

With climate changing, Southern plants do better than Northern locals

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Arabidopsis thaliana Credit: Wikipedia

Can plants and animals evolve to keep pace with climate change? A study published May 19 in the journal *Proceedings of the National Academy of Sciences* shows that for at least one widely-studied plant, the European climate is changing fast enough that strains from Southern Europe already grow better in the north than established local varieties.

Small and fast-growing, *Arabidopsis thaliana* is widely used as the "lab mouse" of [plant biology](#). The plant grows in Europe from Spain to Scandinavia and because *Arabidopsis* is so well-studied, there is a reference collection of seeds derived from wild stocks across its native

range. Originally collected from 20 to 50 years ago, these plants have since been maintained under controlled conditions in the [seed bank](#).

Johanna Schmitt, formerly at Brown University and now a distinguished professor in the UC Davis Department of Evolution and Ecology, and colleagues took banked seed samples originally from Spain, England, Germany and Finland and raised all the plants in gardens in all four locations.

"The southern imports do better across the range than locals," Schmitt said. "This shows that the adaptive optimum has moved really fast."

Seed stocks banked decades ago may no longer be the best for their locations of origin, she said, although they still may be critical for preserving genetic diversity, especially from warmer parts of the species range that may facilitate adaptation to future climates.

Whether wild *Arabidopsis* can evolve fast enough to thrive in warming conditions, or southern varieties move north fast enough to replace northern strains, remains an open question, Schmitt said.

Arabidopsis is a fast-growing, short-lived species. For forest managers, there is another question: can trees that sprouted 30 or 40 years ago adapt in place to a rapidly changing climate?

"This is a concern for foresters—trees live a long time, but will they die if the climate rug is pulled out from under them?" Schmitt said.

More information: Paper: www.pnas.org/content/early/2011/11/14/1406314111.abstract

Provided by UC Davis

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