



E-ISSN: 2320-7078

P-ISSN: 2349-6800

JEZS 2019; 7(6): 292-295

© 2019 JEZS

Received: 01-09-2019

Accepted: 05-10-2019

**Vinay Pradhan**

Department of Entomology  
IGKV, RMD College of  
Agriculture and Research  
Station, Ambikapur,  
Chhattisgarh, India

**GP Painkra**

Department of Entomology  
IGKV, RMD College of  
Agriculture and Research  
Station, Ambikapur,  
Chhattisgarh, India

**VK Sandilya**

Department of Entomology  
IGKV, RMD College of  
Agriculture and Research  
Station, Ambikapur,  
Chhattisgarh, India

**JK Sahu**

Department of Entomology  
IGKV, RMD College of  
Agriculture and Research  
Station, Ambikapur,  
Chhattisgarh, India

**Corresponding Author:****GP Painkra**

Department of Entomology  
IGKV, RMD College of  
Agriculture and Research  
Station, Ambikapur,  
Chhattisgarh, India

## Efficacy of Neem based plant products against linseed bud fly (*Dasyneura lini* Barnes)

**Vinay Pradhan, GP Painkra, VK Sandilya and JK Sahu**

### Abstract

The studies on Efficacy of Neem based plant products against linseed bud fly (*Dasyneura lini* Barnes) were conducted at Rajmohini Devi Collage of Agriculture and Research station, Ambikapur during Rabi seasons of 2017-18. Efficacy of some Neem based plant products viz., Neem leaf extract, Neem seed kernel extract, Neem seed extract and Nimazaal at different concentrations was determined against linseed bud fly (*D. lini* Barnes). The efficacy of different neem based formulation were tested against *D. lini* Barnes on linseed crop during 2017-18. viz. NSKE @ (5%), NSKE @ (3%), Nimazal @ (5%), NSE @ (5%), NSE @ (3%), NLE @ (5%), NLE @ (3%) and untreated control. Bud fly infestation ranged from 18.37 to 27.61 per cent in different neem based formulations. NSKE 5 per cent with bud infestation of 18.37 per cent was most effective against linseed bud fly. It was at par with Nimazal 5 per cent and NSKE 3 per cent having bud damage of 19.07 and 20.12 per cent, respectively, but differed significantly from Neem seed extract 5 and 3 per cent, and Neem leaf extract 5 and 3 per cent with 20.80, 22.41, 23.24, and 27.61 per cent bud infestation, respectively. Neem leaf extract 3 per cent with significantly highest bud damage of 27.61 per cent was least effective against bud fly among neem based formulations as against 33.07 per cent bud damage in untreated control.

**Keywords:** Linseed, neem and bud fly

### Introduction

Linseed (*Linum usitatissimum* L.) is an important oilseed crop belongs to the genus *Linum* of the family Linaceae. Linseed is an important industrial and fibre producing crop. It is grown either for oil extracted from seed or for fibre from stem. Seed contain oil ranging from 37 to 43 per cent. Its seed is rich in oil (41%), protein (20%), dietary fibre (28%), contains 7.7 per cent moisture and 3.3 per cent ashes. It has a high percentage of essential fatty acids, 75 per cent polyunsaturated fatty acids, 57 per cent alphanoleic acid, which is an omega-3 fatty acid and 16 per cent linoleic acid, which is an omega-6 fatty acid. Around the globe, linseed crop occupies an area of 22.70 lakh ha yielding out 22.39 lakh ton having an average productivity of 986 kg per ha. In India, it is grown in an area of 29210 ha with production and productivity being 141200 ton and 484 kg per ha, respectively.

India ranks second in terms of area after Canada which is almost equivalent to China which so far occupied the second slot in world area by the crop. India contributes about 14.89 per cent and 6.56 per cent to world area and production, respectively. Chhattisgarh is one of the important linseed growing state of India, which contribute about 19.05 % area and 16.21% production of the country. In Chhattisgarh, linseed is cultivated over 86 thousand hectare area with a production of 24.2 thousand tones and productivity of 281 kg/ha. It is a major crop grown as "Utera" during Rabi season. The important linseed growing districts of Chhattisgarh are Rajnandgaon, Durg, Bilaspur, Kabirdham, Raipur, Dhamtari, Surguja, Kanker and Raigarh. In Surguja district, linseed is cultivated over 3.016 thousand hectare area with a production of 1.508 thousand tones and productivity of 500 kg/ha.

