

Integrated Pest Management (IPM)

What IS Integrated Pest Management? Let's break down those words first.

Integrated To put together parts or elements and combine them into a whole

Pest ... anything that is a nuisance or annoying

Management The process of dealing with or controlling things (or people)

For example, let's look at our own health.

Prevention ... we try to prevent illness or disease through controlling our environment.

How do we do that? Our lifestyle, reduce stress, more downtime, nutrition, exercise.

Why we get sick When we become out of balance in our lives or environment we become run down, burnt out and illness and disease have an easier way to getting through our defences.

What do we do? ... we take time out to rest and let our bodies sort out the infection where it can, support this through eating nourishing meals or taking natural remedies.

When this doesn't work? We make a decision ... go to the Dr or Chemist

Afterwards... we try not to put ourselves in that position again and take preventative measures!



What does this have to do with IPM? - Plants operate in a similar fashion to us and tell us through various means that something is out of whack. Leaf colour, wilting or dried leaves, poor flowering / fruiting, fruit or leaf drop etc... These are all ways that a plant will give us the hint that something isn't right. When a plant is not operating like it should do, it's an easy way in for pest, to get out of control and take over that plant to the point where it's natural defences can't manage.

Pests are a normal part of every garden and will always be there.

Wherever there are gardens there will always be pests. Start growing an edible garden, and you'll soon discover far more insects than you ever thought you'd come across. Keep your plants strong and healthy and you'll be one step on the way to minimizing pests in your garden.



Let's look at mother nature where you rarely see a natural monoculture. Problems arise when the natural balance has been disrupted. The manner in which nature handles pests and disease is complex, holistic and multi layered and so as gardeners, we can adopt some design techniques and strategies to try and limit the opportunity for pests to gain the upper hand. Diverse ecosystems of polyculture can be replicated in our gardens where pests can come and go with the seasons without really causing too much drama if preventative measures are undertaken. Where pests can become a problem however, is when the environment goes out of balance.

The simple, best preventative management is to design your garden well and to grow healthy, mineralized soil to keep the plants in good shape - weak, sick and stressed plants are more prone to attack. Pests are nature's way of targeting sick and diseased plants, ensuring only the strongest and healthiest survive. In some cases, this may be weeds!

Cultural practices like crop rotation, companion planting and diverse inter-planting further reduce the risk of attack and by providing habitat for beneficial predatory and parasitic insects we are on the way to ensuring our gardens thrive and flourish.



What do we know about pests and what they want?

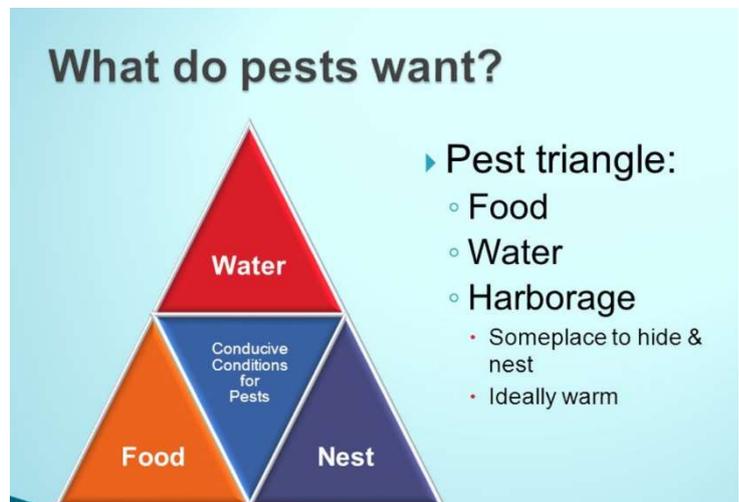
The pest triangle helps us to look at the relationship between three things: firstly, the pest (e.g. aphid, blackspot, etc), secondly the host (plant) and, thirdly, the environment (the conditions of where the plant, pest or disease is living). If the pest is present on a host and the environment is favourable to the pest, then it will thrive.

By interrupting any of the three things that make conditions favourable to insects, you can help reduce the impact of the pest.

Water – look at how you water your plants and when. Does this encourage illness / disease within the plant making them more susceptible to pest?

Habitat – create an unfavourable habitat for them. Crop rotation to encourage healthy soils, companion and diverse inter-planting to create confusion. Look at utilizing green manure crops to encourage healthy soils.

Food – a monoculture of food is like a smorgasbord for pests. Diversify.



