

MAIZE GENETICS COOPERATION

NEWS LETTER

3

January 23, 1933

The data presented here are not to be used in
publications without the consent of the authors.

Department of Plant Breeding
Cornell University
Ithaca, N. Y.

MAIZE GENETICS COÖPERATION
DEPARTMENT OF PLANT BREEDING
CORNELL UNIVERSITY
ITHACA, NEW YORK

December 12, 1932

To Maize Geneticists :-

If you have any good tester combinations you wish to send in so that they may be made available for the whole group or if there is any combination of genes you would like to have, will you please notify us here at Cornell so that we may list your contributions and wants in the corn-letter which will come out in the near future. January 1st has been set as the dead line for receipt of material to be included in the letter. Will you please cooperate with us so that we can make this cooperative affair a real service to all concerned.

We plan to include in the letter a summary of the technic employed by the Russian physiologist, Lysenko, in his "Springefication" of corn.

If any of you have this year's linkage data which could be added to the linkage summary, we shall be glad to receive them at once. The summary is in preparation for publication.

Sincerely yours,

M. M. Rhoades

Vol. 3

January 23, 1953

To maize geneticists :-

We are including in this report an inventory of all maize characters whose description has either been published or called to our attention. We are also including a summary of the technique employed by Lyssenko in his 'Jarovization' of corn. Demerec was kind enough to make the translation from the Russian.

The response of the maize geneticists to the two letters from this office asking for their cooperation in establishing a clearing house and central repository has been good. Either seed or the statement that certain stocks were available and would be sent later has been received from the following institutions: Wisconsin, Texas A. and M., Missouri, Carnegie Institution, U. S. Department of Agriculture, Connecticut Agricultural Experiment Station, California Institute of Technology, Minnesota, Ames, Bucknell and Cornell. A list of these stocks is included in this report.

The following wants have been received:

1. Related stocks homozygous for Ga and ga. Sprague.
2. A multiple recessive stock for each chromosome involving as great a map distance as possible with genes so situated as to reduce undetected double crossovers to a minimum. Sprague.
3. Variegated pericarp material from different sources. Whenever possible variegated/red cob white combination is preferable. Demerec.
4. Allelomorphs or suspected allelomorphs of R such as marbled, stippled, navajo, mottled, etc., and allelomorphs of R affecting plant characters. Stadler.
5. Multiple recessive combinations of genes in the pr-v₂ group. Rhoades.
6. Any recessive gene in the gl₁ v₅ group that is carrying dominant yellow endosperm. Hayes.
7. The combinations al-Y-Pl; ij-ra-gl₁; a₁-na₁ lg₁-gl₂-b; pr-bm₁ su-gl₃; Y-Pl pr-bm₁; P-f₁-an; p-f₁-an. Burnham.

8. Multiple seedling combinations for the same and different linkage groups; particularly new genes such as lg_2 , glossies, argostripe. Randolph.
9. The combination a_1 pr in with any glossy. Randolph.
10. Seedling genes in the Y-Pl group other than a_1 and py . Randolph.

Recommendations concerning symbols for new characters:

Since approximately 290 different characters in maize have been described and assigned symbols it is becoming more and more difficult to find appropriate symbols, suggestive of the character, for new genes. Therefore, we recommend the following:

When a new character arises which is similar in its appearance to a previously described character it should be given the same symbol as that used for the old character except that the subscript, of course, shall be different. This has been done in the past, e.g. the different virescents, glossy seedlings, etc., but it has not been followed in all cases. As a concrete example of what we have in mind, we have different striped leaves described as fine streaked, fine striped, green striped, yellow striped, japonica, iojap, striate, etc. The number of genetically different striped characters will probably be great. Therefore, instead of trying to find a new symbol for a new stripe designate it as j_2 if it resembles japonica, or ys_2 if it resembles yellow stripe, etc. The same holds for the male steriles, dwarfs, etc. Unless we are willing to do this we shall be forced to use tri-literal symbols, or bi-literal symbols which in no way suggest the appearance of the character.

