

## B-9 Evaluation of the Global Warming Effects on Plants

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There is current concern about changes in the distribution of vegetation and possible extinction of plant species caused by global warming. Therefore, it is necessary to conduct studies on prediction of changes and clarification of effect.

### (1) Evaluation and Prediction of the Global Warming Effects on the Distribution of the Natural Vegetation

1) The distribution of Japanese natural vegetation was modeled on two spacial levels; "class" level and "order" or "alliance" level, and potential shift of natural vegetation in Japan caused by global warming was estimated by the steady-state correlation approach.

2) The possible changes of phenology (the date of blooming, budding, leaf-color change, leaf-falling) were predicted based on the correlative relationships between the phenological observation data and the monthly meteorological factors.

3) The long-term effect of high temperature condition on dry matter growth and bud formation of *Pleuropteropyrum weyrichii* var. *alpinum* was clarified through experiments. The leaf-temperature around 2,600 m of Mt. Fuji was measured.

4) Present situation of the populations and their surrounding habitat at the southern limits and vicinities of numerous temperate species were investigated in the field. Some of the populations were studied taxonomically. These data were prepared in a computer using data-file.

5) An experiment was attempted to examine the impact to the plants under the increased condition of the CO<sub>2</sub> and ozone.

### (2) Global warming effects on the alpine and subalpine vegetation of Japan

We investigated the relationship between environmental conditions and plant communities to evaluate the global warming effects on alpine and subalpine vegetation in Japan. Our studies are as follows; effects of earlier snow release on both snow patch vegetation and soil structure; melting processes of snow patch and the phenology of the alpine vegetation; the estimation of climatic conditions in past ages using the analysis of soil structure; estimation of drying procedure of high moor; regeneration processes of subalpine conifer forest; effects of external factors on canopy structure and dynamics of dwarf pine scrub; shifting of the distribution pattern of forest zone; the analysis of tree growth by means of annual ring.