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Effect of different nutrients and cropping - sequences on the incidence of Bihar hairy caterpillar (*Spilosoma obliquea* Walk.) in mustard crop

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An experiment was laid out in the field at Oilseed Research Farm Kalyanpur, Kanpur during rabi 2002-03 to findout the effect of different nutrients and cropping sequences on the incidence of Bihar hairy catepiller (*Spilosoma obliqua* Walk.). Mustard sown after fallow received to less infestation (1.61 larvae per 10 plants) of *S. obliqua* and gave maximum yield (i.e. 32.69q/ha). The crop applied with 112.50 kg N/ha. 56.25 kg P/ha. 56.25 kg K/ha + 2 tonne FYM/ha + 40 kg sulphur/ha + 25 kg $ZnSO_4$/ha + 1 kg boron/ha + seed treatment by *Azotobacter* @ 10 gm/kg of seed have considered effective in checking the larval population (1.66 larvae per 10 plants) of *S. obliqua* and provided yield (34.03 q/ha). Mustard sown after faollow with 150 kg N/ha. 75 kg P/ha. 75 kg P/ha. 75 kg P/ha. + 2 tonnes FYM/ha + 40 kg. sulphur/ha + 25 $ZnSO_1$/ha + 1 kg boron/ha or 150 kg N/ha. 75 kg P/ha. 75 kg K/ha. + 2 tonne FYM/ha + 10 kg sulphur/ha + 25 kg $ZnSO_4$/ha + 1 kg boron/ha + seed treatment by A*zotobacter* @ 10 gm/ha of seed or 112.50 kg N/ha. 56.25 kg P/ha 56.25 kg K/ha + 2 tonnes FYM/ha + 40 kg sulphur/ha + 25 kg $ZnSO_4$/ha + 1 kg boron/ha attracted minimum population (1.00 larvae per 10 plants in each plots) of *Spilasoma abliqua* Walk.

Key words : NPK, FYM, Sulphur, $ZnSO_4$, Boron, *Azotobacter, Spilosoma obliqua* Walk., Mustard.

INTRODUCTION

Indian mustard (*Brassica juncea* L. Czern and Coss) is a major rabi oilseed crop of India. Its seed contains 37-49 per cent oil. The oil and seeds are used as condiment in the preparation of pickles and for flavoring curried and vegetables. The oil is utilized for human consumption throughout northern India for cooking and frying purposes. It is also used in the preparation of hair oils and medicines. The oil cake is used as cattle feed and manure, which contains about 4.9% nitrogen, 2.5% phosphorus and 1.5% potash Green stems and leaves are a good source of green fodder for cattle. The leaves of young plants are used as green vegetables as they supply enough sulphur and minerals in the diet. India is the second largest producer of rapeseed and mustard in the world and contributes about 19% share of the total world production (Singh, 1998). The area of rapeseed and mustard in India is about 4.50 million hectares, which produce about 4.20 million tonnes with average productivity of 8.26 quintal/ha (Anonymous, 2002). which is very low. Amongst many yield limiting factors the insect pest are major. Bihar hairy caterpillar (*Spilosoma abliqua* Walk.) is among them. To get rid off by this problem without any chemical hazards, the present investigation have been carried out to prevent the damage of *S. abliqua* by different crop sequences and amendments.

MATERIALS AND METHODS

A field experiment was carried out during rabi 2002-2003 at Oilseeds Research Farm Kalyanpur, Kanpur. Treatment comprised Nitrogen (N) @ 150 and 112.5 kg/ha, Phosphorus (P) @ 75 and 56.25 kg/ha, Potash (K) @ 75 and 45.25 kg/ha, Farm Yard Manure (FYM) @ 2 tonne, sulphur @ 40 kg/ha, $ZnSO_4$ @ 25 kg/ha, Boron @ 1 kg/ha and *Azotobacter* @ 10 gm/kg of seed. Thus 12 treatment combination were tested in 3 replicated Split Plot Design. Crop was sown on the 26th September 2002 in a randomized layout with plot size 2.5 m x 4.0 m. The mustard (cv. Urvashi) seeds were sown in rows and at the time of thinning the spacing was aintained 50 cm (row to row) x 20 cm (plant to plant). The population of *Spilosoma obliqua* Walk was estimated by counting the number of larvae per plant. Ten plants were selected randomly in each plot. data were recorded during morning hours.

RESULTS AND DISCUSSION

The Table 1 shows that the mustard sown after fallow, was significantly superior over all cropping sequence in minimizing the larval incidence having only 1.61 larvae per 10 plants of *Spilosoma obliqua* Walk and provided 32.69 q/ha yield. Bajra mustard cropping-sequences was most inferior in reducing the larval incidence (having 4.00 larvae per 10 plants) and yield was 27.37 q/ha, Maize

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Table 1 : Effect of different nutrients and cropping-sequence on the incidence of *Spilosoma obliqua* Walk. and Yield of mustard crop.

