

Studies on seed viability of passion fruit (*Passiflora edulis f. flavicarpa* Deg.)

N. GURUNG, ¹G. S. K. SWAMY, S. K. SARKAR, S. O. BHUTIA AND K. C. BHUTIA

Dept. of Fruits and Orchard Management

Bidhan Chandra Krishi Viswavidyalaya, Mohanpur - 741252, Nadia, West Bengal

¹Dept. of Fruit Science, K.R.C. College of Horticulture, Arabhavi - 591218, Belgaum, Karnataka

Received: 31-07-2014, Revised: 09-09-2014, Accepted: 30-09-2014

Keywords: Germination, *Passiflora*, sowing dates and viability

Passion fruit (*Passiflora edulis*), a native of tropical America (Brazil), belonging to the family Passifloraceae is a high value and export oriented crop. It is grown mostly in tropical and sub-tropical part of the world. South America is currently the largest producer of passion fruit worldwide (Sema and Maiti, 2009). In India it is cultivated in few pockets in the Nilgiris, Wynad, Kodaikanal, Coorg and Malabar in the South and North East states like Manipur, Nagaland, Mizoram and Meghalaya.

The fruit can be grown to eat or for its juice, which is often added to other fruit juices to enhance aroma. There is increase in awareness of the crop and production areas under passion fruit. But limited information is available on propagation techniques. To increase the productivity, there should be availability of good planting material along with proper management practices. The vine can be propagated sexually, through seeds and asexually by the use of cuttings, layering and grafting.

Passion fruit vines are usually grown from seeds. Seeds of passion fruit are recalcitrant in nature and lose viability very fast. Germination decreases with increased period of storage. Cleaned and stored seeds have a lower and slower rate of germination. Thus, there is need to sow seeds as soon as possible after harvesting (Thomson, 1979). Hence keeping these ideas in view the present investigation was undertaken to know the seed viability of passion fruit.

The investigation was carried out at the Department of Fruit Science, Kittur Rani Channamma College of Horticulture, Arabhavi, Karnataka state during 2010-2011. Arabhavi is situated in Northern Dry Zone (Zone-3) of Karnataka state. It lies between 16°15 North latitude and 74°45 East longitude, at an altitude of 612 m above mean sea level. Arabhavi lies in Zone-3, Region-2 of agro-climatic zones of Karnataka. Passion fruit seeds were collected from Kittur Rani Channamma College of Horticulture,

Arabhavi, Karnataka. The ripe and healthy fruits were selected and were kept for one or two days for uniform ripening. After that the fruit was cut into two equal halves with the help of sharp knife. The pulp was removed with the help of spoon. The seeds were washed thoroughly in the running tap water with the help of sieve. After washing thoroughly and removing the juicy arils covering the seeds, the seeds were dried on the top of a paper at constant room temperature. The dried seeds were then collected next day depending upon the drying and stored in butter paper bags.

Seeds were sown in the poly bags of 8 × 12 cm size containing potting mixture of soil, sand and FYM in the ratio of 1:1:1 and also in pro-trays containing soil and Peat moss. The poly bags and pro-trays of respective treatments were labelled and kept apart enough from each other. The poly bags were watered daily and weeding and other cultural operations were done as and when required. Daily observation was taken on days taken for initiation, 50 per cent and completion of germination. Germination percentage was recorded at the completion of germination. Statistical analysis of data was done by following the Fisher's Analysis of Variance (ANOVA) as given by Panse and Suhatme (1967).

It was observed that the germination percentage decreased as the storage days increased, irrespective of the environmental conditions. The reduction in germination during storage at room temperature confirms the observations made by Yamashiro and Landgraf (1979), who reported short viability of seeds. Their results have not observed an increase in germination of seeds with increasing period of storage. This may be due to the fact that with increase in the days of sowing the water content of the seeds also decreased, as observed by Osipi and Nagawa (2005), in passion fruit seeds from 10 per cent to 7.7 per cent with the increase days of storage. Since first sowing was done in the month of the September and as the sowing date progressed, the winter month approached. The least germination with increasing dates of sowing may be attributed to low temperature

Short Communication

Email: natashagurung23@gmail.com

Table 1: Effect of different dates of sowing on germination characters under different environmental conditions

Treatments	Days taken for initiation			Days taken for 50% germination			Days taken for completion of germination			Germination percent		
	Laboratory conditions	Shade-net conditions	Mean	Laboratory conditions	Shade-net conditions	Mean	Laboratory conditions	Shade-net conditions	Mean	Laboratory conditions	Shade-net conditions	Mean
T ₁	24.00	25.00	24.50	35.00	27.00	31.00	42.00	44.00	43.00	44 (40.39)	36 (36.86)	38.62
T ₂	20.00	24.00	22.00	28.00	28.00	28.00	36.00	40.00	38.00	52 (46.14)	56 (48.44)	47.29
T ₃	19.00	20.00	19.50	27.00	27.00	27.00	43.00	44.00	43.50	49 (44.42)	52 (46.14)	45.28
T ₄	25.00	23.00	24.00	30.00	32.00	31.00	37.00	41.00	39.00	36 (36.86)	41 (39.81)	38.33
T ₅	21.00	22.00	21.50	29.00	30.00	29.50	41.00	45.00	43.00	30 (33.20)	36 (36.86)	35.03
T ₆	26.00	24.00	25.00	31.00	33.00	32.00	45.00	44.00	44.50	13 (21.09)	37 (37.46)	29.27
T ₇	27.00	26.00	26.50	33.00	34.00	33.50	46.00	47.00	46.50	11 (19.32)	32 (34.44)	26.88
Mean	23.14	23.42	-	30.42	30.14	-	41.42	43.57	-	34.49	40.00	-
	SEm (±)	LSD (0.05)		SEm (±)	LSD (0.05)		SEm (±)	LSD (0.05)		SEm (±)	LSD (0.05)	
Treatments (T)	0.91	2.67		0.88	2.56		0.83	2.44		0.54	1.57	
Environmental conditions (E)	0.48	NS		0.46	NS		0.44	1.30		0.28	0.84	
Interaction (T×E)	1.30	3.78		1.24	3.62		1.18	3.45		0.76	2.23	

