

Mexican feather grass (*Nassella tenuissima*) control – the ACT experience

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Summary There have been two main biosecurity incidents involving Mexican feather grass (*Nassella tenuissima*) in the Australian Capital Territory (ACT), the first in 2008–09 and the most recent in December 2015. Successful control relies on: strict hygiene during removal and disposal of plants, removal of all contaminated plant material and mulch, use of fluprofonate 745 g L⁻¹ to suppress seedlings, covering the sites in deep mulch, thorough and regular follow-up control to locate seedlings and good public engagement.

Keywords Biosecurity, containment, Mexican feather grass, *Nassella tenuissima*.

INTRODUCTION

Mexican feather grass (*Nassella tenuissima* (Trin.) Barkworth) is a prohibited and notifiable pest plant in the ACT. Using the NSW Weed Risk Management System (Johnson 2009), with ACT data, gives a risk of ‘Very High’ for this species.

The increased fire danger observed with serrated tussock (*Nassella trichotoma* (Nees) Hack. ex Arechav.) (Osmond *et al.* 2008) could also apply to Mexican feather grass, as it also has very fine leaves and produces masses of fine-awned seed. It also has low palatability. Potential distribution in the ACT could be as high as that observed for serrated tussock.

During 2008, a Victorian nursery imported stipoid grass seed. The seed was either mislabelled or contaminated with Mexican feather grass seed, which was then propagated and distributed. The plants were sold under various stipoid type names. But this was not the first time it has been on sale in Australia. It has been recorded for sale in NSW and Victoria as far back as 1996 (Queensland Government 2016).

Online overseas seed companies have also marketed the plant under various names including *Stipa tenuissima*, *Stipa tenacissima*, elegant spear grass, white tussock, Texas tussock grass and ponytail grass (NSW DPI 2016).

There was a national response to the 2008–09 illegal importation. The Victorian Government supplied valuable information to the ACT Government regarding numbers of plants sold to the ACT nursery industry.

Plants were tracked down to as many households as possible. There was also one naturalised infestation discovered in Namadgi National Park.

Not all plants were recovered, and in December 2015, seven years after the initial response, two more infestations originating from gardens were discovered. These resulted from plants purchased in 2008–09.

MATERIALS AND METHODS

Enough time has passed since the 2008–09 biosecurity response for us to see what has helped with eradication and containment efforts. Four case studies are discussed below.

Identification Mexican feather grass is a tufted perennial grass native to Texas, Mexico, Argentina and Chile. It can grow to 70 cm tall (Figure 1) and has very narrow leaves (<1 mm wide) with a 1.5 mm to 4 mm long ligule. It has open panicle flower/seed head (University of Queensland 2016).

The numerous flower spikelets have a very long awn (Figure 2) of 50 to 90 mm long (University of Queensland 2016). When mature and not in seed it



Figure 1. Mexican feather grass spread from a garden onto a nature strip at Fraser in 2016.

looks very similar to serrated tussock. At flowering it can look like a cross between serrated tussock and the native rough spear grass (*Austrostipa scabra* (Lindl.) S.W.L.Jacobs & J.Everett).



Figure 2. Mexican feather grass seed at Fraser in 2016.

The 2008–09 Response A well-publicised media alert across the ACT lead to many reports of Mexican feather grass. Most turned out to be other tufted or tussock grass species – spear grasses (*Austrostipa* spp.), poa tussock (*Poa labillardierei* Steud.), serrated tussock, and snow grass (*Poa sieberiana* Spreng.). Eight sites were confirmed and control work was undertaken. Four case studies are looked at below as they provide valuable information on why control was successful. One case study is from the recently discovered 2015 infestation.

All the infestations in the case studies and recent control work have been mapped in the field using the *Collector* (Esri 2016a) application (app) with *ArcGIS On-line* (Esri 2016b). The figures below include screenshots from the *Collector* app. All are orientated north. The hatched polygons are either areas of weed infestations or where weed control has occurred. The faded green background to the screenshots denotes reserved land.

Case Study 1. Gordon This site was part of the original 2008–09 biosecurity response. It was at a home garden in the southern ACT suburb of Gordon. The householder responded to a media alert after returning from a long summer holiday. She reported not being able

to enter the front door of her house, as windblown seed from six or seven Mexican feather grass plants had accumulated covering most of the doorway. The plants had been purchased from a local nursery, possibly in 2007.

