https://doi.org/10.29321/MAJ.10.A03770

Studies on the Germination and Dormancy of two *Solaneous* Vegetable Seeds - Tomato (*Lycopersicon esculentum*, Mill.) and Brinjal (*Solanum melongene*, Linn.)

by

D. DANIEL SUNDARARAJ[1], GIRIJA BALASUBRAMANYAM[2], M. DINAKARAN[3], and G. SOUNDARA PANDIAN[1]

Introduction: Seed testing and seed certification have become important in many countries and are also fast gaining ground in India. The literature available on the germination of vegetable seeds is extensive but contributions from India are not much. Recently Sundararaj *et al* (1965) have given the germination standards for *Abelmoschus esculentus* from their studies in South India. Chopra and Amirsingh (1963) made a study of twelve vegetable seeds from 574 samples collected from different agencies in various regions of the country and have given the mean values of germination.

Oldland (1937) established the absence of dormancy in *solanaceous* crops; this was in confirmation with the findings of Shuck (1936) who found the absence of dormancy in tomato seeds collected from mature fruits.

Very early workers as Hicks (1896) advocated 80–85 per cent germination for brinjal, and 85–90 per cent for tomato seeds; Mcarthy (1894) recommended as standards of germination 60 and 85 percentages for brinjal and tomato seeds respectively; Musson (1913) prescribed a germination standard of 90 per cent for tomato.

Boswel *et al* (1940) studied tomato and nine other vegetable seeds for the deterioration of viability and methods for its prevention. They recorded an initial germination of 93 per cent in tomato and prescribed 80 per cent as the standard viability. In the fresh seeds of tomato and brinjal, Barton (1961) recorded 93 per cent and 86 per cent initial germination.

The germination standards in vogue for the *solanaceous* crops like tomato, bringal and chillies in the different countries and states are given below:

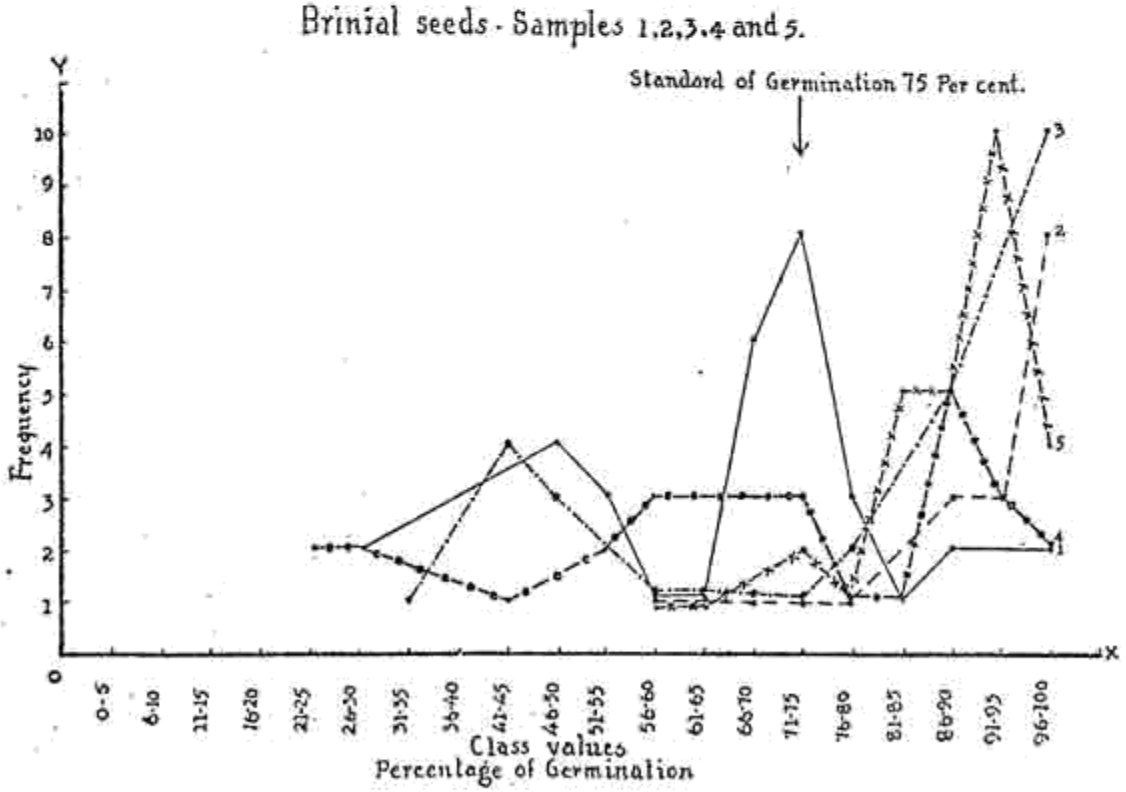
Country or State or Organisation	Germination percentage			Authority
	Tomato	Brinjal	Chillies	
1. Canada (As in 1937)	70	60	55	Burke (1937).
2. I. C. A. R. New Delhi, (as in 1963)	80	65	—	Deshi, N. S. (1963) ICAR. Bull. Seed certification Processing & testing and storage.
3. Virginia – U. S. A. (as in 1937)	80	60	60	Burke (1937)
4. Washington – U. S. A. (as in 1937)	90	75	75	do.
5. Wisconsin – U. S. A. (as in 1937)	85	65	60	do.
6. International Crop Improvement Association (1954)	75	—	75	Anon. 1954. Publication No. 18 of ICIA.
7. U S.D.A. Agricultural Marketing Service (As per Federal Seed Act)	75	60	55	Anon. 1956 Service and Regulatory & Announcement No. 156 of U. S. D. A. Agricultural Marketing Service.
8. Indian Standards Institution, New Delhi.	70	75	—	Anon. 1965 I.S.I. New Delhi publication, 1965.

