



Why Perennials?

Sitting on a coach on the way home from London, I was eating a meal that included roasted chestnuts. Opposite me were a couple of people eating sandwiches. I started to think about the different foods we were eating. Nutritionally they were somewhat similar, both chestnuts and wheat being good sources of carbohydrate, though the chestnuts are rather lower in protein. I then thought about the work involved in growing, harvesting and utilizing each of these foods.

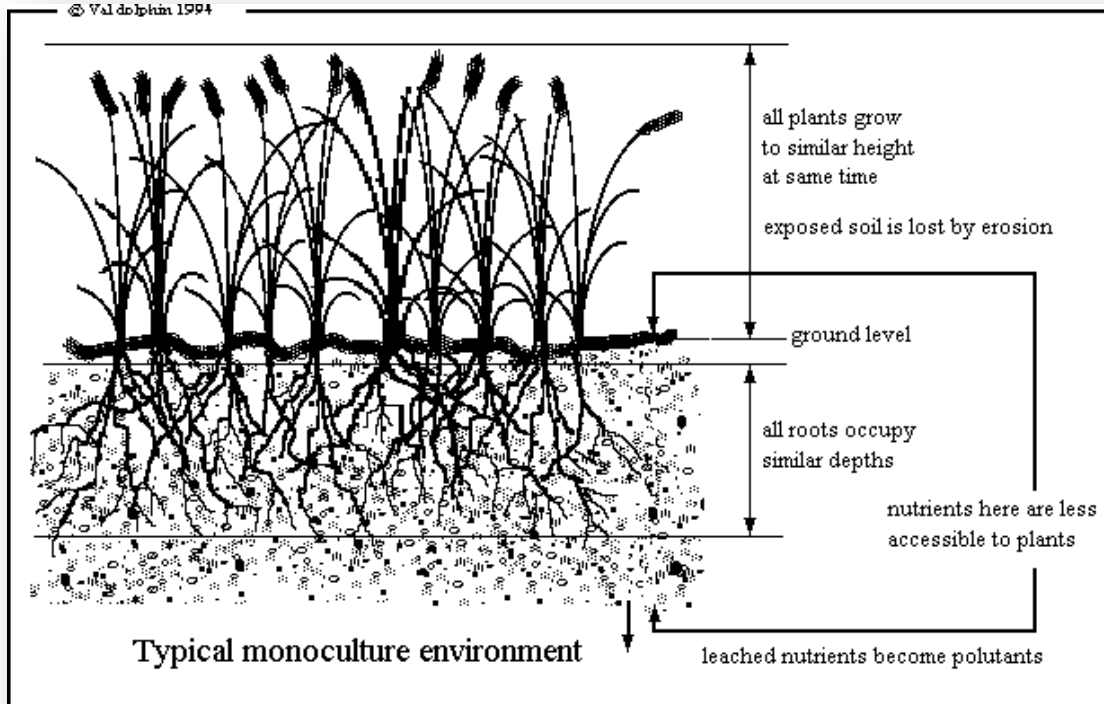
With the sweet chestnuts all you have to do (once the trees have been planted and are old enough to bear fruit) is come along in the autumn and harvest the seeds - the plants will continue to yield for possibly hundreds of years without any help from you. With the wheat, however, it is quite a different matter. Here the ground must be cultivated every year in order to prepare a seed bed; the seed must then be sown; a method found of controlling the weeds; fertilizers added in order to achieve satisfactory yields; fungicides and insecticides applied in order to control pests and diseases and then large machinery used in order to harvest the crop.

This is all so much extra work, particularly when you consider that, even with all this effort put into growing it, the yields of wheat will still be less than the yields of chestnuts could be from the same area of ground. It made me wonder why on earth people had fallen into the trap of growing annual crops. When you go on to consider the wider effects of growing annual crops such as wheat compared with tree and other perennial crops then the issue seems to move from the farcical to the totally ridiculous. Not only have we given ourselves so much extra work for lower returns, we have also devised a method of growing our food that is extremely damaging to our environment and to all the plants and creatures that live in it (which includes us of course).

Let me try and explain this in more detail and, as an example, let me first look at a field of wheat and then compare this with a woodland.

