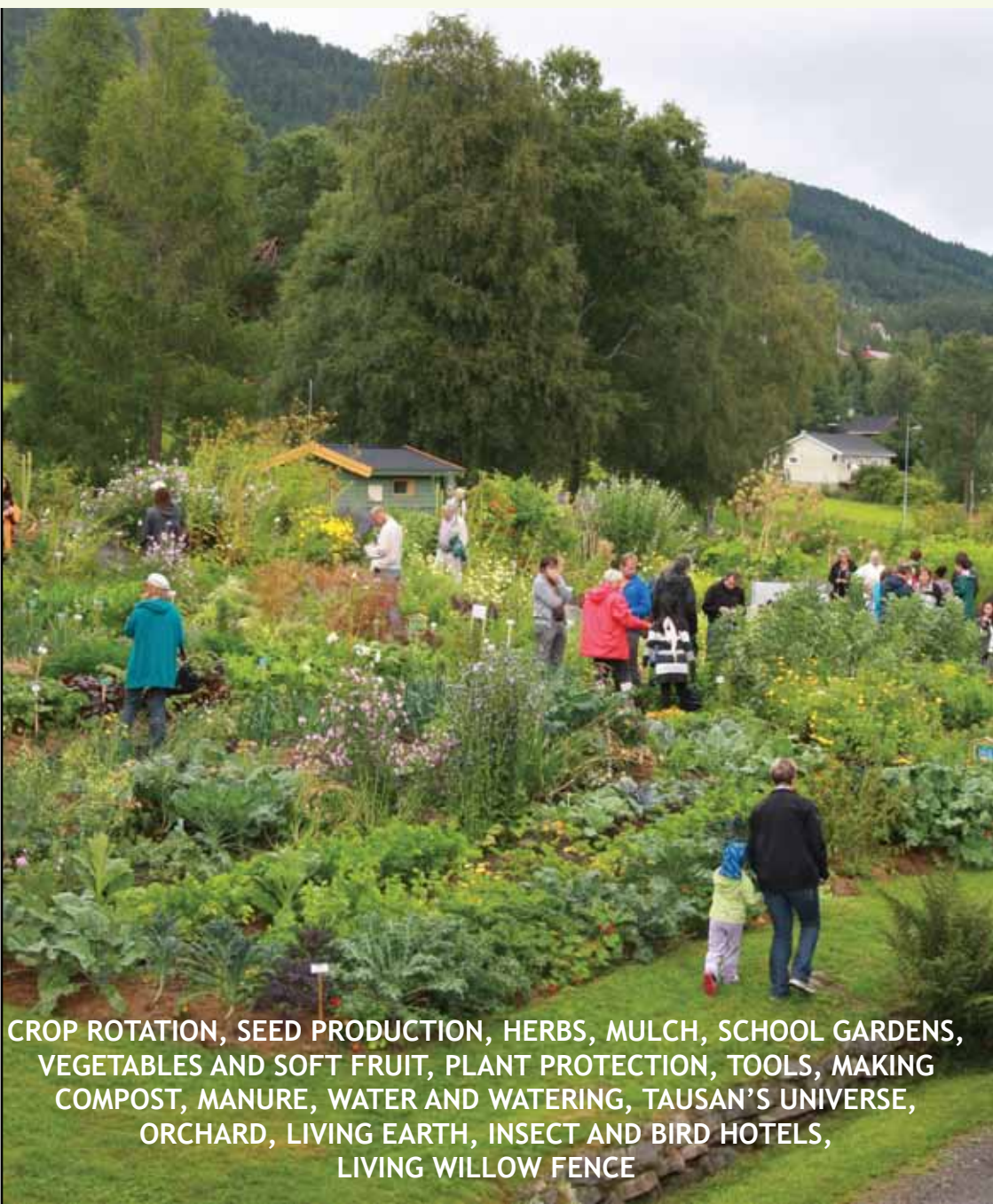


Guide book



**CROP ROTATION, SEED PRODUCTION, HERBS, MULCH, SCHOOL GARDENS,
VEGETABLES AND SOFT FRUIT, PLANT PROTECTION, TOOLS, MAKING
COMPOST, MANURE, WATER AND WATERING, TAUSAN'S UNIVERSE,
ORCHARD, LIVING EARTH, INSECT AND BIRD HOTELS,
LIVING WILLOW FENCE**

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Enjoy your walk through "Stjernehaven"!

Aided by this guide you may wander about in "Stjernehaven" whilst getting an introduction to the practical side of organic gardening.

