Table 1

Phenotypes of kernels selected from ears produced by cross of original a_1^{m-1} carrying plant to plants that were homozygous for the standard a_1 and for A_2.

	Phenotype of kernel	No. of kernels selected with given phenotype	Culture number of plant derived from selected kernel
1	Uniformly pigmented; full A_1 type	4	5713 A-1 to A-4
2	Uniformly pale colored	5	5713B, 5713C, 5713D, 5719B, 5700A
3	Few small colorless areas in deeply pigmented background	2	5713B-1, 5713B-2
4	Original type of variegation pattern	5	5717D 1 to 5
5	Large areas of deep-pigmentation, and areas with many small spots of deep-pigmentation in colorless background	2	5717B-1, 5717B-2
6	Very many small spots of deep pigmentation in colorless background	1	5713C
7	Small deeply pigmented spots ~~of deep-pigmentation~~ in colorless background; uniformly distributed over aleurone layer	6	5714E, 5715A, 5717A, 5718, 5719A-1, 5719A-2
8	Few small deeply pigmented spots in colorless background	2	5715B-1, 5715B-2
9	Large and small pale areas of different intensities in colorless background	2	5715C, 5720
10	Deeply pigmented areas of various sizes in a lightly pigmented background	1	5714F

Table 2

Types of kernels appearing on ears produced by test crosses of variegated plants entered in row 7 of Table 1. All variegated plants were a_1^{m-1}/a_1, A_1. A. Ears produced by self pollination. B. Ears of variegated plants derived from cross with a plant homozygous for a_1. C. Ears produced when pollen of variegated plant was placed on silks of plants homozygous for a_1 and A_2.

	Culture Number of variegated plant	Phenotype of Kernel: Uniformly pigmented	Small spots of deep pigment in colorless background *	Colorless	Total Number of kernels on
A.	5715A	46	389	118	553
	5714E	2	331	82	415
	5718	0	307	146	453
	5719A-1	7	181	55	243
	5719A-2	2	179	68	249
B.	5715A	20	149	163	332
	5719A-2	8	94	111	213
C.	5714E	13	136	127	276
	5715A	43	485	515	1043
	5717A	22	609	508	1139
	5718	5	135	126	266
	5719A-1	9	181	165	355
	5719A-2	24	250	259	533

* on some kernels pale areas also appeared. the meaning of these will be considered in section of this report.

Table 3.

Phenotype of kernel

♀ Parent Ear no.	Plant no.	Position of ear on plant	♂ parent Ear no.	Plant no.	Sh2 Uniform Pigmented A, type	Sh2 Uniform Pigmented Pale	Sh2 Deeply-Pigmented Spots on Colorless background	Sh2 Colorless	sh2 Uniformly Pigmented Pale	sh2 Deeply-Pigmented Spots on Colorless background	sh2 Colorless	Total no. of kernels
6452-1		main	6338B-18		0	102	92	2	0	0	167	363
		tiller	" -14		2	42	51	0	0	0	92	187
a, sh2			6452-1		0	88	91	0	1	0	162	342
6452-2		main	6338B-18		0	83	79	2	0	1	161	326
		tiller	" " -14		0	73	66	0	0	0	107	246
		tiller	" -16		0	27	24	0	0	0	49	100
6452-3		main	" -18		0	5	136	2	0	0	148	291
a, sh2			6452-3		1	57	168	3	0	0	216	445
6452-4		main	6338B-16		0	105	211	0	0	0	297	613
6452-5		main	6338B-18		0	45	31	2	0	0	81	159
		2nd	" -16		0	20	19	0	0	0	39	78
a, sh2			6452-5		0	160	104	0	0	0	290	554
6452-6		main	6338B-16		0	15	11	0	0	0	22	48
		tiller	" -18		0	91	80	0	0	0	169	340
		tiller	" "		0	115	76	0	0	0	225	416
6452-7		main	" -16		1	127	107	1	0	0	229	465
		tiller	" -18		0	124	97	1	1	0	174	397
		tiller	" "		0	22	22	0	0	0	27	71
6452-8		main	" -16		0	56	56	0	0	0	101	213
		2nd	" -11		0	45	44	0	0	0	82	171
		tiller	" -18		0	59	50	0	0	0	104	213
6453-1		main	" -16		0	35	33	0	0	0	74	142
"		tiller	" -14		0	79	79	0	0	0	136	294
a, sh2			6453-1		0	98	82	0	0	0	177	357
a, sh2			6453-1		0	125	119	0	0	0	199	443
6453-2		tiller	6338B-18		0	70	51	3	1	0	103	228
a, sh2			6453-1		0	116	96	4	0	0	197	413
6453-3		main	6338B-18		0	72	157	1	0	0	206	436
a, sh2			6453-3		0	55	97	2	0	1	161	316
6453-4		main	6338B-18		0	126	130	1	0	0	265	522
		tiller	" "		0	114	91	0	0	0	220	425
		"	" "		0	122	87	0	0	0	196	405
a, sh2			6453-4		0	105	64	0	1	0	156	326
6453-5		main	6338B-18		0	155	130	2	0	1	287	575
		tiller	" "		0	105	83	0	0	0	185	373
a, sh2			6453-5		0	94	99	2	0	0	223	418
6453-6		main	6338B-18		0	102	80	1	0	0	199	382
6453-7		main	" "		0	138	120	0	0	0	231	489
6453-8		main	" "		0	109	118	0	0	0	239	466
		2nd	" "		0	131	123	0	0	2	272	528
		tiller	" "		0	83	91	2	0	0	152	328
6453-9		main	" -16		0	48	78	0	0	0	123	249
		2nd	" -18		0	48	160	2	0	0	215	425
		tiller	" -14		0	18	85	0	0	0	102	205
		Totals			4	3609	3868	33	4	5	7260	14,783

