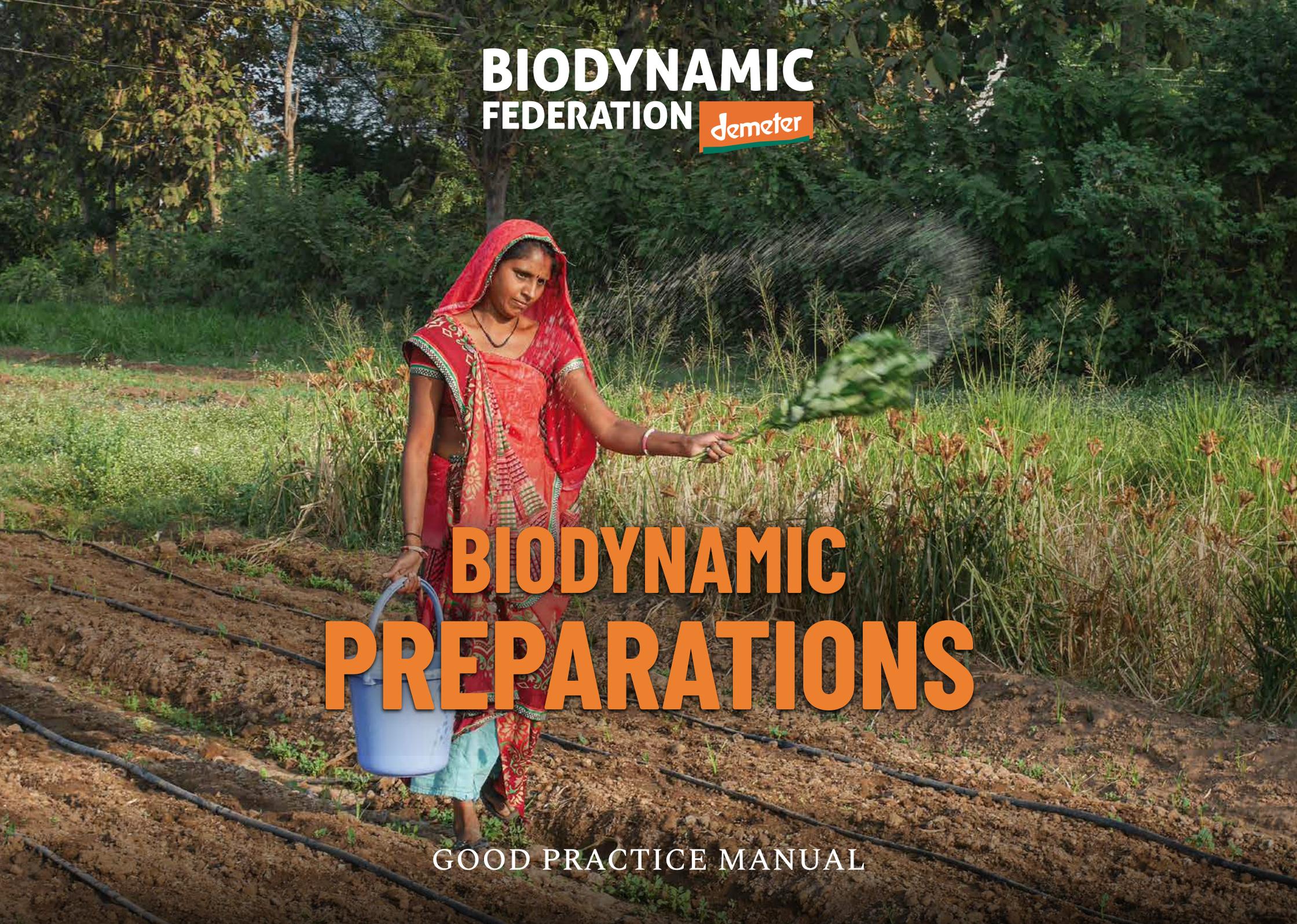


**BIODYNAMIC
FEDERATION** 



**BIODYNAMIC
PREPARATIONS**

GOOD PRACTICE MANUAL

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Anne and Rolf Bucher



Christoph Simpfendörfer
General Secretary

This is the first publication of the Biodynamic Federation – Demeter International. One of the impulses for the founding of the Federation was to foster and support quality improvement in biodynamic work by inspiring and giving examples of good practice. This manual is the first example. The biodynamic preparations are an essential support for both main goals of Biodynamic Agriculture: healing the earth by creating farm organisms that are connected to cosmic influences and providing food that supports the spiritual development of mankind.

This can be understood from three different perspectives:

Expression of the farm individuality when the plants and animal sheaths come from the farm itself; result of a social process when the preparations are made by a group of farmers; medicine for the earth can be created with care and precision.

This manual tries to inspire work in all these areas, and we are thankful to Anne and Rolf to have realised this intention.

A handwritten signature in dark ink that reads "Christoph Simpfendörfer". The script is fluid and cursive.

Christoph Simpfendörfer, General Secretary





Anne and Rolf Bucher
Demeter advisors

Since the early 1980s we have been practising biodynamic agriculture, making biodynamic preps every year, participating in many regional and international meetings of farmers, studying and discussing Rudolf Steiner’s “Agricultural Course” with other farmers and attending the annual “International Biodynamic Agriculture Conference” in Dornach, Switzerland.

Since 2012 we have been working internationally as independent advisors giving introductory courses and workshops in biodynamic agriculture, mainly in India and in African countries such as Kenya and Zimbabwe. We got to know farmers from other African countries, e.g. Botswana, Ethiopia, Namibia, South Africa, Tanzania and Uganda. Thus our perception and perspective, also with regard to the biodynamic preparations, changed and we tried to respond to the following questions: How can you start biodynamic

work without any biodynamic infrastructure, like-minded colleagues in the neighbourhood, without the chance to participate in national conferences, the support of advisors and a national biodynamic association? How can a farmer, or to be more precise, a group of farmers, get to know biodynamic methods and implement them?

Our manual offers a hands-on approach combined with illustrations which might prove to be helpful, especially for beginners. Methods and practices are explained step-by-step and alternatives are included. We would like to emphasise, however, that finding your own appropriate implementation is essential. Working with the biodynamic preparations is a wonderful means of forging a deep bond with your farm and finding ways bringing about a healthy farm.

Anne Bucher Rolf Bucher

Anne and Rolf Bucher, May 2020

HORN MANURE (500)





MATERIALS / PRODUCTION

For the production of horn manure, you need fresh and well-formed cow dung, without straw from lactating cows. In case you don't have enough dung from lactating cows you can also use dung from heifers. The best manure comes from cows grazing outdoors on pastures or from cows fed with a clover grass mixture supplemented with hay and straw. Runny cow dung should not be used. Straw or other plant parts must be removed from the cow dung.



THE COW HORN

Only undamaged and well-formed cow horns should be used. The horns should come from one's own cows as far as possible. Cows should have calved at least once. The cow horn contains a bony core. To remove it, the horns can be placed in a safe spot in the sun or put in a compost heap for a short time. The horn will come off readily from the core after five to seven days. Horns of cows that have calved can be easily recognized by their calving rings. These rings are missing in horns from bulls.

8 HORN MANURE (500)



TIME OF PRODUCTION

In the northern hemisphere, cow horns are filled with dung from the end of September to the end of October; in the southern hemisphere in March-April, sometimes in May.

FILLING THE HORNS

Manure is filled into the horns either by hand or with the help of a spoon or spatula. Care must be taken to ensure that the horns are filled right into the horn tip. To avoid cavities, the horns can be tapped with the tip of the horn on a solid surface or a stone. Horns that are either over filled or under filled will cause poor transformation of the manure. For larger amounts of horn manure, a sausage filler can be used. The dung in the cylinder is pressed into the cow horn.

9 HORN MANURE (500)



PREPARING THE PIT

It is best to bury the horns in a prepared pit as soon as they are filled. It should be easy to find a suitable place in a field, meadow or vegetable garden. When choosing a place, make sure that the pit is not in the root area of trees or shrubs, as roots can grow right into the horns. Wetlands should also be avoided.

BURYING THE HORNS IN THE GROUND

The depth of the pit depends on the quality of the soil. If the soil is good and rich in humus, the pit should be between 50-60 cm deep. If the subsoil is too loamy, the pit can be filled up with a 20 cm layer of good topsoil. For moist and impermeable loamy soils and in areas with high rainfall it is advisable to drain the pit. In extremely heavy loamy or stony soils or in regions with high rain-

fall the pit can also be made shallower. The horns should be placed two fingers apart, with the opening facing downwards, in order to prevent water from penetrating. Each horn should be surrounded by soil. If necessary, a second or third layer of horns can be made with soil added between the layers.

Then the pit is filled up with a soil layer of about 30-40 cm. There is no limit to the number of horns as long as all horns are surrounded by good soil.

In hot countries it is recommended to cover the area with a layer of mulch. The soil should be kept moist.

The pit should be clearly marked, preferably with four thick pegs or larger stones. In case these have been removed a map or photo can also be useful. The number of filled horns should be noted.

The personal relationship between farmer and preps is improved if the farmer keeps an eye on the pits and visits these places now and again.





LIFTING THE HORNS

In the northern hemisphere the horns remain in the ground for six months until April. In the southern hemisphere the horns can often be lifted from the ground after four months in August/September. Before all horns are lifted, the quality of some horns should be checked. The manure should be of dark brown, homogeneous consistency and have a pleasant smell of humus or forest soil.

If the material is still wet or green or smells of manure, the horns can remain in the soil for a bit longer. After lifting the horns, they are cleaned carefully. By gently tapping the horns on a stone the contents can usually be easily removed from the horns. It is easier to remove dry manure than wet manure. If necessary, a spoon, spatula or a piece of wire can also be helpful to get close to the tip of the horns. The horn manure is put into clean containers without any soil and crumbled gently.

Careful work is very important in this process. Earthworms can be removed. The number of horns dug up should correspond to the amount of buried horns. At the end of this work one should not forget to weigh the horn manure.

Depending on the size of the horns, an average of 60 – 150 g/horn of horn manure can be expected; from a single large horn: up to 300 grams.

After the manure has been removed, the cleaned horns can best be stored in the cowshed. In the northern hemisphere, the horns can be used three to five times for making horn manure. In hot and tropical countries, the horns fall apart more quickly and cannot be used that many times.



11 HORN MANURE (500)



STORAGE

The biodynamic preparations are living substances and must therefore be stored and handled with appropriate care. Poor storage impairs quality. Carefully stored preparations can last for several years and will improve with age. Horn manure should be stored in a dark, cool place, filled in jars, glazed earthenware pots, ceramic vessels or glass containers. The vessels must not be airtight.



Horn manure should always be stored with constant humidity. Regular monitoring, especially in the first period of storage is therefore essential. Horn manure that is too dry can be moistened. If the manure is excessively moist, it can be removed from the container and dried for a short time however, it should not be placed in direct sunlight.



12 PREPARED HORN MANURE (500 P)



MATERIALS / PRODUCTION

500 P was developed by Alex Podolinsky in Australia and is particularly helpful if the compost preps together with the horn manure preparation are to be applied over large areas.

To produce 500 P the following ingredients are required: the horn manure prep matured for at least three months and the compost preparations.

Recipe: 60 kg horn manure, 7 sets (one set = 2 g) of each of the compost preparations 502 – 506 and 35 ml (7 x 5 ml) of the valerian prep.

First, 40 kg of horn manure are placed in a glazed clay or ceramic pot. Make five holes (appr. 5 cm deep) arranged in a circle with an additional hole in the middle. Fill each of these holes with one of the compost preparations 502 – 506 and pour part of stirred valerian prep into the

middle one. The pot is then filled with another 20 kg of horn manure. Finally, the remaining valerian preparation is evenly distributed over the surface of the horn manure.

