

1. Number of genes involved in pollen fertility restoration.

Fifteen inbred lines of corn which had been previously reported as restorers to Texas Cytoplasmic male sterility were found to restore fertility in North Carolina. These lines are K6, R6, R7, K55, NC77, Mp307, K63, Ky21, Ky122, T115, Tx127C, TxGJ39, T208, NC212, and a Mississippi inbred, Yel-Jel 81-1-1-1-1.

Additional studies, in general, support the hypothesis that each of these inbreds possesses at least one dominant gene for pollen fertility restoration. The following steps were used in arriving at this conclusion:

1. Seventy eight of the 105 single crosses possible among the 15 inbreds were made.
2. All of these single crosses were crossed with a Texas source of male sterile cytoplasm.
3. Approximately 30 plants of each progeny were grown and classified for pollen shedding.

Of the 78 crosses studied 72 were entirely fertile. Sterile plants did occur in the remaining 6 crosses with a frequency of approximately 1 sterile plant to 30 fertile plants. These sterile plants might be explained by a difference in loci involved in fertility restoration in the two inbreds, the genes being located close enough together so that crossing over between the two loci, which would result in a gamete with genotype for sterility being formed, would occur in about 12% of the meiocytes. Seed mixture or pollen contamination might also explain a few sterile plants.

Ratios in backcross data involving plants of the constitution cytoplasmic male sterile x (cytoplasmic male sterile x restorer inbred), did not deviate significantly from a 1:1 ratio which also indicates that each of the following inbreds possesses a single dominant gene for pollen fertility restoration: K63, Mp307, Ky21, Ky122, NC77, and K55. These ratios are based on populations of approximately 60 plants each.

The inbreds Oh29 and K64 which have been reported as restorers in other states were found to have little value as restorers in North Carolina. These inbreds when crossed with Texas male sterile cytoplasm restored only partial fertility.