

3D weed management

Chilean Needle Grass Case Studies

Four Case Studies of Farmers Managing
Chilean Needle Grass in Grazing Systems

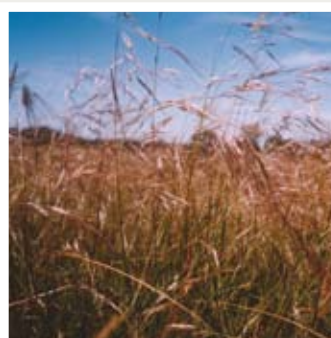


HELPING PRODUCERS TO MANAGE WEEDS IN GRAZING SYSTEMS



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Chilean needle grass (*Nasella neesiana*) is a perennial tussocky grass that can compete all year round with pastures and crops for moisture, sunlight and nutrients. It grows through winter and normally sets seed in spring.

Heavy infestations can reduce pasture productivity by as much as 50%. The seed can cause physical injury to livestock and downgrade the quality of wool, hides and carcasses.

Chilean needle grass can produce both normal flower/seed heads as well as hidden seeds, which are formed in the nodes and leaf sheaths at the base of plants. Forage value declines once the plant goes to seed.

Case Study 1 - Spring View

Ron and Shirley Keats, "Spring View", Caniambo, Victoria

Ron and Shirley Keats own 360 ha at Caniambo, near Shepparton in Victoria. The family has owned this block for over 100 years, with Ron being the third generation to manage Spring View.



The production system

Ron and Shirley run a prime lamb and fodder cropping enterprise, with a few cattle. They currently run 800 first cross ewes and 26 Black Angus cows. All land at Spring View is arable with crop rotations of oats and clover. These crops are used for grazing, saleable hay and silage, and clover seed production.

The couple has recently started to flood irrigate some of the clover, having laser levelled 80 ha of river flats. They plan to increase this irrigated area to 280 ha in the future.

Breeding ewes are mainly run on the clover and lambs are finished on the irrigated clover after seed has been harvested.

Chilean needle grass

Chilean needle grass was discovered on Spring View two years ago. The level of infestation is low, with only a couple of plants found on the property.

Of greater concern to Ron and Shirley, is an area of Crown land that they lease along the river. This land has a Chilean needle grass infestation that is spreading quickly. They are concerned that this is a source of reinfestation for their own land. In particular, if the river floods, it may spread seed to their adjoining land and create a much bigger problem.

When Ron and Shirley first found Chilean needle grass, they didn't know what it was. They experienced a lot of trouble in identifying the weed and determining if it was going to be a problem.

The incentive to act

The Keats' overarching goal is to make money and sustain a living from Spring View and their farming business is driven by commodity prices and seasonal conditions.

Ron and Shirley are motivated to control Chilean needle grass on Spring View for a number of reasons, in particular to minimise the potential impact on their prime lamb enterprise.

While Chilean needle grass is not toxic to stock, it is of little nutritional benefit. Potentially it could reduce the carrying capacity of Spring View or, alternatively, increase feed costs.

The seed also has the potential to contaminate the meat and hide of their prime lambs and discount the price received. There is a risk that Chilean needle grass could contaminate the hay and seed that is produced on Spring View, thus reducing sales.

As soon as they became aware of what the weed was, and the impact that it could have on their farm business, the Keats wanted to eradicate the weed from Spring View and the land leased on the river.



Deliberation

When the Keats first found Chilean needle grass on Spring View two years ago, it took about 12 months to identify it, to gauge its potential impact and work out how they could manage it.

Ron and Shirley were concerned about the potential impact of Chilean needle grass to discount their prime lamb income and contaminate the clover seed and hay. They chose to adopt an eradication program and to try everything possible to keep the weed out of their property. They have been working on this strategy for the past year.

Through vigilant monitoring they have currently eradicated Chilean needle grass from Spring View and prevented it from establishing.

Their main challenge now is to try to contain the Chilean needle grass on the leased river country. The Keats are currently seeking clarity about what management strategies they are able to undertake on the leased Crown land. They are eager to resolve this as soon as possible, so that a control strategy can be undertaken before the next flood.

They both attended a Chilean needle grass field day organised by the local Landcare group, which helped them to identify the plant and provided information on management strategies. They do not want to have to live with Chilean needle grass, as they are convinced that it will destroy their business.

Diversity in the approach

At Springview, a range of control measures are used together to maximise the effect that they have on the eradication and prevention of Chilean needle grass.

Herbicides

In paddocks and along boundaries and roads, isolated plants are identified and spot sprayed with glyphosate.

Clover crops are sprayed with a selective herbicide to eliminate emerging Chilean needle grass plants.

Quarantine

The spread of Chilean needle grass is reduced by limiting the movement of livestock and vehicles between areas of infested and clean land.