Horn manure prepared in this way must be left to mature for at least another three months before being used. During storage the container should be kept in a wooden box in a cool, dry, shady spot. The box should be lined with peat or coco fibre. Further information: see “Storage of preparations”.

Like the horn manure prep, the 500 P needs to be stirred for one hour before application. The 500 P prep should be applied either before sowing or directly after the end of the harvesting season. The soil should be moist.



HORN SILICA (501)



14 HORN SILICA (501)



MATERIALS / PRODUCTION

Very finely ground crystalline quartz (SiO_2) is required for the production of the horn silica preparation. For this purpose, rock crystal or pure quartz rocks can be used. The crystals should not contain other minerals.

For the production of the horn silica preparation undamaged and well-formed cow horns are also required. Horns used for the silica preparation should either be new or be used for this purpose only.



15 HORN SILICA (501)

To obtain of very finely ground quartz powder several steps are necessary. Large pieces of quartz must be crushed with a heavy hammer until they are small enough to be crushed in a solid iron mortar; some use a sawn-off gas cylinder.

Fragments of quartz can be extremely sharp: wear protective goggles. Because of the fine dust produced during grinding, it is recommended to wear a protective mask. The mortar can be covered with a piece of cotton cloth. When crushing in an iron mortar, fine metal abrasion can occur. To obtain a pure product, iron particles can be removed with a strong magnet.

After grinding, the crushed quartz pieces are sieved. The coarse material is further crushed, and the finer material is crushed into a flour-like consistency. Traditional mill-stones, granite slabs or glass plates (8 mm or more) can be used for this process. Be aware that the grinding on the glass plates can contaminate the quartz, so granite slabs are much better for this purpose. The quartz must be ground into a flour so fine that it can be sifted through a tightly woven cotton cloth. To check the degree of fineness, the powder can be tested between the teeth; if it crunches, it is not yet fine enough.





FILLING THE HORNS

The quartz flour is mixed with clean water to form a thick paste and filled into the cow horns. The horns should be placed vertically. Cavities should be avoided. Some farmers pour a rather runny silica into the horns, while others prefer to fill a solid paste with the help of spoons into the horns. After filling, any excess water will rise to the top. Depending on the consistency of the paste, this can take a few hours or one or two days. Excess water must be poured off and the horns topped up with quartz paste. Before burying, the paste should be of a solid consistency.

BURYING THE HORNS

In the northern hemisphere, the horn silica preparation is filled into the horns from March-April. These remain in the earth for six months until September-October; in the southern hemisphere, the horns remain in the soil from September-October to March-April.

The freshly filled horns are placed in the pit with the opening facing down. Some farmers seal the horns with clay. Each horn must be surrounded by soil. The pit should be kept free of vegetation.



17 HORN SILICA (501)



EXCAVATING THE HORNS

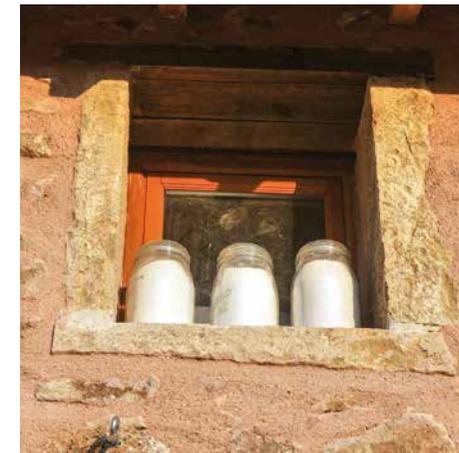
After about six months the horns can be dug out. The horns need to be cleaned from the outside. Any fungi or soil should be scraped away from the mouth of the horn to avoid contaminating the prep when the horns are emptied. By gently tapping the horns on a stone the contents can usually be easily removed from the horns.

Depending on the size of the horns, an average of 150–250g of horn silica can be expected; from a single large horn even up to 600–700 grams.

STORAGE

The silica preparation can be filled into a clean, transparent glass jar and stored in a bright place that catches the morning sun. Alternatively, it is possible to leave the preparation in the horns until the silica preparation is used. The horns should be placed in a light and sunny position. The silica preparation should never be stored in the dark.

As long as the preparation remains dry it can be used for many years.





APPLICATION OF THE FIELD PREPARATIONS



STIRRING AND SPRAYING THE HORN MANURE AND HORN SILICA PREPARATIONS

The two field spray preparations, horn manure and horn silica, must be diluted in water and stirred rhythmically for exactly one hour before application. They are stirred at different times and applied with different methods. Their effects complement and intensify each other. They must be understood as a unity. Both preparations are the cornerstones of biodynamic work.

There are diverse methods for stirring and application. The appropriate method depends on the size of the area, weather conditions, time required, number of workers involved, etc. Ideally, stirring vessels and sprayers should only be used for preparation work.



STIRRING PLACE

Recommendation: Set up a permanent stirring place in the open air. Several criteria are to be considered: The location should be central but quiet and protected. Direct access to water is essential. It is helpful if the place can easily be accessed by tractors and is roomy enough to fill large barrels.

A beautifully designed area with trees, shrubs and flowers may add a nice touch.



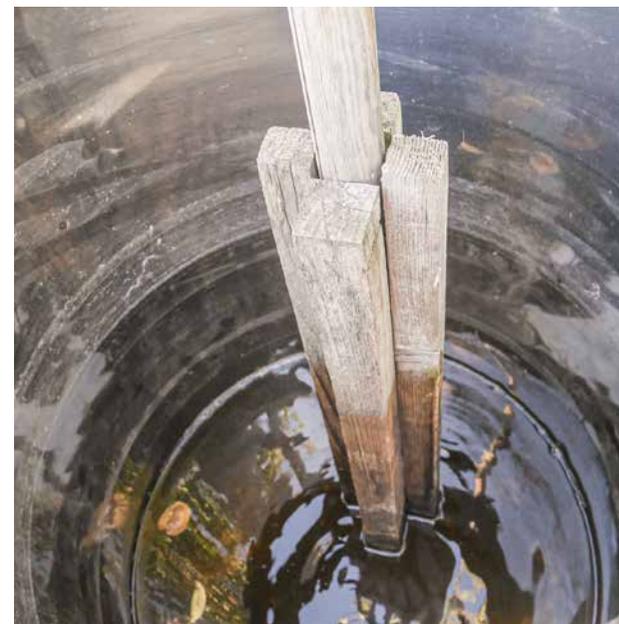
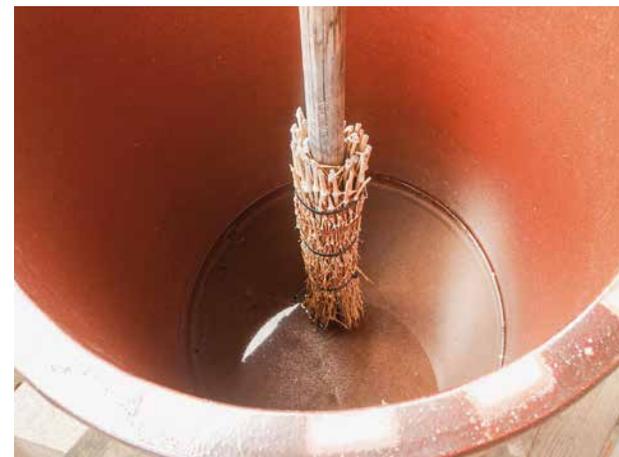
WATER QUALITY

Only clean water is used for stirring. Rainwater or spring water is suitable, drinking water or clean well water can also be used. The water should be lukewarm before stirring. If necessary, the water must be heated to approx. 37°C.

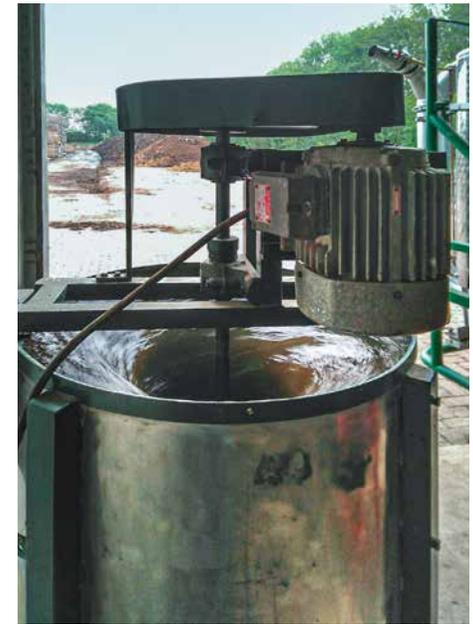
STIRRING CONTAINERS FOR MANUAL STIRRING

Containers must be clean, uncontaminated and should preferably be used for stirring purposes only. Ideally they should be made of wood, stainless steel, earthenware/ceramics or copper. If such containers are not available, a plastic container will suffice. Please note: Sooner or later plastic particles rubbed off by the stirring will find their way into the water, however, it is better to use a plastic drum than not to stir at all. In the long run, aim to replace plastic containers with more appropriate ones.

Each container must be greater in height than in diameter. The shape of the drum should be cylindrical or slightly conical. For vigorous stirring a larger vessel is necessary. To create a well-formed vortex, the volume of the container should be about twice the volume of water.



21 APPLICATION of the field preparations



STIRRING METHODS

The two field spray preparations can be stirred using different methods. For small quantities, stirring by hand is possible. Some farmers use tools such as whisks or stirring rods. If a tool is suspended, it should be movable. A wooden hand-stirrer should fit comfortably in your hand. A piece of wood or brushwood can be used as broom. Make sure that the broom is easily removable, so cleaning is simplified. For smaller quantities (up to 50 litres) a simple stick or small broom is sufficient. For mechanical stirring, specially designed machines and drums have been developed.

22 APPLICATION of the field preparations



STIRRING / DYNAMISATION

Stirring starts with slow but vigorous movements at the periphery of the barrel until with increasing stirring speed a vortex forms. The vortex should go right to the bottom of the barrel. Then the stirring process is stopped abruptly resulting in chaos in the water; without interruption a new vortex form develops running in the opposite direction. The formation of the vortex must be robust so that an intensive mixing and aeration of both water and preparation can take place.

This all depends on bringing about a thoroughly intimate connection between the stirrer and the process of stirring. Creating and breaking the vortex at regular intervals is continued clockwise and anti-clockwise for exactly one hour. This stirring method can be done in small buckets as well as in large barrels. With a good stirring device, even large quantities, i.e. 150-180 litres, can be stirred by one person for one hour without difficulty. Immediately after stirring, the preparation should be applied.

When it comes to the preparations, working together is part of the biodynamic commitment. So stirring the preparations horn manure and horn silica with a group of people, each person with a bucket, is a great experience.



23 APPLICATION of the field preparations



STIRRING AND SPRAYING HORN MANURE (500)

Quantity: 100 g in 25 to 50l water /ha

The horn manure preparation acts on soil and root growth, promotes microbial life and the formation of humus. As soil structure is improved, the soil can absorb and retain water and nutrients more easily.

Horn manure should be sprayed at least twice a year, at the beginning and the end of the growing season. It is best spread on moist soil, or directly before rain. Horn manure can also be sprayed during or after rain. Please note: Sufficient soil moisture is very important.

The preparation should be applied onto bare soil directly after stirring. It should be sprayed on meadows or pastures before the beginning of plant growth and after the first grassland mowing. If the soil is to be mulched, spraying must be carried out before mulching.

