



Non-Toxic Pest Management

PREVENTION

Prevention 1. SOIL

Compost – To keep plants stress free, they need soil that has a full range of nutrients, bacteria, fungi and great water retention. You can provide this by simply incorporating 10% humus into your garden soil. Humus is essentially well-decomposed compost. Given that you can control what goes into your compost, you can ensure that there is the variety of ingredients going in and therefore a variety of nutrients for your plants. All the different ingredients will support a variety of bugs, bacteria and fungi, which then also transfer to your garden soil when you add the compost. Finally Compost holds up to 80% of its own weight in water so a great addition to your soil along with mulching and regular watering.

To make great compost simply follow the A.D.A.M principles;

A is for Aliveness, make sure there is evidence of your compost being alive every time you visit it. This could be in the form of bug activity, heat coming off the pile or a reduction in the amount of compost.

D is for Diversity, compost needs both a variety of ingredients and a variety of insects. Different ingredients will invite different bugs who will help break down the nutrients in the compost.

A is for Aeration, air needs to be mixed into the compost regularly for the benefit of all the living creatures in the compost. As ingredients decompose, they can slump together, creating anaerobic conditions. You know it needs a turn if it's starting to get smelly.

M is for Moisture, many ingredients like fruit and vegetable do have a lot of water in them and help keep the moisture levels up. Over summer or in windy conditions, you may need to wet it down or put an additional cover on.



Alive and diverse compost





Green Manure Crops – These plants have fungi relationships that help to capture nitrogen from the air as well as drawing out nutrients from deeper in the soil. If they are cut down and dug into the soil before flowering, all the nitrogen and nutrients in the leaf is released to the upper soil as it breaks down. As it also provides organic matter, this is highly beneficial alternative to commercial slow release fertilizers.

Crop Rotation – Crop Rotation is simply not putting the same plant in the same location for several years. This can be done systematically moving plant families around the garden. This gives time for any disease in the soil to be broken down while also giving the chance for different plants to draw up different nutrients and the changing conditions make it harder for weeds and pests to take hold.

Prevention 2. PLANTS

Diversity - Diversity is your insurance, diversity in 'What' you plant, 'Where' you plant and 'When' you plant. 'What' - there are thousands of fruit and vegetable seeds available and some are more suited than others to different soils and climates, some are naturally more pest and disease resistant. 'Where' - planting the same type of vegetable in rows is like providing a runway to pests. Mix up fruit and vegetables and then plant herbs and flowers among them as well. 'When' - staggering your planting over several months means you are unlikely to lose the whole crop because the plants are not as appealing at different stages, you can avoid peak pest times and has the added benefit of not harvesting all at once.



Poppies, Borage, Oregano

Companion Complimentary planting can be broken down into the 8S's – Support, Structure, Shade, Shelter, Secrecy, Scent, Secretions, Sacrificial. Plants can be support for another ie Sunflowers and Corn stalks can act as stakes. Some plants are excellent at improving the soil structure with strong or fibrous root systems ie green manure crops. Some plants, particularly leafy greens in summer do well when they are shaded for part of the day. Other plants provide shelter from prevailing winds and heavy rain. Bigger plants can hide more susceptible plants or give off a scent that repels or confuses bugs. Some plants give off secretions that stop germination of seeds (dandelions) or scents that repel pests (Calendula and Tagetes marigolds, alliums, garlic, lavender, oregano, marjoram, spearmint, pelargoniums, rosemary, tansy, thyme, wormwood) or encourage predators with their flowers. Some plants can be left to distract and concentrate pests and in doing so save the others.

Avoidance – There are a number of combinations that do not work well together and in fact it is better to know what doesn't work well than what does! Pines, glossy evergreens, aromatic herbs can give off allelopathic chemicals which inhibit growth. These can be in the leaves, roots, flowers and even decomposing parts of the plant. Some plants simply don't grow to their full potential in the presence of each other for example parsley and mint. However it's always best to observe your garden and determine what works and what doesn't.



Prevention 3. PREDATORS

Beneficial Predators – (Bugs) Ladybirds, Praying Mantis, Dragonfly, Hoverfly, Mantisfly, Damselfly, Lacewings, Native Earwigs, Predators Beetles, Wasps, Spiders, Centipedes(Other) Frogs, Lizards, Birds, and Bats.

Habitat – water source, shelter, predators of your predators, spray free environment and Food! Feathered friends like local natives (grevillea, hakea, leptospermum, melaluca) AND pests, it's always good to have a few around to keep your predators from going elsewhere.

