

# Soil roots, preparations

Studies and those understanding life processes in from Walter Goldstein

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In the last fifteen years US soil scientists have increasingly become interested in this. Interested in the topic of soil quality. The connection has hardly been examined of quality and vitality Soil and root health. But the experiences around the world show that the package of measures organic fertilization and Crop rotation helps to improve soil quality and also root diseases reduced. The latter seem a major problem in many regions of the world be. I don't have any though epidemic data, but their influence is underestimated, rarely does anyone look the roots.

In three states of the Middle West we examined Root diseases in corn from conventional, organic and biodynamic Farms. This was combined with repeated strip attempts, each with and without fertilization. The roots of the corn plants became Flower dug up (Fig. 1): Conventional corn was

twice as heavily infested (26% at 47 farms) like that of organic or biodynamic farms (15% at 32 farms). The figure shows Roots of two farms: a conventional one (left), where corn after corn is grown and a biodynamic dairy farm (right), where corn follows alfalfa grass with Manure was grown. Note the difference in the color of the roots: The dark roots show dead ones or dying roots.

In general, we found that soils that received manure for many years had healthier roots had. Where manure compost and When compared to uncomposted manure, the compost-fertilized corn was healthier Root. The effort of the Plants for root formation also changed. (Fig. 1). The conventional one Corn responded to the early one Root disease by more roots formed around to grow them out. The more roots were produced, the more nitrogen there was recorded. It seems one connection between the Need for mineral nitrogen, the distribution the root disease and that to give earnings risk.

In the one described above Work on root health the disease appeared on everyone farms. The following Figure (Fig. 2) shows hybrid corn roots from the

Zinniker Farm, the oldest biodynamic farm in North America, for more than Farmed biodynamically for 60 years. Not only that These corn plants have the largest root system of all measured on the farms had, they were also completely free from diseases. One Another special feature was that they are an orange color showed after seeing some Standing in the water for days. Possibly divorced they components that Bind iron and turn the roots orange. What Exactly what caused this phenomenon is still unclear.

This image is confirmed by my work in the States Washington and Wisconsin and by Hans BACHINGER in Darmstadt: Biodynamic Preparations can stimulate root growth. We found that they too Increase root health. We do not know, why. Maybe it's an answer on the special living one Quality that I found in biodynamic soils in long-term trials

We organic in Wisconsin and biodynamic systems compared.

## A new collective specimen

In the early 1990s asked the biodynamic association in the USA Dr. Herbert Koepf

### Short and sweet:

The biodynamic preparations also improve root growth and Root health.

If, contrary to the instructions, they are used with animals other than The final product is not comparable.

Only the antagonistic effects of the preparation ingredients enable its special, balancing effect.

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and me, in the development of a new collection preparation (preparation) at the Michalek Institute to participate in the 1960s

Pfeiffer's laboratory in New York with nettle additives

Liquid fertilizer worked. He found that nettle had an improving effect on manure and on the growth of seedlings, that were raised with the mixture. I started researching

to see how the nettle and other additives influence the collective preparation.

First we developed one Seedling test we continue previously in the late 1970s worked out together. It is based on cultivation

of wheat seedlings either in nutrient solution or distilled water. Had seedlings from nutrient solution short roots and long leaves or a high leaf-to-root ratio, which increased with the addition of manure compost.

Seedlings in distilled Water had long roots and short leaves or a low leaf-to-root ratio. When we then did the encore of compost or compost, which was mixed with the herbal preparations 502-507, compared, we found that the addition of herbal preparations plus manure is always a leaf-root ratio

The result was closer than 1:1 was, different from the sole one Adding manure to the two different growth media. We called this a balancing effect.

Collective preparations worked like the herbal preparations and we were able to add the additional

effect of the collection preparation. The seedlings were directed through

the vaccine preparation. The nettle to the collective specimen balancing effect. increase a seedling growth.

