An ecological approach to allotment cultivation

Office International du Coin de Terre et des Jardins Familiaux a.s.b.l.
WE THANK

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and
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Dear gardeners,

When the Office International du Coin de Terre et des Jardins Familiaux was reestablished on September 20th, 1946 in Luxembourg, the delegates adopted a resolution stating that the design of allotments should be improved, and that they should offer people not only material advantages but also the opportunity for relaxation, family enjoyment, raising children, sporting pursuits, individual freedom, social and moral development, and the opportunity for regaining contact with nature.

From this resolution stems the dual function of the modern leisure garden movement. Nowadays, the allotment not only has a social function that benefits the gardener; it also has a planning function and serves to protect nature and the environment. The first benefit to emerge from reestablishing contact between man, the soil and nature is that man learns how to value nature once more. This feeling then gives rise to the obligation to protect, improve and preserve the natural world.

The environment is an indissoluble pact involving subtle changes between man and his surroundings. Environmental protection is therefore a matter that should concern us all, including gardeners, and for which we should feel a sense of responsibility.

Of course, these important matters cannot be dealt with in isolation. The problems can be solved only if they are put into the general global context and addressed on a long-term basis. However, this should not prevent us from taking immediate action on a national, regional and local level. Organisations and individuals can all help by making their own ongoing contribution towards achieving the long-term objectives. There is no point in planting an oak tree in the hope that one will soon be able to sit in the shade of its leaves.

As we all know, however, what people like changing least of all, apart from their housing, is their opinions and habits. All allotment associations and federations are therefore urged to make even greater efforts in this area. Convincing people, translating theory into practice, showing people these are the tasks facing us as gardeners if we are to preserve the natural life of the plots of land entrusted to us, thereby creating in the midst of our towns and curabars little havens of wildlife that will otherwise be lost, as so often in the past.

The purpose of this brochure is to help translate theory into practice. It owes its existence to the excellent preliminary work of our allotment holder friends in Switzerland, Luxembourg and Austria, who also deserve our grateful thanks for their initiative and achievement. This brochure also shows how useful it is to exchange experiences and information on an international level, and how fruitful this can be for us all.

We hope that all allotment holders will find this brochure helpful so that the truth of Peter Rosegger's words:

"From the soil springs forth strength for the whole world and prosperity for those who till it"

may persist for years to come.

Malou Weinrich
General Secretary

Wilhelm Wohatschek
President

of the Office International
du Coin de Terre et des Jardins Familiaux
Ecological significance of allotments

The allotment as a small but versatile green space offers a home to numerous species of animals and plants that have become rare in cities (such as the wall lizard, sand lizard, slow worm, common toad, shrew, numerous types of birds and insects). They act as green arteries linking the final retreats in the city, and thus counteract the genetic isolation of individual populations. However, allotments will acquire this important function for the animal and plant kingdom only if they are cultivated in a more natural way, free from toxic substances.

The present situation

Allotments can be cultivated in a wide variety of ways, ranging from gardens in which everything is "sprayed clean" down to the last nook and cranny, to the plots left to run wild which no longer bear much resemblance to the vegetable garden. These extreme forms are obviously undesirable on allotments. In modern allotment associations, complaints are often made about gardens left to run wild, yet scant regard is paid to the excessive use of pesticides and artificial fertilizers. The present environmental situation and the risk of soil contamination call for more natural forms of cultivation and restrictions on the use of chemicals as a matter of urgency.

Many allotment holders who try to adopt an environmentally aware approach and to cultivate their plots by more natural methods are coming up against a lack of understanding from their neighbouring gardeners and allotment associations. This may well be due to the fact that errors in natural cultivation, such as letting wild flowers run to seed, are more visible than errors in handling chemical aids (over-use of sprays, spraying in windy conditions, discarding the remains of sprays, etc.). The effects of spreading toxic substances are far more disastrous than those of spreading wild flower seeds, however. The accumulation of chemicals in the soil and the interaction between different substances (synergistic effect) have unforeseeable consequences which, in most cases, are irreversible.

In order to pave the way for the development of more natural methods of cultivation and to counteract soil contamination, it is important to pay more attention to ecological relationships in the garden environment.

Objectives

The purpose of this report is to inform allotment holders of the most important aspects of natural garden management and to help allotment associations by acting as a guideline for assessing these forms of cultivation accordingly. Clear limits will show how both soil-destroying and soil-poisoning forms of cultivation and those that lead to an unnatural wilderness can be avoided.
Resolution
adopted at the meeting of the Office International des Jardins Ouvriers et Familiaux and the representatives of the affiliated member organisations in The Hague (Netherlands) from 27th till August 29th 1992.

1. Allotment holders as users of the environment.

Allotment holders make use of the environment and as such are dependent upon an intact environment.

2. Environmental impacts arising from private allotments.

In view of the above, allotment holders are particularly affected by the increasing pollution of the soil, the atmosphere and the water.

3. Allotment holders as environmental conservationists or polluters.

Allotment holders do not only influence the environment through their conduct as normal citizens but also through the particular way in which they treat the soil, the plants and the animals committed to their care. As a rule, this is done in a manner conducive to, or even compatible with, the environment. However, it may still happen now and then that allotment holders do not take proper care and hence cause damage to the environment, which may be either attributable to a lack of knowledge or to other reasons.

4. Allotment holders’ responsibility for the environment.

Allotment holders assume a special responsibility for the ground assigned to them, especially when this ground – as is done in many instances – is made available on particularly favourable terms and even in central urban districts notwithstanding other users’ conflicting interests. This responsibility calls for appropriate action.

5. Concrete action to be taken in view of allotment holders’ responsibility.

Allotment holders declare themselves:

- for the establishment and extension of a system of qualified „expert advice“;
- for an officially authorised „proof of proficiency“ for expert advisers;
- for the introduction of a „good expert practice in allotment keeping“; this should be done on a step-by-step basis and in a coordinated manner first at national and later at international level, e.g. in the form of a manual or a set of rules;
- in particular for the concept of „integrated control“ ** including soil protection;
- for an environmentally compatible and hygienic composting and disposal of wastes from allotments;
- for the development and improvement of a training concept for those holding a mandate in the allotment sector and for each individual allotment holder;
- for the use of „environmentally friendly products“, especially products carrying an environmental certification mark such as „Blaue Engel“ or ECO label;
- for a phasing out of chemical plant treatment products by systematically implementing the „integrated control“ concept and new findings adopted from „ecological agriculture“. 
6. Functional change in allotment gardening.

Until recently, private allotments mainly served the purposes of the allotment holder and his family, e.g. for producing a yield, for recreational purposes, for meaningful leisure pursuits, for enhancing human health by outdoor exercise, for promoting a more family-minded attitude through joint activities in the garden as well as social contacts.

Today, however, private allotments are beginning also to fulfil an increasing number of public functions, such as reducing the pressure on recreation areas in the immediate vicinity of conurbations, contributing to the public green areas accessible to everyone, promoting cross-link biotope concepts, serving for instructional purposes e.g. school gardens, improving the local microclimate, etc.

7. Conclusions to be drawn from this functional change.

Therefore, the Office International des Jardins Ouvriers et Familiaux and the representatives of the affiliated member organizations support the following initiatives:

7.1 To inform the competent authorities of the specific problems confronting the allotment holder and his family, the general public and the environment as such, as a result of the increasing pollution of the soil, the atmosphere and the water and as a result of the still unsolved problem of an orderly disposal of wastes from private allotments. The aim of this is to prevent, among other things, a further close-down of allotment grounds or the imposition of crop restrictions for fruits and vegetables;

7.2 To reach an agreement with the competent authorities ensuring that any future assignment of land for private allotment gardens be made conditional upon the results of a specific Environmental Impact Assessment (EIA) for this purpose. The aim of this is to prevent such allotments from being established on heavily polluted ground or at sites whose peripheral location would involve a considerable increase in traffic;

7.3 To gain the competent authorities support for the idea of a manual for good expert practice in allotment keeping to be based on the "integrated control" concept, and for appropriate instructional and advanced training measures;

7.4 To appeal to trade and Industry to offer products, in particular plant treatment products, in a manner conducive to the environment (e.g. ECO label) and tailored to suit the needs of allotment holders, i.e., appropriate package sizes and environmentally friendly packaging material;

7.5 To seek to establish a permanent basis of cooperation with environmental pressure groups and horticultural associations in order to ensure a mutual exchange of experience thus prompting allotment holders to increasingly adjust their management practices to aims of environmental protection and professional expertise.

*) Comparable for instance to the "good laboratory practice" concept applicable within the European Communities with respect to chemicals.

**) "Integrated control" (cf. Council Directive of 15 July 1991, Official Journal of the European Communities of 19 August 1991, No. L 230, Vol. 34: "The rational application of a combination of biological, biotechnological, chemical, cultural or plant-breeding measures whereby the use of chemical plant protection products is limited to the strict minimum necessary to maintain the pest population at levels below those causing economically unacceptable damage or loss."

***) Environmental Impact Assessment
On the occasion of the International congress in The Hague from August 27th till August 29th, 1992 a directive on a behaviour respecting the environment on the allotment and leisure gardens was adopted.

Respect for the environment means for the gardener or the allotment holder having regard both to ecological requirements and environmental protection.

In order to win the necessary acceptance from leisure gardeners for these principles the attitude to be adopted should be PERSUASION, not REGULATION.

Basic rules for integrated plant protection

- Plant cultivation:
  - selection of suitable plants for the planting position
  - careful study of crop rotation
  - selection of the most resistant varieties for the planting position
  - adequate preparation of the soil
  - healthy seed
  - healthy plant rearing
  - selection of best seeding and planting time
  - matching the supply of nutrients to the plants' requirements
  - application of the right cultivation measures at the right time
  - Rational application of a combination of biological, biotechnological, chemical, cultural or plant-breeding measures whereby the use of chemical plant protection products is limited to the strict minimum necessary.

Creation of natural habitats in the garden

The objective in a natural garden must be to respect all the elements and components of the garden as being the habitat of the indigenous flora and fauna and to ensure that it is so. The under-noted environmental protection measures are also essential:

- biotope and garden ponds (protection of residual area)
- dry stone walls as habitat for reptiles and insects
- flowery grassed areas to provide food for insects
- provision of nesting places for birds
- encouragement of bee-keeping
- management systems for the vegetable garden
- natural arrangement of the garden.

Environmental protection

- prohibition of herbicides
- avoidance as far as possible of the use of chemical plant protection products
- encouragement of composting
- garden waste not to be burnt
- limitation of areas that are concreted or otherwise sealed
- protection of surface and ground waters, requiring a fully reliable management system
- avoidance of refuse and separation of refuse into categories.
Resolution from Sandnes

After the adoption at the 28th international congress in The Hague of a directive concerning a behaviour respecting environment in the leisure gardens and the decision to put this directive gradually throughout Europe into practice, the delegates of the national federations during their meeting in Sandnes from June 27th till June 29th, 1993 have decided to continue to realize in a first stage the stipulations concerning environmental protection of the directive.

They acknowledge that as far as the subjects:

1) Renunciation/Defence to use herbicides.

A specific regulation has already been elaborated in Austria, England, Finland, Germany, Luxembourg and Sweden.

The renunciation/defence to use herbicides is stimulated in Belgium, France, the Netherlands, Norway, Poland and Sweden.

2) Stimulation to make compost.

A regulation has already been elaborated in England, Finland, France, Germany, the Netherlands, Norway and Switzerland.

The elaboration of a regulation is planned in Austria, Luxembourg and Sweden.

The making of compost is stimulated in Austria, Belgium, Finland, France, Luxembourg, the Netherlands, Norway, Poland, Sweden and Switzerland.

3) Renunciation/Defence to use pesticides.

A regulation has already been elaborated in England, Finland, Germany, the Netherlands, Sweden and Switzerland.

