

The Untapped Mystery and Potentials in Termites

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Abstract

This review is aimed at reawakening entomologists and researchers in exploring numerous beneficial potentials in termites rather than just focusing on the destructive nature of termites. Termites are one of the most hated insects in the world because of their destructive nature. Several heavy inorganic chemicals, such as organochlorine (cyclodiene) insecticides, have been developed for termites control. This review indicates some of the benefits, such as medicinal, food, intellectual, spiritual and beautiful scenery architectural works of termites. This review shows that termites could be rear for positive economic values. The economic importance of termites is not yet well explored.

Introduction

Termite (Termitoidea) is one of the most underrated and disrespected insects. The positive impacts of termites have not yet well explored. Termites belong to Order: Blattodea and Infraorder: Isoptera commonly referred to as destroyer of wood or white ants but not white [1]. Termites are eusocial insects. They live in a colony, only some individual is able to reproduce. They are well behaved, meticulous and highly organized insects. They exhibit a division of labor with individuals taking up different roles, such as defense or foraging. Termites emerged 298.9 million years ago. There about 3,106 species [2], these species are grouped into three, dampwood (mostly found in coniferous forest), drywood (found in hardwood forest) and subterranean termites (found in widely diverse area). There are 435 species found in Asia, 1000 species found in Africa, 50 species in North America, 400 species found in South America, 10 species found in Europe and 360 species found in Australia [3].

In caste system, the King mate with the queen, the king regulates the population of fertile female through pheromone [4]. The queen

is primarily responsible for egg production and starting a colony. The soldier, just like humans, performs the duty of defense [5]. The soldiers are ranked; major, minor and nasutes [6]. The workers undertake most labor within the colony. Workers are responsible for food storage, foraging, brooding and nesting. They are also tasked with digestion of cellulose in food [7].

Mystery and Potential of Termites

Behavioral mystery

Most termites are blind. They communicate through chemicals, pheromone and mechanical cues such as vibration and touch [8]. The queen and king are monogamous and remain exclusive to each other till death. Only the queen and king perform nuptial flight (during which the virgin queens' mate with males and then land to start a new colony). When one colony encounters another colony during foraging, a species may commit suicide cramming (die to block the tunnel), the action settles the conflicts. Termites have cemetery pit, where dead termites are buried.

Nest/Mound

Termites primary use faces, digested plant materials and soil as construction materials [9]. Nest are separated into three categories; epigeal (protruding above the soil surface) subterranean (underground nest) and arboreal (they are built with faecal elements and wood, they found on trees). The types of material(s) use depend on the category of nest or mound [4]. A nest consists of chimneys (air conditioning unit), surface conduct pinnacles and ridges. A nest can be as high as 8-9 meters [2,10].

Termites- organism/animals' interactions

Termites nest provides good shelters and warmth to birds, lizards, snakes, Africa giant rat and scorpions. They also house other ants, such as Azteca ants, who assist termites to protect against predators [2,11].

A good delicacy

In most developing countries, termites are highly valued and considered as a special delicacy. They are rich in protein, fat, vitamin and minerals [12].

Medicinal purposes

Figueirêdo et al., [13], findings indicated that about 45 species of termites from four families are used as both food sources and medicinal purposes. In Australia and some developing countries, termites are used commonly for medicinal purposes [13].

Bioreactor

Approximately 200 species of microbes live inside termites hidgut, releasing the nitrogen that was trapped inside wood and plant that they digested [14]. These make termites efficient bioreactors and have been reported to produce 2 liters of hydrogen from a single sheet of paper [15].

Terme-robot

Werfel et al., [16] reported that an autonomous robot was development as a result of an inspiration from termites.

Architecture

Many architectural works have been reported to be inspired by termites. Mick Pearce reported that he was inspired by termite in constructing East-Gate Centre building in Harare, Zimbabwe [17].

Religion

Some tribes in Indian, worship termite nest because of the cave complexity, multiplication of the mound without any visible external interference, their property and the ability of the nest to withstand sun, wind and rain [18-23].

Conclusion

Why then do we focus more on the wood destroying habits of these "small but mighty creature" endowed with great abilities and potentials? There is urgent need to study and focus more on

beneficial sides of termites rather than developing "sledgehammers" (insecticides) to eliminate these great creatures. The problem of malnutrition in the world (especially developing countries) can be resolved if we look more into utilizing the food bank in termites. Just like animal husbandry and apiculture (rearing of bee), termites can be reared for food purposes, medicinal purposes, inspirational purposes and other purposes yet to be discovered. We want more from termites rather than just "destroyer of wood". Respect termite.

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Conflict of Interest

No conflict of interest.

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