Before stirring, the preparation must be dissolved in water and then stirred vigorously for one hour without interruption. Ideally, stirring and spreading should be carried out in the late afternoon or early evening with a slightly overcast sky.

Horn manure should be sprayed as evenly as possible in droplets over a wide area onto the moist ground. Methods of application vary. For small areas horn manure is sprayed with buckets and hand brushes. Branches of shrubs or trees can be cut to size. Knapsack sprayers driven by hand or motor may be employed at low pressure (max. 0.5–1 bar). For large areas tractors or other machines with appropriate attachments are used. Avoid clogging the nozzles by carefully filtering the liquid beforehand.

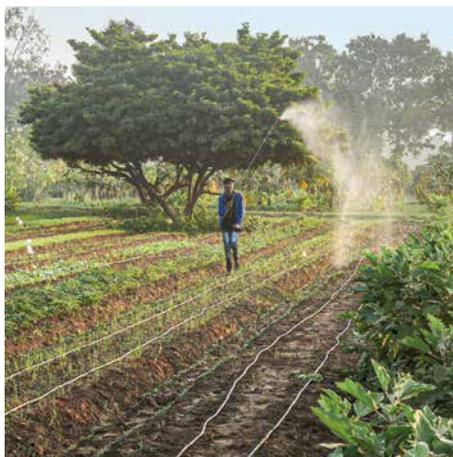
STIRRING AND SPRAYING HORN SILICA (501)

Quantity: 4 g in 25 to 50 l water/ha

Horn silica, the polarity to horn manure, complements its effects. The preparation is used several times a year during the growth period of plants. It promotes the metabolism and assimilation of plants and enhances plant health by increasing their resilience.

It is relatively easy to describe the potential applications of horn manure. As to horn silica, this proves to be more difficult. Depending on the time of application, horn silica stimulates the growth of plants and promotes their maturation. Effects are optimal if plants are sprayed during their most intensive growth stage.

Cereals can be sprayed after tillering, during stem extension and heading. Fruit trees are best treated when their leaves are fully developed, again at fruit formation and during maturation. In general, horn silica increases the storage capacity of grains, pulses, fruits and it improves flavour.



Do not spray seedlings or transplants that are taking root. Avoid spraying during drought.

The stirring of horn silica is carried out directly or soon after sunrise on dry and sunny days. Plants must not be wet or bedewed. Horn silica should never be applied directly before or after rain. Like horn manure, horn silica is stirred for exactly one hour. The vortex formation is of great importance for the blending and dynamisation of water and horn silica. Preparation 501 is carefully filtered and sprayed onto the plants immediately after stirring. During application, care should be taken to ensure that the liquid is sprayed in as fine a mist as possible.

On small areas the horn silica preparation can be applied with knapsack sprayers. Application must be carried out with high pressure of at least 2-3 bar (and more). Spraying horn silica with brooms or brushwood is inappropriate. When knapsack sprayers are used, the spray lance is swung back and forth in a high semi-arch so that the horn silica preparation is distributed evenly on the plants in a finely sprayed mist.

In order to achieve a greater range, extensions can be attached to the spray lance. In orchards motor-driven knapsack sprayers are useful. For larger areas, machines with special attachments are used which can cover 10 m and more. Today, impassable terrain can be sprayed with the help of drones.



YARROW PREPARATION (502)



THE PLANT

Yarrow (*Achillea millefolium*) is a perennial plant up to 60 cm tall. It originated in Europe, and today is naturalised all over the world. Yarrow does well in a wide range of climates and can be found on meadows, pastures, dry grassland and farmland. The flowers are white, sometimes pink, the stems are hard and fibrous. The individual plants are usually linked by rhizomes. The fast spreading rhizomes can be up to 30 cm long.

PROPAGATION

The easiest way to propagate is from rhizomes. Propagation from seeds is possible. Seeds need sunlight for germination. Sprinkle with a little bit of soil, but do not cover the seeds completely. Duration of germination: 7–12 days.



PLANTING

The rhizomes are planted in rows and covered with 2–3 cm of soil; distance between rows: 20–30 cm. Distance between plants in rows: 20–30 cm, 2–3 rhizomes per spot.



HARVESTING

Compared to chamomile and dandelion, harvesting is possible over a longer period of time. Flowers are harvested in the morning on sunny days. A flower head often consists of 100 or more tiny individual flowers and reaches a diameter of 6–10 cm. Yarrow should be harvested during the full flowering period. Stalks and leaves have to be removed. After harvesting, the plants should be cut back just above the ground.

There are several ways to harvest the flowers. Some farmers prefer to harvest the individual flowers with a small pair of scissors by cutting the flowers directly at the base so no stem is included. Another method is to first harvest the whole head of blossoms, and later cut the individual flowers carefully off the stems.



While drying, the flowers must be protected from direct sunlight. Drying ratio: 4:1. For storage, the dried flowers can be stored in a glass container or a paper bag until needed. There should be no moisture left in the dried plant. It is advisable to check the condition and quality of the harvested material occasionally. No matter which storage container is chosen, the plants must be protected against animals and mould.



THE ANIMAL SHEATH

The yarrow is filled into the stag bladder of a red deer (*Cervus elaphus*). As a rule, dried deer bladders can be obtained from the national biodynamic association or from advisors.

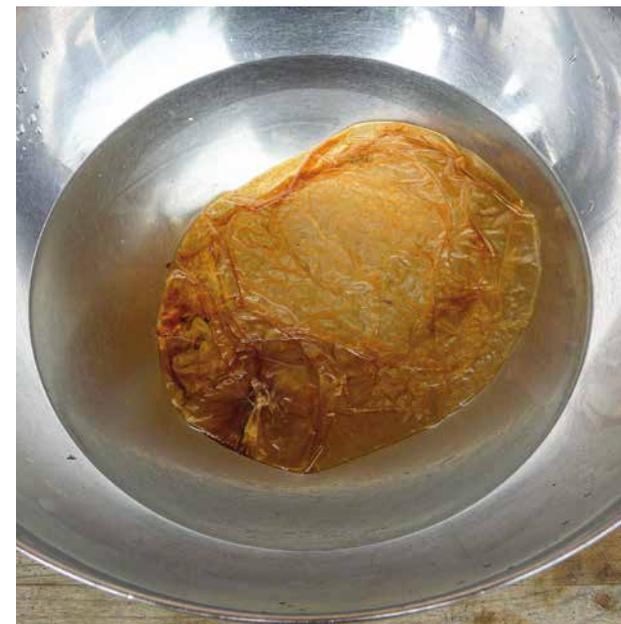
FILLING THE DEER BLADDERS

If fresh flowers are available for filling, they must be slightly wilted before use so that the volume of the filled bladder does not shrink too much during the time of hanging. If dried flowers are used, they should be moistened with lukewarm tea made from yarrow leaves before filling. The moistened flowers should be mixed thoroughly. The plant material should not be dripping wet.

In order to make a dried bladder flexible again, it must be soaked in lukewarm water. After a few minutes the bladder is soft and flexible and can be filled.

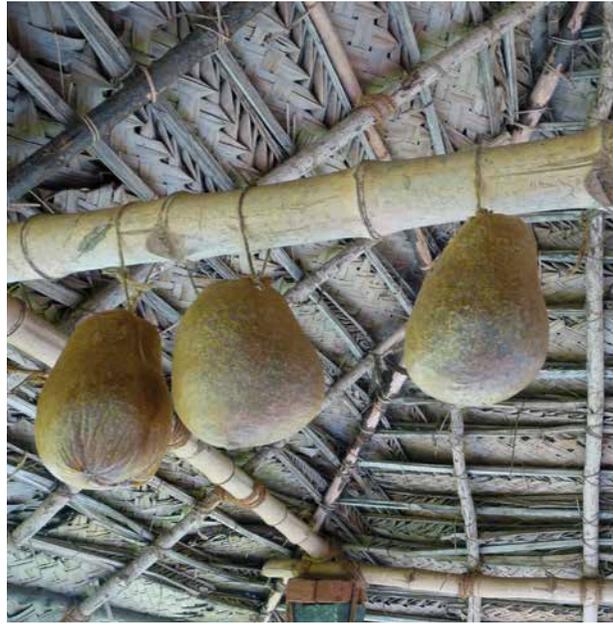
To fill it with flowers, the bladder must be opened with a small cut about two fingers wide, using a pair of scissors or a sharp knife. The opening should only be large enough to insert a funnel. The cut can be made before or after soaking.

With the help of a funnel the filling of the bladder is very easy and quick. The funnel should be about 5 cm long and should have an opening of about 4–5 cm. Use your fingers to fill the flowers evenly into the bladder. A well-stuffed bladder should have its natural spherical form. After filling, the bladder is tied with a string and surrounded on four sides by strings like a net to ensure safe hanging.



29 YARROW PREPARATION (502)

Full bladders are hung in a sunny place for several months; in the northern hemisphere for example under the eaves on the south-facing side of a building, in the southern hemisphere on the north-facing one. The bladders can also be hung in a birdcage to protect it from animals. If several bladders are hung together, they should not touch each other as this can lead to mould. The bladders should remain in the open air for at least three months before being buried in the soil. The right time for hanging the bladders into the open air depends on whether you use fresh flowers or dried ones.





BURYING THE BLADDERS

In the northern hemisphere, the deer bladders are buried at the same time as the horn manure and the compost preparations chamomile, dandelion and oak bark, i.e. at the end of September–October. In the southern hemisphere, this is done at the corresponding times in March–April.

Since the bladders are usually very dry after several months in the air, they must be dipped into a bucket filled with water before burying so that the yarrow is well moistened.

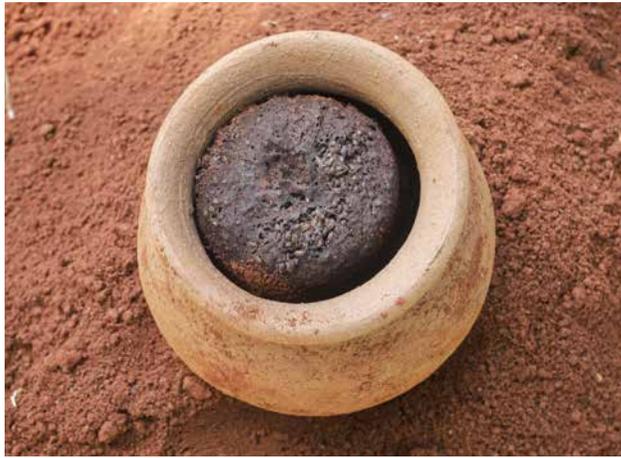
There are several methods for the next step. Some farmers put the bladders directly into the pit, while others, especially in hot and dry countries, prefer to put the deer bladders into unglazed clay pots. This way they are better protected against animals. Some farmers surround the bladders in the pots with fertile soil, while others only put the bladders into the pots. A pot can be completely filled with bladders.



Some farmers place the pot in the ground with the opening facing upwards and put a tile or flat stone on the opening, while others place the pot on a flat stone or tile with the opening facing downwards. Some people, who put the bladders directly into the earth, surround them with some shovels of sand topped with branches, so they find the spot more easily later on.

The pit should be 30–50 cm deep. Here, too, the depth of the pit depends on the quality of the soil. The bladders or the clay pots filled with bladders should be surrounded by fertile soil. The place should be well marked.





EXCAVATING THE YARROW

In the northern hemisphere, the deer bladders are taken from the ground at the end of March-April, in the southern hemisphere, this happens in September-October. The bladder should be lifted very carefully out of the soil or the pots. It will be extremely fragile. The skin of the bladder is often only present in sparse remains. The flower mass is usually preserved in its round or oval shape. Often the structures of the flower heads are still visible. Soil must be removed very carefully from the yarrow preparation. As soon as the soil is removed, the bladder can be opened.

