Gables Farm, Nailsworth
England
30-31 October &1st November 2015

Biodynamic Agriculture

Principles, Practice and Results

www.biodynamie-services.fr/en
www.soin-de-la-terre.org

Dessin Magdalena Lorenz

Vincent Masson
BioDynamie Services

<u>BioDynamie Services</u> *- Vincent and Pierre Masson*

BD Preparations, dried plants, storage boxes, stirring and spraying equipment, editions, BD calendar, BD teaching and consulting

equivalent of 7 full time workers

<u>Soin de la Terre / « Care for the Earth »</u> *non profit organisation*

Research

Encarna Cuevas + student work
Pierre Masson, Ulrich Schreier, Vincent Masson
<u>www.soin-de-la-terre.org</u>

BioDynamie Services

Gables Farm, Nailsworth, England
30 October 2015

INTRODUCTION :
Biodynamic agriculture
Soil evolution, humus levels and climate change

Association pour la recherche sur les pratiques en agriculture biodynamique
Soin de la Terre

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AU SERVICE DE L'AGRICULTURE ET DU JARDINAGE BIO-DYNAMIQUES

The creation of living and colloidal humus is the basis of soil fertility and the evolution of the Earth.

Many soils in Europe have lost between 1 to 2 percent of organic matter in recent decades.
According to pioneer of biodynamic agriculture E. Pfeiffer, good biodynamic soil should contain levels between 3% and 10%, depending on the nature of the soil and crops.

Increased levels of humic organic matter in the soil provide numerous agronomic benefits (structural stability, higher water content, supply of macro and micro nutrients, protection against erosion and leaching, compaction resistance, etc.), as well increased capacity for water regulation during heavy rains.
Water retention in the soil is important for better drought management and may even help limit rising sea levels.

Improving the storage of carbon in soils is a fundamental contribution to controlling climate change.

What positive contributions can biodynamics make with regard to these major issues ?

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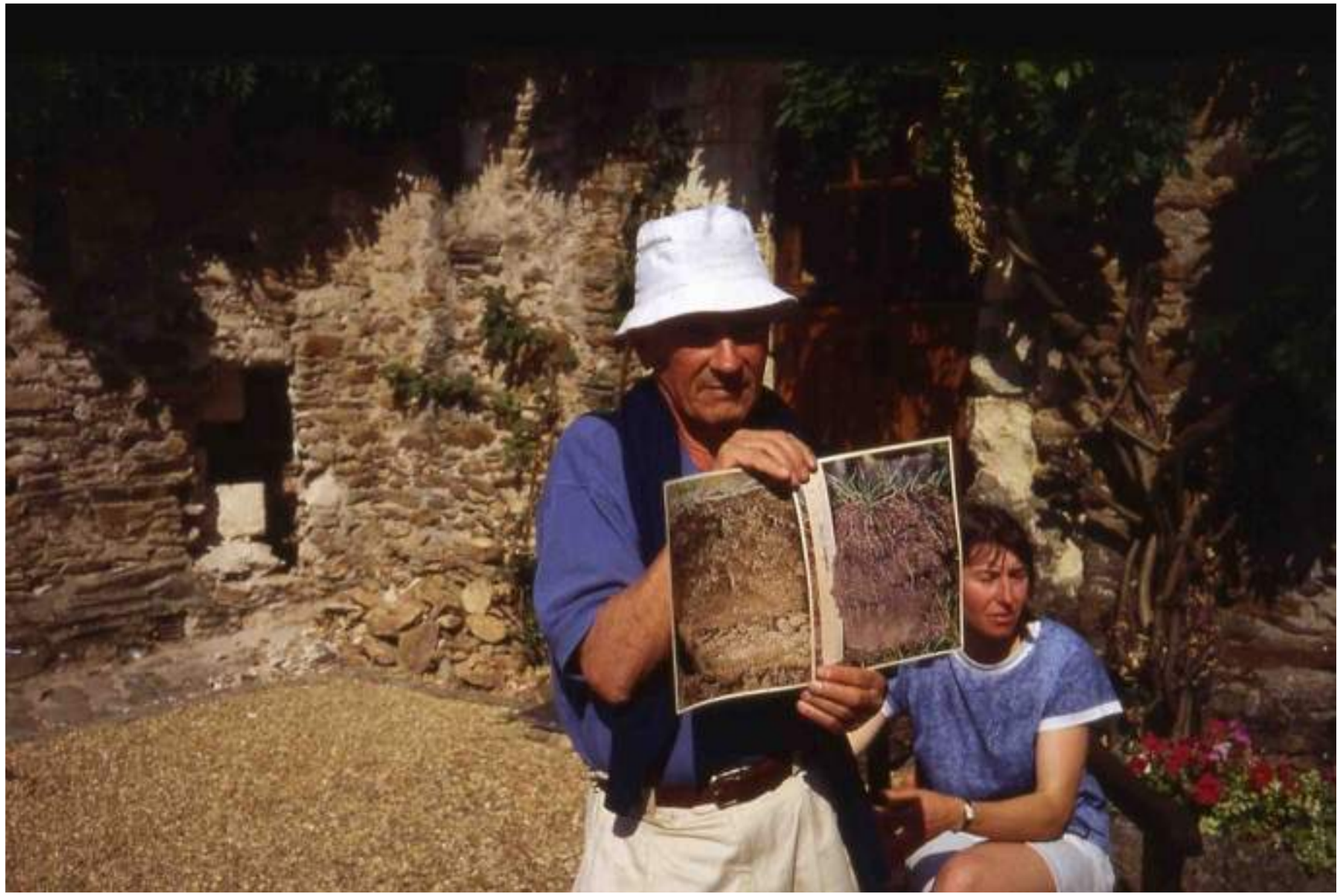
In the 1960s in Australia, Alex Podolinsky reported startling developments of humic levels in soil with the use of 500P, unknown in Europe at the time.



The photo on the left shows poor Australian soil (typically clay loam), compaction, and little vegetation with few roots and no soil structure. The photo on the right shows the same soil, one year later. No compost had been applied. The ground was "decompacted" (ripping) to bring maximum air circulation to the previously compacted soil. After working the soil surface lightly, a complex blend of prarie seed was broadcast. The biodynamic preparation 500P was applied in the spring and autumn (90 g/ha in 33 litres of warm water).

Result: 25 cm deep of dark, structured soil was formed in a year.

Some examples of very rapid soil transformation have again been observed and measured in 2014 and 2015 with the use of 500P (Prepared Horn Manure).

Biodynamic viticulture trials 2014
Mâcon area

Delphine and Sebastien Boisseau

In 2000, all chemical weeding was stopped. From 2002, chemical treatments were abolished.
The whole of the vineyard has been run organically from 2003 and certified organic in 2006.
Organic and agronomic management of this vineyard is exemplary.
First applications of biodynamic preparations in April 2014 on 3 hectares.

Association pour la recherche Soin de la Terre sur les principes en agriculture biodynamique

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Methods and Equipment

- *110 litre-capacity copper stirring machine (Australian type) with rhythmic reversal by sensor (Ecodyn).*
- *Use of spring water (from granitic spring) or rainwater stored concrete tanks treated with tartaric acid.*
- *Heating of water by coil to 36 - 36.5 before stirring.*
- *Copper back-pack sprayers used for manual spraying.*

Preparations :

- *Prepared Horn Manure - colloidal 500P, carefully stored by the moist method. 100 grams stirred in 35 litres of water per hectare.*
- *Horn Silica - 501 made from quartz crystals collected at high altitudes in the Alps and finely ground to a colloidal state. 4 grams stirred in 35 litres of water per hectare.*
- *Valerian - 507 made exclusively from flower petals and solar maceration. 5ml stirred in 35 litres of water per hectare. Used after exposure to hail.*

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Calendar of biodynamic applications - 2014

- *508 Horsetail decoction (Equisetum arvense) 9 April: Moon in Cancer (leaf day, 6 days before the full moon at Easter).*

- *500P. 17 April: Moon in Libra (descending flower day). Spring water from granitic spring used for stirring.*

- *Applications of 501:*

  20 May : Moon in Capricorn (ascending root day). Rainwater used for stirring.
  27 August : Moon in Leo (descending fruit day). Rainwater used for stirring
  6 September : Moon in Capricorn (ascending root day). Rainwater used for stirring.