Pastures and cropping

Cropping rotations of oats and clover are used to remain competitive against weeds and keep the weed seed bank to a minimum.

Soil testing monitors nutrient levels, and the application of soil ameliorants such as lime and gypsum, help crops and pastures to remain competitive. Annual applications of fertiliser in autumn ensure that oats and clover remain competitive against weeds.

Grazing management

Rotational grazing with sheep and cattle ensures the herbage mass of pastures and crops is maintained, so they remain competitive and prevent Chilean needle grass establishment.

Diligence

Ron and Shirley are conscientious in their management of Chilean needle grass and weeds in general. They undertake constant monitoring for new infestations of any weed. Ron considers himself to be a "noxious weed fanatic" and he is very keen to keep his farm clean of weeds.

Ron and Shirley have tried to control Chilean needle grass by spraying glyphosate in spring along their roads and boundaries, so seed cannot spread onto their farm. They will treat the sources of infestation on their leased land along the river as soon as they know what control measures they can undertake.

Benefits and costs

Ron and Shirley have estimated the direct costs of Chilean needle grass management to be about \$4,500 per annum. This includes herbicide and the additional time required for spot spraying.

The control of Chilean needle grass at Spring View has meant that Ron and Shirley have been able to maintain farm productivity. If Chilean needle grass was to spread across their property, they estimate they could lose 25% of their stock carrying capacity, valued at \$13,500 per annum across the total area grazed.

By preventing Chilean needle grass from taking a hold at Spring View, Ron and Shirley can also produce marketable lambs. They believe that the price discount on lamb contaminated with weed seed could be at least \$50 per head, or \$27,500 per annum.

Preventing the establishment of Chilean needle grass has prevented any impact on their hay sales, which are estimated to be \$2,000 per annum.

Taking these factors into account, the net benefit of their Chilean needle grass strategy is approximately \$38,500 per annum.

Annual costs and benefits of weed management

Costs

Herbicides (chemicals, labour) \$4,500

Benefits

Avoided 25% loss of carrying capacity \$13,500

Avoided price discount for lambs sold \$27,500

Avoided price discount for hay sold \$2,000

Annual net benefit \$38,500

Note: a 25% loss in carrying capacity and price discounting would be likely if the spread of Chilean needle grass could not be prevented.

Ron and Shirley feel that their eradication program for Chilean needle grass has been successful, as they don't currently have any plants on the farm at Spring View.

Keys to success

Ron and Shirley consider the factors critical to their successful management of Chilean needle grass are:

- Eradication, before Chilean needle grass can become established.
- Preventing further reinfestation by careful attention to quarantine and treating the sources of infestation.
- Continuous monitoring and immediate treatment of any new plants.

Summary

Ron and Shirley Keats have effectively managed Chilean needle grass at Spring View by:

- ✓ Carefully monitoring for new plants.
- ✓ Spot spraying with glyphosate and digging out plants as soon as they are found.
- ✓ Making sure that clover and oats can compete against Chilean needle grass and stop it from establishing.
- ✓ Limiting the movement of livestock and vehicles between clean land and land infested with Chilean needle grass.

This strategy protects the farm carrying capacity and prevents contamination of lamb and hay - a benefit worth around \$38,500 each year. This greatly outweighs the direct cost of \$4,500 per year in herbicide and labour for spot spraying.

Ron and Shirley have been able to eradicate Chilean needle grass outbreaks at Spring View but are concerned about reinfestation from a portion of Crown land that they lease along the river.

Top tips ✓

Ron and Shirley's suggestions for managing Chilean needle grass are:

- ✓ Always monitor for new weed infestations.
- ✓ Identify a weed as soon as you find it.
- ✓ Control the weed by spot spraying, before it can establish itself on farm.
- ✓ Manage pastures, crops and grazing to provide competition against weeds and prevent weeds from establishing.
- ✓ Limit the movement of livestock and vehicles between infested and clean country.
- ✓ If at all possible, treat the source of infestation to remove it or at least prevent it from seeding.

Case Study 2 - Rosehill

Rex and Julie Sheedy, "Rosehill", Glen Innes, New South Wales

The Sheedy family has run a grazing enterprise at Rosehill, Glen Innes, for over 100 years. After buying neighbouring lands, the farm is now 2,240 ha, of which 800 ha is arable. The remainder is largely hill country.



The production system

The Sheedys have expanded their business to include a property on the eastern part of the New England tablelands and another at Come-By-Chance.

The grazing enterprise is a combination of cattle and sheep. There has been a major shift from predominantly sheep to a much stronger focus on cattle, largely because of Chilean needle grass.

From their 1,200 cows, they sell 600 steers and 350 heifers each year, with the remaining heifers kept for breeding. Sheep are primarily for lamb production, with wool a secondary product. Crossbred ewes are bought in and crossed with top quality local rams to turn off 1,600-1,700 lambs each year.

