

COCKROACHES INFLUX TREATMENT MANUAL



Cockroach

Tenacious vitality, spread bacteria and viruses, even bite people.



Ant

Hard to find nest. Bite people, livestock by stimulation, carry viruses.



Fly

Bite people, livestock. Carry pathogens. Cause sound and visual pollution.



Bedbug

Highly adaptable. Reproduce fast. Eat cloths, pants, paintings, ect. Carry bacteria and parasites.

Get rid of pests

Pest Trouble We solve



Abstract

We deliver pragmatic household pest control solutions including; understanding their evolution, their life cycles, types of formulations appropriate for their control, and methods of application that avoid contamination of food, damage and contamination of habitat and exposure of people and pet.

PESTMAESTRO

HOUSEHOLD PEST MANAGEMENT AND CONTROL



1.0. INTRODUCTION

PestMaestro through its media outlets and personal encounter with clients will increase their knowledge-base on cockroaches and their adverse effects to life. Client will demonstrate a practical knowledge of the varieties of cockroaches, including their life cycles, types of formulations appropriate for their control, and methods of application that avoid contamination of food, damage and contamination of habitat and exposure of people and pets. Since human exposure, including babies, children, pregnant women, and elderly people, could likely be a potential problem, clients must demonstrate practical knowledge of the specific factors that could lead to some harmful conditions associated with the application of household pesticides, including continuous exposure in the various situations of their usage. At times health related pest control could involve outdoor applications, applicators/clients must also demonstrate practical knowledge of environmental conditions, particularly related to the application of a particular pesticide.

1.1.0. How Cockroaches Affect Man

Pests have a long history through many geological periods. They appeared in the world long before man; yet bugs remnants from coal, amber and limestone deposits differ little from their present-day descendants of hundreds million years. As man appeared on earth and changed, his parasites and pests evolved with him. For centuries man has fought pests as, carriers of disease and destroyers of his food and habitat. This combat had continued until today, for humans have never eradicated a single species of pests. Today, many of the most species are even showing increasing resistance to insecticides. Consequently, other methods of control, either alone or in combination with insecticides, are necessary.

Pests are often thought of as man's most formidable competitors. Pests such as cockroaches, flies, fleas, lice and mosquitoes directly attack man and domesticated animals. Cockroaches attack indirectly by transmitting dangerous diseases to man and animals.

1.2.0. Transmission Of Human Disease

Cockroaches disease-laden saliva or contaminated bodies are responsible for many illnesses or deaths over the world.

- **Mechanical or passive transmission of disease occurs**, when cockroaches visit sewers and liquid excrement and then move to human habitations.
- Biological transmission of disease occurs when an insect, becomes essential for the completion of the life cycle of the disease or parasite. According to National Pest Management Association of USA, cockroaches have been found to carry over 33 types of bacteria and six species of parasites which can be extremely dangerous to humans. Cockroaches are proven or suspected carriers of the organisms that cause; salmonellosis, typhoid fever, cholera, gastroenteritis, dysentery, leprosy, plague, campylobacteriosis, listeriosis and giardia.



- ▶ Myiasis is the infestation of man or animals by living larvae (maggots) of insects. Maggots mostly infest dead tissue. An example of the other type is the “true screwworm” which attacks the living tissue of livestock and rarely man. The maggots of some flies, including the rat-tailed maggots of flower flies, may be accidentally swallowed and cause intestinal upsets.

1.3.0. Poison, Irritation and Allergy.

Another, more recent finding concerning insects and allergy is the relation between cockroaches and asthma. Studies have shown that with increased weather-tight buildings, indoor air quality has been lowered and, in structures where roaches are present, cockroach dust will increase the likelihood of childhood asthma.

2.0. GENERAL INFORMATION ABOUT COCKROACHES

The basics of controlling household pests which attack man or his possessions include pest recognition, understanding its life habits, determining the need for treatment or environmental/ structural modifications, pesticide selection, proper timing and application of pesticides and determining the need to treat again (follow-up treatment). The following information deals with the most common cockroaches in most household, factories, offices, schools, hospitals, churches, restaurants etc. that are likely be encountered on daily basis.

