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Phytoremediation Potential of *Pragmites australis*, *Typha angustifolia* and *Zizania latifolia*: Bioaccumulation of Cadmium and Lead

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This study examined the possibility of using *Pragmites australis*, *Typha angustifolia* and *Zizania latifolia*to remove cadmium and lead. These plant species were exposed to cadmium and lead (less than 500mg/L) for 7 weeks. Mean levels of cadmium and lead contents in *P. australis*, *T. angustifolia* and *Z. latifolia* as follows; in the case of cadmium, 1.500.168gg-1, 0.540.029gg-1 and 1.940.173gg-1, and in the case of lead, 3.940.658gg-1, 1.330.203gg-1 and 1.300.146gg-1. The bioconcentration factors (BCF), also known as the plant to soil uptake factor, of cadmium and lead in *P. australis* were 3.45 and 8.19, in *T. angustifolia*, 0.55 and 2.88, and in *Z. latifolia*, 2.31 and 1.91. The removal ratio of cadmium from soil was 79.6% (*P. australis*), 53.5% (*T. angustifolia*) and 60.7% (*Z. latifolia*) and that of zinc was 74.0% (*P. australis*), 75.1% (*T. angustifolia*) and 63.2% (*Z. latifolia*). The biomass of each plant was measured variously. The biomass of *P. australis* treated with cadmium and lead was higher than control, but on the other hand that of *Z. latifolia*was lower than control. Chlorophyll content change in the leaf of plant samples exposed cadmium and lead measured. As a result, we confirmed that chlorophyll *a* and *b* contents in all plant samples were reduced by cadmium.

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이기대의 식물상

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부산광역시 남구 용호동에 위치하는 이기대는 괴암절벽과 해안과의 조화로 아름다운 자연 경관을 이루고 있어 옛부터 잘 알려진 곳이다. 또한 오랫동안 군사보호구역으로 사람의 출입이 통제된 곳이어서 자연 식생이 잘 보존된 지역이다. 따라서 이곳의 식물상을 조사 할 필요가 있었다. 조사된 관속식물상은 57과 118속 155종, 주요 상록식물로는 돈나무, 우묵사스레피, 동백나무, 송악 등이며, 해변식물로는 번행초, 해국, 갯메꽃, 등대풀, 갯까치수염, 도깨비고비, 땅채송화, 돌가시나무, 왕모시풀, 천선과나무 등의 27속 28종이 조사되었다. 우점하는 식물군락은 해송, 해국, 주름조개풀 등이었다.

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Accumulation and Distribution of Cadmium (Cd) and Lead (Pb), and Effects on Oxidative Stress in *Glycine gracilis*

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Seed and seedlings of *Glycine gracilis* were treated for 4, 40 days on the various Cd level(0, 10, 20, 40, 80 M) or Pb levels(0, 20, 40, 80, 160 M) to investigate the effects of Cd and Pb on germination, growth, metal accumulation and distribution in various organs and metal-induced oxidative stress. Under these conditions, both the fresh weight and the length of root and shoot decreasedconcomitantly to Cd or Pb supply. Both Cd and Pb accumulations were markedly higher in roots as compared to shoot, seed leaf. In shoots, more accumulation was observed in lower position older leaves, indicating that fallowing root absorption, Cd and Pb strongly retained by roots. Furthermore Cd and pb lowered the chlorophyll levels of the leaves and, in general notably enhanced the concentration of malondialdehyde(MDA, a lipid peroxidation product) in leaves, presumably due to oxidative stress. In seed germination, the root had serious curvature, black spots and rateral roots. The seedling which grow in the pots have serious necrosis and chlorosis symptom as the concentration grows higher. The results obtained in this research suggest that oxidative stress-mediated accumulation of MDA may cause a pronounced reduction in the chlorophyll levels and the growth of seedlings exposed to Cd or Pb.

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한반도 동백나무(*Camellia japonica*) 분포대에 대한 식물사회학적 연구

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The *Camellia japonica* vegetation in Korean peninsula was investigated by the methology of the Z-M school and Ordination Analysis of phytosociology from May, 1999 to February, 2003. The vegetation table and the synthesis table of *Camellion japonicae* were arranged for association classification from 263 quadrats. The vegetation of *Camellia japonica* forest is divided into one alliance including nine new associations: *Camellietum japonicae* typicum ass. nov., separate into nine associations, *Machilo thunbergii-Camellietum japonicae* ass. nov., *Pino thunbergii-Camellietum japonicae* ass. nov., *Castanopo cuspidatae* var. *sieboldii-Camellietum japonicae* ass. nov., *Lito japonicae-Camellietum japonicae* ass. nov., *Castanopo cuspidatae* var. *thunbergii-Camellietum japonicae* ass. nov., *Querco acutae-Camellietum japonicae* ass. nov., *Neolito sericae-Camellietum japonicae* ass. nov., *Cinnamomo japonicae-Camellietum japonicae* ass. nov..