The elaboration of a regulation is planned in Austria.

The renunciation/defence to use pesticides is stimulated in Austria, Finland, France, the Netherlands, Norway, Sweden and Switzerland.

4) Renunciation/Defence to burn garden waste.

A regulation has already been elaborated in England, Finland, France, Germany, the Netherlands, Norway and Switzerland.

The elaboration of a regulation is planned in Luxembourg and Sweden.

The renunciation/defence to burn garden waste is stimulated in France, the Netherlands, Norway and Sweden.

5) Limitation of the sealed surfaces.

A regulation has already been elaborated in Austria, England, France, Germany and Switzerland.

The limitation of the sealed surface is stimulated in Belgium, France, Norway, Poland and Sweden.
6) Avoidance and separation of refuse.

A regulation has already been elaborated in Austria, England, Finland, Germany and Switzerland. The elaboration of a regulation is planned in France, Luxembourg, the Netherlands and Sweden. The avoidance and separation of refuse is stimulated in Austria, Belgium, Finland, France, Norway, Poland and Sweden.

7) Protection of surface and ground water.

A regulation has already been elaborated in Belgium, England, Finland, France, Luxembourg, the Netherlands, Norway, Poland and Switzerland. The protection of surface and ground water is stimulated in Finland, the Netherlands, Norway, Poland and Sweden.

As green arteries, the leisure garden sites in urban areas make a connection between the last shelters for rare species of fauna and flora and oppose themselves to the genetical isolation of different populations.

This important significance for our animal and plant world can only be assumed by the leisure garden sites if they are increasingly kept by methods respecting the ecological rules and without using pesticides. By the use of pesticides many species of animals are directly or indirectly killed by the way of their food resources and the cultivation of foreign species offers less and less food to the animal world.

In gardens characterized by a lack of natural diversity the pests have an easy task. Because of the absence of natural enemies they can develop without problems. The consequence thereof is an increasing necessity to use pesticides and the nature becomes poorer and poorer.

Therefore:

- all the federations are invited:
- to elaborate on the level of the federation or to work so that on the legislative level specific legislations will be adopted in this area;
- to insert the defense to use herbicides and to burn garden waste in the new leasehold contracts respectively in the documents signed when plots are put at the disposal of new leisure gardeners;
- to make old leisure gardeners renounce to use herbicides and to burn garden waste by information and education;
- to organize seminars and courses in order to stimulate the leisure gardeners to renounce to use pesticides;
- to insert a clause in the leasehold contracts stipulating that the use of pesticides has to be reduced to the absolute minimum;
- to elaborate a documentation on a correct compost making as well as on the separation and avoidance of refuse and to put it at the disposal of all leisure gardeners;
- to organize a system of soil analyses with consecutive fertilization advices and to take into consideration a possible financial support of these actions;
- to limit the sealed surfaces to such an extent still compatible with a gardening use of the plot.

* all the federations are requested:
- to transmit the elaborated documents to the Office;
- to make before May 1st, 1995 a report to the Office on the realization of the afore mentioned points.
Message
from Sandnes at the occasion

In execution of their responsibility for mankind and
environment, the leisure garden federations of Europe,
with their 2,300,000 leisure garden families, unified in
the „Office International du Cöin de Terre et des
Jardins Familiaux“ declare that they permanently ask
and stimulate their members to adopt a respectful
behaviour of environment.

„To be a leisure gardenner“ means to carry out punctually and
globally a mission as protector of the environment besides his social
and urban planning mission. Therefore compliance of his actions with
environment and the requirements of a socially equitable society should
by the criteria of all his actions.

Therefore the Leisure Gardeners
in Europe are invited:

1) to emphasize the protection of environment
   through personal responsible actions:
   * by applying as much as possible to the concept of
     the integrated plant protection: for ex. by
     adequate preparation of the soil; by a choice of
     suitable and resistant plants, of healthy seeds; by a
     healthy plant rearing and a correct plant care;
   * by completing the curative measures of water
     pollutions by measures preventing potential water
     pollutions;
   * by an effective gardening in accordance with the
     requirements of nature: renunciation to use
     herbicides; limitation to a strict minimum of chemical
     plant protection products ....
   * by the creation of natural habitats in the garden.

2) to bring their actions more and more in
   compliance with the requirements of a socially
   equitable society;
   that means that they have to evaluate the negative
   effect of their actions from the ethical point of view
   not only as far as the individual and their own
   community is concerned, but to orientate all their
   actions in respect of the whole humanity, both the
   present and the future.

Therefore the leisure gardeners ask
all the Governments in Europe as
well as the European Communities
and the Council of Europe

to take the problems of the leisure gardeners in
Europe into consideration, to support constructively
their actions and to grant them whatever possible
support both from the material point of view and
the point of view of ideas.

11
The value of our allotments in the modern world should not be forgotten.

Firstly, because of the leisure time that people like to spend in their gardens, the daily stress that can be worked off after a long day, and because the garden is a place of refuge where people can experience humanity in a large city.

For children, we can create a natural world of discovery from the time they are small to when they are grown; the ever-changing life in the garden will reflect their own experience of growing up. Although the idea of community associated with allotments has diminished somewhat, there is still undoubtedly a further reason for life on the allotment: sharing information over the garden fence helps to widen our knowledge, diversify our interests and to make us realize that man is but part of this world, not the centre. The sense of isolation is alleviated, particularly in old age. In modern times, however, this very exchange of information is making our gardens more uniform; indeed, they are almost being reduced to serving a purely representational purpose. An allotment owner whose garden is not squarly clean will soon become an outsider, or even someone who is tyrannised and shunned.

Finally, allotments in large cities are part of the green space that is so vital for existence.

Eco-logical methods?

Many garden enthusiasts sink into torpor and restlessness in the autumn. According to their logic, the garden must be cleaned and polished, just like the house. This is called the „cleaning syndrome“.

Removing every leaf and piece of organic material results in depleted soils that are open to attack by wind and water.

Even the relentless pursuit of every „weed“ is worth noting. When the roots are removed, vital cavities in the soil are destroyed; when whole plants are removed, the habitats of animal groups are destroyed. There is then talk over the garden fence of how high the water bills seem this year.

But surely all these things cannot be connected? It seems so illogical.

On the contrary, it is quite logical! In a cultivated garden, every act of human intervention in the garden habitat leaves its traces.

Changing a piece of ground, artificial watering, planting exclusively exotic varieties of plants, the kind of manuring used and human behaviour patterns such as car driving and parking on the allotment site all give rise to a response from the garden: destabilisation of existing living communities, i.e. absence of native birds, exodus of hedgehog families, laws covered in moss - in short, changes in native plants or animals that may be sufficiently far reaching (or whole species to die out (see the Red List of flora and fauna which are under threat or have already become extinct in our lifetime).
Historical background

In 800 BC a form of culture was restored to life: the garden. Now, in the 20th century, it should not decline due to convenience or ignorance but needs to justify its existence as an expression of human culture.

It was restored to life because it had already been destroyed once after the troubles of folk migrations in antiquity. In view of this fact, ecological allotment cultivation is not a fashionable trend but a revival of an old culture and a way of living.

The allotment holder, so often an object of fun, should not lose sight of the value of his role.

Ecological - the concept of ecology

Ecology as a branch of science will celebrate its 110th birthday in 1996. More than 100 years ago, Erich Haeckel was the first biologist to explore the relationships between plants and animals as well as their relationship with their surroundings (environment: soil, water, climate), and he named this branch of biology ECOLOGY.
Ecological gardening is

* an old cultural activity
* based on scientific principles

Some ground rules

* The greater the diversity of habitats, the greater the diversity of species in plant and animal communities.

* Uniform habitats (monocultures, planting one variety only) often give rise to a richness of individuals but reduce the diversity of species (many creatures of one kind find a habitat that is only suitable for them, e.g. harmful insects that have no natural enemies can be kept in check only by the use of crop protection agents).

* Human intervention in habitats (e.g. population densities, changes in the land and soil, artificial irrigation systems) always lead to changes in species, reduce the diversity of species, destabilise existing communities of life forms and even cause the extinction of various creatures unless enough habitats can be created for the native life forms ("ecological niches").

* The art of ecological gardening lies in restricting the diversity of species.
January
As the gardening work is over and you should not
walk on wet soil, all that need be done is to collect
kitchen waste for the compost heap. Give young
trees a loam wash.

February
On days when there is no frost, chop up tree and
hedge cuttings, mix them with the kitchen waste
collected in January and put them on the compost
heap. Ask the person in charge of the allotment
whether a shredder can be hired.

March
The mulches and remains of green manures rotted
down by the frost can be gradually removed from
the places where you plan to grow vegetables and
plants and put on the compost heap. Loosen the
soil with a single-pronged hoe before sowing.
Put water dishes with ramps for insects in several
places around the garden. Birds will drink from
them and the young birds of fruit and berry bushes
will be spared.

April
Sow leguminous plants beneath trees and bushes
and wherever else you plan to plant them.
Use fleece to protect young vegetables from night
frosts.

May
After the fruit trees have blossomed, apply liquid
manure made from your own plants or from the
liquid manure butt (see Manuring) around the base
of the trees. Lightly hoe leguminous plants, sow
nasturtiums beneath the trees and wherever there
is a bare patch of earth. Collect nettles for making
more liquid manure. Water in dry weather. Loosen
the vegetable patch with a single-pronged hoe.

June
Give plants with a high nutrient consumption a
dressing of nettle manure (diluted to at least one
tenth of its strength) and water in dry weather.
Apply compost to recently harvested vegetable
rows. Mulch or sow phacelia.

July
Prune berry-bearing bushes after picking and mix
prunings with compost. If necessary, spray vegetable patches against harmful
insects (horsetail, wormwood). Manure with plant-
based liquid manure.

August
Apply compost to strawberries after picking, and
cut down to 1 cm above the ground.
Apply plant-based liquid manure to vegetable
patches before the autumn harvest.

September
Mulch vegetable patches after harvesting. Sprinkle
horn-sheavings and a little wood ash (although it is
better to spread these over the compost heap).
Intercrop with lamb’s lettuce as a green manure.
Planting holes dug out for bushes and fruit trees
should be at least twice as large as the circumference
of the root ball, filled with compost or bark humus
and filled in again until ready for use.

October
Plant berry-bearing bushes in the holes prepared.
Towards the middle of the month, follow the same
procedure for trees and deciduous shrubs. Fallen
leaves will serve as a soil mulch for trees, bushes,
vegetable patches etc.
Remove leaves from the lawn.

November
Continue to remove leaves from the lawn and use
as mulch or compost. Earth up soil round roses.
The planting of deciduous shrubs can be continued
till it is freezing.

December
Chop up tree prunings for compost. Spray and
water newly planted evergreen trees with water on
frost-free days, remove rotten fruit from trees and
discard in a dustbin for garden waste. Do not use
this for your own compost. Commercial composting
produces so much heat that plant diseases can be
killed in a controlled manner.
Soil care

An active soil life is vital for providing cultivated plants with healthy food. There are more creatures in a handful of healthy garden soil than there are people in the whole world. These countless soil-dwelling creatures in the soil are responsible for loosening the soil, the soil structure, providing nutrients, breaking down organic material, and controlling harmful organisms living beneath the ground. The soil can be protected and its life forms encouraged and nourished by providing plenty of humus with compost and a covering of green plants or a layer of mulch to protect the soil from weathering (covering the soil with decaying organic material such as shredded lawn mowings, leaves, straw, green cuttings etc.). In order to protect the soil life and promote a good soil structure, the ground should not be dug over and never left fallow for long periods (a healthy soil will remain crumbly and loose even without frost action).

In late summer, patches of earth that are no longer required can be sown with a suitable interim crop so that the soil remains covered during the winter (e.g. spinach, phacelia, clover, yellow mustard). Patches that do not become free until the autumn can be covered with a layer of mulch.

