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THE EFFICACY OF FERMENTED NEEM (*AZADIRACHTA INDICA*) LEAVES SOLUTION FOR GOLDEN APPLE SNAIL CONTROL

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ABSTRACT

The study was conducted to evaluate the effectiveness of fermented neem leaves solution in controlling golden apple snail (*Pomacea canaliculata*). This was carried out using Complete Randomized Design (CRD) with five treatments replicated four times. The study was conducted at Postharvest room, Campus Farm, College of Agriculture, Poblacion 5, Midsayap, Cotabato on August 12, 2017.

The concentration of the neem solution was the basis for the treatments: Treatment 1 was composed of 1 kilogram of neem leaves + 0.5 liter of water; Treatment 2 was composed of 1 kilogram of neem leaves + 1.0 liter of water; Treatment 3 was composed of 1 kilogram of neem leaves + 1.5 liters of water; Treatment 4 was composed of 1 kilogram of neem leaves + 2.0 liters of water; and Treatment 5 was composed of 1 kilogram of neem leaves + 2.5 liters of water.

The effectiveness of fermented neem leaves solution was measured in terms of morbidity and mortality rates by counting the number of affected and dead golden apple snail 24 hours after application. For 24 hours, the analysis of variance showed that there is no significant difference among treatments. On one hand, fermented 1kg. neem leaves + 2.5 liters of water has a mortality rate of 60%.

Keywords: Fermented neem leaves, mortality, morbidity

1. INTRODUCTION

The aquatic gastropod known as the Golden Apple Snail (GAS), Pomacea canaliculata, or "Golden Kuhol," is a member of the Ampularidae family. Ponds, lakes, creeks, rivers, streams, irrigation systems, and rice fields are among its habitats (Kyle et al., 2013; Cowie & Thiengo, 2003 in Penaredondo et al., 2015). According to reports, it is a significant and dangerous pest in rice fields since it can kill off young leaves and stems from plant bases, causing the affected plants to die (San Martin et al., 2008; Ito, 2002 in Massaguni & Latip, 2012).

Although synthetic molluscicides are well-known for their knock-down effect, their detrimental effects on the environment and the high cost of application have sparked interest in finding target-specific, environmentally and toxicologically safe molluscicides derived from plants (Duke et al., 2010; Li et al., 2012 in Prabhakaran, Bhore & Ravichandran, 2017).

Because they are abundant in a range of bioactive organic compounds, including alkaloids, limonoids, terpenoids, phenolic, saponin, tannin, and flavonoids, plants are widely acknowledged as viable substitutes for synthetic pesticides (Phuagphong et al., 2015 in Massaguni, Raman & Latip, 2016). Furthermore, compared to counterparts imported synthetic pesticides, plant pesticides are more readily available and more closely linked to native self-sufficient pest snail control techniques.

Certain plant species, such as Sandorium vidalii, are recognized to have molluscicidal qualities in the Philippines (Ngaloy & Andrada, 2005 in Taguiling, 2015). As an environmentally benign, easily biodegradable, and organic molluscicide, tobacco dust is used in conjunction with other organic molluscicides (Borja, 2012; Tangkoonboribun & Sassanarakkit, 2009). India is the natural home of the neem tree (Azadirachta indica). According to Ufele et al. (2013), it has both therapeutic and pesticidal qualities. There are numerous pharmacological properties found in every part of the neem tree, particularly antibacterial, antifungal, antiulcer, antifeedant, repellent, pesticidal, and molluscicidal properties (Biswas, Chattopadhyay, Banerjee & Bandyopadhyay, 2002; Das, Mukherjee & Murjani, 2002 in Mousa, El-ashram & Mona Hamed, 2008).

For this, there are plants that can be used as biopesticides. There is however a need to evaluate the effectiveness of fermented neem leaves that can be used as biopesticide to control a wider range of pests. Thus, this research was conducted to evaluate the effectiveness of fermented neem leaves solution in controlling golden apple snail (Pomacea canaliculata) in support of rice farming.

2. STATEMENT OF THE PROBLEM

The general objective of this study was to determine the effectiveness of fermented neem leaf solution in controlling GAS. Specifically, it aimed to:

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i. determine the mortality rate of golden apple snails in different concentrations of fermented neem leaf extract.

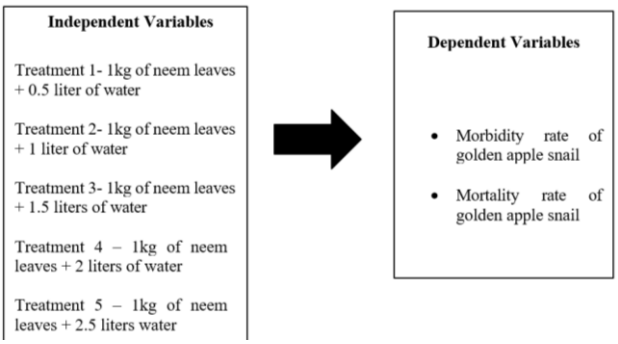
ii. determine the morbidity rate of golden apple snails in different concentrations of fermented neem leaf extract; and

iii. determine the best treatment for controlling golden apple snails.

3. FRAMEWORK

Scope and Limitation of the study

The study was limited to the evaluation of the effect of the fermented neem leaf solution in different concentrations to control golden apple snails. The result was determined in terms of the efficacy of fermented neem leaf solution based on the mortality and morbidity of golden apple snails.



4. METHODS

Preparation of Materials

The neem leaves were gathered at Purok Waling-waling, Kimagango, Midsayap, Cotabato, and were obtained from any diseased free mother plant. Before being processed for treatment preparation, the neem leaves were chopped, pounded, and cleaned with clean water to get rid of any dirt.

