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Insecticidal potentiality of Bael, *Aegle marmelos* (L.) Correa leaves powder against lesser grain borer, *Rhizopertha dominica* (Fab.)

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Abstract: The investigation was carried out to analyse the potency of bael leaf powder to control infestation of *Rhizopertha dominica* (F.). The four different concentrations (1gm to 4 gms) of bael leaf powder exhibited toxic effect against beetles at all the six intervals. Although the lowest dose (1gm) caused remarkable mortality (70% on 15th days after exposure). However percentage of mortality increased progressively. The absolute (100%) beetles death occurred on 15th day at 2 gms of concentration. The higher dose (3 gms and 4 gms) was more effective brought absolute morality at lower duration. The control showed only 10% and 30% mortality on 4th days and 10th days. The observation revealed the mortality rate varied according to the treatments and to the time of exposure. It can be used as insecticide against *R. dominica*.

Keywords : Insectiside, Bael, Pests resistance, I.P.M

INTRODUCTION

There is great loss occur during post harvest storage due to a few insect species. The post harvest deterioration causes economic loss (Kumar et.al, 2008). The lesser grain borer, *Rhizopertha dominica* (F.) is a serious pest of stored grain of world wide. The *R. dominica* larvae damage intact wheat karnels more than any other stored products pest (Edde, 2012). There has been used of chemical insecticides from many years for grain protection. The chemical insecticides caused residual pollution of the environment, toxicity to consumers and residues on grain (Yankanchi S.R. and Gadache A.H., 2010). The toxic effect of synthetic chemicals can be overcome only by persistent search, for new and safer pesticides accompanied by wide use of pest control method which are eco-friendly and effective (D.C. Mohana *et al*, 2010). Botanical insecticide represent one of the best alternative to chemical for development of safer and environment friendly strategies. Plant extracts are considered to be non pollutant, less toxic and easily biodegradable Insecticidal activity of many plants against several insect pests has been demonstrated (Mahfuz and Khanam, 2007, Upadhyaya and Jaiswal 2007, Kiruthika and Sornaraj 2011, Das *et.al.* 2006) *Aegle marmelos* (bael) is an indigenous medicinal plant which is also effective. Several works has been done that showed the plant have great insecticidal potency. Kumar Rajesh *et al*., (2008) reported the essential oils from the leaves of *A. marmelos* against four stored grain insect pests included *C. Chinensis* (L.), *R. dominica* (F.), *Sitophilus oryzae* (L.) and *T. castaneum* found essential oils at different doses significantly reduced oviposition and adult emergence. Dubey *et al*. (2008) also reported the essential oils from leaves of *A. marmelos* had toxic effect to the control of all the above four insects. Similarly N. Patkar (2012) reported leaves extract from *A. marmelos* have insecticidal and growth inhibitory activity against *Nilaparvata lugens* stal. B.B. Mishra and S.P. Tripathi (2011) had also stated similar report that *A. marmelos* leaves had good toxicant effect against *S. oryzae* and *T. castaneum*.

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Therefore, the present study was conducted to investigate the efficacy of *A. marmelos* against *R. dominica.*

MATERIAL & METHOD

100 gms of grain taken as test-grains; separately in the same-sized glass containers. Different doses of powder of *A. marmelos* leaves were mixed with the grains separately. Three replications were used for each experiment. The containers were thoroughly shaken for 5 minutes for optimum coverage of the grain surface. Five pairs of freshly emerged beetles were taken from laboratory culture and release in every replicate. Simultaneously three replicates with untreated grains were established as control. The room temperature at 30°±2°C. The relative humidity varied between 60% to 70% and provided equal degree of ventilation.

Table:- Effect of BLP on *R. dominica* (F.)

Dose	Durations					
	2nd	3rd	4th	5th	10th	15th
1 gm	10%	30%	35%	50%	60%	70%
2 gms	20%	40%	50%	60%	80%	100%
3 gms	50%	60%	80%	100%		
4 gms	80%	100%				
Control			10%		30%	

RESULTS & DISCUSSION

The efficacy of bael leaf powder (BLP) was remarkably evident in all treatments. The effect showed maximum mortality with the highest dose in short duration. The lowest dose (1 gm) cause death of 10%, 30% and 35% on 2nd, 3rd and 4th day respectively. Highest mortality occurred 70% on 15th day. At 2gms exposure observed 20%, 40%, 50% on 2nd, 3rd and 4th day that increased by 20% and showed 60%, 80% on 5th day and 10th day. Absolute mortality (100%) on 15th day. The control showed 10% and 30% insect death on 4th and 10th day. The 3 gms of treatment observed mortality was 50%, 60%, 80% on 2nd, 3rd, 4th day respectively. The 100% (Absolute) mortality occurred on 5th day. The highest dose (4 gms) observed 80% beetles death on very 2nd day and total death (100%) occurred on 3rd day. Observation of the result including control clearly indicates the bael leaf powder on the crude form had toxic effect. The deterioration may be attributed to the toxicity of plant powders affecting the normal physiology of the insects in different ways. The result was coincide with the finding of earlier work done by Kumar Rajesh *et al*. (2008) Dubey *et al*. (2008), B.B.Mishra and S.P.Tripathi (2011) and also with the work of N. Patkar (2012) they supports that BLP are effective in causing mortality and suppressing adult emergence. Even different insect species and concentrations were reported in above studies but there is similarity in effect.

The insecticidal properties of bael leaf powder are undoubtedly link to the presence of some active molecules. Venkatesan *et al.* (2009) reported leaves of *A. marmelos* (L) corr. Have alkaloids, cardiac glycosides, terpenoids, saponins, tannins, flavonids and steroids. These bioactive compounds may be strengthen the possibility of pesticidal properties of *A. marmelos* which may be attributed to insect population deterioration Kim *et al*. (2003) reported the insecticidal constituents of many essential oils are mainly monoterpenoids. Monoterpenoids are known to be natural compound with characteristic pungent odour could have been responsible for the insecticidal activity that help in mortality of adult beetles either by contact or stomach poisoning. The study needs further investigation to find out active ingredients responsible for insecticidal properties against wide range of store grain pests and to reach any final recommendations.

It could be concluded that bael powder poses potential or biopesticidal property that may be used as semi chemicals mediating phytopesticide to protect food commodities during storage, regarding the side effect of synthetic properties.

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