Karnataka J. Agric. Sci.,24 (3) : (415 - 416) 2011

Influence of seed size on germination and seedling growth in *Mammea suriga*

Mammea suriga Buch.- Ham. Ex Roxb. is one of the commercially important aromatic tree species of the Western Ghats. It is popularly known as Suragi. The species is well distributed in Konkan region of the country. Suragi is highly priced for its sweet scented flowers. Economic part of this plant is dried flowers, which keep their fragrance for a long time and used in perfume industries. Flower buds contain a colouring matter, which dyes silk red. Due to this usage, species is under great demand. Farmers of Konkan region are ready to grow this crop on their home garden, on bund and in farmlands. Hence, standardization of nursery techniques for this species is very important and is little known in this species.

Generally, seed germination is controlled by many internal and external factors. Seed size is one among them. Seed size is an important parameter, which influences the germination, growth and biomass of the nursery seedlings and that trend leads to the future crop. Sowing of the mixed seed of a species may result in non-uniform density of seedlings, which may lead to heterogeneity in the vigour and size of the seedlings. The seed size often controls the germination and initial seedling growth in many tree species (Murali, 1997). Generally, bigger seeds germinate quicker and would take lesser duration when compare to that of smaller ones (Manonmani *et al.,* 1996, Negi and Todaria, 1997, Gunaga *et al.,* 2007). In contrast, seeds of medium to smaller produced higher seed germination in few multi purpose trees of Jammu (Dar *et al.,* 2002). Hence, the study was undertaken to know the influence of seed size on germination and seedling vigour in *M. suriga.*

The present study was undertaken at the College of Forestry, Sirsi, Karnataka (14º 36.337' N; 74º 50.895' E and altitude of 624 m asl). Matured fruits were collected from different trees in a natural forest near Kumta of Honnavar Forest Division during the end of June, 2004. Immediately after fruit collection, fruits were squeezed in water and seeds were extracted. Extracted seeds were shade dried for about a day. Healthy seeds were selected and grouped into three classes manually based on seed size such as small (< 1 cm), medium (1 to 2 cm) and large (> 2 cm). Then seeds were exposed to pre sowing treatment *i.e.,* alternate wetting and drying in cow dung slurry for three days and sown them on sterilized sand bed with five replications of 100 seeds each, following completely randomized block design (CRBD) under green house condition. Regular watering was done as per the requirement.

Observation on daily seed germination was counted upto 45 days from the date of sowing. After two months, seedlings were transplanted from sand bed to nursery bags of size- 8"x12" containing potting mixture of soil, sand and FYM in the ratio of 1:1:½. Seedling growth parameters were recorded at three months intervals. Final reading on plant height, collar diameter, number of leaves and root length was recorded at the age of six months from date of transplanting. Data were subjected to statistical analysis using mstat-C package and analysis of variance was constructed.

Seeds of Suragi are recalcitrant in nature. Generally, fruit fall coincided with rainy season. Our earlier report showed that seeds treated with cowdung slurry (*i.e.,* alternate wetting and drying for three days) produced highest seed germination in Suragi (Gunaga, 2006). In the present study, we have recorded a significant variation among three seed size classes for seed germination and early seedling growth attributes (Table 1). Bigger sized seeds recorded quick and highest seed germination (79.2%), followed by medium (59.0%) and small (22.0%). Higher and quicker germination in bigger sized seeds could be due to the presence of higher amount of carbohydrates and other nutrients than in medium and small sized seeds. Similar observations also been recorded in many tropical species. For instance, Manonmani *et al.* (1996) and Gunaga *et al.* (2007) have recorded higher seed germination and seedling vigour by using bigger sized seeds in *Pongamia pinnata and Vateria indica*. This trend is also been reported in some multipurpose trees by Negi and Todaria (1997). In contrast to this, Dar *et al.* (2002) have mentioned that the medium sized seeds produced better germination and seedling vigour than those of smaller and bigger ones. Whereas, Malavasi and Malavasi (1996) and Agboola (1996) have recorded no significant influence of seed size on seed germination and seedling vigour in a few tropical tree species. It is indicated that seed germination and seedling vigour is highly controlled by many intrinsic and extrinsic factors and is species specific (Murali, 1997). Hence, there is need a detailed study for each species on these aspects.

Seedling growth characteristics such as seedling height, collar diameter, number of leaves and root length were recorded significant variation among three groups. Bigger sized seeds showed significantly higher seedling height (12.4 cm), collar diameter (2.66 mm) and root length (9.06) than those of medium

Table 1. The influence of seed size on seed germination and seedling vigour in *M. suriga*

Seed size	Seed germination (%)		Seedling height (cm)	Collar diameter (mm)	Number of leaves	Root length (cm)
Big	79.20	(77.79)	12.4	2.66	2.10	9.06
Medium	59.00	(52.46)	10.3	2.16	2.15	7.59
Small	22.00	(28.06)	7.10	1.40	2.18	5.36
CD @ 5%	5.96	1.00	0.23	NS	0.70	

Values in the parenthesis are arc-sine transformed

and smaller seeds (Table 1). Number of leaves per seedling did not show significant variation among three groups of seed size. Ponnammal *et al.* (1993) have recorded a strong positive association of seed size with seedling vigour attributes in *Leucaena leucocephala.*

The overall result showed that the seed grading is an essential step to improve the quality of nursery stock as well as their performance at field condition. Further, it is suggested to use bigger sized seeds to get higher and quicker seed germination and early seedling growth in *M. suragi.*

College of Forestry,
DBSKKV, Dapoli - 415 712, Maharashtra, India
Email: rpgunaga@gamil.com

RAJESH P. GUNAGA
DODDABASAVA
R. VASUDEVA

(Received : June, 2008)

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