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Original Research Article

Efficacy of Chemicals and Neem based Insecticides against *Sesamum phyllody*

Anjana Arun[1*], C.S. Choudhary[2] and S.M. Prasad[3]

[1]Department of Plant Pathology, VKS College of Agriculture, Dumraon, Buxar, Bihar, India (under BAU, Sabour, Bhagalpur)
[2]Department of Plant Pathology, Tirhut College of Agriculture, Dholi, Muzaffarpur (Dr. Rajendra Prasad Central Agricultural University, Pusa, Samastipur, Bihar, India)
[3]Research and Innovation, Jharkhand Rai University, Ranchi, India
**Corresponding author*

Keywords

Sesamum indicum, Sesamum phyllody, Management

A B S T R A C T

Out of nine different treatments, spraying of Endosulfan 35EC (30 DAS) + neem oil (45 DAS) recorded the lowest incidence of phyllody (5.06% and 6.63%) which was followed by spraying of neem oil on 30 DAS + Endosulfan on 45 DAS (6.63% and7.55%). Control plot with water sprays recorded highest incidence of phyllody (21.70% and 23.60%) during *Kharif*, 2002-03 and 2003-04 crop seasons, respectively. Accordingly, highest seed yield of 626.0 kg/ha and 599.0 kg/ha was recorded with sprays of Endosulfan 35 EC on 30 DAS + Neem oil on 45 DAS, respectively. Considering cost: benefit ratio, sprays of Endosulfan 35EC on 30 DAS + neem oil on 45 DAS was found to be better 1: 3.23 and 1:3.21 during mentioned crop seasons.

Introduction

Sesame (*Sesamum indicum* L.) is an important edible *Kharif* oilseed crop grown in hotter and drier areas. In recent years, regular occurrence of Phyllody has been recorded from districts of Jharkhand State. Now it is becoming a serious phytoplasmal disease of sesame. The disease is transmitted in nature by the leaf hopper vector, *Orosius albicintus* Distant (Vasudeva and Sahambi, 1955; Prasad and Sahambi, 1982; Choudhary and Prasad, 2006). The incidence of *Sesamum phyllody* ranged from 13.00 to 21.70 per cent and 14.80 to 23.60 per cent during *Kharif,* 2002-03 and 2003-04 crop seasons, respectively, at different locations in different districts of Jharkhand state.

Keeping in view seriousness of the diseases causing considerable losses in yields of sesame, the trials were therefore conducted to know the efficacy of chemicals/neem based insecticides alone and in possible combinations (integrations) against the disease and results have been reported in this paper.

Materials and Methods

Field trials were conducted at the Experimental Farm of Birsa Agricultural University, Ranchi, during *Kharif,* 2002-2003 and 2003-2004 seasons for evaluation of chemicals/neem based insecticides alone and in possible combinations (integrations) against the phytoplasmal disease. Nine

different treatments of insecticides, neem based insecticides and their possible combinations (integrations) including control were evaluated as foliar sprays against the phytoplasmal disease (phyllody). Trials were conducted in Randomized Block Design with three replications, plot sizes of 3 m x 2 m, spacing of 60 cm x 15 cm and variety, Kanke Safed. Sowings were done on 25th of June 2002 and 2003 years.

The details of the treatment were as follows:

T_1 -Neem oil (1%) on 30 DAS
T_2 -Neem oil (1%) on 45 DAS
T_3 -Neem oil (1%) on 3 and 45 DAS
T_4 -Endosulfan (35 EC) 1.5 lit/ha on 30 DAS
T_5 -Endosulfan (35EC) 1.5 Lit/ha on 45 DAS
T_6 -Endosulfan (35EC) 1.5 lit/ha on 30 and 45 DAS
T_7 -Neem oil (1%) on 30 DAS and Endosulfan (35EC) 1.5 lit/ha on 45 DAS
T_8 -Endosulfan (35EC) 1.5 lit/ha on 30 DAS and Neem oil (1%) on 45 DAS
T_9 - Control (water sprays)

Phyllody incidence was recorded at 60 DAS. Disease incidence was recorded in percentage by using the formula:

$$\text{Incidence percentage} = \frac{\text{No. of disease affected plants}}{\text{Total no. of plants observed}} \times 100$$

