

## RESEARCH ARTICLE

# Effect of intercrops on infestation of bud fly and yield of linseed (*Linum usitatissimum* L.)

Biradar VK\*, Manapure PR, Nikam RR and Gohokar RT

All India Coordinated Research Project on Linseed, College of Agriculture, Nagpur (M.S.) 440001 India

\*Corresponding author Email: vkbiradar@gmail.com

Manuscript details:	ABSTRACT
<p>Available online on <a href="http://www.ijlsci.in">http://www.ijlsci.in</a></p> <p>ISSN: 2320-964X (Online) ISSN: 2320-7817 (Print)</p> <p><b>Editor: Dr. Chavhan Arvind</b></p> <p><b>Cite this article as:</b> Biradar VK, Manapure PR, Nikam RR and Gohokar RT (2016) Effect of intercrops on infestation of bud fly and yield of linseed (<i>Linum usitatissimum</i> L.), Int. J. of Life Sciences, A6:40-42.</p> <p><b>Acknowledgements</b> The authors are grateful to the Project Coordinating Unit (Linseed) C.S.A.U.A. &amp; T. Campus, Kanpur (U.P.) and Dr. Panjabrao Deshmukh Krishi Vidyapeeth, Akola (M.S.) for providing necessary facilities.</p> <p><b>Copyright:</b> © Author, This is an open access article under the terms of the Creative Commons Attribution-Non-Commercial - No Derives License, which permits use and distribution in any medium, provided the original work is properly cited, the use is non-commercial and no modifications or adaptations are made.</p>	<p>A field experiment was conducted for two consecutive years at Linseed Research Farm, College of Agriculture, Nagpur, Maharashtra (India) to study the effect of intercrops on infestation of bud fly and yield of linseed under rainfed condition during rabi season 2013-14 and 2014-15. The experiment was laid out in randomized block design with three replications. Pooled results revealed that among various intercrops, intercropping of linseed + chick pea in 4: 2 recorded significantly lower budfly fly infestation of 20.49% and higher linseed equivalent yield of 1114 kg ha<sup>-1</sup> followed by linseed + chick pea in 4: 1 recorded budfly fly infestation of 24.95% with linseed equivalent yield of 1089 kg ha<sup>-1</sup>.</p> <p><b>Key words:</b> <i>Dasyneura lini</i>, intercrop, linseed</p>
	<p><b>INTRODUCTION</b></p> <p>Linseed (<i>Linum usitatissimum</i> L.) is one of the important <i>rabi</i> oilseed crop of Vidarbha region of Maharashtra (India) which is used for various industrial purposes. The crop is grown under rainfed condition on minimum input costs. The crop is damaged by 28 pest species throughout its growth stage. Of these, the budfly, <i>Dasyneura lini</i> Barnes is the most destructive and specific pest of linseed. The maggots of bud fly feed upon the reproductive parts of the flower buds. The infested buds turn hollow due to crumpling of the corolla and their reproductive parts become emaciated at green bud stage. These buds remain unfertilized and no seed formation takes place. Yield losses in linseed due to bud fly have been estimated to the tune of 90% in Maharashtra (Malik and Srivastava, 2012). Therefore, management of bud fly with minimum cost is of prime importance. Generally, sole crop of linseed, gram, field pea and lentil are grown in this region. Suitable intercropping of these crops appears to be a choice to insure higher production and economic returns with lower infestation of the bud fly. Therefore, it is necessary to find out the suitable intercrop in linseed for achieving better economic return.</p> <p><b>MATERIALS AND METHODS</b></p> <p>The field experiment was carried out at Linseed Research Farm, College of Agriculture, Nagpur, Maharashtra (India) during <i>rabi</i> seasons of 2012-13 and</p>

2013-14 using Neelum cultivar of Linseed. The crop was sown in first week of December during each year and raised under recommended agronomic practices except insect pest management. The experiments were executed in Randomized Block Design having ten treatments replicated thrice. Gram (var. Jaki-9218), field pea (var. Khaperkheda), and lentil (var. K-75), were sown as intercrops with linseed as main crop in 4:1 and 4:2 row proportion and sole crops. Two fortnightly sprays of mancozeb (0.25%) were also provided to the crop starting from bud initiation stage for the management of *Alternaria* bud blight. Observations on major pests of both the crops (gram pod borer in both crops and bud infestation in linseed) were recorded. Bud infestation in linseed was recorded by observing total number and number of damaged buds at dough stage from five randomly selected plants in each replication and calculated the percentage of infestation. Seed yields recorded ( $\text{kg ha}^{-1}$ ) after harvest and analysed. The economics of each treatment was computed with prevailing prices of each commodity during the year. The data was statistically analyzed and discussed. The yield was further computed in terms of linseed equivalent yield

(LEY) by using the following formula to assess the intercropping system productivity and viability.