Note: Figure in parentheses are angular transformed values, T₁- Zero days of extraction, T₂-10 days of extraction, T₃ -20 days of extraction, T₄-30 days of extraction, T₅ -40 days of extraction, T₆ -50 days of extraction, T₇-60 days of extraction

Table 2: Effect of different dates of sowing on shoot and root parameters of passion fruit after 30 days of sowing (pro-tray)

Treatments	Shoot length(cm)	Root length (cm)	Fresh weight (g)		Number of roots	Dry weight of seedling (g)	Vigour index-I(cm)	Vigour index-II (g)
			Shoot	Root				
T ₁ - Zero days of extraction	7.36	2.13	0.19	0.07	4.00	0.16	323.84	7.04
T ₂ -10 days of extraction	9.75	7.62	0.72	0.05	7.70	0.61	507.00	31.72
T ₃ -20 days of extraction	7.70	7.13	0.60	0.10	3.75	0.59	377.30	28.91
T ₄ -30 days of extraction	10.06	6.05	0.57	0.04	7.50	0.41	362.16	14.76
T ₅ -40 days of extraction	8.21	5.57	0.42	0.08	3.60	0.38	246.30	11.40
T ₆ - 50 days of extraction	11.13	6.70	0.37	0.03	2.95	0.34	144.69	4.42
T ₇ -60 days of extraction	9.20	5.42	0.44	0.04	4.25	0.39	101.20	4.29
SEm (±)	0.40	0.66	0.04	0.01	0.37	0.03	2.37	0.66
LSD (0.05)	1.24	NS	0.12	0.04	1.08	0.10	7.21	3.50

Table 3: Effect of different dates of sowing on shoot and root parameters of passion fruit after 90 days of sowing (Poly-bags)

Treatments	Shoot length(cm)	Root length(cm)	Fresh weight (g)		Number of roots	Dry weight of seedling (g)	Vigour index-I (cm)	Vigour index-II (g)
			Shoot	Root				
T ₁ - Zero days of extraction	13.10	8.27	0.60	0.26	20.60	0.48	471.60	15.36
T ₂ -10 days of extraction	15.16	12.75	1.85	0.21	19.20	1.71	848.96	95.76
T ₃ -20 days of extraction	14.54	11.60	1.15	0.19	17.95	1.09	756.08	39.24
T ₄ -30 days of extraction	10.67	7.24	2.20	0.37	22.85	1.86	437.47	76.26
T ₅ -40 days of extraction	14.57	8.23	1.29	0.31	12.75	1.39	524.52	72.28
T ₆ - 50 days of extraction	10.03	5.26	1.46	0.22	14.65	1.46	371.11	54.02
T ₇ -60 days of extraction	9.95	5.35	1.35	0.20	11.80	1.19	318.40	42.84
SEm(±)	0.57	1.25	0.12	0.02	1.00	0.25	2.40	3.62
LSD (0.05)	1.75	3.79	0.39	0.08	3.04	0.76	7.29	9.05

which had effect on seed germination (Barman, 2006).

In case of environmental conditions, the highest germination percentage was obtained when the seeds were sown in shade-net conditions (40.00%) compared to pro-tray under laboratory conditions (34.49%). The highest germination in shade-net conditions compared to pro-tray may be due to the bright sunshine, congenial temperature and humidity available during the period (Table 2). This might have increased the enzyme activity within the seeds after sowing. Therefore, due to increase in enzyme activity, seed germination was also automatically enhanced. Similar results were also reported by Barman (2006) in Rangpur lime seeds.

REFERENCES

- Barman, P. 2006. Exploitation of Rangpur lime for softwood grafting in citrus. *M. Sc (Hort.) Thesis*, University of Agriculture Sciences, Dharwad.
- Melett, L.M.M. 1999. Regional situation of the culture of passion fruit in south-east state of Sao Paulo. *Proc. Tech. Meet. Res. Passion Fruit*, pp.15-19.
- Osipi, E.A.F. and Nagawa, J. 2005. Effects of temperature on evaluation of physiological quality of seeds on sweet passion fruit (*Passiflora alata dryander*). *Rev. Bras. Frutic.*, **27**:179-81.
- Panse, V.G. and Sukhatme, P.V. 1967. *Statistical Methods for Agricultural Workers*. ICAR, New Delhi, India, pp: 152-61.
- Sema, A. and Maiti, C.S. 2009. Status and Prospects of Passion Fruit Industry in Northeast India. *Inform. Bull.*, Central Institute of Horticulture, Medziphema, Nagaland.
- Thomson, J.R. 1979. *An Introduction to Seed Technology*. Thomson Litho limited, Scotland.
- Yamashiro, T. and Langraf, J.H. 1979. Fusarium resistant graft of passion fruit (*P. edulis f. flavicarpa* Deg.). *Brazilian Cong. Fruit*, **5**: 918-21.