

Climate change affects geographical range of plants

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This is the white form of *Ivesia bailey*. Credit: Mats Töpel, University of Gothenburg

Researches at the University of Gothenburg have shown how climate change many million years ago has influenced the geographical range of plants by modelling climate preferences for extinct species. The method can also be used to predict what effects climate change of today and tomorrow will have on future distributions of plants and animals.

The researcher Mats Töpel at the Department of Plant and Environmental Sciences, University of Gothenburg, has studied how climate change has influenced the development of a group of plants in the genus *Potentilla*, commonly known as cinquefoils.

His research shows that this group of plants developed during a period of climate change in western North America around 25 million years ago, which led to summer drought in California and the largest desert in North America, the Great Basin.

The small plant *Ivesia bailey* is adapted to living in extremely dry conditions, by seeking shade on north-facing rocks in the Nevada Desert. This lifestyle is believed to have evolved in the genus *Potentilla* around 20 million years ago.

Models of the climate

"By creating models of the climate in which the group probably evolved, I have shown that there was a suitable climate in the eastern part of the Great Basin approximately 25 million years ago, and that the geographical range of these plants expanded to the west at the same time as new species evolved and adapted to different types of environments.

The method of building [climate models](#) for [organisms](#) that no longer exist is quite new, and only a few studies of this type have previously been published.

Models can be used to predict the future

"I have used the method to study how climate change many millions of years ago has shaped the vegetation we see today, but it can also be used to predict how present and future climate change may affect organisms

and hence, our living conditions. If these changes lead to a situation in which the crops we depend on find it difficult to cope, large resources will be required to maintain or reorganise our agricultural production.

Future [climate change](#) may also lead to alien species changing their geographical ranges and starting to interact with native species, in the same way as both marine and terrestrial species have done in recent years. This can eventually lead to native species being outrivaled by the alien species.

"Based on my results and this method we have an opportunity to understand processes that were active in the past and that have shaped the environment we live in today. This gives us an opportunity to interpret our contemporary world so that we can influence what our future will look like."

Provided by University of Gothenburg

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