

"STUDIES ON POLLEN GERMINATION IN GUAVA AND ITS RELATIVES"

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The guava var Safeda recorded 80.33% pollen germination with tube length of 35.12 μ at 30% sucrose whereas it was only 3.54% with 12.6 μ tube length to seedless at 5% sucrose 72 hours after sowing. Among the relatives *P. cujavillus* responded for sucrose IBA and GA concentrations. The *p. molle* had showed 54.28% pollen germination with 282.7 μ the maximum tube length among the species studied. A sucrose concentration of 15 to 20% in general had a good affect on *Psidium* species for germination of pollen grains. The requirement of different species for pollen germination in GA was highly variable. The IBA concentration 20, 40 and 60 ppm gave negative results. Hence, lower concentration could be tried for better results.

Regarding pollen germination very little is known about the guava species except for *P. guajava* L. For a well planned hybridisation programme, information on the pollen germination of near relatives is necessary. Hence, Studies on pollen germination of guava and its relatives were carried out in the Department of Horticulture, Allaha-bad Agriculture Institute.

MATERIALS AND METHODS

Two uniform trees in each of six species of guava viz., *P. guajava* var Safeda, *P. guajava* var Seedless, *P. cujavillus*, *P. pumilum*, *P. polycarpum*, *P. molle* and *P. friedrichsthalianum* receiving identical cultural treatment were selected randomly. From each tree four branches were tagged for easy identification. The pollen grains were collected from freshly dehisced anthers. The pollen germination was tested against sucrose concentration

of 0, 10, 15, 20, 25 and 30% and G.A. and IBA 20, 40 and 60 ppm concentrations. The slides prepared were kept at room temperature (29°C) and observed under microscope at 4, 8, 12, 24, 48 hours and wherever necessary 72 hours after sowing. The pollen germination and pollen tube length were recorded.

RESULTS AND DISCUSSION

Pollen germination in artificial media

The guava cultivars showed pollen germination after 72 hours while it was 24 hours in *P. polycarpum*, *P. pumilum*, *P. molle* and *P. cujavillus* and 48 hours in *P. friedrichsthalianum* after sowing. In guava cultivars Safeda, the germination was 80.33% with a tube length of 35.12 μ 20% sucrose solution 72 hours after culture whereas Seedless recorded

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Table: 1-a Pollen germination percentage of psidium species in sucrose, A and IBA media G = Germination percentage
T = Pollen tube length in μ

Name of media	%or. ppm	<i>P. guajava</i> var. <i>Safeda</i>					<i>P. guajava</i> var. <i>Seedless</i>					Total	Mean		
		Observation	Intervals of time in hours	Total	Mean	Intervals of timein hours	Observation	Intervals of timein hours	Total	Mean					
		4	8	12	24	48	72	4	8	12	24	48	72		
Sucrose	0%	G	—	—	—	—	—	—	—	—	—	—	—	—	—
		T	—	—	—	—	—	—	—	—	—	—	—	—	—
5%		G	—	—	—	Bulging	—	—	—	—	—	—	—	3.54	0.59
		T	—	—	—	—	—	—	—	—	—	—	—	12.6	2.1
10%		G	—	—	—	Bulging	50.00	50.00	8.33	—	—	—	—	3.06	0.51
		T	—	—	—	"	26.72	26.72	4.45	—	—	—	—	8.4	1.4
15%		G	—	—	—	"	12.72	12.72	2.12	—	—	—	—	2.5	0.42
		T	—	—	—	"	16.8	16.8	2.8	—	—	—	—	8.4	0.
20%		G	—	—	—	"	80.33	80.33	13.38	—	—	—	—	—	—
		T	—	—	—	"	35.12	35.12	5.82	—	—	—	—	—	—
25%		G	—	—	—	"	23.70	23.70	3.95	No germination (Bulging only)	—	—	—	—	—
		T	—	—	—	"	8.4	8.4	1.4	—	—	—	—	—	—
30%		G	—	—	—	Na germination	—	—	—	—	—	—	—	—	—
		T	—	—	—	—	—	—	—	—	—	—	—	—	—
G. 20, 40, 60 ppm		G	—	—	—	No germination	—	—	—	—	—	—	—	—	No germination (Bulging only)
		T	—	—	—	—	—	—	—	—	—	—	—	—	—
IBA 20, 40, 60 ppm		G	—	—	—	No germination	—	—	—	—	—	—	—	—	No germination (Bulging only)
		T	—	—	—	—	—	—	—	—	—	—	—	—	—

