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Effect of mixture of *Eichhornia*, *Ipomoea* and *Acorus* leaf powder on adult mortality of *Rhizopertha dominica* (fab) infesting rice in different ratio 2:1:2

Ravindra Kumar Sharma^{**} & O.P. Singh^b

^aDepartment of Zoology, B.R.A.B.University & SJS Senior Secondary School, Tetaria, East Champaran, Bihar, India

^bDepartment of Zoology, B.R.A.B.University, & Principal, R.D.S. College, Muzaffarpur, Bihar, India

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Abstract: - Mixture of plant products like *Eichhornia*, *Ipomoea* and *Acorus* leaf powder in different ratio 2:1:2 Showed remarkable effect on Mortality, Survival & growth of adult *R.dominica* in store rice. Rice was weighted 100 gm. separately taken in 6" x 2" glass container. Standard *Eichhornia*, *Ipomoea* and *Acorus* leaves powder where taken from laboratory stock in 2:1:2 ratio & mixed with grains separately & shaken for 15 minutes. Five pairs of fleshly emerged test insect were also taken & released into each replicate. All experiments were set at same temperature and relative humidity 60-70% with the equal degree of ventilation. Six doses (0.5gm, 1gm, 1.5gm, 2gm, 2.5gm & 3gm) such treatment while there replicates with untreated grains were installed for control. The observation showed on adults was remarkable effect in Mortality & delayed emergence.

Key words: - *Rhizopertha dominica* (F.), Adults mortality, Petroleum ether extract, *Eichhornia*, *Ipomoea* and *Acorus* leaf.

INTRODUCTION

The present study is confined to "comparative study of effectiveness of some plant products as protectant against *R. dominica* infesting rice on its adult, larval and egg population."

A lot of work has been done on the insect infestation in different food grains, such as wheat, jawar, maize, pulses. But very little or no work has been found about the effectiveness of *Eichhornia*, *Ipomoea*, and *Acorus* were used as pesticides and their effect were observed.

Recent years have seen a rapid advancement in the field of storage of food grain. There is a lack of common storage production even in given agricultural area.

Comprehensive principle of storage practices have to be developed keeping a view on its eco-friendly nature & human health. The practice of use of plants products as protectants against certain pest may certainly help the farmers immensely.

Men have created problems for themselves by interfering in the nature & disturbing the ecosystem. To maximize the yield of crop, men have used several devices to control the out break of pests. Indians have fallen serious victims to pesticides poisoning. In India, There are two law to regulate the pesticides in food. "preservation of food Alternation Act. 1954 and Insecticide Act 1968." It has appreciably contributed towards improving general economic conditions. However, there is growing awareness among planners, Manufactures & researchers about

*Corresponding author :

Phone : 9113395897

E-mail : rksharmadav77@gmail.com

introducing newer & safer Methods of pest control with greater pest specificity in order to keep the environment free from pollution hazard.

Yield of crop depends not only on the genetic heritage but also on susceptibility of their natural pest. However Rao (1983)¹ reported heavy loss of crops due to pest in storage. The loss of food grains in storage have been estimated to be about 6.8% in our country by Dr. Pansi committee appointed in 1966 by Govt. of India. The maximum loss in storage is caused by insects 2.55%, by rodent 2.50% & by birds 0.85% according Ghosh MR (1989).²

Yadav (1983)³ observed that green gram, cow pea, Bengal gram, horse gram and pea are common hosts of *C. maculatus* & rice, wheat, Maize are common host of *R. dominica* in India.

To minimize the loss and heavy use of agrochemical are in practice. The effect of these chemicals is well known as there is world wide debate on discouraging such use. India recognized this problem early as in 1967 in “*Thakar Report*” A high level of DDT & BHC residue have been detected in sample of wheat, pulses, & bean, due to direct mixing of these pesticides during storage (Report of ICAR special committee on harmful effects of pesticide). Analysis of cereal, pulse, milk, egg, meat, vegetable, showed that more than 50% of sample tested contained pesticide residue and in more than 30% residue exceeded tolerance limit prescribed by WHO.

The present work is being undertaken to examine use of *Eichhornia*, *Ipomoea* and *Acorus* leaves powder on most common coleopteron pest – *R. dominica*, & find out the ideal plant products to check loss of grains through mortality of attacking pest.

Oryza Sativa is the latin name, In English called *rice*, In Hindi called *chaval*, *Dhan*. It belongs to family *Gramineae*. It is mainly used as food but it is also used for straw board, paper, mats from its straw. Rice bran oil is used in soap, cosmetics, anti corrosion oil. Rice husk is used as fuel, soil conditioner, animal feed & preparing activated carbon, sodium silicate & silicon. Our country is a major producer of rice. According to Government of India, about 1/10th of total production of rice in our country is lost due to faulty storage. Besides, the infestation of pest affect adversely economy of country and health of people.

According to Kaura *et al.* (1972)⁴ :- Insect infestation caused loss of weight in variety of storage grains in Egypt. The average weight loss was 32.64% in rice.

***Eichhornia crassipes* :-** Its common name is water hyacinth. It belongs to family *Araceae*. It can be used in making compost, fuel, paper, for generating CH₄ & removing nutrients & toxic chemicals from water. Also observed in reduction of metallic pollution lead from water in Orissa⁵. Petroleum ether extracts of water hyacinth was evaluated for its biological activity against pests. It retarded development and causes mortality high. The extract did not showed any toxicity on *S. orizae*.⁶

***Ipomoea cornea*:-** It is universal in distribution and more abundant in warm regions. Roots are advantageous and haustorial penetrating into most tissue. It is cultivated as hedge plant. It has large genus with 400 species. Several species are used in medicines on account of latex.