We strongly urge that you correspond with this office before assigning symbols to new characters. We shall keep the list of assigned symbols up to date so that we can be of assistance in assigning the proper symbols. The success of this project depends entirely upon your cooperation. There have been several instances in the past where the same symbol has been used for different genes. This is confusing not only to maize geneticists but to others.

Listed below are the best available multiple combinations of genes in each of the 10 chromosomes:

Some of these stocks have just been isolated and the supply of seed is limited. By next summer enough seed should be available for everybody having a legitimate use for the stocks. However an attempt will be made this spring to supply any of the listed stocks as long as the supply holds out.

<u>Chromosome</u>	<u>Combination</u>	<u>Map distance covered by these factors</u>	<u>Total length of known genetic map</u>
I	p-br-f ₁ -bm ₂	125 ±	125 ±
II	lg ₁ -gl ₂ -b-v ₄	80 ±	80 ±
III	a ₁ -na-cr ₁	79 ±	79 ±
IV	su-Tu-gl ₃	40 ±	70 ±
V	ys-pr-bm ₁	30 ±	87 ±
	pr-bm ₁ -v ₂	57 ±	
VI	al-y-Pl-py	69 ±	69 ±
VII	Bn-gl ₁ -v ₅	26 ±	26 ±
	Bn-ra-v ₅	26 ±	
VIII	j-ms ₈	20 ±	27 ±
IX	yg ₂ -c-sh-wx	52 ±	96 ±
X	r-g-nl	33 ±	33 ±

Jarovization technique:

At the Sixth International Congress of Genetics, Professor Vavilov reported Lyssenko's discovery by which the growing period of plants can be appreciably shortened (jarovization). If the claims of the workers investigating this problem are justified, this discovery is of great importance to plant geneticists and to plant breeders.

Following is the description of the method worked out for maize and described in the Bulletin of Jarovization, 283: 105-108, 1932.

(1) Add water to increase the water content of the seed to 30 per cent of weight.

(2) Keep the seed in darkness for 10 to 15 days at a temperature of 20 to 30 centigrade and allow it to germinate. By regulating moisture the germination process should be controlled so that the germ does not develop excessively.

The following stocks have been received:

- Brink - (1) $lg_1-ts_1-v_4$ x $lg_1-Ts_1-v_4$; (2) a_1-lg_2 ;
 (3) p-br-f-bm₂; (4) gl_2-fl-v_4 ;
 (5) $gl_2-ts_1-v_4$ x $gl_2-Ts_1-v_4$.
- Sprague - (1) r-g-nl; (2) $\frac{Ar^E}{aR^E}$ B Pl su; (3) al-y-Pl;
 (4) Bn-gl₁-v₅; (5) $\frac{aR^E}{Pc_1}$ Pc₂ Pc₃ pc₄ - Pc = purple
 (6) bt₂ bt₂; (7) ACR so₁ so₂ - so = coleorhiza;
 orange scutellum;
 (8) sy sy - sy = yellow scutellum;
 (9) Sx - scutellum color; (10) gl_1 ; (11) gl_2 ;
 (12) gl_3 ; (13) gl_4 ; (14) gl_5 ; (15) gl_7 v₁₇;
 (16) gl_8 ; (17) gl_9 .
- Beadle - (1) sr; (2) gs (early); (3) su-Tu- gl_3 .
- Demerec - (1) xn_2 ; (2) w_{11} ; (3) pg_1 ; (4) pg_4 ; (5) pg_3 ;
 (6) pb_1 ; (7) pb_2 and pb_3 (duplicate factors);
 (8) pb_4 ; (9) zebra₁; (10) zebra₂; (11) zebra₃.
- Stadler - (1) Y a R^E C pr in b pl; (2) a r C pr wx y;
 (3) P^{VV} A R^E c sh wx pr su;
 (4) A C r^E sh wx y pr Su su - r^E derived by
 (5) a C R^E pr in y wx Su su. mutation from R^E;
- Jenkins - (1) A₁ A₁ C C R R pr pr a₂ a₂ (Bt bt);
 (2) gl_1 ij YY; (3) gl_1 v₅;
 (4) gl_1 ij YY seg. fr₁ and fr₂.
- Eyster - (1) g_3 ; (2) g_4 ; (3) pk; (4) l₆; (5) l₇; (6) l₅;
 (7) f₃; (8) su₂; (9) yt; (10) da; (11) ar; (12) sa₁;
 (13) au₁; (14) au₂; (15) oy; (16) ms₂; (17) ms₃;
 (18) vp₁; (19) ns₁₈; (20) cr₂; (21) ns₂₀; (22) bt₄;
 (23) pg_8 .

