CHAPTER 5

Integrated Pest and Disease Management Options 2: Using Pesticides

This chapter covers a range of pesticides and how to use them safely.

What equipment do I need?

- ✓ **Pesticide labels (for Exercise 17)**
- ✓ **PNG videos on Safer use of Pesticides**
- ✓ **Photos of pests and diseases from PNG Highlands (for Exercise 21)**
- ✓ **Knapsack sprayer and nozzles**
- ✓ **Butcher's paper or brown paper**
- ✓ **Marker pens**
- ✓ **Samples from farm or garden**

5.1 Introduction to using pesticides

In Chapter 4, your trainees learned about cultural practices of managing plant pests and diseases within an IPDM system. They also learned that in an IPDM approach, pesticides are used as a last resort because of the many problems with their use. The reality is that large-scale pesticide (chemical) use throughout the world is likely to continue for some time. If pesticides are to be used, it is best not to use those which are broad-spectrum as they kill all harmful insects as well as those that are beneficial. Some pesticides are allowed in organic farming as well. In this chapter we look at a range of pesticides and how to use them safely.

The definition of a pesticide is a substance that is made to kill pests, such as insects, weeds, pathogens, mites, rodents, snails and slugs. Sometimes they are referred to as chemicals. Because they are poisonous, pesticides should be used only in IPDM when cultural controls do not work. Pesticides can be divided into two groups: homemade (Table 5.1) and commercial (Table 5.2). Homemade pesticides are made from materials usually readily available in the home or from local plants. Commercial pesticides MUST be made up according to the manufacturer's instructions.

5.2 Homemade pesticides

Many farmers and people living in urban areas make their own pesticides because it is cheaper to do so. However, there are drawbacks. The recipes, and hence the active ingredients in the sprays, vary a great deal. We have not tested them for the problems that exist in the Pacific region, so we don't know if our recommendations are going to work. For instance, chilli is recommended against caterpillars and other kinds of insects, but the type of chilli to use, whether it is affected by age, how much to use and which caterpillars are controlled are unknowns.

There is also the safety factor. Just because a spray is home-made, does not mean that it is safe to use. Some ingredients are toxic; for example, tobacco contains nicotine, which is poisonous to mammals. There is also the possibility of spreading viruses that may be present in tobacco leaves used as a pesticide. So, take care when these products are being made, and when they are being used.

Treat all homemade pesticides as **poisons**; never assume they are harmless. Be sure to test any homemade spray you make on just a few plants **before** spraying the entire garden

Table 5.1 Homemade pesticides, including some common bought products, where they are used, their active ingredients and their purpose. The list is from Solomon Islands. Where used elsewhere is also indicated.

HOMEMADE PESTICIDES							
Type of pesticide	**Fiji**	**Samoa**	**Solomon Islands**	**Tonga**	**Active Ingredient**	**Purpose**	**Remarks**
Ash	✓	✓	✓	✓	Potassium and calcium carbonates (alkali)	Grasshoppers and beetles	
Baking soda		✓			Sodium bicarbonate (alkali)	Used against powdery mildew fungi, and also against ants	Also used to rid apples of pesticide residue
Beer	✓	✓	✓	✓	Alcohol	Slugs and snails as bait	Also used as fruit fly bait in Australia
Chilli	✓	✓	✓	✓	Capsaicin	Ants, aphids, caterpillars, mealybugs	
Derris	✓		✓		Rotenone	Caterpillars, grasshoppers, aphids, spider mites, planthoppers, beetles	Rotenone is a fish poison
Fu'u (*Barringtonia* species)			✓		Saponins	Caterpillars, aphids and more	Fish poison used in Solomon Islands
Garlic	✓		✓		Allicin	Caterpillars, mites, thrips, and possibly some fungal diseases	
Gliricidia	✓		✓		Dicoumarol (interferes with vitamin K)	Aphids, caterpillars, whitefly, and also a rat poison	May need to mix bark with maize and boil and then allow to ferment
Hot water	✓	✓	✓	✓	Heat	Ants, nematodes in yam cuttings for planting and to sterilise nursery soil	

Marigold	✓		✓	✓	α-therthienyl	Insects and is a repellent (planted for control of (root knot) nematodes)	*Tagetes patula, Tagetes erecta,* and *Tagetes minuta*
Milk					Milk fat	Powdery mildew fungi	Use full cream (whole milk) at full strength
Neem	✓	✓	✓		Azadirachtin	Caterpillars, grasshoppers and many more; some fungi and nematodes	Mature seeds have higher active ingredient
Papaya					Papain (enzyme breaks down proteins)	Thrips	
Soap	✓	✓	✓	✓	Sodium stearate (alkali)	Scale insects, mealy bugs, aphids, and mites	
Soursop	✓	✓	✓		Acetogenins	Aphids, caterpillars, (e.g. DBM), planthoppers, grasshoppers	
Tobacco			✓		Nicotine	Caterpillars, aphids and more	
White oil					Smothers pests	Powdery mildew fungi and also many sucking insects, especially scales, aphids, and mites	

5.2.1 Safe handling of home-made pesticides

When handling home-made pesticides:

- Select fresh, healthy plant parts to use as pesticides; reject plants with mould on them.
- Dry plant parts properly for future use. Keep in an airy container (not a plastic container) in a shady place.

- Do not use household cooking utensils or drinking water containers for preparing plant extracts. Clean all tools well after using them.
- Avoid contact with crude extracts during preparation; wear protective clothing when applying. If you do not have rubber gloves, cover your hands in plastic bags.

- Keep plant extracts away from children, house pets and other animals.
- Harvest all mature and ripe fruits on trees before spraying.
- Always test the plant extract on a few infested plants before large-scale spraying.

- Wash your hands after handling the plant extract and wash your clothes as well.
- If there is left-over spray, dispose of it properly (see section 5.3.1).

5.2.2 Preparing home-made pesticides

Homemade pesticides can be used in many different ways to control pests. Review the following recipes with your trainees.

Chilli

Active against ants, aphids, caterpillars, mealybugs.

1. Take 1 cup dry or 2 cups fresh chillies.
2. Crush to a fine paste.
3. Put the paste into a bucket with 1 litre of water and rub with your hands (wear rubber gloves or cover hands with plastic bags). Soak for at least one hour, squeeze and strain.
4. Make up to 1 litre of water.
5. Add 1 teaspoon of grated hand soap.

Soursop or custard apple

Active against aphids, caterpillars, (diamond back moth), plant hoppers, grasshoppers.

1. Boil 500 g of fresh leaves in 2 litres of water until the water is reduced to 0.5 litre.
2. Dilute to a total of 10 litres of water.
3. Strain and add 10 teaspoons of grated hand soap.

OR

1. Take 2 handfuls of seeds and grind to a fine powder.
2. Mix with 4 litres of water and soak overnight.
3. Strain and add 4 teaspoons of grated hand soap.

Tobacco

Active against caterpillars, aphids, beetles

1. Crush 5 large leaves.
2. Add 1 litre of water and leave overnight.
3. Make up to 2 litres with water.
4. Strain and add 4 teaspoons of grated hand soap.

Garlic

Active against caterpillars, mites, thrips, and possibly some fungal diseases

1. Scrape 4 garlic cloves and soak them overnight in a small amount of vegetable oil.
2. Make up to 2 litres with water.
3. Strain and add 4 teaspoons of grated hand soap.

Neem

Active against caterpillars, aphids, grasshoppers, whiteflies, beetles, scale insects (either killing or repelling them). It stops insects from feeding.

Leaves:

1. Put 1 kg of leaves and 5 litres of water in a bucket and leave overnight.
2. Remove the leaves. Retain the water.
3. Pound and squeeze the leaves.
4. Add the 5 litres of water used for soaking the leaves overnight.
5. Strain and add 5 teaspoons of grated hand soap.

Mature seeds:

1. Wash and remove the dry husk.
2. Take 12 handfuls of dry seeds (or use 500 g for each litre of water).
3. Grind them to a fine powder.
4. Mix the powder in 12 litres of water and soak overnight.
5. Strain and add 10 teaspoons of grated hand soap.

Derris

Active against caterpillars, grasshoppers, aphids, spider mites, plant hoppers, beetles. (Note, this is **very toxic** to fish).

1. Take 2 roots of derris (20 cm long and as thick as a small finger) and crush well.
2. Put the crushed roots in a bucket and cover them with water; leave overnight.
3. Make up to 2 litres with water.
4. Strain and add 4 teaspoons of grated hand soap.

Marigold

Active against insects and is a repellent (planted for control of nematodes).

1. Collect 2.5 kg leaves/flowers; pound and mix with enough water to cover them.
2. Strain through a cloth and make up to 18 litres of water; add 4 teaspoons of grated hand soap.

Gliricidia

Active against aphids, caterpillars, whitefly

1. Grind or pound 0.5 kg leaves.
2. Soak overnight in water.
3. Make up to 20 litres with water.
4. Strain and add 5 teaspoons of grated hand soap.

Papaya

Active against thrips Active against insects and is a repellent (planted for control of nematodes).

1. Shake 1 kg of leaves in one litre of water and squeeze through a cloth.
2. Add 4 litres of soap solution (100 g soap/25 litres water).

Soap

Active against scale insects, mealybugs and aphids

Note: Use hand soap, not washing detergent

- Put 5 tablespoons of soap into 4 litres of water

or

- 2 tablespoons of dishwashing liquid in 4 litres of water.

Ash

Active against grasshoppers and beetles

1. Take ash from a fire (make sure it is cool).
2. Beat it to make it fine.
3. Put it in a coarse cloth or a strainer.
4. Shake thinly over each leaf.

Hot water

Active against ants, nematodes in yams, and used to sterilise nursery soil.

Ants – Use hot water to destroy nests, but be careful not to pour hot water onto the roots of small plants that might be growing close to the nests. You will kill the plants!

Soil – Use hot water to sterilise soil: pour it over the soil you have placed in seed boxes or over nursery soil that is spread thinly on the ground.

Yams – Use hot water to kill nematodes in yams with dry rot, before cutting and planting. Dip the whole yam in hot water at 51 degrees for 10 minutes (use a thermometer and clock – do not guess!).

White Oil

Active against powdery mildew fungi and many sucking insects, especially scales.

1. Pour 3 tablespoons (1/3 cup) cooking oil into four litres of water.
2. Add ½ teaspoon detergent soap.
3. Shake well and use.

Milk

Active against powdery mildew fungi

1. Use full-strength milk, diluted to 10% (1 part milk, 9 parts water).
2. Add a few drops of dishwashing liquid as milk does not spread over the leaf surface by itself.

Beer

Active against slugs and snails

1. Place beer in a shallow pan/saucer with edges even with the ground.
2. Snails and slugs will crawl in for a taste and drown.

Baking soda (sodium bicarbonate) (1)

1. Dissolve one or two tablespoons of baking soda in 4.5 litres of water.
2. Spray once a week.

Sodium bicarbonate can be an effective way of controlling fungal growth. It is registered by the US Environmental Protection Agency as a bio-pesticide.

Sodium bicarbonate increases the alkalinity of the surface of the leaves so that is becomes unfavourable for the growth of fungi. It might also leave a protective layer.

Sodium bicarbonate can be used on cabbage, cucumber, lettuce, melon, squash and tomato. It is also useful for most ornamentals, although it is advisable to test a few leaves first before you spray the whole plant, as herbs and other tender-leafed plants may show signs of burning.

Baking soda (sodium bicarbonate) (2)

An insecticide for soft bodied insects such as aphids and a fungicide for vegetables

1. Combine five cups of warm water with:
    - 2 teaspoons baking soda
    - 2 teaspoons dishwashing liquid
    - 1.5 teaspoons of vegetable oil
    - 1.5 teaspoons of natural vinegar

2. Blend until the mixture is white and foamy, then spray it on the plants right away with a hand sprayer. Agitate the sprayer as you go. Try to cover the leaves of your plants and give any bugs a good shower of the spray, so that it covers their exoskeleton and suffocates them.

5.3 Commercial pesticides

As discussed in Chapter 4, pesticides, in particular commercial products, should be used only as a last resort under the IPDM framework. When working with commercial pesticides, trainees must be aware of the dangers, not only to crops but also to those who are applying them and their families. When using commercial pesticides, the trainees should make sure that the labels are read carefully and checked to make sure they are the right product.

Commercial pesticide manufacturers create these products to make a profit. So some manufacturers may try to increase their sales by giving a new name and packaging to a 'new' pesticide, which may not be new at all, but just using the same active ingredients as many older products.

It is important to understand and be aware of the active ingredients in commercial pesticides, so that money is not wasted on gimmick products and more importantly, to avoid contributing to pesticide resistance in crops.

Before going further, test your trainees' prior knowledge of commercial pesticides asking them to complete Exercise 18.

EXERCISE 18: What do you already know about commercial pesticides?

This exercise for commercial pesticides complements the one on homemade pesticides in Table 5.1.

Trainees should describe their use in the *Purpose* column and insert an **F (fungicide), I (insecticide), H (herbicide) or M (molluscicide)** in the column *Type of pesticide*. If they know the active ingredient used, also list this. Check answers in Table 5.2.

Pesticide name	Purpose	Type of pesticide	Active ingredient
Attack			
Sundomil			
Glyphosate			
Kocide			
Confidor			
Orthene			
Agazone			
Suncloprid			
Talendo			
Blitzem			
Steward			
Prevathon			
Others:			

Table 5.2 Common commercial pesticides used in the Pacific Islands (as of 2019).

BOUGHT PESTICIDES							
Common or Trade names	**Fiji**	**Samoa**	**Solomon Islands**	**Tonga**	**Active ingredient**	**Purpose**	**Remarks**
Insecticides & miticides							
Attack	✓	✓	✓	✓	Pirimiphos-methyl/permethrin	Caterpillar, aphids	Broad-spectrum – kills beneficial insects as well
Bt	✓	✓	✓	✓	Bacillus thuringiensis	Larvae of Lepidopterous insects, armyworms, fruit and pod borers	Selective for caterpillars
Match	✓	✓		✓	Lufenuron	DBM in cabbage	Growth inhibitor
Steward	✓	✓		✓	Indoxacarb	Caterpillars, pod borer, armyworm, centre grubs, cutworm, leafroller, leafminers	Low toxicity on non-target insects
Prevathon	✓	✓		✓	Rynaxypyr or chlorantraniliprole	Caterpillars, pod borer, armyworm, centre grubs, cutworm, leafroller, leafminers	Selective for caterpillars
Multiguard	✓	✓		✓	Abamectin	Broad mite, caterpillars	Broad-spectrum – kills beneficial insects as well
Bifenthrin	✓	✓	✓	✓	Bifenthrin	Caterpillar, aphids, leafminers, thrips, mites and taro beetle	Broad-spectrum – kills beneficial insects as well
Confidor	✓	✓	✓	✓	Imidacloprid	Sucking insects like aphids, leafhoppers, thrips, whitefly, mealybugs, scale insects and taro beetle	Broad-spectrum – kills beneficial insects as well as

							taro beetle; toxic to bees
Suncloprid	✓			✓	Imidacloprid	As above	As above
Farmers' Imidacloprid	✓	✓			Imidacloprid	As above	As above
Orthene	✓	✓	✓	✓	Acephate	Chewing and sucking insects like caterpillars, aphids, thrips, leafminers, leafhoppers, cutworm on vegetables and fruits	Broad-spectrum – kills beneficial insects as well
Malathion	✓	✓	✓	✓	Malathion Bactralgel in Samoa	Leafhoppers, aphids, thrips, whitefly, mealybugs and spider mites	Broad-spectrum – kills beneficial insects as well
Karate			✓	✓	Lambda-cyhalothrin	Caterpillars, leafhoppers, aphids, thrips, whitefly, mealybugs and spider mites.	Broad-spectrum – kills beneficial insects as well
Suncis	✓		✓	✓	Deltamethrin	Caterpillar, beetles, thrips, whitefly on fruits and vegetables.	Broad-spectrum – kills beneficial insects as well
Fungicides							
Taratek/Bravo	✓			✓	Chlorothalonil and Thiophanate methyl	Broad-spectrum	Protective and systemic
Manzate	✓	✓	✓	✓	Mancozeb	Broad-spectrum	
Kocide	✓			✓	Copper hydroxide	Broad-spectrum	
Sundomil	✓	✓	✓	✓	Mancozeb	Broad-spectrum	

Talendo				✓	Chlorothalonil/ Thiophanate	Broad-spectrum	Protective and systemic
Kotek	✓	✓	✓	✓	Mancozeb	Broad-spectrum	
Herbicides							
Glyphosate/360/450/ Roundup	✓	✓	✓	✓	Glyphosate	Perennial, woody weeds	Systemic
Agazone	✓	✓	✓	✓	Paraquat	Annual and grass weeds	Contact
Bactericide							
Kocide	✓			✓	Copper hydroxide	Broad-spectrum	
Molluscicide							
Blitzem	✓	✓	✓	✓	Metaldehyde	Snails and slugs	Banning outdoor use is under consideration in Europe.

5.3.1 The pesticide label - an important document

Pesticide labels should provide all the information about how to use the chemical. Trainees should understand that once they have bought a pesticide, they must always **READ, UNDERSTAND** and **FOLLOW** label directions.

The label should have information on:

- the type of product
- what it contains
- the crops it may be used on
- the pests it may be used against
- how it may be applied
- personal protective equipment
- transport
- storage
- disposal after use
- environmental concerns
- what to do in emergencies

Trainees should not be surprised if they can't find all the information they need on the label: it might be missing! If it is not present, it may be because there was not enough space for all the details

Often the label is divided into three panels or sections laid out in a row or column: left, central and right. BUT NOT ALWAYS! The central panel may be above the other two instead.

