



Growth and Survival of Warm-Temperate Trees in Korea

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Because of the sudden rise in temperature by climate change, the patterns of tree species have been changed in Korea. New species were detected in Korea distributed in sub-tropical zone and some warm temperate species were moving northward gradually. We select three warm temperate evergreen trees (*Quercus salicina*, *Q. glauca*, and *Machilus thunbergii*) which are deciduous and grow naturally in Jeju island. We collected seeds, nursed saplings in Jeju and planted at some test sites of northern lands. These species have been planted to examine the phenomenon of growth pattern and possibility of wintering of warm-temperate trees at 2008 (three sites), 2009 (six sites), and 2010 (six sites) throughout the South Korea. After undergoing the winter season, growth and survival rate were investigated. Three species planted in 2008 have experienced two times of winter seasons. Their survival and growth of these species were not different among sites (latitudes, average temperature of winter season, cumulative days under zero degree etc.) Survival and growth of *Q. salicina* and *Q. glauca* were well in all sites. Survival rates were over 85%, and height growth was over 50 cm. But *M. thunbergii* was seriously damaged by cold in winter season. During first winter season, most of *M. thunbergii* was died, but after then some sprouts were regenerated at dead branch near root. The results in six test sites planted in 2009 are very similar with in case of 2008 test sites. Two evergreen oaks have grown well in most test sites, especially the height growth of *Q. salicina* was good. Survival rates and growth of two oaks were not significantly different among the test sites and the average survival rates were 86% and 80%, respectively. Average height and root collar diameter of *Q. salicina* was 57.7cm and 7.2mm, and that of *Q. glauca* was 29.2cm and 5.3mm. However, *M. thunbergii* has been damaged annually by cold during winter season and the survival and growth were very different among the test sites. Most of *M. thunbergii* individuals were died in northern test sites, but some individuals revived. The average height and diameter was 18.2cm and 3.2mm and the average survival rate was about 41%. *M. thunbergii* growth depended not on average temperature and minimum temperature during the winter season. There were positive correlations between survival and relative humidity of this season (from November to next February). It can be reasoned that some evergreen oaks which have good timber quality and growth can be planted and be grown well in northern areas.