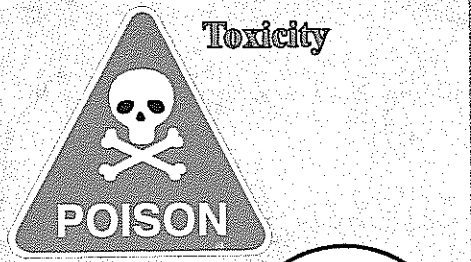
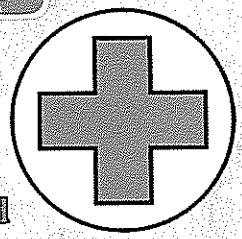
POISONS & PESTICIDES

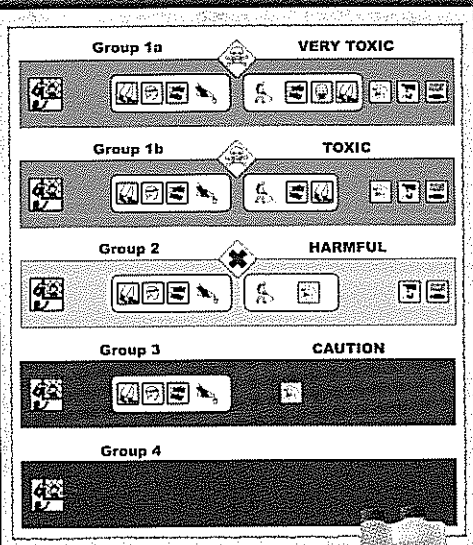
A guide to safe use

Protect yourself!

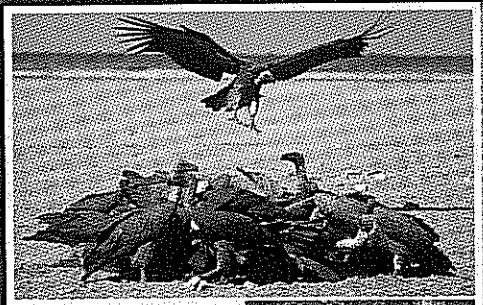




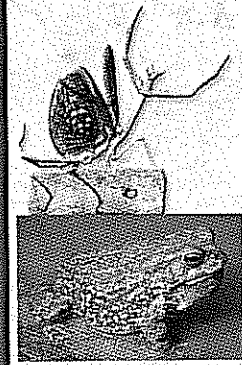
First-aid



Read the label!



Protect us!



The negative effects of chemical pesticide contamination and the positive consideration for the natural environment are increasingly important to world travellers and investors. In contrast to many other countries, Namibia remains relatively free of contamination. This situation, if maintained, is sure to prove of future advantage to the economy of the country.

However, besides the above positive statement on general contamination, serious repercussions of illegal, uninformed and indiscriminate use of pesticides have already led Namibia to wildlife population declines and local extinction, most notable have been oxpeckers and vultures.

This booklet aims to provide a basic understanding of pesticides, with specific reference to chemicals most implicated in wildlife poisoning events and to the symptoms of and treatment for poisoned wildlife.

Contents

This booklet has been made possible by:

Namibia Bird Club

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RAPTORS NAMIBIA
Working together to conserve our birds of prey!

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Knowing about pesticides

Pesticides are chemical substances or compounds manufactured as agricultural remedies to manage specific pests. They include many types of compounds that can be broadly toxic to living systems.

Pesticide are grouped or classified in different ways

Grouped by ***general use*:**

Pesticide Group	General Use
Insecticide	Kills insects
Nematicide	Kills nematodes (round worms)
Miticide	Kills mites
Ascaricide	Kills ticks
Rodenticide	Kills rodents (mice, rats and gerbils)
Fungicide	Kills fungi
Herbicide	Kills plants
Molluscicide	Kills molluscs e.g. snails
Repellent	Repels pests

Grouped by ***mode of action*:**

Oral/stomach poison kills the organism that eats the poison
Contact/dermal poison kills the organism through direct skin contact
Systemic poison is absorbed by an organism and kills other organisms in the host
Inhalation poison/fumigant kills an organism by being "breathed-in" or by vapours that are absorbed across membranes

Each **mode of action** has relative advantages and disadvantages and different efficacy on particular groups or stages of an organism.

Grouped by ***chemical composition***:

Biological Pesticides	These are living organisms (or their spores) that cause disease in the target pest.
Inorganic Compounds	These do not contain carbon and are usually derived from mineral ores extracted from the earth.
Organic Compounds	These contain carbon atoms in their chemical structure. They can be divided into various classes of chemicals. Each chemical class can have chemical compounds with some common characteristics. Any one class may contain insecticides, herbicides and fungicides.

