

Discussion paper (April 2014 update):

Controlling

Onion Weed (*Asphodelus fistulosus*)

I'd like to call this a Factsheet; but I'm neither a biologist nor able to tie down all the variables surrounding this weed to be factual about controlling it. But Marie (my wife) and I have had many years of successful experience controlling it; undertaken experiments and purposefully observing results. This should give you some help in controlling your outbreak.



I read one Government employee state that the best way to eradicate Onion Weed was to do nothing. The assumption was a healthy native environment would push it out. I believe this is erroneous, and why it has now spread from the eastern seaboard and invades all our roadsides through the Murray Mallee. So please do the responsible thing and control it.

Many weeds are merely that, and barely do anything to threaten the ongoing survival of our native species. But some, like *Asphodelus fistulosus*, will decimate hectares of native species, leaving desolation in their path; causing extinction of endangered species.

Our success: This shows about 1 acre of a 3-acre infestation we had.

Before weeding
(May):



Under control
(August following year):



Ok, rant over, now the discussion:

BACKGROUND CONSIDERATIONS

- 1) Us
We've been volunteering in the Blanchetown area of South Australia for about 15 years. Rainfall is about 250mm, and the environments have been generally Mallee & Saltbush in calcareous sandy loam soils. More recently we've bought Ellura, which has similar vegetation and soil types, but has 300mm of rain. This extra 50mm has a marked impact. We prefer to dig plants out. We don't like spraying. The following discusses the pro's and con's of methods.
- 2) Rainfall
Asphodelus fistulosus behaves differently with higher rainfall. It seems to be slightly less aggressive. It's almost as though the lower rainfall makes it trigger (ie germinate & seed) more violently as it thinks it has to struggle to survive. Yet this aggressive triggering makes it one of the most successful plants in the area.
- 3) OH&S
Weeding can be an activity that causes harm to humans. Herbicides (particularly those that can kill adult Onion Weed) are extremely toxic. Mowing & brush cutting can cause severe injury. I knew of someone who had the saw blade come off a brush cutter and lodge deeply into his knee. He was lucky to be able to walk unaided again. Hoeing can be back breaking. Personally, we find digging actually improves our flexibility, which is a major health benefit as we rapidly approach 60. We also have a camera on hand to capture the beauty of our natives, and weeding makes us go out there and be in it. All healthy lifestyle choices ☺
- 4) Effort
There is nothing easy about eradicating Asphodelus fistulosus. Even a small patch requires dedication and large areas can be demoralising. So approach your task with the understanding that anything you do will make it harder for the weed, and in time you can at least halt it's progress; but with luck will be able to eradicate it.
 - a) Break your weeding project up into smaller, more manageable areas that you are confident of success. This will encourage you to keep going.
 - b) Make sure you enjoy your trips to your weed site. If it's all work and no play, you'll eventually give up. We love walking, photography and exploring our sanctuary. While we've walked it all pretty extensively, the different weather conditions this year are showing up a huge variety of new forbs.
 - c) Use the concept of targeted weeds. Choose your most damaging weeds first and eradicate them. Leave less damaging weeds till later. This helps keep you focused and improves the health of your property more quickly. We have 190 acres, with extensive wild sage, wards weed & thread iris. But we left these alone in our first year, concentrating on (targeting) only horehound (because we didn't have much) and onion weed (we have quite a bit but it's very damaging). We've now got these two under control, and are now targeting wild sage and a new weed this year; Smooth Mustard.
 - d) April 2014 update: We visited weekly (1 or 2 days) since the 17th February flood and have put down about 200l of herbicide to control the Onion Weed. We finished a couple of weeks ago. We still get the odd seedling popping up, but the rate is now only about 1% of the germination at the end of February.
- 5) Casualties
Humans can barely breathe without killing something. Driving to your property will result in many insects being killed, along with the odd bird & kangaroo. Once on your property you'll

be walking on plants to get to your weed site, then accidentally digging up or spraying some natives. Given it's impossible to weed without casualties; the aims are to minimise casualties and to ensure they aren't threatened species. We hope that our web site (www.ellura.info) will be a good resource for you to help identify all of your wildlife. But it's most important to try and know what is in your weed site, and protect anything that is threatened.