Central panel

The central panel contains information on *common and trade names*, *what is in the product, what it is used for, as well as the risks involved in using it*. The information usually consists of all or some of the following:

- ***Warnings:*** It might catch fire, keep it away from children, it can damage the environment, particularly fish and bees
- ***Trade name:*** The name given by the company, e.g., *Attack* or *Bravo*
- ***Common name:*** A name recognised internationally, e.g., pirimiphos-methyl and permethrin (*Attack*) and chlorothanonil (*Bravo*)

- **Concentration of the active ingredient**: the number of grams per litre, e.g. 475 g/litre pirimiphos-methyl and 25 g/litre permethrin (*Attack*)
- ***What it is:*** Insecticide, fungicide, herbicide, etc.
- ***What it is used for:*** For example: "A broad-spectrum insecticide for use on avocados, citrus, flowers and ornamentals, glasshouse tomatoes ..."
- ***Formulation:*** How the chemical is made, e.g., an emulsifiable concentrate - EC; a wettable powder - WP; granule - G; or dust – D:
    - EC - the chemical is dissolved in a liquid (solvent plus surfactants) that forms *fine droplets* when mixed with water
    - WP - the chemical is made into a solid, finely ground, and then forms a *suspension* when mixed with water
    - G - a mix of chemical, inert substances (called fillers) and binding substances, then made into pellets, e.g. Furidan pellets are put in the top of coconut palms to control *Oryctes.*
    - D - a mix of chemical and inert substances (called fillers)
- ***Net content:*** The total weight (g or kg), or volume (litres) of the pesticide product

Right panel

The right panel contains information on *precautions* and *first aid* if contamination or swallowing occurs. It may contain some of the items listed below:

- ***Hazard class:*** The World Health Organization has a set of hazard classes for health, based on eating or drinking the chemical and its effect on skin (tested on rats).
    - 1a - extremely hazardous
    - 1b - highly hazardous
    - II - moderately hazardous
    - III - slightly hazardous
    - U - unlikely to present acute hazard

The hazards are sometimes shown in the form of pictures at the bottom of the label:

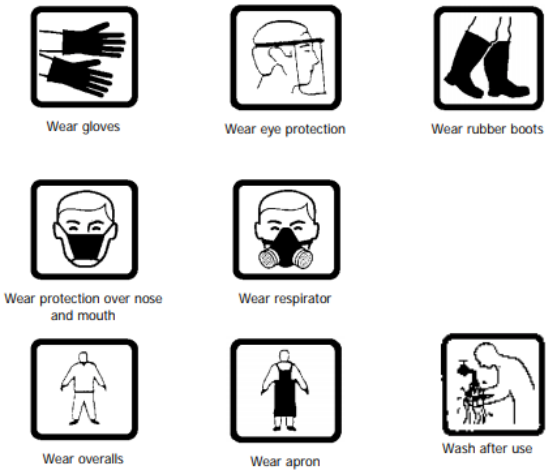


Fig. 5.1 Precautionary advice pictograms published by FAO to reduce risks when handling, applying and storing a pesticide.

- ***Storage:*** Store the product in its original container, tightly closed, and away from heat, food and out of reach of children, preferably in a locked cupboard. Note that in New Zealand, there are different rules depending on the amount of product stored in one place.

- ***Protective clothing:*** This covers the equipment and clothing that should be worn when mixing and applying pesticides, e.g. masks (including respirators) and goggles to protect mouth and eyes, gloves, boots, hat and overalls. After spraying, remove the clothing and wash your hands and face. Wash the clothes used when spraying separately from the normal clothes was. Do not eat, drink or smoke when spraying.

- ***Disposal:*** Notes on how to clean the sprayer and dispose of any remaining chemical residue (usually by spraying on soil at the side of the field, away from humans, livestock and waterways). There are also notes on how to dispose of the pesticide container, either by burying it or sending it to a landfill (Fig. 5.2). Do not re-use the container.

- ***First aid:*** What to do and who to contact if the product is swallowed, skin or hair is contaminated, or the chemical is splashed into the eyes. Usually, a doctor would be called, clothing removed, and skin and eyes flushed with water. Depending on the pesticide, the label will say whether vomiting should be induced or not. If inhaled, victims should be moved to fresh air, and given CPR if the heart stops beating.

You should always go to the field with another person in case of accidents

- ***Spillage:*** What to do if a spill occurs. Wear protective clothing, cordon off the area, prevent the chemical from entering drains, absorb it with inert material *(soil, sand or sawdust)*, and place it in bins for disposal in a landfill. Wash the contaminated area with water.

- ***Transport:*** How the chemical should be transported, especially whether public vehicles *(buses, etc.)* can be used.

Left panel

This panel gives information on *recommended use and how to apply the pesticide*.

- ***Crops/pests used for:*** A list of pests and diseases for which the chemical is recommended in a country. Most Pacific island countries do not have a registration scheme specifically naming the crops on which the chemical can be used.

- ***How to mix and apply:*** Some chemicals need to be pre-mixed before they are added to the tank of the sprayer and mixed with a larger volume of water. The application of a chemical is usually given - either (i) X g/litre of product, sprayed until run off, or (ii) X kg/ha using Y litres of water (adjusted for young and fully developed crops). When to start spraying is often given, and the interval of application, e.g., apply the chemical every 2-3 weeks.

- ***Re-entry period:*** The period after applying the chemical when it is safe to re-enter the crop.

- ***Pre-harvest interval (commonly called the withholding period):*** The number of days between the last application of a chemical and the crop harvest. *This is very important information. It ensures that the harvest does not have residues that affect its market acceptability.*

- ***Compatibility:*** Two chemicals can sometimes be mixed together and used as one. Some companies will say if specific mixtures are safe (usually their own!).

Fig. 5.2 The incorrect way to discard a pesticide container, thrown to the side of the garden after use.

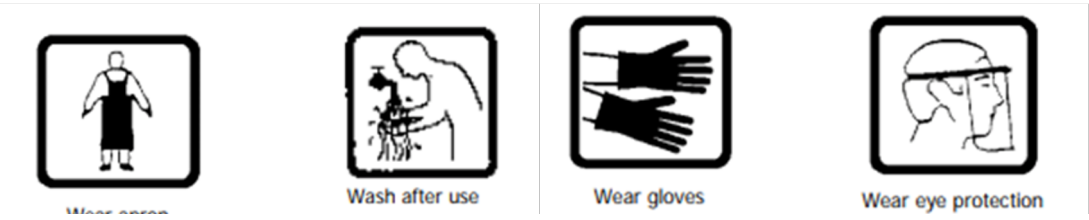
EXERCISE 19: Understanding the pesticide label

Understanding a pesticide label is critically important for the correct and safe use of pesticides. Exercise 19 focuses your trainees on how to understand the label.

A range of commonly used pesticide labels are on the following pages. Make sure each group (pairs or threes) has a different label to work with. Trainees should carefully read their label and answer the following questions. They should write their answers on brown paper or butcher's paper so that they can be held up and read out to the class. If your trainees cannot find all the answers on one label, they should look at others.

1. What kind of pesticide is it? (i.e. fungicide, insecticide, herbicide etc.)
2. What is the pesticide used for?
3. What is the common name of the pesticide?
4. What is the trade name of the pesticide?
5. Is the label divided into separate panels? If so, what information does each of these panels give you?
   - Centre panel?
   - Left panel?
   - Right panel?
6. What is an emulsifiable concentrate (EC)?
7. What is a sticker?
8. What is a spreader?
9. What is meant by 'compatibility'?
10. What should you avoid doing when spraying, but do immediately after spraying?
11. What clothing is recommended when preparing the spray and spraying?
12. What is the recommended way to store the pesticide?
13. What does 'run-off' mean?
14. Is there a hazard number on the label? What is it and what does it mean?
15. What should you do after spraying and before eating, drinking or smoking?
16. Can you wash the sprayer or empty container in the river? If not, why not?
17. Where are the best places to put the container when it is empty?
18. Is it recommended that you induce vomiting if a person has drunk the pesticide?
19. If you spill the pesticide, what should you do?
20. Can you give livestock feed that has been sprayed with the pesticide?
21. What is meant by the pre-harvest interval (also known as the withholding period)?
22. What do these pictograms mean?

(a) (b) (c) (d)



5.3.2 Pesticide labels

DIRECTIONS FOR USE

Vegetables and ornamentals; Fruits files Aphids, Wooly aphids, Thrips, green vegetable bug, bronze orange bug, bean fly Azalia lace bug, leaf miner, jassids, mites. Use 100ml. per 100 l. water (16 fl. oz. per 100 gallons).

Knapsack: 13.5 ml. per 13.5 l. water. (1/2 fl. oz. per 3 gallons).

Citrus: as above but READ WARNING.

Seed dressing: 100 ml. in 570 ml. water.

(3½ fl. oz. in 1 pint) per 45kg. (100 lbs.) seed.

WARNING: DO NOT apply on Myer Lemons, Seville Oranges, Cumquats, Liquid Amber, Chrysanthemums, Begonias, Gloxinias, as damage will occur.

Do not feed treated seed to poultry or animals.

"SAFETY DIRECTIONS"

Avoid breathing of fumes or spray mist.

Avoid contact with eyes, skin and clothes.

Wear full protective clothing, face mask, rubber gloves and respirator when handling or spraying. After applying and before eating, drinking or smoking wash hands and face thoroughly with soap and plenty of water. Do not eat, drink or smoke while spraying or handling. Clothing should be washed before re-use.

"FIRST AID"

Symptoms of poisoning include nausea, headache, giddiness, and vomiting, blurred vision, contraction of pupils, weakness, abdominal cramps and diarrhoea, sweating or excretion of excess saliva.

If swallowed or any of the symptoms arises from absorption through the skin call a doctor immediately. Induce vomiting after drinking a glass or two of water and then putting finger down the throat. Repeat until vomit fluid is clear in appearance.

Administer 0.6 mg Atropine tablets every quarter of hour for one hour or until pupils dilate.

In case of eye contact flush with plenty of water and seek medical advice immediately.

"PRECAUTION"

Keep in original container tightly closed away from reach of Children, near food stuffs or utensils.

Toxic to bees: do not spray plants in flower.

Do not wash empty container or spray equipment into streams, ponds or public water ways.

Destroy empty container by perforation and burying.

"NOT TO BE USED FOR ANY OTHER PURPOSE"

"WAITING PERIOD"

Do not use crops for human consumption for at least 14 days after spraying.

GAGA

KAKUA NI GUNUVA

MAROROI VINAKA ME KUA NI TARA NA GONE

WILIKA NA I VAKASALA BERA NI DOLAVI

TATAQOMAKI

Kakua ni cegiva na kena cawa se cagi e na gauna ni suisui. Kakua ni tauva na mata se kuli ni yago. Vakaisulu vakavinaka ka taqomaka Vinaka na matamu e na matavulo ni suisui kei na logamu e na qaniliga rapa. Mo dara talega e dua na vulo ni ucu kei na gusu me taqomaka na ucumu ka vulona tani na cawa ni wainimate mai na cagi ko cegiva e na gauna ni uliuli kei na suisui. Ni sa oti na nomu cakacaka, savata sara vakavinaka na ligamu kei na matamu e na sovu kei na wai katakata vakarauta nib era na kana. Vakayagataka da sovu kei na wai mo savata tani kina na wainimate ka tara na ligamu kei na tagonisu taucoko. Kakua ni kana, gunu, se vakatavako e na gauna ko vakayagataka tiko kina da wainimate. Savata Vinaka na I sulu nib era ni qai tokari tale.

VEIVUKE TAUMADA

Na I vakatakilakila e kune vua e du aka sa gaga, e lomaloma ca, mosi na uluna, malumumaluruti ka wawa na yagona, lomalomaca,lualua, cawiri ka buwawa na matana, lailai mai na Yaloka ni matana, momosi ka coka na ketene, buno levu ka sivia nona weli. Kevaka e yaco na veika oqori mai na kena tilomi se tauva na kuli ni yago, kaciva sara vakatotolo na vuniwai se vakasaqara na veivuke vakavuniwai. Solia vua e dua se rua na bilo waidroka katovolea me luaraka tani mai na ka e tiloma e na nomu tara na nona I tilotilo. Cakava tiko oqo me yacova sara ni sa savasava na wai e luaraka tani mai. Solia vua e ya 0.6 mg na vuanikau na Altropine e na veiya 15 na miniti e na loma ni dua na aua, se yacova ni sa Vinaka tale na tuvaki ni Yaloka ni matana. Kevaka e tara na Yaloka ni mata, se savata sara vakavinaka e na waidroka, qai kaciva se cicivaka vua na vuniwai e dua na gauna totolo duadua.

QAQARAUNI

Tawani tikoga na wainimate e na kena kava ka me sogo vakavinaka. Me ra kakua ni tara rawa na gone, ka me maroroi vakayawa mai na kakana. Se yaya ni kana. Na Rogor e rawa ni vakamatea na oni, me kakua ni sui na kau e na gauna e se tu kina. Kakua ni savata na kena kava lala se I yaya ni suisui e na uciwa, toevu. Se dua ga na waidrodro. Vaqara na kena kava qai buluta.

KAKUA NI VAKAYAGATAKI E NA DUA TALE NA KA SEGA NI TARA ME

TAMUSUKI

Mo kakua ni vakayagataka me kakana me yacova ni sa oti e tinikava na siga mai na gauna e vakayacori kina na suisui.

POISON

NOT TO BE TAKEN

KEEP OUT OF REACH OF CHILDREN

READ SAFETY DIRECTIONS BEFORE OPENING

AGCHEM LIMITED

Subsidiary Company Lane (Fiji) Limited

AGCHEM ROGOR

Insecticide

ACTIVE CONSTITUENT: 300 g/1 (30% w/v) DIMETHOATE

FOR THE CONTROL OF: Specified insect pests in Oranges, Lemons, Manadarins, Pastures, Cereals, Fruit Crops,
Vegetables, Ornamentals, Peanuts, Cotton, Pea Seed. Sub Clover seed. Lucerne seed. Linseed and Rape seed.

CONTECTS: 1 Litre

MANUFACTURED AND DISTRIBUTED BY:

LOT 5, AGCHEM LTD, WAILADA SUB-DIVISION, LAMI, FIJI

PRIVATE MAIL BAG LAMI, FIJI

PHONE: 336 1867, 336 1499 FAX: 336 1307

EMAIL: info@agchem.com.fj

Registered under the Pesticides Act No. 41 of 1971 (FIJI) Regd. No. 1301/60F/85

BEFORE OPENING CONTAINER READ SAFETY DIRECTIONS

ज़हर

मत पिये

बच्चों की पहुंच से दूर रखिये

खोलने से पहिले सुरक्षा विवरण पढ़िए

सुरक्षा के बारे दर्शेन

दवा का साथ या मुंह के पुहारे में बांस मत लें।आखें,चमड़ी या कपड़ों से संपर्क न होने दें।दवा उठाते धारते या मुंह करते समय संपूर्ण और से सुरक्षित कपड़े पहिनें, दौरों या नकाब,हाथ में दवा का लम्ब बांध के 'रबरोटा' इत्यादि।दवा काम में लाने के बाद और कुछ खाने,पीने या तम्बाकू का इस्तेमाल करने से पहले हाथ और चेहरा साबुन तथा साफ पानी से खूब धो डालें।

दवा मुंह करते समय या उठाते धारते समय कुछ खाये-पिये मत और न ही तम्बाकू का इस्तेमाल करें।कपड़े दुबारा पहिनने से पहिले धो डालें।

प्राथमिक चिकित्सा

जहर पड़ने के चिन्ह है बमलन,जिस में दर्द,सिर चकराना,उल्टी होना,आखों में धुंधलापन,आखें बन्द होना, कमजोरी, पेट में ऐंठन या जुलाब होना, पसीना निकलना या अधिक थूक निकलना। यदि दवा निगल लेने या या कपड़ों से संपर्क हो जाने पर उक्त बताये गये कोई चिन्ह देखने को मिले, तुरन्त डाक्टर बुलाइये।

एक या दो गिलास पानी पिलाकर,गले में उंगली डालकर उल्टी कराये।जब तक उल्टीबिल्कुल साफ न हो जाय, उल्टी कराते रहिए।

हर 15 मिन्ट पर 6 मिलीग्राम 'एट्रोपाइन' की गोली पिलाये और तब तक घंटे तक या आखें बिल्कुल खुल जाने तक करते रहिए।

यदि आख से संपर्क हुआ तो पानी से खूब धुलाई कीजिए और तत्काल डाक्टरी सलाह प्राप्त कीजिए।

सावधानी डाँ

दवा के डिब्बे अच्छी तरह बन्द करके बच्चों की पहुंच से दूर और खाने पीने की सामग्री या बर्तन से दूर उसी डिब्बे में जिस में दवा खरीदी गई है।

पौधा दवा संवेदनशीलता के लिए भी जांचनी है, उस पौधों पर यह मेलीथियोन फूल लगे है।

दवा के खाली डिब्बे या उसे मले करने की सामग्री कोई नदी-नाली, तालाब या पानी में कोई आय इलाके में यह फेंके।

खाली डिब्बों को तोड़ फाड़ कर नष्ट करके जमीन में गाड़ दीजिए।

कोई दूसरे काम के लिए मत इस्तेमाल करें।

'मे के कितने दिन बाद तक पशुओं न खाये

दूध के लिए 14 दिनों बाद तक मांसन में पकड़ का इस्तेमाल मत करें।

RATE - DIRECTION FOR USE

CROP	PEST	KNAPSACK		WITHOLDING PERIOD
		16 litres	20 litres	
Citrus	Scales Insects	99mls	124mls	14 Days
Rice	Leaf Hoppers	84mls	105mls	14 Days
Beans	Aphids, Mites	67mls	84mls	14 Days
Carrots	Aphids, Mites, Leaf Miners	67mls	84mls	14 Days
Vegetables, Lettuce Lettuce, Tomatoes	Miscellaneous Pest, Caterpillars	67mls	84mls	14 Days
Corn	Earworms	67mls	84mls	14 Days
Dalo	Treatment of Dalo Suckers for Taro beetles eggs before planting	64mls	80mls	
Pest Control	Cockroaches (Residual Spray) Bed bugs, Fleas, Flies, Carpet Beetles	25mls / 1litre water or kerosene		

PRECAUTION
Keep in original container tightly closed away from reach of children, near foodstuffs or utensils. Diazinon is also toxic to Bees: do not spray plants in flower. Do not wash empty container or spray equipment into streams, ponds or public water ways. Destroy empty container bt perforation and burying.

