Bioscience Discovery, 7(2):97-100, July - 2016

Print & Online, Open Access, Research Journal Available on http://jbsd.in
ISSN: 2229-3469 (Print); ISSN: 2231-024X (Online)
Research Article

Efficacy of botanical pesticide multi-neem against red pumpkin beetle (*Aulacophora foveicollis*) management on cucurbit

Bishnu Prasad Neupane[1*] and Jiban Shrestha[2]

[1]Grain Legumes Research Program, Khajura, Banke
[2] National Maize Research Program, Rampur, Chitwan, Nepal
bisnu_neupane2000@yahoo.com

Article Info

Received: 04-05-2016,
Revised: 05-06-2016,
Accepted: 11-06-2016

Keywords:
Efficacy, cucurbit, neem and red pumpkin beetle.

Abstract

An experiment was conducted to evaluate the efficacy of different concentration of botanical pesticide neem against the red pumpkin beetle *(Aulacophora foveicollis*) in Khajura, Banke of Nepal in May 2016. The treatment consisted of five different concentrations of multineem i.e.2ml/litre, 3ml/litre, 4ml/litre, 5ml/litre, and control (water) replicated four times in randomized complete block design. There were altogether three sprays (beginning 15 day of sowing) at ten days interval and total number of beetle population were counted in leaf whorl before spray, after four, seven and ten days in each succeeding spray. The results showed that 5ml/litre concentration of multineem gave the highest reduction of beetle population (100%) followed by 4ml/litre (91.5%), 3ml/litre (63%) and 2 ml/litre (37.9%), respectively.

INTRODUCTION

Cucurbits are one of the most important summer vegetable crops in Nepal. Cucurbits production is increasing day by day. Cucurbits have a good nutritive value as well as medicinal value too. All the cucurbits have a good market value which encouraged the farmers to cultivate gourds in large scales. There are many insect-pests of cucurbits in Nepal. Among them, red pumpkin beetle, *Aulacophora foveicollis* (Lacas) is one of the most important constrants to cucurbits production capable of 30-100% yield loss (Alam, 1969; Azim, 1966; Gupta and Verna, 1992 and Dillon *et al.*, 2005). It is polyphagous and attacks more than 81 plant species including pumpkin, squash, cucumber, bottle gourd, sweet gourd, bitter gourd, snake gourd, wax gourd, water melon etc. and a wide range of fruit crops (Doharey, 1983).

Both larval and adult stages of red pumpkin beetle are injurious to the crops. The adult beetle feed on leaves, flower -buds and flowers. But the larvae feed on root tissue and cause direct damage to the newly developed seedlings (Narayaanon, 1960). Damage is severe since the beetles are difficult to control. At the advent of spring the beetle defoliate the cucurbit seedlings to such an extent that sometimes the crop has to be resown for 3 to 4 times (Alam, 1969, Rajak, 2001, Parsad and Kumar, 2002 and Mahamood *et al.*, 2005). Maximum population of the insect is observed during April and May and then it shows a downward trend; the population again exhibits on upward trend in July and August.
The most commonly used method for controlling red pumpkin beetle in Nepal is the application of insecticides. But the main problem is indiscriminate application of the doses of synthetic pesticides. However, due to the unconscious use of synthetic insecticides, development of insect resistance to insecticides, induction of resurgence to target pests, outbreak of secondary pests and undesirable effect on non-target organism as well as serious

Table: 1 Inclusion of treatments to test their effectiveness against Red Pumpkin beetle as:

Treatment combination	Combination detail	Treatment application interval
T1	2 ml/litre water	10 days interval (beginning 15 days after sowing) i.e. 15 days after sowing (DAS)
T2	3 ml/litre water	
T3	4 ml/litre water	25 DAS
T4	5 ml/litre water	35 DAS
T5	Water	

environment pollutions in occurred. Insecticide residue can exist in fruit which cause health hazard to consumers. To control this pest properly, it is necessary to determine the extent of damage and to find out the accurate dose of pesticides. Considering the above situations, a study was undertaken to investigate the efficacy of different concentrations of multi-neem against the management of red pumpkin beetle.