A bladder filled with moistened yarrow weighs on average between 900-1,200 grams, depending on its size. A bladder freshly removed from the ground weighs 500-600 grams on average.

Finally, the pit can be filled with fertile soil. If the location was convenient, it can be used for the same purpose again the following year.



CHAMOMILE PREPARATION (503)



THE PLANT

Chamomile (*Chamomilla recutita*) originates from the Middle East and has now spread worldwide, even to hot or tropical regions. Chamomile is often cultivated as a medicinal plant.

Chamomile is an annual plant with upright and highly branched stems up to 60 cm tall. The yellow flower heads are surrounded by a white corona. The plants have fine, ramified shallow roots. As a pioneer plant, chamomile does not have any special soil requirements; it thrives equally well in light and heavy soils. Compacted soils are even preferred. High nitrogen content will cause strong vegetative growth and reduce flower formation. Chamomile grows best in full sun, shady locations are not tolerated.

CHARACTERISTICS OF CHAMOMILE

The true chamomile (*Chamomilla recutita*) differs from other chamomile species by its hollow flower base, whereas other chamomile species have a completely filled base.



PROPAGATION

Chamomile is propagated exclusively by sowing – usually done in seed trays. When large quantities of flowers are required, the seeds can be sown directly on beds. Chamomile seeds must not be covered as the seeds require light for germination. At temperatures of 15–20°C, germination will take place after 4–6 days. About 5–6 weeks after sowing the young plants can be planted directly from seed trays into the bed: 3–5 plants per spot. Recommendation for planting: in rows, with approx. 10–15 cm distance between plants, and 25 cm distance between the rows. Wide plant spacing reduces flowering.

Chamomile has a strong tendency towards self-seeding; these young plants can easily be transplanted directly into beds.





HARVESTING

The plants flower over a period of about 4-6 weeks. As the older flowers mature, the plants constantly produce new flowers. The flowers can be harvested as soon as the petals are fully extended. This should be done on sunny days in the morning. It is essential to find the optimal harvest time. If the flowers are harvested too early, the yields will be very low; if they are harvested too late, the flower heads may fall apart. Flowers should be harvested without stems as far as possible. If the percentage of stems is too high, they must be removed. An alternative is to harvest the flowers with a flower comb.

If flowers are not used when fresh, they can be dried. The drying ratio is 6:1. For storage, the dried flowers can be stored in a glass container or a paper bag until needed. Even with careful storage the flowers will lose a lot of quality after about a year. It is therefore recommended to grow and harvest chamomile flowers every year.



THE ANIMAL SHEATH: THE SMALL INTESTINE OF A COW

The small intestine (*Jejunum*) of a cow is used as the animal sheath, preferably from a cow from one's own farm. Since fresh intestines are not always available at the time of preparation making, dried intestines can also be used. In both cases, the fresh intestine must be emptied and cleaned with water.

DRYING THE INTESTINE

After the intestines have been cleaned, they can be cut into pieces of about one metre long. The intestines are then tied at one end, inflated with an air pump, tied up and hung out of reach of animals for drying. Dried intestines regain their flexibility by being placed in luke-warm water. After a few minutes the intestines are soft and flexible and can be filled.

When stored, the dried intestines must be kept in a container for protection against moths or other animals. It is always advisable to check the quality of the intestines during storage. Animal sheaths for preparation production should never be stored in a deep-freezer or refrigerator.

There are different times and methods for filling the intestines.





FILLING THE INTESTINE

The flowers are stuffed into pieces of intestine which should be about 30 to 50 cm long. The pieces of intestine must be tied at one end before stuffing. After filling, the other end can be finally tied with a loop.

If fresh flowers are available for filling, they must be slightly wilted before use, so that the volume of the filled intestine does not shrink too much. If dried flowers are used, they should be moistened with lukewarm tea made from chamomile leaves beforehand. The moistened flowers should be mixed thoroughly.

The flowers can then be stuffed into the intestine by hand or by using a funnel. With the help of a funnel the filling process is very easy and quick. The funnel can be about 5 cm long and should have an opening of about 4-5 cm. Funnels can also be made from PET water bottles slightly cut above the bottleneck. Use your fingers to fill



the flowers evenly into the intestine. Care must be taken to ensure that the flowers are evenly distributed and stuffed tightly into the intestine.

Like the yarrow preparation, the intestines are hung in a sunny place for at least three months before being buried in the soil. As to hanging the intestines into the air, timing depends on whether you use fresh flowers or dried ones.

Alternatively, the intestines can be filled just before burying.

BURYING THE INTESTINES

In the northern hemisphere, the intestines are buried at the same time as the horn manure and the compost preparations yarrow, dandelion and oak bark, i.e. at the end of September-October. In the southern hemisphere, this is done at the corresponding period in March-April.

Since the intestines are usually very dry after several months in the air, they must be dipped into a bucket filled with water before burying so that the chamomile inside the intestine is well moistened.



EXCAVATING THE CHAMOMILE

In the northern hemisphere, the intestines are taken from the ground in April, in the southern hemisphere, this happens in September-October. The intestines should be lifted very gently out of the soil or pots. Often the sheaths are still preserved. Soil must be removed very carefully from the preparation so that the soil and the preparation do not mix. The intestines can then be cut open lengthwise with a knife and the preparation can be removed. Depending on the transformation, the structure and colour of the flowers can still be seen. Often the preparation has a faint chamomile scent, sometimes a slightly acidic smell, but this disappears quickly. If the preparation is too moist, it can be dried in an airy and shady place for a short time.



A man and a woman are shown harvesting stinging nettles in a lush green field. The man, on the left, is wearing a blue t-shirt and light-colored pants, and is holding a large bundle of harvested nettles. The woman, on the right, is wearing a striped t-shirt and light-colored shorts, and is wearing gloves while cutting the plants. The background features a dense line of trees and a wooden bench in the distance.

STINGING NETTLE PREPARATION (504)

THE PLANT

The stinging nettle (*Urtica dioica*) is a perennial plant native to Europe, North America and Asia; it has been introduced to many other parts of the world. *Urtica* can tolerate hot temperatures if the soil has sufficient moisture. The plant is erect, growing up to 150 cm high, with a firm and fibrous stem. *Urtica* is dioecious which means that there are female and male plants. The white-green flowers are small and inconspicuous. The plant genus *Urtica* is known for its stinging hairs which can cause painful skin irritations.

Because of its widely spreading rhizomes the plant can be found in large colonies. As a nitrogen-loving plant, it thrives on heavy, fertile and nutrient-rich soil, preferably in full sun.

In East Africa the native *Urtica massaica* (bottom left) is used to produce the preparation; in northern India the indigenous *Urtica parviflora* (bottom right) is used.





PROPAGATION

Due to its worldwide distribution, cultivation is not necessary in many parts of the world. If stinging nettle needs to be cultivated, it can be propagated easily from rhizomes (10–15 cm). Propagation from seeds is also possible.

Planting: The rhizomes are planted in rows and covered with 5 cm of soil; distance between rows: 25–30 cm. Distance between plants in rows: 20–30 cm, 3 rhizomes per spot.

Sowing: The seeds are sown in seed trays. Sprinkle with a little bit of soil, but do not cover the seeds. Germination occurs after 5–12 days. The germination rate is very low, averaging just over 50–60%.

HARVESTING

Wearing protective gloves is recommended. Nettles are harvested at the beginning of the flowering season, preferably on a sunny morning. The plants flower progressively from below upwards. Scissors, sickle or scythe can be used for cutting.

The plants can be cut above yellow or spotted leaves. Thicker stems decompose poorly. It is therefore recommended to remove the leaves from the thicker stem and to use only the upper soft parts of the plants. Alternatively, the upper 30–40 cm of the plants can be harvested and cut immediately.

If the nettles cannot be used when fresh, they can be dried and stored until use. Drying ratio: 6:1

After cutting back to soil level plants sprout again vigorously.



41 STINGING NETTLE PREPARATION (504)



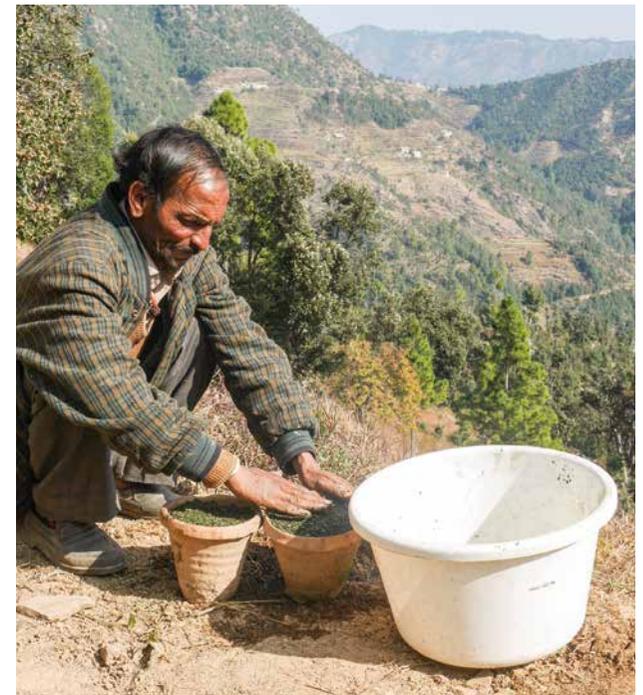
PRODUCTION

Nettles harvested in the morning are left to wilt in light partial shade until the afternoon. If dried nettles are used, they should be moistened with lukewarm tea made from nettle leaves before burying.

For the production of the nettle preparation no animal organ is needed.

Some farmers put the nettles into a wooden fruit crate. The crate needs to be covered with a gunny sack or sack-cloth and surrounded with a light layer of peat to separate the container from the soil. Other farmers prefer to stuff the nettles either into unglazed clay pots or clay tubes.

Whichever container is chosen the nettles should be squeezed in evenly and firmly.





BURYING THE NETTLE

Some farmers place the pot in the ground with the opening facing upwards and put a tile or flat stone over the opening, while others place the pot on a flat stone or tile with the opening facing downwards. The opening of the pipes can be easily closed with terracotta plant pot saucers or a similar material.

In contrast to the other preparations, the nettle preparation remains in the soil for a whole year. When planning the quantity, one should take into account that after one year only very little substance remains.



EXCAVATING THE NETTLE

After 12 months the finished preparation can be dug up. What remains of the nettle is now very small. Here, too, care must be taken to ensure that it is not mixed with soil or peat. The preparation is of a dark black colour, remains of the stems are often still visible. Before the preparation is filled into a container, the remaining stems can be broken up into smaller pieces.