TABLE 4

PHENOTYPES OF KERNELS APPEARING ON EARS PRODUCED BY THE CROSS OF PLANTS HOMOZYGOUS FOR a_1, sh_2, AND y BY PLANTS WHOSE CONSTITUTIONS WERE $a_1^{m-1}\ Sh_2/a_1\ Sh_2;\ Y/y$ (PART I), OR $a_1^{m-1}\ Sh_2/a_1\ Sh_2;\ y/y$ (PART II)

PLANT NUMBER	PARENTAGE IN CROSS	PHENOTYPES OF KERNELS							
		Color in aleurone					Colorless aleurone		
		Pale		Deeply pigmented spots on colorless background		Total			
		Y	y	Y	y		Y	y	Total
Part I:									
6046B-1	♂	107	20	12	89	228	119	113	232
6046B-3	♀	32	1	58	95	186	93	88	181
6046C-2	♀	28	7	55	86	176	75	103	178
6047A-1	♀	30	31	173	162	396	209	228	437
6047A-3	♀	48	82	76	47 1)	253	115	146	261
Part II:									
6047C-1	♀	...	20	...	174	194	...	163	...
6047C-3	♀	...	92	...	97	189	...	203	...
6047C-4	♀	...	58	...	184 2)	242	...	251	...
6047B	♀	...	4	...	398	402	...	391	...
6047B	♂	...	5	...	482	487	...	483	...

1) Kernels selected from this class produced plants in culture 6452, table 3

2) Kernels selected from this class produced plants in culture 6453, table 3

Table 5

Phenotypes of kernels appearing on ears produced by cross of plants homozygous for a_1, sh_2, and y to plants in culture 6629 A having the constitution a_1^{m-1} Sh_2 / a_1 sh_2, Y / y. The kernels entered in the pale columns, were uniformly pigmented. Those entered in the variegated columns exhibited deeply pigmented spots in a colorless background. The symbol I in the end column indicates the position of the upper ear on the main stalk. Symbol II indicates the lower ear on the main stalk.

♀ Parent

Parent

Plant number in culture 6629	Position of ear on plant		Phenotype of Kernel: Sh_2 Y Pale	Sh_2 Y Variegated	Sh_2 Y Colorless	Sh_2 y Pale	Sh_2 y Variegated	Sh_2 y Colorless	sh_2 Y Pale	sh_2 Y Variegated	sh_2 Y Colorless	sh_2 y Pale	sh_2 y Variegated	sh_2 y Colorless	Total
A-1	I	1041-5	36	66	0	58	35	0	0	0	85	0	0	89	369
	II	1041-4	33	51	0	54	36	1	0	1	108	0	1	98	376
A-2	I	1040-1	3	76	1	15	86	0	0	0	91	0	1	82	355
	tiller	1041-4	7	47	0	12	32	0	0	0	37	0	1	34	170
A-3	I	1040-1	34	43	0	52	37	0	0	1	85	1	0	83	336
A-4	I	1041-5	23	56	0	65	36	0	0	0	90	0	0	84	354
A-5	I	1041-4	26	78	0	25	75	0	0	1	122	0	0	101	428
	tiller	1041-4	19	44	0	27	47	0	0	0	66	0	0	53	256
A-6	I	1040-1	34	78	0	67	37	0	0	1	86	0	0	113	416
A-7	I	1040-1	29	58	4	59	36	1	0	0	105	0	0	100	392
	tiller	1041-8	49	1	2	58	3	0	0	0	56	1	0	62	232
A-8	I	1041-5	19	66	0	56	53	0	0	0	101	0	0	87	382
A-9	I	1041-8	39	49	0	41	38	0	1	0	79	0	0	90	337
	tiller	1040-5	41	50	0	58	34	1	0	0	79	1	0	115	379
	Totals		392	763	7	647	585	3	1	4	1183	3	3	1191	4,782

note: In addition to kernels entered in this table there were 2 kernels, each on a different ear, that expressed the full A_1 phenotype. Both were Sh_2, Y, and pr

(spin-w types - infrequent [not mentioned])

Table 6

The degree of association of the pale phenotype with Y and the variegated phenotype with y on ears of plants entered in table 5 that exhibited a ratio of 1 pale to 1 variegated kernel among those kernels having anthocyanin pigment.

Plant number in culture 6629	Position of ear in plant	Phenotype of Kernel: Pale		Deeply-Pigmented Spots in Colorless Background		Total
		Y	y	Y	y	
A-1	I	36	58	66	35	195
	II	33	54	52	37	176
A-3	I	34	53	44	37	168
A-4	I	23	65	56	36	180
A-6	I	34	67	79	37	217
A-7	I	29	59	58	36	182
A-9	I	40	41	49	38	168
	tiller	41	59	50	34	184
Totals		270	456	454	290	1470

Table 7

Plant number in culture 6629	Position of ear on plant	Phenotype of Kernel: Pale		Deeply-pigmented spots in colorless background		Total
		Y	y	Y	y	
A-2	I	3	15	76	87	181
	tiller	7	12	47	33	99
A-5	I	26	25	79	75	205
	tiller	19	27	44	47	137
A-7	tiller	49	59	1	3	112
A-8	I	19	56	66	53	194

Table 8

Phenotypes of kernels on ears of plants in B of culture 6629 produced by cross with plants homozygous for a_1, sh_2 and y. The constitution of the plants in 6629B was: $a_1^{m}\ Sh_2 / a_1\ sh_2,\ y/y$.

