



Department of Agriculture and Food

Gardennote

Managing a garden the natural way

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When the garden suffers a severe disease or an insect infestation, it may be tempting to seek a quick fix by turning to synthetic chemicals. However, their use can disturb the natural balance. Evidently home gardeners are becoming increasingly aware of this fact, to judge by the many who contact the Department of Agriculture and Food's Pest and Disease Information Service and state categorically that they want to garden without using synthetic chemicals. Generally, this is very achievable.

Although gardens occasionally experience waves of seasonal pests originating from outside the area (such as locusts, white cedar moth caterpillars and fruit flies), most common pests and diseases originate from within our gardens, and damage can be minimised if we understand the basics of their biology and the local ecology.



Figure 1. A garden such as this one with a great diversity of species looks good even though there are many minor imperfections caused by pest attack.



Figure 2. According to the owner, this chemical-free garden has a number of insect pests but they never reach nuisance levels because numerous birds and a large population of frogs keep everything in check.

Within our fences there is usually some sort of stable ecosystem in which plants, animals and pathogens coexist in a state of balance. As gardeners, we manipulate this ecosystem a little by supplying water and nutrients but, most of the time, our garden needs little looking after. It is important to keep this concept in mind when we disturb this balance. This may happen when we use pesticides, plant a new tree, introduce a new pet, make a fish pond or start a vegetable or rose garden.

The aim of this Gardennote is to raise awareness of the whole system approach to gardening. It also aims to highlight some easy, 'common sense' methods which could reduce pest and disease build up in your garden.

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Garden establishment – thoughtful design avoids problems

New gardens usually have fewer pest and disease problems, because the blocks have been carved out from bushland or built up with landfill.

When improving the soil, use fill that comes from a reputable source with no history of disease or weed problems. Plants and animals should also be free from pests, disease and weed seeds before entering a new garden. Any organic material and manure is best composted.

Thoughtful design allows for optimum interaction between man-made structures, plants and animals. Basic but important considerations include correct orientation so that the structures, trees and other large plants provide shelter from strong winds, create shade in summer, and let in the sunlight where and when required. Creating zones for plants with similar requirements can minimise pest and disease problems and reduce watering.

Any style of garden - formal, Mediterranean, cottage, permaculture, tropical or native - will eventually progress towards a balanced ecosystem.



Figure 3. Permaculture garden at City Farms, East Perth. Plants in this garden are all edible but also have another function, be it as insect habitat, shelter or insect repellent.

The trick is to plan and design the garden so that this balanced ecosystem fits the style of garden you desire.



Figure 4. Even a traditional vegetable garden will eventually become a balanced ecosystem.

Soil health – healthy plants stem from healthy soil

A healthy soil has a number of beneficial organisms (for example, earthworms, insects, nematodes, fungi and bacteria) and pathogens (some nematodes, fungi and bacteria). Organic matter, such as moist leaf litter or compost, provides the energy for soil microbes. Natural microbial activity in the soil breaks down organic material and releases nutrients to the plants.

Many soil pests are kept at small numbers by the action of these beneficial organisms. On very sandy soil like that of the Perth metropolitan area, adding a little loamy soil containing some clay particles can improve soil properties and, together with added compost, will improve the soil's capacity to retain water and supply nutrients to the plants more evenly. The home gardener can convert home and garden waste to good soil by building a compost heap. Establishing worm farms is another method of obtaining good compost.

As a rule healthy soil grows healthy plants, which are less susceptible to pests and diseases. Gardeners should be aware that soil fumigation (which involves treating the soil with poisonous gas) as a means of fighting nematode infections is counter-productive, because it will disturb the balance by killing the beneficial organisms as well.

Plant health – stressed plants have less resilience to pests and disease

A very important means of maintaining plant health is to keep the plants adequately watered and fertilised – but not overdoing either. A stressed plant is more susceptible to insect pests and diseases.

Harmful insects, nematodes and fungi are naturally controlled by their natural enemies - beneficial nematodes, beneficial fungi, predatory and parasitic insects, birds, frogs and lizards. A number of beneficial insects are commercially available from integrated pest management companies. The most commonly known beneficial predatory insect that visits the garden is the ladybird. This beetle feeds on aphids which suck the sap from plants and transmit viruses.

Beneficial organisms can be attracted by providing the right environment - trees for birds, specific plants for certain insects (local plant species are often best), and ponds and shelter for frogs and lizards. Control your cat and fit it with a bell to protect birds and lizards.



Figure 5. Ladybirds feed on aphids on plants.

Beneficial insects are attracted by the flowers of some plants, especially members of the Umbelliferae such as carrot, parsley, coriander and dill. Spiders and preying mantids also should be encouraged as they feed on insects.



Figure 6. Beneficial insect habitat at City Farms, East Perth.

Companion planting and weed removal may be employed to discourage insect or disease pests from invading and spreading. Numerous publications that give details on companion planting are available on the Internet and in bookshops. Some crops can be used as bait crops - for example, provided both of them flower at the same time, groundcovers can be used under fruit trees to detract the western flower thrips from the fruit tree flowers.