MATERIALS AND METHODS

The experiment was laid out in randomized complete design (RCBD) with five treatments and four replications in Khajura, Banke. For this, twenty pumpkin plants were planted in a row and each plant considered as an experimental unit. Treatments evaluated were as follows:

Treatments materials were sprayed to the plants at ten days interval beginning 15 days after sowing and there were altogether three sprays. Separate bucket and sprayer was used for the formulation and spraying of pesticides for each treatment to avoid the contamination. The pre-treatment observation was made before twenty four hours of spraying. The percentage of population reduction over control were analysed with the formula modified Abbots formula derived from Fleming and Tetnakarn.

Population Reduction over control (%) = 1- (Ta x Cb)/(Tb x Ca) x100

Ta = Population in treatment after spray
Tb= Population in treatment before spray
Ca = Population in contral after spray
Cb= Population in control before spray

RESULTS AND DISCUSSION

Multineem concentration 5 ml/litre water gave the maximum reduction of population (86.3%) over control after one day of spraying followed by concentration 4ml/litre water (85.0%), 3ml/litre water (54.5%) and 2ml/litre water (45%), respectively. Similarly, the maximum reduction of population over control after seven days of first spray was achieved by concentration 5ml/litre water (84.3%), followed by concentration 4ml/litre water (79.9%), 3 ml/litre water (52.9%) and 2ml/litre water (31.4%) respectively. The highest reduction of beetle population after treated over control was achieved after ten days in 5 ml/litre water (100%), followed by 4 ml/litre water (91.5%), 3 ml/litre water (72.63%) and 2 ml/litre water (37.9%), respectively.

Table 2 Effect of various concentration of multi-neem against Red Pumpkin beetle in pumpkin after the first spray

Treatments	Pre-spray beetle count	Reduction over control (%)		
		4^{th} DAS	7 DAS	10 DAS
2ml/litre water	15	45	31.4	37.9
3ml/litre water	25	54.5	52.9	63.0
4ml/litre water	30	85.0	79.9	91.5
5ml/litre water	15	86.3	84.3	100
water	11			

DAS: days after spraying

After the second spray also, the highest reduction of beetle population over control after 4th days of spray was recorded in neem concentration of 5 ml/litre water (100%) and 4ml/litre water, followed by 3 ml/litre (63%) and 2ml/litre water (49.0%) respectively (Table 3). Similarly, the highest reduction of beetle population after 7 days of second spray was in concentration@5ml/litre water (100) and concentration @4ml/litre water (100) treated plots followed by concentration@3ml/litre water (64.2%) and concentration@2ml/litre water (52.3%) respectively. It was again the highest reduction of beetle population after 10 days of the second spray in the neem concentration@5ml/litre water (100%), followed by neem concentration 4ml/litre water(93.1%), neem concentration@3ml/litre water (73.0%) and concentration @2ml/litre (47.0%) respectively.

The response of various treatments against Red pumpkin beetle after the third spray is presented in Table 4. The highest population reduction of beetle over control after 4th day of third spray was achieved by the neem concentration@5ml/liter water (100%), followed by 4ml/litre water (68.2%), 3ml/litre water (57.5%) and 2ml/litre water (52.0%) respectively. After 7th days of third spray, the highest reduction was in concentration 5ml/liter water treated plot (97.0%), followed by 4 ml/litre water (64.0%), 3ml/liter water (44%), respectively. Similarly, after 10th days of third spray, the highest reduction of beetle was found in treatment concentration of 5ml/litre water (80%), followed by 4ml/water concentration (60.2%), concentration 3ml/litre water (40.2%) and 2ml/liter water (38.0%), respectively.

Table 3 Effect of various treatments against Red Pumpkin beetle (*Aulacophora foveicollis*) in Pumpkin after the second spray

Treatments	Pre-spray beetle count	Reduction over control (%)		
		4th DAS	7 DAS	10 DAS
2ml/litre water	11	49.0	52.3	47.0
3ml/litre water	5	63.0	64.2	73.0
4ml/litre water	3	100	100	93.1
5ml/litre water	0	100	100	100
water	13			

Table 4: Effect of various treatments against Red Pumpkin beetle (*Aulacophora foveicollis*) in Pumpkin after the third spray

Treatments	Pre-spray beetle count	Reduction over control (%)		
		4th DAS	7 DAS	10 DAS
2ml/litre water	15	52.0	44.0	38.0
3ml/litre water	6.0	57.0	55.0	40.2
4ml/litre water	4.0	68.2	64.0	60.2
5ml/litre water	6	100	97.0	80.0
water	13			

Indigenous knowledge of Nepalese farmers regarding organic pest management has not been properly documented (NARC, 2005). The plant products with insecticidal properties are becoming an alternative to the synthetic dangerous and more expensive insecticides used in the developing countries (Rajpakshe *et al*., 1998). The insecticidal properties of margosome were documented for the control of leafhopper of okra, (Neupane, 2000), grain weevil of rice and wheat (Paneru and Sah, 2000), rhizome weevil of banana (Vezina *et al*., 2003).

