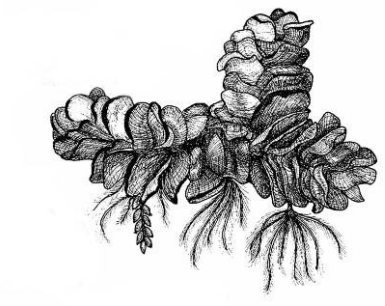
NSW Environmental and Aquatic Weeds Biological Control Taskforce



Newsletter

August 2012

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Welcome to this August 2012 newsletter. As many would be aware the NSW Environmental and Aquatic Weeds Biological Control Taskforce is a group that arose from the old NSW Lantana Biological Control Taskforce. The Taskforce has a significantly expanded role with a number of new priority weed species within its Terms of Reference. These include cat's claw creeper, Madeira vine and salvinia in addition to lantana. A full list of priority weed species for 2012-13 and a brief outline of the Terms of Reference are contained in this newsletter.

The newsletter also contains updates on a number of biological control programs relevant to NSW.

If, after reading this newsletter, your organisation would like to pledge funds to the Taskforce, please forward your contribution to our Secretary/Treasurer Terry Schmitzer as soon as possible. If you are not yet a financial contributor, we ask that you consider providing a donation. A pledge form is included in this issue for your convenience. If you know of any organisation that may be interested in pledging funds to the Taskforce, please ask for a copy of this newsletter to be sent to them.

Happy reading!

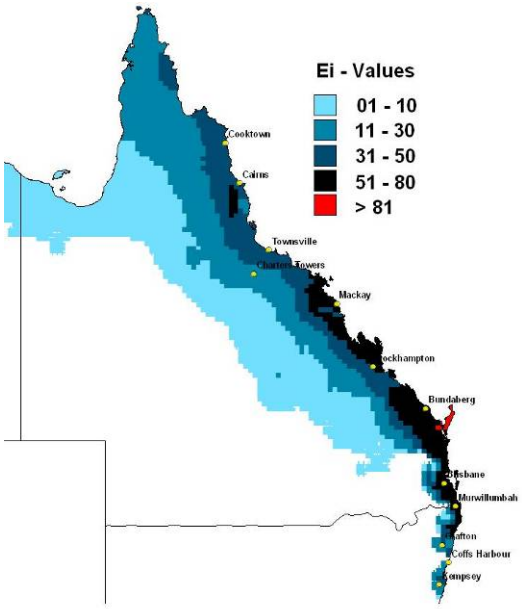
Royce Holtkamp - Editor

Biological control updates from NSW Dept of Primary Industries and Biosecurity Queensland (BQ)

Lantana

A small lantana rust, *Prospodium tuberculatum*, program has been maintained at Grafton Primary Industries Institute (PII) with releases being targeted for locations where the rust hasn't previously established. There have been a few requests for rust in recent months and a small number of infested plants are maintained together with 30 grams of rust spores stored in liquid nitrogen. This is sufficient for more than 20 releases next spring/summer with a reserve supply to ensure the continuation of the culture.

Lantana budmite, *Aceria lantanae*, has been approved for release. It was officially released from BQ quarantine by AQIS on 18th July 2012 and culture increase and field releases will commence shortly. A CLIMEX model of its predicted preferred range is given below.



Damage caused by lantana budmite, *Aceria lantanae*, in South Africa

BQ have also received the final report on the host testing of the rust *Puccinia lantanae*. They are currently considering the recommendations contained in this report before a final decision is made on the project.

Cat’s claw creeper

Ongoing releases of the cat’s claw creeper tingid, *Carvalhotingis visenda*, have been undertaken from Grafton PII, with quite a lot of interest for the agent. It has been released at a large number of sites throughout the distribution of lantana in NSW. Damage has been found at many of these sites but it is too early to determine the long term impact of this insect.

Cat’s claw creeper tingid, *Carvalhotingis visenda*, and field damage

The leaf-mining buprestid beetle, *Hylaeogena jureceki*, has been approved for release. It was officially released from BQ quarantine by AQIS on 18th July 2012 and culture increase and field releases will commence shortly. BQ have conducted exploration for cat's claw creeper and Madeira vine biocontrol agents in Brazil, Paraguay and Argentina, along with researchers from South America. These surveys have identified some promising agents for both cat's claw creeper and Madeira vine in Paraguay.