Mangelsdorf writes that he can furnish the following late stocks:

- (1) B b na na; (2) na g; (3) g; (4) Y y Pl pl;
- (5) lg gl₁ ra; (6) Pr Pr RR cc wx wx; (7) B b lg lg Sk sk;
- (8) pr pr RR CC su su; (9) Tu tu su su;
- (10) Tu tu Ts₅ ts₅ su su.

Kempton advises that he can furnish:

- (1) ra g li lg; (2) ra g lg br; (3) pr li lg f;
- (4) cr li gi - gi = gigas; (5) lg ad f; (6) wx lg gl.

Lindstrom can furnish:

- (1) r g li b pl; (2) R g li b pl; (3) r g nl b pl;
- (4) R g nl b pl.

Singleton and Jones have the following multiple tester:

A c R lg g P Su y.

Anderson has seed of:

P-br-f-bm₂; various combinations of sm and sk.

We have not listed any stocks from Cornell. In the corn letter of October 5, 1932, we listed the multiple testers available here.

Appended herewith is the list of maize characters with their gene symbols. We have attempted to make this list as accurate and up to date as possible but mistakes and discrepancies are bound to occur. We will appreciate it if you will call any of these errors to our attention.

We are making an attempt to collect seed of all of the maize characters in the central repository at Cornell. In the list of genes we have noted the stocks of which we have seed. If any one has seed of a character listed as not on hand at Cornell, he should send us a small supply of such seed.

<u>Gene</u>	<u>Character affected</u>	<u>Chrom- osome</u>	<u>Seed at Cornell</u>	<u>Described by</u>
a ₁ , etc.	plant, aleurone and pericarp color	III	"	Emerson '18, Emerson & An- derson '32
a ₂	plant and aleurone color	V	"	Jenkins '32
ad ₁	adherent tassel	I	"	Kempton '20
ad ₂	" "		"	Eyster
ad ₃	" "		"	Eyster
al	albescens	VI	"	Phipps
an ₁	anther ear	I	"	Emerson '22
ar	argentea	IX	"	Eyster
?	argostripe	VII	"	Eyster
as	asynapsis	I	"	Beadle and McClintock '28
au ₁	aurea	IX	"	Eyster '29
au ₂	aurea		"	Eyster '29
B	plant color booster	II	"	Emerson '22
ba ₁	barren stalk	III	"	Hofmeyr
ba ₂	" "	II	"	Hofmeyr
bd	branched sterile			Collins and Kempton
be	branched ear		"	Bryan
Bh	blotched aleurone	VI	"	Emerson
?	branched silkless		"	Kempton
bk	brittle stalk		"	Wiggans
bl ₁	blotched leaf		"	Emerson '23
bl ₂	" "		"	Wiggans
bm ₁	brown midrib	V	"	Eyster '26
bm ₂	" "	I	"	Burnham
bm ₃	" "		"	Burnham