With a view to obtaining basic data on the dormancy and germination capacity of vegetable seeds, work was taken up in the Botany section of the Agricultural College and Research Institute, Coimbatore, during 1957—1960. The popular *solanaceous* vegetables *viz.*, brinjal (*Solanum melongena*, Linn.) and tomato (*Lycopersicon esculentum*, Mill.) were selected for the study.

Materials and Methods: Five different samples of fresh brinjal seeds from four sources *viz.*, Horticulturist at Coimbatore, Koilpatti, Bhavanisagar and two local ryots, were procured in 1957. In tomato, five lots of fresh seeds from four sources *viz.*, Coimbatore, Bhavanisagar and two local ryots, were procured in the same year. The seeds were thoroughly

sun dried and stored in tin containers. Periodical germination tests were carried out at fortnightly intervals on filter paper medium on galvanised zinc germination trays. Tests were carried out with 100 seeds in each vegetable in an incubator at controlled temperature of 32° ± 1° c. The germination data for 36 months were analysed for mean and S. E. for fixing the minimum standard of germination for these seeds.

Results and Discussion: *Brinjal:* Seeds of brinjal collected from Koilpatti Centre and the Horticulturist, Coimbatore recorded 100 per cent and 98 per cent germination respectively in the first month itself, thereby showing the absence of dormancy in brinjal seeds. The peak germination values for brinjal seeds were obtained for a period nine months in storage. Though individual samples had given about 80 per cent germination in 20th and 30th month after storage, the general trend seemed to be towards deteriorotion after about 15 months, due to loss of viability. The viability of the seeds varied with the sources from which they were collected. The Koilpatti sample recorded better values consistently for 21 months. In the local, the values were fairly good and the viability was unimpaired for about 30 months.



The frequency distribution of the germination data gathered for brinjal seeds is represented in Graph 1. The general mean for a total of 137 frequencies was 76·9 and the standard error was 0·79. The standard

of germination was arrived at as 76·9 ± 1·58 taking into account twice the value of standard error to provide the confidence interval. The minimum standard of germination was thus fixed as 75 per cent. This standard of 75 per cent is in conformity with the standards already fixed by the Indian Standards Institution, New Delhi (Anon 1965) as well as with the findings of Burke (1937) at Washington for brinjal seeds.