Organic chemical compounds can be further classified into different **chemical classes** for example, pyrethroids, organophosphates, carbamates. Within each **chemical class** there may be many different types of **active ingredients**. The active ingredient is **formulated** for field application to manage a specific pest.

Grouped by ***formulation***:

SC	Suspension Concentrate	A dispersion of a liquid in a liquid
EC	Emulsifiable Concentrate	A dispersion of globules in a liquid
SL	Soluble Concentrate	Dissolved solid, liquid, or gaseous substance (usually) into a liquid
WG	Water Dispersible	Granules to be diluted in water
WP	Wettable Powder	Fine dry pesticide formulation that can be suspended in water
SP	Soluble Powder	Powder to be diluted in water
DP	Dustable Powder	Dry powder of toxicant and inert ingredients
GR	Granules	Ready to use solid particles
UL	Flowable Concentrates	Concentrated suspension that can be diluted with water
FS	Seed Treatment	For treatment of seed only

The **formulation** is shown on the product label. (See page 6.)

Toxicity and poisoning

How toxicity of a chemical is described

Before a pesticide is registered, the formulated active ingredient is measured for toxicity to mammals (including humans). This test, on laboratory rats, determines how many milligrams/kilogram will kill half or 50% of the experimental population. The result of the test, the LD50, is shown in mg/kg on the package.Three types of exposures are measured, **oral LD50**, **dermal LD50** and **inhalation LD50**.

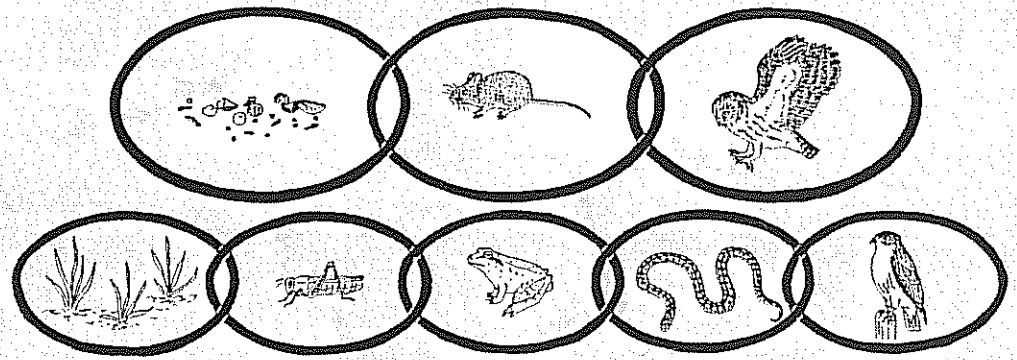
A *broad spectrum* pesticide kills lots of different organisms within its category. A *narrow spectrum* pesticide affects a narrower range of organisms. Even narrow spectrum chemicals can kill *non-target*, unintentional, victims. **Bees, birds, fish and other aquatic organisms are generally more sensitive to toxins than mammals.** Both broad and narrow spectrum pesticides can cause acute or chronic poisoning.

Acute poisoning results from a single pesticide exposure. A high LD50 means it would take more of the pesticide to kill in one exposure. Therefore, high LD50 values are safer than low ones for acute toxicity.

Chronic poisoning results from long-term exposure, or exposure to multiple pesticides. Effects can be carcinogenic (causes cancer), or teratogenic (causes birth defects), or mutagenic (causes genetic mutations).

Primary and secondary poisoning

Pesticides enter the food chain. An organism that eats, contacts or inhales a pesticide product can become ill or die as a **primary victim** of the product. A **secondary victim** is any other organism that eats or contacts the primary victim and becomes ill or dies. Secondary poisoning depends on the type and amount of active ingredient in the primary victim.



Bio-accumulation

Food chains can have many links or only a few. Some chemical poisons bio-accumulate for e.g. a bird of prey gets a little poison from each poisoned prey animal that it eats until a lethal dose is reached.

Symptoms of poisoning

Mild poisoning is like a *spell of flu;* headache, fatigue, skin irritation, loss of appetite, dizziness, weakness, nervousness, nausea, perspiration, diarrhoea, eye irritation, insomnia, thirst, restlessness, irritation of nose and throat, soreness of joints, changes of mood.

Moderate poisoning may be the beginning of severe symptoms; nausea, trembling, muscular incoordination, excessive salivation, blurring of vision, feeling of constriction in the throat and chest, difficulty in breathing, flushed or yellow skin, abdominal cramps, vomiting, diarrhoea, mental confusion, twitching of muscles, weeping, excessive perspiration, profound weakness, rapid pulse, persistent cough.

