

CANADIAN BOTANICAL ASSOCIATION/ L'ASSOCIATION BOTANIQUE DU CANADA - POSITION PAPER ON GLOBAL CHANGE -

Submitted to the CBA/ABC Board of Directors for further consideration and amendment by:
CBA/ABC Ad hoc Science Policy Committee:

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The CBA/ABC

The Canadian Botanical Association/L'Association Botanique du Canada (CBA/ABC) represents Canada's researchers and scholars in the plant sciences from various disciplines including ecology, genomics, systematics, development, and teaching. CBA/ABC provides useful input to national, provincial, and local governments on matters pertaining to management of ecosystems that are sustainable when managed effectively. This can be delivered effectively if there is collaboration with academic and professional organizations that provide local ecological advice to industries and users of resources.

Importance of plant sciences

Research in the plant sciences contribute to Canada's and world's economies and development. The results of this research are integrated in many domains such as agriculture, forestry, horticulture, and urban planning. These research results and informed opinions are often part of larger contributions, and are crucial for human well-being. They respond directly to many of the 2030 Sustainable Development Goals (SDGs) as well as the Paris Agreement.

Support for fundamental research in biology and ecology of plants should support the highest ideals of curiosity-driven science and humankind's quest to understand how life on Earth works. Canadian contributions are important because the size of the country requires researchers to recognize that impacts of changing climate on similar ecosystems, such as the boreal forests in the north, may be different because of latitude differences between large areas that seem similar but are locally different from regions several kilometres away.

Canada cannot expect to be at the forefront of responses to climate change and the changing needs in agriculture, forestry, biofuels, or environmental protection without a sustained support of long-term peer-reviewed basic research. With anthropogenic use of fossil fuels and changes in land use, it is increasingly clear that human activity has become a major cause of accelerated climate change. These accelerated changes have been observed by botanists, specifically, plant ecologists and plant geographers who have in many occasions warned the consequences to the public and policy makers. While some of the engineering developments aimed at replacing fossil fuel use may have actually reduced the rate of climate change, botanists and environmental scientists are becoming active in understanding how replanting disturbed land will be more useful in reversing the increased levels of heat holding gases, and indeed the biological process requires heat dissipation can occur even during growth underwater. There is a need for more research in how and what species can be more effective in function of the various ecosystems.

Plant biologists have been:

- Involved in various important projects that examine how climate and environmental changes can impact the primary production of this world that supports all living species. For example, researchers have been able to demonstrate the changes in pastures and meadows due to increased CO₂ and extreme events such as heavy rain and drought.
- Active in fundamental research to understand how soil and plant interactions may affect production. These results are crucial as they contribute to better understanding of the agroecosystem and ensure greater possibility for sustaining food security.
- Open to collaboration with other disciplines within biology and in other areas of scholarly research. Examples include collaboration with chemists, physicists, and social scientists to respond to societal challenges such as climate change. Many of these collaborations provide essential information that is used to respond to climate impacts (e.g. restoration of impacted areas after a storm surges on coastal communities) and policy development. Unfortunately, there are still important gaps, especially in Canada, in this type of collaboration. For example, while IUCN, UNEP, UNDP, and UN have all adopted ecosystem-based adaptation to climate change, Canada is significantly lagging behind on this approach, preferring old conventional technical responses, many being unsustainable in the long term. Plant biologists have an important role to play to help Canada catch up with other countries on this matter.

CBA/ABC policy statement linked to global change

In so far as new developments and applications have occurred faster than the understanding of the biological and environmental impacts of climate change, the CBA/ABC encourages members with ecological expertise, especially those who study the impact of environmental changes, to undertake research that clarifies the uncertainties surrounding unpredictable changes in climate. This research recognizes that responses by the same plant species will differ in different parts of our country, and to assess what may eventually be different effects. Changing seasons, rain, snow, soil freezing and even different animals feeding on the same plant species in different regions may lead to exceptional changes in competition that disrupt previously stable species, or may lead to invasion of a plant that previously was a minor ecological player.

CBA/ABC:

- Provides formal, expert and credible input to national, provincial, and local governments on matters pertaining to sustainable management of ecosystems.
- Encourages members to become proactive in research on the short and long-term impacts of changing climate on changing ecological conditions.
- Has established policy to nominate areas of special conservation concerns for ecosystems that have been highly impacted by human activities and may be threatened over time (similar to the establishment of the IUCN Red List of Ecosystems).
- Has policy to advocate for and support research into the processes that affect plant growth, and plant adaptability to climatic changes over time, which can increase our understanding of the ecological impacts of climate change, and develop remedial responses.

- Encourages government to accept the need for “Matching funds” from private agencies when particular lines of research are likely to lead directly to economic returns for industry partners.
- Recognizes the need for large scale long-term (5-10 year) funding to solve long-term questions. For example, many stresses that impact the diverse ecosystems and climates found in Canada (from invasive pests and pollution to habitat loss and climate change) can only be resolved by research efforts that may require decades of sustained inquiry.
- Recognizes that much of fundamental long-term research may not attract industrial partners but could progress more effectively if plant biologists based at Canada’s universities were to receive a modest annual operating grant in order to maintain their individual research programs.
- Recognizes the importance of training graduate students, post-doctoral fellows, and other young researchers in Canada, so that they can ensure that early career researchers can start their long-term careers by contributing plant knowledge and improve public understanding to the world.
- Works collaboratively with academic, industrial and government researchers to ensure that the highest quality research fully informs decisions on the commercial exploitation of ecosystems that may be affected by climate changes. This research can be used to address key concerns about ecological sustainability, such as "will the introduction of a plant species aimed to bring sustainable stability to the affected region be ecologically harmful?" and, "will the introduction be ecologically safe?"
- Provides rigorous peer-reviewed answers to public questions about climate altered ecosystems and advises the public of the validity of claims made by both advocates and opponents.
- Encourages those members with expertise in these matters to make themselves available as expert advisers, but to refer questions that are outside their areas of expertise to those who do have such expertise.

Actions for progress

CBA/ABC calls upon the federal government to increase funding for basic research about plants, as they are the basis of life on earth. We seek a strong and continuing commitment by government to support high quality, peer-reviewed research that will address important scientific questions at levels ranging from the molecular to the global. Recent increased funding has been directed to molecular biology and genomics, but much remains unknown about the anatomy, physiology and ecology of the thousands of plant species that are the primary producers in Canada’s forests, grasslands, tundra, lakes and oceans. These whole-plant and vegetation differences and dynamics require ongoing research support in order to be properly understood. Progress would happen more effectively if, in addition to other funding opportunities, plant biologists at Canada’s post-secondary institutions were to receive a modest annual operating grant in order to maintain their individual research programs.