NZ Forage Systems Fact Sheet

Inoculating legume seeds

Key Points

1. Inoculation is essential if sowing a new legume species that has not been sown in the paddock before.
2. Seed can be purchased already inoculated (coated) or you can inoculate it yourself.
3. Coated seed must be stored in a cool place and the inoculating rhizobia has a storage life of 20 days under cool dark conditions.
5. Bare seed inoculated by hand must be sown the same day that it is inoculated.
6. Inoculant must not be mixed with chlorinated water.
7. Store inoculant in the refrigerator.
8. If sowing coated seed adjust sowing rate to account for weight of coating.

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Inoculation

All pasture legumes (clovers and lucerne) form a mutually beneficial symbiotic association with rhizobia to assist in meeting their nitrogen requirements. Small nodules develop on the plant roots and house millions of rhizobia, which convert nitrogen from the air into a form the plant can use (in a process known as nitrogen fixation). Pasture legumes can typically fix around 25 kg of nitrogen per tonne of DM produced by the legume. This nitrogen becomes available when the plants are grazed and nodules break down. Plants not fixing nitrogen can appear stunted and pale yellow/light green in colour.

The association between the legume and its rhizobia is very specific. Rhizobia that inoculate white clover are a completely different strain to those which associate with annual clovers (e.g. subterranean or arrowleaf clovers) or lucerne. Where a particular species of legume has been sown previously, the paddock will have a resident population of the correct rhizobia strain. Where a new legume species is introduced into a paddock that has not had that legume before it is ***essential*** that the seed be inoculated with the correct rhizobia (or Group) prior to sowing.

Seed can be purchased with the correct rhizobia strain incorporated into a seed coat (pellet) or bare seed can be purchased with inoculant and seed inoculated immediately before sowing.

Nodulation

Effective nodulation takes place within four weeks of planting. Nodules appear as small (1-2 mm) round or cylindrical nodules in the roots of legumes. Visual inspection of the number of nodules and the interior colour of the nodule can indicate the status of nitrogen fixation in a legume plant. If the nodule is fixing nitrogen, there will be a reddish pink pigment inside the nodules. A cross section of a functional nodule made with a pocket knife should reveal a pink to dark-red coloration, whereas a white or greenish colour indicates ineffective nodulation.

Coated or bare seed?

Seed may be purchased already inoculated - as commercially coated or pelleted seed. The coating provides protection for the rhizobia, giving it a shelf life of

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20 days if stored under cool conditions. Seed coatings assist in the germination of seed by increasing soil/seed contact and can also be used to include fungicides and nematicides to help protect the establishing seedling. When sowing coated or pelleted seed it is necessary to increase the sowing rate to take into account the weight of the coat being sown. Seed coatings provide the greatest advantage when the seed is oversown or broadcast and rolled. If you are drilling seed you may need to plan on inoculating the bare seed just prior to sowing. Remember once the seed is coated the inoculant has a maximum shelf life of 20 days, provided it is stored in cool conditions.

To inoculate bare seed

Order seed and correct inoculant to arrive just before sowing. If inoculating two different species requiring differing strains of rhizobia, inoculate each separately before mixing seed. You will need:

- Correct inoculant strain - 1 packet per 25 kg of seed. ***Store inoculant in the refrigerator until required***.
- Clean unchlorinated water. ***Chlorine will quickly kill rhizobia.***
- Hand whisk
- 2-3 litre mixing container
- Mixing drum or clean surface to mix seed on.

Remember to -

1. Follow the instructions on the packet carefully.
2. Work in a cool, shady place.
3. Measure the correct amount of clean un-chlorinated water (rainwater is best). It is important not to use more water than recommended for the amount of seed you are processing. Do small batches first until you understand the process.
4. Slowly add the correct amount of peat inoculant to the water stirring vigorously. A whisk is useful to break up any lumps
5. Place one bag of seed in a suitable container (a clean concrete mixer is ideal) or on a tarpaulin on a concrete floor.
6. Add the inoculant solution and mix.
7. The seed may clump but continued mixing will distribute the inoculant.
8. Continue mixing until there is no clumping of seed and seed appears evenly coated. The seed should appear dry and there will be no need to dry it if the correct amount of water has been used.
9. Re-bag the seed and use seed. Keep seed as cool as practicable. ***This un-pelleted seed must be sown within 10 hours.***