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POTASSIUM IN PULSE CROPS

Pulse crops...such as peas, faba beans, beans, and lentils...need plenty of potassium during plant growth. In fact, they often take up twice as much potassium as cereals. A 40-bushel crop of peas requires about 110 pounds of K_2O , while a yield of 40 bushels of faba beans needs over 200 pounds. In contrast, 40 bushels of spring wheat only takes up about 90 pounds of K_2O .

Pulse crops are legumes and, like other legumes, are very responsive to potassium nutrition. Potassium has a big impact on legume yield and may have an even bigger effect on biological nitrogen fixation. But the effect is not a direct one. For nitrogen fixation to occur, legumes must enter into a mutually beneficial partnership (symbiosis) with certain soil bacteria, called rhizobia. The rhizobia invade plant roots and multiply rapidly, causing a swelling... nodules...to form. Nitrogen in the soil air surrounding the nodules is converted by the bacteria in the nodules to a form the plant can use. The rhizobia obtain food from the plant and the plant obtains nitrogen from the rhizobia—both benefit and potassium helps.

Potassium fertility influences several plant factors which can limit nodulation and nitrogen fixation. These factors include:

- **Root growth**—potassium increases root numbers and volumes, increasing the chances for root hairs to intercept the soil bacteria which initiate nodulation.
- **Photosynthesis**—nitrogen fixation requires tremendous amounts of energy, and potassium is known to increase photosynthetic activity.
- **Carbohydrate supply**—potassium increases carbohydrate accumulation in plants. A good supply of carbohydrates to the nodules is essential to complete the nitrogen fixation process.
- **Translocation**—potassium accelerates the translocation of plant metabolites to and from the nodules, making the nitrogen fixation process more efficient.
- **Protein formation**—potassium promotes the conversion of plant metabolites into proteins and amino acids, thus providing a sink for the nitrogen fixed.
- **Nodule formation**—potassium has been shown to increase nodule number, size, and productivity.

Potassium increases nitrogen fixation in legumes. Whether it is grain legumes or forage legumes... potassium has a positive effect on nitrogen fixation and nitrogen accumulation in the plant. Grain legume crops can fix from 60 to more than 250 pounds of nitrogen per acre annually, if conditions are favorable. Potassium plays a key role in ensuring the process is efficient and effective.

Remember: For pulse crops...pay particular attention to soil test potassium.

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