The numbered posts do not follow any path in consecutive order as due to plant rotation they are likely to change position from one year to another. Each subject in the leaflet is treated independently.

If you would like some more information about organic horticulture, literature can be bought at our reception.

Please return the guide after use or leave kr. 20 in the post-box should you wish to take the guide home with you. Donations towards the further running and development of the garden are most welcome!

Guided tours through the garden can be arranged by contacting the reception (see back page for further information).

Have a nice walk!



1 Stjernehaven

Stjernehaven is a display garden for the small-scale gardener.

The garden offers you ideas and practical suggestions on how to grow vegetables, herbs and soft fruit organically. We also wish to inspire gardeners to increase the growth of edible plants in their gardens and to show how beauty and utility can be combined.

Creating a garden is a matter of personal interests and choices. Stjernehaven is not trying to impose set rules

on how to create an organic garden; it merely aims at being a source of inspiration and ideas.

We at Bioforsk Økologisk are continually trying to improve and develop methods of organic cultivation. You may therefore find various test plots in the garden.

Stjernehaven belongs to a network of organic gardens open to visitors throughout Norway.





In Stjernehaven we practice a four year rotation system:

First year: Legumes, i.e. nitrogen collectors like lupins, beans and clover

Second year: Heavy feeders like leek, celery and cabbage.

Third year: Less demanding plants as for instance lettuce, carrot, beetroot.

Fourth year: Potato - perhaps interspersed with broad beans and sunflowers.

Perennials, such as strawberries and many of the herbs, have their own rotation plan.

2 Crop rotation

Crop rotation means that plants are grown in a new area

Advantages:

- We discourage the accumulation of diseases and pests.
- The root systems and other attributes of plants vary greatly. A plant with different demands may benefit from its predecessor in the rotation.

Plants are normally grouped in plant families according to their demands regarding nourishment and manure. Some plants prefer mature compost while others thrive on fresh manure. Some make nutrients available to other plants.



1st year: Legumes such as lupins, beans and clover, which fix nitrogen.



2nd year: Heavy feeders e.g. leeks, celery, cabbage



3rd year: Less demanding plants e.g. lettuce, carrots, beetroot



4th year: Potatoes - perhaps interspersed with broad beans and sunflowers.



Leek flowers make lovely decorations. when dried.

3 Seed production

To follow the entire plant cycle is a most satisfactory experience.

As a rule we do not see the flowers and seed capsules of edible plants as they are eaten before they go to seed. Many are scented and beautiful - just look at a flowering leek! It dries well and stays decorative for a long time.

If we systematically produce our own seeds, we may eventually produce seed stock particularly well adjusted to the local environment. It may also be satisfactory to know the origin of the stock - to know that it has been developed without the use of amendments harmful to the environment.

Gardeners producing seed from heirloom varieties

participate in the maintaining of biological variety and plurality of the species. Many varieties are threatened with extinction because they disappear from seed catalogues, in a short time, therefore, valuable genetic material may have disappeared for good.

Green nameplates in the garden signify plant varieties no longer to be found in official lists. Some such plants are maintained thanks to an English protection programme for heirloom varieties, others have survived due to the care of generations of Norwegian gardeners.



Seeds from two different types of heirloom beans



Chamomile - *Matricaria Chamomilla*



Garden marigold - *Calendula officinalis*



Thyme - *Thymus vulgaris*



Echinacea - *Rudbeckia fulgida*



Mauritanian Mallow - *Malva sylvestris var. mauretania*



Garlic - *Allium sativum*

4 Herbs

In Stjernehaven you will find herbs for a variety of uses - for cooking, medicinal use, potpourri or for natural dyeing.

The Latin names often give an indication of a plant's characteristics or intended use.

The term *officinale* indicates medicinal use. The plant will be listed in the pharmacopoeia and sold through a pharmacy. A number of the plants in this garden are officinale, as for instance:

Borage - *Borago officinalis*

Hyssop - *Hyssopus officinalis*

Lavender - *Lavendula officinalis*

Marsh mallow - *Althaea*

officinalis

Common valerian - *Valeriana officinalis*

Lovage - *Levisticum officinale*

Garden marigold - *Calendula officinalis*

Tinctoria in a name tells us that the plant is suitable for dyeing purposes.

Safflower gives a yellow dye and is called *Carthamus tinctorius* in latin.

Rubia tinctoria is latin for madder, the plant gives a nice red dye.

