

seed germination of several test species such as *Brassica campestris* subsp. *napus* var. *pekinensis*, *Bidens bipinnata*, *Taraxacum officinale*, *Aeschynomene indica*. The plant growth inhibited on seed germination, root hair developments, shoot and radicle growth as increased aqueous extract concentration. The radicle growth was more affected than shoot growth of test species by aqueous extracts of *Q. dentata*. The aqueous extracts of *Q. dentata* not inhibited mycelial development but sporulation inhibited in fungal growth. The H<sub>2</sub>O fraction of result in MeOH fraction (EtOAc, H<sub>2</sub>O, MeOH layer) of *Q. dentata* indicated strong antifungal activity on *Candida albicans*. These results obtained in seed germination, seedling growth and microbial activity suggested that the chemical substances from aqueous extracts of *Q. dentata* would be responsible for allelopathic effects.

#### **B526** Allelopathic Effects of Essential Oils of *Artemisia iwayomogi*

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Allelopathic effects of essential oils extracted from *Artemisia iwayomogi* (EOAI) on weed and crop plants were investigated. The treatment of the volatile essential oils of the *A. iwayomogi* caused significant inhibition in the germination, shoot and radicle growth of the receptor plants. The radicle growth of receptor plants was inhibited more severely than shoot growth. The essential oils of *Artemisia* inhibited the induction and growth of callus of the receptor plants. Light microscope observations of treated root tips of receptor plants showed that development of root hair inhibited. Transmission electron microscope observations showed that treated root of *A. japonica* had ultrastructural alterations of

certain organelles and cell walls such as increased vacuoles, wavy-form cell wall, increased intercellular space. GC/MS was used for analysis and identification of chemical substances from EOAI. Terpenoid compounds from *A. iwayomogi*, 1,8-cineole (31.81%), camphor (30.86%) and 1-borneol (27.91%). 1,8-cineole showed as the strongest growth inhibitor of the chemicals.

#### **B527** Allelopathic Potential of Secondary Metabolites from *Artemisia* Species

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To verify allelopathic effects of some *Artemisia* plants on selected species and to test germination, seedling growth, chemical analysis and bioassay were carried out with secondary metabolites of the *Artemisia* species. Seed germination percentage of selected species included *Lactuca indica* var. *laciniata* showed decreases according to increases of aqueous extracts of *Artemisia capillaris*, while those of the others such as *Leonurus sibiricus* did not. However, the dry weight growth of selected species treated with the same extracts as the above experiment was inhibited remarkably compared with the germination test. The treatment of the volatile oils of the *Artemisia scoparia* caused significant inhibition in the germination, shoot and radicle growth of the selected species. Bioassay with several compounds detected from those *Artemisia* plants was tested and terpinen-4-ol was the most toxic among the tested substances.

#### **B528** The Effects of Storm Runoff on the Ecosystem of (Lake Wanggung) an Agricultural Reservoir.

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Physical, chemical, and biological parameters of limnological features were analyzed in a small agricultural irrigation reservoir (Lake Wanggung) at monthly interval to examine the Asian monsoon effect on a reservoir. Water quality of inflowing stream fluctuated seasonally with variations of flow rate. In summer thermal stratification was established and the anoxic layer was developed below 2m depth. The unique feature of temperature showed that thermal stratification was disrupted by heavy rainfall during monsoon, but hypolimnetic hypoxia reestablished after a few days. phosphorus and nitrogen increased immediately following storm events. The marked increase may be due to the input of P-rich storm runoff from the watershed. Internal phosphorus loading can be one of the explanations for TP increases in summer. When there was a storm total populations of phytoplankton and zooplankton was reduced immediately following the storm, indicating possible flushing of algae and zooplankton. After lag period of low density plankton populations bloomed to a peak five days after the storm. The results demonstrate that water quality is regulated greatly by the rainfall intensity of monsoon in (Lake Wanggung) reservoirs of monsoon Asia.

#### **B529** 고성산불 피해지에서 재생식생의 성장과 개체군동태

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1996년 고성산불로 피해를 입은 소나무숲의 재생군집에서 네 지소에 영구방형구를 설치하고 재생움씩(sprout)의 직경생장과 움씩개체군의 동태를 연구하여 군집구조의 초기복원과정을 규명하고자 하였다. 불탄 피해목을 측정하여 산불전의 층구조를 추정하였는데 네 지소에서 층구조의 발달정도는 산불 이전에도

큰 차이가 있었다. 즉 산불 전의 소나무의 밀도가 772-2,650본/ha, 기저면적이 36.6-66.6m<sup>2</sup>/ha로 지소간의 차가 컸으며 산불 후 움씩재생의 기반이 되는 활엽수의 기저면적도 9.5-21.7m<sup>2</sup>/ha의 범위이었다. 따라서 재생군집량과 생장은 산불전 식생구조의 영향을 직접적으로 받았다. 산불 발생후 5년 경과한 현재, 큰 움씩의 직경이 86mm에 달하였고, 평균 직경은 약 15mm로 성장하였다. 산불직후 당해의 움씩생산량은 최대이었다가 이후 감소하는 현상을 보이는 반면, 사망률은 증가하는 경향이었다. 사망하는 움씩은 주로 크기가 작은 움씩에 국한됨으로써 움씩개체군의 크기를 조절하며 양적으로 발달하는 것으로 보인다. 재생군집에서는 신갈나무, 굴참나무, 졸참나무, 떡갈나무의 참나무속 식물 4종이 네 지역 모두에서 95% 이상을 점유하였다. 재생군집에서 각 종의 점유순서는 산불 전 식생의 점유순서와 동일하였다. 예를 들면 네 지소중 한 지소는 산불 전 기저면적이 신갈나무>졸참나무>굴참나무 순이었는데 재생군집에서도 같은 순서로 재현되었다. 결과적으로 재생군집은 빠른 속도로 성장중이며 자기숙음을 거쳐서 신갈나무 및 굴참나무로 대표되는 활엽수림 구조로 접근하고 있다.

#### **B530** 민둥산 역새군락의 활력도

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강원도 정선군 남면에 위치하는 민둥산(1117.8m)은 정상부를 중심으로 역새군락이 넓은 면적에 분포하고 있어 정선군의 주요 관광자원이다. 역새군락은 20년전까지 반복된 산불에 의해서 조성되고 유지된 군락으로 추정되는데 근래 20년동안 천이가 진행되어 참싸리, 산속 등의 침입이 활발하게 진행되고 있다. 그러므로 민둥산지역에서 역새군락의 활력도 현황을 조사하였으며 동시에 지상부 제거실험을 통하여 역새활력도의 회복방안을 검토하였다. 지상부 제거실험을 위해 역새 및 다른 종의 피도 및 활력을 고려하여 6개 지역을 설정하여 실험구와 대조구를 쌍으로 설치하였으며 2001년 4월 5일 실험구내 지상부를 모두 제거하였다. 역새발의 활력은 민둥산 정상에서 지역산과 화암약수로 이어지는 능선부 지역과 증산초교에서 민둥산 정상의 능선길에서 대체적으로 활력도와 밀도가 높게 분포하고 있으나, 동남사면의 고도가 낮은 사면부