

1st International Symposium on Biological Control of Bacterial Plant Diseases, Darmstadt, October 23rd-26th, 2005

Screening biocontrol agents for control of seedborne bacterial pathogens of carrots and brassicas

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STOVE project



- EC co-funded project
– QLK5-2002-02239
- Three years: Mar 2003 to Feb 2006
- Web-site: www.stove-project.net

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STOVE - partners



- BBA, Germany (co-ordinator)
- Nunhems (Hild), Germany
- PRI, Netherlands
- University of Turin, Italy
- HDRA, UK
- Findus, Sweden
- Gothenburg University, Sweden

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STOVE - aim

- To improve and develop organically-acceptable methods for control of seed-borne pathogens of vegetable crops


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Project outline


Year 1	Hot water, hot air and electron treatments Optimisation for different pathosystems Effects on seed viability	Micro-organisms, resistance inducers, plant extracts Effects on seed-borne pathogens and on plant growth
Year 2	Comparative testing in the glasshouse and in the field Hot water- Hot air- Electron- Micro-organisms Resistance inducers Plant extracts	
Year 3	Field / glasshouse testing of combinations of selected physical methods with selected microorganisms, plant extracts and resistance inducers	

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Pathogens



***Xanthomonas campestris* pv. *campestris* (Xcc) on brassicas**



***Xanthomonas hortorum* pv. *carotae* (Xhc) on carrots**

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Seedborne bacterial pathogens

● **Problems assessing activity:**

- Seed tests based on extraction/plating on selective media (with antibiotics)
 - can't assess by direct seed testing ?
- Relatively low (but epidemiologically significant) levels of infestation found in naturally infested seedlots
 - 0.1% inf., 20% trans. -> 15,000 seeds for 1 inf. seedling (in untreated)
 - large numbers needed in grow-out tests or field trials

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In vitro screening I

Inhibition of growth of *Xcc* on agar by culture supernatants

Supernatant	Medium	Xcc3818A	Supernatant	Medium	Xcc3818A
MBI 600	TSB	++++	I 112	TSB	-
Serenade	TSB	+++	E 11	TSB	-
FZB 24	TSB	++++	E 183	TSB	-
MSMX	TSB	-	I A 6	TSB	-
Fus. 351/2	PDB	-	I 124 b	TSB	-
RG 6	NYDB	-	II 79/2	TSB	-
RG 68	NYDB	-	U 407	TSB	++
R 11	NYDB	-	U 410	TSB	+++
M 8	NYDB	-	G 12	TSB	++
M 29	NYDB	-	G 53	TSB	-
SLU 1	TSB	-	T 63093	PDB	-
SLU 2	TSB	-	MAS 35	PDB	-
SLU 3	TSB	+++	IK 726	PDB	-
SLU 4	TSB	-	FZB 53	TSB / GYM	-
SLU 5	TSB	-			

- = no inhibition zone, + = ≤ 11 mm, ++ = ≤ 18 mm, +++ = ≤ 36 mm, ++++ = > 36 mm

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In vitro screening II



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In vitro screening III

Supernatant	Xcc3818A	Xcc3882	Xhc3856	Xhc9000
MBI 600	++++ / +++*	+++	+++	+++
Serenade	+++ / +++*	+++	+++	+++
SLU 3	+++ / +++*	+++	+++	+++
FZB 24	++++ / *	-*	-*	-*
U 410	+++ / -*	-*	n.t.	n.t.
G 12	++ / -*	-*	n.t.	n.t.