Odoratus means scented, sweet-smelling, a term we find in:

Sweet vernal grass - *Anthoxanthum odoratum*

Sweet woodruff - *Galium odoratum*

Sweet cicely - *Myrrhis odorata*

Sweet violet - *Viola odorata*

Vulgare means common and is often found in the names of wild flowers like:

Lady's mantle - *Alchemilla vulgaris*

Tansy - *Tanacetum vulgare*

Oregano - *Origanum vulgare*

Dandelion - *Taraxacum vulgare*

Several of the annual and biennial herbs seed themselves and reappear the following year. Care must be taken lest they spread more than desired.

Examples of such plants are mullein, chamomile and borage.



5 Mulch

A characteristic trait in nature is that the ground is covered by organic material.

In Stjernehaven we cover the soil with leaves, straw, plant residues, or grass clippings. Such ground cover gives nourishment and protection for soil organisms, improves soil structure and reduces loss of soil through erosion.

We also use living mulches to cover bare soil. As an intermediate or under-sown crop we often use annual clovers such as subterranean clover, Persian clover or crimson clover.

After harvesting early potatoes and summer cabbage it may be advisable to sow plants that germinate quickly and cover the ground well. Fiddleneck (*Phacelia*) and mustard are suitable, likewise winter cereals and annual rye grass. In addition to protecting the soil these plants bind nutrients thereby reducing the danger of nutrient loss.





6 School gardens

In the school garden pupils get to know a variety of cultivated plants and follow their development from seed to plant ready for serving at table, for extracting medicine or procuring fibre.

A school garden is a unique instrument in the learning process when it comes to giving pupils impulses towards loving and respecting all things living in nature.

During the period 1920-1940 and up until around 1980 Norway had a large number of school gardens. The kind of learning and experiences obtained through work in these gardens have been invaluable, a knowledge not transmittable in an ordinary classroom. In spite of the positive results and valuable pedagogical effects obtained through teaching in this

particular ambience the number of school gardens decreased dramatically during the 1980s and -90s. More than ever we need good and satisfactory arenas for teaching the young about natural processes in nature, to show them where the edible plants come from, what they look like and how they develop; somewhere suitable for training and developing the ability to cooperate, for learning good work techniques and experiencing cross-over-subject teaching.

The school garden really deserves a renaissance!





7 Plants in the garden

Stjernehaven contains a great variety of vegetables from the most common like carrot, beetroot, lettuce and cabbage to those as yet less well known in Norway, like Jerusalem artichoke, parsnip and scorzonera.

Among the fruits are red- and black currant, gooseberry and strawberry and in the orchard you find several apple varieties.

Getting to know different varieties is exciting. A carrot is not just a carrot. Who should have thought that so many varieties existed in the carrot world and all with their own “personality”? ‘Jeanette’ is an early variety with long, conical roots; ‘Nantes Duke’ a much grown, high yielding variety; ‘Nantes Fancy’ with long, even- coloured strong-growing roots; ‘Minicor’ a very early variety; ‘London Marked’ with orange reddish

juicy roots suitable for storing; ‘Autumn King’ vigorous and large-growing; another variety has the self-evident name ‘Resistafly’; ‘Beta III’ has a higher than usual carotene content; and ‘Magno’ is a strong-growing variety with a splendid colour.

And the same goes for all the other cultivated plant species. There are numerous varieties all with their own unique features well worth trying to retain. Several of the vegetable species in the garden may be represented by more than one variety.





Frogs are useful in the garden. We have a frog pond in Stjernehaven.

8 Plant protection

A diversified eco-system is the most effective plant protection.

A garden with a large variety of plant societies offers shelter for numerous insects in addition to insect-eating birds and mammals. Make your garden inviting for hedgehogs by assembling a heap of twigs or leaves in a quiet corner, and attractive for birds by hanging up nesting boxes.

Plants adjusted to the environment, nourished and watered correctly, will have fewer problems with diseases, fungi and pests.

Plant diseases and what we normally call pests and weeds are all part of nature. Our task is not to combat them, but rather to aim at a

natural balance by keeping them in check.

Suitable actions:

Crop rotation in order to avoid an accumulation of diseases and pests.

Plant extracts made from nettle, field horsetail, wormwood or onion. Such extracts encourage plant growth and in some cases act as repellent to harmful insects.

Fleece blocks flying pests like carrot fly, cabbage fly and cabbage white butterfly.

Mulch inhibits weed growth.

Mechanical and thermal weed regulating

Choice of plant varieties - some varieties are resistant or have defences against certain diseases or harmful insects.





Fork for loosening the soil

9 Tools

In Stjernehaven we use tools that cause the least possible harm to the soil.