- *500P in the autumn, after the grape harvest.*

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Parcelle de Chardonnay

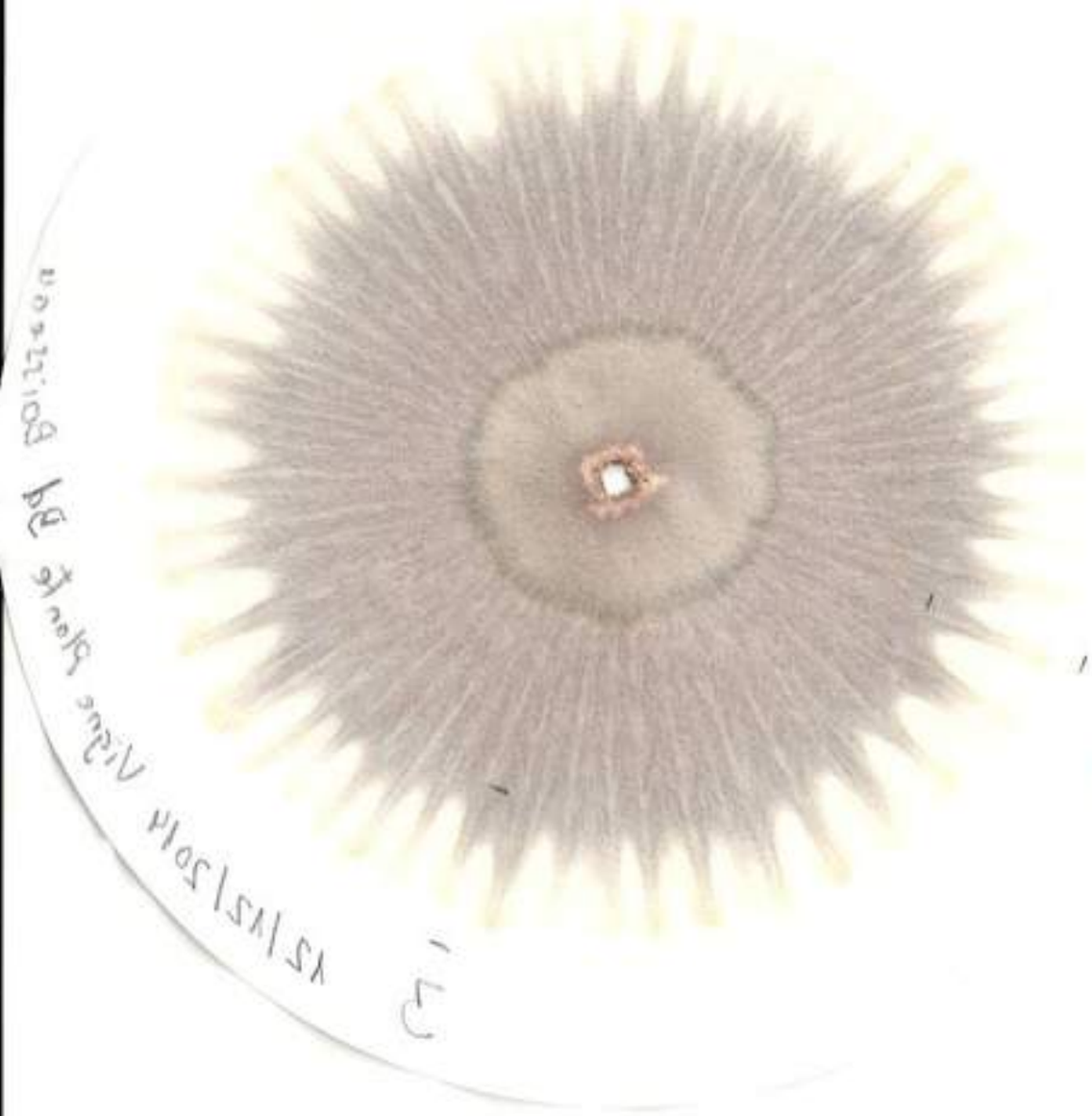
Biodynamique

Biologique

15 juin 2014

L'eau est mieux intégrée dans le sol biodynamique. La terre y colle moins aux doigts. Cela s'est aussi révélé lors du séchage des échantillons pour les morphochromatographies : malgré une apparence plus sèche, le sol biodynamique a été plus long à sécher. Ceci montre une meilleure capacité de rétention en eau, une facilité à limiter l'érosion et une meilleure possibilité de gérer les périodes de sécheresse.

Jeune plantation du printemps
Morphochromatographies de sol réalisées le 12 décembre 2014



Biodynamique

Biologique

Morphochromatographies ARP-BD Encarna Cuevas - Pierre Masson

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Parcelle de Chardonnay et jeune vigne : analyses de sol chimiques et biologiques

Analyses LCA

Essai Boisseau

Parcelle	Couleur	Etat organique MO %	Azote total %	C/N	PH eau
BOISSEAU 1 Plante bio	Rouge	**3,41**	0,19	10,40	**8,10**
BOISSEAU 4 Plante BD	Marron	**5,11**	0,28	10,60	**8,0**
BOISSEAU 3 Chard Bio	Rouge	**2,70**	0,17	9,20	**8,40**
BOISSEAU 2 Chard BD	Marron	**4,15**	0,22	11,0	**8,30**

Effets marquants de la biodynamie en 8 mois :
Coloration différente du sol qui passe du rouge en biologie, au marron en biodynamie.
Augmentation très importante du du niveau de MO entre 1,45 à 1,7 % en plus.

Parcelle de Chardonnay et jeune vigne : analyses biologiques de sol

Analyses CELESTA LAB

Compartiment vivant biomasse microbienne

Essai Boisseau

	Carbone (g/kg terre)	Biomasse Microbienne (BM)		Éléments minéraux stockés dans la BM (calculés en kg/ha)					CARBONE				AZOTE			
		mgC /kg terre	en %C	**N**	**P**	**K**	**Ca**	**Mg**	C organique (g/kg TS)	C minéralisé (mg/ kg/28j)	Indice de minéralisation (%)	Cm/ BM	N total (g/kg)	N minéralisé (mg/kg/ 28j)	Indice de minéralisation (%)	**Fourniture annuelle N (U)**
BOISSEAU Plante bio	19,8	**326**	1,6	**86**	**66**	**56**	**8**	**8**	19,8	339,4	1,7	37,1	1,7	18,7	1,1	**49,1**
BOISSEAU Plante biodynamie	29,7	**600**	2	**158**	**122**	**103**	**15**	**15**	29,7	493,1	1,7	29,3	2,7	32,1	1,2	**72,2**
BOISSEAU Chard bio	15,7	**338**	2,2	**89**	**69**	**58**	**8**	**8**	15,7	338,1	2,5	41	1,7	19,2	1,2	**50,4**
BOISSEAU Chard biodynamie	24,1	**570**	2,4	**150**	**116**	**98**	**14**	**14**	24,1	631,9	2,6	39,6	2	30,6	1,5	**80,3**

Les éléments minéraux N, P, K, Ca, Mg, nécessaires à la nutrition de la plante sont beaucoup plus disponibles dans la partie biodynamique, on assiste presque à un doublement, aussi bien dans la jeune plantation que dans la vigne adulte. La fourniture annuelle possible en azote explique la plus grande vigueur apparente des parties en biodynamie.

This example shows how a vineyard was able to increase the organic matter in the soil on the experimental plots by 1,5% on average in less than a year of biodynamic practice. This represents an increase of roughly 50%.

There is no known explanation to justify such an increase of organic matter, of biological activity in the soil and in vine behaviour. These changes are not consistent with agronomic laws as we know them today (isohumic Coefficient K1)

Is this an exception?
Do other cases show similar, dramatic soil transformation in such a short period of time?

We are currently compiling and comparing reports by farmers, photographs, observations of spade tests with conventional physical, chemical and biological analysis (Celesta Lab and bioelectronics), as well as developing the morphochromatogram technique, in order to widen the spectrum of research.

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Domaine de Lauzières Mouriès Baux de Provence 2 avril 2015

Biodynamique avec 2 x 500P

Biologique

Comparaison vignes en lyre biodynamiques à gauche, biologiques à droite
Le sol biodynamique est plus humifié et garde mieux l'humidité

An increase of 1,5% humic organic matter represents up to 180 metric tons stored in the soil per hectare.

The average proportion of carbon in the organic matter in the soil is 58% and 1 ton of carbon is the equivalent of 3.7 tons of CO2.
If an increase of 1,5% of organic matter stored in soil to a depth of 1 meter is obtained within a short time, then we're talking about a minimum of 180 tons of organic matter; i.e. more than 100 tons of carbon :
which means an additional 380 tons CO2 stored in the soil per hectare.

The most impressive figures for biodynamic soil have been established by university research in Australia.
Comparable figures have been established by field research in France and abroad, but over longer periods of time.

This increase is free and can be achieved without the addition of external substances. It is due to the photosynthetic activity of plants under the influence of the sun.

Over the whole of the earth's surface (about 51 billion hectares), the UAA (usable agricultural area) represents 5 billion hectares.

Maintaining 1.5% more organic matter in the soil to a depth of 1 meter in 1/100th only of cultivated land (50 million hectares): this represents = 100 tons of carbon per hectare or 5 billion tons of carbon (5 giga-tons)

This can be compared with the excess carbon levels in the atmosphere, which, according to data from the IPCC (Intergovernmental Panel on Climate Change) and FAO, currently represent 3 to 4 giga-tons per year - roughly half of which (2 giga-tons) is caused by deforestation.

Data from : FAO Document 2011 « The storing of carbon in the soil is essential to better land management »

Are these figures not sufficient to provoke reflection as to how we are to manage the problems of climate change and rising sea levels?

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What are the characteristics of Biodynamic Agriculture ?

Agriculture → ***Good agronomic practices and farming knowledge***

Working the soil at appropriate times with appropriate tools
use of plants, root stock and seeds adapted to local conditions
water management (drainage)
management of lime and magnesium levels of soil

Organic → ***In line with organic farming requirements***

No chemical fertilizers or pesticides, no GMOs
Organic fertilizers; good management of organic matter and compost
Crop rotation: long-term and diversified (includes green manures)
Inputs : must fit with organic principles

Dynamic → ***Working with non-physical forces***

life forces
sensitive forces
forces of structure

stimulate processes to reduce inputs

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Rudolf Steiner (1861-1925) founding father of Anthroposophy, was at the origin of many innovations in the fields of art, education, social structures, therapy and agriculture.

Goethe (1749-1832)

Rudolf Steiner, in the footsteps of Goethe, strived to develop a suitable method to explore the complexity of the human being and the living. One finds in his work the means to develop living thinking, complementary to the mode of intellectual thinking which is an offshoot of the rational, analytical approach.

In one of his lecture cycles, given to scientists and farmers in 1924 called the 'Agricultural Course', Rudolf Steiner, the Austrian spiritually-orientated philosopher examined the direction that agriculture was taking at that time, emphasizing high productivity. He provided information which created a new form of farming which in alignment with the true nature of the living. It is also respectful to the earth and soil, as well as plant and animal life, which in turn give rise to high-quality nourishment for human beings.

Solid groundwork for the future : the "Agriculture Course"

Rudolf Steiner's "Agriculture Course" can be considered rightly to be the first course on general ecology that offers a promising outlook on the co-evolution of the Earth and the human being in a widened context reaching to the cosmos.

It is a practical agricultural manual that provides basic methodology for farm work (manuring, composting, how to make the preparations, pest control, animal feed, etc.).

It also provides the groundwork for an inner journey that promotes the development of new capacities to heal the Earth and food.

Even today, the "Agriculture Course" provides a foundation for fruitful biodynamic work. Although the text may appear dry, it remains, nonetheless, a treasure to be explored on one's own, or in a group setting.

