

## Variability Analysis in spine gourd (*Momordica dioica* Roxb. ex Willd): An Underutilized Nutritive Vegetable

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### ABSTRACT

A study was conducted to screen the Spine gourd (*Momordica dioica* Roxb. ex Willd) germplasm lines for yield and yield attributing traits. A total of ninety germplasm collected from different regions of Madhya Pradesh and was grown in Randomized Block Design during Kharif 2013. The widest range was recorded for fruit yield per plant and number of fruits per plant, while narrowest range was observed for fruit rind thickness. The characters like number of shoot per plant, fruiting period, fruit length and average fruit weight expressed maximum variability. The germplasm MSG17 with maximum yield per plant considered as a promising line for yield followed by MSG39, whereas MSG15 line recorded lowest yield as compared to all the germplasm lines.

**Key words:** Spine gourd, *Momordica dioica*, Phenotypic coefficient of variance, Genotypic coefficient of variance

### INTRODUCTION

Spine gourd (*Momordica dioica* Roxb. ex Willd) is a dioecious perennial cucurbitaceous vegetable crop mostly grown in the eastern states of India. Spine gourd is considered as highly nutritious vegetable for its high seed protein content and also enjoys a very lucrative market avenue owing to its heavy demand. Spine gourd is a cucurbitaceous crop, belongs to the family Cucurbitaceae with chromosome number  $2n=28$ , under the genus *Momordica*<sup>1</sup>. Spine gourd is a native of tropical regions in Asia, tropical Africa, and South America. Kartoli mainly grew in Orissa,

Bihar and West Bengal as a crop and kitchen garden plant but occurs as wild in Punjab, Uttar Pradesh, Rajasthan, Madhya Pradesh, Kerala and Maharashtra. Immature green fruits, young leaves, flowers and tubers are cooked as vegetable<sup>9</sup>.

The wide genetic variability that exists in the available genotypes provides ample scope for further improvement. Spine gourd shows enormous diversity in shape and size of the leaf, fruit shape and colour as this crop is strictly cross pollinated<sup>3</sup>. The objective of the study was to assess genetic variability of different traits with yield.

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## MATERIAL AND METHODS

The present study was carried out at the Vegetable Research Field, College of Horticulture, Mandsaur, (M.P), during *kharif* season of 2013. Ninety-six genotypes of spine gourd collected from different regions of Madhya Pradesh and were evaluated in randomized block design during the year *kharif* 2013-14.

Recommended dose of manures and fertilizers were applied to provide better nutrition to the crop and all the plant protection measures were taken care to maintain the healthy crop stand. The observations recorded on number of shoots per plant, fruiting period (days), fruit length (mm), average fruit weight (g), fruit rind thickness (mm), number of seed per fruit, number of fruits per plant and fruit yield per plant (g). The data was analysed following statistical procedure of <sup>4</sup>.

## RESULT AND DISCUSSION

The results are presented in the table 1, for the following yield attributes *viz.*, number of shoots per plant, fruiting period (days), fruit length (mm), average fruit weight (g), fruit rind thickness (mm), number of seed per fruit, number of fruits per plant and fruit yield per plant (g) The characters with higher PCV than GCV indicated the high influence of environment on these characters.

### Number of shoots per plant

Number of shoots per plant ranged from 1.0 to 10.0 with a grand mean of 3.66 per plant. Maximum number of shoots were recorded in MSG-17 (10.0) followed by MSG-48 (9.0) and MSG-50 (8.0) whereas minimum number of shoots *i.e.*, 1.0 per plant was noted in case of genotypes MSG-15, MSG-43, MSG-46, MSG-55 and MSG-95. The GCV and PCV for number of shoot per plant were 44.32 and 51.38, respectively. These results are in conformity with the findings of <sup>3</sup> in spine gourd

### Fruit length (mm)

Among the spine gourd germplasm fruit length ranged from 24.70 to 54.13 mm with a mean of 35.33 mm. Longest fruits were recorded in

MSG-60 (54.13 mm) followed by MSG-32 (48.47 mm) and MSG-22 (47.69 mm). Genotype MSG-86 showed smallest fruit length 24.70 mm. The GCV and PCV for fruit length were low 14.88 and 15.42, respectively.