Preparation of Treatments

The procedure employed by Cristobas (2017) was followed in the preparation of the treatment. In accordance with the treatment, one kilogram of pounded neem leaves was mixed with water. 0.5 liters for treatment 1, 1 liter for treatment 2, 1.5 liters for treatment 3, 2 liters for treatment 4, and 2.5 liters for treatment 5. For 48 hours, these were fermented. The fermented neem leaves were strained and squeezed after 48 hours. A graduated cylinder was then used to measure the solution based on the treatment.

Gathering of Golden Apple Snail

Ten (10) medium-sized (2.5 cm) golden apple snails per replication were collected from Barangay Milaya and individually placed in a basin that was 13 inches in diameter and 5 inches deep.

Treatment Application

For each replication, the golden apple snails were placed in a basin with 300 milliliters of varying concentrations of liquids. The exposure lasted for a full day. Every hour, the mortality and morbidity rates of golden apple snails were recorded.

Figure 1 Appendix Plate. Preparation of the conduct of the study: a) washing of neem leaves; b) chopping of neem leaves; c) pounding of neem leaves; d) fermentation process; e) squeezing of fermented neem leaves; f) treatments solution containing 300 ml.

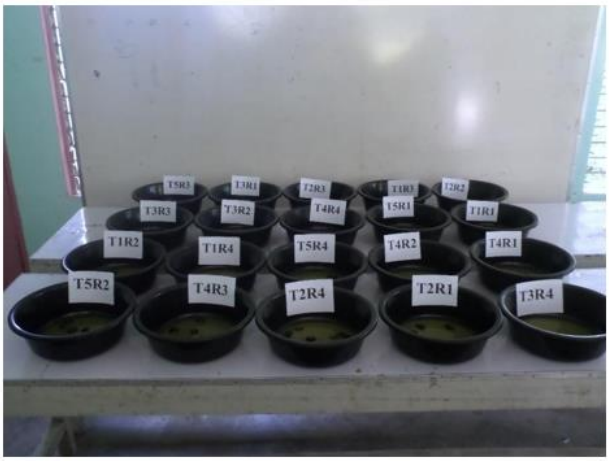


Figure 2 The experimental layout of the study

5. FINDINGS

Mortality Rate

The golden apple snail mortality rate as a percentage display in Figure 3. Over 19 hours, the mortality rate varied between (T2)17.50% and (T5)42.50%. The mortality rate for the 20-hour period varied between (T2)22.50% to (T5)52.50%. The mortality rate over a 21-hour period varied between (T2)22.50% to (T5)52.50%. While the death rate in 24 hours ranged from (T2)35% to (T4 and T5)60%, the mortality rate in 22 and 23 hours ranged from (T2)27.50% to (T5)55%.

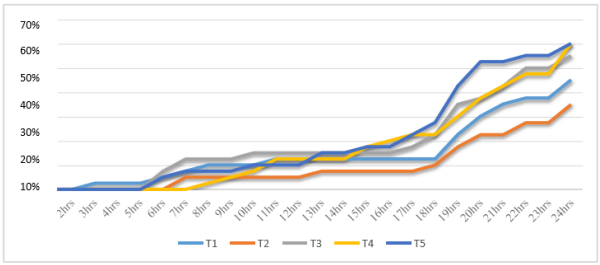


Figure 3 Percentage of dead golden apple snail (1to 24 hours).

The mortality rate of the golden apple snail observed in 19–24 hours was not significantly impacted by the treatments, according to the analysis of variance (ANOVA). Nonetheless, treatments demonstrated mortality within a day, indicating neem's molluscicidal effects. According to Biswas et al. (2002) and Das et al. (2002), as referenced by Mousa et al. (2008), all parts of the neem tree have been found to have a variety of pharmacological qualities, including molluscicidal ones.

Morbidity Rate

The proportion of affected golden apple snails within 1–24 hours display in Figure 4. In 19 hours, the percentage of golden apple snails affected varied from 57.50% to 82.50%. The percentage of afflicted golden apple snails varied between 47.50% and 77.50% throughout the course of 20–21 hours. The proportion of afflicted golden apple snails varied between 45% and 72.50 percent throughout the course of 22 and 23 hours. In contrast, it varied between 40% and 65% over a 24-hour period.

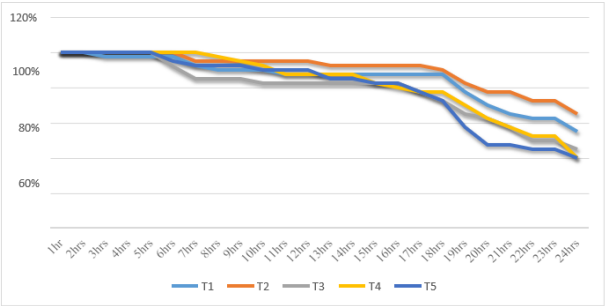


Figure 4 Percentage of affected golden apple snail (1to 24 hours).

The morbidity of golden apple snails discovered during 1–24 hours was not significantly affected by treatments, according to the analysis of variance (ANOVA).

Comparison of Morbidity and Mortality Golden Apple Snail.

The maximum percentage of dead golden apple snails (60%) was seen in treatments 4 and 5, whereas treatment 2 had the lowest percentage (35% of dead GAS). It was found that Treatment 2 had the greatest number of impacted golden apple snails (65%), whereas Treatments 4 and 5 had the lowest number (40%) of affected golden apple snails.

Table 1 Comparison of dead and affected golden apple snail in every treatment with 40 samples after 24 hours.

Treatments	Dead	Affected
T1	45%	55%
T2	35%	65%
T3	55%	45%
T4	60%	40%
T5	60%	40%

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