

# New research sheds light on why plants change sex

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Credit: University of Lincoln

Plants with a particular breeding system change their sex depending on how much light they receive, new scientific research has revealed.

The ability of [plants](#) to flower one year as male and the next as female, or vice versa, is well documented in 'dioecious' plants, however the causes of this ability to change gender have been largely unexplored in 'gynodioecious' plants until now.

Gynodioecy is a breeding system that is found in certain flowering plant species in which female and hermaphroditic plants coexist within a population. Gynodioecy is the evolutionary intermediate stage between hermaphrodite plants (each flower has both male and female parts) and dioecious populations (each plant having either only male or female

flowers).

The ability to change sex in response to the environment has been studied extensively in dioecious plants but this new research has revealed that gynodioecious plants also change sex depending on their environment.

The results of a four-year study by researchers at the University of Lincoln, UK, show that the level of light received by the plant has a significant effect on sexual expression and reproductive output. The study found that in habitats with high levels of light, plants were more likely to change their sexual expression, and the researchers believe this is because sex lability (readiness to change) is costly and related to the availability of resources.

Dr Sandra Varga, Marie Curie Research Fellow at the University of Lincoln's School of Life Sciences, led the research. She explained: "The evolution and maintenance of such sexual polymorphism has been investigated by evolutionary biologists for decades. It is one of the most important developments in the evolution of plant breeding systems. However, understanding the causes and consequences is challenging because so many different factors might be involved in the process of changing from one sex to another.

"Our research clearly showed that sex expression was changeable over the course of the study, and was directly related to light availability."

Throughout the study, the researchers observed the behaviour of 326 different plants for four years and transplanted them between locations with both high and low [light](#) levels to replicate the different environments they may encounter. For example, the wood cranesbill plants used in the study can often be found under dense forest canopies and in meadows and road verges.

The researchers monitored how the sex and reproductive outputs of the plants differed depending on their location, to garner a deeper understanding of how their behaviour is altered by their environment.

**More information:** S. Varga et al. Light availability affects sex lability in a gynodioecious plant, *American Journal of Botany* (2016). [DOI: 10.3732/ajb.1600158](https://doi.org/10.3732/ajb.1600158)

Provided by University of Lincoln

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