2.1. Cockroaches

Cockroaches are major pests in homes, restaurants, hospitals, warehouses, offices and other structures with food-handling areas. These insects can contaminate food and eating utensils, destroy fabric and paper products and impart stains and odors to surfaces they contact. Cockroaches have not been found to be direct carriers of disease; however, they can mechanically contaminate food or utensils by transporting filth or disease organisms on their bodies or by way of their excreta. They are suspected to be associated with the spread of dysentery, diarrhea and food poisoning. They are also associated with allergies and related to some aspects of asthma attacks. Although there are more than 50 species of cockroaches in the the world, only five are considered major pests in Ghana. These species are the German, brown-banded, American, Oriental, and wood cockroaches. Since different species of cockroaches have different habits and habitat preferences, proper identification is essential for control. Cockroaches are mainly active at night but may be commonly seen at other times when infestations are severe. Signs of cockroach infestation are visual sighting of live roaches, fecal droppings, full or empty egg cases (oothecae), cast skins from nymphs, stains and strong musty odors. The use of flushing agents frequently helps to locate cockroach infestations.

Many cockroach infestations begin by the introduction of a few individuals on equipment or other materials from an already infested area. Any suspect objects should be thoroughly inspected. Although this is frequently difficult, the effort may be worthwhile, especially if a structure has a record of recurring infestations.



Sanitation is the key to control. Cockroaches require adequate food, water, shelter and favorable temperatures to survive. Once cockroaches have been introduced into a structure, infestations are likely to build up much more rapidly, be more severe, and more difficult to control, if proper sanitation conditions do not prevail. Accumulations of materials such as garbage, rubbish, boxes, sacks, newspapers, and empty soda and beer bottles should be eliminated. Areas of excessive moisture within a structure should be eliminated. Proper cleaning of areas where scraps of food or grease accumulate is also helpful. In general, anything that can be done to reduce the supply of food, water, or shelter for roaches will reduce possible infestations.

Once a colony of cockroaches has established itself in a structure, proper sanitation will not rid the premises of the infestation. In this case, chemical control is necessary. Since domestic cockroaches have different environmental habits and biology, the method and extent of chemical treatment should vary by species.

2.1.1. General Characteristics and Life Cycles of Cockroaches

Cockroaches are oval, flattened, fast-running insects. Their body structure permits them to squeeze into very small cracks, which makes it extremely difficult to seal them off from harborages. Cockroaches have long hair-like antennae, a saddle-like plate (pronotum) that covers the thorax and projects forward over the head, and antennae-like structures called cerci that extend from the rear of their abdomens. The adults of most species are fully winged. The outer pair of wings are leathery in appearance and the hind wings are membranous and folded under the forewings. Cockroaches go through gradual metamorphosis with three stages in the life cycle: egg (a number of eggs are laid in a capsule-like case called the ootheca), nymphs (the young pass through several molts but basically look like adults except they are smaller and have no wings) and adult. Occasionally a white cockroach will be seen. This is merely one that has recently molted and has yet to regain its normal color. Most species are nocturnal and seek protective cover in the daytime.

In general, cockroaches prefer an environment that is warm, dark, and humid. The four major factors that influence areas where they will inhabit are: temperature, moisture, food supply and amount of light. The areas where cockroaches will be found will vary among species depending on environmental preferences resulting from a mixture of these four factors and population pressure.

2.1.2. German Cockroaches (*Blattella Germanica*)

The German cockroach is the most common household species encountered in Ghana. This species can complete one generation in approximately one-fourth to one-half the time of other species. Thus, it is no wonder that the German cockroach is found in such great abundance and can infest or reinfest a structure in a comparatively short period of time. Once a female German cockroach contacts a chemical and dies, the eggs in the case (oothecae) protruding from her abdomen generally die also. Other domestic species may deposit egg cases on surfaces not reached by a chemical. Consequently, the eggs may continue to hatch over a 30- to 60-day period. The residual activity of some chemicals is not long enough to kill the later hatching nymphs, and retreatment is sometimes needed to insure adequate control.



The German cockroach prefers areas of warmth and high humidity, which are generally found in the kitchen and bathroom. Consequently, monitoring for and thorough treatment of these areas is needed for control of German cockroaches. Typical resting places for German cockroaches include under and behind large appliances, under sinks, and in the cracks and crevices of drawers and cupboards. Severe infestations of German cockroaches will frequently result in a scattered infestation throughout a building. German cockroaches are capable of rapidly adjusting to different conditions and situations. Occasionally they may be found behind ceiling trim, between ceiling voids, and other similar locations, especially in commercial buildings. The German cockroach prefers areas of warmth and high humidity, which are generally found in the kitchen and bathroom. Consequently, monitoring for and thorough treatment of these areas is needed for control of German cockroaches. Typical resting places for German cockroaches include under and behind large appliances, under sinks, and in the cracks and crevices of drawers and cupboards. Severe infestations of German cockroaches will frequently result in a scattered infestation throughout a building. German cockroaches are capable of rapidly adjusting to different conditions and situations.