Bn ₁	brown aleurone	VII	"	Kvakan '24
bp	brown pericarp	IX	"	Meyers '27
br	brachytic	I	"	Kempton '20
bs	barren sterile			Woodworth '26
bt ₁	brittle endosperm	V	"	Mangelsdorf '26
bt ₂	" "		"	Sprague
bt ₃	" "		-	Beadle
bt ₄	" "		"	Eyster
bv	brevis	V	"	Li
c	aleurone	IX	"	East & Hayes '11
cb	chloroblotch	V		
Ch	chocolate pericarp		"	Emerson and Anderson '31
cr ₁	crinkly	III	"	Emerson '21
cr ₂	"	IX		Eyster '32
d ₁	dwarf	III	"	Emerson '12
d ₂	dwarf	-		Suttle
d ₃	dwarf	IX	"	Demerec '23
d ₄	dwarf			
d ₅	dwarf	II	"	Perry
d ₆	dwarf	V		Eyster '32
da	dilute aleurone	IX	"	Eyster '32
de ₁	defective endosperm	IV		Mangelsdorf '26
de ₂	" "			Mangelsdorf '26
de ₃	" "			Mangelsdorf '26
de ₄	" "			Mangelsdorf '26
de ₅	" "			Mangelsdorf '26
de ₆	" "			Mangelsdorf '26
de ₇	" "			Mangelsdorf '26

de ₈	defective endosperm			Mangelsdorf '26
de ₉	" "			Mangelsdorf '26
de ₁₀	" "			Mangelsdorf '26
de ₁₁	" "			Mangelsdorf '26
de ₁₂	" "			Mangelsdorf '26
de ₁₃	" "			Mangelsdorf '26
de ₁₄	" "			Mangelsdorf '26
de ₁₅	" "	IX		Brink '27
de ₁₆	" "	IV		Wentz '25
de _{pl}	" "			Mangelsdorf '26
d _f	flint defective	X		
dt	dotted leaf		"	Emerson
f ₁	fine striped	I	"	Lindstrom '18
f ₂	" "	V	-	Eyster '26
f ₃	" "	X	"	Eyster
fi	fine streaked	VI		Anderson '22
fl	floury endosperm	II	"	Hayes & East '15
fr ₁	frayed	VII	"	Jenkins & Pope
fr ₂	frayed	VII	"	Jenkins & Pope
fs	fasciated		-	Collins & Kempto
g ₁	golden	X	"	Emerson '12
g ₂	golden		"	Jenkins '26
g ₃	golden	I	"	Eyster
g ₄	golden	IX	"	Eyster
Ga	pollen tube growth factor	IV	"	Mangelsdorf and Jones '26
gc	glucostactous			Eyster '24
ge ₁	premature germination			Mangelsdorf '26
ge ₂	" "			Mangelsdorf '26

ge ₃	premature germination			Mangelsdorf '26
ge ₄	" "			Mangelsdorf '26
ge ₅	" "			Mangelsdorf '26
gi	gigas			Kempton
gl ₁	glossy	VII	"	Kvakan '24
gl ₂	glossy	II	"	Hayes & Brew- baker '28
gl ₃	glossy	IV	"	Hayes & Brew- baker '28
gl ₄	glossy	IX	"	Sprague
gl ₅	glossy	-	"	Sprague
gl ₆	glossy	-	-	Sprague
gl ₇	glossy	-	"	Sprague
gl ₈	glossy	-	"	Sprague
gl ₉	glossy	-	"	Sprague
gm ₁	germless			Demerec '23
gm ₂	germless	X		Demerec '26
gm ₃	germless			
gm ₄	germless	VI		
*gm _e	germless	IX		Eyster '29
gs	green striped	I	"	Emerson '12
h	soft starch			Munn '29
hs	hairy sheath		"	Tavcar
I	inhibitor of aleurone color	IX	"	East & Hayes '11
ij	iojap	VII	"	Jenkins '24
in	intensifier of aleurone color	VII	"	Fraser '24

* reported as gm₁.

j	japonica	VIII	"	Emerson '12
Kn	knotted leaf		"	Bryan
l ₁	luteus	X	"	Lindstrom '17
l ₂	luteus	X	"	Lindstrom '25
l ₃	luteus	-	-	Jenkins & Bell
l ₄	luteus	X	-	Jenkins & Bell
l ₅	luteus	V	"	Eyster '32
l ₆	luteus	IX	"	Eyster
l ₇	luteus	IX	"	Eyster
la	lazy		"	Jenkins
lg ₁	liguleless	II	"	Emerson '12
lg ₂	liguleless	III	"	Brink
li	lineate	X	"	Collins and Kempton '20
lp	pollen lethal	V	"	Rhoades
m ₁	yellow white seedling			Stroman '24
m ₂	" " "			Stroman '24
mc	micropyle color			Singleton and Jones
md	mid cob color			Demerec '27
mg	miniature germ			Wentz '24
mi	midget plant			Perry
mr	midrib			Kvakan
ms ₁	male sterile	VI	"	Singleton and Jones
ms ₂	" "	IX	"	Eyster
ms ₃	" "	III	"	Eyster
ms ₄	" "			Beadle
ms ₅	" "			Beadle

