

## III. STOCKS AVAILABLE AND WANTED

## A. Wanted:

W. D. Bell, Pennsylvania State University

Unclassified chlorophyll-deficient mutants, particularly yellow-stripes, green-stripes, pale green or yellow seedlings.

R. G. Creech, Pennsylvania State University

All mutants showing positive allele tests with ae (amylose extender on chromosome 5) for genetic fine structure studies.

All mutants affecting carbohydrate synthesis in the corn kernel (phenotypic changes in endosperm). Please state genetic background, i.e. dent, floury, etc.

## B. Available:

E. H. Coe, Jr., Curtis Hall, University of Missouri

Glossy-1 mutable.

E. H. Coe, Jr. or M. G. Neuffer, Curtis Hall, University of Missouri

Purple-seeded translocation set, wx-marked for each chromosome. Useful in locating factors affecting aleurone color.

A. L. Hooker, 242 Davenport Hall, University of Illinois

Genetic stocks homozygous for a dominant gene (Ht) conditioning resistance to Helminthosporium turcicum. Two stocks are available: Source A resistance from GE440 and Source B from Ladyfinger popcorn. Each is a mixture of S<sub>3</sub> lines from crosses between the resistant sources and corn belt inbreds. Silking data is similar to WF9.

## D. L. Shaver, Biology Division, Brookhaven National Laboratory

The following tetraploid genetic stocks are available.  
In some cases it is not certain that all loci are  
"pure for the aleurone and plant color series":

A <sub>1</sub> A <sub>2</sub> C R P <sup>r</sup> et	a <sub>1</sub> A <sub>2</sub> C R P <sup>r</sup> B Pl	y-sm tester
ij Y seg. su	a <sub>2</sub> bt	b-lg <sub>1</sub> tester
A <sub>1</sub> A <sub>2</sub> B Pl C R P <sup>r</sup>	a <sub>1</sub> Dt A <sub>2</sub> C R P <sup>r</sup>	B lg <sub>1</sub> su
g Y seg. su	a <sub>2</sub> bt g	sh <sub>1</sub> wx
YG <sub>2</sub> sh <sub>1</sub> wx	y-pl tester	lg <sub>2</sub> gl <sub>6</sub>
C wx P <sup>vv</sup>	a <sub>1</sub> -lg <sub>2</sub> tester	

## H. G. Wilkes, Harvard University

Seed is available for research purposes to anyone  
interested from the following bulk collection sites.

Guerrero: Teosinte seed from Cerro de Los Chivos, Pochote,  
Zacatlancillo, and Mazatlán.

Valley of Mexico	Teosinte	Hybrids
Los Reyes	X	X
Chalco	X	X
Amecameca	X	X

There are also available seed envelopes from single  
teosinte plants which may be used for progeny test by  
those interested in the high level of hybridization  
found in the Valley of Mexico.

## IV. CHROMOSOME 1 LINKAGE DATA

(Compiled by D. R. Knott\*, University of Wisconsin)

## Linkage Group 1

Genes known to be in linkage group 1 are:

ad <sub>1</sub>	- adherent-1
ag	- grasshopper resistance
an <sub>1</sub>	- anther ear-1
as	- asynaptic
bm <sub>2</sub>	- brown midrib-2
br	- brachytic
f <sub>1</sub>	- fine stripe-1
Ga <sub>4</sub>	- gametophyte factor-4
ga <sub>6</sub>	- gametophyte factor-6
gl <sub>10</sub>	- glossy seedling-10
gs <sub>1</sub>	- green striped-1
hm	- helminthosporium resistance
Kn	- Knotted
ms <sub>17</sub>	- male sterile-17
P	- pericarp and cob color
pa	- pollen abortion
sr	- striate
ts <sub>2</sub>	- tassel seed-2
Ts <sub>3</sub>	- tassel seed-3
Ts <sub>6</sub>	- tassel seed-6
v <sub>19</sub>	- virescent seedling-19
Vg	- vestigial glumes
vp <sub>5</sub>	- vivipary-5
zb <sub>4</sub>	- zebra striped-4
zg <sub>2</sub>	- zigzag culm-2
zl	- zygote lethal

\*Present address: Department of Field Husbandry, University of Saskatchewan, Saskatoon, Saskatchewan, Canada.

## Possible locations:

- ag - 12 (could be 39)
- Ga<sub>4</sub> - 16
- pa - 54 (near as, possibly  
between P - as)
- ad<sub>1</sub> - four units from an  
(100 or 108)
- Centromere - probably between 47  
and 68, possibly  
between as and br.

