

Varietal Screening of Bottle Guard Against Gummy Stem Blight Disease

MUKESH J. PATEL*, V. A. SOLANKI, K. B. RAKHOLIYA AND M. D. KHUNT

Department of Plant Pathology, N. M. College of Agriculture, Navsari Agricultural University,
Navsari, Gujarat
email : mukesh@agrilandbiotech.com

ABSTRACT

Seven bottle guard varieties were taken for varietal screening against gummy stem blight disease during *Kharif*-2016 and *Rabi* 2016-17. Disease appeared almost at the same time in all the varieties during initiation of flowering stage. During *Kharif* season, the disease intensity was recorded in test varieties were in the range of 24.40 to 50.40% with lowest disease incidence (24.40%) in Varad variety. However, it was at par with Namdhari-509 (25.90%) followed by Anokhi variety. Disease intensity recorded in test varieties during *Rabi* season were in the range of 20.00% to 51.10%, with minimum in Varad (20.00%), and maximum in ABG-1 (51.10%). Pooled data indicated that Varad showed highest tolerance against gummy stem blight followed by Namdhari-509 and Anokhi varieties.

Key words Bottle gourd, Gummy stem blight, Varietal screening, Disease resistance

Bottle gourd [*Lagenaria siceraria* (Mol.) Stand L.] is having wide range of uses and cultivated in the tropical and subtropical region for its edible fruits. Bottle gourd is important for health as it contributes significantly to dietary intake of vitamin A, B and C; carbohydrates, proteins, fats, calcium, iron, potassium, phosphorous, etc. In India it is cultivated in 9000 hectares with productivity of 28.90 t/ha (Harika *et al.*, 2012). Gummy stem blight caused by *Didymella bryoniae* (Auerw) has been observed from the different areas of the country and has become a serious problem in successful, and profitable cultivation of cucurbits in India (Sudisha *et al.*, 2004; Thakare and Gaikwad, 2014; Rajashree *et al.*, 2014). Symptomatically, small spots can be observed on the leaf lamina which gradually becomes ashy brown in color with light brown periphery. Later on, it coalesces and makes papery, and burnt appearance of leaf lamina, which is responsible for poor photosynthesis, and respiration. Ultimately, it affects the setting of flowers, and fruits, and finally defoliation of leaves. All commonly cultivated cucurbits are susceptible to gummy stem blight, although the degree of susceptibility differs among species and variety (Keinath, 2013; dos Santos *et al.*, 2009). Use of high yielding resistant/tolerant varieties is the most reliable, environmentally safe and also less expensive technique for management disease. Thus, it is the most remunerative to farmers. Therefore, the identification of the resistant source is a basic need in breeding for disease resistance. Hence, the present

investigations was undertaken to find out the resistant source against gummy stem blight of bottle gourd.

MATERIALS AND METHODS

Location and experimental details:

Two field experiments were conducted at N.M. College of Agriculture farm, Navsari, which is located at 20.95° North latitude (N) and 72.93° East longitude (E) under Agro climatic zone of South Gujarat, Heavy rainfall zone, Agro Ecological Situation-III during *Kharif* 2016 and *Rabi* 2016-17. Seven popular bottle guard varieties were planted in plot sizes of gross 8.00m x 10.0 m and Net 6.00 m X 8.00 m with spacing of 2.00 m X 1.00 m. Recommended dose of fertilizer i.e. 200: 100: 100 kg/ha NPK was applied. All other agronomical practices were followed as per recommendations. Randomly Block Design (RBD) was used in the field conditions with three replications and seven treatments.

Varietal screening against gummy stem blight disease:

Seven different popular varieties viz. ABG-1, Varad, Mahyco-8, Sharda, Namdhari-509, Anokhi, Gaurav of bottle gourd were used for screening of disease. Varieties were graded on the basis of their GSB disease intensity. The Percent disease intensity at weekly interval was recorded by scoring the plants in each cultivar using 0-9 scale (Gusmini *et al.*, 2005). Types of symptoms and scale rating were recorded for screening bottle gourd for GSB resistance. Percent disease index (PDI) was calculated by formula proposed by Wheeler (1969).

$$PDI = \frac{\text{Sum of individual ratings} \times 100}{\text{Total number of plants} \times \text{Maximum disease grade observed}}$$

RESULTS AND DISCUSSION

Different crop varieties shows different degree of tolerance or susceptibility against diseases which is controlled by either internal or external factors. Gummy stem blight disease observations were recorded from initiation of disease, and then regularly at a weekly interval till the harvesting of crop. Data pertaining to filed trails for varietal screening against gummy stem blight of bottle gourd during *Kharif*-2016 and *Rabi* 2016-17 are represented in Table-1 and Table-2, respectively.