Linseed crop is attacked by several insect pests like linseed bud fly, (*Dasyneura lini* Barnes), semilooper (*Plusia orichalsia* Fab.), thrips (*Caliothrips indicus* Bagnall) and linseed caterpillar (*Spodoptera exigua* Hub.). among them linseed bud fly, (*Dasyneura lini* Barnes) is a major pest and loss upto 88 % grain yield (Mukherji *et al.*, 1999) [6].

### Materials and Methods

The experiment was carried out during rabi season 2017-2018 at R.M.D. CARS Ambikapur, (C.G.). The variety Indira Alsi-32 was sown in second week of November in 2017-18 with

plot size 5 x 4 m<sup>2</sup> with spacing of 30x10 cm and replicated 3 times. The recommended agronomic practices without any plant protection measure were followed.

The prepared neem based formulation was first diluted to the desired concentration by using water. Each formulation was sprayed through knapsack sprayer after proper dilution of required water quantity. The treatments were applied twice first at bud initiation stage and second after 15 days of first spray. Observation of bud fly was recorded one day before spray and after 5, 7 and 10 days of each spray. Bud infestation per cent was recorded on 10 plants selected at random from each plot. Net plot yield was recorded at harvest which was converted to kg per hectare. The data on bud fly infestation and yield was subjected to statistical analysis for critical differences. Economics of different treatments were also worked out. The quality parameters viz., germination percentage, oil contain, No. of branches/plant, No. seed/capsule, No. of buds/plant was work out after harvesting the crop.

**Table 1:** There were eight treatments

Treatment	Treatment details
T <sub>1</sub>	Neem Leaf Extract (NLE) 3%
T <sub>2</sub>	Neem Leaf Extract (NLE) 5%
T <sub>3</sub>	Neem Seed Kernel Extract (NSKE) 3%
T <sub>4</sub>	Neem Seed Kernel Extract (NSKE) 5%
T <sub>5</sub>	Neem Seed Extract (NSE) 3%
T <sub>6</sub>	Neem Seed Extract (NSE) 5%
T <sub>7</sub>	Nimazal 5%
T <sub>8</sub>	Control (untreated)

## Preparation of formulations

### 1. Neem leaf extract

For preparation of 3 % neem leaf formulation in 1 liter water, first of all we take 30 g neem leaf. Then they were ground and the extract was filtered and the volume made up to 1 liters. Emulsifier was also added. By using this method the formulation of Neem leaf extract 5% was also prepared.

### 2. Neem seed kernel extract

The seeds that were used for the preparation of neem kernel extract should be between three and eight months old. Otherwise, the quantity of azadirachtin in the seeds is quite

low and hence they cannot be efficiently used for pest control. For the preparation of formulation of 5% NSKE in 1 litre water, 50 g crushed neem kernel powder was soaked overnight in 500 ml water. The extract was filtered and volume was made up to 1 litre as usual. To the filtrate, an emulsifier like khadi soap solution (a soap with no detergent) is added. One millilitre of emulsifier is added to 1 litre of water. The emulsifier helps the extract to stick well to the leaf surface. By using same procedure 3 % of neem seeds, kernel extract was also prepared.

### 3. Neem seed extract

For the preparation of neem leaf extract, first of all, collect the neem seeds and clean it with water. Then grind them carefully and for 3 % formulation in 1 litre water, we take 30 g of neem seeds powder. Then after the whole Neem seeds were soaked in 500 ml water before 72 hours of applying. It was then filtered and an emulsifier was added at the rate of 1 millilitre for 1 litre of water. By using this method the formulation of Neem seed extract 5% was also prepared.

## Results & Discussions

Different formulations of Neem based insecticides were evaluated under field condition during 2017-18 against linseed bud fly so that their use may be enhanced in IPM models as these are eco-friendly and comparatively safer to the natural enemies (Table 2, 3).