ms ₆	male sterile			Beadle
ms ₇	" "			Beadle
ms ₈	" "	VIII		Beadle
ms ₉	" "			Beadle
ms ₁₀	" "			Beadle
ms ₁₁	" "			Beadle
ms ₁₂	" "			Beadle
ms ₁₃	" "			Beadle
ms ₁₄	" "			Beadle
ms ₁₅	" "			Beadle
ms ₁₆	" "			Beadle
ms ₁₇	" "	I	"	Emerson
ms ₁₈	" "	V	"	Eyster
ms ₁₉	" "	-		Eyster
ms ₂₀	" "	IX	"	Eyster
Mt	mottled aleurone	X	"	Kempton '19
na ₁	nana	III	"	Hutchinson '22
na ₂	nana			Perry
nl	narrow leaf	X	"	Emerson
o ₁	opaque endosperm			Singleton and Jones
o ₂	" "			Singleton and Jones
oy	oil yellow	V	"	Eyster '32
P, etc.	pericarp color (many allelomorphs)	I	"	
pb ₁	piebald		"	Demerec '26
pb ₂	piebald		"	Demerec
pb ₃	piebald		"	Demerec
pb ₄	piebald		"	Demerec
pb ₅	piebald		-	Demerec

pc ₁	coleorhiza color		"	Sprague
pc ₂	" "		"	Sprague
pc ₃	" "		"	Sprague
pc ₄	" "		"	Sprague
pg ₁	pale green	X	"	Brunson '24
pg ₂	" "	III	"	Demerec '25
pg ₃	" "	VII	"	Demerec '25
pg ₄	" "		"	Demerec '25
pg ₅	" "			Demerec '25
pg ₆	" "	IX	"	Eyster '32
pg ₇	" "	V	"	Eyster '32
pg ₈	" "		"	Eyster
pg ₉	" "			Eyster
pg ₁₀	" "			Eyster
pi ₁	development of secondary florets			Hudson and Gillis '29
pi ₂	" " " " "			Hudson and Gillis '29
pk	polkadot leaves	IX	"	Eyster '24
po	polysitotic	VI		Beadle '31
pr	red aleurone	V	"	East & Hayes '17
pu ₁	purple plumule			Jenkins '26
pu ₂	" "			Sprague
py	pigmy	VI	"	Suttle
R, etc.	allelomorphic series, aleurone, plant and pericarp color	X	"	many
ra	ramosa	VII	"	Gernert '12
Rg ₁	ragged	III	"	Brink & Senn
Rg ₂	ragged			Singleton and Jones

ro	rolled leaves			Carver '27
rs	rough sheath		"	
rt	rootless			Jenkins '26
s ₁	scutellum color	IV	"	Sprague
s ₂	" "		"	Sprague
s ₃	" "		"	Sprague
s ₄	" "		"	Sprague
s ₅	" " inhibitor			Sprague
sa ₁	Striped auricle	IX	"	Eyster
sa ₂	" "	V	-	Eyster
sb	slit blade			Beadle
sc	scarred endosperm	V		Eyster '26
sh	shrunken endosperm	IX	"	Hutchinson '21
si	silky	VI	"	Fraser
sk	silkless	II	"	Jones '25
sl	slashed	VII	"	Brewbaker
sm	salmon silks	VI	"	Anderson '21
?	small kernel	IX	"	Eyster '32
so ₁	orange scutellum		"	Sprague
so ₂	" "		"	Sprague
sp	small pollen	IV		Mangelsdorf and Singleton
sr	striate	I	"	Brunson
st	sticky chromosomes	IV	"	Beadle '32
su	sugary endosperm	IV	"	Correns '01
su ₂	" "		"	Eyster
sy	yellow scutellum			Sprague
th	threaded			Singleton and Jones
tn	tinged	V	"	Eyster '26

