Pests and Organic Growing

"A wise man once called insects and diseases the best professors of agriculture. Pests tell you when you are being right by their absence and when you are doing wrong by their presence"

Eliot Coleman in *The New Organic Grower*

For organic growers the health of the plant is the critical factor in sound pest management. Weak, unhealthy plants succumb very readily to pest infestation, while those plants which are strong and healthy are less likely to be attacked. The first step in dealing with pests or disease is to stand back and evaluate the situation and try to identify where the problem really lies.

For example, if we are having a pest problem with tomatoes the first step is to identify how healthy the plants are. How vigorously are they growing? Does the soil have sufficient compost and organic matter to produce healthy plants? Is the location in which they are growing suitable. Are the plants getting the necessary amount of sun? Is there sufficient protection from wind? Were the tomatoes planted at the correct time of the year for the climate of the district? Has there been too much or too little water? Is there sufficient drainage for the plant?

All these factors affect the health of plants and pests and diseases are adapted to take advantage of any decline in plant health health. It is not too dissimilar in the case of humans: people who are 'run down', not eating properly or severely stressed will more easily succumb to viral and bacterial attacks than those who are strong and healthy.

How Can We Grow Healthy Plants

Soil

This is the most important factor in producing pest free vegetables. Build up your soil in the ways outlined in the Soil Fertility paper and the Soil paper. This will ensure that your soil will be the best possible medium for producing healthy plants.

Crop Rotation

This is just what the name suggests: varying from one season to the next the type of crop planted in each garden bed. In other words, don't plant the same type of vegetables in the same place in successive years. Rotating your crops has a number of advantages:

- It interrupts the disease/pest cycle by discouraging a number of fungi and diseases which may be endemic to specific crops. If successive crops of the same family are planted, similar diseases will flourish. It is important to realise however that a number of different plants belong to the same family. For instance, cabbage, cauliflower, broccoli, brussel sprouts are all brassicas; tomatoes, eggplants and capsicums are all

solanum fruits; cucurbits cover cucumbers, melons, pumpkins and zucchinis; while peas and beans of all varieties are legumes.

- Different crops extract different nutrients from the soil. Planting successive crops of the same family therefore will not give the soil enough time to build up depleted nutrients. Rotating crops overcomes this problem.
- Since crops have different growing needs, crop rotation enables allows those needs to be met and to obtain the best from the soil. For instance, legumes fix nitrogen in the soil from their roots. It makes sense therefore to follow a crop of legumes by brassicas which are gross feeders of nitrogen. It also makes sense to follow the brassicas with a root crop such as carrots which do not require such highly nutritious soil.

There is no hard and fast rule about rotation of crops. Crop rotation should be tailored to the needs of the grower and to the available garden beds.

Planting Time

Knowledge of the climate ensures that plants are grown at the most appropriate time of the year. Late and early frosts can play havoc with the health of frost sensitive plants, and even though they may survive, they are generally less healthy and therefore more prone to disease and pests.

Watering

An watering system which waters deeply to encourage deep root growth is essential to ensure that plants make the best use of available water. Dripper systems are very effective for a number of vegetable plants. Dripper systems also avoid problems caused by wet foliage and fruit caused by other watering systems. For instance, overhead spraying on pumpkin and other cucurbits may cause fungi on leaves; and the fruit of capsicums will often rot on the vine if water from overhead spraying continually lies on the fruit near the stem.

Other Factors in Pest Management

Predators and Parasites of Pests

Encouraging natural predators and parasites of pests is a very effective way of keeping pest populations under control. Blackbirds for instance will forage under mulch for baby snails and snail eggs; ladybirds will feast on aphids; spiders will deal with a wide variety of insects; predator and parasitic wasps are particularly valuable for their ability to paralyse or parasitise a variety of larvae, including those of the white butterfly into which they inject their eggs; centipedes will compete with blackbirds in eating snail eggs found under mulch; and the young of the praying mantis win happily feast on small cabbage riddler moths. The list is almost endless.

The effectiveness of predators and parasites in controlling pest populations depends a balance existing in the relative number of predator and parasites in relation to the pest populations. Once poisons (organic or otherwise) are introduced into the garden that balance may be lost if care is not taken to protect the predators and parasites of the pests.

One way to encourage natural predators is to plant a variety of colourful flowers amongst your vegetables. These will attract a whole variety of predators, which in turn will feast upon the pests. It is a simple and colourful method of pest control.

