

Planning a crop rotation

Crop rotation is the traditional practice of growing groups of vegetables on a different plot each year to avoid growing the same type of plant in the same area year on year. Before the advent of intensive farming and artificial fertilisers farmers would use the principles of crop rotation to manage soils for fertility and plant health.

These same principles can be applied to our own vegetable growing in order to manage soil borne pests and keep your soil healthy and fertile.

In order to avoid the use of pesticides (even some of the 'organic' pesticides are very toxic and can be harmful to beneficial insects, the environment – and ourselves) our main weapon is to prevent pests and diseases in the first place. One of the best methods of preventing soil borne pests and diseases such as club root and eel worm is to 'rotate' your crops.

A basic system of crop rotation requires four growing beds for a four-year cycle. You can design your own system based on the range of crops that you are growing. Market gardeners who grow a wide range of crops may have up to 12 different beds and therefore an extended rotation cycle.

There are 3 basic principles to the system, first and foremost is that you do not grow the same vegetables in the same patch of soil each year; Soil borne pests and diseases will thrive if you provide them with a host. As many pests and diseases are 'host specific' i.e. they attack a specific group of plants, if you provide them with food and shelter every year their population will build up in the soil over time, however, if you take away their source of nourishment they will decline. Some diseases however can lay dormant in the soil for several years though and therefore require significant periods of time without a host in order to die out.

The second principle is soil management. Planning your rotation carefully can maximise the nutrients in the soil and reduce the need for fertiliser use and improve plant health and vigour. The main nutrient to consider is nitrogen. Nitrogen is one of the three major nutrients that plants need in large quantities. Nitrogen is released as organic matter breaks down so adding compost or manure to your soil will top up nitrogen supplies, the problem is that nitrogen is a nutrient that is very 'mobile' in the soil which means that it is easily washed out of the soil in times of heavy rain, therefore it is not recommended to add organic matter to sandy soils in the autumn. It is also very volatile when added as a fertiliser and easily converts to its gaseous form which is then lost to the atmosphere. Careful rotation design and the use of green manures, companion plants and ley periods are the best way to manage nitrogen.

The third main principle is the grouping of your plants. Many pests and diseases have a preference for a particular type of plant. Grouping plants together in 'family groups' means that you provide ideal conditions for each plant group and then move them around your plot each year so that they do not occupy the same area for at least 3 to 4 years.

Examples of family groups:

Brassicas: cabbages, brussels sprouts, kale, kohlrabi, turnips,

Roots: carrots, parsnips, salsify

Legumes: peas, broad beans, climbing French beans, runner beans, dwarf French beans, sugar snap peas, lab lab beans

Allium: garlic, onions, shallots, leeks.

Solanum: potato – potatoes are not technically root vegetables although we dig them from the ground they are actually swollen underground stems. They are not related to the carrot family and we keep them separate in a rotation. They are closely related to tomatoes, aubergines and peppers but need different growing conditions so are not necessarily grown together with them.

Salads such as lettuce can be grown in between other slower growing crops such as leeks and parsnips or you can dedicate a whole bed to salads.

Squashes and courgettes take up a lot of space but make good ground cover, they can be grown in a bed of their own or in between your beans or sweetcorn.

A typical rotation system:

1. Potatoes need a nice deep soil with plenty of organic matter, it is best to manure the plot where your potatoes are going. They also benefit from a slightly acid soil to prevent scab.
2. Legumes are not too fussy about soil and will not mind following the potatoes, they create their own nitrogen so do not need heavy feeding and will leave some nitrogen in the soil.
3. Brassicas need lots of nitrogen so these can follow the legumes they will make use of the good nitrogen levels in the soil. They also need an alkaline soil so apply lime before planting if your soil is below pH7. It will be at least 2 years before potatoes go in this plot so the lime will have disappeared by then.
4. Roots are best in an open soil that has not been recently manured so being last in the cycle is perfect. They can be interplanted with onions as they make a good companion plant (i.e. rows of carrots with rows of onions planted either side to disguise the smell of the carrots to deter the carrot fly).

The diagram shows a four-year simple system where the plot has been divided up into blocks. You could alternatively divide into strips. You can add more beds to this (and therefore a longer cycle) if you grow a wider range of crops and it is also good to include a ley period (a rest year) in the cycle.