FRESH NOTES
A TECHNICAL UPDATE PUBLISHED BY HORTGRO SCIENCE

An update to the freshNOTES 200 of October 2022 on galls on apple nursery trees

Dear growers and other industry stakeholders,

We would like to share with you progress that's been made in determining the cause of galls on apple nursery trees since the last FreshNotes of October 2022.

First the not so good news. Despite continued efforts, we have not been able to definitively identify the specific organism responsible for the galls. Pathogenic *Agrobacterium tumefaciens* was identified in some instances, but not at a frequency that our researchers believe is sufficient to conclude that is the cause. However, as noted in previous communications, Agrobacterium is remarkedly difficult to isolate from apple galls.

The more "positive" news is that two completed glasshouse trials by Prof Adele McLeod and Sonja Coertze at the Plant Disease Clinic at Stellenbosch University very strongly suggest the involvement of a pathogen. In the first trial, wounded MM.109 and G.778 liners were planted in soil obtained from a site where a high incidence of galls occurred on nursery trees. Half the soil was pasteurized, thereby killing all organisms in the soil, while the rest of the soil was left untreated as control. Galls developed on some of the wounded liners planted in the control soil while no galls developed in the pasteurized soil where all soil organisms were killed. More G.778 liners developed galls and these galls were also larger suggesting a difference in rootstock susceptibility to the pathogen. This is consistent with our observations in previous FreshNotes.

In the second trial, G.778, G.210, M.7 and MM.109 liners were planted in sterile growth medium. A flap of bark was removed on the shank of each plant. In treatment plants, a droplet of saline buffer from macerated gall tissue was placed onto the wound along with a small piece of gall, which was then wrapped with parafilm. In the control plants, only a droplet of sterile saline buffer was placed on the wound before wrapping with parafilm. Galls developed on some, but not all the G.778, G.210 and MM.109 plants that was inoculated with gall material. No galls developed on inoculated M.7 trees or on control plants that were not inoculated with gall material. The relatively low frequency of gall formation is likely due to the very low incidence of the pathogenic organism within the galls used for the inoculation. For this reason, we cannot make any conclusion on the relative sensitivity of rootstocks based on the results of this particular trial. However, the results indicate the transfer of an organism via the gall material to the wounded tissue resulting in gall formation.

Fig 1. Gall development on G.210 plants inoculated with gall tissue.

Taken together, the results of these two trials suggest that the galls on apple nursery trees are caused by a pathogen, most likely but not absolutely certain to be *Agrobacterium tumefaciens*. Despite lacking 100% bulletproof evidence that the galls are caused by pathogenic *Agrobacterium tumefaciens*, the results indicate that the best course of action in the nursery and on farm remains – as stated in earlier FreshNotes - treating the galls as if caused by a pathogen, likely to be *Agrobacterium tumefaciens* or a similar organism that causes infections through wounds.