6) Time

The most important thing we've found with Onion Weed is consistent (ie every 2 weeks) monitoring and action. We've completely cleared patches and within 3 weeks (over spring) seeds have germinated, flowered and seeded. Monthly visits (at certain times of the year) will never allow you to eradicate this evil. It is the most aggressive weed we've encountered.

7) De-seeding

This is an important ideology that we've discovered; the weed that exists today is immaterial. The seed the current plant has the potential to produce is what we care about. It's the long-term impact that we are aiming to stop. Many times we've come across a patch of weeds; thousands of tiny seedlings in a square meter. We've realised if we leave them, 90% die due to competition with the other seedlings. Because we care about the seed and not the plant, this suits us as we note the location and return to eradicate the few remaining plants before they seed. **This works.** It improves our motivation because we no longer feel we fail if we leave the area with live weeds. But, you have to be committed to returning before they seed to remove them.

8) Soil Disturbance

We've heard concerns that hoeing and digging causing soil disturbance. This is true, but "so what"? Well soil disturbance makes the ingress of more weeds easier. It can bring old weed seed to the best depth for germination. As such, weeding one year can promote germination next year; not really a good long term thought. **BUT** we have Wombats & Roo's. Both species love to dig! Wombats, over the last decade or so, have found a new food source; Thread Iris bulbs. As such they turn the ground like a farmer ploughing a field. We've got acres here where wombats have turned the top 150mm (6") of soil. In summer, Kangaroo's dig out the top 100mm of soil under bushes to lie in. It's cooler.

Further, there are not many weeding alternatives that don't cause soil disturbance, nor have some other problem.

Overall though, if you cannot visit regularly over spring, I'd suggest methods (below) that do not cause soil disturbance. This gives the best chance of killing the parent, without encouraging seedlings.

9) Disposal

While this is only a concern when digging the weed out, I've discussed it here as there's quite a bit to cover, that would interrupt the methodology discussion later.

Rule #1: Never leave removed mature plants on the ground. They will flower and seed out of the ground!

Onion weed is almost a succulent and is very heavy. Bagging a lot to take away is hard work if you can't bring your car close to the weed site. Leaving the weed on the ground to dry out tends not to work. It seems to be able to draw moisture from the ground and stays green. It also smothers and kills natives under the removed plant. Marie came up with a fantastic alternative. She collected dead branches from the surrounding area and made a bed to then lay the removed onion weed on. Over a couple of months most of it dried out, but best of all allowed the growth underneath to continue. We then later bagged the plants and took them



away. We use horse feed bags for this (chaff) which are very large and weren't too heavy when filled (I had to carry them about 50m to 100m to the car). We carted them in our trailer to our camp fire, emptied the bags in the trailer (to contain any seed), and then burnt the weeds in 44 gallon drums before the summer fire ban started. Another alternative we came up with, in the past, involved another \$10 shovel from Kmart. This time I sharpened the end like a knife (so be careful when handling in the car). We found that using this shovel to cut out the crown (what we call the heart of the plant between the roots & the leaves) the plant dried quickly and easily, killing it. I cut the roots and leaves off leaving a disc of about 50mm or so thick. This allowed us to leave the removed plant on the ground, but took a lot of extra time. We were also concerned with the chemical composition of the dead plant. While unlikely, it is possible onion weed is poisonous to natives (plants & animals). We have no way to determine if this is valid or not. In the past we've been able to drive the trailer to the weeds, load the trailer directly and dumped them down a disused well.

