

## Preliminary Investigations on the Dormancy of Cotton Seeds

by

M. BAGAVANDOSS<sup>1</sup>

**Introduction:** Dormancy is a phenomenon common to most seeds and is due to both physical and biological factors. Hard coat of seeds prevents intake of water or the embryos may be immature for proper germination. In cotton seeds, delayed germination has been observed by Simpson (1935) in fresh fuzzy seeds of *G. hirsutum*, as opposed to the naked seeds of *G. barbadense* types. Balasubramaniam and Ramaswamy (1933) working on interspecific and inter-racial hybrid seeds of Asiatic cottons, found delayed germination due to hard seed coat, closed micropyle etc. This was overcome by treating the seeds with sulphuric acid. The inhibition studies on cotton seeds by Dubash and Joshi (1959) had shown that actual inhibition for cotton in general is 8 to 12 hours and the time-lag for germination and inhibition ranges from 18.5 to 62 hours.

**Material and Methods:** The nature of dormancy in the fresh cotton seeds of MCU3 (*G. hirsutum* race *latifolium*) was studied and reported in this paper. The seed cotton from 200 bolls, which just started to burst by exhibiting a linear crack on the septa of the bolls were picked and ginned on the same day. The seeds were cleaned and only good seeds were collected for testing. The seeds so obtained were divided into seven equal portions. On the day of picking the seed cotton, one portion of the seeds were sown. At an interval of every five days subsequent to first sowing, the rest of the seeds were sown. In each sowing, 100 seeds were used. During the first year of the trial only 25 seeds in each treatment were sown in field conditions, without replications. During the second year of trial, the seeds were sown under replication in randomised blocks.

The day of emergence of radicle in all the plots were watched daily till the 30th day after the last date of sowing i.e. 60 days after the first sowing. The sowings i.e. the treatments were taken as 0 day (day of boll crack), 5 days, 10 days, 15 days, 20 days, 25 days and 30 days for the seeds obtained on the same day of boll-crack. The day of first radicle emergence in all the plots was taken as the days of germination from the date of sowing, irrespective of the number of seeds sprouted.

**Results and Discussion:** The results of the first year indicated a state of dormancy for the fresh seeds. Hence, during the second year of trial, a portion of the seeds obtained on the day of boll-crack was treated with 95% sulphuric acid for 2 minutes to remove the seed fuzz and to observe the effect

---

<sup>1</sup> Cotton Assistant, Agricultural College & Research Institute, Coimbatore-3.

on dormancy. This was undertaken on the reported findings of a quicker germination with sulphuric acid treated seeds by Balasubramanian and Ramaswamy (1933) and Simpson, *et al* (1940)

The results are summarised in table I.

TABLE I. *Dormancy of MCU 3 Cotton.*

Treatments *	1962		1963			
	No. of seeds sprouted †	Days taken for first sprouting	Mean of 4 replications (untreated seeds)		Mean of 4 replications (treated with H <sub>2</sub> SO <sub>4</sub> )	
			Seeds sprouted	Days taken for 1st sprout- ing	Seeds sprouted	Days taken for 1st sprout- ing
0	8	14	<u>6.25</u>	<u>17.00</u>	<u>16.50</u>	<u>8.25</u>
5	12	11	12.25	10.00	<u>16.75</u>	<u>7.50</u>
10	14	7	13.25	6.00	18.75	5.50
15	14	8	15.50	6.00	19.25	5.75
20	9	13	<u>8.75</u>	<u>14.50</u>	20.25	6.00
25	12	9	<u>9.00</u>	8.50	20.50	6.25
30	16	7	13.25	8.00	20.25	5.25
Control						
Sig or not.			Yes	Yes	Yes	Yes
C. D. (5% level)			3.81	3.31	2.37	1.34

Note:- \* denote the day of boll crack and subsequent numbers indicate the interval of days in sowing the seeds obtained on the day of boll-crack

† Sprouted seeds are for a total of 25 seeds sown.

Significant values over the control are underlined

The results indicated that there is marked delay in germination for the fresh seeds picked on the day of boll-crack. Simpson (1935) has reported that dormancy of fresh seeds of bolls opened from 1 to 10 days on the fuzzy seeds of American uplands, and the period of germination had extended upto 24 days. In this case, the number of days taken for the seed sprouting as well as the seeds sprouted are markedly inferior to the control i.e. the 30th day sowing. But with the seeds treated with sulphuric acid, the sprouting and the time-lag are again significantly reduced to that of the control. It would therefore appear that by removing the seed fuzz on the seed coat of cotton seeds with sulphuric acid, the delayed germination could be partly overcome and that the state of dormancy is a condition imposed upon the embryo by the seed coat with its fuzz. The seed fuzz seems to delay the proper absorption of moisture by the embryo for sprouting.

Another interesting feature is the distinct deterioration in the sprouting of seeds during the 20-25 days period, for the untreated seeds. The results

of the two seasons are concurrent on this aspect. This phenomenon is however absent in the seeds treated with sulphuric acid. It would appear that the seed fuzz is able to exert a secondary inhibition in the proper inhibition by some phenomenon unknown so far. It is possible that according to Bailey (1948), the chemical constituents like wax (0.4 to 0.7%) lignin etc. may play a part in retarding the absorption of moisture by certain chemical reaction. It is also possible that these chemical substances may temporarily inactivate the micropyle by concentrated deposition near the funnicle

At this stage, it could be said that there is delayed germination or partial dormancy in the freshly picked seeds and that the same may be overcome by drying the seeds for 30 days and more or alternatively by treatment with sulphuric acid for breaking the dormancy. In either case, it would be advisable to avoid picking seeds from the freshly opened bolls.

#### REFERENCES

- Bailey, A. E. 1948. Cotton seed and cotton seed products. Inter Science Publishers, New York.
- Balasubramaniam, R. and V. Ramaswamy. 1933. A physiological study of delayed germination in Cotton. *Madras agric. J.*, 21, 147-62.
- Dubash, P. J. and R. N. Joshi. 1959. Comparative studies in the inhibition of some cotton seeds. Cotton seeds and its by-products (Symp). Indian Central Oilseeds Committee, Hyderabad.
- Simpson, D. M. 1935. Dormancy and maturity of cotton seed. *J. agric. Res.*, 50 : 429-34.
- Simpson, D. M., L. Adams and G. M. Stone. 1940. U. S. Department Agri. Bull., 734.

### Effect of Nitrogen Levels, Seeding Rates and Cutting on Yield and Protein Content of Sorghum Forage\*

by

V. C. SRIVASTAVA<sup>1</sup>

**Introduction:** Sorghum being the popular forage crop of Bihar, can be valuable forage crop for the Chotanagpur region, to meet with the acute fodder scarcity period of November - December and April - June, in the form of silage and sun-dried stalk (hay), since the prospect of *rabi* crop in this region is very dim. This can only be achieved by increasing the quality and yield of this forage in order to make it protein-rich and surplus in *kharif* by suitably adjusting the plant nutrition, plant population and cutting management.

**Material and Methods:** The treatments for the experiment consisted of four levels of nitrogen (24.7, 49.4, 74.1, and 98.8 kg N/ha as ammonium sulphate), three levels of seeding rate (24.7, 49.4 and 74.1 kg/ha) and two

\* Part of the thesis submitted by the author in partial fulfilment for the award of M.Sc., (Agronomy) degree of Ranchi University, 1966.

<sup>1</sup> Division of Agronomy, Ranchi Agricultural College, Kanke, Bihar.