Manuring

Manuring is best done with organic materials and only during the growing season. Well tended garden compost, possibly mixed with composted liquid manure from cows, horses or other mammals is suitable for basic manuring, a total of 4 to 6 times (= 1 to 2 shovels) of compost per square metre per year is sufficient. Plants that require a large amount of nitrogen should also be given a dressing of e.g. horn meal (30-50 g/m²), and plants requiring extra potassium should be given wood ash (100-150 g/m²) or comfrey liquid. Phosphorus-rich manures such as chicken manure, bone meal, sewage sludge and certain compound fertilisers should be used with great restraint, and only in justifiable cases, since too much phosphorus will accumulate in the soil.

It is important to apply manure in the right quantity. Too much or too little can both lead to plants that are susceptible to disease.

Materials needed for improving the soil, manuring and composting:
Rock meal, horn meal, organic compound fertilisers, "Toresa" peat substitute, bark compost, dung compost, mulching materials, fleece, compost bins. Cooperation with nature should always be the prime aim when cultivating a natural garden! This should always be borne in mind.

Practical tips:

Making use of all the organic waste from the home and garden for composting and mulching is the basic principle of garden manuring. Green manure plants can also be sown. By creating raised beds you can ensure a "fully automatic" supply of nutrients to the plants grown on them. It may be appropriate to provide additional organic nitrogen manure for vegetables with a high nutrient uptake such as cabbage or cucumbers. Apart from organic commercial fertilisers (such as horn-shavings, horn meal), nettle liquid manure is also suitable.

Steep the nettle leaves in a butt of water for about 10 days, the liquid manure can then be diluted 1:10 and applied as a liquid nitrogen manure. If there is a calcium shortage, marl, slag lime or calcium carbonate may be used.
Home-made compost is the best and cheapest way of looking after and improving the soil in an allotment cultivated on ecological lines.

About 33 percent of household waste is suitable for composting. A family of four with a garden 500 m² in size will produce 400 kg of household waste per year, at least a quarter of which can be used for composting. This, together with the organic material from the garden, will give about 60 kg of mature compost per year.

**A rule of thumb**

Chop up all material as small as possible.
Mix together as many kinds of chopped up waste as possible.

**e.g.:**
1 part of material containing carbon
3 parts of material containing nitrogen

**or**

Dry - wet
Coarse - fine
Rotted - fresh
Kitchen waste - garden waste

**A quick test**

Add water until a few drops appear when the mixed material is squeezed together.
Leave a few unchopped pieces of wood in the mixture to let a sufficient amount of air into the spaces.

**Make compost all the year round**

The more often you turn over and move the compost heap the quicker it will rot down. Every two weeks at first, approximately four times in succession, then at least once every two months.

Always cover over the compost heap
The compost bin

Closed containers that can easily be put together or taken apart by one person are suitable for allotments. The containers should be placed in an unobtrusive part of the overall arrangement of the garden. They should be shaded for half of the day, if possible, and should stand beneath a bush or group of trees. The main requirements are stability and durability.

The container should hold at least one cubic metre of material, since a minimum amount of natural moisture is required for the organisms living in the compost bin during the rotting process. It must also have air inlets. Do not concrete a pit complete with base into the ground out of an excessive zeal for cleanliness. The compost worm cannot live without oxygen and access to the soil.

What goes in the compost bin?

Planning

Plan to leave 5 percent of your vegetable garden area for preparing compost. In a garden with a total size of 400 m², this means a surface area of about 15 m² in the vegetable garden.

The compost bin should not be too far from the shed, or from the water point.

Put down a firm base over areas you walk on (e.g. duckboards); soil contact should be preserved elsewhere.

If you are able to put your compost bins under trees or bushes, this is the ideal solution, particularly in drier areas. Provide some shade by planting at the base of the compost bin. A trellis of climbing plants has proved to be suitable. Some sturdy plants that are always successful are listed below:

- Sunflowers
- Scarlet runner beans (grown in a wigwam)
- Melons
- Runner beans
- Sweetcorn
- New Zealand spinach
- Nasturtiums
- Hops
- Members of the pumpkin family.
All organic material produced on an allotment can be composted.

Two methods can be used on the allotment:

1. If you have sufficient material (at least 1 m³) at any one time (usually in autumn), pile up a completely chopped mixture in one go.

2. If you have a little material from the kitchen or garden from time to time, throw it in the compost bin and cover it with earth. Turn or shake it up thoroughly with a fork every 14 days so that sufficient oxygen can enter for the composting organisms.

The most frequently occurring composting material on the allotment:

**Nitrogen-containing**
- Kitchen waste, grass, lawn mowings, stalks, hay, leaves, remains of weeds and fruit, animal wastes and flower cuttings.

**Carbon-containing**
- Leaves, twigs, sawdust, and natural wood shavings.

Key words in composting

- **Meat waste** should be discarded in the dustbin (attracts wasps and rats)

- **Citrus fruit skins** throw up to a handful on the compost heap every two days

- **Place seed-bearing weeds** in the middle of the compost heap only if you can be sure that the temperature reaches at least 60 degrees, otherwise it is better to throw them in the dustbin

- **Cat litter**: only use organic litter (no chemical additives)

- **If you only have grass**:
  try to obtain some leaves or small twigs or prunings from your neighbours. Otherwise, leave grass to dry out for two days, then water and place in compost bin. Aerate or turn grass at least once a week otherwise it will "burn" and go white inside. The process is complete once there is no further heat development and the compost no longer compacts down. Special compost for the flower and vegetable beds, shrubs and berry-bearing bushes.

- **If you only have leaves**:
  Mix them with kitchen waste, otherwise add seaweed meal, blood meal or horn meal, old compost earth, keep moist, turn in the same way as grass so that the leaves do not stick together. Special compost for evergreen plants, azaleas, rhododendrons, evergreen trees.
The compost bin smells

Turn it over immediately, aerate it, mix in some dry twigs and check the moisture content (squeeze test).

The compost does not heat up

(usually with leaves and twigs). All the water has been removed, but the compost will keep for years in this state. A compost heap of the right composition should start to warm up within three days (put your hand inside the heap to test it). If it is still not warm, turn heap over and spray with water. Mix in grass or kitchen waste.

The compost is always white/grey inside.

Turn over the heap to introduce air, spray with water and add damp leaves and twigs. If necessary, add bentonite in dry regions, or better still, loam.

Wasps, rats and other pests

Do not compost any meat waste and always cover over the compost bin.

Compost bins that stack together
No one can say for sure when the compost will be ready. Depending on the external temperature and the mixture, various compost stages can be identified e.g. when it is still warm, when a large number of soil-dwelling animals are working in the soil.

Mature compost smells like forest earth. It is dark and resembles real earth. This is mature compost (after about 8 months) and can be used for all plants.

If the compost looks like earth after only 4 months but still contains a large amount of coarse material, soil-dwelling animals and red compost worms, it is fresh compost. It is very rich in nutrients and can be used only in certain instances, e.g. for courgettes or pumpkins.

In principle, mature compost can be used all the year round on the allotment since the nutrients are only released by the soil-dwelling creatures so there is no danger of over-manuring. The humus earth can be prepared for use by sieving through an inclined compost sieve.

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Lawns
Sprinkle 10 litres of compost per 5 m² by hand before the growing sports at the end of March and the middle of July. If you do not pick up the lawn mowings after mowing you can sprinkle compost over the lawn surface like icing sugar each time you mow. If the soil is healthy, both grass and compost will have been worked in within a week (this serves as a test method at the same time!)

Good tip
Mow on dull days or before rain

Fruit trees
In the autumn, spread 2 cm of mature compost round the base of the trees and cover over with fresh compost and leaves. When planting new trees, work in 3 shovels of mature compost and rock meal into a sufficiently large hole and fill in with earth. Plant after 3-6 weeks. If necessary, add blood meal (nitrogenous).

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Evergreen trees and shrubs
Work in mature compost into the uppermost layer of soil.

Ornamental shrubs, berry-bearing bushes
Mix with mature compost

Herbaceous border
Apply about one bucketful of mature compost earth (10 l) per 2 m² after flowers have bloomed and work in lightly with a rake.

Roses
Keep covered all the year round with a layer of mature compost and in winter with coarse, unsieved mature compost (work in composted mature, if necessary). A covering of bark compost is also recommended. Prune after the first blooms, apply a handful of organic compound fertiliser plus wood ash and rock meal containing magnesium, and water with plant-based liquid manure every 2-3 weeks. Stop manuring after the end of July.
Mulching, that is, covering the soil with suitable organic material, is a special form of composting. Unfortunately, it is often dismissed by gardeners as an "untidy practice".

<table>
<thead>
<tr>
<th>Depth</th>
<th>Temperature in degrees C</th>
</tr>
</thead>
<tbody>
<tr>
<td>15 cm</td>
<td>-14</td>
</tr>
<tr>
<td>10 cm</td>
<td>-11</td>
</tr>
<tr>
<td>5 cm</td>
<td>-6</td>
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**Soil**

A cover of leaf mould to a height of 15 cm above the ground will protect the soil and all its living organisms over winter, up to minus 14 degrees C. Always cover your soil with a suitable mulch; even the summer dryness can do serious damage to the soil. Straw mulching will also prevent the removal of soil by the wind.

**The advantages of mulching**

- Keeps the soil temperature constant
- Prevents erosion by providing shade
- Makes use of organic material as a surface compost
- Smothers weeds
- Inhibits attack by pests
- Acts as a source of nutrients for soil-dwelling animals and plants on frost-free days
- Preserves moisture, improves the soil climate (reduces the need for watering)
- Improves the quality, keeping properties and taste of fruit and vegetables
- Prevents the soil becoming exhausted.
Use

Loosen the soil first with a fork or hoe, then wet it slightly and apply about a thumb’s thickness of material. “Little and often” is better than one thick application. For winter protection, gauge the thickness of the layer by the expected outside temperatures. (see sketch)

- Lawn mowings (never around apple or pear trees), plant cuttings, wild flowers without seeds, hedge trimmings; slightly dried tomato plant waste; suitable for short-lived plants (flowers and vegetables).
- Chopped straw, chopped hedge trimmings, chopped leaves (see below), bark chippings, dried lawn mowings; suitable for all ornamental bushes, herbaceous plants and flower beds.
- Coffee grounds, leaf mould; suitable for all bog plants and evergreens.
- Tea leaves, bark mulch; suitable for roses, plant beds.
- Fennel; especially for strawberries
- Living green manures and mature compost; for all perennials
- Dung-based compost; especially for vegetables that take a lot of nourishment out of the soil (e.g. celery, leek).
- Sawdust compost; for fruit trees and berry-bearing bushes.
- All kinds of leaves: elder, acorn, beech, fruit trees, birch (promotes rotting of compost and manure), willow, hazel (fewer mosquitoes and flies), elm.
- Use oak leaves, nut leaves, poplar leaves and chestnut only if finely chopped, otherwise avoid using them as mulch (high tannic acid content).
Imagine the garden soil as a living organism.

It must be fed, tended, watched over and guided by the gardener so that it retains its fertility.

An active soil with a plentiful supply of air and water is the basis of every ecologically managed allotment.

There are some test methods that will tell you about the state of the soil on your allotment:

* Less than 24 hours after it has rained (3mm of precipitation), the soil should be moist to a depth of up to 10 cm. The middle should be wetter and the upper surface should appear drier. Drive your spade into the earth in several places and see what your soil looks like.

* A shower of rain should not cause any puddling on the surface, and the water should drain slowly into the soil.

* Any organic material (mulch) applied in a layer of 2-3 cm should have rotted within 4-6 weeks.

* You can never be quite sure what kind of soil you have inherited from previous owners.

There is more life in a handful of good soil than there are people on this earth.