Cat’s claw creeper leaf-mining buprestid beetle, *Hylaeogena jureceki*, and damage under quarantine conditions

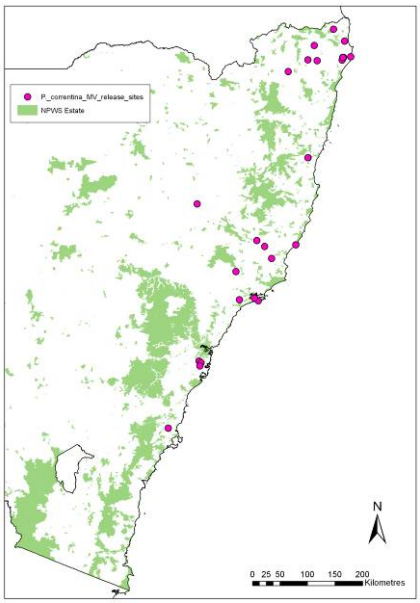
Cat's claw creeper biocontrol research has been in progress since 2001, and since then BQ have tested four agents and released (or got approval to release) three of them. They have released two of the approved agents, the leaf-sucking tingid and the leaf-tying moth, in several sites in northern NSW. In addition they have also supplied starter cultures of both agents, and provided training to various community groups in northern NSW.

Madeira vine

The South American leaf-feeding beetle, *Plectonycha correntina*, was approved for release as a biological control agent in February 2011. The beetle was subsequently mass reared and introduced into Madeira vine infestations in south-eastern Queensland from May 2011 onward. Both the adult and larvae of this insect are leaf feeders, with larvae being particularly damaging. Post release field monitoring determined whether the beetle had established, the rate of spread from the initial release site and level of damage. Field observations at sites where releases had been made before winter (6100 beetles in total) were made in October 2011. The insect had successfully overwintered at 51% of these sites, with adults, larvae and eggs being recorded. Post-winter releases of another 20,462 beetles over 72 sites in south-eastern Queensland, five in northern NSW, one in Central Queensland and two in Far North Queensland are also indicating promising results with insects being present and reproducing at 42% of sites in the autumn. Damage levels at all sites were generally low, reflecting that this was the first year of releases, but 20% loss of leaf area was estimated at two sites. Preliminary analysis of data indicated that establishment does not appear to be closely related to the number of insects released, so other factors such as season of release, light levels at site or density of predators may be important.

Madeira vine beetle, *Plectonycha correntina*, and damage due to adult and larval feeding

A colony of *Plectonycha correntina* has been established in the glasshouse at Grafton PII and a large number of releases were made in the 2011–2012 year. Reports on release sites have been positive, with the majority of sites recording the presence of significant leaf feeding damage and some spreading of the beetles.



Madeira vine beetle, *Plectonycha correntina*, release sites

A new Madeira vine biological control factsheet is attached to assist people with site selection and release techniques.

Salvinia

Salvinia weevils, *Cyrtobagous salviniae*, are bred in 7 tanks at Grafton PII, 2 in a glasshouse and 5 outdoors. Infected salvinia material is distributed to clients on demand.

Mother-of-Millions

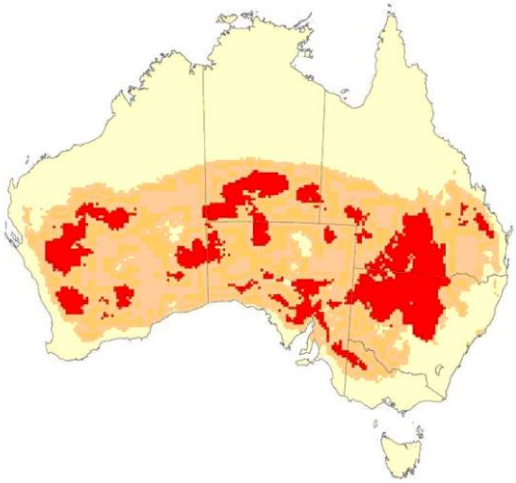
The release of the stem-boring weevil, *Osphilia tenuipes*, is being assessed through the Queensland Biocontrol Act. This process is expected to be quite lengthy.