Instead of turning the soil with a spade we use a fork or a specially made broad fork for loosening the soil before sowing or planting. By carefully inserting the fork in the soil and moving it slightly back and forth we do not disrupt the important layering of the soil. An iron rake is a useful tool for making a smooth seed bed.

Various models of wheel hoes exist. Different kinds of cutters or prongs may be affixed to them making them usable for weeding, soil cultivation or ridging.

Tools for regulating weeds vary in size and shape from small hoes that can be moved close to the smallest plants to the handheld hoe with an oscillating blade and wheel hoes suitable for weeding between rows of plants and on paths.

If motorized tools are to be used, perhaps for loosening or aerating soil, a slow rotating tiller should be preferred as it is less damaging to the soil.





10 Making compost

In nature dead animals and plants rot turning to earth through a slow decomposition process. Not all organic material from a garden or household waste can be left unattended in this way. Composting is a good solution for treating organic waste material.

The word compost means composite - something made up of different parts or materials.

In garden composts we mix various types of organic material in order to obtain a guided decomposition of the material into humus.

A well-functioning process of decomposition in the compost can only be obtained if the active organisms thrive. For optimal results a good combination of nutrients and materials rich in energy should be supplied as well as

a correct level of moisture.

In the large compost bins we put twigs and branches from pruned berry bushes, leaves from the park, coarse parts of plants not suitable for mulching, weeds and some grass clippings. The second year we add a layer of earth and grow squash and cucumber. The woven bin is used for composting leaves which after three years will have turned into first-rate soil for transplants. The closed isolated bin is for household waste and infected plant material.





11 Manure

Plant feeding in an organic garden is based on a household to garden cycle i.e. the main sources of nutrients for the garden originate from the household and garden.

Relevant sources of manure are plant residues, green manure, plant extracts made from the garden's own plants, kitchen waste, grass clippings and wood ash. Human manure can likewise be a valuable resource, but is, at the time of writing, not permitted for use in organic agriculture.

External sources of manure may be seaweed, manure from farm animals, rock powder and various approved trade products. The plastic containers hold liquid plant feed made from comfrey and nettle.

We fill the containers with vegetable matter, add water and stir the mixture every day. After approximately fourteen days the liquid is ready for use. We add water in a ratio 1:1 for heavy feeders like leek and cabbage and 1:10-15 for smaller or less demanding plants.

Liquid feed can also be made with manure from livestock. Leave manure in water for about twenty-four hours before use.

If the manure is held in a net bag, the liquid is more easily spread.

Grass clippings used as mulch release nutrients fairly quickly, particularly in hot and damp weather.





12 Water and watering

All living things require water.

In a garden, birds, frogs and other animals are grateful for an available source of water. Plants must get water supplied in accordance with their special needs; depending on species and stage of development. An excess of water is as bad as an insufficient supply. Lack of water may stress the plant making it go to seed too soon.

Water excess may result in dead roots due to lack of oxygen or roots becoming more susceptible to diseases. Moisture also encourages snails.

Garden plants do not require pure drinking water. Rain water is usually preferable, especially if chlorine has been added to the public water supply. Rain water may be collected from drain pipes and gathered in water barrels, tanks or ponds.

Rules for watering:

- Best time for watering is early morning.
- Soak rather than splash. Thorough watering (approx. 10 litres per square metre) now and then is better than frequent and shallow watering.
- Mulch reduces evaporation i.e. less demand for watering.
- Apply the water directly onto the soil, not on the plants.
- Use a garden hose rather than a sprinkler.



13 Tausan's Universe

This small house has a special history. Some 350 years ago an observatory was built roughly where the house stands today.

It was built by the local clergyman Hans Nilsen Tausan. He was appointed assistant minister at Tingvoll church in 1650. Later he became parson and then succeeded to a higher rank. His portrait hangs in Tingvoll church, inside the main entrance.

Tausan was a man who made his mark in Tingvoll. Apart from building the observatory he initiated salt production at the croft Saltkjelen (the name means 'The salt pan'). He also founded a brick works and ran a farm.

Tausan was a very learned man with a thorough

knowledge of plants as well as planets.

We feel that we have revived an old tradition by building this little stargazer house. Inside the house is a working telescope, available for use. If you are interested in having a look please contact the reception at Bioforsk Økologisk.

Bioforsk Økologisk on whose ground Stjernehaugen and the observatory are situated, is a research centre for organic agriculture. We believe that our activities are a continuation of Tausan's and carry forth his ideas born in the age of enlightenment.