The following test is another way of checking your own progress in your 'ecological garden'.
The potato test

This tells you about the soil quality.

After loosening the soil surface gently in the spring, plant early potatoes.

Assessment: Rapid growth and firm, storable tubers are an indication of good garden soils.

Excessive manuring (usually nitrogen) produces nice large tubers with luxuriant foliage. During storage, however, the tubers soon turn black and go rotten.

A very poor soil deficient in organic material and soil-dwelling creatures, usually with compacted subsoil (due to building machinery), results in poor tuber germination. They do not grow much larger than an egg. Even the foliage soon droops and dies off.

Organic manuring is a „basic food” for the garden soil. The overall proportions of organic matter are approximately:

- 85% decayed plant remains
- 10% living plant roots
- 5% soil-dwelling organisms.

If we count the weight of soil organisms for every 400 m² of surface area, this gives a total weight of 300 kg. This corresponds to the weight of a calf. Earthworms account for the majority of this with 40 kg. That’s about 320,000 worms. Mulch compost contains countless numbers of these creatures, including the earthworm. Charles Darwin proved the importance of worms scientifically. He calculated the weight of the fertile worm excrement in the topsoil of a cultivated field soil and arrived at a figure of 1000 kg per 400 m² per year.

The scientific name for worm excrement is clay-humus complex. Its importance can be equated with the soil fertility.

Worm excrement contains twice as much lime
- 5-7 times as much nitrogen
- 7 times as much phosphorus
- 11 times as much potassium
- 2-5 times as much magnesium

as normal, fertile garden earth. It is possible to observe the activities of earthworms in the garden. Look for small dark heaps of earth (the size of a grape, a few mm high). Earthworms push these up as they move along.

They are easy to spot after rain. In the spring you can even hear the worms „snacking their lips” in the twilight.
Other tests for your soil:

Acidity: A garden soil with a pH between 6.5 and 7.5 would be ideal. If your soil has this pH, sprinkle rock meal on it in the autumn and mulch with natural compost.

If the pH is below 6, sprinkle calcium carbonate in the compost and apply this to the soil. Test the soil yourself with commercially available indicator strips. Moss in the meadow, for example, will indicate an acid soil.


determination:
Sprinkle a few drops of vinegar onto the soil. If the soil foams and bubbles continuously, you can be sure it contains more than 10% lime. All weaker reactions will indicate less than 10% lime. An adequate supply of lime improves the soil structure, since organic material will be rapidly decomposed. This is very important if you are working with compost in the garden. Lime also regulates the water balance of plants and affects their cell structure, so well-developed plants are an indication of a soil that contains sufficient lime. Dandelion, chicory, calendula, common toadflax, scarlet pimpernel, to name but a few, will thrive. Nutrient tests can also be carried out at home with commercially available soil testing kits.

Phosphorus is important for the development of flowers and seeds. High phosphorus values are able to fix trace elements such as iron and zinc. In practice, for example, the leaves of the sunannya tree will not turn red in the autumn if there are insufficient trace elements. The phosphorus content of most garden soils is too high (90 mg/100 g of soil would be sufficient). Compost management and mulching can bring the soil into equilibrium within a few years.

Nitrogen: Plants form chlorophyll and protein. An excess will eventually lead to the well-known nitrate problems. If plants are no longer able to take up everything they need for nourishment and growth due to an excessive nitrogen supply, nitrogen is washed out of the soil with rain and watering. You can tell if there is excess nitrogen because plants are puffy and very susceptible to disease. Plants shoot up and do not last. Nitrogen-deficient soils are indicated by: hare’s foot clover, wall pepper, wild carrot and common broom. Nitrogen-rich soils are indicated by: common chickweed, mercury, nettles, wild chervil, dead nettle. Composting, mulching and green manuring are recommended.

Magnesium is an important factor in the allotment for chlorophyll formation. A magnesium deficiency results in bluish-grey leaf edges, pale grey spots followed by the spread of brown and red patches.

Notice:
Soil analyses made by a specialised laboratory give of course more precise informations to the leisure gardener.
Rule of thumb:

Areas that have become compacted during cultivation, or heavy clay soils can be dug deeply in the autumn, the vegetable patch is best dug in the spring. Try to disturb the living structure of the soil less and less as time goes by and to avoid mixing up the different soil layers by adopting composting, mulching and green manuring techniques. Each layer of the soil has its own living community that has welded itself together and works hard to make your soil as fertile as possible.

Tip:
Always work the soil when it is slightly damp - never when wet.

Important soil cultivating tools for the ecological allotment

When choosing tools you should decide on the basis of how the tool feels in your hands and how it is to be used later.

The main thing to check is the length of shaft and the handles. If several people work in the garden, a variable shaft system is recommended. Do not buy any curved metal handles that are open and have holes in them. The weak point is where the shaft and the tool are joined. They are often wobbly, should be joined, welded or pinned together insecurely.

Tools recommended:
- Spade
- Three-pronged hoe
- Soil aerator (cultivator)
- Single-pronged hoe
- Rake
- Double hoe

The earth around bushes, ornamental plants, shrubs and trees can be loosened with a fork. The meadow should not be forgotten either. Sow green manure and let that do the work for you. Apply a mulch. Notice how the material disappears at increasingly short intervals. This is how to cultivate your soil successfully by adopting ecological techniques.
Gardening measures should limit biodiversity only to the extent that the plants cultivated do not suffer any adverse effects.

A living soil is basically the first line of protection for cultivated plants, since pests and beneficial insects usually maintain an equilibrium.

The garden plants we grow, which are drawn together from many different types of climatic conditions, have varying differing water requirements.

A well functioning soil can store sufficient water to prevent cultivated plants drooping and dying, even in extremely dry periods.

Correct watering in the ecological garden means protecting plants:
The lawn, the largest water consumer, uses up about 25 litres per square metre per week. A well tended lawn can therefore be watered once a week in dry weather.

The water requirement of fruit trees increases from the cherry, pear, through peach and plum to apple. In our latitudes, 30 litres of water per week is sufficient for young trees in extremely hot summers. Their root system is not yet fully developed.

Overwatering could inhibit the natural growth of older trees. That means fewer flower buds and fruits are set for subsequent years.

Mature berry-bearing bushes, native hedges or Mediterranean trees require no extra water apart from rain if the soil is intact and well tended.

Strawberries, on the other hand, can be watered liberally right up to October except when they are fructifying.

A good garden soil can store up to 100 litres of water per square metre.

Here is a quick test for those who are curious:

Dry out a sample of your garden soil in the sun and then put it into an empty toilet roll covered with a nylon bag. When the roll is filled to the top, stand it on a saucer and weigh roll plus saucer on the kitchen scales (dry weight).

Then add water slowly from above until it trickles out from below. Repeat after two hours. Soak up the water that seeps out with a paper towel. Then weigh the roll plus saucer again on the scales (wet weight). The difference between the wet and dry weight is the weight of absorbed water that the soil can store.
It may sound strange, but the best time is after gentle rain. The ground is then slightly damp and will absorb water more easily.

Unless you are rich enough not to worry about your water bill, never water at midday; that is when evaporation is at its greatest. Evaporation can be reduced by mulching.

Watering in the morning will strengthen the parts of the plant above ground (stalk, leaves, flowers, fruits), since the flow of sap rises before midday.

After about 3 o'clock in the afternoon the evaporation losses are about 30% lower than at midday, and the sap is flowing downwards. Watering will therefore strengthen the root area of the plants (highly suitable for young plants or root vegetables). Do not water too late, however. The heat of the day should allow the leaves to dry off, preventing infections and pest attack.

If you can find room for several water butts in your garden, the water can warm up more quickly. You won't have so far to walk, and plants like warm rainwater.

Watering once is better than hoeing twice.

No cold showers

Stagnant rainwater is the best form of water for watering gardens. The epidermis of plants (particularly of vegetables and flowers) pulled taut by the sun is not as stressed as it is by the use of tap water. Splintering can be prevented, and rot-inducing bacteria cannot develop so quickly.

Do not use the watering can to spray the plants all over: the water should be aimed at the shoots directly.

It is better to water thoroughly once a week than superficially every day.

One full watering can (10 l/m²) will moisten the soil only to a depth of 10 cm. If several plant roots penetrate the soil to a depth of 1 m, that is obviously too little.

Another word on „spraying”

Spraying, sprinkling and watering are all good for strengthening the growth of plants on the ecologically managed allotment.
Create habitats for typical garden dwellers

A rich diversity of both animal and plant species is vital for healthy plant growth. The greater the diversity in the garden, the fewer diseases are likely to occur. If the garden is provided with natural entities such as hedges, meadow, marshy patches, nesting sites for insects and such like, an equilibrium will usually be established between beneficial insects and pests. Every creature is a predator, and will in turn be eaten by another.

Earwig
A piece of hose (20 cm) through which a piece of wire is drawn should be hidden in a tree. At night the earwig will hunt aphids; by day it will sleep in the hose.

Syrphus fly
Cut off a piece of branch or wood about 10 cm long and drill holes of various sizes in it. Plant umbelliferous and their wild forms (caraway, pimpinella, dill, lovage, wild celery, wild carrot, anise). Syrphus flies look like wasps; the larvae can eat up to 900 aphids.

Lacewing fly
Plant narcissi beneath fruit trees. Protect the overwintering animals in your greenhouse. They have transparent greenish wings and hunt insects, hatching larvae and destroy aphids.

Hornet fly
These are important in the fruit garden. Plant umbellifiers (see syrphus fly). Thin, black and yellow insects, they hunt flying insects, beetles and bugs.

Tits
Put up a tit nesting box with an entrance hole facing south-east. Tits destroy a huge quantity of small insects (mites and aphids).

Moles
Moles should not be killed but driven out only in places where they are causing rather a lot of damage. Lay pressed garlic in these runs, or put an upturned bottle in the way. The family will probably turn towards the compost heap. The immense importance of the mole for allotment holders can be seen from the amount of food they consume. They eat more than their body weight each day of insects, small mice, larvae of mole crickets, and worms.

Ladybirds
Plant nettles and comfrey. The larvae (longish, bluish with black spots) destroy aphids, jumping plant lice and mites (about 100 per day).

Ground beetle
Create a stone hiding place. Countless varieties, e.g. the greenish-gold brass beetle or the black carrion beetle eat snails, caterpillars and larvae.

Flower and leaf bugs
Do not squash them: they eat aphids, their eggs and red spider mites.

Bees
Plant nectar-producing plants (phacelia), and make sure there is food in the spring: catskins, forsythia, crocus, heather, hazel bushes, snowball bushes as hedge plants.

Ants
These are the cleaning up brigade in the garden. If they start to take over, put an upturned flower pot in their path. The „collection“ can then be carried away easily.
Plant trees that promote bird life and provide natural nesting sites and food sources in the garden.

These include:
wild cherry, dog rose, cornus, barberries, yew, privet, hawthorn, hornbeam, bramble, elder, rowan, hazel, spindle tree, snowball bush, fly honeysuckle, raspberry, holly, cornelian cherry, wild apple, willow, oak, black alder, garden hawthorn, ivy and Virginia creeper.

Hole-nesting birds are finding fewer and fewer natural nesting sites in our towns and gardens.
Man's desire for efficiency and tidiness is responsible for the fact that many hollows in trees and walls are disappearing, as are these types of birds. We can relieve their shortage of nesting sites by making simple nest boxes.

2. Assembly

(see sketch)
The dimensions given are only for planks 24 mm wide. Otherwise the dimensions differ for the front wall and the base. The parts are assembled in the following order: 1, 2, 3, 6, 4, 5.

The back wall should be inclined slightly at the roof so as not to produce too large a gap. The opening mechanism (nail holes = ND) is provided by 2 nails driven through the side wall into the front wall at the same height. Two more nails are bent over to serve as the lock (NV = nail lock).

