Flowering Signal Found

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The signal that causes plants to flower, or "florigen," has been identified by researchers at UC Davis, the University of Arizona, Tucson, and collaborators in New Zealand and Mexico.

"This is the Holy Grail of plant biology," said William J. Lucas, professor of plant biology at UC Davis and senior author on the paper published in the May issue of the journal *Plant Cell*.

Working with pumpkins and squash, Ming-Kuem Lin, a visiting postdoctoral researcher in Lucas' lab and colleagues showed that a protein, FT, is transported through the phloem sap from the body of the plant to the growing tips to trigger flowering.

Many plants, including important crops such as rice, maize and wheat, flower in response to lengthening days in the spring or shortening days in fall. Researchers thought that florigen is made in the leaves as the length of the day changes and it is transported to the meristems, or growing tips of the plant, through the phloem network, which actively transports water, sugars and other molecules from the center of the plant to the periphery.

Lucas' research group works with common pumpkins (Cucurbita maxima), because of the large amount of sap they produce. But pumpkins do not flower in response to day length. So the team searched more than a hundred strains of related plants to find a wild squash, Cucurbita moschata, which flowers only in short days.

When the C. moschata plants were infected with a virus carrying the FT gene, they flowered regardless of day length. The viruses were found only in the leaves and stems, but not in the flowering buds, ruling out another possible candidate, the RNA produced by the FT gene.

The researchers grafted C. moschata onto C. maxima. Again, the plants flowered, as the signal was carried from the C. maxima leaves to the C. moschata meristems. The pumpkin FT protein was isolated from the phloem.

The experiments provide absolute, direct evidence that the FT protein moving through the phloem is the florigen, Lucas said. Phloem contains about 1,900 other proteins, many of which are also likely to be signals of one kind or another, he said.

In addition to opening up new ways to understand how plants regulate themselves, the findings could eventually have widespread applications in agriculture, Lucas said.

Source: UC Davis