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INFLUENCE OF SEED SOURCE VARIATION ON FRUIT AND SEED PARAMETERS IN *SYZYGIUM CUMINI* SKEELS.

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ABSTRACT
In order to identify the seed source variation on fruit and seed parameters in jamun (*Syzygium cumini* Skeels) were evaluated during 2013, 2014 and 2015 spring season. Maximum fruit length (27.48 mm), fruit diameter (19.73 mm), fruit test weight (108.17 g) respectively recorded in Telhara seed source. Maximum seed length (22.14 mm) was recorded in Telhara seed source. Maximum Seed diameter (11.64 mm) and seed weight (46.90 g) recorded in Barshitakli seed source however; least seed length (14.69 mm), seed weight and seed diameter was recorded in Akot seed source (27.17 g), (9.12mm) respectively. Seed sources are suitable for further perpetuation for commercial and breeding zones may be set up in these environmentally heterogeneous areas and the best genotypes may be selected from them.

INTRODUCTION

Variations can be successfully utilized for adaptability of a species e.g. drought resistance or selection of a suitable genotype for growth or fruit quality *etc.* (Sundaram *et al*., 2003). The fruit yielding trees not only provide food, fuel, fodder, timber and /or conserve soil, but also provide rich source of nutrition, medicines and cosmetics. Among several wild fruits, *Syzygium cumini* Skeels is one that has been valued in Ayurvedic and Unani system of medicine for possessing variety of therapeutic properties (Kirtikar and Basu, 1975). High anthropogenic disturbances recorded wherever naturally distributed *Syzygium cumini* (Pawar *et al.*, 2012).

Jamun (*Syzygium cumini* Skeels) is used mainly for food and the sticks of jamun used as tooth sticks (Tripti Bouri *et al*.,2013). The wood is used to install motors in the wells. Being a fast-growing tree, it provides excellent firewood and charcoal to the rural (Chaudhary and Mukhopadhyay, 2012). The leaves are used as fodder and also food for tassar silkworms in India. The leaf distillates yield an essential oil which is used as fragrance in soaps and is blended with other chemicals to make inexpensive perfumes. *Syzygium cumini* flowers are rich in nectar and are useful in the apiculture for their yield of high quality honey (Patel *et al.,* 2010). Fruits are used as a relief for colic, while the wood yields a sulphate pulp that has medicinal uses (Chaudhary and Mukhopadhyay, 2012). The variations are important source for a tree breeder to improve a species. Therefore, variability studies are a prerequisite for improvement of a species.

MATERIALS AND METHODS

The present investigation entitled "Studies on Provenance variability in fruit characters of jamun (Syzygium cumini skeels)" was carried out in the Department of Forestry, Dr.P.D.K.V, Akola. During the year 2013, 2014 and 2015. The extensive survey was undertaken across eight different localities that spread over different provenances of Akola District, Maharashtra. Based on fruit availability at different time, viz. Balapur, Murthizapur, Patur, Akot, Barshitakli, Telhara, Akola (E) Akola (W) fruits were collected from the wide altitudinal range (274 to 425 m) with in their natural distribution to carry out the present investigation. The observations were recorded on shape, colour, and weight, size of fruit and seed of jamun, physiological composition of fruit viz. pulp content (%), seed (%), pulp- seed ratio, the trial was laid out in randomized block design with three replication. The data was analysed statistically as per method given by Panse and Sukhatme

$$\text{Germination percent} \quad \frac{\text{Number of seeds Germinated}}{\text{Number of seeds sown}} \quad 100$$

$$\text{Peak value of germination} \quad \frac{\text{Total germination percent}}{\text{Total number of days}}$$

$$\text{Mean daily germination} \quad \frac{\text{Final germination percent}}{\text{The number of days that took higest Germination}}$$

GV = PV X MDG
Where, PV - Peak Value of Germination
MDG - Mean Daily Germination

RESULTS AND DISCUSSION

Fruit length showed significant variation among the different seed sources. It varied from 19.13 to 27.48 mm. Significantly

higher fruit length was recorded from Telhara(21.26 mm) followed by Akola (E) (27.15 mm) as compared to the other seed sources. The lower seed length was recorded in the seeds collected from Akot (14.69 mm). Maximum fruit diameter and higher fruit test weight were recorded in fruits collected from Telhara (19.73) mm and (108.17) g, respectively, followed by Akola (E) (18.22 mm and 107.87 g, respectively). The fruit parameters are the main important ones for elevation (Srimathi *et al.*, 2001). The fruit traits from Telhara seed source were found superior over the other followed by Akola (E) and Akola (W) seed source and least was observed in Balapur seed source. The fruit from lower altitudinal source were found superior over high altitudinal area probably due to more favourable environmental factors. Similar results were reported by Jamaludheen *et al*. (1995) in *Lagestromia speciosa* and Kallaje (2000) in *Garcinia indicia* Choicy. Higher seed test weight was recorded in Barshitakli (46.90 g) and least seed weight was recorded in Akot seed source (27.17 g). Similarly, higher seed diameter was recorded in Barshitakli (11.64 mm) seed source and seed length (22.14 mm) was recorded in Telhara seed source. Lower seed length and diameter was recorded in the seed collected from Akot (14.69 and 9.12 mm, respectively. It is evident from the data that the highest germination of (88.23) per cent, peak value of germination of 1.95, germination value of 5.08 and mean daily germination of 2.60 was recorded in Telhara seed source. The test weight can be used as a useful parameter for seed source selection. The seed traits and germination characteristics delineated consistent differences among seed sources and this might reflect the true genetic variation. The analyses of the above observations revealed perceptible inter source differences with respect to the seed and germination attributes. These inter source differences establish the existence of genetic variation which can be further exploited to improve nursery production of *S. cumini*. The germination percentage in Telhara seed source recorded was highest and Akot seed source recorded the least (Table 1). This variation in germination may be due to seed size. Heavy and large seed contains more food reserves for the growing embryos, which help in germination by providing more energy than smaller ones; similar results were also reported by Sudhir Kumar (2003) in *Jatropha curcas*. Magnitude of improvement in germination through seed size

