

Northern forests do not benefit from lengthening growing season

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Forests in northern areas are stunted, verging on the edge of survival. It has been anticipated that climate change improves their growth conditions. A study published last week in *Forest Ecology and Management* journal shows that due to their genetic characteristics trees are unable to properly benefit from the lengthening growing season. Furthermore, the researchers were surprised to find that the mortality of established trees considerably promotes the adaptation of forests to the changing environment.

In cooperation with colleagues at the Universities of Oulu and Potsdam, Anna Kuparinen, Docent at the University of Helsinki's Faculty of Biological and Environmental Sciences, simulated [forest](#) growth from southern to northern Finland. A meteorological dispersal model was applied to describe the spread of pollen and seeds in the atmosphere. Above all, the results illustrate the slowness of the adaptation process.

Generally, trees stop growing before the frosts and this cessation of growth has been programmed in their [genotype](#). Therefore, trees are unable to effectively follow the increasing environmental growing season. Instead, they cease growth as dictated by their genotype. It is estimated that after hundred years from now northern forests will substantially lag behind the speed of growth that would be enabled by their environment.

Evolution is promoted by the mortality of established trees

The researchers assumed that demographic characteristics of the trees would have a notable impact on their adaptability. [Tree species](#) differ for example so that birch matures at a considerably younger age than pine, and birch seeds spread more effectively than pine seeds. However, the results showed that these differences had only minor impacts. Instead, the mortality of established trees played a large role in the [evolutionary adaptation](#).

The existing trees in northern forests will survive in a warmer climate better than before but, at the same time, they prevent genetically better adapted individuals from becoming more common. In a dense stand, old trees cast a shadow and prevent new seedlings from establishing. In this way, younger seedlings, which would be more suitable to warmer conditions, cannot easily progress beyond the sapling state.

A question closely related to environmental changes is, whether humans should help the populations to adapt? For forests, possible means of human aid include thinning and planting southern seeds to more northern locations.

Provided by University of Helsinki

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