Grower Summary

CP 106

Pre-colonisation of strawberry runners and tray plants with arbuscular mycorrhizal fungi to manage Verticillium wilt

Annual 2015

Disclaimer

While the Agriculture and Horticulture Development Board seeks to ensure that the information contained within this document is accurate at the time of printing, no warranty is given in respect thereof and, to the maximum extent permitted by law the Agriculture and Horticulture Development Board accepts no liability for loss, damage or injury howsoever caused (including that caused by negligence) or suffered directly or indirectly in relation to information and opinions contained in or omitted from this document.

The results and conclusions in this report may be based on an investigation conducted over one year. Therefore, care must be taken with the interpretation of the results.

Use of pesticides

Only officially approved pesticides may be used in the UK. Approvals are normally granted only in relation to individual products and for specified uses. It is an offence to use non-approved products or to use approved products in a manner that does not comply with the statutory conditions of use, except where the crop or situation is the subject of an off-label extension of use.

Before using all pesticides check the approval status and conditions of use.

Read the label before use: use pesticides safely.

Further information

If you would like a copy of this report, please email the AHDB Horticulture office (hort.info.@ahdb.org.uk), quoting your AHDB Horticulture number, alternatively contact AHDB Horticulture at the address below.

AHDB Horticulture,

AHDB

Stoneleigh Park

Kenilworth

Warwickshire

CV8 2TL

Tel – 0247 669 2051

AHDB Horticulture is a Division of the Agriculture and Horticulture Development Board.

Project Number:	**CP 106**
Project Title:	**Pre-colonisation of strawberry runners and tray plants with arbuscular mycorrhizal fungi to manage Verticillium wilt**
Project Leader:	Professor Xiangming Xu East Malling Research
Industry Representative:	Mrs Marion Regan
Report:	Annual Report 2015
Publication Date:	23 October 2015
Previous report/(s):	N/A
Start Date:	October 2013
End Date:	September 2016
Project Cost:	£67,650

GROWER SUMMARY

Headline

- The effect of pre-colonisation of plants with arbuscular mycorrhizal fungi (AMF) on Verticillium wilt development depends on both cultivar and AMF species used.

Background and expected deliverables

Strawberry wilt, caused by *Verticillium dahliae* Kleb., can reduce yield by up to 75%. For many years, soil was routinely fumigated with methyl bromide until this was banned by the 1994 Montreal Protocol which became effective in the UK in 2006. Extensive effort has gone into finding alternatives. The incorporation of green manures that release volatile fungitoxic compounds, so-called biofumigation, shows promise as a component of a disease management strategy.

In a recent Defra funded Horticulture LINK project, a group of scientists led by EMR demonstrated that lavender waste can effectively reduce Verticillium wilt severity on strawberry and identified three key terpenoids responsible for the observed suppressive effect. In a follow-on Innovate UK project, EMR is leading a consortium to investigate whether pelletised lavender waste and microencapsulated terpenoids can effectively control strawberry wilt. Results so far, however, indicate limited efficacy of these products. Therefore, other measures in addition to the biofumigation-based approach are needed.

Arbuscular mycorrhizal fungi (AMF) are ubiquitous in terrestrial ecosystems where they are major components of the soil microbial biomass. Mycorrhizal associations are multi-functional, assisting the plants in nutrient acquisition, water uptake, and protecting roots from pathogens. AMF have been shown to increase plant tolerance to *V. dahliae* on several crops, including pepper, strawberry and cotton. However, the beneficial effects offered by AMF can vary considerably.

A recent publication showed that one particular AMF strain significantly reduced strawberry wilt when plants were inoculated at planting. The extent of AMF root colonisation and their beneficial effects to plants are however also dependent on particular AMF strains and strawberry cultivars. Ensuring sufficient colonisation of strawberry planting materials (runners or tray plants) before transplanting may further increase the benefit of AMF-symbiosis through physical exclusion of potential colonisation sites for soil pathogens.

This project aims to find out if AMF pre-colonised planting material leads to reduced incidence or severity of wilt on strawberry.

Summary of the project and main conclusions

To date, we have shown that AMF can colonise *in-vitro* derived plantlets in vermiculite and plants from runner tips in a peat/perlite based substrate. The high moisture conditions during weaning/tipping did not prevent AMF from colonising roots. The effects of the symbiosis on plant growth were variable. AMF can survive in cold stores in colonised roots for several months.

All AMF species tested on the tissue culture derived plant 'EM1996' increased the crown diameter of the plantlets but this increase was only significant with *R. irregularis*. For the runner tip-derived plants, the effects of AMF inoculation on crown diameter varied greatly with specific combinations of AMF and cultivars. There is some evidence of reduced wilt incidence for AMF-colonised plants, which needs to be confirmed in 2015.

Financial benefits

It is too early to speculate the financial benefits.

Action points for growers

This is the second year of the project. Although there are a few interesting results, it is still too early to identify action points for growers as further confirmatory studies are needed over the next twelve months.