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# Management of Sesame Phyllody disease through the insecticide in Madhya Pradesh, India

Yashowardhan Singh\*, K.N. Gupta, Sanjay Kharte and Subahsh Sri Sanjay Malempati

Department of Plant Pathology, Jawaharlal Nehru Krishi Vishwavidyalaya, Jabalpur M.P., India

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#### ABSTRACT

Sesame (*Sesamum indicum* L.) is one of the important annual oldest oil seed crop grown in tropical to temperate zones in India. It belongs to family *Pedaliaceae* is native of India and plays an important role in the oilseed economy throughout the world. The sesame crop suffers from phyllody disease caused by phytoplasma. Phyllody disease transmitted through the insect vector, cuscuta and grafting in the form of phytoplasma and phytoplasma move within plants through the phloem from source to sink and they are able to pass through sieve tube elements. Plants infected by phytoplasmas exhibit a wide range of specific and non-specific symptoms. Symptoms of diseased plants may vary with the phytoplasma, host plant, stage of the disease, age of the plant at the time of infection and environmental conditions. The result indicated that, all the treatments were superior over the control. The effect of different treatments on per cent disease incidence and yield was recorded. The results obtained revealed that all the treatments reduced the disease significantly compared to unsprayed control. Seed treatment with imidacloprid 17.8 SL @ 5 ml/kg + spray of acetamiprid 20 % SP @ 0.3 g/l recorded the least disease incidence (7.05 %) and highest seed yield of 5.21 q/ha and while seed treatment with imidacloprid 17.8 SL @ 5 ml/kg + spray of azadirachtin 0.03% @ 3ml/l was least effective in which disease incidence of 11.43 per cent was recorded. The disease incidence in untreated check was 14.94 per cent and lowest seed yield of 3.04q/ha was recorded.

Key words: Sesame, Phyllody, Phytoplasma.

## Introduction

Sesame (*Sesamum indicum* L.) is one of the important annual oldest oil seed crop grown in tropical to temperate zones in India. It belongs to family Pedaliaceae is native of India and plays an important role in the oilseed economy throughout the world. It is considered as queen of oilseeds because of the quality and stability of its oil.

Sesame seed is a rich source of protein (20%) and edible oil (50%), and contains about 47% oleic acid and 39% linolenic acid (Shyu and Hwang, 2002). Sesame oil has excellent stability due to the presence of the natural antioxidants sesamoline, sesamin and sesamol. Seeds with hulls are rich in calcium (1.3%) and provide a valuable source of minerals.

The sesame crop suffers from many diseases like powdery mildew caused by *Erysiphe cichoracearum* (Natarajan *et al.*, 1983), Stem and Root rot caused by *Macrophomina phaseolina* (Mihail, 1995), Phytophthora blight (*Phytophthora parasitica* var. *sesami*), Alternaria leaf spot caused by *Alternaria sesame* (Mehta and Prasad, 1976 and Dolle, 1981), Cercospora leaf spot, Fusarium wilt, bacterial blight (*Xanthomonas Compestris* pv. *sesami*) (Cook, 1981). Bacterial leaf spot (*Pseudomonas syringe* p.v. *sesame* (Cook 1981) and phyllody caused by phytoplasma. Phyllody disease transmitted through the insect vec-

### SINGH ET AL

tor, cuscuta and grafting in the form of phytoplasma and phytoplasma move within plants through the phloem from source to sink and they are able to pass through sieve tube elements. Plants infected by phytoplasmas exhibit a wide range of specific and non-specific symptoms. Symptoms of diseased plants may vary with the phytoplasma, host plant, stage of the disease, age of the plant at the time of infection and environmental conditions.

## Materials and Methodology

A field trial was laid out during kharif, 2018 at PC Unit, AICRP Sesame and Niger (ICAR), JNKVV, Jabalpur to evaluate efficacy of different insecticides separately for the control of vector (*Orosius albicinctus Dist*) of phyllody on sesame.

Experiment was laid out in a random block design with the trial included the following 8 treatments replicated thrice with a plot size of  $3 \text{ m} \times 2.4 \text{ m}$ . The field was ploughed well and fertilizers were applied as per recommendations. Weeding was done regularly and irrigation was given as and when necessary.

The insecticides tested includes imidacloprid 17.8

SL @ (5 ml/kg of seeds), imidacloprid 17.8 % SL (0.5ml/l), acetamiprid 20 % SP (0.3 g/l), thiacloprid 21.7 % SC (1 ml/l), thiamethoxam 25 WG (0.25g/l), lambda-cyhalothrin 2.5 % EC (1ml/l) and azadirachtin 0.03 % EC (3 ml/l). Untreated check was maintained.

The insecticides were applied at 45 and 60 days after sowing. Observation on disease incidence was recorded 7 days after each spraying. Yield of each treatment was recorded in grams, extrapolated and expressed as kg/ha.