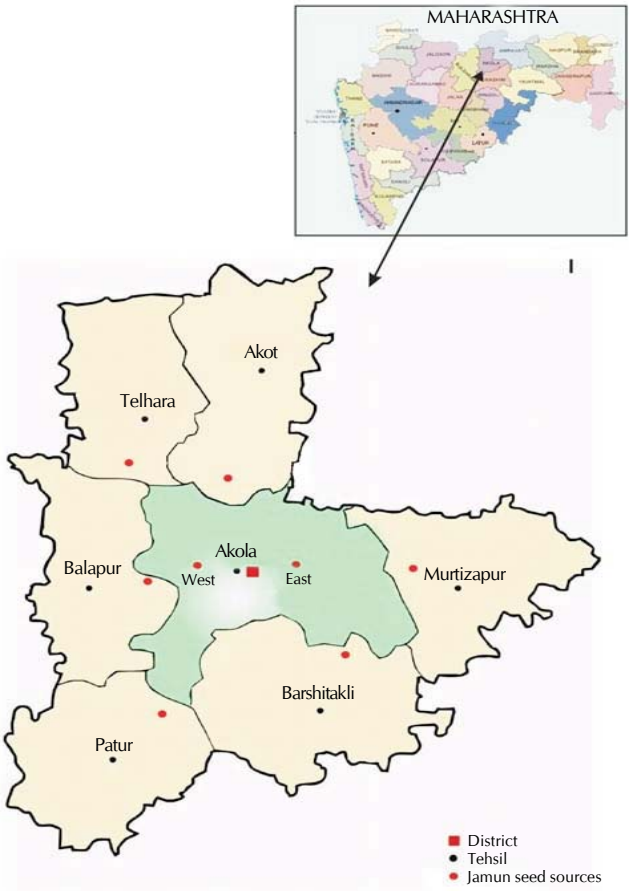

Figure 1: Map of Jamun seed sources in Akola District of Maharstra state

manipulation depends upon the amount of genetic variability and heritability of the traits. However, seed sources with higher seed weight are expected to give higher germination percentage. Hence, it is observed from the results that Telhara and Barshitakli seed sources were found superior with respect to per cent germination, whereas Akot seed source was least in this respect. The peak value of germination (PV) was highest in Telhara seed source followed by Barshitakli and Akola (E).

Table 1: Influence of seed source variation on fruit and seed parameters in *Syzygium cumini*

Treatment / Seed sources	Fruit Length (mm)	Fruit Diameter (mm)	Fruit test weight (g)	Seed length (mm)	Seed diameter (mm)	Seed Test weight (g)	Percent germination	Mean daily germination	Peak value of germination	Germination value
Balapur	19.13	13.49	66.87	15.67	10.41	27.51	80.39 (2.59)	2.31	1.76	4.23
Murthizapur	24.15	17.61	97.79	19.59	10.82	33.49	82.68 (1.41)	2.4	1.8	4.29
Pathur	22.82	16.47	84.5	18.65	9.87	30.66	82.62 (1.46)	2.35	1.78	4.25
Akot	21.18	15.12	74.84	14.69	9.12	27.17	79.41 (1.69)	2.24	1.74	4.19
Barshitakli	23.56	16.96	96.3	21.11	11.64	46.9	86.07 (2.04)	2.57	1.89	4.69
Telhara	27.48	19.73	108.17	22.14	11.37	43.96	88.23 (1.69)	2.6	1.95	5.08
Akola (E)	27.15	18.22	107.87	21.02	11.27	37.95	85.68 (1.46)	2.5	1.85	4.45
Akola (W)	26.91	17.91	98.34	19.97	10.97	34.46	84.68 (1.80)	2.45	1.82	4.31
Mean	24.05	16.94	91.83	19.1	10.68	35.26	83.72	2.43	1.82	4.44
SEm±	0.65	0.5	1	1.37	0.39	1.23	1.74	0.15	0.04	0.33
CD@0.05	1.96	1.53	3.03	4.16	1.19	3.73	5.25	0.45	0.14	1.01

Figures- in parenthesis are arc sin transformed values.

Whereas least peak value of germination was recorded in Akot seed source. This variation in PV may be due to the fact that there is genetic differences exist between the seed sources collected from different locations and moreover seed with high moisture content germinate immediately than with low moisture. This study is in line with Devgiri *et al*. (1998) in *Dalbergia sissoo* and Jayashankar *et al*. (1999) in *Tectona grandis*. The mean germination value was highest in Telhara seed source followed by Barshitakli and Akola (E) seed source. The least germination value was recorded in Akot seed source. The variation in all germination derived parameters may be due to fact that the external and internal seed morphological features are affected to a great extent by the stresses of the habitat and forces operating for perpetuation of the species. This variation in seed traits may be due to fact that this species grown over a wide range of rainfall, temperature and soil type and thus it was found that seed sources with higher seed length and width possessed higher seed weight. Good and viable seeds are always having higher sinks (Srimathi *et al*., 2001). Hence, seed weight can be used as one of the useful criteria for early selection of superior provenances. Thus, seed germination and weight are the two important traits considered for early selection of seed sources and improving seed production. Similar findings were reported by Srivastava (1995) in *Bahunia variegate* and Khalil (1986) in *Picea glauca*. Hence, it is evident from the data that seed sources from Telhara, Barshitakli, and Akola (E) l were found to be superior for fruit and seed traits and they excelled other seed sources

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