14 Orchard

Fruit trees grow in the same place for many years and therefore need good planning before planting in order for them to thrive. Choose a sheltered, sunny spot and carefully consider the variety and rootstock.

Varieties differ in their susceptibility to fungus and disease. When growing organically it is important to choose a strong, healthy variety which suits the climate. The rootstocks, which apple trees are grafted onto, help determine how hardy the tree is, its size and how it will grow.

Fruit trees can be planted as a trellis against a wall or along a fence, or free standing as in Stjernehaven. The base of the trees should be kept free from grass and weeds. It can be an advantage to plant bulbs under the trees which attract pollinating insects early in the season.

Different varieties of apples are planted here. Fruit is often dependant on other varieties for good pollination, therefore, check which varieties work together.

Other advantages are that varieties ripen at different times and are suited to different purposes, such as eating raw, juicing or cooking.

There is a variety of cherry tree here; 'Dønnisens Yellow'. The yellow colour is not as attractive to birds and therefore of advantage to us. The plum tree is, 'Jubilee', a new, high yielding, very hardy Swedish variety.





15 Living soil

The soil is swarming with organisms of different sizes, everything from microscopic bacteria, algae and fungi to larger earthworms and mites.

Important tasks for these organisms are to break down organic matter, circulate nutrients and physically stabilise soil particles. Without living organisms in the soil, plant remains and animal excrement would simply accumulate.

Fungi and bacteria are, together with earthworms, the most important decomposers, breaking down organic material into soil and nutrients. Springtails (an insect that uses its abdomen to jump) also eat organic matter in addition to algae and fungal hyphae.

The earthworm's tunnels are appealing to plant roots and other earth-living organisms. Air and water are more accessible and the walls are lined with nutrient-rich substances.

There are many varieties of mite. Some eat vegetable

matter, some are predators and others consume sap. Spiders are predators and will, among others things, regulate the mites that damage plants.

The soil also contains eggs, pupae and larvae from insects that, later in their life cycle, live above the earth or as flying insects, for example; beetles, butterflies, mosquitoes or flies.



Springtails are an important group of small animals which convert and breakdown dead plant matter and contribute to the recycling of nutrients.



Green lacewings have aphids on their menu.



Green lacewing eggs “on stalks” can be seen under the leaves.



Green lacewing hotel.



Summer house for bats.



Bird table



Earwig hotel

16 Insect and bird hotels

Hanging in the orchard are dwellings for selected species of insects and birds. Such facilitation can contribute to the regulation of insects that damage fruit and fruit trees.

Aphids can be a pest in the orchard. Earwigs are a predatory insect that eats aphids by hunting them at night. To ensure that earwigs stay by the fruit trees, a 'hotel' is hung up where they can live during the day.

You can attract birds into the orchard by hanging up nesting boxes. Flycatchers and tits are especially useful. The birds are fed during winter.

Green lacewings also have aphids on their menu. Their larvae live off aphids and can eat 20-100 of them in a day. Green lacewing eggs "on stalks" can be seen under the leaves. Many lacewings don't survive the winter, so we give them a warm, red 'hotel' to live in. The colour red attracts them.

Bats are also great insect eaters. They can take 2000 insects in one night. Bats often migrate further away in winter but their summer quarters hang in the orchard.



17 Living Willow Fence

A living willow fence with arched entrances is planted around the school garden, making an attractive border separating it from the rest of Stjernehaven.

In addition to the natural beauty of the material there are many advantages in planting a living willow fence. It is possible to create a sustainable structure that regenerates itself, producing new shoots each year. These shoots can be used to strengthen or repair current structures or as a resource for future creations. Any off-cuts not used for planting can be dried and used for basketry or chopped up and used as compost or mulch.

Willows are fast growing, strong and flexible and there

fore ideal for using as a living fence. In the school garden we have used different varieties for their specific qualities, such as colour and scent.

The diagonally woven fence around the school garden is known as a 'Belgian fence'. After several years of growth the willows will naturally graft together where they crossover, forming an even stronger structure. The shoots can be pruned or woven into the fence as desired.



Notes:





Bioforsk Organic



Here on Tingvoll farm beside Tingvoll church are you free to wander around Stjernehaven, get a guided tour at Tingvoll solar and bio energy centre and the cow barn.

The garden is open every day, the cow barn and Tingvoll solar and bio energy centre require an appointment.

Guided tours can be arranged, tel. 452 30 200 or contact okologisk@bioforsk.no

Events are advertised in the local media and at www.bioforsk.no/organic, www.sologbio.no and www.skolehagen.no

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