OAK BARK PREPARATION (505)

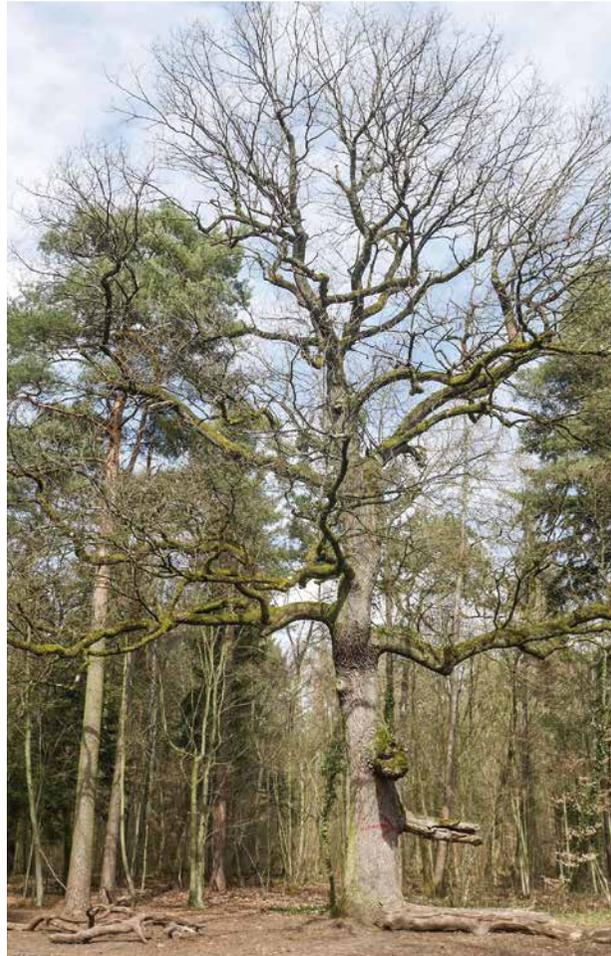


THE PLANT

About 400–500 deciduous or evergreen tree and shrub species belong to the genus *Quercus*. They are widespread in Europe, North and Central America and in large parts of Eurasia, China, Southeast Asia and parts of the Mediterranean, including North Africa. *Quercus* has been introduced to other areas, e.g. Australia, South Africa and Zimbabwe.

Oak trees (*Quercus robur*) prefer fertile, nutrient-rich and well-watered clay soils. As young trees they tolerate moderate shade, but with increasing age the trees need plenty of light. Oak trees can reach a height of up to 35 m. They are long-lived trees and may live hundreds of years.

In northern America the bark of the native White Oak, *Quercus alba*, is often used, in northern India it is the bark of *Q. dilatata*.



PROPAGATION

In the northern hemisphere, the mature acorns fall to the ground in October. Acorns are best collected and sown at this time. Germination takes place about 4–6 weeks after sowing





COLLECTING THE BARK

For the preparation the bark of oak trees is used. The trees should not be too old. There are several ways to collect the bark.

The most common practice is to collect the bark directly from the living tree. The oak should have a trunk diameter of 25-50 cm. Before removing the bark, the trunk must be thoroughly cleaned of lichen and moss with a wire brush.

A cloth is placed around the cleaned trunk to collect the bark. The outer layer of the bark is carefully harvested with the help of a drawknife and wood rasps. Take care not to remove too much bark, as this may damage the tree.

Using a fine grater or a coarse file, the outermost bark layer can be finely crushed and collected in a cloth. Another possibility is to use a drawknife to peel off the bark in thin layers directly from the tree. Then the bark pieces are crushed in an iron mortar or coffee mill.

Alternatively, branches with a diameter of 15 – 25 cm can be sawn off directly from older trees. The bark can be peeled later. Here, too, the branches must first be cleaned with a wire brush. Working with rasps and rough files, the bark is collected in a cloth.



THE ANIMAL SHEATH: A SKULL OF A DOMESTIC ANIMAL

The bark is filled into the skull (bone vessel) of a domestic animal. The skulls of cows, horses, sheep or goats are suitable. Depending on the size of the animal, a cow skull can hold an average of 250 grams of bark, a sheep or goat skull about 90 grams. If possible, the skulls should come from one's own farm.

There are two possibilities how to use the skulls. Either the skulls of freshly slaughtered animals are used directly and filled with bark, or the skulls are cleaned before use.

If you want to use the fresh skull you need to remove the brain from its cavity. This can be done with the help of some small tools and water.

To remove the flesh from skulls, put them in compost for a few days, protected from stray dogs or rats. The biological activity in the compost ensures that the skulls are cleaned within a very short time. Alternatively, fresh skulls can be put into a plastic barrel filled with sawdust and compost.



FILLING THE SKULL

In the northern hemisphere, the bark is put into the animal skulls in September-October, in the southern hemisphere, this happens at the corresponding time in March-April.

Before filling, the finely crushed bark should be moistened with some water. Via the occipital hole, the bark can be filled into the brain cavity by hand or with the help of a funnel. Cavities must be avoided. Finally, the opening is closed with a piece of bone.



48 OAK BARK PREPARATION (505)



BURYING THE SKULL

After filling is complete, the skulls are buried. Several methods have proven to be effective. The skulls can be placed in a wooden barrel. If these are not available, a plastic barrel will suffice. The vessel should have a closable drain near the bottom. A rainwater gutter is well suited as inlet.

The barrel is filled with half rotten, muddy plant material and with some soil. The skulls should be surrounded from all sides by half-rotten plants. Some heavy stones can be placed on top.

In the following months, water should regularly flow into and out of the barrel. Rainwater is best.

It is also possible to put the skulls in a specially created watering place. A regular inflow and outflow of water should also be insured.



EXCAVATING THE OAK BARK

In the northern hemisphere, the skulls are taken out of the barrel in March-April, south of the equator this happens in September-October. Before the oak bark is removed, the skulls must be thoroughly cleaned of mud and soil. With the help of pieces of wire, long nails or other small tools, the preparation can easily be taken out of the brain cavity.

Alternatively, the skulls can be sawn open. When sawing, the fine sawdust must be carefully removed.

The preparation is of a brownish-reddish colour and has adequate humidity.

In most areas, animal skulls are widely available, so new skulls can be obtained every year. If this is not possible, well-cleaned skulls can be stored and re-used next year. However, the skull should not be stored in the sun.



DANDELION PREPARATION (506)



THE PLANT

Dandelion (*Taraxacum officinale*) is a herbaceous perennial growing from a thick, unbranched taproot. The plants have a basal rosette of leaves, smooth, hollow stems, with a solitary golden-yellow flower head, composed only of ray flowers. All vegetative parts of the plant contain a milky latex.

The plant prefers sunny locations and grows in all soil types, but especially well in clay soil. Meadows and pastures rich in nitrogen are preferred.

Originally native and widespread throughout the temperate climate zone, dandelions are now found all over the world in different climate zones. With sufficient soil moisture dandelion even thrives in the tropics.



PROPAGATION

The easiest and fastest way to propagate is with root cuttings. Cuttings should be pencil-thick and about 5–10 cm long. Root cuttings can be placed in furrows and covered with 5 cm of soil. Plant and row spacing approx. 20–25 cm. Dandelion can also be propagated from seeds. Germination period 7–10 days. The seeds should only be covered with a little bit of soil and then lightly pressed. Dandelion tends to self-seed vigorously.



HARVESTING

The blossom opens when the sun shines on it in the morning. With rising temperatures and sunshine, more and more flowers open. On a sunny day, the flowers may already be closed by midday.

As the open flowers quickly go to seed, some rules must be strictly observed: To produce the preparation, only the flowers that still have “closed centres” should be harvested. The best time is just as the flowers begin to open, i.e. before they are completely open.

The flowering depends very much on the weather and temperatures. On hot days with intense sunshine this can be early in the morning, between 8:30 and 9:30 a.m. The flowers can already begin to close around noon. In other places harvesting can take place around 10:00 a.m.

If harvesting is done too late, when the flowers are fully opened, they will develop white fluffy seed heads. These are not suitable for the preparation. Even during drying, flowers that have been harvested too late go to seed.

In most cases the flowers are dried for preparation. For this purpose they are spread out in a thin layer in an airy place. Turning the flowers during the drying process is recommended. The drying ratio is 5:1.

Fresh flowers, slightly dried, can be used immediately to make the preparation.



THE ANIMAL SHEATH

The sheaths should best be obtained from one's own cows. For the dandelion preparation there are two options. The first sheath is the so-called greater omentum (*Omentum majus*). The omentum encloses the internal organs. It is a large apron-like fold and hangs down from the stomach. The omentum is easy to come by from on-farm slaughtering. Cut off excessively fatty parts. They should not be used because too much fat can affect the quality negatively. (Photo bottom left)

Using the mesentery (*Peritoneum intermedium* and *P. viscerale*) that encloses the small intestine is another option. The mesentery attached to the small intestine is a double-walled peritoneum. The mesentery is pulled apart in two halves right up to the intestine. Separated from the peritoneum the intestine can be pulled out.

Work is a lot easier when done in pairs: One person holds the peritoneum halves, the other carefully pulls out the intestine. Now you gain "pockets" which can be filled with the dandelion flowers.



DRYING THE SHEATHS

The pieces of the omentum of about 25x25 cm to 35x35 cm are dried in the air for some days. The pockets of the mesentery are dried in a different way. They must be stretched and left to dry on fresh, thin branches in a shape that simplifies filling the pockets later on. Drying should take place in the shade. Further recommendations as to drying and storing prep sheaths: see "Yarrow Preparation".





FILLING THE SHEATHS

As mentioned above, both the dandelion flowers and the animal sheaths can be used when fresh or dried. If fresh flowers are available for filling, they must be slightly wilted before use. In that case they can be filled into the animal sheath. If dried flowers are used, they should be moistened with lukewarm tea made from dandelion leaves beforehand. Make sure they are not soaking wet. The moistened flowers should be mixed thoroughly.

FILLING THE OMENTUM

The fresh, withered or moistened flowers are pressed into a ball and wrapped in a piece of the omentum. The ball is wrapped with a string and tied. The flowers should only be wrapped with one layer of omentum, as too many layers will delay the transformation of the flowers.

FILLING THE MESENTERY

Filling the mesentery is easy. The flowers are pressed into a ball and filled into the pockets, the ball is then covered by skins.

If the preparation is to be buried directly in the soil, tying is not necessary, as the skins folded over each other enclose the contents. If the balls are to be hung in the air for some time, they must be tied with a string and surrounded on four sides by strings to ensure safe hanging.



55 DANDELION PREPARATION (506)

Like the yarrow and the chamomile preps, the dandelion preparation is hung in a sunny place. Protected against animal attack it remains in the air for at least three months before being buried in the soil.

Alternatively, mesentery or omentum can be filled at the time of burial.

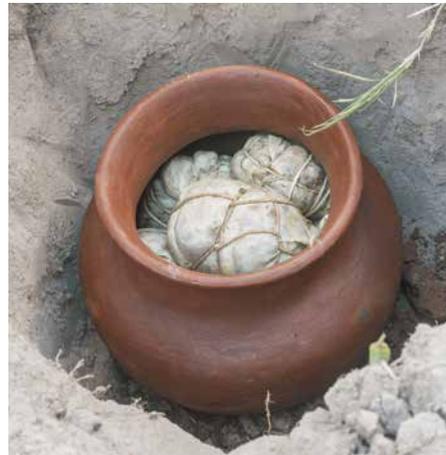


BURYING THE SHEATH

In the northern hemisphere, the dandelion preparation is buried at the same time as the horn manure and the compost preparations yarrow, chamomile and oak bark, i.e. at the end of September-October. In the southern hemisphere, this is done at the corresponding times in March-April.

Since both mesentery and omentum are usually very dry after several months in the air, they must be dipped into a bucket filled with water before burying, so that the dandelion is well-moistened.

The dandelion balls can be placed directly into a prepared pit or put into unglazed clay pots and covered. The pit is filled with fertile soil and well-marked.



EXCAVATING THE DANDELION

In the northern hemisphere, the preparation is taken from the ground in March-April, in the southern hemisphere, this happens in September-October.

The preparation should be lifted cautiously out of the soil or pots. The soil has to be removed very carefully from the preparation so that the soil and the preparation do not mix. Often the sheaths are still preserved. Be heedful when slicing the balls or pockets to remove the preparation. The yellow colour of the flowers can still be seen. If fatter parts had been used the dandelion flowers are usually slightly less transformed. Sometimes the preparation has a slightly acidic smell, but this disappears quickly. If the preparation is too moist, it can be dried in an airy and shady place for a short time.





