OVICIDAL TOXICITY OF INSECTICIDES AGAINST *Clavigralla gibbosa* Spinola UNDER LABORATORY CONDITION

PUROHIT, S. K., P. S. PATEL, SUSHMA DEB* AND B. C. PATEL

DEPARTMENT OF AGRICULTURAL ENTOMOLOGY
C. P. COLLEGE OF AGRICULTURE
S. D. AGRICULTURAL UNIVERSITY
SARDARKRUSHINAGAR- 385 506
GUJARAT, INDIA
EMAIL: debsushma@gmail.com

ABSTRACT

An investigation on ovicidal toxicity of various insecticides against Clavigralla gibbosa Spinola on pigeonpea was carried out in the laboratory of Centre of Excellence for Research on Pulses, S. D. Agricultural University, Sardarkrushinagar during 2012-13. The results revealed that highest ovicidal action was recorded in the treatment of profenophos 50 EC @ 0.05 per cent (82.28 %) and was closely followed by acephate 75 SP @ 0.075 per cent (78.09%).

KEY WORDS: Clavigralla gibbosa Spinola, Ovicidal toxicity, Insecticides

INTRODUCTION

Pigeonpea (*Cajanus cajan* L.) Mill. is an important grain legume crop of semi-arid tropical and subtropical farming systems, providing high quality vegetable protein, animal feed and firewood (Chitralekha *et al*., 2017). Next to chickpea, pigeonpea is the second most important pulse crop grown in the country. The low productivity may be attributed to many reasons, among which damage by insect pests is of paramount importance (Mishra *et al*., 2012). Among the pod damaging insect pests of pigeonpea, next to pod borers, pod sucking bug, *Clavigralla gibbosa* Spinola (Hemiptera: Coreidae) has become a threat to quality grain production (Chakravarty *et al*., 2016). The loss in grain yield production due to the bug generally ranges between 25 to 40 per cent (Adati *et al*., 2007; Gopali *et al*., 2013).

Use of synthetic insecticides against insect pests of various crops is the most potent practice in pest management being lethal to various stages of insect life-cycle. The egg stage in some case is the most vulnerable stage in terms of its relative susceptibility and probably the least studied aspect. Keeping the point in view, a laboratory experiment was carried out to evaluate the ovicidal toxicity of synthetic insecticides against *C. gibbosa* in pigeonpea.

MATERIALS AND METHODS

Study on ovicidal toxicity of various insecticides against *C. gibbosa* on pigeonpea was carried out in the laboratory of Centre of Excellence for Research on Pulses, S. D. Agricultural University, Sardarkrushinagar in the year 2012-13. The experiment was laid on Completely Randomized Design (CRD) with three repetitions.

Maintenance of culture

To establish initial culture in laboratory, *C. gibbosa* adults were collected from pigeonpea field at Centre of Excellence for Research on Pulses, S. D. Agricultural University, Sardarkrushinagar and were reared inside plastic jar providing them with fresh un-infested pigeonpea pods as food source and oviposition substrate. The end of pods was wrapped in cotton wool, soaked with water to keep the pods fresh and turgid for longer duration. The pods with eggs were transferred in separate petridishes for further study.

The freshly laid fourty eggs of *C. gibbosa* were kept in each petridishes for insecticidal application. Nine insecticides (Imidacloprid 17.8 SL @ 0.005%, Buprofezin 25 SC @ 0.025%, Thiamethoxam 25 WG @ 0.008%, Diafenthiuron 50 SC @ 0.02%, Profenophos 50 EC @ 0.05%, Acephate 75 SP @ 0.075%, Clothianidin 50 WDG @ 0.025 %, Fipronil 5 SC @ 0.005 % and Neem oil @ 0.3%) were applied at respective dose with the help of chromatography sprayer. Spray solution (1.0 ml/petridish) of respective insecticides was applied and sprayed petridishes were dried at room temperature.

Observations on number of egg hatched were recorded after 3, 7, 10, 15 and 18 days of spraying. The per cent egg mortality was calculated by Abbott's (1925) formula.

$$\text{Mortality (\%)} = \frac{\text{Mortality in treatment - Mortality in untreated control}}{\text{100 - Mortality in untreated control}} \times 100$$

Per cent egg mortality was subjected to arc sin transformation for statistical analysis.

RESULTS AND DISCUSSION

The results pertaining to per cent egg mortality of *C. gibbosa* revealed that all the treatments found significantly superior over control (Table 1). However, maximum egg mortality was found in the treatment of profenophos 50 EC @ 0.05 per cent (82.28 %) and was significantly effective over rest of the treatments. It was closely followed by acephate 75 SP @ 0.075 per cent, which gave 78.09 per cent mortality of eggs. Among the rest of the treatment, clothianidin 50 WDG @ 0.025 per cent, imidacloprid 17.8 SL @ 0.005 per cent, thiamethoxam 25 WG @ 0.008 per cent, diafenthiuron 50 SC @ 0.02 per cent, buprofezin 25 SC @ 0.025 per cent and fipronil 5 SC @ 0.005 per cent exhibited 76.03, 63.50, 61.43, 60.36, 54.08 and 53.01 per cent eggs mortality, respectively. Neem oil @ 3 ml/l recorded 25.89 per cent eggs mortality, which was least effective as compare to other insecticides.