Plant number in Culture 6629	Position of ear on Plant	Phenotype of Kernel						Total
		$Sh_2\ y$			$sh_2\ y$			
		Pale	Variegated	Colorless	Pale	Variegated	Colorless	
B-1	I	184	171	0	0	0	353	708
	II	43	38	0	0	0	54	135
	tiller	45	58	0	0	0	90	193
B-2	I	52	158	1	0	1	232	444
	tiller	24	51	0	0	0	84	159
B-3	I	91	88	0	0	0	194	373
B-4	I	91	134	0	0	0	210	435
B-5	I	87	104	0	0	0	186	377
	II	8	25	0	0	0	42	75
	tiller	47	97 + 6*	5	0	0	157	312
B-6	I	64	171	0	0	0	231	466
	II	47	122	2	0	0	163	334
B-7	I	126	110	0	0	0	208	444
B-8	I	14	20	0	0	0	29	63
	II	16	7	0	0	0	33	56
	tiller	23	54	0	0	0	68	145
B-9	I	30	135+15*	5	0	0	181	366
	II	38	110 + 3*	0	0	2	127	280
	tiller	24	129 + 12*	21	0	0	144	330
B-10	I	112	136	0	0	0	249	497

* These kernels showed only one or several very small dots of deep pigment in an otherwise colorless kernel.

Note: In addition to the kernels entered in this table, there were 3 deeply-pigmented kernels, A, type, that were Sh and pr.

Table 9

Phenotypes of kernels on ears of plants grown in the greenhouse during the winter of 1950-51 from which plants were grown in the summer of 1951.

Culture Number of a_1^{m-1} carrying plant	Type of Cross conducted with a_1^{m-1} plant: Female	Male	Phenotype of Kernels Selected from Ear	Culture Number of Plants Derived from Selected Kernels	Number of Plants in Culture
5700A	a_1/a_1	5700A	Aleurone lightly pigmented	6078	9
5718	Self-pollinated (see table 2)		Dots of A_1 pigment in colorless background	6045	4
5719A-1	Self-pollinated (See table 2)		Uniformly pigmented aleurone	6046A	3
			Dots of A_1 in colorless background	6046C	9
			Dots of A_1 and some pale areas in colorless background	6046B	3
	a_1/a_1 (See table 2)	5719A-1	Dots of A_1 in colorless background	6047A, B, C	14
5719A-2	Self-pollinated (See table 2)		"	6080C	14
			Dots of A_1 and pale areas in colorless background	6080B	1
	a_1/a_1 (See table 2)	5719A-2	"	6081A	8
			Dots of A_1 in colorless background. No pale areas	6081B	1
5720	Self-pollinated		Pale areas of various intensities in colorless background	6042	12
	5720	a_1/a_1	" "	6043A, B	4
	a_1/a_1	5720	" "	6044	9

Table 10.

Phenotypes of kernels on individual ears produced by test crosses of plants in culture 6081 A whose constitution were a_1 (state 5719A-2) / a_2. A. Ear derived from self-pollination. B. Ear derived from cross of 6081A ♀ × a_1/a_1 ♂. C. Reciprocal of B.

Phenotype of Kernel

	Plant number	(A1) uniform deeply pigmented	pale	Deeply-pigmented Dots in colorless Background	Colorless	Total	Spm Constitution
A.	A-2 I	1	74	166	75	316	1
	A-3 (I)	0	89	244	99	432	1
	A-4 (I)	0	76	257	109	442	1
	A-8 (I)	0	62	188	75	325	1
	Totals	1	301	855	358	1515	
B.	A-4 (II)	0	99	110	214	423	1
	A-5 (I)	0	7	23	32	62	2 (?)
	A-6 I	0	123	136	262	521	1
	A-8 (II)	0	8	30	38	76	2 (?)
	A-8 (I)	0	65	72	131	268	1
C.	A-2	0	110	131	272	513	1
	A-4	0	124	127	258	509	1
	A-5	1	88	238	290	617	2
	A-8	0	114	151	264	529	1

Table 11.

Phenotypes of kernels appearing on individual ears produced by plant 6081 B whose constitution was a_1^{m1} (state 5719A-2) / a_1. A. Ear derived from self-pollination B. Ears derived from cross of 6081B4 × a_1/a_1 07. C. Three ears derived from reciprocal cross.

Phenotype of Kernel

	Part of plant 6081B tested	Deeply (A_1) pigment, uniform over aleurone layer	Uniformly Pale	Dots of A_1 type pigment in colorless Background	Colorless	Total
A	First ear mainstalk	3	0	170	57	230
B	Second ear, main stalk	0	12	96	111	219
	Tiller Ear	0	5	136	141	282
C	Pollen	0	38	191	245	474
	"	0	32	198	258	488
	"	0	24	167	192	383
	Totals	0	94	556	695	1345

Table 12

Phenotypes of kernels on ears of plant 6080B, which was homozygous for state 5719A-2 $\underline{a}_1^{m-1}$. Line 1: Kernel types on ear derived from cross of 6080B ♀ x $\underline{a}_1/\underline{a}_1$ ♂. Lines 2 and 3: Kernel types on ears derived from reciprocal cross.