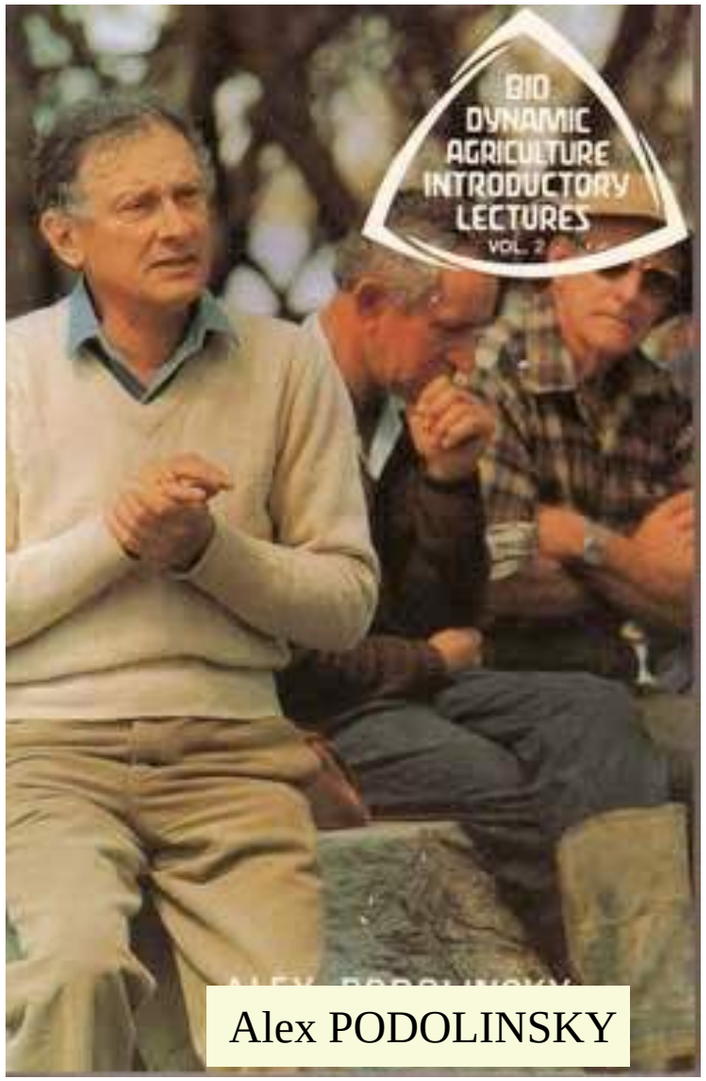
The pioneers

Lily KOLISKO

Agriculture of tomorrow
Landwirtschaft der zukunft
Moon and plant growth

Ehrenfried PFEIFFER

Fécondité de la terre
Le visage de la terre



Alex PODOLINSKY

Active Perception
Biodynamics Agriculture of the Future
Biodynamic Agriculture Introductory Lectures 1, 2 and 3

Becoming acquainted with their works can help one to better understand the principles of biodynamic farming.

Specific aspects of biodynamics
Understanding and working with forces at work in nature

Renewed, expanded view of the relationship between Human beings and Nature and including the Cosmos

The farm, viewed as an individual organism, as autonomous as possible

The use of biodynamic preparations

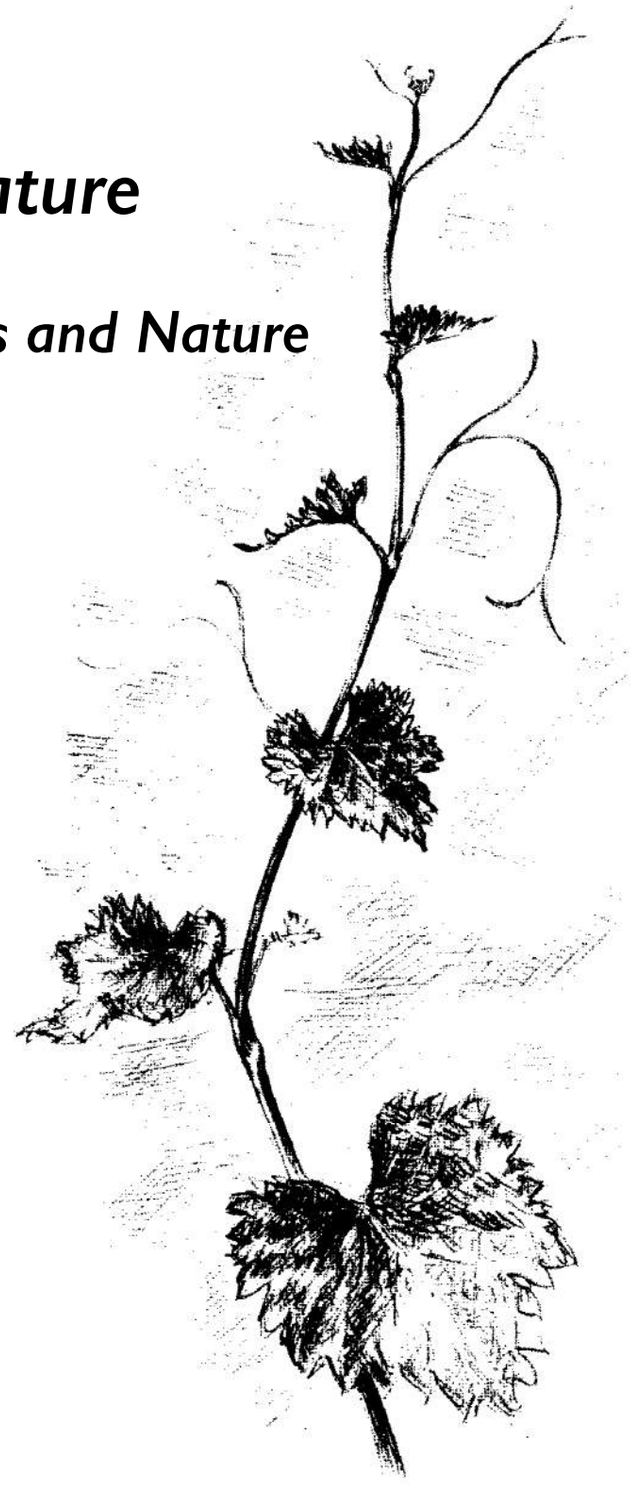
Work in accordance with the rhythms of the earth and cosmos

Specific methods to regulate parasites

Seeds and plants adapted to a local conditions, as well as human and animal consumption

Working towards renewal of the landscape

The need for social impulses in work and research



New concept for plant nutrition

Modern agriculture is based on the principle of nourishing plants with water-soluble salts (often of chemical origin) contained in soil solution

The concept of fertility has been mistaken with the concept of maximum productivity

From a biodynamic point of view, fertility depends on the soil and plants' capacity to take in what they need from the cosmos. For example, everything that comes from the atmosphere : water; gasses such as nitrogen, oxygen, CO2; heat, light and other elements found in air in minute quantities that can be 'received' and concentrated in the soil and plants (phosphorus, calcium, potassium, iron and other trace elements), as well as formative forces coming from the stellar and planetary realms.

How can we find a lasting balance in a given location, taking into account the soil, exposition, climate, natural environment, as well as the intentions of those that live there ?

All agricultural organisms and their land can be 'developed'. But it is not enough to enliven them through the use of manure and creating varied plant life in the landscape. It is also essential to render the farm organism « sensitive » by creating right relationships with the domestic and wild animal realms, as well as giving structure by moving towards the individualization of these processes.

Nitrogen

A central point in Steiner's approach is the question of nitrogen, how it is stored in the soil and its availability to plants. It was a fundamental issue that he addressed at the very beginning of his lecture cycle: "What is the right way to introduce nitrogen into the plant world?"

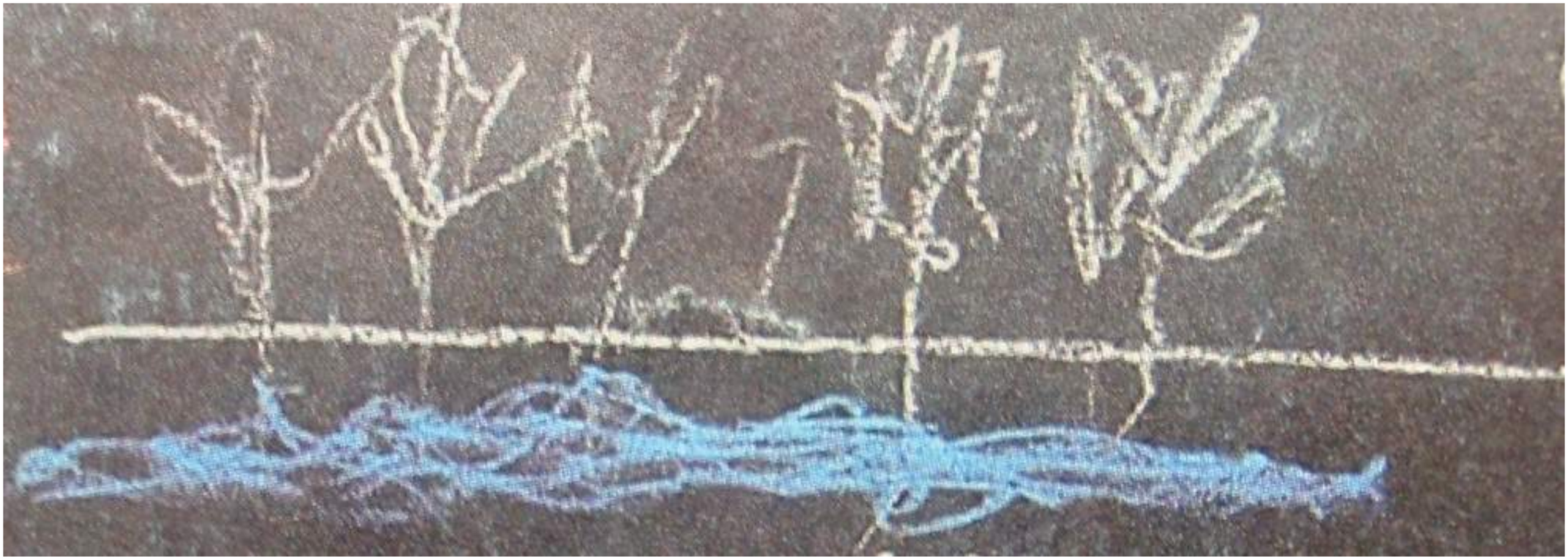
« There is nitrogen and there is nitrogen »

Humus

Another major problem is the formation of humus and the activation of its fundamental qualities: *"The retention and circulation of water, the circulation of air and other gasses, the increase of specific heat and the absorption of the sun's rays, the structuring and stabilizing of the soil, the mobility of ions and soil buffer-power, the reserve of nitrogen and carbonate-bearing substances and the storing of minerals essential to (plant) growth."* ***Birre A., L'humus, richesse et santé de la terre. La maison rustique, Paris***

To that end, one has to develop the respiratory capacity of the soil and its porosity, that is to say, its structure.

