

Mortality rate essay sample



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Chapter 1 - Introduction

Background of the Study

Using natural pest and disease control is often cheaper than applying chemical pesticides because products and materials which are already in the home and around the farm are most often used. Termites are small, white, tan or black insects. It belongs to the insect order Isoptera, an ancient insect group that dates back more than 100 million years. Termites also known as white ants a misnomer based on superficial similarities in the appearance and habits to these two insects group. Termites can cause severe destruction to wooden structures and also consume structural lumber. They considered pest attacking the kept documents. They feed on dead organic material such as crop residues, mulches and soil organic matter (humus). However when this type of food is not available they will eat live plant material including crops such as groundnuts, millets and maize.

Yemane(*Gmelina Arborea* Roxb) from family Verbenacea is a tropical evergreen, perennial tree up to 40m tall and 140 cm in diameter, but usually smaller than this. It is also considered as toxic or poisonous tree which aid as pest repellent.

Gmelina Arborea Roxb gained prominence not only in the Philippines but also in neighboring Asian countries because of economic importance. It is raw material for pulp and paper making post, house, timber and poles while rotary cut veneers are utilized for plywood. The leaves used as feeds for goats and cattle. The roots and bark are stomachic, galactagogue laxative anthelmenthic, improve appetite, burning sensations, fevers and urinary discharge. Chili peppers have been a part of the human diet. Christopher

Columbus was one of the first Europeans to encounter them (in the Caribbean), and called them “peppers” because they, like black and white pepper of the Piper genus known in Europe, have a spicy hot taste unlike other foodstuffs. Upon their introduction into Europe chilis were grown as botanical curiosities in the gardens of Spanish and Portuguese monasteries. But the monks experimented with the chilis’ culinary potential and discovered that their pungency offered a substitute for black peppercorns, which at the time were so costly that they were used as legal currency in some countries. Peppers and certain herbs contain the compound “capasaicin” which will irritate and repel many insects. Chili peppers are very strong and insects (as well as other animals) have a very powerful sense of smell and taste. The chili works to basically fry their senses and causes them pain.

Objectives:

The study focused on the “Mortality Rate of Termites Sprayed with Yemane Decoction and Chili Extract” with an objective:

To determine the mortality rate of termites sprayed with yemane decoction and chili extract.

Statement of the Problem:

At present, termites were considered as pest as they cause severe destruction to a wooden structure. This study focused on the organic preparation of Yemane decoction and chilli extract as substitute to a synthetic pesticide in controlling against termites.

This study sought to answer the question:

What is the mortality rate of termites sprayed with yemane decoction and chili extract? Null Hypothesis

There is no significant difference among the mortality rate of termites sprayed with yemane decoction and chili extract. Significance of the study:

This study would give an idea and sufficient information among lumber users and furniture operators, specifically to the teachers having a problem against those termites attacking their classrooms. Furthermore, it would serve as a guide to people who lack knowledge on the botanical preparations to control termites. They would be benefited with the outcome of the study and at the same time they would be informed that Yemane decoction and chilli extract serve as substitute to synthetic pesticides in controlling termites. Scope and Delimitations:

The study was focused on the mortality rate of termites sprayed with Yemane Decoction and chili extract. This was conducted in Camingawan Elementary

School from the month of August to September 2012.

The experimental design used was the Completely Randomized Design (CRD) with five (5) treatments replicated four (4) times with total experimental units of 20. The treatments used were: A - Pure Yemane, B - Pure Chili, C - 100% Yemane and 100% Chili, D - 75% Yemane and 25% Chili, and E - 25% Yemane and 75% Chili. Data gathered were the average percentage mortality rate, and treated statistically using the F-test or the Analysis of Variance (ANOVA) set at 5% level of significance. Test of significance of the treatment means was done using the Least Significant

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Difference Test (LSD) at 5% level. Counting the desired number of termites as variable in the study and separating it with a piece of soil with extra care were the researchers' limitations.

Definition of Terms:

The following terms used in the study are defined conceptually and operationally. ANOVA. Analysis of Variance or the Fisher's Test (F-test) A parametric test that test or determine the significance of differences among three or more groups.

In this study it refers to the statistical tool being used to determine the significance of the study. Bark. The rough outer covering of the woody stems of trees or bushes. Microsoft® Encarta® 2009.

In this study, it refers to the outer covering of the branch or trunk of Yemane (*Gmelina arborea roxb*).

Chili. Pod with strong flavor: a narrow red or green hot-tasting pod produced by various types of capsicum pepper plant. Use flavoring sauces and relishes. Microsoft® Encarta® 2009.

In this study, it refers to the extract of chili fruit mixed with yemane decoction. CRD. An acronym for Completely Randomized Design commonly used in the experimental design in Agricultural Research.