Annual monoculture

Annual crops, grown in conventional systems, demand that the soil is cultivated. The very act of cultivating the soil serves to destroy organic matter, kills much of the soil fauna and leaves the soil at risk of erosion from wind and rain. The soil structure is damaged and, with continued cultivation, the sub-soil becomes very compacted and is unable to drain properly or allow roots to penetrate and obtain their nutrients. When it rains soil is washed away. Just go and stand in a country lane on a wet day and you will see all the muddy water flowing along the sides of the lane. This is our valuable top soil, being carried off to streams and thence to the sea.



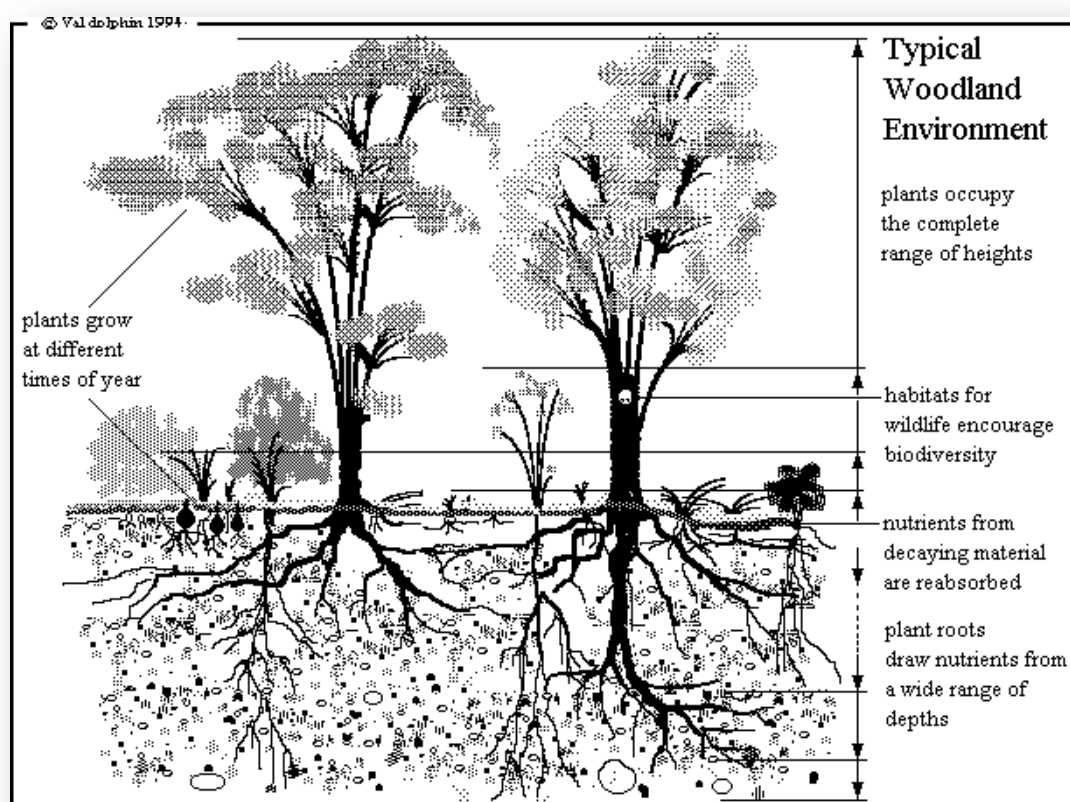
In a field of wheat all the plants have the same nutritional requirements, their roots occupy the same levels in the soil and will only be able to obtain nutrients from this one level of the soil. Any nutrients that have been washed lower down into the soil will be lost to the plants and will eventually find their way into the water system either to be washed out to sea or to pollute our drinking water. Genetically very similar, these plants are all susceptible to the same pests and diseases and all have similar climatic requirements. If one suffers, they all suffer. The system is dependent on large inputs of fertilisers, herbicides, pesticides, fungicides etc. The soil is little more than a medium to hold the plant up, and even this it is becoming less able to do well as soil structure and depth are destroyed. The Fenlands, for example, are losing 30 mm of topsoil every year.

