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Community Structure, Litterfall and Primary Productivity in  
*Pinus thunbergii* Stands on the Kwangyang Bay

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Community structure, litterfall, and primary productivity in *Pinus thunbergii* located at Kwangyang Bay, Chunnam province in Korea were estimated quantitatively. Five kinds of species including a small proportion of *Quercus variabilis*, *Pinus densiflora* etc were identified in the tree layer, 26 species including *Rhododendron mucronulatum*, *Eurya japonica*, *Symplocos paniculata* etc in the shrub layer and 75 kinds of species including *Carex lanceolata* in the herb layer of Black Pine forest. A stand had 1230 trees/ha in tree density, which was 0.67 of skewness and 0.54 of kurtosis in frequency distribution. Annual mean litterfall was 5 ton DM/ha. Average annual productivity of the stand of trunk, branches, leaves and roots were 5.42, 1.67, 4.85 and 2.99 ton DM/ha · yr<sup>-1</sup>, respectively. Turnover rate of the stand was 11.9%. Tree ring width was 5.34 mm/yr. These results assumed that Black Pine forest is invaluable for seashore planting and useful in stabilizing sand dunes.

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**Microbial Activity and Physico-chemical Characteristics of Streams  
Contaminated by Abandoned Coal Mine Drainage**

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A survey was carried out to investigate the contamination of streams by the acid mine drainage originates from abandoned coal mines and coal refuse piles. The physico-chemical characteristics such as pH, and sulfate and elements concentrations in the water and sediment in streams were analyzed. Microbial activity in the sediment was evaluated by measuring dehydrogenase activities. At sites contaminated by acid mine drainage, the pH of the water and sediment declined to acidic range from neutral due to the accumulation of sulfate. The dehydrogenase activity ranged from 12 to 170  $\mu\text{g-TPF} \cdot \text{g-dry soil}^{-1} \cdot 24\text{h}^{-1}$  at the contaminated sites, whereas uncontaminated sites had activities of 1,176 - 4,259  $\mu\text{g-TPF} \cdot \text{g-dry soil}^{-1} \cdot 24\text{h}^{-1}$ . The dehydrogenase activity was significantly affected by low pH of the sediment, indicating that high concentration of sulfate inhibited microbial activity. The concentrations of heavy metals such as Pb and Fe in contaminated sediment (37 - 46 ppm Pb; 46,000-464,000 ppm Fe) were much higher than those in the uncontaminated sediment. The concentration of Al in the contaminated water acidified by coal mine drainage was in the range of 11 to 42 ppm. Compared with those in the uncontaminated sediment, the concentrations of Mn, Mg and Ca in contaminated sediment were low because of the leaching from soil to water by the acidified stream water.