Tp	teopod	VII	"	Lindstrom
ts ₁	tassel seed	II	"	Emerson '20
ts ₂	" "	I	"	Emerson '20
Ts ₃	" "	-	"	Emerson
ts ₄	" "	III	"	Phipps '28
Ts ₅	" "	IV	"	Emerson
Ts ₆	" "			
Tu	tunicate	IV	"	Collins '17
tw ₁	twisted seedlings			Kvakan '25
tw ₂	" "			Kvakan '25
tw ₃	" "			Kvakan '25
v ₁	virescent	IX	"	Demerec '24
v ₂	virescent	V	"	Demerec '24
v ₃	virescent	V	"	Demerec '24
v ₄	virescent	II	"	Demerec '24
v ₅	virescent	VII	"	Demerec '24
v ₆	virescent	VI	"	Carver '27
v ₇	virescent	VI	"	Carver '27
v ₈	virescent	IV		Demerec '26
v ₉	virescent			Phipps '29
v ₁₀	virescent			Phipps '29
v ₁₁	virescent			Phipps '29
v ₁₂	virescent	V	"	Phipps '29
v ₁₃	virescent			Phipps '29
v ₁₄	virescent (same as yg ₂)	IX	"	Phipps '29
v ₁₅	virescent	IX		Phipps '29
v ₁₆	virescent			Phipps '29
v ₁₇	virescent		"	Phipps '29

v ₁₈	virescent	X	"	Phipps '29
v ₁₉	virescent			Phipps '29
v ₂₀	virescent	X		Phipps '29
va ₁	variable sterile	VII		Beadle '32
va ₂	" "			Beadle '32
vp ₁	vivipary	X	"	Eyster
vp ₂	vivipary	V		Eyster
vp ₃	vivipary			Eyster
vp ₄	vivipary	IX		Eyster
w ₁	white seedling	VI	"	Emerson '12
w ₂	white seedling	X		Stroman '24
w ₃	" "			Demerec '23
w ₄	" "			
w ₅	" "	VI		Demerec '23
w ₆	" "	VI		Demerec '23
w ₇	" "			Demerec '23
w ₈	" "			Demerec '23
w ₉	" "			Demerec '23
w ₁₀	" "			Demerec '23
w ₁₁	" "	IX	"	Demerec '26
wa	warty anthers			Beadle '32
wc	white cap endosperm		"	Kulkarni '24
Wh	dominant white endosperm	VII	"	White '17
wl	white leaf base	IV	"	Stroman '24
ws ₁	white sheath			Clark '32
ws ₂	" "			Clark '32
wx	waxy endosperm	IX	"	Collins '09
xn ₁	xantha	X	"	Trajkovich '24
xn ₂	xantha		"	Demerec '25

y	yellow endosperm	VI	"	Correns '01
yd	yellow dwarf	VI		Singleton and Jones
y ϵ ₁	yellow green	V	"	Eyster '26
y ϵ ₂	" "	IX	"	Jenkins '27
y ϵ ₃	" "		"	Burnham
ys ₁	yellow stripe	V	"	Beadle '29
ys ₂	" "	II	-	Brink
yt	yellow top	III	"	Eyster '31
z	zigzag stalk	-	-	Eyster '22
zg	" "	I	-	Eyster '22
zb ₁	zebra striped		"	Demerec '21
zb ₂	" "		"	Demerec
zb ₃	" "		"	Demerec
zb ₄	" " seedling		"	Hayes '32
zl	zygotic lethal	I	"	Emerson

It should be unnecessary to do so, but we urge everyone to go carefully over the list of "wants" and if he has the desired stock to send it to the chap who requested it. Failure to cooperate will defeat the purpose of this service.

If enough requests for material come in we shall send out another corn letter before spring planting.

M. M. Rhoades