VALERIAN PREPARATION (507)



THE PLANT

Valerian (*Valeriana officinalis*) is native to Europe and Asia, where it grows in full sun and partial shade, preferably along streams, damp meadows and at the edge of forests.

The flowering season in Europe is in the summer months from June to July. Valerian is a typical long-day plant; i.e. for flowering it requires long periods of light (daylight for 14 hours or more) and short periods of darkness. Short days promote vegetative growth, but delay flower formation. In regions where the daylight period is shorter, e.g. at the equator, valerian thrives producing plenty of vegetation but does not flower.

Valerian is a perennial herbaceous plant up to 100 – 160 cm tall. The white or pink aromatically scented flowers do not develop until the second year. During the vegetation period of the second year each plant will develop several rhizomes. New plants will sprout from these rhizomes, whereas the withered plant will die.

PROPAGATION

Valerian is usually grown from seeds. Seeds need sunlight for germination. Sprinkle seeds with a little bit of soil, but do not cover the seeds completely. Duration of germination: 7 – 12 days. Seeds can be stored only for a short time. After one year the germination rate is usually below 5%. For propagation the rhizomes can also be used.

PLANTING

Valerian thrives in almost all soils. However, as the plants have shallow roots and require a lot of moisture, the location for planting should be carefully selected.

Initially young plants grow very slowly. After about 10 weeks the young plants are well-rooted and can be transplanted into a bed: 40 cm distance for plant spacing; single plants in 40 cm rows.



HARVESTING

Harvesting should be done on sunny days in the morning. Harvesting is best when most of the flowers have opened. The flowers should be harvested without stems as far as possible, hand-picked or with scissors. If there are too many stems in the crop, they can be removed later. If only the petals are to be used, they can be plucked from the flowers on site.

DRYING THE FLOWERS

If required, the flowers dry well. The drying ratio is 6:1. The quality is maintained for about a year if stored in a dark and cool place. After one year the quality declines very fast.

MAKING VALERIAN

There are different methods for the production of the valerian preparation. In order to store the preparation for a longer period, it is essential to use clean tools and equipment and work meticulously. The filled bottles should contain as little air as possible to prevent oxidation and reduce the growth of microorganisms.

Different methods will result in different colours and intensity of fragrance. No matter which method is used, neat work is essential.





METHOD 1

The freshly harvested flowers are pulped with a mortar and pestle. The plant pulp is filled into a large clean glass container, weighed and approx. twice the amount of water is added, i.e. for every 100 g of pulp 200 ml of water is needed. The jar is then closed tightly and placed in a bright location, but not in direct sunlight. At sunrise and at sunset, the pulp is stirred slowly and carefully for about one minute. After stirring, the container is closed again. The size of the container should allow good stirring. After 3.5 days the plant material is pressed through a clean cotton cloth into a new jar. This liquid must be carefully swivelled for the next 3.5 days at sunrise and sunset for about one minute. This process ends on day seven when the liquid can be bottled.

METHOD 2

If fresh valerian flowers are not available, the preparation can also be made from dried flowers. The mixing ratio is as follows: 10 grams of dried flowers to 100 ml of water. Dried flowers are pestled into fine powder, mixed with clean water and poured into a glass. For seven days it should remain in a bright place, but not in direct sunlight. At sunrise and at sunset, the glass is carefully swivelled. After seven days the plant material is pressed through a clean cotton cloth and the green-brownish liquid can be stored in a bottle.



61 VALERIAN PREPARATION (507)



METHOD 3

According to the method developed by Alex Podolinsky, only the petals are used instead of the whole flowers. The petals are filled into a bottle to about one third. Then the bottle is filled with rainwater or clean water and mixed well. To allow gas to escape the vessel should not be closed tightly. For 10–14 days the vessel should be hung up in a tree in partial shade. Afterwards the liquid can be filtered and filled into bottles.



METHOD 4

Immediately after harvesting, the flowers are crushed with the fresh juice being squeezed out. A mincer can be used for chopping. Use a small mechanical press or a juicer for pressing. The obtained juice is best filtered through a clean cotton cloth and bottled.

STORAGE

Brown glass bottles are best for storing the extract. The bottles should be stored in a dark and cool place; insulation by peat or coconut fibre is not necessary. During the first weeks after bottling, fermentation gases can develop and must be able to escape, so bottles should not be tightly closed at first. The bottles should be vented from time to time in the first months of storage. When gas formation has stopped, bottles must be closed tightly.

During storage, a layer of yeast can form on top of the extract. This layer can be removed without any problems. If necessary, the preparation can be filtered again through a fine sieve.

If well-produced and stored under good conditions the valerian extract can be stored for many years. Once a year the stocks should be checked. Foul smelling liquids can be disposed of onto the compost.





USING THE COMPOST PREPARATIONS

MAKING COMPOST

The compost preparations yarrow, chamomile, nettle, oak bark, dandelion, and the liquid valerian extract are used to prepare compost piles, heaps of cow dung, liquid manure or deep litter.

Each compost preparation has its own unique effect which contributes to the processes within a compost heap and later in the soil. The preparations act not only on the compost itself, but also on the soil fertilised with the compost and the plants growing on it.

When selecting a suitable place, various aspects should be considered. The chosen area should be slightly elevated to avoid flooding. Partial shade is ideal. Placing compost heaps directly below trees can cause great problems as tree roots may penetrate the compost and consume its nutrients. If possible, compost should not be placed on concrete.

Compost heaps can be built in variety of ways. A compost pile can either be built up over a considerable length of time or all materials can be gathered and built up in layers on a specific composting day.



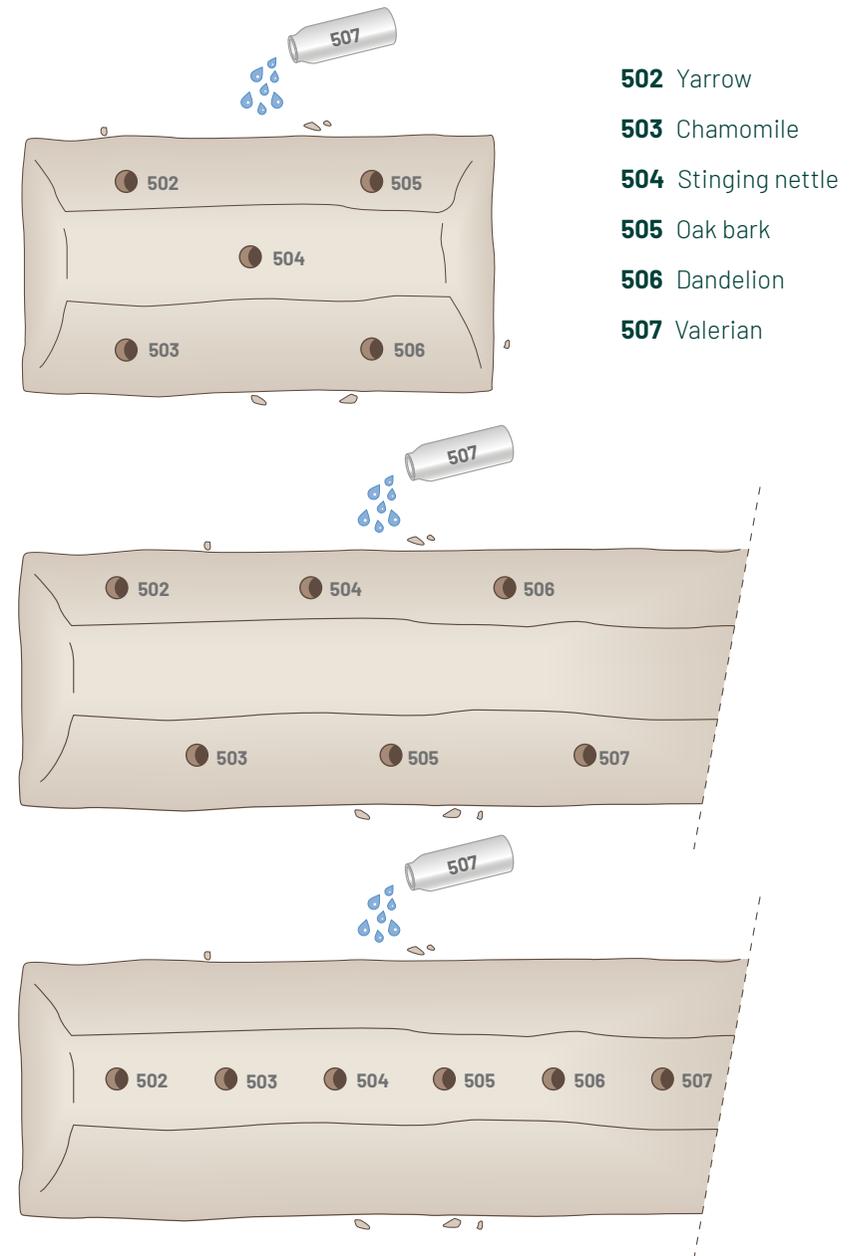
64 USING THE COMPOST PREPARATIONS

Sometimes it is impossible to have all necessary materials at hand. They must be collected and piled up over a longer period of time. All plant materials, animal manure, wood ash and other organic waste from the farm are suitable. Stalks must be chopped. Care should be taken to ensure that the compost has a good moisture content. Compost heaps should never become too dry or wet. For a good breakdown of all materials a balanced ratio of all substances is essential. Once the compost or manure heap has reached an optimal size and height, the heap can be prepared and covered.



INSERTING THE COMPOST PREPARATIONS

One set of compost preps (2 grams per preparation and 5 ml valerian extract) is enough to treat a heap of about 1.5–2 m wide, 1.5 m high and 5–10 m long. Using a sharpened wooden stick, holes about 50 cm deep are made diagonally into the compost heap at regular intervals. For small compost piles the holes should be 0.5 to 1 m apart, for long manure heaps or windrows the holes can be made at approx. 1.5 to 2.5 m intervals. Holes can be made in different ways: either as staggered on the sides of the compost heap or on the top along the compost pile. See sketch.



66 USING THE COMPOST PREPARATIONS

The required amount of one compost preparation fits between thumb, index and middle finger – about half a teaspoon. This amount of prep should be surrounded with some good soil or compost, formed into a small ball and dropped in one of the holes. The hole is then filled with earth or compost so that the ball is in contact with the compost and no cavities are created. 5 ml of valerian extract is stirred for 10–15 minutes in about 3–5 litres of lukewarm water. Part of the liquid is poured in its specific hole. When all holes are filled, the remaining valerian liquid is evenly distributed over the compost. Other farmers prefer to pour the stirred valerian directly on the pile without any additional hole. This is best done with a watering can, a hand brush or with the help of a knapsack sprayer. Finally, the compost can be covered with grass, straw, leaves or other organic material.





In warm and tropical climates a different process of composting is preferred. The plant and animal materials are collected separately for some time and put together on a specific day. The different plant materials and the animal dung, ash, rock meal or borehole dust, lime, etc. are alternately put on the compost in appropriate layers. Often dung mixed with water in a basin or barrel beforehand is added as slurry.

When half the height is gained, the “preparation balls” are put on the compost heap. More compost material is piled up until an optimal height is reached. Finally, the stirred valerian preparation is poured on the pile and the compost is covered carefully with organic material.

If necessary, the compost is turned and preparations are added again. In warm regions, the first turning of a heap and another addition of the preparations can be carried out after 4–6 weeks. The compost is ready for use after about three months. In other regions this can take much longer.