### 1. Effect on bud fly infestation

Bud fly infestation ranged from 15.33 to 25.61 per cent in different neem based formulations as against 31.38 per cent bud damage in untreated control. NSKE 5 per cent with bud infestation of 15.33 per cent was most effective against linseed bud fly. It was at par with Nimazal 5 per cent and NSKE 3 per cent having bud damage of 15.91 and 16.29 per cent, respectively, but differed significantly from Neem seed extract 5 and 3 per cent, and Neem leaf extract 5 and 3 per cent with 18.84, 19.28, 22.21, and 25.61 per cent bud infestation, respectively. Neem leaf extract 3 per cent with significantly highest bud damage of 25.61 per cent was least effective against bud fly among neem based formulations as against 31.38 per cent bud damage in untreated control.

**Table 2 and 3:** Evaluation of neem based insecticides against linseed bud fly on linseed crop during, Rabi 2017-18

Treatments	Mean infestation % after first spray				
	One day before spray	5 DAS	7 DAS	10 DAS	Mean
Neem Leaf Extract (NLE) 3%	10.69(19.07)	13.70(21.71)	14.88(22.68)	16.71(24.11)	17.6524.28
Neem Leaf Extract (NLE) 5%	9.94(18.34)	12.44(20.63)	13.38(21.42)	14.83(22.63)	14.8722.66
Neem Seed Kernel Extract (NSKE) 3%	8.78(17.21)	10.28(18.68)	10.88(19.24)	11.77(20.05)	12.1320.36
Neem Seed Kernel Extract (NSKE) 5%	8.88(17.32)	10.19(18.59)	10.04(18.46)	11.52(19.82)	11.5019.80
Neem Seed Extract (NSE) 3%	9.26(17.70)	11.26(19.59)	12.07(20.31)	13.28(21.35)	13.9521.91
Neem Seed Extract (NSE) 5%	10.13(18.54)	11.91(20.17)	12.59(20.76)	13.61(21.63)	12.9821.10
Nimazal 5%	8.70(17.14)	10.15(18.54)	10.76(19.10)	11.64(19.93)	12.8620.98
Control (untreated)	10.12(18.54)	14.72(22.53)	16.10(23.63)	18.76(25.64)	19.7726.38
Sem±	0.412	0.448	0.625	0.398	0.450
CD	1.262	1.372	1.941	1.21	1.378

\* Figure in parenthesis are Arcsine transformed values

DAS= Days after spray

Treatments	Mean infestation % after second spray				
	One day before spray	5 DAS	7 DAS	10 DAS	Mean
Neem Leaf Extract (NLE) 3%	19.79(26.39)	22.66(28.40)	23.74(29.14)	25.61(30.38)	25.89(30.57)
Neem Leaf Extract (NLE) 5%	17.48(24.69)	19.97(26.52)	21.09(27.31)	22.21(28.10)	21.46(27.58)
Neem Seed Kernel Extract (NSKE) 3%	13.29(21.36)	14.76(22.57)	15.39(23.08)	16.29(23.78)	18.91(25.75)
Neem Seed Kernel Extract (NSKE) 5%	12.73(20.88)	14.06(22.57)	14.70(22.52)	15.33(23.03)	18.05(25.1)
Neem Seed Extract (NSE) 3%	15.24(22.96)	17.27(24.53)	18.04(25.12)	19.28(26.07)	21.89(27.87)

Neem Seed Extract (NSE) 5%	15.40(23.08)	17.11(24.42)	17.82(24.95)	18.84(25.70)	19.35(26.08)
Nimazal 5%	13.05(21.15)	14.08(22.02)	15.04(22.80)	15.91(23.47)	17.81(24.93)
Control (untreated)	23.77(29.16)	26.07(30.68)	28.06(31.97)	31.38(34.05)	30.76(33.67)
Sem±	0.537	0.558	0.425	0.513	0.454
CD	1.644	1.71	1.301	1.57	1.392

Figure is parenthesis are Arcsine transformed values  
DAS= Days after spray

## 2. Effect on no. of branches/plant

No. of branches per plant of linseed differed significantly due to spray of neem based formulations. Significantly higher branches per plant was recorded with NSKE 5 per cent, (29.21 branches / plant) compared to Nimazal 5 per cent (28.04 branches / plant), NSE 5 per cent (24.89 branches / plant), NSE 3 per cent (22.79 branches / plant), NLE 5 per cent (21.49 branches / plant), NLE 3 per cent (19.86 branches / plant) and control untreated (15.55 branches / plant) (Table 4).