Severe poisoning can include the following; vomiting, loss of reflexes, inability to breathe, uncontrollable muscular twitching, constriction of pupils (to pinpoint pupils), convulsions, unconsciousness, severe secretion from respiratory tract, fever, thirst, increased rate of breathing.

If the pesticide is an organophosphate or carbamate and the patient's symptoms are severe, a medical or veterinary practioner will inject massive doses of atropine every 15-30 minutes until signs of atropinization occur. Atropine is not given in cases of inadequate respiration or to an unconscious patient.

Prevention is better than emergency treatment!

ALWAYS TAKE THE LABEL OR CONTAINER TO THE CLINIC OR HOSPITAL.

Basic first-aid

READ THE LABEL to apply first-aid in an emergency situation.

Pesticides can cause illness and they can kill. Their great usefulness rests on their ability to interrupt the life processes of insects, fungi, rodents or plants. But many toxic chemicals can have dangerous effects on humans and other non-target animals.

If breathing is very weak or has ceased:

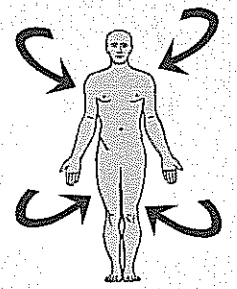
- Give artificial respiration. Artificial respiration takes precedence over all other first aid

If pesticide has been swallowed:

- Do not make the patient vomit unless the label says so
- For vomiting give 1 or 2 glasses of water then touch the back of the throat with a gloved finger
- Keep the head in a down position to prevent aspiration of vomit
- Do not give anything by mouth to a person who is unconscious, or having convulsions

If the pesticide is splashed in the eye:

- Wash the eye with water immediately
- Use large amounts of clean water to gently irrigate the eye for at least 15 minutes
- Seek medical attention if irritation or any other symptoms persist



If the pesticide is spilled on the skin:

- Remove all contaminated clothing
- Wash the skin thoroughly with plenty of soap, preferably under a shower
- Clean under finger and toenails
- Wear rubber gloves while washing pesticide from skin or hair of a poisoned person or animal
- Cover the patient with clean clothing or a clean blanket

If convulsions occur:

- Keep patient warm, dry and in a very quiet place
- Use gentle restraint to prevent injury

If unconsciousness occurs:

- Ensure patient can breathe adequately (may need to pull tongue forward to prevent the throat blocking)
- Keep patient warm and dry
- Do not give anything by mouth to an unconscious person or animal

The label on the product

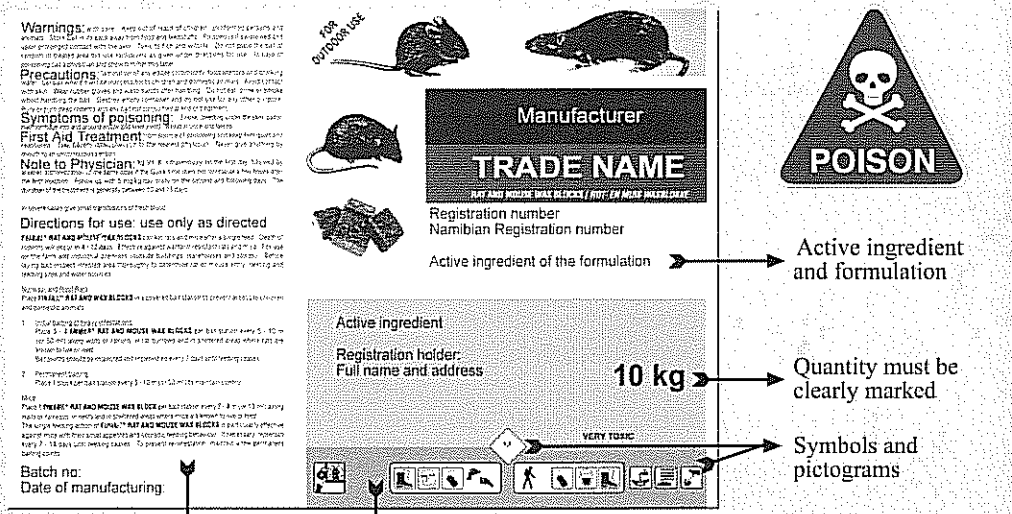
Trade names and registration numbers

The **trade name** is the name given by the manufacturer to their product. Every traded pesticide has a registration number. Registration of pesticides is the responsibility of The Registrar, Ministry of Agriculture Water and Forestry.

The label on the container gives important information about how to use the pesticide effectively and safely.

