

Studies on New Seed Dressing Insecticides Against Insect Pests of Green Gram

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Abstract – Seed treatment with Thiamethoxam @ 4.3 g and 8.6 g/kg, Imidacloprid @ 5ml and 10 ml /kg, Acetamiprid @ 15 g and 30 g/kg, Carbosulfan @ 30ml and 40 ml/kg, Clothionidon @ 6 g and 12 g/kg seed and Untreated control as 11 treatments replicated thrice in R.B.D were field evaluated for their efficacy against sucking pests of green gram, Var. LGG-460 at SV Agricultural College, Tirupathi during Rabi season 2008.

To assess the influence of seed dressing chemicals in the suppression of early season insect pests in green gram. Thiamethoxam @ 4.3 g/kg and 8.6 g/kg was highly effective against aphids, thrips, leaf hoppers upto 30 days after germination in green gram. The leaf damage was low in thiamethoxam, imidacloprid, acetamiprid treatments. Low plant stand was recorded in clothionidon @ 6 g and 12 g/kg treatments. The seed treatment can also be included as a component in the eco-friendly modules of integrated pest management in Green gram.

Keywords – Thiamethoxam, Imidacloprid, Acetamiprid, Carbosulfan, Clothionidon, Seed Treatment Efficacy.

I. INTRODUCTION

Green gram (*Vigna radiate* (L.) Wilczek), also known as mung bean, is one of the most important pulses, but a number of insect pests adversely affect its production. The major pests infesting green gram crop are aphid, jassid, whitefly, thrips at an early stage of crop growth and pod borer at flowering and pod filling stage (Sukul et al., 1987). The sucking pests complex significantly contributes to yield losses.

Though many insecticides have been tried for controlling these sucking pests as seed dressers, a new group of insecticide, viz., neonicotinoides was found effective recently. So, imidacloprid and thiamethoxam belonging to this group were evaluated against the major sucking pests of green gram.

II. MATERIALS AND METHODS

The efficacy of the certain insecticides as seed dressings was assessed in the present study. The field trails were designed with 11 treatments replicated three times in RBD involving five insecticides and their influence on the insect pest complex on Green gram variety LGG-460.

Appropriate dosages of Thiamethoxam @ 4.3 g and 8.6 g/kg, Imidacloprid @ 5ml and 10 ml /kg, Acetamiprid @ 15 g and 30 g/kg, Carbosulfan @ 30ml and 40 ml/kg, Clothionidon @ 6 g and 12 g/kg seed were weighed separately and mixed thoroughly

with the polymer sticker provided. One kilogram of the seed from each of green gram is taken in separate polythene bags and chemicals were added and thoroughly mixed until all the seeds were uniformly coated. Similarly, pre-measured quantities of carbosulfan (30.0 ml and 40.0 ml) and clothionidon (6.0 g and 12.0 g) were taken separately and applied on to the seed (1 kg of each crop) and carefully swirled swirled in separate polythene bags till all the seeds are coated with respective insecticide doses. All the seed dressings were done one day prior to sowing and shade dried.

Observations were recorded on the total number of aphids, jassids and thrips per ten randomly selected plants at 10,20,30,45 DAG. Also observations on grain yield were recorded after systematic harvesting. Data of each observations were subjected to statistical analysis.

III. RESULTS AND DISCUSSION

Effect of Seed Dressers on Sucking Pests (Table 1)

