



## Resolution International Tundra Experiment

As a result of deliberations and consensus achieved at a workshop to design an International Tundra Experiment (ITEX) on December 2-5, 1990, at the Kellogg Biological Station, Michigan State University, U.S.A., that participants from nine countries (Canada, Denmark, Finland, Great Britain, Iceland, Norway, Sweden, United States, USSR) have agreed to submit the following findings and recommendations to their respective organizations and scientific colleagues.

### Taking into account

1. That the tundra regions represent an important component of the geosphere-biosphere, being a sensitive indicator of global change and contributing actively in the functioning of the global climate system;
2. That the understanding of the geophysical and ecological processes that occur in the tundra is an important objective of the international community concerned with global change, biodiversity, environmental protection, and sustainable development;
3. That recent acceleration of international interest and cooperation in arctic and alpine science has opened new possibilities for coordinated international research and analyses;

### And recognizing

1. That carefully organized comparisons within and among tundra sites over time will greatly increase understanding of the ecology of tundra species;
2. That coordinated observations and measurements of a few carefully selected arctic species populations occurring along circumpolar megatransects and environmental gradients are achievable;
3. That an experimental approach to a few selected manipulations of the environment is deemed desirable as a cost effective mean to compare species responses to variables relevant to global change;
4. That international exchange of scientists, especially students, is highly desirable to enhance communication and training;

### The participants therefore agree

That an initial set of selected tundra plant species, measurement protocols and manipulations have been specified for the ITEX experiments starting in 1991 as the result of this international meeting of experts. They, therefore, recommend

1. That the first ITEX experiment focuses on vascular plant species;
2. That a set of abiotic observations and destructive and non-destructive measurements be carefully specified to determine phenological events, reproductive and vegetative effort, physiological responses, and genetic response to the manipulated and predominant environmental variables during the growing season and over a period of years;

3. That explicit protocols be developed for simple and relatively inexpensive manipulations of air temperature (such as by small greenhouses) and snow cover (as by snow fences) at participating sites;
4. That sets of selected individuals in field transplant gardens be subjected to a common garden (environmental) experiment and assessed in terms of genetic variation within each species population and its phenotypic response in order to evaluate probable adaptations to climate change;
5. The more complex or expensive experiments involving manipulations such as atmospheric CO<sub>2</sub>, or soil temperature and reciprocal transplant gardens, fertilizer treatments, or even phytotron experiments may be desirable and practical for some sites;
6. That appropriate coordination of research, communication and synthesis of results will be achieved by a small set of coordinators, and by the convening of participating principal investigators for periodic assessment workshops, and that exchanges of scientists and students among sites will facilitate ITEX;
7. That development of an appropriate protocol for the exchange of ITEX data among participants is needed;
8. That funding for research is the responsibility of each participating country, and may utilize activities already underway and including Biosphere Reserves, protected areas, and long-term ecological research areas; and
9. That future experiments focusing on other taxa and ecological parameters, including animals, are desirable, and contacts for ITEX established through the MAB Northern Science Network are encouraged