In this study it is the experimental design being used.

CV. Coefficient of Variability a normalized measure of dispersion of a probability distribution. (<http://en.wikipedia>.

org/wiki/Coefficient_of_variation)

In this study it refers to the tool used for the probability of the study.

Decoction. Extracting process: the extraction of an essence or active ingredient from a substance by boiling. Microsoft® Encarta® 2009. In this study, it refers to the boiled bark, leaves and seeds of yemane(*Gmelina arborea roxb*) used as insecticide. Extract. To take or pull out by force; the essence of a substance obtained by extraction (Webster's Universal English Dictionary, 2004).

In this study it refers to the extract of chili fruit and yemane decoction used as insecticide. Leaf (pl. Leaves). a flat green part that grows in various shapes from the stems or branches of a plant or tree and whose main function is photosynthesis. (Microsoft® Encarta® 2009).

In this study it refers to the leaves of yemane being chopped and boiled.

LSD. Least Significant Difference Test ($LSD = \alpha 0.05\sqrt{(2MSE/r)}$) is to compare the mean of one group with the mean of another. (<http://corn.osu.edu/newsletters/2010/2010-40/agricultural-statistics-least-significant-differences-bsd>) In this study it refers to the significance among treatment means.

Mortality rate. Ratio of deaths to population: the number of deaths in a place or group compared with the total number of people in that place or group (Webster's Universal English Dictionary, 2004).

In this study it refers to the number of termites died after spraying yemane decoction and chili extract. Seed. The mature, fertilized ovule of a plant,

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containing the embryo and a food store to sustain the seedling during germination, enclosed within a protective coat.

In this study it refers to the seeds of yemane(*Gmelina arborea roxb*) pounded and boiled. Spray. Water or other liquid dispersed in fine particles. An instrument for discharging small particles of liquid. (The New International Webster's Comprehensive Dictionary of the English Language, 2010 Edition).

In this study it refers to the treatment or concentration being sprayed towards termites. Termites. a light-colored social insect that forms large colonies. Many species live in warm or tropical regions, feed on wood, and are highly destructive to trees and wooden structures. (Microsoft® Encarta® 2009).

In this study it refers to the subject or variable being used by the researchers. Yemane (*Gmelina Arborea Roxb*). From family Verbenacea is a tropical evergreen, perennial tree up to 40m tall and 140 cm in diameter, but usually smaller than this. Yemane is a deciduous tree which has a very remarkable growth rate. It is capable of surviving from 30 to 40 years. (http://erdb.denr.gov.ph/publications/rise/r_v14n3.pdf)

In this study it refers to the tree used by the researchers, wherein its bark, leaves and seeds are chopped, boiled and extracted as decoction.

Chapter II

Review of Related Literature

This chapter contains the findings, related studies and information which would help in the conduct of this study.

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Yemane (*Gmelina arborea roxb*) Description

Yemane is a deciduous tree which has a very remarkable growth rate. In a reasonably good site, it takes only three years to attain a merchantable timber size of 5.8 m – 8.3 m with 10 cm – 15 cm diameter. It is a short-lived tree but with good soil condition and proper care and maintenance, it is capable of surviving from 30 to 40 years. Production may exceed 30 m³ per hectare every year. Foronda, S. and Llamas-Apolinar(2003) emphasized that it is a prolific seeder even at a juvenile age of three to four years. It is considered a drought and fire resistant species. Leaves are opposite; deciduous; entire, 10 cm – 20 cm long, 7 cm – 13 cm wide, and have waxy bloom on the underside. Flowers are numerous, trumpet-shaped, hairy and short-stalked, and has a length of 4 cm. The panicle cymes of yellow or brown flowers are 15 cm to 30 cm long which appear after the leaves drop. The fruits are 2 cm – 2.5 cm long, containing 1 – 2 and sometimes, 3 seeds. Bark is thin and gray colored.

Uses

Yemane is primarily used for pulpwood production because of its relatively high yield of kraft pulp and low chlorine requirement. Its wood is sawn for general carpentry, joinery, furniture components, and other household fixtures. It is ideal for musical instruments and boat decking. The round timbers are used for posts, house timbers and poles while rotary cut veneers are utilized for plywood. It can also be used as fuel wood.

Distribution

The species is native to India, Pakistan, Northern Rhodesia, and Malaysia. It

is widely planted throughout the Philippines. Plantation of yemane in the Philippines started in the provinces of Cebu and Nueva Vizcaya.

Termites: what are they?

