2 or 4 groups of one bivalent each were found. The second division is also quite regular but in two cells, out of several studied at anaphase II, chromosome bridges in one cell and a laggard in the other were observed. Pollen fertility and seed setting are good.

J. Venkateswarlu
Panuganti N. Rao

BHABHA ATOMIC RESEARCH CENTRE
Trombay, Bombay, India
Biology Division

1. Absence of a detectable change in Ds at the A_1 locus following mutagenic treatments.

In last year's MNL we reported our observations in regard to the stability of Ds at the A_1 locus. We now present additonal data regarding the absence of a detectable change in Ds at the A_1 locus following certain "mutagenic" treatments viz. Ultraviolet radiation, gamma-rays and Mitomycin C.

It is known that UV irradiation of pollen produces discrete changes at the genic level. It was assumed that a "change" in Ds, without affecting the A_1 locus, would restore the function of A_1. No such change was detected as Table 1 shows. That the treatment was in general mutagenically effective is shown by the fact that a very large number of cases of sh_2 were obtained, although most of these must be losses of Sh_2 following the generation of breakage-fusion-bridge cycles.

Similarly no change was detected for Ds following gamma irradiation of pollen or plants. Gamma radiation in general does not produce discrete changes and practically all the changes must be due to marker loss. However, the B-F-B cycles are correlated with the "recreation" of Dt-like elements but in the present case no Ac-like elements were generated.

Mitomycin (MC) was used since it is a known agent for the induction of lysogenic bacteria. If Ds were like a prophage, then conceivably it could be induced by MC treatment. MC was apparently very mildly mutagenic. Its ability to "induce" Ds, if it is an inducible prophage, remains in doubt. No colored kernels were obtained (Table 1).

Chandra Mouli
N. K. Notani

2. Induced mutation of I and C: a comparison.

The complex inter-relationships of expression and dominance among I, C and c are not readily interpretable in terms of the structure and function of the locus or loci involved. By themselves III, CCC and ccc genotypes respectively condition colorless, colored and colorless aleurone. I and c are resolved only when present together with C, the former being dominant and the latter recessive to C. Further, because both I and C are mapped very close together, it is generally considered that I and C or c are either components of a compound locus or form an allelic series of a

Table 1

Types of kernels obtained from treatment with different mutagenic agents of A_1 Ds Sh_2, no Ac stocks crossed to a_1^s sh_2, no Ac tester

Treatment	Total kernels	Phenotype of the kernels					Total change for Sh_2
		Colorless non-shrunken	Colorless			Colored shrunken or non-shrunken	%
			¼ shrunken %	½ shrunken %	Full shrunken %		
Control	1799	1791	6(0.35)	2(0.11)	0(0.00)	0(0.00)	8(0.46)
UV irradiation of pollen	2197	2066	64(2.91)	45(2.04)	22(1.01)	0(0.00)	131(5.96)
Seeds treated with Mitomycin C	2543	2517	10(0.39)	12(0.47)	4(0.16)	0(0.00)	26(1.02)
Seeds treated with Mitomycin C, pollen irradiated with UV	2268	2124	53(2.33)	63(2.77)	28(1.25)	0(0.00)	144(6.35)
Plants exposed to chronic gamma radiation	1822	1774	24(1.31)	14(0.76)	10(0.56)	0(0.00)	48(2.63)
Plants exposed to chronic gamma radiation, pollen treated with UV	2647	2455	47(1.77)	101(3.77)	44(1.66)	0(0.00)	192(7.20)

Table 2

Changed kernel types obtained from the cross I Sh Bz Wx / I Sh Bz Wx (treated) X C sh bz wx / C sh bz wx and their subsequent breeding behavior