Hudson pear

Hudson pear, *Cylindropuntia rosea*, is an invasive cactus of central Mexican origin which poses a threat to agricultural enterprises, biodiversity conservation and human and animal health. Individual plants have been recorded reaching 1.5 m in height and 3 m across. Stems consist of rope like segments which are armoured with hundreds of extremely sharp spines up to 3.5 cm in length. These spines are covered by a detachable sheath which may remain embedded in a wound even after the body of the spine is removed. The spines are capable of causing serious injury to humans, livestock and working animals such as horses and dogs and may present a severe impediment to mustering operations. *C. rosea* also poses a threat to native fauna and has caused the deaths of native animals such as koalas. Infestations of *C. rosea* may also displace native flora with a possible consequential impact on biodiversity.

Cylindropuntia rosea near Lightning Ridge NSW

The potential distribution of *C. rosea* has been modelled indicating that it is capable of invading large areas of arid, inland Australia including much of the Darling River basin.



Potential distribution of *Cylindropuntia rosea* in Australia

A biological control program for *C. rosea* was initiated in 2009 with subsequent importations of a potential biological control agent, the cochineal insect *Dactylopius tomentosus*, from Mexico and South Africa for quarantine host specificity testing in BQ quarantine facilities under contract to NSW DPI. The project has recently completed a 12 month research grant from RIRDC and funding has been sourced from Western CMA for 2012-13. This will enable further studies to be carried out to finalise the project.

Giant Parramatta grass

Research has been carried out on Giant Parramatta grass (GPG) by Dr David Officer at the Grafton PII. GPG crown root rot, *Nigrospora oryzae*, has been observed doing extremely well in recent months. The pathogen is present across a large percentage of the Nambucca Shire, with reports of spread within other North Coast Weeds Advisory Committee local government areas. A fact sheet detailing Dr Officer's work is attached.

For further information on Taskforce related weed biological control activities in NSW contact:

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4 Marsden Park Rd, Calala, NSW 2340

Ph: 02 6763 1234 or 0428 400743
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NSW Environmental and Aquatic Weeds Biological Control Taskforce

Pledge form

Please forward an invoice for the amount of $..... to .....

at the following address:

.....

.....

.....

Contact Name:.....

Return to: Terry Schmitzer
C/- Mid North Coast Weeds Co-ordinating Committee Inc.
961 Comboyne Road
Byabarra, NSW 2446

Phone: 02 6587 1116
Email: mncwac7@gmail.com

NSW Environmental and Aquatic Weeds Biological Control Taskforce – Terms of Reference

Purpose
To establish a taskforce to promote the rearing, releasing and monitoring of biological control agents approved for release against significant environmental and aquatic weeds in NSW.

Goals & Outcomes
The main focus of the Taskforce will be to:
(i) Seek funding for rearing and releases of biological control agents,
(ii) Ensure that this research is focused on the high priority environmental and aquatic weeds in NSW,
(iii) Ensure that monitoring focuses on agents establishment as well as impacts on the target weed, and
(iv) Help stakeholders with redistribution of biological control agents.

The Taskforce should also act as an advocacy group where required.

Areas of Authority
The Taskforce will operate under the NSW Invasive Species Plan and the associated Weed Action Program. The Taskforce must also work within national and state weed strategies and legislative frameworks.

Target weeds will be approved by the Taskforce. Weeds will be prioritised based on:
(i) Significant widespread weeds in NSW.
(ii) Weeds that threaten biodiversity (or are a significant threat to the environment including aquatic environments).
(iii) Biological control agents for the target weed being already approved for release in Australia, suitable for release in NSW and available for rearing and releasing.
(iv) The practicalities of rearing agents with particular reference to their biology.
(v) Access to and availability of suitable rearing facilities.
(vi) Weeds where significant other biological control work has not already been (or is in the process of being) undertaken in NSW, such as through research organisations or Commonwealth funding of community groups to rear and release agents.
(vii) Results from monitoring, including the success or failure of previously released agents.

Members
The Taskforce should comprise members:
(i) From the main state agencies responsible for managing weeds in NSW, particularly NSW DPI (including Catchments and Lands Division) through their biological control and aquatic weed programs and NSW OEH,
(ii) From a number of local government agencies empowered with weed control,
(iii) CMA and regional weed management committee representatives, and
(iv) Biological control research scientists.

