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Growing Better



Double Inoculant

Pulse & Pasture Legumes

TECHNICAL FACT SHEET



LEGUME INOCULANT



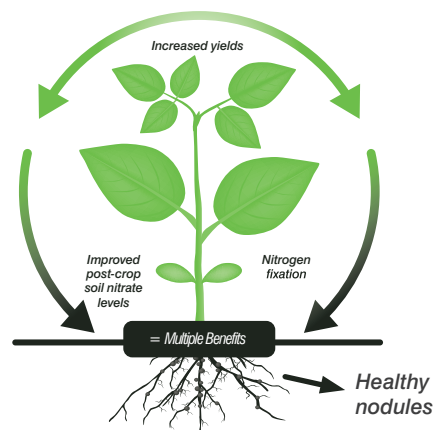
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Why inoculate your legumes?

NEM's NoduleN™ & EasyRhiz™ range are all prepared with highly productive Rhizobia strains.

The GRDC highlights the significant impact of legume inoculation in Australia. The benefits of legume inoculation are multifaceted. The purpose of legume inoculation is to supply elite rhizobial strains in large numbers to the roots of the legumes soon after germination. This process aims to optimize the chances of effective nodulation and increase symbiotic nitrogen fixation, plant, and grain yield while decreasing input costs. Additionally, some of the nitrogen fixed by legumes and rhizobia will have carryover benefits for the farming system, thereby reducing the need for synthetic nitrogen fertilizers in following crops.



LEGUME INOCULANT



GRDC supports the use of Double Inoculation in legumes.*

Combining NEM's EasyRhiz™ vials with NoduleN™ peat based inoculant improves plant performance to increase the rhizobia counts on seed which can lead to higher yield gains, biomass, and increased nitrogen fixation all which has been proven in recent trial data.

*Ref: GRDC Double Inoculant Fact Sheet - June 2021



NoduleN™ Peat

NoduleN™ uses a Peat carrier formulation containing moisture and nutrients to help rhizobium bacteria survivability applicable as an on seed slurry treatment.

EasyRhiz™

EasyRhiz™ is an exclusive formulation made up as a soluble concentrated powder applicable through both on seed treatment and liquid systems.

Active Ingredients EasyRhiz™: Rhizobial Strains 1x10¹² cfu/vial

Active Ingredients NoduleN™: Rhizobial Strains 1x10⁹ cfu/gram

Inoculating Legumes

LEGUME INOCULANT



Give it the nod!

Double Inoculation fuels the future of sustainable farming, where seeds thrive and fields flourish.



HIGHER CFU



INCREASE NODULES



HIGHER YIELD



INCREASED N NEXT SEASON

GREATER RETURN ON INVESTMENT

- Including a legume in your rotation offers increased nitrogen in the soil for multiple years.
- Inoculating legumes with rhizobia improves nodulation on plants.
- To combat external, adverse conditions, industry trials and data supports the practice of double inoculating seed to increase the number of nodules.
- Additional nodules can lead to higher yield and increased nitrogen fixation.
- Adding EasyRhiz™ Vials to a peat slurry has demonstrated to be a convenient, cost effective and practical way to achieve the highest rhizobia count on seed.

The Do's & Don'ts of Inoculating Legumes

THE DO'S

DO take into account paddock history, including legume and inoculation history and the soil pH. Acidic soils, especially if pH_{Ca} is less than 5.5, usually require inoculation every time for pulses, except narrow leaf lupins. Consider inoculating if it's been four years since the legume was grown.

DO use the correct inoculant group for the legume. Each legume type is matched to its own inoculant group. Inoculating with the wrong inoculant group leads to nodulation failure. Using the correct group is essential to good nodulation and nitrogen fixation.

DO take care when inoculating pickled seed. Some pickles, or seed-applied fungicides can reduce the survival of the rhizobia on the seed. For example, thiram and fungicides containing thiram (P-Pickel T®) are toxic to rhizobia, and metalaxyl (Apron®) can also be inhibitory.

To avoid issues, apply rhizobia last, once the fungicide has dried on seed. Limit exposure time between inoculation and sowing to less than 6 hours where possible.

