
## *Part 1 - Summary Details*

**CRDC Project Number:** **CRDC 266**

**Project Title:** Travel Report: Disease Study Tour of US 2nd-15th July 2005

**Project Commencement Date:** July 2005 **Project Completion Date:** July 2005

**CRDC Program:** Capacity & Community

## *Part 2 – Contact Details*

**Administrator:** (Name & position of officer responsible for all correspondence).

**Organisation:** (Organisation administering the research project).

**Postal Address:**

**Ph:** **Fax:** **E-mail:**

**Principal Researcher:** (Name & position of the principal researcher).

**Organisation:**

**Postal Address:**

**Ph:** **Fax:** **E-mail:**

**Supervisor:** (Name & position of senior scientist overseeing the project).

**Organisation:**

**Postal Address:**

**Ph:** **Fax:** **E-mail:**

**Signature of Research Provider Representative:** _____

## *Part 3 – Final Report Guide (due 31 October 2008)*

### *Background*

This tour focused on Nematodes in Arkansas, Texas Root Rot in Texas and Fusarium and its interaction with and without nematodes in California.

### *Highlights*

**Nematodes**
We looked at two types of Nematodes in Arkansas - Root Knot Nematode and Reniform Nematode. Nematodes are a microscopic round worm that eats the cotton plants roots. The plants ability to take up water and nutrients are significantly reduced.

The Reniform nematode will uniformly affect the whole field and prefer soils with clay content of between 20-30%, and would probably be suited to Australian soils. Only a few counties have reniform nematodes but they are on the increase. Nematodes prefer soil temperatures greater than 20 degrees celcius for growth and have an ability to move about 50cm without the assistance of water for movement. In the Munroe county in Arkansas trials showed a reduction in renifonn population by growing mustard when compared to wheat and vetch. There were distinct differences between crops treated with Telon and no treatment. The plants were short, stunted and water stressed due to a poor root system. Telon (dichoropropine) is expensive @ $37/acre. This product sterilises the root zone in the soil and is usually applied 2 weeks before planting by shaking the product down the centre of the bed.

In Arkansas there is 1 million acres of cotton and about half the fields in the state have Root Knot Nematodes. Root Knot Nematodes prefers sandy soils, unlikely to be a problem in Australia due to clay content of soils. Yield losses are 10%-40%, damage is usually localised in smaller spots. Grain sorghum will reduce root knot nematodes numbers.

Both species of nematodes are increasing the affect of thielaviopsis. Normally this disease only affects the epidermal cells of the cotton plant but the nematodes provide access for thielaviopsis to the phloem and xylem causing major plant health problems.

Temik @ 5.7kg(Ha is used on moderate infestation levels of both nematodes.

**Texas Root Rot**
We travelled with Tom Isakeit a plant pathologist from Texas A & M University at College Station to see Jeff Strapper a County Extension Agent at Sinton near Corpus Cristae to look at the fungus Texas Root Rot. Texas root rot is a devastating disease that attacks the cotton plants during boll fill. Both yield and quality is affected and the amount of loss depends upon when the fungus kills the plants. Luckily the disease is not spreading, no new cases were known and it has been around for over one hundred years. The fungus is located in the soils at a depth of 15-30cm. Both Jeff and Tom felt there was no chance that this disease could accidentally spread to Australia.

For the disease to be spread the resting bodies of this fungus, called sclerotia, must be spread. These sclerotia are small, about the size of mouse droppings, so it is quite difficult for them to be easily spread.

**Fusarium**

Whilst in California we travelled to a farm in the Fresno County on the west side of the San Joaquin valley to look at Fusarium ***(Fusarium oxysporum f.sp. vasinfectum Race 4*** with Bob Hutmacher, Statewide Cotton Specialist and University of California. The field was variety trial site consisting the leading California varieties. This race of Fusarium has been a problem for three seasons. The plants display a yellowing discolouration in the leaves and vascular staining in the plant. Death of the plants was occurring from the seedling stage right through the plants life cycle, very similar to the Australian strains of Fusarium. The Race **4** line of Fusarium does not require a vector, unlike Race 1, which only affects plants when nematodes are present. Race 4 is affecting both Acala and Pima lines of cotton and is spreading via tail water, laser buckets etc. It appears to be very similar to the Australian Fusarium lines. The Californian growers have been very lucky in that there leading Pima variety - Phytogen 800 is also their most tolerant variety. This variety has a 85-90% survival rate.

We looked at Fusarium Race 1 interacting with Root Knot Nematodes near Bakersfield. The photos show a variety trial plot looking at the different interaction between varieties/Fusarium and root knot nematodes. The most resistant variety to Race 1 Fusariurn, Deltapine 744 is very susceptible to the race 4 strain.

I believe both races of Fusarium pose a potential risk to the Australian cotton industry, race 4 a greater risk, as it didn't require a nematode interaction. The movement of machinery is the likely source of contamination. The alarming feature of the two different races was that a variety might be partially resistant to one race but very susceptible to the other Fusarium line. If a **US** Fusarium turned up in Australia, it may well affect our high F rank varieties differently to the Australian line of Fusarium. It may be beneficial to put some of our leading varieties through Fusarium nurseries in the **US.**

***Conclusion***

I believe both reinform nematodes and Fusarium (race 4) have the characteristics that could potentially, affect the Australian cotton industry if they were to be introduced to Australia. There is a feeling in the industry that breeders will overcome Fusarium and there has been a loosening of farm quarantine procedures, this will increase the chance of an introduced pathogen spreading throughout the industry. The best defence that Australian cotton growers have against these two pathogens is sound quarantine procedures and the policy of 'Come Clean - Go Clean' that is in place on most cotton farms. The Australian cotton industry is in a pretty good position to minimise the spread of any pathogens if they are introduced to Australia, due to this policy.