Modus Operandi
The Taskforce will promote and seek funding to enable:
- The rearing and releasing of agents as per a prioritised list of target weeds
- An annual review of the prioritised list of target weeds
- Monitoring of releases made
- Engagement/collaboration with technical specialists as required.

The Taskforce will provide guidance, direction and promotion of biological control for environmental and aquatic weeds in NSW. The Taskforce will provide support on the rearing and releasing of agents

as per a prioritised list of target weeds. The Taskforce will also undertake annual reviews of the prioritised list of target weeds and monitoring of releases made, in order to measure the performance of the biological control agents on reducing the impacts of environmental and aquatic weeds in NSW.

The Taskforce will not contribute funding towards importation and testing of new agents which show promise overseas. This remains the responsibility of state and federal governments and peak funding bodies. The Taskforce will fund the rearing and releasing of agents already approved for release in Australia and suitable for release in NSW.

Lower priority will be given to those weeds where rearing and releases have been or are in the process of being undertaken by other research biological control programs or other funded biological control programs.

The Taskforce will undertake promotion and public awareness activities through a newsletter, media releases and the securing of financial contributions.

Members of the Taskforce will provide in-kind support to the coordination and management of the Taskforce. In addition, NSW DPI will provide agent rearing facilities at their Grafton and Tamworth laboratories. Those members that have a biological control research background (currently Royce Holtkamp and Peter Turner) will also provide in-kind support for monitoring.

Funds collected from public land managers will help employ a part-time research assistant, based at NSW DPI's Grafton Primary Industries Institute. The research assistant will:

- Rear and release agents
- Supply stakeholders with agents as well as information on rearing and release methods
- Attend field days on establishing agents
- Assist Taskforce members and other stakeholders with monitoring
- Keep records on the locations of releases made
- Provide up-dates at Taskforce meetings.

Priority Weed Species 2012-13

Madeira vine	Madeira vine leaf beetle (*Plectonycha correntina*)	Highest priority for next 12 months Rearing and redistribution
Cat's claw creeper	Cat's claw creeper tingid (*Carvalhotingis visenda*)	High priority for 1/7/12 to 31/12/12
Cat's claw creeper	Leaf-mining buprestid beetle (*Hylaeogena jureceki*)	High priority for 1/1/13 to 30/6/13 * Rearing and redistribution
Lantana	Lantana bud mite (*Aceria lantanae*)	Medium priority for 1/1/13 to 30/6/13 * Rearing and redistribution
Lantana	Lantana rust (*Prospodium tuberculatum*)	Maintain program at low levels (Grafton) for next 12 months
Salvinia	Salvinia weevil (*Cyrtobagous salviniae*)	Maintain current program (Grafton) for next 12 months
Blue heliotrope	Blue heliotrope leaf beetle (*Deuterocampta quadrijuga*)	Maintain current program (Tamworth) for next 12 months
Hudson pear		Active research program in quarantine
Mother of millions		Assessment under Queensland Biological Control Act
Water hyacinth		Possible new program - Keep a watching brief on progress
Crofton weed		Possible new program - Keep a watching brief on progress
Blackberry		Keep a watching brief on progress
Broom		Keep a watching brief on progress
Cabomba		Keep a watching brief on progress
Groundsel bush		Keep a watching brief on progress
Alligator weed		Keep a watching brief on progress
Pistia (water lettuce)		Class 1 weed in NSW – watching brief if status changes
Cactus species		Redistribution phase – no Taskforce involvement
Paterson's curse		Redistribution phase – no Taskforce involvement
St John's wort		Redistribution phase – no Taskforce involvement
Bitou bush	Bitou leaf roller moth (*Tortrix* sp.)	Redistribution phase – no Taskforce involvement
GPG	Crown rot (*Nigrospora oryzae*)	Redistribution phase – no Taskforce involvement
Mistflower		Smut fungus well established and widespread
Bridal creeper		Rust well established and widespread

* Based on the presence of suitable NSW climatic areas for the leaf-mining buprestid beetle and lantana bud mite

Biological control of Madeira vine

Bernadette Hanley

Handout prepared for Primex 2012

Madeira vine

Madeira vine *(Anredera cordifolia)* is native to Bolivia, Paraguay, Uraguay, Southern Brazil and North Argentina. It is an invasive perennial climber with a twining habit, succulent heart shaped leaves, and fragrant cream flowers in summer.

