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# IPM MODULE FOR THE MANAGEMENT OF GIRDLE BEETLE AND SEMI LOOPER IN SOYBEAN

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## *ABSTRACT:*

Soybean is the number one oilseed crop in the world has recently occupied on important place in the edible oil and agricultural economy of the country. Low yield of soybean due to heavy infestation of pest. Out of these pest, girdle beetle & semilooper are the major pest in soybean especially in sehore district. IPM module for the management of semilooper & girldle beetle in soybean – "Summer Deep Ploughing + bird purchers (50/Ha) + pheromone trap (10/Ha) + One spray of neem based insecticide at flowering and second spray of trizophos at 7 days after first spray are assessed at farmers field during 2006-07 & 2007-08. IPM module are reduce average 53.06% larval population of girdle & semilooper resulted enhance the productivity of soybean crop. Under IPM module average productivity of soybean is 12.63 qtl $ha^{-1}$ wherer under farmers practice , the average yield of soybean are 9.63 qtl $ha^{-1}$.

***KEY WORD:*** *Soybean, Girdle beetle, Semilooper, IPM module.*

## *INTRODUCTION:*

Soybean (*Glycine max* L., Merril) occupies third position among the oilseed crop in India after groundnut and rapeseed-mustard. Soybean is the number one oilseed crop in the world has recently occupied on important

place in the edible oil and agricultural economy of the country. Soybean is established as major rainy season in India particularly in central part of the country. Soyabean (*Glycine max*) is an important oil crop all over the world. Although soyabean is not new to India, commercial cultivation of yellow seeded soyabean is comparatively of recent origin. Apart from high yield potential, soyabean possesses a very high nutritional value. It contains about 20 % good quality edible oil and 43 % high quality protein. Soyabean protein is rich in the valuable amino acid lycine (5 %) in which most of the cereals are deficient. In addition, it contains good amount of minerals, salts and vitamins. Its sprouting grain contains a considerable amount of vitamin C. Vitamin A is present in the form of carotene.

Madhya Pradesh has its major share in Area (70%) and production (65%) of soybean in India and hence knows as soybean state. In Madhya Pradesh the average productivity of soybean in very low (10q $ha^{-1}$) as compare to genetic potential (25q $ha^{-1}$). The adoption of recommended production technology among farmers is not very encouraging. The reason may be that the crop is affected by a number of insect pests during their life cycle. Out of these pest, girdle beetle & semilooper insect are the major insect in soybean & they are affected about 15-20% average yield losses in soybean. Hence an efficient technology transfer system is required for creating awareness and acceptance of IPM technology among the farming community. Keeping in this view the present study was carried out to find out the effect of IPM module for the management of girdle beetle & semi looper on soybean productivity in Sehore district of Madhya Pradesh.

## *METHODOLOGY:*

The present study was carried out by the Krishi Vigyan Kendra, Sehore (M.P.) during *Kharif* season from 2006-07 & 2007-08 in farmer's field of in adopted villages of Krishi Vigyan Kendra. The total number of farmers under this programme was 11. 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 separate 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 IPM module for the management of semilooper & girldle beetle in soybean – "Summer Deep Ploughing + bird purchers (50/Ha) + pheromone trap (10/Ha) + One spray of neem based insecticide at flowering and second spray of trizophos at 7 days after first spray ). The yield data were collected from both the demonstration and farmer's practice and their technology gap; extension gap and the technology index were worked out (Samui *et al.*, 2000) as given below.

Technology gap = Potential yield-demonstration yield

Extension gap = Demonstration yield -farmer's yield

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

## *RESULTS AND DISCUSSION:*

Total 11 no of trails were conducted at farmer's field in their farming situation. There was partial gap in adoption of recommended practices over farmer's practices with regards to variety and weed control, whereas complete gap (full) was noted for seed treatment, seed inoculation, plant spacing, STV based fertilizer application & pest management through IPM module (Table-1)

Table 2 revealed that the reduction of girdle beetle & semilooper population ranges from 52.5% to 53.61% in 2006-07, 2007-08, respectively over farmers practice resulted highest yield of soybean (12.67 q $ha^{-1}$) was obtained during the 2007-08 with the additional amount of Rs. 600 over farmer's practices, which yield 9.9 q $ha^{-1}$. The average yield under demonstration fluctuated and ranged from 12.59 q $ha^{-1}$ to 12.67 q $ha^{-1}$ during the 2006-07 to 2007-08. The results clearly indicated that the yield of soybean could be increased by 27.98% to 34.65% over the yield obtained under farmer's practices of soybean cultivation due to adoption of IPM module for the management of girdle beetle & semi looper in soybean. Dixit and Singh (2003), Patil *et al.* (2003) and Singh (2002) 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 2.77 q $ha^{-1}$ to 3.24 q $ha^{-1}$ during the period of study emphasized the need to educate the farmers through various means for adoption of Integrated Pest Management module for the management of girdle beetle & semilooper to reverse this trends of wide extension gap. More use of latest production technologies with high yielding varieties will subsequently change this alarming trends & reduce the extension gap.

