

A Review on Biology and Health Importance with the Control Measures of Cockroaches (Order-Blattodea)

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Abstract

Cockroaches are insects which belong to the order Blattodea and native to tropics and in mild environments. For that reason, they are important to recycling nutrients, as a food source for different organisms including human, important for research, as pest of public health and damage electric devices. Therefore, the objective of this review paper is to share information about the biology, ecology, economic importance and control methods of public health important cockroaches. Different authors suggest that there are information gaps by communities about domiciliary cockroaches which carry and transmit different human parasites and their excreta cause of allergies of asthma both in urban and rural area of the world including in Ethiopia. And also lack of information on the appropriate controlling mechanisms. Therefore, the paper compiled information from different studies of those cockroaches which have public health importance. And also, give emphasis those which provide valuable services on the establishment of the ecosystem. Generally, it shares the existing knowledge on the aspect of cockroach biology, ecology and economic importance of this insect. Over all, few species of cockroaches are categorized as pests but they affect human health

and cause nuisance in various way. Therefore, much of money spent to recur health problems which are caused by micro organisms that carried by domiciliary cockroach species. The same is true a large sum of money spent to control cockroach infestation.

Introduction

Cockroaches prefer a warm, humid, dark environment and are usually found in tropical or other mild climates. They are free-living insects that are found mainly in the tropical regions of the world.

They are distributed throughout the world and they are among the most notorious insects inhabiting apartments, food handling establishments, and health care facilities feed on human and pet food and can leave an offensive odor [1].

Cockroach is a vector of disease, mostly intestinal in developing countries [2]. And also there are different species of this insect are as pest in Ethiopia such as: *Blattella germanica* is the most widely distributed species of cockroaches both in urban and rural area of Ethiopia. Whereas, *Periplaneta brunnea*, *Pycnoscelus surinamensis* and *Supella longipalpa* are also found next to *Blattella germanica* outside Addis Ababa in most rural area of Ethiopia as in Ziway [3].

Biology of Cockroach

The cockroach is characterized by a flattened oval body, fast-running insects. Anterior end of the head bears appendages forming biting and chewing type of mouth parts. A median flexible lobe, acting as tongue (hypopharynx), lies within the cavity enclosed by the mouthparts [4,5].

Public Health Importance

Nuisance

Cockroaches live in small cracks and crevices around your home, which can make your life difficult. They not only destroy furniture and electrical appliances, but they also create a big hygiene problem [6].

Vectors of Human Diseases

Cockroaches not only create a nuisance in dwelling places but are also potential carriers of protozoan, helminth, bacterial, and viral diseases [7-11]. Kinfu and Erko (2008) [3]; show in their research; cockroaches play as potential roll as vectors of human intestinal parasites in Addis Ababa and Ziway, Ethiopia.

Although, *Salmonella* spp., *Shigella flexneri*, *Escherichia coli*, *Staphylococcus aureus*, and *Bacillus cereus* were isolated from *Blattella germanica* through cultural examination of faecal pellets from adult *B. germanica* were captured among four hospitals and four restaurants in Addis Ababa.

Control Measures of Cockroaches

Control Measures by Chemicals

Heavy infestations of cockroaches can be dealt with by chemical control measures, followed by environmental management to deprive the insects of food and shelter. Low numbers can be effectively controlled by baits or traps [12]. Cockroaches are difficult to control with insecticides for several reasons, one of which is that they may become resistant to commonly used compounds. Moreover, many insecticides are repellent to them and are therefore avoided [13]. Chemical control gives only temporary relief and, wherever possible, it should be accompanied by environmental sanitation and house improvement [12,13].

Sometimes keeping the house clean is not enough, and more active pest control is needed. Cockroaches control without chemicals can be made by making a mixture of sugar and boric acid (H_3BO_3) or baking soda. Then sprinkling it on surfaces where cockroaches crawl and they will eat it and die. Or, mixing boric acid with water to make a thick paste and adding corn flour and make little balls and leaving them around the house.

During the past few decades, chemicals have disastrous after-effects and can create environments in which pest pests develop immunities and flourish. In addition, frequent pesticide use results in environmental pollution and poor air quality within rooms, so as an alternative way many pests can be driven away using organic materials that are less harmful and less costly than chemical pesticides. Therefore the strategies should be directed to emphasis of knowledge of the biology and ecology of target cockroaches, improvement in sanitation and hygiene and limited pesticide use.

Control Measures by Attractants

Female cockroaches produce a variety of pheromones including sex pheromones, but in many species, such as the German cockroach (*Blattella germanica*), they are non-volatile contact chemicals. However, long-range pheromones are produced by other species such as the American cockroach (*Periplaneta americana*). For this species, pheromones have been used to a limited extent in baited traps, where upon entry the cockroaches are either retained alive or killed with insecticides. When aggregation contact pheromones of the German cockroach are added, the traps become more effective. However, the main use of these contact pheromones is to mix them with insecticides such as diazinon and propoxur to make them less repellent, thus increasing the contact of cockroaches with the insecticide.

Traps containing attractant bait have been used for many years in cockroach control, and are still used, especially where insecticidal spraying is not feasible or when cockroaches have developed insecticide resistance. Sanitation was also reported as a major affecting factor determining the bait performance against German cockroaches [14].

Although cockroaches can be controlled by insecticides, measures involving toxicants are not desirable in a domestic environment. A systematic study on the use of attractants for the control of cockroaches has emerged from the work of Sugawara *et al.* (1975; 1976) [15,16]. After examining a large number of esters,

they came to the conclusion that by far the best attractant was propyl cyclohexaneacetate. The receptor model proposed by them based on a structure–activity relationship indicated that, for maximum activity, a six-atom non-branched side chain as a tail and a cyclohexane ring as the head were essential. The introduction of a double bond in the ring or of a methylene group at the end of the chain brought down the activity [16,17].

Conclusions

Overcrowding, cooking and storing food in the house and accumulating refuse provide conducive breeding ground for cockroaches. The severe health implications arising from cockroach infestation justify the need to provide hygiene education to link cockroach infestation to health and disease. Controlling cockroaches infestation in house settings will require a comprehensive approach targeted at reducing over-crowding of rooms, improvement of hygiene and sanitation, and general maintenance of house facilities.

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