

Site suitability for conifer plantation and a new challenge to utilize deciduous trees

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Degraded plantation forests are increasing because of unfavorable forestry conditions prevailing in Japan, including falling timber prices, increasing operational costs, and aging and declining forestry workforce. To remedy this situation, appropriate management strategy is required. This study introduces the challenges of Odai Town, Mie Prefecture that employed a new management strategy by evaluating site suitability for conifer forests and that proposes a new forest management regime of planting deciduous trees in unsuitable sites. The site suitability for conifer forests was evaluated from two aspects: the natural site conditions and the relationship among site conditions, growth, and damage by *Anaglyptus subfasciatus* Pic. in *Cryptomeria japonica* D. Don and *Chamaecyparis obtusa* Sieb. Et Zucc. forests. By analyzing the relationship among site conditions, growth, and insect damage based on field data obtained in plantation forests, growth evaluation and insect damage evaluation maps were developed. Based on the natural forest investigation, natural site condition maps for *C. japonica* and *C. obtusa* were established. Furthermore, by integrating these evaluation maps with the forest road maps showing the accessibility to the forest, the forest management regime for the whole plantation area of Odai Town was established. The forest management regime map indicates the sites suitable for forestry: suitable for long-rotation, short-rotation, and potential sites for short-rotation. The sites unsuitable for forestry were considered to be more suitable for broadleaved forests. Clear-cutting was conducted in a small area and different seral stage saplings (approximately 20 deciduous tree species) suitable to the site conditions were planted in an area of 80-120 m² protected by deer-fences. This might establish a forest composed of many species with a multilayer vertical forest structure in a short period. The planted saplings were distributed neither randomly nor uniformly to reflect the natural distribution of trees in the forest. A challenge to develop new products using the deciduous trees has started, such as wood chips for preparing smoked food, essential oil, and deodorizer. As these challenges have just begun, their effects on enhancing sustainable resource management are still being monitored. Even with the challenges, this regime can be of high value as a management strategy to remedy the situation of expansion of degraded forests in Japan.