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**Short Comuunication**

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# Repellency of Indigenous Plant, Bhant (*Clerodendron Viscosum* Vent.) Leaf on *Tribolium Confusum* Duval

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## Abstract

Repellent response of Bhant (*Clerodendron viscosum* Vent) to the larvae and adults of *Tribolium confusum* was studied. Results indicated that both the larvae and adults were repelled by contact with different food media when mixed with Bhant leaf dusts at with 100, 500, 1000 and 2000 ppm of wheat flour.

**Key words:** Repellency, Bhant, Larvae, Adults, Food media, Leaf dusts

## Introduction

*Tribolium confusum* Duval considerably damages various food items in stored conditions throughout the world. Many studies on this genus have been dealt with its control. Research on the control measure of *Tribolium confusum* was done by Bond (1973), Husain (1995), Husain *et al.*(1988, 1991), Hasan and Khan (1988) and Mondal (1984, 1986). Most of these authors studied the effects of chemicals on *Tribolium*. Jahan *et al.* (1989), Mondal *et al.* (1989) and Husain *et al.* (1995) used some indigenous plants to control *Tribolium confusum*. Husain and Rahman (2006) used bhant plant to control *Tribolium cataneum* Herbst. Jilani and Malik (1973) used neem plants as repellents against stored grain insects. Screening of antifeedant plants is important in discovering safe and biodegradable alternatives to synthetic insecticides.

No published information is available on the effect of the indigenous plant, bhant (*Clerondendron viscosum*) against the flour beetle, *Tribolium confusum*. In the present investigation, attempts were made to evaluate the repellent effect of this plant material as grain protectant against *Tribolium* infestation.

## Materials and Methods

Leaves of bhant were collected from the field, sun dried and powered in grinding

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machine and then sieved through a 80 mesh sieve. The powder thus obtained was mixed with wheat flour to prepare 100, 500, 1000 and 2000 ppm doses.

Petri dishes (15 cm diameter, 2 cm deep) were used for this experiment (to study the response of *T. confusum* to contact with bhant dust). In this experiment fresh food was treated with bhant leaf dust by adding the appropriate amount and mixing thoroughly in a blender. Doses of 500, 1000 and 2000 ppm bhant dust were used in the experiments. The experiments were replicated five times for each experiment. Each replicate contained 20 larvae and adults separately. Fresh insects were used throughout the experiment. Wheat flour was used as food medium in the experiments.

Experiments on the repellent effects with bhant leaf were conducted in Petri dishes. Each dish was divided into two equal halves by a mark on the outside surface. Using a partition, one half of the dish was loaded with untreated food medium (2g.) and the other half with 2g. of food treated with the plant dust. After loading, the partition was discarded and 20 larvae were released at the middle of the dish. This provided an option for the larvae to select either the untreated medium or the medium treated with bhant dusts. The petri dishes were placed in an incubator run at 30$^{O}$C. The similar experiments were conducted with the adults.

After 24 hours, the Petri dishes were removed from the incubator and Tribolium larvae and adults were collected from each half, their numbers were counted and recorded.

**Results and Discussion**

The results of the experiments are shown in Tables I, II and III. Results were tested using chi-square analysis based on an expected distribution of 50:50. Both larvae and adults were found to be repelled by the media treated with dust of bhant leaves.

From the results shown in Tables II and III , it was found that the adults were repelled by the flour media treated with bhant dusts at all doses of the media, excepting 2000 ppm doses, in *T. castaneum* adults (Table III) where insignificant repulsion were observed. This repellent result of *Tribolium* agrees with the findings of Jilani and Malik who reported that adults of Tribolium confusum were repelled by water and ethanol extracts of neem (*Azadirachta indica* A. Juss). In the present experiments the larvae and adults of Tribolium were in contact with the treated media, so the repulsion may be due to contact with bhant leaf dusts. The larvae were more repelled particularly in the older larvae (Table I).

