

Exploring Echinacea's enigmatic origins

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An Agricultural Research Service (ARS) scientist is helping to sort through the jumbled genetics of *Echinacea*, the coneflower known for its blossoms--and its potential for treating infections, inflammation, and other human ailments.

Only a few *Echinacea* species are currently cultivated as botanical remedies, and plant breeders would like to know whether other types also possess commercially useful traits. ARS horticulturist Mark Widrlechner, who works at the ARS North Central Regional Plant Introduction Station (NCRPIS) in Ames, Iowa, is partnering in research to find out how many distinct *Echinacea* species exist. Previous studies have put the number between four and nine species, depending on classification criteria.

Working with Iowa State University scientists, Widrlechner selected 40 diverse *Echinacea* populations for DNA analysis from the many populations conserved at the NCRPIS. Most of these *Echinacea* populations were found to have a remarkable range of [genetic diversity](#).

[DNA analysis](#) suggested that when much of North America was covered with glaciers, *Echinacea* found southern refuges on both sides of the [Mississippi River](#). But when the glaciers receded after thousands of years, the groups came together as they moved northward and began to hybridize, which might have blurred previous genetic distinctions.

The research team also analyzed the same populations for chemical differences in root metabolites. These metabolites, which are often

essential for survival and propagation, can vary widely among species and may have benefits for human-health.

Using this approach, researchers were able to identify clear distinctions among all 40 populations. These distinctions were organized into three composite profiles that accounted for almost 95 percent of the metabolite variation among the populations.

Additional analysis of metabolite variation indicated that the populations grouped together in ways that aligned well with earlier *Echinacea* species assignments that were based on plant morphology. This work suggested that there were nine distinct species, not just four.

Results from this work were published in *Planta Medica*.

More information: Read more about this research in the March 2010 issue of Agricultural Research magazine, available online at: [www.ars.usda.gov/is/AR/archive ... 10/echinacea0310.htm](http://www.ars.usda.gov/is/AR/archive...10/echinacea0310.htm)

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