

## Effectiveness of Some Botanicals and Quinalphos against Stem Fly and Girdle Beetle of Soybean

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### Abstract

*The present investigation was carried out during two Kharif seasons at farmers field near College of Agriculture, Kundeshwar Road, Tikamgarh (M.P.). The efficacy of six plant products with quinalphos were evaluated against stem fly and girdle beetle on JS 93-05 variety of soybean in randomized block design with three replications. The results revealed that Insecticide quinalphos 0.2% was more effective than botanicals but neem oil 2 per cent and NSKE 3% had the potential in reducing the population of stem fly and girdle beetle over the unsprayed control.*

**Key words:** Botanicals, quinalphos, stem fly, girdle beetle, soybean

### Introduction

The soybean is one of the oldest cultivated crops of the world. It is also known as “Golden bean”, “Miracle crop” and “Crop of the planet” etc., because of its several uses. It is one of the most important crops in the world, with great economic and social value due to the fact that it is a source of protein for feed at low cost and soybean oil is highly digestible and has almost no saturated fats. It is a unique crop with high nutritional value, providing 40 per cent protein and 20 per cent edible oil besides minerals and vitamins.

### Materials and Methods

#### Experimental site

The experiment was carried out during Kharif season of 2010 and 2012 at farmers field situated on Kundeshwar road, Tikamgarh (M.P.). The Tikamgarh District encompassing an area of 5048 Km Co-ordinates of 24°26' ; 25°40' North latitudes and 78°26' to 79°26'; East longitudes. It is nearly 1400 ft. from the sea level. It is situated in the northern part

The luxuriant crop growth, soft and succulent foliage attracts many insects and provides unlimited source of food, space and shelter. Soybean crop is reported to be attacked by about 350 species of insects in many parts of the world. Among the major insect pest of soybean stem fly and girdle beetle is becoming the most important production constraint and posing threat to soybean cultivation in Madhya Pradesh. To minimize such serious damage on soybean, a study was conducted for evaluating the effectiveness of six plant products with selected insecticides for their management.

of M.P. The soil is heavy black clay and light in texture. The field was ploughed and cross bakhared before sowing. Drainage channels were prepared at the time of sowing for drainage of excess rain water from the field. Fertilizer was applied at the time of sowing @ 20kg N: 60kg P<sub>2</sub>O<sub>5</sub>: 20kg K<sub>2</sub>O/ha as basal dose. The popular variety of soybean JS 93-05 was sown @ 80kg/ha in row by putting the

seeds in furrows with row to row distance of 40cm and 10cm between plants. A randomized block design experiment with eight treatments was laid out to compare the efficacy of six plant products with selected insecticide. Plot size was kept 5x2.80m spacing between plot to plot was 70 cm and from one replication to other kept 1m. Six plant products and one insecticide was tested in the field against the stem fly and girdle beetle. The treatments were Neem oil 2%; Neem seed kernel extract - 3%; Neem seed kernel extract - 5% ; Tobacco decoxtant-3%; Garlic + red pepper extract- 1%; Achook

**Results and Discussion**

**Effects of plant products on stem fly infestation:**

The stem fly infestation initiated in the first week of August and continued up to these nascence of the crop. The stem tunneling by stem fly was calculated by recording total length of the plant and the length of the stem tunneled by stem fly. Thus the percentage of the stem length tunneled was worked out and presented in Table-1. The data exhibited in Table- 1 showed that the stem tunneling during 2010 ranged from 13.10 to 22.44 per cent and during 2012 from 10.13to 17.95 per cent. Pooled data showed that per cent stem tunneling caused by maggots of stem fly was significantly decreased in all the treatments as compared to untreated

(commercial neem products)- 0.4%; Quinalphos 25 EC- 0.2%; Untreated control (Water spray). To record the infestation of stem fly and tunnel length in stem caused by its maggots, 10 plants/plot from middle rows were uprooted at random and split open vertically. Plant height and tunnel length were measured for calculating per cent stem tunneling. One meter area at 10 places was marked and number of girdled plants by girdle beetles were recorded. Tunnel length and plant height were also recorded before harvest of the crop.

control, recording 11.62 to 16.63 per cent stem tunneling in the treated plots as against 20.20 per cent in untreated control. Significantly less stem tunneling (11.62%) was observed in quinalphos than other treatments, however, neem oil 2%, neem seed kernel extract 5%, neem seed kernel extract 3% were equally effective in reducing the tunnel length and were *at par* with each other<sup>[1,3]</sup>.