Aphids: The aphids populations at 10,20,30 and 45 DAG in the green gram crop sown during December, 2008 was presented in Table No. 1 showed that the seed treatment with Thiamethoxam (4.3 g and 8.6 g/kg) and Imidacloprid (5 ml and 10 ml g/kg) were highly effective against aphids. The differences among the most effective treatments and the untreated control (4.30-182.00/10 plants, respectively) were significant. The present findings are in conformity with Vadodaria et al. (2001) who reported that Thiamethoxam (cruiser 70 WS) at 4.3 g and 2.8 g/kg, Imidacloprid (Gaucho 600 FS) @ 12 ml and 9 ml/kg and Imidacloprid (Gaucho 70 WS) @ 7.5 g/kg kept the population of aphids below ETL. Santos and Santos (1999) also observed as Acetamiprid@ 40 g/ha and Thiamethoxam @ 50 g/ha were effective against aphids on cotton. Similar observations were reported by Nakat et al. (2002), who reported that Thiamethoxam and Imidacloprid both at 0.05 per cent proved the best against aphids in green gram. Dhandapani et al. (2002) concluded Clothionidon (poncho 800 FS) at 9 ml/kg and Imidacloprid (Gaucho 600 FS) at 12ml/kg effectively controlled the sucking pests and cotton

Thrips: The thrips populations at 10,20,30, and 45 DAG in the seed treatments with Thiamethoxam (4.3 g and 8.6 g/kg) and Imidacloprid (5 ml and 10 ml/kg) was very less, while untreated control had significantly high populations of 105.33/10 plants. Superiority of Imidacloprid and

Thiamethoxam at the tested dosages was attributed to the systemic action of these chloronicotinyle insecticides and their amenable seed dressing formulations. The efficacy of Imidacloprid against thrips was also reported by Mote et al. (1994) in Chilli: and Almand (1995) and Burries et al. (1995) on Cotton. Seed treatment with isofenphos, carbofuran and chlorpyrifos registered good control of root grubs and early season pests such as Jassids and Thrips and period of protection was 30 days (NARP 1982). Vadodaria et al., (2001) was also observed that Thiamethoxam (cruiser 70 WS) @ 4.3 g and 2.8 g/kg, Imidacloprid (Gaucho 600 FS) @ 12 ml and 9 ml/kg and Imidacloprid (Gaucho 70 WS) @ 7.5 g/kg kept the population of thrips below ETL. Sreekanth (2002) reported the similar findings by observing that Imidacloprid 0.0035 per cent seed treatment was the most effective against Thrips palmi on mungbean.

Leafhoppers: Data on the leafhopper population at 10,20,30 and 45 DAG in the green gram crop sown during December, 2008 after seed treatment with different seed dressing insecticides showed that the seed treatment with Thiamethoxam (4.3 g and 8.6 g/kg) and Imidacloprid (5 ml and 10 ml/kg) were highly effective against leaf hoppers upto 20 days and build up of leaf hoppers was noticed thereafter. The differences among the effective treatments and the untreated control varied between 2.60 and 102.33/10 plants, and were significant. Superiority of Imidacloprid through seed treatment to suppress leaf hoppers in groundnut was supported by Gupta et al. (1998), Khilikawja Abbas (1999) and Jyothirmai (2000) on groundnut. Vadodaria et al. (2001) reported that Thiamethoxam (Cruiser 70 WS) @ 4.3 g and 2.8 g/kg, Imidacloprid (Gaucho 600 FS) @ 12 ml and 9 ml/kg and Imidacloprid (Gaucho 70 WS) @ 7.5 g/kg kept to the population of leafhoppers below ETL.

Effect on Yield (Table 2)

Present investigations on the effects of seed treatment chemicals on the economic yield of green gram (Table 2) revealed that though the crop is sown during December 2008 differences in yield among the seed treatments were not significant and the highest yield of 11.03 t/ha was recorded in Acetamiprid

Dandale H G Thakare A Y Tikar S N Rao N G @ 15g/kg seed followed by Carbosulfan @ 40 ml/kg seed (10.72 t/ha), as compared to low yield of 7.41 t/ha in Clothionidon @ 6g/kg.