Madeira vine in flower. Photo: T. Inkson

Madeira vine propagates by aerial bulbils and underground tubers. Both bulbils and tubers can maintain viability for many years.

The Madeira beetle

The biological control agent for Madeira vine is a beetle (*Plectonycha correntina*). Both the adult beetle and the larvae feed on the foliage.

The Madeira beetle. Photo: Biodiversity Australia

The beetles lay small yellow eggs in groups of 8-15 on the undersides of leaves.

Small yellow eggs. Photo: Biodiversity Australia

After 5 days, larvae emerge and start feeding on the leaves, remaining in a group on the underside of the leaf. The larvae cover themselves with a sticky black gelatine-like substance made up of their own excreta and old skin cells.

After feeding for 14 days, the larvae leave the group, feed alone and move towards the ground, leaving their slimy black covering behind. They emerge as small white-then-butter-yellow grubs, 3-4 mm long with black heads. They burrow into the topsoil to pupate by covering their bodies in a white substance from their mouths to form a pupal case.

It takes between 19 and 25 days from when the eggs are laid to the beginning of pupation. The pupal stage is another 20 days, after which the adult beetles will emerge. After another 7days the beetles are sexually mature.

In total, the life cycle takes between 42 and 52 days (from egg to reproductive adult). Female beetles can live from 75-115 days. The average number of eggs laid are 555 per female.

Larvae with black sticky covering. Photo: Biodiversity Australia

Selecting a suitable release site

- Choose an infestation which is not scheduled for either chemical treatment or manual removal in the near future.
- Avoid sites in flood/frosty areas.
- Choose the biggest/worst infestation for a release site, this will give the beetles the greatest selection of micro-climates in which to establish.

Taking delivery of beetles

Beetles will be posted on Mondays or Tuesdays, and you will receive a phone call or a text message to confirm the parcel has been sent. You will receive the parcel from Australia Post. Inside there will be an insulated box, containing an ice brick and vented containers of Madeira vine leaves and adult beetles.

- Open the parcel as soon as you receive it, taking the vented beetle container out into fresh air. If you will not be available to open the parcel, please delegate another person to do so.
- Keep the beetles out of direct sunlight and as cool as possible until you release them.

It is important to release the beetles as soon as possible.

Beetles should survive in the container for another day, as long as they have some fresh, cool air.

Transporting beetles

Beetles should be transported in an air conditioned vehicle, otherwise keep them out of direct sunlight in a shaded spot.

Releasing beetles

If possible, release the beetles into the middle of the infestation (access and topography allowing). This allows the beetles to fly or walk to their choice of micro-climates, avoiding the drawbacks of 'edge effects' (extreme conditions closer to the edges). To release the beetles:

- Remove the lid and mesh of the container, gently pulling the Madeira stems/foliage and absorbent paper out.
- Place everything onto a healthy patch of madeira vine. Remove any beetles which may be caught in the paper or in the container and put them on a leaf. If eggs have been laid on the leaves place the foliage among some fresh Madeira leaves.
- Mark the release spot with some flagging tape, which has been dated, and record the number of beetles released at the spot, for example, '19/3/12 beetles X 100'.

Completing the forms

Please complete the release forms, with GPS co-ordinates if possible, and return the esky/box and insect containers to:

NSW Department of Primary Industries
Attn: Weeds Biological Control
PMB 2
Grafton NSW 2460

Please fax or email the release forms to:

FAX: 02 66447251
Attn: Weeds Biocontrol
EMAIL: bernadette.hanley@industry.nsw.gov.au

For further information contact:

Bernadette Hanley
Technical Officer
Grafton Primary Industries Institute
02 66401622
Mon, Tue, Thur, Fri

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Department of Primary Industries

FACTSHEET

Nigrospora crown rot for biocontrol of giant Parramatta grass

David Officer, Research Agronomist, Grafton Primary Industries Institute

Introduction

This factsheet describes recent research into a naturally occurring (endemic) fungus *Nigrospora oryzae,* which causes crown rot in weedy Sporobolus grasses (WSGs). Until recently the control of WSGs has been dependent on chemicals that are expensive and often provide only short term suppression. Biological control in the form of Nigrospora crown rot is now a viable option for WSGs, particularly giant Parramatta grass. As producers are becoming aware of Nigrospora crown rot they are switching from long-term chemical use to biocontrol. Except in cases where an immediate reduction in GPG is required, chemical control is becoming less necessary.

