



Welcome to vegetableseeds.net.au

March 2015 Newsletter

The worst thing for you to find are pests and diseases (P and D) on your vegetable plant.

In this newsletter we will look at harmful bacterial infections and how to avoid them on home garden vegetable crops.

Agricultural departments all over the World take P and D of plants seriously and try to stop them entering their country with biosecurity and quarantine regulations stopping people importing plant material and seeds which may pose a risk.

However P and D organisms like bacteria are part of the web of life, we exist together. Eventually a P and D outbreak does emerge in a county's agricultural system. When a crop experiences a serious attack by a pest or disease, we use pesticides and if that does not work, as a last resort, we destroy all infected material.



However, there are other ways of managing P and D.

Plants have their own ways of defending themselves and there is a natural balance in nature with pests and diseases, much of this has to do with the soil, plant RNA and DNA which is now being studied in depth.

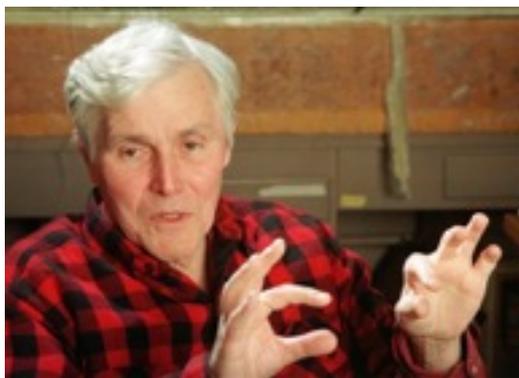
In your vegetable garden you are growing many different varieties of vegetables from all over the World in one place. You can give all your plants the best chances of success by thinking about and using these factors.

Bacteria History

Bacteria were probably the first forms of life. The name comes from the Greek word for little stick or rod, referring to the shape of bacteria.

Antonie Van Leeuwenhoek, a Dutch Microscopist discovered their spherical, spiral and rod shapes in 1676. He wrote a series of letters to the Royal Society in London about his observations.

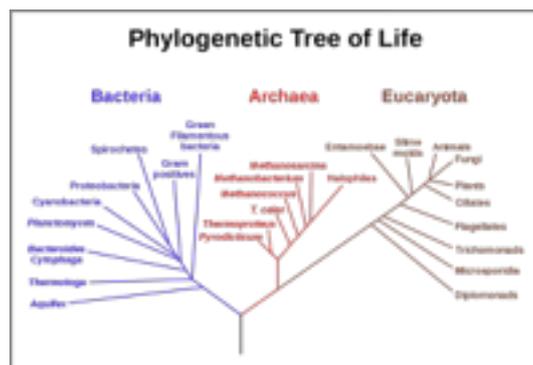
In 1828 Christien Gottfried Ehrenberg used the term Bacterium.



In 1859 Louis Pasteur demonstrated that bacteria was responsible for souring wine and could be destroyed by boiling and then cooling. He then investigated where bacteria came from.

In 1977 Dr Carl Woese researched RNA and bacteria (prokaryotes). He founded a new order called Archaea. These cells, like bacteria have no nucleus, but are now grouped between the bacteria and the plant, animal and fungi kingdoms whose cells do have a nucleus.

Today plant researchers, schools, colleges and universities teach students about the cell at a molecular level and genetics in greater detail than even ten years ago. There are now theories that suggest that the nucleus was once an individual organism and that by some means and at some time millions of years ago, it somehow naturally entered a non-nucleus cell, like bacteria, and became a new organism. This has led to the complex ecological web of life we are part of today. This may sound far-fetched but then so was Darwin's theory not so long ago.



Bacteria (Prokaryotes)

Basically there are many good bacteria in the soil, termed symbiotic, which help a host plant to thrive and prosper, and some bad bacteria termed pathogenic or parasitic which live off and can kill the host plant.

We try to increase the symbiotic type and decrease the parasitic type, the ones that cause diseases in our vegetable crops. All bacteria multiply very quickly.

In this newsletter we are interested in the harmful bacteria.