Data were analysed statistically following the method of Gomez and Gomez (1984). Seed yield was recorded separately for each replication. Per rupee return for each treatment was worked out separately

Results and Discussion

This experiment was conducted to find out the suitable chemicals/neem based insecticides or their possible combinations for the management of phyllody disease of sesame. The trial was laid out in RBD with nine treatments and three replications. The incidence of phyllody was recorded 60 DAS. The data presented in Table 1 revealed that single sprayings each of Endosulfan 35EC on 30 DAS+ neem oil on 45 DAS recorded the lowest incidence of phyllody (5.06%) which was followed by spraying of neem oil on 30 DAS + Endosulfan on 45 DAS (6.63%) and two sprays of Endosulfan 35EC on 30 and 45 DAS (7.38%). Control plot with water sprays recorded highest incidence of phyllody (21.70%). Accordingly, highest seed yield of 626.0 kg/ha was recorded with sprays of Endosulfan 35 EC on 30 DAS + Neem oil on 45 DAS. This treatment was followed by sprays of neem oil on 30 DAS + Endosulfan on 45 DAS (591.0 kg/ha) and two sprays of Endosulfan on 30 and 45 DAS (570.0 kg/ha). Considering cost: benefit ratio, sprays of Endosulfan 35EC on 30 DAS + neem oil on 45 DAS was found to be better (1: 3.23) which was followed by single sprays of Endosulfan 35 EC on 30 DAS (1: 2.90) and sprays of neem oil on 30 DAS + Endosulfan 35EC on 45 DAS (1:2.58).

Similar results were obtained during *Kharif*, 2003-04. Single spraying of Endosulfan 35EC on 30 DAS + neem oil on 45 DAS recorded the lowest incidence of phyllody (6.63%) which was followed by spraying of neem oil on 30 DAS + Endosulfan on 45 DAS (7.55%) and two sprays of Endosulfan on 30 and 45 DAS (7.68%). The control plots registered the highest incidence of phyllody (23.60%). Similarly, highest seed yield of 599.0 kg/ha was recorded with sprays of Endosulfan on 30 DAS + Neem oil on 45 DAS. The above treatment was followed by sprays of neem oil on 30 DAS + Endosulfan on 45 DAS (591.0 kg/ha) and two sprays of Endosulfan on 30 and 45 DAS (581.0 kg/ha).

Table.1 Efficacy of chemicals and Neem based insecticides against *Sesamum phyllody* during the year, 2002-2003

Treatment	***Incidence (%)**	***Yield (Kg/ha)**	**Yield increased over control/ha**	**Value of additional yield (Rs/ha)**	**Cost of insecticidal sprays/ha (Rs)**	**Net Return (Rs/ha)**	**C:B ratio**
Neem oil (1%) on 30 DAS	9.10 (17.54)	490.0	93.0	1860.0	550.0	1310.0	1:2.38
Neem oil (1%) on 45 DAS	10.86 (19.25)	480.0	83.0	1660.0	550.0	1110.0	1:2.02
Neem oil (1%) on 30 and 45 DAS	7.61 (16.00)	552.0	155.0	3100.0	1100.0	2000.0	1:1.81
Endosulfan (35 EC) 1.5 lit/ha on 30 DAS	8.87 (17.32)	501.0	104.0	2080.0	532.5	1547.5	1:2.90
Endosulfan (35 EC) 1.5 lit/ha on 45 DAS	10.53 (18.91)	485.0	88.0	1760.0	532.5	1227.5	1:2.31
Endosulfan (35 EC) 1.5 lit/ha on 30 and 45 DAS	7.28 (15.68)	570.0	173.0	3460.0	1065.0	2395.0	1:2.25
Neem oil (1%) on 30 DAS and Endosulfan (35EC) 1.5 lit/ha on 45 DAS	6.63 (14.89)	591.0	194.0	3880.0	1082.5	2797.5	1:2.58
Endosulfan (35EC) 1.5 lit/ha on 30 DAS and Neem oil (1%) on 45 DAS	5.06 (13.05)	626.0	229.0	4580.0	1082.5	3497.5	1:3.23
Contorl (Water spray)	21.71 (27.75)	397.0	-	-	-	-	-
SEM±	0.34	2.63					
CD at 5%	0.91	7.27					

*Average of three replications.

