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Bio-efficacy of insecticides against pest complex of cabbage

PD Mane, BB Singh, Mahesh Kumar and PK Singh

Abstract

For controlling pest complex of cabbage, all the treatments were significantly superior over control. Spinosad (0.3ml/lit.) was the most superior treatment followed by Indoxacarb (0.5 ml/lit.) The treatments Novaleuron (T₁), Flubendiamide (T₃), Emamectin Benzoate (T₅) and Profenophos (T₆) were at par with each other. The bio-pesticide, NSKE 5% (T₇) showed poor result as compared to chemical pesticides in controlling cabbage pest complex. All the treatments recorded significantly higher yield over control. The highest yield of cabbage was recorded in Spinosad (0.3 ml/lit.) treated plot followed by Indoxacarb (0.5 ml/lit.). Regarding yield performance the treatments, Novaleuron (T₁), Flubendiamide (T₃), Emamectin Benzoate (T₅), Profenophos (T₆) were at par with each other. In general, it can be concluded that spraying with Spinosad (0.3ml/lit.), Indoxacarb (0.5ml/lit.) and NSKE (5%) were effective measures for the control of Cabbage butterfly, Diamond back moth, Tobacco caterpillar and cabbage head borer.

Keywords: Bio-efficacy, spinosad, bio-pesticides, NSKE (5%), cabbage

Introduction

Cabbage, among the cole crops, is highly valued for its attractive colour, good taste and high nutritive contents. The productivity of cabbage is becoming comparatively low due to various factors in Bihar. Cabbage is attacked by a large group of insect-pests at different stages of growth, Sachan ^[1] and Gangwar ^[2], 1980 which act as limiting factor in the profitable cultivation of this crop. The major insect pests of this crop are cabbage butterfly, *Pieris brassicae*, cabbage aphid, *Brevicoryne brassicae*, diamond back moth, *Plutella maculipennis*, cabbage semilooper, *Trichoplusiani*, leaf webber, *Crociodomia binotalis*, Anonymus ^[1], 1987; Bhatia ^[1] and Verma ^[2] 1993; Sharma ^[1] 1998. The damage caused by these pests is reported to be varying from 05-100 per cent, Sachan ^[1] and Gangwar ^[2], 1990. In view of the above, the present investigations were undertaken to evaluate the bio-efficacy of various pesticides against major pests of cabbage.

Materials and Methods

The experiment was laid out in randomised block design with eight treatments each replicated thrice. The net plot size was 3 m x 3 m. Row to row and plant to plant distance was 50 and 45 cm. The experiment was conducted in Rabi season of 2019 at Research farm of Nalanda College of Horticulture, Noorsarai (Nalanda). Agronomic practices were followed as per recommended schedule. The seedlings of variety, NS-22 (F₁ Hybrid) grown on raised beds were transplanted in the main field after one month. Transplanting was done on the flat beds with 50 x 45 cm spacing. Healthy and vigorous seedlings were preferred for transplanting. Protective irrigation was given immediately after transplanting and thereafter irrigations were given at an interval of 15 days. Marigold was grown as border crop around the whole experimental field.

Administration of treatments

T ₁	Novaleuron (01 ml/lit.)
T ₂	Spinosad (0.3 ml/lit.)
T ₃	Flubendiamide (0.4 gm/lit.)
T ₄	Indoxacarb (0.5 ml/lit.)
T ₅	Emamectin Benzoate (0.4 gm/lit.)
T ₆	Profenophos (1.5 ml/lit.)
T ₇	NSKE 5%
T ₈	Control

Application of insecticidal treatments was initiated one month after transplanting i.e. on 02-02-2020 and continued thereafter at 10 days interval. In all, five sprays were applied during the crop season. Spraying was done in early morning hours to avoid mid day heat. The spray volume ranged from 250-550 lit per hectare depending upon crop stage. Measured quantity of insecticide was taken in 250 ml capacity beaker and mixed in small quantity of water, and then it was added to a bucket containing known quantity of water. Spraying was done using knapsack sprayer, fitted with solid cone nozzle. Due care was taken to cover the lower side of leaves for effective control of cabbage pests.

Five plants were selected randomly in each plot. They were provided with coloured labels. Population of cabbage butterfly, diamond back moth, Tobacco leaf eating caterpillar and head borer were recorded seven days after each spray. The observations on population of cabbage pests were subjected to $\sqrt{X + 0.5}$ transformation before statistical analysis.

Results and Discussion

The observations on population of different cabbage pests

after insecticidal spray are presented in Table 1. From Table 1, It is found that for controlling pest complex of cabbage, all the treatments were significantly superior over control. Spinosad (0.3ml/lit.) was the most superior treatment followed by Indoxacarb (0.5 ml/lit.) The treatments Novaleuron (T₁), Flubendiamide (T₃), Emamectin Benzoate (T₅) and Profenophos (T₆) were at par with each other. The bio-pesticide, NSKE 5% (T₇) showed poor result as compared to chemical pesticides in controlling cabbage pest complex. As regards bio-efficacy of various insecticides on yield of cabbage, all the treatments recorded significantly higher yield over control (Table 2). From Table 2, it is found that the highest yield of cabbage was recorded in Spinosad (0.3 ml/lit.) treated plot followed by Indoxacarb (0.5 ml/lit.). Regarding yield performance, the treatments, Novaleuron (T₁), Flubendiamide (T₃), Emamectin Benzoate (T₅), Profenophos (T₆) were at par with each other. In general, it can be concluded that spraying with Spinosad (0.3ml/lit.), Indoxacarb (0.5ml/lit.) and NSKE (5%) were effective measures for the control of Cabbage butterfly, Diamond back moth, Tobacco caterpillar and cabbage head borer.