The distance from P to br is  
problematical. Rhoades (J. of  
Heredity 1950) lists it as 47 units,  
presumably based on three point tests  
with a translocation as the marker  
between P and br. The best of Beadle's  
data on three point tests with P-as-br  
gives 55 units. Anderson's data  
(Genetics 1941) with translocations  
also gave about 55 units. Burnham  
lists pa as being 30 units from P  
and 34 units from br, or a total of  
64. The distance here is listed as  
55 - an average figure.

sr-0

ga<sub>6</sub>-15  
zb<sub>4</sub>-19  
ms<sub>17</sub>-23  
ts<sub>2</sub>-24  
P-26  
z1-28

as-56

hm-64

br-81  
Vg-85  
f<sub>1</sub>-86

an<sub>1</sub>-104Ts<sub>3</sub>-119

Kn-127

gs<sub>1</sub>-135

Ts<sub>6</sub>-158  
bm<sub>2</sub>-161

LINKAGE DATA ON CHROMOSOME 1  
Taken from the Maize Genetics Cooperation News Letters 1935-1951.

		<u>Two-Point Tests</u>							
Phase	XY	Xy	xY	xy	Total	Recom- bina- tions	%	Authority and year of newsletter	
ad <sub>1</sub> an <sub>1</sub>	CB	247	7	10	199	463	17		
	RB	4	36	31	1	<u>72</u>	<u>5</u>		
						535	22	4.1 Emerson '38	
Kn Ts <sub>3</sub>	RB	3	9	16	2	30	5	16.7 Emerson '40	
Kn Ts <sub>3</sub>	RB	2	78	68	5	153	7	4.6 Murray '44	
Kn Ts <sub>6</sub>	RB	8	27	47	13	95	21	22.1 Emerson '40	
Ts <sub>6</sub> f <sub>1</sub>	CB	21	17	20	32	90	37	41.1 Lindstrom '40	
Ts <sub>6</sub> gs <sub>1</sub>	CB	128	37	46	113	324	83	25.6 Lindstrom '37	
v <sub>19</sub> bm <sub>2</sub>	RS	102	58	67	6	223		16.0 Emerson '41	
zb <sub>4</sub> bm <sub>2</sub>	RS	487	103	144	23	757		46.0 Hayes '37	
zb <sub>4</sub> br <sub>2</sub>	RS	448	142	152	12	754		31.1 Hayes '37	
zb <sub>4</sub> f <sub>1</sub>	RS	455	135	158	9	757		28.0 Hayes '37	
zb <sub>4</sub> P <sup>1</sup>	CS	266	24	5	64	359		6.9 Hayes '37	
	CS	63	30	2	24	119		6.7 Hayes '37	
	CB	67	6	3	67	143	9	6.3 Hayes '39	

Two-Point Data

From three-point tests with a translocation as a marker at one end

br an <sub>1</sub>	CB	39	6	8	43	96	14	14.6	Emerson '40
	CB	103	25	18	107	253	43	17.0	Emerson '40
br bm <sub>2</sub>	CB	27	10	15	37	89	25	28.2	Emerson '40
	RB	5	41	38	3	87	8	9.1	Emerson '38
ms <sub>17</sub> P	RB	2	61	38	0	101	2	2.0	Emerson '38
	RB	3	181	189	9	381	12	3.0	Emerson '38
sr P	RB					375	109	29.0	Anderson '37
	RB					230	78	34.0	Anderson '37
	RB					228	45	19.8	Anderson and Emerson, '37
	RB					129	27	20.9	Emerson '37
	RB	24	38	37	18	117	42	35.9	Emerson '38
	RB	20	64	54	20	158	40	25.3	Emerson '40
	CB	100	17	24	117	258	41	15.9	Emerson '40
	RB	31	67	52	20	170	51	30.0	Emerson '40
ts <sub>2</sub> P	RB					592	6	1.0	Emerson '37
	RB	1	93	115	2	211	3	1.4	Emerson '38
	CB	206	2	1	167	377	3	.8	Emerson '38
	RB	3	254	325	1	583	4	.7	Emerson '38
	RB	3	135	176	1	315	4	1.3	Emerson '38

Three Point Tests Where a Translocation was the Middle Marker

Region	Recombinations			Percent (P to br)	Total Plants	Authority
	1	2	1 & 2			
P br	71	108	28	52.1	449	Anderson '37
P br	60	58	19	47.0	332	Anderson '37
P br	5	29	0	40.0	85	Emerson '40
P br	19	34	10	37.1	170	Emerson '40

