

How to check your legume nodulation

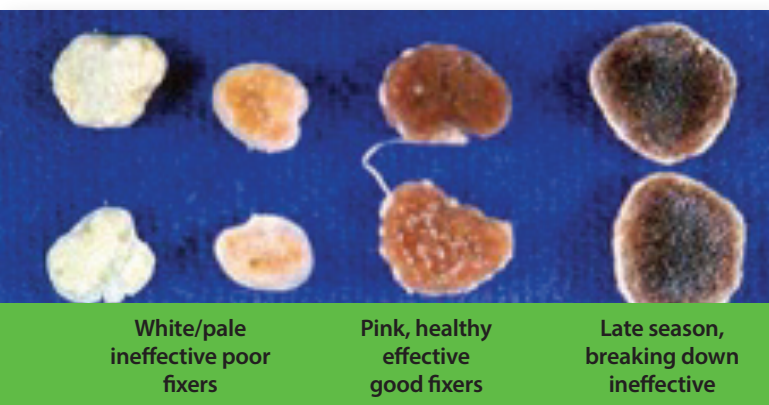
Assessing your legume nodulation annually during winter provides the opportunity to build a paddock by paddock understanding of your nitrogen fixation capacity.

Introduction

This tech bulletin provides key information for the reader to undertake in-paddock nodulation assessment. When regular/annual (or when in rotation) assessment is undertaken a year to year profile of how a paddock's background or new sowing Rhizobium is performing can be gained.

When to assess (winter early-spring)

If moisture has not been limiting, then nodule colonies should be apparent on the roots from 4-6 weeks after germination with forage species and 8-10 weeks with crop legume species through to the onset of seed set.



White/pale
ineffective poor
fixers

Pink, healthy
effective
good fixers

Late season,
breaking down
ineffective

What gear you'll need (don't lose the nodules)

Be prepared, the key is to dig and wash and not pull and shake as nodules may dislodge and your equipment for the task should reflect this.

1. Spade or hand trowel for digging up the sample without losing the nodules.



2. Water & bucket to wash/rinse the soil off or soak the clay off the roots in the case of heavier textured soils.
3. Optional, a sharp blade to cut nodules and check colour, snap-lock bags and marker pens to collect samples if need be and a basic pH test kit as pH often reveals why nodulation may have failed.

How to go about sampling

Get the timing right, (see When to assess) avoiding dry soil conditions. The best time to sample is during winter to early-spring. So, not before nodules have formed or once the soil profile has dried and the nodules are shutting down.

Get a representative sample. Take a sample much like you would for soil sampling so avoid atypical areas for the main assessment. Given this, it is beneficial to sample poor areas along with stronger sections of the paddock to build an understanding for how constraints like pH or waterlogging influence the nodulation. Sample at least 20 plants in 2's and 3s at 5m intervals across the paddock.

Dig, don't pull, plants up. This is the key to getting a meaningful indication. With the majority of species nodules will dislodge if the root systems are pulled from the ground or shaken aggressively to shed the soil.



Taking a look at nodule colour. Generally pink nodules are deemed to be healthy and good nitrogen fixers whereas brown, green, pale or white are recognised as poor nitrogen fixers.

Wash don't shake. This is particularly important with heavier textured clay and loam soils. With light textured soils the bulk of the dug soil will fall away and a light rinse will reveal the nodules. Heavy textured soils can be problematic and may require soaking in a bucket of water for a while to disperse the soil before you can assess the nodule colonies.

Assess. There should be multiple colonies, so at least 2-3 individual colonies, and greater than 90% of them should be pink in colour when cut open.

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