1. Materials required
- Well dried coniferous wood
- Dimensions 145 x 18 cm, 24 mm thick
- Nails and 2 wood screws, approx. 40 mm

3. Protection against moisture

It is not usually necessary to paint the wood to protect it from the damp because:
1. the box will dry out again in the sun, and
2. it will last several years even without being treated. Those who want to protect the box from the wet can plane the outer surface of the boards (so that the water does not have such a large area to attack) and paint it with a biological wood preservative. The interior should always remain untreated! Please do not use the usual wood preservatives: the toxic vapours evaporate and can harm both young and mature birds. Coating with tanned felt does not help (promotes condensation).
4. Choosing a site

Generally speaking, nesting boxes should be hung up only in places where no plant protection agents or insecticides are used in the vicinity, otherwise the birds will pick up poisoned insects and will be severely damaged or even killed. The boxes should be hung at a height of 2-4 metres and should not be exposed to the sun, wind and rain. If all the boxes are full, this means there is a shortage of nests and it is advisable to hang up more boxes.

5. Cleaning

The old nests are removed in the autumn and the boxes can be cleaned out with a brush if heavily soiled.

Never clean the boxes with chemicals!

If you find overwintering dormice, bumble bees or hornets when cleaning out the box, do not disturb them: they too have a shortage of nesting sites. When they have “moved out” in the spring, the old nest can be removed.

6. Entrance hole

In order to encourage only one type of bird, hang up nesting boxes with different sizes of hole.

Diameter 25 mm
for blue tits, marsh tits

Diameter 32 mm
for great tits, nuthatches, pied flycatchers, tree sparrows

Diameter 32 mm to 50 mm
for redstarts.

For partially hole-nesting birds such as the redstart and grey flycatcher, replace the front wall by a piece of wood about 12 cm high.
Biodiversity in the garden is essential for a stable ecological equilibrium and therefore makes the most effective contribution to successful plant protection. Even insects that are scarcely noticed have a crucial part to play.

Simple nesting aids made of wood help "beneficial" wasps. Our sketch shows a sand wasp preying on a caterpillar.

We can encourage these numerous little friends effectively by providing habitats (such as hedges or meadows), tolerating wild plants and preserving "wild corners", e.g. piles of dead wood. With some species, nesting aids improve their chances of moving in.

This is particularly true of one of the largest groups of insects, the hymenoptera, which includes bees (and bumble bees) and wasps (and hornets).

Many gardeners may be doubtful at first about encouraging wasps. The majority of our species of bee and wasp are neither pest nor plague. Bees and wasps carry out important pollination work in the garden and help to decimate (and control) plant-eating insects (pests).

Most species of bee and wasp are solitary rather than colony-forming insects. The females build breeding tunnels in decaying wood, old fence posts, hollow stalks of plants, stone clefts, sand pits or paths, and tend their brood without the aid of their fellow insects.

Either pollen or nectar or, in the case of most wasps, damaged insects and caterpillars are brought into the breeding chambers as a source of food. The chambers are then sealed with loam or resin.

For some decades now we have noticed a sharp decline in the solitary species of bees and wasps in the wild. The reasons for this are the use of environmental poisons, and the removal of suitable nesting sites.

If we consider their way of living, we can help threatened insects in our gardens with simple, effective methods.
Wooden nesting aids

We can offer suitable nesting sites with drilled lumps of hardwood, logs or stumps (oak, beech, acacia or fruit tree wood).

The holes should be about 1–10 mm in diameter, 5–10 cm deep and drilled horizontally. Hollow stems and branches of elder or reed can also be bundled up and suspended. These nesting aids should be hung up or placed in a sunny position protected from the wind. Even on a balcony in the city these nesting aids may be accepted if the conditions are favourable.

Tree stump as an „insect tower“

Nesting box (filled with hollow stalks)

Food plants and avoiding the use of toxic substances

Even the crevices in dry walls or open sand surfaces (e.g. on paths in the garden) are used by many species as nesting sites. Habitats and sites with a profusion of flowers (meadows, flower beds, wild flower corners) are equally important as a source of food. In each case we must avoid endangering bees and wasps by using toxic chemicals (insecticides, weedkillers).
Obviously, extreme weather conditions can disturb the balance in the garden from time to time, and the number of pests may increase. The ecological gardener should not immediately reach for the toxic spray. In time, the balance will normally be restored of its own accord.

A worrying case of plant disease and attack suggests insufficient care of the garden.

In the words of Prof. A. Howard: „Healthy plants protect themselves“.

Shriveled, falling leaves or needles with diseased withered spots, withered growing tips, rotten fruit - these are signs of diseases caused by bacteria and viruses. Sprays that control these bacteria and viruses have no place in the ecological garden. Instead of using growth-promoting manures (e.g. fresh dung), use a 30-fold dilution of plant liquid manure and mature compost as a mulch. Cut away the affected places right back to healthy tissue. Do not throw them onto the compost heap. If the problems recur, check whether the plant is in the right position. Consider how resistant it is to pests. There are plants which attract aphids. One example is the wonderfully fragrant mock orange.

If this happens, consult the specialist literature. There are already some good biological pest control agents for emergencies. Natural pyrethrum can be used for mock orange. Years when the weather is humid and damp are often to blame for spongy, bloated plants.

Plants can be attacked by more than 3000 types of fungi

Mildew, scab, rust and botrytis are the most well known fungi in the garden. In susceptible places try to strengthen your plants from early spring onwards. This includes spraying with valerian extract and preparations containing silicic acid (waterglass, horsetail extract).

In an ecologically managed garden, protecting plants means preventing not controlling pests.

A few tried and tested sprays for preventing fungal diseases:

Horsetail
(Field horsetail)
200 g plant/10 l water, steep for 24 hours. Boil for 30 minutes and dilute to 50 l. Spray the soil in the spring.

Parsley fern
(Yellow flower heads, leaves and stems)
300 g plant, 10 l water, proceed as for horsetail.

BiO-S
A vegetable mineral agent. Follow instructions on the packet. Suitable for all plants. Also very effective dissolved in horsetail.

Rock meal
This is worked into the uppermost soil layer on a spring morning and if necessary dusted over plants at risk as a preventive measure.
Other methods
of controlling pests and diseases

- Collect and shake off pests. Remove decayed fruit from fruit trees in winter.
- Cut off diseased parts of plants and add compost.
- If there is a severe attack of aphids, knock them off with a strong jet of water in the middle heat, as an exceptional case (do not repeat too often).
- If there is an invasion of snails, catch them in traps (e.g. beer traps, dry pine needles etc).
- Growing shoots attacked by mites e.g. red spider mites and currant gall mites should be removed; spray a slurry of garlic and onion (60 g/8 l rainwater) over the affected leaves. Plant parsley tar in between currant bushes and apply a liberal dressing of compost.

Ways of strengthening plants and controlling pests

Dried plants for plant liquid manures, various plant strengthening agents, vegetable fly net, cherry fly net, caterpillar grease bands to combat winter moths, fruit maggot grease bands, trunk washes, granulose virus to combat apple codling moth, nematodes to combat weevils, bacillus thuringiensis to combat various caterpillars, natural pest control agents based on plants, plant oils and soap.

A few tips for do-it-yourself

Liquid manures made from dried or fresh plants activate the soil life and nourish the plants with quick-acting nutrients during the growing period. Not only are they cheap, they also increase the plant’s resistance due to their particular constituents.

As a rule of thumb, use the following proportions: 1 kg of fresh leaves or 100-200 g of dried leaves per 10 litres of water.

It is important to cover over the containers, leaving air gaps, so that no birds or small animals can fall in and drown. Wire netting or a lid with a piece of wood beneath it can be used as a cover. A rough branch or stick in the container is often sufficient to allow insects that have fallen in to climb out again. The diluted plant liquid manure can be poured over the root area of plants early in the morning or in the evening on cloudy days. Never pour liquid manure over the entire plants as this may scorch them.

Liquid manures in a greater dilution may be sprayed as a foliar feed so that the nutrients are absorbed through the stomata of the leaves. Fine sprays can be prevented from clogging by straining the liquid manures through a cloth first. Plant remains that have not decomposed can be used as mulch material or composted. The plants given in the recipes are picked from the garden or can be obtained commercially either as dried product or as extract.

Tips

- Rock meal can be added to prevent liquid manures smelling.
- Do not include diseased plants.
- Seeds do not die when liquid manure is prepared, so they may be dispersed.

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Other recipes

Nettles
Rich in iron, trace elements, phosphorus, nitrogen, vitamins and enzymes.
Liquid manure (fermented)
Use:
1. For strengthening plants: spray every two weeks; concentration 1:50
3. Watering seedlings: horsetail and nettle liquid manure - half and half; concentration 1:20.
4. Soil improvement: pour over the soil and compost in spring; concentration undiluted or slightly diluted.
Juice
Use: for strengthening plants and preventing diseases: spray over plants twice a month; concentration 1:10.

Comfrey
Rich in nitrogen, trace elements, minerals.
Liquid manure (fermented)
Preparation: After 3-4 days the liquid manure becomes slimy and is ready for use after about one week.
Use:
1. Promotes the formation of tubers and fruit, e.g. tomatoes, celery and cabbage. Use twice a month; concentration 1:10.
2. Fertilizer: spray over plants once or twice a month; concentration 1:20.

Chamomile
Cold water extract
Preparation: Leave a handful of chamomile flowers to stand in 2 l of water for 24 hours, strain, express and make up to five times the quantity.

Use:
1. For promoting healthy plant growth and protecting against soil and root diseases: apply once or twice a month; concentration 1:5.
2. For promoting rotting processes and preventing mould: pour over the compost heap; concentration undiluted.

Horsetail
Rich in silicic acid
Juice
Preparation: Soak 200 g of dried plant in 10 l of water for 24 hours; boil for one hour; cover and leave to cool.
Use:
1. Usually mixed with other liquid manures (e.g. nettles or comfrey) to strengthen the tissue and prevent fungal diseases; spray once or twice a month; concentration 1:10.
2. To suppress odours from strong-smelling liquid manures: mix in one part horsetail juice with 2 parts of liquid manure.

Onions
Rich in essential oils containing sulphur.
Liquid manure
Preparation: Collect up onion skins, place loosely in a container and pour water over them.
Use: In a mixture with other liquid manures, to strengthen plants and prevent fungal diseases; concentration 1:10.

Plant mixture
The individual plant liquid manures can be mixed together to combine their effect but it is also possible to put different plants in one container. For example, plants that are cut back several times during the course of the summer can be mixed together with comfrey or nettle to form a liquid manure. Only growth-inhibiting plants such as parsley, lovage, wormwood and mugwort cannot be used.
Do not choose varieties that are susceptible to disease.

Prepare the site well beforehand:

Break up compacted soil by using green manure, dig out a sufficiently large planting hole and fill it with rock meal and mature compost, cover with earth and leave for about 6 weeks before planting.

Cankerous parts. Seal wounds with a blow lamp.

Cherry trees: Hang traps for cherry fruit flies in the trees before the fruits turn red. Choose early varieties in preference.

In September put grease bands round the trunks to control winter moths. Remove them in the spring. At the beginning of June, tie a grease band made of corrugated cardboard round the tree, with the corrugated side inwards.

Close off the upper end with twine. Insects and mites will hide in this cardboard. Replace it from time to time, burning the old cardboard.

The sun's warm rays can cause a temperature difference of up to 15 degrees C between the north and the south side of the tree. To prevent the sap rising prematurely in the winter on the south side of trees:

* Wrap mats around the tree
* In February/March, apply a LSM wash on frost-free days.

Crumble LSM into 500 g of horsetail-bracken tea, add a little cow dung and a handful of rock meal, stir well until the mixture is liquid and leave for 24 hours (you can also stir in 50 ml of water glass).

Cracks in the bark of trees can be sealed with tree wax.
This part of the brochure describes some suggestions which may encourage you to plan or reorganise your allotment on ecological lines.

