Madras agric. J. 65 (1) : 59—61, Jan., 1978

Effect of Post-Irradiation Storage and Storage Temperature on *Sesamum indicum* L.

Uniformly dried seeds of the cultivated variety of sesame (*Sesamum indicum* L.) 'Onattukara' were treated with gamma rays at 20, 40, 60, 80 and 100 Krads. Half the quantity of the treated seeds were sown in the field soon after irradiation and the other half was kept stored at three different temperatures viz. 4, 30 and 45°C for 60 and 120 days. After the storage a sample of 100 seeds from each group was germinated in petridishes under laboratory conditions for assessing germination and early seedling growth. Pollen sterility was studied from the plants raised in the field after storage. Acetocarmine staining was used for assessing pollen sterility.

Table I gives the data on seed germination, seedling length and pollen sterility. There was considerable reduction in germination as a result of storage. Under the ambient temperature the germination of control seeds came down from 95 per cent in unstored seeds to 84 per cent in seeds stored for 60 days and to 69 per cent in seeds stored for 120 days. At 20 Krad the corresponding values were 83, 64 and 56 per cent. There was a rapid fall in germination rate as the dose increased. At 100 Krad the germination rate was 68 per cent in seeds sown with out storage, 48 and 42 per cent in seeds stored, at room temperature for 60 and 120 days respectively. Further decrease in germination was noted as the storage temperature increased to 45°C. For example, the germination rate of 100 Krad treated seeds stored for 120 days decreased from 53 to 15 per cent as the storage temperature increased from 4 to 45°C.

The early seedling growth measured after seven days indicated further the influence of storage and storage temperature (Table I). In the case of unstored seeds the mean length of seedling was 7.1 cm while in 100 krad it was 2.1 cm. Unirradiated control seeds stored for 60 days at 4°C gave a mean length of 7.2 cm while the corresponding value for 20 kard was 5.1 cm, and for 100 krad 2.1 cm. At 30°C, the seedling length after 60 days of storage reduced from 7.3 cm in the unirradiated control to 1.9 cm in 100 krad and after 120 days from 7.0 cm (unirradiated control) to 1.2 cm in 100 krad. At 45°C, seedling length reduced from 7.0 cm in the unirradiated control to 1.0 cm in 100 krad after 60 days storage and to 0.5 cm after 120 days storage. Thus, there was a remarkable enhancement of radiation effect as a result of storage and storage temperature.

Pollen sterility was also affected considerably as a result of post-irradiation storage. The percentage sterility increased from 22.0 in the unstored control to 94.1 in the 100 krad raised immediately after treatment. In the case of seeds stored for 60 days at 45°C, the sterility increased from 28.1 per cent in the unirradiated control to 78.2 per cent in 60 krad, beyond which

TABLE I. Effect of post-irradiation storage and storage temperature on germination, seedling length and pollen sterility

Gamma dose (KR)	Unstored	Stored for 60 days			Stored for 120 days		
		4°	30°	45°	4°	30°	45°
Germination (%)							
Control	95	88	84	75	72	69	68
20	83	64	64	58	59	56	54
40	78	61	60	47	54	56	43
60	72	57	56	44	58	53	41
80	71	55	53	39	51	48	31
100	68	52	48	23	53	42	15
Seedling length (cm)							
Control	7.1	7.2	7.3	7.0	6.2	7.0	7.0
20	5.2	5.1	4.3	4.0	4.2	4.1	3.1
40	4.6	4.1	4.3	3.9	3.9	3.4	3.0
60	4.0	4.0	4.0	3.1	3.2	3.0	2.0
80	2.9	4.0	3.2	2.9	2.9	2.2	1.3
100	2.2	2.1	1.9	1.0	1.9	1.2	0.5
Pollen sterility (%)							
Control	22.0	26.8	24.1	28.1	30.0	29.9	28.8
20	43.0	54.1	53.1	55.0	56.4	53.8	58.9
40	55.1	58.3	57.3	58.9	63.8	62.9	64.3
60	76.8	75.2	76.3	72.8	79.1	L*	L
80	84.1	L	L	L	L	L	L
100	94.1	L	L	L	L	L	L

* L — Lethal — no plants reached maturity

the treatments were lethal and produced no mature plants. Complete lethality resulted in 80 and 100 krad irradiated seeds stored for 60 and 120 days, and also in 60 krad stored for 120 days at 30 and 45°C.

In cereals like barley and rice it is known that post irradiation storage and storage temperature can influence the radiation induced injury considerably (Eherenberg, 1955., Constantin, Conger and Osborne, 1970). The present study pointed out that the irradiation effect could be enhanced in *Sesamum* also by storage. This is evident from germination percentage, seedling length and pollen sterility. Reduction in fertility was found to be considerable and in seeds stored for 60 and 120 days plants either did not flower or were completely sterile or lethal. Similar results were reported in barley (Eherenberg, 1955) and in *Lucerene* (Fautrier, 1976).

Hence it is possible in *Sesamum* to enhance the radiation effect through post-irradiation storage at varying temperatures. Apparently it seems to be preferable to use comparatively low dose combined with storage at higher temperature for breeding purposes.

P.N. RAVINDRAN

Central Plantation
Crop Research Institute
Vittal,
Karnataka State.

REFERENCES

CONSTANTIN, M.J., B.V. CONGER and T.S. OSBORNE. 1970. Effect of modifying factors on the response of rice seeds to gamma rays and fission neutrons. *Radiation Botany* **10**: 539-49.

EHRENBERG, L. 1955. Factors influencing radiation induced lethality, sterility, and mutations in barley. *Hereditas* **40**: 123-46.

FAUTRIER, A.G. 1976. The infuence of gamma radiation on dry seeds of *Lucerene* cv Wairau. I. Observations on MI generations. *Env. Exp. Bot.* **16**: 77-81.