"NOT TO BE USED FOR ANY OTHER PURPOSE"

FIRST AID
Symptoms of poisoning include nausea, headache, giddiness, vomiting, blurred vision, contraction of pupils, weakness, abdominal cramps and diarrhoea, sweating or excretion of excess saliva. If swallowed or any of the symptoms arises from absorption through the skin call a doctor immediately. Induce vomiting after drinking a glass or two of water and then putting finger down the throat. Repeat until vomit fluid is clear in appearance. Administer 0.6 mg Atropine tablets every quarter of hour for one hour or until pupils dilate. In case of eye contact flush with plenty of water and seek medical advice immediately.

SAFETY DIRECTIONS
Avoid breathing of fumes or spray mist. Avoid contact with eyes, skin and clothes. Wash full protective clothing, face mask, rubber gloves and respirator when handling or psraying. After applying and before eating, drinking or smoking wash hands and face thoroughly with soap and warm water. Wash away spillage on the skin with soap and plenty of water. Do not eat, drink or smoke while spraying or handling. Clothing should be washed before re-use.

WAITING PERIOD
Do not use crops for human consumption for at least 14 days after spraying.

जहर

मत पियो बच्चों की पहुँच से दूर रखिए सुरक्षा विवरण को खोलने से पूर्व पढ़ लीजिए, किसी दूसरे काम में मत लाएं।

सुरक्षा के मार्ग दर्शन:
दवा का भाप या स्प्रे के फुहारे में सांस मत लें। आखें, चमड़े या कपड़ों से संपर्क न होने दें। दवा उठाते धारते या स्प्रे करते समय संपूर्ण तौर से सुरक्षित कपड़े पहिने, चेहरे पर नकाब, हाथों में रबर ग्लब्स् सांस के रिसपीरेटर इत्यादि। दवा काम में लाने के बाद और कुछ खाने, पीने या तम्बाकू इस्तेमाल करने से पहले हाथ और चेहरा साबुन तथा गर्म पानी से खूब धो डाले। चमड़े पर से दवा के छिटके साबुन और पानी से खूब धो डाले। कपड़े दुबारा पहिनने से पहले धो डाले।

प्राथमिक चिकित्सा
जहर पड़ने के चिन्ह है मचलन, सिर में दर्द, सिर चकराना, उल्टी होना, आखों में धंधलापनना आखें बंद होना, कमजोरी, पेट में ऐंठन या जुलाब होना, पसीना निकलना या अधिक थूक निकलना। यदि दवा निगल लेने पर या चमड़ों से संपर्क हो जाने पर उपाय बताये गये कोई चिन्ह देखने को मिले, तुरन्त डाक्टर बुलाइये। एक या दो ग्लास पानी पिला कर गले में उंगली डाल कर उल्टी कराएं। जब तक उल्टी बिलकुल साफ न हो जाए उल्टी कराते रहिए। हर १५ मिन्ट पर 0.६ मिलीग्राम एट्रोपाइन की गोली पिलाये और ऐसा एक घंटे तक या आखें बिलकुल खुल जाने तक करते रहिए। यदि आंख से संपर्क हुआ तो पानी से खूब धुलाई कीजिए और तत्काल डाक्टरी सलाह प्राप्त कीजिये।

सावधानी बर्तें
दवा के डिब्बे अच्छी तरह बंद करके बच्चों की पहुँच से दूर और खाने पीने की सामग्री या बर्तन से दूर उसी डिब्बे में रखिये जिसमें दवा खरीदी गई है। डायज़ीनोन दवा मधुमक्खियों के लिए भी जहरीली है, उन पौधों पर मत स्प्रे करें जिन में फूल लगे है। दवा के खाली डिब्बे को तोड़ फोड़ कर नष्ट करके ज़मीन में गाड़ दीजिये। कोई दूसरे काम के लिए मत इस्तेमाल करें।

'स्प्रे के कितने दिन बाद तक फसल न खाएं'
स्प्रे से कम से कम १४ दिनों तक भोजन में फसल का इस्तेमाल मत करें।

POISON

*NOT TO BE TAKEN *KEEP OUT OF REACH OF CHILDREN
*READ **SAFETY** DIRECTIONS BEFORE OPENING

DIAZINON 20

ACTIVE CONSTITUENTS
contains 200g/l (20%) W / V DIAZINON SOLVENT 492g/l (49.2%) W / V
HYDROCARBON SOLVENT
For the control of Aphids, Mites, Leaf Miners, Leaf Hoppers, Flea Beetles, Leaf Miners, Earworms, etc in Rice, Citrus, Vegetables, Tomatoes, Watermelons.

CONTENTS 1 LITRE

IMPORTED AND DISTRIBUTED IN FIJI BY
AGCHEM LTD
WAILADA INDUSTRIAL ESTATE LAMI
PRIVATE MAIL BAG, LAMI, FIJI
PHONE: 336 1499, 336 1867 FAX: 336 1307
EMAIL: info@agchem.com.fj
REGISTERED UNDER FIJI PESTICIDES ACT NO. 41 OF 1971
REGISTRATION No. I274/32F/85

GAGA

*KAKUA NI GUNUVA *MAROROI VINAKA ME KUA NI TARA NA GONE
*WILIKA NA I VAKASALA NI BERA NI DOLAVI

TATAQOMAKI
Kakua ni oeguva na kena cawa se cagi e na gauna ni suisui. Kakua ni tauva na mata se kuli ni yago. Vakasulu vakavinaka ka taqomaka vinaka na matamu e na matavulo ni susu kei na ligamu e na qaniliga rapa. Mo dara talega e dua a vulo ni ucu kei na gusu me taqomaka na ucumu ka vulona tani na cawa ni wainimate mai na cagi ko oeguva e na gauna ni ukuli kei na suisui. Ni sa oti na nomu cakacaka, savata sara vakavinaka na ligamu kei na matamu e na sovu kei na wai katakata vakarauta ni bera na kana. Vakayagataka no sovu kei na wai mo savata tani kina na wainimate ka tara na ligamu kei na yagomu taucoko. Kakua ni kana, gunu, se vakatavako ena gauna ko vakayagataka tiko kina na wainimate. Savata vinaka nai sulu ni bera ni qa tokari tale.

VEIVUKE TAUMADA
Nai vakatakilakila e kune vua e dua ka sa gaga, mosi na uluna, malumalumu ka wawa na yagona, lomalomaca, lialia, cawri ka buwawa na matana, lalai mai na yaloka ni matana, momosi ka coka na ketena, buno levu ka siva na nona weli. Kevaka e yaco na veika oqori ma na kena tiomi se tavua na kuli ni yago, kaciva sara vakatotolo na vuniwai se vakaqara na veivuke vakavuniwai. Soka vua e dua se rua na bilo waidroka ka tovolea me kuraka tani mai na ka e tiloma e na nomu tara na nona i tiotio. Cakava tiko oqo me yacova sara ni sa savasava na wa e kuraka tani mai. Soka vua e ya 0.6 mg na vuanikau na Atropine e na veiya 15 na minit e na loma ni dua na aua, se yacova ni sa vinaka tale na i tavaki ni yaloka ni matana. Kevaka e tara na yaloka ni mata, savata sara vakavinaka e na waidroka, qai kaciva se cicivaka vua na vuniwai e na dua na gaunii toteio duadua.

QAQARAUNI
Tawana tikoqa na wainimate e na kena kava ka me sogo vakavinaka. Me ra kakua ni tara rawa na gone, ka me mororoi vakayalewa mai na kakana, se yaya ni kana. Na Diazinon e rawa ni vakamatea na oni, me kakua ni sui na kau e na gauna e se tokona. Kakua ni savata na kena kava lala se i yaya ni suisui e na udiwa, toevu, se dua ga na waidrodro. Vaqara na kena kava qai buluta.
KAKUA NI VAKAYAGATAKA E NA DUA TALE NA KA

SEGA NI TARA ME TAMUSUKI
Mo kakua ni vakayagataka na kakana me yacova ni sa oti e tinikava na siga mai na gauna a vakayacori kina na susua.

Precautions

1. Product is poisonous if swallowed.
2. Will irritate the eyes and skin.
3. Facial skin contact may cause temporary facial numbness
4. Always wear protective clothing.

5. Avoid contact with eyes and skin.
6. Do not inhale spray mist.
7. When preparing spray, wear cotton overalls buttoned to the neck and wrist and a washable hat, elbow-length PVC gloves, face and shield.

First Aid

1. Remove contaminated clothing and bathe patient.
2. Wash the patients body thoroughly with plenty of soap and water.
3. Identify, as accurately as possible, the product(s) associated with the exposure. If possible, ask the patient. Store the container, label and leaflet to show to the doctor.
4. If breathing has stopped, provide artificial respiration.
5. No specific antidote. Treat symptomatically

Directions for Storage

1. Store in a cool place.
2. Do not store the product in the rooms of your home.

Spillage and Disposal

1. For small spills, take up with sand or other absorbent material and place into containers for later disposal.
2. Do not reuse container.
3. Wash contaminated area with soap and water.
4. Dispose of container into an approved sanitary landfill.

Tataqomaki

1. Ena rawa niko gaga ke gunuvi.
2. E na milamila na matamu se na yagomu ke tauva na wainimate oqo.
3. Ena rawa ni nunu na matamu ke terega na wainimate.
4. Me daramaki na sulu ni tataqomaki.
5. Kakua ni tauva na mata se kuli ni yago.
6. Kakua ni ceguva na cawa ni suisui.
7. Ena gauna ni uliuli, mo daramaka nai sulu me taqomaka na yagomu kei na ligamu, vaka qa ni liga rapa kei na i tataqomaki ni mata.

Veivuke Taumada

1. Luvata na i sulu sa terega na wainimate ka sili.
2. Me vakasilimi vinaka e na sovu kei na wai.
3. Raica na Vuniwai ke yaco e dua na leqa ka kauta vua e dua na i lavelave ni wainimate.
4. Ke sa tasogo na nona i cegu, me soli vua nai cegu ni veivuke taumada.

Kena Mararoi

1. Mararoi ena dua na vanua vinaka.
2. Ka kua ni mararoi ena dua na rumu ni nomu vale.

Kena Vakarusai

1. Buluta ena nuku ke tasova vakalailai na wainimate o qo, qai takiva kina dua na vokete me vakarusai.
2. Ka kua ni vakayagataka tale na kava lala.
3. Savata vinaka e na sovu kei na wai na vanua e tasova kina na wainimate.
4. Buluta na kava lala e na dua na vanua digitaki vinaka.

सावधानियां

1. उत्पाद अगर निगल लिया हो तो ज़हरीला है।
2. आँखों और त्वचा में जलन होगा।
3. चेहरे की त्वचा के संपर्क के कारण स्तब्ध हो सकता है।
4. संवेदनशील मज़दूरों को सुरक्षित कपड़ों का उपयोग करना चाहिए।
5. आँखों और त्वचा के संपर्क से बचे।
6. स्प्रे की धुंध को साँस से मत मिलने दे।
7. स्प्रे की तैयारी; कपास धोंगा पहीने गर्दन और कलाई तक , टोपी, कोहिनो तक लमबे ग्लवस, चे पर मास्क और कवच पहीने।

प्राथमिक चिकित्सा

1. दूषित कपड़े निकाले और साबुन पानी से मरीज़ का शरीर अच्छी तरह से धो ले।
2. अगर मरीज़ डॉक्टर के पास जाए तो उत्पाद का लेबल लेकर जाए ताकी उसे पता चल सके इस उत्पाद के विशय में।
3. अगर साँस लेना बंद हो जाए तो कृत्रिम श्वसन लेना चाहिए।
4. कोई विशिष्ट मारक नही है तो लाक्षणिक उपचार करे।

सुरक्षित स्थान

1. उत्पाद को ठंडे जगह पर रखे।
2. अपने घर के कमरे में उत्पाद को मत रखे।

छलकना और निपटान

1. उत्पाद छलक गया हो तो रेत या बाद से कंटेनर मे रख दे और फिर बाद मे निपटान करे।
2. कंटेनर का उपयोग दुबारा मत करे।
3. साबुन और पानी से दूषित क्षेत्र धो ले।
4. एक अनुमोदित सैनिटरी लैंडफिल में कंटेनर के निपटान करें।

CAUTION

NOT TO BE TAKEN
KEEP OUT OF REACH OF CHILDREN
READ SAFETY DIRECTIONS BEFORE OPENING OR USING

AGCHEM LIMITED

HORTIGUARD

Composition of Content

Active Ingredient:

Abamectin	1.8%
Inert Ingredients	98.2%
Total	100%

For Agricultural use to control Leaf miners, Mites, Aphids and Thrips on Ornamental plants, Lawns and Crops like Capsicum, Eggplant Cottons, Citrus, Cabbage, Strawberries, and Tomatoes.

Contents 1L

Application Method

Crops	Crops - Pest/ Disease	Dosage (Per 100L water or as indicated)	Application Direction and Minimum Time between Last Application and Harvest or Feeding (F)	
			Days	Unless otherwise indicated dilutions are for high volume application.
Apples and Pears	Red spider mite and European red mite	35ml + 250ml spray oil (1000 - 2000 ml/ha + 0.25% spray oil)	7	Apply as a full spray when pest is noticed and repeat when necessary. Resistance to various pesticides may be encountered.
Cabbage	Diamond back moth, Pieris Rapae	22 -23ml		Add 2000 - 3000 times of water and spray.
Tomatoes Capsicum Eggplant	American leaf miner	60ml (300 - 1200ml/ha)	3	Apply at first signs of infestation as a full cover spray. Repeat application every 7 days or as needed to maintain control.
	Red spider mite	60ml (300 - 1200ml/ha)	3	Apply when pest is noticed and repeat when necessary. Resistance to various pesticides is evident. Full cover application.
Citrus	Thrips	10 -20ml + 300ml light or medium narrow range mineral oil	7	Apply at first signs of thrip presence. Use higher dosage rate when climatic conditions are favourable for thrip infestation. Apply as a light cover spray. Repeat when necessary. Do NOT apply more than 3 sprays or 2 consecutive sprays per season.

AGCHEM LIMITED

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Lot 5, Wailada Industrial Estate, Lami
Private Mail Bag, Lami Fiji Islands
Phone: 336 1499, 336 1867 Fax: 336 1307
Email: info@agchem.com.fj

SUNDAT

Manufacturer:
Sundat (S) PTE Limited
26 Gul Crescent, Singapore.

Registered Under the Fiji Pesticide Act No. 41 of 1971.

Registered No. I 776/221 F/85

Precautions

1. Product is poisonous if swallowed.
2. Will irritate the eyes and skin.
3. Facial skin contact may cause temporary facial numbness.
4. Sensitive workers should use protective clothing.
5. Avoid contact with eyes and skin.
6. Do not inhale spray mist.
7. When preparing spray, wear cotton overalls buttoned to the neck and wrist and a washable hat, elbow- length PVC gloves, face and shield.

First Aid

1. Remove contaminated clothing and bathe the patient.
2. Wash the patient body thoroughly with plenty of soap water.
3. Identify, as accurately as possible, the product(s) associated with exposure. If possible, ask the patient. Store the container, label and leaflet to show to the doctor.
4. If breathing has stopped, provide artificial respiration.
5. No specific antidote. Treat symptomatically.

Directions for Storage

1. Store in a cool place.
2. Do not store the product in the rooms of your home.

Spillage and Disposal

1. For small spills, take up with sand or other absorbent material and place into containers for later disposal.
2. Do not reuse container.
3. Wash contaminated area with soap and water.
4. Dispose of container into an approved sanitary landfill.

Tatagomaki

1. Ena rawa niko gaga ke gunuvi.
2. Ena milamila na matamu se na yagomu ke tauva na wainimate oqo.
3. Ena rawa ni nunu na matamu ke terega na wainimate .
4. Me daramaki nai sulu ni tataqomaki.
5. Kakua ni tauva na mata se kuli ni yago.
6. Kakua ni ceguva na cawa ni suisui.
7. Ena gauna ni uliuli, mo daramaka nai sulu me taqomaka na yagomu kei na ligamu, vakaqariliga rapa kei na tataqomaki ni mata.

Veivuke Taumada

1. Luvata na i sulu sa terega na wainimate ka silivakavinaka.
2. Me vakasilimi vinaka e na sovu kei na wai.
3. Raica na Vuniwai ke yaco e dua na leqa ka kauta vua e dua na i lavelave ni wainimate.
4. Ke sa tasogo na nona i cegu, me soli vua nai cegu ni veivuke taumada.

Kena Maroroi

1. Maroroi e na dua na vanua vinaka.
2. Kakua ni maroroi e na dua na rumu ni nomu vale.

Kena Vakarusai

1. Buluta e na nuku ke tasova vakalailai na wainimate oqo, qai takiva kina dua na vokete me vakarusai.
2. Kakua ni vakayagataka tale na kava lala.
3. Savata vinaka ena sovu kei na wai na vanua e tasova kina na wainimate.