Herbs and Flowers as Pest Deterrents

Growing some herbs and flowers in between vegetables is another technique that can be used in a pest management regime. For instance, French marigolds will deter a number of unwanted bugs, including nematodes and white fly, and at the same time their bright flowers will attract bees to your garden. Sage will help to protect against the cabbage white butterfly, and rosemary will do the same against the carrot fly. Plant garlic in between your brassicas to deter not only the cabbage white butterfly, but other flying insects. There are many varieties of mints peppermint, spearmint, eau de cologne and they are all useful in deterring bugs, aphids and the larvae of the white butterfly in particular. Since mint roots are very invasive however, it is better to grow them in pots which can be moved around between your plants as needed.

Snails and Slugs

One of the most persistent pests in the vegetable garden are the snails and slugs which attacks young seedlings before they have had a chance to grow into healthy plants. To counteract this :

- Trap them in small containers filled with a 50/50 mixture of stale beer and water. Sink these into the soil in strategic spots near seedlings. Snails find the mixture irresistible, and dead snails can then be disposed of next morning.
- After rainy weather they are very visible and can be disposed easily; alternatively, inspect the dark corners of the vegetable garden from time to time. With careful observation their favourite daytime hiding places can be found, and once again they can be disposed of.

Last Resort Management

If all else fails, there are some measures that can be taken to cope with problem pests.

Garlic Spray

This can be useful for aphids and caterpillars. It can be purchased commercially, but it is easy to make at home. Crush some garlic, soak for several days in a small amount of liquid paraffin, mix with water (about 600ml) and a small quantity of soft soap (to enable it to stick to the leaves). Dilute with more water before spraying. Experiment to find out the best strength for any particular application.

Pyrethrum

This is a contact spray made from the pyrethrum daisy (*Chrysanthemum cinerariafolium*). It will kill a variety of bugs, caterpillars, aphids and other insects with which it comes in contact. Be careful however because it will also kill friendly predators such as ladybirds.

Make sure therefore that none of these is present when spraying. Pyrethrum will generally break down completely within two days, but as it does not kill the eggs of insects, a repeat application may be necessary. It is better to spray in the evening when bees are not active; in addition, if sprayed during the day in strong sunlight it may causes some burn damage to some of the leaves.

Derris Dust (Rotenone)

This insecticide is more powerful than pyrethrum and will be effective for a longer period. It should be used with great care however, because it will also kill earthworms if they come in contact with the powder. It can either be used as a dust on the leaves, or mixed with water and soft soap and sprayed on the plants in the normal way.

Dipel (*Bacillus thuringiensis*)

This is a useful bacterium because it attacks only the larvae of the white butterfly. Spray on the brassicas if the larvae are in plague proportions, but remember once again it is a last, not a first resort.

Defender (Metaldehyde)

Snails and slugs prefer to eat these pellets rather than seedlings, so they will give effective control if necessary. It is lethal to pets however and could make small children very ill if it is ingested. It may kill worms and other friendly predators if it comes into contact with the soil. To minimise these problems, old margarine containers can be used, complete with lids. Cut out a number of doorways on the sides of the containers, insert some pellets and place in strategic places in the garden. This will avoid the poison contaminating the soil, but pets and small children could still be at some risk.

Conclusion

One of the exciting aspects of organic growing is that it is very easy to do our own experiments. This applies particularly to pest control management. Try different combinations of herbs and flowers in your vegetable garden and make a note of what works so that not only can the successful technique be used again next time, it can also be shared with other organic growers. Much of the information on pest control techniques has come from just that type of experimentation by gardeners. The observations of individual growers, as to what works and what doesn't, can add to the sum total of all our knowledge.

Read books by those who have conducted their own experiments on pest control and who are now sharing their knowledge with other organic growers. There are many such books to be found in libraries and bookshops which are well worth reading.

"What I am proposing is a totally revised way of thinking for the proper understanding of agriculture. We need to develop a biologically orientated thinking that sees our agricultural efforts as participatory rather than antagonistic vis-à-vis the natural world. It isn't a

question of whether perticides are undesirable or not. The fact is that they are totally superfluous. They were devised to prop up an agro-industrial framework which was misconceived from the start. When you abandon that framework, you can abandon its superficial thinking pattern. Don't start with industrial theory and try to "naturalise" it. Start on another plane entirely. Study the established balances of the natural world in order to learn how to nurture and enhance those balances for agricultural production. Pay attention to the existing framework of pest-plant relationships and learn how food production can be achieved through biological diplomacy rather than chemical warefare. The potential of such a new understanding is as yet undreamed of."

Eliot Coleman in *The New Organic Grower*