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EFFECT OF SEED SIZE ON GERMINATION OF BAEL (*AEGLE MARMELOS* (L.)

Aegle marmelos (L.) Corr. is a popular medicinal tree belonging to the family Rutaceae and its various parts are used in Ayurvedic and Siddha medicines to treat a variety of ailments. The tree grows wild in dry forests of hills and plains of tropical and subtropical region of Central and Southern India, Burma, Pakistan, Bangladesh, Sri Lanka, Northern Malaya, and Java Islands (Islam *et al*., 1995). It grows wild in well-drained soil and attains a size of about 12 to 15min height even in the harsh and dry climates. The tree bears fruits when there is a long dry season and the peak fruiting season in India is normally during the month of May and June (Sharma *et al*., 2007). The pulp which is yellow or orange in colour is very fragrant (characteristic floral aroma), pleasantly flavoured and sweet to taste (Roy and Khurdiya, 1995). The fruit which are of dietary use is either round, pyriform, oval, or oblong in shape.

Bael fruit is a heterozygous out-breeding plant that can be easily propagated by seeds. However, the seedlings show great variation in form, size, texture and quality of rind and number of seeds (Prematilake *et al*., 2006). Variation in seed size is an important area of plant ecology because seed size can directly affect the processes of germination and seedling recruitment, influencing the plant performance under different environmental conditions (Leishman, 2001).

The present study was conducted to study the effect of variation in seed size on germination of Bael at CAZRI, RRS, Pali-marwar during May, 2016. Bael seeds collected from Pali - Marwar region were extracted, washed, depulped and dried in shade for two days. The seeds were graded visually in to different size classes viz., large (L), medium (M) and small (S). Seed characters viz. length (cm), breadth (cm), and weight (gm) were recorded for all the three classes (Fig.1). Fifty (50) seeds from each size classes were sown in root trainer with coir pith as substrate. After 21 days of germination, germination percentage and other growth parameters were recorded for shoot length (cm), root length (cm), leaf length (cm), leaf width (cm) and number of leaves.

Fig. 1: Variation in seed size and shape of Bael (*Aegle marmelos* L.).

Grading of seed based upon their size and weight is a common practice in a majority of plant species as it has been found to regulate the germination and subsequent seedling growth (Ahirwar, 2012). In the current study (Table 1), among three classes large size seed recorded highest seed length (0.73 cm), followed by small (0.68 cm) and medium (0.66 cm). The seed breadth recorded high for large (0.56 cm) and 0.47 cm were recorded for medium and small size category. The hundred seed weight showed similar trend of seed length with highest weight recorded for large (7.76g) size seed.

The physiological seed quality parameters viz., days to first germination was noticed in large (10 days) followed by medium and small. The high germination percentage was recorded in small size with 61% whereas large size seed recorded low germination percentage of 56%. Similar results have been observed in *Cassia fistula L., Cassia hybrida* L. *Acacia holosericea* L. and *Acacia concinna* (Swaminathan and Srimathi, 1994). Similarly, the highest shoot length was recorded for small size seed. Root length (6.42cm), R/S ratio (1.36) and Number of leaves (3.2) recorded high for medium size category. Leaf length and breadth performed better in small size category (Table 2; Fig. 2).

In general, seed size is directly related with seed coat thickness and inversely related with water absorption (Beninger, 1998). Apart from this, smaller seeds have thinner coats and higher relative surface. This seed trait ensures greater permeability in small seeds and, consequently, less time for germination. The larger leaf size under small size seed category could have been

Table 1: Seed morphometric parameters of Bael (*Aegle marmelos* L.)

S.No.	Size class	Average seed length (cm)	Average seed breadth (cm)	Average 100 seed weight (g)
1.	Large	0.73 ± 0.18	0.56 ± 0.80	7.76
2.	Medium	0.66 ±0.48	0.47 ±0.15	5.59
3.	Small	0.68 ±0.70	0.47 ±0.71	6.03

Table 2: Growth parameters of Bael (*Aegle marmelos* L.) in Seedling stage

Size Classes	Days to first germination	Germination %	Shoot length (cm)	Root length (cm)	R/S Ratio	No.of leaves	Leaf length (cm)	Leaf breadth (cm)
Large (L)	10	56	4.16	5.38	1.29	2.2	3.28	2.08
Medium(M)	11	59	4.98	6.42	1.36	3.2	3.66	2.26
Small(S)	12	61	5.20	5.74	1.116	2.4	3.88	2.54
SE(m)			0.34	0.35	0.12	0.28	0.21	0.17
C.D at 5 %			0.61	0.63	0.22	0.50	0.38	0.31

Small Large Medium

Fig. 2: Difference in Number of leaves of three size class of Bael (*Aegle marmelos* L.).

attributed to high photosynthesis. Some of the studies have reported medium sized seed grade gave higher values of initial germination, total germination and germination values for *Acaianilotica, Acacia catechu, Pinus roxburghii* and *Albizia lebbeck* (Ahmad *et al.*, 2002).

It is indicated that the better performance of medium and small seed may be attributed to great access to water, since smaller seed tend to have higher surface to volume ratio than larger ones.Though, the exact reason cannot be drawn out but, the seedlings are kept under nursery to observe the further performance in growth.

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