	Phenotype of Kernel		
$\underline{A}_1$	Uniformly Pale Pigmented	Dots of $\underline{A}_1$ in Colorless Background	Total
1	186	154	341
0	226	187	413
0	273	202	475*

* One colorless kernel was present in addition to those given in the table.

Table 13

Phenotypes of kernels on individual ears produced by test crosses conducted with plants in culture 6080C that were homozygous for the state 5719A-2 of a_1m-1.
A. Ears derived from self-pollination. B. Ears derived from cross of 6080C ♀ by a_1a_1 ♂.
C. Reciprocal of B.

	Plant number	Part of plant tested	Phenotype of Kernel: A_1	Pale	Dots of A_1 in Colorless Background	Total	Remarks
A	C-3	I	1	2	124	127	
	C-5	I	3	2	272	277	2 dark color plus A_1 dots
	C-6	I	3	2	205	210	1 light pale plus A_1 dots
	C-8	I	0	62	133	195	1 Spm
B	C-2	I	0	78	246	324	2 Independently located Spm elements
	C-3	II	0	14	264	278	
	C-4	I	0	0	14	14	
	C-4	tiller	0	0	18	18	
	C-5	II	0	1	278	279	
	C-8	II	0	51	44	95	1 Spm
	C-11	I	1	2	216	219	
C	C-2	pollen	0	159	350	509	2 Independently located Spm elements
	C-3	"	2	60	492	554	
	C-5	"	0	34	410	444	
	C-6	"	7	100	422	529	
	"	"	1	74	396	471	
	C-8	"	0	279	220	499	1 Spm

Table 14

Phenotypes of kernels on individual ears produced by test cases conducted with plants in B+C of culture 6046. A. Ears derived by self-pollination. B. Ears derived by cross of 6046B♀ × a_1/a_1 ♂. C. Reciprocal of B. Plants B-1 and B-2 were a_1 m-1 (state 5719A-1)/a_1 and plant B-3 was homozygous for state 5719A-1 a_1 m-1.

	Plant number	Part of plant tested	Phenotype of Kernel: A_1	pale	spots of A_1 in colorless background	Colorless	Total	Spin constitution
A	B-2	I	1	46	121	0	168	1
	B-3	tiller	2	14	217	85	318	2
	C-1	I	3	33	376	0		2
	C-11	I	3	32	371	0		2
B	B-2	II	0	117	110	0	227	1
	B-3	I	1	33	153	181	368	2
	C-2	tiller	0	35	141	178		2
C	B-1	Pollen	0	137	140	269	546	1
	B-1	"	1	137	101	232	471	1
	B-2	"	0	172	173	0	345	1
	B-2	"	0	210	197	0	407	1
	C-1	"	1	212	465	0		2

Table 15

Phenotypes of kernels derived from ears produced by tests of plants in culture 6045.

Plant 1 was a_1^{m1} (state 5718) $/a_1$. Plant 4 was homozygous for state 5718 a_1^{m-1}. A. Ears produced by self pollination. B. Ears produced by cross a_1/a_1 ♀ × 6045 ♂.

	Plant number	Phenotype of kernel: A_1	very pale color	Date of A_1 in colorless background	colorless	Total
A	1	0	73	207	83	363
	4	6	26	387	5 (?) 1)	424
B	1	0	57	112	238 (?) 2)	407
	4	6	72	407	112 (?) 1)	597

1) these kernels most probably belong to the pale class.

2) about 40 % these kernels probably belong to the pale class.

Table. 16

a_1^{m-1} (5720) | $a_1 S$ × a_1/a_1

♀	♂	Phenotype of kernel: Uniformly pale. Various grades of intensities or hues	pale areas in colorless background	colorless	Total
6044-3	6041B-5	56	36	242	334
6044-4	" -6	90	34	301	397
6044-6	" "	68	64	398	530
a_1/a_1 6038-71	6044-6	112	54	429	595
6044-7	6041B-6	88	55	434	577
6044-8	" "	51	15	170	236

Uniformly pigmented class. Intensity ranged from very faint to dark pale

Variegated class: in plants where a_1^{m-1} was ♀: few kernels with pale background instead of colorless

Pale areas could have areas of darker intensity in them

Thus not explained by reciprocal cross. Reason due to $2a_1^{m1}$ in ♀ cross, only 1 in ♂.

Table 17

A. Phenotypes of kernels on ears produced by cross a_1^{m-1} (original state) Sh_2 / a_1 Sh_2 ♀ x a_1 sh_2/a_1 sh_2 ♂. B. Reciprocal of A.

		Phenotypes of Kernels					
A. Culture	Plant Number	A_1	pale pigment	Variegated	Apparently colorless	Total	Number of kernels with new state
5994	8	68	56	186	332	642	0
5994	10	38	91	113	264	506	0
5994	12	60	11	163	266	500	0
5995	1	63	3	140	315	521	1
5995	2	51	12	193	290	546	0
5995	10	76	42	70	329	517	0
5995	12	71	16	176	402	665	1
5996	1	16	44	54	159	273	0
5996	2	24	1	169	214	408	0
5996*	4	10	107	120	280	517	1
5996	10	48	68	43	203	362	0
5997	2	63	18	73	229	383	0
Totals		588	469	1500	3283	5840	3
B.							
5994	2	57	10	97	278	442	0
5994	12	57	75	96	303	531	0

*The part of the plant that produced this ear had an altered state of a_1^{m-1}.