**Biotopes in the ecogarden**

**The flower meadow**

Do you have an area of at least 100 m² in your garden that you would like to use in a simple, ecological manner? Then plant a flower meadow. A meadow of this size or larger will be an important refuge for small creatures.

In towns in particular, flower meadows make an important contribution to preserving communities of creatures of great biodiversity. The flower layer forms a feeding area and habitat for butterflies, bees, bumble bees, hoverflies and leaf beetles. The leaves and stalks are home mainly to spiders, cicadas and grasshoppers. Ground beetles, woodlice, daddy longlegs and ants abound at ground level. A meadow alive with insects will attract four times as many birds as a uniform lawn. Countless soil-dwelling creatures will burrow in between the roots in the soil.

Manure your soil in spring with earthy compost, a little well rotted chicken manure, bone meal and wood ash (50 g/m²).

Mow in June and at the beginning of October. Cut a natural path the width of the mower through the meadow and always keep plant growth short here, so you can walk through your meadow and enjoy it.

If your soil is rather dry and poor, you can mix together the following meadow flower seeds: yarrow, agrimony, sea thrift, Coventry bell, cardine thistle, brown knapweed, chichory, asseed, maiden pink, cranebill, bird’s-foot trefoil, field poppy, burnet saxifrage, self-heal, common toadflax; of the grasses, rescue and panicle types should predominate.

Dig the area before sowing and remove any couch grass roots. Level the ground and sow in April/May, June or September.
There is some historical value in planning a wild flower patch. Wild flowers grow in communities. They have accompanied man since the early stone age 5000 years BC. Just as buildings, fences, walls, woodlands and cultivated landscapes have altered over the centuries, so the typical appearance of wild plant communities has altered.

Some examples of wild flowers:

Annual wild flowers:
Many annual ‘field’ weeds are threatened by extinction because of intensive weed control. Controlled wild flower cultivation in the garden can make a valuable contribution to preserving these plants, which are often very decorative. Cornflowers, cress, wallflower, Virginia’s looking glass, wild chamomile, field poppy, corn buttercup.

Biennial wild flowers
Numerous types of biennial wild flowers will seed themselves time and again, like annuals. They can be left to grow in suitable places; if they are troublesome, they can simply be removed. Moth mullein, dark mullein, great mullein.

Wild shrubs
Compared with non-native ornamental shrubs, native wild shrubs offer a habitat to a wide variety of species. Most types must be pruned regularly and in some cases severely. Hawthorn, common broom, common seephe, spindle tree, blackthorn, dog rose, common elder and redberried elder.

Wild herbaceous plants
(Perennial wild plants whose foliage dies off in the autumn). Numerous wild herbaceous plants are good for the ornamental garden and herbaceous bed. Yarrow, lady’s mantle, amanthus ranunculoides, garden cumbine, ox-eye, peach-leaved bell-flower, parsley fern, Carthusian pink, foxglove, dyer’s broom, bloody cranesbill, liverwort, wood crane’s bill, musk mallow, wild marjoram, lungwort, Fair-maid of France, meadow clary, stonewort, comfrey, perennial and wild pansy.

The layout for your garden
Reserve an area of about 2 m² of your garden in a partly shaded, partly sunny position. This will create a habitat for wildlife including lizards, common toads, grass snakes, hedgehogs, spiders, caddis and grasshoppers.

Use rubble to form a heap of stones with bushwood and leaves. Layer the stones in such a way as to leave spaces in between. Cover the north side of the heap with earth. Lay flat stones on the south side. Whenever you go out walking, collect seeds and scatter them in spring or autumn (until the end of September) on a patch of poor, unmeasured and unmarched earth in the garden. Your own personal biotope of wild flowers will develop as the years go by.
The dry wall

The dry wall makes a little more work but is highly recommended on a south-facing terrace. Even if you are planning a pond it will make a pretty focal point and fulfil an ecological function.

Specialised plants and animals live in a stone wall built up from local materials without mortar and joints. The foundation should be composed of half a metre of rubble. It should be one third of the height of the wall. Set one stone on top of another on both sides by hand. Taper off the top and fill in the joints with loam and sand. Plants and animals will occupy the spaces of their own accord. In some garden centres you can buy special dry wall plants. The following are a must:

On top: white stonecrop, thyme, yellow fumitory,
ivy-leaved toadflax, convolvulus.

Centre: yellow stonecrop

At the base: spleenwort, hoary cinquefoil, herb Robert.

The pile of stones

The cavities produced in a pile of stones in your garden acting as a small biotope will provide a hiding place and habitat for many small animals such as toads, shrews, newts, lizards or insects (ground beetles etc.). Hedgehogs will also find a hiding place if the cavities are large enough.

In shady parts of the heap, lichens, mosses and ferns will colonise the stones. If a pile of stones is placed in a sunny position, some parts can be filled with garden soil in which flowers can be planted.
The butterfly garden

Unfortunately, many butterflies and moths have already become extinct, or are threatened by extinction.

In the spring, butterflies emerge from the chrysalis and go in search of their mates. Nectar-rich flowering plants are their first food.

In early summer, butterflies lay their eggs on the underside of the leaves of certain host plants. The caterpillars feed off these leaves. In June/July, the second generation then appears. Before the beginning of autumn, the butterflies and moths form a chrysalis again, after laying their eggs. They may overwinter on the dry stalk of a plant. For every ugly caterpillar there is a beautiful butterfly. This kind of environment would be ideal as an observation garden for children. Speak to your neighbors about it beforehand.

Nectar-rich flowers for moths and butterflies: wallflower, geranium, thyme, stonecrop, sweet William, dame's violet, marjoram, salvia, thistles, evening primrose, common centaury, phlox, lavender, large pink, lilies, golden rod, sedum, Michaelmas daisy, garden chrysanthemum.

With these combinations your garden will bloom from April to November.

Add caterpillar food plants in a wild flower corner, such as nettles, brambles, thistles, wild carrot, hedge garlic, heather, vetch, trembling aspen.

There are certain meadow flowers that no meadow should be without; gather together the following mixture and scatter the seeds from every year on bare patches: aquilegia, monkshood, evening primrose, marjoram, various types of bellflower, carrots, pink, field poppy, clovers, corn cockle, snapdragon, marigold, dame's violet, viper's bugloss, soapwort, meadow clay, common mallow, scabious varieties, etc.
Laying out a garden pond

Damp areas in particular have fallen victim in recent decades to the “clearing” of our landscapes - many types of plant and animal that inhabit ponds and lakes are now on the “Red List” of species that are extinct or threatened with extinction. Although garden ponds cannot save Red List species, they can, if designed and laid out on natural lines, develop into valuable substitute habitats for many plants and animals that live in or near water. At the same time, garden ponds can be of educational value, making an important contribution to teaching about ecological relationships. Native plants and animals can be observed and experienced in their natural habitat.

Choose a site that is not directly beneath deciduous trees. Falling leaves can lead to an undesirable accumulation of nutrients in the water (alga growth) and disturb the oxygen balance.

The site should be chosen such that the pond gets the sun for at least 4-6 hours during the day.

Size
Even very small ponds are an asset to the garden.

They can also act as a source of drinking water and bath for birds and other animals. If we are to attract a varied and stable pond community, however, we need a water surface of at least 5 m² with a depth of water of 80 cm at the deepest point.

The larger the better; the more variety there is in the pond, the more plants and animals it will attract.

Lining
The water table is not usually high enough for a natural water feature so we have to line the base artificially.

Where possible, clay can be used as a natural form of lining, it should be laid down on the base of the pond in a layer about 20 cm thick.

In practice, special pond liners have proved to be the simplest form of lining.
Plastic liner
The liner should be at least 1 mm thick and resistant to UV light. It can be bought as a roll, in which case you have to weld the seams together yourself. This requires some degree of expertise. It is easier and only slightly more expensive to purchase the required size of sheet and to have the liner made up to your own specification. The required size can best be worked out after the hole has been dug (using a piece of rope laid lengthwise and then crosswise over the pond area).

Tip
To be on the safe side, the liner purchased should be slightly larger so that it can conform to an uneven base.

Shape of the pond
It should always be borne in mind that the pond must have a sufficiently wide, gently sloping rim (bog and shallow water zone) on all sides. This will enable animals to enter and leave the pond safely.

There is always an active pond life in the transition zones. It is advisable to have the broadest bank edge on the north side so that the bank zone receives plenty of sun and the observer does not have to look into the sun. An observation place should therefore be sited on the south side. The shape of the pond is otherwise tailored to the surroundings. It is possible to stake out an outline in situ and to run a piece of rope round these stakes. This will give an impression of the shape and size. It should be borne in mind, however, that the actual water surface will be considerably reduced by the bog zone.

Layout and design

Excavation
The pond bed should conform to the sketch plan when the pond is excavated. A stepped layout with a bog zone (0-30 cm), a shallow zone (30-50 cm) and a deep zone (50-100 cm) will make the design and planting work easier later on. Only large ponds with very gentle slopes do not require such planting levels.

To avoid excavating too much earth, the levels should be also staked out beforehand. This means that small earth banks can be left at the height of the levels during excavation, thus preventing any slippage of the substrate introduced.

The pond should always be excavated about 5-10 cm deeper than the anticipated depth to allow for a layer of sand to be placed beneath the liner.

Levelling
Before the liner is laid, the upper edge of the hole must be levelled. There are two ways of doing this:

a) Levelling with a hose. Material: transparent plastic hose or normal garden hosepipe in which a transparent piece of hose has been inserted at both ends. The pipe or hose is marked the same at both ends. The ends of the hose are then secured at opposite edges of the pond and the hose is filled with water until the water level at both ends is shown to be at the water level required.

b) Levelling with a spirit level:
Stakes are driven into the edge of the pond and fitted with battens and spirit level such that their height corresponds to the water level ultimately required.
Laying the liner
Before placing the liner in position, remove any projecting roots and sharp objects and add a protective layer of sand about 5 cm thick. The liner should be placed in position on a warm day, if possible, so that the material is more malleable and easier to lay.

To prevent too many folds, the liner is folded over at the four corners. This produces four fairly large folds which are hardly noticeable later on.

The liner should project a few centimetres over the edge of the pond at first, so that it can sink down after the pond has been filled. After a few days, the liner can then be cut off to about 1 cm above the ground.

This breaks the contact between the earth and the surroundings, therefore minimising water losses.

Otherwise there is a risk, particularly in dry summers, that large quantities of water will be sucked out by the “wick effect” of the surrounding earth.

The liner is then pressed down onto the base. The soil substrate can then be laid in stages (beginning with the deep zone) up to the required bank height.

The water
The pond can now be filled gradually with water. It is advisable to tie the hose to a wooden plank so that the earth does not swell too much. It is also best to create a fine spray so as to reduce the harmful chlorine content.

Tips: It is useful to “inject” the pond with water from an existing pond. Take a bucketful of pond water and a bit of sludge and empty it carefully into the new pond. Water fleas, which can be bought from pet shops, can also help to clarify the water.

Plant substrate
Only low-nutrient sand or a sand-gravel mixture (e.g. 4 parts sand, 1 part gravel) should be used as a plant substrate, introduced where required to a thickness of about 20 cm. The algae growth so often observed is usually due to the introduction of nutrient-rich human earth.

The nutrient requirement of water plants can be provided completely by the minerals dissolved in the water. For bog plants, a little earth should be placed in the plant hole and then covered over with the sand-gravel mixture.
Bank design
When finishing off the pond it is particularly important to create as much variety in the bank as possible with large and small stones or a pile of stones (providing hiding places for many animals), dead wood or even a tree stump, with sand and gravel banks and places planted with bog plants. A willow bush as a shrub zone on the north side of a pond would also be suitable.

Planting
If possible, it is best to use central European plants. If a wide variety of animals is to be attracted to the pond.

