

USING TIME AND DISTANCE ISOLATION FACTORS FOR CONFINEMENT OF POLLEN-MEDIATED GENE FLOW IN MAIZE. Mark E. Halsey, Donald Danforth Plant Science Center, St. Louis, MO 63132; Kirk M. Remund, Philip J. Eppard, Monsanto Company, St. Louis, MO 63167; Christopher A. Davis, Monsanto Company, Coalinga, CA 93210; Mick Qualls, Qualls Ag Labs, Ephrata, WA 98823; Sharon A. Berberich, Chlorogen, St. Louis, MO 63141.

Studies were conducted in California (CA) and Washington (WA) to evaluate the relationship of distance and temporal separation for isolation of maize from pollen-mediated gene flow (PMGF). Kernel color was used to detect outcrossing from source plots to receptor plots planted at distances up to 750 m and planting intervals of up to three weeks from the pollen source. Increasing temporal separation reduced the distance required to achieve genetic isolation. Outcrossing was <0.01% at 500 m when source and receptors flowered at the same time, whereas this level of confinement was achieved at 62 m when two weeks of temporal separation (335 gdu) was used. No outcrossing was detected at 750 m and two weeks of temporal separation. Levels of outcrossing were less in WA, perhaps due to the less persistent wind patterns observed there. Wind variability was such in WA that the presentation of wind data in 'wind roses' was not helpful in determining the direction of predominant gene flow, and more detailed presentation was required. PMGF may be expressed as dispersal curves or gradients, which may be helpful in analyzing diverse environmental influences. The comparison of gene flow gradients may be useful in evaluating production locations and establishing reproductive isolation standards for maize with novel genetic traits.