

Summary of the Cut Flower Centre (CFC) trial examining the susceptibility of a wide range of different varieties of column stocks (*Matthiola incana*) to fusarium wilt

Lyndon Mason, CFC Project Manager, October 2013

Introduction

Fusarium oxysporum is a major problem of column stocks. Recent trials examining biological and chemical control options have found no reliable way of controlling the disease and most growers still have to rely on soil steaming as the main control measure. However, even plants grown in steamed soil can suffer from severe fusarium wilt problems. Growers have

observed obvious varietal differences in terms of disease susceptibility under commercial production conditions, and so this trial was designed to investigate the varietal susceptibility of a wide range of commercially grown varieties of column stocks to assist growers in their management of the problem.

Cultural and cropping information

The trial was planted in a commercial glasshouse in week 24 at a spacing of 64 plants/m². The glasshouse had a history of fusarium wilt and was steamed before the first commercial crop was planted, the trial then directly followed this commercial crop. The varieties grown are listed in Table 1 and consist of the complete range of varieties available (as well as some coded trial varieties) from both Combinations and Florensis young plant suppliers. Four replicates of 85 varieties were planted giving a total number of 340 plots, with each plot containing 16 plants.



Column stocks trial being planted up



Established plants showing the first signs of flower colour

The main growing period of the crop coincided with the very warm summer of 2013 which meant that the plants were stressed and hence more vulnerable to the disease, making this trial a 'worse-case scenario' situation. The trial was assessed in week 31 after all the marketable stems had been harvested. The number of stems in each plot infected with obvious fusarium wilt was counted as well as the total number of unmarketable stems which remained (Figure 1).