ज़हर

बच्चों के पहुंच से दूर रखें। डिब्बा को खोलने से पहले लेबल को बारीकी से पढ़ लें।

चेतावनी

इस दवा को निगलने पर ज़हर का सम्भावना हो सकता है। दवा लगने पर आंखों और त्वचा में सुजलाहट महसूस किया जा सकता है। दवा या दवा के फुहारों को सांस मत लें। आंखों और त्वचा पर मत लगने दें। दवा मिलाते या छेड़ करते समय सुरक्षित कपड़ों को पहन रखें।

दवा रखने की जगह

दवा को इसी डिब्बा में लेबल लगा हुआ और कस कर बन्द कर एक सुरक्षित जगह पर रखें। रखने की जगह को हरदम बन्द कर रखें। सूरज की किरणों से दूर रखें।

प्रारम्भिक चिकित्सा

दवा का कोई "एन्टिडोट" नहीं है। इलाज वैसे करें जैसे ज़हर महसूस हो। सांस रुकने पर फेस्ट छोड़ दें। देह पर पड़ने पर कपड़ों को उतार कर साफ पानी और साबुन से नहाले। आंखों में पड़ने पर साफ पानी से खूब धोवें। मरीज़ को तुरन्त डाक्टर के पास दवा का डिब्बा सहित ले जाएं।

खाली डिब्बों का विनाश

खाली डिब्बों को किसी और काम में मत लाएं। डिब्बा खाली होने पर छेद कर एक सुरक्षित जगह पर ज मीन में जो नदी नालियों से दूर हो वहां गाड़ दें।

फसल को इस्तेमाल करने का समय

बैंगन और अन्य शाक सब्जियों को आखरी बार छिड़कने पर पहिदा (१४) दिन के बाद ही इस्तेमाल करें। डालों पर छिड़कने के एक महीना बाद उसाड़े।

चेतावनी

इस दवा को केवल उन्हीं काम में लाएं जो लेबल पर है। किसी और काम में मतलाएं।

CAUTION
NOT TO BE TAKEN
KEEP OUT OF REACH OF CHILDREN
READ LABEL CAREFULLY BEFORE OPENING

AGCHEM

BIFENTHRIN 8 SC

Composition Content

Active ingredient: Bifenthrin	80 g/l (8%) % w/v
Inert ingredients	92% w/v
Total	100% w/v

Insecticide

A systemic Pyrethroid Insecticide and Acaricide with a board spectrum of activity which has a rapid knockdown and a long residual action

Content: 1 Litre **WHO III**

Compatibility
Not compatible with alkaline materials.

Application Method

Crops	Pest	Knapsack Rate 16l	Knapsack Rate 20l	Withholding Period
Vegetables	Caterpillars Aphids Leafminers White Fly Thrips Mites	15-20mls	20-25mls	3 Days
Rose Ornamentals	Caterpillars	32mls	40mls	
Dalo	Dalo Beetles	40mls	50mls	Start treatment once at planting and 3 months later at 100mls / plants
Household Pests	Spiders	30-65mls/10L Water		Use the higher rate in situations where pest pressure in high, when a rapid knock down and/or maximum residual protection is desired. The lower rate may be used for follow up treatments
	Cockroaches, Fleas Ants, Flies, Ticks, Paper-Nest Wasps, African-Black Beetles, Stem Weevils Mosquitoes	65-125mls/10L Water		

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Manufacturer:
SUNDAT (S) PTE Ltd
26 Gul Crescent, Singapore 629532

Registered under Pesticide Act No. 41 of 1971
Registration No. I562/211F/85


APPLICATION EQUIPMENT
Through coverage of grasses and weeds with spray of medium fine droplets is required for optimum control. Because contamination of propal with small amounts of certain pesticides results in injury to rice. Clean equipment with detergent solution and rinse with clean water before filling the tank. To avoid possible injury to other crops later, flush the sprayer with clean water immediately after each application. Can be applied with knapsack sprayers or motorized sprayers.
OPERATIONS CONDITIONS
Do not apply when wind velocities 5 to 10 miles per hour and cause poor plant coverage or spray to nearby susceptible crops. A slight cross – wind during spraying is desirable to equalize distribution. Fields may be treated when grasses and weeds are either fry or wet with dew. Rain within 3 to 6 Hours after application may reduce effectiveness, is most effective when applied in warm to hot weather. For best results it should be applied in day temperature to 23 – 26 degrees (74 – 80F)
DRIFT HAZARD TO OTHER CROPS
Propal injure most crops except cereal grains and perennial grasses. Avoid drift or accidental application on other crops such as cotton, soy bean, corn, safflower, seeding legumes, vegetables, orchards, vineyards, gardens, shrubs and ornamentals.
WARNING
Do not mix propal with carbamate or organophosphate insecticides nor apply chemicals within 10 days if using propal. Store in original containers, tightly closed in a safe place away from food stuff, seeds, fertilizers or other pesticides. Wash out empty containers and dispose with the chemical or used container.
NOT TO BE USED FOR ANY OTHER PURPOSE
SAFTEY DIRECTION
Avoid contact with eyes and skin. Avoid breathing spray mist. Wear rubber gloves and protective clothing when handling or spraying. Wash hands and exposed parts of the body after used and before eating, smoking or drinking. Do not eat or smoke while spraying
FIRST AID
If swallowed, drink a glass or two of water then induce vomiting by putting a finger down the throat. Repeat until the vomit fluid is clear. Call a doctor immediately. In case of eye contact flush with plenty of water and seeks medical advise at once. If spilt on skin, wash immediately with soap and water.
IMPORTED AND DISTRIBUTED BY:
AGCHEM LTD.
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PRIVATE MAIL BAG, LAMI, FIJI
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EMAIL: info@agchem.com.fj
REGISTERED UNDER THE PRETICIDE
ACT 41 OF 1971 (FIJI)
REGISTERED No. 1309/11F/85.
NOTICE TO BUYER
Seller makes no warranty of any kind expressed or implied concerning he use of this product. Buyers assumes all risk of the use in handling whether in accordance with directions or not
AGCHEM LIMITED
QARAUNA
-MAROROYA VINAKA ME KUA NI RA TARA NA GONE
-REREVAKI KEVAKA E TILOMI
-WILIKA NA I VAKASALA NI BERA NI DOLAVI
-E WAINIMATE KAMA TOTOLO. KUA NI DOLAVA TU SE MO VAKAYAGATAKA SE NA LOMA NI 30 NA I YATE MAI NA DUA NI BUKA SE YAMEYAME
LEQA NI YACOVI IRA NA KA TEI TALE SO:
E rawa me vakacacana na porpal na veika tei tale e so, vakavo wale ga na veika me vaka na sila, raisi kei na witi kei na co bula tudei e na loma ni veigauna kece. Tovolea me kua ni vuka na kena cawa se me vakayagataki cala e na vetei tale e so me vaka na vauvau, soya bean, sila, sunflower sore ni legumes, kakana draudrau, loga ni vuanikau, loga ni viani, itei, veico tubu lelevu kei na kau tei me i ukuku ni lomanibai.
NA VEIVUKE TAUMADA:
Kevaka e sa gunuvi, solia vua e dua se rua na bilo wai droka qai tavolea me lauraka tani tale mai. Oqo e rawa ni caka ena nomu tara na nona i tilotilo. Vakarautaka tale me yacova ni sa makare na wai ka lauraka tani mai. Kaciva sara vakatotolo na vuniwai. Kevaka e sikava se tauva na yaloka ni mata, suya tani mai qai kauta vakatotolo vua na vuniwai.
TATAQOMAKIA:
Me kakua sara ni tara na mata kei na kuli ni yago. Kakua talega ni ceguvi na kena cawa se cagi ni vakayacori tiko na suisui. Me sava vinaka na liga kei na veitiki ni yago e sega ni vakaisulutaki, e na gauna sa vakayagataki oti kina. Kakua ni kana se vakatavako e na gauna ni suisui. Sava vinka na i sulu ni bera ni daramki tale. Kevaka e tara na kuli ni yago, savata sara vakatotolo e na sovu kei na wai.
REREVAKAI:
Kakua ni wakia vata na propal kei na dua tale na wainimate ni suisui. Mo kakua talega ni vakayagataka kina na Propal vakavo ke sa oti e 10 na siga mai na gauna ko vakayagataka kina. Me sogo vinaka ni maroroi vata na sore ni tei, vakabulabula ni qele se waimate tale eso. Savata vinaka na kena kava sa lala. Tukitukia kina e so an qara buluta. Kakua ni ko biuta e na toevu. sala ni wai se viritaka tu vakaveitalia.
ME KAKUA NI VAKAYAGATAKI E NA DUA TALE NA KA.
CAUTION
*KEEP OUT OF REACH OF CHILDREN *READ SAFTEY DIRECTIONS BEFORE OPENING *HARMFUL IF SWALLOWED *HIGHLY INFLAMABLE. DO NOT OPEN WITHIN 30 FEET OF FIRE OR FLAME.
AGCHEM LIMITED
PROPAL
Contains 360g/litre Propanil
CONTENTS 1 LITRE
For control of barnyard and other grasses in rice
GENERAL: Preparation of a good seed bed helps in obtaining a uniform germination of rice and grasses and obtaining optimum results. With irrigated crops a temporary flooding will assist in making the grass more susceptible to the application of propal will not be controlled.
DIRECTIONS FOR USE: For best results apply when grasses are succulent and actively growing.
RATE: up to 4 leaf stage of weed.
USE: 10 TO 11.5 Litres propal in sufficient water to cover 1 Ha. Or 7 to 8 pints propal in sufficient water to cover 1 Acre.
Knapsack Spraying: 13.5 liters (3 gal) tank use 340mls (12 fl ozs) per knapsack and apply 30 knapsacks per Ha.
Motor Blowers: 13.5 liters (3 gal) tank use 510mls (18 fl ozs) and apply 20 tanks per HA or 8 tanks per acre. Grasses from early 4 leaf to 5 stage can be controlled by 17 L/HA (1.5 gallons of product per acre) when idle conditions exist. Spraying at this later growth stage or earlier stages under adverse conditions, may give inferior results. The spraying of good – seeded crops is not recommended.
सावधान

Sundothrin 25 EC Insecticide.

GENERAL INSTRUCTIONS

APPLICATION
Sundothrin 25 EC is a contact spray. Through, even coverage is essential.

EQUIPMENT Ground Spray:
Standard low volume boom or high volume equipment may be used.

COMPATIBILITY
Sundothrin 25 EC may be mixed with most formulations of fungicides and insecticides such as dimethoate, methamidophos, pirimicarb, methomyl liquid, mancozeb, metalaxyl, and chlorothalonil, where these products are required for additional insect control or control of diseases. Sundothrin 25 EC may also be mixed with X-77 Sticker.

MIXING
Add the required quantity of Sundothrin 25 EC to the spray thank with agitators in motion. Where other products are to be mixed, add these after Sundothrin is mixed in the tank.

PROTECTION OF LIVESTOCK
- Dangerous to bees. Do NOT spray on any plants in flower while bees are foraging.
- Some repellent effect may be apparent for approximately 2 days.

PROTECTION OF WILDLIFE, FISH, CRUSTACEA AND ENVIRONMENT
- Dangerous to fish. Do not contaminate dams, ponds, waterways or drains with chemical or used container.

STORAGE AND DISPOSAL, PROTECTION OF OTHERS
Store in original container tightly closed and in a cool, well ventilated area. Do not store for prolonged periods in direct sunlight. Triple rinse containers before disposal and add rinsing to tank mix or disposal pit. Destroy empty empty containers by breaking, crushing or puncturing them. Bury containers to the depth of 50cm or more at a municipal or private sanitary land fill type tip that does not burn its refuse.

SAFETY DIRECTIONS
Product is harmful if absorbed by skin contact, inhaled or swallowed. Facial skin contact may cause temporary facial numbness. Avoid contact with eyes and skin. When preparing spray wear elbow-length PVC gloves and face shield. If product spills on skin, immediately wash area with soap and water. After use and before eating, drinking or smoking, wash hands, arms and face thoroughly with soap and water. After each days work wash contaminated clothing, gloves and face shield.

FIRST AID
If skin contact occurs, remove contaminated clothing and wash skin thoroughly with clean water. Remove patient from contaminated area. If splashed in eye wash thoroughly in clean running water for least 13 minutes. If swallowed rush patient to nearest health centre or doctor. Apply artificial respiration if not breathing.

AGCHEM LIMITED
Subsidiary Company Lane (Fiji) Limited

Manufactured by:
SUNDAT(S) PTE LTD
26 GUL CRESCENT
SINGAPORE 2262

IMPORTED AND DISTRIBUTED BY:
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PHONE: 336 1499, 336 1867 FAX: 336 1307
REGISTERED UNDER THE FIJI PESTICIDE ACT No.41 OF 1971
REGISTRATION No. 1512/112F/85

HARMFUL

NOT TO BE TAKEN
KEEP OUT OF REACH OF CHILDREN
READ SAFETY DIRECTIONS BEFORE OPENING

SUNDOTHRIN

25 EC INSECTICIDE

Active Ingredient: contains 250g/litre (25%) Permethrin as an Emulsifiable concentrate

For the control of Cluster Caterpillars, Diamondback moth, Large cabbage moth, Cabbage Aphids, Army worms, Bean Pods Borer, House hold Pest and Tick, Fleas, Lice, Mites in Domestic Animals.

A SYNTHETIC PYRETHROID INSECTICIDE

NOT TO BE USED FOR ANY PURPOSE OR IN ANY MANNER CONTRARY TO THIS LABEL UNLESS AUTHORITIES UNDER APPROPRIATE LEGISLATION.

PRECAUTIONS

Wear rubber gloves, face shield and protective clothing when handling the chemical.

Crop/ SITUATION	PESTS	KNAPSACK RATE		WITHHOLDING PERIOD	CRITICAL COMMENT
Beans	Army worm, Bean Pod Borer and Cluster Caterpillar	16L 13-16 mls	20L 17-20 mls	7 days	Start applying when the flower buds appear and repeat at 7-10 to day intervals until the pods are fully formed.
English Cabbages, Chinese Cabbages, Cauliflower and Broccoli	Diamondback moth . Large Cabbage moth. Cluster caterpillar and Cabbage aphids	17-22 mls	21-26 mls	3 days	Apply at the first appearance of the insects and required amount of x77 sticking agent to the spray tank.
Maize	Army worm	17-22 mls	21-26 mls	5 days	Spray when the insects first appear and repeat as necessary. Pay special attention at the tips of the ears for presence of the insect Larvae.
Tobacco	Army worm and Cluster Caterpillar	17-22 mls Mistblower 45-60 mls in 10L tank.	21-26 mls	5 days	Spray when the insects first appear and repeat as necessary. Pay special attention at the tips of the ears for presence of the insect larvae.
Household and industrial areas	Cockroaches, silverfish, cloth moth, ants, fleas, bedbugs, mosquitoes, act.	20 mls in 10 litres of water. Use 5 litres of the mixture to 100 square metre area.			Spray the mixture to the point of run-off. Remove all foodstuff, clothing and bedding before spraying in house. Do not enter treated areas until fully dry.

ADVICE TO PHYSICIAN
No antidote is available and treatment should be symptomatic. Chemical pneumonitis is resulting from aspiration of the solvent into lungs is a hazards that occurs when liquid formulations are used. Do not induce vomiting. Empty the stomach only on the advice of a Physician and only with equipment that will not cause aspiration into lungs. If convulsions occur diazepam (10-20mg for an adult) should be administered slowly, intravenously or rectally and repeated if necessary.

FIRST AID
If Swallowed cause vomiting by giving a glass or two of water and then poking finger down the throat. Call doctor immediayely.
जहर का रोक - थाम
अगर निगल लिया गया हो तब पहले एक या दो गिलास पानी कर अगुली गले के अन्दर डाल कर चट कराइये डाक्टर को तुरन्त बुलाइये

VEIQARAVI TANUMADA
Ke gunuvi me sagai me lualua ni gunuvi oti e dua na bilo wai oqo ne tarai na nona i tilotilo. Laki raica e dua na Vuniwai.

PRECAUTIONS
Wear rubber gloves, face shield and protective clothing when handling the chemical.
चेतावनी
दवा विलेयान करते समय हाथो मे रबर कर मोजा और बदन पर सुरचाकार कपडे पहनिये

TATAQOMAKI
Daramaka na qa ni liga rapa. Taqomaka na yaogmu ena i sulu vakarautaki ni ko vakayagataka na wai ni mate.

HARMFUL

CONTENTS
1 LITRE

Suncis 25 EC Insecticide.

GENERAL INSTRUCTIONS

APPLICATION

Suncis 25 EC is a contact spray. Through, even coverage is essential.

EQUIPMENT Ground Spray

Standard low volume boom or high volume equipment may be used.

COMPATIBILITY

Suncis 25 EC may be mixed with most formulations of fungicides and insecticides such as dimethoate, methamidophos, pirimicarb, methomyl liquid, mancozed, metalaxyl, and chlorothalonil, where these products are required for additional insect control or control of diseases. Suncis 25 EC may also be mixed with X - 77 Sticker.

MIXING

Add the required quantity of Suncis 25 EC to the spray tank with agitators in motion. Where other products are to be mixed, add these after Suncis is mixed in the tank.

PROTECTION OF LIVESTOCK

. Dangerous to bees. Do NOT spray on any plants in flower while bees are foraging.

. Some repellent effect may be apparent for approximately 2 days.

PROTECTION OF WILDLIFE, FISH, CRUSTACES AND ENVIRONMENT

. Dangerous to fish. Do not contaminate dams, ponds, water ways or drain with chemical or used container.

STORAGE AND DISPOSAL, PROTECTION OF OTHERS

Store in original container tightly closed and in a cool, well ventilated area Do not store for prolonged periods in direct sunlight. Triple rinse containers before disposal and add rinsing to tank mix or disposal pit Destroy empty containers by breaking, crushing or puncturing them. Bury containers to a depth of 50cm or more at a municipal or private sanitary land fill type tip that does not burn its refuse.

