

Procedures for the Handling of Carbofuran for Emergency Control of Guam Biotype *Oryctes rhinoceros* L. (CRB-G) (Coleoptera: Scarabaeidae)

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The pest and control

Coconut rhinoceros beetle (*Oryctes rhinoceros* L.) is a major pest of coconut and oil palms in the regions where the crops are grown and the pest occurs. For oil palm, it is particularly a serious problem during replant where fallen palm trunks become readily available for the beetles to breed and cause damage to young palms. Control is usually through an integrated approach through the use of *Metarhizium* (a fungus available as a commercial product), a virulent strain of NudiVirus and pheromone trapping. However, a variant biotype of the beetle which was initially detected in Guam in 2007 has been found both in PNG (NCD and Central) and the Solomon Islands (Guadalcanal Province). The beetle is resistant to the NudiVirus and feeds more aggressively causing severe damage to both coconut and oil palms. In the event that the population increases rapidly and the damage is extensive, chemical control options do need to be considered. When considering chemical options, crown application of granular form of systemic persistent insecticides with longer residual period is the best option. Broadcast spraying of broad spectrum contact insecticides can suppress natural enemy populations of other pests as well in the field and should be avoided. Granular formulation of Carbofuran (Furadan) is the insecticide recommended by PNGOPRA.

The insecticide

Carbofuran is a broad spectrum Cholinesterase inhibiting Carbamate insecticide. It is highly toxic and falls under Group 1B of WHO classification, with its use restricted/banned in many parts of the world. The commercial name is Furadan. It acts through both contact and systemic modes of action and is used for the control of insect, mite and nematode pests. The insecticide can only be applied under strict guidelines and supervision with comprehensive training provided to applicators. Only the granular formulation will be used for the control of CRB-G.

Importation and distribution of carbofuran

The insecticide can only be imported through a registered supplier in the country of import.

Details of treatment

Transfer the carbofuran granules from the package and place in clearly labelled containers with handle for application. Containers with lids are recommended to cover the chemical in case of rainfall suddenly arising during application. Draw 2g (about half a tea spoon full) of the granular formulation of the insecticide

from the containers and apply within the axils of the spear per palm. When applied, the insecticide will dissolve and translocate throughout the palm where the beetles will either ingest the chemical when feeding on the palm tissue or come in contact during the course of damage and die. The insecticide will be effective for 2-3 months. Reapplication of the insecticide should be dependent on infestation levels. Around 500-800 palms should be treated per day depending on topography and should only be half day's work to minimise the level of exposure by the workers to the chemical. The treatment is only applicable to 1-2 year old palms. Palms older than 2 years old are not suitable due to the palm canopy structure.

Storage

Store in a cool, dry and well-ventilated place. Do not use or store near heat, open flame or hot surfaces. Store in original containers only. Keep out of reach of children and animals. Do not contaminate other pesticides, fertilizers, water food or feed by storage or disposal.

Entry of treated fields

Extreme precaution **MUST** be taken when entering a treated field. Entry into treated fields should be avoided the same and the next day. This will allow for complete translocation of the chemical into the palm. All routine field upkeep activities with minimal contact with the treated palms can resume after this time but adequate awareness will need to be done to the workers to avoid any contact with the points of chemical application. Activities that will involve regular contact with the palms such as pruning and harvesting will need to be delayed for at least a week (5 days). When working within the treated fields PPE such as gum boots must be worn at all times. Hands **MUST** always be washed before chewing betel nut, smoking, eating and drinking.

Handling

Hazard

Carbofuran is highly toxic. It can kill people and non-target organisms including domestic and wild animals, birds, fish or beneficial insects, and harm the environment. The insecticide should be handled with high level of precaution. Always read the Material Safety Datasheet (MSDS) for information on safety procedures before handling the insecticide.

Symptoms of over exposure include headache, light-headedness, weakness, abdominal cramps, nausea, excessive salivation, perspiration, blurred vision, tearing, pin-point pupils,

blue skin colour, convulsion and unconsciousness.

Protection

ALL REQUIRED PPEs MUST BE WORN AT ALL TIMES WHEN HANDLING CARBOFURAN

In the tropics, gloves, overalls, respirators, face masks and goggles (the recommended range of clothing) may be uncomfortable and unpleasant in hot and humid conditions. An uncomfortable operator can be at risk of poisoning if not enough rest periods are allowed during prolonged activities. The selection of protective clothing should be made for safe practice and the comfort of the user during the treatment.

All protective clothing must be free from holes and should be made from materials which should be as light as possible.