DO consider using double rate inoculant in the following situations:

- If the inoculant group for that legume hasn't been used in that paddock before (especially for chickpea)
- When sowing into dry soil
- In very acidic soils with a pH_{Ca} of less than 5.5
- When inoculating treated seed

DO use clean equipment and containers or tanks.

Rhizobia are sensitive to chemical residues. Take care to use clean equipment when preparing, mixing and delivering inoculant.



DON'T use saline bore water or chlorinated tap water when preparing and applying peat slurry or freeze-dried inoculants. Rhizobia are sensitive to chemical stresses, so it is important to use good quality rainwater or non-saline bore water. If using chlorinated water, let it sit for at least 24 hours.

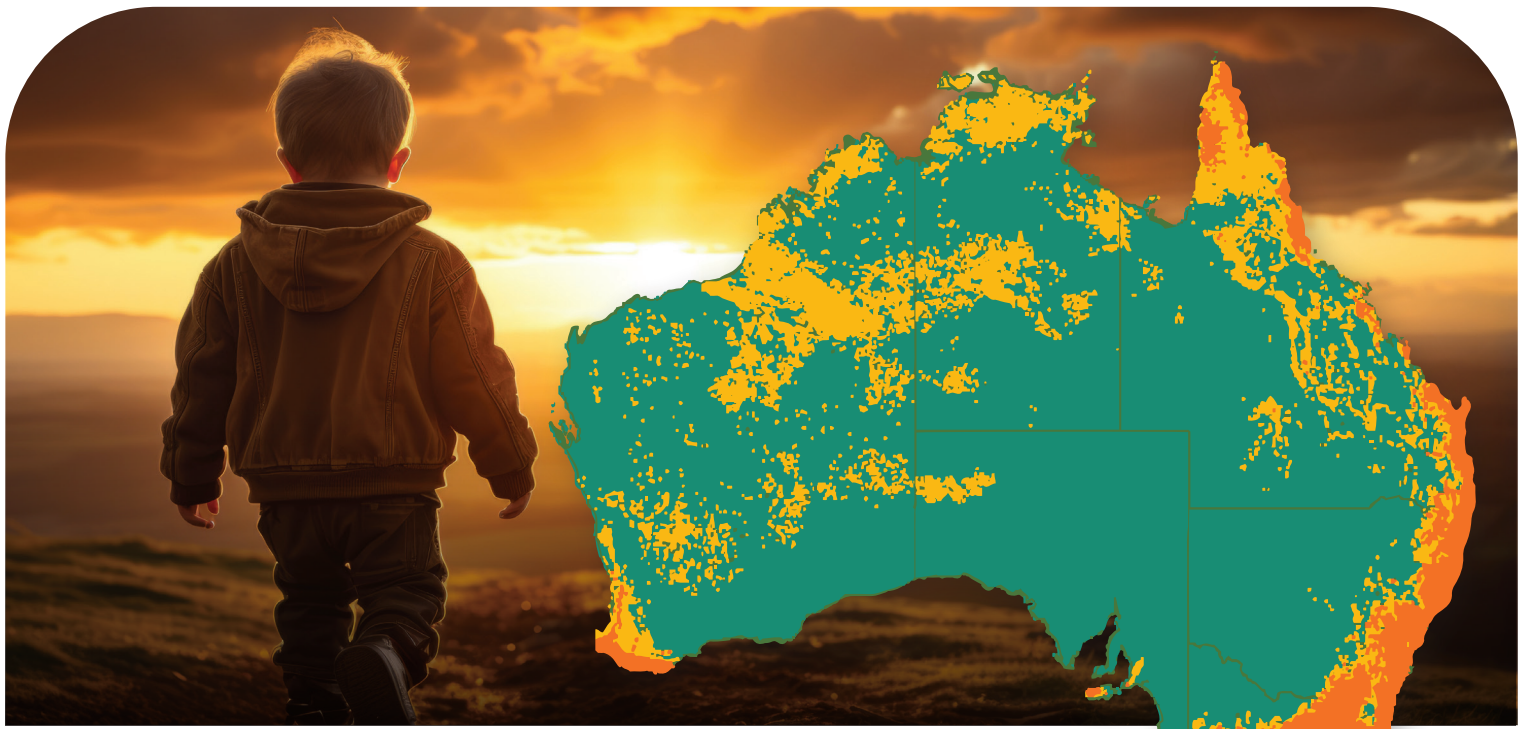
DON'T mix trace elements with liquid inoculants in a tank as they can be very toxic to rhizobia. Where freeze dried and peat slurry inoculants are applied as liquids in furrow, avoid adding trace elements or other additives to the tank mix, as they often kill the rhizobia. Alternatively, use a granular inoculant.