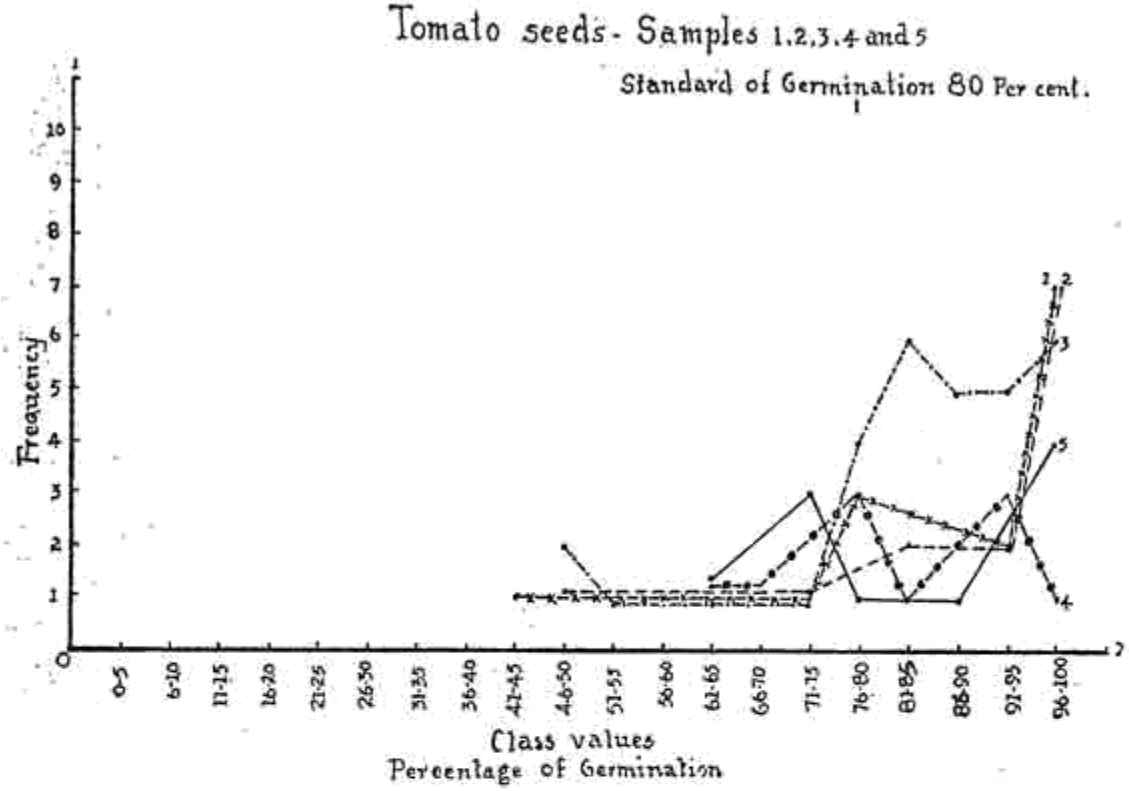
Tomato : Fresh seeds of sample Nos. 2, 3, 4 and 5 have shown 80, 94, 94 and 97 per cent germination respectively. The values obtained for the subsequent two months were also high enough to justify the initial values obtained. These facts tended to suggest the absence of a dormancy period in tomato.

The values obtained from samples 1, 2 and 3 suggested that the peak germination can be expected in tomato upto 10 months. Though in sample No. 3, the germination had been about 80 per cent for about 23 months it had declined in about 12 months in the other samples. The trend indicated that it would be economical to use seeds which are 12 months old. Though initially the germination capacity did not vary much in the different samples of tomato seeds, yet, viability was found to decline rapidly in some, especially in sample Nos. 4 and 5 and in others, it prolonged for a longer period.

The frequency distribution of the germination data gathered for tomato seeds is presented in Graph 2. The general mean for a total of 83 frequencies was 83·96 and the standard error was 0·74. The standard of germination was arrived at as 83·96 ± 1·48 which worked out to a minimum of 81·48 rounded off to 80 per cent. This standard of 80 per cent germination is in conformity with that fixed by Deshi (1963) and also that of Burke (1937) at Virginia for tomato seed.

