PIONEER HI-BRED CORN COMPANY
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1. Fertility restorer genetics.

Three progenies from the S_1 of the backcross: WF9(WF9 x KY21) have been obtained which when crossed to the male-sterile line $SK2^T$ give all fertile progeny but which when crossed to the male-sterile line $WF9^T$ give all male-sterile progeny. This is a confirmation of the hypothesis (Duvick, in Genetics 41:544-565, 1956) that fertility restoration in T cytoplasm depends upon the simultaneous presence of at least two dominant genes, either of which, if present as a homozygous recessive, can cause sterility. Thus, the genotypes of the various lines involved herein are presumed to be as follows:

SK2	$rf_1rf_1Rf_2Rf_2$
WF9	$rf_1rf_1rf_2rf_2$
KY21	$Rf_1Rf_1Rf_2Rf_2$
Selected S_1 of BC	$Rf_1Rf_1rf_2rf_2$

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2. Rapid recurrent and reciprocal selection.

By use of genetic markers displaying incomplete dominance of simply inherited kernel characteristics, it should be possible to complete cycles of selection requiring progeny tests in less time than hitherto reported (see Hull, Agron. J. 1945 and Comstock et al., Agron. J. 1949). This modification of conventional recurrent and reciprocal methods is herein outlined and designated as the rapid method.

Three crop generations are ordinarily required per cycle in conventional recurrent or reciprocal selection for yield in corn. These consist of (1) making test crosses, (2) growing test crosses, and (3) intercrossing the parent lines of the best test crosses. The rapid method hinges on the ability to separate outcrossed and intercrossed seed on single ears or groups of half sib ears (half sib ears are from sister plants pollinated by non-sister plants). This separation of seed effectively allows the combining of crop generations (1) and (3) above. The following example utilizes endosperm color as a marker in a reciprocal selection program. The rapid method for recurrent selection would be similar but requiring only one isolation plot.