Termites are a group of insects (Isoptera) consisting of 2, 500 species of which 300 are considered pests. Termites are one of the most damaging pests in the tropics and can cause considerable problems in agriculture, forestry and housing. There are several families and sub-families. Some have nests underground, others in wood, for example hollow trees, and some build mounds. Before control methods can be adopted a basic identification of the pest species or family is needed. This can be done by observing pest behaviour and the damage pattern on the tree or crop. The most troublesome type of termites in agriculture are the fungus-growing termites. They feed on this type of food is not available they will eat live plant material including crops such as groundnuts, millets and maize. Harvester termites are found in dry and semi-desert areas. They build underground nests which can be difficult to locate. They collect live green plant material and cause damage to living grasses, crops and seedlings. They will attack weak plants that are wilting or damaged. Characteristics of a Termite

Termites play a vital role in nature. They break down dead wood and other cellulose materials. This is helpful in the ecosystem and the balance of nature. When termites attack homes, though, they are a pest and cause over \$5 billion damage in the US each year. Termites usually are cryptic, meaning that they don't come out into the open. Termites are difficult to detect because of this cryptic nature and are a destructive force when left

unchecked. Royalty, workers, soldiers, and non-winged reproductives do not leave the hidden areas. Most of the colony is never seen. Even when visible within the home as flying insects, termites can be mistaken for ants. Some homeowners will dismiss the termites as pesky ants and ignore them with no preventive or extermination methods taken. This allows established termite infestations to grow exponentially. Flying ants possess many of the characteristics of a flying termite. However, while ants have three distinct body segments, the termite appears only to have two. Termites also have four wings of equal size, while the flying ant's four wings are two distinct sizes. A further distinguishing characteristic of subterranean termites is the presence of protective tunnels constructed from mud, saliva and fecal matter.

These tubes act as entry points for subterranean termites to above-ground food sources. They are most commonly located near the foundation of an infested home. Ants do not construct tunnels. Dry wood termites also enter homes after swarms, usually occurring in the spring. During swarms, an existing termite colony sends out a large number of winged reproductive males and females. These mating swarms may result in several newly-fertilized king and queen termites attempting to establish colonies which may be within or around a home. Termites are social insects in that they have an organized structure in a colony with a king, queen, and various castes each of which have a specialized function. Each caste has its own characteristics. Termite Facts

Termites cause more damage than tornadoes, hail storms, wind storms, and hurricanes combined.

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Termites cost Americans more than \$1 billion each year.

You can buy insurance for many sources of home damage, but not for termites.

Termites have been around for more than 240 million years. They adapt to ever changing environments. Termites are nature's way to break down wood and return it to the soil.

Termites cannot determine the difference between the wood in the forest where your home was built and the wood members of your home.

Termites can infest almost every part of your home.

Termites can enter your home through a crack or opening as thin as a piece of paper.

Termites never stop working and eating. They work 24 hours a day.

Termite colonies can average more than a million termites.

Termites damage photos

These photos give an idea to what extent termites can inflict damage on the woodwork of any unprotected building. Wooden flooring, window panels, doors, staircases, roofing, books, and paper are all fair game for the termites. The wood may appear alright on the outside, but once the termites are done, the wood becomes hollowed-out shells, and the termites then move on for fresh targets. They do not make any wood as their nest; they just eat it out from within and in so doing, they leave an intricate, interconnecting latticework of galleries, arches, and pillars that permit ease of movement for the termites when they are chomping away. Also, termite activity is much more frequent in wet weather than dry weather.

(Above) Termite damage looks like this - At least on the inside of wood that they feast on. Termite damaged books.

I guess termites are not into reading.

A close up view of the door, revealing extensive termite damage. The termites have remodelled the wood inside, and all that is left is a skeletal latticework to enable the termites to move around.

Chili As Insecticide

G. F. Antonious, J. E. Meyer, J. A. Rogers and Y. Hu. (2007) explained that research is needed to provide alternative pesticides with minimal impact on human health and the environment. Farmers around the world have long used plant extracts to protect food and fiber from insects and mites. Peppers have shown particular promise as a source of botanical pesticides:

Powdered chili pepper deters the onion fly, *Delia antiqua*, from laying eggs. A chemical from hot peppers reduces growth of the spiny bollworm, *Earias insulana* and may repel cotton pests. Culinary uses Chili pepper pods, which are berries, are used fresh or dried. Chiles are often dried to preserve them for long periods of time. Preserving may also be done by pickling fresh chillies. Many fresh chillies such as poblano have a tough outer skin which does not break down on cooking. For recipes where chilis are used whole or in large slices, roasting, or other means of blistering or charring the skin are usually performed so as not to entirely cook the flesh beneath. When cooled, the skins will usually slip off easily. Chili pepper plant leaves, mildly bitter but nowhere near as hot as the fruits that come from the same plant, are cooked

as greens in Filipino cuisine, where they are called dahon ng sili (literally “chili leaves”). They are used in the chicken soup, tinola. In Korean cuisine, the leaves may be used in kimchi. In Japanese cuisine, the leaves are cooked as greens, and also cooked in tsukudani style for preservation. Psychology

