



NATIONAL COALITION FOR FOOD AND AGRICULTURAL RESEARCH

Media Advisory

UCR Biochemist Comes to Washington with High-Protein Corn

Daniel Gallie's findings propose a useful approach to feeding the world's growing population

Washington, DC - Sept. 23, 2005 - Corn with twice its usual content of protein and oil and about half of its usual carbohydrate content is what Daniel Gallie, professor of biochemistry, University of California, Riverside, will present at a HILL SEMINAR SPONSORED BY NATIONAL C-FAR, in Washington, D.C., this week.

Because his research holds promise for efficiently feeding high-protein corn to people and livestock all over the world, Gallie has been invited to speak by National C-FAR to an audience of congressional staff. The seminar is scheduled for 10:00-10:45 a.m. on Friday, Sept. 23 in 1302 Longworth House Office Building of the U.S. House of Representatives. "We are honored to have Dr. Gallie featured in National C-FAR's 'Break & a Briefing' Hill Seminar Series," said Joe Layton, President of National C-FAR, a broad-based coalition bringing the research, extension and education community together with its many customers.

In the United States, the vast majority of corn - nearly 65 percent - is used to feed animals for meat production. Much of the remainder is exported to other countries for feeding animals or made into corn sweeteners or fuel alcohol. Corn, the most widely produced feed grain in the United States, accounts for more than 90 percent of total value and production of feed grains in the country, with around 80 million acres of land planted with corn.

Gallie's research on doubling the protein content of corn grain adds significant value to the crop, benefiting corn producers. Moreover, his technology nearly doubles corn oil, the most valuable content of corn grain, and significantly increases the grain's value. Corn is processed also into other food and industrial products such as starch, sweeteners, beverage and industrial alcohol, and fuel ethanol.

"Nearly 800 million people in the world suffer from protein-energy malnutrition, which is a leading cause of death in children in developing countries, many of which already produce corn as a major cereal crop," said Gallie. "A significant fraction of the world's population, particularly in developing countries, has no access to meat as a protein source, and has to rely on plant sources such as grain. The new corn we have developed has two embryos in its kernel, which is what doubles the content of protein and oil and reduces the starch content. It could provide a good source of protein for those that depend on grain as their primary source of nutrients."

Every corn kernel results from a flower on an ear of corn, Gallie explained. Initially the ear produces a pair of flowers for every kernel. But then one of the sister flowers undergoes abortion, resulting in one flower for each kernel. Gallie's research group has developed technology that essentially rescues the aborted flower, resulting in two kernels that are fused together. "Despite the fusion, the kernels are not bigger," Gallie said. "It's basically the same corn, except that it is protein-rich and starch-poor - something that, if applied to sweet corn, would appeal to a large number of weight-conscious people in this country who are interested in low-carb diets and who normally avoid corn in their diets."

Media interested in covering the event need to contact Brian Hyps, American Society of Plant Biologists, at 301-251-0560, ext. 114 or bhyps@aspb.org.

Details of the study:

Flowers in the corn ear develop in pairs but one from each pair aborts before pollination can occur. Because of the role cytokinin, a plant hormone, plays in preventing organ death, Gallie's research group introduced a gene that enabled production of cytokinin, thus rescuing the flowers. The kernels produced from pairs of flowers fused into a single normal-sized kernel that contained two embryos and a smaller endosperm, the food storage tissue that provides nutrients to the developing embryo. Because the embryo contains the majority of protein and oil, two embryos in the kernel doubles the protein and oil content in corn grain. The nutritional value of the grain improves also because the size of the endosperm, which contains most of the carbohydrates, is reduced.

Gallie and his colleagues published their work last year in *The Plant Journal*. Though their research focused on feed corn, their technology can easily be applied to sweet corn, a sugar-rich mutant strain of regular corn. The U.S. Department of Agriculture, the National Science Foundation, and the California Agricultural Experiment Station funded the research.

Brief biography of Daniel Gallie:

Daniel Gallie received his doctoral degree in 1985 from the University of California, Davis. After completing postdoctoral studies at the John Innes Institute in Norwich, England, and at Stanford University, he joined the biochemistry department at the University of California, Riverside in 1990. During his career, Gallie has investigated the regulation of protein synthesis, the function of heat stress proteins, the control of cell death in plants, the role of plant hormones such as ethylene and cytokinin during plant growth and development, and the function of vitamin C in a plant's response to adverse environmental conditions. Results from his group have been published in over 100 papers and patents. He is a member of the American Society of Plant Biologists, a professional society devoted to the advancement of the plant sciences.

NATIONAL C-FAR IS a nonprofit, nonpartisan, consensus-based and *customer-led* coalition that brings food, agriculture, nutrition, conservation and natural resource stakeholders together with the food and agriculture research and extension community, serving as a forum and a unified voice in support of sustaining and increasing public investment at the national level in food and agricultural research, extension and education. The “Break & a Briefing” Seminar Series regularly presents leading-edge researchers to address pressing issues confronting the public and Congress. Interviews with National C-FAR President Joe Layton are available by request. For additional information, go to www.ncfar.org; or contact Tom Van Arsdall, Executive Director, at tom@vanarsdall.com.