About 160 ha of fodder crops are grown each year for grazing and storage in silos. Until recently, some paddocks had been cropped to soy beans by a sharefarmer.

Rex's goal is to turn off high quality cattle and lambs. Good genetics, well bred and well grown animals are important to achieve this.

Chilean needle grass

Chilean needle grass was scattered on a neighbouring farm that the Sheedys bought in the 1970s. Today, Chilean needle grass makes up about 50% of the pasture at Rosehill.

After trying hard to eradicate it, Rex has now accepted that Chilean needle grass is part of his pasture and he has learnt how best to graze and make good use of it, while slowing its spread and vigour.

The incentive to act

Initially Rex was very concerned about what this unknown grass might do to their farm. He tried hard to eradicate it by spot spraying and, for about 10 years, it appeared to be under control. Then, after the 1981 drought, the recovering pastures across the farm contained Chilean needle grass. The Sheedys felt they were going backwards with spraying.

This was a key turning point. Rex decided that with so much Chilean needle grass, eradication wasn't feasible. They would have to learn to live with it instead.

Initially, Rex said that they felt devastated – like they were "getting flogged." But now they "have a handle on how to graze it" and it's not as bad as they thought.

This wasn't a matter of just accepting the impact. Deductions of \$2-3 per head were being made for lambs that had Chilean needle grass seeds burrowed into their carcasses. Carrying capacity was also reduced. Vegetative contamination of wool increased slightly, but this didn't result in significant discounts for their type of wool.

With this in mind, Rex set about a lot of trial and error, to figure out how best to manage Chilean needle grass to produce the best possible grazing returns and to manage the land.

Rex's goals are to maintain carrying capacity and the quality of turn-off. Through careful management, Rex is now able to fatten cattle and graze prime lambs on blocks with Chilean needle grass.

Deliberation

Finding information about Chilean needle grass was difficult and somewhat frustrating, as the Sheedys were the first to ask questions about it. Even identification was a problem - they were told it was a native speargrass (*Austrostipa* spp).

Their own trial and error has been the most useful source of information. Trials were also undertaken on Rosehill by the NSW Department of Primary Industries (DPI) agronomist, Geoff Lowein.

A lot of field days were held, sometimes at Rosehill, and these were useful as many farmers in the area were just coming to terms with Chilean needle grass. The field days are less common now, as most farms in the area have developed a system of management.

The information from a study tour to Argentina by Mark Gardner was particularly useful as this helped them to realise that they couldn't feasibly spray it out, but rather had to learn to live with it.

Diversity in the approach

Rex's approach to managing Chilean needle grass is to design grazing strategies that maximise animal and pasture performance; keep country clean where possible; keep the infestation at acceptable levels elsewhere; minimise the impacts on stock; maintain or improve carrying capacity; and undertake trials to better understand it.

Grazing management

Rex has reduced sheep numbers and increased cattle numbers, as cattle don't suffer many problems when grazing Chilean needle grass.

Cattle are grazed first in each paddock, to take the head off the grass, and are then followed by sheep when the grass is shorter. This system allows the grass to be used effectively and slows the rate of seed set, thereby reducing problems to stock from the seed. This requires careful planning of the grazing rotations.

Use of supplements

The Sheedys normally supplement their stock through winter when grazing any grass.

Pastures and cropping

Arable land is sprayed and direct drilled to fodder crops for three to four years. Oats are the main fodder crop, but triticale, sorghum, millet or barley have also been sown. After the cropping cycle, the land is planted to a competitive pasture.

Fencelines are sprayed to keep Chilean needle grass from entering these paddocks.

Fodder cropping helps make up carrying capacity lost to Chilean needle grass invasion and it also helps to reduce the weed's dominance in those paddocks.

In the past, the Sheedys found that Chilean needle grass "really took off" after cultivation, so now they direct drill fodder crops.

Competitive pastures include a mixture of several grasses and clovers. Rex has tried winter ryegrass alone but this wasn't sufficient. He now always uses a mixture. Fescue competes well, but he is hoping a more competitive pasture will be found in the future.

The non-arable hills comprise 50% Chilean needle grass. It doesn't grow very high there and in the past 15 years hasn't set the tall seed heads. Rex accepts this balance, but always grazes it with cattle first.

Farm trials

On-farm trials help to investigate various options for managing Chilean needle grass.

A long term trial is running in one paddock where the black soil flat was cultivated and fertilised 20 years ago, resulting in Chilean needle grass coming up densely everywhere and becoming almost a monoculture. For the past 15 years, this paddock hasn't been cultivated or fertilised and has been grazed heavily. Rex is now starting to see patches of Chilean needle grass die out. It didn't set seed in 2007 and other grasses are starting to grow. Cattle do "really well" on this block, though carrying capacity is at about 75-80% of what it could be with other pastures.

