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Tuba (Croton tiglium) as botanical rodents' control

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Abstract: The use of chemical pests is a usual thing to individuals as these abound in any agrivet stores. The usual way is that many don't know this. This commercially compounded bait formula can cause harm to other animals in the farm and in the environment and even human beings. This study is conducted in order to aid farmers and household owners in controlling the rapid increase of rodent's population in farm and houses that become a menace to the people. It is a formulated botanical rodent control which is organic and the effect is not fatal to other animals. Made up of tuba fruit and cassava flour, this bait for rodents will cause dehydration and once affected, the rodents will come out their hiding place and die in the open. This research used the experimental and descriptive methods in order to observe and ensure the field trials measure accurately the effectively of the botanical rodents' control.

Key words: Croton tiglium; Botanical; Rodents

1. Introduction

Man has been combating rodents across the earth for over a hundred years. Control efforts have been taken in numerous forms; however, it requires one's knowledge on the characteristics of rodents / rats on their biology and habits as bases to determine appropriate weapon and most effective way of stopping their population/reproduction.

Practices of the old folks in locality are to put tuba juice in minimal amount to "Sanggulan" and when taken even small amount cause excessive loose of bowel movement. Although it cannot cause death but the purpose is to discipline those who used to steal the native wine in "sanggutan". Based on the cited practices known on the effect of tuba to human beings, caused the researchers to come-up with a research to use tuba as botanical bait preparation in order to determine and evaluate the effect to the rodents. As we all know, rodents are very wise and intelligent pests. They can easily determine thru smell the food that contains poison. Since this is new to their smell. Possibly this preparation would be effective.

Thus, this research would like to find out the effect of botanical preparation as rodent control.

2. Objectives of the study

The purpose of this study is to determine the effect of tuba as Botanical rodent's control. To clarify further the main problem, the study sought to find the answers to the following sub-problems:

- Evaluate the chemical components of tuba as botanical rodent's control.
- Determine the fatal the effect to the rodents
- Evaluate the hazardous effect if dead rodents will be eaten by other animals.

3. Methods and procedure used

This research uses the experimental and descriptive methods in gathering the data. Field trial will be administered to ensure the affectively of the different preparation in 5 replicates.

- T1 – with 20% tuba added to 5 cup rice
- T2 – with 25% tuba added to 4 cup rice
- T3 – with 33% tuba added to 3 cup rice
- T4 – with 50% tuba added to 2 cup rice
- T5 – with 100% tuba added to 1 cup rice

3.1. Raw materials

- Tuba fruit and cassava flour

3.2. Formulation of the preparation

- 1 kilo of tuba fruit
- 5 kilos of Cassava
- Extract the juice separately
- Add 1 cup of cassava flour to every extracted juice
- Sundry for 3 days to ensure the desired moisture
- Pound or grind the mixture until it becomes powder

3.3. Procedure of bait preparation

- T1 –1 cup tuba powder + 5 cups rice
- T2 – 1 cup tuba powder + 4 cups rice
- T3 – 1 cup tuba powder + 3 cups rice
- T4 – 1 cup tuba powder + 2 cups rice

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- T5 – 1 cup tuba powder + 1 cups rice

4. Related studies

Based on the information gathered by the researchers from the old folks in five remote barangays of Cantilan, they used Tuba Croton tiglium as botanical bait for wild pig and monkey. Some say instead of TOBLE that causes blindness.

Studies were also conducted by the PhilRice Butuan City using TUBA as botanical weevil control in rice intended for seed material. It was shown in different preparation as acceptable weevil control. Among the 4 preparations of Tuba, fruits extract showed better than the order 3 preparations as weevil control.