Every well-run nursery will offer a wide and attractive variety of water and bog plants. Plants should be planted sparingly, however, in order to encourage spontaneous colonisation in between the other types that usually spread very quickly.

No plants should be put in the front free zone because this is where our pond dwellers overwinter and need oxygen. It there was a covering of ice and snow in the winter, plants would consume the oxygen in the water (because no light could penetrate), and the animals would be at risk.

More tips
Algae formation in the first few years is quite normal. Only if the algae get out of hand should we take action (e.g. by raking off or fishing out the algae). Take care not to disturb dragonflies and water new larvae or other waterdwellling creatures. Under no circumstances should chemicals be used to control algae.

Every pond needs care and attention. Plants that spread rapidly have to be removed regularly. It is better to avoid fastgrowing plants like cat’s tail or reed altogether (or plant them in baskets). The slowforming sludge layer near the bottom must also be removed regularly (carefully, and always in stages so as not to decimate the animals that live and overwinter in the sludge). Reed plants should not be cut in the autumn. The stems will ensure a minimum gaseous exchange in the winter if ice forms. If there is snow lying on the ice surface, the plants will change over to aerobic respiration, so it is advisable to sweep off the snow covering.

Planning a garden pond is made easier by preparing sketches beforehand (top view with planting levels and crosssections). On the basis of such sketches the size of the liner can be worked out and the material ordered even before the pond has been excavated.
Vegetables on the ecological allotment

Vegetable growing on the allotment tends to be regarded as more of a hobby at present, but a closer look over the garden fence will reveal that many gardeners, particularly families with small children and their grandparents are growing vegetables in their own gardens.

A few basic principles for ecological gardening should be observed if a vegetable garden is also to become a habitat for many native creatures.

The same type of plants grown in the same place year after year (with a few exceptions) will usually leach the soil one-sidedly (crop rotation, erosion).

Different plants have different nutrient requirements (compost management, high, medium and low nutrient-consuming plants).

There are some plants which, because of their root exudations or fragrances, have a positive effect (mixed culture).

The soil must be protected from erosion (mulch cover).

Proven methods of cultivating the allotment on ecological lines:

Procedure:

* Do not plant any vegetables the family dislikes.
* Decide whether you want to store vegetables or just grow enough for the summer.
* Decide whether you want to grow vegetables from your own seed or buy plants.

Ways of laying out the vegetable patch

Circular beds

If you have planned to set aside an area of about 50 m² for vegetables, a relatively simple system of circular beds has proved to be effective in drier areas.

In order to store heat and solar energy, vegetables are planted in a circular crater, the base of the centre lying beneath the level of the garden soil.

The beds are like a volcanic crater. The wind can sweep all around the outer wall, thus preventing the drying out often seen with raised beds.

If the beds are covered with plastic film, they can be used to grow early vegetables; in winter, they can be covered with straw.

Construction:
Diameter approx. 2 m
Base of centre 10 cm below the earth level
Wall 20 - 30 cm

A circle of radius one metre is described with a stake and a funnel-shaped depression is dug out, the spoil being used to create the wall. It has proved advisable to lay basalt stones in the centre. They serve to retain the heat in spring or at night, and they also provide a surface to walk on.
Raised beds

These are useful if you want to make use of excavated material, such as the earth dug out when building the pond. Other advantages: it will make gardening work much easier later on, particularly for elderly people, the disabled, in hilly locations and in terraced gardens.

Constructing this permanent system of cultivation is laborious and expensive, but as sowing, planting, weeding and harvesting can be done standing up, it is worth the effort.

The bed should be in a sunny position protected from the wind. Start the construction work in late autumn.

Height: approx. 80 cm, width approx. 120 cm, any length; align in an E/W direction. The bed is bounded by planks, boards, tree trunks or pressure-impregnated poles. The most laborious part of the operation is obtaining the filling material: about 4 m³ of earth is required. Chicken wire is incorporated to keep out voles. A drainage pipe forming an underground irrigation system has proved useful in drier gardens. A grass and straw mulch is required. After the garden earth has settled it can be topped up several times. This is easier because the work can be done standing up. An early bed can be created in the spring simply by covering it with plastic film.

Manuring

Every year in the autumn a layer of about 15 cm mature compost should be raked in. Do not bury it.

A practical example

Zone 1. On the north side, tall plants consuming large quantities of nutrients (broccoli, cauliflower, asparagus, leeks, tomatoes, cucumbers) intercropped with lettuce and Kohlrabi which are quick-maturing.

Add 8 litres of compost per m² in the first year and top-dress during the growing period with a liquid manure (see plant liquid manures).

Zones 2 and 3: Onions, carrots, lettuces. 6 litres of compost per m².

Zone 4: (south side): Plant strawberries, peas (they can grow down the wall) at 10 cm intervals.

Add 4 litres of compost per m². The zones are approx. 30 cm apart.
Under natural conditions, the soil is alive with numerous small creatures and microorganisms. When covered with concrete or paving slabs, the soil life dies due to lack of water and oxygen; the soil structure is destroyed and only a dead, compacted, infertile brown mass remains. On paved areas, rainwater flows away on the surface, so when it rains there is no slow surface seepage of water which is so important for the microclimate and the water balance, and no evaporation of water in hot, dry weather.

For these reasons, it is best to aim for as little paving as possible in a natural garden. On areas that are constantly being walked on and where paving is unavoidable, the individual slabs should be laid with generous spaces in between. This guarantees a certain degree of water and gaseous exchange, and the joints can be lined up with suitable plant growth. If a path is less heavily used, it can be strengthened in a natural way with gravel, chippings or sown grass.

For little used paths, a path on which special types of wild flowers adapted to footsteps can grow is usually sufficient, depending on the frequency of use. If the plants grow too high, they can be cut back regularly. If the path is heavily used, however, plant growth will die back altogether and the path will become muddy. In this case it will help to put down individual walking boards or a layer of wood chippings, straw or other mulching material.

By the way:

Overgrown garden paths provide a hiding place and habitat for numerous useful creatures apart from snails. Where snails are a problem, however, it is preferable to put down a layer of shredded bark or sawdust.
Even an ecologically managed orchard is regarded as a life form.

Trees that complement each other’s requirements should be planted next to each other in the orchard. Unfortunately, modern small gardens rarely sport more than two fruit trees, almost as if it were improper to do so, or merely a duty to "keep" trees.

If combined with fruit-bearing hedges, for example, fruit trees could provide an excellent biotope for insects, birds and other animals involved in the food chain.

Pay close attention to the understock when you purchase your tree. The fruit development, maturing time, colour of the skin and taste are all closely associated with this.

Try out native varieties that are adapted to the location, so avoid those that are highly susceptible to pests. Suitable varieties of bush fruit can still be obtained. In 1839 there were 878 different varieties of apple mentioned in one manual. 150 years later there are only 30 commercial varieties left. The allotment is the ideal way of trying to save and continue cultivating native varieties of fruit.

Find out whether the trees are self-fertile or cross-pollinators.

Otherwise, you may wait in vain for fruit year after year for want of a pollinator.

In theory, it would be possible to leave the tree unpruned so as to encourage its natural growth. If you are less concerned with the yield than with creating a habitat for animals and plants, have the courage to carry out such an experiment (except when thinning). We have already mentioned ways of looking after fruit trees, such as giving the tree a loam wash, spraying the crown with horsetail or valerian extract, and planting around the base of the tree. Compost is applied as a mulch in the autumn.

As there are countless individual ways of looking after trees and shrubs, we shall try to take you through the garden year with fruit trees and bushes.

At the same time, we shall make further reference to nature as a living organism by describing our observations of garden plants at different times of the year.
The attempt made below to reproduce the seasons is by no means complete.

Mid-winter in January is typified by extremely cold weather.

On frost-free days, take cuttings from the south side of a young shoot if you are planning to graft fruit trees in the spring. Attend a fruit tree pruning course. One-year-old shoots of healthy trees are cut and kept in damp, dark but frost-free sand.

On frost-free days, give the fruit trees a loam wash to prevent frost cracks.

Plant protection: Remove grease bands from trunks, protect damson trees from European lackey moth; brush them off and give trunks a loam wash, spray with white oil; apple trees: to prevent apple mildew, remove affected growing tips (they seem weaker, slightly open and possibly grey in colour). Peach: To prevent leaf curl, spray with Bio-S or, in extreme cases, with copper preparations. If the trees are badly affected, consider changing the site. Protect currant buds from birds with a close-mesh net until the leaves have developed.

Late winter is characterised by heavy snowfalls right up to March. The end of winter is heralded by the appearance of the first tips of snowdrops.

Crows and branches that are growing too close together are cut out from berry-bearing bushes. Cut them back with a knife and coat the wound with about 3 cm of loam or proprietary wound treatment agent. In order to graft apple or pear trees, you can discard the old crown now, leaving short stumps which dry out in spring and can receive their grafts.

Continue to check your fruit store.

Fruit tree canker: remove all diseased branches and treat the wounds. Do the same for cracks or patches damaged by frost.

Remove ‘big buds’ carefully, especially from blackcurrant bushes. If necessary, think about planting more resistant varieties. At any rate, manure with wellrotted compost.

Woolly aphids on apple trees overwinter just beneath the soil at the base of the tree: uncover the affected parts and expose them to the frost.
Early spring is heralded by snowdrops, followed by colt's foot and finally by yellow willow cattails.

Spray the plant and root area with e.g. hornet tree juice, wormwood juice or a mixture of thin oil and fish oil soap. Continue as a preventive measure from now until autumn.

Make the first grafts with V-shaped grafts or whip grafts. If this is unsuccessful you can try again in May. Take flexible measures to protect plants from the cold. Put back any mulch covers that have been disturbed, e.g. leaves that have been blown away by the wind.

As a preventive measure, spray peach trees with seaweed meal and liquid nettle juice.

Spring is well underway when the apple blossom develops, lilac blossom and laburnum flowers appear in the middle of this period, and raspberries flower at the end.

Now is the ideal time to plant the various varieties of fruit tree. Try to purchase plants that will suit your garden location and have loose root balls. Then trim the shoots to about half their length. Any roots that are too long and crooked should also be trimmed.

Choose self-fertile varieties such as sour cherries, damsons, quince, apricots, peach, grape and elder.

To be sure of a yield, plant a late-flowering variety.

Hazel bushes can be propagated by layering. Bend flexible shoots down to the ground and secure them with a hook. Scratch the parts in contact with the soil with a knife and cover over with earth. Keep moist in the summer and separate from the parent plant in the autumn.

Transplant.

Early summer is heralded by flowering common elder, and it comes to an end when the sweet cherries are ripe for picking.

If you have planned to take bark grafts, do so now. Scions are placed behind the bark. Any spring grafts that did not take can be regrafted now. If the grafts take, do not forget to loosen the bands. Unwanted shoots should also be removed from the understock.

In the orchard, protecting plants on a preventive basis means planting beneath fruit trees, e.g. garlic, crown imperial, euphorbia. You can apply wormwood to currants, and "nudge" strawberries with garlic. After harvesting, cut back the old strawberry foliage to just above the ground.

Mulch all trees and bushes towards the end of early summer or sow green manure. Competing peach shoots growing inwards should be thinned out after flowering. (Paint the wounds)

Tear out stray shoots of core-type fruits by hand (apple, pear, quince). Sprinkle calcium carbonate over heavy soils and rock meal containing magnesium over light soils.

Pick off greenish-yellow caterpillar-like larvae from gooseberries. Severe infestations should be treated with pyrethrum, otherwise nettle liquid manure, parsley lime juice and seaweed meal.
In high summer, sweet cherries and most of the berry fruits and sour cherries are harvested. When you see heather flowering in the garden, high summer is over.

