

Chilli Extracts Used as Rice Bugs Insecticide

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Abstract— This paper presented the efficacy of chilli extract to prevent rice bugs in rice fields. The study was conducted at Libertad, Banate, Iloilo. The rice bug was collected in the rice fields during night time. Using a Completely Randomized Design (CRD) with five (5) treatments and replicated to three (3) times. The concentration of chilli extracts was used by the researchers as organic insecticide. As to the results, shows that the higher the percentage of chilli extract the higher the mortality rate. Therefore, it was recommended that chilli extracts is very useful insecticides against rice bugs.

Keywords— chilli extracts, rice bugs, pesticides

I. INTRODUCTION

Bugs damage to rice crops has been a major problem for farmers. Rice crops are the major crops in the Philippines and the most necessary food for Filipinos. Because of insects that make fatal damages on the rice fields the crops was so affected that reduced their yields. The farmers are too affected with these issues.

Due to high cost of commercial insecticides the low income farmers cannot afford them. Chilli pepper (*Capsicum annum*), belonging to the Solanaceae family, instigates from tropical America.¹ Chilli peppers are one of the major vegetable and spice crops cultivated worldwide.² The tremendously hot or burning sensation of chilli peppers is due to the presence of capsaicinoids found only in the Capsicum genus, which are biosynthesized in the placenta of the fruits by condensation of vanillylamine and medium chain length fatty acids.^{3,4} The heat of chillies is cause by the family of compounds called Capsaicinoids. Several different compounds are found in the various varieties of chillies but the dominant compound is capsaicin.⁵

The limited availability and prohibitive cost of synthetic insecticides for sustenance and temporary farmers, some consider botanicals to be a valid substitute to artificial insecticides.⁶ Specifically, the practice of widely used of botanical variety for insect pest control is emphasized in many farmer surveys, such as with 10 botanicals being used by farmers in Northern Malawi, 7 in Zambia⁷, 34 in the Lake Victoria basin in Uganda⁸, or 11 in one district of the Tamil Nadu State in India.⁹

Insecticides destroy the physiology of the insects. It grazes the skin of the insects (roughens the skin or wear it away), causing them to lose water. Insecticides are useful, but they can also be hazardous. Some insecticides, called broad spectrum poisons, kill a

variety of organisms. Besides killing pests, they kill harmless and helpful organisms such including wasps, spiders and other natural enemies of pests.⁵

Domestic botanical insecticides are often suggested by agricultural extension services and some development organizations. However, this could be questioned because scientific evidence of their efficacy and safety may not be available or accessible.¹⁰ Still today, traditional pest control using botanicals for the protection of field crops or during storage is widespread and popular among subsistence and transitional farmers.¹¹

The aim of this study is to determine the lethal dose effects of chilli fruit extract to a rice bugs. It also evaluated the efficacy of the treatments combined against rice bugs. Persuaded to this fact, this research might be a pacing for further study about the development of a homemade insecticide that basically can help to the reduction of chemically-produced insecticide. This can also promoted environmentally friendly insecticide.

II. MATERIALS AND METHODS

This study was conducted last November, 2021 at Libertad, Banate, Iloilo. It used Chili Fruits that was purchased at Banate Public Market, Banate, Iloilo as materials. The rice bugs were collected at the rice fields and place in a screen bag in preparation for treatment application. The effect was observed every hour.

Research Design

This was used a Complete Randomized Design (CRD) with five (5) treatments and replicated to three (3) times. The concentration of chilli extracts was used by the researchers as organic pesticide.

Experimental Layout

Table 1: Factorial Complete Randomized Design (FCDR)

R1	R2	R3
B	C	A
D	E	D
A	B	C
C	A	E
E	D	B

Chilli Extract

The following treatment was used in the study:

- Treatment 1 (25 grams concentration, 75 ml water)
- Treatment 2 (50 grams concentration, 50 ml water)
- Treatment 3 (75 grams concentration, 25 ml water)
- Treatment 4 (100 grams concentration, 0 ml water)
- Treatment 5 (0 grams concentration, 100 ml water)

Pest Management

In the pest management, proper collections and storing are necessary. In every screen bag there are ten (10) rice bugs placed into for every treatment and replication.

Pest Collection

The pest collection was done during the night time. Light trap was used as a method to catch pest or rice bugs. After collecting the rice bugs, it was placed into a clear screen bag for security.

Formulate Chilli Extracts

In formulating chilli pesticide, 1 kilogram chilli fruit was collected and grinded until totally crushed. It was mixed with 100 ml of water, then it was placed in strainer and squeezed to collect its extract and separate the solid from liquid matters. Finally, the collected extract was mixed with water to obtain the desired concentration amount.

Applying Insecticide

In applying of chilli extracts insecticide, there are ten (10) rice bugs in a screen bag and levelled according to five (5) treatment desired concentration of insecticide. The insecticide was applied simultaneously. The distance and speed of spraying application are equal. The distance was set to three (3) cm from the subject and the speed was sprayed per second.

Data Gathering

The effects of the insecticides were observed after the application. The mortality rate of rice bugs was thoroughly observed. The data was recorded every 30 minutes within two (2) hours for a data analysis used.

Data Analysis

The insecticides effect of chilli fruit extract against rice bugs at different levels was analysed using the frequency count to determine the mortality rate of rice bugs. To determine the lethal dose of the formulated insecticide from the extracted chilli fruit, the statistical tools to be used is Statistical Procedures on Social Science (SPSS) and ventilation. The pest collected was conducted at Libertad, Banate, Iloilo on November, 25, 2021 a day before the experiment was conducted.

III. RESULTS

Different observation of the treatment was administered and the researchers observed that the percentage of mortality rate of the rice bugs was varied depending on the concentration of chilli extract. As to the results, Table 2 shows that the higher the percentage of chilli extract the higher the mortality rate.

Table 2: Chilli extract mortality rate

Chilli grams	Mortality Rate (10)
25 grams of chilli	3
50 grams of chilli	5
75 grams of chilli	7
100 grams of chilli	10

CONCLUSION

Based on the data analysis presented, the higher the concentration of chilli extract the higher the rate of mortality of the rice bugs.

RECOMMENDATION

Therefore, it was recommended to the farmers should use chilli extracts as an alternative insecticide against to rice bugs. It is also concluded that chilli extract insecticide is environmentally friendly and less expensive compare to some other chemical insecticides.

It is also recommended for further study to apply the chilli extracts to other insecticides in some other crops. In addition, farmers should plant chilli 2-3 months before growing rice so that they have sufficient supply of chilli to be used as insecticide.

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