We found that the optimal mixture was 1 to 2% chopped nettle and two

usual units of herbal preparations (502-507) each

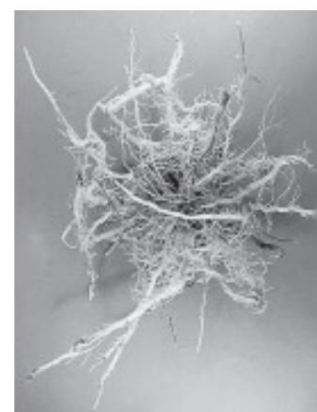
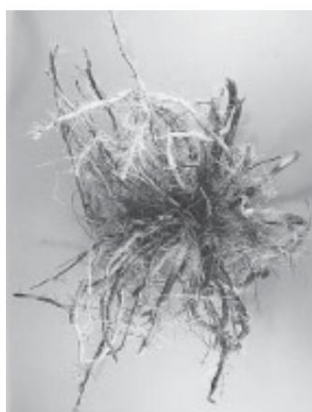
There was 40 kg of manure compost. The Collection specimen could also too much nettle and herbal preparations contain what is in the growth inhibition of wheat seedlings

and of corn plants in Field testing showed. The addition of nettle stimulated them Activity of earthworms and led to faster composting of the manure.

The addition of basalt flour to the mixture seemed to slow down decomposition.

Then we started a line of field tests to achieve this new nettle preparation with the biodynamic Pfeiffer spray preparation (from the Pfeiffer starter), plus the Pfeiffer (Compost) starter, dem Thunschen birch pit preparation and the Podolinsky Super-500 (horn manure added with compost preparations and then prepared) to compare organic and conventional control plots included.

Over several years of testing It was shown that the biodynamic treatment the nettle preparation included, balancing effects the yield of winter wheat and had corn. The goods similar to those that RAUPP and KING from many attempts



described in Germany.

If the yields from organic farming were generally low, the biodynamic variant was included

Nettle preparations have a strong effect Effect on yield (Fig. 2).

If the yields of the organic variant were very high, showed the biodynamic ones

There are few preparation variants Effect. The balancing one The effect was only evident for them Variant with nettle preparation. This showed the highest Grain yields across all five Years of trying. This

Variant also significantly increased root growth and improved root health. The preparations can therefore lead to strong balancing effects lead to plant growth.

Could it be that investing in the root of the Plant in bad years

**Fig. 1:** Healthier roots in organic farming: Results root diseases in different fertilization systems (infestation is shown by blackening), left conventional (infestation in 22% of 47 Farms), right organic (infestation at 15% from 32 farms). Left corn after corn, Mineral fertilization, right corn after alfalfa, manure compost. Highly significant, P =

	conv.	Ecol. %	organic Signifi-to conv. cank (P)
Number of fields	27	53	—
Grain yield (t/ha) 7.2		7.9	110 ns
Corn root (t/ha) 5.9		5.0	85 **
Root diseases (%) 22		15	68 *
Root to grain yield (kg/kg) 1.2		0.7	58 **
N uptake (kg/ha) 227		186	82 *
N uptake per grain yield (kgN/t)(= N efficiency)	32	25	78 *

**Table 1: healthier roots with ecological management enable greater efficiency. Corn: Conventional and organic Comparison (not fertilized plots)**

helps? That should be of great importance Be significant in view of increasing stress linked to climate change.

Maybe we will in the future lead to the best biodynamic combinations research treatment, that balance out stress.

**How do we understand and How do biodynamic preparations work?**

The preparations are already interesting as a study object enough, and we still have to learn more about what we achieve with them. The is particularly important e.g. b. in light of current EU regulations that restrict the use of animal organs as casings for the production of the preparations.

I started in the fall of 1976 a job in Dornach this topic with the help of Manfred Stauffer, in the garden of the Goetheanum, and led she later attended Emerson College and later in Wisconsin together with farmers: We enclosed the plant parts with linen bags instead animal organs and stuffed manure into glass and plastic tubes instead of cow horns.

We placed them in pits next to the regular ones Preparations. Will BRINTON (USA) by the way, in experiments

with horn manure a decrease of dry matter and oxidation potential, as he the starting material is crap and their transformation during the preparation over winter compared.

