

Effect of some parts of plant powders to control *Sitophilus granarius* in store wheat grains.

¹Geeta Patil, ²Chetankumar Sharma, ²Vaishali Maliand and ¹Kajal Patil

¹Assistant Professor in Botany, ²Assistant Professor in Zoology, Arts, Commerce & Science college, Bodwad Dist.-Jalgaon, MS, India | Email: geetadarange@gmail.com

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ABSTRACT

Present study evaluated the efficacy on mortality of 3 plants powder i.e. leaf powder of *Annona squamosa* and *Zizipus xylopyrus* and seed powder of *Annona squamosa* against *Sitophilus granarius*. Losses of stored grain due to infestation by storage pest are the most serious problem and reducing nutritional value in food. current study shows that seed powder of *Annona squamosa* is more effective to control *Sitophilus granarius* than leaf powder of *Annona squamosa* and *Zizipus xylopyrus*.

Keywords: *Annona squamosa*, *Zizipus xylopyrus*, *Sitophilus granaries*.

INTRODUCTION

Sitophilus granarius is the major pest which causes significant damage to harvested stored wheat grains and decrease the crop yield. Loss of Food grain due to this insect infestation during storage is a serious problem. They not only consume food grains but also accumulate exuviae, webbing, and cadavers. This result in grain unfit for human consumption. It also decreases quantity and quality of the food grain by affecting nutritional value. It is estimated that more than 20,000 species of field and storage pests destroy approximately one third of the world's food production, among which the highest losses (43%) occurring in the developing world. (Jacobson, 1982; Ahmed and Grainge, 1986).

Chemical pesticides are effective but due to their repetitive use resistance will be developed in pests and also it creates environmental pollution and an adverse effect on food besides side effect on humans. Park *et al.*, 2003 reported that continuous usage of synthetic insecticides as preservatives is being discouraged due to various adverse environmental, biological and economic consequences associated with its usage (Park *et al.*, 2003). Previous research indicated that some plant powder and extracts have strong effect on stored grain insects such as toxicity and the inhibition of reproduction (Regnault-Roger and Hamraoui, 1991; Talukder and Howse, 1995). Hence to overcome this problem we have to use some Botanical insecticides. In this study we used some parts of plant products i.e. leaves and seeds of *Annona squamosa* and Leaves of *Zizipus xylopyrus* to control the pest *Sitophilus granarius* in stored wheat grains.

MATERIAL METHODS

Present investigation was carried out at department of Botany, Arts, Commerce and Science College, Bodwad. Insects was collected from infested wheat storage godown from local area. The insects were maintained on uninfested wheat grains at laboratory in plastic jar.

The fresh leaves of *Annona squamosa* and *Zizipus xylopyrus* were collected from the field near Bodwad and seeds of *Annona squamosa* were dried in the shade and then in the oven. The dried leaves and seeds were powder in the grinder and stored in polyethylene bags.

To test the effect of plant and seed powder, the grains of wheat is sterilized in an oven for 24 hrs. at 45°C to disinfect. Take 100 gm. of wheat grain and add to it 10 gm. of leaves and seeds powder of testing plants. Released 10 adults of *Sitophilus granaries* to each testing jars and control is maintained simultaneously. Experimental setup is maintained in Plastic jar under the laboratory condition. There are 3 replications is done simultaneously for better and accurate result, mean mortality is recorded for the observed mortality. A plastic jar is closed with muslin cloth and tied with rubber band to avoid the discharge of insect.

To calculate the mortality at 7,14,21 and 28 day after treatment, counted the number of dead insects in each plastic jar. Percentage of corrected mortality was assessed as per the given formula (Abbott's 1925).

$$\% \text{ corrected mortality} = \frac{\text{Observed mortality} - \text{Control mortality}}{100 - \text{Control mortality}} \times 100$$

RESULTS & DISCUSSION

Table A. shows the effect of leaves and seeds powder of *Annona squamosa* and leaves powder of *Zizipus xylopyrus* was evaluated and it seen that the seeds powder of *Annona squamosa* having more effective to show the highest percentage of mortality as compare to leaf powder of *A. squamosa* and *Z. xylopyrus*. comparatively leaves powder of *Z. xylopyrus* show less effective than others. Leaf and seeds powder of *A. squamosa* shows mortality of 44.82% and 65.51% respectively at 28 days while, Leaf powder of *Z. xylopyrus* show mortality of 10.34% which is greater than control i.e. 3.33%.

Photograph A and B Show the collection and drying the seeds of *A. squamosa* in laboratory and collection of leaves of *Z. xylopyrus* in the field respectively. Experimental setup of the present investigation at different parts of plant powder is seen at photo C. Photo D. Observation of the results and obtaining result is compared with control. The result obtained from the present investigation evaluate that *Annona squamosa* is more effective than *Zizipus xylopyrus*. Mortality rate of Seeds of *Annona squamosa* is greater than leaves of *A. squamosa* and *Z. xylopyrus*. This indicates that seeds contain more pesticidal property than Leaf of two plants.



Figure 1: A- Seeds of *Annona squamosa*, B. Collection of Leaves of *Zizipus xylopyrus* C- Experimental Setup, D- Observation of experiment

Table 1: Effect of different parts of plants powder against Sitophilus granaries in store wheat grains.

Sr. No.	Name of Used Plant Parts	Mean Mortality in Days			
		07	14	21	28
1.	Leaf of <i>Annona squamosa</i>	13.33	36.66	41.38	44.82
2.	Seed of <i>Annona squamosa</i>	6.66	43.33	55.00	65.51
3.	Leaf of <i>Zizipus xylopyrus</i>	00	6.66	10.34	10.34
4.	Control	00	00	3.33	3.33

Present study shows that different parts of plants i.e. leaf and seeds having capability to control the selected pest. (Asawalam *et al.* 2012) reported that the plant powders can lead to suffocation and death of storage insect pest. The antifeedent activity of an extract of senescent leaves of *M.azedarach* on nine insect species, including *S.oryzae* was examined by (Valladares *et al.* 2003). These finding supported the finding of (Achiano *et al.*,1999) who showed the effectiveness of neem leaf powder and ash from various sources against different stored grain pest. The high mortality may not be due to contact toxicity of these phytochemicals due to thick exoskeleton of *S. oryzae* which is expected to have conferred on them some level of resistance to these powders. The high weevil mortality could therefore be possibly linked to stomach poison by these bioactive compounds (Olajire *et al.*, 2015). The high pungent smell of powder of *E. aromatica* and *P. guineense* could also be responsible for high mortality observed in weevils exposed to them when compared to their counterpart exposed to *Z. officinales*. The toxic effect of any insecticide depends on the point of entry of the toxins (Franz *et al.*, 2011).

CONCLUSION

The pesticidal property is higher in Seeds of *Annona squamosa* than leaf of *Annona squamosa* and lower in leaf of *Zizipus xylopyrus*.

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