Psychologist Paul Rozin suggests that eating chilis is an example of a “constrained risk” like riding a roller coaster, in which extreme sensations like pain and fear can be enjoyed because individuals know that these sensations are not actually harmful. This method lets people experience extreme feelings without any risk of bodily harm. Eating chili is viewed as a warrior’s ritual in Japan because of its spicyness that gives individual fear and mental block. By forcing themselves to eat chili, warriors’ mental state gets stronger and may even feel invincible when stepping onto the battlefield. Eating chili has been a popular practice among the karate athletes who use it to strengthen their minds and determination. Medicinal

G. F. Antonious, J. E. Meyer, J. A. Rogers and Y. Hu. (2007) stated that capsaicin is a safe and effective topical analgesic agent in the management of arthritis pain, herpes zoster-related pain, diabetic neuropathy, postmastectomy pain, and headaches.

Crop defense

Farmers in Africa and South Asia have found the use of chillies effective in crop defense against elephants. The chillies are spread on fences and other structures to keep the elephants away. Because the elephants have a large and sensitive olfactory and nasal system the smell of the chilli causes them

discomfort and deters them from feeding on the crops. This can lessen dangerous physical confrontation between people and elephants.

Related Studies

According to Paglumotan (2008), a lethal dose of 100 (LD100) with and without surfactant of Yemane bark decoction applied to termites have the higher mortality response, based on the Probit analysis. Thus he added that the higher level of concentration applied to the termites the mortality rate of termites also increases at a given period of time. A. A. Osipitan and A. E. Oseyemi of Ogun State, Nigeria conducted a study on the “ Evaluation of the Bio-insecticidal Potential of Some tropical Plant Extracts Against Termite” The leaves of citrus (*C. sinensis*), cocoa (*T. cacao*), sunflower (*T. diversifolia*) and cashew (*A. occidentale*) were used as the variable in the study. Thus, result showed that these plants extract have a significant effect towards the mortality of termites. Collected from farms at the University of Agriculture, Abeokuta, Ogun State. The plant parts were sufficiently air dried at room temperature until constant weights were obtained. The plant parts were shredded and ground using an electronic blender and 60 g each of the milled parts were weighed and poured into 200 mL of water and left for three days. Thereafter, the extracts were decanted and sieved using a muslin cloth.

The resultant solvent was used for the laboratory and field study. Worker of *Macrotermes bellicosus* were used for the laboratory study. They were sourced from a termite mound in the premises of the University of Agriculture, Abeokuta. The test of contact toxicity of the plant extracts to the termites by topical application was carried out in the laboratory of the

Department of Crop Protection, University of Agriculture, Abeokuta using the standard method described by McDonald et al. (1970). Ten worker termites of underdetermined age and sex were placed in a petri dish lined with moist filter paper, thereafter, eight (8 mL) of each extract or the synthetic insecticide (0.1% Chlorpyrifos) were applied to the dorsal surface of the thorax of each insect individually with a microapplicator (Obeng-Ofori and Reichmutu, 1997; Ebenezer, 2000). The insects were examined at 2 h intervals after application for 10 h and the insect mortality was noted. Those that did not move or respond to three probing with a blunt probe were considered dead (Obeng-Ofori and Reichmutu, 1997). The treatments were arranged on a work table in the laboratory using Complete Randomized Design (CRD). The percentage insect mortality was calculated according to Niber (1994):

Related Topics

Plant Preparations

Plant parts and plant extracts can be used effectively. These can be removed from the plant and used as a natural insecticide by grinding up the relevant parts, placing in boiling water, stirring and leaving to soak. The mixture is then sprayed onto the pest infested crop. Alternatively the plant part, such as toxic fruit juices, pulps or shavings can be applied directly.

Safety for people

The HDRA – the organic organisation Termite Control stated that artificial pesticides can quickly find their way into food chains and water courses. This

creates health hazards for humans. There is also much concern for people using chemical pesticides. The products may be misused because the instructions are not written in the language understood by the person using them. This has led to many accidents and deaths.

Safety for the environment

There are a number of harmful effects that chemical pesticides can have on the environment. Artificial pesticide can kill useful insects which eat pests. Just one spray can upset the balance between pests and the useful predators which eat them. Artificial chemicals can stay in the environment and in the bodies of animals causing problems for many years. Pests become resistant to pesticides so more powerful chemicals are needed. There are number of alternatives to using chemical pesticides for termite control. These methods work within the natural system and help promote natural pest control mechanisms.

Organic control methods do not pollute the environment and are not harmful to beneficial insects and animals, or to the people using them.

Organic methods aim to use locally available materials and do not rely on importing expensive materials from elsewhere.

Organic methods are cheap and easy to use.