From the above one indication on yield of economic produce, it is understood that increased yields in the treatments were directly related to the plant stand. Similar findings were reported by Lal et al. (1974) who obtained increased yields of 46.43, 68.43 and 71.93 per cent, respectively over control with carbofuran treated groundnut seed @ 3,5 and 7 per cent levels. Seed treatment with quinalphos 25 % EC @ 25 ml/kg seed, gave highest pod yield (10.80 q/ha) and dry totter (42.130 t/ha). Mote and Shah (1993)

also obtained high grain yield with soil application of carbofuran 3G @ 1 kg/ha followed by the Carbosulfan 7% seed treatment in French bean. According to Patil and Kulkarni (2004), seed treatment with Thiamethoxam resulted in 742.50 kg/ha additional yield over untreated check. Mote et al. (1994) also reported that seed treatment of chillies with Imidacloprid at 10 g/kg + seedling root dip in 0.04 % resulted in the highest yield of dry chillies as compared to untreated check.

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Table 1. Effect of different treatments on the population of sucking pests

Tr.No.	Treatments	Mean number of sucking pests /10 plants											
		Aphids				Thirps				Leaf hoppers			
		10	20	30	45	10	20	30	45	10	20	30	45
T1	Thimethoxam@4.3g/kg	24.66	38.00	82.00	78.00	26.66	16.66	41.00	36.00	22.00	19.66	19.00	22.33
T2	Thimethoxam@8.6g/kg	18.00	33.33	71.00	68.00	26.00	12.00	33.00	30.00	14.00	17.00	14.00	16.00
T3	Imidaclopride@5 ml/kg	42.33	58.00	58.33	98.33	12.33	34.00	23.66	49.33	8.66	1433	34.00	40.00
T4	Imidaclopride@10 ml/kg	37.66	52.33	52.33	90.33	8.66	26.00	19.33	43.33	6.33	11.33	26.00	35.33
T5	Acetamiprid@15 g/kg	62.66	72.66	95.33	122.00	39.66	44.00	53.33	65.33	39.33	46.00	74.00	57.66
T6	Acetamiprid @30 ml /kg	56.66	67.00	86.00	111.66	30.00	39.00	47.00	56.66	31.66	39.00	66.00	51.33
T7	Carbosulfan @30 ml /kg	76.00	88.33	136.00	138.33	56.00	63.33	80.66	76.00	49.33	58.33	64.00	68.66
T8	Carbosulfan @40 ml /kg	70.33	81.66	127.00	131.00	45.33	53.00	73.66	69.00	42.33	51.33	56.00	64.00
T9	Clothionidon@ 6 g/kg	89.66	97.00	112.66	163.00	64.66	69.33	70.00	86.00	63.66	68.00	50.00	84.00
T10	Clothionidon @ 12 g /kg	82.33	92.33	106.33	157.33	56.33	57.33	63.00	81.66	56.00	60.33	44.00	78.66
T11	untreated control	95.33	106.66	160.00	182.00	76.00	85.00	96.00	105.33	71.00	84.00	92.33	102.33
	General mean	59.60	71.57	98.87	121.81	39.63	45.42	54.60	63.1	36.75	43.54	49.03	56.39
	S.Em+-	0.07	0.06	0.07	0.05	0.01	0.06	0.07	0.09	0.09	0.08	0.09	0.08
	CD 5%	0.23	0.18	0.22	0.17	0.29	0.19	0.20	0.19	0.28	0.24	0.29	0.24
	CV %	1.80	1.32	1.32	0.91	2.88	1077	1.66	1.43	2.88	2.22	2.52	1.93

Table 2 Grain yield

Tr.No	Treatments	Green gram (Q/ha)
T1	Thimethoxam@4.3g/kg	8.87
T2	Thimethoxam@8.6g/kg	9.64
T3	Imidaclopride@5 ml/kg	9.41
T4	Imidaclopride@10 ml/kg	9.56
T5	Acetamiprid@15 g/kg	11.03
T6	Acetamiprid @30 ml /kg	8.70
T7	Carbosulfan @30 ml /kg	8.87
T8	Carbosulfan @40 ml /kg	10.72
T9	Clothionidon@ 6 g/kg	7.41
T10	Clothionidon @ 12 g /kg	9.25
T11	untreated control	8.72
	General mean	9.02
	S.Em+-	1.45
	CD 5%	NS
	CV %	27.93