

## Seed vigour characteristics of amla as influenced by fruit position

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**Abstract :** Studies were carried out in amla (*Emblica officinalis* Gaertn.) to trace the variation in seed and seedling quality characteristics owing to the position of fruit within the branch. The results revealed that fruits collected from the posterior end of the branch was superior in seed and seedling quality characters in terms of germination, root length, shoot length, dry matter production, vigour index, per cent seed filling and 100 seed weight. This is followed by middle portion of branch and fruits in seed quality parameters.

(Key Words: Amla, Fruit position, Seed quality characters)

Amla (*Emblica officinalis* Gaertn.) is one of the important minor forest produce yielding tree of tropical origin. Swaminathan et al. (1991) expressed that top of the canopy yield good seed compared to medium and bottom canopy. Sivasubramaniam (1996) expressed that seed quality varies within pod and were higher in proximal and middle portions than distal portion in moringa. Hence studies were formulated to trace the variation in fruit, seed and seedling quality characters owing to the position of fruit within the branch as flowering sequence vary within the branch also.

### Materials and Methods

Twenty five year old trees of amla located at ARS, Bhavanisagar were selected for the study. The main branch numbers tree<sup>-1</sup> vary from 6-10. At peak maturity period fruits were collected from branches of each tree at proximal (near the main trunk), distal (end of branch) and middle position by climbing on the tree. The fruits of individual trees and branch positions were pooled to obtain bulk sample of fruits collected of proximal, middle and distal end of the branch. The observations on fresh weight of fruit<sup>1</sup> (g), fresh weight of nut fruit<sup>1</sup> (g), seed weight fruit<sup>1</sup> (g), 100 seed weight<sup>1</sup> (g) (ISTA, 1999) and filled seed percentage. The seeds were dropped in double the volume of the solution and were separated into sinkers and floaters and the sinkers were considered as filled seed and values were made with 50 fruits of 5 replications. The extracted seeds were evaluated on seed quality characters viz., germination percentage (ISTA, 1999), dry matter production of ten seedling (g) and vigour index (Abdul Baki and Anderson 1973). The collection technique was repeated for two consecutive years (1994 to 1996) for confirmation of results and to trace the variation due to year of collection. The data were statistically scrutinised as per Panse and Sukhatme (1967) for understanding the level of significance.

### Results and Discussion

The variation due to position of fruit in the

branch were highly significant with years of collection. Their interaction were also found to be highly significant. The fruit weight was higher at bottom (Proximal) position (11.895 g) and it reduced with middle (11.562 g) and top (distal positions) (10.531 g) which should be due to nearness of proximal region to source of supply (Srimathi and Ramasamy, 1992). But the nut weight was higher in middle portion compared to proximal and distal portions.

The seed weight was also more in proximal position (0.149 g) compared to others. In addition to physical characters the seed set represented by filled seed set percentage was higher in proximal region due to good food supply than at distal region. The seed germination and seedling vigour parameters were also higher in proximal end compared to middle and distal end highlighting the influence of physical characters of seed, fruit and seed set on the seed quality characters of amla except nut weight fruit<sup>-1</sup>. This variation could be possible as flowering occur from bottom to tip of the branch in amla (centrifugal phenology) because of which maturity status among the fruits/seeds were varying and resulted in expression of seed and seedling quality characters. Such variations were also observed due to translocation of food material within the pod and crown by Srimathi et al. (1991), Sahai (1994) and Kumaran et al. (1994). Jackson et al. (1997), also explained that the position of seed on the mother tree is important factor which determines the final quality of seed. The source-sink relationship is not uniform all over the tree canopy and gets varied with light interception and nutrients translocation. But nut development alone is found to be independent of fruit and seed development recording higher weight at middle portion followed by proximal region. But hitherto the distal end recorded the lightest weight expressing role the distance of translocation in source-sink relationship.

Among the years of collection a rhythmic sequence was obtained in germination percentage alone which increased over year of collection might be

due to aging as explained by Jayaraj et al. (1989) in sapota. But the observed wider variation in the present study might be due to influence of climatic conditions on fruit and seed set as revealed by Schrock (1957) and Stern (1961).

The study thus expressed that variations were observed for seed and seedling quality characters among the position of fruit within a branch. Seeds/fruit

from proximal portion of the branch were superior to middle portion. Though the collection is laborious, this stringent selection will help in collection of fruits for elite seedling production at nursery either for rootstock or for direct planting based on better fruit and seed characters. The variation among the years of collection were wider and might be due to agroclimatic conditions prevailing during the period and aging of the tree.