## 3. Effect on no. of capsule/plant

Effect of neem based formulations on number of capsule per plant was recorded after harvest and the no. of capsule per plant ranged from 73.80 to 54.10 per cent in different neem based formulations as against 41.87 per cent capsule per plant in untreated control (Table 4).

## 4. Effect on no. of seeds/capsule

The data on number of seeds per capsule as influenced by different neem based formulations are given in Table 4. The number of seeds per capsule was significantly influenced by different neem based formulations. Number of seeds per capsule was recorded significantly higher in NSKE 5 per cent and lowest in neem leaf extract 3 percent with 9.17 and 7.70 seeds per capsule as compared to other neem based formulations as against 6.80 seeds per capsule in untreated control (Table 4).

## 5. Effect on grain yield

The data on grain yield indicated that NSKE when applied at

a concentration of 5 per cent was most effective against bud fly with highest grain yield of (1237.837kg/ha). It was significantly followed by Nimazal 5 per cent 1214.77kg/ha), NSKE 3 per cent with grain yield of (1188.71 kg/ha). The latter was at par with Neem seed extract 5 per cent (1180.71 kg/ha), Neem leaf extract 5 per cent (1091.185 kg/ha) and Neem seed extract 2 per cent (1065.898 kg/ha). Neem leaf extract 3 per cent with (1076.28 kg/ha) grain yield was least effective against bud fly and was at par with untreated control with (966.563 kg/ha) grain yield (Table 4).

## 6. Effect of neem based formulations on germination % of linseed

The germination % was recorded in each plot separately at harvest and the data was computed for critical differences. Germination % decreased with increase in bud damage by bud fly during 2017-18. Significantly maximum germination of linseed 78.83 % was obtained from NSKE 5% and minimum germination 77.73 % was found in NLE 3% against all neem based formulations and lowest germination 77.01 % of from untreated crop.

## 7. BC ratio of linseed crop using neem based formulations

NSKE 5 per cent with cost benefit ratio of 1:9.30 was most economical against bud fly. It was followed by Nimazal 5 per cent, NSKE 3 per cent, Neem seed extract 5 per cent, Neem seed extract 3 per cent and Neem leaf extract 5 per cent, with 1:10.41, 1:7.76, 1:7.15, 1:6.48 and 1:6.52 cost benefit ratio. Neem leaf extract 3 per cent with cost benefit ratio of 1:3.34 was least economical against bud fly (Table 5).

**Table 4:** Effect of different neem based formulations on quality parameters of linseed variety Indira alsii-32

Treatments	No. of branches / plant	No. of capsules/ plant	No. of seeds/ capsule	Seed yield kg /hectare	Germination %
Neem Leaf Extract (NLE) 3%	19.86	54.10	7.27	1076.28	77.73
Neem Leaf Extract (NLE) 5%	21.49	57.46	7.70	1164.07	77.92
Neem Seed Kernel Extract (NSKE) 3%	26.53	69.57	8.98	1188.71	78.43
Neem Seed Kernel Extract (NSKE) 5%	29.21	75.90	9.47	1237.837	78.83
Neem Seed Extract (NSE) 3%	22.79	62.73	8.17	1155.497	78.02
Neem Seed Extract (NSE) 5%	24.89	66.83	8.63	1180.71	78.24
Nimazal 5%	28.04	73.87	9.17	1214.77	78.69
Control (untreated)	15.55	41.87	6.80	966.563	77.01
S.Em±	0.892	1.5242	0.1460	17.01338	0.497
CD	2.707	4.668	0.448	51.60988	N/A

\* Significant at 5% level of significance

\*\* Highly Significant at 1% level of significance

**Table 5:** Benefit cost ratio of linseed crop using different neem based formulations during rabi, 2017-18

Tretments	Average Yield (Kg/ha)	Increased yield over control (Kg/ha)	Profit over control (Rs/ha)	Amount of insecticide (kg/ha)	Cost of insecticide (Rs/ha)	Cost of labour/ spray (Rs/ha)	Total cost of spray (Rs/ha)	Net return over control (Rs/ha)	B:C Ratio
Neem leaf extract (NLE) 3%	1076.28	109.71	4388.4	9	135	400	670	3718.4	1:5.54
Neem leaf extract (NLE) 5%	1164.07	197.50	7900	15	225	400	850	7060.50	1:8.30
Neem seed kernel extract (NSKE) 3%	1188.71	222.15	8857.2	9	162	400	724	8133.2	1:9.23
Neem seed kernel extract (NSKE) 5%	1237.837	270.43	10817.2	15	270	400	940	9877.2	1:10.50
Neem seed extract (NSE) 3%	1155.497	188.92	7556.8	9	225	400	900	6656.8	1:7.39
Neem seed extract (NSE) 5%	1180.71	214.14	8565.6	15	375	400	1150	7415.6	1:6.4

