

North East
Farming Futures



growing our future

Establishing various salt tolerant species on salt land areas inaccessible by machinery



Project Site B: Ashley Sparkman spreading clay seed balls

1.0 AIM

To re-establish plant diversity on salt affected soils on a large farm scale trial using “seeded” clay balls.

2.0 BACKGROUND

Salt land areas inaccessible to machinery have continue to degrade. This project is testing the viability of seeding these areas with seed impregnated clay balls. If the demonstration is successful it may be possible to conduct aerial dispersal over larger degraded areas.

The control seedlings will be planted to determine if the conditions are acceptable to local salt tolerant species and therefore the failure or success of the seeded clay balls will indicate if this method can be adopted. If successful, this method would be more cost effective for re-establishing plant diversity on existing salt riparian systems for salt land areas that are currently unproductive and inaccessible to tree planting machinery

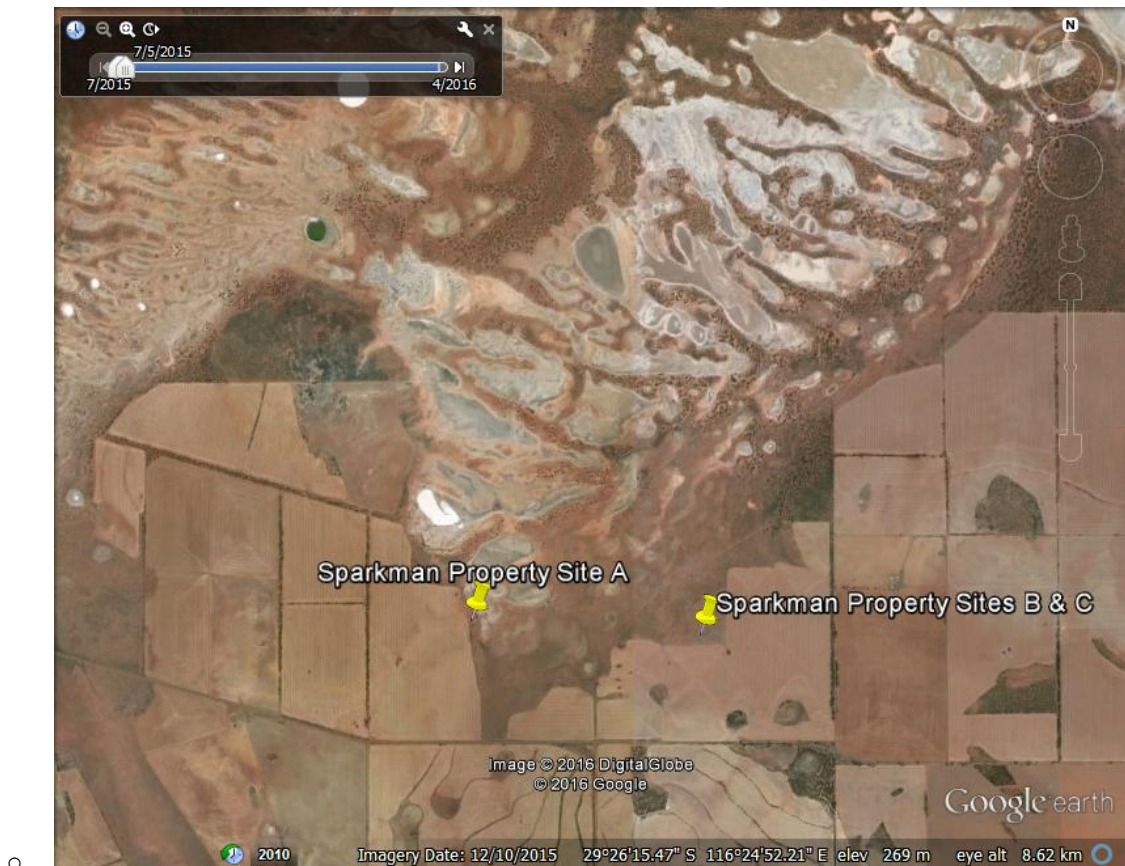
3.0 DEMONSTRATION SITE/S DETAILS

The demonstrations sites are approximately 15km due east of the Perenjori town site on the Sparkman family property on Rothsay Road. The Sparkman property was chosen due to the high proportion of salt land in relation to grazing and cropping land, situated at the south western tip of the Wheelamby Lake system.

Sites B & C are on the northern edge of part of the existing cropping land and Site A is situated on the edge of a salt scald to the west of Sites B & C. Soil at all sites is red in colour, has high clay content and is classed as a sodic soil.

Rainfall for the growing season at the property after seeding clay seed balls in April 2015 at Sites A & B:

- May 11mm
- June 45 mm - Oldman saltbush clay seed balls & Oldman saltbush seedlings planted
- July 40 mm
- Aug 38 mm
- Sept 3 mm



4.0 METHOD

Covering a total of 1ha, three sites were set up to demonstrate if clay seed balls would establish suitable native species plantings in areas inaccessible by machinery. Desert Cassia seed was listed in the Trial Design but seed was not available for purchase and it has not been included in the multi species clay seed balls.