### Fruit rind thickness (mm)

The mean value for fruit rind thickness was recorded 3.30 mm while the range of values for fruit rind thickness in germplasm under study was 1.96 to 4.33 mm. Maximum fruit rind thickness was recorded in MSG-41 (4.33 mm) which was followed by MSG-30 (4.15 mm) and MSG-86 (4.12 mm). Minimum rind thickness was observed in fruits of genotypes MSG-95 (1.96), MSG-98 (2.09) and MSG-94 (2.1). The GCV and PCV for fruit rind thickness were low 3.97 and 15.40, respectively.

### Fruiting period (days)

Fruiting period ranged from 22.0 to 69.0 days with a mean of 40.75 days. Longest fruiting period was recorded in MSG-23 (69.0) which was followed by MSG-17 (67.0) and MSG-22 (57.0) whereas shortest fruiting period was recorded in MSG-51 (23.0) which was followed by MSG-49 (24.0) and MSG-22 (57.0) The GCV and PCV for fruiting period were moderate *i.e.* 29.65% and 29.78%, respectively.

### Average fruit weight (g)

There was a significant difference in fruit weight of spine gourd germplasm. It weight ranged from 4.64 to 17.07 g with a mean of 10.44 g. Maximum fruit weight was recorded in MSG-39 (17.70 g) followed by MSG-17 (16.10 g) and MSG-50 (15.16 g). Lowest fruit weight was noted in MSG-61 (4.61 g). The GCV and PCV for individual fruit weight were moderate *i.e.* 22.85 and 23.36, respectively.

### Number of seeds per fruit

Number of seed per fruit ranged from 13.33 to 35.33 with a grand mean of 22.3 seed/fruit. Maximum number of seed was recorded in MSG-17 (35.33) which was followed by MSG-59 (32.66) and MSG- 56 (29.33). Genotype MSG-15 (13.33) has minimum number of seeds/fruit. The GCV and PCV for number of seed per fruit were 18.39 and 18.69, respectively.

**Number of fruit per plant**

Among different genotypes there was significant variation for number of fruits/plant. Number of fruit per plant ranged from 7.0 to 224.0 with a grand mean of 56.16. Maximum number of fruits per plant was recorded in MSG-17 (224.0) followed by MSG-39 (133) and MSG-08 (115). Minimum number of fruits per plant was found in genotype MSG-42 (7.0). The GCV and PCV for number of fruit produced per plant were high 57.27 and 58.18, respectively.

**Fruit yield per plant (g)**

Wide range of variability *i.e.*, 116.87 to 2072.0 g per plant was recorded for fruit yield per plant with maximum in MSG-17 (2072.00 g) followed by MSG-39 (1065.50 g) and MSG-80 (998.00 g). The mean value of fruit yield/plant in the existing germplasm was 414.98 g. Lowest fruit yield/plant was found in case of genotype MSG-15 128.0 g/plant. The GCV and PCV for fruit yield per plant were 68.04 and 68.65, respectively and both were

high. The results were in confirmation with the works of

Fruiting period ranged from 22.0 to 69.0 days with a mean of 40.75 days. Similar findings were also reported by <sup>5,7</sup>. in spine gourd for first female flower appearance. Early flowering and days to first fruit harvest not only gives early pickings but also widen fruiting period of the plant. Increase in days to last fruit harvest increases the number of pickings and fruiting period. Fruiting period indicates the duration of harvest. Hence, high mean value desirable for days to last fruit harvest and fruiting period.

Similar findings were also reported by <sup>5,8</sup> in spine gourd for fruit length, fruit weight and yield per plant and by <sup>9</sup> in spine gourd for fruit length, fruit weight and number of fruits per plant. In spine gourd these traits are directly associated with the fruit yield per plant, for which high mean value is desirable. High mean values are also desired for fruit length, weight and number of fruits per plant.

**Table 1: Mean, range, phenotypic and genotypic coefficients of variance for yield attributes of spine gourd**

S. No.	Characters	Mean	Range	PCV	GCV
1	Number of shoot per plant	3.66	1.00-10.00	51.38	44.32
2	Fruiting period	40.75	22.0-69.0	29.78	29.65
3	Fruit length (mm)	35.33	24.70-54.13	15.42	14.88
4	Average fruit wt.(g)	10.44	4.64-17.07	23.36	22.85
5	Fruit rind thickness (mm)	3.3	1.96-4.33	15.4	3.97
6	Number of seed per fruit	22.3	13.33-35.33	18.69	18.39
7	Number of fruit per plant	56.16	7.00-224.00	58.18	57.27
8	Fruit yield per plant(g)	414.98	116.87-2072.00	68.65	68.04

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