

Efficacy of plant *Fagonia cretica* on the percentage of damaged grains of *Triticum vulgare* infested by beetle *Tribolium castaneum*



Zoology

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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 *Tribolium castaneum*. The results showed that the damaged percentage of grains of *Triticum vulgare* 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.

1. INTRODUCTION

Tribolium castaneum is an important pest of stored wheat. It is a secondary pest. This is omnivorous beetle with chewing mouth parts. In the grains it prefers embryo and germ portion.

As chemical insecticide pose several hazards, need arises to search for non-toxic grain protectants. Moreover, this pest is resistant to various chemicals like malathion and phosphine.

Botanical insecticides seem to have a distinctive advantage being eco-friendly, bio-degradable, non-toxic to non-target population, economic and easily available.

It was therefore planned to screen a desert plant *Fagonia cretica* belonging to family *Zygophyllaceae* on the percentage of damaged grains of wheat infested by *Tribolium castaneum*.

2. MATERIALS AND METHOD.

The test insects *T.castaneum* was cultured on host grains of *Triticum vulgare* 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 the study. 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 findings:

The weight loss indicates the quantitative loss in stored grains due to insect feeding showing a direct relationship between insect population and weight loss.

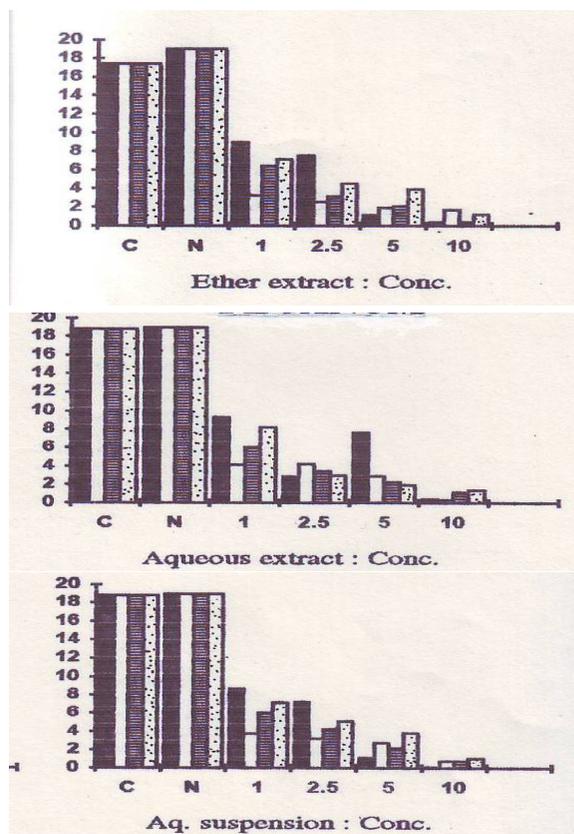


FIG. 1

Ether extract : Conc. Aqueous extract : Conc. Aq. suspension : Conc.
 LEAF STEM ROOT FRUIT
 C = Control, N = Normal

EFFECT OF DIFFERENT FORMULATIONS OF SOME PARTS OF PLANT *FAGONIA CRETICA* ON THE WEIGHT LOSS ON THE GRAINS OF *TRITICUM VULGARE* INFESTED WITH *TRIBOLIUM CASTANEUM*



Fig. 2

Photograph showing seeds of *TITICUM VULGARE* damaged by the insect pest *TRIBOLIUM CASTANEUM* .

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 %.

Chander et al (1992) [2] evaluate the effectiveness of turmeric powder 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 zeamidis*, *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.

In laboratory experiment, feeding on flour treated with 15ppm caffeine or 1000ppm castor oil reduced the fecundity and fertility of *Tribolium castaneum* in comparison with the control was reported by Akhtar and Mondal (1994) [1] .

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 *Tribolium castaneum*.

REFERENCE

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