MODELING GENETICALLY-MODIFIED MAIZE GRAIN PRODUCTION PRACTICES TO ACHIEVE EU LABELING THRESHOLDS. David I Gustafson, Ivo O. Brants, Michael J. Horak, Kirk M. Remund, Eric W. Rosenbaum, and John K. Soteres, Senior Fellow and Research Scientists, Monsanto Company, 800 North Lindbergh Blvd, St. Louis, MO 63167.

An empirical approach is given for specifying co-existence requirements for genetically-modified (GM) maize production, in order to ensure compliance with the 0.9% labeling threshold for food and feed in the European Union. A total of 56 individual datasets were considered in which pollen-mediated gene flow (PMGF) was measured within maize receptor fields at a series of distances from source fields having a marker trait not present in the receptor. The field data for each trial were assessed to determine three characteristic results from each experiment: (1) the precise distance at which gene flow fell below 0.9%; (2) the first 5 m harvester pass that would yield gene flow below 0.9%; and (3) the number of 5 m passes that would need to be harvested separately in order to maintain blended average gene flow below 0.9% for a 100 m wide field (corresponding to a square, 1 ha receptor field, or approximately one truck load of grain). In addition, an empirical model is presented that fits the observed decrease of gene flow with distance. The model was parameterized to provide both reasonable worst case and expected case predictions of gene flow for various combinations of isolation distance, use of non-GM border rows in the GM field and/or separately harvested border rows in the receptor field. Based on the data assessed, the model is used to show that the effect of scale is minimal for source fields of surface area 4 ha and greater. Combinations of isolation distance and border rows of 20 m or more are predicted to result in gene flow of less than 0.9%, as a blended average for receptor fields 1 ha or larger. Lesser requirements are necessary when the source field is much smaller than the receptor, and an extension to the model is provided in order to estimate such effects.

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