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Germination Studies in Different Guava (*Psidium guajava* L.) Cultivars

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ABSTRACT

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An investigation was carried out on germination studies in different cultivars of guava during 2011 -2012. Germination studies revealed that the least number of days for the initiation of germination (17.67 days) and 50 per cent of germination (24 days) was noted in cv. Sardar. Maximum germination per cent (88.00 %), shoot length (8.43 cm), seedling root length (7.54 cm), fresh weight (3.14 g), dry weight (1.57 g) of seedling were recorded in cv. SR – 4, whereas the highest vigour index was noted in cv. SW – 4.

Introduction

Guava belongs to family Myrtaceae, is one of the commercial fruit crop grown in tropical and sub topical region. It is known for its nutritive value being rich in minerals and vitamin 'C' content. Most of guava plantations in India are seedling origin. Traditionally, it is mostly propagated from seed (Zamir *et al.*, 2003), which is easy and a cheap method (Ruehle, 1948). In recent years asexual methods such as inarching, veneer, soft wood grafting (Shashikumar, 2010), patch budding (Patel *et al.*, 2005) and layering (Rymbai and Reddy, 2011) are being practiced for large scale multiplication. Seed propagation is necessary for raising rootstocks for grafting and budding practices. Graft success and vigour of graft largely depends on quality of rootstock. Huge variability in growth pattern of seedling plantation has been reported in guava (Shashikumar, 2010). There is a need to identify a suitable rootstock with

good vigour and wider adoptability. Keeping these points in view an experiment was conducted to study the germination behavior in different guava cultivars (varieties and local landraces) under shade house conditions.

Materials and Methods

The experiment was carried out during 2011-12 at the Department of Fruit Science, Kittur Rani Channamma College of Horticulture, Arabhavi, University of Horticultural Sciences, Bagalkot, Karnataka state. The experiment was laid out in Completely Randomized Design with 16 treatments comprising seeds of varieties and local land races replicated thrice. Hundred seeds were used per treatment per replication. Seeds were soaked overnight in a solution of GA₃ - 250 ppm and sowed in pots with FYM and

red soil in equal portion as potting mixture. Observations were recorded on seed weight, seedling growth parameters like number of days taken for the initiation of germination and seedling shoot and root length per seedling. Five seedlings were selected at randomly for determining fresh and dry weight. Vigour index of seedling was computed by adopting the formula suggested by Abdul Baki and Anderson (1970).

Results and Discussion

Guava seeds are known to be recalcitrant and germination of seeds is uncertain due to hard seed coat (Singh, 1967). Traditional methods of propagation like grafting and budding

necessarily required good healthy and vigorous rootstock raised from seeds, there is a existence of huge variability in seed traits including seed shape, size, number among different popular varieties and local races. There is a need to screen this variability in seed for its germination and growth responses keeping in view to identify suitable rootstock for large scale propagation through grafting and budding. In the context of conflicting review from literature on seed germination behavior, the present experiment was carried and executed. The assessment of results obtained from this investigation reveals that there is a varied response for germination and growth of seedlings.

Table.1 Variation in seed germination behavior among different cultivars of guava under Arabhavi conditions

Treatment details	100 Seed weight (g)	Days taken for initiation of germination	Days taken for 50 % of germination	Per cent germination
T ₁ - Sardar	1.48	17.67	24.00	76.67
T ₂ - GW-1	1.01	23.67	30.67	56.50
T ₃ - GW-2	1.63	20.33	25.67	62.00
T ₄ - GW-3	1.15	22.00	28.67	0.00
T ₅ - GR-1	1.25	22.00	26.67	72.33
T ₆ - GR-2	1.23	23.67	27.33	35.33
T ₇ - GR-3	1.12	22.67	26.00	68.67
T ₈ - CIW-1	1.20	24.67	29.67	78.00
T ₉ - CIW-3	1.15	22.33	27.67	71.00
T ₁₀ - CIW- 4	1.29	25.00	29.67	53.33
T ₁₁ - CIW- 5	0.80	23.00	29.67	62.00
T ₁₂ - SWY-1	0.75	23.00	27.67	71.33
T ₁₃ - SW- 4	1.25	22.33	26.00	40.33
T ₁₄ - SR - 4	1.28	22.67	17.33	88.00
T ₁₅ - Allahabad safed	1.04	24.00	26.33	78.00
T ₁₆ - Safeda	0.87	25.00	32.67	76.67
SEm ±	0.02	0.47	2.23	8.39
CD @ 5%	0.07	1.37	6.44	24.18
CV (%)	0.60	2.50	10.72	26.12

