THE IMPORTANCE OF INOCULATING LEGUMES

In the Top End of the Northern Territory, legumes are grown for use as crops and pasture. Inoculating legume seed prior to or at sowing is an important process to increase nitrogen levels in the soil.

What is inoculating and why is it important?

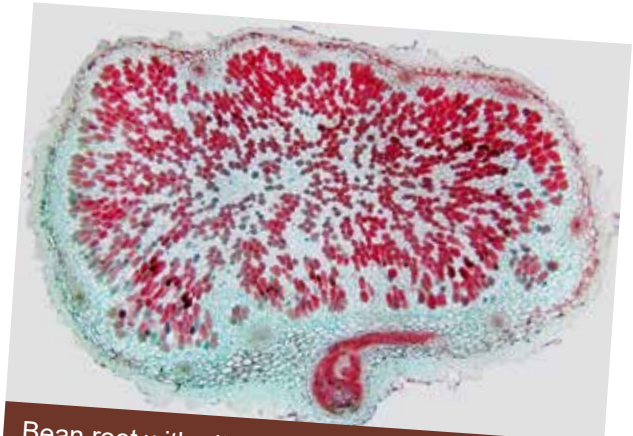
Legumes are known for “fixing” high levels of nitrogen from the atmosphere into the soil. What people may not know is that this chemical reaction is caused through a symbiotic relationship with a commercially prepared root-nodule rhizobia bacteria. Commercial inoculants containing the correct rhizobia for a given legume species can be applied to the seed just prior to sowing or with delivered with the seed at sowing. While legumes can be sown without inoculants, the native and naturalized rhizobia that populate the soil may only form a partially effective, or in some cases a completely ineffective association with the legume and nitrogen fixation potential can be lost.

What types of inoculant are available?

The different inoculation formulations available in Australia include; Peat, freeze dried, granular, liquid and pre-inoculated seed. It is important to use the correct inoculant group for the legume species to be grown. For example, lucerne requires Group AL while vetch requires Group F. If using peat or freeze-dried inoculant to treat seed prior to sowing, ensure you only treat an amount of seed that can be planted within 24 hours of treatment and that the treated seed is kept in a cool dry place, out of direct sun light until sown. Other options for inoculation include liquid injection at sowing and use of granular inoculant products.

Commonly NT grown species of legumes

- Cavalcade
- Calopo
- Cowpea
- Lablab
- Butterfly Pea
- Stylos
- Oolloo
- Blue Pea
- Lucerne
- Leucaena
- Desmanthus



Bean root with nitrogen nodule The actual root is the small bundle of red vascular elements near the bottom. Magnification 40x

For more information: 08 8942 8300 info@territorynrm.org.au www.territorynrm.org.au

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What are the benefits of legume inoculation?

Soon after an inoculated legume seed germinates, the rhizobia infects the newly sprouted root system, the cells of the roots enlarge and nodules form. The bacteria live within these nodules and covert atmospheric nitrogen (N) into usable ammonia nitrogen for the host plant through a chemical process called Biological Nitrogen Fixation (BNF). In exchange for BNF, the bacteria are provided with habitat and carbohydrates, sourced from the process of photosynthesis conducted by the plant. An effectively nodulated legume can fix 20-30 kg N/t above ground dry matter (DM) it produces. So a 5 tonnes DM/ha legume can contribute 100-150 kg N/ha.

The legume uses the fixed nitrogen for cellular growth and upon decomposition the residual nitrogen enters into the soil and benefits can be taken up by the roots of non-legume plant species within the pasture or crops that are sown after the pasture. Ensuring that legumes are inoculated with the correct strain of rhizobia can significantly reduce the requirement for synthetic nitrogen fertilisers to support crop and pasture growth.