## RESULTS AND DISCUSSION

### Effect of intercrops on infestation of linseed bud fly

The pooled results of both the years pertaining to average percentage infestation of bud fly (Table 1) revealed that bud infestation (%) is statistically significant in different intercrop combinations. The intercrop proportion Linseed + Chickpea (4:2) and Linseed + Chickpea (4:1) recorded significantly lower infestation of bud fly 20.49 % and 24.95 %, respectively over other intercrops. Maximum infestation of bud fly (46.70 %) was recorded in Sole Linseed. The present findings on lower bud fly infestation corroborates the findings of Patro *et al.*, (2014) who observed lowest infestation due to epilachna beetle and *Leucinodes* in brinjal + marigold intercrop. Rekha and Dhurua (2009) also recorded intercropping of cotton with legumes is more effective against pests of cotton which build up natural enemies.

$$\text{Linseed Equivalent Yield (LEY)} = \frac{\text{Yield of Intercrop (kg ha}^{-1}) \times \text{Market rate of produce (Rs kg}^{-1})}{\text{Rate of Linseed (Rs kg}^{-1})} + \frac{\text{Yield of Linseed in kg ha}^{-1}}{1}$$

**Table1:** Effect of intercropping on linseed budfly infestation, seed yield and LEY\* in linseed

Sr. No.	Treatments	Bud fly infestation (%)			Yield of linseed ( $\text{kg ha}^{-1}$ )			Yield of intercrop ( $\text{kg ha}^{-1}$ )			*LEY ( $\text{kg ha}^{-1}$ ) Pooled
		2013-14	2014-15	Pooled	2013-14	2014-15	Pooled	2013-14	2014-15	Pooled	
1	Linseed + Chickpea (4:1)	27.45 (31.51)	22.45 (28.20)	24.95 (29.86)	678	805	741	213	780	497	1089
2	Linseed + Chickpea (4:2)	22.68 (28.39)	18.30 (25.71)	20.49 (26.83)	542	834	688	427	790	608	1114
3	Linseed + Dwarf field pea (4:1)	38.45 (38.28)	32.10 (34.39)	35.28 (36.33)	678	516	597	138	722	430	906
4	Linseed + Dwarf field pea (4:2)	42.35 (40.52)	30.75 (33.65)	36.55 (37.08)	542	685	613	275	725	500	974
5	Linseed + Lentil (4:1)	43.25 (41.06)	34.70 (36.07)	38.98 (38.56)	678	686	682	133	639	386	991
6	Linseed + Lentil (4:2)	41.60 (40.10)	37.45 (37.65)	39.53 (38.88)	542	572	557	265	685	475	937
7	Sole Linseed	45.75 (42.53)	47.65 (43.33)	46.70 (43.08)	813	780	797	0	0	0	797
8	Sole Chickpea	--	--	--	0	0	0	1280	782	1031	722
9	Sole Dwarf field pea	--	--	--	0	0	0	825	723	774	557
10	Sole Lentil	--	--	--	0	0	0	795	684	740	592
	S.E. (m) $\pm$	2.53	2.11	1.57							28.66
	C.D. at 5%	7.90	6.56	4.56							85.80

Figures in parenthesis are arcsine values.

**Note:** Market rates of the produce (Rs./kg): (Pooled): Linseed: Rs. 49.00; Chickpea: 34.00; Field Pea: 32.00 and Lentil: 38.00

\*Linseed Equivalent Yield (LEY) = ((Yield of Intercrop in kg/ha  $\times$  Market rate of produce in Rs./kg)  $\div$  Rate of Linseed in Rs./kg) + Yield of Linseed in kg/ha

## Effect of intercrops on yield of linseed

The seed yield of linseed showed significant variations due to intercrops. The pooled results pertaining to Linseed equivalent yield (LEY) (Table 1) found statistically significant. The intercrop combinations viz., Linseed + Chickpea (4:2) and Linseed + Chickpea (4:1) intercrop recorded significantly higher LEY of 1114 and 1089 kg ha<sup>-1</sup> respectively, over all other intercrops and sole crops. Lowest LEY 557 kg ha<sup>-1</sup> was recorded in Sole Dwarf field pea.

According to Rekha and Dhurua (2009) intercropping of cotton with legumes is more remunerative. Tanwar *et al.*, (2011) reported that intercropping systems of linseed with chickpea were found more LER and advantageous than sole cropping. These finding confirm the results of the present study

Therefore, it may be concluded that intercropping has several advantages like building up of natural enemies population (Sakhinetikpalli and Patnaik, 2013) deterring the pests and even trapping the pests of the sole crop thereby reducing the pest load of the sole crop. Further, the yield from the intercrop compensated the yield loss in sole crop due to pest injury. The present study undertaken linseed intercropping is preliminary and therefore, further long term studies in this line is necessary to develop suitable cropping pattern with reduced use of pesticides for the sustainable management of linseed pests.

## REFERENCES

- Malik YP and Srivastava RL (2012) Biotic stress management in Linseed. Project Coordinating Unit (Linseed), CSAUA & T, Kanpur -208002, Pp 5.
- Patro B, Satapathy CR, Mishra M and Rath BS (2014) Effect of intercropping on incidence of major insect pests of brinjal, Journal of Plant Protection and Environment, 11(2):43-46.
- Sakhinetikpalli A and Patnaik HP (2013) A preliminary study on the prevalence of spider and ant species in the brinjal crop ecosystem, Journal of Plant Protection and Environment, 10(1):82-87.
- Sree Rekha M and Dhurua S (2009) Effect of legume intercrops on pest incidence and yield of rainfed cotton in vertisols, Journal of Cotton Research and Development, 23(2):251-254.
- Tanwar SP, Rokadia P and Singh AK (2011) Effect of row ratio and fertility levels on chickpea (*Cicer arietinum*) and linseed (*Linum usitatissimum*) intercropping system, Indian Journal of Agronomy, 56:217-222.