NO 'JUMPING GENES,' RESEARCH SAYS

Cal Poly students—known for applied, real-world studies—frequently work with professors on projects that touch today’s headlines. One such study in the College of Agriculture sheds new light on the controversial topic of genetically modified crops.

When biotechnology critics argued that genes from genetically modified Roundup Ready® corn “jumped” to the Chico strain of rye grass, multi-national Monsanto Corporation representatives claimed that it could not happen. Monsanto now has Cal Poly student research to back up its claim.

Biotechnology critics claim that a primary threat from genetically modified organisms (GMO) technology is that herbicide-resistant genes can “jump” from genetically modified crops to wild or domesticated species, producing “super weeds” which would resist conventional control methods. Monsanto maintains it would be very difficult, if not impossible, for a weed to mutate under normal circumstances due to the genetics involved.

Under the direction of Crop Science Professor Scott J. Steinmaus, undergraduate students in his advanced weed science class initiated a lab experiment using genetically modified Roundup Ready® cotton, a susceptible variety, and a Roundup Ready® variety of corn, as well as a resistant biotype and susceptible biotype of rye grass, Chico and San Luis Obispo, respectively. Of these test plants, only the Chico strain of rye grass and the Roundup Ready® corn and cotton survived the pesticide application at the highest labeled rate.

The students next set about isolating DNA from both GMO and non-genetically modified organisms (NGMO). Each student worked at an independent lab station to separate the DNA from other cellular contents.
According to Steinmaus, "The students were 'hands-on' in the lab—they weren't just watching me do everything or watching a video about the procedure. They all had the opportunity to actually isolate the DNA, amplify the specific modified gene through the use of a polymerase chain reaction (PCR), and run the PCR products on an agarose gel by electrophoresis. When dye was added to the gel, the location of the gene could be clearly seen under ultraviolet light. We all found Monsanto's altered gene in the GMO crops. We didn't find a single instance of it in any of the other species, including the resistant Chico rye grass."

Steinmaus continued, "Resistant rye grass from Chico simply does not have the same altered gene as the GMO Roundup Ready® crops. Therefore, the altered gene could not have jumped—or transferred—from the crop to the weed. The next step for this year's classes will be equally exciting: to determine the actual mechanisms of resistance in the Chico rye grass biotype."

Steinmaus' study and the class project to investigate herbicide resistance in weeds were funded by the nonprofit Agriculture Education Foundation.

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One hundred years ago, local journalist Myron Angel and the townspeople of San Luis Obispo knew success when "An Act to Establish the California Polytechnic School" passed both houses of the state legislature and was signed by Gov. Henry Gage on March 8, 1901.

Two years later, President Theodore Roosevelt visited San Luis Obispo and commended the citizens for their "courage ... and common sense" in establishing a polytechnic institute for scientific training in "the arts of farm life."

Those early days saw the establishment of traditions that continue today, from enterprise projects where students "earned while they learned" to the first Poly Royal sponsored by the Future Farmers of America, students actively participated in their education, extracurricular activities, and community events.

Today, as it begins its next 100 years, the College of Agriculture is still showing "courage and common sense" as it prepares students for the challenges facing agriculture in the 21st century.

These challenges are also the college's greatest strength. Its long tradition of a hands-on "learn-by-doing" education and the continued commitment of the university community—students, faculty, staff, alumni, and friends—are what will see the college through the next year, decade, and even century, and ensure that it continues to be "only the best."