Several studies on rodents have been made which show the effect of strange object in the rodents' environment. During the experiment, changing the design of the feeding tray was enough to cause feeding to drop almost to nothing. Sometimes it persists for several trials during the night. Light left at night and unfamiliar noises also caused drop in feeding. Even changing the location of familiar object caused avoidance and a lowering of general activity. These studies also pointed out that rodents may avoid new food for several days. This is an important fact in poisoning operation. When the rats first began to take a new food, it may only take "token" amounts. If this amount contains a sub-lethal dose of poison, it may make the animal sick, thus it strengthens the avoidance reaction. This is the biological basis for the use of unpoisoned bait, of probating, before the poison is added. The feeding studies also indicate that hunger can cause the avoidance of strange object.

4.1. Studies of stuart godofredo (2011)

Purgative/Laxative: (1) A study of the ethanol extracts of three Chinese medical plants-Croton tilium (Badou), Rheum palmatun, (Dahuang) and Cannabis sativa (Huomaren)-known for their laxative properties, showed an effect on the rat intestinal epithelial cells providing evidence for the pharmacologic mechanism on the intestinal tract.

Tumor-Enhancing: (1) A 1995 study isolated 2 active cocarcinogenic agents from the seed of CT. Both were potent cocarcinogens at very low dosage. Phorbol myristate acetate, a semisynthetic compound from the croton resin showed promoting activity. (2) Study of active fractions of croton resin showed a high incidence of malignancy and low incidence of tumor regression. Alone, croton resin gives rise to a very few tumors; croton oil elicits low incidence of malignancy.

Gastrointestinal Motility Modulation: Study showed Croton tiglium oil might modulate gastrointestinal motility and induce intestinal inflammation related to immunological milieu and motor activity. Results highlights it folkloric use in gastrointestinal disorders.

EBV-Including: (1) TPA, a tumor-promoting agent, 12-0-tetradecanoyl=phorbol-13-acetate, was isolated from the seed and stalk of Croton tiglium. Study has shown it ti be a potent EBV-inducer n vitro while also decreasing EBV-specific cellular immunity and enhancing EBV-induced transformation. (2) Combined usage of oily extracts from C tiglium, E lathyris and E tirucalli exerted a marked induction of EBVirus-associated earl (EA) and viral capsid (VCA) antigens in genome-carrying human lymphoblastoid cell lines with implications in EBV-associated diseases.

Antifungal/Antibacterial: Study isolated a novel antimicrobial protein from the seed of Croton tiglium. The protein was found to possess a strong and broad spectrum antimicrobial activity.

Insecticidal/Anti-Termite/Croton Oil: A home study of Croton oil from leaves mixed with ethyl alcohol showed anti-termite effects and suggests a non-toxic environment-friendly alternative to termite control.

4.2. Botany

Tuba (Euphorbiacease family) is an erect or less spreading shrub or very small tree. Leaves are alternate, ovate 7 to 12 centimeters in length, usually somewhat rounded at the base, pointed at the tip and toothed at the margins. Flowers are very small, bome on terminal inflorescences, with the female flowers situated toward the base of each inflorescence. Fruit is a capsule, ellipsoid or obscurely 3-angles, 1.5 to 2 centimeters long and contains a single seed. Seeds are ovod or obling. 12 to 15 millimeters in length and 3-angled, the testa dark brown or blackish, thin and brittle and of faint odor; the albumen and the embryo are yellowish. Seeds are at first mild in taste and subsequent acrid and pungent.

4.3. Distribution

- Usually planted, in and about towns, throughout the Philippines
- Naturalized in some places
- Of prehistoric introduction from Malaya
- Also occurs in India to New Guinea

4.4. Chemical Constituents

Major known chemical constituents:
- Glyceryl crotonate
- Crotonic acid
- Crotonic resin

Tumor-promoting:
- Phorbol esterophorpol for mate
- Phorpol butyrate
- Phorpol/crotonate

Parts utilized:
- Roots, seeds, fresh leaves.