Figure 2.1.
German Cockroach,
Blattella Germanica

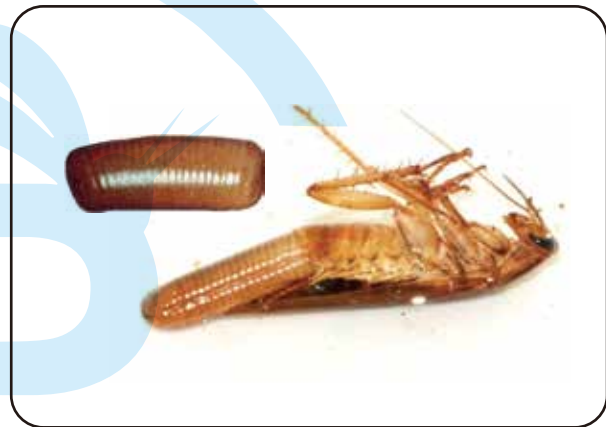


Figure 2.2 As with many species of cockroaches, female German cockroaches lay their eggs into a capsule called an ootheca. German cockroach females carry these egg cases throughout most of the incubation period.

Characteristics of German Cockroaches:

- Adults are pale brown to tan and approximately 1/2 inch long. Adults are fully winged and have two dark stripes that run lengthwise on the pronotum (the shield-like plate behind the head).
- This species has the highest reproductive potential (number of eggs laid and shortest life cycle) of the house-infesting cockroaches.
- Females carry egg cases (oothecae) protruding from their abdomen until eggs are ready to hatch. Females produce about four to eight capsules in their lifetime. Each capsule contains 30 to 48 eggs that hatch in about 28 days at room temperature.
- Females live an average of 250 days.
- German cockroaches will generally be found close to moisture and food (e.g., kitchens and other food areas, restrooms, and around plumbing fixtures). Check such items as cracks and crevices, under tops of tables, behind sinks, in cabinets, the motor compartments of



refrigerators, soft drink and other equipment, underneath kitchen equipment, in switch and fuse boxes and other areas where conditions are favorable.

When they are found scattered throughout non-food areas of building, it is usually due to very heavy population pressure.

2.1.3. Brown-banded Cockroach *Supella Longipalpis* (*S. Supellectilium*)

Brown-banded Cockroach *Supella longipalpis* (*S. supellectilium*) The brown-banded cockroach prefers warm but frequently drier locations than the German cockroach. Brown-banded cockroaches tend to be found in higher locations, such as behind wall decorations or bureaus, and behind plates covering electrical switches and plugs. This cockroach may be found in any room, and an infestation is frequently spread throughout the structure. In addition, the female carries the egg case only a short time making control of this species difficult if a building is not thoroughly treated.

Characteristics of Brown-Banded Cockroach

- Brown-banded cockroaches vary from light tan to glossy dark brown in color. The adults are slightly smaller than German cockroaches and have two light yellow or cream-colored transverse bands at the base of the wings.
- Egg capsules (oothecae) are usually deposited or glued to surfaces in dark areas such as cabinets, chairs, couches, drawers, and in higher areas of the building. Females produce about 14 capsules in their lifetime. Each capsule contains about 18 eggs that hatch in 50 to 75 days, depending on temperature.
- Females live an average of 200 days.
- Brown-banded cockroaches tend to scatter throughout buildings, preferring temperatures of 80 degrees F or slightly higher. These cockroaches are more often found in homes, apartments, hotels, hospital rooms, stores or restaurants. Infestation frequently results from shipments of furniture, luggage or other animals.

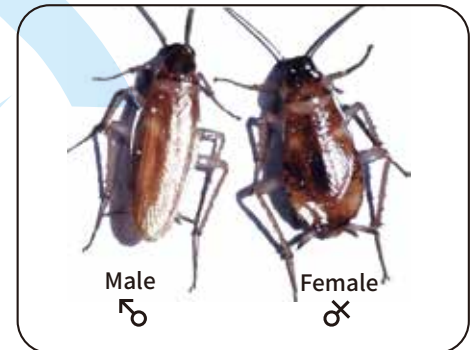


Figure 2.3.
Brown-banded cockroach,
Supella longipalpa

2.1.4. American Cockroach (*Periplaneta Americana*)

The American and Oriental cockroaches may be found outdoors during the warmer months of the year, as well as indoors. The Oriental cockroach prefers cool, damp situations and is usually found near the floor level of basements. They are also frequently found in abandoned cesspools, storm drains, water meter boxes and crawlspaces under buildings.

