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Effect of Quinalphos 25% EC on Population of Natural Enemies in Pigeon Pea

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Effect of Quinalphos 25% EC at 1300, 1400, 1500 ml/ha was tested along with Indoxacarb 14.5% SC 400 ml/ha, Deltamethrin 2.8% EC 500 ml/ha and control on natural enemies by counting the population of common predatory fauna viz.; population of grub and adults of *Coccinella* spp., *Chrysoperla carnea* and *Menichilus* at regular interval in each replication. The observations were recorded on random upper three leaves through visual counting in field condition at the Instructional Farm of Rajasthan College of Agriculture, MPUAT, Udaipur during *kharif* 2016 and 2017 from August to January. It was found that none of the above doses of Quinalphos 25% EC adversely affected the population of natural enemies. However yield was recorded maximum when Quinalphos 25% EC @ 1500 ml/ha was applied.

Introduction

Red gram is an important pulse crop in India. It is also known as Pigeon pea, Arhar and Tur. Red gram is mainly cultivated and consumed in developing countries in the world. This crop is widely grown in India. India is the largest producer and consumer of Red gram in the world. The ability of red gram to produce high economic yields under soil moisture deficit makes it an important crop in rained and dry land agriculture. India contributes for nearly 90% of world's total red gram production. However, it is gaining importance in African countries due to its adaptability to limited moisture conditions. According to the all India crop situation report, *Kharif* 2017-18, Ministry of Agriculture, Government of India, the area under redgram in the country has decreased to 43.00 lakh hectares in 2017-18 from 53.39 lakh hectares in 2016-17. Red gram is a protein rich staple food. It contains about 22 per cent protein, which is almost three times that of cereals. Red gram supplies a major share of protein requirement of vegetarian population of the country. Red gram is mainly consumed in the form of split pulse as Dal, which is an essential supplement of cereal based diet. The rice is combined with Red gram because of the complementary relationship of the essential amino acids. It is particularly rich in lysine, riboflavin, thiamine, niacin and iron. In addition to being an important source of human food and animal feed, Red gram also plays an important role in sustaining soil fertility by improving physical properties of soil and fixing atmospheric nitrogen. Being a drought resistant crop, it is suitable for dryland farming and predominantly used as an intercrop with other crops.

A number of insects attack the red gram crop but use of chemical pesticides may have a negative impact on natural enemies. In this view it was need felt to find out a safe dose of pesticide for red gram without adversely affecting the population of natural enemies.

Methods

The investigation was carried out at Instructional Farm of Rajasthan College of Agriculture, MPUAT, Udaipur during *Kharif* (August 2016 to January 2017 and August 2017 to January 2018). Geographically, Udaipur is located at 23.4°N longitude and 75°E latitude at an elevation of 579.5 MSL in the state of Rajasthan. The experiment was laid out in a randomized block design with 4 replications. The pigeon pea variety “ICPL-1087” was used for the experiment. Five plants were randomly selected and tagged from each plot. The effect of Quinalphos 25% EC at 1300, 1400, 1500 ml/ha, Indoxacarb 14.5% SC 400 ml/ha, Deltamethrin 2.8% EC 500 ml/ha alongwith control on natural enemies was studied by counting the population of common predatory fauna viz.; population of grub and adults of *Coccinella* spp., *Chrysoperla carnea* and *Menichilus* at regular interval in each replication.

The population data were subjected to estimate the reduction in natural enemies after treatments as under:

$$\text{Per cent reduction in population} = 100[1 - T_aXC_b/T_bXC_a]$$

Where,

T_a = Number of insects after treatment

T_b = Number of insects before treatment

C_a = Number of insects in untreated check after treatment

C_b = Number of insects in untreated check before treatment.