Read the label before you:

- buy poisons and pesticides
- store poisons and pesticides
- use poisons and pesticides
- dispose of the empty container



Active ingredient and formulation

Quantity must be clearly marked

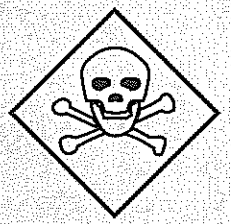
Symbols and pictograms

Warnings
Precautions
Symptoms of Poisoning
First-aid Treatment
Directions for use
Expiry date

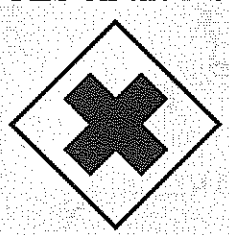
Colour coding shows toxicity:

Red:	Group 1a	- VERY TOXIC
Red:	Group 1b	- TOXIC
Yellow:	Group 2	- HARMFUL
Blue:	Group 3	- CAUTION
Green:	Group 4	- HANDLE WITH CARE

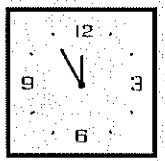
Understanding the SYMBOLS on the label



VERY TOXIC / TOXIC

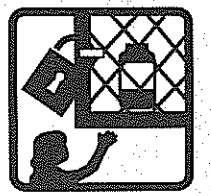


HARMFUL



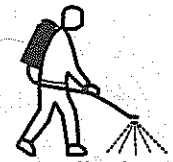
EXPIRY DATE

Understanding the PICTOGRAMS on the label



Keep the product locked away from children and uniformed people.

Application and handling:

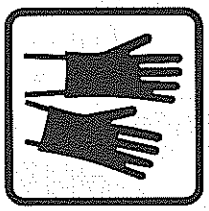


Application

Handling dry concentrate

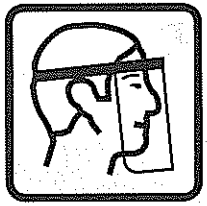
Handling liquid concentrate

Health and safety:



Wear gloves

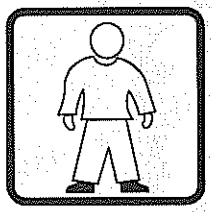
Wear protection over nose and mouth



Wear eye protection

Wear a respirator

Wear boots

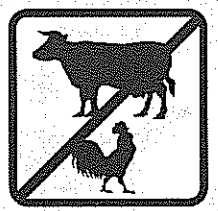


Wear overalls

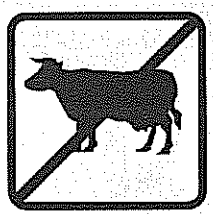
Wear an apron

Wash after use

Animals and environment:

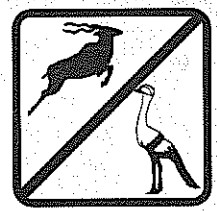


Dangerous/harmful to livestock & poultry



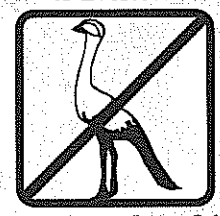
Dangerous/harmful to livestock

Dangerous/harmful to poultry

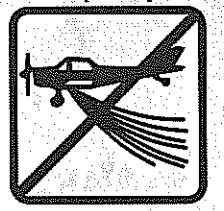


Dangerous/harmful to wildlife & birds

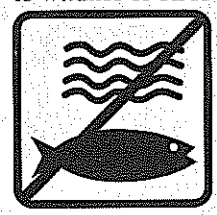
Dangerous/harmful to wildlife



Dangerous/harmful to birds



Not for aerial application



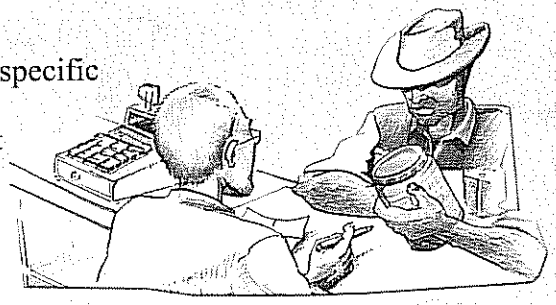
Dangerous/harmful to fish & water bodies

Buying, transporting and storing pesticides

Before buying

- First identify the pest
- Check for alternative methods of pest control

When buying



- Buy a narrow spectrum product specific to the pest
- Only buy what is needed for that season or application
- Never buy products with damaged packaging or damaged labels
- Never buy products that are not in their original containers

