



## Efficacy of plant *Fagonia cretica* on the percentage of damaged grains of *Sorghum bicolor* infested by pest *Rhizopertha dominica*.

### KEYWORDS

Extracts, *Fagonia cretica*, *Sorghum bicolor*, *Rhizopertha dominica*.

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### ABSTRACT

The present research was carried out to evaluate the grain protectant efficacy of plant *Fagonia cretica*, different parts of which were formulated using different extracts and at various concentrations against *Rhizopertha dominica*. The results showed that the damaged percentage of grains of *Sorghum bicolor* infested with *Tribolium castaneum* at direct relationship with concentration. The sets treated with dose concentration of 10% were most effective and recorded lowest damage to the grains.

### INTRODUCTION

In India, cereal grains such as wheat, pulses and rice form the principle source of dietary fibre. These grains are highly susceptible to infestation by stored grain pest such as *Tribolium castaneum*, *Rhizopertha dominica* and *Callasobruchus chinensis*. Pests reduce grain weight, nutritional value and germination of stored grains. Infestation also causes contamination and odour that reduces the quality of grains and make it unfit for human consumption. Moreover high relative humidity and warm temperature of India make it a suitable environment for insect multiplication. About 500 species of insects are associated with stored grain products.

In India, estimated losses due to stored grain pests are about 10% of total production. The lesser grain borer (*Rhizopertha dominica*) is a cosmopolitan beetle of the family *Bostrichidae*. It is reported to have originated from India but now has a world wide distribution. It is very destructive primary pest of stored grains.

The management of stored grain pests has been typically carried out by chemical pesticides which have resulted in damage to the environment, pest resurgence, pest resistance to insecticides and lethal effect on target organisms. This has forced to change the approach of pest management and dictated the need for effective and biodegradable pest control strategy as an alternative to chemical pesticides. In the last decade, there has been an increasing interest in natural products, particularly those of plant origin.

The present study was carried out to evaluate pesticidal property of plant *Fagonia cretica* against the pest *Rhizopertha dominica*.

Isolated incidences of resistance have been reported for *Rhizopertha dominica* (F.) {Haliscak and Beeman, 1983; Zettler and Cuperus, 1990} [1]

### MATERIALS AND METHODS

The pest insect *Rhizopertha dominica*, was cultured on host grains of *Sorghum bicolor* (jawar) at a temperature of 28±2C and 70% relative humidity. Different plant parts viz. leaf, stem, root and fruit of *Fagonia cretica* collected from Bikaner were used for this study. The plant parts were separated and dried.

The formulations were prepared using petroleum ether (assay 74.12) and glass distilled water. Ether extracts were prepared by soxlet extraction, aqueous extracts by boiling the material in water and aqueous suspension by suspending dried powder in water. Five pairs of adult insects were released in 10 grams of grains on *Triticum vulgare* treated with 1 ml. of different doses which included 1, 2.5, 5 and 10% along with control and normal experimental sets.

The weight loss of grains (%) was assessed in terms of biomass

by finding the differences between initial weight of the grain i.e. when five pairs of pest insects were released and the final weight of the grains taken after the emergence of new progeny of pest insects and calculated as:

$$\% \text{ Weight loss} = \frac{Iw - Fw}{Iw} \times 100$$

Where, Iw = Initial weight (10 gram)

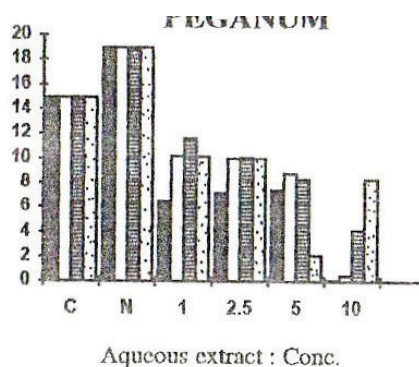
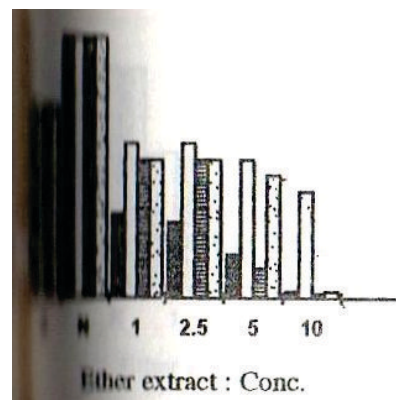
Fw = Final weight

The average values for each aspects were calculated by using observations from the three replicates and compared with control and normal treatments. Here normal includes untreated grains while control includes grains treated only with the particular solvent viz; water, ether etc.

The results were statistically analysed using ANOVA and t-test.

### RESULTS AND DISCUSSIONS.

The results are presented in figure 1 and ANOVA table 1, revealed following finding:



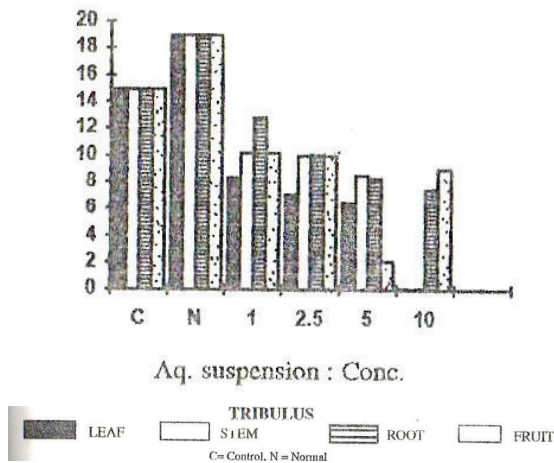


Figure 1



Photograph showing seeds of *Sorghum bicolor* damaged by the insect pest *Rhizopertha dominica*.

It was observed that in normal experimental sets in the grains infected with insect was 18.95%.

The extracts of flower *Fagonia cretica* reduced the weight loss to 0.1% - 5% as compared to 1.7% - 1.8% in control experimental sets.

All the parts of *Fagonia* influenced the weight loss. 10% concentration of all the plant part formulations of *Fagonia* are effective causing minimum loss to 0.8 – 1.0 %.

Savitri and Subba Rao [2] evaluate the effectiveness of Neem powder in reducing the rate of oviposition in *Rhizopertha dominica* and unrefined mustard oil in different combinations as protectant for rice grain against infestation by *Tribolium castaneum*.

The present findings are in agreement with the observations of Xu et al.(1993) [3] who used four essential oils against stored product pest *Sitophilus zeamais*, *Tribolium castaneum*, *Oryzaephilus surinamensis* and *Rhizopertha dominica* and reported that 0.2% cassia oil when applied as a seed dressing kept stored wheat free from insect damage upto eight months.

Qadri and Rao {1977} [4] tested the toxicities of custard apple *Annona squamosa* in combination with neem against *Rhizopertha*.

The plant *Fagonia cretica* has been screened for the first time for its insecticidal efficacy by the perusal of the result it may be concluded that:

All the parts of plant *Fagonia* viz. leaf, stem, root and fruit are effective to be used as seed protectant against insect pest *Rhizopertha dominica*.

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