CONSERVATION & ENVIRONMENT GUIDELINES

Royal Horticultural Society
200 YEARS

The use of garden chemicals

SUMMARY **When used for their correct purpose in a responsible manner, pesticides have a useful role in tackling some pests, diseases and weed problems. The Royal Horticultural Society, through its advisory service at Wisley Garden, its website and at RHS Shows, offers advice on the identification of pests, diseases and weeds, and the appropriate measures that can be taken to control them. It will also advise when treatment is not required, thus saving the unnecessary use of chemicals.**

RHS policy statements

1 When used correctly in a discriminating way the RHS recognises that insecticides, fungicides and herbicides are useful and effective tools in a garden.

2 The RHS believes that garden chemicals should not be considered in isolation when tackling pests, diseases and weeds. Other approaches, involving cultivation practices, cultivar selection and encouraging or introducing natural enemies, should be considered as alternatives wherever possible before the use of chemical pesticides.

3 The RHS recommends that when a pesticide is required, gardeners should:
i) use an appropriate pesticide for the task.
ii) read and follow all the manufacturer's instructions.
iii) store pesticides under secure and safe conditions.
iv) dispose of unwanted or out-dated pesticides by consulting the local authority's waste disposal department.

4 The RHS, through its advisory service, offers advice on the identification of pests, diseases and weeds, and their control. It will also advise when treatment is not required, thus saving the unnecessary use of chemicals.

The use of garden chemicals

Garden chemicals and pesticides

Garden chemicals are often referred to as pesticides, a term which, in the context of the Food and Environment Protection Act and this leaflet, encompasses not just insecticides but also fungicides, herbicides, wood preservatives, animal repellents and plant growth regulators, but not fertilizers. There is a separate Guidelines leaflet on "Fertilizers and manures". This leaflet is concerned only with chemicals currently approved for use by amateur gardeners.

Why use pesticides?

Insecticides and fungicides can give rapid control of pests and diseases that would otherwise spoil the appearance or cause the death of plants. Their use can improve the quality and yield of flowers, fruits and vegetables. Natural enemies of garden pests often breed too slowly to prevent damage and so additional protection through chemical use may be needed. Some pests have no effective natural enemies and it can be difficult to maintain certain plants in good condition without resorting to spraying.

Weeds compete with cultivated plants for water, light and nutrients. Hand weeding is effective against some weeds but herbicides have the advantage in terms of speed and convenience for weed control in lawns and uncultivated ground such as paths. Problem perennial weeds in flower borders can be impossible to remove by hand weeding but can at least be checked by using appropriate herbicides.

What are the disadvantages?

The objections to garden chemicals are that, with a few exceptions, they are not selective for the targets they are aimed at. Most insecticides have a broad spectrum of activity and will kill beneficial insects along with the pests. This may allow pests to return in greater numbers due to the demise of their natural enemies. Regular use of pesticides can lead to the development of resistance. There is a growing list of pests, diseases and weeds which are no longer controlled by chemicals that were once effective against them. Pesticides are poisons – they would be ineffective against pests, diseases and weeds if they were not. People have an innate fear of poisons and worry about the effects that garden chemicals will have on their health and the general environment. These fears may not be substantiated but they nevertheless exist.

Is chemical control really necessary?

Many people have attractive gardens despite using few or no pesticides. Chemicals are not the only, or in some cases, the best means of controlling pests, diseases and weeds. Problems can sometimes be avoided by good gardening practices such as crop rotation, hand picking of pests and diseased leaves, and the promotion of good growth through the careful use of feeding and watering. Well-grown plants will be more tolerant of pests and diseases compared with plants that are under stress through adverse growing conditions.

Natural enemies in the form of predators and parasites can make a useful contribution to pest control. Some natural enemies can be purchased for the control of glasshouse pests such as whitefly, red spider mite, mealybugs, aphids and vine weevil. Other biological controls are available for slugs, caterpillars and some other pests. The use of natural enemies in conjunction, where necessary, with compatible chemicals is known as integrated control or integrated pest management. Unfortunately most of the insecticides available to amateur gardeners are not compatible as they are harmful to many beneficial insects and mites. There are some exceptions: fatty acids, vegetable oils and compounds such as rotenone/derris and pyrethrum have relatively little harmful effect on predators and parasites by virtue of their short persistence.

How are pesticides developed?

Before a garden chemical can be marketed it must undergo a considerable amount of research to ensure that it is effective and can be used safely. Pesticide manufacturers screen thousands of new compounds for signs of activity against pests, diseases and weeds. The few that show promise begin a process of testing and research which will take at least ten years to complete.

After about three years of testing in laboratories and glasshouses, small-scale field trials are carried out, which will be followed by larger trials if the product has passed its earlier tests. During the development period the effects of the chemicals on non-target animals and plants will be assessed. When all the necessary tests and trials have been completed the data are submitted to an independent committee appointed by the government. If the committee is satisfied with the data the chemical can be marketed for the purposes specified on the product label.

Pesticides today are more thoroughly tested before marketing than any other chemicals, apart from pharmaceuticals. It is ironic that they are now regarded with much greater suspicion than in the bad old days when much more dangerous chemicals were available.

How safe are pesticides?

The safety record of garden pesticides is good. Surveys of accidents occurring in gardens regularly show that incidents involving pesticides come well down the list of hazards. Sharp tools top the list and apparently innocuous objects such as deckchairs and flower pots cause many more accidents than pesticides. The use of chemicals on food plants may cause concern over the dangers of pesticide residues being present when the food is eaten. Chemicals intended for use on food plants will include in the manufacturer's instructions how long must be left between the last treatment and harvesting. For amateur garden products this will range from 0 to 21 days, depending on the chemical.