DON'T wait too long before sowing seed. Sow peat inoculated seed within 24 hours, or within 6 hours if the seed has a fungicide coating. Sow freeze-dried inoculated seed within 6 hours.

DON'T leave inoculant in direct sunlight or in temperatures higher than 25 degrees Celsius. All types of inoculant in bags or packets, on inoculated seed, as liquid or in granule form can be damaged by warm temperatures.

DON'T mix inoculant directly with fertilisers. Some types of fertiliser can be toxic to rhizobia and most types of inoculant granule should not be mixed with fertiliser. This is particularly the case for acidic fertilisers such as mono ammonium phosphate (MAP) and super-phosphate. Delivery of liquid fertiliser through a separate line can be effective.

THE DON'TS



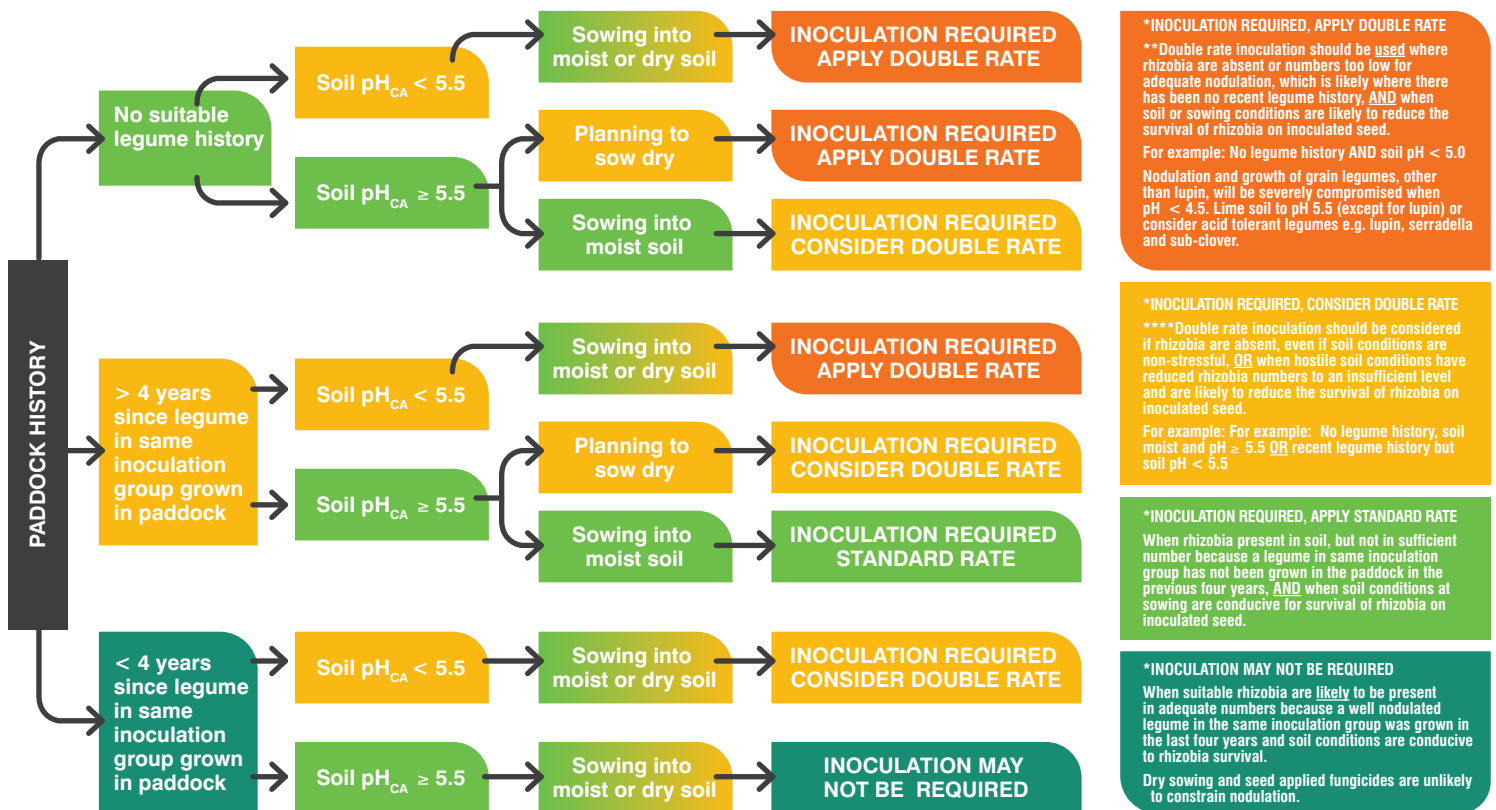
Future generations are **relying** on it!