- = no inhibition zone, + = ≤ 11 mm, ++ = ≤ 18 mm, +++ = ≤ 36 mm, ++++ = > 36 mm

* = results from trials in which the *Xanthomonas* was incorporated into the agar

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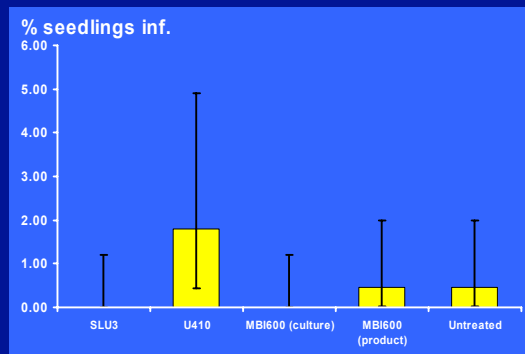
Transmission experiments

- 500 seeds sown in seed trays
- Grown in glasshouse for 4-5 weeks
- Samples of seedlings harvested from each tray
- Samples then stomached 5 min, diluted and plated on selective media
- Sub-culture and confirm identity
- Estimate infection by maximum likelihood methods

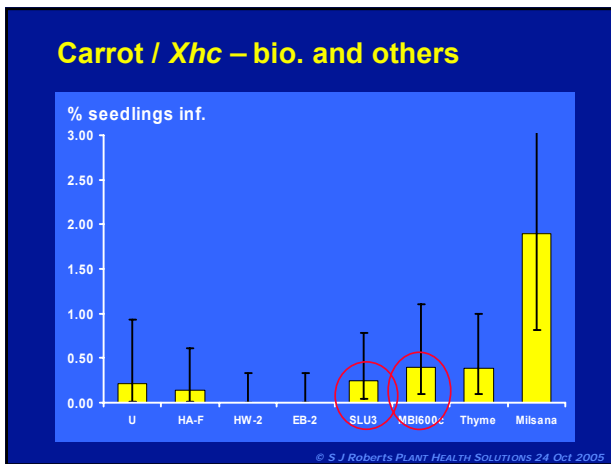
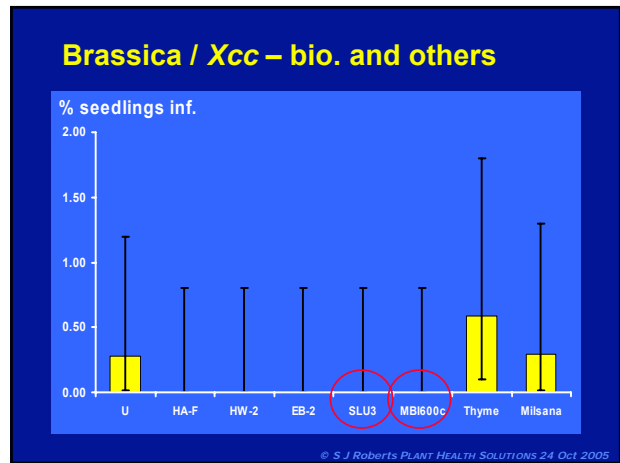
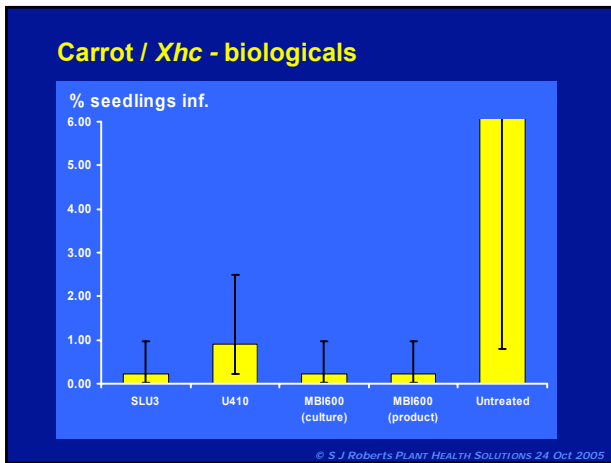


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Brassica / Xcc - biologicals





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Final stage

- Carrots / Xhc
 - Field trials with carrots
 - approx. 5,000 seeds per plot (3.6 x 8 m)
- Brassica / Xcc
 - Field trials not feasible due to numbers / area req.
 - Glasshouse transmission expts,

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To be continued.....

- Awaiting results

Handout available from:
www.planthealth.co.uk

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