A field of wheat is like a desert to most of our wild animals and plants - the intensive growing regime means that very few species of plants will be able to grow in the field and thus there will be very few animals that will be able to survive in and around the field. In the edition of The Guardian newspaper dated 12/08/94 there was an article about the declining population of some of our commonest species of birds. Apparently, in the period between 1969 and 1991 tree sparrow populations declined by 85%, corn bunting by 76%, grey partridge by 73%, turtle doves by 75% and skylarks by 50%. The article went on to blame current agricultural practices that have seen hedgerows destroyed, meadows ploughed up and fields harvested before the birds had a chance to finish rearing their young. It said that the dawn chorus, that enchanting time of the morning when the air is alive to the sound of bird song, is heard no more in many parts of E. Anglia, where an eerie silence now greets the dawn.

It can be argued that yields of wheat have increased dramatically in the last 100 years, from around 1 ton per acre at the beginning of the century to 3 tons or more now. But is this sustainable? No it is not! In fact when you take into account all the energy that is expended in making the farm machinery, in fuelling it, in making the fertilisers etc. and all the other things that need to be done in order to produce the food, far more energy is actually used up in growing the food than the food itself yields in energy! This ridiculous state of affairs is only possible due to the current abundance of fossil fuels, but how long are they going to last?

Woodland systems

Let us now look at a native woodland. Who feeds this with artificial fertilisers? Who sprays fungicides? Who applies the herbicides and why isn't everything eaten up by insects? Year after year the woodland produces masses of plant growth feeding a host of mammals, birds and insects. A wide range of plants grow side by side, sometimes competing but more often occupying subtly different niches in the woodland. For example, some plants will have deep root systems and these will obtain many of their nutrients from deep down in the soil in areas beyond the reach of other plants. When their leaves die in the autumn many of these nutrients will be made available to other members of the plant community. Other plants will have shallower root systems and these will obtain their nutrients from nearer the soil surface. Similarly, there will be gradations of height in the woodland, some of the plants will be tall trees, some will be small trees or shrubs, there will be climbers making their way up the trunks of the trees, smaller perennials able to grow in the shade of the trees will be found on the woodland floor. Some of the smaller plants will come into growth early in the year, before the trees have leafed out, and will complete most of their life-cycle by early summer. Thus there are different niches for plants to occupy in the soil, above the ground and in time.



The canopy of trees creates a sheltered and more stable environment inside the woodland. Temperature fluctuations are less extreme than in an open field, there is less wind and frost and so plants are less subject to the vagaries of our weather. Because of all the different available habitats there is a wide range of creatures able to live in the woodland and the more diverse the numbers of species that live in an eco-system, the more stable it becomes. The force of the rain is broken by the trees and the rich carpet of organic matter in a woodland absorbs the rain and allows it to drain into the soil and enhance the water table instead of running off into the rivers and thence to the sea, taking valuable soil and nutrients with it.

There are various fungal and bacterial activities taking place on the root systems of the woodland plants which increase the abilities of plants to take up nutrients from the soil and also produce nutrients for all the plants to utilise. Recent research has demonstrated that the greater the diversity of plants growing in an area then the greater the total amount of growth that takes place. Thus we see that a woodland is not only self-sustaining and highly productive, it can also lead to a gradual build-up of fertility, unlike annually cultivated soil which needs constant inputs if it is to remain fertile.

The value of diversity.

By growing a number of different species together so that there isn't a large planting of one single species, insects that seek out plants visually may be confused by the different shapes of plants and be less able to find the species that they are looking for. If you can imagine a few pest insects arriving at a large wheat field, once they have landed on one wheat plant no matter what way they move they cannot avoid moving on to the next wheat plant simply because they are totally surrounded by them. Heaven on earth for the insect and ideal breeding conditions for it. The result is a very rapid population explosion usually only controlled by an expensive regime of chemical sprays. If, on the other hand, the field contains a diversity of plants, as is found in a native woodland, the insect is going to have to work much harder to find the next host plant and it is also going to be much more at risk from predation, both because it has got to move about a lot more and also because this diversity of plants offers more places for its predators to live in. The result is far less damage to the plants and a more balanced population of pests and predators.

