



Organic gardening

SUMMARY Organic gardening methods avoid the use of manufactured fertilizers and other synthetic chemicals in the cultivation of soil and plants. Although organic gardening is often regarded as an alternative to gardening with chemicals, many organic techniques are simply good gardening practices and are compatible with other forms of gardening. In its gardens, the Royal Horticultural Society uses a combination of both organic and other methods to maintain soil fertility and deal with damaging pests, diseases and weeds. The reduced reliance on chemicals in a wholly or partly organic garden brings benefits through a more sustainable form of gardening and by encouraging wildlife.



Photo: N A Callow

Seven spot ladybird

RHS policy statements

- 1 The Royal Horticultural Society is sympathetic to the basic aims of organic gardening and adopts an integrated approach to pest, disease and weed control in its Gardens, where it uses a combination of organic, chemical, biological and physical control measures.
- 2 The Society recommends the restrained and thoughtful use of garden chemicals, whether synthetic or organic, and it is concerned to promote their safe usage. It provides advice on, and demonstrates in its Gardens, alternative methods such as biological control and physical deterrents; also the benefits of resistant cultivars and crop rotation.
- 3 The Society strongly advocates the improvement and maintenance of soil fertility by the incorporation of organic matter, which features prominently in the husbandry practices at all its Gardens. It demonstrates and provides advice on the use of green manures and suitable methods for making garden compost. It endorses initiatives for rendering plant residues into compost, such as the segregation of municipal green waste and the decomposition of kitchen waste in wormeries.
- 4 The Society advises gardeners through its advisory and information services on the careful use of fertilizers and composts, and will indicate organic options where these are available. Care is urged in the use of fertilizers and manures, both organic and inorganic, to avoid overuse or misuse, and to ensure that excessive residues are not lost to drainage. The Society's Gardens make use of organic fertilizers where appropriate, and inorganic kinds are also carefully used.
- 5 The Society advises the use of thorough cultivation for weed control in preference to or in association with the use of chemical herbicides. The application of weedkillers should be reserved for special problem situations and the products used strictly in accordance with the makers' recommendations. The destruction of weeds by careful use of purpose-made flameguns is considered suitable for situations where there is no risk to wildlife. Ground mulching with organic matter, fabricated plastic and other covers, and plant ground cover are recommended for the suppression of annual weeds. These techniques are well demonstrated in the management programmes of the Society's Gardens.
- 6 The Society believes that the abandonment of digging in the context of organic gardening is suitable only on soils of naturally very good structure, and where skilful crop management is possible. It promotes the use of narrow, raised beds, especially for vegetable growing, as a means of preserving soil structure.
- 7 The Society respects the views of individuals and organizations who adopt, or lobby for, the complete abandonment of inorganic chemical substances in gardening. It also recognizes the interests of both total adherents and those who believe that it is sometimes necessary to use inorganic chemical substances in order to maintain a productive and attractive garden. The interests of wildlife protection and conservation are prominent in all considerations.

Organic gardening

What is organic gardening?

The term 'organic gardening' is commonly used to describe cultivation systems which make minimal use of manufactured chemical substances. A fundamental feature is reliance on manures and fertilizers derived only from animal or plant remains. These are practical elements of a broader philosophy which takes a holistic view of gardening, emphasizing the interdependence of life forms. Conserving natural resources and avoiding pollution and health hazards are further important elements in the concept of organic gardening.

Why give it a thought?

Commercial production of food crops is associated with high yields and first-class quality. The pursuit of these requirements has involved the extensive use of inorganic fertilizers and a range of sometimes noxious, and usually highly effective, herbicides, fungicides and other pesticides. In many instances these practices have been shown to have had harmful effects on soil structure, the purity of water resources and the survival of wildlife. Some of these chemicals have been developed for the amateur gardening market, with many definite benefits for gardeners. But there has undoubtedly also been some cost or risk to good husbandry and the environment. The true measure of the problem is difficult to assess but there is much reliable evidence that total reliance on chemical solutions to problems can be counterproductive. For most gardening situations the production of maximum yield and total excellence is not essential; and since the aims of gardeners are to enjoy and benefit from the natural

environment, it is incumbent on them to adopt practices which do not threaten it. It is certainly a subject deserving careful thought and attention to environmentally-friendly options.

The challenges

The exclusion of manufactured inorganic substances in the growing of ornamental plants, lawns, fruit and vegetables brings challenges and problems. Alternative treatments often involve more expensive or less readily available resources. Some may be less effective with consequent loss of yield and quality; some may involve techniques which are not visually appealing to everyone. There is a need for special effort to acquire a good understanding of the wildlife in gardens, both friends, foes and neutrals, their life-cycles and requirements; with time allocated for care in planning, preparation and vigilant maintenance. Where plants' requirements for steady growth are met, including choice of site, timing of planting or sowing, soil preparation, nutrition and watering, the occurrence of damaging attacks by pests, diseases and other disorders is less likely. Successful gardening following organic principles therefore requires a dedicated and informed approach.

