

## Morphological changes in bamboo with nitrogen saturation

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### [Introduction]

In recent years, nitrogen saturation, a state where the amount of available nitrogen exceeds plant and microbial nutritional demand due to nitrogen deposition, has been reported. In a nitrogen-saturated forest, Tama hill, bamboo (*Phyllostachys pubescens*) lodging is observed. In the case of rice, it is known that leaf mass is increased and internodal growth is promoted under high nitrogen nutrition, resulting in rice lodging. Thus, we hypothesized that similar morphological changes by nitrogen saturation would have caused a lodging phenomenon for bamboo, a family of rice. Based on this assumption, we studied the cause of bamboo lodging from the following morphological changes; 1) promotion of extension growth, 2) the increase in mass of branches-and-leaves, 3) decrease of roots.

### [Method]

We studied the biometry of bamboo in a nitrogen-saturated site (Tama, Tokyo) and control sites (Fukushima and Izu). Diameter at breast height (DBH), each internode length, culm height, and mass of branches-and-leaves, and root mass in the soil surface (0-5 cm) were measured. The total carbon and total nitrogen content of leaves were measured with the dry combustion method.

### [Result and discussion]

No significant difference was found in the leaf nitrogen concentration, culm height, and the mass of branches-and-leaves for bamboos standing straight among the N-saturated and control sites. Lodging bamboo in the Tama hill, however, had significantly larger mass of branches-and-leaves. Very low root mass in the soil surface was also measured and a root mat as observed in the soil surface in a control site was hardly seen in the N-saturated site. It is considered that increase in the load of the aboveground by the increase in mass of branches-and-leaves and the fall of the bearing power of the underground by the decrease of root mass is responsible for bamboo lodging as observed in the N-saturated site. Further research is necessary to study the strength of bamboo culm, mass of branches-and-leaves of lodging individual, and mass of whole root.

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