



April 2011



# Newsletter



## *Special issue: crown gall*

### What is crown gall?

Crown gall, or *Agrobacterium Tumefaciens*, severely affects growth and production. *Agrobacterium Tumefaciens*, which also affects roses, is a negative bacterium. It is prevalent across the globe and can infect both ligneous and herbaceous plants. The bacteria cause the formation of tumours or galls at the base of stems or on the roots. Contaminated plants display stunted growth and reduced yield.

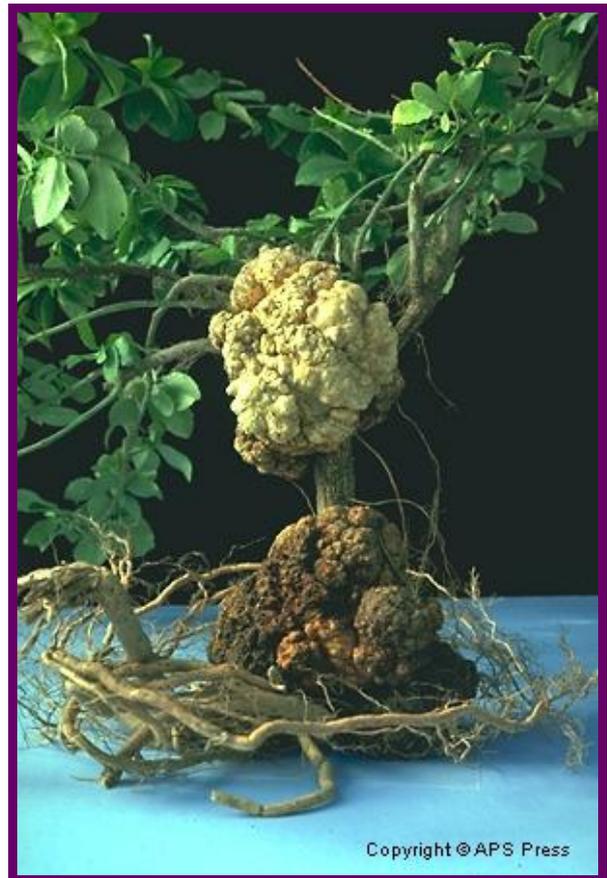
### Symptoms

Symptoms caused by the bacteria are generally observed around tissue wounds. In their initial stage, the resulting tumours are white, soft and fairly small. As they grow larger, the outer cells turn dark brown and the surface of the tumours become hard and rugged.

Multiple tumours can form on a single plant. They can also continue to grow even once bacteria are not present in the plant matter anymore. Although plants do not die as a direct result of *Agrobacterium Tumefaciens*, it can cause enormous damage. Besides causing tumours, which absorb much of a plant's energy, the bacteria can affect plant physiology in such a way that infected plants produce small chlorotic leaves. Plants can also be robbed of their resistance to disease and can become vulnerable to adverse environmental conditions.

*Agrobacterium Tumefaciens* is a rod-shaped bacterium that is found in all soil types. Virulent strains of *Agrobacterium Tumefaciens* possess one or more plasmids (DNA strands). A plasmid is a circular DNA molecule outside the cell core. Certain genes on these DNA molecules can be introduced to the cells of host plants. Plant cells are then

activated by formation of tumour cells. This is also known as the Ti-plasmid (tumour inducing plasmid). Without this plasmid, the bacteria are not virulent. There are also strains of *Agrobacterium* that infect root systems. These are known as *Agrobacterium Rhizogenes*.



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### Epidemiology

Strains of *Agrobacterium* – including virulent strains – are common in all types of soil. These bacteria can live saprophytically without host plants for a number of years. This means that

virulent bacteria are present in virtually all soil. *Agrobacterium Tumefaciens* infection can only take place when plants have relatively fresh tissue wounds. The bacteria are attracted by phenolic compounds released by plants in reaction to tissue wounds. Such wounds could be the result of cultivation activities, grafts, damage, vegetative reproduction, or could be caused by insects and nematodes. Once the bacteria enter a plant, they will stimulate (Ti-plasmid) the plant cells, which will split at a high rate. As the tumour cells increase in number and size, pressure on the surrounding plant matter increases and it cracks or breaks, providing yet another opportunity for infection. Older tumours become woody and hard because the vascular bundles in such tumours no longer function.

#### **Decontamination agents not the solution**

Due to pressure of circumstance, many operations apply decontamination agents, such as chlorine solutions, hydrogen peroxide and other chemical

substances. They do this to lower the rate of infection, while also putting numerous hygiene measures in place to prevent and/or reduce contamination. Such solutions are not lasting and must be repeated on a regular basis. If stopped, the contamination returns. Chemical substances combat or suppress the disease, but their effect is only temporary and never lasting.

#### **Orgentis offers you a lasting solution**

Orgentis has developed a treatment method that solves this problem for good. The treatment that we promote involves the administering of positive bacteria and fungi, antagonists and protective fungi. At various operations (references available), this method has led to the complete elimination of contamination, as well as full recovery of growth and production. This sustainable and environmentally-friendly treatment conforms to all environmental requirements and only costs a few cents per m<sup>2</sup>.



Sint Martinusstraat 151  
2671 GK Naaldwijk  
The Netherlands  
Tel. +31 174 614080  
info@orgentis.nl  
www.orgentis.nl