Tracing Transgenic Seeds Using Fluorescent Marker Proteins and Laser Seed Sorting Technology. (C04-welbaum084301-Poster)

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Abstract:

Chlorophyll content of seeds can be non-destructively measuring by fluorescence after seeds are exposed to a laser beam ranging from 675-720 nm. Chlorophyll fluorescence sorting is used commercially to remove immature seeds from seed lots. Fluorescent proteins can be expressed in seeds and used as nondestructive markers for tracing particular genes. We transformed diploid potato with GFP to determine how effectively it could be used as a fluorescent marker in seeds. When viewed under a microscope and excitation at 450-490 nm from a high pressure mercury light source, GFP potato seeds appeared pale green. However, nontransformed seeds also fluoresced at the same wavelength yielding a yellow-green color in comparison. There was also significant variability in the degree of fluorescence among transgenic seeds. A SeedMaster Analyzer (Satake USA Inc., Houston, Texas) set in the range of 675-720 nm to measure chlorophyll fluorescence could not successfully sort GFP from nonGFP potato seeds despite differences that could be detected by eye. Combinations of fluorescent proteins, light sources, filters, gene promoters must be optimized before seed fluorescent markers can be reliably used to trace transgenic seeds.

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