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VARIABILITY, SELECTION AND PLANTING MATERIAL IN KEWDA (*PANDANUS FASCICULARIS* LAM.)

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ABSTRACT

Six morphotypes of kewda (*Pandanus fascicularis* Lam.) had been identified based on leaf pigmentation and presence or absence and size of thorns on the leaf margin, which exhibited consistency. A study on suitability of planting materials revealed that ground suckers and crowns from flowering part were best suitable for propagation purpose and stem cuttings proved to be futile.

Key words: Kewda, *Pandanus fascicularis* Lam., variability, selection, planting material.

Screwpine, or kewda shrub, is found along water courses in many parts of India. Its male spadices (grouped in flowers) is highly aromatic and are collected for use as perfumery flowers and preparation of kewda water and its scent. Although, the wild growing populations of kewda has a measure of variation, this has never been documented and utilized. The present investigation aims to collect genetic stocks, access variability in morphological characters and make selection of clones for raising plantation. Amongst the 36 species recorded [1] in India, *Pandanus fascicularis* Lam., the most common species of screwpine is widely distributed over coastal districts of Orissa, Andhra Pradesh, Tamil Nadu, Gujrat and to some extent in parts of Uttar Pradesh (Badayun, Balia and Gajipur districts) [2]. The present study on collection of germplasm is based on natural strains and cultivations around paddy fields in Orissa.

MATERIALS AND METHODS

Survey of different locations like Chhatrapur, Berhampur, Gopalpur regions of Ganjam and Konark, Tomando, Kalupada, Chilka lake shore regions of Puri districts was made during 1989 to 1991 to study the variability present in the natural growing plantations of

kewda under farmers field condition. Selection of clones was done on the basis of leaf pigmentation, and presence or absence and size of thorns on the leaf margin. Observations on 13 quantitative and 6 qualitative traits were recorded from five randomly selected plants per type and the mean data over locations were considered for the purpose.

Five sources of planting material were tested for raising new plants for identification of suitable planting material. For this purpose an experiment was laid out at Coconut Research Station, Konark during 1989-90 and 1990-91 in randomised block design with four replications consisting of five treatments, viz. crowns from flowering (Crown-F) and from nonflowering (Crown-NF) parts, stem cuttings of 0.5 m and 1.0 m length and ground suckers. Planting was done on 27 September 1989 at a spacing of 1 m x 1 m, maintaining a population of 16 plants per plot. Observations on plant survival, height, girth, number of new leaves and aerial roots developed per plant were recorded from ten randomly selected plants per plot in an interval of 60 days up to 720 days after planting (DAP) and the mean data were analysed following [3].

RESULTS AND DISCUSSION

As reported earlier, *P.fascicularis* Lam. is highly polymorphic with numerous forms and varieties and variations were more spectacular [4]. The common wild armed form of the sea coasts was var. Littoralis, in which flower growers had selected various races for cultivation, which included the prickly var. Samak and the thornless var. Laevis [5]. During the survey, basing on the variability present, we have selected six different morphotypes, which exhibited distinct variations in 19 important characters (Table 1), particularly flower bearing, weight, colour and aroma of flower and interestingly, in adaptability with regard to location, land type and soil texture. Flower production, the most important economic trait, was maximum in dark green small thorny type followed by dark green large thorny type and very poor in mala (dwarf) type; weight of flower was highest in thornless type, whereas aroma of flower was strongly scented in dark green large thorny type. In adaptability, large thorny types preferred sandy soils closed to sea, whereas small thorny types performed well under saline situation and thornless types under upland condition at nalla site (flowing water side) and mala types under inland situation. Deshaprabhu [1] reported that fertile, well drained soil was preferred for raising of scented types. Hence, a comprehensive survey was thought desirable to identify some promising genotypes from the amongst natural variability existing along the coastal belt of Balasore, Cuttack and Puri districts, besides district Ganjam, which possess largest acreage under kewda plantations for production of flower and kewda water. The breeding and selection strategies for crop improvement would also obviously be habitat and genotype specific.

