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Research Paper

TOXIC IMPACT OF FIPRONIL (REGENT-3G) ON A SUGARCANE PEST; *TRYPORYZA (SCIRPOPHAGA) NIVELLA* (FAB.)

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Abstract

Sugarcane top borer; *Tryporyza nivella* Fab. is one the major factor of sugarcane and responsible to decrease its yield in a heavy quantity as well as quality. To control the infestation of *T. nivella*, granule form of Furadan-3G (Carbofuran) at 1.5, 2.0, 2.5 and 3.0 Kg a.i./hac quantities was treated over four micro-plots at each of the three macro-plots by taking the interval of 15, 20 and 25 days respectively at selected control site. The larval mortality of *T. nivella* was concluded at each micro-plot after four to eight hours of the application of insecticide. It was concluded that infestation of *T. nivella* was controlled about 86 % by the application of Fipronil (Regent-3G) at 3.0 Kg a.i./hac quantity.

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

INTRODUCTION

Uttar Pradesh is the largest producer of cash crop of sugarcane but per hectare yield of sugarcane is not more in comparison to other states of India. Amongst many factors which decrease the production of sugarcane, insect pest are the major problem [1]. Sugarcane top borer; *Tryporyza (Scirpophaga) nivella* is a major devastator pest of sugarcane [13]. Due to the attack of *T. nivella,* quantity and quality of sugarcane is much reduced [5, 7]. Due to attack of *Scirpophaga nivella,* the decreased production of sugarcane was recorded 12.68 % by Ahmad [3]. In a further investigation, the total reduction due to the attack of top borer, was concluded 36-56 % by [16]. *T. nivella* is a member of family- Pyralidae of order- Lepidoptera under class- Insecta. *T. nivella* completed its life history in four developmental stages; egg, larva, pupa and adult [12]. Adult of *T. nivella* slightly infested the sugarcane plant but newly hatched larvae enter first in the mid-rib of the leaf and bores downwards into the shoots from the top [11] and [9]. The heavy destruction was made by larval stage which feed on newly growing leaves of sugarcane from 3rd week of May to 1st week of July in support of [2, 8 and 12]. So, this investigation was carried out to search the better method for control *T. nivella* infestation by treatment of a granular insecticide; Fipronil (Regent-3G) during research work at control site.

MATERIALS AND METHODS

To control the infestation of *T. nivella,* selected insecticide; Fipronil (Regent-3G) was applied with the help of granule mechanical dispenser over selected four micro-plots at each of three macro-plots at selected control site; agriculture farm house of R.B.S. College Bichpuri Agra (U.P.) from 26 May 2012 to 16 July 2012 as suggested by [12]. At all three selected macro-plot during application of selected insecticide, interval was maintained 15, 20 and 25 days respectively. In

accordance of [21] at each macro-plot, different quantities; 1.5, 2.0, 2.5 and 3.0 kg a.i./hac of Regent-3G was respectively applied at first, second, third and fourth plots of 100 plants while; a fifth plot at each macro-plot of 100 plants was not treated with selected insecticide as a control plot in support of [6]. Regent-3G was applied at selected three macro-plots when, 42, 44 and 42 percent infection of *T. nivella* appeared respectively in support of [20]. At selected macro-plots, Regent-3G was applied periodically with three replications in accordance of [17]. After 4-8 hours of application, the effect of insecticide was translocated into various parts of sugarcane plant then, the larval mortality was recorded at each micro-plot of three macro-plots. Observations were recorded and obtained result was analyzed that is presented in Table- 1 and Graph- I. Mortality percentage was counted by applying the following formula of [14]-

