



Agriculture & Horticulture  
DEVELOPMENT BOARD



# New Project

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## **BOF 69**

Narcissus: Suppression of Fusarium basal rot using composts amended with specific biocontrol agents

<b>Project Number:</b>	BOF 69
<b>Project Title:</b>	Narcissus: Suppression of Fusarium basal rot using composts amended with specific biocontrol agents
<b>Project Leader:</b>	Professor Ralph Noble
<b>Contractor:</b>	East Malling Research
<b>Industry Representative:</b>	Adrian Jansen, Lingarden Bulbs Ltd
<b>Start Date:</b>	1st July 2011
<b>End Date:</b>	30th June 2012
<b>Project Cost:</b>	£11,686

#### **Project Summary:**

- Evaluate control of Fusarium basal rot of narcissus using composts amended with specific Trichoderma isolates and other commercial biopesticides (fungal and bacterial products) in a pot bioassay experiment.
- Monitor the populations of Trichoderma and Fusarium propagules in the compost amended soil and non-amended soil.
- Compare results obtained with amended composts with those obtained with biocontrol (*Trichoderma*, *Clonostachys*, *Pseudomonas chlororaphis*) and chemical (thiabendazole and prothioconazole) bulb treatments.
- Disseminate results to the narcissus industry and make recommendations for future pot and field-scale experiments.

#### **Background & Objectives:**

- Basal rot control remains an intractable problem of narcissus in the UK. It is a disease of warm summers, and is likely to increase with global warming.

- Current chemical bulb dips for controlling narcissus basal rot are being withdrawn (formaldehyde), curtailed, expensive, prone to pathogen resistance (thiabendazole), and ineffective over several seasons.
- Varieties of narcissus that show resistance or tolerance to *Fusarium* basal rot do not have the same quality attributes of susceptible varieties, and breeding new varieties is too long-term.
- Project FV 358 showed that under high disease pressure in a pot experiment, compost amended with *Trichoderma viride* S17A and incorporated in soil at 25% reduced *Fusarium* in onion plants by 48% compared with the soil control. This is a higher level of disease control than that achieved with control of white rot in pot experiments (*Trichoderma* compost applied at 5 tonnes/ha was effective in controlling white rot in the field).
- The technology has been used at WHRI for amending compost with the Koppert product undergoing registration, Trianium (*T. harzianum* T22). GlioMix (*Gliocladium*) and Endofine (*Clonostachys rosea*) are also soon to be registered but these products have not been tested for control of *Fusarium*.
- Tests in Australia and New Zealand have shown that the products Tenet (*T. atroviride*) and Unite (*T. harzianum*) can control basal rot when applied as a spray to the soil during planting.
- Following application to soil, *Trichoderma* can persist in the field and control white rot in onions from one year to the next. This would avoid the need for repeated applications of compost amended with *Trichoderma* to a longer term narcissus crop.
- Bacterial biocontrol products Cedomon (*Pseudomonas chlororaphis*) and Serenade Soil (*Bacillus subtilis* QST 713) have controlled soil-borne diseases of other crops caused by *Fusarium* species, when applied as treatments to seed or at planting.
- The Bayer fungicide Rudis (prothioconazole) is registered for use as a bulb dip treatment in the Netherlands where it has been found to give good control of basal rot in one-year Narcissus 'Tete-a-tete' varieties.

#### Commercial Objectives

- To extend the efficacy of composts amended with *Trichoderma viride* from the control of Allium white rot and *Fusarium* basal rot of onion to the control of *Fusarium* basal rot of narcissus.
- To examine the efficacy of other commercial biopesticide products (including fungal and bacterial biocontrol products) applied with composts in controlling basal rot of narcissus.
- Monitor the populations of *Trichoderma* and *Fusarium* propagules in the compost amended soil and non-amended soil.

- Compare disease control efficacy with that obtained with bacterial biocontrol products or fungicides applied as bulb treatments.
- Disseminate results to the narcissus industry and make recommendations for future pot and field-scale experiments.

### **Benefits to industry**

- New methods using composts colonised with *Trichoderma viride* or other biocontrol agents will be available to the UK narcissus industry for *Fusarium* basal rot control that persists over several seasons. Infested land will be brought back into production.
- Application of composts should increase the water holding capacity and improve water conservation of light sandy soils during periods of low rainfall; chemical inorganic fertiliser requirements would also be reduced - recent increases in the cost of K and P fertilisers mean that the nutrient value of the compost is over £100/ha.
- Information will be obtained on the relative efficacy of biocontrol amended composts, and biocontrol and fungicide bulb treatments in controlling basal rot.
- Basal rot control using a new bulb fungicide treatment (Rudis) will be examined.

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