Table 1. Variability in different characters among six morphotypes of kewda

Character	Character values in different types					
	dark green large thorn	light green large thorn	dark green small thorn	light green small thorn	thorn-less	mala-type
Length of leaf (cm)	70.0	64.5	65.0	68.0	75.0	55.0
Breadth of leaf (cm)	3.5	3.8	4.0	4.0	3.0	2.5
Thickness of leaf (mm)	0.5	0.6	0.4	0.6	0.4	0.8
Weight of leaf (g)	8.0	7.5	7.5	7.3	9.5	5.5
No. of thorns/10 cm length of leaf margin	9.5	10.0	15.0	13.0	—	10.0
Angle of thorn projection	45°	45°	85°	85°	—	50°
Time taken for discolouration of leaf in water (d)	7.0	6.0	7.5	6.0	8.0	6.0
Flower production ability in 25-year-old plant/year	25.0	20.0	28.0	24.0	10.0	3.0
Length of flower (cm)	45.0	55.0	40.0	55.0	65.0	42.5
Weight of flower (g)	85.0	92.5	50.0	110.0	175.0	135.0
No. of androecious fesicles/flower	16.0	13.0	13.5	14.0	14.0	11.0
Length of androecious fesicles (cm)	6.5	6.0	6.0	6.5	7.0	5.0
No. of bracts/flower	19.0	18.0	14.5	18.0	17.0	13.0
Colour of leaf	Dark green	Light green	Dark green	Light green	Pale green	Light green
Stiffness of leaf	Less	Less	Stiff	Less	Tender	Tender
Colour of thorn	Red	White	Red	White	—	White
Colour of flower	Yellowish white	White	Yellowish white	White	White	White
Aroma of flower	Strongly scented	Sweet scented	Sweet scented	Sweet scented	Less scented	Less scented
Adaptation	Sandy and sandy loam soil close to sea	Sandy and sandy loam soil close to sea	Saline situation	Saline situation	Upland situation at nalla site	Inland situation

Table 2. Effect of different planting materials on plant survival and growth of kewda

Treatment	Plant survival (%)				Plant height (cm)			Plant girth (cm)			Number of new leaves per 60 days/plant			Number of aerial roots/plant		
	90	240	480	720	240	480	720	240	480	720	240	480	720	240	480	720
Crown-NF	81.25 (64.50)	51.56 (46.04)	50.00 (45.10)	46.88 (43.19)	70.49	88.63	97.46	15.97	16.87	16.18	6.87	6.91	11.14	0.58	2.84	4.91
Crown-F	87.50 (70.09)	57.56 (46.00)	50.00 (45.10)	50.00 (45.10)	77.08	91.13	98.08	17.13	17.50	16.66	6.77	6.54	9.93	1.01	2.60	5.65
Stem cutting (0.5 m)	28.13 (31.99)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Stem cutting (1.0 m)	29.69 (32.94)	6.25 (14.48)	—	—	74.00	—	—	21.00	—	—	6.00	—	—	—	—	—
Ground sucker	84.38 (67.29)	75.00 (60.56)	73.44 (59.66)	73.44 (59.66)	71.10	91.45	100.05	14.23	15.08	13.73	6.80	6.40	10.05	0.95	3.55	5.65
SE(m) ±	3.85	5.73	6.06	5.53	6.39	6.40	6.34	1.28	1.64	1.33	0.31	0.47	1.19	0.40	0.36	0.45
CD at 5%	8.39	12.96	NS	13.53	NS	NS	NS	2.89	NS	NS	NS	NS	NS	NS	NS	NS

*Figures in parentheses are transformed angular values.

Note. Observations recorded on different days (240, 480, 720) after planting.

However, our study on planting materials (Table 2) revealed that during initial 90 days, the survival was significantly higher in ground sucker and crowns (> 80%), whereas success was very low in stem cuttings (< 30%). At later stage, i.e. 240 and 720 DAP, a significant high survival was noticed in ground suckers over Crown-F. Further, all the plants raised from stem cuttings died irrespective of their size. The values of other vegetative traits like plant height, girth, number of new leaves and aerial roots produced showed that although the maximum values were obtained in plants raised from ground sucker, followed by Crown-F, but these traits were not significantly affected by different planting materials. In essence, the study established that ground sucker and crown taken out from flowering part were suitable for propagation purpose and stem cuttings proved to be futile. This will be further verified, based on their performance for bearing of flower crop which will commence after fifth year of planting.

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