 hours incubation were not much different from the rates at 24 hours. To check the activity on the plant, each isolate was mixed with equal volume of conidial suspension of *C. gloeosporioides* and wound-inoculated on green pepper fruit. After 6 days, the anthracnose lesions on the fruits inoculated with the mixture were much smaller than the lesions caused by the *C. gloeosporioides* itself. The lesion areas of TH-04 or BA313 treated pepper were less than 30% of the check. TH-04 and BA313 also showed antagonistic activity to *Phytophthora* spp. and *Botrytis cinerea*. By scanning electron microscopy and fatty acid analyses (MIDI), TH-04 and BA313 were identified to *Streptomyces halstedii* and *S. violaceusniger*, repectively.

2-22. Identification of an Antagonistic Bacterium, KJ1R5, for Biological Control of Phytophthora Blight of Pepper

Hye Sook Kim, Inn-Shik Myung[1], and Ki Deok Kim*

Collage of Life and Environmental Sciences, Korea University, 136-701 Seoul, Korea ;

[1]Plant Pathology Division, National Institute of Agricultural Science and Technology, Rural Development Administration, Suwan 441-707, Korea

An antagonistic bacterium, KJ1R5, to *Phytophthora capsici* was obtained from root interior of a healthy pepper plant. To identify the bacterial antagonist, 16S rDNA sequence analysis, Biolog system, fatty acid methyl-esters (FAMEs), and physiological and biochemical characterization were conducted. The determined 16S rDNA sequence of KJ1R5 showed higher similarities to those of a group consisting of several *Chryseobacterium* strains with 95.2, 95.2, and 95.1% similarity to *C. defluvii*, *Chryseobacterium* sp. FR2, and *C. scophthalmum*, respectively. In addition, *Haloanella gallinarum*, B*ergeyella zoohelcum*, and *Riemerella anatipestifer* are another group for KJ1R5 with 94.1, 89.7, and 87.2% similarities, respectively. When identification of the antagonistic bacterium, KJ1R5 was conducted using BIOLOG system, the strain KJ1R5 was identified as *Flavobacterium tirrenicum* (similarity; 0.75%). Fatty acid profiles of the strain KJ1R5 were composed mainly of iso-17:0 w9c and iso-15:0 and identified as *Chryseobacterium balustinum* (similarity 0.524%). KJ1R5 was Gram-negative, regular short rods ranging from 0.8 μm to 1.0 μm and had no flagella. Phenotypic characterization of the antagonistic bacterium indicated that KJ1R5 were included in the genus *Chreseobacterium*, which belongs to the family Flavobacteriaceae. The strain was distinguished from these six existing species. These results indicated that strain might be placed as a new species in the genus *Chryseobacterium*.

2-23. Development of the stable liquid formulation of *Burkholderia cepacia* YC5025, a biocontrol agent for cucumber anthracnose

Eu Jeen Chung, Young Ryun Chung

Division of Applied Life Sciences (BK21 program), Gyeongsang National University, Jinju 660-701, Korea.

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

Hang T. T. Nguyen[1], S. O. Oh[1], J.-S. Hur[2], Y. J. Koh[1].
(1)Dept. Applied Biology, Sunchon National University, Suncheon 540-742, Korea; (2)Dept. Environmental Education, Sunchon National University, Suncheon 540-742, Korea.

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*

G. H. Kim[1], I. S. Nou[2], Y. J. Koh[1].
[1]Dept. Applied Biology, Sunchon National University, Suncheon 540-742, Korea; [2]Dept. Horticulture, Sunchon National University, Suncheon 540-742, Korea.

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,