What I and others observed have is that the animal ones Coatings of the preparations cause accelerated darkening (oxidation) of the material with little loss Dry matter or smell.

The initially high gaseous losses of carbon that normally occur associated with the decomposition of organic material

are, become obvious avoided. This seems against the natural rules be. To like in the horn or an animal shell

Browning combined with oxidation would have to be achieved, or compost the material and would half or

lose more of its organic carbon. Intense appears in the preparations Oxidation, but the carbon loss is small. This effect seems to work

the right combination of substances and shells to surrender. For example: Manure fermented in glass or plastic containers, with or without cover, or crap in horns of Bulls or rams just don't turn into the way like crap in cow horns.

Yarrow, fermented in Linen bags side by side with yarrow in deer bladders results in a product that colored rusty orange strong smell like peppermint tea. In the deer bladder fermented, it is darker and smells less.

Chamomile in linen sachet fermented, shows lighter color and smells unpleasant Sewage sludge manure. Fermented in intestines, it is darker and smells light and pleasant of chamomile.

Bark of a dead one Oak stuffed into sheep skulls produces a rust colored Preparation, while bark one live oak in sheep's skulls, the usual dark colored preparation results.

**What was intended Rudolf Steiner with the preparations?**

So what effect does it have if you? the right animal shells, Plant parts and

decomposition environment come together We should not overlook that the third ingredient is the

environment in which we put it give preparations. In the case of Steiner's horns were clear

Intention that the horns the Forces that live in the ground in winter into the muck. We can imagine that the deer bladder, intestines, Skull and mesentery one play a comparable role and the preparations help Forces of air and water and the winter soil.

Let's remember what Steiner with the use of herbal preparations.

It has everything to do with sucking in, invigorating, stimulating, make sensitive and to steer. This fits Steiner's Description of astral functions that occur in the living Soil with both nitrogen and others

substances. He wanted to improve the ability of the soil, cosmic

to absorb forces that "in finest homeopathic Dosage" from the cosmic Dust can be worn and thus stimulating the plant, your protein in a healthy way to build. The herbal preparations should contain organic fertilizers and soils revitalize, avoid unnecessary nitrogen losses and the Absorption of nutrients support financially. The herbs (and bark) were also included thought to be force patterns to offer the plant support in the formation of shapes. Using these preparations, live nitrogen in the manure is regulated Ground shaped and enabled the plant, its material to express shape correctly and so their nutritional value to train.

Maybe using animal casings will help the plant parts on one to raise the astral level. Dr. Nikolaus Remer describes in his book "Laws of Life in Agriculture" that the Production of the preparations a sharp decrease in the Nitrogen content in the Sharing the medicinal herbs leads which ferments in the ground become. Does this finding apply? too, then the biodynamic movement has to become more deal with it. The master's or

Christopher's thesis Stearn at Ohio State University. He described that simultaneous appearance and Increase in cytokinin plant hormones and free-living, nitrogen-fixing bacteria of the genus

Azotobacter in both horn manure and horn pebbles during fermentation in the ground.

### What is the logic behind the production of the preparations?

Steiner's statements regarding plants and the corresponding organs are very precise and he indicated that some are analogous to its counterpart: e.g. b.

Yarrow like the process between kidney and bladder, Chamomile like the wall of the Guts, nettle like that Heart or what the heart is surrounds (the lungs). Over I understood that for decades

Relationship between herbs and the cases in a rather naive kind: there was a relationship, somehow belonged them together, they were similar.

After I read had what Steiner said about the organs in its cycle "Humanities and Medicine" (1st medical course, GA 312, 1920) said and the Considering the effects that we see when we make preparations, I started this one easy viewing angle questioning. Could it be, that the unusual results we get from decomposition observe in the preparations, have to do with a kind of extinction effect? Could

Steiner herbs and organs have put together, the with parallel processes do, but in opposite directions?