It is refered to in this report as state 5996-4 a_1^{m-1}.

Table 18

Origin of Plants Grown in the Summer of 1954

State of a_1^m-1	Origin of Ear ♀	Origin of Ear ♂	Test Reference	Phenotypes of Kernels selected from ears. Pale Sh_2	Var. Sh_2	Pale sh_2	Var. sh_2	Color-less, sh_2	Odds	1954 Culture Number
5718	6045-4	Self.Poll.	Table 15	8	8					6638
5719A-1	6046A-1	$a_1 sh_2$	Page	30						6639
	6046B-2	" "	Table 14	28						6640
	6046C-1	Self-Poll.	" "	9						6641
	6046C-4	" "	" "	2						6642
	a_1 sh_2	6047B	Table 4		9					6697
	6047B	$a_1 sh_2$	" "		10					6698
	6628-2	Contam.	Page		1					6658
	6628-5	a_1 sh_2	"	19						6659
	6628-6	" "	"	22						6660
	6628-8	" "	"	20						6661
	6629A-4 t	Self.Poll.	"	0	10	1		39		6662
	" B-2t	6629A-4t	"	6	10			20		6663
	" B-6t	" "	"	6	10			27		6664
	" A-1 I	a_1 sh_2	Table 5	13	13			33		6665
	" " II	" "	" "	11	12		1	23		6666
	" A-2 t	" "	" "		19			22		6667
	" A-3	" "	" "			1	1		2*	6669
	" A-4 I	" "	" "	13	12			20		6670
	" A-5 I	" "	" "	12	12		1	22		6671
	" A-5t	" "	" "	7	11			30		6672
	" A-6 I	" "	" "	12	17		1	35	1†	6673
	" A-7 I	" "	" "	12	11			11	3*	6674
	" " " t	" "	" "	9		1		38	6*	6675
	" A-8 I	" "	" "	4	20			24		6676
	" A-9t	" "	" "			1				6678
	" B-1 I	" "	Table 8	10	9			12		6679
	" B-2 I	" "	" "	10	8		1	25	4†	6680
	" " " t	" "	" "	5	4			14		6681
	" B-4 I	" "	" "		8			11		6682
	" B-5 I	" "	" "	5	9			13	2*	6683
	" " " II	" "	" "	3	3			16	2*	6684
	" B-5t	" "	" "	8	9			27	7*	6685

Table 18, continued

State 5719A-1

Origin ♀	♂	Text Reference	Phenotypes of Kernels Selected from Ear: Pale Sh_2	Var. Sh_2	Pale sh_2	Var. sh_2	Colorless sh_2	Odds	1954 Culture Number
6629B-6 I	a_1 sh_2	Table 8	10	10					6686
" B-7 I "	"	" "	11	6			16		6687
" B-8 I "	"	" "		10			16	6 *	6688
" B-9t "	"	" "		9				10 *	6689
" " " II"	"	" "				1			6690

State 5719A-2

6080B	a_1 sh_2	Table 12	10	10			Colorless Sh_2		6691
a_1 sh_2	6080B	" "	5	7					6692
6080C-2	a_1 sh_2	" 13	5	6					6693
" C-3 II"	"	" "	3	11					6694
6080C-8 I	Self.Poll.	" "	4						6643
6081A-6	a_1 sh_2	" 10	4	10			13		6695
a_1 sh_2	6081B	" 11	4	9			12		6696

State 5700A

6078-3 I	Self.Poll.	Page	8						6699
" "II	6041B-15	"	5						6700
" -5	Self. Poll,	"	8						6701
" "	6041B-18	"	10						6702

State 5996-4

5996-4	6041B-14	"	10	8					6704

Original State

5996-2	6041B-6	Table 17		9					6705

State 5999

5999t	Self. Poll.	Page		8					6706
" I	6041B-2	"	10	8			10		6707

Table 18 continued

Origin ♀	Origin ♂	Text Reference	Phenotypes of Kernels Selected from Ear: Pale Sh_2	Variegated Sh_2	Colorless Mutant Sh_2	1954 Culture Number
State 5713B-2						
5713B-2 I Self.Poll.		Tables 1 and 2		10		6644
a_1 Sh_2	5713B-2	Table 2			12	6645
State 5714F						
a_1 Sh_2	5714F	Table 2	3	6		6646
"	" "	" "		8		6647
State 5715A						
5715A Self. Poll.		Table 2		10		6648
a_1 Sh_2	5715A	" "		9		6649
" "	"	" "		4		6650
State 5720						
6042-3	a_1 sh_2	Page		5	5	6651
" -7	" "	"		5	5	6652
6044-1t	" "	"		5	10	6655
" -7	" "	Table 16		8	9	6657
Combinations of states:						
5700A x 5719A-2:					Colorless Sh_2	
6078-5t	6080C-3	Page		20	14	6703
5720 x Original State						
6042-8t	5995-10	Page		7		6653
6043A-1t	5994-2	"		6		6654
6044-6t	5995-10	"		4		6656

*Colorless kernels with 1 or several small A_1 dots.

