

THE EFFECT OF GAMMA RAYS ON GERMINATION AND SURVIVAL IN TWO CULTIVARS OF *CAJANUS CAJAN* AND TWO SPECIES OF *MOGHANIA*

The present study was initiated to find out the radiosensitivity in two cultivars of *C. Cajan* (*Ranchi* and *Assam*) and two species of *Moghania* (*M. macrophylla* and *M. chappar*) with the ultimate aim to obtain improved lac productivity.

Pure line, dry and dormant seeds were irradiated with gamma rays at doses of 5, 10, 15, 20, 25, 30, 35 and 40 kR and the treated seeds of the *Moghania* species were sown in the second weeks of April in well prepared nursery beds along with the untreated seeds using 40 seeds, for each treatment. These were later transplanted in the field in the second week of July. The treated and untreated seeds of the two cultivars of *C. cajan* were sown, 18 seeds per treatment, direct in the field in the second week of June. The experiment was carried out in a randomised block design (R.B.D.) with 6 replications for the *Moghania* species and 10 for the cultivars of *C. cajan*. Observations were recorded for germination percentage

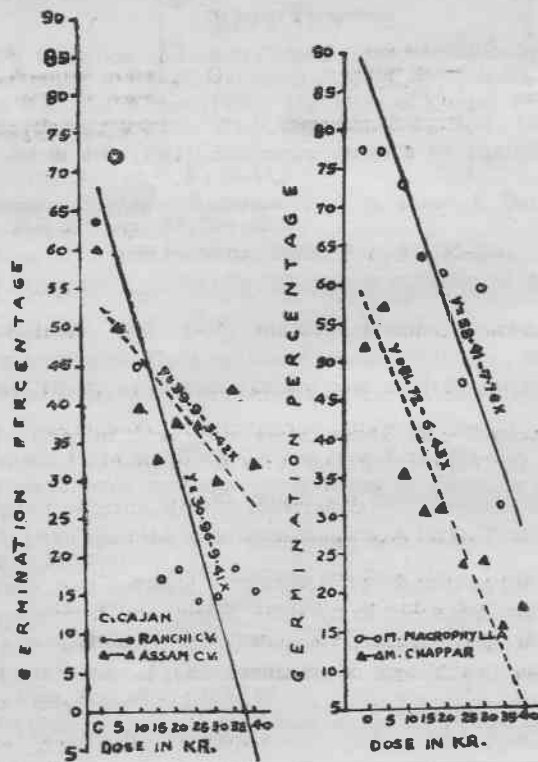


Figure 1. Effect of gamma rays on germination of seeds in two cultivars of *C. cajan* (*Ranchi* and *Assam*) and two species of *Moghania* (*M. macrophylla* and *M. chappar*).

and survival at maturity. Straight line graphs were drawn on the basis of equation $Y = \bar{y} - b(X - \bar{x})$, after appropriate statistical analysis. The results are given in Figures 1 and 2.

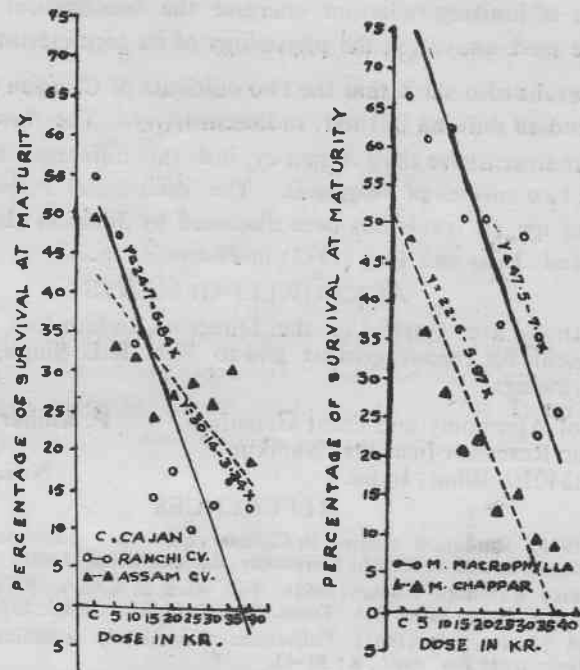


Figure 2. Effect of gamma rays on survival of plants to maturity in two cultivars of *C. cajan* (Ranchi and Assam) and two species of *Moghania* (*M. macrophylla* and *M. chappar*).

The results show that the germination and survival percentage are decreased with the increase in the radiation dose and these have fluctuated at certain high doses.

The lower dose tried *i.e.* 5 kR. appears to have stimulated the germination process as evidenced by the increased germination percentage in the case of *Ranchi* cv. of *C. cajan* and *M. chappar* but the survival of plants to maturity is adversely affected as has been the case with the higher doses.

The decreased germination percentage and survival of plant to maturity with the ionizing radiation of seeds and the general relationship between these reduction and the radiation dose are well known phenomenon (Gustaffson, 1944, Gunkel, 1957, Gunkel, and Sparrow, 1961; Basu, 1962, Gaul, 1964, Sinha, 1967, Son *et al.* 1970, Akhaury 1971, Roy, 1973 and Srivastava, 1975). In the present study also, the germination percentage and survival of plants to maturity decreased with the increase in the radiation dose. The fluctuations recorded at certain high doses are similar to those reported by Basu and Basu (1968) in rice with the use of P^{32} and S^{35} as the source of treatments. They have tried to explain such results as possibly due to differences in the shape, size and thickness of seeds in addition to those of the genetic constitution.

The increase in the germination percentage recorded with a low dose of ionizing radiation has also been observed by Fujii and Matsumura (1968), Bilquiz and Mar ia (1961), Basu (1962), Swaminathan (1965), Basu and Basu (1968) and Son *et al.* (1970) working with the other plant species, which, appears to show that the mild doses of ionizing radiation energise the biochemical and physiological processes of the seed, activating the physiology of its germination.

These results also show that the two cultivars of *C. cajan* and the two species of *Moghania* studied differed in their radiosensitivity. The *Ranchi* cv. of *C. cajan* is much more radiosensitive than *Assam* cv. but this difference is not so marked in the case of the two species of *Moghania*. The differential response to radiation at the varietal and specific levels has been discussed by Johnson (1936) in *Artiples* sp., Sinha (1967) and Lens and Roy (1973) in *Phaseolus* sp.

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