

**B533** Phytosociological Studies on the Pine (*Pinus densiflora*) Forests in KoreaYoung-Moon Chun<sup>1</sup>, Ho-Joon Lee<sup>1</sup>, Jong-Hong Kim<sup>2</sup> and Ichiroku Hayashi<sup>3</sup><sup>1</sup>Department of Biological Sciences, Konkuk University, <sup>2</sup>Department of Biology, Suncheon National University, <sup>3</sup>Sugadaira Montane Research Center, Tsukuba University, Japan

A phytosociological study of pine forests in Korea was carried out with the methodology of the Zurich-Montpelier (ZM) school. The study sites were the montane areas, hills, islands and coastal regions in Korea. The field works were carried out in the selected 45 sites using 402 relevés from May, 1994 to August, 2000. The pine forests in Korea were classified into 2 orders, 2 alliances, 3 suballiances, 4 associations and 7 subassociations in vegetation taxonomy. The associations *Quercu mongolicae*-*Pinetum densiflorae*, *Quercu serratae*-*Pinetum densiflorae* and *Saso*-*Pinetum densiflorae* belong to the order *Rhododendro*-*Quercetalia* Kim 1990 were distributed in the inner Korean Peninsula and Cheju Island. The association *Castanopsio*-*Pinetum densiflorae* belong to the order *Camellietalia japonicae* Oda and Sumata 1966 was located in the warm temperate region including island region of the south-west coast.

**B534** Symmetry and Periodicity on the Changes of Mean Relative Growth Rate in *Cassia mimosoides* var. *nomame* Seedling

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This study was conducted to examine the flexibility of *Cassia mimosoides* var. *nomame* seedlings to temperature. We analysed the structural pattern of the changes in mean relative growth rate

(MRGR) of dry weight by growing seedlings under three different types of temperature conditions. The value of MRGR measured daily showed the phenomenon of alternative different values (i.e., positive values or negative values). In addition, by schematizing the positive and negative values of MRGR, three or four symmetries were found during the period of nineteen days sampling of *Cassia mimosoides* var. *nomame*. Between under 28°C treatment at which photosynthesis is activated and 10°C treatment at which photosynthesis is restricted by low temperature, it was found that there is no difference in the width between the maximum and the minimum values of MRGR, as was shown by each symmetrical structure (Phase 1, 2, 3). However, a different phase was found under the treatment when seedlings were treated under 10°C and 28°C on alternate days. Although the changes of MRGR pattern has the same structure, the accumulation of dry weight associated with cold tolerance has different phases in accordance with the different treatments. It is shown that the width between the maximum and minimum values for MRGR within the symmetrical structures increases when length growth rate decreases. On the other hand, the width decreases when length growth rate increases. It means that MRGR is related to the period of seedling length growth.

**B535** Phytosociological Studies on the Pine (*Pinus densiflora*) Forests in Korea

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A phytosociological study of pine forests in Korea was carried out with the methodology of the Zurich-Montpelier (ZM) school. The pine forests in Korea were classified into 2 orders, 2 alliances, 3 suballiances, 4 associations and 7 subassociations in vegetation taxonomy.

The associations *Quercus mongolicae*-*Pinetum densiflorae* assoc. nov., *Quercus serratae*-*Pinetum densiflorae* assoc. nov. and *Sasolobos*-*Pinetum densiflorae* Yim et al. 1990 belong to the order Rhododendro-*Quercetalia* were distributed in the inner Korean Peninsula and the Cheju Island. The association *Castanopsis*-*Pinetum densiflorae* assoc. nov. belong to the order *Camellietales japonicae* Oda and Sumata 1966 was located in the warm temperate region including island region of the south-west coast.

#### **B536** Vegetation Structure and Distribution of Exotic Plants with Geomorphology and Disturbance in the Riparian Zone of Seunggi Stream, Incheon

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We investigated flora and vegetation structure of exotic plants along stream geomorphology and disturbance factors in the riparian zone of Seunggi stream, Incheon. Total 53 exotic plant species were found in the riparian corridors of Seunggi stream. The percentage of exotics ranged from 25% to 33% of total species richness, and its mean value was 24% in the whole riparian area. The percentage of exotics reflected the vulnerability of riparian zones to plant invasions by disturbances, and it could be used as an indicator of riparian system dysfunction. The distinct distribution patterns of exotic plants did not found in the lateral topographic features of the stream. Invasion and proliferation of the exotic plants were somewhat remarkable at terraces and bank slopes of the stream. Among various disturbance factors, plowing and trampling were important on the invasion of exotic plant communities of Seunggi stream.

#### **B537** Effect of Salt Stress on Structure and Function of the Methanogenic Archaeal Community in Rice Field Soil

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The effects of salt stress on methane production and structure of the methanogenic archaeal community in rice field soil were investigated using gas chromatography and culture-independent molecular techniques. Addition of salts above 100 mM NaCl to soil slurries resulted in the suppression of CH<sub>4</sub> production, decrease of H<sub>2</sub> accumulation, and a transient accumulation of acetate. At the initial stage of methanogenesis, archaeal community was dominated by Methanosarcinaceae, rice cluster I, and Methanosaetaceae. Methanomicrobiaceae was not detected and three novel groups, rice cluster IV, rice cluster V, and deep-sea hydrothermal vent euryarchaeotic group 6, were appeared after 45 days of anaerobic incubation. Under salt stress of 300 mM NaCl, relative abundance of Methanosarcinaceae was increased, whereas methanogenic community structure of 500 mM NaCl was similar to that of control. Salt stress affected therefore not the species composition but the relative abundance of methanogenic archaea in anoxic rice field soils.

#### **B538** Removal Efficiencies of Nitrogen and Phosphorus in the Microcosm with Artificial Floating Island of *Iris pseudoacorus*

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The removal efficiencies of N and P by artificial floating island of *Iris pseudoacorus* L. were examined in three different microcosms with 6 L of polluted pond