Manufactured by:
SUNDAT (S) PTE LTD
26 GL CRESCENT
SINGAPORE 2262

IMPORTED AND DISTRIBUTED IN FIJI BY
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PRIVATE MAIL BAG, LAMI, FIJI
PHONE : 336 1499, 336 1867 FAX 336 1307
REGISTERED UNDER THE PESTICIDE ACT No. 41
OF 1997 (FIJI) REGISTERED\RED No. 144/129F/85

AGCHEM LIMITED
Subsidiary Company Laos (Fiji) Limited

HARMFUL

GAGA
ME KAKAU NI GUNOVI
ME MAROROI LAVI BRA NA
GONE,WILIKA VINAKA, NA IVANORO
NI BERA NIKO DOLAVA

NOT TO BE TAKEN
KEEP OUT OF REACH CHILDREN
READ SAFETY DIRECTIONS BEFORE OPENING

Suncis

25 EC INSECTICIDE

A synthetic pyrethoid insecticide for the control of caterpillars, beetles, thrips, white butterfly, diamondback moth on a broad range of fruit and vegetables. It is fast acting light stable and has moderate persistence on plants.

Active Ingredient	
Deltamethrin	2.5%
Inert Ingredients	97.5%

NOT TO BE USED ANY PURPOSE OR IN ANY MANNER CONTRARY TO THIS LABEL UNLESS AUTHORITIES UNDER APPROPRIATE LEGISLATION

PRECAUTIONS

Wear rubber gloves, face shield and protective clothing when handing the chemical.

Crop	Pest	Knapsac Rate 16L	Knapsac Rate 20L	Withholding Period
Cabbage	Diamondback Moth	7mls	8 mls	7 Days
Tomato	Tomato Fruitworm Looper Caterpiller	7mls	8mls	3 Days
Ornamental	Looper Caterpiller Tomato Fruitworm Thrips	7mls	6mls	
Beans	Looper Caterpiller	6mls	8mls	3 Days
Cucumber Squash Water Melon	Aphids	16mls	20mls	3 Days
Maize Sweetcorn	Greasy Cutworm Corn Earthworm	8mls	10mls	7 Days

SAFETY DIRECTIONS

Product is harmful if absorbed by skin contact, inhaled or swalloed. Facial skin contact may cause temporary facial numbness, Avoid contact with eyes and skin. When preparing spray wear elbow-length PVC gloves and face shield. If product spills on skin, immediately wash area with soap and water. After use and before eating, drinking or smoking, wash hands, arms and face thoroughly with soap and water. After each days work wash contaminated clothing, gloves and faces shield.

FIRST AID

If skin contact occurs, remove contaminated clothing and wash skin thoroughly with clean water. Remove patient from contaminated area. If splashed in eye wash thoroughly in clean running water for at least 13 minutes. If swallowed rush to nearest health center or doctor. Apply artifical respiration if not breathing.

ADVICE TO PHYSICIAN

No antidote is available and treatment should be symptomatic. Chemical pneumonitis is resulting from aspiration of the solvent into lungs is a hazards that occurs when liquid formulations are used Do not induce vomiting. Empty the stomach only on the advice of a Physician and only with equipment that will not cause aspiration into lungs. If convuisions occur diazepam (10-20mg for an adult) should be administered slowly, intravenously or rectally and repeated if necessary.

FIRST AID

If Swallowed cause vomiting by giving a glass or two of water and then poking finger down the throat.

VEIQARAVI TAUMADA

Ke gunuvi me sagai me lualuā ni gunvi oti e dua na bilo wai ōqo me tarai na nona i tilotilo. Laki raica e dua na Vuniwai.

PRECAUTIONS

Wear rubber gloves, face sheild and protective clothing when handling the chemical.

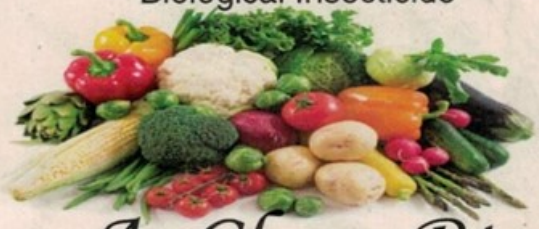
TATAQOMAKI

Daramaka na qa ni liga rapa. Taqomaka na yaogmu ena i sulu vakarautaki ni ko vakayagataka na wai mate.

HARMFUL

CONTENTS
500ml

Biological Insecticide



AgChem Bt.

500grams

GENERAL INSTRUCTIONS:

AgChem Bt is a highly effective biological insecticide for the control of caterpillar larvae of certain Lepidopterous insects in vegetable crops.
Crops should be scouted for early signs of infestations.
Larvae must eat deposits of AgChem Bt to be effected. Best results are obtained on small insects.
Thorough coverage of the plants is necessary. Treat both sides of the leaves.
Under heavy insect pressure shorten the spray interval to 3days instead of 7 days, and increase volumes of spray to improve coverage.

Use 10grams of AgChem Bt in a 20l knapsack. X-77 Sticker is recommended on hard to wet plants like Cabbages.
Withholding period Nil.

Crop	Pest	16L Knapsack	20L Knapsack
Fruiting Vegetables Such as eggplant Pepper & Tomato	Loopers Tomato Fruitworm Variegated Cutworm Saltmarsh caterpillar Hornworm Armyworms	Bt 8 grams X-77 16ml	Bt 10 grams X-77 20ml
Leafy & Cole Crops Such as Broccoli, Brussels Sprout Cabbage, Cauliflower, Celery Chinese Cabbage, Collard, Endive, Kale, Kohirabi, Lettuce (Head & Leaf), Mustard, Greens, Parsley & Spinach	Looper Imported Cabbage worm Diamond Backmoth Armyworms	Bt 8 grams X-77 16ml	Bt 10 grams X-77 20ml
Legume Vegetables Such as Bean, Pea, Lentil & Soybean	Looper Green Cloverworm Velvetbean Caterpillar Podworm Armyworms Soybean Looper Saltmarsh caterpillar	Bt 8 grams X-77 16ml	Bt 10 grams X-77 20ml

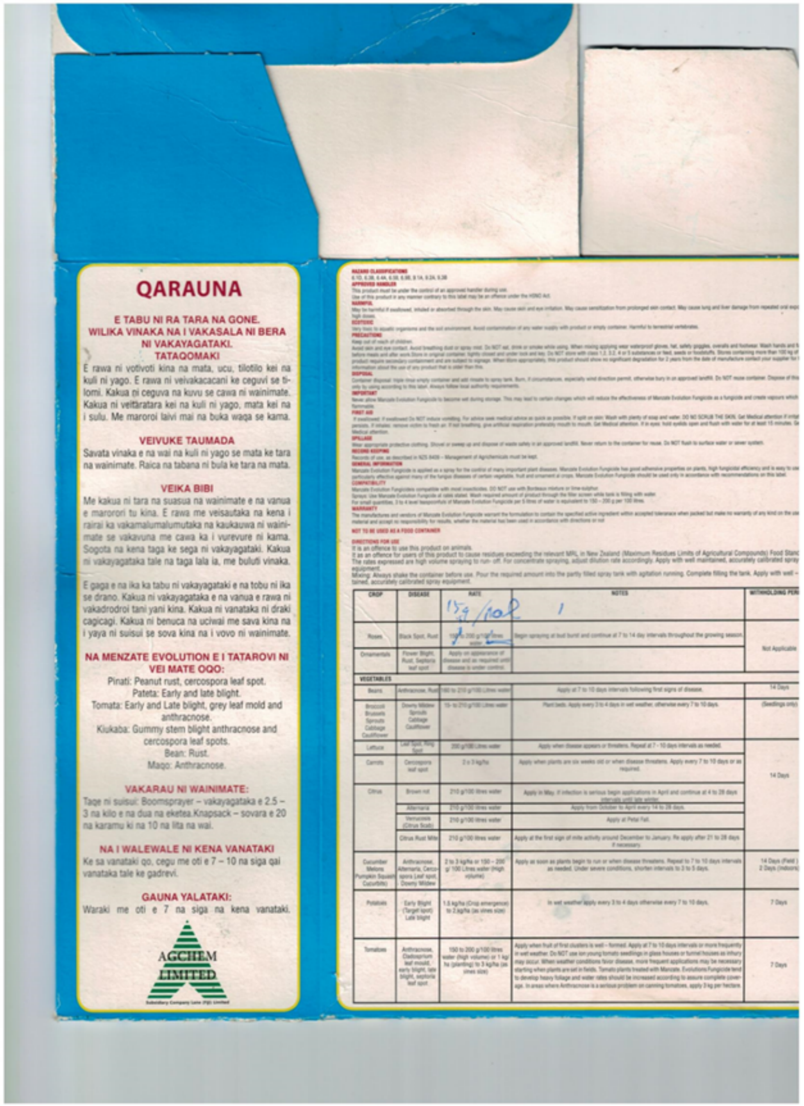
AGCHEM LIMITED
Subsidiary Company Lane (Fiji) Limited

Imported and Distributed by
Agchem Limited.
Factory: Lot 5, Wailada Industrial Estate.
Postal: Private Mail Bag, Lami, Fiji.
Phone Bus: 336 1499, 336 1867
Fax: (679) 336 1307
Email: info@agchem.com
REGISTERED UNDER THE FIJI PESTICIDE ACT NO.41 OF 1971
REGISTRATION NUMBER: I 695/87 C/85

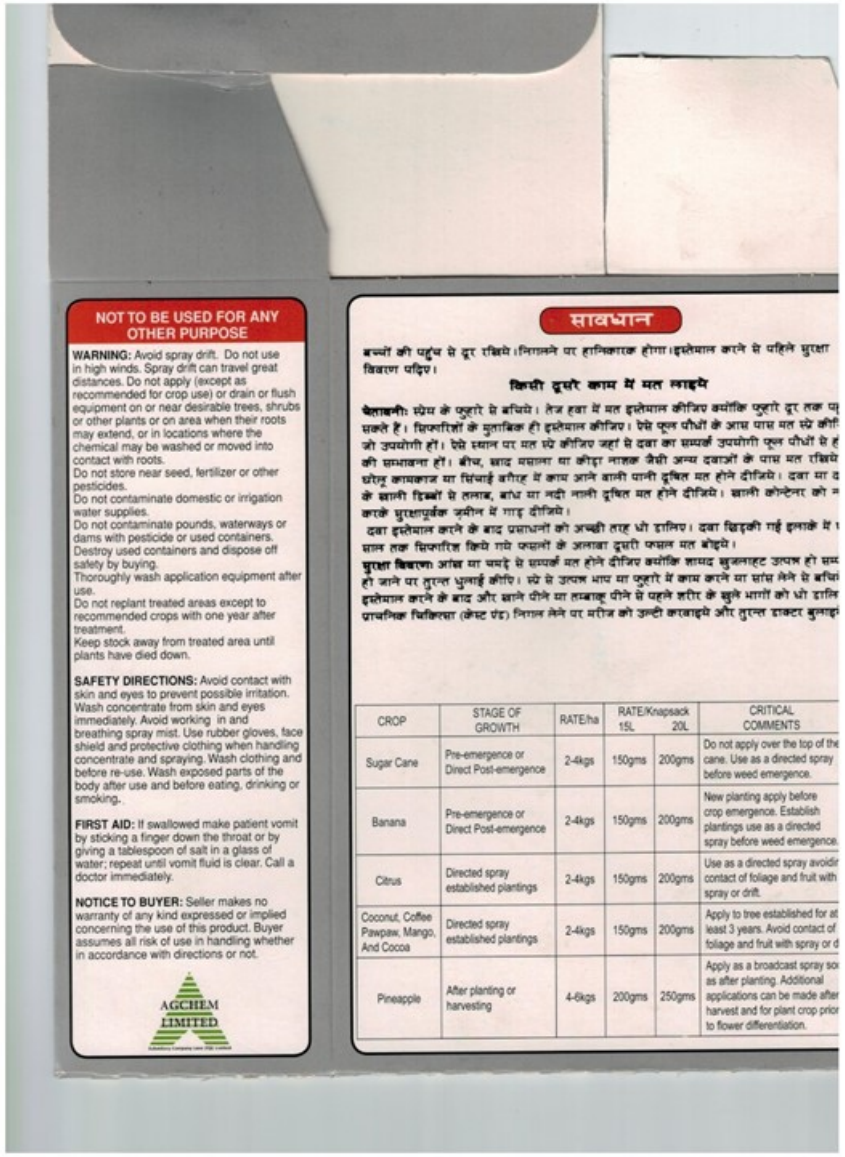
ACTIVE INGREDIENT:
Active ingredient of 32,000 IU/mg Bt WP is extremely low hazard to human being, but avoid over exposure.
Formulation Toxicity:
Acute Oral in rats: LD_{50}>5000

acute dermal in rats: LD_{50}>2000


AGCHEM LIMITED
Manzate Evolution
ECOTOXI
Manzate®
Evolution™
FUNGICIDE
ACTIVE INGREDIENT:
750g/kg MANCOZEB
in the form of a water dispersible granule
For the control of certain diseases in fruit, vegetable and ornamental crops.
Registered pursuant to the ACVM Act 1997 No. P7514.
See www.foodsafety.govt.nz for registration conditions.
Approved pursuant to the HSNO Act 1996 Code HSR000808
Net Contents : 1 Kg
United Phosphorus NZ Ltd
PO Box 158, Auckland New Zealand 1140
सावधान
AGCHEM LIMITED
IMPORTED AND DISTRIBUTED BY :
AGCHEM LTD.
LOT 5, WAILDA INDUSTRIAL ESTATE, LAMI
PRIVATE MAIL BAG, LAMI, FIJI
REGISTERED UNDER THE PESTICIDE
ACT 41 OF 1971 (FIJI)
REGISTERED No. 133/56/85


QARAUNA
E TABU NI RA TARA NA GONE.
WILIKA VINAKA NA I VAKASALA NI BERA NI VAKAYAGATAKI.
TATAQOMAKI
E rawa ni votivoti kina na mata, ucu, tilotilo kei na kuli ni yago. E rawa ni veivakacacani ke ceguvi se tilomi. Kakua ni ceguva na kuvu se cawa ni wainimate. Kakua ni veitaratara kei na kuli ni yago, mata kei na i sulu. Me maroroi laivi mai na buka waqa se kama.
VEIVUKE TAUMADA
Savata vinaka e na wai na kuli ni yago se mata ke tara na wainimate. Raica na tabana ni bula ke tara na mata.
VEIKA BIBI
Me kakua ni tara na suasua na wainimate e na vanua e maroroi tu kina. E rawa me veisautaka na kena i rairai ka vakamalumalumutaka na kaukauwa ni wainimate se vakavuna me cawa ka i vurevure ni kama. Sogota na kena taga ke sega ni vakayagataki. Kakua ni vakayagataka tale na taga lala ia, me buluti vinaka.
E gaga e na ika ka tabu ni vakayagataki e na tobu ni ika se drano. Kakua ni vakayagataka e na vanua e rawa ni vakadrodroi tani yani kina. Kakua ni vanataka ni draki cagicagi. Kakua ni benuca na uciwai me sava kina na i yaya ni suisui se sova kina na i vovo ni wainimate.
NA MENZATE EVOLUTION E I TATAROVI NI VEI MATE OQO:
Pinati: Peanut rust, cercospora leaf spot.
Pateta: Early and late blight.
Tomata: Early and Late blight, grey leaf mold and anthracnose.
Kiukaba: Gummy stem blight anthracnose and cercospora leaf spots.
Bean: Rust.
Maqo: Anthracnose.
VAKARAU NI WAINIMATE:
Taqe ni suisui: Boomsprayer – vakayagataka e 2.5 – 3 na kilo e na dua na eketea.Knapsack – sovara e 20 na karamu ki na 10 na lita na wai.
NA I WALEWALE NI KENA VANATAKI
Ke sa vanataki qo, cegu me oti e 7 – 10 na siga qai vanataka tale ke gadrevi.
GAUNA YALATAKI:
Waraki me oti e 7 na siga na kena vanataki.
AGCHEM LIMITED


