

Increase funding for tree-science research

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COMMENTARY

Tree mortality has increased in Canada in recent decades due in part to climate change. Canada's climate is changing rapidly and more severely than most regions on earth, and it is uncertain whether our trees will survive. Answers to such questions cannot be provided, because the tree-science research has not been done.

That is the impetus behind a petition to the Parliament of Canada (petition e-3353), which has been authorized by Fredericton MP Jenica Atwin and is concerned with the future of Canada's forests in relation to climate change.

Survival fitness, also known as physiological tolerance, is the crucial factor determining the composition, areal extent and sustainability of forest trees. When trees lack sufficient fitness,

they decline into unhealthy states and become more susceptible to insects and disease. To survive, persist, grow and reproduce, a tree must be able to tolerate whatever its micro-environment presents, every day year after year.

Before plantation forestry, Mother Nature seeded and reliably produced survivors which provided the non-timber and timber amenities that built Canada. Many of our native tree species were in existence 100 million years ago. For more than two million years, repetitive episodes of glaciation and climatic warming destroyed and then re-afforested the Canadian landscape. Our primeval forests were made up of genetic lines thoroughly tested by natural selection.

Plantation forestry since 1900 has emphasized fast growth, commercial rather than tree-survival improvement and unnatural rather than

natural selection. Survival fitness in tree-improvement programs was taken for granted based on growth performance during earlier climates, assuming that climate would remain constant. But climate history has not repeated itself, and now that most of Canada's old-growth natural forest has been replaced, Canada's hardiness zones and all aspects of forest sustainability are in question. Fast growth and survival fitness can be competing physiological attributes.

The Canadian Forest Service, a department within Natural Resources Canada, has strongly supported tree-improvement programs but been miserly in supporting fundamental tree-science research to advance knowledge about the basis for intrinsic survival fitness. This is understandable, because the emphasis in the Canada Department of Natural Resources Act is on that money-blinkered word "resource" and on short-term economic considerations, not on the performance of fundamental research having no immediate payback.

On the other hand, the Canada Department of the Environment Act empowers Environment and Climate Change Canada (ECC) to act for "the

preservation and enhancement of the quality of the natural environment ... including ... flora ...". Nevertheless, Environment Canada versions have largely avoided tree-science research. Parks Canada Agency is part of ECCC, and our 48 national parks and reserves hold important old-growth survivors, the last of the "unimproved" ancient trees. A national council of tree science research within ECCC would allow us to compare the attributes of those trees with those of the "improved" stock, thereby contributing to national parks as well as national forest sustainability.

Tree science is the foundation on which all forestry stands, but tree science has been neglected by Canadian forestry schools and downplayed by the Canadian Institute of Forestry. Forest management, forest science and wood science and technology have been emphasized, but not one Canadian university offers an undergraduate degree program in tree science. Students are discouraged by phrases such as "not being able to see the forest for the trees."

Exacerbating this, Canadian schools of plant science have focused on agricultural plants and simpler organisms. Perennial trees are difficult organisms

for research progress, particularly in relation to the demands posed by university administrations and granting agencies to publish new scientific advances yearly.

Canada funds space-science research at about \$300 million each year. The relevance of such activity in relation to sustaining our basic needs is questionable, and certainly is very long term. Canadians may reasonably ask which is more important: space research or tree-science research to ensure sustainability of our forests?

A budget similar to that of the Canadian Space Agency would be a reasonable level of support for a national council of tree science research to address all the many unanswered questions about tree-survival fitness in relation to climate change.

Canada's forest future depends on the government of Canada appreciating forest values more clearly and giving back just a little bit of what the forest has given Canadians, to ensure ongoing sustainability of both forest and humanity.

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As published online in The Telegraph Journal, April 28, 2021.