bath. Coarse cellular material was spun down at low centrifugal speeds until the supernatant fluid could be assured of passing through a syringe. Within an hour after harvest the root extract was injected into young rabbits by two routes: one group of animals was inoculated intravenously and a second group was inoculated intramuscularly using antigen with an adjuvant. The injection program was continued eight weeks at the end of which time the animals were exsanguinated and the blood allowed to clot. The serum was collected and stored at -72° C.

Gel diffusion plates were prepared with wells from which antiserum was allowed to diffuse out against the antigens prepared from fresh roots by the method mentioned above. Two separate precipitin bands could be detected where $\underline{r}^g$ or $\underline{R}^r$ was used as the diffusing antigen. It is concluded that the alleles $\underline{R}^r$ and $\underline{r}^g$ produce antigenically detectable substances which can now be identified by means of our antiserum.

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1. 7x7 latin square experiments for special purpose studies.

In 1963 four sets of eight 7x7 latin square experiments were planted, two sets on the Dayton, Iowa, and two on the DeKalb, Illinois, research farms. Each set of two experiments had duplicate entries. One purpose for planting this series of experiments (which will not be discussed in detail here) was to accurately measure agronomic differences between hand harvest and machine harvest methods.

A. TR vs. T Cytoplasm Comparison

In addition to the comparison between harvest methods, these experiments were designed to show differences in yield, moisture, and plant quality between sterile T-cytoplasm, and restored sterile T-cytoplasm.

In each 7x7 latin square, six of the entries were composed of three pairs of single crosses, one member of each pair being the sterile version, the other member a restorer version of the same single cross. In this latter version, the TR line was used as the female parent. For the purpose of this test, one to one segregating backcross progeny of T sterile and TR restored-sterile plants were pollinated by the same male inbred so that each pair of single crosses differs only by Rf genes and their linkage complex. It also follows that each female inbred of a pair had an equivalent amount of backcrossing. Most pairs were either in the 5th or 6th backcross generation. The 7th entry in each experiment is a standard commercial single cross hybrid with normal cytoplasm.

Table 1

	Entry No.							Entries Thinned to 16,000 Pl/A.	
	1	2	3	4	5	6	7		
Cytoplasm	TR	T	TR	T	TR	T	N	LSD*	C.V.%
				Expt. 224 (H)					
Yield bu/A	142.0	143.5	131.6	131.7	122.6	118.2	129.1	9.83	6.86
Moisture %	17.3	17.4	16.1	16.3	18.6	19.3	17.6	1.04	5.44
T.D.Pl.	0.7	1.9	2.0	1.7	1.1	1.7	1.4	N.S.	--
				Expt. 225 (M)					
Yield bu/A	144.9	142.9	125.7	123.1	107.8	113.6	127.9	9.83	7.12
Moisture %	17.3	16.6*	16.4	16.4	18.9*	19.6	17.3	.60	3.12
T.D.Pl.	1.7	2.9	2.6	2.7	1.9	0.4	1.3	N.S.	--
				Expt. 226 (H)					
Yield bu/A	123.7	125.1	175.5	176.2	156.6*	147.2	136.1	7.44	4.59
Moisture %	20.0*	21.0	19.1	19.3	19.4	19.4	17.9	.64	3.02
T.D.Pl.	1.0	0.1*	0.4	0.4	0.0	0.0	1.1	.77	--
				Expt. 227 (M)					
Yield bu/A	117.4	121.6	162.7	160.0	141.4	141.3	135.2	8.07	5.29
Moisture %	19.7*	20.9	19.6	19.6	19.6	19.3	18.1	.83	3.89
T.D.Pl.	.4	.9	.6	.6	.4	.4	.6	N.S.	--
				Expt. 228 (H)					
Yield bu/A	126.4	128.6	146.6	148.1	155.7	155.6	128.1	6.25	4.05
Moisture %	16.3	16.1	15.6	15.6	16.3	16.0	15.4	0.47	2.72
T.D.Pl.	1.4	2.1	3.3	2.6	5.3	5.7	1.4	2.31	--
				Expt. 229 (M)					
Yield bu/A	122.8	116.1	144.9	140.6	144.8	156.8*	124.3	10.22	6.90
Moisture %	16.7	16.0*	15.9	15.7	16.4	16.4	15.7	.48	2.72
T.D.Pl.	2.6	2.9	2.9	2.6	3.7	2.6	2.0	N.S.	--
				Expt. 230 (H)					
Yield bu/A	136.2	139.9	150.8	148.1	133.3	136.2	123.1	7.24	4.80
Moisture %	15.0	15.0	15.9	15.7	15.7	15.7	15.0	0.58	3.46
T.D.Pl.	2.6	1.6	2.4	3.4	3.1	2.1	0.9	1.39	--
				Expt. 231 (M)					
Yield bu/A	126.1	133.9	123.7	131.7	132.6	131.4	114.1	10.47	7.51
Moisture %	15.1	15.1	16.0	16.0	16.0	15.6	15.3	.36	2.09
T.D.Pl.	3.7	1.6*	4.3	4.7	2.9	2.0	1.1	1.83	--
Expts.				Average Yield Bu/A.					
224/225	143.45	143.20	128.65	127.40	115.20	115.90			
226/227	120.55	123.35	169.10	168.10	149.00	144.25			
228/229	124.60	122.35	145.75	144.35	150.25	156.20			
230/231	131.15	136.90	137.25	139.90	132.95	133.80			

(H) = Hand harvested; (M) = Machine harvested.
*Significant at the five per cent level.

Data from each experiment are summarized in Table 1 for yield in bushels per acre, per cent moisture, and total damaged plants (T.D.Pl.). The pairs of single crosses are entries 1 and 2, 3 and 4, 5 and 6, with No. 7 being the check entry. With the exception of entry 5 in experiment 226 and entry 6 in experiment 229, no pair member significantly outyielded the other. In the case of moisture, five pairs differed significantly and two pairs differed in total damaged plants. Of the 24 pairs of single crosses compared, eleven yielded more with a TR female and thirteen yielded more with a T female. When the yields of the entries from hand harvested and picker-sheller harvested experiments were averaged, the number of TR and T female single crosses outyielding the other was the same, namely six.

B. Restorer Gene Expression

By using the TR line in the female or "A" position, it was also possible to detect any inhibiting or enhancing action on the part of the pollinator inbred with respect to fertility restoration in the crosses containing Rf germ plasm. From a cursory examination of the plants at pollen shedding time, it was found that entries 1 and 5 in experiment 224 had a higher proportion of fertile plants than the expected 1:1 ratio of fertile to sterile. Entry 5 of experiment 226 exhibited only partial fertility. However, its sterile counterpart, entry 6 in the same experiment, exhibited the same degree of partial fertility. These results, even though from incomplete data, suggest that further investigation of this mode of fertility expression is warranted.

Loring M. Jones

2. Parthenogenesis.

In parthenogenesis in maize, the fate of the male nucleus that normally fertilizes the egg is unknown. The possibility has been raised that in parthenogenesis both male nuclei fuse with the polar nuclei to form a tetraploid endosperm. To check this possibility, the white inbred line 4Co82 was crossed reciprocally with the yellow inbred line W22. It was hoped that dosage effects would indicate tetraploid endosperm, as follows:

a) 4Co82 as female x W22 as male -
normal endosperm yyY (pale yellow)
tetraploid endosperm yyYY (medium yellow)

b) W22 as female x 4Co82 as male -
normal endosperm YYy (strong yellow)
tetraploid endosperm YYyy (medium yellow)

The expected (tetraploid) class of endosperms was not detected. Another test set based on stippled gave the same negative result.

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