tions, the soil may be "preinoculated." The inoculant is mixed with moist soil, moist sawdust, or other inert material and is then incorporated in the soil before seeding. This may be carried out on plowed fields at the last harrowing for weed control and final preparation just before seeding.

Inoculated seed should not come in contact with caustic lime, acid fertilizers, or fertilizers containing chemical salts. Inoculated seed can mix in the drill spout with materials such as superphosphate and basic slag. Ordinarily, concentrations of fertilizer in the soil that do not affect seed germination or injure seedling roots will not harm the root-nodule bacteria. However, mixing fertilizer with inoculated seed should be avoided.

How do you choose an inoculant?

Several types of legumes may be effectively nodulated by a single species of root-nodule bacteria. Plants nodulated by different species of bacteria are called CROSS INOCULATION GROUPS. Commercial inoculant containers are clearly labeled with the proper Cross Inoculation Group designation. It is the buyer's responsibility to request inoculant for the Cross Inoculation Group which includes the legume he wishes to plant. The more commonly recognized groups are as follows:

Alfalfa group	
alfalfa	bur clover
sweetclover	black medic
Cowpea group	
cowpea	lima bean
crotalaria	pigeon pea
lespedeza	partridge pea
peanut	mung bean
kudzu	hairy indigo
alyce clover	Aeschynomene
beggarweed	Stylosanthes humilis
velvet bean	
Lupine group	
blue lupine	white lupine
yellow lupine	serradella
Soybean group	
soybean	
Clover group	
Berseem clover	crimson clover
white clover	subterranean clover
red clover	other true clovers
Pea and vetch group	
field pea	sweet pea
garden pea	rough pea
Austrian winter pea	(Singletary, Caley)
common vetch	tangier pea
monantha vetch	
Bean group	
garden bean	scarlet runner bean
Trefoil group	
birdsfoot trefoil	

Frequently, strains of bacteria effective on one member of a group are ineffective on other members of the same group. An ineffective strain of bacteria is "parasitic:" it will nodulate a particular plant but will fix little or no nitrogen. Good examples of this are in the clover and trefoil groups. In the clover group, effective strains of bacteria isolated from crimsom clover are ineffective on white clover and vice versa. Bacteria isolated from either big trefoil or birdsfoot trefoil may be totally ineffective on one or more group members. Therefore, satisfactory group cultures can be prepared by combining strains which have been proven effective on all members of the same group.

Why does inoculation fail?

There are times when inoculation fails. Some possible causes of failure are the following:

- Use of wrong inoculant. It is the buyer's respon sibility to know the type of inoculant he needs, to request it specifically, and to ascertain that he has received what he requested. If in doubt about the type of inoculant required he should consult his County Extension Director.
- Unfavorable soil conditions. In general, soil conditions (other than high soil N levels) which favor plant growth also favor the processes of nodulation and nitrogen fixation.
- Use of dead inoculant. Although unlikely, inoculant may be dead due to faulty manufacture. It is more likely to be the result of poor shipping or storage conditions before purchase. In particular, exposure to high temperatures, even for very brief periods of time, or to direct sunlight, may severely reduce the success of inoculation.
- Faulty handling of inoculant after purchase. Inoculant must be transferred and stored under cool conditions. Pay careful attention to the inoculation procedure previously outlined.

NOTE: Excessive heating or drying of the inoculant at ANY time before use will result in inoculation failure.

What are the benefits of inoculation?

- Improved quality of forage. The protein content of pasture and hay is increased by the presence of inoculated legumes.