



# Integrated Disease Management for: Reniform nematode

## The pathogen

Reniform nematode (*Rotylenchulus reniformis*) is a plant parasitic nematode that feeds on the plant root using retractable, hollow, spear-like mouthparts causing plant stunting. It has a worldwide distribution within tropical and subtropical regions and was first detected in Australian cotton in 2003 in a single field in Emerald. No further detections were made until late 2012, when an investigation of stunted plants in Theodore cotton fields led to the identification of this plant parasite.

## Symptoms

Feeding causes damage to the plant resulting in stunting and generally poor plant growth. The reniform nematode does not typically cause complete plant death, however they reduce the productivity of the crop. Populations can be quite uniform in their distribution across a field, making detection of early plant symptoms difficult.

## Economic impact

In addition to the damage caused by plant stunting, experience from countries like the United States where reniform nematodes are prevalent in cotton suggests that yield losses can be severe in crops with very high populations. In addition, nematodes can interact with certain fungal pathogens in disease complexes, increasing the risk and severity of seedling diseases and Fusarium and Verticillium wilt.



Patchy growth typical of root damage is common.

## Favoured by

The reniform nematode is largely distributed in tropical and subtropical regions although it can be found in warm temperate regions as well. Damage potential differs widely according to soil type. Sandy soils tend to promote the greatest level of damage, while nematode survival and reproductive success is favoured by soils with higher (20-40 per cent) silt or clay. Drought stress may allow increased plant growth and yield suppression where reniform nematode population densities are high, and there is limited evidence that irrigation may ameliorate some degree of potential damage.

## Dispersal

Reniform nematodes have a unique ability to survive in very dry soil for extended periods of time. They can be spread by anything that can move contaminated soil – farm equipment, birds, flooding or even dust.

## Survival

Reniform nematodes can survive at least 2 years in the absence of a host in dry soil through anhydrobiosis.

## Host range

The reniform nematode has a very wide host range including chickpeas, mungbeans, pigeon pea, sunflower and vetch. Certain crops are considered to be non-hosts, including corn, canola, faba beans, safflower, sorghum, soybean, wheat, barley, triticale and oats.

## Control strategy

- Come Clean Go Clean – good farm hygiene is the key to minimising the spread of the Reniform nematode. See Come Clean Go Clean fact sheet or page 99 of the 2014-15 Cotton Pest Management Guide for protocols and more information.
- Rotating with non-host crops such as wheat or sorghum to reduce base populations. Long fallows can help to also break the life cycle; however it is important to control any weeds and cotton volunteers which may grow in the bare fields.
- Cotton stubble management – cotton stalks should be cut and soil tilled through the stubble zone as soon as possible after harvest to destroy breeding sites. Ensure root cutting is successful and there is no re-growth.
- Plant into good conditions including optimum soil

*Reniform nematodes have a unique ability to survive in very dry soil for extended periods of time.*



PHOTO DAMIEN ERBACHER



Cotton root infected with reniform nematode showing egg masses on the root surface.

temperature, no water stress and well-formed beds.

- Monitor crops for patches of stunted plants and submit soil samples from around the stunted plant for testing if you are suspicious.

## Assessment

Growers and consultants across the industry are asked to monitor for patches of unexplained unthrifty or stunted plants and send a sample of





Stunted cotton plants observed in Theodore.

PHOTO LINDA SMITH

soil if concerned. Nematodes cannot be seen with the naked eye in the soil or in plants. Affected roots may have small nodules/knots when there is a high population of the nematode present in soil.

1. Mark patches with GPS or on a map so that they can be monitored next season.
2. Scrape off the dry top soil and sample 10-15cm deep using a small trowel or soil corer.
3. If there is more than one patch in a field, collect multiple samples from these areas in a bucket, and mix through.
4. Place approximately 400g in a clearly labelled plastic bag.
5. Postage and handling – the extraction process relies on live nematodes so please keep cool in an esky without an ice brick, but **DO NOT STORE SAMPLES IN THE FRIDGE.**

Include information about the sample sheet (see page 126 of the 2014-15 Cotton Pest Management Guide for a form and checklist on sending plant samples for diagnosis)

Please **PHONE FIRST** before sending any samples to confirm the address and to ensure that samples will be processed appropriately on arrival. Avoid sending samples late in the week when they may be delayed over the weekend.

Send samples to:

Dr Linda Smith

Ph: 07 32554356

Mob: 0457 547 617

E: [linda.smith@daf.qld.gov.au](mailto:linda.smith@daf.qld.gov.au)

Department of Agriculture and Fisheries (DAF)

Basement 3 Loading Dock (off Joe Baker St)

41 Boggo Rd

Dutton Park 4102

### For more information:

- Visit [www.cottoninfo.net.au](http://www.cottoninfo.net.au)
- Download the 2014-15 Cotton Pest Management Guide from [www.cottoninfo.com.au/publications](http://www.cottoninfo.com.au/publications)

By Ngaire Roughley (DAF and CottonInfo) and Linda Smith (DAF).