Herbicides

Clean country is kept clean by monitoring and spot spraying with glyphosate. They have previously used flupropanate, which also gave good control, though eventually Chilean needle grass returned. They also avoid flupropanate due to concern about residues and because it is tough on pasture.

Diligence

Rex is constantly managing his grazing system to minimise the impact of Chilean needle grass on sheep.

The Sheedys' eastern New England farm doesn't have Chilean needle grass and they are working hard to keep it that way. They have decided that quarantine



Summary

Rex Sheedy has found ways to manage Chilean needle grass in his pasture by:

- ✓ Keeping clean country clean, through vigilant monitoring and spot spraying.
- ✓ Grazing it appropriately – shifting the balance to more cattle and less sheep; grazing the cattle first and then bringing the sheep in once the grass is shorter; and using liquid feed supplements in winter.
- ✓ On arable land, planting an additional 120 ha to fodder crops for three to four years followed by planting a competitive pasture to reduce Chilean needle grass and to produce enough fodder crops to maintain carrying capacity.

With careful management this system is working well. Rex gains good feed from Chilean needle grass, particularly in the winter. He has minimised the impact it has on his high quality beef and lamb carcasses and on wool.

Overall, the benefit from managing Chilean needle grass is around \$154,000 each year, while the costs are around \$23,500.

In the longer term, Rex hopes a competitive pasture grass and/or biological control will become available to help manage Chilean needle grass.

Top tips ✓

If you have a lot of Chilean needle grass:

- ✓ Crop where possible for three to four years.
- ✓ Avoid cultivation by spraying and direct drilling.
- ✓ Plant it to a competitive pasture mix.
- ✓ Rotational graze cattle, followed by sheep. If it's too good a season, run cattle and sheep together to keep Chilean needle grass low.

If you only have a little Chilean needle grass:

- ✓ Be very, very vigilant.
- ✓ Spot spray.
- ✓ Watch it like anything - one plant will beat you.

of vehicles is not practical, as the seeds stick well inside vehicles. Instead, they carefully monitor and spot spray, particularly at entry points such as along roadways and around yards.

They don't transfer sheep between farms, as they carry the seeds in their fleece.

Rex and his team are always looking out for any new weeds and spot spraying them.

Benefits and costs

Having decided to learn how to actively manage Chilean needle grass rather than eradicate it, Rex is reasonably confident with his strategy. He has avoided some of the significant time, stress and other costs that were involved with an eradication program.

Without active management, Chilean needle grass would have reduced the farm's carrying capacity by around 25%. However, instead of having to reduce stock numbers, Rex grows an additional 120 ha of fodder crops to maintain current carrying capacity.

The combination of extra fodder cropping, spot spraying and rotational grazing is returning significant benefits for the costs outlaid.

NSW DPI farm budgets have been used to estimate the economic impact of the strategy.

Annual costs and benefits of weed management

Costs

Herbicides (120 ha crop + spot spraying)	\$23,500
Herbicides	Not costed

Benefits

Maintain carrying capacity (5,000 DSE @ \$30/DSE gross margin)	\$150,000
Avoided price discount for lambs sold	\$4,000
Annual net benefit	\$130,500

A downside is some loss of flexibility in grazing; having to always graze paddocks with cattle first and keep sheep out of paddocks where Chilean needle grass is tall and seeding.

The weed is more of a problem for sheep and Rex believes that he no longer has the option of a grazing system dominated by sheep.

Dogs can't be used for mustering when the Chilean needle grass is in seed and he also needs to be careful with horses.

Although he recognises it as a weed and something that he'd rather not have, Rex believes that Chilean needle grass is useful feed through the winter. According to Rex "it is high protein and good grazing when young, it's very hardy, it greens up quickly after a frost" – he can get through the winter much better with Chilean needle grass.

While some people may be concerned about property values, Rex notes that in reality, recent property sales haven't been affected by Chilean needle grass.

Keys to success

Rex believes that the critical factor for management of the weed lies in accepting that Chilean needle grass is now a part of the system on Rosehill.

While he would rather not have the weed, he feels this isn't a realistic option and that it's better to make the most of it.

While Rex is confident in his current strategy, he would still prefer not to have Chilean needle grass. He is keeping it from spreading, in the hope that a better option will come up in the future, such as a grass that can compete with it more strongly or a biological control option.

Case Study 3

New England, Northern New South Wales

This is a true case study of Chilean needle grass management by a family who farm in the New England region, northern NSW. Names have been withheld.



The production system

A Black Angus cattle enterprise is operated over the 280 ha home farm and the 380ha second farm. Each year 300 cows are joined, typically producing 270 calves. Steers are grown to supply a local feedlot. Surplus heifers are sold as breeders to farms that are building their Black Angus herds or for local first cross Wagyu / Black Angus enterprises.

