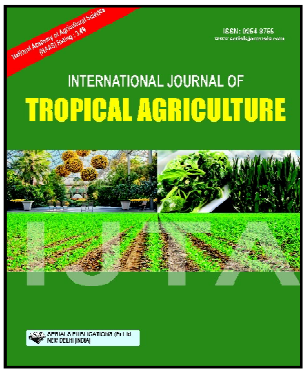

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Collection of Genetic Variability of Aonla

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Abstract: Survey of part of eastern UP was conducted and seven genotypes were identified i.e. three from Vindhyan hills (AKS/CIAH/EO-27, 28 and 29) one from Allahabad (AKS/CIAH/EO-30) and three from Pratapgarh (AKS/CIAH/EO-31, 32,33). Based on observation it was noted that AKS/CIAH/EO-28 and 29 were red coloured profuse and cluster bearing with small-fruited type. The maximum plant height 9.0m was observed with AKS/CIAH/EO-30. The maximum length (11.4cm) of determinate shoot was found in AKS/CIAH EO32 where as the shortest size (4.5cm) recorded with AKS/CIAH EO27 genotype. The maximum number (9) of fruit per shoot was with AKS/CIAH EO27 as compared to minimum number (5) of fruits with AKS/CIAH EO31. Data shown maximum fruit weight (44.78g) of genotype AKS/CIAH EO32 where as smallest size (3.27g) fruit was noticed with AKS/CIAH EO29. The fruit size in terms of length and width was measured and variable sizes of fruits from 1.52 to 3.88cm long and 1.84 to 4.62 cm wide was recorded in different genotypes. The highest pulp weight (42.95g) with AKS/CIAH EO32 whereas minimum pulp weight (5.10g) with AKS/CIAH EO27 was recorded. The per centage of pulp content was found highest (95.91) with AKS/CIAH EO32 as compared to minimum (84.01%) with AKS/CIAH EO27. Based on the observation recorded genotype AKS/CIAH EO32 found to be superior with respect to several physical and quality parameters for crop improvement progrommes.

INTRODUCTION

Aonla (*Emblica officinalis* Gaertn) is a member of family Euphorbiaceae being cultivated in India since *Vedic* era. As results of intensive research and development efforts aonla has attained a commercial status and proved to be a potential fruit crop in arid ecosystem. The fruit is recognizedmainly for its nutritive, medicinal and high therapeutic properties (Shukla *et al* 2002). The fruit is a rich source of vitamin-C and mainly grown in North India

particularly Uttar Pradesh, Madhya Pradesh, Bihar, Rajasthan and Gujarat. Genetic variability is the most important basis of diverse economic uses of aonla fruit. The seedling aonla plants commonly observed in Vindhyan hills which bears heavily however, fruit size comparatively smaller. Generally variability in aonla is found in seedling population for vegetative growth, fruit characters, yield and quality attributes due to outcrossing behaviour. (Dhandar and Shukla 2003). The present survey was aimed to identify elite type genotypes among the existing variability from eastern UP and collect bud wood of identified genotypes for further research and evaluation under arid agro ecosystem of Rajasthan.

MATERIALS AND METHODS

Exploration was conducted during during 2004-05 to identify elite type aonla genotypes of aonla form vindhyan hills and part of eastern UP. During survey seven genotypes were identified i.e. three from Vindhyan hills, one from Allahabad, three from Pratapgarh. While identifying the elite plant, twenty fully ripe fruits were randomly collected from different directions of the plant and subsequently fruits were analysed for physico-chemical characteristics. Total Soluble Solid (TSS) was determined by using Hand Refractometer. The fruit and stone size was measured with the help of Vernier Callipers. Canopy spread was measured by with the help of meter tape where as size of determinate shoot and leaf size was measured with scale. The locations of identified plants were earmarked for collection of bud wood material. Further, the bud wood of identified genotypes was collected during August 2005, which was subjected to *in-situ* budding in field repository of aonla at ICAR-CIAH, Bikaner.

RESULTS AND DISCUSSION

As a result of survey of part of eastern UP seven genotypes were identified i.e. three from Vindhyan hills (AKS/CIAH/EO-27, 28 and 29) one from Allahabad (AKS/CIAH/EO-30) and three from Pratapgarh (AKS/CIAH/EO-31, 32,33). Based on observation it was noted that AKS/CIAH/EO-28 and 29 were red coloured profuse and cluster bearing with small-fruited type. There was wide range of variability with regards to physico-chemical properties of fruit samples collected during identification of aonla genotypes. Variability with respect to various physical parameter given in table-1 exhibited marked variation with respect to plant height, leaf size, size of determinate shoot and No. of fruit per shoot. The maximum plant height 9.0m was observed with AKS/CIAH/EO-30 where as the dwarfing height i.e. 3.5m was recorded with AKS/CIAH/EO-29. The maximum leaf size was 2.5cm in AKS/CIAH EO33 genotype and the minimum 0.9cm recorded with AKS/CIAH EO27. This difference is highly correlated with important character of fruit weight and size (table 2). Under survey programme genotype AKS/CIAH EO29 was noted to be dwarf in nature with minimum canopy size in terms of spreading size of canopy from east-west (2.5m) and north-south (2.3m) where as vigorous type genotype has better canopy area measuring 4.5m east west and 5.0m north south direction. Size of determinate shoot, which is an important character of aonla is basically responsible for bearing of flowers and fruit. A remarkable difference also observed for this character in different genotypes. The maximum length (11.4cm) of determinate shoot was found in AKS/CIAH EO32 where as the shortest size (4.5cm) recorded with AKS/CIAH EO27 genotype. The maximum number (9) of fruit per shoot was with AKS/CIAH EO27 as compared to minimum number (5) of fruits with AKS/CIAH EO31. The colour of fruit differed with respect to genotypes and an excellent red coloured fruit were observed with AKS/CIAH EO29. Thus this genotype revealed two distinguishing characteristics of dwarfing nature and red colour of fruit that may be considered elite genotype for crop improvement programmes.