PREPARATION OF DEEP LITTER, LIQUID MANURE AND SLURRY

Fermentation processes are influenced in a positive way when deep litter is treated with the compost preparations. In addition, unpleasant odours are reduced. Like long compost heaps deep litter can be prepared at intervals of about 3–4 weeks.

Compost preparations can be added to liquid manure and plant teas. One possibility is to put the individual preparations into clay balls and sink them into the cesspit.

Alternatively, you can put the preparations 502–506 individually into small pieces of cloth each weighed down with a small stone and tie them with a string to a wooden cross.

Valerian, stirred as described, is poured directly into the manure pit or slurry drum.





STORAGE OF THE PREPARATIONS

STORING THE PREPARATIONS

Biodynamic preparations are living substances. To obtain preps of excellent quality aim for good harvests of plant materials, obtain fine animal sheaths, ensure adequate production processes and optimal conditions during burial and storage.

In order to preserve their effects, preps must be stored with utmost care, otherwise their effects will be considerably reduced.

The preparations will change during storage. Therefore it is advisable to check them regularly, especially in the first weeks after excavation. Their moisture, scent and consistency indicate important aspects of their quality. Preparations which have become too dry can be moistened with clean water, those that are too wet can be dried for a short time in the shade. Poor storage considerably impairs their quality.

Preparations are either odourless or emit a faint scent. Their colour varies. The horn manure prep is always dark black, most compost preparations are mainly brown, the oak bark preparation has a light red tint. A few worms are no problem. If they get out of hand collect them and put them into a compost pile.



70 STORAGE of the preparations

Besides storing the preparations in a slightly moist state, there is also the possibility to transform them into a colloidal state. The consistency of these preparations is soft and malleable, with a great water-holding capacity. However, this method requires some experience and increased attention, especially in the early days after excavation.

STORAGE PLACE

A quiet, cool and tidy place is suitable for storing. Machine halls or equipment sheds are not advised.

Sometimes special preparation storage spaces are built.

STORAGE OF HORN MANURE (500) AND THE COMPOST PREPARATIONS (502 - 506)

These preparations are stored separately in a dark and cool place. Each preparation surrounded by peat or coconut fibre on all sides must be stored separately. Vessels made of ceramic, earthenware, glazed clay pots or glass are suitable. Unglazed pots draw moisture from the preparations and should therefore not be used for storage. The size and number of vessels depends on your preparation requirements. Small vessels require an opening large enough to ensure safe removal of the prep.

Do not seal pots hermetically, the preparations should be able to „breathe“. The labelling of the vessels should be clearly legible even after months.



71 STORAGE of the preparations

As a rule, the vessels are stored in wooden boxes. There, they must be surrounded on all sides, including the top and bottom of the box by a layer of peat (peat moss, sphagnum) or coconut fibre, approximately 10 cm thick. Both peat and coconut fibre have preserving and insulating properties and have proved to be effective. Combined layers of peat and coconut fibre are also possible. Peat and coconut fibre should be dry. Damp peat can be dried in the sun for a few days. Damp material will damage the wooden box. Insulation remains doubtful with damp peat.

Please note: Preparations must not come into direct contact or accidentally get mixed with peat or coconut fibre.

In areas with termites, wooden boxes must be substituted by a storage box made of brick or stone slabs. Clay vessels surrounded with coconut fibre on all sides are placed inside the walled interior. Then glasses containing preps are put into these clay pots. Use jute bags for covering after filling them with approx. 10 cm of coconut fibre.

No matter what kind of storage you choose, be aware of these strict rules. Preps must always be evenly protected on all sides. This applies especially to the covering on top of the vessel. For practical reasons, the topmost centimetres are often left without any peat cover, however, this does not correspond to the quality guidelines of good preparation storage and should definitely be avoided.





EXAMPLES OF STORAGE BOXES

The size of a storage box depends on the quantity of preparations and the volume of the storage containers. The box should be large enough to accommodate one or more containers. Double-walled boxes with a space of about 10 cm between them are ideal. Gaps are filled with dry peat or dry coconut fibre to ensure insulation of the preparations on all sides. The lid of the box must also be double-walled and the space in between must be filled with peat or coconut fibre. Such a box is well suited for storing individual preps or larger quantities of horn manure.

Alternatively, boxes with compartments for compost preparations can be built. The size of the compartments depends again on the volume of preparations. The interior must match the size of the boxes. Here, too, each compost preparation must be stored separately. Different vintages of a single prep can be stored in the same compartment, of course.

Please note: Each compartment must be surrounded by peat or coconut fibre on all sides, i.e. on the bottom, the four sides and on top.

Wooden boxes can be easily made with tongue and groove boards.

Please note: After some time, peat or coconut fibre will settle in the spaces between the box and the lid. Resulting gaps cause incomplete insulation, therefore, insulation should be checked at regular intervals to refill gaps if necessary.

Optimal storage is important for purchased preparations as well. They should either be used immediately upon arrival or stored in a preparation box in a suitable container. Under no circumstances should purchased preparations be left outside suitable storage for longer than one week.





STORAGE OF HORN SILICA (501)

The silica preparation can be put into a clean, transparent glass container and stored in a light and dry place. On a windowsill exposed to the morning sun is a good choice; intense and direct midday sun should be avoided. You can also leave the preparation in the horns until use. Filled horns should be stored in a bright and sunny place.

Please note: The horn silica preparation should never be stored in the dark. As long as the preparation is kept in a dry and bright place, it can be used for many years.



STORAGE OF THE VALERIAN PREPARATION (507)

The freshly prepared preparation is bottled. The bottles should be stored in a dark and cool place. During the first weeks after bottling, fermentation gases can develop and must be able to escape, so bottles should not be tightly closed at first. Alternatively, bottles can be regularly and briefly vented during the first period of storage. When gas formation has stopped, bottles can be closed tightly. If a fermentation cap is used, gases can escape without any problems and without air getting into the bottle.

Once a year stocks should be checked.

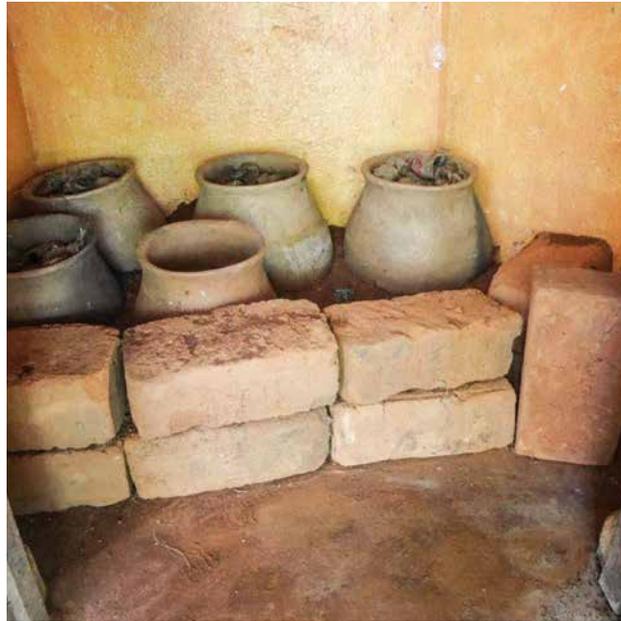
During storage a yeast layer may form on the liquid. This layer can easily be removed. If necessary, the preparation can be refiltered with the help of a fine, clean sieve.

If well-produced and stored under good conditions, valerian extract lasts for a very long time. It will keep its typical valerian scent for years.



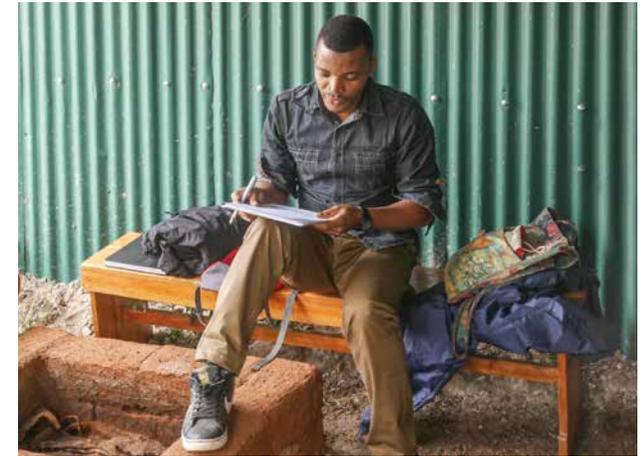
STORAGE OF CPP OR FLADEN PREPARATION

Finished CPP preparation can be used immediately or stored in a cool and dark place. Large earthen pots or jars are particularly suitable. During storage, care should be taken to retain a constant amount of moisture in the preparation. The prep should be used up within six months if possible.



MAKING NOTES

Irrespective of whether documentation is required for your conversion plan and certification process, it is advisable to use a booklet to note all important information about your preparations, such as origin of the preparations, date of harvest, production, quantities and quality, pit location, date of excavation, storage, weather conditions and special observations.



HORSETAIL PREPARATION (508)



THE PLANT

Horsetail (*Equisetum arvense*) is a non-flowering plant, multiplying through spores. *Equisetum* grows in a wide range of climates and soil conditions, preferring moist and compacted soils. The plant will develop a deep-rooted and widely branched rhizome system, which can spread horizontally and vertically over several metres. Due to its ability to multiply quickly from these extensive rhizomes, it is very difficult to contain.

In Europe and North America, the fertile spore-bearing stems develop in March-April, followed by the green sterile non-reproductive stems. The green stems will grow to a height of 20–50 cm.

Equisetum arvense must not be confused with other horsetail species, which are unsuitable for use in this preparation; *Equisetum palustre* is even poisonous. It can be distinguished by its hollow stem.



HARVESTING

The green stems can be harvested just above the ground with scissors or a knife. The plants can be used when fresh, but in most cases the plants need to be dried. For drying, they are spread out thinly in a shady place. After drying, *Equisetum* should retain its green colour. The drying ratio is 5:1. Dried horsetail can be stored for a year after which it loses its effectiveness.



PREPARATION AND USAGE OF EQUISETUM TEA

As a plant care product, *E. arvense* is characterised by its high silica content and therefore has a particularly preventive effect on fungal diseases. When spraying, the soil should be moist. Spraying is usually carried out before planting time. In Europe and North America this is done on bare soil from November to March.

For one hectare you need about 100 g dried horsetail or 500 g fresh horsetail. As soon as the plants are dry, they can be crushed into small pieces. Before being used, the crushed parts can also be ground into fine powder.

100 g of dried horsetail is soaked in 4 litres of clean water for one day. The following day it is boiled and left to simmer on low heat in a covered pot for 60 minutes. The tea must be left to cool for some time. Before spraying, the liquid is filtered and diluted with water. A good dilution ratio is 1 part *Equisetum* tea to 9 parts of water. The tea can be stirred for 20 minutes before spraying.

For application knapsack/backpack sprayers are suitable; for larger areas spraying is carried out with tractor-mounted sprayers. Spraying on three consecutive days is recommended.

Furthermore, as a preventive measure *Equisetum* tea can be sprayed on vulnerable crops in the early stages of growth. *Equisetum* can also be added to fruit tree paste: see CPP applications.



ALTERNATIVE PLANT: CASUARINA EQUISETIFOLIA, WHISTLING PINE TREE

Casuarina equisetifolia is an evergreen tree growing to 10–25 metres tall. Its native range extends throughout Southeast Asia and Australia. The species has been introduced to the southern parts of the United States as well to parts of Africa. *Casuarina* is recommended as a substitute for *Equisetum*.