The results of the present experiments are similar to those of Pinniger(1970) working with malathion and fenitrothion and Pricket and Ratcliffe (1977) working with Pyrethrin,

**Table 1. Number of *Tribolium confusum* larvae recorded on untreated flour and flour treated with different doses of Bhant (*Clerodendron viscosum* Vent.)**

| Larval instar | Concentrations of dust (ppm) | Distribution of the larvae (N=100) | | $\chi^2$(1df) |
|---|---|---|---|---|
| | | Total numbers of treated flour | Total numbers on untreated flour | |
| First | 100 | 39 | 61 | 4.84* |
| | 500 | 37 | 63 | 6.74* |
| | 1000 | 34 | 66 | 10.24*** |
| | 2000 | 36 | 64 | 7.84** |
| Second | 100 | 30 | 61 | 4.84* |
| | 500 | 36 | 64 | 7.84** |
| | 1000 | 35 | 65 | 9.00** |
| | 2000 | 39 | 70 | 16.00*** |
| Third | 100 | 28 | 72 | 19.36*** |
| | 500 | 30 | 70 | 16.00*** |
| | 1000 | 29 | 71 | 17.64*** |
| | 2000 | 30 | 70 | 16.00*** |
| Fourth | 100 | 30 | 70 | 16.00*** |
| | 500 | 27 | 73 | 21.16*** |
| | 1000 | 29 | 71 | 17.64*** |
| | 2000 | 25 | 75 | 25.00*** |
| Fifth | 100 | 22 | 78 | 31.36*** |
| | 500 | 21 | 79 | 33.64*** |
| | 1000 | 22 | 78 | 31.36*** |
| | 2000 | 24 | 76 | 27.04*** |
| Sixth | 100 | 20 | 80 | 36.00*** |
| | 500 | 21 | 79 | 33.64*** |
| | 1000 | 25 | 75 | 25.00*** |
| | 2000 | 23 | 77 | 29.16*** |

Five replicates per test, each replicate consisting of 20 larvae (N=100)
***Highly significant, P <0.001 (1df)
**Significant, P <0.01 (1df)
*Significant, P <0.05 (1df)

bioresmethrin, lindane and DDT who reported that *Tribolium castaneum* adults were repelled by the media treated with these insecticides. A similar result was also reported by Mondal(1984), Mondal and Port (1984) and Husain *et al.* (1995) who report

**Table II. Number of *Tribolium confusum* adults recorded on untreated flour and flour treated with different doses of Bhant (*Clerodendron viscosum* Vent.)**

| Doses applied (ppm) | Distribution of the adults | | $\chi^2$(1df) |
|---|---|---|---|
| | Total numbers on treated flour | Total numbers on fresh flour | |
| 100 | 39 | 61 | 4.84* |
| 500 | 36 | 64 | 7.84** |
| 1000 | 35 | 65 | 9.00** |
| 2000 | 30 | 70 | 16.00*** |

Five replicates per test, each replicate consisting of 20 adults (N=100)
***Highly significant, P <0.001 (1df), ** Significant, P<0.01 (1df), * Significant, P<0.05 (1df)

**Table III. Number of adult *Tribolium castaneu*m recorded on untreated flour and flour treated with different doses of Bhant (*Clerodendron viscosum* Vent.)**

| Doses applied (ppm) | Distribution of the adults | | $\chi^2$(1df) |
|---|---|---|---|
| | Total numbers on treated flour | Total numbers on fresh flour | |
| 100 | 41 | 59 | 3.24* |
| 500 | 40 | 60 | 4.00* |
| 1000 | 39 | 61 | 4.84* |
| 2000 | 43 | 57 | 1.96 N.S. |

Five replicates per test, each replicate consisting of 20 adults (N=100)
N.S.= Not significant P >0.05 (1df)
*Significant, P <0.05 (1df)

ed that the larvae of Tribolium were repelled by methylquinone, pirimiphos-methyl, simbush and diazinon. The results also agree with of the studies of Husain(1995) and Husain *et al.* (1985) who tested the repellent effects of the indigenous plants, bishkatali (Polygonum hydropiper) and custard apple (*Annona squamosa*) on *Tribolium castaneum.*

The results of the present experiments indicate the possible use of this indigenous plant with less insecticidal properties in controlling Tribolium confusum in warehouses as a repellent material. Bags of grains or other stored products treated with its repellent property may prevent Tribolium confusum from attacking and infesting the food commodities.

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