**Table 1.** Influence of fruit position within the branch on fresh weight fruit<sup>1</sup>, fresh weight of nut fruit<sup>1</sup>, fresh weight of seed fruit<sup>1</sup> and 100 seed weight of amla

Position (P)	Fresh weight fruit <sup>1</sup> (g)				Fresh weight fruit <sup>1</sup> (g)				Fresh weight fruit <sup>1</sup> (g)				100 seed weight (g)			
	Year (Y)				Year				Year				Year			
	1994	1995	1996	Mean	1994	1995	1996	Mean	1994	1995	1996	Mean	1994	1995	1996	Mean
Base	13.581	10.815	11.291	11.895	0.906	0.751	0.700	0.786	0.121	0.162	0.165	0.149	2.001	1.991	1.583	1.860
Middle	12.899	10.943	10.845	11.562	0.889	0.859	0.967	0.906	0.104	0.141	0.122	0.122	1.763	2.190	1.358	1.770
Top	11.887	9.241	10.475	10.531	0.834	0.662	0.605	0.700	0.083	0.066	0.061	0.070	1.683	1.748	1.259	1.563
Mean	12.789	10.333	10.870		0.888	0.757	0.760		0.103	0.123	0.116		1.816	1.978	1.400	
CD (P = 0.05)		Y	P	YP		Y	P	YP		Y	P	YP		Y	P	YP
		0.185	0.185	0.320		0.004	0.004	0.008		0.006	0.006	0.009		0.004	0.004	0.008

**Table 2.** Influence of fruit position within the branch on sinker seed, germination, dry matter production 10 seeding<sup>1</sup> and vigour index of amla

Position (P)	Sinker seed (%)				Germination (%)				Drymatter production (mg)				Vigour index			
	Year (Y)				Year				Year				Year			
	1994	1995	1996	Mean	1994	1995	1996	Mean	1994	1995	1996	Mean	1994	1995	1996	Mean
Base	81	77	76	78	85	81	77	81	77	74	71	74	1517	1446	1363	1442
	(64.16)	(61.34)	(60.67)	(62.03)	(67.21)	(64.16)	(61.34)	(64.16)								
Middle	68	73	71	71	77	73	77	66	65	71	69	68	1290	1216	1267	1258
	(55.55)	(58.69)	(57.42)	(57.42)	(61.34)	(58.69)	(61.34)	(54.33)								
Top	59	61	67	62	65	67	59	64	57	61	63	60	1044	1042	938	1008
	(50.18)	(51.35)	(54.94)	(51.94)	(53.73)	(54.94)	(50.18)	(53.13)								
Mean	69	70	71		76	74	71		66	59	68		1284	1235	1189	
	(56.17)	(56.79)	(57.42)		(60.67)	(59.34)	(57.42)									
CD (P = 0.05)		Y	P	YP		Y	P	YP		Y	P	YP		Y	P	YP
		NS	0.95	1.65		1.10	1.10	1.91		1.07	1.07	1.80		NS	129.5	224.4

(Figures in parenthesis indicates arcsin values)

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## Influence of canopy position of fruit on seed and seedling quality characters of amla (*Emblica officinalis* Gaertn.)

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**Abstract :** Studies were made with *Emblica* to trace the influence of canopy position of fruit on seed and seedling qualities for three years. The results expressed fruit and seed characters of top canopy were superior compared to medium and bottom. An increasing trend was evident with increase in years of collection in fruit and seed characters. But seedling characters were found to be independent of years of collection. (*Key Words :* Seed collection, Canopy, Seed quality)

Amla (*Emblica officinalis* Gaertn.) is an important tree of medicinal value. Swaminathan et al. (1991) found out that in *Acacia mellifera* fruits collected from top of the crown (canopy) was superior to seeds collected from other positions. Dharmalingam et al. (1988) observed higher germination and vigour of coffee seeds collected from lower 1/3 position of the plant. Hence studies were made in *Emblica* to trace the influence of canopy position on seed and seedling quality characters which could aid in stringent selection of fruits for seeds which could give rise to elite seedlings at nursery.

### Materials and Methods

Twenty five year old trees of amla (*Emblica officinalis* Gaertn.) situated at Agricultural Research

Station, Bhavanisagar were selected for the study. At peak fruiting season (Jan-Mar.) the crown canopy of the tree was divided into 3 positions viz., top, middle and bottom based on the total height of canopy. Then climbing on to the tree, fruits were collected from top, middle and bottom portions. The fruits of individual trees were pooled as top, middle and bottom. Then observations were made on fruit seed and seedling characters viz., fruit weight (g), stone weight (g), seed weight (g), 100 seed weight (g), filled seed percentage (empty seeds were removed by water floatation technique and filled seeds which sank to the bottom are called sinkers) germination (ISTA, 1999), dry matter production seedling<sup>-10</sup> (mg) and vigour index (Abdul Baki and Anderson, 1973) were made on each category with 50 fruits of 4 replications. The data were collected