The American cockroach prefers warmer temperatures and moist areas, but occasionally they may be found in some fairly dry sites. They are likely to be found in upper levels of basements, alleyways and sewer systems. American cockroaches are often found in food handling establishments and industrial plants. Occasionally, control of Oriental and American cockroaches may require treatment of outdoor areas, underneath crawlspaces and indoor areas.



Characteristics of American Cockroaches:

- American cockroaches are the largest species found in buildings in Ghana. Adults average about 1 1/2 inches in length, are reddish-brown in color and have a light yellow or tan band around the edge of the pronotum.
- The oothecae are usually dropped near food sources. Females may produce an egg capsule per week until 15 to 90 are produced. Each capsule contains from 14 to 16 eggs. Eggs hatch in 50 to 55 days at room temperature.
- Females live an average of 450 days.



Figure 2.4.
American cockroach,
Periplaneta Americana

2.1.5. Oriental Cockroach (Blatta Orientalis)

Oriental Cockroach (*Blatta Orientalis*) is a cockroach family type in the order Blattodea containing several of the most common household cockroaches. They often travel through sewers and may come inside through pipes and drains. Abundant outdoor plants may also provide places for these cockroach populations to flourish and get inside houses in search of food. Also leaking pipes and other plumbing leaks are very attractive to oriental cockroaches.

Characteristics of American Cockroaches:

- Adults are approximately one inch long and dark brown to black in color. This species is often referred to as the “waterbug.”
- Females have small wing pads, while males have wings that cover about three-fourths of their abdomen. Neither sex can fly.
- Females drop egg cases in warm, sheltered areas near a food supply. Females produce an average of eight egg capsules, with each containing about 160 eggs. Under room conditions, eggs hatch in about 60 days.
- Females live an average of 180 days. Nymphs and adults have similar habits and are frequently found associated with decaying organic matter indoors and out. Oriental cockroaches are rather gregarious and “clusters” are generally found in moist, dark habitats. Common habitats include floor and storm drains, water meter boxes, under siding next to soil, around plumbing fixtures, crawl space areas underneath buildings, sewers, basements, around dumps, garbage containers, and compactors. Oriental cockroaches are seldom found high on walls, in high cupboards or in the upper floors of buildings.
- This species can live approximately 30 days without food if water is available, but die within two weeks without water.



Fig. 2.5.
(Blatta Orientalis)



3.0. PESTMAESTRO'S MANAGEMENT GUIDELINES FOR COCKROACHES

The control of cockroaches requires a great deal of care and planning on the part of the pest control operator. Successful management depends on identifying the species involved and then selecting methods of control that are effective against these species. Because life cycles and habits vary with the species, knowledge of these factors is important in finding their hiding places and establishing a control program.

- Careful inspection is necessary to find their hiding places and then to treat them thoroughly. Nighttime surveys are useful because cockroaches are nocturnal (active at night). Use a flashlight and search in cracks, under counters, around water heaters and in other dark location. Look for live and dead cockroaches, cast skins, egg capsules and droppings, all of which aid in identification.
- Good sanitation is as important as the use of insecticides. Pestmaestro's Pest Control Operative will work very closely with the customer to see that all possible sources of food supply are removed. Cleanliness and good housekeeping are very important. Do not leave food exposed. Keep garbage in closed containers and check dog and cat foods because roaches can live on these alone. Eliminate dripping faucets, leaking water pipes and other sources of moisture. Keep sewer openings screened. Incoming merchandise, especially groceries and drink cartons, should be inspected for cockroaches and egg capsules. Unnecessary boxes and other trash should be discarded. Exclusion of roaches by such methods as equipment design, good screening, tight-fitting doors and by filling cracks and crevices is important in a program of prevention and control.
- In spite of sanitation, cockroaches do become established in some locations. Before and during treatment, a thorough inspection with a flashlight should be made to locate infestation sites. A flushing should be made to locate infestation sites. A flushing agent may be useful. Often, where no previous control has occurred, the initial treatment consists of what is commonly known as a "cleanup" or "clean-out." That is, sprays and/or dusts are applied in a very thorough treatment. There is an immediate reduction in the number of roaches, but usually they are not totally eliminated. There are several reasons for this. The egg cases may not have been affected by the treatment and more roaches emerge one to several weeks later. It may not be possible to kill every roach in heavily infested premises. For these reasons, PestMaestro's pest control operators apply a "follow-up" treatment one to several weeks after the "clean-out." Often, it is general practice to apply control measures at monthly or shorter intervals to keep the infestations at a minimum and to prevent further reinfestation. Less insecticide and time are required in these "follow-up" trips; consequently, the cost of treatment is much less than that for a "clean-out."
- Control chemicals may be oil base sprays, water emulsion sprays, dusts and, for some species, baits. Choice of chemical frequently is dependent on the situation requiring treatment. Dusts may not be appropriate where they would be unsightly or cause contamination problems. On porous surfaces, oils will penetrate deeply and leave less surface residue than will a water emulsion. Most of the time a residual chemical is preferred for roach control, but in some instances, it may be necessary or desirable to use a contact spray. Common residual