Nigrospora crown rot fungus is generally a saprophyte (uses dead plant material for nutrients), or is occasionally a secondary cause of disease. In introduced WSGs it produces crown rot. The disease is known to kill giant Parramatta grass (GPG) and reduce infestations to non-economic levels over a couple of years. Up to 78% reduction in tussock size (over 15 months) and 64% reduction in tussock presence (over 12 months) has been observed in the field, due to the effects of Nigrospora crown rot.

Nigrospora oryzae has also been observed inducing disease in Parramatta grass (PG) and giant rats tail grass (*GRT*). How effective it will be as a biocontrol agent in these species is discussed below.

Abbreviations

GPG = giant Parramatta grass (*Sporobolus fertilis*)

GRT = giant rat's tail grass (*Sporobolus pyramidalis* or *Sporobolus natalensis*)

PG = Parramatta grass (*Sporobolus africanus*)

WSGs = weedy *Sporobolus* grasses (includes GPG, GRT, PG and *Sporobolus jaquemontii*)

Figure 1. GPG affected by crown rot (pale orange leaves).

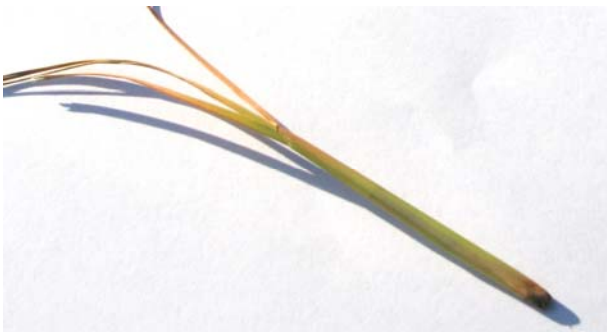

Figure 2. Crown rot in a GPG tiller.

Nigrospora crown rot symptoms

Nigrospora crown rot produces pale orange leaves on diseased tillers. The diseased tillers are easy to remove from the crown and have a brown-coloured base instead of the normal white colour. Yellowing caused by crown rot will always occur in the central folded leaf of a tiller, not just in the outer leaves as can be caused by frost or age.

The symptoms of crown rot become obvious in spring 7-10 days after the first effective rainfall event after winter. By late December through to mid January the disease is usually easiest to spot. The amount of disease and rate of spread can be dependent on rainfall.

During autumn and winter the symptoms of the disease tend to disappear, reappearing the following spring.

Using Nigrospora crown rot as a biocontrol agent

Nigrospora crown rot may need to be introduced to an infestation and managed for maximum effect, or it may already be present in small amounts and only require better management to increase its spread and effectiveness.

Introducing Nigrospora crown rot to an infestation

Ideally, *Nigrospora* spores will be available as a commercial preparation for inoculating large areas of GPG. Until a commercial preparation is developed the only way to introduce the crown rot-causing spores is by transplanting diseased plants.

Diseased plants can be introduced from other infestations, but an initial check for crown rot-affected plants that may have gone unnoticed and could provide local transplanting stock is best practice.

The natural spread of the disease has been patchy, but with more producers introducing diseased plants this situation will improve.

Transplanting diseased plants

Crown rot-diseased plants should be transplanted along ridges and areas of high cattle traffic.

Dig up diseased plants using a mattock or spade and take 5-10 cm depth of soil and roots. Keep the plants cool between digging up and planting. Try to plant when the soil is moist. Use a mattock to open the soil up next to a healthy WSG plant. Plant the diseased plant in this hole and stomp around it to ensure good root ball and soil contact.

Research is underway to determine the best time of year to introduce diseased plants. Because diseased plants are hard to find in late autumn and winter, most diseased plant transfer will take place between late spring and early autumn.

Where can I get diseased plants?

Northern NSW coastal cattle producers are using Nigrospora crown rot as a control measure by moving diseased plants onto their properties when they can locate suitable material. Crown rot disease has been found from the Tweed to the lower mid-north coast in NSW. Contact your local weeds officer or District Agronomist who may be able to recommend sites with active crown rot disease infections.

Figure 3. Planting diseased plants in research plots.

Restrictions on the movement of diseased plants

Movement of prohibited plants including WSGs across a state border needs a permit. It is best practice to identify and use any local infection sites for diseased plant transfers.

