

4. Association test between interchanges and midribless leaf character.

In 1959 a selfed culture of Illinois High Oil produced several plants whose lower leaves had no midribs. The character is redressive and affects the first 2 to 5 leaves of the plant which hang limp from the stalk. A selfed ear culture was used as the source of the character for this study. By selection, selfing, and sibbing, plants have been obtained with no midribs in any of the leaves; however all these extreme types have been weak plants. The original trait appears to have no effect on vigor or viability. The expression of the character is most striking in the third to tenth leaf stage and thus may have some possibility as a seedling marker. Seed has been offered to Maize Cooperative Genetic Stocks.

The A 188 interchange series (developed by Burnham, Longley and Jenkins) was used to determine the location of the gene(s) controlling this character. The following is a portion of the data obtained in recent X^2 tests of backcrosses involving the character and a series of chromosomal translocations.

Family	Translocation	NR	Tr	Nr	TR	Total	P
25076	3-4(5156)	17	28	61	36	142	.01
25081	4-7(7108)	17	34	46	42	139	.01
25106	4-8(6926)	22	23	51	69	165	.01
25079	3-7c	12	19	50	57	138	.01

N = normal; T = translocation-heterozygote; R = ribbed; r = midribless

Although further tests are required, it appears that a major factor is located on the long arm of chromosome 4 and possibly another on the long arm of chromosome 7.

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1. The cytology and morphology of male-sterile lines of corn.

Measurements of normal, male-sterile, and restored corn stalks showed that the internodes and tassel culms were shortened in the male-sterile version. Pre-anthesis plants showed shortening in the male-sterile version between 10 and 14 days after meiosis. The exact time depends upon the internode location in relation to the ear and when elongation occurs. Since pollen degeneration occurs about 5 days after meiosis, shortening does not appear to be the effect of the cytoplasm itself. Genetic male steriles also showed a shortening of the tassel culm and internodes above and below the ear. Shortening depended upon the line and internode location. Pollen breakdown preceded shortening by at least 5 days.

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