Like with a lot of things, knowledge is power! Quite often, a mighty pest takeover can be fully preventable by an approach using the IPM model of continual improvement.

The 5 steps of IPM will help you with a systematic approach to the management of pests in your garden. Let's explore these further!



Integrated Pest Management - Model of Continual Improvement

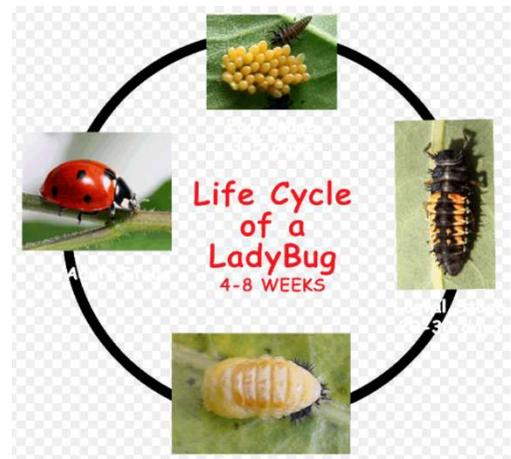
The 5 Steps of IPM

1 Knowledge = Prevention. It is power! Get as MUCH knowledge as you can. There's no point knowing things if you don't put them into practice.

- a. Location, location, location. Know your site conditions. What was in that spot before? **Crop rotation**
- b. Practice good hygiene with your gardening tools & equipment to avoid the spread of disease
- c. Have you chosen the best cultivar / variety for your area?
- d. Learn how the plant grows:
 - i. What soil does it like?
 - ii. How much water does it need?
 - iii. How much sun & ventilation does it need?
 - iv. What nutrients and minerals will help this plant be really healthy? **Soil remediation / correction**
 - v. Who are good neighbours? **companion planting and polyculture (diverse interplanting)**
- e. What are it's key pests
- f. What are that pests life cycle and stages and what do they LOOK like?

2 Monitor and Inspect

- a. Take time to look at your plants and inspect them. Turn over the leaf, see what bugs are hanging out on your plant? Are they pests or predators ie: friendlies such as praying mantis, parasitic / paper wasps, lady beetles, lacewings. Understand what your predators lifecycles are so you avoid seeing a lady beetle larvae and thinking it's something else! Eg: lady beetle larvae look VERY different to the adults.
- b. What tracks are left on your plant leaves in the morning (slug / snail)
- c. What bite holes are in the leaves?
- d. Is there any "ring barking" going on down below on the stem at just about slater head height?



3 Make. A. Decision.

- a. Is this a problem yet? For example – aphids! How many? Are there lady beetles in the area?
- b. When will you treat the problem? This goes back to knowing your pest and it's lifecycle.

4 INTERVENTION!!! You've made the decision it's time you intervene and do something.

a. Mechanical

- i. Hand picking – squash the eggs, pick off the pests (feed them to the chooks and ducks!)
- ii. Cover those plants! Row covers, bagging, exclusion netting
- iii. Traps – homemade fruit fly, yellow sticky tape, beer traps,
- iv. Create decoys and confusion Scarecrows, compact disks, land cress (brassicas), white eggshells / paper butterflies (confuses cabbage moth)



b. **Biological** – bringing in other animals to eat your pests

- i. get in the hit squad of mother nature! Praying mantis, lady beetle, lace wing are all friendlies and beneficial insects. You can buy these online but be careful that they're not a nuisance first. Check with the Department of Agriculture if you have doubts.



- ii. Chickens & ducks! Don't underestimate the power of a beak or bill but be warned, chickens also will peck at your lettuce.

c. **Chemical** – last resort. Problems with using chemical controls are that (a) bugs build immunity to them and they can stop working and (b) they are not species specific so beneficial as well as harmful bugs are killed - i.e. you may kill off the entire food source (pest) for the predators you do have.

- i. BFA or NASAA approved approaches recommended if you most. Learn recognize and look for these symbols. In Permaculture we don't consider other chemical approaches.



5 **Keep Records (see attached chart)**

- a. What did you see?
- b. When did you see it? Date & Time
- c. What did you do?
- d. Did this work?



Back to the basics. Where to start?

Design your garden well – take the time

Time spent designing a garden will pay you back. Sun, wind, water, ventilation, space & shade are all elements that play a pivotal role in a garden design. Location of your garden and how often you can get to it should also be included on your consideration sheet. Develop a good balanced ecosystem in your garden encouraging predatory insects like lady bugs, lacewings, lizards and frogs. Provide them with what they like. Ponds, logs, preferred plants will all encourage the beneficial insects and animals back into the garden.