Spreading crown rot through an infestation

The spores of *Nigrospora oryzae* are spread in a number of ways:

- in water with overland flows after rain
- in air, short distances to new host plants, and
- through animal and vehicle movement.

Water movement after rain

Over time rain water will move spores downhill. By planting diseased plants into an infestation at the top of a ridge or hill, rain water will spread the spores through an infestation. A single diseased plant can spread spores and infect plants over 0.1 ha in 12 months.

Air transfer

Spores from diseased plants can move in the air a short distance to new host plants.

Animal and vehicle movement

Disease incidence is often highest along cattle tracks and is more likely to show up in areas where cattle movements are more frequent. It is also likely that vehicles aid the movement of spores. Slashers and other cutting equipment are also likely to move diseased plant material around a property.

Figure 3. A diseased plant was planted at the top of this ridge. Over 2 years water has spread the spores downhill and the depressions are now GPG free.

Figure 4. 90% of GPG plants along this cattle track were diseased compared with 30% of plants away from the track.

Managing crown rot for maximum control

Crown rot can be managed for maximum suppression and control of WSGs.

Grazing, slashing and burning

Initial research has observed a greater rate of disease spread in GPG infestations that are well grazed. Moderate to heavy grazing produces a flush of new growth. Disease symptoms occur in new shoots while they are still short and green, and do not occur in tall, hayed-off plants. Any management practice that produces a flush of new growth is more likely to help the spread and effectiveness of disease.

Crown rot disease symptoms have been seen on both burnt and slashed GPG. Burning and slashing also result in a flush of new shoots and it is likely both management options may assist in the spread of crown rot disease. Research is planned to confirm this theory.

Figure 5. Well grazed GPG on the left side of fence.

Figure 6. Pale orange new leaves of a diseased GPG plant after burning.

Figure 7. Two years after slashing a section of Nigrospora crown rot-infected paddock there is less GPG in that part of the paddock.

Effects on Parramatta grass and giant rat's tail grass

Nigrospora crown rot is now known to occur in two other WSGs, PG and GRT. Both these species have been found with crown rot disease in the field and a survey has found diseased GRT as far north as central Queensland. It is still too early to know what economic impact Nigrospora crown rot will have on these species.

Given its genetic closeness to GPG, PG is likely to respond similarly to Nigrospora crown rot, and current trials are suggesting high susceptibility.

Disease symptoms exhibited by GRT in the field are slightly different to GPG. The initial symptoms of the disease occur when plants become progressively wilted, leaf colour bleaches and stems produce very few seed heads compared to healthy plants.

Figure 8. Pale, diseased GRT with few seed heads in the foreground, with darker green healthy plants behind.

Effects on native *Sporobolus* species

Native *Sporobolus* grasses are not usually present in high densities in pastures as they lack the competitive ability of the introduced WSGs.

There have been no observations of Nigrospora crown rot in any native species in the field. Host specificity testing with the natives *Sporobolus creber* and *Sporobolus diandrus* has shown no evidence of crown rot symptoms.

Nigrospora oryzae will grow on the native *Sporobolus virginicus* but to date no evidence of disease has been noticed. Because *Sporobolus virginicus* is an important plant for maintaining the stability of sandy coastal areas, more research is needed to confirm its level of susceptibility to Nigrospora crown rot. Fortunately there is usually geographic separation between *Sporobolus virginicus* and other WSGs which may minimise the transfer of *Nigrospora oryzae* to this important native species.

Future research

Solid culture of *Nigrospora oryzae* using vegetable juice (V8) agar does produce spores but is labour intensive and unsuitable for the production of commercial amounts of spores. Further research and funding are needed to develop commercial preparations of *Nigrospora oryzae* spores.

Research into the inoculation of PG in southern NSW and Victoria and GRT in Queensland is also required. Diseased plants have been collected from the field but it is not yet known if the course of the disease is the same as it is with GPG.

Additional work on the susceptibility of *Sporobolus virginicus* to *Nigrospora oryzae* is also needed.

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Figure 3 – Sethu Ramasamy

Publications available

Weedy Sporobolus Grasses Best Practice Manual (2007), Queensland Department of Primary Industires and Fisheries. View or download at www.dpi.nsw.gov.au/weeds

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