Nature & Environment
Vol. 18 (1&2), 2013: 1-3
Website: www.natureandenvironment.org

ISSN (Print) : 2321-810X
ISSN (Online) : 2321-8738

RESEARCH ARTICLE

Evaluation of the Efficacy of Regent-3g (Fipronil) Against a Major Insect Pest: *Tryporyza (Scirpophaga) Nivella* Fab. of Sugarcane

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Received: 15th Oct. 2012, Revised: 30th Oct. 2012, Accepted: 2nd Nov. 2012

ABSTRACT

Sugarcane is a major cash crop of the world and is seriously destroyed by a borer pest; Tryporyza nivella Fab., etc. T. nivella reduces the production of sugarcane in a heavy quantity as well as in quality. To control the infestation of T. nivella (Fab.), Regent-3G (fipronil) in the form of granule at 1.5, 2.0, 2.5 and 3.0 kg a.i./hac quantities was applied over four special micro-plots in each of three macro-plots at the interval of 15, 20 and 25 days respectively at selected sugarcane fields; agriculture farm house of R.B.S. College Bichpuri Agra during heavy infestation of T. nivella. A fifth micro-plot was not treated with selected insecticide as a control plot at each macro-plot. After four to eight hours of application of insecticide, the mortality of larvae was counted at each micro-plot. Regent-3G controls the 87 percent infestation of T. nivella.

Keyword: *Regent-3G (Fipronil), Sugarcane Top Borer, Tryporyza (Scirpophaga) nivella (Fab.), Saccharum officinarum L.*

INTRODUCTION

Top borer of sugarcane is one of the most destructive pest of sugarcane (Permana *et. al.,* 1995). *T. nivella* is a member of family- Pyralidae. The family Pyralidae comes under Order- Lepidoptera of Class- Hexapoda (Prasad *et. al.,* 2010). The life history of *T. nivella* showed complete metamorphosis with four developmental stages viz, egg, larva, pupa and adult (Kumar and Rana, 2012). Adult infects the plant but the serious damage was caused by larvae (caterpillar) from third week of May to first week of July (Cheng *et. al.,* 1998) it was the peak period of population of this pest (Rana *et al.,* 1992). The newly hatched larvae bored into the newly coming leaves through its midrib and caused serious destruction to sugarcane by feeding on it vigorously (Deka and Sharma, 2005). According to Abdul *et. al.* (1986); Pandey *et al.* (1997), *T. nivella* reduces the production of cane about 12.68%, 36-56% respectively. Many insecticides; Sevin, Phorate, Aldicarb, Endosulfan etc) have been applied to control the infestation of *T. nivella* but due to directly or indirectly harmful to living being, Government of India has been listed as banned to these insecticides. So, present research work was carried out under taken as a test case to find out the better control method to control the infestation of *T. nivella* by the application of selected granular insecticide; Regent-3G during research work at selected site.

MATERIALS AND METHODS

To study the evaluation of the efficacy of Regent-3G (Fipronil), the research experiments were conducted at selected sites; a sugarcane field of agriculture farm house, R.B.S. College Bichpuri Agra, under agro climatic conditions from 28 May to 14 July, 2011, during first experimental year; 01 April, 2011 to 31 March, 2012 when infestation of *T. nivella* occurred in each micro-plot in accordance of Kaushik Chakraborty (2010) ; Muhammad Mustaq *et. al.,* (1989).

In the present investigation, Regent-3G in the form of granules was strewed with the help of granule mechanical dispenser at different quantities; 1.5, 2.0, 2.5 and 3.0 kg a.i./hac. over

selected four micro-plots of sugarcane respectively in support of Mishra *et. al.* (2007). The interval was taken 15, 20 and 25 days at three macro-plots respectively in accordance of Singh and Rana, (2004). At each macro-plot, the first plot of 100 plants was treated with 1.5 kg a.i./hac quantity of Regent-3G, the second plot with 2.0 kg a.i./hac, third plot with 2.5 kg a.i./hac while the fourth plot with 3.0 kg a.i./hac was treated in support of Singh and Rana (2004). A fifth plot of 100 plants was not treated with any insecticide at each macro-plot as control plot.