Disease incidence (%) =  $\frac{\text{Total number of infected plants}}{\text{Total number of plants observed}} \times 100$ 

#### **Experimental Details**

The experiment was laid out in Randomized Block Design (RBD) which is depicted through figure and the details of the experiment is given below

*	0
Crop	Sesame
Experimental Design	Randomized Block
	Design (RBD)
No. of Replication	03
No. of treatment	08
Plot size	3x2.4
Spacing	30x10 cm

Table 1. Efficacy of different compatible insecticides for control of vector of Sesame phyllody.

Treatments	Concentrations	Method and Timing of application			
T1: Imidacloprid 17.8% SL	5 g/kg	Seed treatment at the time of Sowing			
T2: T1+ Imidacloprid 17.8 % SL	0.5 ml/l	Foliar spray at 45 and 60 DAS			
T3: T1+ Acetamiprid 20 % SP	0.3 g/l	Foliar spray at 45 and 60 DAS			
T4: T1+Thiacloprid 21.7 % SC	1 ml/l	Foliar spray at 45 and 60 DAS			
T5: T1+ Thiamethoxam 25 WG	0.25 g/l	Foliar spray at 45 and 60 DAS			
T6: T1+ Lambda cyhalothrin 2.5 %EC	1 ml/l	Foliar spray at 45 and 60 DAS			
T7: T1+ Azadirachtin 0.03 % EC(300 ppm)	3 ml/l	Foliar spray at 45 and 60 DAS			
T8: control	-	-			

**Table 2.** Effect of compatible insecticides for the management of sesame phyllody

Treatment	Disease incidence (%)	Seed yield (q/ha)	Total Expenditure (Rs.)	Net return (Rs)	B:C
T1: Imidacloprid 70 WS seed treatment @ 5 g/kg	11.15	3.93	12970	34190	3.63
T2: T1+ imidacloprid 17.8 % SL @ 0.5 ml/l spray	7.91	5.09	14370	46710	4.25
T3: T1+ acetamiprid 20 % SP @ 0.3 g/l spray	7.05	5.21	14220	48300	4.39
T4: T1+ thiacloprid 21.7 % SC @ 1 ml/l spray	8.89	4.48	14630	39130	3.67
T5: T1+ thiamethoxam 25 WG @ 0.3 g/l spray	8.74	4.36	15670	36630	3.33
T6: T1+ lambda-cyhalothrin 2.5 % EC @ 1 ml/l spray	9.60	4.83	14665	43295	3.95
T7: T1+ azadirachtin 300 ppm @ 3 ml/l spray	11.43	3.92	15070	32870	3.18
T8: Untreated check	14.94	3.04	12930	23550	2.82
SEm+-	0.36				
CD	1.23				

2060

# Results

All the treatments were superior over the control. The effect of different treatments on per cent disease incidence and yield was recorded. The results obtained revealed that all the treatments reduced the disease significantly compared to unsprayed control. T<sub>2</sub> (seed treatment with imidacloprid 17.8 SL @ 5 ml/kg + spray of acetamiprid 20 % SP @ 0.3 g/lrecorded the least disease incidence (7.05 %) and highest seed yield of 5.21 q/ha and while  $T_{\tau}$  (seed treatment with imidacloprid 17.8 SL @ 5 ml/kg + spray of azadirachtin 0.03% @ 3ml/l) was least effective in which disease incidence of 11.43 per cent was recorded. The disease incidence in T<sub>o</sub> (untreated check) was 14.94 per cent and lowest seed yield of 3.04 g/ha was recorded. The results on benefit cost ratio revealed that highest benefit cost ratio was recorded in treatment  $T_3$  (4.39). The lowest BC ratio of 2.82 was recorded in treatment  $T_8$  (Untreated check). Net income and BC ratio was high in treatment T<sub>2</sub> (T<sub>1</sub>+ acetamiprid 20 % SP @ 0.3 g/l) 48300 and 4.39 respectively and Lowest net income and BC ratio



**Fig. 1.** Effect of different insecticides treatments on disease incidence (%)



Fig. 2. Effect of different insecticides treatments on seed yield (q/ha)



**Experiment field layout** 

was recorded in  $\mathrm{T_8}$  (Untreated check) 23550 and 2.82 respectively

# Conclusion

Sesame (*Sesamum indicum* L.) is one of the important oilseed crops grown throughout the country. Sesamum phyllody disease is one of the most serious constraints among the diseases and limiting factor in sesamum cultivation in many parts of the country. The present investigation was carried out on different aspects of sesamum phyllody disease *viz.*, distribution of Sesamum phyllody, symptomatology, transmission of phyllody, different host range, and management of sesame phyllody.

Seed treatment with imidacloprid 17.8 SL @ 5 ml/kg + spray of acetamiprid 20 % SP @ 0.3 g/l recorded the least disease incidence (7.05 per cent) and maximum seed yield (5.21 q/ha). The results on benefit cost ratio revealed that highest benefit cost ratio was recorded in treatment  $T_3$  (4.39). All the treatments are superior over the control.

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# SINGH ET AL

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