The Rate of Pollen Tube Reallocation and Its Effect on the Location of Developmental Hybrid Seeds in Cucurbita pepo

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The purpose of this project was to determine the rate of pollen tubes fertilizing ovules in non-corresponding locules in a process termed reallocation. Determining the rate of reallocation will verify the efficiency of the industry practice of breeding multiple hybrids on different stigmatic lobes to save greenhouse space. It was hypothesized that there would be a low rate of reallocation supporting this industry practice. The hypothesis was tested by crossing purebred recessive vine females with purebred dominant bush and purebred recessive vine males. Bush and vine pollen were placed on different stigmatic lobes and the corresponding locules of each pollination type were marked on the young fruit. Eight experimental pumpkins were grown out, and harvested, and the markings were observed to determine each seed's locule and pollination type. Ninety-four experimental seeds were grown out to see if they matched their locule's pollination type. If the offspring's phenotype did not match its locule's pollination type, it was fertilized by a non-corresponding stigmatic lobe meaning that reallocation occurred. Overall, the hypothesis that the majority of the offspring phenotypes would match their locule's pollination type was partially supported. Sixty-eight point two percent of the offspring had phenotypes matching their pollination type while reallocation occurred the other thirty-one point eight percent of the time. A chi-square test showed that pollinating different stigmatic lobes significantly affected the location of corresponding seeds. Important trends were observed, and these results provide a good base for further research into these trends.

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