

2. Greenhouse studies of X-ray and thermal neutron effects on crop seedlings.

An attempt is being made to determine the effective dosage range of irradiation of dormant seeds for a number of crop species with X-ray and thermal neutrons and to find species which are differentially susceptible to the two types of irradiations.

Five types of corn are included in the 15 crops tested. These are: dent, flint, sweet, pop and waxy. Single cross foundation seed was used to insure uniformity. The limited data available indicate that all types of corn are approximately equally resistant to irradiation. More extensive tests have been made with dent corn and barley than with any of the other crops studied. The single cross L289 x T205 dent corn and Himalaya barley have been used. Dormant seeds were irradiated with X-rays and thermal neutrons at dosages shown in Table 2. The 100 seeds per treatment were planted in flats in a randomized block design consisting of 4 replications.

Plant height has been used as a measure of the injury due to irradiation. Measurements have been taken at 7 day intervals for a maximum of 35 days after planting the seeds. From preliminary statistical analysis of the data it appears that measurements on the fourteenth day show the greatest differences between control plants and plants from irradiated seed.

There appears to be a differential susceptibility of dent corn and barley to the two radiations. As shown in table 2 corn seems to be more susceptible to X-rays than the barley especially if number of surviving plants is considered. On the other hand corn is more resistant to thermal neutrons than barley.

Table 2. The effects of X-ray and thermal neutron radiation on dormant seeds of barley and corn as measured by plant height 14 days after planting.

	No. plants	Average Height		No. plants	Average Height	
		cm.	% of control		cm.	% of control
Control	94	37.7	100	97	23.2	100
<u>X-ray</u>						
4000r	93	33.7	89.4	94	20.6	88.4
8000r	96	25.6	67.9	97	20.7	89.0
16000r	54	12.6	33.4	89	18.4	79.1
24000r	8	4.9	12.9	88	16.0	69.0
32000r	7	12.3	32.5	86	9.6	41.5
<u>N_{th}</u>						
4.7 x 10 ¹²				97	19.4	83.7
7.2 x 10 ¹²				99	16.7	72.0
10.2 x 10 ¹²	98	32.5	86.1			
11.6 x 10 ¹²				99	9.6	41.1
17.2 x 10 ¹²				99	3.5	14.9

21.6×10^{12}	92	26.7	70.7
25.2×10^{12}	95	17.3	45.9

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