Initial control required removal of mature plants, hundreds of seedlings, contaminated mulch and soil, and vacuuming loose seed (Figure 3). This proved to be time-consuming due to the large volume of seed and the ability of seed to drill into cracks in pavers.

The contaminated waste was deeply buried (>2 m deep) at the waste and recycling facility at Mugga Lane. Disposable overalls and gloves were also buried.

A search of surrounding gardens and an open space area was also conducted. Only a few seedlings were found at those locations.

Follow-up control has been on-going since then. The first few years required twice a year control to remove seedlings. The home owner helped greatly by spot spraying with glyphosate 360 g L⁻¹ and manual removal. No seedlings were allowed to mature. This meant the weeds officers did not have to use flupronate 745 g L⁻¹ to deal with germinating seed.

It took six years using this approach before no more seedlings were detected. At least 2000 seedlings had been removed over the six years. The site and surrounding area will continue to be monitored annually.

Case Study 2. Holder infestation Holder is a suburb in the Weston Creek part of Canberra. The infestation at this household spread from four plants purchased from a local nursery, possibly in 2007.

A thick cover of fine eucalypt mulch at this site limited initial spread. The plants were discovered by an off-duty ACT Parks and Conservation Weeds Officer walking her dog.

The owner of the house was happy to have the plants removed because he noticed they had started to spread to other parts of his garden and he understood the importance of controlling invasive weeds.



Figure 3. Mexican feather grass seed removal at Gordon in 2008.

A search of a nearby park and neighbour’s gardens did not uncover any more plants.

As with the Gordon site, follow-up control was initially twice a year (early spring and autumn). Seedlings kept being discovered for seven years.

Fluprofonate 745 g L⁻¹ had to be used in the garden because the home owner was not as diligent as the Gordon householder with on-going control.

Case Study 3. Bendora Dam, Namadgi National Park. This was a very interesting infestation on a number of levels. It was in a disturbed understorey in montane forest in Namadgi National Park.

The plants originated from the edge of the Ranger’s house garden. It was thought that they were planted when builders from Victoria renovated the house. None of the builders could remember planting the grass and none had properties with look-a-like serated tussock or stipoid grass like infestations.

This infestation was successfully contained to 0.2 ha (Figure 4), because it could be monitored continuously so seedlings were removed as they appeared. It took seven years of rigorous follow-up control to reach

the stage of only one or two seedlings in 2015–2016.

As with the other sites there will be on-going monitoring for seedlings. The monitoring will include searching surrounding forest, with the focus on disturbed and more open understorey.

Case Study 4. Fraser This is the first of the post 2008–09 national response infestations to be discovered (Figure 5). A retired weeds officer reported a suspicious grass at the local preschool. He was the manager of the ACT Parks and Conservation Service Weeds Unit when the 2008–09 response occurred.

At the preschool, seedlings had spread into adjacent garden beds. Prevailing wind helped prevent spread off-site. A local Fraser resident donated the plants used in the garden. The resident was pleased to hear from the Parks Service because the Mexican feather grass plants in his garden were spreading along the nature strip and into drains (Figures 6 and 7) despite his best efforts removing the plants on a regular basis. Unfortunately the resident had taken a couple of trailers uncovered loads of plants and seed to the green waste recycler. No plants have been detected there yet.

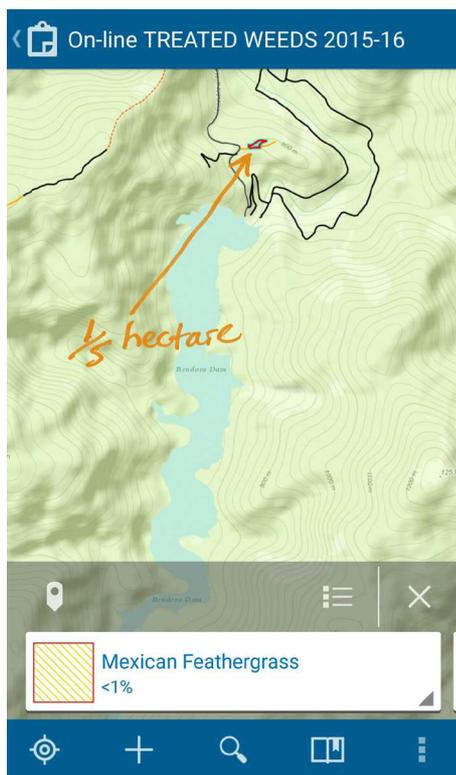


Figure 4. Namadgi National Park Mexican feather grass Control Area.

