

Follow the 'Do' list to achieve healthy soybeans



Good root nodulation



If you don't follow the 'Do' list, the inoculant may fail and result in a poor soybean crop



Poor root nodulation



The result of poor inoculation in a peanut crop due to nozzle blockage



A well-inoculated peanut crop



Plant yields from poorly inoculated plants (left) and well-inoculated plants (right)



More information

For more information, call the Department of Employment, Economic Development and Innovation on 13 25 23 or visit www.deedi.qld.gov.au

The following people contributed to the information presented in this brochure:

Rao CN Rachaputi (ACIAR-SMAR 2007/068 Enhancing productivity and profitability of tropical pulses in Indonesia and Australia)

Neil Halpin, Nikki Seymour and Mike Bell (GRDC DAQ 00129 Improving the integration of legumes in grain and sugarcane farming systems)

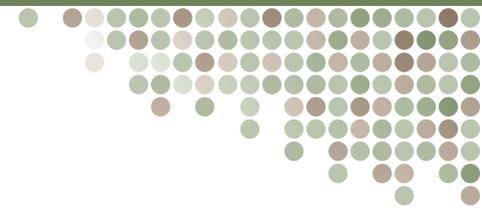


Department of Employment, Economic Development and Innovation
Agri-Science Queensland



Rhizobium inoculation

Get the best from your legume crop



Tomorrow's Queensland:
strong, green, smart, healthy and fair



What is rhizobium?

Rhizobium bacteria are beneficial soil bacteria that enable legumes to use or 'fix' atmospheric nitrogen for plant growth. Each species of legume has a specific strain of rhizobium that it needs for this process. To ensure adequate plant growth, it is important to inoculate legume seed at planting with the correct strain of rhizobium.

Why is it important?

Grain legumes are quickly becoming part of the sugarcane farming system, not only due to their own high market value but also because of the significant rotation benefits they offer to a sugarcane crop.

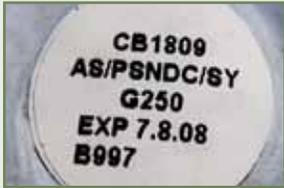
One of the important roles performed by grain legume break crops is to fix enough nitrogen from the atmosphere for its own use, as well as leaving some residual nitrogen behind for the subsequent cane crop.

A well-inoculated crop of soybeans or peanuts can contain 300 kg of nitrogen, and the crop residue after harvest (including below ground parts) leaves about 120 kg of nitrogen per hectare for the following cane crop. At the current price of \$680/t of urea (as of June 2010), this represents a cost reduction of \$236/ha.

The 4200 ha of grain legumes in the Wide Bay district in the 2008–09 season represented a drop in nitrogen input of 1176 t compared to a sugarcane-only farming situation, which amounts to a saving of \$800 000 for coastal farms.

How can I get the best results?

Legumes need the correct strain of rhizobium to make functional nodules on roots and to fix the atmospheric nitrogen. The rhizobium inoculant has to be handled correctly to get the best performance from your legume crop. Remember, rhizobium is living bacteria and needs to be well looked after. The following table describes the most important 'dos and don'ts'.

Do	Don't
Use the right inoculant for the crop (e.g. use Group P for peanuts and Group H for soybeans).	Don't use cowpea inoculant (Group I) on soybeans.
Check the expiry date on the packet.	Don't use out-of-date stock. 
Ensure that the inoculant is stored below 12° C. Keep it cool and fresh in an esky.	Don't leave the inoculant in the sun. Don't freeze the inoculant as that will cause cell rupture on thawing.
Check soil pH—apply lime if it is less than 5.5.	Don't expect the inoculant to work well in acid soils.
Ensure there is adequate soil nutrition, particularly phosphorus, sulphur and molybdenum. Consult your agronomist for advice on soil test results.	Don't skimp on getting the paddock soil tested pre-plant.
If applying inoculum using water injection, check the pH level of the water and adjust it so it is close to 7 where necessary. Use rain water if possible.	Don't add liquid fertilisers to water injection solution, especially zinc and sodium molybdate as these solutions will kill the bacteria.
Plant into adequate soil moisture.	Don't plant and apply inoculum in dry soil. Dry soil reduces bacteria survival. 

Do	Don't
Supply adequate inoculant, especially if the paddock has never grown a particular legume before. Remember that at least 1 000 000 live bacteria per seed are required for effective nodulation. This is achieved by following the manufacturer's recommendations.	Don't under supply inoculant.
	
<i>Well-coated seeds</i>	<i>Poorly treated seed</i>
Use a minimum of 100 L of water per hectare when water injecting. Ensure that you have adequate filtration so that nozzles don't block.	Don't leave the water 'nurse tank' in the sun as that can increase the temperature of water and kill the bacteria.
Ensure intimate contact between the inoculant and seed. The rhizobia have to penetrate the root within 24–72 hours.	Don't separate the inoculant from the seed.
Sow the seed within 6 hours after treatment. If applying inoculant to the seed (as a peat slurry), sow as soon as possible after treatment.	Don't leave treated seed lying around for several days prior to planting.
Physically separate the fertiliser from the seed and rhizobium. Rhizobium is much more sensitive to the fertiliser 'salt effect' than seeds and seedlings.	Don't place fertiliser in the same furrow as the seed and rhizobium.