Sheep are no longer run on the farms. This represents a substantial change from the predominantly prime lamb and wool enterprise with some cattle that was operated on these farms prior to Chilean needle grass becoming widely established.

Phalaris and cocksfoot pastures with some winter ryegrass were established in the mid-1950s and 1960s. Fescue was also sown but it didn't establish very well. Seed is still aerially sown occasionally when needed to enhance the pasture condition.

Each year around 10-20 ha on each farm is sown to fodder oats. Pastures are sown after the oat crops. Fertiliser is applied every two to five years, according to soil tests results. Nitrogen fertiliser is used when planting pasture.

Chilean needle grass

Chilean needle grass has been in the New England region since the mid-1960s. It was originally thought to be a native speargrass but since realising its invasive and destructive nature, graziers have been trying to control this grass.

A grazing enterprise in the New England region, consisting of two separate farms, has been applying strategies to manage Chilean needle grass.

The home farm is heavily infested with Chilean needle grass and, despite extensive control efforts, this has now become the dominant pasture species. Spot spraying for Chilean needle grass commenced in 1985 when it appeared that the weed was becoming a big problem.

On the second farm, which is some distance from the first, Chilean needle grass is restricted to isolated outbreaks in a couple of paddocks. Extensive monitoring and careful quarantine procedures are preventing it from establishing there.

The incentive to act

The home farm has been in the family for five generations and this creates a strong emotional link to the property.

Initially there was concern that Chilean needle grass would become a monoculture as it spread so quickly and dominated other pastures. Increasingly it caused problems for sheep on the property. The growth of clovers was reduced and it became more difficult to finish lambs. The seed also damaged their carcasses.

One of the owners recounted an incident that triggered a key decision point for the management of the weed. A lamb had been killed and the needles could be felt all along the carcass. That was when they decided they "really had to do something different."

Deliberation

For over five years, exhaustive efforts were made to eradicate Chilean needle grass.

During October and November, when the Chilean needle grass went to seed, it could be seen everywhere. They'd go out with hand-pumps and, later, with bikes – spending any spare time spraying it. During the 1991/92 drought it was really noticeable.

This was a time consuming, exhausting and very demoralising exercise as the Chilean needle grass was still spreading. To make it worse, spraying with flupropanate left big bare patches of ground. Groundcover reduced year after year and the Chilean needle grass kept germinating.

After this considerable effort, it was recognised that eradication of Chilean needle grass wasn't a feasible option. The owner had to accept that they couldn't change the situation and move on.

"We came to the point one day that we decided we had to either live with it or walk away."

They set different Chilean needle grass management objectives for each farm.

On the home farm, the approach is to manage the weed as an undesirable but major component of the pasture.

On the second farm, the aim is to prevent Chilean needle grass from establishing.

Finding information about how to manage Chilean needle grass has been a challenge. In particular there was limited specific advice about what actions might work.

Diversity in the approach

There are several elements to the management strategy implemented by the family. This varies to match the different Chilean needle grass objectives for each farm.

Enterprise change

A major part of the strategy was to change the enterprise from sheep and cattle to only cattle. In 1983 the enterprise consisted of 1,200 sheep and 50 cattle. By 2001 the enterprise was all cattle. Chilean needle grass was the real catalyst for this change.

Sheep may still be feasible on the second farm but it suits the venture better to run the farms as a single livestock enterprise.

This change has been well suited with a nearby feedlot a very good outlet for the Black Angus steers. The Chilean needle grass dominant pasture is better for growing cattle than it is for finishing them.

Quarantine

Quarantine measures are employed to prevent the spread of Chilean needle grass between properties.

Movements of visiting vehicles are restricted. For example, rather than take an agent up to a paddock, cattle are brought to a yard near the house. Agents are also asked to visit this farm as the last stop on their daily rounds so that Chilean needle grass isn't spread to other farms.

Extra quad bikes have been bought so they are not moved between farms. The tractor is only used on the home farm in the winter (when Chilean needle grass is not in seed). It is carefully cleaned down before moving it between farms.

Cattle are bred on the second farm and then grown on the home farm. Most are sold directly from there. The few that are returned are only ever moved after Chilean needle grass has stopped seeding.

Grazing management

Cattle fed on Chilean needle grass do quite well, but the feed value declines as it goes to seed.

To maintain feed value it is grazed down while it is still vegetative. This can be difficult as it is now across most paddocks on the home farm and it all goes to seed at once. The strategy is to run cattle in big mobs to crash graze.

In difficult winters, cotton seed is provided as a feed supplement.

Herbicides

Spray topping - applying a sub-lethal dose of herbicide early in the flowering period - has been tried and more of this is being considered. However, there is a preference not to use too much herbicide.