Add 1 kg of dried *Casuarina* needles to 10 litres of clean water and boil for one hour. Use 50 g of this liquid to 10 litres of water.





COW PAT PIT (CPP)

COW PAT PIT (CPP) OR FLADEN PREPARATION

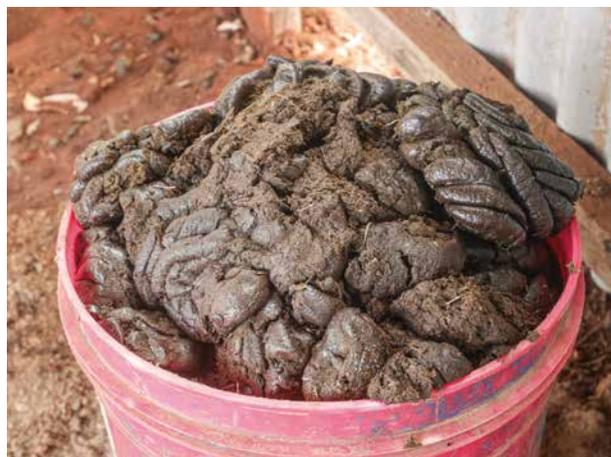
This preparation was developed in the 1930s by Max Karl Schwarz, a pioneer of the biodynamic movement. Additional impetus was given by Maria Thun and Peter Proctor. Today this preparation – known as Cow Pat Pit or Fladen prep – is especially popular amongst biodynamic farmers in warm and tropical countries.

The preparation promotes the break-down of organic matter to humus in soil, compost and manure and it promotes soil life, improves soil structure and water retention. The activity of micro-organisms in particular is stimulated by the preparation. Microbes also play an important role in making nutrients available to plants and in increasing their resistance against plant disease.

There are numerous recipes for the production of CPP, which can vary greatly from country to country. The recipes are characterised by their simple production and varied applications and they are particularly helpful in countries where compost preparations are not yet available in sufficient quantities. The following text refers exclusively to CPP production in warm and tropical climates. In warmer climates CPP can be produced all year round.

MATERIALS

In addition to cow manure, ground eggshells, basalt dust and the compost preparations 502–507 are needed for the production of CPP. Ideally, a biodynamic farm is a closed farm organism so the cow manure comes from one's own cows, if possible, this should also apply to the eggshells.





MAKING A CPP PIT

There are some important criteria for the selection of the pit. The soil should be well aerated, and the site should be shaded. Soils with a high water content or impermeable loamy soils that are flooded during heavy rainfall are unsuitable. A simple roof construction above the pit is sufficient. When choosing a place, make sure that the pit is not in the root area of trees or shrubs, as roots can grow over long distances into the pit and the manure.

The dimensions for a pit are 90 x 60 x 30 cm, or 3 x 2 x 1 ft. The number of pits is unlimited, yet there should be sufficient space between rows to allow access. Bricks have proven to be a particularly good material. Concrete blocks should not be used. In countries with termites, constructions out of wood are out of the question. After digging the pit, the four sides are lined with bricks; the bottom of the pit remains open.

CPP RECIPE

The CPP recipe according to Peter Proctor (India): 60 kg of cow manure, 200 g of dry, finely ground eggshells and 300 g of basalt dust as well as three portions of the preparations 502–507. If basalt dust is not available, granite dust from quarries or borehole dust can be used instead.





MAKING OF THE CPP PREPARATION

First the fresh cow manure is cleaned from straw. It should have a good consistency. If the cow manure is too dry, it can be moistened with some water. Then the ground eggshells and basalt dust are sprinkled on the manure. Cow manure, eggshells and basalt dust are vigorously mixed and dynamized for at least 20 minutes to ensure that the mixture is thoroughly aerated. Some farmers prefer one hour of mixing. During the dynamization both smell and consistency change. Mixing can be done with shovels, hands or even feet.

There are numerous other possibilities to vary the recipe for CPP. In some places wood ash is added, some farmers add whey, while others prefer to include molasses or jaggery.

FILLING THE PIT

To prevent the bricks from drawing moisture from the cow manure, they must be sufficiently moistened before filling the pit. The manure is filled evenly into the pit to a depth of 15 cm; the surface should be even, but not too firmly pressed down. With layers that are thicker than 15 cm, the breakdown of the manure can be delayed.





PREPARATION OF THE CPP

Make six holes in the surface of the manure about 7 cm deep, one hole for each of the compost preparations 502–507. Use one teaspoonful of the preparations 502–506 respectively, and 10–15 ml of the valerian preparation. The valerian juice is dynamized in 300–350 ml of lukewarm water in a bucket, or alternatively in a bottle, for 10 minutes. Half of the liquid is poured into the last remaining hole, the rest is sprinkled evenly on the surface. After the preparation is complete, the pit is covered with a wet sackcloth or gunny sack. Especially in hot climates, take care to ensure a constant amount of moisture in the manure while it matures.

After one month the manure can be turned and mixed thoroughly. Mixing can then be done regularly every two to four weeks.

The CPP preparation is ready after three to four months. The manure has turned into a humus, dark and fragrant substance. The finished CPP prep can be used immediately or stored in a cool and dark place. Large earthen pots or jars are particularly suitable for storage. During storage, care should be taken to retain a constant amount of moisture in the preparation. The prep should be used up within six months if possible.

In India, between 30–35 kg of the CPP preparation can be obtained from 60 kg of manure.



APPLICATION

The CPP preparation can be used in agriculture in many different ways.

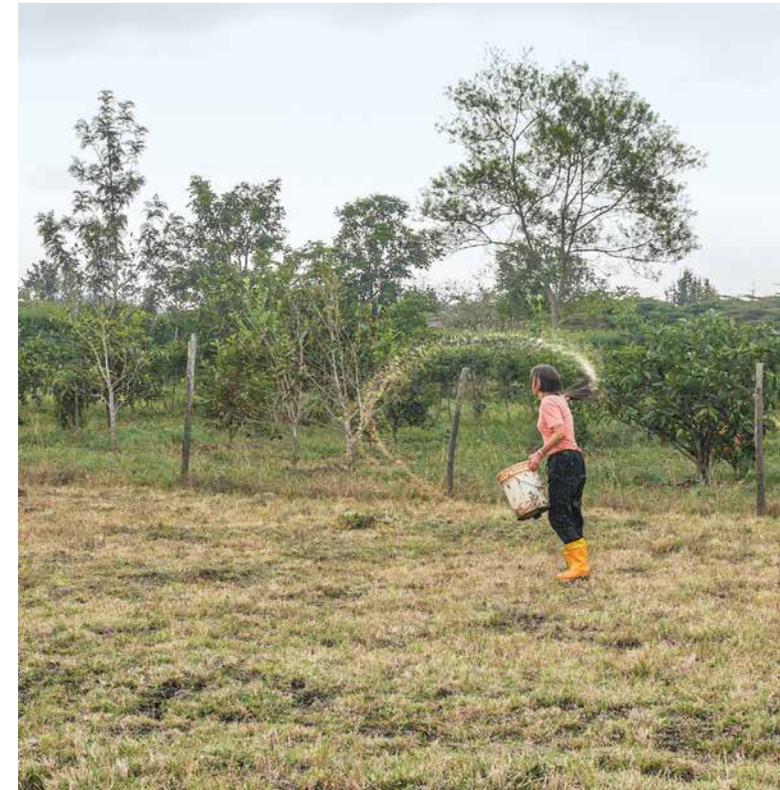
Before application onto soil and plants, it should be soaked in water for some hours. Like the two field preparations (horn manure and horn silica) the preparation should be stirred in lukewarm water for about 15–20 minutes before use. For spraying late afternoon is the best time. The CPP is applied in large droplets, using a hand brush; for larger areas spraying is carried out with a knapsack or tractor-mounted sprayer.

There are numerous possibilities to apply CPP in agriculture, fruit and vegetable cultivation as well as vineyards. CPP is an excellent soil inoculant. It can be applied to the soil directly before or after tillage or after harvesting. The soil should have sufficient soil moisture. Rhythmic spraying on three consecutive days enhances the effect of CPP.

CPP is particularly recommended during the conversion period of a farm, when biodynamic compost is not available in sufficient quantity. It allows the effects of the different compost preparations to be distributed more widely over the land than is otherwise possible.

On grazing areas and pastures, spraying is carried out when livestock is moved off the field after grazing. It will help the sward to recover more quickly. It should likewise be applied to pastures and meadows cut for hay.

CPP can be used in many ways before sowing and as seed treatment. It can be finely scattered in the furrows of nurseries or directly on the land.



TREATMENT OF SEEDS, PLANTS AND COMPOST

Before sowing, seeds can be impregnated with CPP. The preparation is diluted with a small amount of water. Large seeds, such as maize or beans, can be mixed into the pulp and remain there for several hours. Afterwards the seeds should dry for a short time and then be sown immediately. Fine seeds require a different treatment. The seeds are mixed with CPP, but this time without water. The mixture should be left standing for an hour and applied directly onto the land. To improve the vitality of young plants a handful of CPP preparation can be added to the potting mixture.

Seed potatoes can also be treated with CPP. Before planting, the seed potatoes are put in soft CPP pulp. After about 1 hour they can be dried and planted.

As a foliage spraying agent, CPP is not only recommended for treating fruit trees of all kinds, but also for tea and coffee plants, as well as vines and numerous other plants. Leaves can be sprayed with CPP at regular intervals of about 14 days during the vegetation period. Spraying should be carried out in the late afternoon or early evening hours. Spraying should cease about four weeks before the start of the harvest season. Before spraying with a backpack sprayer, the preparation must be carefully filtered.

CPP can be applied to the soil before mulching young plants, trees or shrubs.

CPP is also appropriate as tree paste to promote and stimulate cambium growth and to help heal pruning cuts. For this purpose, fresh cow manure and clay are mixed thoroughly in equal parts. Some fine sand can be used. CPP is then stirred in water and added to the mixture to form a solid paste. Horsetail tea or whey, basalt meal or wood ash can be supplemented as required.

Before applying the tree paste, lichen and moss must be brushed off the trees; a wire brush can be helpful. On dry and sunny days, the paste is painted on with hands or with the help of a broad brush in the morning, preferably on a sunny day. No rain should be forecast for the next few days.

CPP is also very apt when planting. The young plants are dipped into stirred CPP for 20–30 minutes. Apart from the CPP effect, the roots can simultaneously be saturated with water.

CPP can also be used to improve the quality of liquid manure or plant teas.



CPP can also be used for compost. A 5 m long compost requires 1 kg of CPP stirred in 40 litres of water. The liquid can be poured into holes along the top of the heap. The stirred CPP can also be applied when compost is turned. Alternatively, a few shovels of CPP can be added to the compost.

CPP can be sprinkled or sprayed every 2-3 weeks in the cow shed, i.e. the lying area, the walkways. This promotes stable hygiene and animal health.

There are numerous other possibilities to vary the applications of CPP.





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Biodynamic Federation – Demeter International

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Editor:
Christoph Simpfendörfer

Authors:
Anne & Rolf Bucher

Feedback Group:
Andrea D'Angelo Lazzarin (Brazil)
Petra Derkzen (Netherlands)
Angela Hofmann (Egypt)
Binita Shah (India)

Proofreading:
Alysoun Bolger, Hannelore Bucher

Layout:
Gabriele Roth

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CONTACT

secretariat@demeter.net



Precisely from the example of agriculture, we can see how necessary it is to derive forces from the spirit, forces that are as yet quite unknown. This is necessary not only for the sake of somehow improving agriculture, but so that human life on Earth can continue at all.

Rudolf Steiner, 20. June 1924

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