



Albescent mutant Alb\*-N2522/+ plant showing greenish white upper leaves resulting from absence of chlorophyll except for greenish flecks in midvein tissue and darker green veins. The lower (older) leaves have become darker with age.

Progeny from Pgd\*-N2542/+ mutant crossed on normal showing small pale green lazy dwarf plants compared to normal.

ShBaR1\*-N2549/+, Short Barren mutant plant from outcross on A632 showing primitive ear with weak husks and silks attached at 3rd leaf node.

Homozygous Pgy\*-N2558, Pigmy mutant plant showing compressed internodes and narrow thread-like erect leaves, especially upper leaves and functional single spike tassel.

Homozygous Hsf\*-N2559, Hairy Sheath Frayed mutant plant showing prominent tissue enations along leaf margins.

Section of 8th leaf of LesGr\*-N2576 from homozygous (right) and heterozygous plants showing more extreme expression of the homozygote.



**New Dominant Mutants From EMS Mutagenesis**

Neuffer, M.G.; Chang, M.T.; Sylvester, Anne; Lawrence, Carolyn; Hake, Sarah

As a result of treating corn pollen with EMS to help colleagues find significant new mutants in their specific areas of emphasis, I have been able to view large M1 plantings and recognize new dominant mutant types, both whole plant cases and half plant chimeras. Many of these mutants were saved by selfing or outcrossing to normal and observing the progeny. From over 300 putative cases noted, 251 were validated and subjected to tests to confirm, evaluate and characterize them as mutants. Of these, 84 proved to be good, clear and viable cases which could be maintained as stocks and had relevant data and clear photographic images. This group is of special interest because dominant mutants are quite rare from EMS mutagenesis (200 times more rare than recessives) and thus are more likely to be something not previously observed. Seed samples and relevant data for each of these mutants have been sent to the Maize Genetics Stock Center, and similar data along with high-resolution photo images are available at MaizeGDB. The purpose of this poster is to call attention to these mutants, which are freely available to colleagues and students, and hopefully will lead to their characterization and location in the maize genome using some of the exciting new technologies now available.

The details of treatment, problems, consequences of handling, and theoretical considerations are found in an earlier publication: Neuffer, et al. 2009. All our images, posted at MaizeGDB, are of high resolution and can usually be digitally enlarged to reveal often striking details about each mutant. These mutants are a unique and valuable resource, but none have been definitely placed in the maize genome. We encourage colleagues and students to join us in doing so.

Ref: Neuffer, M.G., Jhal, G.S., Chang, M.T., Hake, Sarah (2009) Handbook of Maize Genetic and Genomics; Benetizen and Hake S (eds) Vol 2 pp 63-85; Springer-Verlag, NY

**The Mutant Images**

On the right is a list of 47 photos of the 22 best characterized mutants from the 84 confirmed cases since 2003. They are listed with lab number, individual lab number and testable name. Each image has an individual number from 1 to 47 in the left hand column. Those having a following number (P1-P22) are among the numbered images on this poster. The other 25 listed are additional photos that show special aspects of the same mutant for which there was no space on the poster. They appear in sequential order in a photo album associated with the poster for anyone desiring to see more.

The senior author wishes to express gratitude to those who are listed as coauthors for their encouragement, moral support, administrative and financial service, and for their obvious interest in the success of this project. Thanks to the National Science Foundation for financial support and encouragement.