Isolated outbreaks on the second farm are treated by spot spraying with flupropanate during the October-March period as this is the best time to detect the grass. Some paraquat is added to the mix to make it easier to see which patches have been sprayed.

Diligence

Complementing the careful quarantine measures; constant awareness and monitoring allows any new outbreaks to be quickly dealt with. For example, a hoe is always carried on the bikes to chip out any new plants and likely entry sites are regularly checked.

Careful attention is paid to the movement of machinery, vehicles and stock between the two properties and other farms.

Benefits and costs

Deciding to accept Chilean needle grass as a part of the pasture on the home farm and to change enterprises to suit, has given significant emotional benefit. While preferring not to have Chilean needle grass, the owners are more confident that a viable and productive cattle enterprise has been developed and the farms will remain capable of producing good returns.

Changing enterprises and matching this to strong demand for Black Angus cattle has increased the overall profitability of the farm business.

Importantly, the owners no longer feel that they're being 'beaten' by the grass. They are happy to have reduced the amount of herbicide they use, because this has reduced potential residue risks and their reliance on chemicals.

Ideally some sheep would add diversity to the enterprise, making use of existing infrastructure and for greater efficiency but the heavy infestation of Chilean needle grass prevents this option.

The strict quarantine that operates between farms, particularly in relation to machinery, does pose some inconvenience as well as additional capital cost in purchasing another quad bike.

Keys to success

Making a clear decision about what was achievable with Chilean needle grass on each farm, both realistically and economically, was a critical starting point. This made it possible to accept and adopt new and profitable strategies for managing Chilean needle grass. Until this decision was made, attempting eradication was exhausting and demoralising.

Next, developing and implementing a management strategy for each farm was important – grazing management on the home farm; prevention and containment on the second farm; and careful quarantine between properties.

Choosing a new enterprise helped to match good demand for turning off cattle to the feed supply from Chilean needle grass. The opportunity to supply a nearby feedlot was an ideal solution. Additionally, a strong demand for Black Angus breeding stock has provided good returns.

Being very cautious and vigilant is preventing the spread of any weeds between farms or from entering from elsewhere.

The owners hope that in the future, tools such as a biological control may help to prevent Chilean needle grass from becoming a monoculture on the second farm.

Knowing more about the nutritional value of Chilean needle grass to optimise its use, seems the most likely hope for the future management of this weed.

Summary

A system for managing Chilean needle grass on these farms has been developed that involves:

- ✓ Switching from a predominantly prime lamb and wool enterprise to a Black Angus cattle enterprise.
- ✓ Intensive grazing pressure to keep Chilean needle grass low and prevent it from setting tall seed heads.
- ✓ Monitoring, spot spraying and chipping less infested areas.
- ✓ Quarantine of vehicles between properties.
- ✓ Preventing movement of cattle between properties during critical seed times.

This system has given considerable benefit in regaining confidence in and profitability of the farming system.

Top tips ✓

Drawing from this experience, the owners suggest that anyone with Chilean needle grass needs to carefully plan a strategy that will suit their farm and the level of weed infestation.

- ✓ Be very vigilant. Look carefully for new outbreaks at likely entry points such as airstrips, yards and shearing sheds to treat them quickly.
 - ✓ If you only have a little Chilean needle grass, do everything in your power to remove it as soon as possible and to prevent it from establishing.
 - ✓ If you have a lot of it, decide what is feasible and develop your own system to suit your farm and any local opportunities.
- Changing out of sheep may be the most viable option. Always be active in managing Chilean needle grass to reduce its spread, stop it going to seed and keep it palatable.

Case Study 4 - Urandangie

Bill and Jacqui Perrottet, "Urandangie", Guyra, New South Wales

Bill and Jacqui Perrottet have owned and managed Urandangie in the New England Tablelands for the past seven years.

On this 1,525 ha property they run a mixed grazing enterprise, producing fine wool, beef and goat meat.



The production system

Stock numbers vary, to take advantage of prices and seasons. Typically, they have 4,600 sheep for fine wool, joining about 2,500 ewes each year. They calve 160 cows and trade in cattle, running about 640 head in most seasons. They also run 1,300 goats for meat and trading, which Bill believes has a strong industry outlook.

Pastures mainly consist of the native grass, poa tussock, with white clover, and all stock are supplementary fed with cottonseed meal during winter.

The country is very stony, hilly and only 20% arable but direct drilling is possible on half of the land.

As part of a pasture improvement program, Bill typically plants 120 ha each year – one paddock to a fodder crop (rye or triticale) and another to a fescue/white clover pasture.

Grazing management varies from crash grazing through to set stocking. Paddocks are gradually being fenced down to 15-25 ha in size to allow more controlled, rotational grazing.

