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IDM Module for the Management of Yellow Mosaic Disease in Green Gram

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ABSTRACT

India is the largest producer and consumer of pulses in the world contributing around 25-28% of the total global production. Among the pulses grown in india, chickpea, pigeon pea, urdbean, greengram, lentil, fieldpea, lathyrus are important Pulses crops. Farmers grow green gram crop not as a principal crop but as a bonus crop for extra income. Pulse crops are least preferred by farmers because of high risk (weather & pest incidence) and less remunerative than cereals. Mungbean yellow mosaic virus (MYMV) disease is one of the most vicious diseases of green gram and cause economic losses due to this virus account up to 85% in green gram which is spreading faster towards newer areas. IDM module are reduce the yellow mosaic disease incidence from 81.82 to 82.83 % resulted enhance the productivity from 11.11 to 15.91 %, respectively in 2011-12 & 2015-16.

Key word: *Green gram, Yellow mosaic, IDM module*

INTRODUCTION

In India, presently farmers grow more than a dozen of pulses. Among them chickpea, pigeon pea, urdbean, greengram, lentil, fieldpea, lathyrus are important. Out of these *kharif*/ summer pulse crops, green gram (*Vigna radiata* L.) has special importance in intensive crop production of the country for its short growing period. India is the largest producer and consumer of pulses in the world contributing around 25-28% of the total global production. Pulses are least preferred by farmers because of high risk and less remunerative than cereals; consequently, the production of the pulses is significantly low to meet the demand of pulses. Majority of Indian population is vegetarian & pulses are cheap and best source of protein for Indian diet. It contains 20-25 per cent protein, which is more than two times of cereals. The green plants can also be used as animal feed and its residues have the capacity to improve the physical, chemical and biological properties of soil thus increase the productivity of land. It can also fix atmospheric nitrogen through the symbiotic relationship between roots and soil bacteria and thus improves soil fertility. Farmers grow this crop not as a principal crop but as a bonus crop, mixed with other crops on marginal lands. By the introduction of numerous short duration varieties in greengram it had been feasible to introduce greengram in multiple cropping systems for increasing pulse production.

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Yellow mosaic disease is widely distributed in the tropical and sub tropical regions. The symptom appears as brilliant yellow or golden yellow colour on leaves which may be partially or completely yellow. Disease infected plant are show mild yellowing and often plant shows stunting. Pods exhibits blotching, discolored with reduced the size and number[4]. The estimation of crop loss ranged from 40 to 100 per cent depending on the cultivar and time of infection[7].

Bemisia tabaci (Gennadius) (Aleyrodidae: Homoptera) is one of the important sucking pests which inflicts heavy damage to the crop not only through direct loss of plant vitality by feeding cell sap but also by transmitting the yellow mosaic virus disease[5]. The economic losses due to this virus account up to 85% in green gram which is spreading faster towards newer areas[2].

MATERIALS AND METHODS

The present study was carried out by the Krishi Vigyan Kendra, Sehore (M.P.) during Zaid season from 2011-12 & 2015-16 in farmer's field of in adopted villages of Krishi Vigyan Kendra. The total number of farmers under this programme was 15. For the assessment of technology, one control plot was also kept where farmer's practice was carried out. Data were collected with the help of personal contact and observations on yield data was also recorded at the time of threshing. The yield of each trails was recorded in a systematic manner and the yield of farmer's practices was also recorded at the same time.

The results of farmers practice were compared with the technology of IDM module for the management of yellow mosaic disease in green gram – "Resistant variety (PDM-139) + Optimum seed rate (30 kg/Acre) + Seed treatment with Thiomethoxam 70 ws @ 3gm/kg seed + Removal of infected plant at initial stage + One spray of Thiomethoxam 25 WG @ 100gm/ ha at occurrence of disease.

The observations on number of plants infected with the yellow mosaic virus (YMV) were recorded at 15 days interval till physiological maturity. The percentage of disease incidence was assessed by recording the number of plants showing disease symptoms out of total number of plants examined by using the formula mentioned below.

$$\text{Per cent disease incidence} = \frac{\text{Number of diseased plants X 100}}{\text{Total number of plants examined}}$$

The yield data were collected from both the demonstration and farmer's practice and workout to calculate the technology gap; extension gap and the technology index as given below.

