POLLEN-MEDIATED GENE FLOW IN CALIFORNIA COTTON DEPENDS ON POLLINATOR ACTIVITY. Allen Van Deynze, Frederick J. Sundstrom, and Kent Bradford; Seed Biotechnology Center, University of California, Davis; and California Crop Improvement Association, University of California. One Shields Avenue, University of California, Davis, CA, 95616.

Many cotton (*Gossypium hirsutum*) pollination studies have been carried out in the southern U.S., but no data exist for California. In this study, we measured pollen-mediated gene flow (PGF) in four directions over two years from herbicide-resistant source plots in upland cotton in the California cotton growing region and in a region with high pollinator activity. In addition, samples were taken from fields of conventional varieties at varying distances from fields planted with herbicide-resistant varieties to assess PGF under commercial production conditions. A seedling herbicide bioassay confirmed by DNA tests was used to measure PGF. PGF was independent of direction from the source plot and declined exponentially with increasing distance from 7.65% at 0.3 m to less than 1% beyond 9 m when there was high pollinator activity (Figure 1). In the absence of high pollinator (honeybee) populations, PGF was less than 1% beyond 1 m. Pollen flow in commercial fields was consistent with the experimental plot data, with only 0.04% PGF detected at 1625 m. This study confirms that PGF decreases exponentially with distance in cotton grown under California conditions and is low in the absence of pollinators, although sporadic occurrence of PGF can be detected up to 1625 m (1 mile) (Figure 2).

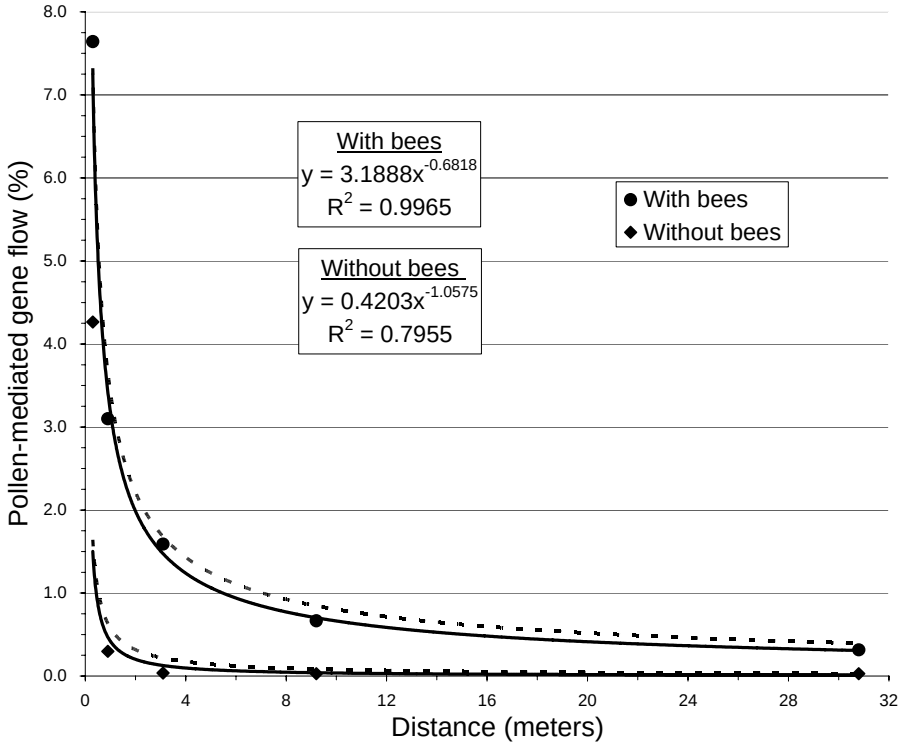

Figure 1. Pollen-mediated gene flow (PGF) in California with (Kearney, circles) and without (Shafter, triangles) the addition of honeybees. Each datapoint represents PGF detected from 16,000 seeds sampled in four directions from a source plot in two growing seasons. Solid lines represent the best fit curve for the two datasets. Broken lines represent 95% upper confidence limit.

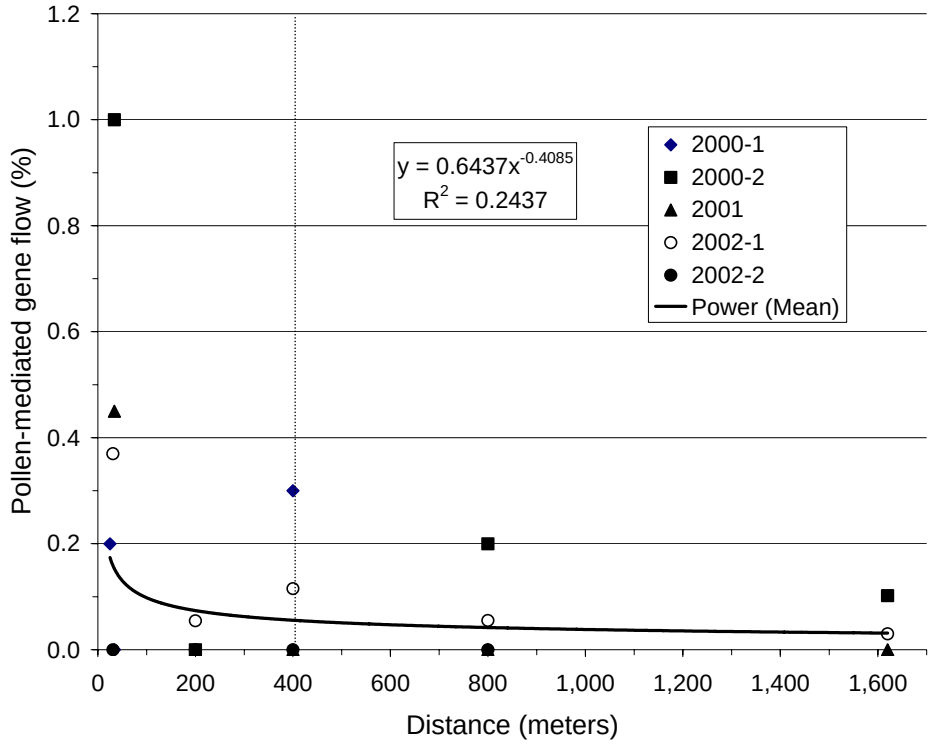

Figure 2. Pollen-mediated gene flow (PGF) in California collected from neighboring fields separated by open space in five different locations in three years. PGF was calculated based on samples (2000 seeds each) collected at the closest edge of solid-seeded commercial fields (25-34 m), 200, 400, 800 and 1625 m from herbicide-resistant (BXN or Roundup Ready) cotton. Solid line is the best-fit regression curve. Broken vertical line represents the current isolation distance for foundation seed of 400 m.