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Effects of Cd Treatments on the Growth and Nitrogen Fixation of
Melilotus suaveolens

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Melilotus suaveolens, field growing pioneer plant, were investigated in the effects of toxic heavy metal Cd²⁺ on the growth adaptation, and change of nitrogen fixation activity of root nodules. Plants were treated with 0, 10, 30 and 100 ppm of Cd²⁺, Cd²⁺ accumulation in the root were 55.88, 157.43, and 256.21 µg g⁻¹ dr.wt. root respectively on 42th days. Cd²⁺ transport through stem increased by Cd²⁺ concentration, and a high expanded exposure of Cd²⁺ resulted in outstanding Cd²⁺ accumulation. Plant height growth of 42th treated with 10, 30 and 100 ppm of Cd²⁺ reduced 12.4, 22.2, and 34.5% compared with those of control. Root growth showed 41.6, 52.4, and 69.7% respectively on 14th days compared with those of control plant. Nodule formation was inhibited by Cd²⁺ concentration, on 42th days Cd²⁺ 100 ppm treatment was inhibited 13.4% of control, specific nitrogen fixation activity showed high value in the earlier growing stage, and then reduced by Cd²⁺ concentration. Leguminous plants treated with heavy metal, were first inhibited in nitrogen fixation system, therefore plant growth were inhibited severely by environmental stress.

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Changes of Forest Soil and Herb Layer Composition by Group
Breeding of Herons

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Community structure and soil properties of larch forest which are used for breeding site by herons were studied at Appogri, Hoengsung, Kangwon Province. This site has been protected as a Natural Monument (No. 248) from 1973, in Korea. Herons have used this habitat from February to October every year. In 1995, more than 500 herons were observed in this habitat. Most of the larches died due to group breeding of herons, and no larch saplings were found at forest floor. Nutrients content of soil in this habitat were much higher than those in control plot(non-breeding site). This must be due to the addition of faeces from herons and of thin twigs and other organic materials from the canopy and bird nests. Species composition of herb layer in this habitat was quite different from that in control plot. Breeding site were dominated by *Humulus japonicus*, *Persicaria fauriei*, *Persicaria perfoliata*, *Commelina communis*, *Chelidonium majus* var. *asiaticum*, *Digitaria sanguinalis*, *Bidens bipinnata*, *Dioscorea batatas* which are indicator species of soil eutrophication. Similarity index of shrub and herb layer between the breeding site and control site was 0.36 and 0.07, respectively.