Technology gap = Potential yield- demonstration yield

Extension gap = Demonstration yield - farmer's yield

$$\text{Technology index} = \frac{\text{(potential yield-demonstration yield) X 100}}{\text{Potential yield}}$$

RESULT AND DISCUSSION

Total 15 no of trails were conducted at farmer's field in their farming situation. Table 1 revealed that the reduction of yellow mosaic disease ranges from 81.82 % to 82.83 % in 2011-12 & 2015-16, respectively over farmers practice resulted highest yield of green gram (10.2 q ha^{-1}) was obtained during the 2015-16 with the additional amount of Rs. 1200 over farmer's practices, which yield 8.8 q ha^{-1}. The average yield under demonstration fluctuated and ranged from 8.0 q ha^{-1} & 10.2 q ha^{-1} during the 2011-12 & 2015-16, respectively. The results clearly indicated that the yield of green gram could be increased by 11.11 % to 15.91 % over the yield obtained under farmer's practices of green gram cultivation due to adoption of IDM module for the management of yellow mosaic disease. Dixit and Singh[1] & Patil *et al*[6]. were also found the similar type of findings.

The results indicated that the assessed technology has given a good impact among the farming community of Sehore district as they were motivated for future adoption of the technology.

The extension gap which ranged from 0.8 q ha^{-1} to 1.4 q ha^{-1} during the period of study emphasized the need to educate the farmers through various means for adoption of

Integrated Disease Management module for the management of yellow mosaic disease in green gram.

The technology gap were ranged from 1.8 q ha^{-1} to 4.0 q ha^{-1}, respectively in 2015-16 & 2011-12. The technology gap observed may be attributed to the dissimilarity in the trends adopted by farmers, day by day enhancing pest infestation as well as changing weather condition. Hence timely application of IDM technology for manage yellow mosaic disease in green gram incidence resulted minimize the technology gap for yield level of different situations.

The technology index shows that the feasibility of the evolved technology at the farmer's fields. The lower value of technology index more feasibility of the technology. As such, reduction of technology index from 33.33 % in 2011-12 15.0 % in 2015-16. The variation in yield from location to location can be accounted for varying climatic condition, prevailing microclimatic and variation in agricultural practices followed by farmers resulted very in yellow mosaic disease incidence. More or less similar findings are found by Sagar and Chandra[8].

Table 2 showed that the cost of production under assessment was Rs. 15200 to Rs. 15500 per hectare in 2011-12 & 2015-16, respectively while the cost of farmer practice (FP) Rs.14200 to 14300 ha^{-1} in 2011-12 & 2015-16, respectively. The table 3 also revealed that the average net return from technology Rs 16500 ha^{-1}, while average net return from farmers practice was Rs. 13750 ha^{-1}. It means the net return from assessed technology was higher than farmer's practices. Similar finding are found by Kumar & Kumar, 2012. The additional cost Rs.1000 to Rs.1200 gave additional net return, it was ranged Rs. 1800 to Rs. 3700 per hectare in 2011-12 & 2015-16, respectively. The increased benefit: cost ratio was also calculated, it was ranged from 1:1.84 to 1:2.30 in demonstration & 1:1.79 to 1:2.15 in farmers practice, respectively in 2011-12 & 2015-16.

Thus, it was clearly showed that the IDM module for the management of yellow mosaic disease in green gram are more effective technology over farmers practice. In this technology eco- friendly & timely manage the yellow mosaic disease in green gram resulted enhance the net profit.

Table 1: Disease incidence, Productivity, extension gap, technology gap and technology index of Green gram

Year	No. of Demo	Disease incidence (%)			Yield q/ha			Extension gap q/ha	Technology gap q/ha	Technology index%
		T1	T2	% reduction	T1	T2	% increase			
2011-12	5	26.8	4.6	-82.83	7.2	8.0	11.11	0.8	4.0	33.33
2015-16	10	24.2	4.4	-81.82	8.8	10.2	15.91	1.4	1.8	15.0
Total	**15**	-	-	-	-	-	-	-	-	-
Mean		**25.5**	**4.5**	-82.33	**8.0**	**9.1**	**13.51**	**1.1**	**2.9**	**24.17**

T1- Farmers practice T2 – Recommended practice

Table 2: Economics analysis

Year	Demonstration			Farmer practices			Additional cost of cultivation Rs ha^{-1}	Additional net return Rs ha^{-1}	Incremental benefit cost ratio	
	Cost of cultivation Rs ha^{-1}	Gross returns Rs ha^{-1}	Net return Rs ha^{-1}	Cost of cultivation Rs ha^{-1}	Gross returns Rs ha^{-1}	Net return Rs ha^{-1}			T1	T2
2011-12	15200	28000	12800	14200	25200	11000	1000	1800	1.79	1.84
2015-16	15500	35700	20200	14300	30800	16500	1200	3700	2.15	2.30
Mean	15350	31850	16500	14250	28000	13750	1100	2750	1.97	2.07

T1- Farmers practice T2 – Recommended practice

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