

## 2. Testing for heterosis from inter-allelic interaction.

In a backcrossing experiment extending over ten generations, dominant gene markers were introduced into a relatively homozygous, long inbred line by outcrossing and backcrossing. The backcrossed lines each segregating for one of the dominant gene markers were gradually reduced in the amount of heterosis until there was no measurable difference in average height between the backcrossed line and the original recurrent parental line. One of the gene markers, Yy, endosperm permits a critical comparison between individuals grown from seeds produced on the same ears. The plants heterozygous for the gene marker were 0.8 inches taller than the plants homozygous for this marker. The two other markers used showed similar differences. The significance of these differences is being determined. This difference in the Y and y individuals is an increase in height of 10 percent over the homozygous sib plants. The original heterosis was a 33 percent increase in the first generation hybrid.

The evidence shows clearly that a large number of genes are involved in heterosis as measured by height of plant. Many of these are on the same chromosomes and are closely linked with these gene markers which were selected at random for their position on the chromosomes.

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