Inoculation of Legumes

The large pink color of these clover root nodules indicates good nitrogen fixation.

There is a symbiotic (mutually beneficial) relationship between legume plants and Rhizobia bacteria. The bacteria infect legume roots and nodules are formed. They get food from the plant. The nitrogen in the nodule that is "fixed" from the soil air by the bacteria is then available for use by the plant. Nitrogen fixation can be reduced by:

1. nutrient deficiencies in the soil
2. excessive nitrogen applications (generally over 20 lbs/acre)
3. weed or grass competition that shades the legumes
4. low soil pH, drought, extreme heat

Specific species of Rhizobium bacteria are required for specific species of legumes.

Alfalfa Group
(Rhizobium meliloti)
Alfalfa
Black medic
Burclover
Button clover
White sweetclover
Yellow sweetclover

Clover Group
(Rhizobium trifolii)
Alsike clover
Crimson clover
Red clover
White clover

Cowpea Group
(*Bradyrhizobium japonicum spp.)*
Cowpea
Peanut
Lespedeza

Pea and Vetch Group
(Rhizobium leguminosarum)
Big flower vetch
Common vetch
Hairy vetch
Rough pea
Winter pea

Other [1]
Birdsfoot trefoil *(Rhizobium loti)*
Crownvetch
Soybean *(Rhizobium japonicum)*
Kura clover

[2] Except for legumes listed in "other", the same inoculum can be used for all species listed within an inoculation group.

On Farm Inoculation

When inoculant is purchased, check the label for:

- legume listing
- expiration date

Management of Inoculant

- Always use fresh inoculant
- Store purchased inoculant in a cool place
- Do not mix with fertilizer
- Inoculate legume seeds just prior to seeding
    - one package should inoculate about 50 pounds of seed
    - make seed “sticky” by applying either a commercial sticker or a dilute mixture of syrup and water
    - mix thoroughly
    - plant right away (if over 1 day before planting, re-apply)
- A slight soil cover and soil moisture improves inoculant survival

Coated Seed

The seed is pre-inoculated by applying an adhesive, then the inoculant, sometimes a fungicide, plus a lime or clay based coating.

Advantages

- a higher population of rhizobium on the seed
- longer rhizobium survival in the soil

Cautions

- Re-calibrate drill to take into account the larger seed
- Less seed per pound due to the coating

Inoculation of Legumes

Obtain correct inoculant for the legume species
check package
Alfalfa and Sweetclover- *Rhizobia meliloti*
True Clovers - *Rhizobia trifolii*
True Peas and Vetch - *Rhizobia leguminosarum*
Soybean - *Rhizobia japonicum*
Birdsfoot Trefoil - *Rhizobia loti*
Annual Lespedeza - Cowpea group
Partridge Pea - Cowpea group

Check expiration date on package

Prior to use, store in a cool place out of sunlight

Always use fresh inoculant

Inoculate just prior (same day) to planting

Make seed "sticky" so inoculant will adhere to seed
Place seed in open container (tub)
Slightly dampen with a:
commercial sticker; or
small amount of soft drink and water; or
small amount of syrup and water

When seed is slightly damp and sticky, add inoculant
And mix thoroughly
Use amount shown on packaging

Plant soon after inoculation (keep out of sun)

Do not mix inoculated seed with fertilizer

If plant> 1 day after adding inoculant, re-inoculate

Commercially pre-inoculated seed

Check expiration date on seed bag tag

Store out of sunlight and heat

Calibrate seeder using the inoculated seed

Plant as soon as possible