Table 1
Physico-morphological observations of identified elite genotypes in aonla surveyed in Eastern UP

S. No.	*Genotype*	*Plant height (m)*	*Canopy spread (m)* *EW*	*NS*	*Leaf size (cm)*	*Size of determinate shoot (cm)*	*No of fruit per shoot*	*Age of plant (Years)*	*No. of segments/ fruit*	*Time of flowering*	*Time of harvesting*	*Colour of fruit*
1	AKS/CIAH/EO27	4.0	3.0	3.5	0.9	4.5	9	12	7	Feb-March	Dec-Jan	Reddish green
2	AKS/CIAH/EO28	5.5	3.5	3.0	1.1	5.7	6	9	8	February	Dec-Jan	Reddish green
3	AKS/CIAH/EO29	3.5	2.5	3.0	1.3	4.8	7	11	7	February	Nov. Dec	Red
4	AKS/CIAH/EO30	9.0	4.5	5.0	1.4	7.5	6	30	8	March-April	Nov-Dec	Green
5	AKS/CIAH/EO31	5.5	3.2	3.5	1.8	10.8	5	8	6	Feb-March	Oct-Dec	Greenish yellow
6	AKS/CIAH/EO32	4.8	4.0	3.2	2.3	11.4	7	7	7	Feb- March	Oct-Nov	Yellow
7	AKS/CIAH/EO33	5.0	3.4	3.6	2.5	9.8	6	9	6	Feb-March	Nov-Dec	Yellowish green
	Range	3.59.0	2.5-4.5	3.0-5.0	0.9-2.5	4.5-11.4	5.0-9.0	8.0-12	6.0-8.0	—	—-	—

Table 2
Variability in elite genotypes of aonla with respect to fruit characters surveyed in Eastern UP

S. No.	*Genotype*	*Fruit weight (g)*	*Fruit size (cm)* *L*	*W*	*Stone weight (g)*	*Stone size (cm)* *L*	*W*	*TSS (%)*	*Pulp weight (g)*	*stone content (%)*	*Pulp content (%)*	*Acidity (%)*	*Pulp/stone ratio*
1	AKS/CIAH/EO27	6.07	2.10	2.20	0.97	1.40	1.22	25	5.10	15.98	84.01	2.3	5.25
2	AKS/CIAH/EO28	10.68	2.38	2.78	1.05	1.44	1.30	20	9.63	9.84	90.16	1.7	9.16
3	AKS/CIAH/EO29	3.27	1.52	1.84	0.53	1.12	1.10	23	2.74	16.21	83.79	2.6	5.17
4	AKS/CIAH/EO30	12.43	2.54	2.94	0.66	1.16	1.10	18	11.77	5.31	94.69	2.0	17.83
5	AKS/CIAH/EO31	26.61	3.12	3.82	1.26	1.48	1.30	13	25.35	4.74	95.26	1.4	20.09
6	AKS/CIAH/EO32	44.78	3.88	4.62	1.83	1.60	1.46	15	42.95	4.09	95.91	2.2	23.45
7	AKS/CIAH/EO33	37.60	3.58	4.28	1.93	1.74	1.54	15	35.67	5.14	94.86	1.8	18.45
	Range	3.27 -44.7	1.5 -3.88	1.84 -4.62	0.53 -1.93	1.12 -1.74	1.10 -1.54	13 -25	2.74 -42.95	83.79 -95.91	4.09 -16.21	1.4 -2.6	5.17 -23.45

A marked variability in aonla with respect to fruit characters was also recorded under investigation (table 2). Data shown maximum fruit weight (44.78g) of genotype AKS/CIAH EO32 where as smallest size (3.27g) fruit was noticed with AKS/CIAH EO29 Singh *etal* (1994) have also recorded variation in fruit characters of aonla genotypes. The fruit size in terms of length and width was measured and variable sizes of fruits from 1.52 to 3.88cm long and 1.84 to 4.62 cm wide was recorded in different genotypes as given in table-2. The stone weight and size also varied with respect to different genotypes from 0.53g to 1.93g stone weight and length of stone measured from 1.12cm to 1.74cm and width 1.10 to 1.54cm. These measurements clearly indicate the variability of fruit quality in terms of pulp/stone ratio indirectly. Total soluble solids (TSS) which generally determine the quality of fruits for nutritive and shelf life of produce also differed with respect to genotypes and maximum TSS (25%) was recorded AKS/CIAH EO27 followed by AKS/CIAH EO29 (23%) as compared to minimum with AKS/CIAH EO31 (13%).

The final economic part of the fruit is the pulp quantity and this character was measured with different genotypes and a high pulp weight (42.95g) with AKS/CIAH EO32 whereas minimum pulp weight (5.10g) with AKS/CIAH EO27 was recorded. The per centage of pulp content was found highest (95.91) with AKS/CIAH EO32 as compared to minimum (84.01%) with AKS/CIAH EO27. The per centage of pulp content was measured and the minimum (4.09%) was observed with AKS/CIAH EO32 as compared to maximum (15.98%) with AKS/CIAH EO27. It is evident from the data given in table-1 and 2 that genotype AKS/CIAH EO32 seems to be superior with respect to several physical and quality parameters for crop improvement progrommes.

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