10) Seed Bank

It's our belief/contention that 90% of Onion Weed seeds will germinate in the 1st year. This is both a curse and a blessing in one. It means an infestation will cause lots of work in year one as nearly everything seeds. But **IF** you can control the first year of seeding, unlike other weeds, your work is almost done. It requires a massive short-term explosion of effort. However, we've heard that *Asphodelus fistulosus* has a 3-year seed bank life. We happily accept this, and surmise that in higher rainfall areas Onion Weed doesn't trigger as ferociously. As such, some of the strategies we've promoted here may change for those in high rainfall locations.



11) Where to begin

The location of weeding can be important. There are a number of choices and really it's up to you and your environment which has the best impact.

- a) The heaviest: Allows you to remove the most seed producing areas first, more rapidly reducing the supply of seed
- b) Tracks: Allows you to stop cars, people & animals from spreading the seed by travelling past (particularly in animal fur)

The edge: Stops the advance of the seed at the front line, working in each year 'till it's gone.

- c) Threatened species: It's more important to protect these species if there is a chance the weeds will kill them soon, rather than protecting larger areas of plants that are of least concern.
- d) Boundaries: If you have weed ingress from a neighbour, there isn't any control you have over this. You are going to constantly be re-infested unless you can get your neighbour to control their side. So eradicate those areas you have total control over first, leaving boundaries 'till later.

12) April 2014 update: Herbicide, Dye & Spray Equipment:

- a) We use Glyphosate 360gm of the active salt per litre. The cheapest we can find is \$9 at Bunnings. Other stores sell similar bottles, but it's only 100gm/l. We've heard you can use dish washing liquid (~1ml per litre) as a wetting agent which would allow us to use a lower concentration of herbicide. We have yet to try this.
- b) We also use Vegi-Dye. It's a red dye that seems to be the safest to use. It helps to see where we finished the last back pack but also as we spray where we just did. In the heat, it dries quickly and can be hard to see where you've just done without it. The dye saves accidental respray & so reduces the herbicide used. We have heard of using beetroot juice, but haven't tried it yet. Vegi-dye is \$44 per litre at Coopers in Mt Torrens. It's much cheaper than other dye because you only use 1ml per litre of mix. The others require 5+ml per litre. We've had varying results with dye. Unfortunately they don't last long, so you can't tell where an area was

sprayed from one week to the next. Also because we have sandy soils, it doesn't show well if there isn't broad leaf weeds or bark / wood / rocks around to show the colour. The sand absorbs it. In a few locations we had to use a stronger concentration to see it. Where wild sage is around and we spray both then the 1ml is good. The other brands of red dye have Rodium B in them which is carcinogenic and nasty. The blue ones are apparently safe, but expensive at \$36 / litre at 6ml per litre rate.

- c) We have been using a back pack sprayer, but it's very heavy and painful. Friends gave us a good quality, 100l sprayer which will make life safer & easier; as well as make the job much quicker. They are available off eBay for around \$220 delivered, but I can't attest to their quality. Unfortunately many of our weed spots are well over 30m (hose length) from existing tracks. So we'll be getting a quad bike and small trailer to cart the sprayer. We feel a quad is better than a car as it's easier to navigate around bushes & minimise damage to herbs.

METHODOLOGY

1. Spray with Metsulphuron

Graham and Raelene Churchett, have extensive experience with herbicide. The formula to kill Onion Weed is:

Per 100 litres of clean water: 10 gms Metsulphuron (Brush Off), 200 mls (Brush Wet) wetter, 1 litre of Glyphosate 360, (Weedmaster Duo) plus 200 mls (Red Enviro Dye) marker if required.

Now, this mix is nasty. Graham used to wear a face mask (quality breathing filter), goggles, disposable overalls, gloves and gum boots to ensure none of it ever got on his skin.

He and Raelene were able to successfully cover kilometres of infestation by towing a spray tank loaded with the mix.

Pro's:

As you can understand, the size of your infestation will have a marked bearing on the methodology you use. Even working 8 hours a day, 7 days a week, all year, Graham & Raelene couldn't have killed as many weeds in any other way as this method killed over the occasional weekend.

This method is suited to large, old plants in large outbreaks.