Chilean needle grass

Several weeds were already established on Urandangie when the Perrottets bought it, but Bill regards Chilean needle grass as the biggest problem. Goats have controlled the blackberries and graze the thistles. African lovegrass is present on 2% of the farm, where it is being contained and slowly controlled with herbicides.

Chilean needle grass poses a different and more concerning challenge. It is dense on about 5% of the property, with moderate-to-low infestations on the remaining land. It is more concentrated in some paddocks than others and has spread in lines out from the shearing shed.

The incentive to act

Bill and Jacqui's goal is to improve Urandangie and their grazing system, to increase output.

They're also keen to improve the farm's environment, planting 1,500-2,000 trees each year to revegetate the farm, attract birds and provide windbreaks. With funding from the local Catchment Management Authority, they're fencing off all of the property's water ways and putting in reticulated water.

Without management, Bill feels that Chilean needle grass could easily affect the whole farm and district with major consequences for their wool enterprise.

Chilean needle grass is widespread in the New England region but Bill said that he believes many people are in denial about the problem, perhaps because they are worried that it will affect their property values or stock sales.

Bill's greatest concerns with Chilean needle grass are that it may take over and dominate the pastures; reduce carrying capacity, particularly during the spring flush; cause vegetative contamination that could halve the price premium for his fine wool; reduce the value of surplus sheep sales; and reduce the property's value.

Bill knows Chilean needle grass is very competitive. It copes well with grazing, is a little more winter active than other pasture species and is unpalatable in spring, when other species are being eaten.

Bill undertook a trial to run prime lambs in a Chilean needle grass paddock. His lambs did well but the Chilean needle

grass seeds worked through the wool and irritated their skin.

Bill now aims to contain Chilean needle grass by preventing, or at least slowing its spread and managing it to minimise the impacts on his wool and lamb enterprises.

Deliberation

Within two months of buying the property, Bill realised that Chilean needle grass was present and the impact it might have.

He sought out all he could about the weed and how to control it. He was frustrated by the lack of information about what to do. There was some help from the agribusiness sector, with a Monsanto representative suggesting that spray topping might help.

Bill talked with other producers who had tried different things but this provided limited information as few producers would admit to having Chilean needle grass. Bill said that he feels that the stigma associated with having Chilean needle grass blocks the sharing of ideas.

Bill quickly set out to do all he could to eradicate the weed by spot spraying. He found this stage quite depressing. He spent a lot of time spraying and didn't feel as though he was beating it.

A major turning point - and considerable relief - came when a nearby grazier who'd had a similar experience commented "you'll put yourself in an early grave" trying to eradicate Chilean needle grass. The grazier suggested that he'd be better off learning how to work with it.

With this in mind, Bill has developed a strategy for Chilean needle grass, with four key priorities:

- Stop the spread.
- Restrict it to where it is already dense
- Prevent seed set
- Keep the grass palatable.

This will be a long term strategy that needs regular and timely attention to contain and manage Chilean needle grass until better management options become available.

Diversity in the approach

The key elements of Bill's strategy are spray topping, rotational grazing and quarantine, which involves cleaning down equipment, slowing spread through boundary fences and managing stock movements.

Herbicides

Bill contracts someone to undertake spray topping - the application of sub-lethal herbicide doses early in the flowering period - along laneways and holding paddocks, totalling around 200 ha. It is done around the first week of October to stop Chilean needle grass from going to seed. This prevents or reduces the seed set and also keeps the grass palatable for longer.

To reduce the risk of herbicide resistance developing, Bill alternates the type of herbicide used each year. Glyphosate, at a rate of 400mL/ha, is used every second year and paraquat, at a rate of 500mL/ha, in alternate years.

Grazing management

Rotational grazing to keep stock out of infested paddocks is a viable option, as not all paddocks have a Chilean needle grass problem. Bill is sub-dividing blocks further and adding goat-proof fencing to widen the options available.

He currently keeps sheep out of Chilean needle grass paddocks when it is seeding as the seeds are a significant problem in fine wool.

Goats and cattle are run together in rotations to graze the weed down, preventing it from growing rank. Bill finds that goats seem to selectively graze Chilean needle grass more than other stock. Stock on the infested paddocks are quarantined there when the weed is seeding.

Bill slashes the area around the house to stop the grass going to seed.

Quarantine

Bill rotates cattle and goats in a quarantine pattern. To reduce the spread of seeds into cleaner paddocks, stock graze the worst affected paddocks last.

In the past, vehicles and stock were the main means of seed spread. Now, all contractors' machinery is cleaned down thoroughly using a pressure cleaner and washdown pad on the farm.

Bill tries to keep the weed down along the boundaries. He has planted and fenced treelines along some boundaries to try to stop the grass from spreading.