Intensified biological activity leads to the development of a microbial population which, at the end of their cycle, results in the formation of humus. This increases the reserve of nutrients in the soil which can be used by the plant. This can only occur correctly in structured, stabilised soils with good aerobic conditions.



Drawing by R. Steiner in the Agricultural Course :
Plants communicate with one another through their roots and in their shared root environment. Diversity guarantees balance, stability and durability. Botanical diversity in perennial crops and prairies and market gardens and cereal crops is a factor that ensures productivity and crop immunity.

The following is a modern description of an ecological economy which functions in cycles. "An ideal form of agriculture is one that, in truth, approaches this state (...) this means that you have to have at your disposal, at the very heart of the farm itself, everything that is essential to production. Including, of course, the appropriate livestock." R. Steiner, 1924

The idea of an individualised, self-sufficient agricultural organism is not new. It's at the root of ancient and traditional farming.

What is innovative in Steiner's approach is that he reveals the intimate bonds which unite the soil, plants, and animals in a cultural process.

The necessity to have animals on a farm, as well as the striving towards autonomy as regards fertilizers, are essential principles which are not always possible, particularly by winegrowers, vegetable farmers and tree growers.

However, good results can be obtained in these areas by the careful application of biodynamic preparations in conjunction with good agronomic practices.

Lectures 4 and 5

Lectures 4 and 5 address the subject of manure and introduce the biodynamic preparations: how to make them and their role in agriculture. These lectures are at the heart of the Agricultural Course. They lay the groundwork for the complete renewal of farmers activity in their work with Nature.

Dessin de Rudolf Steiner 1924 rayonnement des forces des préparations dans le tas de compost.

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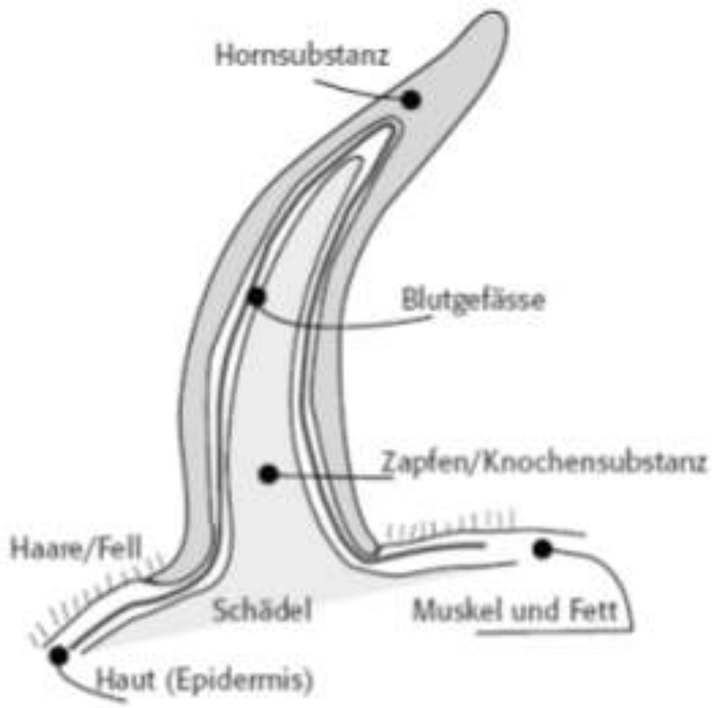
What is the purpose of bovines' cow horns ? … cosmic qualitative analysis

The cow horn is the outer envelope of the inner bone. It contains many nerves and blood vessels.
R. Steiner considers it to be a sensory organ (a kind of skin) that is orientated inwards and forms an integral part of the digestive system.
It is an extension of the digestive system, it forms a kind of closure of the cow's organism. The forces flow back from the horns inwards again.

a

Anatomie de la corne



((Légende))
Substance cornée
Vaisseaux sanguins
Cône de substance osseuse
Poils / Peau
Crâne
Muscles et graisse
Peau (épiderme)

The internal bone of the horn is hollow; it is linked to the sinuses and nasal passages. Digestive gases from the rumination process circulate within the horn.
This organ continues to develop and its capacity for "analysis" increases with time.

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BIODYNAMIC PREPARATIONS
DESCRIPTION
HOW TO USE THEM

BASIC FIELD SPRAYS

HORN MANURE “ 500 “

HORN SILICA “ 501 “

SIX COMPLEMENTARY PREPARATIONS

"502 à 507" TO BE INSERTED INTO COMPOST

MARIA THUN’COWPAT PREP (CBMT CPP)

LIQUID COMPOST FOR SPRAYING

PREPARED HORN MANURE (500P)

PFEIFFER’S PREPS : COMPOST STARTER & BD FIELD SPRAY

Substance - processus : colloides

Vincent Masson

BioDynamie Services

Horn Manure (500)

- *It is the basic preparation used in biodynamic agriculture.*
- *It is obtained by the evolution of good-quality cow manure, put into cowhorns and buried in fertile soil for 6 months during the winter season.*
- *It is a blackish substance, humus-like, damp, colloidal in nature, odourless, or having a light smell of humus or woodland soil.*
- *Applied in the evenings, it has to be stirred ahead of time for an hour, in good-quality water, warmed to human body temperature.*

This Preparation was named «500» by Ehrenfried Pfeiffer as it was found to contain 500 million aerobic bacteria per gramme of this substance.

500P - Prepared 500

(500 + 6 compost preparations)

First developed by Alex Podolinsky in Australia

Widely used in Europe

Only made with top quality preparations

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Action of Horn Manure 500 and Prepared 500

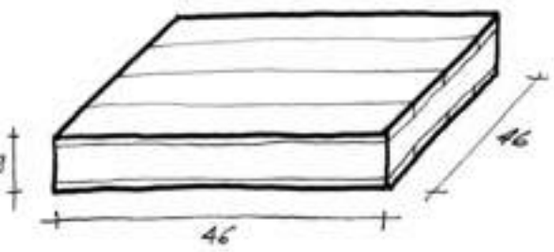
- *Improves the development of root systems its verticalisation.*
- *Is a kind of model which fosters the formation of stable organic matter and microbial activity and increases the formation of humus in the soil.*
- *Helps the structuring of the soil*
- *Stimulates bacterial life, including the formation of nodosity in leguminous plants.*
- *Better water management in the soil*
- *Is able to dissolve hardened substances in the soil, including salinisation on soil surfaces.*

Storage of Horn Manure - Care and precision are essential

A layer (6 cm minimum) of dried peat serves to line the wooden box on all 4 sides.
Stoneware, glass or enameled pots are suitable.
Preparations must be stored in a cool, dry space (far from electrical circuits, electro-magnetic fields, and any contact with products of petrochemical origin, including gas emissions)

Peat that is still damp does not insulate properly; the preparations will lose their forces and the storage boxes deteriorate.

Avoid any contact with the peat or even air-born peat dust once the preparations have been stirred, as this will interfere with their effect of positive evolution of the soil.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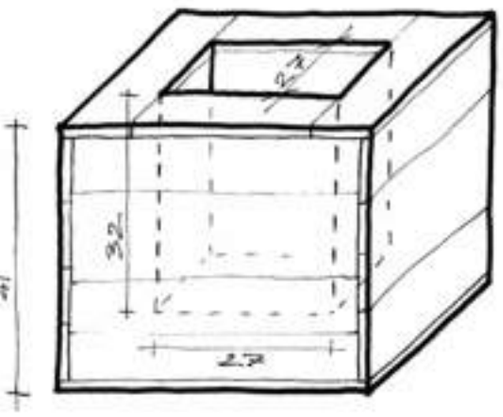
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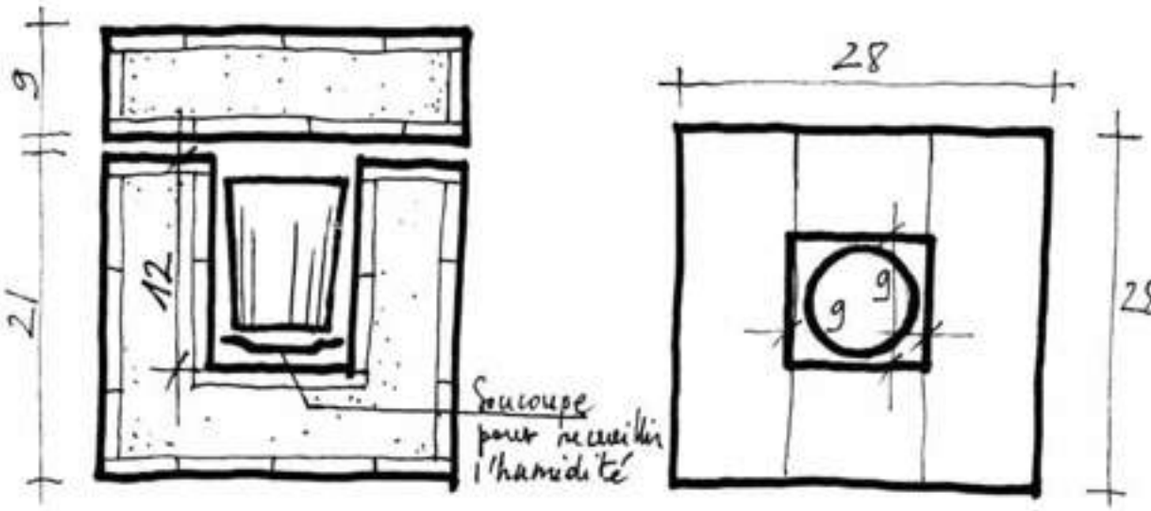
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Soucoupe
pour recueillir
l'humidité
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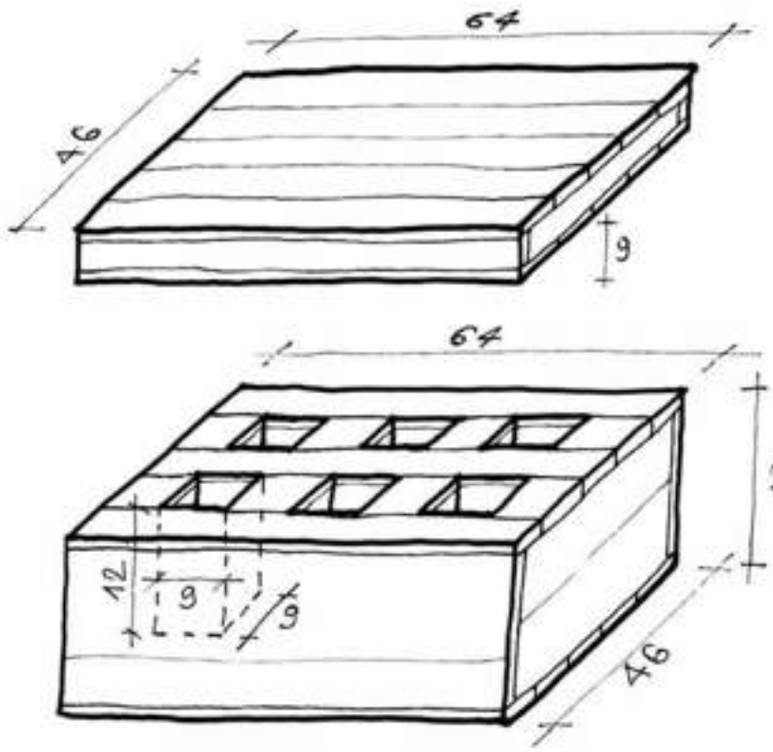
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500 and P500 directions for use

