# Movable Genes

A plant grows a seed, and the seed grows a plant. Amidst that apparent simplicity, exists a world of complexity scientists still are unraveling.

University of Arizona plant geneticist Karen Oishi uses recently developed molecular tools to isolate genes involved in seed development.

Her type of basic research is critical to arid-land farming, which requires more and more varieties of drought- and salt-tolerant plants, she says. Traditional plant breeders develop these crops through plant selection. Oishi is exploring whether even greater tolerance can be reached at molecular levels.

She uses transposable elements as gene markers to follow the development of seeds. Transposable elements are the parts of genetic code-containing DNA, or deoxyribonucleic acid, which have the ability to "hop around" at random in chromosomes. These techniques also allow geneticists to study several normal plant processes, such as leaf development or the interaction of plants and disease organisms, at the molecular level.

The existence of transposable elements was discovered by Barbara McClintock, the 1983 Nobel Laureate in Medicine, who first described the action of transposable elements genetically.

Until then, scientists had no idea that the genome, which carries the "blueprint" of an organism, has the ability to be so dynamic and flexible.

"Now we know that genomes are constantly changing," Oishi says. "That fact has interesting implications for subjects such as evolution and mutations."

When a transposable element moves, it has the ability to hop into a gene, rendering it inactive. If the inactive gene is essential for proper seed development, its plant will produce defective seeds.

Seeing the visible symptoms caused by a moving transposable element allows Oishi to correlate a specific gene with a specific function. Scientists can't predict where the DNA string will hop because it's strictly a matter of chance. But that doesn't matter.

"We can label critical genes such as those than control drought tolerance," Oishi says. "With transposable elements, we have tags or markers to connect genes with the process they control, and that opens up a world of possibilities."

**—By Lorraine B. Kingdon**

*Contact Oishi at the UA department of plant sciences, Biological Sciences West Building, Rm. 509, Tucson, Ariz., 85721, (602) 621-3381.*

ALLAN FERTIG

**Karen Oishi**