

IMPACT OF AGRONOMIC PRACTICES ON SOYBEAN SEED QUALITY

Roger Borges ^{1/}

A single soybean variety can express a wide range of grain protein and oil content when exposed to different environmental conditions. Information about the impact of manageable factors on the protein and oil content of soybeans grain is scarce at best.

Eight thousand eight hundred and forty nine soybean grain samples from 72 experiments were analyzed for protein and oil content at the University of Wisconsin in Madison. The two main objectives were (1) to identify management practices that can have an impact on soybean grain composition, and (2) to demonstrate the extent to which some management variables can impact the protein and oil content of soybean grain.

Grain from over 200 fields planted with NK S20-F8 soybean revealed several significant correlations between soil and grain variables (see companion slides). A randomized complete block design in six site years showed up to 20% increase in protein concentration and 16% decrease in oil concentration as soil pH rouse from 4.5 to 7.0. A rhizobium inoculant study conducted as a complete randomized block design at two locations showed a positive correlation between nodule counts at R1 and protein output per acre. A randomized complete block study on row spacing and plant density showed a higher protein and lower oil content at 19 cm compared to 75-cm row spacing.

Higher plant densities also increased protein and decreased oil contents. Addition of soil amendments such as animal manure and paper mill residue increased the protein content of soybean grain at multiple locations.

Fifty-six soybean plots from a long-term corn/soybean rotation study were evaluated to determine the effects of crop rotation and tillage has on grain composition. The trail consists of two different tillage systems and seven different crop rotations. More year of consecutive soybean in conventional tillage systems tend to lower the protein concentration of soybean grain. Also, higher protein and lower oil concentrations were observed in no-till plots compared to tilled plots.

^{1/} Assistant Professor, Department of Agronomy, Univ. of Wisconsin-Madison.