

## SHORT COMMUNICATION

**A Note on Crinkle Leaf Virus Disease Resistant Accessions of Mothbean (*Vigna aconitifolia* (jacq.) Marechal)****Om Vir<sup>1</sup>, AK Singh<sup>1</sup> and RK Tyagi<sup>2</sup>**<sup>1</sup>National Bureau of Plant Genetic Resources, Regional Station, Jodhpur-342003, Rajasthan<sup>2</sup>National Bureau of Plant Genetic Resources, New Delhi-110012

(Received: 5 January 2013; Revised: 11 September 2013; Accepted: 12 September 2013)

Mothbean (*Vigna aconitifolia* (Jacq.) Marechal) also known as mat bean or Turkish gram belongs to family Fabaceae and sub-family Faboideae. This arid legume, native to India, Pakistan and Myanmar, is an important pulse crop of arid and semi arid regions of India and Pakistan. The plant resembles a small mat and its height is approximately one foot. Its branches are densely mated, grow horizontally and have deeply notched leaflets on long leaf branches. The plant is generally adapted to extremes or uncongenial ecological niches particularly arid regions, receiving fewer rains with erratic distribution. The crop is generally grown in the North-Western deserts of India and Pakistan where droughts are more prevalent. It is extensively grown in Rajasthan as mixed crop with cotton, sorghum, and other pulses. The mothbean is consumed as a rich protein source (22-24 %) by the low income consumers in the rural areas and tribal belts of Rajasthan, Uttar Pradesh, Punjab, Haryana and Madhya Pradesh. It is used in several confectionary items, forming essential components of day to day snacks (Singh *et al.*, 2012). Mothbean is a good source of amino acids, particularly lysine and leucine and certain vitamin, like carotene (Swaminathan, 1985). Its green fodder is at par to alfalfa and dry fodder is better than cowpea and clusterbean (Singh *et al.*, 2012).

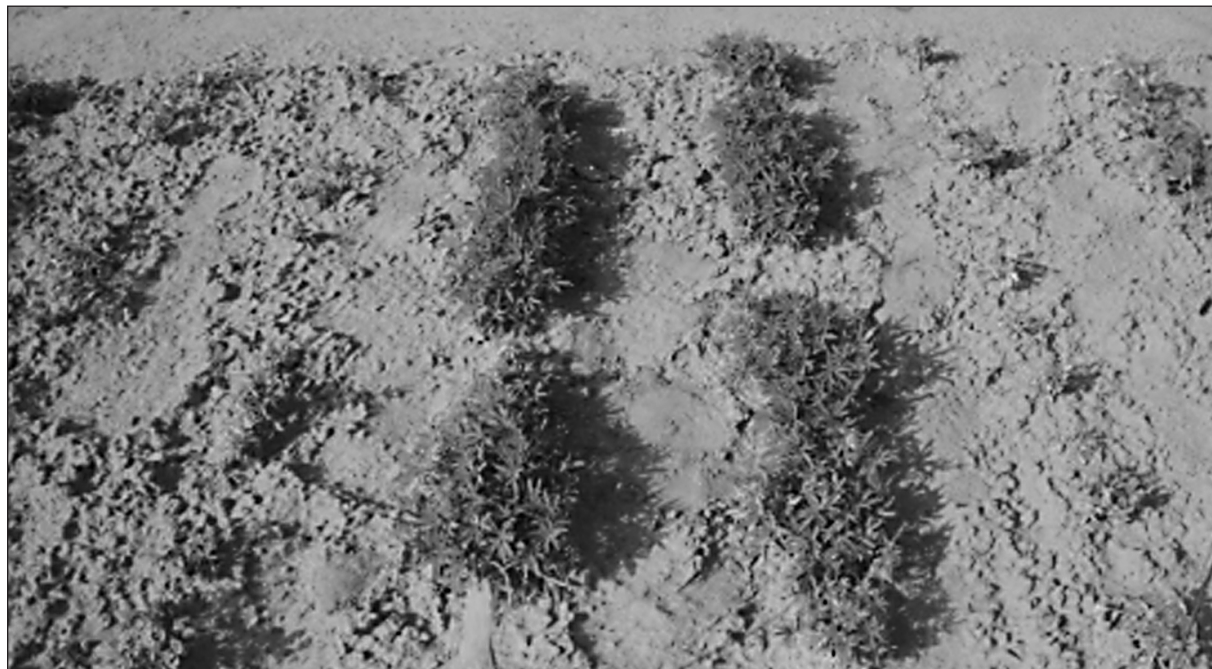
Mothbean is a major arid legume and is recognized for its twin tolerance to drought and heat. It is therefore, the ultimate choice of marginal and sub marginal farmers for realization of sustained production under the extreme hostile and harsh climatic conditions. Mothbean is grown in about 12.2 lakhs hectares of area in Rajasthan, however, productivity is very low that varies from 200 to 250 kg/ha (Singh *et al.*, 2012). Many constraints are responsible for low productivity including its susceptibility to a number of fungal, bacterial and viral diseases. The most common diseases of mothbean are bacterial leaf blight and leaf