The native species used in the demonstration were Bluebush, Oldman saltbush, Goldfields daisy bush, Tan wattle, Curara bush, Currant bush seed and Oldman saltbush seedlings. Clay seed balls were moulded with 3 different seed combinations of Bluebush only, Oldman saltbush only and a multi species combination of the other four species listed.

Three sites were selected to test plant survival testing Low, Moderate and High Salinity levels at Site A, different planting densities at Site B and planting seed balls using a tree planter with Oldman saltbush seedlings as a Control at Site C. Each of the three sites were developed as follows:

- Site A had a suitable gradient to allow for the three soil salinity levels needed for the trial with the High salinity soil at the valley floor increasing to Low salinity soil higher in the gradient. Testing to confirm the salinity levels was unable to be carried out due to the testing equipment not being available during the project. Site A was fenced by Sparkman's to restrict stock access to the trial. Site A had 3 rows of 50m x 10m with each row encompassing the three salinity levels. Seed balls were dispersed at 0.3 per m² in April 2015 consisting of:
 - Row 1 Multi Species clay seed balls
 - Row 2 Bluebush clay seed balls
 - Row 3 Oldman saltbush clay seed balls
- Site B was a low salinity site with 4 rows of 50m x 10m. Other than the Control which had no dispersal, each row had different densities of clay seed balls at 0.3 per m², 1 per m² and 2 per m² dispersed across the row with dispersal in April 2015 consisting of:
 - Row 1 Bluebush clay seed balls
 - Row 2 Oldman saltbush clay seed balls
 - Row 3 Multi species clay seed balls

- Site C was a low salinity site with planting of Oldman saltbush seedlings (planted using a Chatfield Tree Planter) as a Control for plant viability during the trial and clay seed balls. Seedlings were planted at 3m spacing with clay seed balls planted at 1m spacings between the seedlings. Four 50m rows were ripped with planting in June 2015 consisting of:
 - Row 1 Old Man saltbush clay seed balls & Oldman saltbush seedlings
 - Row 2 Bluebush clay seed balls & Oldman saltbush seedlings
 - Row 3 Multi species clay seed balls & Oldman saltbushseedlings
 - Row 4 Oldman saltbush seedlings

For biosecurity reasons, clay balls were made with soils selected from the Sparkman property. Moulds were sourced from Bunnings. Impregnation of the clay balls was done using a cement mixer and trowelling the slurry into the moulds. The three varieties of clay balls made were:

- Bluebush clay seed balls
- Oldman saltbush clay seed balls
- Multi species clay seed balls with Goldfields daisy bush, Tan wattle, Curara bush & Currant bush

The clay seed balls were dispersed by dropping the different varieties of clay seed balls at the required spacings at Sites A & B in April 2015 with the seedlings and clay seed balls planted at Site C on 15th June 2015. Sites A & B were assessed within 24 hours following the first heavy rains in late May and in early July and October 2015 with a final assessment in March 2016.

5.0 RESULTS

April to June 2015 – After some heavy rains in May the clay seed balls were 50% dissolved and the seed had been dispersed. Monitoring till the end of June showed that none of this seed had germinated yet however the Oldman saltbush seedlings at Site C are establishing despite kangaroo grazing. To note: that the clay seed balls germinated in controlled greenhouse conditions.

July to Sept 2015 – The only survival of clay seed ball dispersed seed plants is at Site A, but only on the lowest salt effected salinity levels and where it is lower in the landscape and held more moisture than Sites B & C. The few plants surviving at Site A are too young to identify.

Due to salinity and drying top soil the harshness of the sites may not have allowed for the clay balls to hold moisture long enough for more seeds to survive germination.

October to Dec 2015 – Oldman saltbush seedlings survived in the salt land conditions but clay seed balls were not effective in establishing native plants from seed in the harsh salt land conditions. The clay seed balls were interspersed with the seedlings at Site C in the ripped tree lines. The lack of survival in the ripped furrow at Site C reflect that the conditions were too harsh for the selected plants to establish from seed at these sites. The germination of a few Oldman saltbush plants at Site A may have been from natural regeneration rather than the dispersed seeds.

January to March 2016 – There was no further germination in seeds and by the end of March all the clay seed balls had dissolved dispersing all the seed across the sites. The only species to survive were the Oldman saltbush seedlings planted at Site C which had good growth but had been heavily impacted by kangaroo grazing.

There were Oldman saltbush germinations in Site A observed in September 2015 and fencing was erected to keep sheep off the site, but it is unknown if they were from the dispersed seed or from natural regeneration.

6.0 CONCLUSION

What are host farmers thoughts?

The trial gave the Sparkman's the knowledge that this method of regenerating salt land pastures was not effective and that clay seed ball dispersal by air would not be feasibly.

How are farmers going to plant in these areas in the future?

With less salt affected sites the clay seed ball method could work. The clay seed ball seeds germinated under Greenhouse conditions so that there is a possibility of germination in more favourable conditions.

What is the prospect of clay ball seeding in the future?

- Clay ball seeding has been effectively used in the Murray\Darling river system pre the 2000 drought (ABC Landline story) and near Geraldton to grow Tagasaste on non wetting soils (personal communication - RH Logue).
- However the clay seed ball method may work with less salt affected sites.

This trial showed that regenerating salt land pastures by this method was not effective on the harsh sites at the Sparkman property.

7.0 ACKNOWLEDGMENTS

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