Grower Summary

TF 203

Apple: Studies on *Fusarium* species causing core rots and storage rots

Final 2013

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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.

HDC is a division of the Agriculture and Horticulture Development Board.

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Project Title:	Apple: Studies on *Fusarium* species causing core rots and storage rots
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Contractor/(s):	East Malling Research
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Further information

If you would like a copy of thia report, please email the HDC office (hdc@hdc.ahdb.org.uk), alternatively contact the HDC at the address below.

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GROWER SUMMARY

Headline

- *Fusarium tricinctum* was identified as the main species of *Fusarium* responsible for mouldy core in UK apples.

Background and expected deliverables

HDC project TF184 (which studied mouldy core) identified *Fusarium* spp. as the main fungal species responsible for core rots in both the varieties Cameo and Bramley. In HDC project TF193, *Fusarium* species were also shown to be responsible for storage rots in Bramley, causing stalk, cheek and eye rots, particularly in longer term stored Bramley, where they could account for around 30% of the rotting (actual losses due to rots 2-10%). Several species of *Fusarium* were isolated from core rots and post-harvest rots, but the actual species were not identified.

Several *Fusarium* species, especially *Fusarium avenaceum*, are also responsible for ear blights in cereals where they produce a range of mycotoxins and cereal products are routinely screened for these to see if they exceed strict EU health limits.

Apple rots caused by *Fusarium* spp. appear to be increasing in incidence in other countries in Europe. Recent investigations on wet core rots on apple in Slovenia (varieties Gloster, Jonagold and Fuji), identified *F. avenaceum* as the main cause of the rots and showed high levels of mycotoxins present in apples with wet core rot (Sorensen *et al*., 2009). Recent advances in *Fusarium* taxonomy based on molecular techniques mean that identification of *Fusarium* species is relatively straight forward. The purpose of this project was to identify the main *Fusarium* species responsible for core rots and post-harvest rots in apples.

Summary of the project and main conclusions

Isolates of *Fusarium* were obtained either from fruit rots collected during apple rot surveys in 2010 / 2011, 2011 / 2012 and 2012/ 2013, or from fruit collected from orchards of the varieties Bramley or Cameo in Kent, Cambridgeshire and Suffolk in August 2012. Rots were isolated on Potato Dextrose Agar. A total of 120 isolates were collected. Species of *Fusarium* were identified by DNA analysis. DNA was extracted from the fungal mycelium and sequenced for a particular region. The resulting sequences were compared to *Fusarium*

databases available on the internet to identify the species. Almost all *Fusarium* isolates were identified as *F*. *tricinctum* species complex 1-a which is closely related to *F. avenaceum*.

Mouldy core of apple is undetectable until the fruit is cut open or consumed and in the case of processed apple, may never be detected. Further work is required to understand the epidemiology of *Fusarium* in apple orchards to reduce its incidence in the future.

Financial benefits

Apples used for processing and in particular for juice production, are generally routinely checked for the mycotoxin patulin produced by certain species of *Penicillium*. *Fusarium* species have been shown to cause core rots and post-harvest rots in apples, particularly Cameo and Bramley. In this project, the *Fusarium* species in apple has been identified as *F*. *tricinctum*. This study was a preliminary study but obviously the results obtained are potentially significant for the fruit industry. It is important that further work is funded to develop methods to manage and control the fungal rot so that future action can be planned.

Action points for growers

- Apple varieties susceptible to core rots such as Bramley and Cameo should be treated with Bellis (pyraclostrobin + boscalid) or Switch (cyprodonil + fludioxonil) during blossom and petal fall to minimise the risk of *Fusarium* rots.