

Soil and Us

A look into the physiology of the
human body and the soil

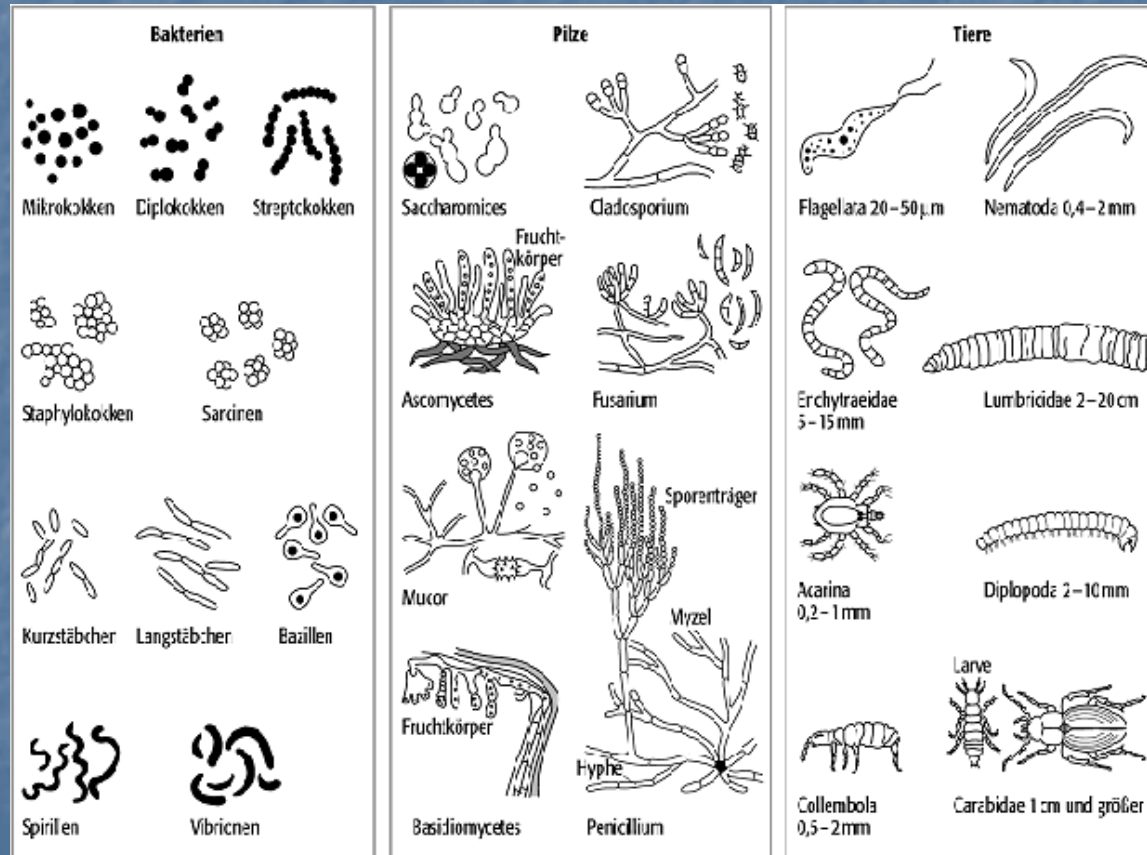
Good soil

- Good soil consists of
 - 93% minerals (Selenium, Zinc, Magnesium...)
 - 7% bio-organic substances
 - 85% humus (structure)
 - 10% roots
 - 5% edaphon (soil organisms)

Edaphon

The Edaphon (greek meaning ground) is comprised of a number of organisms :

- Fungi 40%
- Bacteria (soil based organisms) 40%
- Earthworms 12%
- Macrofauna 5%
- Microfauna 3%



The rhizosphere

- The rhizosphere is the region of soil where plant roots and soil organisms (probiotics) interact.
- The roots put out exudates (carbon rich molecules) that diffuse through the soil, becoming attractive food for soil probiotics, which in turn proliferate and produce nutrients (ammonium for example) for the plant. This is part of the natural cycle of nitrogen.
 - This is the same transformation of N_2 gas to ammonium that is done in war-agriculture with the use of high heat and pressure.
 - Legumes fix nitrogen with the help of these soil probiotics, which create root nodules that they use for habitat.

