

## Original Research Article

# **Insecticidal property of parthenium hysterophorus and vitex nigrunda leaf extract (acetone) against sitophilus oryzae (rice weevil) { coleoptera , curculionidae} in stored grain pest.**

### **ABSTRACT:**

The insecticidal property of Parthenium hysterophorus and vitex nigrunda leaf extract in acetone against the rice weevil (Sitophilus oryzae) were very effective to control the pest. Different concentration, dose were checked and the result showed that high doses or the extract of Parthenium and vitex were significantly more toxic to Sitophilus oryzae compared to lower dose.

The probit analysis of data demonstrated mortality rate for acetone extract was mortality % of Parthenium leaf extract in acetone 5%, 10%, 15% = 25%, 40%, 60% mortality % of vitex leaf extract in acetone 5%, 10%, 15% = 15%, 35%, 65%. Mortality % of mixture of Parthenium and vitex leaf extract in acetone = 5%, 10%, 15%, 30%, 40%, 80%, respectively from 10 days. Hence we concluded that leaf extract of Parthenium hysterophorus and vitex nigrunda served as a potential insecticide used against Sitophilus oryzae (Rice weevil).

### **Keywords:-**

**Parthenium hysterophorus, vitex nigrunda, rice weevil, stored grain mortality insecticide**

### **INTRODUCTION**

Stored products are attacked by insects in different ways. Particularly in developing countries 5 to 10% cereal grains in temperate and 20—30% loss in tropical countries is a serious problem due to insect infestation during storage. Different types of stored product pests are seen in India. Like rice weevil, Indian meal moth, saw-toothed green beetle, red flower beetle, cowpea weevil. (Sitophilus oryzae). (Coleoptera, Curculionidae) is one of the most widespread destructive major insect pest of stored grains. (Park L. et al 2003)

It causes up to 30—40% cereal grains loss in India favorable to their development 25-30°C. Adult weevil is 3-4 mm long. Dark brown egg or small white, on the grains hatching larvae bore inside the grains (Zakladnoi GA, Ratonove 1987). Control of infestation of stored grains by insect pest is primarily achieved by the use of synthetic chemicals. Insecticides like methyl bromide & phosphine. In most of countries due to environment concerns and human health, hazardous several chemicals have been either banned or restricted. (Taponjou L A 2003) Chemical pesticides are toxic to use as they have high toxicity and residual value and hence are not suitable to treat the pest in stored grains. There is no doubt that botanical pesticides are more than 250,000 plant species growing on our planet have been properly evaluated for these purposes many weeds, medicinal plants and spices have been used to pest control agents (Lale NES 1992 Isman MB, 1995) Farmers and researchers often claim the successful use of plant material in insect pest control included ash (Ofuya IT, 1986), vegetable oil [Schoohovern Av, 1978], plant extract and botanical powders (Bindu VR et al (Nilesh Jaywalker et al, 2016) It has been reported that certain plants

### **Chemical Constituents:-**

Negundoside, flavonoids, pentene, limonene, linalol and camphor, Vitricin (Alkaloids) (Rasthogi & Metrotra 1993 & 1995)

### **Mode of Action: -**

Antifeedent, insecticidal and repellent (Listinger et al 1978) Keeping this in view the present study was carried out to test the efficacy of the leaf extract of two plants i.e. Parthenium hysterophorus, Vitex negundo.

## INSECTICIDAL PROPERTY

Parthenium:-

Higher plants are rich source Of novel substance that can be used to develop safe method for insect control. Plant Parthenium hysterosporus is labeled as a serious weed of pasture wasteland and agricultural field in world. The weed is noxious on two counts. Firstly it is a highly adaptable weed and can grow any where but it content several important chemical components like lactone, Parthenon, histamine, saponine. The presence of several important like chemical components in Parthenium hysterosporus and there prominent biological activity in animal and human and human models indicate that a weed can be used as ovicidal, antifeedent, insect growth regulator, insecticidal, weedicidal, antiviral, antibacterial active compound there analog due to the cytotoxic and pharmacological in future may find and important place as medicine. The nutrition value of plant indicate its utility o food and fodder also and it also is used as insecticide. (Veena et a', 2012).

Vitex:-

The plant is indigenous to the Mediterranean Countries and central Asia, It is found in India, Burma, Shrilanka, Afghanistan, India, in all districts. The insecticidal property of Vitex as well as its essential oil is well known. And it is effective against puls beetle C. chinnensis (Jadhav & Jadhav, 1984). Leaf extract of V.nigondo. Under different extraction method Vis. Cold water, hot water, cold alcoholic soxhelt extraction with methanol and petroleum ether were tested for their toxicity against S.litura on tobacco. The application Of extract exhibited considerably mortality after 48 and 72 hrs. Of exposure period and found significantly superior over control. Higher mortality was observed higher mortality at higher concentration. Similarly more mortality also reported with higher exposure period (Nemade et al, 200

### Material:-

parthenium hysterosphorousFamily; Asteraceae ,Vitex nigundiFamily; Verbanaceae ,Solvent; Acetone ,Insectpest; Rice weevil, stored grain's (jawar)

### Methods:-

Preparation of leaf extract in Acetone parthenium and vitex leaf Extracts.Collect the healthy and fresh leaves of parthenium and vitex Wash With tan Water ,Wash With DIW ,Dry under shade for 10 daysGrind the dried leaves (separately)Take 50 gm. Of powder Of Parthenium leaves & vitex leaves Separately dissolve in 300 ml of Acetone ,Filter the extract through watman filter paper No-I Keep for 10 days in dark brown bottle ,Evaporate the excesses solvent with use of rotarvevaporator Make final volume (SO ml) Keep in cold temperature

### MORTALITY

The mortality of Sitophilus oryzae adult was recorded after 10 days and parentage data collected was analyzed and determination of mortality rate for 10 days was done by using following formula.

