

As record breaking heat affects many parts of the world, [University of Florida \(UF\)](#) scientists are working to develop crops that can withstand high temperature stress by studying gene expression.

The UF study identifies genes that may help plants cope with temperature stress, setting the stage for developing crops bred for enhanced heat tolerance, said Bala Rathinasabapathi, Senior Author of the study and a professor in the UF/IFAS Horticultural Sciences Department.

Some plant species are more sensitive to heat than others. But when temperatures rise above what a species can typically withstand, the plants become stressed, often producing smaller yields, Rathinasabapathi explained.

“Our program has been studying how plants respond to high temperature stress and designing new ways to improve the tolerance levels of crops. When we placed plants under controlled conditions and increased the temperatures, we noticed that young leaves were affected much less than older leaves,” Rathinasabapathi commented.

“This observation prompted us to question the cause of such a difference,” he added. “We rationalized that if we could identify the genes that are involved in young leaves’ tolerance to high temperature stress, it will provide testable ideas to improve heat stress tolerance of crops.”

In the experiment, study co-author Qingyuan Xiang, a Ph.D. student in Rathinasabapathi’s lab during the study, tested how the plant *Arabidopsis thaliana* changes its gene expression in response to extreme heat.

The scientists exposed some *Arabidopsis* plants to high heat (107.6 degrees Fahrenheit), while others were placed in more typical non-stress conditions. After one hour under high heat, the researchers took samples of the plants’ young and old leaves and repeated the process again after 10 hours.

By sampling at different times, the researchers were able to see how gene expression progressed in the young leaves compared with older leaves. They also compared those patterns to those in plants not exposed to heat.

“The current study provided us lists of specific genes that may have functions in heat stress tolerance in plants. In the future, we will aim to test those genes for their potential connections to heat stress tolerance in plants and even use them in breeding strategies,”

Rathinasabapathi concluded.