AGCHEM LIMITED
DIURON DF
HERBICIDE
QARAUNA
*MAROROYA E NA DUA NA VANUA KA RA SEGA NI YACOVA NA GONE LALAI
* REREVAKI KEVAKA E GUNUVI. WILIKA VINAKA NA I VAKASALA NI BERA NI DOLAVI.
ME KAKUA NI VAKAYAGATAKI E NA DUA TALE NA KA.
VAKSALA: Kakua ni liwavi iko na cagi ni wainimate. Kakua ni vakayagtaki e na gauna cagicagi. E na rawa ni kauta vakayawa na cagi. Kakua ni vakyagataki e na i tei (vakavo kevaka evakakina), salasala ni wai, yaya ni cakacaka, vanua ka tei kina na vunikau, se dua ga na vanua e yacova yani na waka ni kau se ena vanua ka rawa ni drodro kina na wai ka na waki vata kei na wainimate.
Kakua ni maroroi volekata na sore ni kau, vakabulabula ni qele, se na wainimate ni manumanu meca ni kau. Kakua ni biu ena wai ni gunu, se wai vakayagataki ena i teitei. Kakua ni biu e na uciwai, tobu ni wai ena wainimate, se biu ki na kava lala ni wainimate. Me biu laivi na kava ka daumaka me bulu.
Savata vinaka na i yaya ni vanavana ni sa vakayagataki oti. Kakua ni teivaki na vanua e vana vakavo kevaka e vakasalataki vakakina ni oti e dua na yabaki, mai na gauna a vana kina.
DUSIDUSI NI TATAQOMAKI: Qarauna me kua ni veitaratara kei na kuli kei na yaloka ni mata. Ke mani yaco me tauva na tiki ni yago e rua oqori., savata sara vakatotolo, kua ni oeguva na kena kabu se cawa e na gauna ko suisui tiko kina. Vakayagataka na qaniliga rapa, na i ubi ni mata kei na I sulu vavaku ni tataqomaki e na gauna ko suisui kina. Savata sara vakavinaka na I sulu ni bera ni ko vakayagataka tale. Savata sara vakavinaka na veitiki ni yagomu ka sega ni vakaiubi ni oti na suisui, vakabibi ni bera ni ko kana, gunu se vakatawako.
VEIVUKE TOTOLO DUADUA: Ke sa mani gunuvi se tiomi, saga me lua ko koya e yacovi koya e na nomu i qaqalo se solia vua e dua na taki masima kei dua na bilo wai. Tomana me yacova ni savasava na wai ni lua ka kaciva sara vakatotolo na Vuniwai.
Packed & Distributed by :
Agchem Limited.
Lot 5, Wailada Industrial Estate, Lami, Fiji.
PHONE: 336 1499, 336 1867 FAX: 336 1307
E-mail: info@agchem.com
REGISTERED UNDER THE PESTICIDE ACT 41 OF 1971 (FIJI)
REGISTERED No. W98:8F:45
AGCHEM LIMITED
WARNING
KEEP OUT OF REACH OF CHILDREN. HARMFUL IF SWALLOWED
READ SAFETY DIRECTION BEFORE OPENING
DIURON DF HERBICIDE
FOR SELECTIVE WEED CONTROL IN SUGARCANE, PINEAPPLE, PAWPAW, CITRUS, RUBBER, COCONUT COCOA, TEA AND BANANA
ACTIVE CONSTITUENT: 80 % W.W DIURON
FOR TOTAL WEED CONTROL AROUND BUILDINGS, INDUSTRIAL INSTALLATIONS, FENCE LINES & DRAINAGE & IRRIGATION DITCHES
CONTENTS 1 KG. NETT
HARMFUL


NOT TO BE USED FOR ANY OTHER PURPOSE
WARNING: Avoid spray drift. Do not use in high winds. Spray drift can travel great distances. Do not apply (except as recommended for crop use) or drain or flush equipment on or near desirable trees, shrubs or other plants or on area when their roots may extend, or in locations where the chemical may be washed or moved into contact with roots.
Do not store near seed, fertilizer or other pesticides.
Do not contaminate domestic or irrigation water supplies.
Do not contaminate pounds, waterways or dams with pesticide or used containers.
Destroy used containers and dispose off safety by buying.
Thoroughly wash application equipment after use.
Do not replant treated areas except to recommended crops with one year after treatment.
Keep stock away from treated area until plants have died down.
SAFETY DIRECTIONS: Avoid contact with skin and eyes to prevent possible irritation. Wash concentrate from skin and eyes immediately. Avoid working in and breathing spray mist. Use rubber gloves, face shield and protective clothing when handling concentrate and spraying. Wash clothing and before re-use. Wash exposed parts of the body after use and before eating, drinking or smoking..
FIRST AID: If swallowed make patient vomit by sticking a finger down the throat or by giving a tablespoon of salt in a glass of water; repeat until vomit fluid is clear. Call a doctor immediately.
NOTICE TO BUYER: Seller makes no warranty of any kind expressed or implied concerning the use of this product. Buyer assumes all risk of use in handling whether in accordance with directions or not.
AGCHEM LIMITED
सावधान
बच्चों की पहुंच से दूर रखिये।निगलने पर हानिकारक होगा।इस्तेमाल करने से पहिले सुरक्षा विवरण पढ़िए।
किसी दूसरे काम में मत लाइये
चेतावनी: स्प्रेय के फुहारे से बचिये। तेज हवा में मत इस्तेमाल कीजिए क्योंकि फुहारे दूर तक पहु सकते हैं। सिफारिशों के मुताबिक ही इस्तेमाल कीजिए। ऐसे फूल पौधों के आस पास मत स्प्रे कीजि जो उपयोगी हों। ऐसे स्थान पर मत स्प्रे कीजिए जहां से दवा का सम्पर्क उपयोगी फूल पौधों से हो की सम्भावना हो। बीच, खाद मसाला या कीड़ा नाशक जैसी अन्य दवाओं के पास मत रखिये घरेलू कामकाज या सिंचाई वगैरह में काम आने वाली पानी दूषित मत होने दीजिये। दवा या द के खाली डिब्बों से तालाब, बांध या नदी नाली दूषित मत होने दीजिये। खाली कोन्टेनर को न करके सुरक्षापूर्वक जमीन में गाड़ दीजिये।
दवा इस्तेमाल करने के बाद प्रसाधनों को अच्छी तरह धो डालिए। दवा छिड़की गई इलाके में । साल तक सिफारिश किये गये फसलों के अलावा दूसरी फसल मत बोइये।
सुरक्षा विवरण: आंख या चमड़े से सम्पर्क मत होने दीजिए क्योंकि सामद खुजलाहट उत्पन्न हो सम हो जाने पर तुरन्त धुलाई कीजि। स्प्रे से उत्पन्न भाप या फुहारे में काम करने या सांस लेने से बचिं इस्तेमाल करने के बाद और खाने पीने या तम्बाकू पीने से पहले शरीर के खुले भागों को धो डालि प्राथमिक चिकित्सा (लेक्ट एंड) निगल लेने पर मरीज को उल्टी करवाइये और तुरन्त डाक्टर बुलाइ
CROP | STAGE OF GROWTH | RATE/ha | RATE/Knapsack 15L | RATE/Knapsack 20L | CRITICAL COMMENTS
Sugar Cane | Pre-emergence or Direct Post-emergence | 2-4kgs | 150gms | 200gms | Do not apply over the top of the cane. Use as a directed spray before weed emergence.
Banana | Pre-emergence or Direct Post-emergence | 2-4kgs | 150gms | 200gms | New planting apply before crop emergence. Establish plantings use as a directed spray before weed emergence.
Citrus | Directed spray established plantings | 2-4kgs | 150gms | 200gms | Use as a directed spray avoidir contact of foliage and fruit with spray or drift.
Coconut, Coffee Pawpaw, Mango, And Cocoa | Directed spray established plantings | 2-4kgs | 150gms | 200gms | Apply to tree established for at least 3 years. Avoid contact of foliage and fruit with spray or d
Pineapple | After planting or harvesting | 4-6kgs | 200gms | 250gms | Apply as a broadcast spray so as after planting. Additional applications can be made after harvest and for plant crop prior to flower differentiation.

PINEAPPLE SPRAY
GROWTH REGULATOR

POISON

KEEP OUT OF REACH OF CHILDREN

Active Ingredient Composition:
2-Chloroethylphosphonic acid...48 %w/v
Inert ingredient..........................52 %w/v

Precautions:

1. Product is poisonous if absorbed by skin contact or swallowed.
2. Repeated minor exposure may have cumulative poisoning effect.
3. Avoid contact with eyes and skin.
4. Do not inhale spray mist.
5. When preparing spray and using the prepared spray, wear cotton overalls buttoned to the neck and wrist, a washable hat, elbow-length PVC gloves, face shield or goggles

Directions for Storage:

1. Store in cool place
2. Avoid direct sunlight
3. Do not store the product in the rooms of your home

Induce Flowering in Pineapples

WATER	BORAX	UREA	PINEAPPLESPRAY
16LTR	80grm	320grm	32mls
20LTR	100grm	400grm	40mls
50LTR	250grm	1000grm	100mls

Application Method:

CROP	USES	RATE
Pineapple	Enhance colouring of fruit	2 to 4L / 500 to 1000 L water per ha

Qarauna

E rawa ni vakavu gaga ke gunuvi se me drodrova ka curuma na kuli ni yago.
Qarauna me kakua ni terega na kuli ni yago se na yaloka ni mata.
Me kakua ni ceguvi na kena cawa.
Na gauna e vakayagataki tiko kina na wainimate me daramaki tiko na i sulu rakorako me vaka na tarausese balavu kei na sote liga balavu, na i sala, qaniliga rapa, kei na mata lloilo.

Veivuke Taumada

Ke takavi iko na wainimate, me luva sara na i sulu, ke me sisili sara vakavinaka ena wai kei na sovu ni bera ni qai qarai na veivuke vaka vuniwai.
Ke terega na mata, me sava e na wai (wadrawadra ena wai) me 15 na miniti ni bera ni qarai na veivuke vaka vuniwai.
Ke vaka e ceguvi na cawa ni wainimate, me vakagalala taki kina dua na vanua lala me cegu cagi bulabula kina, ia ke sa tasogo na nona i cegu me garavi ena veigaravi me vakasukai kina vua na i cegu, ka me qarai sara vakatotolo na veivuke vaka vuniwai.

Kena Maroroi

Me maroroi ena dua na vanua ka me kakua ni ra tara na gonelalai, ka me kakua ni maroroi tiko e loma ni nomu vale. Me kakua ni vaka cilavi siga se biu ena dua na vanua katakata, ka me tawa tiko ga ena kena bola dina. Me kakua ni vakayagataki tale na kena bola lala ena dua tale na i naki, ka me lamuti ka buluti sara vakavinaka ni sa lala.

आपातकाल और प्राथमकि चकित्सा

आंखों के लएि:
या कम से कम पंद्रह मनिट के लएि पानी और नमकीन घोल के साथ आंखों सचिाई. तत्काल चकित्सा ध्यान दे

त्वचा के लएि:
तुरंत दूषति कपड़े नकिाल दे. साबुन पानी और शराब के साथ दूषति क्षेत्रों धो लो.

साँस लेना के लएि:
ताजा हवा के लएि जोखमि क्षेत्र से तुरंत हटा दें. कृत्रमि श्वसन दे जब श्वास बंद कर दयिा है, हवा की तरह, रक्त का दबाव बनाए रखने और प्रशासन ऑक्सीजन दे वहाँ जब अभी भी उपलब्ध है. तत्काल चकित्सा ध्यान दे

अगर नगिल लयिा:
अगर व्यक्ति सतर्क है और श्वसन उदास नहीं है, ipecac के सरिप, और पानी देना. तत्काल चकित्सा ध्यान दे

Emergency & First Aid Procedures

For Eyes:
Irrigate eyes with water or saline solution for at least 15 minutes. Get medical attention immediately.

For Skin:
Remove contaminated clothing immediately. Wash contaminated areas with soap and water followed by alcohol. Get medical attention immediately.

For Inhalation:
Remove from exposure area to fresh air immediately. If breathing has stopped give artificial respiration, maintain airway and blood pressure and administer oxygen if available. Get medical attention

For Ingestion:
If person is alert and respiration is not depressed,give syrup of IPECAC, followed by water (if vomiting occurs, keep head below hips to prevent aspiration. Treat respiratory difficulty with artificial respiration and oxygen

1 LITRE

IMPORTED AND DISTRIBUTED IN FIJI BY
AGCHEM LTD
WAILADA INDUSTRIAL ESTATE LAMI
PRIVATE MAIL BAG, LAMI, FIJI
PHONE: 336 1499, 336 1867 FAX: 336 1307
EMAIL: info@agchem.com.fj
REGISTERED UNDER FIJI PESTICIDES ACT NO. 41 OF 1971
REGISTRATION No. M120/242D/85

AGCHEM LIMITED

SUNDAT (S) PTE LTD

WARNING

ACTIVE INGREDIENT:
600 g/Kg of Metsulfuron as the Methyl Ester in the form of water dispersible granule.

PRECAUTIONS

PLEASE READ THIS LABEL BEFORE OPENING OR USE.
May cause eye and mild skin irritation. Very toxic to aquatic organisms and to many plant species.

STORAGE: keep out of reach of children. Store in the original, tightly closed container, in a secure place away from foodstuffs, seeds, fertilisers, insecticides or fungicides used for crop protection.

PERSONAL PROTECTION: Avoid contact with eyes and skin. Avoid inhalation of dust or spray mist. When mixing or applying, wear overalls, boots, gloves and eye protection. Do not eat, drink or smoke while using. Remove protective clothing and wash hands and face thoroughly before meals and after work.

EQUIPMENT: apply with well-maintained and calibrated spray equipment.

DISPOSAL: dispose of this product only by using in accordance with this label, or at a suitable landfill. Do not burn. Dispose of packaging to a suitable landfill. Do not use packaging for any other purpose.

ENVIRONMENTAL: use this product carefully. Do not contaminate aquatic environments with product, spray drift or packaging. Spray drift or equipment contamination may cause serious damage to desirable plants, so do not drain or flush equipment near to desirable trees or other plants, or on areas where their roots may extend to.

FIRST AID: if swallowed do not induce vomiting. If splashed in eyes, wash out immediately with running water for several minutes. If skin or hair contact occurs, remove contaminated clothing and wash with soap and running water. For advice, call the National Poisons Centre or a Doctor immediately.

WEED	KNAPSACK RATE		MIST BLOWER RATE	APPLICATION COMMENTS
	16L	20L	10L	. Bottle Cap Measures 1 gram . The addition of X-77 Sticker or Input penetrant at rate of 100ml/100litres (1ml/1litre) is essential in order to get a good result.
WEDELIA, BROADLEAF WEEDS, GUAVA	16gms	20gms	30gms	

MANUFACTURED BY:
Orion Crop Protection Ltd.
Unit 1, 15 Sir Gil Simpson Drive, Harewood, Christchurch 8053.
PACKED AND DISTRIBUTED BY:
AgChem Limited.
Lot 5, Wailada Industrial Estate, Lami, Fiji
Private Mail Bag, Lami, Fiji
Phone: 3361499, 3361867 Fax: 3361307
Email: info@agchem.com.fj
REGISTERED UNDER THE PESTICIDE ACT No. 41 OF 1971
REGISTRATION NUMBER: W 486/192 F/85

सावधान

मत पिये
बच्चों की पहुँच से दूर रखिये
खोलने से पहले सुरक्षा विवरण पढ़िए

चेतावनी
फुहारों की धारा से बचिये और जब हवा चलती हो तो मत इस्तेमाल करें। फुहारों की धारा बहुत दूर तक जा सकती है। यह दवा उन पौधों के नजदीक में नहीं काम में लाना चाहिये जैसे, दालो, कासेरा, पैशन फ्रूट, टमाटर, फल, सजावट वह फसलों के पेड़। यदि पेड़ भीगे हो यह पानी बरसने वाला हो तो मत स्प्रे करें, छोटे घास पर सब से अच्छा असर पड़ता है। बीज, छोटे पौधों, खाद इन्सेक्टीसाइड और फंगीसाइड से दूर रखिये। इस दवा से स्प्रे किये गये पौधे जानवरों के लिए आकर्षक हो सकते है, जानवरों को ऐसी जगह से तब तक दूर रखिये जब तक पौधे मर ना जाये अन्य किसी काम के लिए मत इस्तेमाल करिये।

सुरक्षा के आदेश
चमड़े और आँखों में मत लगने दीजिए। धुन्ध या फुहारों को सांस के द्वारा अन्दर मत जाने दीजिये। इस्तेमाल करने के बाद और भोजन करने, पानी या तम्बाकू पीने से पहले हाथों और शरीर के खुले भागों को धो लेना चाहिए। स्प्रे करते समय न तो भोजन करना चाहिए न ही पानी या तम्बाकू पीना चाहिए। [illegible] और बचाव के लिए कपड़े पहन कर स्प्रे कीजिए। दुबारा इस्तेमाल करने से पहले कपड़े धो लेना चाहिए।
(१) तालाब, नाली या रुके हुए पानी को पेस्टीसाइड या काम में लाये गई कोन्टेनर्स से मत दूषित होने दीजिए।
(२) खाली कन्टेनर्स को सुरक्षा पूर्वक मिट्टी में गाड़ कर नष्ट कर दीजिए।
(३) स्प्रे करते समय कुछ मत खाये पीये या तम्बाकू पिये।

फेर्स्ट एड
यदि कोई निगल ले तो मरीज को एक या दो गिलास पानी पिला कर गले में उंगली डाल कर उल्टी कराइये। उल्टी कराते रहे जब तक कि सब कुछ न निकल जाये। डाक्टर को तुरन्त बुलाइये यदि आंख में लग जाये तो साफ पानी में खूब धोना चाहिये और डाक्टर की सलाह तुरन्त लेनी चाहिए। दूषित कपड़ों को निकाल देना चाहिये और बदन को अच्छी तरह धोना चाहिये।

POISON

KEEP OUT OF REACH OF CHILDREN
READ SAFETY DIRECTIONS BEFORE OPENING OR USING
For the control of certain grass weeds in broadleaf crops as per Directions for Use table

AGCHEM LIMITED

WEDELIA ERADICATOR

A HERBICIDE for the control of wedelia, broadleaf weeds, wild ginger, guava and a range of other scrub weeds in pasture, waste areas and in forestry sites prior to planting.

80 Grams

HARMFUL

GAGA

QARAUNA
WILIKA VAKAVINAKA NA I VAKASALA NI BERA NI VAKAYAGATAKI.
Rawa ni vakavuna na milamila ni Mata kei na Kuli ni yag
rawa ni vakavu leqa vei ira na veikabula e wai kei na vei
eso. Me qarauni sara vakavinaka na kena vakayagataki

KENA MARORОI
Maroroi vakavinaka me ra kakua ni tara na gone lalai. M
tikoga ena kena bola dina ka me sogolati vakavinaka. M
ni biu vata kei na Kakana, na i tei, na i vakabulabula ni c
wainimate ni manumanu, na waimnimate ni tatarovi ni m

I TATAQOMAKI
Qarauna me kakua ni terega na mata kei na kuli ni yagc
kakua talega ni ceguvi na kuvu ni wainimate se na cawa
daramaka na i sulu ni tataqomaki ena gauna e vakayag
wainimate oqoka. Kakua ni ko kana, gunu, se vakatavai
ena gauna e vakayagataki tiko kina na wainimate oqo. I
sulu ni tataqomaki ka mo sasavui sara vakavinaka ni ot
ka ni se bera niko kana.

