Identification of Genes Required for Embryo Development in *Arabidopsis*

Iris Tzafrir[1], Allan Dickerman[2], Colleen Sweeney[1], Steven Hutchens[1], Sandrine Casanova[1], Amy Fesler[1], Clay Holley[1], John McElver[3], George Aux[3], David Patton[3], and David Meinke[1]

[1] Department of Botany, Oklahoma State University, Stillwater, OK 74078, USA
[2] Virginia Polytechnic Institute and State University, Blacksburg, VA 24061, USA
[3] Syngenta Biotechnology, Inc., Research Triangle Park, NC 27709, USA

We describe here an initial dataset of 250 *EMB* genes required for normal embryo development in *Arabidopsis*. This represents the first large-scale dataset of essential genes in a flowering plant. Analysis of these genes has been the primary objective of our NSF 2010 Project (www.seedgenes.org). When compared with 550 genes with other knockout phenotypes, *EMB* genes are enriched for basal cellular functions, deficient in transcription factors and signaling components, have fewer paralogs, and are more likely to have counterparts among essential genes of yeast and worm. *EMB* genes also represent a valuable source of plant-specific proteins with unknown functions required for growth and development. Analysis of these genes is described in two other posters from the laboratory (T1-82 and T10-42). Many of the estimated 500-1000 *EMB* genes in *Arabidopsis* have nevertheless escaped detection to date. Based on sequence comparison with essential genes in other model eukaryotes, we have identified 244 candidate *EMB* genes without paralogs that represent promising targets for reverse genetics. Salk lines containing insertions within these genes are currently being screened for seed defects. These efforts should facilitate the recovery of additional genes required for embryo development.