Table: 1-C *P. polycarpum* *P. molle* *P. Friedrichsthalianum*

Name of media	% or Observation	Intervals of time in hours		Intervals of time in hours		Intervals of time in hours	
		G	T	G	T	G	T
Sucrose	0%	No germination		—	—	4.38	0.87
				—	—	6.30	1.26
5%	G	22.47	37.82	77.01	137.3	34.32	4.46
	T	8.06	12.48	28.18	48.72	12.18	60.48
10%	G	7.69	19.62	35.79	71.15	134.25	33.56
	T	8.4	35.73	60.85	117.93	322.91	55.72
15%	G	10.11	27.42	45.76	80.31	163.6	40.9
	T	38.39	74.59	120.95	226.38	460.31	115.07
20%	G	13.49	27.85	50.42	9.46	180.22	45.30
	T	26.58	47.92	100.02	189.90	363.42	90.85
25%	G	10.76	24.69	42.75	71.62	149.82	37.45
	T	12.6	20.98	39.56	68.46	146.6	35.4
30%	G	—	12.89	39.86	69.69	122.44	30.61
	T	—	12.6	30.84	63.74	106.84	26.71
G. A. 20 ppm	G	No germination		23.40	23.40	4.68	4.68
	T	No germination		33.6	33.6	6.72	6.72
40 ppm	G	40.74	73.13	113.87	35.18	13.64	2.72
	T	8.6	10.08	18.68	4.67	25.2	5.04
60 ppm	G	50.56	81.48	132.04	44.01	8.42	1.68
	T	17.45	35.28	52.73	13.18	14.26	2.85
IBA 20 ppm	G	No germination		28.0	28.0	5.6	5.6
	T	No germination		12.6	12.6	2.52	2.52
40 ppm	G	No germination		12.86	12.86	2.57	2.57
	T	No germination		16.8	16.8	3.36	3.36
60 ppm	G	No germination		No germination		No germination	
	T	No germination		No germination		No germination	

G = Germination percentage T = Pollen tube length in μ

only 3.54% germination with a tube length of 12.6 U in 5% sucrose solution after 72 hours of culture. However, the two cultivars had shown negative results with GA and IBA, even 72 hours after sowing and only bulging of the pollen was observed. In the sucrose solution also there was no response upto 48 hours. Among the guava relatives *P. cujavillus* recorded the maximum germination of 86.36% with a tube length of 51.66 μ in 15% sucrose solution. However, maximum tube length of 195.30 μ was recorded at 30% sucrose with 54.83% germination. In GA 78.70% germination with a tube length of 145.92 U was observed under 60 ppm after 48 hours whereas it was 77.77% with a tube length of 12.6 U in IBA at 20 ppm after 48 hours of sowing. The *P. pumilum* recorded 79% germination with a tube length of 25.11 U at 20% sucrose 24 hours after culture. This species failed to respond to GA and IBA except GA 60 ppm showed some positive results. *P. polycarpum* had recorded 89.46% germination with a tube length of 189.80 μ at 20% sucrose 24 hours after culture. In GA 40 and 60 ppm it gave positive results whereas it failed to respond to IBA. However, *P. molle* recorded a germination of 54.28% with a tube length of 282.70 μ at 30% sucrose 48 hours after sowing. This also responded to the GA and IBA. *P. friedrichsthalianum* at 20% sucrose recorded germination of 43.39% with a tube length of 110.04 μ 48 hours after culture and at lower concentrations of sucrose and in GA

and IBA failed to germinate. The tube length increased with the increase in concentrations of sucrose and decrease in germination. *P. cujavillus* was highly responsive at sucrose and GA and time of intervals. The same trend was noticed in *P. polycarpum*, *P. molle* and *P. pumilum* for sucrose alone.

The guava cultivars of Safeda and Seedless had recorded a maximum germination and tube length of 80.33% 35.12 U; for 20% sucrose 72 hours after culture respectively. (Table-1-a). *P. cujavillus* had recorded maximum germination in sucrose 15% and maximum tube length of 195.3 U at sucrose 30% concentration. *P. pumilum* had recorded 79% germination with tube length of 25.11 μ 24 hours after sowing. (Table 1-b). *P. polycarpum* had shown a germination of 89.46% with the tube length of 198.90 μ at 20% sucrose and followed by GA at 60 ppm. The *P. molle* recorded only 54.28% germination with a tube length of 282.70 U at 30% sucrose 48 hours after sowing which was the maximum tube length among the species studied. *P. friedrichsthalianum* recorded 43.39% germination with a tube length of 110.04 μ at 20% sucrose 48 hours after sowing (Table 1-C). In guava cultivars and its relatives varying percentage of germination was obtained by Nair *et al* (1964), Tewari (1969), Ranganath (1973), and Teotia, *et al.* (1970). *P. molle* responded to the sucrose in higher concentration while Ranganath (1973) could not get positive results which might

be due to lower concentration with boric acid addition. However, the poor response of both the cultivars of guava could be due to the possible antagonistic effect of the media and the same might have suited the other species. The IBA concentration might be higher to the pollen germination while GA higher concentration might prove a better medium for guava and its relatives. In contrast Singh and Randhawa (1961) reported in citrus that the increase in concentration of GA decreased the pollen germination.

The present findings confirm the report except for *P. polycarpum* but it was in line with the above authors that growth of pollen tubes increased with the increase in concentration of GA. The IBA concentration at lower level might prove better when compared to the higher concentrations.

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