- *100 grams per hectare, to be stirred into 25 to 35 litres of good-quality water.*
- *The stirring takes place after 3 pm local time (solar)(5 pm summer time in France) and is sprayed in the evening onto damp, warm soil. In the spring: from bud-burst onwards. In the Autumn: after harvest. Two to three sprayings are ideal.*
- *Two to three sprayings per year are ideal - once or twice once plant growth has begun and once more in Autumn.*
- *The preparations should be used during the descending Moon, however it is even more important that the soil be receptive - warm and damp.*
- *It is crucial to avoid unfavorable times, particularly moon and planetary nodes.*
- *The addition of a few drops of Valerian (Preparation 507) at the beginning of stirring helps plants to cope with difficult weather conditions during the Spring.*
- *If difficult weather conditions (little or no Spring rain) do not allow for an ideal spraying program, it is possible to spray late in the evening, by spraying the leaves (on vine leaves, for example, the first application of Horn Silica is done when the first 4 - 5 leaves are unfolded to obtain maximum leaf absorption, helping plant development.)*
- *In the weeks following the spring sprayings, it is imperative that this preparation be supplemented by one or several sprayings with Horn Silica.*

When to use Prepared 500 :

In Spring on vines and fruit tree growing, after bud burst and when the roots of young plants start working, and little white roots appear on weeds
At sowing times in Autumn and Spring
After grape and fruit harvest
At time of stubble ploughing or turning over of green manure in market gardens or cereal crops
On pastures as soon as grass growth begins, as well as following the first hay harvest

The right time to apply P500

Saint Estèphe 3 March 2011

One year of biodynamic practice with two applications of P500 in Spring and one application in Autumn

Three applications of 501 before flowering and before grape harvest

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Témoin biologique

biodynamique

Une année de pratiques biodynamiques

Mars 2011 - Saint Estèphe 33

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Domaine Boisseau, Burgundy - 1x 500P 17 april 2014 - Pictures 15 june 2014

Essai Boisseau, le 11 décembre 2014.

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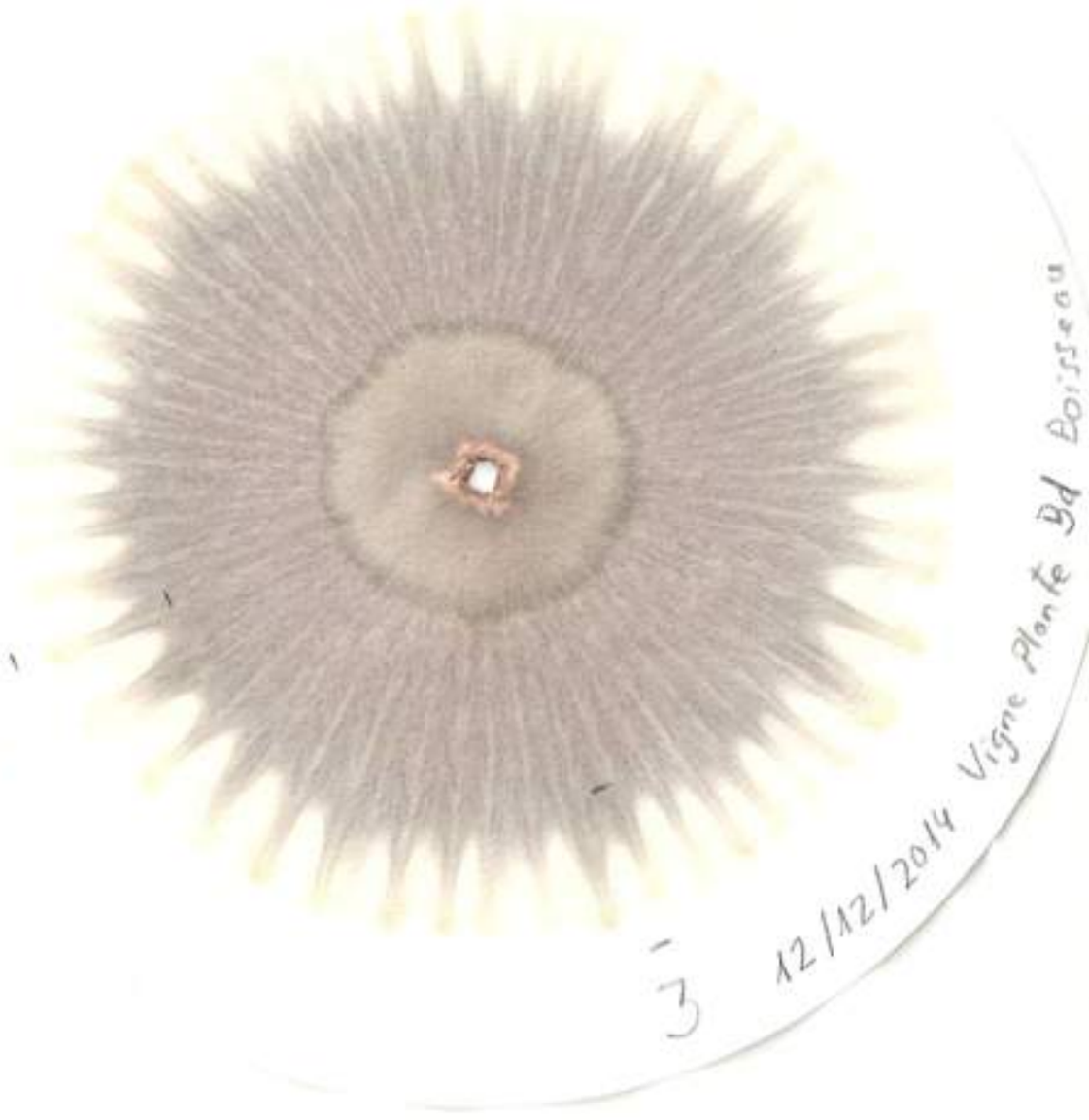
Boisseau 2014
Comparatives chromas : organic / biodynamic
Made by Soin de la Terre - F-71250 Château



Adriano Zago, Italia

3 x 500P
after green manure
on the soil before
plantation
root dip before
plantation

Roots develop the soil

Châteauneuf du Pape (Rhône Valley). 15 october 2014, 3 years of good biodynamic practice.

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IDEAL CONDITIONS FOR THE USE OF BIODYNAMIC PREPARATIONS

Additional information ....

In the dairy, the wine cellar, or in the fields, success and balance depend on the care and attention given to detail. The quality and precision when carrying out the work is more like an art than a technique.

Points to remember :

1° Storage
2° Water
3° Stirring
4° Spraying
5° When to spray - times and cosmic rhythms

Quality of the preparations : the colloidal state
Use of all the preparations : 501 -508

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IDEAL CONDITIONS FOR THE USE OF BIODYNAMIC PREPARATIONS
Additional information ....

In the dairy, the winecellar, or in the fields, success and balance depend on the care and attention given to detail. The quality and precision when carrying out the work is more like an art than a technique.

Points to remember :

I° The Preparations

- Use only quality preparations that are completely "humified" and colloïdal in nature, that have been correctly prepared and stored by the moist method.

- Store Horn Manure (500 and 500P) in glass or sandstone jars (never use flowerpots or other porous containers). Place the storage jar in a peat-lined wooden storage box, lined with a minimum of 6 cm dried peat on all sides (including the lid). The preparations should never be in direct contact with the peat. Do not store preparations for more than one week if unequipped with suitable storage. Order only the quantity required for immediate use and remove the plastic wrapping immediately.

- Storage boxes for 500P or the compost preparations should be kept in a cool, healthy environment, free from any chemical or other pollution (noise, odours, electro-magnetic fields).

- Horn Silica (501) should be stored outdoors, in glass jars only in gentle sunlight. Keep away from all sources of electro-magnetic fields and noise pollution.

2° Water

- Use only good-quality water (pure, slightly acidic and low in mineral-content) such as rainwater, once the first 3 - 4 mm of water that has washed off the roof has been eliminated. Pure stream or spring water can also be used, providing it contains no lime (low-mineral content).

- Use only gas or wood (never use electricity) to heat water to 35/37°C before stirring. Water temperature should not exceed 37°C. Never mix hot and cold water. Do not use pre-heated water (water that has stagnated in a solar water heater, for example.) Water will cool slightly during stirring.

