

## Carbon allocation in Japanese cedar forests with different nitrogen deposition in northern Kanto district

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Recently nitrogen deposition to forest ecosystems is increasing by human activity which causes forest decline, nutrient deficiency and soil acidification. In Japan, some Japanese cedar forests have high nitrogen loss and considered as nitrogen saturated condition. Trees allocate assimilated carbon into leaves, stems, roots and reproductive organs and their proportion can vary as affected by nitrogen deposition. However information about carbon allocation in Japanese cedar forests is limited. In this study, we evaluated pattern of carbon allocation in Japanese cedar forests with high and low nitrogen deposition in Ibaraki Prefecture.

The study areas are Tsukuba with high nitrogen deposition and Katsura with low nitrogen deposition. Study plots (600-675m<sup>2</sup>) was established and Diameter at breast height and tree height were measured annually for 3-4 years. Litterfall was collected by littertraps and separated into leaves, branches, male cones and seed cones. Soil respiration was measured monthly by chamber method. Sum of fine root production and respiration of roots was estimated as soil respiration minus litterfall. Coarse wood biomass production was estimated by expansion factor for the species. The reported value of carbon use efficiency was used to estimate respiration of stem, leaves and reproductive organs. Gross primary production and carbon allocation to wood, leaves, reproductive organs and roots were estimated.

Aboveground net primary production was 8.2 MgCha<sup>-1</sup> yr<sup>-1</sup> and 6.3 MgCha<sup>-1</sup> yr<sup>-1</sup> in Tsukuba and Katsura, respectively, with a 1.29-fold difference. Nitrogen utilized for aboveground biomass production was 72.5 kgha<sup>-1</sup> and 29.1 kg N ha<sup>-1</sup>yr<sup>-1</sup> in Tsukuba and Katsura, respectively, with a 2.5-fold difference. Nitrogen uptake in Tsukuba with high nitrogen deposition is higher but the difference of ANPP is much smaller. Gross primary production was 22.2 MgC ha<sup>-1</sup> yr<sup>-1</sup> and 19.3 MgCha<sup>-1</sup> yr<sup>-1</sup> in Tsukuba and Katsura, respectively, with a 1.15-fold difference. Carbon allocation of stems, leaves, reproductive organs and roots was 37%, 24%, 14% and 21%, respectively in Tsukuba and 41%, 18%, 6%, and 35% in Katsura. Allocation to stems was not different between two forests but that to leaves, reproductive organs and roots was different.

Keywords: Japanese cedar, Nitrogen saturation, Carbon allocation