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This study was conducted to investigate the effects of waste landfill leachate containing heavy metals as well as the macro-, micronutrients on plant growth and provide plans about the re-cycling of the leachate. Not only the vegetation structure and seedbanks but also the growth chamber experiment was performed to inquire the effects of leachate on seed germination about the several herbivorous plants. There was high level of nutrients in leachate, especially the contents of Na, Cl⁻ and NH₄⁺ were elevated. The percentage of seed germination was decreased as the leachate concentrations were increased, but there were no difference statistically between the leachate value at 12.5% and the control. The results of the study with diluted leachate values at 12.5% showed, that there was a delayed seed germination in early phases rather than inhibition. Root growth was affected more negatively than shoot growth.

B506 Responses of *Ageratina altissima* (white snakeroot) to variation in light availability

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Ageratina altissima (white snakeroot), an exotic perennial in Korea, is invading into disturbed forest floor and occupying most of the understory vegetation. The purpose of this study was to provide a hypothesis on the invasion success of *A. altissima* in the forest interior with a viewpoint of growth and biomass allocation responses to variation in light availability. Seeds of *A. altissima* were collected from the forest interior of which the relative light intensities were 15.1% photosynthetically active radiation (*PAR*). Germinated seedlings were grown at 31%, 16.6%, 3.8%,

and 0.6% *PAR* for 30 days. Overall, low light availability resulted in plants with small number and total area of leaves, longer internodes, reduced stem height, and smaller dry weight biomass. Also, relative growth rate (*RGR*), root-shoot ratio (*RSR*), and root mass ratio (*RMR*) were decreased, while leaf area ratio (*LAR*) and specific leaf area (*SLA*) were increased. Our results indicate that *A. altissima* may be capable of capturing and using light resources for biomass production and responding plastically to changes in light environment through morphological adjustments.

B507 Soil Property of *Phytolacca americana* and Its Allelochemicals Effect of GuPOX Activity and Morphology on *Cassia mimosoides*

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The phenolic compound effects of aqueous extract from *Phytolacca americana* were studied. The soil that there was not being *P. americana* was a lot of nutrients and heavy metal ions compared with those of being *P. americana*. Also the accumulation of heavy metal in leaves was significantly higher than those of other region. Ten phenolic compounds were identified from *P. americana* extract by HPLC: benzoic acid, gallic acid, chlorogenic acid, gentisic acid, ρ -hydroxy benzoic acid, caffeic acid, *m*-hydroxybenzoic acid, ρ -coumaric acid, cinnamic acid and ferulic acid. Benzoic acid among them was the most amount of phenolic compound. The root length of *Cassia mimosoides* var. *nomame* was more affected than shoot length by the phenolic compound of *P. americana* soil. The activity of GuPOX on whole plant, root and shoot of *C. mimosoides* was increased in proportion to the concentration of *P. americana* extract. When *C. mimosoides* was treated with 30% concentration of *P. americana* extract, the GuPOX activity of root region was over 3 times higher than

that of shoot region. Especially, the root activity of total peroxidase was extremely high at pH 6.6, and amyloplast and large vacuole were formed in cell of *C. mimosoides*. Therefore we could certify that defense enzyme, GuPOX was generated and phenomenon of cell degeneration in *C. mimosoides* against stress of phenolic compound.

B508 한국에 분포하는 자리공과 식물의 형태적 분류 및 allelochemicals가 타 식물의 종자발아와 유식물 생장에 미치는 영향

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한국에 분포하는 자리공과(자리공, 미국자리공, 섬자리공) 식물의 형태적 분류와 3종의 잎 추출액에 대한 phenolic compounds 분석 및 타 식물의 종자 발아와 유식물 생장에 미치는 영향을 조사하였다. 자리공과 3종 식물의 기관별 형태를 해부 현미경으로 비교한 결과, 미국자리공의 열매는 구형이고, 자리공과 섬자리공의 열매는 8개로 분과된 장과형이었다. 자리공의 꽃밥은 짙은 분홍색이며, 섬자리공은 열은 노랑색이며, 미국자리공은 흰색이었다. 울릉도에는 미국자리공과 섬자리공이 함께 분포하는 것으로 조사되었다. 자리공과의 total phenolic compounds 정량 분석 결과, 자리공은 3.9mg/L, 미국자리공은 10.2mg/L, 섬자리공은 4.4mg/L로, 미국자리공의 total phenolic 함량이 2배 이상 높았다. 중금속 원소 분석은 미국자리공의 중금속 이온 total contents가 자리공과 섬자리공에 비해 각각 8배와 16배 축적되는 것으로 나타났다. 자리공과의 잎 추출액에 의한 발아율 실험 결과, 방가지뚝과 왕고들빼기 종자는 추출액 농도가 증가함에 따라 비례적으로 발아율이 감소하였으며, 미국자리공 추출액에 의한 발아 억제 효과가 가장 크게 나타났다. 차풀과 미국자리공 종자는 추출액 간의 농도에 의한 영향이 거의 없었고 종간의 발아율에도 차이가 없었다. 차풀의 유식물 생장과 방가지뚝의 root 생장은 추출액의 농도가 증가함에 따라 미국자리공, 자리공, 섬자리공의 순으로 억제되었다. 자리공과 식물 잎의 phenolic compounds의 함량과 4종 종자의 발아와 유식물 성장에서 미국자리공이 자리공과 섬자리공에 비해 억제 효과가 컸으며, root에 대한 억제 효과가 shoot 보다 큰 것으로 조사되었다.

B509 Estimation of Critical Loads of Sulfur and Nitrogen in South Korea

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The critical loads of sulfur and nitrogen and their exceedances by the sulfur and nitrogen deposition of 1994-1998 were mapped for South Korea for the first time with a spatial resolution of 11 14km using the steady-state mass balance model. A large percentage of the maximum critical load of sulfur was found to be in the range of 1,000-2,000 eq ha⁻¹yr⁻¹. The maximum critical load of nitrogen was to be relatively high (predominantly 2,000-4,000 eq ha⁻¹ yr⁻¹), while the critical load of nutrient nitrogen was low (predominantly 400-800 eq ha⁻¹ yr⁻¹). Exceedance of the maximum critical load of sulfur was found at 85% of the ecosystems considered mainly in the southeastern part of Korea, whereas that of the critical load of nutrient nitrogen was found in the whole Korean ecosystems. This implies that Korean ecosystems are very susceptible to the combined loadings of sulfur and nitrogen.

B510 남해안에서 자생하는 거머리말속 (*Zostera*, *Zosteraceae*)의 분포와 생육환경

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제주도를 포함하는 남해 연안에서 거머리말속 식물의 분포와 생육지 환경 특성을 파악하기 위해 2000년 7월부터 2001년 7월까지 조사하였다. 남해 연안의 거머리말속의 자생종은 거머리말, 포기거머리말, 수거머리말과 애기거머리말 4종이 출현하였다. 거머리말의 생육지는 만, 하구, 항과 보초지역으로 수심 0.6 ~ 7.0m의 사질과 사니질의 퇴적 환경에서 생육하였으며, 조석의 영향을 받는 조간대와 조하대 지역에 대규모 초지 또는 작은 군락을 형성하였다. 거머리말의 분포는 제주도를 포함한 섬과 연안지역에서 빈번하게 출현하였으며, 최대 면적은 약 2.86km²로 나타났다. 포기