

Project Title Parsnip Seed Health Screening

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Location of project: Laboratory Testing by OSTS
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The results and conclusions in this report are based on a series of experiments conducted over a one-year period. The conditions under which the experiments were carried out and the results have been reported in detail and with accuracy. However, because of the biological nature of the work it must be borne in mind that different circumstances and conditions could produce different results. Therefore, care must be taken with interpretation of the results, especially if they are used as the basis for commercial product recommendations.

AUTHENTICATION

We declare that this work was done under our supervision according to the procedures described herein and that the report represents a true and accurate record of the results obtained.

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Grower Summary

Headline

- The technology exists to provide UK parsnip growers with disease free seed. Seed companies must employ this to provide consistently disease free seed of all batches of all varieties.

Background and expected deliverables

Parsnip growers have long suspected that seed carries a level of fungal disease infection. Commercial testing suggests this varies between seed lots, varieties and seasons.

Parsnip seedling emergence in the 2003 season was variable with some significantly poor plant stands and some fields requiring intensive fungicide applications to suppress disease.

The British Carrot Growers Association Research and Development committee requested a survey of seed health testing at the January and April 2004 meetings and Martin Evans of Freshgro Ltd. agreed to obtain commercial seed samples for disease testing at OSTS Cambridge.

Expected deliverables from this include:

- A quantifiable measure (benchmark) of the disease loading on commercial stocks of parsnip seed.
- Individual disease identification and quantification on each seed lot.
- Guidance and need for any future development work to ensure a consistent supply of disease free seed.

Summary of the project and main conclusions

Seed lots were collected by Iain Robertson of Freshgro Ltd and sent to Dr Steve Jones at the Official Seed Testing laboratory in Cambridge in spring 2004. Seed samples were supplied by several growers and the source kept anonymous. Each seed sample was tested for *Alternaria dauci*, *Alternaria radicina*, *Itersonilia pastinacae* and *Phoma* sp.

Of 11 seed lots tested for seed borne diseases:

- 8 seed lots were disease free.
- 2 seed lots contained *Itersonilia pastinacae* at 0.5 and 2.0% respectively.
- 3 seed lots contained *Phoma* sp. at 0.5, 1.0 and 0.6 % respectively.

- 1 seed lot contained 3 diseases, *Alternaria dauci* 1%, *Itersonilia* 2% and *Phoma* at 1 %.
- These levels were low.

Financial benefits

There are no immediate financial benefits to this project.

Action points for growers

- The level of Parsnip seed borne disease varies with seed lot.
- Testing seed will determine the amount of seed borne disease.
- Consideration should be given to rejecting infected seed prior to drilling.
- Testing seed post drilling will provide a guide to which disease(s) is present.

Science Section

Introduction

Commercial crops of parsnips grown in the UK can be adversely affected by several fungal diseases. These are described in HDC factsheet FV167a. At least 4 of these diseases are seed borne – *Alternaria dauci*, *Alternaria radicina*, *Phoma sp*, *Itersonilia pastinacae*.

Parsnip seed is not subject to EU regulations, which set minimum standards for seed quality and health in more popular vegetable species.

Commercial experience suggests that seed borne fungal disease reduces plant establishment and increases the subsequent need for fungicide applications. This appears to vary with season, seed source and variety. A scientific appraisal relating the loss of crop yield and quality to seed quality and health has not been undertaken but commercial experience suggests this could be the cause of significant financial loss to growers and packers of parsnips in some seasons.

Materials and Methods

Samples (11) of commercial seed were collected by Iain Robertson of Freshgro in spring 2004 and these were sent to the Official Seed Testing Laboratory (OSTS), Huntingdon Road, Cambridge, CB3 0LE.

The seed source was kept anonymous.

OSTS tested each seed lot for *Alternaria dauci*, *Alternaria radicina*, *Itersonilia pastinacae* and *Phoma spp*.

The method used is an OSTS in-house development based on that of Wilkinson (1952 *Phytopathology* 42:23).

The general method is to attach 200 seeds to the lid of the petri dish so that they are suspended above agar and incubated for 7 days at which point agar is examined for the presence of *Itersonilia* and the seeds themselves for pycnidia of *Phoma* and conidia of *Alternaria spp*. There is no pre treatment.

Results and Discussion

<i>Sample No.</i>	<i>% Alternaria dauci</i>	<i>% Alternaria radicina</i>	<i>% Itersonilia pastinacae</i>	<i>% Phoma spp</i>
54539	0	0	0	0
54540	0	0	0	0.5
54541	0	0	0	0
54542	0	0	0	0
54543	0	0	0	0
54544	0	0	0.5	0
54545	0	0	0	0
54546	1	0	2	1
54547	0	0	0	0.6
54548	0	0	0	0
54550	0	0	0	0

The samples had very little in the way of infection with the 4 diseases that are reported and certainly none at levels that are considered to cause a problem. This is also in line with other parsnips seed tested by OSTs in 2004 where, unusually, seed borne *Itersonilia* has been rare.

Conclusions

Of the 11 seed samples tested in 2004 only 4 were found to be infected with a low level of seed borne disease.

The technology exists to provide UK parsnip growers with disease free seed.

Seed companies must employ this to provide consistently disease free seed of all batches of all varieties.

Technology transfer

Members of the BCGA R and D committee are aware of these results. Several seed companies are members of BCGA and are aware of these results.

References

Wilkinson (1952 *Phytopathology* 42:23).