Mortality % =

$$\frac{\text{NO OF DEATH OF INSECT}}{\text{TOTAL NO.OF INSECT USED FOR EXPERIMENT}} \times 100$$

### STUDIES:-

**RESULT:-In the insecticidal property of Parthenium leaf extract (Acetone) shows the mortality % of 10%,**

**In the insecticidal property of Vitex leaf extract show the mortality % of 5%, 10%, 15%=15%, 35%, 65%.**

**In the insecticidal property of mixture of Parthenium and Vitex leaf extract (Acetone) shows the mortality % of 5%, 10%, 40%, 80%.. In the insecticidal property Of Parthenium leaf extract and Vitex leaf extract show the low rate of mortality percentage. The Mixture of Parthenium and Vitex leaf extract (Acetone) shows the mortality percentage in 15% conc. Extract shows 80% of mortality rate.**

### Observation Table:-

Table No 1.

Effect of Parthenium leaf (Acetone) extract on mortality of *stiophilusoryzae*

Name of Plant Extract	Time of exposure in days	Dose	Total no of insert used for expt.	No of death of insert	Mortality

	10	5%	20	5	25%
Parthenium	10	10%	20	8	40%
	10	15%	20	12	60%

**Table No 2.**

**Effect of Vitexnigundi leaf extract (Acetone) extract on mortality of *stiophilusoryze***

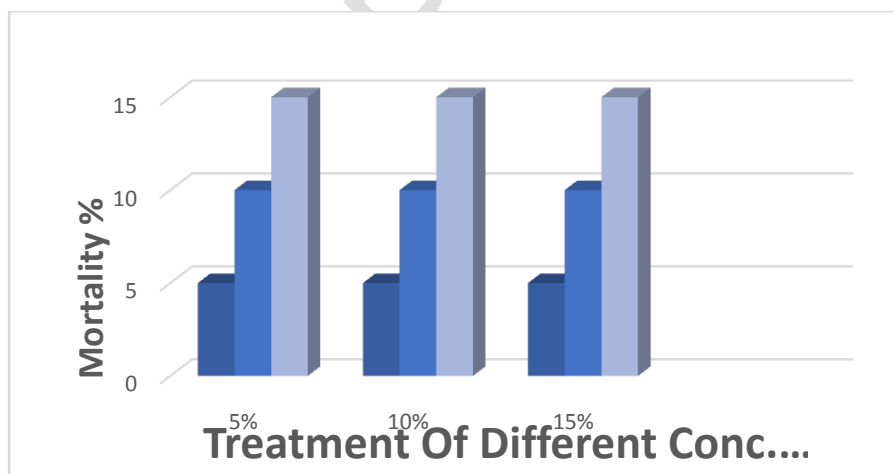
Name of Plant Extract	Time of exposure in days	Dose	Total no of insert used for expt.	No of death of insert	Mortality
	10	5%	20	3	15
Vitex	10	10%	20	7	35
Nigundi	10	15%	20	13	65

**Table No 3.**

**Effect of mixture of Parthenium & Vitex leaf extract (Acetone) extract on mortality of *stiophilusoryze***

Name of Plant Exrant	Time of exposure in days	Dose	Total no of insert used for expt.	No of death of insert	Mortality
Parthenium	10	5%	20	6	30%
&	10	10%	20	8	40%
Vitex	10	15%	20	16	80%

**Graph:-**



**Graph1:- the graph shows mortality % of *S.oryae* for treatment of different conch extract**

100% Parthenium leaf extract

100% Vitex leaf extract

100% Parthenium Vitex leaf extract

#### Toxicity of plant extract to adult Insect:-

The stock culture Of Weevils. *Sitophilus oryzae* reared in laboratory condition were used for experiment.

On the bottom Of petriplate simple filter paper disc were placed singly at the bottom of petriplate [3 sets of 3 petriplates one set for parthenium one set for vitex & another for mix of Parthenium & Vitex i.e. 5%, 10%, 15%,] The extract were applied at different doses on petriplate & dried the 20 gm. By jawar grains were placed on the paper. 20 insect released in each petriplate. And fix with the help of rubber band of muslin cloth observation were recorded on the 10th days after the treatment.

#### CONCLUSION:-

Weed shows rich source of novel nature substance that can be used to develop safe method for insect, This result show the acetone leaf extract parthenium and vitex lethal toxic to *S. oryzae* but the mixture Of parthenium and vitex acetone leaf extract more toxic to rice weevil or tested against stored grain pest i.e. *S. oryzae*. Research reveals that extract prepared from plants have a variety of properties including insecticidal activity, repellent to pest, antifeedent, insect growth regulator etc. (Prakash AGRao, 1997).

The plant like Vitex and Parthenium contains various components which are known to be insect repellent and toxic to the insect (Tilak, 1977). The various chemical compounds present in vitex like Negondoside, flavonoids, pinene, limonene, comphyvitricin, and in parthenium chemical compounds like lacton and parhenine. (Shen et al, 1976 and Ramesh et al, 2003, The various chemical compounds present in that plants that's why it's vary toxic to stored grain insect, i.e. *S. oryzae*).

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