Place maybe we can use it as a kind Zero point at which forces be raised to a higher level? Here is the

Logic behind the question:

In "Humanities and Medicine" states Steiner, that the forces that the plant-based protein and those that animal protein forms are different. in fact



Fig. 2: The healthiest corn roots, observed in 2000: Zinniker Farm, farmed biodynamically for 60 years: without blackening due to illness, denser roots

They are actually opposites: "The functions of animal protein are impaired or eliminated

through that of the protein of the Plant."

After the medical Steiner's course is linked to the kidney-bladder system dissolving the carbon from the body and the removal of salts. In his Agricultural course Yarrow is used as a preparation as an active Model, like a figure is formed correctly by Sulfur, potash and protein be combined.

In the medical course the small intestine described as active in breaking down and isolating substances and in killing the flora and Fauna that lives in the intestines. In the Agricultural course Chamomile should help us to combine substances in the right way To revitalize manure and soils.

The skulls and the structure of oak bark both have to do with a common die-off process: The Medical course describes, that the salt process in the mind

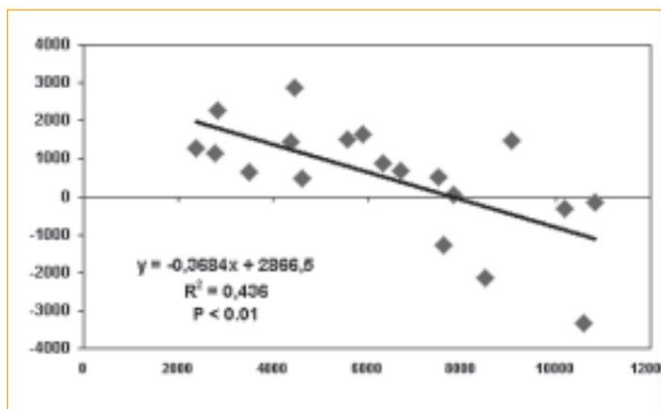


Fig. 3:

Preparations have a balancing effect, i.e. increasing yield with less  
 Yield level and vice versa:  
 Additional yield with biodynamically treated corn plus  
 Nettle preparation compared to organic cultivation (1994-1994)  
 X-axis: grain yield (kg/h) organic corn, Y-axis: additional corn yield biodynamic with nettle preparation

is formed by the shaping powers of the pebble, which represents tin and lead while presented in the agricultural course will that the salting process in the bark formed by lime becomes. Pebble and lime represent polar opposite forces.

Mesentery and dandelions are likely to be themes of transmutation and transformation  
 Substances with living ones have forces in common, but with polar opposites

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Gestures. The mesentery envelops the most internal, own food streams. After the medical course and a lecture for them Workers at the Goetheanum, become food components along the intestinal walls in an inanimate, dismantled one State transferred, but she are then created again in an animated form and through the veins and the lymphatic system of the mesentery return directed into the blood. After Agricultural course on the other hand has dandelions to do with mediating cosmic silica forces over wide regions in space and Area. In the way he grows, his curvy, jagged Leaf shapes, its unusual round heads and radiant flowers, his hollow flower stalks and spherical seed heads he shows a strong connection to the surrounding cosmos. He is a “messenger from heaven” while the mesentery a Guardian/guide of the inner, earthly nutrition is.

In the fourth lecture of the agricultural economics course we learn that cattle horns have the ability to... Forces that radiate from the digestive system are kept in check to keep.

On different levels we have the aspect of Bringing together opposing forces that tend to work against each other or wipe each other out. It seems that behind the Preparations a principle on Work is something I didn't do before had understood. Naturally you can ask how to Forces of balance different can produce, except through

the bringing together of opposing forces.

**outlook**

Long-term trials in Sweden, Germany and the Switzerland have shown that the use of biodynamic preparations Carbon binding in shape of organic matter in can improve soil. Could it be that this effect reduced carbon losses with the special ones Effects of the preparations Root formation and decomposition of organic matter is connected that I have described? It is here more research needed to clarify to what extent the optimal application of the biodynamic preparations Promotes carbon sequestration and thus makes a contribution to reducing global warming, as well as Plants help balance out stress. More research is necessary to understand the nature of the preparations and that, what happens during production and use.