***Acorus calamus*:-** It is herbaceous flag like plant commonly called *sweet flag* in English & *safe buch or ghora buch* in Hindi. It belongs to family *Araceae*., mainly used as medicines & insecticides. *Asarone* (Obtained from rhizome of *A. calamus*) were tested as insecticides against an egg & adult of *C. chinensis* reduced by 20-60% (Panji HR *et al.* 1998)⁷

***Rhizopertha dominica*:-** Commonly called lesser grain borer or Australian wheat weevil. It belongs to Class *Insecta*, order- *Coleoptera* & family *Bostrichidae* Both larvae & adults form are destructive in nature.

MATERIALS & METHOD

1. Procurement of plant products food grains & insects.

Eichhornia is abundantly found in Bihar a type of water weeds. Leaves were collected & dried in sunlight for 7 days continuously further grinding for power. Leaves of *Ipomoea* were thoroughly washed in running water & dried in 8 hours at 60°C. Then grinding further over dried for 24 hours at 50°C. *Acorus* leaves were obtained from pond. They were kept in glass container for 3 days 40-50°C. Rice was collected from agricultural farm Pusa, Muz. and considered free from bacterial, fungus, infestation.

After verification, Rice was kept in incubator to check the moisture content. Temp. of incubator was 30-40°C.

2. Treatment with plant product :-

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Rice were weighted 100 gm. separately & taken in same size glass. Leaves powder of plant products were taken in ratio 2E:1I:2A. They were mixed with test grains separately & shaken for 15 minutes from laboratory culture. Five pairs fleshly emerged test insects were taken and released into each replicates. Besides, three replications were installed for control. All replication were set at same temp. & relative humidity with equal degree of ventilation. Room temp. was 30+2⁰ C & humidity 60-70%. Out of these ratios, the different ratio (0.5gm, 1gm, 1.5gm, 2gm, 2.5gm, 3gm) were measured & used for treatment.

OBSERVATIONS & RESULTS

Mixture of *Eichhornia*, *Ipomoea*, *Acorus* in 2:1:2 ratio used & result showed that ratio was quite effective in no. of adult weevils.

0.5gm. of this mixture eliminated 33% weevils within 24 hours. But addition of 3% mortality was noticed on 3rd days, On 4th days mortality rate was 53%, On 5th days 60% & On the 10th days were 66%.

1gm. dose pushed the mortality rate ahead 40% on 2nd days, 56% on 3rd days & 4th day, 60% on 5th days, & 80% on 10th days. Only 20% weevils were surviving but most inactive conditions.

1.5gm. treatment showed the mortality 66% on 3rd days, 73% on 4th days, 80% on 5th days and 100% on 10th days.

Bigger doses of mixture had phenomenal effect on weevils 60% insect died on 2nd days. The rate further moved to absolute mortality in sequence of 73% , 90%, & 100% on 3rd, 4th & 5th days respectively.

2.5gm. mixture had a considerable toxic effect on adult weevils & showed 100% mortality on 4th days. The highest dose of 3gm. had killed 100% on 3rd days.

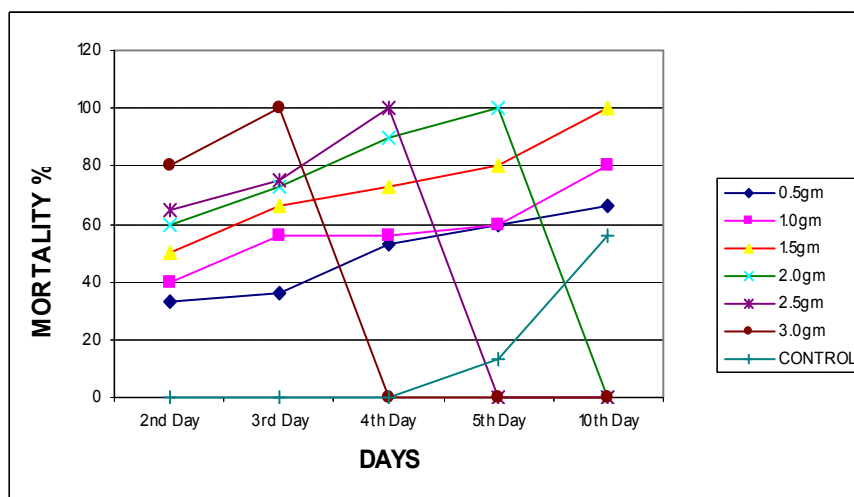
The control mortality was noticed on 5th day at 13% reaching up to 56% on 10th day.

Result showed that quicker more mortality depends upon doses and duration. The mixture of plant products in ratio 2:1:2 has strong insecticidal effect & bigger dose caused quicker death.

Effect of mixture of *Eichhornea*, *Ipomoea* & *Acorus* leaf powder on *R. dominica*. Infesting rice in different ratio (2:1:2)

DOSE	ADULT MORTALITY %				
DURATION	2 nd day	3 rd day	4 th day	5 th day	10 th day
0.5gm	33	36	53	60	66
1gm	40	56	56	60	80
1.5gm	50	66	73	80	100
2gm	60	73	90	100	—
2.5gm	65	75	100	—	—
3gm	80	100	—	—	—
CONTROL	—	—	—	13	56

Effect of mixture of *Eichhornia*, *Ipomoea* and *Acorus* leaf powder on the percentage mortality of *R.dominica* infesting rice in different ratio (2:1:2)



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