"critical region" between y9 and bf2 that could account for some of the observed differential transmission. Whether or not this "critical region" really exists will require further tests. If it does exist, it will be necessary to determine how much of the "hypoploid effect" is due to events within this region and how much is due to hypoploidy per se.

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A case of genetic instability at the opaque-2 locus — In a 1971 field trial all the ears of the hybrid (FR 123 o2 x R 103 o2) x A 619 o2 segregated variegated kernels. This phenotypic variegation appeared particularly clear on the kernel surface, where sharply bordered horny and opaque patches were present side by side. In the last two years we have accumulated genetic data suggesting the existence in our material of a mutable system responsible for the somatic variegations observed. The attributes of the system, even though not carefully quantified, may be synthesized from the following data from two selected progenies (Tables 1 and 2).

1. Mutability is either autonomous or under the control of an independent factor. With some exceptions the segregation ratios of Table 1 are consistent with the 3:1 ratio expected in the case of autonomous control. The ratios of Table 2, on the other hand, imply the existence of a two-factor interaction.
2. A particular variegation pattern is not stable. Kernels of c or m phenotype (see Table 1) frequently produce N or c variegated kernels, respectively. For example, the 3472-1 plant was clearly heterozygous, bearing a mutable and a non-mutable o2 allele. This plant, when outcrossed to standard o2, gave 345 opaque and 347 variegated seeds (232 of c or m type and 115 N type). The N phenotype has been maintained in the subsequent generation (class 3 of Table 1).
3. When heterozygous with an unstable o2 allele, o2-R may segregate at unexpectedly low frequencies. This is the case with ears 5, 7, 13, 23 and 27 in Table 1. Abnormal segregation ratios have also been observed in progenies with independent control of mutability (i.e., ears 4, 17 and 18 selfed and 5/o2-R and 16/o2-R in Table 2).

Table 1. Segregation ratios of a progeny with autonomous control of mutability. In 1973 a plant (3472-1) bearing a mutable o2 allele was outcrossed to a plant homozygous for a standard o2 allele (hereafter designated as o2-R). From this cross originated 345 opaque seeds (non variegated; class 1), 232 variegated seeds (class 2), and 115 subnormal seeds (class 3). In 1974 the three classes, after self-fertilization, gave the indicated segregation ratios.

Class	Selfed ear number	Number of variegated kernels	Type of variegation*	Number of opaque kernels	χ^2 (3:1)
1	1-12		-	all	-
2	1	294	c + m + f	94	0.12
	2	232	m + f	70	0.53
	3	140	c + m	48	0.03
	4	134	c + m	51	0.65
	5	159	c + m	60	0.67
	6	235	c + m	92	1.71
	7	386	c + m	105	3.42
	8	501	c + m + f	110	15.95
	9	213	c + m	67	0.17
	11	210	c + m	83	1.73
	12	149	c + m	53	0.16
	14	119	c + m	37	0.14
	16	199	c + m	57	1.02
	17	72	c + m	28	0.48
	18	108	c + m	43	0.97
	19	184	c + m + f	65	0.16
	20	98	c + m	27	0.77
	21	134	c + m	48	0.18
	22	210	c + m + f	70	0.00
	24	169	c + m + f	47	1.21
	25	185	c + m	55	0.55
	26	199	c + m	50	3.21
	13	240	N + c	4	71.02
	23	106	N + c	7	31.31
	27	224	c + m	25	29.72
3	1	211	c + m	96	2.31
	2	108	N	37	0.02
	3	100	N	42	1.59
	4	105	N + c	43	1.30
	6	99	N	29	0.37
	8	96	N + c	14	8.84
	9	95	N	31	0.01
	10	167	N	52	0.18
	11	102	N	26	1.50
	5	180	N + f	18	26.63
	7	263	N + f	15	56.98

*c Variegated phenotype with normal tissue prevailing.
m Variegated phenotype with 50% normal tissue.
f Variegated phenotype with opaque tissue prevailing.
N Subnormal phenotype: may appear either as a true normal or as a normal with very few spots of opaque tissue.

Table 2. Segregation ratios of a progeny with independent control of the o2 mutability. In 1973 the 3466-1 plant was pollinated with o2-R pollen. All the seeds obtained were variegated (c or f type). The plants from the f seeds, when self-fertilized or outcrossed, gave ears showing the following segregation ratios.

Ear number	Number of variegated kernels	Number of opaque kernels	x^2 (9:7)	x^2 (1:3)	x^2 (1:1)
1 self	259	187	0.60		
2 self	211	136	2.93		
3 self	383	236	7.95		
4 self	418	221	21.80		
6 self	196	142	2.93		
7 self	156	120	0.01		
17 self	312	176	11.60		
18 self	350	205	10.46		
5/o2-R	132	249		18.90	
8/o2-R	127	337		1.53	
9/o2-R	64	232		1.80	
11/o2-R	62	128		5.90	
12/o2-R	64	160		1.52	
19/o2-R	59	179		0.00	
16/o2-R	211	207			0.04

4. The system of mutability acting at the o2 locus seems independent from the previously described Ac Ds and Spm systems. An Ac activity test has been carried out by crossing a C-I Ds/C Ds female with a male bearing a mutable o2 allele; no B-F-B cycles appeared in the F_1 kernels. The F_2 progeny segregated normal and variegated kernels, but B-F-B cycles were still absent. An Spm activity test was achieved by crossing a female a-m1/a-m1 wx-m8/wx-m8 with an o2 mutable male. The F_1 kernels were phenotypically a-m1 without the Spm-induced variegations, and the F_2 ears segregated opaque-2 variegated kernels without Spm activity at the A or Wx locus.

The o2 mutable system here described promises exciting developments. An analysis of a mutable gene system at a biochemical level is now feasible; moreover, the foreseen recovery of a wide spectrum of new o2 alleles will be useful in breeding maize for protein quality.

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