

What is this Action Sheet about?

It's about natural ways to control pests and diseases. It tells you about the advantages of natural pest and disease control, and learn about several different methods that you may wish to try in vegetable gardens and small farms.

Why use natural pest and disease control?

Pests and diseases are part of nature. In the ideal system there is a natural balance between predators and pests. If the system is imbalanced then one population can become dominant because it is not being preyed upon by another. The aim of natural control is to restore a natural balance between pest and predator and keep pests and diseases down to an acceptable level. The aim is not to eradicate them altogether.

The alternative to natural pest and disease control is using chemicals known as pesticides. However, pesticides do not solve the pest problem. In the past 50 years, insecticide use has increased tenfold while crop losses from pest damage have doubled. Here are three important reasons why natural control is preferable to pesticide use.

Safety for people

Artificial pesticides can quickly find their way into food chains and water courses. This can create health hazards for humans. Human health can be harmed by people eating foods (especially fruit and vegetables) which still contain residues of pesticides which were sprayed on the crop.

There is also much concern for people using chemical pesticides. The products may be misused because the instructions are not written in the language spoken by the person using them. This has led to many accidents such as reports of people suffering from severe skin rashes and headaches as a result of using chemical pesticides. There are an estimated one million cases of poisoning by pesticides each year around the world. Up to 20,000 of these result in death. Most of the deaths occur in tropical countries where chemical pesticides which are banned in Europe or the USA are still available.

Cost

Using natural pest and disease control is often cheaper than applying chemical pesticides because natural methods do not involve buying materials from outside. Products and materials which are already in the home and around the farm are most often used.

Safety for the environment

There are a number of harmful effects that chemical pesticides can have on the environment:

- Chemical pesticides can kill useful insects which eat pests. Just one spray can upset the balance between pests and the useful predators that eat them.
- Artificial chemicals can stay in the environment and in the bodies of animals causing problems for many years.
- Insect pests can very quickly, over a few breeding cycles, become resistant to artificial products and are no longer controlled. This means that increased amounts or stronger chemicals are then needed creating further economic, health and environmental problems.

How can pests and diseases be controlled without pesticides?

There are many ways in which a farmer can control pests and diseases, without using artificial pesticides:

- Growing healthy crops that suffer less damage from pests and diseases.
- Choosing crops with a natural resistance to specific pests and diseases. Local varieties are better at resisting local pest and diseases than introduced varieties.
- Timely planting of crops to avoid the period when a pest does most damage.
- Companion planting with other crops that pests will avoid, such as onion or garlic. Farmers in Zimbabwe find that placing mint leaves near spinach plants deters most insect pests.
- Trapping or picking pests from the crop.
- Using crop rotation to help break pest cycles and prevent a carry over of pests to the next season.
- Providing natural habitats to encourage natural predators that control pests. To do this, the farmer should learn to recognise insects and other animals that eat and control pests.

PLANTS THAT PESTS DON'T LIKE

Onion (*Allium sepa*)

Garlic (*Allium sativum*)

Tea (*Camellia sinensis*)

Chilli (*Capsicum frutescens*)

Pawpaw (*Carica papaya*)

Pyrethrum (*Chysanthemum cinerariifolium*)

Eucalyptus spp.

Sweet potato (*Impomoea batatas*)

Tomato (*Lycopersicon esculentum*)

Sunhemp (*Crotalaria juncea*)

Feverfew (*Matricaria eximia*)

Sweet basil (*Ocimum basilicum*)

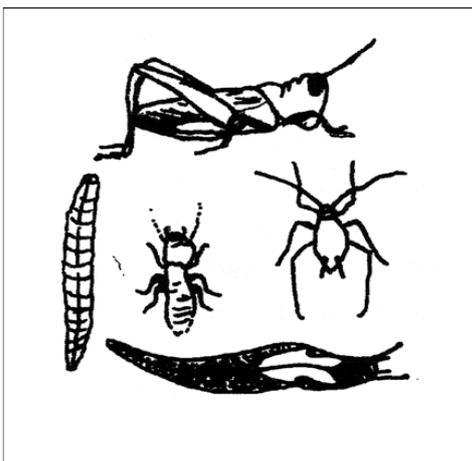
African marigold (*Tagetes erecta*)

Mexican marigold (*Tagetes minuta*)