There was an article in the Spring 1994 edition of 'Kew' magazine. It was talking about a group of chimpanzees that live in a small area of forest, called Gombe, in Africa. The forest is a reserve and is surrounded by cultivated land. The article continued:-

'Outside Gombe, the local people are struggling to live off perhaps 30 different types of foods, mostly introduced species of plants grown in drought conditions on easily eroded soils.... But the chimps seem to be expert botanists, knowing exactly where and when the next crop of fruit will be. There may be only six major plant foods each month but, over the year, more than 150 species are used. Some of the fruits they eat are delicious and they can certainly teach us a great deal about a balanced diet and preventative health-care. But although a lot is known about the chimps' social behaviour, our understanding of their botanical knowledge and its significance to us is in its infancy. Few of their food plants have been tested for nutrients or medicinal properties.'

It seems that the chimpanzees are more intelligent than we are!

Selecting the plants.

Of course, if you try to depend on a typical British woodland to provide you with all your food for the year, then you are either going to die fairly quickly of starvation, or you are going to have to learn to eat a lot of rather unpleasant tasting foods such as acorns. It is quite probable that neither of these possibilities appeal to you - but there is an alternative. It is possible to plan out a woodland, using the guidelines that nature has shown us, but using species that can provide us with tasty fruits, seeds, leaves, roots and flowers. When well designed, such a system can:-

- be far more productive than a field of annuals
- produce a much wider range of foods
- require far less work
- require far less inputs such as fertilizers and pesticides
- provide valuable habitats for wildlife
- be very pleasing aesthetically.

It all comes down to selecting the right mixture of species. There are over 5,000 species of edible plants that can be grown outdoors in Britain and about 2,100 of these can be grown in a woodland so there really is no lack of variety to choose from.

The main difficulty is that people have been selectively breeding the traditional annual crops over a period of thousands of years. In that time the cultivated plants have often changed dramatically from the original wild species (cauliflowers, brussels sprouts and cabbage all derive from the same wild plant) whilst the taste and yield has also undergone great changes. Thus the cultivated lettuce was derived from a bitter tasting poisonous plant and the wild ancestor of carrots has a thin woody root that really does not make very pleasant eating.

This selective breeding, however, has also had a number of disadvantages. We might have ended up with a lettuce that has mild flavoured leaves that go well in a salad, but we also have a plant that is very susceptible to pests and diseases, whilst it also requires a lot of attention when growing since it is unable to compete with most other plants. Thus if anyone wants to eat lettuce all the year round they have to sow seed on at least 10 occasions over the year - which means preparing the soil, weeding, watering if the weather is dry, trying to prevent the plants running to seed if the weather is hot and trying to prevent them rotting if the weather is wet. We also have to supply nutrients and organic matter to the soil if we are to produce a good quality plant. Even with all this attention, we will produce a plant that is considerably lower in nutrients than the wild plant it was bred from.

Most of the perennial plants that we recommend for woodland plantings have never been selectively bred for yields, flavour etc. Thus the harvest might be lower than you would expect from cultivated annuals, or it might be more fiddly - but all the plants on the lists below produce very tasty crops. Once established these plants will continue to yield their harvests for many years with very little work on behalf of the grower. Not only that, but they will tend to suffer far less from pests and diseases, will not require much in the way of fertilising and will be far more resilient to the vagaries of the weather. Since many different species will be able to occupy the same area of land, overall yields can be much higher than from annual plants. There is also a lot of scope for careful selective breeding in order to produce more productive and easier to harvest cultivars. Any selective breeding, however, should always take into account any potential negative effects on the plants.

A woodland garden.

The first thing that you need is a woodland. If you are fortunate enough to already have a few mature trees then you can begin straight away planting out the other plants of the woodland. If you do not have some trees already, then it is best to plant the trees first and allow them to grow for a few years to become established before putting in the other plants. There are a number of general points to remember when deciding whether or where to grow a woodland garden.