Soil Remediation /

Building a healthy, friable soil with good drainage goes a long way. Checking and adjusting pH can also be used to prevent disease that will weaken your plant.

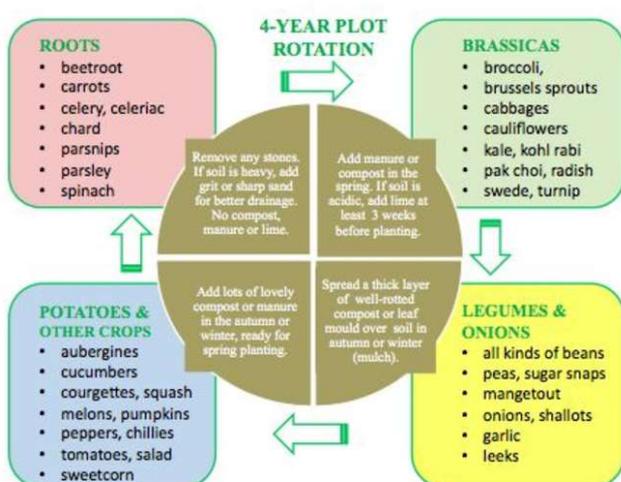
Plant cover crops or green manures when resting beds. Well chosen green manures, when slashed and dug in, will provide organic matter to the soil, while some mustards create a bio-fumigation effect as they break down and release gases to help eradicate root knot nematodes.

Interplanting your garden beds with dynamic accumulators such as borage, tansy & dandelion utilises these plants ability to get deep down into the soil and tap into those nutrients that are usually out of reach of most annuals. These nutrients are then released back into the top of the soil through the dying and decomposing foliage from these plants.

Crop Rotation

Do your research into crop rotation and incorporate this into garden design. Utilise crop rotation to halt the spread of pests and diseases that attack plants of the same group. Planting green manures to invigorate an impoverished soil and break pest and disease cycles. Plan a yearly crop rotation chart.

In farming, crop rotation means allowing a three to five year time period between planting a member of the same plant family in the same plot of land. Rotating your crops will control a lot of pests, disease, and fungus because they are usually plant family specific.



Classic Four Way Crop Rotation



Companion planting / Diverse interplanting – avoiding a monoculture

Having a diversity in the garden to attract natural predators of insects. Look at how nature generally works with having a diverse range of plants all working together to create a balanced ecosystem.

Plants that work together below the soil supporting each others nutrient requirements, can also provide confusion above the soil for pests. Manage these well and it will add to your tool bag of tricks.

Include insectary crops which attract beneficial insects. Insect-supporting plants including natives, can be interplanted with garden crops providing habitat to harbor your beneficial insects to help keep your pests in check also.

Include plants that keep your beneficial insects around when there aren't as many pests. Put your time and effort into attracting the beneficial insects to help keep the pests in check. It is very important to encourage and feed native pest managers.



Utilise plants in Pest Control

Pest controlling plants come under three categories;

1. **those that repel or confuse pest insects** with strong scent,
2. those that **attract beneficial insects**, and
3. those that **distract pests as an alternative food source**.

Pest repellent plants actually work in three different ways.

1. The first - **masking plants** - include thyme, lavender and scented geranium. These produce strong, volatile oils and scent that actually masks the plants the insects might be looking for.
2. There are also specific **repellent plants** such as cotton lavender or santolina, tansy and wormwood. These plants produce a scent or taste that is so bitter or putrid it drives insects away.
3. Finally, there are plants that contain **natural toxins or poisons** which can be used to make sprays or washes. These include fennel, which can be used as a flea repellent for animals, feverfew and chamomile, which can be used as an antifungal agent, and the dried flower of pyrethrum or chopped chilli, which can be used as insect sprays.

Useful websites

<http://www.sgaonline.org.au/tag/pests/>

<http://www.sgaonline.org.au/pest-repellant-plants/>

<https://permaculturenews.org/2016/10/13/restore-degraded-soil/>

<http://www.greenlifesoil.com.au/>

<https://permaculturenews.org/2016/11/18/rotate-annual-crops/>

<https://permaculturenews.org/2010/07/30/companion-planting-guide/>

<https://blog.fantasticgardenersmelbourne.com.au/common-garden-pests-australia/>