During *Kharif*-2016, the disease intensity recorded in test varieties were in the range of 24.40 % to 50.40%. The

Table 1. Gummy stem blight intensity in various popular varieties of bottle gourd (Kharif-2016)

Sr. No.	Treatments	Per Cent Disease Intensity#							Types of Resistance
		Days After Sowing (DAS)							
		45	52	59	66	73	80	87	
1	ABG 1	7.3* (0.7)	25.1 (17.0)	30.3 (24.4)	33.6 (29.6)	36.3 (34.1)	42.8 (45.2)	45.8 (50.4)	++ (S)
2	MAHYCO-VARAD	7.3 (0.7)	13.3 (4.5)	16.9 (7.4)	19.7 (10.4)	22.8 (14.1)	26.1 (18.5)	30.3 (24.4)	++++ (MR)
3	MAHYCO-8	5.7 (0.0)	14.1 (5.2)	19.7 (10.4)	27.2 (20.0)	29.8 (23.7)	33.1 (28.9)	37.2 (35.6)	++ (MS)
4	SEMINIS-SHARDA	5.7 (0.0)	18.3 (8.9)	20.3 (11.1)	21.6 (12.6)	24.6 (16.3)	29.6 (23.7)	36.3 (34.1)	++ (MS)
5	NAMDHARI-509	7.3 (0.7)	13.3 (4.4)	19.0 (9.6)	20.3 (11.1)	22.8 (14.1)	27.2 (20.0)	31.0 (25.9)	+++ (MS)
6	NUNHEMS- ANOKHI	5.7 (0.0)	18.0 (8.9)	21.0 (11.8)	23.4 (14.8)	26.1 (18.5)	31.2 (25.9)	34.5 (31.1)	+++ (MS)
7	BIOSEED-GAURAV	7.3 (0.7)	22.2 (13.3)	30.0 (24.0)	34.0 (30.4)	35.8 (33.3)	41.1 (42.2)	45.4 (49.6)	++ (S)
	SEm±	1.2	1.8	0.9	1.5	1.5	1.7	2.1	
	CD at 5%	NS	5.4	2.7	4.6	4.5	5.3	6.6	
	CV%	32.1	17.1	6.8	10.1	9.0	9.1	9.9	

* Figures outside parentheses are arcsine transformed values and those inside are original values

Mean of three replications

Resistant (R) (<20%): +++++,

Moderate Resistant (MR) (20-30%) : +++++,

Moderately Susceptible (MS) (30-40%) : +++,

Susceptible (S) (40-50%) : ++

Highly Susceptible (HS) (> 50%) : +

Table 2. Gummy stem blight intensity in various popular varieties of bottle gourd (Rabi 2016-17)

Sr. No.	Treatments	Per Cent Disease Intensity #							Types of Resistance
		Days After Sowing (DAS)							
		45	52	59	66	73	80	87	
1	ABG 1	7.3* (0.7)	26.2 (18.5)	32.5 (28.1)	37.2 (35.6)	40.2 (40.7)	43.7 (46.7)	46.2 (51.1)	++ (S)
2	MAHYCO-VARAD	5.7 (0.0)	14.4 (5.2)	18.9 (9.6)	21.5 (12.6)	24.6 (16.3)	25.1 (17.0)	27.3 (20.0)	++++ (MR)
3	MAHYCO-8	7.3 (0.7)	18.9 (9.6)	21.0 (12.6)	25.1 (17.0)	28.1 (21.5)	29.2 (23.0)	32.2 (27.4)	++ (S)
4	SEMINIS-SHARDA	5.7 (0.0)	17.4 (8.1)	21.0 (11.9)	24.3 (16.3)	26.5 (19.3)	28.7 (22.2)	30.8 (25.2)	+++ (MS)

