에는 독성물질이 함유되어 있을것이라고 쉽게 짐작이 되었다. 실험방법은 화백의 잎과 열매로부터 수용추출액과 휘발성 정유를 준비하여 식물의 발아와 생장에 미치는 영향을 조사하였고, 정유를 과일에 처리하여 곰팡이 생장실험을 실시하였으며, 또 화백의 천연화학물질이 뿌리혹 형성에 미치는 효과도 조사하였다. 실험 결과 화백의 화학물질에 대한 식물의 반응은 세가지 부류로 나누어졌다. 즉, 심하게 영향을 받는 것, 영향을 별로 받지 않는 것, 그 중간 것으로 나타났고, 발아와 생장의 억제 정도는 실험 식물의 종류별로 차이가 나타났다. 그리고 화백의 열매 정유가 잎의 정유보다도 더 심한 억제효과가 있었다. 그래서 화백에 함유된 천연화학물질을 GC/MS로 분석확인하였다. 요컨대, 화백 식물체에 함유되어 있는 2차 대사산물은 다른 식물과 미생물에게 해로운 효과를 나타냈고, 이것은 화백식물 자신의 방어와 관계가 있으리라고 생각되었다.

B206

Ecological Characteristics of Remnant Populations in the Rare Plant *Scrophularia takesimensis* Nakai

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Population size, vegetative and reproductive components, vegetation structure, and habitat quality in the rare perennial plant *Scrophularia takesimensis* were investigated in the Ulnung Island. *S. takesimensis* is limited to the only Ulnung Island and occurs in a sheltered rocky coast. It has decreased in abundance due to habitat degradation and fragmentation from the construction of road and enbankment in a coastal area. In 2000 only about 13 populations with two - 300 individuals still remain and about 700 individuals survive in the whole island. Plant height was 150 cm to the maximum and 80 cm on average. Plants had 14 branches to the maximum and produced 1100 capsules on average. In the community of *S. takesimensis*, *Calystegia soldanella* and *Aster spathulifolius* often cooccurred. Electric conductivity of soil (soil : water = 1 : 2 w/v) was in the wide range of 11 - 253 mS/m and mean content of soil organic matter was 5.4% at the habitats of *S. takesimensis*. The fragmented remaining populations of this rare plant were to decline further or even become extinct due to a consequence of human-related habitat destruction.

B207

Role of Proline Accumulation in Response to Toxic Copper in *Microcystis aeruginosa*

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The blue green alga *Microcystis aeruginosa* was found to accumulate proline under stressful concentration of cupric ions. The changes of proline level in *Microcystis aeruginosa* in response to copper (Cu) have been monitored and the function of the accumulated proline was studied with respect to its effect on Cu uptake. Exposure of *Microcystis aeruginosa* to elevated concentrations of Cu led to accumulation of free proline depending on the concentrations of the metal in the external medium. The greater the toxicity or accumulation of the metal, the greater the amount of proline in algal cells. When proline was exogenously supplied prior to Cu treatment, the adsorption of Cu was markedly reduced. When exogenous proline was supplied after Cu treatment, it resulted in a remarkable desorption of the adsorbed Cu immediately after the addition of proline. Pretreatment of *Microcystis aeruginosa* with proline

counteracted metal-induced lipid peroxidation. The results of the present study show a protective effect of proline on metal toxicity through inhibition of lipid peroxidation and suggest that the accumulation of proline may be related to a tolerance mechanism for dealing with Cu stress.

B208

The Characteristics of Chlorophyll Fluorescence of Alpine Plants Acclimated at Low Altitude

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The characteristic and diurnal fluctuation of chlorophyll fluorescence were surveyed from the leaves of three alpine plants from June, 1996 to August, 1999, in order to investigate the adaptation potential of alpine plants to low altitude. Although the photochemical efficiency of PSII of dark-adapted leaves (Fv/Fm) was different with species, it showed positive relationship with relative humidity in alpine habitats (1850~1950 m a.s.l.). In the low altitude (150 m a.s.l.), however, Fv/Fm showed negative relationships with temperature and light intensity, suggesting that the alpine plants were under the stress of high temperature and light intensity in the low altitude. Non-photochemical fluorescence quenching (NPQ) was higher in sun plants (*Chrysanthemum zawadskii ssp. coreanum*) than in shade or wetland plants (*Allium taquetii, Silene fasciculata*), and was higher in alpine plants with dynamic photoinhibition (*Potentilla stolonifera var. quelpaertensis, C. zawadskii ssp. coreanum, Thymus quinquecostatus*) than in those with chronic photoinhibition (*Anaphalis hayatae, Trifolium lupinaster var. alpinum*). These results indicate that alpine plants with high NPQ are highly adaptive to low altitude. The photochemical efficiency of PSII exhibited much reduced levels in midday (12:00~15:00) both in natural habitats and in low altitude. This midday depression was generally due to reversible decline of Fo and Fm in habitats, whereas it resulted from decrease in Fm combined with an increase in Fo in low altitude. This results suggest that alpine plants were dynamically photoinhibited in natural habitats and chronically photoinhibited in low altitude.

B301

Simultaneous Utilization of Two Different Pathways in Degradation of 2,4,6-Trinitrotoluene by a White Rot Fungus Irpex lacteus

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In previous studies none of the fungal strains could carry out two different initial reactions simultaneously in the 2,4,6-trinitrotoluene (TNT) metabolism. This study confirmed that a white rot fungus, Irpex lacteus isolated in Korea, was able to metabolize TNT with two different initial transformations. In the initial transformation of TNT in one metabolic pathway a nitro group was removed from the aromatic ring. As the intermediates in this process [H-]-Meisenheimer complexes of TNT colored dark red were confirmed by comparison with a synthetic compound. 2,4-Dinitrotoluene as a following metabolic product were detected and nitrite which produced as a result of denitration of [H-]-Meisenheimer complexes supported this pathway. In the other TNT pathway nitro group in TNT was successively reduced to