4.5. Constituents

Roots contain tannin, 65% and seeds have a fixed oil (croton oil), 30-56%, containing croton globulin and croton albumin, arginine, and lysine; alkaloid ricinine (toxic); lipase; invertase, amylase, raffinase; proteolytic enzyme, crotone resin, tiglic acid, croton oleic acid, stearic, palmitic, myristic, lauric, cenathrallic, capronic valerianic, butyric, isobutyric, acetic and formic acids; tannin, 65%

4.6. Properties

- Oil is yellow, orange, or brown, according to age.
- Pungent and burning taste, warning, antipyretic.
- Nauseating odor.
- Toxic in excessive internal use.
- Roots, bark, leaves, and seeds possess drastic purgative properties.
- Croton oil is considered rubefacient and counterimitant.
- Croton oil's property as external vesicant and internal purgative is attributed to the presence of croton oleic acid.
- Differentiation between croton poisoning from ptomaine poisoning: In croton poisoning, pain is felt at the back of the throat, sometime after the poison has been swallowed. Pain is also felt at the back of the throat, sometime after the poison has been swallowed. Pain is also felt at the anus. Also croton poisoning is immediately relieved by doses of bismuth, not so with ptomaine poisoning.

4.7. Uses

4.7.1. Folkloric

- For rheumatic pains of the legs and waist: uses 3 to 6 gms of dried materials in the form of decoration.
- Pounded fresh leaves may be applied as poultice for snakebites or may be used as insecticide.
- For sprains and bone pains: oiled leaves or bark materials are heated and applied to painful areas.
- Croton seed oil has been used as purgative.
- Seed oil used for treatment of schistomosomiasis and other intestinal parasites.
- Roots, bark, seeds, and leaves considered a drastic purgative.
- Bruised root applied to carbuncles and cancerous sores.
- Testa used for fluxes.
- Croton oil is used in dropsy, obstinate constipation, intestinal obstructions, and lead poisoning; as a preliminary laxative in leprosy; and as a revulsive in apoplexy. A few drops at the base of the tongue produce catharsis.

4.8. Others

Poison: Plant is universally used as fish poison. Pounded ripe fruit is used in Java and bythe Dayaks of Bornea to poison fish. In the Philippines, fruit or crushed leaves are similarly used. The leaves are one of the constituents of the Batak arrow poison. The arbor arrow poison of the northeast frontier Assam is a paste believed to be made from pounding soft plant parts. When seeds are used, they are pulverized, put in sacks, ad placed in ponds or rivers.

4.9. Croton-phenol peel

Minute quantities of croton oil with phenol as solvent, diluted in water and saponified have been used as a peeling agent. The mechanism of interaction between oil and skin continues is yet to be fully explained.

5. Findings

Analysis of variance (Two-factor ANOVA) of Tuba Croton Tiglium Linn; as botanical rodents control was given in this part.

Based on the result of the experimentation among the five preparations the one that has fatal effect to rodents is the 5th preparation with a ratio of 1:1.

5.1. Result of experimentation

Table 1: (Trial 1) (1 cup tuba powder + 5 cups of rice) N=5 hampster (mice)

No. of days	Immediate effect	No. of rodents at the start of dehydration	No. of rodents which have sign of death near water pond	No. of rodents too weak to stay near the water pond	No. of rodents died outside their hideout	No. of rodents total
1st day						
2nd day		2				
3rd day			1			
4th day						
5th day				3		
6th day					1	
7th day						4

The table shows that out of 5 hampsters (mice), on the first day there was no sign of effect but on the second day 2 mice were dehydrated and one mouse almost died when it went go near the water pond, and on the 5th day 3 rats were too weak, and on the sixth day one rat was found dead, and the total rats died were 4. It shows that 2 hampsters were dehydrated, and on the 4th day 3 hamsters were too weak and stayed near the water pond, then at the sixth day all 5 rats died outside their hide out.