Harmful plant bacteria

The soil around your living plant roots has good and bad bacteria. Plants are 80%-90% water and they have yummy nutrients that the bad bacteria want. They can enter your plant through plant cells by damaged or broken roots, by wounds in stems and leaves caused by chewing, biting or sucking insects, wind or larger pests from slugs to rabbits. They can get into seed and cuttings. They can also exist in cold warm or dry conditions.

Watering plants creating humid conditions can provide conditions for bacterial entry through the plant pores in leaves, called stomata, overwatering can rot roots where they can enter. Once in your plant the bad bacteria colonise from cell to cell utilising the cells nutrients and damaging plant tissue, blocking your plant's mineral and water transport system and spreading toxins, eventually your plant will get very sick.

Protecting your vegetable plant from bad bacteria

Use Complete Organic Fertiliser (COF) - See newsletter "August 2013 COF and Biochar"

It all starts with your soil whether sandy, silty, clay or loam. Your aim is to strengthen your plant cell walls so harmful bacteria find it harder to get in.

Our little bags of COF may look pretty humble, but the balanced ingredients are a very important part for successful vegetable gardening. COF will provide conditions for the good bacteria to thrive.

Nitrogen

Canola seed meal in our COF supplies nitrogen which is needed for plant proteins.

Excess nitrogen promotes weak cell walls and increased plant growth so in humid conditions, a plant is more vulnerable to bacterial infection.

Our COF has the correct amount of nitrogen.



Potassium

Potassium sulphate in our COF is in the correct amount to strengthen your plant cell walls, too much and you get other problems like calcium deficiency.

In some vegetable plants cell walls are thin, others are thicker but potassium is vital for all of them. Potassium activates 40 enzyme systems for the resistance to disease and drought. By strengthening cell walls harmful bacteria find it harder to get into your plant.

Soft rock phosphate (SRP)

In our COF soft rock phosphate is very readily available to your plant it is important for DNA, energy storage and transfer in cells. It is important for your plant's genetic memory system for reproduction. In other words you are promoting strong healthy plant growth and seeds. It suppresses the harmful bacteria's ability to cause harm.

Typical Analysis w/w	
Phosphorus (water soluble)	0.03%
Phosphorus (citrate soluble)	0.80%
Phosphorus (citrate insoluble)	7-8%
Total Phosphorus (as calcium phosphates)	8-9%
Total Potassium (as inorganic K)	0.7%
Silicon	15-26%
Calcium (as phosphate)	19.3%
Iron	2.0%
Magnesium	4600 ppm
Sulfur	1500 ppm
Manganese	1100 ppm
Chloride	360 ppm
Copper	130 ppm
Zinc	260 ppm
Impurities	
Fluoride	<2%

Calcium

In our COF calcium is needed for your healthy plant growth. Calcium is only taken up by young root tips in soil solution it is very immobile in plant uptake.

Without calcium there will be a breakdown in plant tissues, so harmful bacteria will be a problem. Plants lock up calcium and remove it from the soil, it has to be replaced after a crop is harvested or acidity builds up, slightly acid soil can prevent some bad bacterial infections, like wilt, but too acidic soils reduce the good bacteria.

Calcium deficiency can cause manganese and aluminium toxicity because these will be more readily available to the plant as the soil gets more acidic. It is very important to get the correct

amount of calcium into your soil for healthy plant growth. Our COF has the correct amount of calcium.

Iron

Small amounts of iron in our COF is very important for enzyme systems.

It is used for promoting chlorophyll in your plants which makes stronger cells so more resistant to harmful bacteria.

Zinc

Small amounts of zinc in COF promote growth hormones, root development, strong mature seeds and strong stems.

It also helps your plant produce chlorophyll and carbohydrates, all of which help combat harmful bacteria.

Silicon

Silicon in COF is deposited as silica in the plant cell walls, it strengthens the cell and plant making it more resistant to diseases.

Your happy vegetable plant

There are many more plant elements in COF. Above are some that are important for protecting your plant against harmful bacteria.