Soil fertility

All possible steps should be taken to develop or improve and maintain soil fertility, except in special instances such as sites intended for the establishment of wild flowers. This entails attention to lime requirements, both for its direct contribution of calcium and indirect vital role in providing soil pH conditions for the satisfactory uptake of other essential nutrients. Also of

great importance is enrichment with humus through the incorporation of organic matter. Rotted animal manures are ideal, also plant residues such as seaweed, leaf mould or compost made from garden and kitchen waste. For best advantage, heavy-textured soils should be dug in autumn or early winter, whilst light textured soils may be left until spring. In both cases organic matter should be incorporated as evenly as possible throughout the top 20cm (8 in). Annual digging and manuring helps maintain soil fertility, and occasional deeper digging with the incorporation of organic matter is beneficial.

The procedures for making garden compost are described in a separate Guidelines leaflet, entitled 'Recycling'. Wormeries designed for the decomposition of kitchen waste provide a useful, if limited, quantity of organic matter. Green waste derived from the composting of segregated municipal waste is now of some significance. Sewage sludge and other domestic organic waste derivatives are potentially useful materials for garden use.

Green manuring offers some benefits to the maintenance of soil structure and fertility, although it may be difficult to fit into crop rotation in a small garden. Grazing rye (*Secale*



Mustard as a green manure

cereale) is a very good choice for overwintering; legumes, such as winter field beans (*Vicia faba*), clovers (*Trifolium* spp.) and bitter lupin (*Lupinus angustifolia*) have the added advantage of fixing atmospheric nitrogen in their root nodules; mustard (*Sinapis alba*), rape (*Brassica napus* var. *napus*) and phacelia (*Phacelia tanacetifolia*) are suitable annual plants for occupying vacant ground and digging in before the plants set seed.

The above practices are not exclusive to organic gardening, but they are important features of the method. Bulky organic manures provide limited nutrients for demanding fruit and vegetable crops, and some types, such as leaf mould, provide very few nutrients indeed. So there may be a continuing need to apply fertilizer base and top dressings. Processed organic materials such as hoof-and-horn and bonemeal provide nitrogen and phosphate supplements respectively over an extended period, whilst dried blood is a quicker acting source of nitrogen. Liquid fertilizers of organic origin, either proprietary or home prepared, for example infusions of comfrey or animal manures, are also useful, especially for container-grown plants. When handling manures and fertilizers it is a sensible precaution to avoid any possibility of ingestion or other personal contact with the materials. Wearing gloves is recommended, and a face mask in the case of products formulated as fine powders.

The case for no-digging often features in the practice of organic gardening. Undisturbed soil provides a more amenable environment for many beneficial soil-inhabiting organisms; in some cases it preserves soil

structure and reduces moisture loss by evaporation. Conversely, digging provides an opportunity for the incorporation of bulky organic manures; it is a means of improving drainage and root penetration by breaking up compaction; it aerates the soil; weeds can be destroyed and soil pests exposed to winter cold and predators. No-digging is an option where soil structure is naturally very good and where the garden site can be skilfully managed for crop establishment and weed control.

Pest and disease control

Growth-stressed or otherwise unthrifty plants invariably succumb more readily to pests and diseases. Careful husbandry is therefore the first essential, and it has many facets to be borne in mind. Attention to soil fertility and the timely use of irrigation is important. Advice on making the best use of water is given in the Guidelines leaflet "Water Supplies". Club root disease of brassicas thrives on acid soil and scab of potatoes on alkaline ones. Powdery mildews are worse where soils are dry. Raising ornamental plants and vegetables in cells or pots facilitates planting out in optimum conditions for rapid establishment. Timely sowings may avoid a crop being vulnerable at a critical stage of insect activity, for example swedes and turnips sown after May will miss the main egg-laying period of cabbage root fly. Crop hygiene should be practised, such as cutting out fruit tree wood infected with canker. Consider the use of physical barriers to exclude or deter pests, for example low-level screenings around blocks of carrots for protection from egg-laying carrot fly; growing brassicas under a horticultural fleece to exclude insect pests; grease bands around fruit tree

trunks in autumn to intercept female winter moths. Trapping is sometimes a practical technique on a small scale, such as beer traps for slugs. Hand picking of pests is a real possibility, as for cabbage caterpillars on small areas of brassica plants.



