

II. REPORT ON MAIZE COOPERATIVE

During the past summer the initial plantings of genetic stocks at the North Central Maize Genetics Research Center were grown. In addition to an extensive collection of maize stocks obtained from Cornell University, genetic stocks were solicited and received from about two dozen other sources in this country. A total of about sixteen thousand plants, comprising more than eleven hundred cultures, were grown.

In this first season, major emphasis was placed on preserving established genetic stocks, increasing the supply of material for distribution, and beginning a program of conversion of all stocks to three inbred lines. Whenever possible, specific genetic stocks were increased both by sib pollinations and by intercrossing stocks of different backgrounds in order to increase their vigor. In addition, all stocks were crossed routinely to the inbred lines M14, W23, and Oh51a with the object of extending the range of their adaptability.

Certain other types of crosses were made as labor considerations permitted. However, during this first season, they were necessarily on a rather small scale. In some instances, stocks were intercrossed to test their genetic identity or allelism. In the case of genes which have been assigned to specific chromosomes but whose positions in the linkage groups have not been established, some crosses were made to appropriate genetic testers with a view to eventually determining their map positions. Many of the genes which are not yet assigned to individual chromosomes were crossed to a selected series of chromosome rearrangements which are mostly marked by closely-linked endosperm or seedling genes. It is planned that these F_1 's will be selfed or test crossed next season to check linkages. A considerable number of the unplaced gene stocks were also pollinated by A-B translocations. Some intercrosses of chromosome linkage tester stocks were made with a view to extracting more favorable gene combinations. Likewise, several of the multiple gene stocks were intercrossed in order to derive various new combinations.

The presently available Cooperation stocks are indicated below. Genes listed under specific chromosomes include some whose placements should be considered only tentative pending further verification. On the other hand, some of the genes designated as unplaced may have been assigned to particular chromosomes on the basis of more recent information. The listing which follows is intended primarily as a catalogue of stocks rather than as an indication of chromosome placement.

MAIZE COOPERATIVE STOCKS

Chromosome 1 stocks

as
bm₂ (may seg. zb₄, ts₂, br₁)
bm₂ v₁₉
Hm
Kn

lw_1
 ms_{17} (may seg. zb_4 , P)
 ms_{17} (may seg. zl)
 p^{rr}
 p^{or}
 P^{rr} ad_1 bm_2
 P^{rr} br_1 an_1 gs_1 bm_2
 P^{rr} br_1 f_1 an_1 gs_1 bm_2
 sr bm_2 (may seg. an_1)
 Ts_6
 Vg
 vp_5
 zb_4 ts_2

Chromosome 2 stocks

ba_2
 lg_1 al
 lg_1 gl_2 b (heterozygous ws_3 , fl_1 , v_4)
 lg_1 gl_2 b fl_1 v_4
 lg_1 gl_2 B sk v_4
 lg_1 gl_2 b sk v_4
 lg_1 gl_2 b v_4
 seg lg_1 gl_2 ts_1 v_4
 seg lg_1 , gl_2 , b , gs_2 , v_4 , Ch
 ws_3 lg_1 gl_2

Chromosome 3 stocks

A^d-31

$\frac{a_{x-1} \text{ Et}}{a \text{ et}}$

$\frac{a_{x-3}}{a}$

a_1 et
 a_1 sh_2 (seg. Dt)
 a^p et Dt
 A ga_7
 ba_1
 cr_1 ts_4 na_1
 d_1
 d_1 Rg
 d_1 ts_4 lg_2
 d_2
 g_2
 gl_6
 gl_6 lg_2 a_1 et
 gl_6 Y_{17}

$lg_2 \frac{A^b}{a}$ et C R Pr (Carries Dt)

Lg₃
ms₃
pg₂
pm
ra₂
may seg. ra₂ lg₂ a₁
may seg. ra₂, P^m, lg₂, a₁
Rg (may carry ra₂)
Rg Lg₃
rt
vp₁

Chromosome 4 stocks

may carry bt₂
bm₃
de_(1?)