The technology gap were ranged from 3.41 q $ha^{-1}$ to 3.33 q $ha^{-1}$, respectively in 2006-07 & 2007-08. 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 weather condition. Hence timely applicatioj of IPMtechnology for manage pest infestation resulted minimize the technology gap for yield level of different situations.

The technology index shows the feasibility of the evolved technology at the farmer's fields. The lower value of technology index more is the feasibility of the technology. As such, reduction of technology index from 20.81 % in 2007-8 to 21.31% in 2006-07. 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 girdle beetle & semilooper insect infestation. More or less similar reasoning was provided by other workers (Sagar and Chandra, 2004). Table 3 showed that the cost of production under assessement was Rs. 15300 to Rs. 15500 per hectare in 2006-07& 2007-08, respectively while the cost of farmer practice (FP) Rs.14800 to 14900 $ha^{-1}$ in 2006-07& 2007-08, respectively. The table 3 also revealed that the average net return from technology Rs 12071 $ha^{-1}$, while average net return from farmers practice was Rs. 6091 $ha^{-1}$. 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.500 to Rs.600 gave additional net return, it was ranged Rs. 6466 to Rs. 5494 per hectare in 2006-07 & 2007-08, respectively. The increased benefit: cost ratio was also calculated, it was ranged from 1:77 to 1:79 in demonstration & 1:1.36 to 1:1.46 in farmers practice.

Thus, it was clearly showed that the IPM module for the management of girdle beetle & semilooper in soybean are more effective technology over farmers practice. In this technology, ecofriendly & timely manage the Girdle beetle & semi looper in soybean resulted enhance the net profit.

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**Table 1 : Adoption gap of recommended soybean technology and percentage of farmers of non-adoption recommended practices.**

| S. N. | Items | Existing practices | Recommended practices | Gap in adoption | Farmers prioritization for critical input |
|---|---|---|---|---|---|
| 1. | Variety | JS-335, Samrat, Sonia | JS-93-05, JS-9560 | Partial | I |
| 2. | Seed rate | 100 Kg $ha^{-1}$ | 75 Kg $ha^{-1}$ | Partial | VII |
| 3. | Seed treatment | No use of fungicide | Seed treatment with fungicide | Full | IV |
| 4. | Seed inoculation | No use of culture | Seed inoculation with Rhizobium 5gm+PSB gm per kg of seed | Full | VI |
| 5. | Spacing | 9" (22.5cm) | 16-18"(30cm) | Full | VIII |
| 6. | Fertilizers | 50 kg DAP $ha^{-1}$ | 20:60:20 Kg N:P:K (100 Kg DAP $ha^{-1}$) | Full | II |
| 7. | Weed control | One hand weeding | One spray of post emergence weedicide+ one hand weeding | Partial | V |
| 8. | Plant Protection | 1. Application of insecticide without knowledge<br>2. Use of incorrect dose | 1. IPM module for the management of pest<br>2. Need based insecticide spray<br>3. Use of correct dose and time of insecticide | Full | III |

**Table 2 : Productivity, extension gap, technology gap and technology index of soybean as grown under Assessed technology and existing package of practices.**

| Year | No. of Demo | Larval population / $M^2$ | | | Yield q/ha | | | Extension gap q/ha | Technology gap q/ha | Technology index% |
|---|---|---|---|---|---|---|---|---|---|---|
| | | T1 | T2 | % reduction | T1 | T2 | % increase | | | |
| **2006-07** | **5** | **3.2** | **1.52** | **52.5** | **9.35** | **12.59** | **34.65** | **3.24** | **3.41** | **21.31** |
| **2007-08** | **6** | **3.6** | **1.67** | **53.61** | **9.9** | **12.67** | **27.98** | **2.77** | **3.33** | **20.81** |
| **Total** | **11** | | **-** | | **-** | **-** | **-** | **-** | **-** | **-** |
| **Mean** | **-** | **3.4** | **1.60** | **53.06** | **9.63** | **12.63** | **31.32** | **3.01** | **3.37** | **21.06** |

**Table 3: 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 |
| 2006-07 | 15300 | 27068 | 11768 | 14800 | 20102 | 5302 | 500 | 6466 | 1.77 | 1.36 |
| 2007-08 | 15500 | 27874 | 12374 | 14900 | 21780 | 6880 | 600 | 5494 | 1.79 | 1.46 |
| Mean | 15400 | 27471 | 12071 | 14850 | 20941 | 6091 | 550 | 5980 | 1.78 | 1.41 |

**T1- Farmers Practice** **T2 – Recommended Technology**