Inoculant - standard or double rates

SOIL PH



The considerations for doubling inoculant rate on seed are similar to those used for determining whether inoculation is required in the first instance:



* Inoculation requirement for legumes in the E and F inoculation groups (faba bean, lentil, Field pea and vetch) can be measured using PREDICTA rNod provided by SARDI. Tests for Group G and S, and N are under development. Rhizobia levels insufficient for adequate nodulation if < 250 rhizobia/g soil. Rhizobia levels adequate and inoculation response unlikely if > 1000 rhizobia/g soil.

** For double rate inoculation add twice the amount of peat to the same amount of water recommended for single rate. A small test batch is recommended to confirm the inoculated seed is unlikely to cause seeder blockages, especially with smaller seeded legumes.

Latest Trial Results

Recent trial results have demonstrated the benefit of adding an EasyRhiz™ Vial to a peat slurry to significantly increase the rhizobia count on seed.

Faba seed was treated with a number of different inoculants and rates.

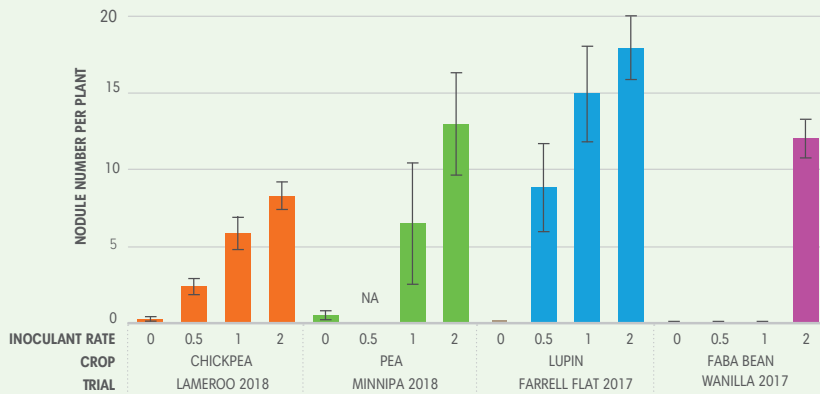
By adding a single rate of EasyRhiz™ to a single rate of NoduleN™ Peat, the CFU/seed increased 4 times.

This combination proved to be the most cost effective and convenient method to achieve the highest rhizobia count on seed to treat at a double rate.