$\frac{Ga_1 Su}{ga_1 su}$

may seg. lo
lw₄ (with lw₃)
S₁ (with S₂ S₃ s₄)
sp₁ su₁ (may seg. lo)
seg sp₁, su₁, la, gl_(3?)
st
(st) A₁ A₂ B^w Pl
su₁ bm₃
su₁ gl₃ (may seg. j₂)
su₁ gl₄
su₁ la gl₃
su₁ Tu
su₁ zb₆
su₁ zb₆ Tu
Ts₅
v₈

Chromosome 5 stocks

a₂ bm₁ bt₁ bv pr
a₂ bm₁ bv pr
a₂ bm₁ pr v₂
a₂ bt₁ pr ys₁
bm₁ yg₁
seg bm₁ pr ys₁ v₂
gl₅
gl₈
gl₁₇

lw₂
lw₃ (with lw₄)
ms₁₈
pr A₁ A₂ A₃ C R
pr v₃ (aleurone genes may not be homozygous)
seg sh₃, bm₁, pr, ys₁, intensifier (apparently linked to sh₃)
tn
v₃
v₁₂
vp₂ gl₈
vp₂ A₁ A₂ A₃ C R pr
vp₇ (may seg. gl₈)

Chromosome 6 stocks

at si
l (Eyster's luteus on chromosome 6); may = l₁₀
pg₁₁ (with pg₁₂)
Pl Bh (with A₁ A₂ A₃ B c sh₁ wx R⁹)
Pl sm py (with A₁ A₂ b)
po
(si?)
v₇
w₁
w₁ (may seg. py)
y l₁₀
y; seg l_(10?), w_(1?)
y ms₍₁₎
y A₁ A₂ b pl
y Pl sm (may seg. py); A₁ A₂ b
y su₂
y su₂ (may seg. si)
y su₂ v₇
y w₁

Chromosome 7 stocks

(Bn)
gl₁
gl₁ sl (Bn)
Hs
Hs o₂ v₅ ra₁ gl₁
in (with A₁ A₂ A₃ C R pr)
o₂ v₅ ra₁ gl₁
ra₁ gl₁
ra₁ gl₁ ij
Tp₁ (may seg. v₅, ra₁, gl₁)
va₁
vp₉ gl₁
(Wh) gl₁

Chromosome 8 stocks

V₁₆ ms₈ j₁

Chromosome 9 stocks

au₁ au₂

carries bk₂, ms₂₀

C sh₁ au₁ au₂ (with A₁ A₂ A₃ R Pr)

c sh₁ pc₁ Pc₂ Pc₃ pc₄

c sh₁ wx gl₄ (may seg. yg₂, l₆); probably A₁ A₂ A₃ R

c sh₁ wx gl^H; A₁ A₂ A₃ R

c sh₁ wx (may seg. v₁, l₇); R may not be homozygous

gl₁₀

gm^(1?)

I wx (with A₁ A₂ A₃ R)

I wx (with A₁ A₂ A₃ R B pl y)

l₇

ms₂

ms₂₀

ms₂₀ (may seg. bk₂)

o₁

Pc₁ (with Pc₂ Pc₃ pc₄)

pg₁₂ (with pg₁₁)

sh₁

sh₁ (may seg. l₆)

sh₁ bp wx

sh₁ d₃

seg sh₁, d₃, l₆

sh₁ l₇

sh₁ ms₂

sh₁ wx d₃

sh₁ wx d₃; may carry l₆

(Wc?)

wx^a

wx; seg l₆

wx g₄

wx v₁

seg wx, sa, ar, da, ms₂

Chromosome 10 stocks

a₃ g₁

du₁ (with su₁)

g₁

g₁; may seg. l₂

gl₉; may carry g₁

l₁; with ms₈, j₁, v₁₆

li

li g₁ R

li r abnormal 10; carries g₁

Mt

na₂

n_l₁ g₁ R
n_l₁ g₁ r
Og
Og a₃; carries g₁
Pc₂ (with Pc₁ Pc₃ pc₄)
pc₂ (with Pc₁ Pc₃ pc₄) r; condition of A and C unknown.
R^{mb} (with A₁ A₂ A₃ C Pr)
R^{nj}
Rst
v₁₈; may carry l₄
v₂₀
w₂
may carry w₃

