



Relationship #10



The bacteria found on the roots of a soybean plant fix atmospheric nitrogen and make it available to the plant. The bacteria receives carbohydrates from the plant.

Rhizobium is a free living soil bacterium that enters the root cells of plants in the family Fabaceae (peas, beans, peanuts, clover, soybean) and the plant root forms nodules around the Rhizobium containing cells.

Rhizobium fixes N_2 gas to form NH_3 (ammonia) and NH_4^+ (ammonium ion) which is used by the bacterium to form organic nitrogen compounds. Nitrogen fixation is not performed by any plants, and nitrogen is a limiting nutrient for plant growth.

The bacteria provide nitrogen to the plant at the nodules.

The plant provides the bacteria with shelter, provide anaerobic conditions necessary for nitrogen fixation to occur (hemoglobin-like compounds in the outer cells of the root nodule trap oxygen), and provide carbohydrates to the bacteria.

Both organisms benefit from this relationship.