Stand structure and geographic conditions of natural selection forests in central Hokkaido, northern Japan

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Hokkaido, a northern island of Japan, has 5.5 mil. ha of forestland, of which natural forest accounts for 67 % (3.7 mil. ha). A natural forest is mainly comprised of multi-aged and mixed stands with coniferous and broad-leaved species, and selection system has been practiced in natural forest management. The purpose of this study was to characterize the stand structure and geographic conditions of selection forests in central Hokkaido. To address this purpose, we analyzed stand-level inventory data collected within selection forests.

Our study site was the Tokyo University Forest in Hokkaido (43° 10 – 20´ N, 142° 18 – 40´ E, 190 – 1,460 m a.s.l.), where the University of Tokyo owns 22,733 ha of forestland. It is mostly covered by natural forests, in which the predominant tree species are Abies sachalinensis, Picea jezoensis, Quercus crispula, Kalopanax pictus, Fraxinus mandshurica, Betula maximowicziana, and Tilia japonica. A natural forest can be classified into several stand types according to the difficulty of natural regeneration, site conditions, and timber quality. The stand in which natural regeneration is expectable so that selection cutting is applicable can be classified as selection stand.

We used a total of 1,385 measurement plots that had established in selection stands during 1995 – 2004. The plot size was typically 0.250 ha (50 m x 50 m), and the species and diameter at breast height (DBH) for all living trees with DBH ≥ 5 cm were recorded in each plot. The number of juveniles by tree species (≥ 1.3 m in height and < 5 cm in DBH) were also recorded. The geographic coordinates of each plot location were accurately identified through ground forest surveys.

Stand structure (tree density, species composition, and size structure) of selection forests were portrayed through statistical analyses. Geographic conditions (elevation, inclination, slope aspect, ground surface) were also characterized through spatial analyses using geographic information software ArcGIS 9.3 (ESRI Corp., CA) with digital elevation models.