Extent and distribution of genetic variation in U.S. maize (C01-ho104726-Poster)

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Abstract:

We report the extent and distribution of SSR variation in 40 Northern Flints, 39 Southern Dents, 107 Corn Belt Dents, and 75 historically important inbred lines. Loss of rare alleles in open-pollinated germplasm resulted in the distinct divergence of inbred lines from their progenitor races. In contrast, the Corn Belt Dents retained high levels of genetic variation that approximate or exceed that found in the Northern Flints and Southern Dents. Absence of population differentiation in dent germplasm suggests frequent admixture, recent divergence time, or poor correlation between the degree of divergence at neutral marker loci and quantitative trait variation. Population substructure, heterozygote deficiency, and departure from Hardy-Weinberg equilibrium indicate assortative mating or incomplete admixture that can be critical to strategies for sampling open-pollinated maize. This research suggests that the inbreds used for line improvement do not represent the genetic diversity available in their ancestors: only 56% of the observed Corn Belt Dent alleles were found in our diverse set of lines. Extensive sampling of a limited number of Corn Belt Dent cultivars is a promising approach toward the improvement and conservation of modern U.S. maize.

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