img#	Lab#	Lab #	Name	Discussion Topics	
1	P1	Alb	2522	Albescent	failure of carotenoids producing a creamy green color
2	P2	Pgd	2542	Pale green Dwarf	half plant chimera
3	P3	Pgd	2542	Pale green Dwarf	defective seeds; tiny plant; late
4	P4	Pgd	2542	Pale green Dwarf	homozygous/heterozygous modifiers
5	P5	ShBaR1	2549	Short, Barren, Ruffled leaf	low ear; late
6	P6	ShBaR1	2549	Short, Barren, Ruffled leaf	weak, irregular seed set ear
7	P7	ShBaR1	2549	Short, Barren, Ruffled leaf	slow, homozygous/heterozygous modifiers
8	P8	Pgy	2558	Pigmy	homozygote
9	P9	Pgy	2558	Pigmy	homozygote
10	P10	Hsf	2559	Hairy sheath, Frayed	leaf margins and tle
11	P11	LesGr	2576	Lesion Grassy	chlorosis
12	P12	LesGr	2576	Lesion Grassy	homozygous vs heterozygous; tiny lesions
13	P13	LesGr	2576	Lesion Grassy	diurnal crossbands
14	P14	Pb	2583	Piebald	bleaching in crossbands
15	P15	Morph	2585	Morphological	twining, smut, irregular leaf surface
16	P16	Morph	2585	Morphological	ear florets
17	P17	Morph	2585	Morphological	seed set
18	P18	Les	2586	Lesion	chlorosis
19	P19	Les	2586	Lesion	homozygous vs heterozygous
20	P20	Les	2586	Lesion	vein pattern
21	P21	Vrs	2595	Virescent Stripe	chlorotic leaf
22	P22	Vrs	2595	Virescent Stripe	green to pale green
23	P23	Vrs	2595	Virescent Stripe	chlorotic leaf
24	P24	Vrs	2595	Virescent Stripe	uniform pattern mutant
25	P25	NI	2598	Narrowleaf	homozygous, heterozygous, warty, Meadlands
26	P26	PgyV	2602	Pigmy Virescent	chlorosis; not tassel
27	P27	PgyV	2602	Pigmy Virescent	brown pigment
28	P28	Yls	2612	Yellow leaf blade	fragile tissue
29	P29	Yls	2612	Yellow leaf blade	homozygote
30	P30	Yls	2612	Yellow leaf blade	homozygote
31	P31	LesZn	2618	Lesion Zebra Necrotic	les; tiny spots Zn
32	P32	LesZn	2618	Lesion Zebra Necrotic	homozygote
33	P33	ChStk	2619	Chlorotic Streak	yellow green patches
34	P34	ChStk	2619	Chlorotic Streak	anthocyanins
35	P35	ChStk	2619	Chlorotic Streak	homozygote
36	P36	ChStk	2619	Chlorotic Streak	chlorotic streak
37	P37	Ts	2620	Tassel seed	cluster of ears
38	P38	Ts	2620	Tassel seed	cluster of ears
39	P39	Ts	2620	Tassel seed	cluster of ears
40	P40	DpPtc	2622	Dwarf, Pale green, Patch	slow, pale green patches
41	P41	LesGr	2629	Lesion Grassy	tiny chlorotic spots; strong on veins
42	P42	AdS	2640	Adherent Stale	late after seed germination
43	P43	AdS	2640	Adherent Stale	homozygote
44	P44	AdS	2640	Adherent Stale	homozygote
45	P45	Vcb	2646	Virescent Crossband	virescent crossband temperature sensitive only in P2
46	P46	Vcb	2646	Virescent Crossband	only in P2
47	P47	Ts	2651	Tassel seed	late T6

8th leaf of Pb\*-N2583/+ mutant plant showing a broad diurnal bleached patch of greenish white tissue.

Morph\*-N2585/+ mutant plant showing wrinkled and irregular leaf growth; twinning at the 5th node, smut infection at the 4th node, and irregular growth of the midrib and blade of most of the leaves.

F2 progeny from sibbed NI\*-N2598/+ plants showing a tall zigzag culm narrow leaf heterozygote (center) and two tiny bladeless homozygotes.

8th leaf of the original PgyV\*-SN2602/+ chimeric mutant plant showing 1/2 leaf blade sector of greenish white tissue with frequent greenish streaks. Also note tiny contrasting spots on all tissues, which often appear in Mo17 backgrounds.

8th leaf of original, Les\*-N2586/+, chimeric mutant plant showing profuse small round necrotic lesions on left blade.

Eighth leaf of Les\*-N2590/+ mutant plant from outcross on Mo20w showing moderate size rectangular shaped chlorotic to white necrotic lesions distributed in an unique pattern, namely clustering in groups that appear to be remnant of a target spot pattern at more than one level. Note that some of the larger lesions take a "C" form.



8th leaf of original Vsr\*-N2595/+ chimeric mutant plant showing 1/2 leaf sector of white tissue with pale green streaks; these later bleached out to near white as the plant matured.

Leaves of original Spt\*-N2597/+ mutant plant showing pale green background with dark green spots arranged in a systematic pattern.

F2 progeny from sibbed NI\*-N2598/+ plants showing a tall zigzag culm narrow leaf heterozygote (center) and two tiny bladeless homozygotes.

8th leaf of the original PgyV\*-SN2602/+ chimeric mutant plant showing 1/2 leaf blade sector of greenish white tissue with frequent greenish streaks. Also note tiny contrasting spots on all tissues, which often appear in Mo17 backgrounds.

A short PgyV\*-SN2602/+ mutant plant from a cross on M017/A632 showing erect leaves, brownish leaf sheath and greenish white tissue at the base of the emerging leaf whorl.

Section of the 10th leaf of the Original LesZn\*-N2618/+ mutant plant showing chlorotic lesions becoming streaks along midvein with some diurnal effect, like developing Zn.



5th leaf of Heterozygous ChStk\*-N2619/+ mutant plant from a sib cross of heterozygous mutant plants showing intense anthocyanin accumulation in chlorotic tissue with appropriate anthocyanin genes present.

The top of Ts\*-2620/+ mutant plant from a cross on Mo20w showing a terminal inflorescence consisting of a strong tassel with branches at the tip surrounded at its base by a cluster of 5 fully formed ears with husks and fertile silks.

Original DpPtc\*-N2622/+ mutant plant showing short erect normal green leaves with pale green patches and also tillering.

Close up of 8th leaf of Original LesGr\*-N2639/+ mutant plant showing profuse tiny chlorotic lesions spread over all leaf tissues but more pronounced over veins.

Original AdMs\*-N2640/+ mutant plant showing tassel with branches clumped together, anthers irregular in shape but containing some pollen.

Original VCB\*-N2646/+ mutant seedling showing green leaves with greenish white chlorotic diurnal cross bands