- **Respirators and goggles/visors** are essential for the operators who handle carbofuran. A single/double filter face and nose mask is preferred. The fumes can be poisonous and should not be inhaled for prolonged periods. Carbofuran fumes can also cause slight irritation to the eyes.

- **Overalls** made of cotton fabric and orange in colour are preferable. All overalls should be washed thoroughly daily after every use and kept separate from other items being washed. If they do have to be washed at the same time as other clothing, they should be put through the water last to avoid contaminating ordinary clothes. Clothing used in treatment operations should be hung in full sunshine to dry so that the UV light can speed up the breakdown of any remaining pesticides. They should also be stored separately from everyday clothing. Do not allow operators to go home with the overalls at all times.

- **Gloves** (rubber) **MUST** be worn at all times when handling Furadan. They should be made of nitrile or some other material that is not damaged by the insecticide or is impervious. Overall sleeves should be placed over the gloves so that if there is any spillage, the insecticide cannot get into the gloves to come in contact with the skin. Gloves should be washed with soap and water after use.

- **Boots** must always be worn during the treatment operation. Gum boots are preferred so that the legs of the overall can sit over the boot (*not tucked in*). If there is any spillage the chemical can run over the boot and not come in contact with the skin on the foot.

Always have plenty of soap and clean water available near the site where Furadan is handled and always wash thoroughly after handling and using.

- Carbofuran **must never** be transported in open containers or packets.
- Carbofuran **must never** be transported with food.
- Carbofuran **must never** be applied within 50m away from any water source.
- Restrict movement of people into the treated field during the treatment and at least two weeks after the treatment.

Refer to the MSDS for safe disposal of containers/packages.

Safe disposal of carbofuran

Wear full protective clothing when dealing with carbofuran

spills.

Spillage of granular carbofuran should be scooped up with spade and placed in a clearly labelled container for disposal. Supplies of disposal containers should always be kept in store. The waste should then be disposed off in a designated chemical disposal pit. The spade used for scooping spilled chemical must always be washed thoroughly.

Empty carbofuran containers/packets must never be used for domestic or agricultural purposes. They must be disposed off appropriately in chemical disposal pits.

Code of conduct for Carbofuran users

1. When applying carbofuran:

- 1.1. Wear appropriate protective clothing: overalls, gloves, boots, respirator and goggles/visors.
- 1.2. Have plenty of soap and water immediately available for washing.
- 1.3. Read the instructions on the label carefully and follow them.
- 1.4. Avoid contamination by transferring carbofuran carefully without dropping.
- 1.5. Never eat, drink, chew betel nut or smoke and avoid touching the eyes, mouth or any broken skin when handling carbofuran.
- 1.6. Never work alone when handling carbofuran.
- 1.7. Keep unauthorised people (especially children) and animals away from carbofuran.
- 1.8. Never leave opened containers/packets of carbofuran unattended.
- 1.9. Do not apply carbofuran if weather conditions (i.e. rain) are unsuitable for application.
- 1.10. Ensure that operators are adequately instructed and supervised, and have sufficient rest periods after each round of treatment.
- 1.11. Only use carbofuran in strict accordance with instructions or approved recommendations.
- 1.12. If an operator, through accident or carelessness, does become contaminated, immediately take him away from the insecticide spillage, remove his contaminated clothing and make sure the whole body is washed thoroughly with soap and water, and that clean clothing is put on.
- 1.13. If anyone becomes contaminated with the insecticide, seek medical advice as soon as possible, giving the doctor full details of the incidence in line with the instruction on the label of the insecticide container. Also complete the accident report form for records.
- 1.14. Have all members of the treatment team involved in regular treatment checked for blood cholinesterase levels.
- 1.15. The team member must not continue to work or remain in contact with carbofuran if the blood tests show that his cholinesterase level is below normal.
- 1.16. Always wash thoroughly after handling carbofuran.

2. After applying carbofuran:

- 2.1. Return unused carbofuran to the designated chemical store and keep it locked away from unauthorised people and out of reach of children.
- 2.2. Never transfer carbofuran into bottles used for storing food (*e.g. lunch box containers*).
- 2.3. Make all empty containers/packets unusable, and safely dispose them off by burying. It is **NOT POSSIBLE** to

clean an insecticide container well enough to make it safe for storing food or water, or for use as a cooking vessel or for distilling alcoholic beverages.

2.4. Clear up any spillage as soon as possible.

2.5. Remove and wash protective clothing.

2.6. Wash thoroughly and put on clean clothing.

2.7. Keep an accurate record of carbofuran usage, including details of workers and the number of hours each was exposed to the insecticide during the operation.

For further information contact:

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