Nimazal 5%	1214.77	248.20	9928	15	2100	400	2200	9058	1:4.11
Control (untreated)	966.563								

Prasad and Prasad (2003)<sup>[7]</sup> who recorded the 6.48 per cent minimum bud damaged by linseed bud fly and 1.96 per cent damage by capsule borer and maximum seed yield of 1288.06 kg/ha and net monetary return of Rs 9467/ha at Ranchi when the crop was sprayed five times at ten days interval with NSKE 5 per cent. In the present studies, NSKE when applied twice at a concentration of 5 per cent was most effective against bud fly with lowest bud damage of 14.15 per cent and highest grain yield of 1309.325 kg/ha.

While testing the bioefficacy of different neem products against linseed bud fly at Faizabad, Ali (2002)<sup>[2]</sup> found that NSKE performed better than other botanical insecticides. On the other hand, Prasad (2003)<sup>[8]</sup> who recorded the lowest bud infestation of 14.6 per cent with Achook 1.0 per cent at Ranchi when sprayed twice at fifteen days interval starting with bud initiation stage. The next best treatment was NSKE 5 per cent. He further reported that neem based insecticides were significantly superior in reducing the incidence of *D. lini* and enhancing the seed yield.

Gupta and Rawat (2004)<sup>[3]</sup> who reported the reduction in the incidence of *D. lini* and increase in grain yield with increase in concentration of neem leaf extract, NSKE and neem oil. Similar trend was observed in different neem based formulations in the present studies. They further reported that admixture of neem oil 0.5% or NSKE 3% either with dimethoate or methyl demeton 0.023% further reduced the incidence and increased the yield.

While testing the neem products against *D. lini* at Tikamgarh (M.P.), Gupta *et. al.* (2000)<sup>[3]</sup> recorded that the highest grain yield and maximum net profit with neem oil 0.1% followed by neem oil 0.5%. Neem oil 0.5% was least effective against bud fly with 32.62 per cent highest bud damage and 968.56 kg / ha lowest grain yield.

Malik *et. al.* (1996)<sup>[5]</sup> tested the efficacy of ethyl alcohol extracts of various parts of seven plants against linseed bud fly at Kanpur observed sweet flag 1% to be most effective with significantly low bud damage (11.70%) and higher grain yield of 12.3 q/ha. and followed by neem oil 1% with 12.75% bud damage and 11.2 q/ha grain yield.

## References

1. Anonymous. Contingency plan for district Surguja (C.G.), 2013, p.1-33.
2. Ali S, Kumar R, Rizvi SMA. Bioefficacy of neem products against linseed bud fly (*Dasyneura lini* Barnes). Shaspa. 2002; 9(2):175-177.
3. Gupta MP, Rawat GS. Evaluation of neem products and their admixture with insecticides against bud fly incidence in linseed. Annals Plant Protection Science. 2004; 12(1):1-4.
4. Gupta MP, Chourasia SK, Rai HS. Efficacy of neem products against the bud fly (*Dasyneura lini* Barnes) on linseed. Indian Journal Agriculture. Science. 2000; 70(11):762-764.
5. Malik YP, Pandey ND, Singh B, Singh SV. Field evaluation of some plant extracts and insecticides against linseed bud fly, *Dasyneura lini* Barnes. Indian Journal of Entomology. 1996; 58(1):32-35.
6. Mukherji KG, Dubey OP, Upadhyaya R. Insect pests of linseed- IPM system in Agriculture: Oliseed crops. 1999; 5:250-263.
7. Prasad R. Field efficacy of neem based insecticides against major insect pests of linseed. Proceedings of the national symposium on frontier areas of Entomological Research. 2003; p.325.
8. Prasad R, Prasad D. Ecofriendly management of major insect pests of linseed. Proceedings of the national symposium on frontier areas of Entomological Research. 2003; p.326.