1. It is possible to grow trees almost anywhere in Britain (97% of the land used to be covered with trees before people started chopping them down). What is important is to choose the correct trees for the site - if planting right by the coast, for example, then you need to select species that can tolerate the strong salt laden winds. Once the trees are established they will provide shelter from the elements so that other less tolerant plants can be grown amongst them.
2. You do not need large areas of land on which to grow your woodland. By choosing small trees it is possible to have a mini-woodland even in a small back yard.
3. Be clear in your mind what crops you want to grow and then choose the appropriate species.
4. Plant the sun worshippers on the sunny side of the woodland - most fruit-bearing species crop better when grown in full sun.
5. Taller trees should be towards the north side so that they do not shade out the smaller species
6. Be aware of the vigour of each plant and plan accordingly. If, for example, you plant a very strong-growing climbing plant into a small tree then it is very likely that the tree will be smothered by the climber and die.

There is no space in this leaflet to talk about the plants that can be grown in this woodland system - if you would like more information on these then please ask for our leaflet titled [Woodland Garden Plants](http://www.pfaf.org/user/cmspage.aspx?pageid=90) (<http://www.pfaf.org/user/cmspage.aspx?pageid=90>). However, I would like to list just a few of the plants that you could be growing to supply food all the year round.

Seeds

Araucaria araucana (Monkey puzzle); *Caragana arborescens* (Siberian pea tree); *Castanea sativa* (Sweet chestnut); *Cephalotaxus drupacea harringtonii*; *Corylus species* (Cobnuts and Filberts); *Juglans regia* (Walnut) and *Quercus ilex* (Holm oak) all bear well at least in parts of Britain.

Fruits

There is such a wide range here that I can only mention just a very few of them. *Actinidia deliciosa* (Kiwi fruit); *Amelanchier alnifolia* (Juneberry); *Cornus species*; *Crataegus species*; *Elaeagnus x ebbingei*; *Malus sylvestris domestica* (Apple); *Prunus domestica* (Plum); *Pyrus communis* (Pear); *Ribes species* (Gooseberries and currants) and *Rubus species* (Raspberries and blackberries) will provide a succession of fruit all year round.

Leaves

[Allium ursinum](#) (Wild garlic); *Campanula persicifolia* (Harebell); *Cryptotaenia japonica* (Japanese parsley); *Fagopyrum dibotrys* (Perennial buckwheat); *Montia sibirica* (Miner's lettuce); *Myrrhis odorata* (Sweet Cicely); *Rumex acetosa* (Sorrel); *Tilia species* (Lime trees); *Urtica dioica* (Stinging nettles) and *Viola odorata* (Sweet violet) are just a few of the species to choose from and between them you should be able to pick fresh leaves all the year round.

Roots

Erythronium species (Dog's tooth violets); *Lathyrus tuberosus*; *Lilium lancifolium* (Tiger lily); *Medeola virginica* (Cucumber root) and *Streptopus amplexifolius* are some of the more interesting root crops that you could grow.

A woodland is not the only place in which to grow perennial crops of course, there are many other habitats in which they can also be grown. For more information on this see some of our other leaflets such as [The Edible Lawn](http://www.pfaf.org/user/cmspage.aspx?pageid=72) (<http://www.pfaf.org/user/cmspage.aspx?pageid=72>), [Edible Pond and Bog Garden Plants](http://www.pfaf.org/user/cmspage.aspx?pageid=79) (<http://www.pfaf.org/user/cmspage.aspx?pageid=79>) and [Edible Ornamental Plants](http://www.pfaf.org/user/cmspage.aspx?pageid=78). (<http://www.pfaf.org/user/cmspage.aspx?pageid=78>)

Database

The database has more details on these plants: [Actinidia deliciosa](#), [Allium ursinum](#), [Araucaria araucana](#), [Caragana arborescens](#), [Castanea sativa](#), [Cryptotaenia japonica](#), [Elaeagnus x ebbingei](#), [Fagopyrum dibotrys](#), [Juglans regia](#), [Lathyrus tuberosus](#), [Lilium lancifolium](#), [Malus sylvestris](#), [Malus domestica](#), [Medeola virginica](#), [Myrrhis odorata](#), [Prunus domestica](#), [Pyrus communis](#), [Quercus ilex](#), [Rumex acetosa](#), [Streptopus amplexifolius](#), [Viola odorata](#)