Good Bug Plants – Masses of small flowers ie Apiaceae (Dill, Parsley, Fennel, Parsnip, Caraway, Lovage), Asteraceae (Marigolds, Zinnias, Calendula, Sunflowers, Daisies), lavender, borage. Green Harvest sell a 'Good Bug Mix' Seed Pack.

Prevention 4. BARRIERS

Collars ie Copper Rings zing and deter snails and slugs whereas plastic or cardboard collars around seedlings stop cutworms. Make sure they go 60mm into the soil as well as on top. A thick layer (collar) of coffee grounds around plants is also said to repel snails and slugs.

Glue/Grease Bands – these are applied to cardboard, fabric or similar and then tied around the base of the tree approx. 45cm from the ground. It will stop ants that herd aphids, mealy bugs and scale for their honeydew ie commercial options are Tanglefoot and Trappit. Homemade glues of flour and water work but don't last.

Exclusion Bags – are placed around the growing fruit or branch of fruit. Ensure flowers are pollinated first. This is effective against fruit fly however picking up fallen fruit is just as critical.

Netting/Fences – Netting is placed over the whole tree and is quite effective against larger birds and bats.



Emerging lady beetle

Prevention 5. TRAPS

Board Traps – sticky and can be hung around the garden to tell you which type of bugs are around as well as catching a few too. Yellow coloured card is for whiteflies and aphids, with blue coloured card for thrips.

Collection Traps – use food or pheromones to lure bugs in but not out ie snails, slugs and fruit fly. Some pheromone traps only attract the male fruit fly, if you want to trap both the male and female fruit fly, look for products that specify attracting both. Removing fallen fruit is essential as it can act as lure but without the trapping!



TREATMENT

Treatment 1. LEAVE IT

This is all about observation and asking questions before you do anything! Is it a problem? Are the pests being kept under control? Are the pests moving around to other plants? Is it useful as a sacrificial plant? Why was this plant susceptible? Is there fallen fruit that is harbouring the younger phase of a pest?

Treatment 2. REMOVE IT

Removing the offender can be quite effective if certain pests are around for a short time. Hand removing caterpillars can be a few minutes, every couple of days if you have other strategies in place. Removing stink bugs (with very long tongs and into water) may be quicker than making up a new batch of spray!

Treatment 3. SPRAY IT

This is a final measure taken when a particular pest has got out of control and is starting to spread further around your garden. Many effective sprays can be made at home which ensures you know exactly what has gone into it and often your ingredients can be picked straight from the garden.

At this point, it is important to also consider why the pests have gotten such a foothold into the garden and look back at the preventative measures. You may also consider a resting period to break any pest cycles before you plant again. This would be a great opportunity to plant some green manure crops.

Homemade

Homemade (herbal/vegie) sprays is not exact as the strength of the infusion and the dose required does vary. Don't give up if your first spray doesn't have the desired result and look at the ingredients more carefully; how young or old was the plant, the amount of bruising, chopping or breaking of the plant material, temperature of the water, length of the time left to soak.



Bay with scale & black soot



White cabbage moth caterpillars



Garlic Spray (Pest Repellant Plants by Penny Woodward)

The spray seems to be most potent during cooler weather and will kill a wide range of sap sucking bugs as well as others ie aphids, scale, snails, caterpillars. It can also be an effective fungicide (ie use on fruit trees at leaf fall and bud swell to minimize the chance of bacterial infection and curly leaf. Spray will keep for a few months.

1. Mix and soak for 24hrs;
 - Approx 200g garlic roughly chopped
 - 6 tbs vegetable oil, cover and soak for 24hrs.
2. Dissolve 20g pure soap in 1L of water.
3. Add this to to the garlic mixture and mix well.
4. Filter, sieve or strain into a non metallic container in a cool dark place and it will keep for several months.

**Use at a dilution rate of one part to ten parts water*

Commerical Options

Eco Oil – a blend of canola oil, teatree, eucalyptus for killing soft bodied sap suckers.

Bacillus thuringiensis (Dipel, Thuricide, Biobit) bacteria has insecticidal proteins, some resistance is occurring, can take 3 or 4 days for catterpillars to die.

Diatomaceous Earth is a dust (fossilized skeletons of phytoplankton) to kill soft-bodied pest but can kill beneficial insects.

Derris is organic (extract of roots) but poisonous to birds, frogs, fish and worms

BOOKS

What Garden Pest or Disease is that? By Judy McMaugh

The Garden Guardians by Jane Davenport

Bug by Tim Marshall

Pest Repellant Plants by Penny Woodward

Companion Planting by Bob Flowerdew

Companion Planting by Brenda Little

The Complete Guide to Companion Planting by Dale Mayer

Companion Planting in Australia by Judith Collins