KENA VAKARUSAI
Me na buluti na bola lala ni wainimate ena dua na vanu
vakamatau. Me kakua ni vakayagataki tale na bola lala
ena dua tale na ka.
VEIKABULA TALE ESO: Me qarauni na kena vakayaga
wainimate. Me kakua ni vakadukdukalitaki na uciwai, to
ni wai ka ni rawa ni vakavu mate vei ira na manumanu
talega ni vakavu leqa vei ira na kau eso ka me qarauni
sova kina na wai e dau sava kina na i yaya ni cakcaka
kina na cakacaka. Qo me dau laurai me yawaka mai na
yacova yani na waka ni kau ka ni rawa ni vakamatea n
na waka ni kau.

VEIVUKE TAUMADA
Kevaka e tilomi me kakua ni sagai me lauraka mai. Ke
me sava sara na mata ena wai, ka wadrawadra vakala
bera ni qarai na veiqaravi nei Vuniwai. Ke tasova ena y
luva laivi na i sulu ni cakacaka ka sisili vakavinaka ena
ni bera ni laurai ko Vuniwai.

5.4 Applying pesticides – the important steps in spraying

- Do not spray on windy days
- Take another person with you when spraying in case of an accident, a spill or poisoning
- Always wear proper protective clothing

5.4.1 Before spraying

The nozzle

Check you have the correct nozzle for the pesticide you are going to use. The nozzle is the most important part of the sprayer.

What does the nozzle do?

- **Nozzles break liquids into droplets.**
- **Nozzles send liquids out in a pattern. The pattern for killing weeds is quite different from the pattern for spraying pests and pathogens.**
- **Nozzles control the width of the spray.**
- **Some sprayers have a pressure control knob inside, which regulates the pressure of the spray.**

Check you have the correct nozzle for the pesticide you are going to use.

Types of nozzles

- Flat fan or anvil (also known as flood) for herbicides
- Hollow cone for insecticides or fungicides

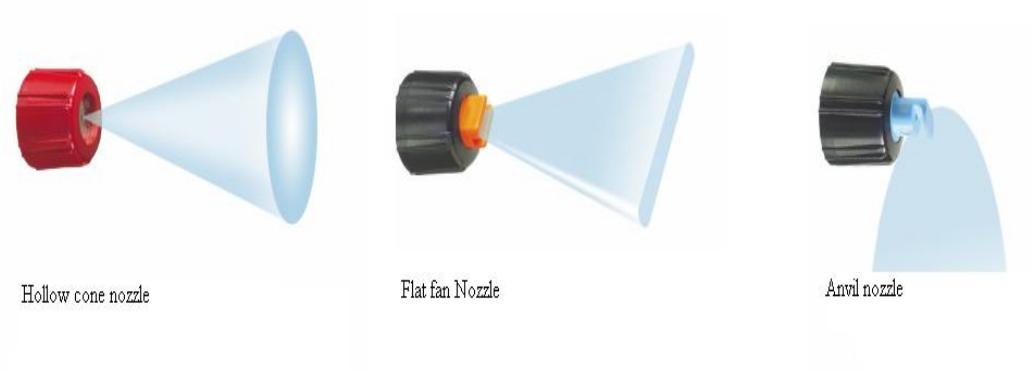


Fig. 5.3 Types of spray pattern produced by a hollow cone, a flat fan and an anvil nozzle.

Before using the nozzle

1. Check that the nozzle is clean.
2. Remove the nozzle from the sprayer and wash in water.
3. Tap to unblock.
4. If still blocked, use a piece of grass to unblock (Fig. 5.4). Never use a nail!

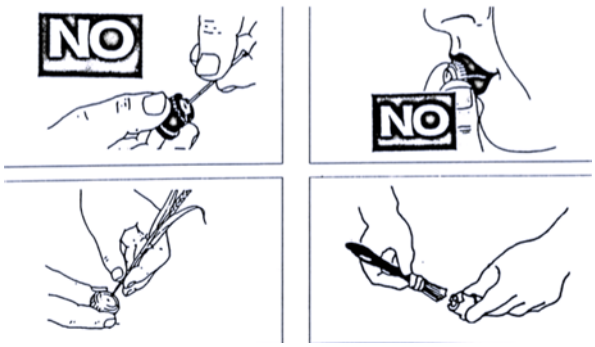


Fig. 5.4 How to clean a nozzle. Use a piece of grass rather than a nail.

Spraying herbicides

- Use a flat fan or anvil (also known as a flood) nozzle (Fig. 5.3)
- The pressure should be low
- Apply as a 'light rain'
- The droplets fall on the TOP of the leaves

- The droplets are larger than those of insecticides or fungicides, lowering the chance of drift and damage to crops

Spraying insecticides and fungicides

- Use a hollow cone nozzle (Fig. 5.3)
- The pressure should be high
- Apply as a mist
- The droplets are small forming a cloud
- They give better coverage as they flow AROUND the plant

The sprayer

- Check the straps. Are they worn? If they are, replace them
- Check the tank. Are there leaks? Put water in the sprayer, check when upright, on the side and upside down. Do not use if there are any leaks
- Check the handle. Open and close the trigger; it should start to spray and stop quickly
- Consult the PNG videos on 'Safe Use of Pesticides' for personal protective equipment (PPE) and maintenance of the sprayer

Personal protective equipment (PPE)

Remember that pesticides are poisons, so you must protect yourself when spraying. Ideally, you should wear the following:

- Lightweight overalls
- Gloves
- Boots
- Goggles, face mask and a cap

If you don't have all these, protect yourself with a **long-sleeved shirt and long trousers** used only for spraying, and boots and gloves. Wear the shirt over the gloves, and the trousers over the boots.

Making up sprays

Do not guess! Read the label, making sure that the concentration of spray is correct.

Example 1: Spraying cabbages with lambda cyhalothrin (the name of the product is *KARATE).*

The label tells you to add **10 mls *Karate* per 10 litres (L) of water** and apply at the rate of **400–500 ml per ha** (Fig. 5.5).

You have a 15 L knapsack sprayer, so you need 15 mls – about 3 teaspoons of *Karate*.

How much *Karate* spray should you spray on the cabbages?

1. Pace out the length and width of a bed of cabbages. Let's say the length is 25 m and the width is 4 m. The area is 100 m^2.

2. To find out how much *Karate* is needed for a 100 m^2 bed:
    - Divide the rate of Karate/ha by the number of m^2/ha and multiply by the area of the bed. Use the higher rate of 500 ml/ha.
    - 500/10000 x 100 = 5 ml.
    - Look at the label, this tells you to mix *Karate* at 10 ml/10 L water. So, for 5 ml you need 5 L water. This is the amount for a 100 m^2 bed.
    - Now, spray the 100 m^2 bed with 5 L **water**. (We use water first to test that you are walking at the right speed to deliver the right amount of spray).

Check:

- ✓ Did you spray more or less than 5 L?
- ✓ If you sprayed more, repeat with water at a slower pace.
- ✓ If you sprayed less, repeat with water at a faster pace.

3. When you have the correct pace, refill the tank with 15 L of water, add 15 ml *Karate*, shake the tank, and spray the cabbages on all the beds at the pace you selected from your tests.

   Now, spray the 100 m^2 bed with 5 L **water**. We use water first to make sure no *Karate* is wasted or overused.

Fig. 5.5 Amount of *Karate* per ha and rate per L in knapsack sprayer.

Example 2: Spraying tomatoes with chlorothalonil. The name of the product is *Eko*

The label tells you to add **34 ml of *Eko* per 20 L of water** (Fig. 5.6). But the label does not say how much *Eko* per ha. **Usually, for tomatoes, this is 1.8–2.3 L/ha.**

You have a 15 L knapsack sprayer, so you need 25 ml - about five Coca-Cola tops of *Eko*.

How much *Karate* spray should you spray on the tomatoes?

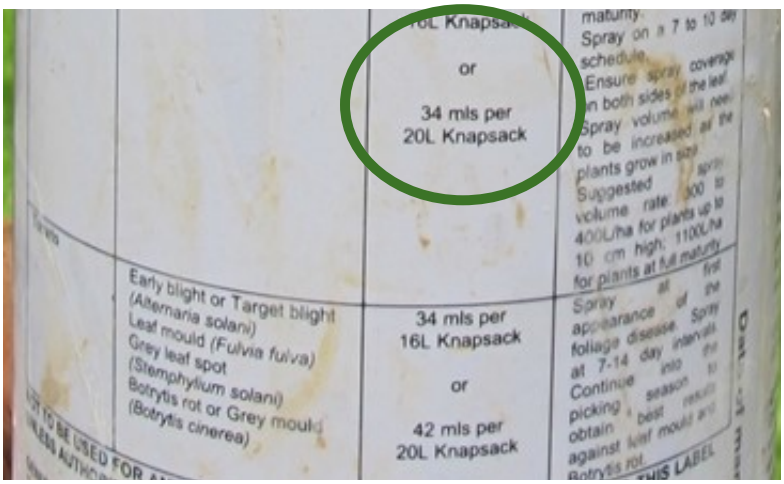


Fig. 5.6 Amount of *Eko* per 16 and 20 litre knapsack sprayers.

1. Pace out the length and width of a bed of tomatoes. Let's say the length is 25 m and the width is 4 m. The area is 100 m^2.

2. To find out how much *Eko* is needed for a 100 m^2 bed, do the following:
   - Divide Rate Eko/ha by number of m^2/ha and multiply by the area of the bed. Use the lower rate of 1800 ml/ha.
   - 1800/10000 x 100 = 18 ml.
   - Look at the label. This tells you to mix *Eko* at 34 ml/20 L water. So, for 18 ml you need 10.6 L water. This is the amount for a 100 m^2 bed.
   - Now, spray the 100 m^2 bed with 10.6 L **water**. (We use water first to test that you are walking at the right speed to deliver the right amount of spray).
   - Now, spray the 100 m^2 bed with 10.6 L of water.

   Check:

   ✓ Did you spray more or less than 10.6 L?
   ✓ If you sprayed more, repeat with water at a slower pace.
   ✓ If you sprayed less, repeat with water at a faster pace.

3. When you have the correct pace, refill the tank with 15 L of water, add 25 ml *Eko* (five *Coca-Cola* tops), shake the tank, and spray the tomatoes on all the beds at the

pace you selected from your tests. Later, when the plants are mature, increase the amount per bed to 14 L (this is the higher rate of 2300 ml/ha (see above).

A quick practical method for calibration

If extension staff and farmers find the methods of calibration too complicated, then do the following:

i) add water to the hydraulic knapsack sprayers (according to the volume of each machine)
ii) add insecticide or fungicide to the water according to the volume of sprayer and the size of bottle top chosen (Figs. 5.7, 5.8 and Table 5.3)
iii) spray crops to just before run-off as shown in the following section (5.4.2 and Fig. 5.10)

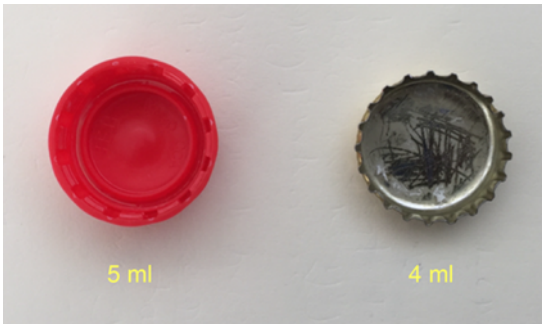


Fig. 5.7 Measuring pesticides (liquids): 5 ml Coca-Cola bottle top (left); 4 ml beer top (right).

The amounts of *KARATE* and *Eko* to add are given in Table 5.3.

Table 5.3 The number of bottle tops of *Karate* or *Eko* (capacity 5 ml or 4 ml) to add to three knapsack sprayers (10, 15 and 20 L water) to formulate the pesticides according to the manufacturer's instructions.

Volume of knapsack sprayer (L)	Total no. mls *Karate*	No. Coca-Cola 'tops'	No. beer 'tops'	Total no. mls *Eko*	No. Coca-Cola 'tops'	No. beer 'tops'
10	10	2	2 1/2	17	3 1/2	4
15	15	3	4	25	5	6
20	20	4	5	34	7	8

If you are using a pesticide that is a powder, then use the tops (lids) as either 2.5 g or 2 g measures. Calculate the number of tops required depending on:

i) the size of the top
ii) the volume of the knapsack
iii) the concentration indicated on the pesticide label (Fig. 5.8).

Fig. 5.8 Measuring pesticides (powders): 2.5 g (Coca-Cola bottle top (left); 2 g beer bottle top (right)

5.4.2 During spraying

Trainees should know that it is important to spray at the right time and during the right weather conditions. If this is not done, the crops will not be treated effectively, and there is a danger to health.

When is it best to spray?

Spray either early in the morning or late in the afternoon, when the wind is less strong. If it is windy, do not spray. If the wind is only light, spray down wind.

Always use a spray shield to prevent chemical drift!

For small plants (near the ground), e.g. cabbages, your sprayer should be fitted with a hollow cone nozzle, and you should spray 50 cm above the crop (Fig. 5.9).

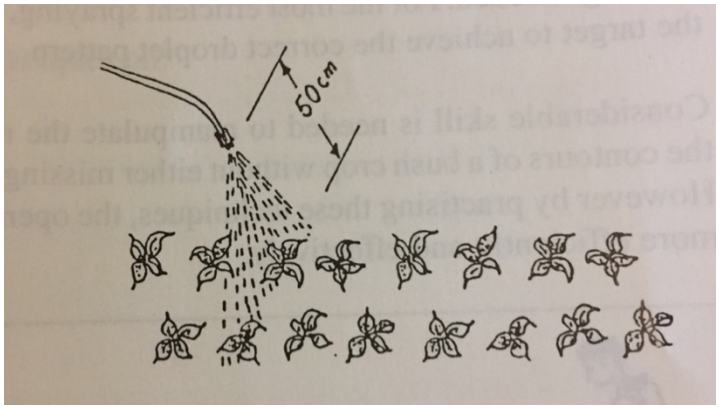


Fig. 5.9 How to spray cabbages or any low-growing plants from above. Keep the nozzle 50 cm above the crop.

When you have finished spraying, look at the leaves to check the way the droplets have landed. You want small droplets covering all the leaf. If you spray too much, the droplets come together and fall off the leaf (Fig. 5.10).

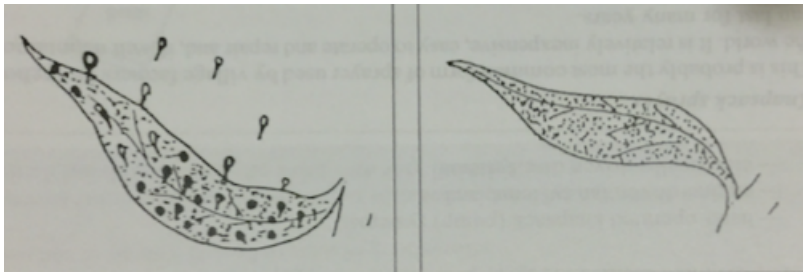


Fig. 5.10 Pattern of droplets on a leaf sprayed with too much pesticide run-off (left) and the correct amount (right)

For taller plants, e.g. tomatoes, your sprayer should be fitted with a hollow cone nozzle, and you should angle the lance sideways, moving it up and down and around the plants so that the spray covers both sides of all the leaves. Keep the nozzle about 50 cm from the plants as you spray (Fig. 5.11).

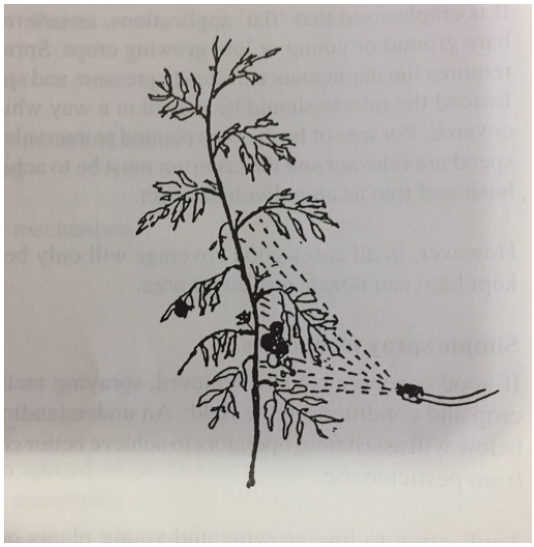


Fig. 5.11 How to spray tomatoes or any other bush from the side. Keep the nozzle 50 cm from the crop

If an accident happens, refer to the label. In case of a spill, cover the chemical with sand, sawdust or soil, and bury it away from the house at the edge of the garden or field

5.4.3 After spraying

- Clean the tank immediately after use so that the chemical does not dry on the inside
- Open the tank, remove the strainer, fill with 1.5 L of water, replace the cap and shake
- Pour onto an area that has been sprayed, or the ground nearby
- Add another 1.5 L of water and spray to clean the hose, lance and nozzle

After spraying, remove your clothes and shower. Wash the clothes separately from other clothing. And DO NOT eat or drink after spraying until you have washed.

EXERCISE 20: Making up a pesticide for spraying

Trainees should use the following information to determine how much pesticide is needed

- The pesticide label (*Eko*) tells you that you should apply *Eko* in **400 L of water per ha**.
- *Eko* is made up at **34 ml per 20 L sprayer** (see Fig. 5.6).
- The farmer has a **5 square chain tomato field**.
- Area: 5 square chains is equivalent to 0.2 ha (**25 sq chains = 1 ha, 5/25**)
- Spacing**: 0.5 m x 1 m.**
- The farmer has a **15 L** knapsack.