Doubling Inoculating Rate Demonstrates Increased Nodule Numbers

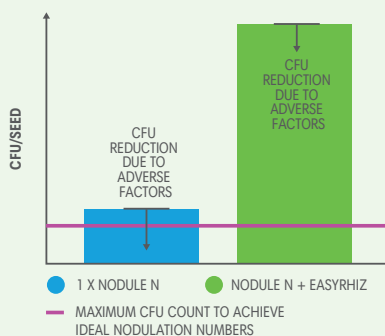
FIGURE 1: Nodule number responses in hostile sowing conditions to varying rates (0, 0.5, 1, 2 times standard rate) of peat inoculant applied to seed. Source: Fact Sheet Doubling Inoculant Rates, GRDC, 2021 times.



Start with the highest CFU count possible to minimise external adverse conditions

External adverse conditions can impact the rhizobia CFU count on seed.

If numbers fall below the minimal count, a reduction in development of nodules on plants may occur.

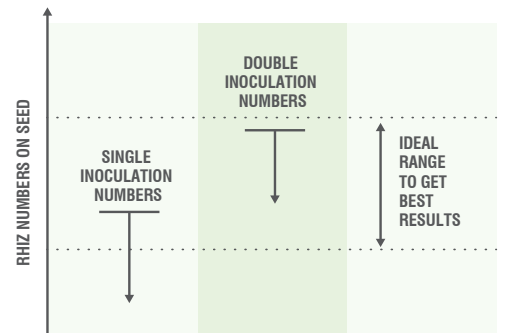


External adverse factors include:

- Acidic soils
- Dry or wet weather conditions
- Paddocks with greater than 4 years without a legume
- Prolonged period between treating and sowing
- Herbicide residues. Particularly Group B and I, and seed treatments.

Maintaining Rhizobial numbers on seed

Double inoculating seed ensures Rhizobial numbers stay on the seed. The below external factors may impact results.



External Factors can cause Rhizobia numbers on seed to fall.

- Application technique and accuracy
- Soil moisture at sowing
- Time between application and sowing
- pH of soil
- Single inoculation may lead to numbers falling below ideal range.

* Arrow depicts fall.



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Experience the Future of Agriculture with NEM!

At NEM, we lead the way as Australia's premier producer and supplier of inoculants, bio-fertilisers and bio-stimulants, revolutionising agriculture. We harness the best Australian and global science to support sustainable farming and a healthier planet.

NEM's inoculant products produce nodulation on roots, maximise nitrogen fixation and enhance soil fertility. Establishing a robust partnership with rhizobia bacteria, legumes can significantly improve their nutrient uptake, leading to increased crop yields and healthier soils, while reducing the need for synthetic fertilisers.

Unleashing the Power of Biostimulation isn't just about enhancing plant resilience to better deal with stress; it's a gateway to unlocking nature's potential to boost crop yields and improve quality naturally.

Our Biofertiliser products optimise soil nutrients through innovative methods like nitrogen fixation and phosphorus solubilisation. By teaming up with mycorrhizal fungi, plants can more efficiently absorb water and essential nutrients, paving the way for remarkable growth.

NEM is constantly working to provide growers with tailored solutions for a changing landscape. Our dedicated team works tirelessly to address grower challenges by increasing crop productivity, quality, and profitability. So, when you choose NEM, you're not just buying products; you're investing in the future of farming.

Setting Quality Standards High

We are committed to excellence, striving to be a pioneering microbial front runner, and assisting growers to achieve a better tomorrow. From rigorous screening processes to partnering with a global leader in the industry, every step is meticulously monitored to ensure our products meet the highest industry benchmarks.

Powering Agriculture with Partnerships

Collaborating with over 400 scientists worldwide, our partner Lallemand Plant Care, ensures that innovation is at the core of everything that is done. With state-of-the-art research facilities and strategic alliances with universities and research hubs worldwide, we continue to explore plant-microbes.

Join us on this transformative journey towards a more sustainable and productive agricultural future with NEM!

Our team, leading the way from the ground up.

NoduleN™

NoduleN™ Peat is a microbial product compatible with NexusProvide, Customer Technical Support: Speak with our friendly support team if you need to seek specialist or product compatibility advice.

EasyRhiz™

EasyRhiz™ is a microbial product compatible with NexusProvide, Customer Technical Support: Speak with our friendly support team if you need to seek specialist or product compatibility advice.



For more information head to the NEM website.



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