

RESEARCH NOURISHES NUTRIENT MANAGEMENT

As soybean yields increase, regional checkoff-funded research provides fertility and nutrient management recommendations that maximize the potential of today's high-yielding varieties.



SOYBEAN RESEARCH &
**INFORMATION
NETWORK**

PHOSPHORUS **P**

Soybeans use phosphorus (P) in root development, photosynthesis and energy transfer. Response to P fertilizer varies, although soybeans do appear to effectively pull P from the soil. Research into requirements and availability across geographies fine-tunes tips for high-yield environments.

POTASSIUM **K**

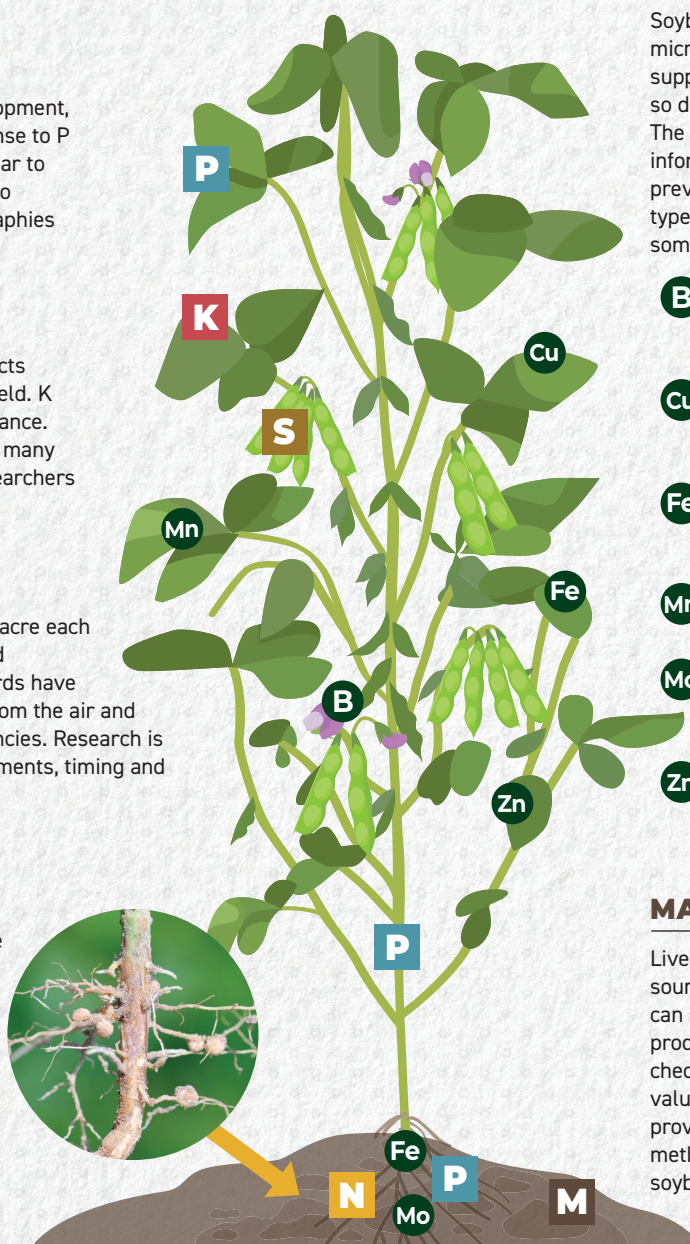
Potassium (K) availability in soybeans impacts biomass production, stress tolerance and yield. K can improve plant health and disease resistance. But as soybean acres and yields increase in many areas, K deficiencies are appearing. So, researchers are studying K needs and uptake.

SULFUR **S**

Soybeans use 20 to 25 lbs. of sulfur (S) per acre each season to enhance amino acids cysteine and methionine. Changing air emissions standards have reduced how much S is deposited in soils from the air and some regions now report soybean S deficiencies. Research is exploring S fertilization in different environments, timing and delivery to determine the right solutions.

NITROGEN **N**

Soybeans require 4 to 5 lbs. of nitrogen (N) per bushel. Nodules on soybean roots house bacteria that fix about half of that N for the plant. Research advances efficient nitrogen use by investigating when N becomes a yield-limiting factor in high-yield environments, soybean response to N fertilizer, plant availability of N from crop residue and cover crops and more.



MICRONUTRIENTS

Soybeans need small amounts of key micronutrients to thrive. These nutrients support essential physiological functions, so deficiencies can noticeably cut yields. The checkoff supports research to provide information and recommendations that prevent yield limitations. For example, soil type and pH both factor into availability of some micronutrients.

- B BORON (B)** supports node number, plant height, flowering, pollen viability, pod and seed set.
- Cu COPPER (Cu)** is used for photosynthesis, respiration, lignin production and metabolism.
- Fe IRON (Fe)** supports chlorophyll for photosynthesis and root nodule formation to fix N.
- Mn MANGANESE (Mn)** plays a key role in photosynthesis.
- Mo MOLYBDENUM (Mo)** is an important part of the enzyme root nodule bacteria used to fix nitrogen.
- Zn ZINC (Zn)** is critical for early vegetative growth, chlorophyll and carbohydrate production.

MANURE **M**

Livestock and poultry manure is a valuable source of fertilizer and organic matter and can supply nutrients soybeans need to produce high-quality protein for feed. With checkoff support, researchers analyze the value poultry, swine and dairy manure provide to soybeans along with application methods, timing and rates to ensure soybeans use manure nutrients efficiently.

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The Soybean Research and Information Network (SRIN) is a joint effort of the North Central Soybean Research Program and United Soybean Board. The online resource contains checkoff-funded soybean production challenge research findings with direct links to the respective underlying scientific studies housed in the National Soybean Checkoff Research Database. *Funded by the soybean checkoff.*