After the sour cherries have been picked, prune back to the new shoots. Sweet cherries should also be cut back immediately after harvesting to keep the trees low. Remove the old fruit-bearing wood from blackcurrants. Old raspberry canes should be cut down to the ground and new canes tied in. Apply plenty of manure and mulch.

Any new strawberry plants should be planted now. As regards summer pruning, the plants have now completed their shoot growth. As in winter, competing shoots can be removed. The effect of this is to restrict root growth and to promote the formation of fruit buds. Unlike winter pruning, this prevents excessive "shooting".

Remove fallen fruit with the characteristic worm holes. Stop treating fruit trees with liquid manure, but apply mulch round the base of the trees and keep moist.

Control spider mites and woolly aphids (especially on apple trees) by brushing them off the bark and trunk and dust with rock meal. If the tree is badly affected, remove the branch concerned. Paint wounds larger than 3 cm! In a garden managed on ecological lines, there ought to be sufficient natural enemies (ladybirds, predatory mites ...). Treat aphids in a similar way, but first try knocking them off around midday with a strong jet of water.

Late summer begins when the rowan trees are in flower; it lasts until the plums and the first apples and pears are picked, and ends when the autumn crocus is in bloom.

Cut back the suckers and side shoots of brambles to about 4 leaves. Now is the time to prune walnut trees. Sour cherries are pruned again and cut back to the new shoots.

Cut back the leading branches. Plums and damsons: remove unwanted shoots. Continue plant care as described above.
The autumn crocuses bloom at the beginning of early autumn, and apples, pears and damsons continue to ripen. This period comes to an end when winter rye is sown as a green mulch for hedges.

The correct physiological time for picking fruit is often disputed. Fully ripe fruit has a different taste, it keeps for longer and has more valuable constituents. This time has arrived when damsons and apples have fallen from the tree, or when greengages come away easily from their stalks.

A handful of wood ash can be sprinkled over raspberries.

Apply grease bands around tree trunks to prevent codling moth (do not forget the supporting stakes). Spray apple trees with horticultural juice, dust with seaweed meal if they are infested with woolly aphids. Red spider mites which may now occur in increased numbers in humid weather can be sprayed with hornet, parsley fern and wormwood juice. Remove affected fruit remains from the trees.

When the first nuts start to fall from the trees, autumn is at its height. When you pick the first of the late varieties of apple and pear, you will already be halfway through this period.

When the first leaves start to fall in the garden, these lovely days are coming to an end.

Once again, the spectacle of falling leaves means that winter is approaching. The first leaves to fall are those of the sweet cherries, followed by plums and damsons and sour cherries, and finally apples and pears. Clean out all the nest boxes in the garden.

Do not forget the grease bands. Apply these if you have not yet done so. Current bushes are propagated by taking a cutting about 10 cm long from young shoots. Stick it in the earth until one bud is showing above the ground. Prepare planting holes (about 6 weeks before planting) and cover over the ground with leaves (mulch).

Late autumn has arrived when the horse chestnut leaves are falling, the leaves of the walnut tree disappear overnight and the garden experiences its first frost.

Start clearing up the garden. You can still plant on mild days. Apply mulch and mature compost around the base of trees. If fruit trees are attacked by canker and brown rot, cut back deep as far as healthy tissue. Paint the wounds, or better still, torch them with a blow lamp. Now is the last chance to apply grease rings. Clean the tree trunks. Do not forget to place a plastic film at the base so that falling insects can be collected and thrown away. Treat red pustule disease on fruit trees and berry-bearing bushes in the same way as fruit tree canker.

WINTER

The orchard is resting during this period when the light levels are at their lowest.

If there is a thick covering of snow, shake it off from the berry-bearing bushes and young trees so that the branches do not break.

Check the fruit store.
Allotments exhibit an interesting variety of individual layouts and forms of cultivation. Behind this variety lies a great deal of creativity which bears witness to the valuable role of gardening for thousands of town dwellers.

Certain limits should be imposed on this freedom, however, partly out of regard for our gardener neighbours and successors, and partly because of our responsibility towards the environment.

Careful use of the soil, the most valuable resource, is an absolute necessity for keeping the family garden fertile for years to come. For this reason, the following cannot be tolerated if gardens are assessed from an environmental angle:

Incorrect and inappropriate use of plant protection products

Whilst professional gardeners have to pass a test before they are authorised to use plant treatment agents, this does not apply to people who garden as a hobby. Consequently, these products may also be used in gardens by laymen without any specialist knowledge whatsoever. Unfortunately, this freedom is often exploited in an irresponsible manner. As a result, there is often a danger of toxic substances accumulating in the soil of allotments, these react to form new compounds, eventually leading to irreversible soil contamination. Countering this risk is an important part of gardening assessments. It is difficult to prove that chemicals have been used incorrectly or excessively, but this problem should nevertheless be given serious consideration before it is too late. Plant protection products are permitted only if the same purpose cannot be achieved with less polluting substances.

In view of the many examples of biological, non-toxic nutrient products available, the use of chemical plant treatment agents in allotments can hardly be justified any more. Allotment holders should therefore be urged to refrain from using chemicals. Moreover, the allotment association should gradually phase in a complete ban on these products and anchor this in the statutory Garden Order.

Use of weedkillers

The use of weedkillers is not acceptable in a natural garden. If troublesome wild flowers have to be removed, this can be done by hand or by hoeing. The use of weedkillers is therefore no longer accepted on allotments.

At any rate, their use is permitted only with considerable restrictions.
Use of peat

Peat is a raw material which has required centuries to form. As a result of the increased destruction of this raw material, irreplaceable moor landscapes are being destroyed within a very short space of time, and with them the plant and animal varieties that are associated with these habitats. The use of peat and peat products is therefore unacceptable for reasons of environmental protection.

There are enough substitutes available such as shredded bark, pine needle litter and compost to obviate the need to use peat in the garden.

Manuring with chemically produced substances (artificial fertilizers)

Artificial fertilizers contain nutrients in the form of highly water-soluble salts. They therefore dissolve very rapidly in the soil water and can be taken up by the plants immediately. There is thus a very real danger of incorrect feeding. The consequence is a greater susceptibility to diseases and pests. Moreover, the soil life may be impaired because of the high salt concentration and the nutrient deficiency in a soil enriched with artificial fertilizers. These disadvantages are also a reason for placing great restrictions on the use of artificial fertilizers on allotments.

Organic manures should be used instead, such as compost, composted manure, horn meal etc. These contain the nutrients in complex organic compounds. They are only released on a gradual basis by the soil-dwelling creatures and largely according to requirements. Compared with artificial fertilizers, the risk of an incorrect nutrient supply is much lower. Moreover, the soil life is encouraged by organic manuring.

Phosphorus-rich manures such as poultry manure, bone meal and sewage sludge should be used sparingly and only if there is a proven need.

In view of the risk of nitrates leaching out into the groundwater during the non-growing season (autumn/winter), no fertilizers containing nitrogen should be applied at this time. Fresh manure should not be dug in in the autumn, but composted and protected from the rain, and applied during the growing season in the well-rotted state.

Overmanuring has the effect of making plants grow faster and taller, but there are also disadvantages both for the plants and the environment: the plants become more susceptible to diseases and pests, their storage stability is reduced and excessive amounts of nutrient salts accumulate in the soil (e.g. phosphorus, potassium, magnesium) or are leached out into the groundwater (e.g. nitrogen). Even organic products should be applied with care. Four to 8 litres of compost per square metre and per year is sufficient for most plants.

Allowing problematic weed roots to proliferate

Wild flowers that multiply by means of underground shoots (rhizomes) can take over large areas within a short space of time. As every piece of rhizome is capable of forming a new plant, they must be removed very carefully from the ground. Wild plants that form underground runners must be kept in check on the allotment. The following types are not tolerated in the garden because of their tenacious habits:

- Hedge bindweed (Calystegia sepium)
- Field bindweed (Convolvulus arvensis)
- Couch grass (Agropyron repens)
- Ground elder (Aegopodium podagraria).
Letting problematic weeds set seed

Annual plants can overwinter and propagate only by forming seeds. Consequently, they usually form countless seeds which remain capable of germinating for many years. As a result, every garden soil contains a large supply of wild flower seeds. They have the important natural task of providing green cover for bare soil and hence protecting it from adverse weather conditions. Every garden will have different plants germinating in it, depending on the soil conditions and the methods of cultivation used, and on the types of plants that have matured in large quantities over recent years. In order to prevent individual species from becoming a problem, the seeding of wild flowers should be kept in check. Very common types must be removed before they set seeds. Special care should be taken with those types that develop organs by means of which the seeds can be borne by the wind, e.g. dandelion (Taraxacum officinale), and creeping thistle (Cirsium arvense).

Lack of controlled management, neglect

Nature always tries to take over any area that is left to itself. In order to keep a useful garden natural, certain gardening tasks must always be carried out. Areas of wild plants are important components of a natural garden, but where they are allowed to grow unchecked all over the garden and start to suppress cultivated plants, this amounts to neglect rather than controlled, natural management.

Overgrown, neglected gardens do not conform to the idea of a natural garden.
Recommmded ways in which the allotment association can encourage natural, non-toxic allotment cultivation

Information for association members and the public

The association's intention to promote natural, non-toxic cultivation and to reduce the use of chemically produced aids in stages, until they are dispensed with altogether, must be formulated as a new objective and made known to allotment holders and the public alike. As with anything new, this measure can be expected to come up against violent opposition.

It should be borne in mind, however, that there are also many allotment holders who have already been using more environmentally aware methods of gardening for a long time, and who warmly welcome the association's support. Moreover, this action will greatly enhance the allotment association's standing in the public eye. In order to be able to give people some idea of what natural, non-toxic cultivation on the allotment involves, it is very important to provide detailed information to the tenants and public alike.

It is vital to clarify the meaning and purpose of this objective and to explain the ecological background and relationships in order to gain understanding and support for this change.

The association will be tolerant towards initial difficulties with natural cultivation.

Natural non-toxic cultivation requires some knowledge of how nature works and of the plant and animal species that are found in gardens. In contrast to conventional methods of cultivation, gardening work is done on a preventive basis.

If pests have become widespread, it is usually too late to take action, and wild flowers that have multiplied too vigorously can be removed only by hard manual labour.

Everything is hard at first! In the past, some serious mistakes have gone unnoticed following the use of chemicals. Pesticides sprayed in excessive quantities are difficult for the association to monitor, whereas a profusion of wild flowers will be noticed from a long way off.

Finally, the risk of irreversible damage to the plot is far lower with non-toxic methods of cultivation than it is with chemically produced substances.

Allotment holders who are willing to change over to new methods should be supported and advised, and shown great tolerance regarding their lack of knowledge and their initial difficulties.

The association organizes bio-garden courses.

By undertaking to cultivate a garden, allotment holders assume a great responsibility for preserving the environment, particularly for protecting the soil they work. Many allotment holders are unaware of their responsibility, however, or they lack the necessary knowledge to live up to this task.

"Problem gardens" often occur because of a basic lack of knowledge of garden cultivation techniques and because the most important ecological relationships are not understood.
New allotment holders must make an undertaking not to use toxic substances.

As soon as the association has passed the resolution to support the natural, non-toxic garden, only those new members who are prepared to support this objective should be admitted. In this way, all new allotment holders would make an undertaking to use non-toxic methods of gardening. The feasibility of this provision will depend on the other measures that the association takes to promote non-toxic gardening. In particular, the same regulation should also apply to existing allotment holders after a certain period of time.

*Anchoring non-toxic cultivation in the statutory Garden Order.*

The gradual changeover to non-toxic gardening should be laid down in the statutory Garden Order and thus become binding for all allotment holders.

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**Start a new life with your ecologically designed and managed allotment.**

Our gardens should be tended in the most natural way possible so that this Earth, given to us by our forebears as a blossoming paradise, can also be passed on to later generations in a healthy state.

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