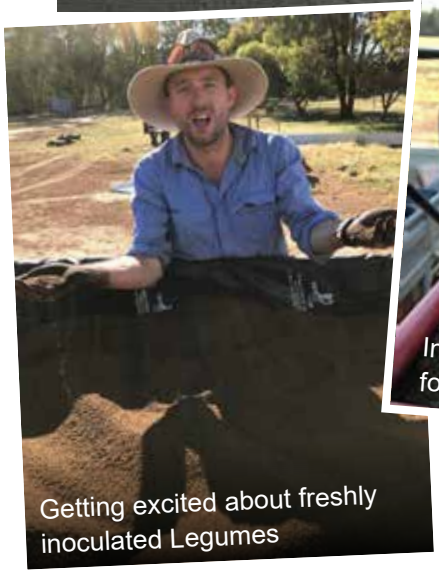
How to know if the inoculant is working?

Carefully dig up a plant and gently rinse the root system with water (or leaving to soak in a bucket). Depending on the legume species, the nodules attached to the root system can be round or fan-shaped. Use your thumbnail to cut the nodule open. If the inside of the nodule is pale pink to pink, then the bacteria are active and doing their thing. If the nodules are white or green, the bacteria are not active.

Benefits of using inoculated legumes

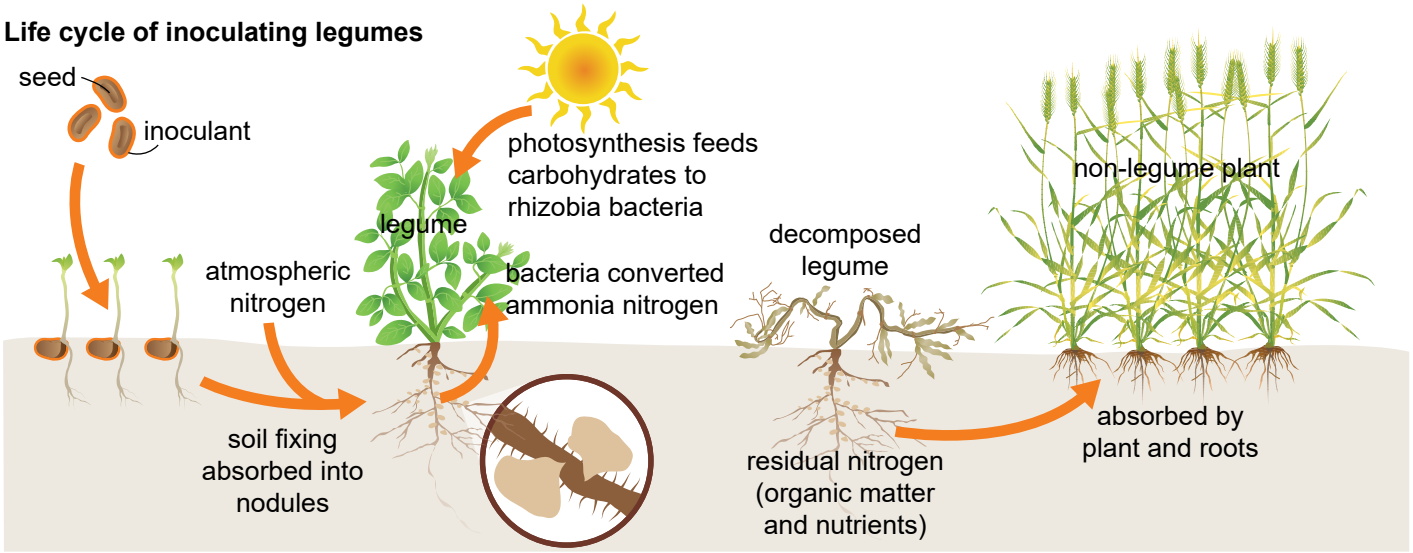
- The legume is self-sufficient in nitrogen production
- The reliance of synthetic fertilisers is decreased
- Decomposed legume leaves behind residual nitrogen in the soil to be taken up by other non-legume species and increase crop yield


Inoculated vs non inoculated


Getting excited about freshly inoculated Legumes


Inoculated seed ready for planting

Life cycle of inoculating legumes



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