Table.2 Variation in seedling vigour among different cultivars of guava under Arabhavi conditions

Treatment details	Length of root (cm)	Length of shoot (cm)	Fresh weight of seedlings (g)	Dry weight of seedlings (g)	Difference between fresh and dry weight (g)	Vigour Index
T ₁ - Sardar	5.86	8.12	2.34	1.49	0.85	622.93
T ₂ – GW-1	5.59	5.56	1.65	1.29	0.37	313.42
T ₃ - GW-2	6.73	8.18	2.62	1.58	1.04	513.56
T ₄ - GW-3	1.11	1.25	0.46	0.40	0.06	0.00
T ₅ - GR-1	5.81	7.33	2.37	1.49	0.88	533.33
T ₆ - GR-2	3.21	4.39	1.17	0.87	0.30	228.65
T ₇ - GR-3	5.41	7.71	2.99	1.62	1.38	528.85
T ₈ - CIW-1	4.89	7.19	2.44	1.46	0.98	561.99
T ₉ - CIW-3	4.71	7.24	2.47	1.46	1.01	514.36
T ₁₀ - CIW- 4	6.55	6.99	1.72	0.99	0.73	365.55
T ₁₁ - CIW- 5	4.61	4.34	1.59	0.96	0.63	268.49
T ₁₂ - SWY-1	5.24	6.27	2.45	1.46	0.99	173.88
T ₁₃ - SW- 4	3.22	5.31	1.71	1.01	0.69	749.44
T ₁₄ - SR - 4	7.54	8.43	3.14	1.57	1.56	612.67
T ₁₅ - Allahabad safed	5.72	8.24	2.97	1.55	1.41	332.55
T ₁₆ - Safeda	3.53	4.15	1.98	1.00	0.98	90.71
SEm ±	1.21	1.27	0.56	0.29	0.30	260.71
CD @ 5%	3.49	3.67	1.62	0.85	0.86	110.32
CV (%)	13.59	12.72	9.63	6.62	7.86	110.32

The data pertaining to seed weight and germination behavior is presented in Table. 1. Maximum 100 seed weight was recorded in GW – 2 (1.63g) followed by Sardar (1.48g), which was found associated with faster rate of germination as reflected by early initiation (17.67 and 20.33 days) and 50 percent germination (24.0 and 25.67 days) in cv. Sardar and GW -2 respectively. However there was no clear relation between seed weight and percent germination (Table.1).

Among the different cultivar the percent germination was highest in SR – 4 (88.00 %) followed by Allahabad safed (78.00 %), CIW – 1 (78.00 %) and Sardar (76.67 %). High rate of germination in there cultivars may be

attributed to their better response to overnight soaking in GA₃ - 250 ppm solution compared to other accessions. These observations corroborate with Singh and Soni (1998) who reported high per cent germination on water soaking for more than 12 hours in cv. Allahabad safed and Red fleshed. Similarly Birdar *et al.*, (2005) suggested the treatment of chilling + GA₃ - 100 ppm treatment to realize higher per cent germination in guava cv. Taiwan guava and Allahabad safed.

High percent germination in present germination of present investigation in few cultivars may be attributed to availability of moisture in seed, exogenous application of GA₃ which might have helped to increase

endogenous synthesis of GA₃ (Ramchandra and Sheogovind, 1990) and trigger synthesis of hydrolyzing enzymes for conversion of starch to sugar making then available for developing embryo.

The interpretation of data pertaining to seedling growth (Table 2) also reflected vigorous growth in seedlings of cv. SR – 4, Allahabad safed and Sardar as depicted by high values for shoot length (8.43, 8.24 and 9.12 cm) and root length (7.54, 5.72 and 5.86 cm) respectively. This may be attributed to the good response of these cultivars to GA₃ – 250 ppm treatment which might have stimulated easily investigation highlighted the suitability of cv. SR – 4, Allahabad safed and Sardar for raising rootstock.

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