

RESEARCH NOTE

Bioefficacy of promising botanicals against pulse beetle, *Callosobruchus chinensis* L. infesting stored seed of moong bean

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ABSTRACT

The efficacy of some botanicals powder viz., Neem leaf powder (*Azadirachta indica*), soapnut powder (*Sapindus trifoliatus*), turmeric powder (*Curcuma longa*) @ 10 and 20 g/ kg seed, Vasambu rhizome powder (*Achorus calamus*) @ 5 and 10 g/ kg seed along with a chemical insecticide, Deltamethrin @ 40 mg /kg seed of moong were evaluated as post harvest grain protectants against pulse beetle, *Callosobruchus chinensis*. Based on parameters like seed germination, seed moisture and insect infestation, Vasambu rhizome powder @ 10 g /kg seed and Deltamethrin @ 40 mg /kg seed were observed most effective against pulse beetle infesting moong bean up to twelve months of storage without deteriorating the viability of seed while Neem dry leaf powder, soapnut powder and turmeric powder were least effective.

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Callosobruchus chinensis L. is a serious pest of pulses under storage condition. The use of botanicals is an alternative to the chemical insecticides and the efficacy of botanicals had been found against stored grain pests (Rao *et al.*, 1990). Sweet flag was observed to be highly effective against *C. chinensis* in pulse (Agrawal *et al.*, 1973, Chander and Ahmad 1985). Neem seed kernel was suggested by Ghosh *et al.* (1981) to control *C. chinensis* in pulses.

A laboratory study was conducted in 2008 to study the efficacy of some botanicals in powder form as post harvest seed protectants against *C. chinensis* infesting moong bean. Four botanicals namely, Neem leaf powder (*Azadirachta indica*), soapnut powder (*Sapindus trifoliatus*), turmeric powder (*Curcuma longa*) @ 10 and 20 g/ kg seed and Vasambu rhizome powder (*Achorus calamus*) @ 5 and 10 g/ kg seed along with a chemical insecticide, Deltamethrin @ 40 mg/ kg of moong seed were evaluated as post harvest grain

protectants against pulse beetle, *Callosobruchus chinensis*. These botanicals were prepared in powder form and sieved through a mesh (0.75 mm). One kg freshly harvested certified seed of moong variety K 851 with high percentage of germination and low moisture content (below 10 per cent) were treated with these botanicals along with untreated control in three replications, packed in gunny baglets of two kg capacity and kept in laboratory under ambient conditions. Observations on seed germination, seed moisture and natural infestation of *Callosobruchus chinensis* in percentage were recorded after every three months for a total period of eighteen months or till loss of germination below IMSCS, whichever is early.

Vasambu rhizome powder @ 10g/ kg seed and Deltamethrin @ 40 mg/ kg seed were found at par most effective against pulse beetle infesting on moong up to twelve months of storage which gave 76.0 per cent germination at 12.8 per

Treatments	After three month of storage			After six month of storage			After nine month of storage			After twelve month of storage		
	Mean seed germination (%)	Mean seed moisture (%)	Mean insect infestation (%)	Mean seed germination (%)	Mean seed moisture (%)	Mean insect infestation (%)	Mean seed germination (%)	Mean seed moisture (%)	Mean insect infestation (%)	Mean seed germination (%)	Mean seed moisture (%)	Mean insect infestation (%)
Neem leaf powder @ 10 g/kg seed	81.3	10.5	0.0	81.3	10.3	0.0	75.3	10.3	2.0	56.0 (48.5)	13.1 (21.2)	18.3 (25.3)
Neem leaf powder @ 20 g/ kg seed	81.0	10.4	0.0	80.0	10.5	0.0	76.6	10.4	0.0	69.0 (56.1)	12.6 (20.7)	14.3 (22.2)
Soapnut powder @ 10 g /kg seed	82.0	9.9	0.0	80.3	10.3	0.0	76.3	10.4	0.0	60.0 (50.7)	12.8 (20.9)	16.0 (23.5)
Soapnut powder @ 20 g /kg seed	81.3	10.1	0.0	79.0	10.4	0.0	77.0	10.5	0.0	70.0 (56.7)	13.0 (21.1)	11.0 (19.3)
Vasambu rhizome powder @ 5 g /kg seed	80.0	10.3	0.0	81.0	10.6	0.0	77.3	10.8	0.0	71.0 (57.4)	12.9 (21.0)	9.0 (17.4)
Vasambu rhizome powder @10 g/kg seed	79.3	10.6	0.0	80.3	10.9	0.0	76.6	10.7	0.0	75.0 (60.0)	12.8 (20.9)	9.0 (17.4)
Turmeric powder @ 10 g/ kg seed	79.6	10.8	0.0	78.3	10.8	0.0	77.3	10.6		51.0 (45.5)	13.1 (21.2)	21.3 (27.4)
Turmeric powder @20 g/ kg seed	80.6	10.2	0.0	79.0	10.7	0.0	76.3	10.9	0.0	54.0 (47.2)	12.5 (20.7)	17.3 (24.5)
Deltamethrin @ 40 mg /kg seed	82.3	10.1	0.0	81.0	10.5	0.0	77.0	10.5	0.0	76.0 (60.7)	12.8 (20.9)	4.3 (11.9)
Untreated control	78.3	11.2	0.0	78.3	10.9	1.0	70.0	10.9	5.0	39.0 (38.6)	13.3 (21.3)	35.3 (36.4)
S. E. ±										1.61	0.16	2.94
C. D. @ 5 %										3.31	0.32	6.04

Figures in parenthesis are angular transformed value

cent moisture with minimum 4.3 per cent insect infestation and 75.0 per cent germination at 12.8 per cent moisture with 5.3 per cent infestation of *C. chinensis*, respectively (Table 1). While Vasambu rhizome powder @ 5 g/ kg seed, soapnut powder @ 20 g /kg seed and neem leaf powder @ 20 g/ kg seed were equally at par effective but not able to maintain germination above to IMSCS after twelve months of storage by giving 71.0 germination at 12.9 per cent moisture with 9.0

per cent insect infestation, 70.0 per cent seed germination at 13.0 per cent moisture with 11.0 per cent insect infestation and 69.0 per cent germination at 12.6 per cent moisture with 14.3 per cent insect infestation, respectively. Least effective botanicals were turmeric powder @ 10 and 20 g/ kg seed and neem leaf powder @ 10 g /kg seed which gave minimum germination as 51 to 56 per cent at 12.5 to 13.1 per cent moisture with maximum infestation of *C. chinensis* viz., 17.3 to 18.3 per

cent, respectively. These results are in agreement with Devi and Kalita (2011) who reported that sweet flag @ 10 g/ kg seed of moong was most effective against pulse beetle, *Callosobruchus chinensis* in respect of fecundity, number of adults emerged, percentage of grain damage and percentage of weight loss.

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