



## Environmental changes and forest ecosystem

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A wide variation among forest ecosystem is observed with respect to the climatic factors such as temperature, amount of precipitation and light condition. According to global warming, the forest ecosystem tends to move toward from south to north. Ecologists and forest researchers are looking to see the phenomenon of forest ecosystem reaction. Trees growing in a certain ecosystem could show a response as the morphological characteristics, e.g., height, diameter, leaf size and branching pattern, which can be interpreted in terms of the different growth strategies. Among these trees, a certain species expresses a special sensitive growth pattern. The tree of *Quercus glauca* is sensitive to climate change. Also it could be an indicator for the global warming occurring in Korean Peninsula. It is one of the sub-tropical forest tree species or broad-leaf evergreen tree species which is distributed through Japan, Taiwan and in southern part of Korea including Jeju Island. The wood of *Q. glauca* has been considered as one of the greatest timber and conventionally used especially in southern part of Korea, China and Japan. However it is endangered species and designated as a protected species by Korean ministry of environment due to illegally lumbering as a material of column or fuel. Now the natural region has been ruined and very few individual trees left.

To establish the growth strategy, a breeding population of *Q. glauca* has been built via simple recurrent selection. Among the native populations in Jeju Island, outstanding phenotypic mother trees have been directly selected and 35 families have been chosen from the year of 2002 to 2004. Seeds were collected from the selected trees and seedlings were produced from the naturally crossed seeds of these selected trees. In 2006, the seedlings were planted using stroll repeated planting method into two experimental forests located at Hannam and Sanghyo in Jeju. After 3 years of planting, characteristics of growth such as height and diameter of root collar were examined. All climate factors of year from 2006 to 2009 were serviced by Seogwipo meteorological office in Jeju Island. Among the climatic factors, data about the amount of sunshine, warmth index (temperature  $>5 [U+2103]$ ) and periodic precipitation which could mainly affect on the growth of seedlings were analyzed. The result of growth difference between two tested sites was regarded that an adaptability test could be useful for the growth strategy of this species. The survival rates and growth characteristics of this species related to climate factors could also be used as scientific and objective data for the forest ecosystem response to climatic change.