

# Can Tedera Establish Well on Gutless Sand?

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Australian Government



## Key Messages

- Tedera germinated well on gutless sand in Watheroo
- It is expected that the first tedera cultivars will be released to a commercial partner in 2015.
- Tedera can persist with an average rainfall of 150mm and up to 5 months in drought.

## Aim

To determine how much green feed tedera can produce on gutless pale sandy soil and to determine if growing tedera can increase the amount of soil organic carbon in pale sandy soil.

## Background

During a worldwide search for a drought tolerant plant to supply WA farmers with sheep feed during the autumn feed gap a team from the Future Farm Industries CRC found a perennial forage legume in the Canary Islands, Spain. Tedera has the ability to survive on 150mm of rainfall and can exist without rainfall for up to five months making it readily adaptable to the Northern Agriculture Region.

Since 2006 research on Tedera (*Bituminaria bituminosa* var. *albomarginata*) has been conducted at west Buntine on the Liebe Long Term Trial Site where it has undergone grazing trials for breeding selection and grazing palatability and showed excellent ability to produce green foliage in the middle of summer. However, the soil type at our Buntine site is good pear tree country where the economic returns are greater for crop production than perennial forage/sheep production. Growers wanted tedera put through its paces on land that was less suitable for cropping. An area of pale deep gutless sand on the Martin's property near Watheroo was chosen to determine the plants suitability and ability to increase organic carbon in the soil.

## Trial Details

|                                   |  |
|-----------------------------------|--|
| <b>Property</b>                   | Martin Family, Watheroo                                  |
| <b>Soil type</b>                  | Pale deep sand   |
| <b>Soil pH (CaCl<sub>2</sub>)</b> | Topsoil: 5.2      Subsoil: 4.5                           |
| <b>EC (dS/m)</b>                  | 0.03   |
| <b>Sowing date</b>                | 23/05/2014   |
| <b>Seeding rate</b>               | 10 kg/ha   |
| <b>Soil amelioration</b>          | 09/06/2014: 1 L/ha Wetting agent irrigator               |
| <b>Fertiliser</b>                 | None   |
| <b>Paddock rotation</b>           | 2010 to 2012: Pasture/weeds mainly ryegrass, blue lupins |
| <b>Herbicides</b>                 | 22/05/2014: 1.2 L/ha Roundup, 30 mL/ha Nail              |
| <b>Growing Season Rainfall</b>    | 250mm  |

## Results

The tedera at Watheroo has had no fertiliser since the trial was established in August 2013, which explains the low levels of nutrients in the soil. However, you can see that on the "Seedling" plot the organic carbon % has increased from 0.41% to 0.55% (Table 1). The "Seed" plot has decreased from 0.44% to 0.32%. The pH has improved in both plots compared to the August 2013 control sample (Table 1).

**Table 1:** Selected soil properties (0-30cm) for soil collected August 2013 (prior to treatments being imposed) and December 2014 (post treatment) at the Watheroo trial site.

| Plot Name            | Depth | Ammonium Nitrate (mg/kg) | Nitrogen Nitrate (mg/kg) | Phosphorus Cowell (mg/kg) | Potassium Cowell (mg/kg) | Sulphur (mg/kg) | Organic Carbon (%) | EC (dSm) | pH (CaCl <sub>2</sub> ) |
|----------------------|-------|--------------------------|--------------------------|---------------------------|--------------------------|-----------------|--------------------|----------|-------------------------|
| <b>Control 2013</b>  | 0-10  | 4                        | 11                       | 11                        | 28                       | 3.7             | 0.41               | 0.037    | 5.2                     |
|                      | 10-20 | 2                        | 1                        | 10                        | 15                       | 2.0             | 0.16               | 0.010    | 4.5                     |
|                      | 20-30 | 2                        | 1                        | 10                        | 20                       | 2.0             | 0.08               | 0.010    | 4.4                     |
| <b>Seedling 2014</b> | 0-10  | 3                        | 2                        | 6                         | 30                       | 2.6             | 0.55               | 0.039    | 5.3                     |
|                      | 10-20 | 1                        | 1                        | 6                         | 15                       | 0.8             | 0.26               | 0.013    | 4.7                     |
|                      | 20-30 | 1                        | 1                        | 5                         | 15                       | 0.8             | 0.09               | 0.010    | 4.6                     |
| <b>Seed 2014</b>     | 0-10  | 1                        | 1                        | 8                         | 15                       | 1.5             | 0.32               | 0.020    | 5.2                     |
|                      | 10-20 | 1                        | 1                        | 8                         | 15                       | 0.8             | 0.30               | 0.010    | 4.8                     |
|                      | 20-30 | 1                        | 1                        | 8                         | 15                       | 0.5             | 0.30               | 0.010    | 4.6                     |

### Comments & Observations

Poor establishment of the tедера was experienced in the first year of the trial as result of late seeding in August compounded by a very dry summer. As a result more tедера was sown in May 2014. There was a good early germination of seeds from 2013 following the rain in early May and following this a second germination from the seed sown on the 23<sup>rd</sup> of May 2014. Germinations were vigorous however, the trial site was badly windblown on the 18<sup>th</sup> of June. The plants that survived this wind event were very healthy and thriving with the subsequent rain events and were competing aggressively against yellow serradella.

In early December the foliage was plentiful but due to the extreme temperatures that followed the tедера had dropped its leaves by mid December. Tедера has shown the ability to recover in Buntine from the drier years and it recovered well at this site after the dry 2013/14 summer, so it is expected to recover when rain arrives.



**Figure 1:** Seedling on the 6<sup>th</sup> June 2014, sown August 2013.

**Figure 2:** Seed on 6<sup>th</sup> June sown 23<sup>rd</sup> May 2014.

**Figure 3:** Seed on 16<sup>th</sup> August 2014 sown 23<sup>rd</sup> May 2014.

### Future Plans

The Department of Agriculture and Food, Western Australia, Meat & Livestock Australia and Seednet/Landmark are working together to continue research into the perennial legume and its potential to fill the summer feed gap and to bring Tедера into the commercial market. The Liebe Group will continue to monitor the Tедера at the Martin's property at Watheroo. However, going forward monitoring will be less rigorous than it has been to date.

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