spot, seed rot, root rot, seedling blight, fusarium seedling rot, Choanephora pod rot, web blight, Colletotrichum leaf spot and pod infection, Myrothecium leaf spot and pod infection, Alternaria leaf spot, Curvularia leaf spot, powdery mildew, seed microflora, witchers broom, yellow mosaic virus and leaf crinkle virus (Rathi and Punia, 2002). The crinkle virus, transmitted by white fly is the most dangerous disease and damages crop up to 90% (unpublished data). The initial symptoms of crinkle virus appears three to four weeks after sowing. The growth of plant is stunted and plants look like burnt. Leaflets curl downward with crinkling. At the time of flowering, the peduncles bear a large number of small flower buds. The sepals of the flower of infected plants become thicker and greener than normal and cover half or whole of the bud. This gives a bushy appearance to the inflorescence and pod setting is reduced (Rathi and Punia, 2002).

During *summer* 2012, 44 accessions of mothbean which were collected from different places of India were grown in a randomized complete block design with three replicates at two soil fertility levels manipulated by applying fertilizers in the soil at the time of sowing. The plot size was consisted of three rows of two meter length each. The line to line and plant to plant distances were maintained 45 and 20 cms, respectively. The same experiments were repeated during *kharif* 2012. The data were recorded on morphological traits on five randomly taken plants of middle row of the plot. The mean value of two experiments with three replicates and five plants in each replication of recorded traits are given in Table 1 for both the seasons.

The plants were severely infected by crinkle virus and out of the 44 accessions only two accessions namely IC 39786 and IC 39822 survived and rest

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**Fig. 1: Crinkle leaf virus disease resistant accession IC 39786. Other accessions seen in the picture were infected up to 90% by this disease**

**Table 1. Mean value of morphological traits recorded for mothbean accessions IC 39786 and IC 39822.**

Traits	Moth bean (IC 39786)		Moth bean (IC 39822)	
	<i>Summer</i>	<i>Kharif</i>	<i>Summer</i>	<i>Kharif</i>
Crinkle virus grade	1 (Highly Resistant)	1 (Highly Resistant)	1 (Highly Resistant)	1 (Highly Resistant)
Early plant vigor	Good	Very good	Good	Very Good
Plant growth habit	Spreading	Spreading	Spreading	Spreading
Plant habit	Indeterminate	Indeterminate	Intermediate	Intermediate
Leaf colour	Dark green	Dark green	Green	Green
Leaf pubescence	Moderately pubescent	Moderately -pubescent	Sparsely	Sparsely
Days to 50% flowering	43	47.75	44.2	45.75
Days to maturity	60	65	60	65
Plant height (cm)	25.15	30.43	26.35	30.5
Peduncle length (cm)	3.8	4.27	3.81	4.12
Branches / plant	4.2	8.47	4.56	7.9
Clusters / branch	3.56	11.95	4.02	10.25
Clusters / plant	15.4	75.03	16.2	68.6
Pods / branch	10.6	13.67	11.75	14.75
Pods / plant	38.88	96.87	48.64	103.1
Pod length (cm)	2.55	3.4	2.81	3.52
Seeds / pod	6.0	6.47	4.6	6.3
100 seed wt. (g)	2.53	2.71	2.68	3.01
Seed yield / plant (g)	5.03	12.17	6.89	14.34

of the 42 accessions including checks namely Jadia, Jawal, RMO 40 and FMM-12-6-134 were almost wiped out (80-90% infection) by the crinkle virus (Fig.1). The disease rating was done on 1 to 9 scale being 1- highly resistant, 3- resistant, 5- moderately resistant, 7-susceptible and 9- highly susceptible ( Mahajan *et al.*, 2000). These two accessions scored 1 whereas other accessions scored 7 or 9. During *khariif* 2012 also these two accessions exhibited the high field resistance to this disease. Thus, mothbean accessions IC 39786 and IC 39822 possess strong genetic resistance scoring to crinkle virus disease, tested at field level. These mothbean accessions IC 39786 and IC 39822 were collected from the villages namely, Paddhar and Vallipur respectively of Vadodra district of Gujarat state on September 12, 1980 by NBPGR. Mothbean breeders may use these two

genotypes in their breeding programme to incorporate crinkle leaf virus disease resistance in the high yielding varieties of mothbean.

## References

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