Results

The data recorded on the population of grub and adults of *Coccinella* spp., *Chrysoperla carnea* and *Menichilus* spp. revealed that their population did not vary significantly and were at par to each other in different treatments. It indicated that sprays of Quinalphos 25% EC at 1300, 1400, 1500 ml/ha, Indoxacarb 14.5% SC 400 ml/ha and Deltamethrin 2.8% EC at 500 ml/ha did not have adverse effect on the common natural enemies present in red gram eco-system (Table 1). The maximum yield (4.48 q/ha) of red gram was recorded with a dose of Quinalphos 25% EC @ 1500 ml/ha.

Table 1: Bio-efficacy of Quinalphos 25% EC, Indoxacarb 14.5% SC and Deltamethrin 2.8% EC insecticides against natural enemies in red gram during kharif 2016 and 2017

S. N.	Treatment	Dose (g.ai / ha)	Formulation dose (l/ha)	Natural enemies/plant												Yield (q/ha)	
				<i>Coccinella</i>				<i>Chrysoperla carnea</i>				<i>Menichilus</i>					
				Grub		Adult		Grub		Adult		Grub		Adult			
				2016	2017	2016	2017	2016	2017	2016	2017	2016	2017	2016	2017	2016	2017
T ₁	Quinalphos 25% EC	325	1300	1.80 (1.52)	1.90 (1.55)	1.90 (1.55)	2.00 (1.58)	1.92 (1.56)	1.90 (1.55)	1.96 (1.57)	2.00 (1.58)	1.95 (1.56)	1.90 (1.55)	1.90 (1.55)	1.88 (1.54)	3.99	3.81
T ₂	Quinalphos 25% EC	350	1400	1.97 (1.57)	2.00 (1.58)	2.00 (1.58)	2.00 (1.58)	1.80 (1.52)	1.90 (1.55)	1.90 (1.55)	2.20 (1.64)	1.87 (1.54)	1.88 (1.54)	1.88 (1.54)	2.00 (1.58)	4.19	4.26
T ₃	Quinalphos 25% EC	375	1500	1.85 (1.53)	1.88 (1.54)	2.10 (1.61)	2.09 (1.61)	2.00 (1.58)	1.93 (1.56)	2.10 (1.61)	2.11 (1.62)	1.86 (1.54)	1.95 (1.57)	2.00 (1.58)	2.03 (1.59)	4.39	4.48
T ₄	Indoxacarb 14.5% SC	60	400	1.79 (1.51)	1.90 (1.55)	2.12 (1.62)	2.12 (1.62)	2.10 (1.61)	2.00 (1.58)	2.20 (1.64)	2.10 (1.61)	2.10 (1.61)	2.00 (1.58)	2.10 (1.61)	2.10 (1.61)	3.83	3.85
T ₅	Deltamethrin 2.8 EC	12.5	500	1.90 (1.55)	2.20 (1.64)	2.20 (1.64)	2.10 (1.61)	2.10 (1.61)	2.10 (1.61)	2.15 (1.63)	1.90 (1.55)	2.00 (1.58)	1.80 (1.52)	1.90 (1.55)	1.90 (1.55)	3.90	3.91
T ₆	Untreated control	-	-	1.88 (1.58)	1.90 (1.55)	1.90 (1.55)	2.00 (1.58)	2.05 (1.60)	2.06 (1.60)	2.12 (1.62)	2.20 (1.64)	2.20 (1.64)	1.90 (1.55)	1.94 (1.56)	2.00 (1.58)	3.44	3.32
S. Em ±				0.024	0.023	0.024	0.012	0.024	0.022	0.025	0.020	0.041	0.012	0.024	0.017	0.02	0.126
C.D. at 5%				0.076	0.072	0.077	0.039	0.076	0.069	0.071	0.062	0.129	0.038	0.076	0.053	0.05	0.40

Conclusion

A dose of Quinalphos 25% EC up to 1500 ml/ha can be used safely without adversely affecting the population build-up of natural enemies in red gram. The findings can be used for deciding dose of Quinalphos 25% EC for insect control in red gram.

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