Three Point Tests  
Recombinations

Genes	0		1		2		1 & 2		Total	Authority
1. $\frac{+ + Kn}{ts_2 f_1 +}$	171	125	101	161	94	31	29	71	783	Bryan '37
		296		262		125		100		
				33.5%		16.0%		12.8%		
2. $\frac{+ Ts_3 +}{an + gs}$	62	70	17	0	5	22	7	0	183	Emerson '40
		132		17		27		7		
				9.3%		14.8%		3.8%		
3. $\frac{+ + Ts_6}{an gs +}$	58	37	16	6	13	7	10	5	152	Emerson '40
		95		22		20		15		
				14.4%		13.2%		9.9%		
4. $\frac{+ Ts_3 +}{an + bm_2}$	59	26	10	1	18	24	2	1	141	Emerson '40
		85		11		42		3		
				7.8%		29.8%		2.1%		
5. $\frac{+ + Ts_6}{an bm_2 +}$	81	41	23	4	5	0	0	0	154	Emerson '40
		122		27		5		0		
				17.5%		3.3%				
6. $\frac{+ Kn +}{an + gs}$	49	32	9	14	0	8	2	1	115	Emerson '40
		81		23		8		3		
				20.0%		7.0%		2.6%		

(2, 3, 4, 5, - segregations are very irregular)

Genes	Three Point Tests							1 & 2	Total	Authority	
	Recombinations										
	0		1		2						
7. $\frac{+ Kn +}{an + bm_2}$	56	44	26	7	24	14	7	0	178	Emerson '40	
	100		33		38		7				
			18.6%		21.3%		3.9%				
8. $\frac{+ + +}{br f an}$	347		22		77		7		453	Emerson '40	
			4.8%		17.0%		1.6%				
			(data only from plants clearly $f_1$ )								
9. $\frac{+ + Ts_6}{br bm_2 +}$	93	83	94	59	1	1	0	1	332	Lindstrom '40	
	176		153		2		1				
			46.1%		.6%		.3%				
10. $\frac{br f an}{+ + +}$	512	367	26	25	78	125	12	3	1157	Emerson '41	
	888		51		203		15				
			4.4%		17.5%		1.3%				
11. $\frac{br f an}{+ + +}$	1109	853	26	44	92	73	7	2	2206	Emerson '41	
	1962		70		165		9				
			3.2%		7.5%		.4%				
			(Crossing over reduced by translocations)								
12. $\frac{ag P pa}{+ P +}$	65	84	8	10	23	26	6	8	230	Horovitz and Marchioni '48	
	149		18		49		14				
			7.8%		21.3%		6.1%				
13. $\frac{Vg + +}{+ br bm_2}$	70	76	1	1	53	50	5	1	257	Sprague Journal Heredity 30: 143-145 '39	
	146		2		103		6				
			.8%		40.1%		2.3%				
14. $\frac{+ Kn +}{an + gs}$	96		29		7		1		133	Emerson '41	
			21.8%		5.3%		.8%				
15. $\frac{+ Kn +}{an + bm_2}$	146		47		43		20		256	Emerson '41	
			18.4%		16.8%		7.8%				
16. $\frac{+ + +}{br f an}$	507		12		4		17		540	Emerson '41 (probable inversion)	
			2.2%		.7%		3.1%				

Four Point TestsRecombinations

	0	1		2		3		1 & 2		1 & 3		2 & 3		1, 2 & 3		Total	
$\frac{++ Kn +}{br f_1 + bm_2}$	162	182	14	4	50	50	47	52	7	10	1	2	16	32	6	2	640
	347		18		100		99		17		3		48		8		
			2.8%		15.6%		15.5%		2.7%		.5%		7.5%		1.3%		
	Recombinations $br-f_1 = 7.2\%$ $f_1-Kn = 27.0\%$ $Kn-bm_2 = 24.1\%$																
	Authority: Bryan '38																
$\frac{hm + + +}{+ br f bm_2}$	897	75	134	14	60	327	435	49	15	60	73	13	78				2230
	209		74		762		64		133		91						
	9.4%		3.3%		34.2%		2.9%		6.0%		4.1%						
	Recombinations $hm-br = 18.3\%$ $br-f = 10.3\%$ $f-bm_2 = 44.3\%$																
	Authority: Ullstrup and Brunson '45																
$\frac{+ + + Ts_3}{br f an +}$	104	11	22	19	4	1	5	4									170
	Recombinations $br-f = 11.9\%$ $f-an = 20.6\%$ $an-Ts_3 = 17.1\%$																
	Authority: Emerson '41																
$\frac{+ + Ts_6 +}{an gs + bm_2}$	152	56	35	11	16	1	0	0									271
	Recombinations $an-gs = 26.9\%$ $gs-Ts_6 = 19.2\%$ $Ts_6-bm_2 = 4.4\%$																
	Authority: Emerson '41																

Four Point Tests - data derived from five point tests where a translocation was one end marker

