



Evaluation of Certain Grain Protectants Against Drug Store Beetle (*Stegobium paniceum* L.) in Stored Coriander

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ABSTRACT

Laboratory studies on the efficacy of certain plant product powders as grain protectants against drug store beetle *Stegobium paniceum* L. in stored coriander were conducted at Regional Agricultural Research Station, Lam Farm, Guntur during 2006-08 crop seasons. Among the treatments tested sweet flag @ 5g/kg and parad @ 1 tablet recorded high initial % mortality, low cumulative beetle population and zero per cent seed damage upto two months.

Key words : Drug Store Beetle, Grain Protectants, Plant Product Powders, *Stegobium paniceum*, Stored Coriander

Coriander is one of the important spice crops cultivated in Andhra Pradesh in an area of 31,290 ha with a production of 37,550 tonnes. Mostly it is cultivated in Kadapa and Kurnool districts of Andhra Pradesh. Drug store beetle *Stegobium paniceum* L. in stored coriander is a main limiting factor in the storage of coriander causing so much economic loss both in quality and quantity. There is a need to identify safe, cheap and non-chemical seed protectant.

Panse (1966) in his interim report reported post-harvest losses to an extent of 9.33% of which 2.55% loss was due to storage insects. There are many advantages with natural plant products such as easy availability, low mammalian toxicity and non-hazardous to human health, surface persistence lasting for long time with no adverse effects on germinability, cooking quality and milling. Hence, the present laboratory studies on the efficacy of certain plant product powders as grain protectants against drug store beetle *S. paniceum* in stored coriander were conducted at Regional Agricultural Research Station, Lam Farm, Guntur during 2006-08 crop seasons.

MATERIAL AND METHODS

Ten pairs of newly emerged drug store beetles were released into 100 g of test seed coriander added with different grain protectants and stored in the cloth bag. Each treatment is replicated thrice. The performance of grain protectants was calculated based on adult beetle mortality, cumulative beetle population and per cent seed damage. Adult beetle mortality and per cent seed damage were transformed to arc sin values and then F test was

done. While in cumulative beetle population, the numbers were transformed to square root of $x+1$ transformation and then F test of significance was performed.

RESULTS AND DISCUSSIONS

The results of studies on the efficacy of certain plant product powders as grain protectants against drug store beetle *S. paniceum* in stored coriander for 2006-08 were pooled and the mean values of Table 1 and 2 are presented in Table 3.

From the Table it is evident that among the grain protectants tested sweet flag @ 5g/kg and parad tablet @1/kg recorded high initial per cent mortality of beetle of 47.4 and 46 per cent respectively and these were statistically on par with each other and followed by ocimum leaf bits @ 5g/kg (44.4%).

As regards per cent seed damage both sweetflag @ 5g/kg and parad @1 tablet/kg recorded zero per cent damage upto two months. In all other treatments above ETL level of 1% seed damage was recorded even at 30DAT.

Present studies on sweetflag are in agreement with Chiranjeevi (1991), who reported that sweetflag @1.5% and 2% provided 100% protection of greengram seed from *C. chinensis* upto 60 days by recording zero per cent damaged grains. Ramarao and Sarangi (1998) reported that sweetflag rhizome powder both at 3% and 5% concentration against *S. oryzae* was effective for 90 days after treatment.

Sharma (1999) reported that neem leaf powder at 5% protected maize seed for five months against *S. zeamais*, *S. oryzae* and *R. dominica*.

Table 1. Effect of grain protectants against drug store beetle of coriander during 2007-08

Treatment and dose	Mortality of beetle (%) after 48hrs*	Cumulative Popul. of beetle**	% Seed damage*			
			30 DAT	60 DAT	120 DAT	210 DAT
Neem leaf bits 5 g/kg	11.11 (19.63)	651.00 (25.41)	1.72 (7.20)	7.50 (15.60)	91.20 (74.40)	94.50 (77.20)
Eucalyptus leaf bits 5 g/kg	11.11 (19.63)	978.00 (30.71)	1.63 (6.98)	14.70 (22.40)	97.80 (82.50)	98.30 (82.70)
Lantana leaf bits 5 g/kg	24.40 (29.48)	691.60 (26.20)	1.90 (7.70)	24.90 (29.86)	94.60 (77.30)	94.80 (77.10)
Pongamia leaf bits 5 g/kg	11.11 (19.63)	512.3 (22.47)	2.95 (9.30)	29.15 (32.70)	95.40 (78.60)	96.90 (81.20)
Mint Leaf bits 5 g/kg	15.55 (23.12)	771.60 (27.69)	2.66 (9.10)	4.80 (12.44)	76.72 (61.20)	84.30 (67.60)
Sweet flag 5g/kg	46.64 (39.68)	191.33 (13.77)	0 (0)	0 (0)	65.86 (54.20)	76.80 (64.70)
Custard apple leaf bits 5g/kg	35.55 (36.50)	914.33 (30.17)	1.35 (6.18)	5.67 (13.50)	74.46 (59.70)	89.40 (72.00)
Ocimum leaf bits 5g/kg	48.88 (44.37)	501.30 (22.22)	1.56 (6.70)	2.90 (9.66)	94.00 (76.30)	95.50 (78.20)
Parad tab. 1/kg	46.66 (39.66)	156.6 (12.42)	0 (0)	0 (0)	55.40 (48.10)	72.50 (58.50)
Control	0 (0)	983.33 (31.30)	12.5 (20.50)	18.18 (25.10)	94.90 (77.70)	98.60 (83.50)
CD at 0.05	4.57	1.06	2.06	1.61	3.03	6.60
CV%	9.8	2.6	16.3	6.1	2.6	5.2

* = Figures in parantheses are angular transformed values.