Stocks of unplaced genes

(in some cases, allelism tests with other genes are not complete)

an₂
at
bk₁
bk₂
bm₄
"bt₄" Singleton
cl
de₁₇
may carry dv
dy
fl₂
gl₁₁
gl₁₂
gl₁₃
gl₁₄
gl₁₅
gl₁₆
gl₉
h
mg
mn
ms₅
ms₆
ms₇
ms₉
ms₁₀
ms₁₁
ms₁₂
ms₁₃
ms₁₄
nl₂
New starchy gene
pb₄
Pc₃
pc₄

"ra₃" Perry
 Rs₁
 rs₂
 S₂ S₃ s₄ (with S₁)
 sb
 "sh₄" Singleton
 "sh₅" Singleton
 sy
 Ts₃
 tw₁
 tw₂
 may carry tw₃
 V₁₃
 V₁₇
 V₁₉
 may carry va₂
 vp₆
 wa
 ws₁ ws₂
 may carry yg₃
 zb₁
 zb₂
 zb₃
 zb₅

Multiple gene stocks

A ₁ A ₂ A ₃ C R	Pr
"	Pr wx
"	Pr wx y
"	pr
"	pr wx
"	pr wx y
"	pr su
"	Pr lg ₁ gl ₂
A ₁ A ₂ A ₃ B Pl	(C) (R ^g) Pr lg ₁ y (C and R may segregate)
"	C R ^g Pr
"	C R ^g sh ₁ wx Bh
A ₁ A ₂ A ₃ c R Pr	su ₁
"	y wx
"	y sh ₁ wx
A ₁ A ₂ A ₃ C r Pr	su ₁
"	su ₁ y gl
"	y wx
"	y sh ₁ wx

y lg₁ gl₂ b v₄
 wx lg₁ gl₂ b v₄
 y su₁ ra₁ gl₁
 y wx gl₁
 lg₁ su₁ bm₁ y gl₁ j₁
 lg₁ su₁ bm₁ y gl₁ j₁

su₁ y wx a₁ A₂ A₃ C R⁹ pr

Combinations of endosperm genes (from Dr. Kramer)

du₁
du₂
fl₁
h
o₁
o₂
sh₂
su₁
su₁^{am}
su₂
wx
du₁ du₂
du₁ sh₂
du₁ wx
su₁ du₁
su₁ h
su₁ su₂
su₁ wx
su₁^{am} du₁
su₁^{am} su₂
su₂ du₁
su₂ sh₂
su₂ wx
su₁ du₁ wx
su₁^{am} du₁ du₂
su₁^{am} su₂ du₂

Stocks used in studies of Ga factors (from Dr. Nelson)

Hulless
South American
Ohio Yellow
Black Beauty
Red
Amber Pearl
Supergold
White Rice

Exotics and varieties

Black Mexican Sweet Corn (without B chromosomes)
Black Mexican Sweet Corn (with B chromosomes)
Gourdseed
Maiz chapolote
Papago Flour Corn
Parker's Flint
Tama Flint
Zapaluta chica

Stocks of A-B chromosome translocations

B-1a	1L	.2	Proximal to Hm
B-1b	1S	.05	
B-3a	3L	.1	
B-4a	4S	.25	Proximal to su_1
B-7b	7L	.3	Proximal to ra_1
B-9b	9S	.4	Between wx and C; close to wx
B-10a	10L	.35	Proximal to g_1

Stocks of primary trisomics

Stocks possibly segregating for each of the ten primary trisomics of maize were planted last summer. Root tip samples were taken from all plants in order to obtain a cytological check on chromosome number. All plants were pollinated by the inbred W23 in an effort to maintain trisomic stocks with favorable characteristics for cytological work. Chromosome counts have not yet been made in this material. However, they will be made shortly and the information will be available in time for requests prior to spring planting.

Chromosome rearrangements marked with closely-linked genes for endosperm or seedling traits

A collection of chromosome rearrangements is being maintained for use in locating unplaced genes. A series giving rather complete chromosome coverage is available marked with wx. Supplementary, and to some extent overlapping, series are available which are closely linked with su_1 , y, or gl_2 . Stocks of some of these are being increased in a greenhouse generation and it is hoped that an improved series will be available for spring planting.

The excellent cooperation of many maize workers in contributing genetic stocks to this collection is gratefully acknowledged. If any recipients of the Newsletter have additional useful stocks that they feel should be added to the collection, we would be most happy to receive them. Likewise, any suggestions for useful new gene combinations or any corrections of the listing above will be welcomed.

Earl B. Patterson