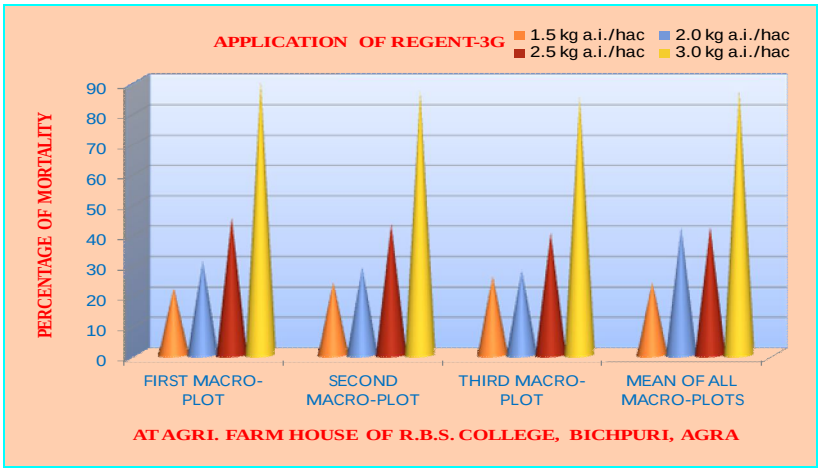
The granules of insecticide were applied when 42, 44 and 41 percent infection shown at each macro-plot respectively. The treatments were applied periodically with three replications at each macro-plot in accordance of (Prasad *et. al.* 2010). The toxicity of insecticide was translocated into various plants parts after 4-8 hours of application, and then the mortality of larvae was counted in each plot of macro-plot. Observations were recorded caringly and obtained data after analyzing is presented in Table no.-1 and graph no.-I. Percentage of mortality was calculated by using following formula (Marwat *et. al.*, 1985)-

$$\text{Percentage of Mortality} = \frac{\text{No. of Dead Larvae}}{\text{Total Number of Larvae}} \times 100$$

Table- 1: The Percentage of Mortality of Larvae of *T. nivella* on *Saccharum officinarum* (Linn.), Applying Regent-3G (Mean Made of 100 Observations)

Experimental year 2011-2012												
Name of Insecticide	Treatment (kg a.i./hac)	No. of Replications	Percentage of mortality at three macro-plots at agriculture farm of R.B.S. College Bichpuri Agra									Mean of % of mortality of all three sites
			At Ist macro-plot, at the interval of 15 days (in 2011)			At IInd macro-plot, at the interval of 20 days (in 2011)			At IIIrd macro-plot, at the interval of 25 days (in 2011)			
			28 May	12 Jun.	27 Jun.	29 May	18 Jun.	08 Jul.	30 May	24 Jun.	14 Jul	
Regent-3G (Fipronil)	1.5	3	10	11	22	13	14	24	16	22	26	24
	2.0	3	16	21	31	14	19	29	12	18	28	29
	2.5	3	18	26	45	14	23	43	15	27	40	42
	3.0	3	24	45	90	21	42	87	22	41	85	87
(Control)	Nil	Nil	42	75	96	44	73	94	41	76	95	Nil

Graph- 1: Relation between Rgent-3G (Fipronil) and % of larval mortality of *T. novella*



RESULT

Table No.- 1 and Graph No.- 1 reveal that 1.5, 2.0, 2.5 and 3.0 kg a.i./hac quantity of Regent-3G (Fipronil) gave 22, 31, 45 and 90 percent mortality at first macro-plot at the maximum infestation rate. At second macro-plot same quantities of Regent-3G controlled 24, 29, 43 and 87 percent infestation of *T. nivella* at the maximum infestation rate. Moreover, at third macro-plot same quantities of Regent-3G showed the 26, 28, 40 and 85 percent larval mortality of *T. nivella* at the maximum infestation rate. After analyzed the mean of larval mortality of all three macro-plot, it was found that when 1.5, 2.0, 2.5 and 3.0 kg a.i./hac quantity of Regent-3G were applied, then selected insecticide controlled the 24, 29, 42 and 87 percent infestation of *T. nivella* at the maximum infestation rate.

CONCLUSION

The findings of present research work show the difference with the findings of Anonymous, (1997-98) who reported that Regent-3G could control 17.42 % infestation of *T. nivella*. The findings of Roshan Lal, (2006) again cannot be match with the present findings who reported that Regent-3G was control 60 % infestation of top borer respectively. Therefore, it can be safely said that in the present research work, in applied four quantities of selected insecticide, 3.0 kg a.i./hac quantity of Regent-3G is the excellent effective quantity in comparison of other quantity for control the infestation of *T. nivella*.

ACKNOWLEDGEMENT

The author is great thankful to The Secretary, Rajeev Gandhi National Fellowship for SC/ST Students, for providing financial support. The author is also thankful to The Principal, Agra College, Agra for providing all essential facilities during the research work.

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