Complementary Planting of *Quercus acutissima* stands from a Pungsu Perspective in Korea

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ABSTRACT

Korea utilized acorns as a substitute for other staple crops during the harsh times about 6,000 years ago. Among the six main oaks, people preferred to use the acorns of *Quercus acutissima* (QA). This study was conducted to suggest a habitat suitability model of QA using presence data and to analyse with response variables such as annual mean temperature, elevation, precipitation of warmest quarter and percent forest cover within circle of 500 m radius. We also analysed the number and areas of patch size of QA stands delineated in the fifth digital forest type map. We initially surveyed the dbh (diameter at breast height) at seven sites of QA stands in Seoul to understand the stand structure and predict the future age structure of QA stands. Total 63,364 patches were identified in South Korea with an estimated size of 105,335 ha, and it amounts to 1.7 percent of total forest areas in South Korea. Habitat suitability of QA was highly explained by the annual mean temperature (ranging from 11 to 12 degrees in Celsius), altitude (below 800 meters), the precipitation of warmest quarter (from 400 to 1,000 mm) and the percentage of forest cover within a 500 m (more than 10%). The average dbh of QA stands ranged from 25.6 to 43.2 cm at seven sites in Seoul. There was no significant difference in dbh distribution among seven QA stands. Distribution pattern of dbh showed lower ratio of small-sized dbh trees. We found the literature mentioned the human planting of QA stands aga during low rice production in dry seasons. The amount of irregular precipitation would be a limiting factor to maintain constant rice production in monsoon climate regions, however, Korean ancestors have been adapting and transferring the complementary planting of QA stands to supplement the low amount of food available from generation to generation. Therefore, at a Pungsu perspective, complementary planting of QA stands could be interpreted as the resilience mechanism to maintain crop production in monsoon climate, where a main factor determining rice production, i.e., dominant staple food crop, is the amount of rainfall.

Keywords: Socio-economic viewpoint, complementary planting, acorns, *dotori*