Table 2: Trial 2(1 cup tuba powder +4 cups of rice) N=5 hampster

No. of days	Immediate effect	No. of rodents at the start of dehydration	No. of rodents which have sign of death near water pond	No. of rodents too weak to stay near the water pond	No. of rodents died outside their hideout	No. of rodents total
1st day						
2nd day		2				
3rd day						
4th day				3		
5th day						
6th day					5	
7th day						

Table 3: Trial 3 (cup of tuba powder + 3cup of rice) N=5 hampster

No. of days	Immediate effect	No. of rodents at the start of dehydration	No. of rodents which have sign of death near water pond	No. of rodents too weak to stay near the water pond	No. of rodents died outside their hideout	No. of rodents total
1st day	3 groggy					
2nd day		4				
3rd day			3			
4th day				5		
5th day					5	
6th day						
7th day						

On the 1st day of the trial there were 3 rats directly became groggy, then at 2nd day 4 rats were dehydrated, and 3 rats died near the water pond, and finally on the 4th day 5 rats were dead.

Table 4: Trial 4 (1 cup tuba powder + 2 cups of rice) N=5 hampsters

No. of days	Immediate effect	No. of rodents at the start of dehydration	No. of rodents which have sign of death near water pond	No. of rodents too weak to stay near the water pond	No. of rodents died outside their hideout	No. of rodents total
1st day	4 groggy					
2nd day		5				
3rd day			5			
4th day				5	5	
5th day						
6th day						
7th day						

In this trial, 4 rats were groggy on the 1st day. An immediate effect was shown to 4 rats, and on the second day 5 rats were dehydrated, and on the 3rd day the 5 rats were too weak a near the water pond and the same rats were dead outside their hide out on the 4th day.

Table 5: Trial 5(1 cup tuba powder + 1 cup of rice) N=5 hampster

No. of days	Immediate effect	No. of rodents at the start of dehydration	No. of rodents which have sign of death near water pond	No. of rodents too weak to stay near the water pond	No. of rodents died outside their hideout	No. of rodents total
1st day						
2nd day				5		
3rd day					5	
4th day						
5th day						
6th day						
7th day						

5.2. Grand Total N=25

The total trial indicated that on the second day five automatically became too weak near the water pond and on the 3rd day 5 rats were dead outside their hide out.

6. Null Hypothesis

- There is no difference between tuba powder and rice as extract ant to rodents.
- There is no difference/relationship of dehydration and death of rodents.1.

Table 6: Two-ways analysis of variance (Two-Way ANOVA) of tuba croton tiglium linn; as botanical rodents, N=5

No. of days	Immediate effect	No. of rodents at the start of dehydration	No. of rodents which have sign of death near water pond	No. of rodents too weak to stay near the water pond	No. of rodents died outside their hideout	No. of rodents total
1	2	1	3	1	4	11
2	2	0	3	5	0	10
3	4	3	5	5	0	27
4	4	5	5	5	5	24
5	0	0	0	5	5	10
Total	12	9	16	21	14	72

Table 7: Analysis of variance (Two-Way ANOVA) of tuba croton tiglium linn; as Botanical Rodents

Square of Variation	Sum of Squares	Degrees of Fleedos	Means Squares	Computed F	Tabular F(0.05)	Decision	Interpretations
Treatment	(SST) -95.32	K-1=4 b-1=4 (K-1)(b-1)=16	MST=SST K-1	MST=-23.83 MSE 29.64 =-0.80	5.05	F<TV	Not Significant
Blocks	SSB -70.92		MSB=SSB b-1 =17.73				
Error		16	MSE=SSE 16				
Total			29.64				

7. Conclusion

Therefore, based on the given result shown in the table, if there is an equal proportion of tuba powder and cup of rice feed to the rats, it affect earlier compared to the previous experiments.

8. Recommendation

- It is recommended therefore that utilizing Tuba Croton Tiglium Linn; as Botanical Rodents greatly help eradicate millions of mice in our place and throughout the country.
- The cost is also affordable by low income families.
- Safe & none toxic to environment.

References

Orris L. http://canceres.aacjoumal/.org./content 25/ii part, 1871 Absent

PhilRice Butuan City Tuba as Weewil Control 2010

Stuart, Godofredo (2011). http://www.stuartchango.com/Tuba.html

Van Duuren Institute of Enviromental Medicine,New York Medical Center,New York.