

COMPARISON OF THE PALATABILITY OF GYPSY MOTH ACROSS SEVERAL WOODY SPECIES NATIVE TO NORTHERN JAPAN

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Abstract

Introduction

From 2000 to 2003, there was the outbreak of gypsy moth (*Lymantria dispar*) at several parts of Hokkaido, northern part of Japan. Gypsy moth is the representative herbivore feeding deciduous trees including several birch species. Although the outbreak of gypsy moth occurs cyclically (about once per 10 years) at extensive region in Japan, death of trees because of the outbreak was hardly reported.

In the forest, we could find specific variation in the intensity of feeding by gypsy moth. To clarify the specific difference of palatability, bioassay test, which can exclude several environmental factors, is efficient. In addition, chemical analysis of leaves is needed to investigate the factor affecting the palatability.

Materials and Methods

Larvae of gypsy moth were grown from 1st instar to pupa with leaves of eight woody seedlings (*Alnus hirsuta*, *Betula maximowicziana*, *Betula platyphylla* var. *japonica*, *Betula ermanii*, *Ostrya japonica*, *Carpinus cordata*, *Acer mono* and *Quercus mongolica* var. *grosseserrata*). First bioassay experiment was done with larvae hatched on 13 May and second bioassay experiment was done with larvae hatched on 20 May. Total phenolics (Folin-Ciocalteu method),

condensed tannin (Proanthocyanidin method), toughness (Push-pull gage), water content, nitrogen and carbon content (NC analyzer) of each leaves harvested on 13, 29 May and 22 June were measured.

Results and Discussion

Although survival rates were relatively high both in first and second bioassay, survival rate and growth of larvae growing with *O. japonica* and *B. maximowicziana* were regulated in second than in first bioassay. We could find significant difference in pupa masses among species. Regardless of the same genus (*Betula*), pupa masses of larvae growing with *B. ermanii* were largest and those with *B. maximowicziana* were smallest of all. However, we could not find any correlation between pupa mass and each parameter of leaves, phenolic compounds, toughness, nitrogen and carbon content. Only water content was positively correlated to masses of female pupa in first bioassay. It was reported that leaves containing high phenolic compounds were not palatable. However, growth of larvae in *B. ermanii* was largest, regardless of that *B. ermanii* had highest total phenolic compounds of all. These results suggested that it is difficult to compare the strength of defense against Gypsy moth by the amount of phenolics among species.