** = Figures in parantheses are square root of X + 0.5 transformed values.

Table 2. Effect of grain protectants against drug store beetle of coriander during 2006-07

Treatment and Dose	Mortality of beetle (%) after 48hrs*	Cumulative popul. of beetle**	% Seed damage*			
			30 DAT	60 DAT	120 DAT	210 DAT
Neem leaf bits 5 g/kg	10.11 (18.69)	675.00 (25.98)	2.12 (8.29)	8.20 (16.55)	87.40 (69.40)	95.60 (78.20)
Eucalyptus leaf bits 5 g/kg	11.11 (18.88)	967.00 (31.10)	2.00 (8.09)	15.50 (23.06)	89.60 (74.80)	97.80 (80.90)
Lantana leaf bits 5 g/kg	24.40 (31.70)	682.00 (26.12)	2.32 (8.68)	27.40 (31.56)	96.60 (79.50)	94.70 (76.70)
Pongamia leaf bits 5 g/kg	11.11 (18.59)	521.30 (22.83)	3.25 (10.30)	31.30 (34.02)	97.50 (81.00)	95.90 (77.70)
Mint Leaf bits 5 g/kg	15.55 (23.83)	715.60 (26.75)	2.90 (9.78)	5.20 (13.18)	72.30 (58.50)	82.60 (65.10)
sweet flag 5g/kg	46.64 (43.96)	181.66 (13.42)	0 (0)	0 (0)	62.50 (52.20)	72.30 (58.10)
Custard apple leaf bits 5g/kg	35.55 (37.75)	921.33 (30.36)	1.65 (7.20)	4.57 (12.06)	69.50 (56.60)	91.40 (72.70)
Ocimum leaf bits 5g/kg	48.88 (44.54)	511.20 (22.62)	1.86 (7.71)	3.40 (10.56)	95.60 (77.90)	94.80 (76.90)
Parad tab. 1/kg	46.66 (42.34)	145.33 (11.97)	0.16 (1.35)	0 (0)	57.50 (49.30)	69.60 (56.60)
Control	0 (0)	983.33 (31.88)	13.10 (21.20)	17.40 (24.63)	97.50 (81.00)	97.40 (80.00)
CD at 0.05	3.6	0.79	1.10	1.81	4.59	1.57
CV%	7.5	1.9	7.8	6.4	3.9	1.3

* = Figures in parantheses are angular transformed values.

** = Figures in parantheses are square root of X + 0.5 transformed values.

Table 3. Pooled data of grain protectants against drug store beetle of coriander during 2006-07 and 2007-08

Treatment and Dose	Mortality of beetle (%) after 48hrs*	Cumulative Popul. of beetle**	% Seed damage*			
			30 DAT	60 DAT	120 DAT	210 DAT
Neem leaf bits 5 g/kg	10.8 (18.9)	663.0 (25.7)	1.92 (7.7)	7.8 (16.0)	89.3 (70.8)	95.1 (77.6)
Eucalyptus leaf bits 5 g/kg	10.9 (19.0)	972.5 (31.1)	1.81 (7.5)	15.1 (22.7)	93.7 (75.4)	98.0 (77.9)
Lantana leaf bits 5 g/kg	25.5 (30.2)	686.6 (26.5)	2.11 (8.1)	26.2 (28.2)	95.6 (78.5)	94.7 (76.8)
Pongamia leaf bits 5 g/kg	10.7 (19.0)	516.6 (22.6)	3.1 (9.9)	30.2 (33.3)	96.5 (79.2)	96.4 (79.1)
Mint Leaf bits 5 g/kg	15.9 (23.4)	743.6 (27.2)	2.78 (9.4)	5.0 (12.7)	74.5 (59.7)	83.5 (66.1)
Sweet flag 5g/kg	47.4 (43.5)	186.4 (13.7)	0 (0)	0 (0)	65.8 (53.2)	74.6 (59.7)
Custard apple leaf bits 5g/kg	36.5 (36.9)	917.6 (30.3)	1.5 (6.8)	5.1 (10.1)	72.0 (58.0)	90.4 (74.9)
Ocimum leaf bits 5g/kg	49.0 (44.4)	506.2 (21.8)	1.71 (7.3)	3.2 (10.6)	94.8 (77.0)	95.2 (77.4)
Parad tab. 1/kg	46.0 (42.7)	150.9 (11.9)	0.0 (0)	0 (0)	56.4 (47.9)	71.1 (62.6)
Control	0 (0)	999.7 (31.6)	12.8 (20.9)	17.8 (24.9)	96.2 (78.9)	98.0 (81.3)
CD at 0.05	2.2	1.2	1.3	1.1	3.5	6.9
CV%	4.6	3.0	9.7	11.2	3.1	5.5

* = Figures in parantheses are angular transformed values.

** = Figures in parantheses are square root of X+0.5 transformed values.

Rajasekharan *et al.*, (1985) reported that coating of sorghum and greengram grains with extracts of karanja at 0.4% and 0.6% vol/vol, respectively gave significant protection from *C. chinensis*. George and Patel (1992) observed prevention of egg laying by the pulse beetle on greengram seed treated with mint at 10% upto 60DAT and cent per cent protection to the greengram grain. The present investigations on neem, mint and karanj leaf powders against drugstore beetle in coriander are in disagreement with these reports. This may be due to differences in crop and insect tested.

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