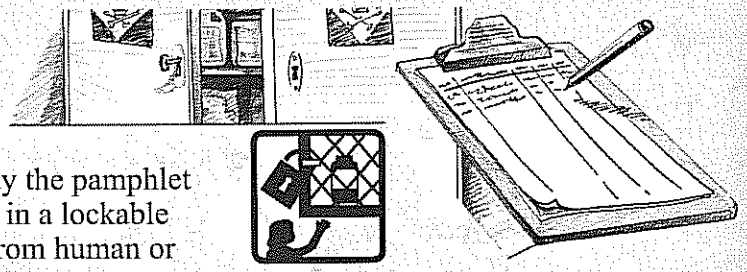
READ THE LABEL

When transporting

- Separate pesticides from people and animals
- Separate from food, drinks and clothing
- Separate pesticides from animal feeds
- Secure the load to avoid spillage
- Transport small bottles in boxes or strong plastic bags
- Check for sharp objects that may damage the packaging

READ THE LABEL

When storing



- Never throw away the pamphlet
- Put all pesticides in a lockable cupboard away from human or animal food
- Organize the store according to toxicity (red, yellow, blue and green labels)
- Organize the store into types (insecticides, herbicides etc…)
- Organize the store according to product's expiry dates
- Keep a register of the date of purchase, date of use and amount used
- Never store pesticides near petrol or other flammable products
- Inspect the store regularly for spills, broken containers and leakages
- Store pesticides in the original container

READ THE LABEL

Mixing and applying pesticides

Before you start, READ THE LABEL ON THE CONTAINER

On the label you will find the formulation, the mixing and application instructions and what to do in case of accidental inhalation or contact with the pesticide

When mixing

- Wear eye protection, rubber gloves, rubber boots
- Make sure you have all the mixing tools ready, e.g. a bucket, measuring cup and stirring paddle - **never use wood for stirring**
- Make sure you have equipment ready to cleanup accidental spills, e.g. a bucket with clean sand or wood dust and a disposable broom
  Always clean up spills immediately!
- Open and mix poisons and pesticides outdoors or in a well-ventilated space
- Measure accurately
- Mix only the amount you will use
- Keep other people, children and animals away

READ THE LABEL

When applying

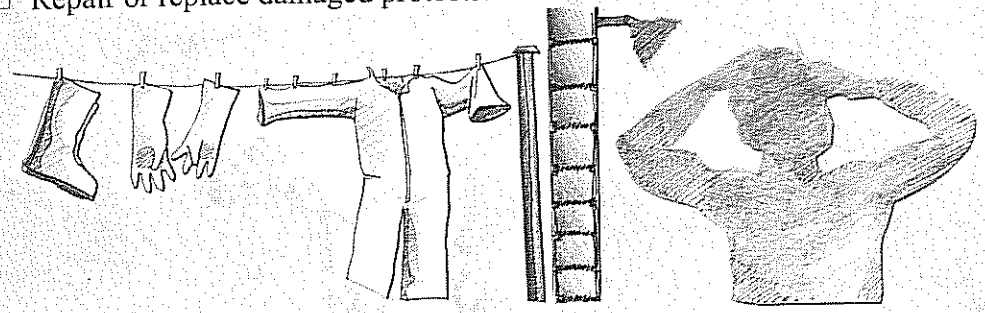
- Wear protective clothing:
  eye protection, dust mask for nose and mouth, rubber gloves, rubber boots, overall with long sleeves and a PVC apron
- Do not apply when it is windy
- Do not apply if heavy rainfall is anticipated
- Never smoke, drink or eat while handling a pesticide
- Always keep other people, children and pets away from treated areas
- Never apply more than is stated on the label

READ THE LABEL

What to do after applying pesticides

People

- Shower or wash immediately after handling a pesticide
- Separate protective clothing for washing
- Wash the clothing with soap or detergent after each use
- Wash rubber boots and gloves inside and outside
- Dispose of washing water away from children, animals and any other water
- Dry safety-wear completely before you look for damage to any item
- Repair or replace damaged protective wear



