

## Biological Assessment of Blasting Noise and Vibration in Residential Area: II. Damage of Local Ecosystem

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This area is plant-geographically located at the Temperate Subtropical Zone and Evergreen Broad Leaf Zone which is included in the sea of southern area of the Korean Peninsula. The Japanese black pine is the most common tree in this area. The sorts of trees that are living in this area Camellia, Alder, Oak, Acorn. It is reported that this area is located at the Evergreen Broad Leaf Zone of Korean Peninsula that is living in the southern sea. The construction place was originally a grassy place. About 40 family 100 species different plants were living at this area. The most common animals were the Rodents and the most common birds were the Colombiformes.

Key words : local ecosystem, ecosystem diversity

### 1. Introduction

Behind J village there was a ruined construction site that could not be restored to its original state. So, starting in April of 1996 until May, we used this construction site and mountainous region that was a closed area behind this village as subjects for our environmental investigation on the ecology of the trees there. This region is nearby the southern sea and so investigated and recorded the present documents concerning the present situation of animals and plants in the area. We asked questions to the residents of the area and consulted experts on specific situations of animals that were impossible for us to investigate.

### 2. Methods

The distribution of plants were investigated 10 times from March to May. We established the Square that is over 20 m × 20 m. The names of

present plants were recorded depending on the table including the dominance and sociability of Braun-Blanquet(1964) in the Square. The sweeping method was used for the landing insects. The insect net was made of length of 150 cm and diameter of 45 cm. The sweeping method between one place another was used 20 times each. The total number of using this method was over 10. The samples of insects were put under anesthesia and were classified in the laboratory.

10 points were chosen for the investigation of distribution of land animals and birds using Point Count (Colin, 1992). The species and populations were also recorded.

### 3. Results and Discussion

#### 3.1. Effects of local ecosystem

The construction place is located at the back side of mountain area of J village in Kyung-Nam

Province. The ecological investigation was processed between March and May, 1996. It was an investigated ecological state of the land using documents of the state of animals and plants in the Southern Sea and files that were made from investigations of the flora distribution in Southern Sea. J village does not have the source of pollution, but the existence of plants and pure production rate will be decreasing because of the construction and the devastation around the construction place (Yim, 1976).

### 3.2. Plants of land ecosystem

J village's plant-geography includes the Temperate Subtropical Zone and the Evergreen Broad Leaf Zone that is below 600 m above the Southern Sea of the Korean Peninsula (Lee, 1978). Around the construction place, there were many

houses and farm-lands, but natural flora of this place were totally destroyed by continuous development for a long time. The Japanese black pine group is the major forest in this area and there are camellia, oak, chestnut trees. They belong to the Evergreen Broad Leaf zone of the Southern Sea. So, this results are correspond with the report that this area belongs to the Evergreen Broad Leaf of the Korean peninsula (Yim, 1976; Yim, 1977a; Yim, 1977b). The flora of this village are Japanese black pine and pine, alder, oak, acorn, camellia and wax trees. The herbs and weeds are grass, pink, knotgrass, foxtail, wormwood, wild spinach, white dutch, dandelion, plantain. It was known that the grass field was present in this area (Kim, 1982; Colin, 1992; Lee, 1997). Therefore, the plants of this area are from 40 families, 100 species and the dominant species is the Japanese black pine (Table 1.).

**Table 1.** The major distribution of plants.

Gramineae	Compositae	Pinaceae	Aceraceae
<i>Zoisia japonica</i>	<i>Artemisia asiatica</i>	Pinus	Acer
<i>Zoisia sinica</i>	<i>Taraxacum platycarpum</i>	<i>Pinus densiflora</i>	<i>Acer mono</i>
<i>Setaria viridis</i>	<i>Ixeris dentata</i>	<i>Pinus koraiensis</i>	<i>Acer ginale</i>
Urticaceae	Fabaceae	<i>Pinus thunbergii</i>	<i>Acer pseudo-sieboldianum</i>
Urtica	Trifolium	<i>Pinus rigida</i>	Mimosaceae
<i>Urtica thunbergiana</i>	<i>Trifolium pratense</i>	Fagaceae	<i>Albizia julibrissin</i>
Poligonaceae	<i>Trifolium repens</i>	Quercus	<i>Albizia julibrissin</i>
<i>Polygonum aviculare</i>	Pueraria	<i>Quercus dentata</i>	Daphniphyllaceae
Chenopodiaceae	<i>Pueraria thunbergiana</i>	<i>Quercus acutissinra</i>	Daphniphyllum
Chenopodium	Euphorbiaceae	<i>Quercus aliena</i>	<i>Daphniphyllum macropodium</i>
<i>Chenopodium album</i>	Euphorbia	<i>Quercus mongolica</i>	<i>Mallotus japonica</i>
<i>Chenopodium aristatum</i>	<i>Euphorbia pekinensis</i>	<i>Quercus variavilis</i>	Acalypha
Malvaceae	Vitaceae	Oleaceae	<i>Acalypha australis</i>
Althaea	Ampelopsis	<i>Forsythia koreana</i>	Ranunculales
<i>Althae rosea</i>	<i>Ampelopsis benuipedunculata</i>	<i>Fraxinus rhynochophylla</i>	Ranunculus
Hibiscus	Parthenocissus	Cupressaceae	<i>Ranunculus japonicus</i>
<i>Hibiscus syriacus</i>	<i>Parthenocissus thunbergii</i>	<i>Chamaecyparis</i>	<i>Ranunculus tachiroei</i>
Ericaceae		<i>Chamaecyparis dbtusa</i>	Polipodaceae
Rhododendron		Uimaceae	<i>Pteridium aquilinum var japonicum</i>
<i>Rhododendron mucronulatum</i>		Zelkova	
		<i>Zelkova serrata</i>	

