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The Vegetation Structure and Restoration of Coastal Sand Dunes in Kangwon Province

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We aim to investigate on vegetation structure and status of the coastal sand dunes in Kangwon Province and to suggest the restoration options for them. Total vegetation inventory and quadrat surveys at 22 coastal sand dunes were conducted on June, 2003. Total ground cover of the herbaceous species and the percentage ground cover of every species in the herbaceous layer were recorded in each quadrat. The canonical correspondence analysis (CCA) was performed to explain the variations of species composition with nine environmental factors: distance from coastal line, vegetation size and width, slack width, exotic species number, dune length and width, dune structure, and disturbance level. The mean total species number at sites was 187 (meanSD). The most frequently recorded species was *Ixeris repens*, which appeared at all sites. *Calystegia soldanella*, *Carex kobomugi*, *Carex pumila*, *Elymus mollis*, *Lathyrus japonica*, *Glehnia littoralis*, *Oenothera biennis*, *Salsola Komarovii*, *Bromus tectorum*, and *Rumex crispus* appeared in decreasing order at the frequency more than 5 0%. The ratio of the exotic species number to the total species number was 0.230.09. The mean total cover of all species recorded in quadrats was 74%. The CCA results showed that the geomorphological factors such as distance from coastal line and sand dune width are important variables explaining species composition variations. This research work was financially supported by UNU/K-JIST Joint Program.

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동해안 산불피해 유역에서 영양염류의 흡수와 소실 형태환<sup>P</sup>, 이규송<sup>1</sup>, 박상덕<sup>2</sup>, 정연숙<sup>C</sup>

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2000년 동해안산불로 피해를 입은후, 자연복원과 인공조림의 방법으로 복원중인 두 유역에서 식생에 의한 질소와 인의 흡수력과 토사유출에 의한 유실량을 측정하였다. 연구는 강릉시 사천면의 소형댐이 설치된 유역에서 이루어졌다. 식물의 생장을 통한 질소와 인의 연흡수량은 1차생산력과 직접적인 관련이 있었는데 자연복원지와 인공조림지가 각각 1,762 kg/ha, 944 kg/ha로 자연복원지가 1.9배 높았다. 질소의 경우, 자연복원지가 인공조림지에 비해 2.2배 많이 흡수하였고, 인은 1.9배 많이 흡수하였다. 질소와 인의 경우 모두 자연복원지는 신갈나무가, 인공조림지는 물오리나무가 가장 많은 양을 흡수하였다. 유역에서 유출되는 영양염류의 양은 두 유역에서 발생한 토사의 질소와 인의 농도가 거의 유사하여 토사유출량에 결정적인 영향을 받았다. 2002년 여름 토사가 발생할 정도의 강우는 5회 있었는데 시기별로 변동이 컸지만 모든 경우 조림지에서 질소와 인의 유실이 심각하였다. 특히 태풍 루사 후의 질소와 인의 유실은 자연복원지보다 인공조림지에서 1,000배 이상 컸다. 토사유출과 영양염류의 유실에 미치는 여러 요소 중 식생의 발달 정도와 조림 작업시의 교란이 큰 영향을 미치는 것으로 판단되었다. 그러므로 산불로 교란된 지역은 토양의 안정화 기간을 거치는 동시에 보다 정교한 조림기법의 개발이 필요한 것으로 판단된다.

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Distribution of *Eupatorium rugosum* by Forest Type and Soil Characteristics

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This study was carried out to investigate the relationship of occurrence and distribution of *Eupatorium rugosum* by forest types and soil characteristics in Mt. Namsan, Seoul, Korea. *E. rugosum* is a harmful non-indigenous plant on ecosystem designated by the Natural Environmental Conservation Act in Korea. *E. rugosum* was distributed along roadside and in valleys with some favorable light conditions. *E. rugosum* occurred in aggregations under *Pinus densiflora* and *Robinia pseudoacacia* communities, but it was sparse in forests of *Quercus mongolica* and *Pinus koraiensis*. The representative species were *Oplismenus undulatifolius* and *Parthenocissus tricuspidata* in the *E. rugosum* communities. There was a significantly negative correlation between the coverage of *E. rugosum* and the coverage of tree layer of forests. Soil moisture content, organic content, and pH were slightly higher in plots with *E. rugosum* than without, but it was non-significant difference. It was found that the correlation of the coverage of *E. rugosum* was very significantly negative with the depth of upper layers of soil (litter and fermentation layer).

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Flowering Phenology of Korean Angiosperms: Effects of Phylogeny and Pollinators

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We examined the pattern of flowering time and duration among 3037 angiosperm species in Korea. In order to consider the potential confounding effects of phylogeny on variations in flowering parameters, three different data sets were used. We also analyzed the relationship of pollinators with flowering parameters. Regardless of the data used, more than 50% of Korean angiosperms flowered in the summer, and flowering lasted for an average of two months. All taxonomic levels considered exerted significant effects on flowering parameters. However, the largest proportion of variance in flowering parameters was detected among species within genera. Furthermore, non-zoophilous species flowered early in the season and briefly compared to zoophilous species. Thus, Korean angiosperms may have been selected to flower in a certain time and for a certain duration within some phylogenetic constraints acting at the higher taxonomic levels.