The trial at the point of harvest



Impact of fusarium wilt on the plants

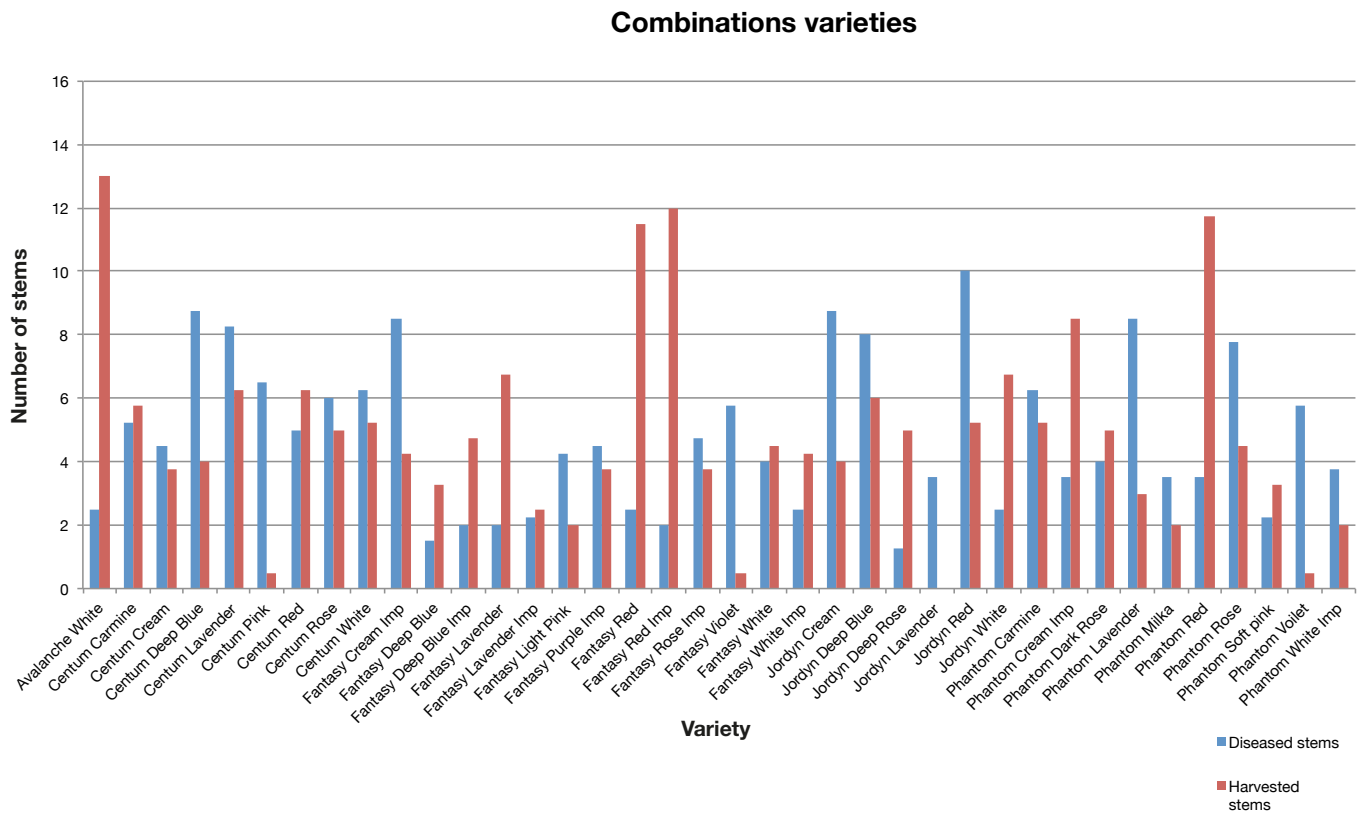
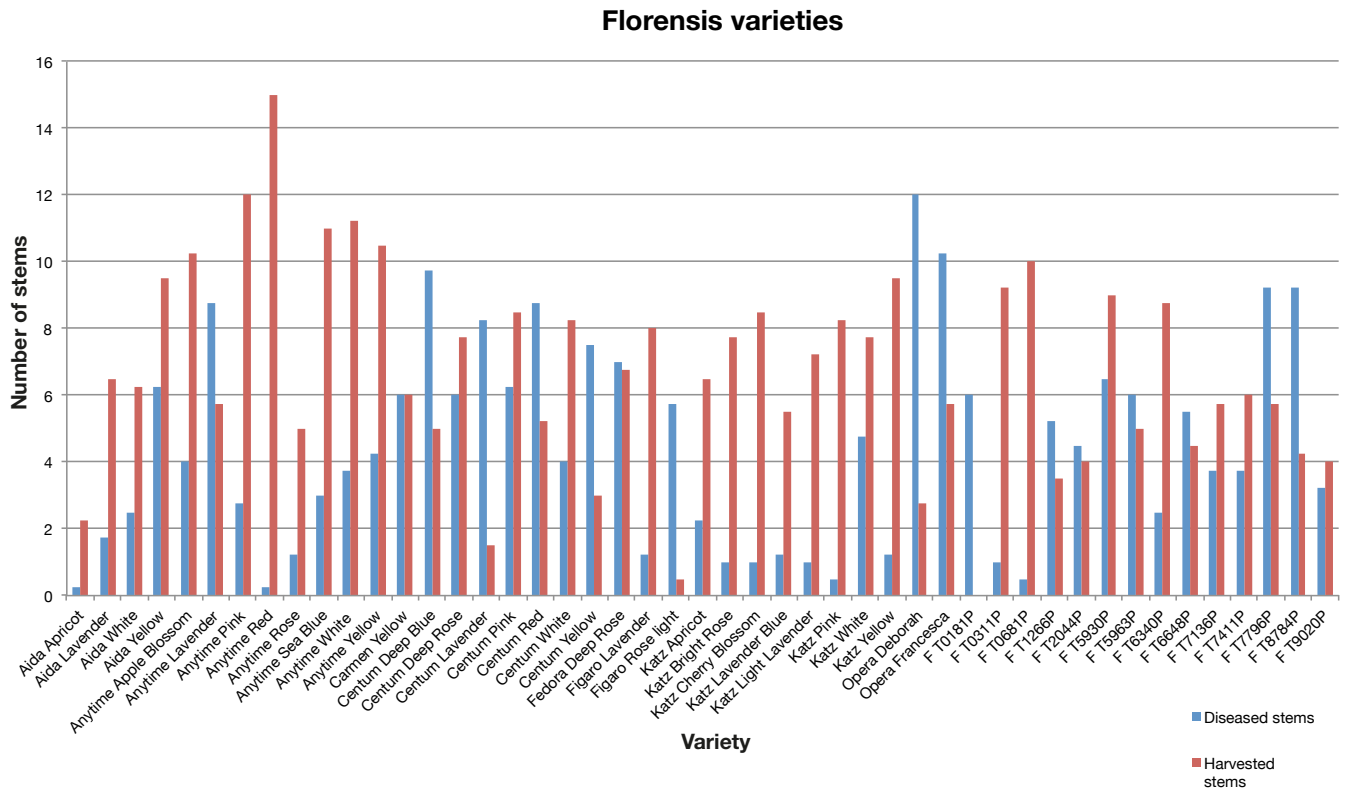
Growers had an opportunity to view the trial as part of the CFC Open Day on the 1 August 2013.