During the development of a chemical the regulatory body (Pesticides Safety Directorate) will have assessed a parameter known as the Acceptable Daily Intake (ADI). This is based on the highest dose of the chemical ingested on a daily basis at which no observable effect is seen in long-term feeding tests on laboratory animals. The safe level set for man is 100 times lower than the ADI of the most susceptible test animal. This gives a safety margin for differences between man and other animals, and for variations in individual humans and their diets. Maximum residue limits (MRL) are calculated so that food at or below the limit will not exceed the ADI. The time interval set between treatment and harvesting allows the chemical to dissipate and break down to meet these requirements. Note that some insecticides and fungicides are approved for use on non-edible plants only.

Pesticides, gardeners and the law

In recent years several pieces of legislation have been brought in which now tightly regulate the sale, storage and use of pesticides. While much of this is aimed at users of professional chemicals, some aspects also apply to amateur gardeners. Regulations made under the Food and Environment Protection Act 1985 give legal force to those parts of the manufacturer's instructions that are indicated as being "statutory conditions of use". This means that it is illegal to use the wrong dilution rate or to use a product for purposes other than those stated in the instructions. A prosecution could follow if careless spraying of plants in flower results in a beekeeper losing his bees. Only products approved by the government can be used as pesticides, so home-made pesticides brewed from concoctions of rhubarb, cigarette butts or even washing-up liquid are now outside the law. Amateur gardeners cannot purchase, store or use chemicals that are marketed for use by professional growers. Chemicals must be stored in their original containers, so it is illegal to split a chemical between several gardeners.

The effective and safe use of garden chemicals

The manufacturers have done their part in researching their products and presenting some of them in unbreakable plastic bottles with child-proof caps, or as ready-diluted sprays. The weak link in the safety chain is often the gardener who misuses pesticides by failing to follow one or more of the following points:

a) Effective use

- Identify the cause of the problem. There is no point in trying various insecticides and fungicides if the plant is suffering from growth defects caused by cold weather, mineral deficiencies or poor cultivation. Be aware of which problems are of a serious nature; those which cause little harm to plants should be tolerated.
- Choose a chemical that is approved for use against the pest, disease or weed. Note that the approval may be limited to certain types of plants, such as ornamentals or named fruits and vegetables, or to certain situations, such as in gardens but not in glasshouses or on houseplants.
- Apply the chemical at the right time. Pests often have one or more stages in their life cycle when they are more vulnerable to chemical control; spraying at the wrong time will give little or no control. Inspect plants at regular intervals so that problems are tackled before heavy infestations have developed. Some pests and diseases will need a number of treatments at regular intervals to achieve control.
- Spray or dust the plants thoroughly, especially on the underside of the leaves. Do not use chemicals at all under windy conditions or if rain is imminent. Similarly avoid treating plants exposed to bright sunlight or extremes of temperature.

b) Safe use

- Before using any chemical, read the instructions carefully and apply in the manner stated. Under no circumstances should the dilution rate be varied.
- Do not mix different chemicals together for simultaneous spraying unless the manufacturer's instructions state that this is permissible.
- Pesticides that require the use of protective clothing do not receive approval for garden use. Nevertheless it is a sensible precaution to use rubber gloves when handling chemicals and sprayers. Clothing or skin that becomes contaminated with chemicals should be washed thoroughly.
- Avoid standing downwind when applying chemicals.
- Do not smoke, drink or eat until the job has been completed.
- Keep children and pets away from treated areas until the spray has dried off.
- Fish and other wildlife in ponds, ditches, streams etc, are very susceptible to pesticides. Contamination of the water must be avoided.
- Protect bees and other desirable flower visitors by not spraying plants that are in flower. If this cannot be avoided, treat the plants in the evening when bees are not active. Spraying at that time also reduces the risk of sensitive plants being scorched by chemicals.
- Store chemicals in a cool, dark place, preferably in a locked container where children and pets cannot gain access. The chemicals must be kept in their original containers with the tops firmly closed.
- Wash sprayers and other equipment thoroughly after use. Use separate equipment for applying herbicides and insecticides/fungicides.

Disposing of unwanted chemicals

This problem is best avoided by purchasing chemicals in quantities that will be used up within a year or two. Similarly when diluting a chemical for use it is desirable to try to match the quantity to the size of the job. If excess diluted spray or washings from the sprayer cannot be used up on plants requiring treatment, the chemical should be sprayed over level bare soil or an uncultivated area such as a gravel path. Empty pesticide containers can be washed out and disposed of in the dustbin. Gardeners wishing to dispose of old pesticides that are no longer approved for garden use or other undiluted garden chemicals should seek advice from the waste disposal department of their local authority. Such chemicals will usually be accepted for disposal at manned local authority waste disposal centres. Under no circumstances should chemicals be poured down drains.

The RHS Advisory Service

RHS Members can write, telephone or send emails (advisory@rhs.org.uk) to the Members' Advisory Service at Wisley Garden for advice on garden problems. As diagnosis often depends on seeing specimens of the problem, it is best to send or bring samples to Wisley. Information on many gardening problems is given on the RHS website (www.rhs.org.uk/advice). Persons who are not RHS Members can get gardening advice from the website or at RHS Flower Shows.

Other useful websites

www.gardencareproducts.org.uk
www.pesticides.gov.uk

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 A W Mailing Services Ltd, PO Box 38, Ashford, Kent TN25 6PR (91p postage for the full set).

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