Sr. No.	Treatments	Per Cent Disease Intensity #							Types of Resistance
		Days After Sowing (DAS)							
		45	52	59	66	73	80	87	
5	NAMDHARI-509	7.3 (0.7)	14.2 (5.2)	19.7 (10.4)	22.2 (13.3)	25.1 (17.0)	26.1 (18.5)	28.3 (21.5)	++++ (MR)
6	NUNHEMS- ANOKHI	5.7 (0.0)	17.6 (8.2)	20.3 (11.1)	20.3 (11.1)	26.3 (18.6)	26.7 (19.3)	28.7 (22.2)	+++ (MR)
7	BIOSEED-GAURAV	7.3 (0.7)	24.6 (16.3)	28.2 (21.5)	28.2 (21.5)	38.0 (37.0)	42.0 (43.7)	44.5 (48.2)	++ (S)
	SEm±	1.2	1.6	1.8	1.6	1.6	2.0	1.8	
	CD at 5%	NS	4.8	5.4	4.6	4.8	6.2	5.6	
	CV%	30.2	14.1	13.2	10.4	9.1	11.1	9.3	

* Figures outside parentheses are arcsine transformed values and those inside are original values # Mean of three replications

Resistant (R)(<20%): +++++, Moderate Resistant (MR) (20-30%): +++++,
 Moderately Susceptible (MS) (30-40%) : +++, Susceptible (S) (40-50%) : ++
 Highly Susceptible (HS) (> 50%) : +

disease appeared almost at the same time in all the varieties during initiation of flowering stage. The lowest disease incidence (24.40%) was observed in variety Varad as compared with other varieties, however it was at par with Namdhari-509 (25.90%) followed by Anokhi. The varieties

Sharda, and Mahyco-8 showed 34.1, and 35.6 per cent disease intensity, respectively. The Gaurav and ABG-1 showed maximum disease intensity of 49.60% and 50.40%, respectively.

Disease intensity recorded in test varieties during

Table 3. Symptoms appeared on various plant parts of popular varieties of bottle gourd during *kharif* 2016 and *rabi* 2016-17

Sr. No.	Variety	Symptoms on various plant parts of bottle gourd					
		Season	Leaf	Stem	Fruit	Stem Splitting	Pycnidia development
1.	ABG-1	<i>kharif</i>	++	+++	+++	+++	+++
		<i>rabi</i>	++	+++	++++	+++	+++
2.	VARAD	<i>kharif</i>	++++	++++	++++	++++	++++
		<i>rabi</i>	++++	+++	++++	+++	+++
3.	MAHYCO-8	<i>kharif</i>	+++	++++	++++	++++	++++
		<i>rabi</i>	+++	+++	+++	+++	+++
4.	SHARDA	<i>kharif</i>	+++	+++	+++	++++	++++
		<i>rabi</i>	+++	+++	++++	++++	++++
5.	NAMDHARI-509	<i>kharif</i>	++++	++++	++++	++++	++++
		<i>rabi</i>	++++	+++	++++	++++	++++
6.	ANOKHI	<i>kharif</i>	++++	++++	++++	++++	++++
		<i>rabi</i>	++++	+++	++++	+++	+++
7.	GAURAV	<i>kharif</i>	+++	+++	++++	+++	+++
		<i>rabi</i>	++	+++	+++	+++	+++

Resistant (R) (<20%): +++++, Moderate Resistant (MR) (20-30%): +++++,
 Moderately Susceptible (MS) (30-40%): +++, Susceptible (S) (40-50%): ++
 Highly Susceptible (HS) (> 50%): +

Rabi 2016-17 were in the range of 20.00 % to 51.10%. Variety Varad recorded lowest disease intensity of 20.00 per cent, and maximum disease intensity was recorded in ABG-1 (51.10%). The varieties viz. Namdhari-509, Anokhi were showed less susceptibility to gummy stem blight. The varieties Sharda and Mahyco-8 were exhibited moderate level of susceptibility to gummy stem blight. The remaining two varieties Gaurav and ABG-1 were found susceptible to gummy stem blight. Table-3 indicated symptoms on various plant parts of bottle gourd suggested that Varad was the most tolerant to gummy stem blight followed by Namdhari-509, and Anokhi. The varieties Sharda, and Mahyco-8 exhibited moderate level of susceptibility against gummy stem blight. Gaurav and ABG-1 were found most susceptible to gummy stem blight.

Results of the study were in accordance with Keinath (2013), and dos Santos (2009). Host resistance has the potential to provide an alternative means by which to reduce disease pressure in cucurbits and there have been studies looking to find novel sources of host resistance. All commonly cultivated cucurbits are susceptible to gummy stem blight, although the degree of susceptibility differs among species, and variety (Keinath, 2013; dos Santos *et al.*, 2009).

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