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

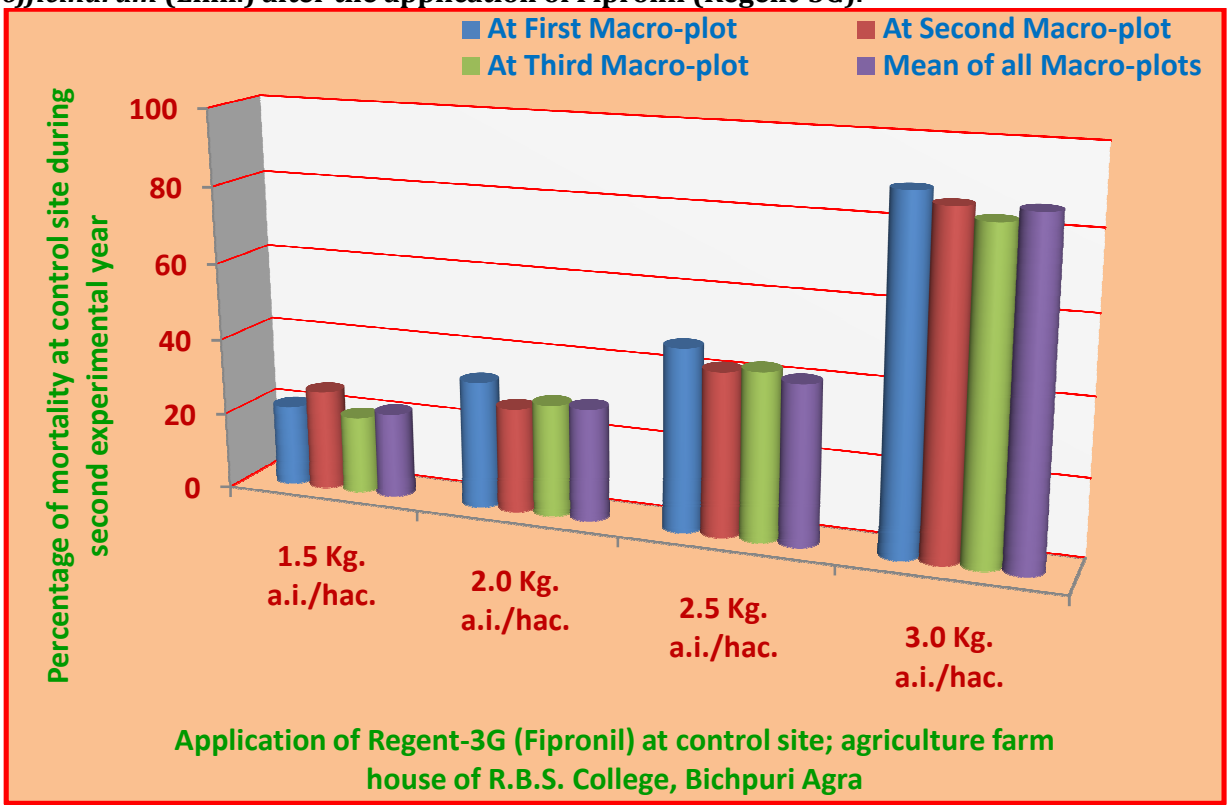
RESULTS AND DISCUSSION

Table -1 and Graph- I reveal that different applied quantities; 1.5, 2.0, 2.5 and 3.0 kg a.i./hac of selected insecticide; Fipronil (Regent-3G) gave 21, 33, 47 and 89 percent mortality at first macro-plot at the maximum infestation rate. Moreover, at second macro-plot, same quantities of Regent-3G killed 26, 27, 42 and 86 percent larvae of *T. nivella* at the maximum infestation rate. At third macro-plot same quantities of Regent-3G controlled 20, 29, 43 and 83 percent larval mortality of *T. nivella* at the maximum infestation rate. Mean of larval mortality of all three macro-plots was also recorded which shows that the different quantities viz; 1.5, 2.0, 2.5 and 3.0 kg a.i./hac of Regent-3G controlled about 22, 29, 41 and 86 percent infestation of *T. nivella* at the maximum infestation rate. The findings of present research work have contradiction with the findings of [4] who recorded that Regent-3G could control *T. nivella* infestation about 17.42 percent. The findings of [19] also show disagreement with the present findings who reported that Regent-3G was control 60 percent infestation of top borer respectively.

Table- 1 : Showing the observations on the percentage of mortality of larvae of *T. nivella* on *Saccharum officinarum* (Linn.) after the application of Fipronil (Regent-3G).

During second experimental year; 2012-2013												Mean of mortality percent of all three macro-plots
Name of Insecticide	Treatment (kg a.i./hac)	Number of Replications	Percentage of mortality at control site									
			At first macro-plot at the interval of 15 days			At second macro-plot at the interval of 20 days			At third macro-plot at the interval of 25 days			
			26.05.12	10.06.12	25.06.12	29.05.12	18.06.12	08.07.12	27.05.12	21.06.12	16.07.12	
Regent-3G (Fipronil)	1.5	3	12	13	21	12	16	26	09	09	20	22
	2.0	3	15	24	33	16	18	27	15	20	29	29
	2.5	3	20	29	47	15	21	42	19	25	43	41
	3.0	3	26	46	89	23	40	86	23	44	83	86
(Control)	Nil	Nil	42	75	96	44	73	94	42	75	96	Nil

Graph- I : The Relation in the mortality percentage of *T. nivella* larvae on *Saccharum officinarum* (Linn.) after the application of Fipronil (Regent-3G).



CONCLUSION

The variation of mortality percentage which came in the present and previous research work may be due to climate change of the selected site. In the present research work by the treatment of Fipronil at the quantity of 3.0 K.g. a.i./hac, the highest percentage of mortality was recorded 86 percent while in the previous research works of [4 and 19] it was noted only 17.42 and 60 percent. Keeping above view it can be safely said that Regent-3G at 3.0 kg a.i./hac quantity is the excellent effective quantity in comparison to other quantities for control the infestation of *T. nivella*.

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