- Cultivate one's sensitivity in order to learn how to perceive water quality. Observe water in a crystal wine-tasting glass, for example. Use only water that has the capacity to receive light, and that has perfect organoleptic qualities.

- It is best to use purified rainwater.

- Pure spring water in granitic regions is good. Chalky water should not be used.

- Rainwater can be saved in a cement tank underground (stainless steel and enamel containers can also be used.) Use glass water jugs for smaller quantites. Avoid plastic materials; plastic containers for short-term water storage should only be used as a last resort.

3° STIRRING

Manual stirring should be vigourous and last exactly one hour for volumes less than 120 litres. Energetic stirring will result in the formation of a vortex; reverse the stirring direction as soon as the vortex is formed; this creates a kind of bubbly "chaos". Alternate the vortex and chaos phases by stirring first in one direction, then the other, for exactly one hour non-stop.

Should you choose to use a mechanised stirrer with an electric motor, use a stirrer that has a sensitive, rhythmic, musical mecanism. At the present time, the only manufacturers of quality mechanised stirrers in Europe are Ecodyn and Biomecanicca. Stir for exactly one hour in the open air and light.

A wooden paddle for stirring is better than a twig broom.

Australian-type mechanised stirrers are equipped with a sensor that triggers the right time to reverse the stirring direction. They have a dynamic rhythm, and give good stirring results.

Copper is a noble material.

If using a mechanised stirrer, it is important to stir outdoors and in full light. Sunlight reduces the negative impact of electro-magnetic fields.

4° *Spraying*

Filter the preparation carefully, with a fine-mesh stainless steel filtre, or a muslin (or similar) cloth.

Filtering ensures that no particles will block the spraying jet.
The spraying time following stirring is short : less than 2 hours for 500P and 3 hours for Horn Silica 501.

For manual spraying, use copper or stainless steel backpack sprayers, used for this purpose only.

For mechanical spraying, use low pressure for 500P, taking care not to allow any back-flow into the spraying tank. High pressure should be used for 501 which should be sprayed in a fine mist. Sprayers should be used exclusively for biodynamic preparations and herbal teas and decoctions (no essential oils or terpenes).

Avoid using synthetic materials as much as possible : for stirring, filtering, transport or spraying.

Manual spraying of small areas (1 - 20 ha)

Ecodyn Mechanical sprayer for large areas

5° When to spray - ideal weather conditions and times

- Spray 500P in the spring and autumn, at sowing and planting times, when the the soil is "receptive" i.e. warm and damp. Begin stirring after 3 pm solar time for 500P (beginning of stirring round 5 pm on the clock in summer). Spray immediately following stirring; spraying should be completed within the 2 hours following stirring.

- For Horn Silica (501) : Spray plants at height of growth or during maturation. Stir at sunrise, and spray immediately; spraying should be completed at most 3 hours following stirring and before it gets too hot.

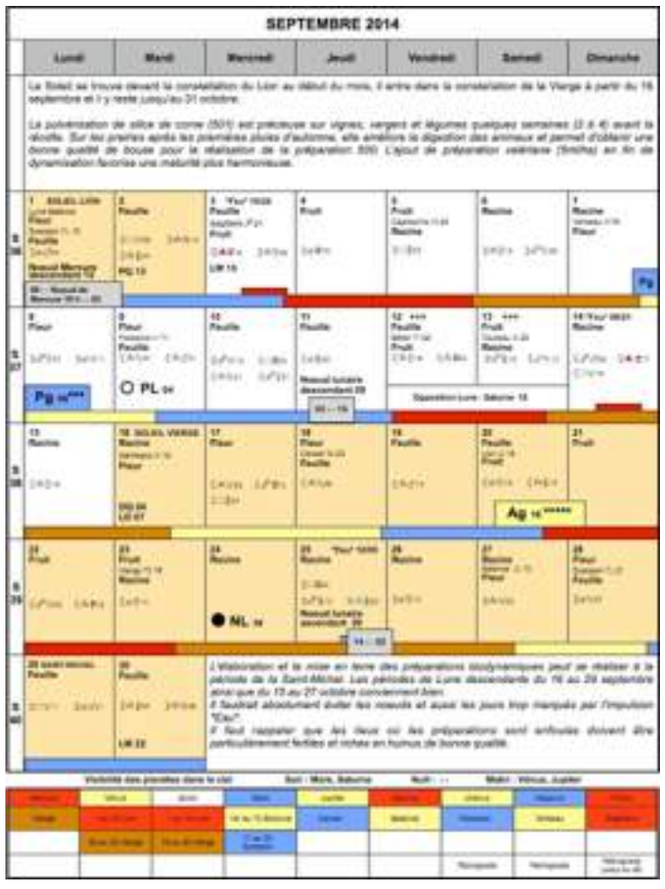
- Avoid days considered unfavourable on the planetary calendar, especially nodes and moon and planetary eclipses.

- For 501, spray in accordance with the sidereal rhythm (root, leaf, flower and fruit days) and the Moon's opposition to Saturn, depending on what impulse you wish to accentuate. In sunny areas, avoid apogee day.

WARNING

- Never use 500P as a leaf spray on overly-vigourous plants or when there is a strong tendency towards fungal diseases.

- Never spray 501 on plants suffering from drought conditions.



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OUR GOAL IS TO SERVE BIODYNAMIC FARMERS AND GARDENERS

Horn Silica (501)

- *Is made of Quartz, ground as finely as possible which is put in cow horns and buried in the earth for 6 months, the duration of the summer season.*
- *Addresses the vegetative and fruit-bearing parts of plants.*
- *Is a harmonizing preparation that regulates the growth processes of plants.*
- *Is a "spray of light" which stimulates the plants' immune system and helps their structure. Promotes cuticle resistance.*
- *Plays an important role in the formation of quality-related aspects of agricultural production: sugar content, flavour, conservation.*
- *Essential complement to Horn Manure 500.*

Horn Silica (501)

- *Use 2 to 4 grammes per hectare, stir for one hour in 25 to 40 litres good-quality warm water. The stirring should begin at daybreak.*

- *A very fine spray and high pressure are essentiel to disperse the preparation in the atmosphere forming a light mist above the plants.*

- *A few millilitres of Valerian (507) can be added at beginning of stirring, which eases plant stress and encourages harmonious maturing of plants.*

It is unnecessary to store Horn silica (501) in a peat-lined box; it should be kept outdoors in a glass jar on a north-east facing window ledge, away from direct sunlight.

Biodynamic preparations are substances that have received specific information, coming from the natural processes present whilst making them. Care must be taken to preserve these qualities by avoiding disturbances, in particular from electro-magnetic frequencies/waves (radio, wifi, vibrations from compressors in refrigeration units, for example).

If unable to find a suitable place in or around farm buildings, it is possible to construct a little box, mounted on a wooden stake placed in a hedge or bush, in partial sunlight and well away from the disturbances.

Horn Silica (501) directions for use

- *Generally used in the early morning, after sunrise, after having been stirred for one hour. It is sprayed onto developing plants, before flowering and before harvest. <u>Not to be used on plants suffering from drought conditions.</u>*
- *In some cases, 501 can be applied in the afternoon or evening, to lessen vitality in the aerial parts and encourage the migration of the plant's reserves to the roots. This is advisable to improve storage qualities of root vegetables, for example, but is not appropriate before fruit/ grape harvest as this can cause premature decrease of vitality of plants.*
- *Frequency of use depends on the plants and climatic conditions. During seasons with little light and damp conditions application of 501 can be increased.*
- *In hot, dry climates and/or weather conditions, prudence is required with this preparation.*

Mourvèdre, no BD preparations

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Same place same time. Typical plant behaviour with preparations (500P and 501): upright shiny leaves. Individual positions of leaves. Healthy plants.

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July 2014 Germany - Maria Bienert

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COMPOST
The Six Compost Preparations

- *Yarrow (Achillea Millefolium)*
- *German Camomile (Matricaria recutita)*
- *Stinging Nettle (Urtica Dioca)*
- *Oak Bark (Quercus Robur)*
- *Dandelion (Taraxacum dens Leonis)*
- *Common Valerian*

The six compost preparations are inserted into the compost heap once it has been completed. They orientate fermentation and restrict overheating, as well as contributing to a better availability of nutrients for plants.

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Six compost preparations

The six preparations have a specific role to play in the regulating and organisational processes at work in the life of the compost itself and in the soil where it is spread.
These preparations serve as the organs (heart, kidneys, lungs, liver, spleen, bone marrow, etc.) in the large, living body of the compost heap.

The behaviour of plants and the soil is noticeable following application of compost that has gone through all phases of its development. Quantities of compost to be used vary from 1 to 10 tons per hectare, as needed.

The beneficial qualities of compost on soil and plant health increase with maturity (3 - 6 months are ideal).

"Compost acts both directly and indirectly on plant health. Its indirect action is due to the influence on soil structure and the balanced nutritive elements (particularly micro-elements) that it brings to the soil. However, the direct action of compost on plant health, thanks to its beneficial micro-flora, is the most important." Jacques Fuchs, FIBL BIOPHYT.SA

- *Yarrow : sulfur and potash.*
- *Camomile : metabolism of calcium and regulation of nitrogen processes.*
- *Nettle : iron and nitrogen processes, renders the soil « wise, knowing ».*
- *Oak : bond with calcium, regulates over-exuberance in plants and cryptogams.*
- *Dandelion : silica et potassium.*
- *Valerian : phosphorus and heat/warmth processes.*

YARROW (502)

- *Yarrow is a plant belonging to the Asteraceae family (compound) which is characterised by its complexity and beautiful form. This plant has powerful regenerative qualities on living tissues (HERBE AUX COUPURES, HERBE AUX CHARPENTIERS). Through its regenerative and beautifying properties, yarrow expresses its relationship with Venus.*
- *Yarrow flowers are packed into a deer bladder, then hung in the sunlight for the duration of the summer. They are then placed to ferment in the earth from the autumn equinox to the following spring equinox.*
- *Rudolf Steiner indicates that this preparation plays an active role in the mobilisation of sulfur and potash.*
- *Yarrow also possesses cooling properties for plants in dry or hot conditions.*

Members of the deer family (Cervidae) have antlers - a type of bone that renew it's growth each year. Deers are hypersensitive animals in their environment, which is a Venusian characteristic, like the Goddess Venus in Greco-Roman mythology. This heightened sensitivity and capacity for regeneration express themselves especially in the renal system, of which the bladder is a part. The latter is used as an envelope for the fermentation, evolution and metamorphosis of the yarrow flowers.

