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EFFECT OF MUTAGENIC TREATMENTS ON *Arachis hypogaea L* IN M[1] GENERATION

T. RAMANATHAN,

In the present study, the two varieties showed indentical response to mutagenic treatments with regard to germination and survival while diffential response was indicated by growth reduction Gamma rays have reduced the height of seedling in TMV-9 to a greater extent than EMS However, this trend was reversed in Ah. 7911 in which EMS had the effect of greater reduction on seedling height than that of gamma rays Growth of seedlings in the combination treatment was less than that observed in single treatments and the effect was more pronounced in Ah, 7811 than in TMV, 9.

Mutagenic studies in groundnut, (*Arachis hypogaea.L*) in the earliar period were restricted to only physical mutagen, mostly x-rays. Later, gamma rays thermal and fast neutrons have been employed Emery *et. al.*, 1965). More recently chemical mutagens like diethyl sulphate (DES), ethyl methane sulphonate (EMS) N-methyl N-nitro-N-nitrosoguanidince (MNNG), sodium azide(SA), ethylence bromide (EB), and acriflavine were also employed (Lavy and Ashri, 1978).

Investigations involving chemical mutagens were mostly directed to assess the physiological sensitivity of different varieties of goundnut Ashri and Herzog, 1972:.

One of the approaches in mutation breeding is to enlarge the spectrum and increase the frequency of mutation by treating the material with physical and chemical mutagens and their combinations.

One of the objectives of the present investigation was to increase the spectrum and frequency of mutation in groundnut by use of physical mutagens and their combination. The observations recorded in M1 generation are presented and discussed in this paper.

Two improved cultivars of groundnut, TMV-9 and Ah. 7911 with bunch growth habit were chosen for the study. They are hybrid derivatives with a common male parent of Ah 477 (Bassi). The female parents of TMV-9 and Ah 7911 are A.h. 3490 (Bromie 3) and Ah. 4218 (Gudiyatham) respectively, seeds with a moisture content of 5.5 percent and retained by 21/64 inch sieve were treated with gamma rays at 20, 30 and 40 krad. Seeds presoaked in deiomized water for 12hrs were subjected to chemical treatment for 4 hours with EMS at 40, 60 and 80mm concentrations. Combination treatment consists of

Coconut Research Station, Veppankulam-614 906, Thanjavur Dist.

irradiation of dry seeds with 30krad of Gamma rays followed by presoking in deionized water for 12 hours and chemical treatment with EMS at 40mm. The seeds treated with chemical were washed in running tap water for one hour.

The seeds subjected to single and combination treatments were immediately sown in the field along with controls in randomised block design with five replications in 1975. Two rows of 3m length spaced 30cm apart constituted the plot size. Twenty seeds were dibbled per row with a spacing of 15cm between seeds in the row. Observations on germination % (seedlings emerged up to 15th day after sowing), survival % (seedlings survived on the 30th day after sowing) and seedling height (measured on 30th day after sowing from the collar to the tip of the main stem) were recorded.

The data collected on three M1 indices, namely, germination, survival and seedling height are presented in Tables 1 and 2.

Gamma irradiation, EMS treatment and combination of both have resulted in reduction in germination compard in control (Table 1). Progressive decrease in germination with increase in dose of gamma rays and EMS was observed. Similar relationship between dose and effect was reported in the irradiated material of groundnut (Gregory 1968). Data have shown that combination treatment caused greater reduction in germination than that of single treatments. Such increase in reduction of germination due to combination treatment was observed in rice (Siddiq and Swaminathan, 1968) and Sorghum (Sree Ramulu, 1970).

It may be clear from Table 1, that survival was reduced with increase in doses of gamma rays and EMS. Such inverse relation between dose and survival was observed in groundnut due to X-irradiation (Gregory, 1968). Combination treatment was found to reduce survival to a greater extent than that of single treatments.

Data on seedling height (Table 2) have indicated growth reduction with increase in doses of gamma rays and EMS. There were several reports on such growth reduction due to mutagenic treatments. In groundnut, irradiation with X-rays Gregory, 1968) and thermal neutrons and gamma rays were shown to cause reduction in the seedling growth with increase in dose

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Table-I Germination and survival in M_1 generation (Percentages after angular transformation)

Treatment		Germination percent				Survival percent			
		TMV-9	Percent on control	Ah.7911	Percent on control	TMV-9	Percent on control	Ah.7911	Percent on control
Control (DS)		73.1	100.0	76.4	100.0	67.7	100.0	68.3	100.0
Gamma rays	20 krad	62.1	85.0	60.6	79.3	57.5	85.0	56.8	83.1
	30 krad	59.4	81.3	57.2	74.8	54.8	80.9	53.4	78.2
	40 krad	55.1	75.4	53.8	70.4	48.3	71.3	47.3	69.2
	Mean	58.8	80.5	57.2	74.8	52.6	79.1	52.5	76.8
Combination 20 krad + 40 mM		53 8	75.1	52.7	69.0	49.7	73.4	47.7	69.9
Control (SS)		73.9	100.0	74.4	100.0	69.5	100.0	64.5	100.0
MS	40 mM	61.8	83.7	57.5	77.3	53.1	76.3	50.9	78.-
	60 mM	50.8	72.0	49.0	65.9	44 4	63.9	42.7	66.2
	80 mM	38.6	52.2	36.8	49.5	34.3	49 4	32 6	50.4
	Mean	55.4	68.9	47.8	64.2	43 8	63.2	42.0	65.1

Source	S.E	C.D.	S.E.	C.D.
Variety	1.33	N.S	1.19	N.S
Treatment	2.82	7.94	2.52	7.11
Variety X Treatments	3 98	N.S	3.57	N.S

Table : 2 Seedling height in M_1 generation

Treatment		Seedling height (cm)			
		TMV-9	Percent on control	Ah. 7911	Per-cent in control
Control (DS)		5.2	100.0	6.1	100.0
Gamma rays 20 Krad		4.8	92.3	5.5	90 2
30 Krad		4.4	84.6	4 6	75.4
40 Krad		3.4	65.4	3.6	59.0
Mean		4.2	80.8	4 6	75.4
Combination 20krad + 40 m*M*		4.3	82.7	4.4	72.1
Control (SS)		4.9	100.0	6.0	100.0
EMS	40 m*M*	3.7	75 5	5.0	83.3
	60 m*M*	3.2	65.3	2.7	45.0
	80 m*M*	2.2	44.9	2 0	33.3
	Mean	3.0	87.8	3.2	52.5

Source	S E	C.D
Variety	0.01	0.03
Treatment	0.22	0.61
Variety X Treatment	0.31	0 8