

AGRY 515: Plant Mineral Nutrition

Nitrogen Fixation

Powerpoint file: N2Fixation_Slides_2012

Major Strategies for N fixation

- Symbiotic

- Associative

- Free Living

Fixation Capability and Energy Source

Symbiotic N Fixers (Table 2, 3)

- Rhizobia

- Bradyrhizobia

- Frankia

Host Specificity (Table 4)

Inoculation Process (Fig. 2, 3, 3a, 4, 5)

- Recognition of host

- Molecular conversation: bi-directional transfer of information

- Development of nodule meristem

- Enzyme synthesis / biochemical changes

Determinant and Indeterminate Nodules (Table 5, Fig. 6, 7)

Biochemistry of N fixation (Fig. 8 – 11, Table 6, Supplemental Slides (slide #26 - 30))

- Nitrogenase System

 - Nonheme Fe proteins

 - ATP / Ferredoxin

- Factors controlling fixation potential

 - Oxygen sensitivity

 - Photosynthate supply

 - Fixed N export

Ecosystem level factors regulating N fixation (Supplemental Slides (slide #31 – 35))

- Specificity & inoculum availability

- Environmental factors

 - Exogenous N

 - Other mineral nutrients

Improving the system...