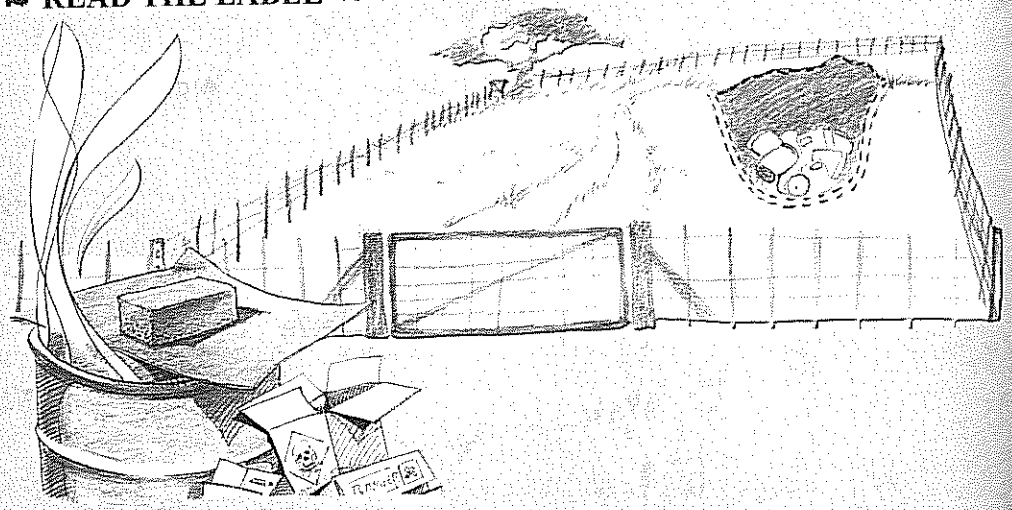
The container

Never use an empty poison, pesticide or chemical container for any other purpose. Do not dump empty containers, someone may find them and use them.

How to dispose of empty containers

- Paper and cardboard containers can be burnt in hot fires
- Plastic and metal containers must be punctured to prevent further use
- Punctured containers can be buried in a fenced-off area, away from people, animals and water sources

READ THE LABEL



Namibia's wildlife threatened by pesticide use

A major threat to wildlife from pesticide use is in the number of non-target victims that are poisoned. The chemical classes and active ingredients listed in the tables (pages 12-17) are highly toxic to wildlife.

Wildlife most at risk include:

- Scavenging diurnal (day) birds of prey, vultures, some eagles, falcons etc.
- Nocturnal (night) birds of prey, both rodent and insect-eating owl species
- Non-target mammals such as aardwolf, hedgehog, pangolins
- Insect-eating garden birds
- Cranes, game-birds and waterbirds
- Useful insects such as honeybees, dung beetles, praying mantis, ladybirds
- Amphibians and fish

To minimize the risk to non-target species from pesticides

- ✔ Apply Integrated Pest Management (IPM).
- ✔ Identify the pest correctly.
- ✔ Understand the basic life cycle of the pest.
- ✔ Consider all alternative and complimentary methods to secure the crop.
- ✔ Both toxicity and exposure are eliminated if you choose not to use a pesticide as one of the IPM tactics.

Safe, responsible and legal use of pesticides

Poisons and pesticides serve a useful purpose, protecting crops or animals from pests. Because pesticides can harm people, animals and environments, international and national codes and prescribed practices are used for the registration, transport, storage, sales, end-use and disposal of pesticides.

National legislation governing pesticides, hazardous chemicals, pollution and killing of protected species in Namibia

- Hazardous Substances Ordinance 14 of 1974
- Fertilizers, Farm Feeds, Agricultural & Stock Remedies Act 36 of 1947
- Nature Conservation Ordinance 4 of 1975
- Medicines and Related Substances Act 101 of 1965
- Veterinary and Para-veterinary Professions Proclamation 14 of 1984

Table 1 - The pesticides implicated in most wildlife poisoning events

General use	Common trade names	Active ingredients	Physical appearance	Specific notes
		Organochlorines		
Insecticides	Aldrin Bexadust Blue Death DDT Dieldrin Dyant Endosulfan Lindane	Aldrin DDT Dieldrin Endosulfan γ-BHC	White powder dustable or wettable	Registered for use against malarial vector species only (Ministry of Health and Social Services)
		Organophosphates		
Garden and agricultural products Used in: animal dips Insecticides Nematicides	Aphicide Azodrin Baythion Dazzle Disnis Dursban Folidol Folithion Lebaycid Lujet Monostem Metasystox Nemacur Nuvacron Queletox Rogor	Chlorpiriphos Cudasaphos Diazinon Dichlorvos Dimethoate Fenamiphos Fenthion Fenitrothion Methmidophos Monocrotophos Oxdemeton-methyl Parathion Phorate Triazophos	Oily liquids Wettable powders Dustable powders	Has a pungent odour Common garden, orchard and nursery pesticides Often used off-label **Very toxic** for all birds in primary and secondary poisoning **Very toxic** for all amphibians
		Carbamates		
Insecticides Nematicides	Temik Sanacarb	Aldicarb	Tiny grey granules (like poppy seeds)	Common garden, orchard and nursery pesticides
Insecticides Nematicides Poison collars used on small livestock	Agriterr Alfuran Curaterr Ficam Furadan Oncol	Carbofuran Bendiocarb Benfuracarb	Blue powder (like washing powder) Liquids	**Very toxic** for all birds in primary and secondary poisoning Poisoning of scavenging birds of prey
		Strychnine		
Lethal control registered for mammalian livestock predators	Strychnine	Strychnine Strychnine hydrochloride	Crystalline powder, white, pinkish or blueish	Available on perscription **Highly toxic** primary and secondary poison
		Chloronicotinyl		
Insecticide	Gaucho	Imidacloprid	Wettable powder	**High primary** toxicity to birds