Practical ways to reduce pest numbers

Snails and slugs are attracted to wet conditions and feed on young, juicy plant material. Both these pests and also slaters can be controlled with physical barriers like sawdust, sand, shell grit, or snail pellets that are non-toxic to children or animals.

If you cannot keep poultry in your garden, try to enlist the aid of the wild birds that visit. Many recognise that gardening activities bring insects to light and, as a result, will wait quite near the gardener. Throw a handful of slaters towards a willy-wagtail and it will eat them immediately.

Chickens and ducks will control snails, slugs, slaters and many insects

Good garden management can reduce certain seasonal insect pests, which means you can sit back and do nothing during the first infestation – provided you then guard against the same problem occurring next year. For example, ash white fly on claret ashes will disappear at the end of the season when the trees shed their leaves, but you must dispose of the old leaves to avoid the larvae breeding for the next season.

Garden management techniques will minimise many household pests that originate in the garden. For



Figure 7. Because of free ranging chickens, this small landholding in Bridgetown did not experience any serious pest outbreaks. Mediterranean fruit fly was never a problem in 10 years.

example, Portuguese millipedes breed in organic matter and are attracted to house lights, so positioning of outside lights in combination with traps will detract them away from the house. Confine and turn compost heaps - if left lying around, they can harbour pests such as cockroaches and flies.

Larger animal pests should not be forgotten. To avoid attracting foxes, rats, mice, cats and other feral animals, remove food scraps after outdoor meals and keep pets' feeding bowls clean.

Practical ways to reduce the incidence of disease

Pathogens grow and feed on those plant parts which provide suitable conditions. Fungal infections will occur on wounded plant parts which are located in situations ideal for the fungi to thrive - for example, bean rust thrives in warm, moist conditions, and common potato scab is a problem in very alkaline soils.

Most fungal infections on plants are encouraged by humid conditions. A high humidity environment can be the result of crowded plants with poor ventilation, and watering in the evening or at night. Simply change these conditions by thinning the foliage and watering in early morning.

It is also important to rid the system of fungal spores whenever possible. Seal all infected plant material in plastic bags and bin it – never put it on the compost heap. Also, keep garden tools and support stakes well-sterilised.

If the management and preventative techniques outlined above fail to give adequate control of pests or diseases, bear in mind that there is an expanding range of natural organic substances available. Try to use products that are target-specific rather than broad spectrum, as the latter can harm beneficial organisms as well. Home gardeners should closely observe their gardens to determine which beneficial organisms are present.

Weed control – one year’s seeding and many years of weeding

It is crucial to remove weeds before they flower and set seed. Weeds can be smothered by using newspaper, sawdust, or other thick mulch. A good groundcover will reduce the opportunity for weeds to establish.



Figure 8. This tropical foliage garden was created entirely from cuttings of dracaenas, crotons, cordylines and other hardy species, planted quite densely so that insect damage does not show and there is no bare ground for weeds to exploit.

Depending on your personal standpoint, you may find it acceptable to use glyphosate on stubborn weeds because, although it is a chemical, it does not affect the soil structure and may not affect anything else provided you wipe it on instead of spraying.

Adding manure to build up soil can also lead to weed introductions. Doublegee can be introduced with horse and sheep manure, while wild oats seeds can be in bales of straw. When mulching, buy hay instead of straw.

Research a plant’s growth habit before introducing it into your garden, because many of the more hardy or vigorous ones have the capacity to become weeds, in your own garden, your neighbours’ gardens, and bushland. Aquatic plants such as azolla, duckweed and waterlilies will shelter fish in ponds from birds, but never use salvinia and water hyacinth as they are serious weeds of waterways and are prohibited in Western Australia.

Keep records of seasonal ‘problems’

Being forewarned of the problems that may arise is one of the best defences because, if you know when a certain pest or disease is likely to occur, you can judge the best time to take preventative action.

Therefore, keep records of when pest and disease problems occur on certain plants so that, the following

year, you can perhaps avoid growing that particular flower or vegetable at the same time, or select a different variety, or grow it in a different way or different spot. Also, familiarise yourself with the insects and animals that normally visit your garden and local area, because then you will be more aware when something unusual appears.

Pest and disease control when nothing else works

If alternative methods have been tried, and pests or diseases are in bad proportions, you may want to consider the following options:

Do nothing

If possible, live with the problem and it will go away - but then you must reduce the chances of it happening again (see “Practical ways to reduce pest numbers”).

Hand pick the pest as much as you can

Make sure you also kill the pest to prevent it from breeding.

Use alternative sprays

There are many alternative sprays, which anecdotally work. The Internet has plenty of information on recipes from garlic spray to pyrethrum flower spray, which can be made up easily.

Use registered chemicals as an occasional last resort

If you buy chemicals, make sure they are non-toxic to bees and other beneficial organisms. Apply only where absolutely necessary.

Further reading:

Department of Agriculture and Food website:
www.agric.wa.gov.au

Organic Growers Association of WA:
www.ogawa.org.au

When sending or delivering samples, the following information is required:

- Collector’s name, location (where the specimen was found), full address, telephone number and e-mail address, description of the damage and date collected.

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