CONCLUSION

The bio-efficacy of different concentration of neem was found effective to reduce the pumpkin beetle population. Among different concentration of neem, 5ml/liter water reduces beetle population up to 100% at 10th days of first spray where as 91.5% by neem concentration of 4ml/litre water and only 37.9% beetle population reduced by 2ml/liter. So based on the study, it can be concluded that multineem @5ml/litre water was found effective against red pumpkin beetle management.

REFERENCES

Alam MZ, 1969. Insect pests of vegetables and their control in East Pakistan. The Agricultural Information Service, 3, R. K. Mission Road, Dhaka. 146 p.

Azim MII, 1966. Studies on the biology of red pumpkin beetle, *Aulacophora foveicollis* (Lacas) (Chrysomelidae: Coleotera) in East Pakistan. M.Sc Thesis. Department of Entomology, Bangladesh Agricultural University, Mymensingh.

Dillon MK,Naresh JS, Singh R and Sharma NK, 2005. Evaluation of bitter gourd (*Momordica charantia* L.) genotypes for resistance to melon fruit fly, *Bactorcera cucurbitae*. *Indian J.Pl. Prot*. **33** (1):55-59.

Dohary KL, 1983. Bionomics of Red Pumpkin beetle, *Aulacophora foveicollis* (Lacas) on some fruits. *Indian Journal of Entomology*. **45**:406-413.

Gupta D and Verna AK, 1992. Population fluctuations of the grubs of red pumpkin beetle; *Aulacophora foveicollis* (Lucas) infesting cucurbitaceous crops. *PL. Sci*., **5**:518-523.

Mahmood T, Khokhar KM, Hussain SI and Lajhari MH, 2005. Host preference of red pumpkin beetle, Aulacophora (Raphidopalpa) foveicollis (Lucas) among cucurbit crops. *Sarhad J. Agric*, **21**(3): 473-475.

Narayanan ES and Batra HN, 1960. Red pumpkin beetle and their control. Indian Council of Agricultural Research, New Delhi, India. **2**:1-68.

NARC, 2005. Methodology development of mass rearing of parasitoids and predators of agriculture importance. *In:* Annual Technical Report 2003/2004. Entomology Division, NARC, Khumaltar, Lalitpur, Nepal.

Neupane FP, 2000. Field evaluation of botanicals against insect pest of okra, *Abelmuschus esculentus* in Nepal. *J. Sci. Tech.* **2:**95-100.

Paneru RB and Sah YP, 2000. Botanical and other indigenous knowledge systems for the control of post harvest insects of maize. *In:* Proceedings of a Working Group Meeting of the Hill Maize Research Project, 25-27 September, 2000, NARC, Khumaltar, Lalitpur, Nepal.pp. 24-29.

Prasad K and Kumar P, 2002. Insect pest status on summer vegetables in hilly tracts. *Karanataka J. Agric. Sci*, **15**(1): 156-157.

Rajapakse R, Sencyake SGJN and Rathasekera D, 1998. Effect of five botanicals on oviposition, adult emergence and mortality of *Callosobruchus maculates* F. infesting cowpea, *Vigna unguiculata* L. *J. Ent. Res.* **12:**117-122.

Vezina A, Escalant JV, Marcham R and Roux N, 2003. Biology and integrated pest management for the banana weevil. *In: The International Journal on Banana and Plantain-Infomusa*. **12**(2):30-31.

How to Cite this Article:

Bishnu Prasad Neupane and Jiban Shrestha, 2016. Efficacy of botanical pesticide multi-neem against red pumpkin beetle (*Aulacophora foveicollis*) management on cucurbit. *Bioscience Discovery*, **7**(2):97-100.