



PANAMA DISEASE TROPICAL RACE 4 RESEARCH UPDATE

Testing the efficacy of urea as a treatment for the destruction of *Fusarium oxysporum* f. sp. *cubense* in infected soil

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Aims

To determine the effectiveness, mode of action and limitation to the use of urea as a method for inoculum reduction and recovery of *Foc* from soil.

Experiment 1 – Efficacy of Urea

Objective:

Determine possible effect of urea and lime treatments on *Foc* to hasten break-down of plant material.

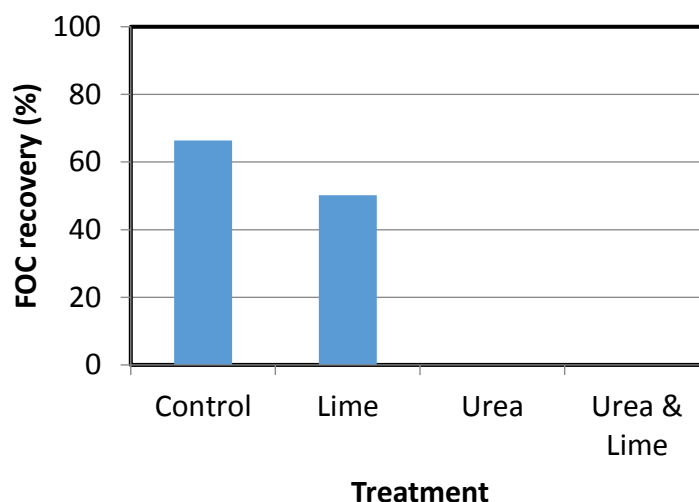
Treatments:

- Urea @ 0.5kg/m²,
- Lime @ 0.5kg/m²,
- both together.

Average inoculum 385 conidia/g soil

Outcome:

The use of urea at 0.5kg/m² prevented the recovery of *Foc* from the soil



Experiment 2 – Altering Nitrogen Availability

Objective:

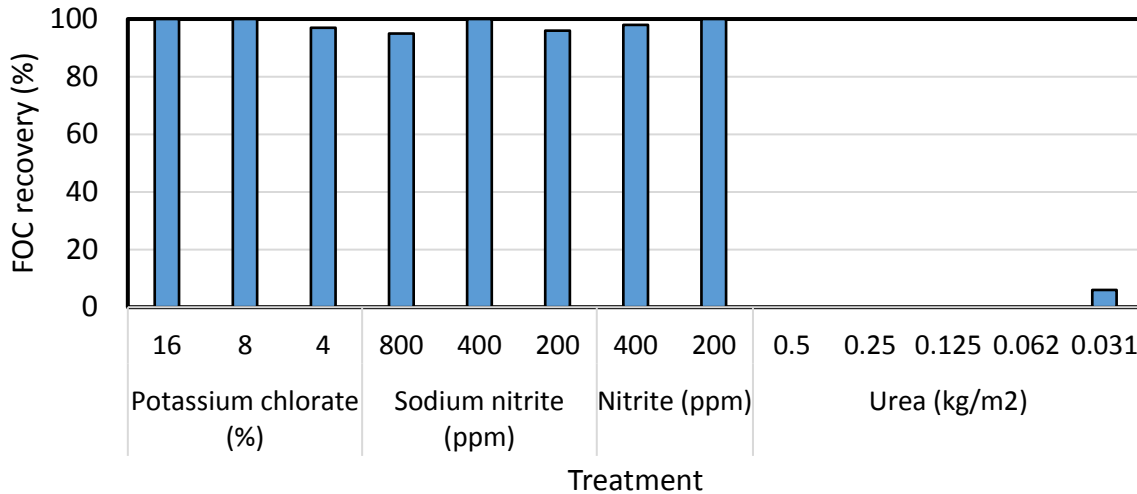
To explore the effectiveness of urea treatments at lower rates and investigate chemical alternatives which have been suggested as toxic to *Fusarium*.

Treatments:

Potassium chlorate at 4%, 8%, 16% (w/v),
Sodium nitrite at 200ppm, 400ppm, 800ppm,
Nitrite at 200ppm, 400ppm, & Urea 0.5kg/m², 0.25kg/m², 0.125kg/m².
Inoculum load: 80 conidia/g soil (40,000 conidia/50g soil)

Outcome:

Urea at rates greater than 0.031 kg/m² were effective at preventing *Foc* from being recovered from the soil, whereas nitrite forms and potassium chlorate (a nitrogen cycle disruptor) were ineffective at reducing *Foc* recovery



Experiment 3 – Efficacy of ammonia

Objective:

To determine the limit of the effectiveness of urea treatments between 0.0625kg/m² and 0.03125kg/m², whilst comparing them to alternative sources of ammonia at equivalent concentrations.

Treatments:

- Urea
- Ammonium Nitrate + Potassium hydroxide
- Aqueous ammonia

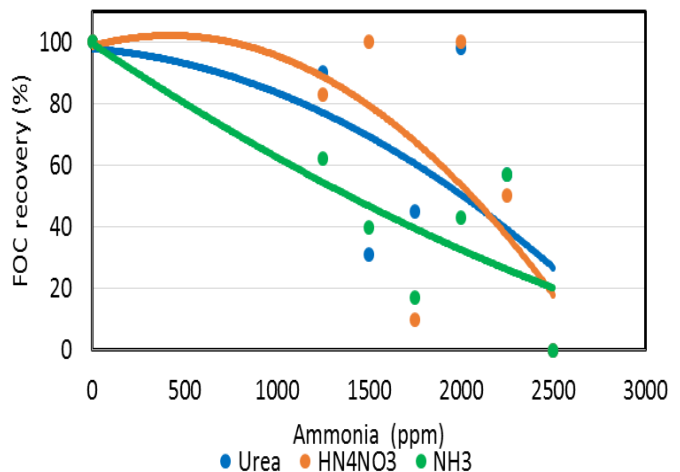
Rates (NH₃ equivalent):

- 2500, 2250, 1750, 1500, 1250 ppm

Inoculum Load - 80 conidia/gram soil (40,000 conidia/50g soil).

Outcome:

Ammonia (NH₃) from any source that produced a concentration equal to or above 2500 ppm was effective at preventing *Foc* from being recovered from the soil.



Conclusion:

Urea that produced ammonia (NH₃) above concentrations of 2,500 ppm was an effective treatment for reducing the recovery of *Foc* under laboratory conditions. The recommended treatment at 1 kg of urea/m² would therefore be expected to significantly reduce recovery of *Foc* from soil.

For more information about this work contact David East on 07 4220 4132, email david.east@daf.qld.gov.au or Tony Pattison on 07 4220 4127, e-mail tony.pattison@daf.qld.gov.au