Grower Summary

FV 366

Parsnip: An Improved understanding of root blemishes and their prevention

Annual 2011

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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.

Further information

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

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Headline

- A wide range of skin blemish symptoms were observed on root samples and not all were associated with the major fungal pathogens of parsnip.

- A range of brown spotting and skin symptoms were linked to various Fusarium species.

Background and expected deliverables

Various root blemishes continue to downgrade the quality of parsnip crops and cause economic damage in some seasons. Up to 80% crop losses were reported in some crops in the 2009/2010 season. The main cause or causes of some of these root blemishes are not known but it is considered that fungal or other root pathogens maybe involved.

There are several potential pathogens capable of causing various blemishes, rots & cankers on roots that have been identified in previous studies but their relative importance in specific situations is not clear and has not been fully investigated.

The range of pathogens encountered can vary between cultivars on the same site (Gladders, 1997) and this increases the problem. Large roots are often more severely affected than small roots and could be because the crown is more exposed and larger roots can have growth cracking.

Black cankers are generally thought to be a result of infection by *Itersonila pastinaceae* or possibly *Mycocentrospora acerina* (Davis & Raid, 2002). *Phoma complanata* has been associated with brown cankers previously though *Cylindrocarpon destructans,* a relatively common soil-inhabiting fungus, may also be involved in some situations.

The orange-brown cankers which have been reported more recently have not been fully investigated and the main cause has not been found. Also, the 'cavity spot'-like symptoms which occur in this crop, unlike in carrots, have not been formally confirmed to be caused by *Pythium* spp. or other specific pathogens (Gladders,1998).

The identification of the various root blemish symptoms in the field is not entirely reliable, especially using visual inspection alone. Detailed laboratory examination is therefore required to help identify and elucidate primary causal organisms or other factors involved. Hopefully it will be possible to produce a factsheet to help growers and their advisors quickly identifiable the primary cause of root blemish in this crop and hence instigate an early and preventative control programme.

Summary of the results and main conclusions

A large number of samples were collected from different parsnip crops and received by both STC and ADAS during 2010. A wide variety of skin blemish problems were catalogued and tests were carried out to help identify the causal organisms and link them to specific blemish types.

Typical symptoms found:

Crown canker

Black crown/small black crown

Corky crown

Black shoulder lesion

Narrow black bands

Ginger blotch

Cavity spot - like

Dry scars and deep dry scars

Deep soft rot

Pink/brown superficial lesions (watery)

Young red lesions near crown

Carrot fly mines

Figure 1: Lesions identified during sampling

Some skin blemish symptoms increased over the season e.g. cavity spot like lesions and the orange speckling.

Testing and monitoring was carried out on a selection of cultivars and no clear correlation between cultivar and lesion type was observed at this stage. This may suggest that the incidence of skin blemish is linked more closely to the presence of soil-borne inoculum rather than to differential susceptibility of specific parsnip varieties.

Tests to confirm pathogenicity of the collected fungal organisms were carried out. *Fusarium* isolates, *Cylindrocarpon destructans*, *Phoma* sp. and *Botrytis cinerea* had confirmed pathogenicity. Interestingly, although *Itersonilia* spp. were detected regularly in association with the large shoulder and crown lesions, either STC or ADAS was able to re-create the symptom in pathogenicity tests. More investigations are needed.

Collected soil samples from all 12 monitored sites were used to set up a range of seedling bait tests to check for damping-off, possible development of cavity spot lesions, and also for longer term tests with a particular variety where an interesting banding symptom had developed. Some of these tests are still on-going.

Figure 2. Pathogenicity testing

Figure 3. Seedling bait tests

Work will be carried out in year 2 of the study will focus on trialling a range of chemical and biological control products for control of the primary organisms detected in small-scale *in-vitro* and *in-vivo* studies.

Promising candidates from this list will be taken forward into larger scale field trials at STC (in an existing disease nursery developed for this work) and ADAS (in a commercial crop) in year 3 where it is hoped they will result in a reduction in skin blemish problems.

Financial benefits

Additional work will be carried out in years 2 and 3 of this project may identify products which could be applied to parsnip crops to control some of the more consistently observed fungi causing blemishes from year 1.

Action points for growers

- Monitor crops regularly and submit samples with unusual skin blemish problems for testing to help identify the primary organisms responsible.