Tr. No.	Treatment	*Spilosoma obliqua* Walk. Number of larvae/ pupae per 10 plants			Mean (treatment)	Yield Yield (q/ha)			Mean (treatment)
		Bajra-mustard	Maize-mustard	Fallow-mustard		Bajra-mustard	Maize-mustard	Fallow-mustard	
1	Recommended fertility level i.e. 150 kg N/ha, 75 kg P/ha, 75 kg K/ha	5.66	5.00	2.33	4.33	24.67	28.38	31.85	28.33
2	Tr. 1+2 tonne FYM/ha	6.00	4.66	2.66	4.44	24.95	30.86	34.86	30.22
3	Tr. 2+40 kg sulphur/ha	5.00	4.00	2.00	3.66	32.59	31.81	37.71	34.03
4	Tr. 3+25 kg ZnSO4/ha	4.33	3.33	1.66	3.11	34.57	27.81	32.76	31.71
5	Tr. 4 +1 kg boron/ha	4.66	3.66	1.00	3.11	30.80	29.90	32.53	31.07
6	Tr. 5 + seed treatment by *Azotobacter* @ 10 gm/kg of seed	3.00	1.66	1.00	1.88	30.67	30.86	34.67	32.06
7	75% of recommended fertility level i.e. 112.50 kg N/ha, 56.25 kg P/ha, 56.25 kg K/ha	5.00	4.00	2.00	3.66	23.81	25.90	28.57	26.09
8	Tr. 7+2 tonne FYM/ha	4.33	3.33	1.33	3.00	24.38	29.90	29.53	27.93
9	Tr. 8+ 40 kg sulphur/ha	3.00	3.33	1.33	2.55	22.29	28.57	35.24	28.70
10	Tr. 9+25 kg $ZnSO_4$/ha	2.33	2.33	1.66	2.11	27.62	28.57	30.47	28.88
11	Tr. 10+1 kg boron/ha	2.66	2.66	1.00	2.11	24.19	30.10	33.90	29.39
12	Tr. 11+ seed treatment by *Azotobacter* @ 10 gm/kg of seed	2.00	1.66	1.33	1.66	27.81	31.43	30.29	29.84
	Mean (Cropping-sequences)	4.00	3.30	1.61		27.37	29.50	32.69	

mustard cropping-sequence was little bit superior to bajra-mustard, in reducing the population (having only 3.30 larvae per 10 plants) of *S. obliqua* and yield was 29.50 q/ha.

In the group of over all different nutrients, plot treated with 112.50 kg N/ha, 56.25 kg P/ha, 56.25 kg K/ha + 2 tonne FYM/ha + 40 kg sulphur/ha + 25 kg $ZnSo_4$/ha + 1 kg boron/ha + seed treatment by *Azotobacter* @ 10 gm/kg of seed was on top position in reducing the larval population (having only 1.66 larvae per 10 plants) and gave maximum yield (34.03q/ha) followed by plot treated with 150 kg N/ha, 75 kg P/ha, 75 kg K/ha + 2 tonne FYM/ha + 40 kg Sulphur/ha + 25 kg $ZnSO_4$/ha + 1 kg boron/ha + seed treatment by *Azotobacter* @ 10 gm/kg of seed which reduced the larval population (1.88 larve per 10 plants) and provided yield of 32.06 q/ha Plot treated with 150 kgN/ha, 75 kg P/ha, 75 kg K/ha +2 tonne FYM./ha and 150 kg N/ha, 75 kg P/ha, 75 kg K/ha were less valuable in reducing the larval population (having 4.44 and 4.33 larvae per 10 plants, respectively) and provided lowest yield (26.09 and 27.93 q/ha, respectively). Rest of treatments showed intermediary effect.

In joint action of cropping-sequence and nutrients its amply documented from Table-1 that fallow-mustard, plot treated with 150 kg N/lha, 75 kg P /ha, 75 kg K/ha + 2 tonne FYM/ha + 40 kg sulphur/ha + 25 kg $ZnSO_4$/ha +1 kg boron/ha; 150 kg N/ha, 75 kg P/ha, 75 kg K/ha + 2 tonne FYMA/ha + 40 kg Sulphur/ha + 25 kg $ZnSO_4$/ha + 1 kg boron seed treatment by *Azoiobacter* @ 10 mg/kg of seed and 112.5 kg N/ha, 56.25 kg P/ha, 56.25 kg K/ha, + 2 tonnes FYM/ha + 40 kg sulphur/ha + 25 kg $ZnSO_4$ + 1 kg boron/ha proved to be best in reducing the larval incidence, having 1.00 larvae per 10 plants, followed by maize-mustard, plot treated with 150 kg N/ha, 75 kg P/ha, 75 kg K/ha + 2 tonne FYM/ha + 40 kg sulphur/ha + 25 kg $ZnSO_4$ + 1 kg/ha boron + seed treatment by *Azotobacter* @ 10 gm/kg of seed having 1.66 larvae per 10 plants which showed moderately impact against larval population. Bajra-mustard, plot treated with 150 kg N/ha, 75 kg P/ha, 75 kg K/ha + 2 tonnes FYM/ha showed pernicious against larval incidence having 6.00 larvae per 10 plants.

Similarly Purohit and Despande (1991) reported that the higher dose of nitrogen (120 kg/ha) enhanced the development of *Heliothis armigera* Hub. in sunflower, Gangwar and Shah (1996) also noticed that the sesamum leaf damage by *Antigastra sp.* was positively increased with an increase dose of nitrogen and phosphorus. Prasad *et al.* (1989) have also reported that fertilizer resulted in greater damage of Bihar hairy caterpillar (*Spilosoma obliqua* Walk.) in soybean.

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