Insecticidal spray of endosulfan, 0.07% was found most effective treatment in reducing stem tunneling by *Melanogromysojae* (37.67%) followed by the spraying of 2 % neem seed oil (46.60%) and 1 % neem seed oil (50.50%) on soybean crop. The present finding is in close accordance with these findings<sup>[5]</sup>.

**Table 1 :Effect of different plant products and quinalphos on stem tunneling by stem fly**

Treatments	Per cent stem tunneling		
	2010	2012	Pooled
Neem oil 2%	15.77	12.30	14.04
Neem seed kernel extract 3%	16.77	12.75	14.76
Neem seed kernel extract 5%	16.22	12.62	14.42
Tobacco decoxtant-3%	18.79	14.47	16.63
Garlic + red pepper extract- 1%	18.43	14.30	16.37
Achook/ commercial neem products 0.4%	17.46	13.48	15.47
Quinalphos 0.2%	13.10	10.13	11.62
Untreated control	22.44	17.95	20.20
SEm±	0.54	0.50	0.34
CD at 5%	1.59	1.47	1.00

**Effect of plant products on girdle beetle plant infestation**

The girdle beetle is one of the major pest causing heavy economic losses to the soybean crop. The data given in Table- 2 showed that the plant infestation during 2010 ranged from 6.76 to 10.60 per cent and during 2012 it was ranged from 6.03 to 9.17 per cent. All the treatments proved to be significantly superior in having lesser infestation of girdle beetle in soybean crop compared to control plots. Pooled data showed that application of quinalphos 0.2% had the lowest infestation of girdle beetle (6.40 %). It was followed by the application of

neem oil 2% (6.99 %), neem seed kernel extract 5% (7.43 %), both the treatments were *at par* with the quinalphos, whereas, the maximum infestation of girdle beetle was recorded in untreated control (9.88 %).

The neem oil (2.00, 3.00 and 4.00%), and neem seed kernel extract (4.00, 5.00 and 6.00%) with monocrotophos (0.03, 0.04 and 0.05%), monocrotophos were reported best treatment followed by neem oil (56.32 to 60.58) and lowest in NSKE (55.22 to 61.48%)<sup>[2]</sup>. Quinalphos was found more effective for the management of Girdle beetle<sup>[7]</sup>.

**Table 2: Effect of different plant products and quinalphos on plant infestation by girdle beetle**

Treatments	Per cent plant infestation		
	2010	2012	Pooled
Neem oil 2%	7.20	6.77	6.99
Neem seed kernel extract 3%	8.33	7.15	7.74
Neem seed kernel extract 5%	7.89	6.96	7.43
Tobacco decoxtant-3%	8.99	8.30	8.65
Garlic + red pepper extract- 1%	8.60	7.64	8.12
Achook/ commercial neem products 0.4%	8.51	7.48	8.00
Quinalphos 0.2%	6.76	6.03	6.40
Untreated control	10.60	9.17	9.88
SEm±	0.56	0.42	0.42
CD at 5%	1.65	1.24	1.23

**Effect of various treatments on the girdle beetle stem tunneling (%)**

It was revealed from the Table-3 that the damage caused by the girdle beetle in soybean was influenced significantly by the application of botanicals. The data exhibited in Table- 3 showed that the stem tunneling during 2010 ranged from 24.53 to 35.13 per cent and during 2012 from 22.08 to 28.32 per cent. All the treated plots proved to be significantly superior in having lesser stem tunneling compared to control plots. The application of quinalphos 0.2% recorded the lowest stem

tunneling caused by girdle beetle (23.31%), followed by the application of neem oil 2%, neem seed kernel extract 5%, neem seed kernel extract 3% were *at par* with each other and more effective than achook 0.4%, Garlic + red pepper extract-1% and Tobacco decoxtant-3%<sup>[4,6]</sup>. The later treatments were *at par* with each other, whereas, the maximum damage caused by girdle beetle was recorded in the untreated control (31.73 %).

**Table 3 : Effect of different plant products and quinalphos on stem tunneling by girdle beetle**

Treatments	Per cent stem tunneling		
	2010	2012	Pooled
Neem oil 2%	25.76	22.39	24.08
Neem seed kernel extract 3%	27.05	22.86	24.96
Neem seed kernel extract 5%	26.60	22.66	24.63
Tobacco decoxtant-3%	30.07	24.19	27.13
Garlic + red pepper extract- 1%	28.66	24.13	26.40
Achook/ commercial neem products 0.4%	27.62	23.43	25.53
Quinalphos 0.2%	24.53	22.08	23.31
Untreated control	35.13	28.32	31.73
SEm±	0.65	0.70	0.63
CD at 5%	1.92	2.06	1.87

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