†Spm entering inactive phase in some cells of kernel

Table 18

Origin of plants grown in summer of 1954

State	Origin		Text Reference	Phenotypes of kernel from which plant arose: Pale Sh2	Var. Sh2	pale sh2	Var. sh2	Colorless sh2	odds.	1954 Cutting no.
5718	6045-4	self-poll.	Table 15	8	8					6638
5719A-1	6046A-1	a1 sh2		30						6639
	6046B-2		Table 14	28						6640
	6046C-1	self poll.	Table 14	9						6641
→	6046C-4	" "	Table 14	2						6642
	6628-2	contam.	[illegible]		1					6658
	" -5	a1 sh2	" "	19						6659
	" -6	"		22						6660
	" -8	"		20						6661
Y Spm/y+	6629A4-I	self poll.	"	9	10	1		39		6662
	" B-2-I	6629A-4-I	" "	6	10			20		6663
	" B-6-I	6629A-4-I		6	10			27		6664
Y Spm/y+	" A-1-I	a1 sh2	Table 5	13	13			33		6665
Y Spm/y+	" A-1-II	"	" "	11	12		1	23		6666
Y Spm/y+ 2 Spm	" A-2-I	"	" "		19			22		6667
Y Spm/y+	" A-3	"	" "			1	1		2 1)	6669
Y Spm/y+	" A-4-I	"	" "	13	12			20		6670
Y Spm/y+ 1 Spm	" A-5-I	"	" "	12	12		1	22		6671
see ear	" A5-I	"	" "	7	11			30		6672
Y Spm/y+	" A-6-I	"	" "	12	17		1	35	1 2)	6673
Y Spm/y+	" A-7-I	"	" "	12	11			11	3 1)	6674
	" A-7-I	"	" "	9		1		38	6 1)	6675
Y Spm/y+ 1 Spm	" A-8-I	"	" "	4	20			24		6676
Y Spm/y+	" A-9-I	"	" "			1				6678
1 Spm	" B-1-I	"	Table 8	10	9			12		6679
2 Spm	" B-2-I	"	" "	10	8		1	25	4 1)	6680
2 Spm	" B-2-I	"	" "	5	4			14		6681
1 Spm	" B-4-I	"	" "		8			11		6682
2 Spm (1 [illegible])	" B-5-I	"	" "	5	9			13	2 1)	6683
2 Spm	" B-5-II	"	" "	3	3			16	2 1)	6684
2 Spm	" B-5-I	"	" "	8	9			27	7 3)	6685
2 Spm	" B-6-I	"		10	10			12		6686
1 Spm	" B-7-I	"	" "	11	6			16		6687
1 Spm	" B-8-I	"	" "		10			16	5 1)	6688
2 Spm	" B-9-I	"	" "		7				10 1)	6689
2 Spm	" B-9-II	"	" "				1			6690
								Colorless Sh2		
5719A-2	6080B	a1 sh2	Table 12	10	10					6691
	a1 sh2	6080B	" 12	5	7					6692
	6080C-2	a1 sh2	" 13	5	6					6693
	6080C-3-II	"	" 13	3	11					6694
	6081A-6	"	" 10	4	10			13		6695
	a1 sh2	6081B	" 11	4	9			12		6696
5719A-1	a1 sh2	6047B	"		9					6697
	6047B	a1 sh2	" 9		10					6698
	6080C-8-I	self poll	" 13	4						6643

Test 1954

State	Origin		Reference	Pale Sh2	Var. Sh2	Colorless Sh2	Mutant Sh2			Center No.
5700A										
	6078-3-I	self-poll.	page –	8						6699
	" 3 II	6041B-15	" –	5						6700
	" -5	self-poll.	" –	8						6701
	" -5	6041B-8	" –	10						6702
5996-4										
	5996-4	6041B-11	" –	10	8					6704
original stato										
	5996-2	6041B-6	Table 14		9					6705
5999										
	5999 I	self-poll.	page –		8					6706
	5999-I	6041B-2	–	10	8	10				6707
5713B-2										
	5713B-2-I	self-poll.	Table 1+2		10					6644
	a, Sh2	5713B-2	" 2				12			6645
5714F										
	a, Sh2	5714F	Table 2	3	6					6646
	"		"		8					6647
5715A										
	5715A	self-poll.	Table 2		10					6648
	a, Sh2	5715A	" "		9					6649
	" "	"	" "		4					6650
5720										
	6042-3	a, sh2	page –		5		5			6651
	" -7	" "	" "		5		5			6652
	6044-1 I	" "	Table		5		10			6655
	" -7	" "	"		8		9			6657
Combinations of States										
5700A × 5719A-2										
	6078-5 I	6080C-3	page –		20	14				6703
5720 × original state										
	6042-8-I	5995-10	page –		7					6653
	6043A-1 I	5994-2	"		6					6654
	6044-6-I	5995-10	"		4					6656

Table 19

Constitution of tester plants whose culture numbers are given in last column

Part I. Homozygous for a_1^{m-1} and Sh_2

State of a_1^{m-1}	Chromosome 5	Chromosome 6	Chromosome 9	Spm	1954 Culture Number
5718	pr/pr	y/y	wx/wx	0	6638A
5719A-1	pr/pr	Y/y	wx/wx	0	6641A
5719A-1	pr/pr	y/y	wx/wx	0	6641B
5719A-1	pr/pr	Y/Y or Y/y	wx/wx	0	6642
5719A-2	pr/pr	Y/Y	wx/wx	0	6643
5700A	Pr/Pr	y/y	sh_1 wx/sh_1 wx	0	6701-2

Part II a_1^{m-1} sh_2/a_1 sh_2, no Spm (state 5719A-1 in all plants)

	Pr/pr	y/y	wx/wx	0	6662C
	Pr/pr	y/y	Wx/Wx	0	6675G
	Pr/pr	y/y	Wx/Wx	0	6678
	Pr/pr	y/y	Wx/wx	0	6669C

