

RESEARCH ARTICLE :

Seasonal incidence of linseed bud fly, *Dasineura lini* Barnes in linseed ecosystem

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SUMMARY : The research trials were conducted at Agricultural Research Farm, Institute of Agricultural Sciences, Banaras Hindu University, Varanasi for two consecutive *Rabi* seasons of 2015-16 and 2016-17. To study the Seasonal incidence of linseed bud fly, *Dasineura lini* Barnes in Linseed ecosystem. The peak activity of linseed bud fly was observed during 12th and 10th standard meteorological week of year 2015-16 and 2016-17, respectively. During this period, minimum and maximum temperatures, Morning and evening relative humidity and sunshine hour were found favorable for maximum activity of the pest. Direct effect of maximum and minimum temperature and sunshine hour on its correlation with linseed bud fly, *D. lini* was very high and positive. Similarly, morning and evening relative humidity had negatively correlation with linseed bud fly.

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KEY WORDS :

Linseed bud fly,
Seasonal incidence,
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BACKGROUND AND OBJECTIVES

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 alpha-linoleic 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. The crop is grown in area of about 1 lakh ha in Uttar Pradesh, which occupied 12.2 per cent of the total area of the country. Annual production of this crop is 40

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lakh metric tonnes. The productivity of linseed in UP is 462 kg per ha against national productivity of 408Kg per ha. Linseed crop is attacked by a number of insect pests at various phases of its growth. Among which linseed bud fly, *Dasineura lini* Barnes causing 88 per cent grain yield losses and it is a key pest of linseed (Mukherji *et al.*, 1999). The intensity of infestation was initially one to two larvae per bud in last week of January. Maximum numbers of larvae (16-25 larvae/bud) were recorded during last week of February and middle of March (Singh *et al.*, 1998). Its peak bud infestation was maximum (11.82 and 10.22 %) during last week of February to mid-March (Malik *et al.*, 1998). The infested buds become hollow and unproductive. Studies on pest succession of any crop are essential as it provide information on the status of various insect pests and also helps in identifying the most critical stage of the crop. This information would help in developing an efficient management model for linseed bud fly, *Dasineura lini* Barnes attacking at various growth stages of the crop and the present study was therefore undertaken.

RESOURCES AND METHODS

The experiment was laid out in *Rabi* season at Agricultural Research Farm of Institute of Agricultural Sciences, Banaras Hindu University, Varanasi during 2015-16 and 2016-17. The variety Neelum was sown in last week of November during both year of experiment. With plot size 5 row x 3 meter length having spacing of 30x10 cm and replicated 3 times. The recommended

agronomic practices without any plant protection measure were followed. Incidence of linseed bud fly was observed at weekly interval on 5 randomly selected plants at each plot. The incidence of bud fly was estimated by making count on the basis of number of damaged bud per plants and total number of healthy buds (per cent bud infestation were estimated). Based on meteorological standard weekly record of weather parameters the population dynamics of bud fly was studied. At last the linseed bud fly population were averaged and subjected to simple correlation, taking population as dependent factor and temperature, humidity, rainfall and sunshine as independent factors.

OBSERVATIONS AND ANALYSIS

Seasonal incidence of linseed bud fly and the effect of various weather parameters on it were observed on cv. NEELUM during *Rabi* 2015-16 and 2016-17. The correlation co-efficient was calculated to study the correlation of linseed bud fly infestation with different weather factors. The summary of the observation of seasonal incidence of linseed bud fly, *D. lini* Barnes with respect to the standard meteorological week during *Rabi*, 2015-16 and 2016-17 is given in Table 1 and 2, respectively.

During *Rabi* 2015-16, Linseed bud fly was found mostly during bud initiation to harvesting stage of the crop by feeding inside the inert material. The incidence of *D. lini* was first recorded on the crop with the formation of buds during last week of January with 1.40

Table 1: Effect of weather parameters on the seasonal incidence of linseed bud fly on during *Rabi*, 2015-16