This causes no soil disturbance.

Con's:

The herbicide is expensive.

Herbicide kills everything, including the crust. So no matter how targeted your delivery, you are going to have casualties.

2. Spray with Glyphosate

We've recently been experimenting with this method and surprisingly seem to be having some success. After we dug up all the large woody plants we've now found an inundation of tiny seedlings (hundreds of thousands, as expected). We sprayed with a 4:30 (too strong, see below) glyphosate:water mix and found them to be very sick. We've always been told that Glyphosate won't kill onion weed, but it seems possible it can kill seedlings. Even making them very sick, will reduce their seeding capacity significantly. Wayne Donald (www.entwood.info) reports a lot of success with this method on seedlings.

April 2014 update: In summary, this is the only weed control method we currently use. We had a flood on 17 Feb 2014, then warm weather. This brought everything on, a 2nd spring; natives & weeds alike. In particular the Onion Weed germinated heavily & extensively. Since writing this paper, we've heard you shouldn't use stronger doses of herbicide than stated on the container as it burns the leaves and doesn't get to the roots. While this may be true, we haven't seen this occur with Onion Weed; which isn't broad leaved. We have reduced our dosage significantly from that stated above with equal success. We now use 1:56 glyphosate:water (ie 300ml glyphosate : 17 litre back pack sprayer). We have tried the recommended rate of 10ml per litre (1:100 or 170ml per 17litre) with mixed success, so have chosen to stick with the 1:56 ratio as

we don't have time to respray unsuccessful areas. Hopefully adding dish washing liquid will allow us to use the 10ml / litre all the time. We think the success was due to the size & age of the plant. The younger & smaller they are, the less herbicide you need. But once they are 50mm tall / 2 weeks old we feel the stronger mix is required. Once the seedlings are 2-3 months old, we hit them twice. While it may not be necessary, they were taking so long to die we weren't sure they would. They were sick with a brown tinge to them a month after the first spray but we couldn't take the risk they'd flower as we have been so inundated. We now also use dye; which reduces the amount of herbicide we use.

Pro's:

No soil disturbance. It's a cheap mix and is very fast in covering medium sized outbreaks (acres v/s square kms).

Con's:

It only kills seedlings.

It has unintended casualties.

April 2014 update: Getting a large quantity of water / herbicide to the weeds.

3. Paint with Glyphosate (Concentrate, no water mix)

Where we have dense weed seedling areas, we are experimenting with painting the leaves with the poison directly. It's more time consuming than spraying, but less than digging and is far more targeted than spraying. It's taken a long time to see the poison kill the seedlings.



On the left is OP (Onion weed Paint), OC (Onion weed Cut) then OH (Onion weed Hoe)
Before After 40 days

Painting worked well, cutting to ground with scissors has done almost nothing, hoeing was quite good but not as successful as painting and had soil disturbance & casualty problems.

Pro's:

Minimal casualties

No Soil Disturbance

Fairly Cheap

Con's:

Hard work

4. Cut and swab

I hadn't heard of this method being used for onion weed until our neighbour told me about it recently (so have no experience with it). Alex Coombe, from Trees for Life, gave me the details:

Cut the plant with a knife (or a saw for older plants) and liberally apply 1:5 glyphosate:water herbicide mix to the wound with a brush. April 2014 update: Trees for Life sell swabbing containers for only \$6 which we've bought. Also useful on African Boxthorn, etc.

Pro's:

No soil disturbance, or unintended casualties. It's a cheap mix, and the method uses low volumes of herbicide.

Con's:

It's a slow back-braking job (I'd imagine), more suitable to small outbreaks of medium sized plants that haven't become woody yet.

5. Dig out

This is our preferred method of weeding.

We get to walk a lot, and study our native environment as we go. I get to take my camera ☺ I've designed some special



diggers that allow good targeting of the weeds and minimise soil disturbance. They are cheap, light and easy to make (if you can weld a bit). There is more on these on the web site. But the main soil disturbance with onion weed comes from extracting the plant itself, rather than the shovel. Either they are large with bulky root systems, or they occur as thousands of seedlings in a square meter that you can't hope to remove without breaking up the crust.