Part III a_1^{m-1} sh_2/a_1 sh_2 (state 5719A-1 in all plants)

	Pr/pr	Y/y	Wx/Wx	Y Spm/y +	6666E
	Pr/pr	Y/y	Wx/wx	1 Spm	6671E
	Pr/pr	Y/y	[illegible]	1 Spm	6673F
	Pr/pr	y/y	Wx/wx	3 Spm	6680D
	pr/pr	y/y	Wx/wx	1 Spm	6690

Table 20

Phenotypes of kernels from which plants were grown under culture number indicated in column 1

1954 Culture Number	Cross that produced ear from which kernels were selected	Phenotypes of kernels: Pale Sh_2 Y	Pale Sh_2 y	Variegated Sh_2 Y	Variegated Sh_2 y	Colorless Sh_2 Y	Colorless Sh_2 y	Odds
6665	6629A-1 x 1041-5	6	7	10	3	21	12	
6666	6629A-1 x 1041-4	5	6	7	5	10	13	1*
6670	6629A-4 x 1041-5	6	7	7	5	6	14	
6673	6629A-6 x 1040-1	6	6	12	5	17	18	1†
6674	6629A-7 x 1040-1	5	7	7	4	5	6	3‡
	Totals	28	33	43	22	59	63	5

* This kernel was variegated, sh_2, Y

† Kernel was variegated for pale and colorless areas with few dots of A_1 pigment within the colorless areas; Sh_2, y.

‡ Kernels were colorless with 1 or 2 small dots of A_1 type pigment; Sh_2, y.

Table 21

Constitution of ♂ used in cross

♀ in cross

Culture	Plant no.	Constitution Spm + excision	a. sh2 stock	Tester I	Tester II	Tester III	Self-pollinated
				From table 19 Culture numbers			
I Pale Sh2 Y			no. of ears tested per plant.				
6665 A	-1	0		6702-2 (see table 18 for state			
" A	-2	0	1			6690	
" A	-5	0	1		6678		
II Pale Sh2 y							
" A	-3	0	1				
" B	-3	0				666E	
" B	-4	0	1			6690	
" B	-5	0		6638A		6680D	
" B	-6	0				6666E	
" D		0	2				1
6666 B	-1	0				6666E	
" B	-2	0			6678		
" "	4	0	1				
"	5	0	1				
III From Var. Sh2 Y kernels.							
6665 E	1	Y Spm/y+	1				1
"	2	"	1	6638A	6678		
"	3	"	2				
"	4	"	1	6638A			
"	5	"	1	6638A			
"	6	"	1				
"	7	Y Spm/y+	1				
"	8	Y Spm/y+	1	6638A			
"	9	"	1				
"	10	Y/y; 2 spm	2				
6666 C	1	Y Spm/y+	1				
"	2	"	1	6638A			
"	3	"	2				
"	4	"	1				
"	5	"	1	6638A			
"	6	"	1	6638A			
"	7	["] 1)	1	6638A			

1) see text

Cultivar	Plant no.	Spin no.	Anthery stock	Tester I (Table 19)	Tester II (Table 19)	Tester III (Table 19)	Self-pollinated	odds		
From var. Sh2 y hemb										
6665 F	- 1	1	2	6641A						
"	- 2	1	1							
"	- 3	1			6678					
6666 D	- 1	1		6641A						
"	- 2	1		6641A						
"	- 3	1	2	6641A						
"	- 4	1		6638A				state 5/20		
"	- 5	1	1	6641A						
From var. sh2 Y hemb										
6666 E	many crosses, see discussion in text.									
		Spin/y+								

Table 22

Test crosses conducted with plants in culture 6665G and H and culture 6666G and H derived from colorless, sh_2 kernels on ears of plant 6629A-1. Plants in Parts I and II were Y/y in constitution. Those in parts III and IV were y/y. Each plant was used as the ear parent in the cross.

Culture and Plant number	Source of pollen used in making test cross: Tester type I, Table 19, States		Pale plants with states other than those in table 19
Part I Y/y Spm present: 15 plants			
6665G-1	5718	5700A	5719A-2
6666G-4	5718	5719A-2	
6665G-7	5718	5718	
6665G-2,-5,-6,-12,-13,-16,-21	5718		
6666G-2, -5, -6, -9, -10	5718		
Part II Y/y, No Spm: 15 plants			
6665G-9	5718	5700A	5719A-2
6665G-3	5718	5700A	
6665G-10	5718	5714F	
6665G-14	5718	5719A-2	
6665G-8, -11, -17, -18, -19, -20	5718		
6666G-1, -3, -8,	5718		
6665G-11, -15	5719A-1		
6666G-7	5719A-1		
Part III y/y, Spm present: 6 plants			
6666H-6	5718	[redacted]	5996-4
6665H-5	5719A-1	[redacted]	
6666H-10, -13	5718	5719A-2	
6666H-2, -12	5718		
Part IV y/y, No Spm present: 18 plants			
6666H-9	5718		5719A-2
6665H-3	5700A		
6665H-1, -4, -10	5718		
6666H-1, -3, -8, -11	5718		
6665H-6, -7, -8, -9, -11, -12	5719A-1		
6666H-4, -5, -7	5719A-1		

Table 23.

Types of kernels appearing on ears of pale colored plants in cultures 6665 and 6666 that were $a_1 m_1 Sh_2 / a_1 m_2 sh_2$ in constitution.

