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August 2015 Newsletter

GOING VIRAL

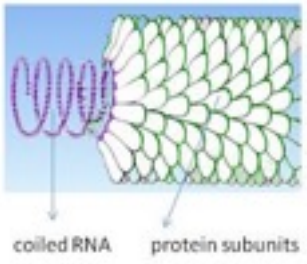
This newsletter is an introduction to plant viruses and keeping up to date with AQIS regulations.

Definitions

Virus literally means poison. It is a disease that can only be cultivated in living tissues.

Plant virus discovery

At the end of the 1800s a Russian plant scientist, D.J. Iwanowski made a remarkable discovery.



He took sap from a diseased stunted tobacco plant (same family as the tomatoes, egg plants, potatoes and the weed nightshade) and inoculated a healthy tobacco plant with this sap. The healthy plant developed the same symptoms as the diseased one.

He wanted to make sure that this was not a bacterial infection so he repeated the experiment but this time passed the sap through a fine filter that visible bacteria could not pass through. The healthy plant contracted the disease again, so it could not be bacteria.

This was the discovery of the ‘Tobacco mosaic Virus’ .

What does a plant infected with a virus look like?

Look at the leaf of a plant in active growth in late Spring/Summer.

If it has yellow mottled leaves it could be a virus, but this could also indicate a mineral deficiency, other infection or just the leaf colour of that plant so we need more clues.

If the plant has smaller leaves than it should have, does not appear to be growing, has deformed stems, and smaller deformed fruit and is stunted and looks like it is dying, you could deduce that it probably has a virus.

Image T.A. Zitter Cornell University and J.F. Murphy Auburn University.

Where do they come from?

Viruses are a third major category of life. They lack cells unlike bacteria and higher life forms.

They look machine-like under the electron microscope. They exist as ‘Virions’ which are tiny infectious particles which can be likened to cell constituents rather than cells.

Insects act as ‘carriers’ and often spread viruses from plant to plant, they are referred to as ‘vectors’.

The infected plants are called ‘hosts’. Once a ‘host’ is infected the virus replicates itself by copying the host’s materials - very nasty.

The more weeds you have that harbour specific pests the more likely it may be to get a virus infection. Poor soil and nutrition can also add to the problem because the plants get weaker and more vulnerable to disease.

Image www.ars.usda.gov

How do you control a virus?

This is very difficult, most gardening literature recommends removing and destroying infected plants. This is sound advice.

Prevention

1. **Research and development**. Selective breeding of newer cultivars using conventional breeding techniques results in plants that are either ‘highly’ resistant to or ‘moderately’ resistant to viruses, note that the wording is not ‘completely’ resistant to, this is because

viruses have an annoying habit of mutating and if these plants are in poor growing conditions as mentioned above even they can succumb to infection.

2. Use only quality virus free seeds or plants.
3. Remove all weeds which act as hosts for insect pest populations.
4. Good soil health.
5. Inoculation and gene manipulation, this is beyond the scope of this newsletter.

Seed businesses and Australian Quarantine Inspection Services (AQIS)

New vegetable cultivars with high disease resistance are offered by big seed companies every year. Quarantine recognises these as virus-free when they have a phytosanitary certificate to prove it.

Seed businesses understand quarantine regulations. If seed has the correct certificates they have control of much of the market. It is untrue that all heritage vegetable cultivars carry virus infections, many do not, but it is hard to get certificates for them, and expensive.

International markets insist on quality disease-free produce. Quarantine helps protect the seed industry and growers - this is a positive thing.

Seeds that have the correct phytosanitary certificates used by a grower for export of the crop are certified disease-free. This means seed companies can move seeds more easily and international trade is easier.

Having said this, procedures for seed companies and growers can be frustrating too. However there are some nasty disadvantages for the home gardeners and small growers from ‘free trade agreements’.

1. The range of seeds gets limited for the home gardener, so the same cultivars appear over and over again in different home garden seed catalogues.
2. Some seeds can no longer be purchased from anywhere in the world without the risk of them being confiscated by quarantine.

3. Seed savers may not be able to send seeds to each other without the risk of losing their seeds.
4. A cultivar that you have just got used to and works well in your region suddenly disappears off the market and you have to trial and grow a new one all over again.

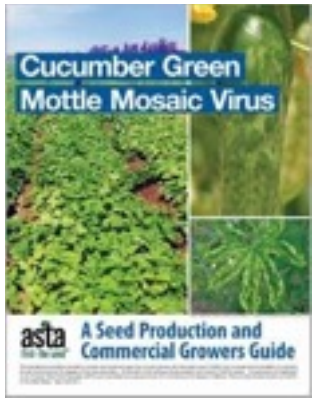
An example of regulations

To import seeds of the Cucurbitaceae family into Australia in 2015 you need phytosanitary certificates which are expensive and not always easy to get. This makes it hard to import cucumber, melon, water melon, squash, pumpkin and zucchini seeds.

If AQIS stop them at their port of entry without certificates, they will ask your permission to either destroy them or send them back, at a cost.

They may ask if you want to pay to get them tested at their recognised labs. The sad fact is that the seed you purchased probably does not have a virus if it comes from a reputable seed supplier.

AQIS currently need virus-free certificates for the following:



Cucumber green mottle mosaic virus (recently added by AQIS and certification of virus-free seed is needed. Very hard because a lot of seed suppliers in other parts of the World DON'T test for this virus. It was found in the Northern Territory in 2014 and in 2015 is no longer feasible to contain in this State).

Cucumber yellow veining virus

Cucumber yellow stunting virus

Zucchini yellow mosaic virus

Image seedquest.com from ASTA newsletter

Quarantine Tasmania does currently allow cucurbitaceae seeds into the State. The cool climate reduces the insect vectors over most cold winters reducing the risk of infection of crops and hence seeds, the catch is to get your seeds here past Victorian quarantine.

There's always the possibility that a plant virus infection could occur, but as long as you are not overcrowding crops, remove all weeds that harbour insect pests like aphids and leaf hopers, control insect pests (not the good bugs), pay special attention to soil health and only use virus-free seeds and plants, the risks are reduced.

At Inspirations we make every effort to supply virus-free seeds for cool climate regions.

At Cressy we are growing seed crops and hopefully in 2016 we will finally be able to offer the first seeds I have mentioned in previous newsletters plus many more selections.

This takes time but we want to make absolutely sure we have enough seed to supply everyone. When it happens, it will be the result of growing a few plants for seeds some years ago to producing several kilograms of seed today.

If you are interested in reading more about plant viruses and bacterial viruses I would recommend:

"Botany: An introduction to plant Biology", T E Weier. M G Barbour C R Stocking T L Rost, sixth edition published by John Wiley and sons New York. 1982 isbn 0-471-86840-x.

We now have our first vegetable seedlings in stock at Inspirations, suitable for planting out in August/early September grown from our seeds by the Northern Support School.

These are fully hardened off and ready for planting now the days are lengthening.

It is still too cold in some areas to sow seeds but they can be raised in punnets with 17 degrees C bottom heat, see our planting and sowing guide.

Picture of Katie Cundall at Ravenswood Community Garden loading truck with seedlings

We have changed our seed packets.

The seeds are now zip locked plastic bags.

Please store your seeds out of direct sunlight in a cool place with low humidity, seed can last from two years to seven years depending on what it is but they are living organisms and so do have a life span.

You can now find Inspirations Garden Centre on Facebook

Have a look at

Living Better With Less Group

Suburban Jubilee

Urban Farming Tasmania

Happy gardening wherever you may be.