DE KALB AGRICULTURAL ASSOC., INC.
De Kalb, Illinois

1. Cytoplasmic influence on internode length in maize.

I. The stunting effect of cytoplasm on plant height has been reported in Epilobium by Michaelis (Advances in Genetics, vol. 6. 1954. pp. 287-401) and also in Zea mays by Briggle (Agronomy Journal, vol. 48. 1956. pp. 569-573) and others.

In 1955 and 1956 an attempt was made to determine whether this stunting phenomenon in maize took place in the tassel internode only or if it was a general effect involving all internodes. Preliminary observations also seemed to suggest the possibility that one or more nodes was actually missing in the cytosterile strain.

Fertile and sterile counterparts of both S and T type inbred lines and single crosses were grown in alternating rows. In all comparisons listed in the tables below plants from sterile rows were compared with plants in fertile rows adjacent to them. After the plants had obtained their maximum growth and were still green, they were cut between the lowest visible node and the surface of the ground. These plants were then stripped of their leaves. Internode No. 1 is the distance in inches between the lowest tassel branch and the uppermost leaf node. Internode No. 2 is the length between the uppermost leaf node and the next leaf node below and so on down the stalk. All internode lengths were measured but only the upper three including the tassel internode are listed on the accompanying tables.

All lengths and node numbers in the following data are average lengths in inches of ten plants with the exception of table A where Wf-9 F internode lengths are the average of 20 plants compared with 29 plants in Wf-9 S. Also, 12 plants of Wf-9 F are compared with 14 plants of Wf-9 T. In the single crosses, table B, the average internode lengths of 21 plants of (Wf-9 x 38-11)F were compared with 19 plants of Wf-9 x 38-11)S.

II. The following tables show the comparison between fertile and sterile counterparts of inbred and single crosses. Average internode length of 10 or more plants (see last paragraph in section I) is given in inches. "S" and "T" refer to the cytosterile source.

1955 Data

Table A.

		Internode No. 1		Internode No. 2		Internode No. 3	
		Fertile	Sterile	Fertile	Sterile	Fertile	Sterile
Wf-9 S		7.07	6.17	3.75	3.70	4.29	4.15
Wf-9 T		6.74	5.71	4.15	3.80	4.77	4.52
	Sum	13.81	11.88	7.90	7.50	9.06	8.67
	F	11.75*		0.88		0.44	

Table B.

Wf-9 x M14)S		8.90	6.92	5.67	4.54	5.25	5.02
Wf-9 x 38-11)S		8.40	6.92	5.17	5.06	5.06	5.24
	Sum	17.30	13.84	10.84	9.60	10.31	10.26
	F	50.00*		2.92		1.00	

1956 Data

Table C.

Wf-9 T		9.00	6.67	4.85	3.99	4.64	4.41
M14 T		8.26	7.57	5.45	4.64	4.89	4.58
W22 T		7.89	7.47	4.66	4.45	4.50	4.45
	Sum	25.15	21.71	14.96	13.08	14.03	13.44
	F	65.66**		4.21		2.00	

Table D.

Wf-9 S		8.16	7.20	4.35	3.82	4.25	4.07
M14 S		8.31	7.14	5.34	4.17	5.15	4.21
W22 S		7.69	7.79	5.03	4.92	4.90	4.90
	Sum	24.16	22.13	14.72	12.91	14.30	13.18
	F	5.81		1.88		1.02	

** Significant at 1% level.
* Significant at 5% level.

	Internode No. 1		Internode No. 2		Internode No. 3	
	Fertile	Sterile	Fertile	Sterile	Fertile	Sterile
Table E.						
Wf-9 x Oh43)T	11.34	9.37	7.20	5.97	6.66	6.30
Wf-9 x Pal.8)T	12.32	9.20	6.80	5.97	6.52	6.16
Wf-9 x 38-11)T	10.63	7.62	6.42	5.68	6.44	5.98
Wf-9 x Hy)T	12.27	9.83	7.60	6.69	7.28	6.93
Sum	45.56	36.02	28.02	24.31	26.90	25.37
F	17.58**		7.71*		1.83	
Table F.						
Wf-9 x M14 S	11.11	8.19	6.92	5.69	6.91	5.85
Wf-9 x W22 S	11.10	9.71	7.08	6.55	7.07	6.96
Wf-9 x Pal.8 S	11.82	9.57	6.48	6.10	6.25	6.46
Wf-9 x 38-11 S	10.97	8.44	6.36	5.75	6.24	6.01
Wf-9 x Hy S	12.15	11.21	7.17	7.39	7.15	7.67
Sum	57.15	47.12	34.01	31.48	33.62	32.95
F	11.69**		1.89		.106	

** Significant at 1% level.
* Significant at 5% level.

III. When the "F test" is applied significant differences exist in the internode length of single crosses and inbred lines between fertile and sterile counterparts of both cytoplasms with the exception of the inbreds in table D. In table E a significant difference at the 5% level was found in the second internode of four single crosses involving the T cytoplasm. No significant differences exist in internode lengths below the 3rd internode down to the internode above ground. Whether or not stunting takes place in the internodes of the root system below ground or in the floral parts other than glumes, anthers, and pollen is not known.

IV. Slight differences in the actual number of nodes was also observed between inbred lines and single crosses involving the S and T cytoplasm. However, when the "F test" is applied these differences are not significant at either the 1% or 5% level. The results from 1956 data are summarized in the following tables where each number represents the average number of nodes in 10 plants.

Table G.

	S - Type		T - Type	
	Fertile	Sterile	Fertile	Sterile
Wf-9	14.9	14.6	13.1	12.7
M14	12.0	12.1	11.6	11.8
W22	12.8	12.0	12.6	12.3
Sum	39.7	38.7	37.3	36.8
F	.072		.127	

Table H.

	Fertile	Sterile		Fertile	Sterile
Wf-9 x M14)S	13.6	13.8	Wf-9 x Oh43)T	13.2	13.5
Wf-9 x W22)S	14.7	14.1	Wf-9 x Pal.8)T	14.8	14.3
Wf-9 x Pal.8)S	15.4	15.0	Wf-9 x 38-11)T	15.0	14.6
Wf-9 x 38-11)S	15.4	14.7	Wf-9 x Hy)T	14.4	14.2
Wf-9 x Hy)S	15.3	14.4			
Sum	74.4	72.0	Sum	57.4	56.6
F	1.38			.184	

Loring M. Jones

EAST AFRICAN AGRICULTURE AND FORESTRY RESEARCH ORGANIZATION
Kenya Colony, East Africa

1. Breeding maize for resistance to Puccinia polysora Underw.

Puccinia polysora was first recorded in East Africa in 1952. Genetic studies, by seedling tests in glasshouses and breeding from plants selected in these tests, were undertaken at Muguga, Kenya; and field breeding by collaborators on three stations in Kenya, Uganda and Tanganyika.

Only one physiologic race, termed "EA.1", has yet been detected in the field. A second race, "EA.2", appeared in the glasshouses in 1955.

No resistance to either race was found in any African maize. Through the generosity of correspondents, a collection of over 200 maizes from Central America and the Caribbean area was assembled. In 45 of