Table 1: Bio-efficacy of various insecticides against pest complex of cabbage

Sr. No.	Treatments	Dose	Cabbage butterfly (mean of three replications)	Diamond back moth (mean of three replications)	Tobacco caterpillar (mean of three replications)	Cabbage Head borer (mean of three replications)
1.	Novaleuron	1.0 ml/lit.	0.23 (0.85)	1.39 (1.37)	0.44 (0.96)	0.12 (0.78)
2.	Spinosad	0.3 ml/lit.	0.12 (0.78)	0.83 (1.15)	0.12 (0.78)	0.05 (0.74)
3.	Flubendiamide	0.4 gm/lit.	0.28 (0.88)	1.25 (1.32)	0.36 (0.92)	0.15 (0.80)
4.	Indoxacarb	0.5 ml/lit.	0.16 (0.81)	0.93 (1.19)	0.16 (0.81)	0.08 (0.76)
5.	Emamectin Benzoate	0.4 gm/lit.	0.39 (0.94)	1.17 (1.29)	0.36 (0.92)	0.14 (0.80)
6.	Profenophos	1.5ml/lit	0.61 (1.05)	1.33 (1.35)	0.54 (1.01)	0.41 (0.91)
7.	NSKE	(5%)	1.02 (1.23)	1.70 (1.48)	0.81 (1.14)	0.59 (1.04)
8.	Control	----	1.36 (1.36)	2.03 (1.59)	0.91 (1.18)	0.69 (1.09)
S.E±C.D. at 5%	---	---	0.063 0.218	0.042 0.146	0.053 0.183	0.029 0.102

Figures in Parenthesis are $\sqrt{x+0.5}$ values.

Table 2: Bio-efficacy of various insecticides on yield of cabbage

Sr. No.	Treatments	Dose	Yield (Qt./ha)			Mean
			R-I	R-II	R-III	
1.	Novaleuron	1 ml/lit.	520.35	512.88	508.96	514.06
2.	Spinosad	0.3 ml/lit.	635.40	638.24	644.15	639.26
3.	Flubendiamide	0.4 gm/lit.	540.28	535.35	544.20	539.94
4.	Indoxacarb	0.5 ml/lit.	627.38	625.28	632.16	628.27
5.	Emamectin Benzoate	0.4 gm/lit.	515.30	520.54	522.38	519.40
6.	Profenophos	1.5 ml/lit.	508.44	504.96	509.95	507.78
7.	NSKE	5%	472.28	465.70	462.28	466.75
8.	Control	-----	454.20	450.92	452.10	452.40
S.E.±	---	---	-----	-----	-----	8.75
C.D. at 5%	---	---	-----	-----	-----	25.96

Similar results were obtained by Mong and Sudderuddin, 1978 who found that Diamond back moth infestation recorded minimum in the plots sprayed with N.S.K.E. (57.) + Profenophos (1.5ml/lit), (0.43 larvae/plant). Koshiya and Ghelani, 1993 reported lowest infestation of Tobacco leaf eating caterpillar (0.47 larvae/plant) sprayed with NSKE 5 % on cabbage crop. Prasannakumar, 2014 reported that cabbage yield 34.93, 29.19 and 27.13 tonnes/ha were obtained from Neem Seed Powder Extract 4 %, Spinosad 45 SC (0.013 %) and Neem cake @ 100 kg/acre respectively. Higher yield (42.4 tonnes/ha) of cabbage from Spinosad treated plot was earlier reported by Ghosh, 2001 which is in conformity with the present studies.

Conclusion

The highest yield of cabbage was recorded in Spinosad (0.3 ml/lit.) treated plot followed by Indoxacarb (0.5 ml/lit.). Regarding yield performance the treatments, Novaleuron (T₁), Flubendiamide (T₃), Emamectin Benzoate (T₅), Profenophos (T₆) were at par with each other. In general, it can be concluded that spraying with Spinosad (0.3ml/lit.), Indoxacarb (0.5ml/lit.) and NSKE (5%) were effective measures for the control of Cabbage butterfly, Diamond back moth, Tobacco caterpillar and cabbage head borer.

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References

1. Sachan JN, Gangwar SK. Vertical distribution of important insect-pests of cole crops in Meghalaya as influenced by the environmental factors. *Indian Journal of Entomology* 1980;42(3):414-421.
2. Anonymous. Package of practices of vegetables. SKUAST-Kashmir 1987, 45.
3. Bhatia R, Verma A. Insect- pest complex of cabbage in Himachal Pradesh. *Journal of Insect Science* 1993;6(2):297-299.
4. Sharma S. Integrated Management of Major Insects Pests of Cauliflower, *Brassica oleracea var. botrytis* in Jammu. M.Sc. Thesis, SKUAST-Jammu 1998, 110.
5. Sachan JN, Gangwar SK. Seasonal incidence of insect-pests of cabbage. *Indian Journal of Entomology* 1990;52(01):111-124.
6. Mong TT, Sudderuddin KI. Effect of a neem tree (*A. Indica*) extracts on diamond back moth, *Malaysian Applied. Biology* 1978;07:01-09.
7. Ghosh SK, Choudhary N, Ghosh J, Chattarjee H, Senapati SK. Field evaluation of pesticides against the pest complex of cabbage under terai region of West Bengal. *Pestology* 2001;25(02):95-97.
8. Koshiya DJ, Ghelani AB. Antifeedant activity of different plant derivatives against *Spodoptera litura* on groundnut. *Indian Society of Tobacco Science* 1993, 257-260.
9. Prasanna Kumar NR, Sandeep Kumar GM, Mukesh M. Efficacy of botanicals and synthetic insecticides on major insect pests of cabbage in kullu valley, Himachal Pradesh, *Insect Environment* 2014;19(4):231-233.