WHEAT COMPOSITE CROSS I. CREATED FOR BREEDERS EVERYWHERE

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The authors have developed a very diverse composite population from recombined F1 plants of hexaploid wheats. The population is believed to be amenable to selective improvement and exploitation anywhere that wheat is grown. Built-in sterilities will foster continuing recombination and high heterozygote persistence.

This population was engineered to advance population genetics and evolutionary breeding (2). Pugsley’s male-stereile (4), set in several backgrounds, was the most unique recombination tool. The population complements in theory and probable use Barley Composite Cross XXXI distributed world wide in 1960–61 (3). It differs from the broad contributory gene pool concept proposed by Jensen (1), principally in that it features the inclusion of special media for accelerating continued recombination among a finite parental group.

The diverse interests inherent in our respective regions and programs were put into this composite. The crosses from California included the products of 40 years of backcross breeding, introgressions from 25 years of manipulating wheat × Agropyron crosses, both named and unnamed wheats from Mexico, certain male-stereile lines, and historically important parents. The Idaho crosses combined disease resistant types of red and white, winter and spring wheats principally from northwestern North America, Australia, and South America. From the Cornell nurseries came winter wheat hybrids from both red and white parents with eastern United States, Canadian, European, and Japanese origins. The Missouri crosses sampled soft red and hard red winter wheats and the North Dakota crosses only hard red spring wheats. The aggregate totaled 235 crosses. This partial listing of named parents will further characterize the diversity of the recombinants: Avon, Baart 46, Big Club 60, Burt, Canus, Chappingo 53, Charter, Centana, Chyenne, Clarkan, Conley, Elgin, Frontiera, Gabo, Gaines, Hohenheimer, Genesee, Golden, Itana, Idaed 59, Justin, Kawvale, Kentana 48, Kenya Farmer, Knox, Komar, Lemhi 53, Marquis, Maria Escolar, McMurchy, Munturki, Monon, Newthatch, Onas 55, Orfeld, Ponca, Pwnee, Poso, Ramona 50, Rescue, Redcoat, Reed, Ridd, Sonora, Tendoy, Thatcher, Triplet, Triumph, Wasatch, Wichita, and Yaski 54.

The 85 California crosses contributed the principal mechanisms for promoting natural F2 and subsequent recombination. In addition to Pugsley’s male-stereile wheat, there were included chemically induced mutant sterilities (mostly nullisomic and monosomic types) and the gamete viability difference inherent from crossing blue wheat (with a substituted pair of Agropyron chromosomes) with red or white wheat (4).

Summary

Castorbean varieties appear to differ in their susceptibility to European corn borer. The degree of damage can be sufficiently high to warrant consideration of European corn borer resistance in castorbean breeding programs in areas of potential corn borer hazard.