Figures in parentheses are angular transformed values.

Cost of fungicides etc. (Rs. Kg^{-1}/ L^{-1}):

Neem oil- 40/-, Endosulfan- 255/-, Cost of application – Rs. 150/- per spray, Cost of sesame seed- Rs. 20/- per Kg.

Table.2 Efficacy of chemicals and Neem based insecticides against *Sesamum phyllody* during the year, 2003-2004

Treatment	*Incidence (%)	*Yield (Kg/ha)	Yield increased over control/ha	Value of additional yield (Rs/ha)	Cost of fungicidal sprays/ha (Rs)	Net Return (Rs/ha)	C:B ratio
Neem oil (1%) on 30 DAS	10.64 (19.00)	480.0	109.0	2180.0	550.0	1630.0	1:2.96
Neem oil (1%) on 45 DAS	12.90 (21.05)	451.0	80.0	1600.0	550.0	1050.0	1:1.90
Neem oil (1%) on 30 and 45 DAS	7.95 (16.29)	562.0	191.0	3820.0	1100.0	2720.0	1:2.47
Endosulfan (35 EC) 1.5 lit/ha on 30 DAS	9.58 (18.05)	481.0	110.0	2200.0	532.5	1667.5	1:3.13
Endosulfan (35 EC) 1.5 lit/ha on 45 DAS	12.02 (20.25)	460.0	89.0	1780.0	532.5	1247.5	1:2.34
Endosulfan (35 EC) 1.5 lit/ha on 30 and 45 DAS	7.68 (16.11)	581.0	210.0	4200.0	1065.0	3135.0	1:2.94
Neem oil (1%) on 30 DAS and Endosulfan (35EC) 1.5 lit/ha on 45 DAS	7.55 (16.00)	591.0	220.0	4400.0	1082.5	3317.5	1:3.06
Endosulfan (35EC) 1.5 lit/ha on 30 DAS and Neem oil (1%) on 45 DAS	6.63 (14.89)	599.0	228.0	4560.0	1082.5	3477.5	1:3.21
Contorl (Water spray)	23.60 (29.05)	371.0	-	-	-	-	-
SEM±	0.20	1.96					
CD at 5%	0.63	5.29					

*Average of three replications.

Figures in parentheses are angular transformed natures.

Considering cost: benefit ratio, sprays of Endosulfan on 30 DAS + neem oil on 45 DAS was found to be superior (1:3.21) which was followed by single spray of Endosulfan on 30 DAS (1: 3.13) and sprays of neem oil on 30 DAS + Endosulfan on 45 DAS (1: 3.06) (Table 2).

Singh and Singh (1997) sprayed seven plant products, twice during *Kharif*,1992-93 against *Antigastra catalaunalis* and phyllody in sesame (cv. JT–7) and concluded that neem oil (1%), neem seed kernel extract (2%) and neem leaf extract (2%) were the most effective plant extracts and resulted in high yields. However, maximum yield was recorded for 0.07% Endosulfan (372kg/ha) compared to 290 kg /ha for neem oil. The incidence of phyllody was statistically similar in all treatments. A trial was conducted with 9 treatments at Vridhachalam (Tamil Nadu) and results revealed that spraying of Endosulfan on 30 DAS and neem oil on 45 DAS recorded lowest incidence of phyllody followed by spraying of neem oil on 30 DAS and Endosulfan on 45 DAS (Anon, 2002). Saharan (1980) also reported that spraying of Dimethoate (0.05%) or Monocrotophos (0.05%) at 21 days after sowing minimized the insect vectors.

Hence concluded spraying of Endosulfan 35EC on 30 DAS + neem oil on 45 DAS recorded lowest phyllody disease incidence (5.06 and 6.63 per cent), highest seed yield (626kg and 599 kg/ha) and highest per rupee return (1:3.23 and 1:3.21).

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