$\frac{+ + + +}{br f an bm_2}$	167	6	35	118	3	6	17										352
	br-f = 4.2% f-an = 15.6% an-bm <sub>2</sub> = 40.1%																
	Authority: Emerson '41																
$\frac{+ + + +}{br f an gs}$	123	2	16	60	3	1	2										207
	br-f = 2.9% f-an = 10.1% an-gs = 30.4%																
	Authority: Emerson '41																
$\frac{+ + + +}{br f an bm_2}$	81	1	23	52	3	10	1										171
	br-f = 8.2% f-an = 15.8% an-bm <sub>2</sub> = 36.8%																
	Authority: Emerson '41																
$\frac{+ + + +}{br f an gs}$	97	4	3	19	0	2	1										126
	br-f = 4.8% f-an = 4.8% an-gs = 17.5%																
	Authority: Emerson '41																
$\frac{+ + + +}{br f an bm_2}$	113	0	7	59													179
	br-f = 0% f-an = 3.9% an-bm <sub>2</sub> = 33.0%																
	Authority: Emerson '41																
$\frac{+ + + +}{br f an gs}$	161	12	4	26	1	2	1										207
	br-f = 7.2% f-an = 2.9% an-gs = 14.0%																
	Authority: Emerson '41																



Five Point Tests

Emerson 1941

	+   br +   f Tl-5a   + +   an +   bm <sub>2</sub>	+   br +   f +   an Tl-3d   + +   gs	+   br +   f +   an Tl-3d   + +   bm <sub>2</sub>	+   br +   f +   an Tl-4   + +   bm <sub>2</sub>
0	142	119	59	185
1	5	5	2	4
2	6	4	4	4
3		1		4
4	72	9	36	125
1-2				
1-3	1			
1-4	5	1	1	3
2-3	1			1
2-4	3	1	1	3
3-4	2	1	2	8
1-2-3				
1-2-4				
1-3-4				1
2-3-4			1	
	<u>237</u>	<u>141</u>	<u>106</u>	<u>338</u>
	br-f=4.6%	br-f=4.2%	br-f=2.8%	br-f=2.4%
	f-T=4.2%	f-an=3.5%	f-an=5.7%	f-an=2.4%
	T-an=1.7%	an-T=1.4%	an-T=2.8%	an-T=4.1%
	an-bm <sub>2</sub> =34.6%	T-gs=8.5%	T-bm <sub>2</sub> =38.7%	T-bm <sub>2</sub> =41.4%

Five Point Tests (con't)

Emerson - 1941

	+   br +   f +   an Ts <sub>3</sub>   + +   gs	+   br +   f +   an Ts <sub>3</sub>   + +   bm <sub>2</sub>	+   br +   f +   an +   gs Ts <sub>6</sub>   +	+   br +   f +   an +   gs Ts <sub>6</sub>   + +   bm <sub>2</sub>	+   br +   f +   an +   gs Vg   + +   f +   an +   bm <sub>2</sub>
0	88	68	82	26	164
1	4	7	6	2	5
2	21	15	32	12	1
3	21	14	35	22	42
4	33	30	31	1	103
1-2			1	1	
1-3			5		4
1-4		2	2		2
2-3			3	3	
2-4	3	9	16		1
3-4	16	5	19		15
1-2-3					
1-2-4			1		
1-3-4			1		
2-3-4	2	1	1		
1-2-3-4	<u>188</u>	<u>151</u>	<u>235</u>	<u>67</u>	<u>337</u>

br-f= 2.1%    br-f=5.9%    br-f=6.8%    br-f=4.5%    br-Vg= 3.3%  
f-an=13.7%    f-an=16.6%    f-an=23.0%    f-an=23.9%    Vg-F= .6%  
an-Ts<sub>3</sub>=21.3%    an-Ts<sub>3</sub>=13.3%    an-gs=27.2%    an-Ts<sub>6</sub>=37.3%    f-an=18.1%  
Ts<sub>3</sub>-gs=28.7%    Ts<sub>3</sub>-bm<sub>2</sub>=31.2%    gs-Ts<sub>6</sub>=30.2%    Ts<sub>6</sub>-bm<sub>2</sub>=1.5%    an-bm<sub>2</sub>=35.9%

Data giving only map distances:

p - 30 - pa - 34 - br Burnham - 1941

sr ms<sub>17</sub> - 1.7 - ts<sub>2</sub> - 1.3 - P - 1.5 - z1 br Emerson - 1943

sr Ga<sub>4</sub> - 10 - ms<sub>17</sub> - 3 - P br Emerson - 1946

Centromere is between 21.2 units to the right of P and 13 units to the left of

br Anderson - 1945

vp<sub>5</sub> is in the short arm of chromosome 1 Robertson - 1949

D. R. Knott