### 3.3. Degree of green naturality

The degree of green naturality(DGN) is used as the standard to minimize the destruction of present flora by development and it shows the degree of natural state of flora. Even though this place is farm-land by DGN, it can be divided into the Orchard Area which has relatively enough green flora like seedling port and orchard, Grassy Plain, and Forestation which is a forest area of broad and needle leaf trees. Therefore, the Japanese black pine is the dominant species. Grass groups and forest that is relatively short are distributed in this construction place (Kim, 1994).

### 3.4. Animals in the local ecosystem

The land-animals of this area are divided into mammalian, birds, amphibian, reptilian, and insects. We took from many professors advices and obtained informations from the residents. There were not rarities or natural monuments that must protect in this area. Although this area was small, local dominant species consisted of several species that inhabit the southern sea. Birds, for example, eastern ring dove, magpie, great-tit, sparrow inhabit there. But because it was winter, it was impossible to investigate about amphibian and reptilian on the spot. Salamander by reptilian, leopard frog, green frog, and red-bellied frog by amphibian, cricket, grasshopper, bee and cockroach by insects inhabited in this area. In addition, animals such as Rodent, Carnivora and Insectivora inhabit this area. These results obtained the professional advice and information from the academic world. It is difficult to investigate about animals inhabitation because of the destruction of green field (Kim, 1982; Colin, 1992; Lee, 1997). Consequently, we should protect these green fields and local ecology (Table 2.).

**Table 2.** The major animals.

Rodentia
Sciuridae
Sciurus
<i>Sciurus vulgaris vulgaris</i>
Tamias
<i>Tamias sibiricus sibiricus</i>
Muridae
Micromys
<i>Micromys minutus ussuricus</i>
Apodemus
<i>Apodemus agrarius ningpoensis</i>
Rattus
<i>Rattus rattus</i>
<i>Rattus norvegicus</i>
Mus
<i>Mus musculus musculus</i>
Colombiformes
<i>Streptopelia orientalis orientalis</i>
Paridae
<i>Parus major minor</i>
Corvidae
<i>Pica pica sericea</i>

### 3.5. Damage of toxic substances toward to local ecosystem

Dusts containing toxic materials that come from the working place will damage the hillock of this area. The toxic elements in the natural soil are Cu, Zn, Pb, Cd, Cr. If the quantity of Mg, Ca, K, P is large, it bothers the absorption of water which is necessary for plants. These toxic elements have a bad influence on using water. There is inhibition of enzyme activity and cell division in plants, damage of osmotic pressure, deficiency of root growth, unbalance of ions' movement, damage of cell membrane, damage of stomatal function in leaf, destruction of chlorophyll (Pesir, 1977; Thompson, 1967; Krizek, 1986; Fletcher, 1972).

### 3.6. The opinions about local ecosystem diversity

It is expected that population and species of living animals in the working place will change due to green area's lost which is caused by destruction of habitat of animals. It is also expected that the animals which are living in this working place will move to other areas because of reducing of foods and habitat which is caused by noise and shaking for using equipments, and the loss of green area. These changes will give bad effects to the diversity and the function of ecosystem. The distribution of richness of species is defined as the diversity of species that expresses the number of species in general area, and it is a standard to estimate the natural environment. It should be also considered ecological diversity that expresses the number of living plants and animals. This notion of diversity of species are important to express the state of natural ecosystem. It is considered that if the number of species is high, the rate of diversity is low and if the number of species is low, the rate of diversity is high. As the food chain between plants and animals is complex, the rate of diversity of living species is high. If it became an simple environment which exists only a few living species due to the continuity of environmental destruction and rash development of ecosystem, the speed of environmental destruction that includes the reduction of species diversity and the disconnection of food chain is increasing. Therefore, we doubt that the extinction of plants and animals occur and the residents should move to other place. For example, when the safety of local environment is destroyed, the local flora formation is changes and the number of species of wild animals which are living in the working place decreases. The mineral contents of local soil are based on the environmental elements like

humidity, having relation with trees and diversity of species. The solutions to these environmental problems have to be reached guarantee of minimum standard in human life of the environment to guarantee the diversity of plants and animals' species including humans (National Science Museum, 1997 ; 1995).

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