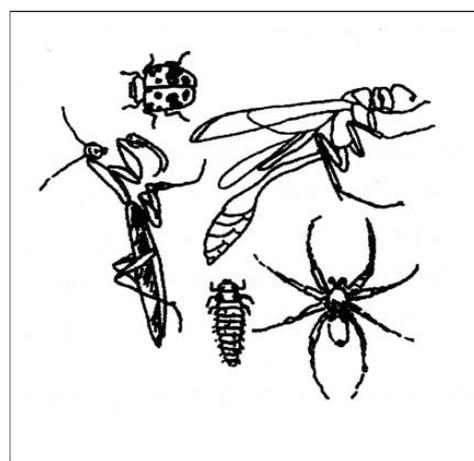
Blackjack (*Bidens pilosa*)

Termites have many predators because they provide a source of protein. Insects that eat termites include spiders, beetles, flies, wasps and especially ants. Other predators including frogs, reptiles, birds and mammals such as pangolins, bats, monkeys and humans. Encouraging this kind of wildlife will help to reduce the number of termites. Bushes and trees are a home for many of these useful creatures.

It helps to be able to identify pests and diseases correctly. This will prevent the farmer from wasting time or accidentally eliminating beneficial insects. It is therefore useful to know life cycles, breeding habits, preferred host plants and predators of pests.



Grasshoppers, slugs, termites, aphids and types of caterpillars are pests.



Ladybirds, spiders, ground beetles, parasitic wasps and praying mantis are predators.

What if we've tried all these things, but there is still a pest problem?

Through careful planning and by using all the other techniques available it should be possible to avoid the need for any crop spraying. If pests are still a problem, natural products can be used to manage pests, including sprays made from chillies, onions, garlic or neem.

Plants which can be made into sprays to deter pests include chillies, onions, garlic, Mexican marigold, pyrethrum and neem, but there are many more. For further recipes, consult the HDRA Tropical Advisory Service, and talk to farmers, gardeners or people involved in **permaculture** (Action Sheet 78) to find out what works in your area, and above all experiment! Take care when handling these plants and sprays, because they often irritate eyes and skin. Even with these natural pesticides, their use should be limited as much as possible and only the safest ones used.

RECIPES*

Chilli and garlic spray. Grind 1 garlic bulb and 1 onion. Add 1 tablespoon of powdered chilli peppers. Stir into 2 litres of hot water. Leave the mixture to cool. Strain through a fine cloth and keep the liquid. Add 1 tablespoon of soft soap and stir well.

How to use. Use as a spray for caterpillars in fruit trees.

Garlic, marigold and onion spray. Take 3 cloves of garlic, 2 handfuls of marigold leaves, 2 large onions, 2 chilli peppers, add water and boil. Cool and dilute with four times the quantity of water. Stir constantly, (From Elwell and Maas).

Soap spray. Plain soap or washing up liquid dissolved in hot water makes a good spray against soft bodied insects like aphids. It will dissolve their shells and kill them.

If *Tephrosia vogelli* is grown in your area look at Action Sheet 53, it explains how the leaves can be used against pests. The World Agroforestry factsheet on Termite Control in agroforestry might also be useful.

Acknowledgements

This Action Sheet is an edited extract from the HDRA Tropical Advisory Service Publication on Natural Pesticides. One recipe is from Elwell and Maas (undated), described in the Landcare Permaculture Booklet.

More information

HDRA (Garden Organic) – www.gardenorganic.org.uk/international-resources

FTFA Food and Trees for Africa - www.trees.org.za

Henry Doubleday Research Association Tropical Advisory Service Publications Natural pesticides series (Chilli pepper, Mexican marigold, Garlic, Pyrethrum, Neem - *Azadirachta indica*, Termite control without chemicals) www.gardenorganic.org.uk/international-resources

Natural Pest and Disease Control (unknown date) H Elwell and A Mass published by the Natural Farming Network, PO Box 8515, Causeway, Harare, Zimbabwe.

The Landcare Permaculture Booklet, South Africa's first grassroots permaculture manual. Available from Food and Trees for Africa (www.trees.org.za).

'Pests and Diseases of Tropical Crops' (1988) D S Hill and J M Waller.

'Pest Control Without Poisons' (1990) Step by Step Organic Gardening, HDRA

'Gardening with Beneficial Insects for Natural Pest Control' (1990) Step by Step Organic Gardening, HDRA

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* If the farm is supplying certified organic produce to an international market, it is wise to check with national an international organic standards to see which ones are allowed or recommended.