sprays include oil-based or water emulsion sprays. These sprays should be applied to cockroach harborages with emphasis on cracks and crevices, and minimizing treatment of exposed surfaces. When it is necessary to treat exposed surfaces, the application should be made with a low-pressure spray. Avoid runoff or puddling. Excess spray should be wiped up immediately to avoid staining or damaging certain materials. Other precautions include:

- i. Do not apply oil-based insecticides near open flames, to tile floors or on plants.
- ii. Do not use water-based sprays near electrical outlets.
- iii. Remove pets and cover aquariums before spraying and allow treated surfaces to dry before dishes, foods, cooking utensils or other items are placed on them. These items should be covered or removed when it is necessary to spray near them.

No matter what type of insecticide is used, insecticides placed in or near regular hiding places will give better control than those placed where roaches will only walk over them occasionally. ***PestMaestro's War Wind Multi Insect Spray*** becomes the best antidote in such cases.

Contact or space sprays are used to knock down and flush cockroaches from their hiding places. These insecticides irritate the insects, causing a very rapid response. For this reason, they are useful as a flushing agent to bring the insects out of their hiding places. Space treatments used alone do not penetrate cracks and crevices well enough to provide effective control, but cockroaches on exposed surfaces can be killed with space treatments.

Dusts are useful for placing insecticides into cracks and crevices, under large appliances and other harborage areas. Light applications are more effective than heavy applications that may repel insects. Dusts generally provide longer residual control than sprays except under conditions of excessive moisture that can make them ineffective. Silica aerogels also may be used alone or in combination with insecticides. ***PestMaestro's War Wind Insect Powder and Mr. Zhao Insect Dust*** is the remedy.

Baits are generally long lasting and can be applied to sensitive areas that cannot be effectively treated with sprays or dusts. Baits often include an attractant and/or a food source, in addition to an insecticide. To be effective, baits need to be used in small amounts placed very close together because of competition from other food sources; baits only work if the cockroach eats it. Baits can be effective when used in conjunction with other methods and treatments. Heat can cause bait formulations to run and drip. When using a baiting method, it is important to nutritionally stress the roach population by practicing good sanitation. A larger portion of the cockroach population will find and consume bait if there is, less alternative food available. It is also important to recognize the nutrients that cockroaches need (such as protein and fat around a stove, or carbohydrates in a pantry) to help with choosing baits and where to place them. For example, a cockroach infestation in a pantry may not have a water source readily available; therefore, gel bait may be more practical. Alternately, an infestation of cockroaches under a sink, with a stove or fryer located some distance away, might allow the use of bait with higher levels of protein. ***PestMaestro's War Wind Cockroach Gel Bait*** and ***PestMaestro's War Wind Bait House*** are the ideal therapy.

It is important to remember to only use formulations of insecticides registered by EPA for cockroach control and for the particular site or location where control is needed. Most labels of insecticides registered for roach control have very specific instructions for their use in food and nonfood handling locations. Read and follow those instructions to the letter. Consult PestMaestro for insecticides labeled for



insecticides labeled for cockroach control. Cockroaches may avoid certain deposits of residual insecticides. For this reason, it is important to use materials that do not repel them; otherwise, you must have thorough coverage to ensure that the cockroaches will contact treated areas. Cockroach populations may develop resistance to the insecticides. Populations of cockroaches migrating in from another area may already be resistant to insecticides that were used against them elsewhere. Methods that may help to reduce resistance problems include:

- Use of alternate, nonchemical control methods such as biological control and good sanitation.
- Lowering the frequency of insecticide application.
- Alternating the types of active ingredient and formulation.
- Using insecticides that do not repel cockroaches. Sometimes cross-resistance develops in cockroach populations. This is a condition where the resistance to one type or class of insecticide makes the insect resistant to one or more other types or classes of insecticides.

