



EFFECT OF SEED PROTECTANTS AGAINST PULSE BEETLE *CALLOSOBRUCHUS CHINENSIS* INFESTING MUNGBEAN

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ABSTRACT

Efficacy of some seed protectants against pulse beetle *Callosobruchus chinensis* (L.) in stored mungbean variety MH 421 was evaluated under laboratory conditions in the Department of Entomology, CCSHAU, Hisar during October- December 2018. The result revealed that the neem leaf powder (30g/ kg) and neem oil (10 ml/ kg) were found most effective with maximum adult mortality (100 and 98.33%, respectively), lowest grain damage and weight loss (1.06 and 1.20%) and (0.75 and 0.81%, respectively), followed by mentha oil (2.5 ml/ kg) and lemongrass oil (2.5 ml/ kg). Turmeric powder resulted in only less adult mortality (48.33%) with maximum infestation and weight loss (14.66 and 4.13%, respectively).

Key words: *Callosobruchus chinensis*, mungbean, plant oil, neem leaf powder, turmeric powder, adult mortality, infestation, grain damage, weight loss

Pulses are main source of protein and minerals contribute in sustainable agriculture (Kumbhare et al., 2014). India, though being the world's largest producers of pulses, productivity is low because of biotic and abiotic stresses. Mungbean is a major kharif pulse crop which is grown in arid and semi arid regions of the country. In India, it is cultivated in 43.26 million ha with total productivity of 500 kg/ ha (Anonymous, 2016-2017). Stored mungbean suffers enormous losses due to *Callosobruchus chinensis* (L.) infestation in field as well as storage (Fletcher and Ghosh, 2002). Control measures in stored grains rely on the use of insecticides/ fumigants (Shaheen and Khaliq, 2005). Use of botanicals such as neem seed powder, custard apple seed powder, edible and some non-edible oils, turmeric, bel, lantana etc for mixing in grain legume has increasingly become an ecofriendly option. These botanicals are environmentally safe, less hazardous, readily available and less expensive (Das, 1986). This study evaluates the effect of seed protectants against pulse beetle *C. chinensis* infesting mungbean in storage conditions.

MATERIALS AND METHODS

Studies were carried out using various seed protectants viz., neem oil (10 ml), neem leaf powder (30 g), mustard oil (7.5 ml), groundnut oil (7.5 ml), turmeric powder (3.5 mg), custard apple seed powder (5 g), mentha oil (2.5 ml), lemongrass oil (2.5 ml) and control (untreated) under laboratory conditions (30-

35°C, 75-80% R.H.). Required dose of various seed protectants were mixed with 50 g mungbean grains (variety MH 421) by shaking it manually. The treated grains were dried under shade for 24 hr. Newly emerged ten pairs of *C. chinensis* adults were released in plastic containers having treated seeds. Adult mortality was observed after 7 days of treatment. For estimation of grain and weight loss, observations were taken after 60 days of treatment and calculated (Adams and Schulten, 1978). The data were subjected to statistical analysis using OPSTAT software.

RESULTS AND DISCUSSION

The data on adult mortality revealed that neem leaf powder and neem oil were most effective protectants, whereas turmeric powder was the least effective against *C. chinensis* (Table 1). After 7 days of treatment, maximum mortality was in neem leaf powder (100%) and neem oil (98.33%) statistically at par with each other followed by mentha oil (91.66%) and lemongrass oil (88.33%) which were also, being statistically at par. The least mortality was found to be in the treatment of turmeric powder (48.33%) after control (8.33%). Maximum grain infestation by number and weight loss was also with turmeric powder (14.66 and 4.13%, respectively) after control (34.00 and 21.08%, respectively). The least infestation/ weight loss was observed with neem leaf powder (1.06 and 0.75%, respectively) and neem oil (1.20 and 0.81%, respectively) which was statistically at par

Table 1. Efficacy of seed protectants against *C. chinensis* infesting mungbean

Treatment	Adult mortality (%)	Grain damage (%)	Weight loss (%)
	7 DAT*	60 DAT	60 DAT
Neem oil (10 ml/ kg)	98.33 (85.68)**	1.20 (6.27)	0.81 (5.17)
Neem leaf powder (30 g/ kg)	100.00 (90.00)	1.06 (5.92)	0.75 (4.97)
Mustard oil (7.5 ml/ kg)	81.66 (64.66)	2.26 (8.65)	1.82 (7.74)
Groundnut oil (7.5 ml/ kg)	68.33 (55.74)	2.86 (9.74)	2.10 (8.32)
Turmeric powder (3.5 mg/ kg)	48.33 (44.02)	14.66 (22.49)	4.13 (11.72)
Custard apple seed powder (5 g/ kg)	80.00 (63.52)	2.33 (8.78)	2.02 (8.18)
Mentha oil (2.5 ml/ kg)	91.66 (73.37)	1.66 (7.41)	1.11 (6.06)
Lemongrass oil (2.5 ml/ kg)	88.33 (70.08)	1.73 (7.55)	1.18 (6.23)
Control	8.33 (16.59)	34.00 (35.64)	21.08 (27.31)
CD (p=0.05)	5.93	0.99	0.71

*DAT- Days After Treatment; ** Figure in parentheses angular transformed values

with each other, followed by mentha (1.66 and 1.11%, respectively) and lemon grass oil (1.73 and 1.18%, respectively). Thus, it was concluded that neem leaf powder (30 g) and neem oil (10 ml) were the most effective against *C. chinensis* on stored mungbean. These findings derive support from Tabu et al. (2012) with neem leaf powder (20 g/ kg seed). Reddy et al. (1999) reported that neem oil at 1.0% was an effective protectant. The present findings agree with those of Khan et al. (2015) on neem leaf powder @ 2.5 g/ kg mungbean as regards damage and weight loss. Kumar et al. (2017) reported that treatment of grains with neem oil, mentha oil and lemongrass oil @ 2.5 ml/ kg seed were very effective.

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