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Short communication

Genetic variability studies in ridge gourd under arid environment

D.K. Samadia
Central Institute for Arid Horticulture, Bikaner 334 006, Rajasthan

Ridge gourd (*Luffa acutangula* L.) is an important cucurbit native to India. Despite economic and nutritive importance, not much attempts have been made on its genetic improvement for cultivation under stressed arid environment. Considering the available genetic variability with respects to yield and other desirable characters, the study was carried out with a view to assess the scope of improvement in ridge gourd through selecting promising genotype. The experimental material for the present investigation consisted of 20 genotypes collected from the tribal areas of Rajasthan and northern Gujarat. These were evaluated at the experimental farm of Central Institute for Arid Horticulture, Bikaner under arid agro-climatic conditions. The experiment was conducted in randomized block design with three replications during the rainy seasons of 2003-04 & 2004-05. Research findings have been presented on 18 quantitative characters, *viz*., days to appearance of first male flower (DFMF), days to appearance of first female flower (DFFF) and days to first harvest (DFH) after sowing; node to first fruit set (NFF); fruit length (FL), fruit diameter (FD), fruit weight (FW), number of fruits/plant (NF/P), fruit yield/plant (FY/P), vine length (VL), leaf length (LL), leaf width (LW), leaf size (LS), mature fruit length (MFL), number of seeds/fruit (NS/F), seed length (SL), seed width (SW) and seed test weight (STW). The collected data were subjected to statistical analysis adopting standard procedures with computer based INDOSTAT package.

The analysis of variance revealed highly significant mean square estimates for all the 18 characters indicating sufficient variability in the germplasm. The extent of variability in ridge gourd genotypes was measured in terms of mean, range, genotypic and phenotypic coefficient of variation (Table 1). The genotypes depicted considerable diversity in fruit yield and quality attributes when grown under arid environment and thus showed great potential for selection of promising types. The days to appearance of first male and female flower ranged between 32.26 - 45.03 and 40.66 - 57.23 days from sowing, respectively. The days taken for first marketable harvesting varied from 50.70 to 67.00 with a population mean of 58.02 days after crop sowing. The maximum fruit length of 38.36 cm was recorded in the genotype AHRG-20 and the minimum of 7.60 cm in AHRG-15. The number of fruits per plant ranged from 6.70 to 12.60 with a population mean of 9.08. The genotypes AHRG-1, AHRG-4 and AHRG-15 recorded more than 12 fruits per plant. The marketable fruit yield/plant ranged from 0.356 to 1.963 kg with a mean of 0.935 kg. The maximum fruit yield 1.963 kg/plant was obtained in AHRG-1. On the basis of fruit quality, earliness and yield, the genotypes AHRG-1, AHRG-3 and AHRG-4 were found to be the most promising for growing under hot arid environment.

In general, the estimates of PCV were higher than GCV for all the characters. Differences between phenotypic and genotypic coefficient of variations were low. This indicates the low impact of environment on the expression of characters. Fruit yield/plant, fruit weight and fruit length exhibited the highest PCV and GCV estimates. High values of GCV are an indication of high genetic variability among the genotypes and thus the scope for improvement of these characters through simple selection would be better. The findings are in close agreement with the results of Narayana *et al*. (4) in bottle gourd, and Varalakshmi *et al*. (9) in ridge gourd.

The high values of heritability estimates in broad sense indicated that sustainable improvement can be made using standard selection procedures. These results confirm the findings of Sahni *et al*. (6), and Varalakshmi *et al.* (9) in ridge gourd. In the present study high heritability with high genetic advance as percentage of mean was observed for fruit length, fruit weight, fruit yield/plant, mature fruit length and number of seeds/fruit whereas it is moderate for number of fruits/plant. Similar results have also been reported by Varalakshmi *et al.* (9), and Sahni *et al.* (6). Simple selection, therefore, could be effective for improvement in these traits (Panse and Sukhatme, 5). High heritability with low genetic advance was observed for days to anthesis of first male and female flower and days to first harvest. Since, these characters are governed by non-additive gene action hybridization followed by selection may be used for improvement. Since the characters with high heritability coupled with high genetic gain would

*Corresponding author's E-mail: samadiadk@yahoo. com

Table 1. Genetic variability for various characters in ridge gourd.

Character	Range		Mean	CV (%)	GCV (%)	PCV (%)	h^2 (broad sense)	Genetic Advance (GA)	GA as percentage of mean (5%SI)
	Minimum	Maximum							
DFMF	34.26	45.03	37.83	7.23	6.37	7.62	69.96	4.15	10.98
DFFF	40.66	57.23	47.05	5.47	8.91	9.45	88.84	8.14	17.30
NFF	8.33	28.06	16.95	11.60	28.33	29.11	94.71	9.63	56.80
DFH	50.70	67.00	58.02	4.03	9.00	9.30	93.74	10.42	17.96
FL	7.60	36.36	22.71	9.94	29.99	30.53	96.46	13.78	60.68
FD	2.31	4.14	3.14	3.10	13.95	14.07	98.38	0.89	28.51
FW	43.10	162.90	104.04	6.23	32.50	32.70	98.79	69.24	66.55
NF/P	6.70	12.60	9.08	11.07	21.61	22.53	91.95	3.87	42.69
FY/P	0.356	1.963	0.935	8.97	45.41	45.70	98.72	0.86	92.94
VL	2.51	3.69	2.91	6.97	12.37	13.00	90.42	0.70	24.23
LL	13.22	23.76	18.01	1.53	13.93	13.95	99.60	5.15	28.63
LW	14.79	26.70	19.28	1.08	15.74	15.75	99.84	6.25	32.41
LS	201.42	634.41	354.13	2.03	30.02	30.05	99.85	218.89	61.81
MFL	9.73	36.90	26.94	3.47	24.72	24.80	99.34	13.67	50.76
NS/F	55.83	194.93	105.05	7.30	25.89	26.23	97.41	55.30	52.64
SL	0.89	1.31	1.09	4.48	10.66	10.97	94.42	0.23	21.34
SW	0.42	0.75	0.61	6.87	17.52	17.96	95.12	0.21	35.20
STW	7.432	16.067	10.030	0.97	19.41	19.42	99.92	4.01	39.97

respond to selection better than those with high heritability along with low genetic gain (Johnson *et al*., 2) the traits like fruit length, fruit weight, fruit yield per plant and number of seeds/fruit with high GCV, heritability and high genetic advance as percentage of mean could be effectively used in selection process.

The correlation parameters in general indicate high magnitude of genotypic correlation coefficients than the phenotypic ones for most of the characters studied. This establishes inherent relationships among the characters as also shown by the findings of Abusaleha and Dutta (1), Krishna Prasad and Singh (3), and Thamburaj (8) in ridge gourd. Fruit yield/plant showed significant positive correlation with number of fruits/plant, fruit weight and diameter both at genotypic and phenotypic levels. Days to first harvest exhibited positive and highly significant correlation with days to appearance of first male and female flower and node to first fruit set. Negative and significant association of days to appearance of first male and female flower and days to first harvest with number of fruits and fruit yield/plant clearly indicate that early bearing genotypes produce higher number of fruits resulting in higher yield. Fruit weight had positive and significant correlations with fruit length and diameter but had negative and significant association with days to first harvest, and appearance of first male and female flower.

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