Cover Stories:

Major Scientific Publications Featuring NRI-funded Research

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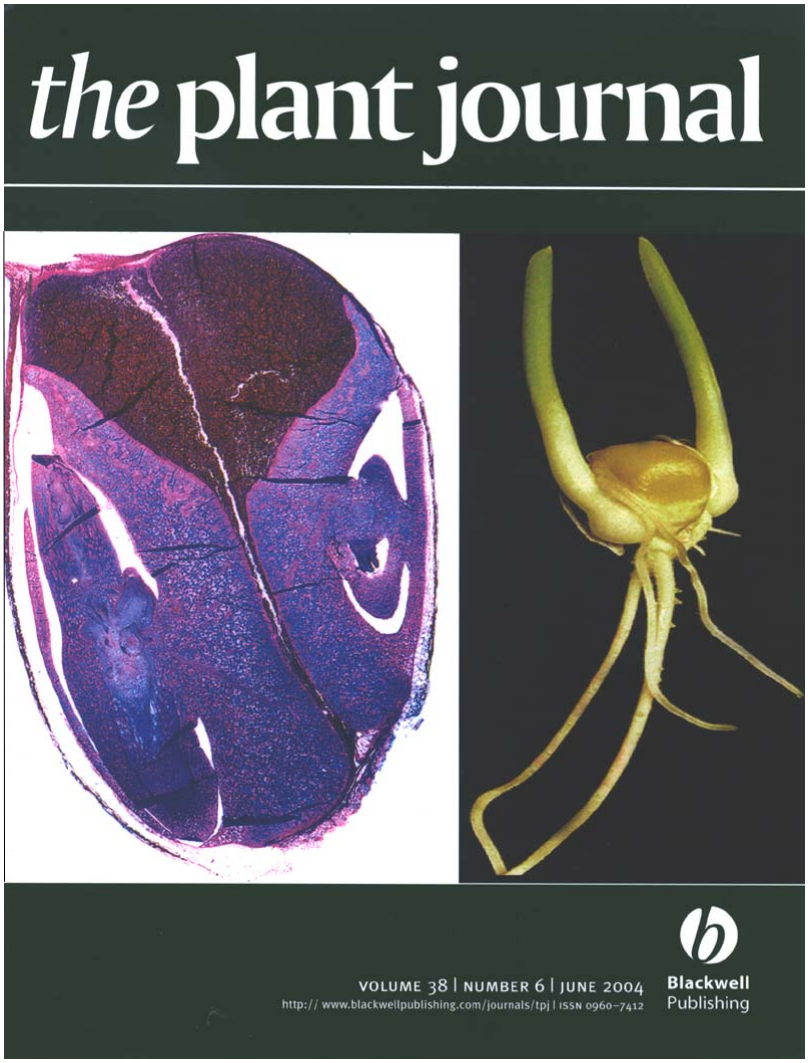
T. E. Young, J. Geisler-Lee, D. R. Gallie. June 2004. Senescence-induced Expression of cytokinin reverses pistil abortion during maize flower development. ***Plant Journal*** *38(6): 910-922.*



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University of California, Riverside biochemist Daniel R. Gallie and co-workers have developed technology that doubles the protein and oil content of corn while reducing its carbohydrate content. Flowers in the corn ear ordinarily develop in pairs but one from each pair aborts before pollination occurs. Because of the role that the plant hormone cytokinin often plays in preventing organ death, the researchers investigated whether it might rescue corn flowers which were destined to abort. Introduction of the gene that enabled production of cytokinin in developing corn flowers prevented flower abortion but, surprisingly, the kernels produced from each pair of flowers fused into a single normal-sized kernel that contained two embryos and a smaller endosperm. Because it is the embryo that contains the majority of protein and oil, the presence of two embryos doubles their content in corn grain. The reduction in the size of the endosperm in the kernel, the tissue that contains most of the carbohydrate, means that the protein and oil content of the grain increased relative to the carbohydrate content, thus improving the nutritional value of the grain. The findings may provide a useful approach toward feeding the world's population. Cereal grains are the most important crops to humanity and are used for animal feed as well as for the production of oil, protein, and starch. As the oil content of corn is especially valuable, increasing the amount of oil will increase the profitability of this crop to U.S. farmers. Specifically, the knowledge gained may be used to engineer grain crops to improve their nutrient and economic value.

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