



Efficacy of plant *Aerva tomentosa* on the percentage of damaged grains of *Triticum vulgare* infested by the beetle *Tribolium castaneum*.

KEYWORDS

Efficacy, Extract, *Aerva tomentosa*, *Tribolium castaneum*.

Amandeep Kaur Mann

Department of Zoology, Dungar College, Bikaner- 334 001

ABSTRACT

The study deals with evaluating insecticidal efficacy of a desert plant, *Aerva tomentosa* (family: Amaranthaceae), different parts of which were formulated using different extracts and at various concentrations against *Tribolium castaneum*. The results showed that the ether extracts at highest dose concentration of 10% were the most effective in increasing adult mortality, retarding rate of development, reducing egg laying, adult emergence and weight loss in host grains of *Triticum vulgare*. Among the plant parts the leaf was found to be most effective followed by fruit, root and stem.

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-degradeable, non-toxic to non-target population, economic and easily available.

It was therefore planned to screen a desert plant *Aerva tomentosa* 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±2°C 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:

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

10

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, revealed following finding:

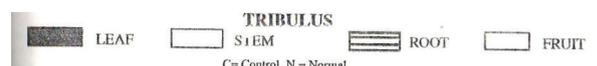
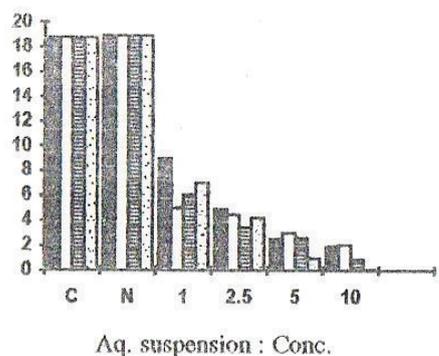
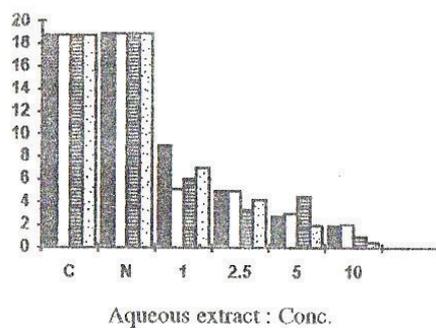
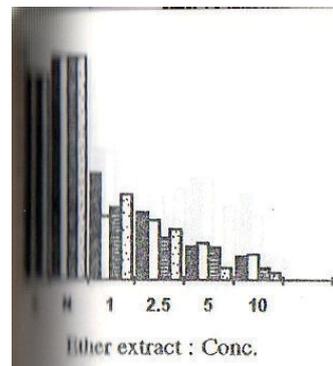


Figure 1



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 *Aerva tomentosa* reduced the weight loss to 0.1% - 5% as compared to 1.7% - 1.8% in control experimental sets.

All the parts of *Aerva* influenced the weight loss.

But, root and fruit of *Aerva* plant are most effective in reducing the weight loss.

10% concentration of all the plant part formulations of *Aerva* are effective causing minimum loss to 0.8 – 1.0 %.

Chander et al (1992) [1] 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) [2] 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.

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) [3].

The plant *Aerva tomentosa* 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 *Aerva* viz. leaf, stem, root and fruit are effective to be used as seed protectant against insect pest *Tribolium castaneum*.

Reference:

1. Chander, H., Kulkarni, S.G., Berry, S.K. 1992. studies on turmeric and mustard oil as protectant against infestation on red flour beetle *Tribolium castaneum* in stored milled rice. J. Insect. Sci., 5(2): 220-222
2. Xu, H.H., Chiu, S.F., Jiang F.Y., Huang G.W. 1993. Experiments on the use of essential oils against stored product insects in store house. J. South China Agri. Univ., 14(3) : 42-47
3. Akhtar, N. and Mondal, K.A. 1994. Effect of caffeine and castor oil on fecundity and fertility of *Tribolium castaneum* Herbst. (Coleoptera : Tenebrionidae). Pak. J. Zool., 22(2) : 179-181.