

Varietal Susceptibility of Deltamethrin Treated Chickpea Seeds against *Callosobruchus maculatus* under Ambient Condition

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Safe storage of pulse seed is a difficult task owing to the severe damage caused by insect pests (bruchids). Out of five known species of *Callosobruchus* from India, *C. maculatus*, *C. chinensis* and *C. analis* are the most common species of pulse beetle in India [1]. Apart from the seed damage in the field, there is also a danger of its concomitant migration to store along with the seeds, resulting in both qualitative and quantitative losses. Seed losses due to *C. maculatus* were reported as high as 30 per cent in India [2]. Similarly, seed damage up to the extent of 40-50 per cent has been reported in Nigeria and Egypt [3,4]. The objective of this investigation was therefore, to study the varietal susceptibility of chickpea caused by pulse beetle, *C. maculatus* (Fab.) during storage with a seed protectant deltamethrin 2.5 WP @ 1 ppm (40 mg/ kg of seed) under ambient condition.

The experiment was undertaken during *kharif* 2001-2002, 2002-2003 and 2003-2004. Five recommended, popular varieties of chickpea *viz.*, PG-12, Vijay, Vishal, Virat and PG-5 were selected for the present studies. Freshly harvested seed was taken having high germination and low moisture content (less than 10 per cent) for each variety. These varieties were arranged in two sets of experiment, one set of experiment was treated with deltamethrin 2.5 WP @ 1 ppm (40 mg / kg of seed) while the other set was kept as untreated control. In treated set of seed, required quantity of pesticide was diluted in 5 ml of water to treat one kg of seed for proper coating. Seed was kept in shed for drying and packed in 2 kg capacity gunny bag-lets and bag-lets of each set had a distance of two meter between replications. Observations were recorded on the per cent germination and insect infestation caused by *C. maculatus* every month up to six month of storage

period. The data was statistically analyzed in factorial completely randomized design and the findings have been discussed.

Insect infestation

The pooled data of three years experiment are presented in table 1. The data showed that treated seed of all varieties had significantly less seed damage than untreated ones. Treated seeds of PG-12 and Vishal were free from insect infestation during six months of storage whereas Vjay and PG-5 had 0.9 and 0.7 per cent insect infestation as against 1.4 per cent in Virat. In untreated control set, the highest level of insect infestation was recorded in Virat (20.3%) as against 10.9 per cent in PG-12. It was also noticed that in treated seed, all the varieties were free from insect damage up to 3 months of storage whereas it was one month in case of untreated control. Insect infestation increased with increase in storage period in treated as well as untreated seeds. In both the treatments, variety Virat was found to be more susceptible to *C. maculatus* than others.

Seed germination

As regards to the germination, three years pooled data (Table 2) showed that seeds of all the five varieties treated with deltamethrin had significantly higher germination than untreated control and after 6 months of storage, the germination level was above the IMSCS level of 85 per cent except, variety Virat (82%) which had less germination level.

Seed germination declined significantly in all the varieties in both the treatments from the time of commencement to 6 months of storage. This decline

Table 1. Effect of seed protectant on per cent insect infestation of different varieties of chickpea seed

Treatment	Variety	Storage period (month)						
		0	1	2	3	4	5	6
Deltamethrin@ 1 ppm	PG-12	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	Vijay	0.0	0.0	0.0	0.0	0.2	0.8	0.9
	Vishal	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	Virat	0.0	0.0	0.0	0.0	0.7	1.1	1.4
	PG-5	0.0	0.0	0.0	0.0	0.4	0.6	0.7
Untreated Control	PG-12	0.0	0.0	0.0	1.1	4.6	8.0	10.9
	Vijay	0.0	0.0	0.6	5.2	9.6	15.3	16.1
	Vishal	0.0	0.0	0.0	2.8	9.2	13.8	15.6
	Virat	0.0	0.0	0.8	3.7	10.2	15.9	20.3
	PG-5	0.0	0.0	0.0	0.8	6.8	11.8	15.6
	S.E.±	C.D. at 5 %						
Treatment (A)	2.67	6.21						
Variety (B)	0.56	1.84						
Storage period (C)	2.42	7.47						

Table 2. Effect of seed protectant on per cent germination of different varieties of chickpea seed during storage

Treatment	Variety	Storage period (month)						
		0	1	2	3	4	5	6
Deltamethrin @ 1 ppm	PG-12	100	98	97	95	95	94	93
	Vijay	100	99	96	95	95	92	92
	Vishal	99	99	96	95	94	93	91
	Virat	97	95	92	90	90	85	82
	PG-5	98	96	94	93	91	91	88
Untreated Control	PG-12	99	98	95	93	91	85	84
	Vijay	99	97	95	94	90	88	85
	Vishal	99	97	96	93	90	88	85
	Virat	97	94	91	90	87	81	77
	PG-5	97	96	93	92	87	85	81
	S.E.±	C.D. at 5 %						
Treatment (A)	1.07	6.53						
Variety (B)	0.83	2.72						
Storage period (C)	1.52	4.68						

in germination is a natural phenomenon and could also be attributed due to insect infestation caused by *C. maculatus* with the increase in storage period.

Regarding the varietal susceptibility of chickpea to *C. maculatus*, the variety PG-12 was found to be less susceptible followed by Vishal and PG-5 as against Virat in untreated control. This investigation revealed that there were significant differences in relative susceptibility of different varieties to the pulse beetle. Similar findings were also reported in gram, green gram and pigeon pea (5, 6 and 7).

As regards, the efficacy of deltamethrin 2.5 WP @1 ppm (40 mg/ kg of seed) against the *C. maculatus*, the insecticide could completely protect the seeds of all the varieties for a period of three months.

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