Treatment	Number of seeds treated	Colored			Shrunken			Waxy			Remarks
		Obtained	Failed to propagate	Noncon-cordant	Obtained	Failed to propagate	Noncon-cordant	Obtained	Failed to propagate	Noncon-cordant	
A.											
Control	250	0	-	-	0	-	-	0	-	-	
γ-ray irradiated	500	5	0	4	0	-	-	1	1	-	
Diethyl-sulfate	202	5	1	3	0	-	-	0	-	-	One case: All 4 markers lost
Ethyl-methane-sulfonate	350	3	1	2	3	0	0	4	2	0	
EMS +γ-ray irradiated	146	5	0	4	0	-	-	0	-	-	
Total	1198	18	2	13	3	0	0	5	3	0	
True muta-tions		3			3			2			
B. EMS											
I Sh Bz Wx* / I Sh Bz Wx X C sh bz wx / C sh bz wx	150	0	-	-	0	-	-	0	-	-	
C Sh Bz Wx* / C Sh Bz Wx X c sh Bz wx / c sh Bz wx	180	6	1	0	-	-	-	-	-	-	

*Treated

Table 3

Transmission of linked factors on the short arm of chromosome 9 in crosses heterozygous for a gametophyte factor

Cross	Progeny kernels						
	I Sh (Bz) Wx	C sh bz wx	I sh (bz) wx	C Sh Bz Wx	C sh Bz Wx	I Sh (Bz/bz)wx	C sh bz Wx
C sh bz wx / C sh bz wx X C sh bz wx / I Sh Bz Wx	3	196	0	6	5	0	20
C sh bz wx / C sh bz wx X C sh bz wx / I Sh Bz Wx	1	133	0	3	4	0	14
C sh bz wx / I Sh Bz Wx X C sh bz wx / C sh bz wx	54	61	1	0	1	6	9
C sh bz wx / I Sh Bz Wx X C sh bz wx / C sh bz wx	92	117	1	4	0	12	10
C sh bz wx / I Sh Bz Wx X C sh bz wx / C sh bz wx	110	106	1	0	1	8	15
C sh bz wx / I Sh Bz Wx X C sh bz wx / C sh bz wx	90	86	0	1	0	16	11

bifunctional locus. The latter model was proposed by Coe (1964) because he did not obtain the crossovers expected on the basis of the compound locus model. While this may be the case, the dominance behavior of (the mutation) I appears to be somewhat similar to the so-called super-repressed mutations of the regulator gene (R^s type) in E. coli which when heterozygous (R^s/R^+) are unable to synthesize the enzyme (B-galactosidase). This is a very striking result from the genetic point of view since an R^s mutation corresponds to a dominant loss of function (Jacob & Monod in Cytodifferentiation and Macromolecular Synthesis, Academic Press, 1963).

The data to be presented here were collected with a view to study similarities and differences between I and C in regard to their direction of mutation, mutation rates, and any other information which would have a bearing on the above models. Our observations are summarized in Table 2. The following points are noteworthy:

(1) There is a very high proportion of non-concordant changes of I. In contrast no such class was observed from C, Sh and Wx mutations.

(2) The direction of mutation of I is only to i (phenotypically indistinguishable from c) never to C. These findings are similar to those of Coe (1962) for the direction of spontaneous mutation of I.

(3) The mutation rates of I and C are apparently dissimilar but the data are insufficient on this point.

Chandra Mouli
N. K. Notani

3. A new gametophyte factor on chromosome 9.

Drastically reduced pollen transmission for the factors located on the short arm of chromosome 9 was observed following, apparently, a spontaneous mutation of a Ga factor to ga. I was transmitted to the extent of about 1%, Sh about 3%, Bz about 4%, and Wx about 10%. No reduction in transmission of these factors was noted in the reciprocal cross (Table 3). Assuming 100% non-transmission for the pollen carrying ga and assuming the transmitted gametes as due to crossovers, the locus of ga is placed very close to I and distal to it. Crossing-over between I and Wx is about half the usual value. Its relationship with ga, if any, is not clear at the moment.

Chandra Mouli
N. K. Notani

4. High rate of induced change for anther color in maize.

During the course of a study designed to reveal the type of sectorial mutations induced by ionizing radiations and chemical mutagens, homozygous ACR^r (original stock kindly supplied by Prof. R. A. Brink) seeds were irradiated with Co^{60} gamma-rays and ethylmethane sulfonate (EMS). A large number of plants arising from the treated seeds were observed to have green anthers (Table 4). EMS was found to be particularly effective in inducing this change with as many as 103 out of 280 plants showing some