Soil probiotics

- Soil probiotics are capable of changing molecular structures of nutrients for the benefit of the root/plant growth, as well as antibiotics for protection.
- They metabolize phosphorus and iron bonds to dilute them in the soil.
- They are essential for the health of the plant.
- One gram of healthy soil contains over ten million bacteria (probiotics).
- The life span of a single bacteria in this environment is about half an hour.

Meet the Luebke family

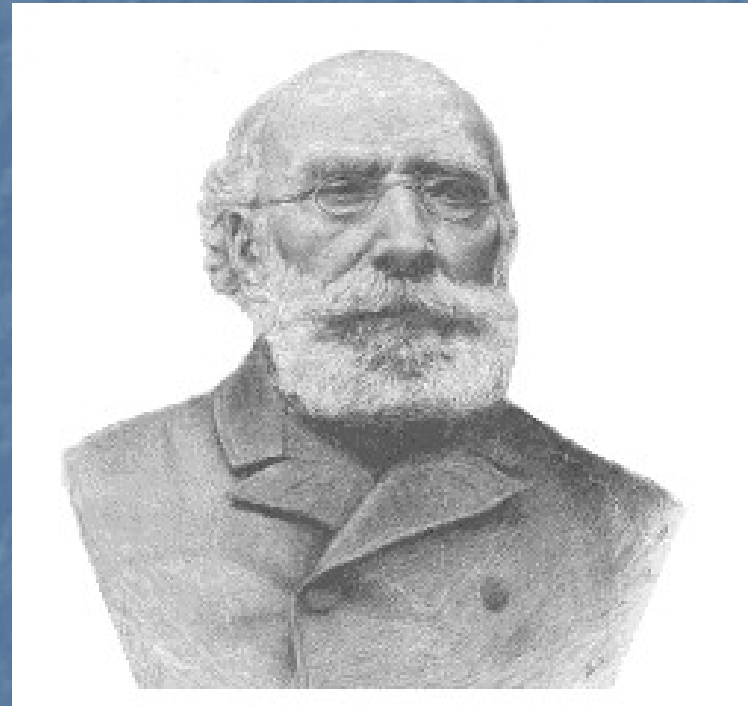
- They have been farming organically since the 60's in Peuerbach, Austria.
- Sigfried Luebke is a soil microbiologist with an on-farm laboratory. His research created a database of 3600 microbe driven enzyme reactions in soils and compost.
- **Following downwind fallout from the Chernobyl nuclear reactor accident, root vegetables raised on their farm were uniquely free of radioactive contamination in comparison to other farms in the region.**

Let us therefore not forget, that..

- Symbiosis is the main principle in nature
- Diseases of plants are diseases of the soil
- We must treat the prime origin of the disease, not the symptom...(weeds are a symptom, soil imbalance is the reason).

"Modern" medicine

- Modern medicine was born from a dispute between Bechamp and Pasteur, which the latter won. He just happened to have more political help.



Soil erosion

- Erosion of our soil is equivalent to erosion of our civilization...

The human probiotics

- Did you know that inside our digestive tract are beneficial organisms that outnumber all the cells of the body by a factor of ten? (Bengmark 1998)
- These organisms fulfill many vital roles in maintaining our health, that is why they are called probiotics (pro life).

What do probiotics do?