Table 1. List of column stocks varieties by supplier included in the trial

Combinations	Florensis
'Avalanche White'	'Aida Apricot'
'Centum Carmine'	'Aida Lavender'
'Centum Cream'	'Aida White'
'Centum Deep Blue'	'Aida Yellow'
'Centum Lavender'	'Anytime Apple Blossom'
'Centum Pink'	'Anytime Lavender'
'Centum Red'	'Anytime Pink'
'Centum Rose'	'Anytime Red'
'Centum White'	'Anytime Rose'
'Fantasy Cream Improved'	'Anytime Sea Blue'
'Fantasy Deep Blue'	'Anytime White'
'Fantasy Deep Blue Improved'	'Anytime Yellow'
'Fantasy Lavender'	'Carmen Yellow'
'Fantasy Lavender Improved'	'Centum Deep Blue'
'Fantasy Light Pink'	'Centum Deep Rose'
'Fantasy Purple Improved'	'Centum Lavender'
'Fantasy Red'	'Centum Pink'
'Fantasy Red Improved'	'Centum Red'
'Fantasy Rose Improved'	'Centum White'
'Fantasy Violet'	'Centum Yellow'
'Fantasy White'	'Fedora Deep Rose'
'Fantasy White Improved'	'Figaro Lavender'
'Jordyn Cream'	'Figaro Rose light'
'Jordyn Deep Blue'	'Katz Apricot'
'Jordyn Deep Rose'	'Katz Bright Rose'
'Jordyn Lavender'	'Katz Cherry Blossom'
'Jordyn Red'	'Katz Lavender Blue'
'Jordyn White'	'Katz Light Lavender'
'Phantom Carmine'	'Katz Pink'
'Phantom Cream Improved'	'Katz White'
'Phantom Dark Rose'	'Katz Yellow'
'Phantom Lavender'	'Opera Deborah'
'Phantom Milka'	'Opera Francesca'
'Phantom Red'	FT0181P
'Phantom Rose'	FT0311P
'Phantom Soft pink'	FT0681P
'Phantom Violet'	FT1266P
'Phantom White Improved'	FT2044P
	FT5930P
	FT5963P
	FT6340P
	FT6648P
	FT7136P
	FT7411P
	FT7796P
	FT8784P
	FT9020P

Results

Figure 1. Harvested and diseased stems in a range of column stocks varieties tested in the trial



Summary

Due to the uneven occurrence of the pathogen in the soil and the unpredictable nature of disease expression, the results of this trial have to be interpreted with caution. With this in mind the following observations have been made from the results of the trial:

- None of the currently available range of column stocks show total resistance to *Fusarium oxysporum*.
- As observed in commercial crops, some varieties such as 'Centum' (especially 'Deep Blue') and 'Opera Deborah' and 'Fedora' were highly susceptible to the disease although in this trial the Florens range of 'Centum' seemed more susceptible than the Combination range. This result needs to be investigated further.
- The 'Katz' series was the least susceptible to fusarium wilt but this could be partially due to the high number of plants with single flowers, which from previous experience rarely express disease symptoms.
- The Combinations variety 'Fantasy Red' and 'Fantasy Red Improved' would seem worthy of further investigation because they achieved a high percentage of marketable stems with a low level of disease expression.
- As a series, 'Anytime' showed a low susceptibility to fusarium wilt, combined with a high proportion of marketable stems. The exception being 'Anytime Lavender'. These trial observations were reinforced in 2013 by a late commercial crop grown in unsteamed soil with a history of the disease. Also, on a number of nurseries in 2013, a late planted crop of 'Anytime' initiated flowers despite the excessive heat of April and July whereas other varieties including 'Centum' remained in vegetative growth.
- Some varieties showed a low level of fusarium wilt but a low number of marketable stems (usually less than 50%) including 'Aida White' and 'Figaro Lavender'. Over the past few years these varieties have been shown to perform very poorly in unsteamed soils and this observation was confirmed by the trial.
- Some of the new coded column stocks varieties, such as FT0311P and FT1266P, showed promise expressing a low level of disease whilst having a high number of marketable stems; whereas others such as FT7796P and FT8784P appeared to be highly susceptible to fusarium wilt.

Conclusion

Fusarium oxysporum is still the single most troublesome problem of column stocks resulting in very high crop losses in some situations. It is a very aggressive pathogen and in cases of extreme disease pressure it is likely to attack all of the current commercially available varieties. However, this trial has confirmed earlier grower observations that there is a considerable variation in varietal susceptibility. These findings will help growers to plan their future cropping programmes based on their individual nursery disease risk, the sterilisation

technique used, time of year etc. The CFC will continue to liaise with both the industry and plant propagators in order to further develop some of the findings of this trial, especially in relation to some of the more promising coded varieties that are not yet commercially available. Suggestions from industry have also indicated that some of the traditional older varieties such as 'Anthony' and 'Cleopatra' should be re-examined in order to determine their susceptibility to the disease, this will be an area of further work for the CFC in 2014.

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**Horticultural
Development
Company**

Stoneleigh Park
Kenilworth
Warwickshire
CV8 2TL

T: 024 7669 2051
E: hdc@hdc.org.uk
Twitter: @HDCtweets

www.hdc.org.uk

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Agriculture and Horticulture
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