Thus, it can be concluded that profenophos 50 EC had maximum ovicidal action against eggs of *C. gibbosa* under laboratory conditions. Yelshetty (1999) reported that methomyl 12 SL @ 500 g a.i./ha and profenofos 50 EC @ 1500 g a.i./ha recorded highest egg occlusion both in freshly laid and older eggs of *Helicoverpa armigera*. The lowest dosage (125 g a.i./ha) was equal to highest dosage (1500 g a.i /ha) of profenofos 50 EC with respect to egg occlusion. The present findings were in close agreement with earlier reports.

In contrast, Chakraborty *et al.* (2011) revealed that quinalphos 0.05 per cent, fipronil 0.005 per cent and dichlorvos 0.05 per cent were found the most toxic to eggs of *Chrysoperla zastrowi silleni*, whereas endosulfan 0.07 per cent proved the least toxic followed by malathion 0.05 per cent and imidacloprid 0.005 per cent. The contradictory results in which fipronil has high ovicidal toxicity might be due to difference in test insect under study.

REFERENCES

Abbott's, W. S. (1925). A method of computing the effectiveness of an insecticide. *J. Econ. Ent.*, **18:** 256-257.

Adati, T.; Tamo, M.; Yusuf, S. R.; Downham, M.C.A.; Singh, B. B. and Hammond, W. (2007). Integrated pest management for cowpea-cereal cropping systems in the West African savannah. *Int. J. Trop. Insect Sci*., **27** (3-4): 123-137.

Chakraborty, D.; Korat, D. M. and Deb, S. (2011). Relative ovicidal and larvicidal toxicity of eleven insecticides to the green lacewing, *Chrysoperla zastrowi silleni* (Esben-peterson). In: “Insect Pest Management, A Current Scenario” edited by Dunston P. Ambrose, Director, Entomology Research Unit, St. Xavier’s College, Palayamkottai, Tamil Nadu. pp: 107-110.

Chakravarty, S.; Agnihotri, M.; Kumar, L. and Ahmad, M. A. (2016). Influence of weather parameters on natural egg parasitization of pod bug, *Clavigralla gibbosa* Spinola (Hemiptera: Coreidae) on pigeonpea. *The Bioscan*, **11** (3): 1759-1763.

Chitralekha; Lal, R., Verma, T.; Prince and Lalita (2017). Biology of Tur Pod Bug, *Clavigralla gibbosa* Spinola on Pigeonpea Variety Manak. *Int. J. Curr. Microbiol. App. Sci.*, **6** (9): 1504-1509.

Gopali, J. B.; Sharma, O. P.; Yelshetty, S. and Rachappa, V. (2013). Effect of insecticides and biorationals against pod bug (*Clavigralla gibbosa*) in pigeonpea. *Indian J. Agric. Sci.*, **83** (5): 582-585.

Mishra, M. K.; Singh, R. P. and Ali, S. (2012). Chemical control and avoidable yield losses of pigeonpea due to insect pests.). *Ann. Pl. Prot. Sci.*, **20**: 306-309.

Yelshetty, S.; Siddegowda, D. K. and Patil, B. V. (1999). Efficacy of indoxacarb (Avaunt) 15% SC against pigeonpea pod borer, *Helicoverpa armigera* (Hub.). *Pestology*, **23**: 60-64.

Table 1: Ovicidal toxicity of insecticides against *C. gibbosa* in pigeonpea

Sr. No.	Treatments	Dose (ml or g/10 lit.)	Egg mortality (%)
1	Imidacloprid 17.8 SL	3.0 ml	53.13* (63.50)
2	Buprofezin 25 SC	10.0 ml	47.63 (54.08)
3	Thiamethoxam 25 WG	3.20 g	51.90 (61.43)
4	Diafenthiuron 50 SC	4.0 ml	51.27 (60.36)
5	Profenophos 50 EC	10.0 ml	65.48 (82.28)
6	Acephate 75 SP	10.0 g	62.44 (78.09)
7	Clothianidin 50 WDG	5.0 g	61.02 (76.03)
8	Fipronil 5 SC	10.0 ml	47.01 (53.01)
9	Neem oil	30.0 ml	30.91 (25.89)
10	Control	---	4.05 (0.00)
		S. Em. ±	0.83
		C. D. at 5 %	2.45
		CV %	3.01

**** Figures in parenthesis are retransformed values, those outside are arc sin transformed values.***

[MS received : December 18, 2017] ***[MS accepted : December 26, 2017]***