- Probiotics play a crucial role in many ways:
 - They increase nutrient absorption
 - They support healthy immune function
 - They directly eliminate pathological organisms
 - They stimulate cell repair
 - They provide powerful anti-oxidants
 - They prevent build-up of waste material
 - They help raise HDL (Kiessling et al 2002)
 - They normalize bowel transit time (Goldberg 2002)

Nutrient absorption

- Complex nutrients are broken down into their basic building blocks (proteins into amino acids etc.) through fermentation, which increases the absorption of these nutrients (Rothschild et al 2002)
- Micronutrients produced by or contained within the probiotics help increase the absorption of other nutrients, such as calcium and potassium (Rothschild et al 2002)
- The production of lactoferrin helps the delivery of iron to the target cells (improves chronic anemia (Rothschild et al 2002)) and makes it unavailable for pathogens (bacteriostatic effect)
- Digestive enzyme production is increased

Immune modulation

- Production of 16 of a total of 20 alpha-interferons and therefore T-lymphocytes (chain reaction of immune modulating effects that are antiviral, antifungal, antibacterial etc.)
- Stimulation of B-lymphocyte and "non-programmed" antibodies production
- Inhibition of over-reactivity, as in certain autoimmune illnesses and RA (Kano et al 2001)
- Increase in NK cell production (main cancer fighting immune cells)
- Reversal of immunosenescence on cellular activity (Gill et al 2001)

A closer look at immune modulation

- Increased use of **antibiotics**, eating sterile foods with low nutrient value have shown to interfere with the development of a child's immune system, including a worsening inflammatory Th2 dominance. Which in turn leads to more allergies, autoimmune diseases and inflammatory responses. All this manifests as colics, exzema, asthma, juvenile arthritis and... obesity (low grade inflammation, intestinal dysbiosis and malnutrition with a background of high calorie intake).

Elimination of pathogens

- They are capable of secreting substances (including hydrogen peroxide and other bactericidal proteins) that inhibit the growth of harmful microbes, such as *Candida albicans*, *Aspergillus niger*, *Mucor racemosus*, *E. coli*, *Staph aureus* (Gan et al 2001), *H. pylori* (Cats et al 2003),
- They produce organic acids (lactic and acetic acid) which lowers the intestinal pH, further creating an unfriendly environment for pathogens (Kim et al 2003)
- They block receptor sites that are used by harmful bacteria, viruses, parasites and yeast (Rolfe 2002)

Cell repair

- Speedier cell repair through production of special pool of DNA/RNA, that contains the naturally coded instructions for self-repair in certain human cells
- **Some evidence points towards the possibility that GE/GMO food changes the DNA/RNA in probiotics.....**

Supply of anti-oxidants

- These antioxidants have the ability to :
 - Chelate metal ions
 - Inhibit the enzymes that create free reactive oxygen species
- In particular SOD (superoxide dismutase) which is capable of :
 - Capturing free radicals (involved in almost every human illness from chronic inflammation to cancer)
 - Reducing tissue damage in the heart (for example: after heart attack) and other organs of the body (kidneys, intestins, pancreas)

Waste material elimination

- Probiotics are capable of blocking the formation of toxic compounds
 - Decreased beta-glucuronidase activity (Marteau et al 1990)
- They are also capable of breaking down already existing toxins (Rolfe 2002)

Why are these probiotics doing all this ?

-You can call it symbiosis : a mutually interdependent relationship between the probiotics and the host (that would be us).

-You can also speculate that they do it for the greater good?

Where are these probiotics coming from?

From our soil...

(and babies get it also from their mothers both via birth canal and breastfeeding)

Breastfeeding

- During breast feeding the child ingests:
 - Breast skin flora
 - Nowadays mostly Staph aureus, that produce proinflammatory toxins (Kalliomäki et al 2008)
 - Breastmilk containing :
 - Bifidobacteria
 - Milk oligosaccharides (food for B. longum)
 - Soluble pattern recognition receptors that activate and modulate (inflammation control) the child's immune system (Kalliomäki et al 2008)

How do they get from the
soil into our intestines?

They travel with the plants that
we eat...

The role of fermentation

- Fermentation is the main mechanism by which probiotics transform food into readily absorbable nutrient or basic building blocks
- **Fermentation can be done both outside or inside the body**
- The fermentation outside the body is dependent on the presence of probiotics in the food

So?

Good soil is needed for soil based organisms (probiotics) to grow, for foods to be a carrier, for fermentation to happen, for humans to be healthy.

THANK YOU !