PestMaestro offers varieties of roaches control traps, and bait with low toxicity than salt with attractant to safely augment their extinction from your specific abode.



4.0. PESTMAESTRO PRODUCTS COMPOSITION

Our products have the efficacy to terminate cockroach infestation. Our cockroach extinction pesticides have low toxicity and are very harmless if all safety protocols are fully observed during application. PestMaestro's cockroaches' killer are made of; Fipronil 0.3%, Dinotefuran 0.2% and 1.5% Acephate. Pestmaestro's Insects Bait Powder and 20g Gel Bait made of 0.3% Fipronil, 10g Gel Bait and Cockroaches Bait Trap made of 0.2% Dinotefuran, PestMaestro's Green Cockroach Powder Bait: 1.5% Acephate, War Wind Insects Spray; 0.5% Dinotefuran, and Mr Zhao Insects Dust; 0.8% Dinotefuran.

4.1. Dinotefuran

Dinotefuran is a popular active ingredient used in various professional-grade pesticides which was first registered in 2004 by US EPA to cockroaches and other plant-damaging pests. It is widely accepted as a much safer form of pest control insecticide compared to other more toxic chemicals while still being effective and providing a quick knockdown of problem pests. It blocks certain neuronal pathways that are much more common in insects than mammals. That's why the chemical is much more toxic to insects than humans and animals. When the cockroach gets into contact with dinotefuran, it begins to overproduce acetylcholine, an important neurotransmitter, resulting in its paralysis and eventually die. When applied according to instructions, dinotefuran is safe to use and apply in and around the home. Keep children and pests away from the treated area until the application product (spray type) has completely dried up which takes half-hour to an hour.

4.2. Fipronil

Fipronil is a broad use insecticide that belongs to the phenylpyrazole chemical family. Fipronil is used to control ants, beetles, cockroaches, fleas, ticks, termites, mole crickets, thrips, rootworms, weevils, and other insects. Fipronil is a white powder with a moldy odor. Fipronil was first registered for use in the United States in 1996. Fipronil is used in a wide variety of pesticide products, including granular products for grass, gel baits, spot-on pet care products, liquid termite control products, and products for agriculture. There are more than 50 registered products that contain fipronil. Always follow label instructions and take steps to avoid exposure. If any exposures occur, be sure to follow the First Aid instructions on the product label carefully. Fipronil kills insects when they eat it or come in contact with it. Fipronil works by disrupting the normal function of the central nervous system in insects. Fipronil is more toxic to insects than people and pets because it is more likely to bind to insect nerve endings.

Scientists have not found any evidence of fipronil causing cancer in humans. Researchers fed fipronil to rats in their diet for nearly two years to find out if fipronil can cause cancer. Researchers found thyroid tumors in both male and female rats fed the highest dose. While these findings are considered to apply only to rats, fipronil is classified as a "possible human carcinogen" by the United States Environmental Protection Agency (U.S. EPA), therefore as applied to any pesticide, handle with care and keep out of reach of children and pets.



4.3. Acephate

Acephate is an organophosphate insecticide. It is used on food crops, citrus trees, as a seed treatment, on golf courses, and in commercial or institutional facilities. At one time acephate was used commonly in and around homes, but most of those uses are no longer allowed. Acephate has been registered by the U.S. EPA since 1973. Acephate products may be sold as powders, liquids, granules, tablets, and in water-soluble packets. About 100 products that contain acephate are currently registered.

Always follow label instructions and take steps to avoid exposure. If any exposures occur, be sure to follow the First Aid instructions on the product label carefully. Acephate can kill target insects when they touch it or eat it. When insects eat acephate, their bodies turn it into a chemical called methamidophos, which is another, stronger insecticide. Acephate is less toxic in mammals because mammal bodies do not turn it into methamidophos very well. Acephate and methamidophos affect the nervous system, causing over-activity in the nerves, muscles, or brain. Acephate is absorbed into plants, so insects that feed on treated plants may eat acephate.

5.0. FOR ENQUIRIES AND DISTRIBUTION

PestMaestro is looking for a nationwide distributors and wholesalers. Visit www.pestmaestro.com for more product details. Contact us by blackchinese@pestmaestro.com or manager@pestmaestro.com +233546177777 or +233244724397.