Table 1 - continued

General use	Common trade names	Active ingredients	Physical appearance	Specific notes
		Monofluoroacetate (1080)		
Lethal control of mammalian predators	No trade or common names	Sodium monoflouro-acetate	White crystalline powder Poison collars used on small livestock	**Not currently registered for use in Namibia**
		Arsenic		
Obsolete insecticides Stock dips and stimulants Herbicides	Agromate Bueno 6 Cooper's Dip MSMA Masma	Arsenic trioxide Arsenic pentoxide MSMA	White or yellow powder Liquid	Seldom used in modern pesticides
		Heavy metals		
	No agrochemical products Batteries, paints, putty, petrol, sinkers, solder and shot	Lead	Shiny grey metal shot and bullets White salts	**Contaminates and poisons water** Lead can cause secondary poisoning
		Anti-coagulants		
Lethal control of rodents	Droot Finale Klerat Rattex Ridak Scientific-Supakill Storm Tornado	Brodifacoum Bromadialone Chlorophacinone Difenacoum Defethialone Warfarin/sulpha-quinoxaline	Blocks or granules, blue, red or pink Liquid blue	**Highly toxic** primary and secondary poison for birds, especially owls
		Barbiturates		
Euthanasia, sedatives and narcotics	Euthanaze Euthapent		Liquid, blue or green	A schedule 7 injectable substance with lethal secondary effects
		Urea		
Ruminant feed supplements/licks Fertilizers	Urea Chocolate mielies		White crystalline nodules	Implicated in poisoning of livestock
		Avian botulism		
		Botulism toxin Types A, C and D Especially Type C	Occurs during late hot dry summer months	A natural toxin in old carcasses, drying mudflats and water-pans

Table 2 - Survival prognosis for a poisoned animal

Survival prognosis in primary oral poisoning	Where an animal will be found after primary oral poisoning	Survival prognosis in secondary oral poisoning or primary dermal poisoning	Where an animal will be found after secondary oral poisoning or primary dermal poisoning	Some clues at the source of poisoning
		Organochlorines		
Reasonable to poor	Far from the source of poisoning	Reasonable to good	Very far from the source of poisoning	White powder on bats, dead insects
		Organophosphates		
Poor to extremely poor	At the source of poisoning	Depends on the product Poor to very poor for dermal contact Reasonable to very poor for secondary poisoning	At the source of poison in severe cases At roosts or at water in mild cases	Dead insects, small birds and reptiles on the baits Common use for citrus and garden Typical pungent smell from poison
		Carbamates		
Extremely poor	At source of poisoning (Aldicarb) Away from source of poisoning (Carbofuran)	Reasonable to fairly poor for secondary poisoning	At source of poisoning (Aldicarb) At the primary victim's carcass or at roosts (Carbofuran)	Visible grey granules or blue powder Often around citrus trees, plant nurseries and recently treated crops All organisms including insects dead around poisoned bait
		Strychnine		
Very poor	At the source of poison with high doses	Poor Not applicable for dermal use	Away from source of poisoning Birds are often at roosts or at water	No dead insects Dead carnivores (birds and mammals) Regurgitated meat
		Monofluoroacetate (1080)		
Extremely poor for mammals Reasonable for birds	Far from source, often at water	Good prognosis for secondary poisoning in birds Not applicable for dermal contact	Far from source, often at water	No dead insects

Table 2 - continued

Survival prognosis in primary oral poisoning	Where an animal will be found after primary oral poisoning	Survival prognosis in secondary oral poisoning or primary dermal poisoning	Where an animal will be found after secondary oral poisoning or primary dermal poisoning	Some clues at the source of poisoning
		Arsenic		
Reasonable	Far from the source of poisoning	Good Little chance of dermal exposure	Very far from the source of poisoning	Yellowish powder on baits Dead insects
		Heavy metals		
Reasonable after oral ingestion	Far from source, often at water	Not applicable for dermal contact	Not applicable	Any product using lead Contaminated water
		Anti-coagulants / Rodenticides		
Poor to extremely poor	Anywhere	Poor Not applicable for dermal contact	Anywhere, often near water	Dead rodents Rodent baits
		Chloronicotinyl		
Very poor	Near the source of poisoning	Reasonable Not applicable for dermal contact	Anywhere	Soaked seeds
		Barbiturates		
Very poor	At the source of poisoning	Poor for oral ingestion Not applicable for dermal contact	Far from the source of poisoning	Injected lethal dose to intended victim (usually pet animal)
		Urea		
Poor	At the source of poisoning	Not applicable	Not applicable	Fertilizer use Supplementary licks for ruminants
		Avian botulism		
Extremely poor	At the source of poisoning - stale water and old carcasses	Poor Not applicable for dermal contact	At the source of poisoning - stale water and old carcasses	Dried or drying water source and/or water plants Maggots