We can consider the Cervidae to be the polar opposites of Bovines. Bovines possess powerful metabolisms and concentrate their attention on their inner life and their digestive processes. Their consciousness can best be described as « dreamlike » and they have a minimal awareness of their environment. Their horns are a sense organ, used to perceive the quality of their digestive processes (cosmic and qualitative analysis). Their horns form a barrier in relation to the outer world, which reinforces even more the introverted character of these animals.

GERMAN CAMOMILE (503)

- *Camomile is a plant completely devoted to the exchanges between the air and the earth. This plant strives to enhance the respiratory quality in compacted and silt-sealing soils. It's lace-like leaves and hollow capitula reveal its affinity with the activity of Mercury.*
- *The Camomile flowers are placed into a small intestine, then set to ferment in the earth from the autumn equinox to the spring equinox.*
- *The small intestine is an organ which participates in nutritional exchanges, similar to how the lung takes in oxygen but gives off carbon dioxide. Both of these organs reflect the activity of Mercury.*
- *This preparation plays a role in the metabolism of calcium and regulates the processes of nitrogen.*

STINGING NETTLE (504)

- *Stinging nettle, has a martial uprightness which expresses itself when it stings us. This, along with its high iron content, reveals its affinity with the activity of Mars.*
- *The leaves and the flowering heads of the nettle plant are harvested when flowering begins and are placed directly into fertile soil, without any animal envelope. They can be put into earthen pots, and remain in place for an entire year after which time they are transformed into a black, humus-like substance.*
- *R. Steiner tells us about Nettle's relationship to the iron and nitrogen processes so that this preparation reinforces the action of the first two compost preparations and enhances the sensitivity of the soil and compost, making it more "reasonable".*

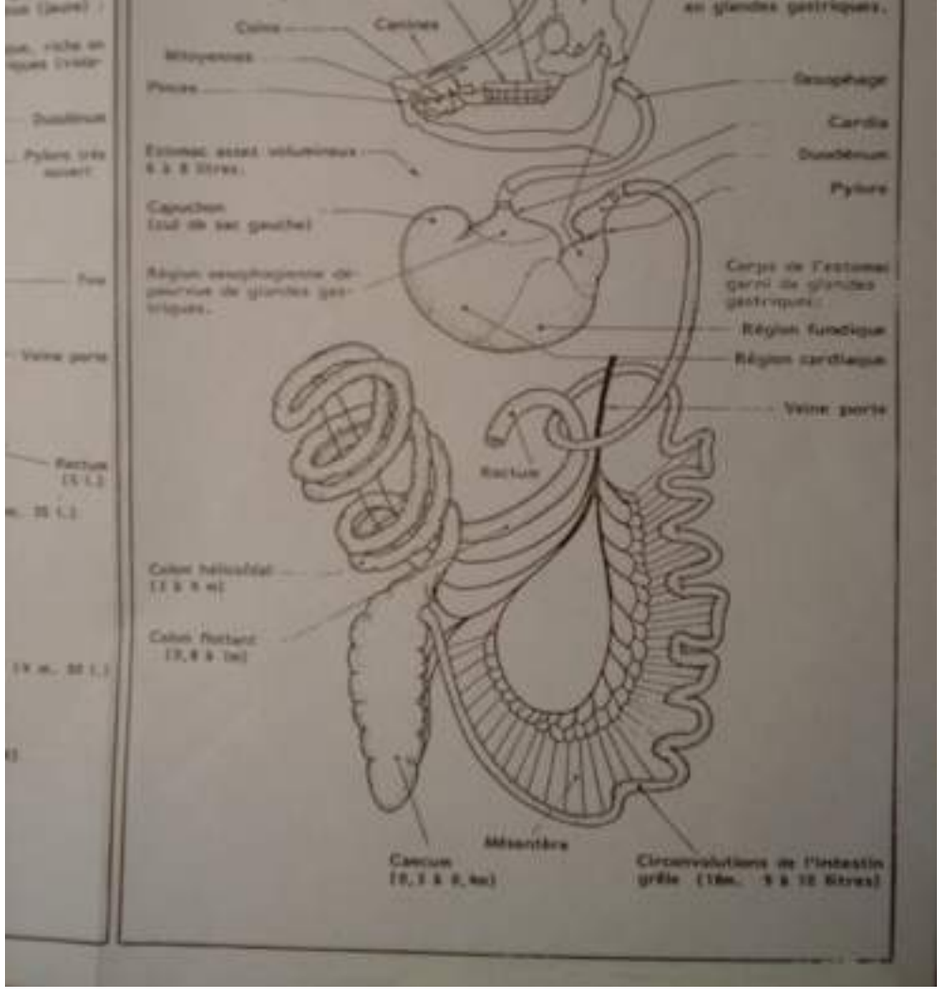
Nettle used as a herbal infusion, slurry, or preparation stimulates plants and unblocks iron chlorosis.

OAK BARK (505)

- *Ashes of the upper layers of oak bark contain up to 79% calcium, whereas this tree can grow on soils that contain almost none. This capacity to regulate calcium makes it beneficial for preparations.*
- *The oak bark is put into the skull of a domestic animal and placed in a damp place which is sure to receive rainwater regularly.*
- *Skulls also have the capacity to place calcium on the periphery. We're in touch with channelled lunar forces in relation to the reproductive functions.*
- *This preparation is related to living calcium and helps plants which have an over-exuberant tendency to regulate cryptogamic diseases.*

DANDELION (506)

- *Dandelion (Taraxacum officinalis) has a royal bearing, from the position of its first spring flower, to its magnificent sphere-like fructification. Even its yellow colour manifests its relationship to the forces of Jupiter.*
- *Dandelion flowers picked at the beginning of flowering are metamorphosed in an animal mesentery.*
- *The mesentery can be considered as related to the liver, organ of Jupiter (the "master organ" in Chinese and Ayurvedic medicine.)*
- *The dandelion-filled mesentery is placed in fertile soil from late September to the following Spring.*
- *This preparation has an affinity with silica and potassium.*



Ici il s’agit du mésentère (mesentery en Anglais ou Rindergekröse en Allemand)

VALERIAN (507)

- *This is a liquid Valerian flower extract that requires stirring in water for several minutes before use on compost heaps.*
- *Related to the sphere of Saturn, this preparation has an affinity with phosphorus and the heat processes.*
- *It helps to form a protective sheath over the compost and relieves stress from plants suffering from moderate damage inflicted by freezing temperatures or hail.*
- *This preparation can be used on its own, after having been stirred from 10 to 20 minutes. It can also be stirred for one hour with Horn Manure or Horn Silica preparations.*
- *In certain cases, it can be used without stirring.*

COMPOST

The basic substances are of plant and animal origin. Each type of manure has its own particular quality, from cold manures (pig manure) to warm manure, such as that of sheep and poultry. Cow manure of organic or biodynamic origin that contains a sufficient amount of straw is the most balanced and the easiest to compost. One should adapt the type of manure to the prevailing pedoclimate.

The decomposing substances break down in every direction.

The composting process consists of organising these substances and creating new substances that interact.

The preparations act as organs in this new organism. They organise and regulate the processes following the chaotic (breakdown) phase which is set off by the rise in temperature and the de-construction of the initial stages. The preparations limit overheating if they are introduced immediately following completion of the compost heap.

The use of good-quality compost is a basic foundation for well-balanced and healthy crops.

Good compost contains une flora of micro-organisms able to limit telluric diseases (seedling blight, pythium, rhizoctonia, bremia, take-all-disease, etc.) Compost that has been allowed to mature contains more beneficial qualities for the health of soil and plants than young compost. Ideally, it should have matured three to six months before use.

Storage of mature compost must be aerobic.

« Compost acts **directly** and **indirectly** on the health of plants. Its indirect action is due to its influence on soil structure and its supply of well-balanced nutrients, especially micro-elements. However, the direct action of compost on plant health due to beneficial micro-flora is even more important. » Jacques Fuchs FIBL

