Chromosome Engineering by Homoeologous Recombination. (C08-lukaszewski104528-Oral)

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Abstract:

Chromosome engineering is defined here as a conscious introgression of alien chromatin into a crop species. It can be accomplished by recombination or by random fragmentation and fusion of chromosomes. The fragmentation approach tempts with large rewards for little input, but is ineffective. Recombination guarantees precise introgressions of desired segments into designated positions in the recipient genomes, but is laborious. In the recombination approach in wheat, the donor and recipient chromosomes are induced to recombine, primary recombinants are selected and evaluated, and may be used to create higher-order recombinants. In theory, single alien genes could be introgressed; in practice, efficiency limits precision. Sensible population sizes are dictated by chromosome affinity, the resolution in mapping of the breakpoints, and the frequencies of crossovers between closely spaced points on two structurally different chromosomes. The parameters of recombination can be manipulated to a degree, and selection protocols may increase the recovery rates of recombinants. In other species, such as grasses or rice, recombination patterns and rates may be altered in the hybrids offering opportunities not available in wheat. In each system, therefore, the selection of the proper approach should be based on the characteristics of chromosome behavior and the commitment to the objective.

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