FV 65 Host Specificity of Pea & Bean Root Infecting Fungi

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INTRODUCTION

Previous studies, expecially those carried out by PGRO indicate that peas and green beans must be regarded as the same crop, when planning rotations designed to minimise the risk of damage from footrot diseases.

Here, a major problem is that a range of fungal pathogens can attack large-seeded legumes to give a rootrot disease.

Little is known about the cross-infectivity of strains of individual pathogens between legume hosts. Preliminary work at Manchester Polytechnic has suggested that some fungi may equally be able to infect peas and green beans. However, in the USA, workers have observed that their strains of *Fusarium solani* that are pathogenic to peas, only produce mild symptoms of root disease on green beans.

Additionally, the host range of the other common footrot pathogen, *Phoma medicaginis* var *pinodella* is relatively little understood in terms of legume species grown in the UK.

OBJECTIVE

To examine the host specificity of *Fusarium solani* f. sp. *pisi* and *Phoma medicaginis* var *pinodella* on peas, broad and field beans *(Vicia faba)* and French beans *(Phaseolus vulgaris)*.

METHODS

From 10 crops of vining peas grown in East Anglia, 10 isolates of *Fusarium solani* and 10 of *Phoma medicaginis* var *pinodella* were obtained from plants showing symptoms of footrot.

A spore suspension of each isolate was inoculated onto 7 day old seedlings of peas, cv. Sprite, field beans cv. Alfred and French beans cv. Groffy growing in tubes containing tap water agar.

After 7 days, symptoms of disease were assessed using a 0 - 6 scale of increasing disease discolouration of the stem base *(P. medicaginis)* and a 0 - 5 scale of increasing discolouration of the root system *(F. solani)*.

RESULTS

1. *Fusarium solani* 0 All 10 isolates produced root disease higher than the controls. In peas, the isolates were all very pathogenic and symptoms developed after 4 days. In field beans all isolates produced severe root disease symptoms after 11 days, and in French beans, nine of the ten isolates produced root disease symptoms after eight days.

The disease scores are shown in table 1.

Table 1 - Disease scores with *F. solani*

Isolate No.	Mean disease score 0-5 Pea	Field Bean	French Bean
CONTROL	0.3	0.50	0.57
F82	3.6	2.8	0.86
F99	3.0	3.6	1.29
F89	2.4	3.2	1.70
F63	3.2	3.1	1.86
F13	2.8	3.9	2.14
F32	3.7	4.0	2.00
F64	3.5	3.6	2.00
F40	3.1	3.3	1.57
F81	3.2	3.3	2.29
F68	3.5	3.7	2.43

2. *Phoma medicaginis* var. *pinodella* isolates were all pathogenic to peas and produced severe symptoms of basal stem rot by seven days after inoculation. Most isolates produced similar effects on *Vicia faba* but two isolates produced milder symptoms. None of the isolates produced symptoms of *Phaseolus vulgaris*, although on some roots, some slight discolouration was observed at the sites of lateral emergence from the stem. *P. medicaginis* was reisolated from these areas following surface disinfection.

The results of the disease scores are shown in table 2.

Table 2 - Disease scores with *P. medicaginis*

Isolate No.	(0 - 6) Pea	Field Bean	French Bean
CONTROL	0.5	0.5	-
P13	6.0	6.0	-
P16	6.0	4.2	-
P40	6.0	2.2	-
P57	6.0	4.4	*1
P63	5.4	5.1	-
P68	5.4	5.3	-
P81	3.3	6.0	*2
P82	6.0	5.3	-
P89	5.5	3.2	-
P95	6.0	2.0	*2

*1 - 3/10 plants with brown lateral root discolouration
*2 - 2/10 plants with brown lateral root discolouration

CONCLUSIONS

The work clearly demonstrated that a range of isolates of *Fusarium solani* from peas were pathogenic to peas, *Vicia* beans and green beans, and that *P. medicaginis* was also equally pathogenic to peas and French *Vicia* beans.

This finding reinforces the importance of regarding peas and beans as one and the same crops as far as crop rotation is concerned. The suggestion that *P. medicaginis* may also survive on the roots of French beans is also interesting and this may help to explain why the pathogen appears to survive in field soil for such a long period of time.

PROCESSORS & GROWERS RESEARCH ORGANISATION

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