Constitution of	Culture number of	number of ears.	Phenotypes of kernels: Pale		Variegated		Colorless		Totals
			Sh_2	sh_2	Sh_2	sh_2	Sh_2	sh_2	
$a_1 sh_2 / a_1 sh_2$ stock.		8	1123	1	0	0	5	1110	2239
Tester I Table 19	6638A-1	1	428						428
$a_1 m_1$ (5700A) $Sh_2 / a_1 sh_2$ pale plant.	6702-2	1	176	0	0	0	0	53	229
Tester II, Table 19	6678	2	299	128	0	0	0	156	583
Tester III, Table 19	6690	2							
	6680D	1	9	1	164	88	2	93	
	6666E	3	413 [1]		306 [2]				

[1] 160 Y : 253 y
[2] 186 Y : 120 y

$a_1^{m1}Sh_2 / a_1 sh_2$ pale plants enter Y/y or yy.

I By $a_1 sh_2$ sstock =

6665 A-2 I ✓
6665 A-5 I ✓
6665 A-3 ✓
6665 B-4 I ✓
6666 B-4 I ✓
6665 B-5 - I ✓

8

6665 D I ✓
" " I ✓

II By a_1^{m1} (5718) Sh_2 homo. pale 6638 A-1 = 6665 B-5 I ✓

By a_1^{m1} (5700A) $Sh_2 / a_1 sh_2$ pale 6702-2 = 6665 A ① ✓

III By $a_1^{m1} sh_2 / a_1 sh_2$ pale plant

6665 A-5 × 6678 ✓
6666 B-2 × 6678 ✓

IV ① By $a_1^{m1} sh_2 / a_1 sh_2$ var plant 6690

6665 A-② - I
6665 B-④ - I

② plant 6680 D

6665 B-5

③ 6666 E

6665 B-③ I
6665 B-⑥ I
6666 B-① I

Pale var. colorless

no. of	Sh2		sh2		Sh2		sh2		Sh2	sh2				
ears.	Y	y	Y	y	Y	y	Y	y						
6665B-3	49	93	42		60	55	39	15	0	126	- [illegible]			
" B-6	56	88	36	16	72	32	22	28	0	98	- OK			
6666B-1	55	72	56		54	33	45		1 Y	134	- [illegible]			
Totals	160	253			186	120			1	358				
	413		150		306		149							

Table 24

Phenotypes of kernels appearing on ears of 15 plants in cultures 6665G and 6666G in which Spm was present. The constitution of these plants was a_1 sh_2 / a_1 sh_2, Y/y, [redacted]. The pollen used to produce these ears was from plants in culture 6638A or 6701 of table 19, or from a plant ~~xxxxxxxxx~~ 6693A-2 whose constitution was a_1^{m-1} (state 5719A-2) Sh_2/a_1 sh_2 Y/y, no Spm.

Part I. Phenotypes of kernels on ears ~~xxxxxxxx xxxxxxxxx~~ of plants whose constitution was Y Spm/y+. Part II Phenotypes of kernels on ~~xxxx~~ two ears of a plant whose constitution was probably Y Spm/y +. Part III. Phenotypes of kernels appearing on an ear of each of two plants ~~whose~~ in which Spm did not appear to be linked with Y.

♀	♂	Phenotype of Kernels on ear					
		Pale Sh2		Variegated Sh2		Others	Total
		Y	y	Y	y		
Part I							
One ear per plant:							
6665G-2,5,6,12,13	6638A						
6666G-2,5,6,9-10		640	1118	1033	614		3405
2 ears per plant							
6665G-7 main	6638A-1	70	143	135	88		436
6665G-7 tiller	6638A-7	18	49	50	14		131
3 ears per plant							
6665G-1 main	6638A-3	67	130	141	78		416
6665G-1 tiller	6701-2	60	140	120	91		411
6665G-1 tiller	6693A-2	61	26	63	11	[illegible] Sh2	300
Part II							
6666G-4 main	6638A-1	18	27	27	21		93
6666G-4 tiller	6693A-2	4	1	6	1	[illegible] Sh2	[illegible]
Part III							
6665G-16 *	6338A	30	40	47	41		158
6665G-21 †	6638A	66	57	79	75		277

* Tests in succeeding generation indicated that Spm was loosely linked with Y, see table

† Tests in succeeding generation indicated no linkage of Spm with Y, see table

Table 25

Phenotypes of kernels appearing on ears produced by test crosses entered in part III of table 22. Tester plant 6693A-2 was a 1m (state 5719A-2) Sh2/a1 sh2 in Spm. Tester plant 6704C-4 was a 1m (state 5996-4) Sh2/a1 sh2, in Spm.

Culture no. of ♀ plant	Culture no. of ♂	Phenotypes of kernels: Pale Sh2	Variegated Sh2	Others	Totals
One test cross ear per plant:					
6665 H-5	6641A-5	204	179		383
6666 H-2	6638A-1	209	185		394
6666 H-12	"	211	240		451
Two test cross ears per plant					
6666 H-6 main ear	6638A-3	175	182		357
H-6 2nd ear	6704C-4	71	86	1 pale sh2, 164 colorless sh2	322
6666 H-10 main ear	6638A-3	223	258		481
" tiller ear	6693A-2	52	38	92 colorless sh2	90
6666 H-13 main ear	6638A-1	209	201		410
" tiller ear	6693A-2	41	55	91 colorless sh2	187