Photo: Photos Horticultural

Prediction methods can be employed, for instance pheromone traps amongst apple trees attract male codling moths so that periods of peak egg-laying activity of the females can be predicted; on isolated apple trees such traps may lower the incidence of attack by trapping male moths and thereby reducing the mating success of the moth. Companion planting has its advocates, and it is possible that interplanting crops may reduce pest incidence, for instance that of cabbage aphid and root fly where brassica plant rows are alternated with some other crop. Crop rotation is advisable practice, particularly with vegetables; and avoiding the replanting of roses on the same site invariably ensures better subsequent results. There is a relationship between weather conditions and pests and diseases. If plants are congested through lack of thinning or too close planting, air flow is reduced and diseases may be encouraged. The same can be true where plants are given luxury dressings of nitrogen. In both situations the ubiquitous grey

mould is likely to thrive. Seasonal populations of pests and diseases can be reduced significantly by carefully destroying crop remnants before new season plantings, as is the case with leek rust.

There are clearly many alternatives to consider before reaching for the sprayer and chemicals. Where recourse to chemical pesticides is essential, plant-derived substances are available, which have short persistence and low toxicity to birds and mammals. These and other pesticides should always be used with full regard to the product recommendations and to the possible effects on beneficial organisms. The Guidelines leaflet entitled 'The Use of Garden Chemicals' deals further with some of the points raised on pest, disease and weed control.

Biological and other natural control methods

Two means of controlling or avoiding pest and disease attack are worth special mention.

The use of predators and parasites, either alone or integrated into pest control programmes, has practical relevance to gardening. These include the parasitic wasp *Encarsia formosa* which is an effective control of

glasshouse whitefly; the predatory mite *Phytoseiulus persimilis* against glasshouse red spider mite; and the pathogenic nematode *Steinernema kraussei* against vine weevil grubs, which are a serious pest of container plants especially. Other biological controls that are available include pathogenic nematodes for the control of slugs, leatherjackets and chafer grubs, a ladybird predator of glasshouse mealybugs, various predators and parasites of glasshouse aphids and a bacterium, *Bacillus thuringiensis* for controlling caterpillars of pest moths and butterflies. The effective use of predators and parasites requires their introduction at the appropriate time, an absence of persistent pesticide residues and careful management. Biological control organisms are supplied by mail order, and they are well worth using in support of successful organic gardening.

Plants can vary in their susceptibility to pest and disease attack, and plant breeders and plantmen have exploited these advantages through breeding and selection. For example hollyhocks resistant to rust are available, the rose 'Elina' is resistant to black spot, and the apple cultivars 'Sunset' and 'Ashmead's Kernel' are little affected by scab. The blackcurrant cultivars 'Foxendown' and 'Farleigh' are resistant to big bud mite, while carrots 'Flyaway' and 'Resistafly' are less susceptible, but not immune, to carrot fly.

Weed control

Many newcomers to gardening, and those with limited interest or spare time, together with others struggling with major, often pernicious weed invasion are attracted to the use of chemical weedkillers. There is little

doubt that a great deal of money is spent in the quest for solutions. Some chemicals may affect non-target plants, either through being residual in the soil or carried on spray drift. Careless use may destroy beneficial insects and their habitats. For all of these reasons there is great value in forward planning site preparation, thorough and regular cultivations, and hand weeding.

Meticulous forking out of perennial weeds such as couch grass and ground elder should not be discounted as an effective means of eradication in many situations. It is important to carry out such work when soil conditions are most suitable, and in hot summer months lifted weeds can be desiccated on the soil surface. Weed destruction with a specially-designed flamegun is a possibility for some situations, such as paths, where its use does not pose a threat to garden plants and wildlife.

The removal of weeds before seed dispersal is most important. Ground mulching with deep layers of organic matter, or plastic sheets, or any fabricated material that is visually acceptable provides a useful means of suppressing annual weeds. In ornamental garden situations the same can be achieved with the use of ground cover plants. The principle of



Photo: Photos Horticultural

Companion planting



Photo: Photos Horticultural

Organic mulch suppresses weeds

soil cover applies also to fruit and vegetable growing. In all weed situations it is important to tackle the problem before heavy infestations develop. Annual weeds are easily destroyed by hoeing whilst they are very young and the soil is dry.

Further reference

Much valuable information on organic gardening methods, including Guidelines on Organic Standards, is available from:

The Henry Doubleday Research Association,
Ryton Organic Gardens,
Coventry, Warwicks, CV8 3LG
Tel 02476-303517
www.hdra.org.uk

The Soil Association
Bristol House, 40-56 Victoria Street,
Bristol, BS1 6BY
Tel 0117 929 6661
www.soilassociation.org

For further reading

Flowerdew, B. (1998) *Bob Flowerdew's Organic Bible*. Kyle Cathie Ltd

Hamilton, G. (1987) *The Organic Garden Book*. Dorling Kindersley

Pears, P. & Stickland, S. (1999) *Organic Gardening*. Mitchell Beazley

Other leaflets in the RHS Guidelines series can be read and downloaded from www.rhs.org.uk/publications. They can be obtained by post by sending an A4 SAE to AW Mailing Services Ltd, PO Box 38, Ashford, Kent TN25 6PR (91p postage for the full set).



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