

PHYSICAL AND BIOLOGICAL SEED TREATMENTS FOR CONTROL OF BACTERIAL DISEASES OF CARROTS AND BRASSICAS CAUSED BY XANTHOMONAS SPP.

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Background

- An EU-funded project (QLK5-2002-02239) on Seed Treatments for Organic Vegetable Production **STOVE** was started in 2003.
- *Xanthomonas hortorum* pv. *carotae* (*Xhc*) and *X. campestris* pv. *campestris* (*Xcc*) are seedborne and cause bacterial blight of carrot and black rot of brassicas, respectively.
- A range of physical treatments (hot water, hot air, electron bombardment) and a number of potential biocontrol agents (BCAs) were examined for their efficacy in controlling these diseases.

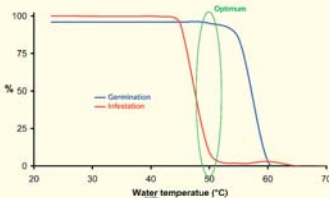
Seed Treatments

Hot water (HW):

'Low tech'; seed immersed in hot water then re-dried.

Electron (EB):

Mobile system, based on TV technology: seed falls past a beam of electrons. Voltage and dose adjusted to penetrate only the seed coat.



Hot air (HA):

Hot, humid air for a short time with precise control of temperature, humidity, treatment time.

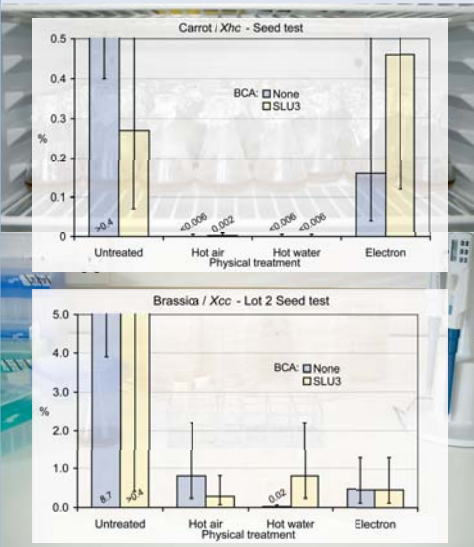
Biological (BCA):

Commercial and experimental BCAs initially screened in vitro for activity against the target pathogens.



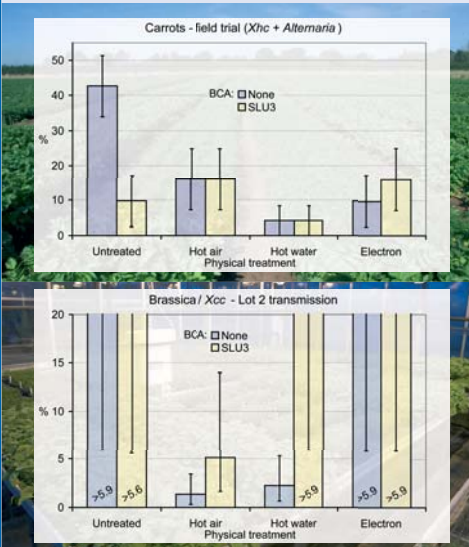
Seed tests

Dilution plating on selective media (ISTA methods), max. likelihood estimates of inf.



Glasshouse and Field

Glasshouse transmission studies and field trials to assess practical value.



Conclusions

Physical treatments:

- reduced seed infestation levels;
- did not always 'eliminate' the pathogens;
- practical value will depend on initial infestation level.

BCA:

- limited reduction when used alone.
- no benefit as a combination treatment.

Acknowledgments

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Physical and biological seed treatments for control of bacterial diseases of carrots and brassicas caused by *Xanthomonas* spp.

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As part of an EU-project (Seed Treatments for Organic Vegetable Production, STOVE, QLK5-2002-02239), three physical treatments (hot water, hot air, electron bombardment) and a number of potential biocontrol agents (BCAs) were examined for their efficacy in controlling seedborne *Xanthomonas hortorum* pv. *carotae* and *X. campestris* pv. *campestris*, the causal agents of bacterial blight of carrot and black rot of brassicas, respectively. Seed-borne bacterial pathogens present particular experimental difficulties due the relatively low (but epidemiologically significant) levels of infestation found in naturally infested seedlots. Physical treatments were optimised to avoid adverse effects on germination of healthy seeds. Potential BCAs were initially screened *in vitro* for inhibition/antagonism against the target pathogens and the efficacy of the physical treatments was first evaluated by seed health tests. The best physical treatments and BCAs from the first screening were applied to naturally infested seed and their effects on pathogen transmission (from seed to seedling) were assessed in glasshouse experiments. Finally the most effective methods and combinations were evaluated by seed health tests and in either a field trial (carrot) or glasshouse transmission experiments (brassicas). All of the physical treatments gave significant reductions in seed infestation levels and reduced or eliminated transmission from seed to seedling. However, the reduction may not be adequate to avoid damaging disease levels in the field, depending on the initial seed infestation level. Although promising *in vitro*, and initial transmission tests, the selected BCA failed to give significant reductions in the final trials. More info.: www.stove-project.net