Standard week	Bud fly infestation (%)	Temp. (°C)		Rainfall (mm)	R.H. (%)		Wind speed (km/hr)	Sunshine hours	Evapo. (mm)
		Max.	Min.		Morning	Evening			
52	-	22.8	8	0.0	82	37	2.5	5.4	1.6
1	-	24.3	9.6	0.0	94	47	4.2	2.5	1.2
2	-	25	10.7	0.0	85	45	1.9	5.9	1.7
3	-	19	11	7.7	94	69	1.9	0.6	0.9
4	1.4	21.7	7.2	0.0	85	43	2.0	5.2	1.6
5	1.91	24.7	11.9	0.0	79	50	2.0	6.5	2.1
6	5.37	24.5	9.6	0.0	83	52	2.3	6.3	2.2
7	21.84	27.1	13.5	2.4	85	57	1.7	6.3	2.2
8	25.61	28.6	14.9	0.0	77	44	4.0	8.5	3.6
9	27.28	29.9	16.2	0.0	85	51	1.4	6.4	2.7
10	32.96	30.9	17.9	19.2	77	46	2.4	7.6	3.3
11	33.83	28.9	16.6	16.2	73	51	3.5	6.4	3.6
12	34.1	33.6	17.3	0.0	61	26	3.8	9.6	4.6

Table 2 : Effect of weather parameters on the seasonal incidence of linseed bud fly on linseed variety Neelum during Rabi, 2016-17

Standard week	Bud fly infestation (%)	Temperature (°C)		Rainfall (mm)	R.H. (%)		Wind speed (km/hr)	Sunshine hours	Evapo. (mm)
		Max.	Min.		Morning	Evening			
52	-	20.5	10.9	0.0	94	69	1.4	0.2	0.9
1	-	20.1	11.6	0.0	95	76	2.2	0.2	0.8
2	-	20.7	8.2	0.0	91	44	2	3.2	1.6
3	-	23	8.8	0.0	90	49	1.3	1.0	1.6
4	-	24.4	10.9	1.0	90	58	1.8	1.8	2.4
5	2.9	23.8	14.1	0.0	94	57	1.9	4.1	1.5
6	5.51	25.4	10.8	0.0	91	47	2.4	7.1	2.3
7	21.61	26.2	12.3	0.0	87	53	1.2	4.6	2.3
8	26.74	27.7	13	0.0	81	41	3.1	6.4	3.3
9	32.19	29.7	13.1	0.0	83	43	2.3	7.4	3.3
10	38.32	29.6	14.6	0.0	71	38	3.1	5.7	3.8
11	34.5	28.7	12.3	0.0	81	39	2.7	7.6	4.0
12	33.83	33.2	17.6	0.0	81	36	2.7	6.2	4.3

Table 3 : Correlation co-efficients (r) of weather parameter with bud fly infestation

Insect pest	Year	Temperature(°C)		Rainfall (mm)	R.H. (%)		Sunshine (hours)
		Max.	Min.		Morning	Evening	
Bud fly	2015-16	0.899**	0.934**	0.489	-0.691**	-0.240	0.678**
	2016-17	0.906**	0.700**	-0.280	-0.913**	-0.723**	0.782**

**Correlation is significant at 0.05 levels

per cent bud damage. It remained active throughout the cropping period on linseed. From first week of February, the activity of bud fly increased gradually with peak density at fourth week of March with 34.10 per cent bud damage which is given in Table 1. The statistically analyzed data revealed that *D. lini* incidence had higher significant positive correlation with maximum as well as minimum temperature with the r value of 0.899** and 0.934**, respectively. It had negative correlation with morning and evening Relative Humidity with r value -0.691** and -0.240, respectively which is given in Table 3. It had positive correlation with sunshine hour with r value 0.678*. During Rabi, 2016-17 the incidence of linseed bud fly was delayed by one week and was recorded on first week of February with 2.9 per cent bud damage. In this year, it does not remained active throughout the cropping period of linseed as its population density was seen to decrease from 11th to 12th standard week of March. The maximum damage was seen on 10th standard meteorological week with 38.32 per cent damage which is given in Table 2. Linseed bud fly incidence had a high significant positive correlation with maximum as well as minimum temperature with the r value of 0.906** and 0.700**. This result is found to be in close association

with result obtained by Singh *et al.* (2013) and Sahoo (2016). It also had negative correlation with morning and evening Relative Humidity with r value of 0.906** and 0.700**, respectively. This result is found to be in close association with result obtained by Mishra and Shamshad (2007) and Sahoo (2016). It had positive correlation with sunshine hour with r value 0.782**. These findings are also supported by Singh *et al.* (2013).

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