From the germination behaviour of fresh seeds of brinjal and tomato it is found that they do not possess any dormancy. Fresh seeds are capable of giving good germination after an intital sun drying. This is in confirmation with the observation of Oldland (1937) who noted no dormancy in tomato and chilly seeds, and that of Barton (1961) who observed high initial germination in tomato and brinjal seeds suggesting the absence of a dormant period in them.

Summary : Fresh seeds of brinjal and tomato collected from different localities were subjected to fortnightly germination tests for a period of 36 months. The minimum germination standards were arrived at as



75 and 80 per cent, respectively for brinjal and tomato seeds. No dormancy was observed in both these vegetable seeds. Seeds of brinjal could be stored safely for a period of 15 months and that of tomato for a period of 12 months without deterioration in germination capacity.

REFERENCES

Anon 1954 *Minimum seed certification standards. Publ. Intr. crop. Improv. Assn.*, **18**: 91.

Anon 1956 *Rules and regulations under the Federal Seed Act. U. S. D. A.* Service & Regulatory & Announcement No. 156.

Anon 1965 *Indian Standards Institute*, New Delhi Publication, 1965.

Barton, L. V. 1961 *Seed Preservation and Longevity*, Leonard Hill (Books) Ltd., London.

Boswell, V. R., E. H. Tolle, V. K. Toole & D. F. Fisher 1940 A study of rapid deterioration of vegetable seeds and methods for its prevention. *Tech. Bull. U. S. D. A.* No. 708.

Burke, T. W. L. 1937 Germination standards for vegetable seeds. *Proc. Asso. Off. Seed. Anal.* (N. Amer.)., 45-56.

Chopra, P. & Amirsingh 1963 *Viability and purity of vegetable Seeds. I. S. I. Bull.*, **15**: 72-3.

Deshi, N. S. 1963 *Seed Certification, Processing and Testing* and storage *ICAR. Bull.*

Hicks, H. N. 1896 Standards of the purity and viability of agricultural seeds. *Circ. U. S. D. A.*, No. 6.

Mc Carthy, G.	1894	Seed testing: its uses and methods. *N. C. Exp. Sta. Bull.*, **108** : 349-415.
Musson, C. T.	1913	Seeds and seed testing for farmers. *Farmers Bull N. S. W. Dep. Agric.*, **73** : 36
Oldland, M. L.	1937	Observations on dormancy in vegetable seed. *Proc. Amer. Soc. Hort. Sci.*, **35** : 562.
Shuck, A. L.	1936	The germination of secondary dormant tomato seeds and their formation. *Proc. Int. Seed Test. Assn.*, **8** : 136-58.
Sundararaj, D. D., G. Balasubramaniam and G. Soundarapandian	1965	Standard of germination in *Abelmoschus esculentus* Linn. *Madras agric. J.*, **52** : 10-2.

Efficacy of Organic and Inorganic Form of Phosphates on the Growth and Yield of Paddy Crop - Part I

by

RANI PERUMAL[1] and S. VARADARAJAN[2]

Introduction: The importance of organic matter in Agricultural system is well founded. Besides improving the soil physically, chemically and biologically, it serves as a source of readily available plant nutrients to the crop. The organic matter also serves to mobilize the soil native phosphorus and added inorganic phosphorus into readily available forms. Most of the past studies on organic matter and green manure have been made mainly as a soil amendment and as a mobilizing agent of soil phosphorus. In the present study, the result of green manuring of paddy, as a source of organic 'P' in combination with added inorganic 'P' in different proportion is presented.

Review of Literature: Sen and Bains (1956) reported that the superphosphate in combination with Farm Yard Manure increased the yield of both cowpeas and wheat in the rotation as compared to super or Farm Yard Manure alone. Summarising the result of a 20 years fertilizer trial with rotation crop (cereals, root crops and rape) on a sandy loam (pH 5·5 to 5·9), Amberger (1957) reported the phosphorus utilization was about equal from both mineral and inorganic fertilizers. The addition of Super to the Farm Yard Manure decreased the ornanic matter loss (Lefevre, 1957).

[1] Research Assistant in Chemistry, [2] Agricultural Chemist and Associate Professor of Soil Science, Agricultural College and Research Institute, Coimbatore - 3.