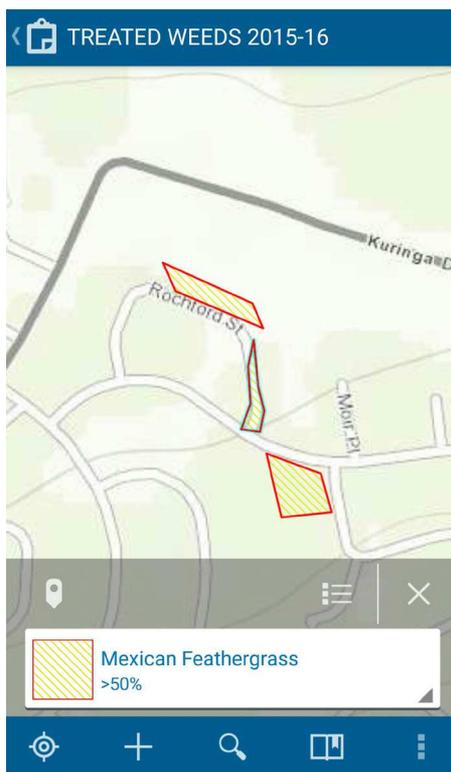


Figure 5. Fraser Mexican feather grass control areas at Fraser.

A search of surrounding areas found several plants in parkland and an area of grassy open space adjacent to a yellow box (*Eucalyptus melliodora* A.Cunn. ex Schauer) – red gum (*Eucalyptus blakeleyi* Maiden) grassy woodland. Drains and creeks were also searched and fortunately no plants were detected.

Plants had spread 600 m from the garden (Figure 5). There was also a scattered infestation of serrated tussock overlapping with the outlier Mexican feather grass. These were all spot sprayed with a mix of fluproponate 745 g L⁻¹ at 300 mL and glyphosate 360 g L⁻¹ at 335 mL (APVMA permit 9792) per 100 L water.

The plants in the garden were physically removed along with seed heads and contaminated mulch. These were bagged for deep burial. The area was then sprayed with the mix of fluproponate 745 g L⁻¹ and glyphosate 360 g L⁻¹ and covered in a deep layer of mulch.

The Fraser infestations originated from four to six plants purchased sometime between 2007–09.

As of March 2016, the fluproponate 745 g L⁻¹ used to prevent germination seems to be working as follow-up inspections only found a few seedlings. At other sites where fluproponate 745 g L⁻¹ had not been used, there were dozens of seedlings only a couple of months after initial control.

DISCUSSION

Mexican feather grass produces masses of viable seed on par with serrated tussock. The longer awn appears to make it more likely to be accidentally spread plus creates larger masses of seed.

It readily invades disturbed areas but also invades sparse understory and inter-tussock spaces.

Intensive control for at least seven years is needed to significantly reduce the seed bank. Successful control requires: preventing seedlings from maturing, frequent monitoring and use of the residual grass herbicide fluproponate 745 g L⁻¹.

It is too soon to declare eradication but all sites are contained.

Factors that we have observed that affect success or otherwise in Mexican feather grass control are listed below:

Helps control – reporting suspicious plants early, use of fluproponate 745 g L⁻¹ to reduce seed bank, accurate mapping with *Collector* app to ensure follow-up control, deep mulch cover in treated areas to prevent movement of soil off site and suppress germination and good grass identification skills.

Increases spread – on-line sales of Mexican feather grass material, careless disposal of contaminated material, inadequate resourcing of follow-up control, and slashing/mowing before control work.



Figure 6. Seedlings removed from roadside at Fraser in 2016.



Figure 7. Seedling spread to drain at Fraser in 2016.

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