Most vegetable plants are sun lovers. Photosynthesis works best if they are in full sun. If all your nutrients are in the correct amounts your plants will be a rich healthy green colour so the higher the light intensity the stronger the plant cells get, the stronger your plant, the more bulk density, higher the yield and goodness for you to eat.

Each plant nutrient in a good COF maintains healthy plant growth, does a different job in your plant and without any one of them the plant would show abnormal growth and make your plant more vulnerable to harmful bacterial attack

Soils which have been leached due to high rainfall or over watering, must have the nutrients replaced or weak plants will result which are prone to disease attack.

Harmful bacteria can affect plants in cool or warm climates but are more prevalent in warm humid environments, in hot houses and outside in late spring, summer and early autumn in cool climates.

Humates

Another material for you to use are soil humates.

It is now believed these could be the link between inorganic and organic matter in evolution.

Humates are important for good soil bacteria and so aid your plants to combat harmful bacteria.



This year we are offering a new product at Inspirations specially formulated by Steve Solomon for you.

Have a look at the ingredients, in trials to date this is showing positive results.

Steve calls this product CIF (Complete Inorganic Fertiliser). We believe this should have a place in vegetable gardening, even though it is not purely organic like the COF.

Unfortunately the weight of COF and CIF make it expensive to sell online, but if you are interested please let us know, we sell both products in 2.5 lt amounts at Inspirations and the CIF in 25kg bags.

PRODUCT NAME	CODE	Kg/lt
Manna	Hybrid Blend Jan 13	
...	...	3,500
...	...	580
...	...	580
...	...	250
...	...	750
...	...	710
...	...	8
...	...	30
...	...	20
...	...	4
...	...	10
...	...	400
...	...	60
...	...	150
...	...	60

Biochar - See newsletter "August 2013 COF and Biochar"

Having used high quality biochar for the past two years I am confident that symbiotic bacteria are present in large numbers where this has been used, all the vegetables I have grown in it have been disease free, have high bulk density, high yields and taste superb.

Plant hygiene



Remove all weeds, and debris like your old harvested plants, and older leaves from vegetable plants regularly.

These all have a place in nature in other parts of the garden but not in your vegetable garden because you are trying to grow so many different plants from so many different regions in one place and harmful bacteria can reside in these materials.

Practice crop rotation. If you don't, the probability of the same crop grown in the same place getting a bacterial infection is very high.

Over-watering cold wet soils in autumn or spring can result in poor root growth and rotting these are ideal conditions for harmful bacteria to thrive. Use clean watering cans and irrigation equipment for watering plants.

Green manures and broad beans - See Newsletter July 2013 Green Manures 2 and June 2013 Green Manures 1

We offer bags of tic beans, lupins, black oats, serratas and mustard seeds as green manures. See previous newsletters.

Broad bean aquadulce, coles dwarf, red epicure, witkiem, purple flowered, paramo can go in from late March.

Disease resistant varieties

Save seed of disease free plants only, otherwise bacterial infections can remain in seed, see photo.



Some of the more recent hybrids, please do not confuse these with transgenic crops, are more resistant to wilts and bacterial spots.

Transgenic seed is not available in Tasmania, there is no need anyway because our vegetable seeds are strong and healthy, suitable for your region and produce good yields.

If you do save or have seed of dubious quality one way of trying to eradicate possible bacterial infection is to treat it with hot water, like Louis Pasteur did.

Of course the viability is then compromised and your seeds need sowing reasonably quickly. However, if you follow the guidelines above you will reduce the probability of harmful bacterial infections.

Spraying the last resort, not the first

Copper hydroxide can control bacterial leaf spots of most of your vegetable plants when seen in the early stages. Do not spray more than recommended otherwise copper toxicity can result.

Happy gardening wherever you may be.



References

Garden Pests, diseases and good bugs by Denis Crawford 2015.

What garden pest or disease is that? By Judy McMaugh 1995.

Pests diseases and disorders of garden plants by Stefan Buczacki and Keith Harris 1981.

Growing vegetables south of Australia by Steve Solomon 2015 edition out soon which we will have at Inspirations and in our online catalogue.