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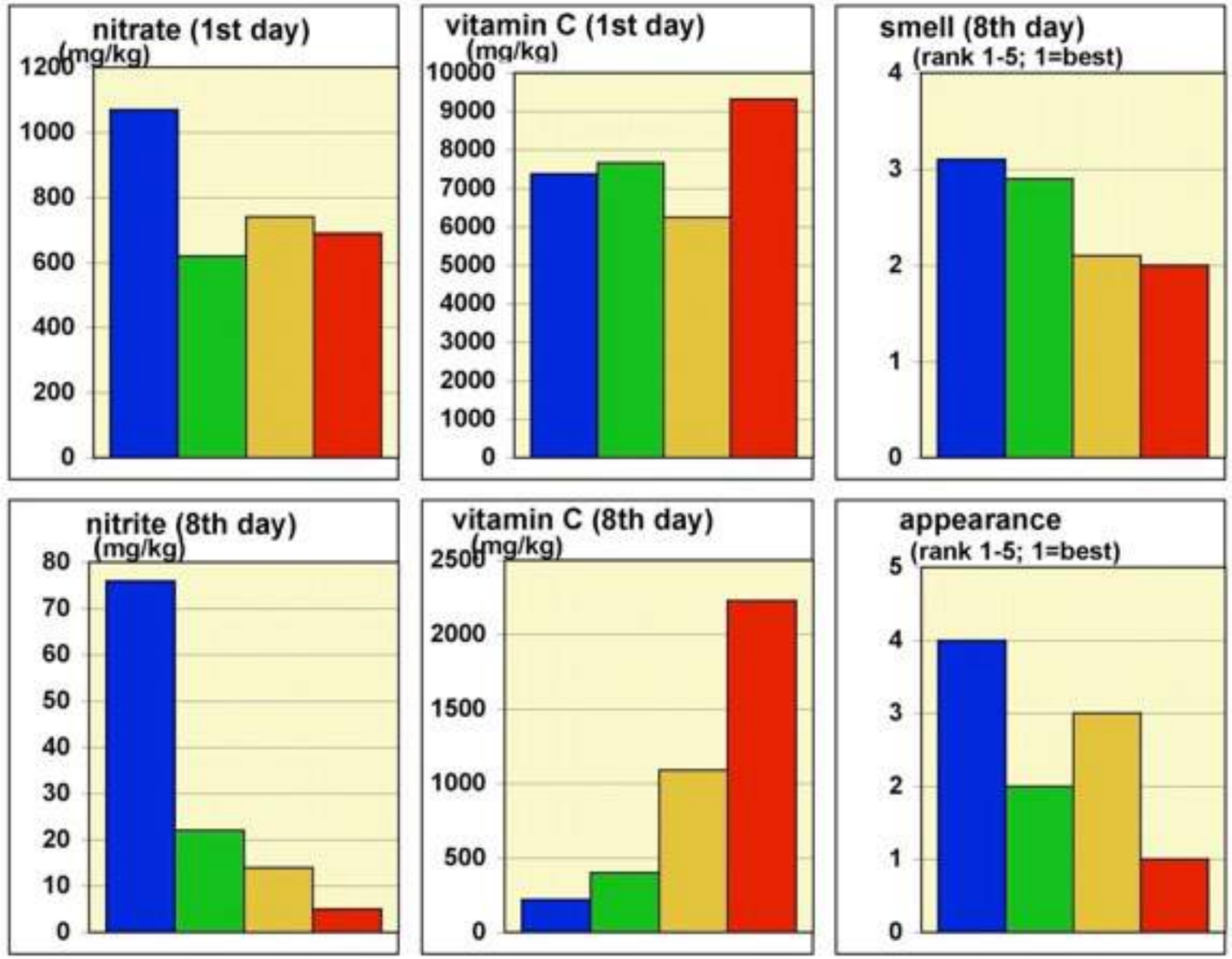
Proven Results

- *On the functioning of the soil*
- *On the diversification of flora*
- *On the regulation of parasites*
- *On plant behavior*
- *On the quality of products (vegetables, cotton, tea, etc.)*
- *On reducing doses of copper in market gardening, tree and fruit growing and viticulture.*
- *On wine (acidity, complexity, elegance, drinkability, digestibility)*
- *It must be noted that the use of biodynamic preparations does not increase yields compared with organic agriculture but its regulating, harmonising effects are noticeable. Plants become more « reasonable » as regards their nutritional behavior, have increased resistance and improved quality overall.*

The biodynamic preparations are complementary.
They give the best quality results when all (500, 501, compost preparations) used on the same crops.
Here on spinach.

IBDF

Improvement of food quality of spinach by the biodynamic preparations



On a high manuring level (ca. 200 dt rotted manure)
the application of biodynamic preparations leads
to an increase of quality of products.
The full effect of the compost- (pr. STMK) and spray preparations (FP)
only appears when preparations are applied in combination.

Source: Elsaidi (1982): Dissertation, Giessen
Arranging: König, Institute for Biodynamic Research, Darmstadt 1999

Q-3/99

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The use of tree pastes to care for cambium

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The Moon, Planets, Zodiac and Agriculture

Understanding and using the cosmic rhythms in biodynamic agriculture and the use of calendars

More indications on Pierre and Vincent Masson's biodynamic calendar
Free download :
www.biodynamie-services.fr/en/

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Main Cosmic Rhythms

Sun Rhythms

Annual: The Seasons (1 year)

Daily: Morning / Afternoon (24 hours)

Moon Rhythms:

ascending / descending (tropic) (27.3 days)

waxing / waning (synodic) (29.5 days)

Apogee (Ag), Perigee (Pg) (27.5 days)

Nodes

Moon in Zodiac Constellations (sideral) (27.3 days)

Planetary Rhythms, Oppositions, Conjunctions, etc.

More indications on Pierre and Vincent Masson's biodynamic calendar
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THE REGULATION OF PARASITES AND WEEDS WITH SPECIFIC BIODYNAMIC FARMING METHODS

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Herbal teas, decoctions and macerations
Important plants and their effects
How to make them
How to use them

The winning team of herbal teas and decoctions to regulate plants and prevent cryptogams

Horsetail
Nettle
Willow

Complementary Regulating Herbal Teas

Dandelion
Chamomile
Yarrow
Oak Bark

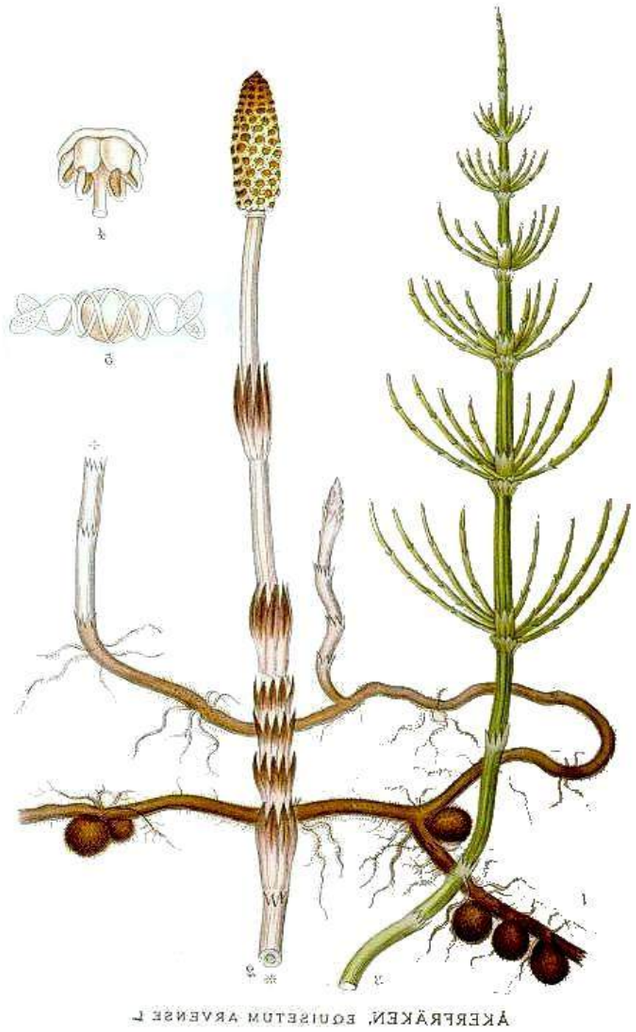
Stimulating plants used in cold macerations (fermented plant extracts)

Nettle
Comfrey

Extract of an exceptional plant

valerian

Horsetail
Equisetum arvense



The fruit-bearing stage in this plant is short-lived and develops before the vegetative phase.

Horsetail regulates (even extremely) damp conditions and provides a behavioral model which indicates to fungus (cryptogams) and lunar forces that stimulate them to remain in the sphere of the soil and not to rise up into the plants.
Horsetail also provides information for limiting the over-reproduction of spores. This plant that has rid itself of its desire to flower (of its reproductive impulse) and exists quietly, in a purely vegetative state, which is what we want to see in behavior of cryptogams, particularly mildew.
Its high silica content reinforces plant cuticles, but prudence is required in its use during the vegetative stage, as in certain conditions, Horsetail can cause drying out of plants and soil. It should be used in conjunction with willow and nettle.

One whole lecture from the Agricultural Course by R. Steiner (7th lecture) is devoted to the subtle interactions that are linked together in the landscape between crop cultivation, orchards, hedges, copses, damp zones, etc.
The role of insects, butterflies and birds in the atmosphere, and that of the fauna of the soil, including larva, insects, earthworms, etc. is examined with a view to develop a richer form of agriculture.

Man does not live by bread alone.

"We are also nourished by our sense impressions, images, sounds, smells and moods, that we internalize consciously or unconsciously every day." (Thomas van Elsen FIBL 2009)

The "Agriculture Course » and Salutogenesis

Can be viewed as a course on salutogenesis.

For the past 200 years, conventional medicine and agriculture focus primarily on the origin of illness and how to eliminate pathogens (germs, bacteria, parasites, fungal disease, weeds). This approach forms the inheritance of the work of microbiologist Louis Pasteur.

Essential to the work of physiologist Claude Bernard (contemporary of Pasteur), however, is the concept that creating health is preferable to fighting disease. "Germs are nothing, the constitution is everything."

The approach developed by Claude Bernard and his famous saying "Germs are nothing the constitution is everything" can be deepened and new research orientated towards the concept of salutogenesis as developed by Aaron Antonovsky in the US. His work explores the resilient individuals in a cross-section of the population, and seeks to identify the factors that contribute to their good health.

Michaela Glöckler : 3 levels for building health
These 3 levels are also found in the « Agriculture Course ».
The Biodynamic Preparations are determining factors for establishing the foundation for health in agriculture.

Determining factors for Salutogenesis according to the work of Dr Michaela Glöckler

Sources of health for the farm or vineyard

Conscious relationship to the spiritual world and the worlds of thought, art and culture. Consistency and meaning in life.

Relationship to the cosmos by working with cosmic rhythms and with the preparations as substances organized by the cosmos.

Mobilise the resources of resilience by cultivating relationships with others : family members, friends, social contacts, colleagues.

Relationship to a diversified environment. Individualised farm organism

- *landscape below the soil*
  roots, mycchorizes, bacteria, worms, larva
- *landscape above the soil*
  companion plants, wetlands, trees, birds, butterflies, bees, insects
- *the animal as an "analyser" and healer in its environment participates in a form of intelligent co-evolution of plants and soil.*

Ensure access to a minimum of material resources : education, healthy food, decent housing, health care. Develop the capacity to adapt.

Access to a minimum of :
Fertility in the soil and manuring (compost + 6 preparations, 500)
Seeds and plants adapted to local environment
The means to regulate pests and disease (horsetail, 501)
The preparations as a link with the earth (500) (root systems, soil structure, humus).

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91 years later, the 'Agriculture Course' is still promising.
It is a well for the agriculture of tomorrow !

Thank you for your attention !

Vincent Masson

www.biodynamie-services.fr/en
www.soin-de-la-terre.org

Diaporama conçu par Pierre et Vincent Masson