

# Evolutionary biology research on plant shows significance of maternal effects

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When habitat changes, animals migrate. But how do immobile organisms like plants cope when faced with alterations to their environment? This is an increasingly important question in light of new environmental conditions brought on by global climate change.

A University of Virginia study, published in the Nov. 16 issue of the journal *Science*, demonstrates that plants grown in the same setting as their maternal plant performed almost 3½ times better than those raised in a different environment — indicating that maternal plants give cues to their offspring that help them adapt to their environmental conditions.

Evolutionary biologist Laura Galloway, an associate professor of biology at the University of Virginia, recently completed a study of the American bellflower, a native wildflower that commonly grows in both shaded areas and areas that receive full sunlight for at least part of the day. She focused on the transmission of environmental information between maternal plants and their offspring.

Galloway planted some seeds in light conditions similar to their maternal plants and some in different light. She found that plants growing in the same setting as their maternal plant outperformed those planted in a different environment. The work was conducted in a natural habitat at the University of Virginia's Mountain Lake Biological Station in Southwest Virginia.

Since seeds typically fall close to their maternal plant, they grow in a

similar environment. When seeds are dispersed to different environments, Galloway found that the plants may suffer for one generation, but as long as the seeds of those plants grow locally, their offspring will recover.

“We found a temporary mechanism of adaptation to local environmental conditions,” says Galloway. Since plant adaptation is typically studied on a permanent, genetic level rather than in direct response to environmental conditions, Galloway’s insights are unique.

Galloway was led to this line of inquiry by chance. She was surprised to observe a number of years ago that plants that had experienced drought had smaller seeds than those that had not. This highly visible physiological change within only one generation intrigued her.

“Historically maternal effects have been viewed as a complicating factor — an inconvenience,” explains Galloway. “But we have found that they can dramatically influence the performance of an individual.”

Source: University of Virginia

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