By themselves, trainees should answer the questions below:

1. **How many knapsack sprayers are needed to spray 1 ha of tomato?**

2. **How much (*Eko*) chemical will you need to spray 1 ha of tomato?**

3. **What advice would you give the farmer about the amount of chemical (*Eko*) … that he/she will use?**

4. **Check your answer with a partner and then discuss with the whole class.**

EXERCISE 21: Important factors in spraying

In pairs or small groups, trainees should write down at least four important things that they need to know before, during and after spraying. Discuss answers with the class.

Before spraying	1. 2. 3. 4.
During spraying	1. 2. 3. 4.
After spraying	1. 2. 3. 4.

5.5 Pesticides and organic farming

Organic farmers have a restricted range of pesticides they can use. This is because these farmers and their certifying bodies believe that many bought and even some home-made pesticides are harmful to humans, animals and the environment. Hence, some of the pesticides may not be as effective as bought ones, and not all have been scientifically tested.

Organic certification is carefully regulated. The Pacific Organic Standards (2008) are available at **https://lrd.spc.int/organic-pasifika-publications/cat_view/364-pacific-organic/369-pacific-organic-standard**. This document provides excellent information on organic farming in the Pacific region.

Some of the pesticide and growth regulators allowed in organic farming are listed and detailed in Table 5.4.

Table 5.4 Pesticides and growth regulator inputs allowed in organic farming.

Input	Purpose	Remarks
Chitin	Nematicide	
Coffee grounds	Insect repellent	Have a strong smell
Corn gluten meal	Pre-emergent herbicide	
Milk, casein	Fungicide	For powdery mildews
Gelatine	Insecticide	
Lecithin	Fungicide	
Vinegar	Herbicide, bactericide, fungicide	
Neem	Insecticide	
Castor oil	Rodenticide, insecticide, insect repellent, bird repellent	Care should be taken; it is very toxic
Grapefruit seed oil	Fungicide	
Chilli	Insecticide	
***Tithonia* (African sunflower)**		
Marigold (*Tagetes* species)	Insecticide and repellent of root knot nematodes	
Papain (from *Papaya*)	Thrips	
Jatropha	Insecticide, molluscicide	
Pongamia glabra	Insecticide	
Propolis	Insecticide	
Pyrethrum (Chrysanthemum cinerariaefolium)	Insecticide	The synergist (carrier) piperonyl butoxide used in commercial pesticides must not be used
Quassia (Quassia amara)	Insecticide	
Derris elliptica, Lonchocarpus spp., Tephrosia spp.) Rotenone	Insecticide	Studies show a (unconfirmed) link between rotenone and Parkinson's disease so use should be limited, and safety measures observed

Ryania (Ryania speciosa)	Insecticide	
Sabadilla	Insecticide	
Seaweed	Root diseases of sunflower and tomato	
Tobacco tea	Insecticide	Safety measures need be taken to reduce skin contact. Pure nicotine must not be used
Mineral clays (e.g. bentonite, vermiculite, perlite, zeolite)	Insecticide	Form a barrier to attack on the plant – used in orchards
Copper salts (e.g. sulphate, hydroxide, oxychloride, octanoate)	Fungicide, bactericide	Maximum 8 kg/ha copper per year (on a rolling average basis)
Light mineral oils (paraffin)	Insecticide, herbicide, fungicide	
Diatomaceous earth	Insecticide	
Lime sulfur (calcium polysulfide)	Fungicide	
Potassium bicarbonate	Fungicide	
Potassium permanganate	Fungicide, molluscicide, bactericide	
Quicklime silicates (e.g. sodium silicate, quartz)	Fungicide, molluscicide, bactericide	
Sodium bicarbonate	General post-harvest insecticide and fungicide for banana	
Sulfur	Insecticide, miticide, fungicide	
Fungal and bacterial preparations (e.g. *Bacillus thuringiensis*, Bt)	Insecticide	Used against caterpillars
Iron phosphate	molluscicide	
Calcium hydroxide	Fungicide, herbicide, bactericide	

Salt (sodium chloride)	Molluscicide, herbicide, insecticide, bactericide	
Sodium carbonate (washing soda)	Insecticide	Scale insects, mealy bugs, aphids, and mites
Soft soap	Insecticide	Scale insects, mealy bugs, aphids, and mites
Pheromones (in traps and dispensers only)	Insect traps	Traps for fruit-fly and substances as required by regulations are permitted

5.6 Pesticide resistance management

Some pests develop resistance to pesticides. This happens when the same pesticide is used repeatedly against the same pest in a crop. It is due to random genetic mutations that occur within the pest population; by chance, some of these mutations allow individuals to survive exposure to the pesticide and they multiply quickly, as there is little competition (Fig. 5.12). Soon, they become the dominant type.

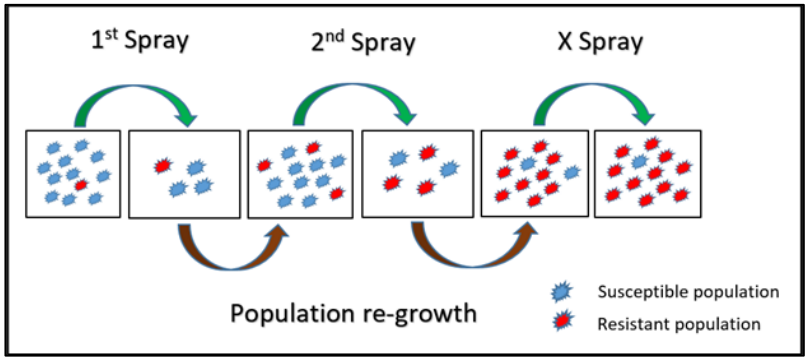


Fig. 5.12 Diagram showing how insect pest resistance to pesticides builds up.

Insecticides are grouped according to how they kill pests, i.e. their mode of action (MoA). The chances of a pest population becoming resistant to a pesticide can be reduced by making sure that a pesticide with the same MoA is not used repeatedly against successive generations of the pest. We must ensure that the pesticides used have different MoAs, as well as being the least harmful to natural enemies.

The 'Groups' mentioned in Fig. 5.13 (6, 11, 22 or 28 and 15) identify pesticides based on their chemical characteristics and the way in which they kill insects (ie their MoA). The trade names and common names are: Multiguard (abamectin); Ag Chem Bt (*Bacillus thuringiensis*); Prevathon (chlorantraniliprole); Steward (indoxacarb); and Match (lufenuron).

A critical feature of the approach is that insecticides that kill insects in different ways are rotated to slow the development of resistance. Fig. 5.13 shows how this strategy can be implemented to reduce the probability of the diamondback moth (DBM), a pest of cabbages, developing resistance to pesticides. In lowland regions of the Pacific islands, DBM can complete a generation (from egg to adult) in approximately 18 days. To make sure that successive generations are not exposed to the same type of insecticides, different insecticides should be used in the 'windows', as indicated in Fig. 5.13. In this strategy, Bt is used at the leafy stage, as this is the most sensitive stage of the crop. Bt has the added advantage that it is harmless to natural enemies.

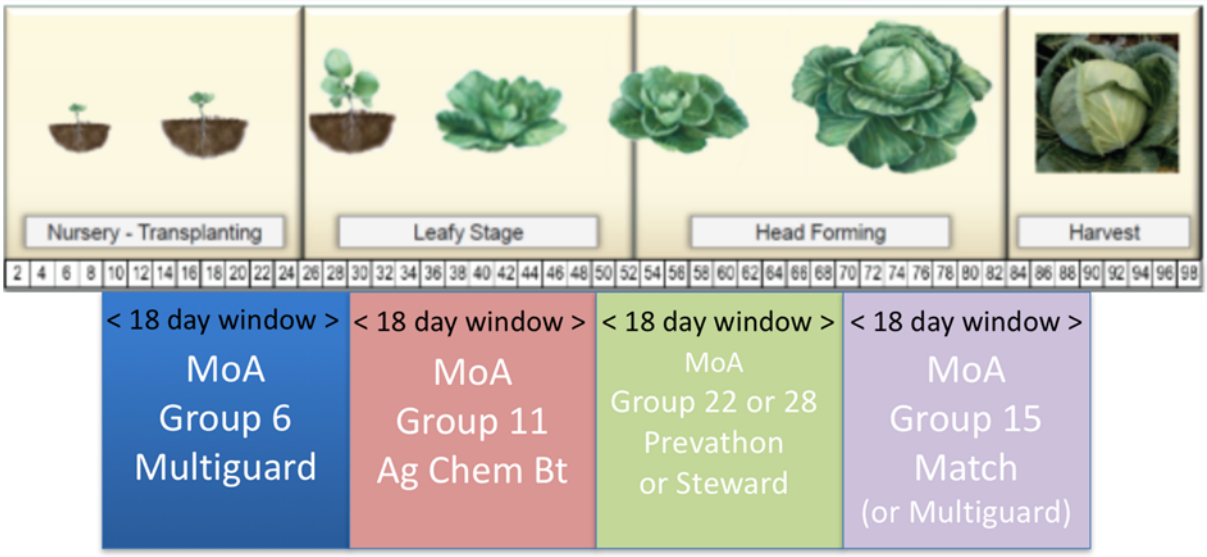


Fig. 5.13 Insecticide resistance management strategy for diamondback moth in the Pacific region, using pesticides with different ways of killing the pest (MoAs). Group 6 – avermectins (affect nerves (chloride channels)); Group 11 - *Bacillus thuringiensis* products (affect mid-gut of caterpillars); Group 15 - benzolureas (affect chitin synthesis in cuticle); Group 22 - oxadiazines (affect nerves (sodium channels)); Group 28 – diamides (affect muscle).

EXERCISE 22: Advantages and disadvantages of using pesticides

Trainees have now covered Chapters 4 and 5 on management of pests and diseases through cultural control and use of pesticides.

In pairs or small groups, they should discuss and write down what they now know about the advantages and disadvantages of using pesticides, compared with other methods included in IPDM.

An example is given below.

Advantages of using pesticides	Disadvantages of using pesticides	Safer alternatives
Example: • *They are cheap* •	• *They are toxic to beneficial insects* •	• *Crop rotation* •

EXERCISE 23: Using trainees' knowledge to identify and develop a management strategy for a farmer

Now that your trainees have studied the identification, diagnosis and management of pests and diseases, they need to put their knowledge into practice. Practice and experience are essential; becoming a competent plant health doctor is complicated and takes work! This is an important exercise, as it prepares your trainees for plant health clinics and is a good introduction to Chapter 6: Running a plant health clinic.

This exercise is in five parts. Allow your trainees plenty of time to work on it.

1. Identify and diagnose the problem
2. Ask the farmer questions about the problem
3. Manage the problem – make a plan
4. Completing the prescription form
5. Discuss and reflect

Trainees should work in pairs. Allocate two of the photos from Papua New Guinea highlands to each pair. The pictures show samples of problems a farmer might bring to a plant health clinic. The crops are:

- tomato (3 photos)
- zucchini (2 photos)
- Chinese cabbage (1 photo)
- cabbage - caterpillars (2 photos)
- cabbage - yellow spots (2 photos)

Part 1 – Identifying and diagnosing the problem

Trainees should now work through the process of identification and diagnosis of the problem in their photos. They should use all the information from the manual, Fact Sheets in the Pacific Pests, Pathogens & Weeds app, as well as their own experience.

Remind trainees to use the identification and diagnosing process in Chapter 2:

1. Is it A, B, or C? (Abiotic, Biotic or Confused)
2. Possible and Probable?
3. They should check with the feact sheets in the Pacific Pests, Pathogens & Weeds app ***only after they have done steps 1 and 2.***

Exercise 23 (PART 1)

TOMATO (i)

Exercise 23 (PART 1)

TOMATO (ii)

Exercise 23 (PART 1)

TOMATO (iii)

Exercise 23 (PART 1)

ZUCCHINI (i)

Exercise 23 (PART 1)

ZUCCHINI (ii)

Exercise 23 (PART 1)

CHINESE CABBAGE

Exercise 23 (PART 1)

CABBAGE (i)

Exercise 23 (PART 1)

CABBAGE (ii)

Exercise 23 (PART 1)

CABBAGE (iii) Black rot

Exercise 23 (PART 1)

CABBAGE (iii) Black rot (close up)

PART 2– Asking the farmer questions about the problem

As well as examining the sample, at a clinic, plant doctors will need to ask the farmer questions to provide more detail and information about the pest or disease.

1. Trainees should make a list of questions they would ask the farmer.
2. Each pair should now show the class their photos, read out their questions and discuss their diagnosis.

Part 3 – Managing the problem - making a plan

Next, trainees should discuss and write down all the different ways the problem could be managed, using:

- Biological control
  - Are there any natural enemies that are important to preserve which might be killed with some pesticides?
- Cultural control – what can be done?
  - Before planting
  - During growth
  - After harvest
- Resistant varieties
  - These can only be recommended if they are known to be available in the country
- Chemical control
  - Homemade pesticides
  - Commercial pesticides

Part 4 – Completing the prescription form

Trainees should now complete the plant health clinic prescription form. They can make up the farmer's details. Stress that they should fill in **ALL** parts, using clear handwriting.

Part 5 – Discussion and reflection

Discuss and reflect on the exercise as a class. What worked well? What is difficult to do? What can be done better? What training is still needed?

This exercise should now be repeated using real samples from a garden or field. Practice is essential!

The Plant Health Clinic Prescription Form

CLINIC

Date: ☐ Fiji ☐ Samoa ☐ Solomon Islands ☐ Tonga Code:

FARMER

Family Name: Given Names: Sex: M☐ F☐

Village/Settlement: Province: Mobile:

Clinic visit: 1st ☐ 2nd ☐ 3rd ☐ other: Age: < 29 ☐ 30-55 ☐ > 56 ☐ Sample: Yes☐ No☐

CROP

Crop: Estimate planted area (m²):

Variety: Estimate no. of plants:

Seed source: Estimate no. of plants damaged: Few ☐ Many ☐ All ☐

Previous crop: Plant problem: Common ☐ New ☐

Crop stage: Weather: Normal ☐ Wet ☐ Dry ☐ Unusual ☐

DESCRIBE WHAT YOU SEE (if no sample, write what the farmer tells you)

WHAT CONTROL MEASURES HAS THE FARMER TRIED?

WHAT DO YOU THINK THE PROBLEM IS?

YOUR RECOMMENDATIONS

What can the farmer do now?

Cultural control Chemical control

What can the farmer do in future (when growing the same crop)?

Cultural control Chemical control

Before planting: Any resistance varieties?

During growth

After harvest:

Photo(s) taken: Yes ☐ No ☐ Sample sent to lab? Yes ☐No ☐

Plant doctor: Signature: Mobile no.:

END OF CHAPTER 5 QUIZ: Test your knowledge

Multiple choice. Pick one answer only.

1. Which of the following are all fungicides?

A. Manzate, milk, baking soda, malathion
B. Sundomil, Kotek, Kocide, Talendo
C. Glyphosate, neem, Blitzem, pyrethrum
D. Confidor, Orthene, Bt, Manzate

2. A sprayer nozzle suitable for fungicides should:

A. be an anvil type and the spray should form a light rain.
B. be a flat type and the spray should form a mist.
C. be a hollow cone type and the spray should form a mist.
D. be a flat type and the spray should form a cloud.

3. A pesticide label says that it should be made up at a concentration of 10 ml pesticide to 10 L water. The concentration of the pesticide is:

A. 10%.
B. 1%.
C. 0.1%.
D. 0.01%.

4. A farmer has 10 ha of a crop to be sprayed. The pesticide label tells her that the spray should be 30 ml pesticide per 20 L water and the crop should receive 400 L per ha. How many ml of the pesticide should she use to make up the spray to spray the whole crop properly?

A. 4000 ml
B. 600 ml
C. 6000 ml
D. 2400 ml

5. Buildup of insecticide resistance in a pest can be prevented by:

A. alternating the spraying between an insecticide and a fungicide.
B. spraying early in the morning.
C. using the correct type of nozzle for spraying.
D. making sure the same type of insecticide is not used all the time.

6. Which of these pesticides are not allowed in organic farming?

A. copper fungicides
B. tobacco
C. castor oil
D. glyphosate

7. Which action should you NOT do if you accidently spill some pesticide?

A. cover the area with sand.
B. make sure you wash yourself and your clothes thoroughly.
C. get the dog to lick it up.
D. keep children away from the spill.

8. Pesticide resistance in insects is caused by:

A. a genetic mutation that is passed on to new generations of the insect.
B. a fungicide being used by mistake.
C. a virus getting into the insect.
D. using the wrong crop rotation.

9. Which of the following information is NOT usually found on a pesticide label?

A. the type of product
B. which pests are resistant to it
C. what it contains
D. what crops it may be used on

10. An emulsifiable concentrate:

A. is the same as a wettable powder.
B. is incompatible with all other pesticides.
C. cannot be mixed with water.
D. forms a milky liquid when mixed with water.

11. A pesticide withholding period means:

A. how long before it is safe to enter the crop after spraying.
B. the period during which animals are not allowed to graze on the crop at any time.
C. the number of days between the last application of a pesticide and crop harvest.
D. how long before a pesticide is allowed into a country.

12. Copper can be used to control:

A. phytoplasmas and viruses.
B. nematodes and mites.
C. snails and insects.
D. bacteria and fungi.

13. Pests in a small farm or garden are best controlled by:

A. ignoring them.
B. using pesticides as soon as they are seen.
C. encouraging beneficial insects and spiders.
D. using insecticides and fungicides weekly.

14. Pesticides allowed in organic farming:

A. come only from plants.
B. are the same as commercial pesticides only weaker.
C. are controlled under organic standards.
D. Are always safe.