Diligence

Bill continues to trial new approaches. This year he tried crash grazing and weed wiping in areas with low infestation, which has given good results at a cost of \$10 per ha.

Bill has tried a number of other strategies with less success.

He found that hand spraying with flupropanate killed everything and he was concerned about the 150 day withholding period.

Hand spraying with a kill rate of paraquat or glyphosate left bare ground, and Bill observed that the Chilean needle grass generally came back first.

Some of the farm had been cultivated for cropping but this tended to spread the grass.

Bill tried using a crop rotation cycle, planting three years of oats and then planting pasture but found that the Chilean needle grass returned within 12 months.

Summary

Bill is containing Chilean needle grass and reducing its impact at Urandangie by:

- ✓ Acknowledging that Chilean needle grass is present and monitoring it.
- ✓ Spray topping to prevent seed set, particularly along roads and stock laneways.
- ✓ Keeping sheep out of the Chilean needle grass paddocks at seeding while goats and cattle stocked in these paddocks at seeding time are quarantined there.
- ✓ Grazing it down with cattle and goats, to stop it growing tall and rank.
- ✓ Not moving cattle from infested paddocks back onto clean paddocks at seeding time.

This is keeping Chilean needle grass from spreading, but in the longer term Bill hopes that better options will be available to control, manage and utilise this weed.

By actively managing the weed, Bill gains a number of benefits for productivity and farm management. If he did nothing, Bill estimates that the farm carrying capacity may drop by 20-30%. Retaining this carrying capacity is worth around \$105,000 each year to the business. It also means that the Perrottets are still able to run a sheep enterprise.

Top tips ✓

Bill's suggestions are:

- ✓ Carefully assess your Chilean needle grass issue, talk with people who have it, find out how to identify it and don't deny that it might be there.
- ✓ If you have a smaller area, perhaps 5% or less, or the weed is all in one place, fence it off and try to eradicate it.
- ✓ If it's in small areas scattered over the farm, try to reduce seed set by spot spraying.
- ✓ If it's thick on about a quarter of the farm, try spray topping, focusing on stock movement areas, and rotational grazing, to contain it until some better options become available.

In the tree lines, where stock are excluded, the Perrottets noticed that where phalaris was established, Chilean needle grass didn't compete with it.

However, phalaris isn't able to compete with established Chilean needle grass. Therefore, spelling the pasture wouldn't be sufficient to fix the problem.

Benefits and costs

Bill believes there are many benefits from his strategy of spray topping, rotational grazing and quarantine.

His management strategy has helped retain the spring flush on most of the farm. Spring pasture growth is reduced in spray-topped areas, but would likely be worse over the whole farm if Chilean needle grass got away.

Management has also reduced the spread of the grass; improved winter carrying capacity due to the higher protein and digestibility of the Chilean needle grass when kept short; and increased weight gains in all stock.

By reducing the vegetative matter contamination in wool, Bill has retained the fine wool premium. He estimated that contamination would halve the average price received for wool. Comfort during stock handling is far greater without the Chilean needle grass seeds in the fleeces and it is also better for sheep dogs.

More flexible grazing rotations are possible, as spray topping makes more paddocks available without seed problems.

However, spray topping does have some downside. Reduced ground cover allows other weeds (thistles, Bathurst burr) to invade; clovers are killed in their early growth stages; it can reduce the bulk of some temperate grasses (offset somewhat by increased digestibility); and although Chilean needle grass isn't spreading, it is increasing in density in the areas where it now exists.

The main cost of Bill's management strategy for Chilean needle grass is spray topping at \$12.50/ha (herbicide and application) over 200 ha, once per year.

Other costs (eg, rotational grazing) are difficult to attribute to Chilean needle grass as they are part of the new grazing management system that Bill uses.

If left unmanaged, Bill thinks Chilean needle grass could reduce the carrying capacity of his land by 20-30%. If an average livestock gross margin of \$25/DSE is used, this is worth around \$105,000 per year.

A 25% discount on the price of wool could be expected if Chilean needle grass was uncontrolled and caused vegetative matter contamination of around 4%. However, in this situation, the irritability of the seed would most likely necessitate a change of enterprise away from sheep.

At this stage, Bill doesn't feel that he is winning against Chilean needle grass. Rather, he is keeping it at bay. He hopes that more effective management tools such as a competitive pasture or a biological control will become available and will enable better control or eradication.

Annual costs and benefits of weed management

Costs

Spraying topping (chemicals, labour)	\$2,500
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Benefits

Avoided 25% loss of carrying capacity	\$105,000
Avoided price discount for contaminated wool	N/A
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Annual net benefit	\$102,500

Other publications from AWI and MLA:

3D Weed Management: Chilean needle grass

**Tips & Tools: Weed removers, pasture improvers
– Effective weed control**

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