

# SOIL RESET

## GETTING RID OF SOIL CONTAMINANTS

**All market-gardeners that grow crops in soil know the problem: disease and pests. The lion's share of the gardeners work is in steaming nematodes, molds and other problems from the soil but a total soil reset seems to be more effective. Currently, laying foil sheeting is necessary but in the future, the development of a special coating will make this process a thing of the past.**

The problem is almost as old as growing crops in the soil: nematodes, fungi and soil-borne insects that one prefers to be rid of. Steaming is the most common method of solving these problems, followed by microwave disinfection. 'Cooking the ground', because that is basically what steaming does, is probably not the best method and can lead to 'steam damaged' soil which can lead to a reduction in crop production and the continuation of infestations and repeated disease flare ups.

### POTATOES

In recent years, soil resetting has been regularly reviewed in the market gardeners journals. For those who are not sure, we explain again in detail how the process works, at least as far as it is understood.

Henk Meints of Thatchtech BV is the spiritual father of the soil reset and he says: "Through a combination of two different events, I decided on the soil reset method. I came in contact with a vegetable grower who was tearing his hair out. He cultivated organically with good intention, but his plant production was poor. He therefore decided to dig grass into the ground, an ancient biological method, and to cover the ground with sheeting. With this method he wanted to rid himself of unwanted and difficult to detect diseases. Unfortunately, he was not entirely successful but I found the idea behind the principle very interesting. Later while working at a potato processing company, the manager showed me a new system: a water treatment plant combined with anaerobic and aerobic processes. First, purification took place using bacteria that need oxygen to function and in the following process the bacteria which required almost no oxygen to do their job."

### KILL OFF

The principle of biological soil disinfestations seems simple, but in reality it is quite complex. The principle of killing off breathing organisms is a simple concept, i.e. everything needs oxygen to live. The simplest way to destroy oxygen dependent organisms is to make oxygen inaccessible. By providing food that is attractive for aerobic bacteria, i.e. bacteria that absorb oxygen through their combustion processes, and then covering the soil with airtight sheeting, in a short

time the oxygen in the soil will be exhausted by the bacteria. The result is that all of the oxygen-dependent organisms die off.

With the removal of the breathing organisms you're not there yet! Fungi, for example, do not require oxygen to survive and will therefore need a different approach.

Henk: "The processes by which these pests are cleared are more complex, since one needs to investigate the organism in a more detailed way. By making use of a food that is not only attractive for aerobic bacteria, but also for anaerobic bacteria, you find, after covering the soil that the latter increase in number as well. The anaerobic group should be divided into facultative anaerobes and strict anaerobes. The first group is partly dependent on oxygen; the latter group function completely independent of oxygen. Interestingly, both take on different groups of pests in the soil. The strictly anaerobic bacteria are masters in the 'cracking' of complex molds and can destroy them. They use mainly phosphate molecules to stay alive. The facultative anaerobic bacteria take on both breathing and oxygen independent organisms. They do this by breaking down sugars and metabolizing them. By breaking down, or metabolizing these substances, acids, methane, hydrogen sulfide and other substances are released, which the pests are sensitive to. Over time therefore, these pests die off."

### IT WORKS!

Biological soil disinfestation is a three-stage process: first the oxygen-dependent organisms are attacked by aerobic bacteria and then they tackle respectively facultative anaerobic bacteria and strictly anaerobic bacteria, the most complex of pests.

"The more complex the pest, the less we know about exactly how the organisms are cleared up," admits Henk. "By doing more research, we will learn more in due course. Importantly, we can conclude that the treatment does in fact work."

Also the temperature of the soil influences the soil cleansing. Henk: "As the temperature of the soil is increased, the strict anaerobic bacteria find it much easier and are all very active much faster. Instead of the



regular four weeks under the sheeting at twenty degrees, at thirty degrees, we can see significant results after ten days. WUR Bleiswijk has demonstrated this through their trials. From other studies, for example, the fermentation of manure and producing green gas, also anaerobic processes, EHEC-bacterium destruction was reported to be one hundred percent within four days."

### BOOST

The food is the core of the system. Under the name 'Herbie', three types of granular and one liquid variant was produced. What exactly is in it is the secret of the alchemist, but the composition is one hundred percent vegetable.

"Depending on the soil type and the existing pests, we choose a particular food supply, which we have ascertained, will be the most successful given the circumstances."

The food supply is supplied via a spreader and worked into the soil with a rotivator. The soil is then covered and the edges taped. The cost of the food is about a half euro per square meter.

"Steaming is slightly cheaper", agrees Henk, "but is much less effective. After steaming pathogens often return quite quickly. Moreover the soil cleansing method can fall under the GMO-scheme."

"Once the sheeting is removed, many crops grow rapidly," says Henk. "The aerobic bacteria that are present, feed on the anaerobic bacteria and that gives a boost to the soil."

### COATING

As a result of a recent development, soil resetting is becoming even more interesting as a process.

Henk: "Laying and masking the sheeting is a fairly labour intensive job and with outdoor crops, sheeting is susceptible to damage by birds. The sheeting must then be repaired to prevent the oxygen again being drawn into the soil. In crops where a fast soil reset is required, such as chrysanthemums, greater speed is necessary in the process. We are now working to develop a coating which will make foil or sheet laying redundant. Through spreading a kind of clay layer over the soil and keeping it wet, this serves to prevent the soil from coming into contact with the oxygen-rich air. After the soil is sufficiently decontaminated, the coating layer is dug in and breaks down naturally in the soil. We are currently carrying out research to determine which coating is best suited for this purpose."

More information: [www.bodemresetten.nl](http://www.bodemresetten.nl)