Table 3 - Clinical symptoms and treatment of poisoned animals

Clinical symptoms of a poisoned animal	Immediate treatment	Treatment by veterinarian	Trade names of often used pesticides
Organochlorines			
Twitching and spasm Body tremors Nausea, vomiting Skin irritation Stiff gait Ataxia	Ringer's lactate orally at 1% of body weight every hour For dermal contact, wash the exposed skin with soap and cold water	Diazepam or Xylazine or Medetomidine Activated charcoal therapy Saline purgatives Gastric lavage Cortisone topical preparations	Aldrin Blue Death DDT Dieldrin Dyant Endosulfan Bexadust Lindane Thioflo
Organophosphates			
Disorientated Spastic paralysis of legs (and head) Wings (and head) still moving Pupils constricting and dilating Eyes opaque Frothing at the mouth Mucous around gape Bradycardia Cyanosis	Ringer's lactate orally at 1% of body weight every hour Keep patient very quiet in dark surroundings Activated charcoal therapy For dermal contact, wash the exposed skin with soap and cold water	Atropine Sulphate (0,5-1 mg/kg) 2-PAM or Toxogonin Activated charcoal therapy Gastric lavage	Aphicide Azodrin Baythion Dazzle Disnis Dursban Folidol Folithion Lebaycid Lujet Monostem Metasystox Nemacur Nuvacron Queletox Rogor
Carbamates - Aldicarb & Carbofuran			
Disorientated General paralysis Pupils constricting and dilating	Ringer's lactate orally at 1% of body weight every hour Activated charcoal therapy For dermal contact, wash the exposed skin with soap and cold water	Atropine sulphate (0,5-1 mg/kg) Activated charcoal therapy (No 2-PAM or Toxogonin)	Temik Sanacarb Curaterr Agriterr Alvuran Furadan Ficam Oncol
Strychnine			
Frothing Severe convulsions Hypersensitive Pupils normal to dilated Apnoea	Administer Ringer's lactate orally at 1% of body weight every hour Keep patient very quiet in dark surroundings	Diazepam or Medetomidine for control of convulsions Gastric lavage Diluted potassium permanganate	Strychnine (No other trade name)

Table 3 - continued

Clinical symptoms of a poisoned animal	Immediate treatment	Treatment by veterinarian	Trade names of often used pesticides
Monofluoroacetate (1080)			
Total lethargy Head hanging	Give **no** liquids! Keep animal quiet and cool	Induce regurgitation No antidotes available Ca-gluconate	No trade name or common names
Arsenic			
Abdominal pain Regurgitation Watery diarrhoea Bloody diarrhoea Dehydration	Administer Ringer's lactate orally at 1% of body weight every hour Activated charcoal therapy Wash the exposed skin with soap and cold water	Activated charcoal therapy Sodium sulphate Electrolyte therapy	Bueno 6 Cooper's Dip MSMA Masma Agromate
Heavy metals			
Head tremors General lethargy Anaemia Blindness	Administer Ringer's lactate orally	Chelate with Na-EDTA Vitamin B1	No agrochemical products Batteries, paints, putty, petrol, sinkers, solder
Anti-coagulants / Rodenticides			
Lethargy Nausea Anaemia Haemorrhaging Blood in faeces	Vitamin K1 treatment for prolonged periods	Vitamin K1 treatment for prolonged periods Blood transfusion	Droot Finale Klerat Rattex Ridak Scientific-Supakill Storm Tornado
Barbiturates			
Sedated Hypothermic	Keep patient warm Check hydration levels	Respiratory and cardiac support	Euthanaze Euthapent
Urea			
Paralysis Haemorrhage of mucous membranes	Administer Ringer's lactate orally at 1% of body weight every hour	Sodium thiosulphate	Fertilizers Ruminant licks
Avian botulism			
Flaccid paralysis (limber-neck) Diarrhoea	Administer Ringer's lactate orally	Sodium sulphate Anti-sera Lincomycin Spiramycin	

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local office.....

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