Pro's:

Very few unintended casualties (if the roots of the weed are wrapped around a native, then the native is usually killed in this process). It's a cheap method. We find it improves our health (but others may not).

It's highly suited to scattered outbreaks of medium to large plants.

Con's:

It's a slow job, not overly suited to dense or large outbreaks, nor tiny seedlings. It creates soil disturbance (more than usual due to onion weed itself). You have to dispose of the removed plants.

6. Hoe

We used something similar to these as our introduction to weeding over a decade ago and found they had severe drawbacks. We bought a garden hoe for about \$10. It was too wide (too much soil disturbance) and weak (because we use it in rock), so I narrowed it (to 90mm wide) with a grinder and welded a brace on it.



Pro's:

Low unintended casualties. It's cheap and highly suited to outbreaks of small plants. It's relatively fast (compared with cut & swab or digging). It's also very good in rocky areas (no soil disturbance) where a digger can't penetrate.

Con's:

It causes soil disturbance creating divots everywhere, sometimes missing the weed entirely. The water collects in these divots, supplying weed seeds with moisture and the ideal environment to germinate. It's back breaking work (well I find it so) as you are bending at the same angle all day (based on the length of the handle).

7. Mow



A reasonable solution (considering the 80:20 rule) but destroyed the mower in the process. It depends on the ground, and our test was rocky; hence a higher than preferred blade height. I was able to cover a large area.

Pro's:

If done during flowering, it'll remove a lot of seed potential.

It covers large areas very quickly.

No soil disturbance.

On balance a good, fast control mechanism when time is very limited for large infestations.

Con's:

It tends not to kill the plant.

Kills or mutilates everything in it's path, including the crust, so only useful for devastated areas with no wildlife left.

Not so good/easy with woody plants.

8. Brush cut

Harder and slower than mowing, but it cut lower and so was more fatal to the weed. Was really hard work.



Pro's:

Doesn't damage the machine, like mowing, as brush cutters are made for this type of work.

Has a higher kill rate than mowing, but takes much longer to cover the same area.

Minimal soil disturbance.

On balance a good control mechanism for small, devastated areas.

Con's:

Still has a high casualty rate as it's hard to see natives when swinging the brush cutter.
Slower than mowing and hard work.

9. Slash and spray

Graham offered another method which he's found successful with other weeds. A combination of Mowing & Spraying. One person mows while the other follows up immediately behind and sprays the stubble with a 1/5 mix of Glyphosate. It's best done when the plants are growing vigorously (so that the chemical is taken down into the vascular tissue). This sounds like it would be very effective as the main difficulty with spraying Onion Weed is getting the herbicide into the root system. Generally it runs off, hence the need for a wetting agent. Would be suited to medium sized devastated areas.

Pro's:

Cheap herbicide mix

Fast and probably very effective

Con's:

Haven't tried it on Onion Weed (yet)

Requires 2 people

Would have a high casualty rate as the mower would kill taller natives, and the herbicide will kill the rest.

10. Plough

"Say what?" ... Well wheat farmers don't have any problems with onion weed. It can't take being ploughed. I'm not suggesting it's a useful method, but have it here for completeness and possibly give someone an idea for a methodology that is actually useful

Pro's:

It works

Con's:

Massive soil disturbance.

Very expensive equipment.

Kills everything.

Basically this is the "nuke it" method.

11. Cover with a Tarp

DON'T DO IT! It happily thrived on the condensation and wasn't bothered by the heat (50+ deg). As such, this is not a control method and has no pro's or con's attached.



If you have anything valuable to add to this paper, we'd really like to hear from you. Our aim being to improve this paper over time to be a definitive guide to help land-owners control this weed.

Cheers

Brett & Marie Smith

Ellura Sanctuary

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