



FLUID FACTS

NFSA AGRONOMIC NEWSLETTER

DOUBLE-CROP PRODUCTION SYSTEMS REQUIRE CAREFUL FERTILITY MANAGEMENT

Because the 1990 Farm Program allows farmers more flexibility for planting soybeans in rotation with program crops, fertility management in double crop soybeans will be important this year. The University of Arkansas Fact Sheet 2034, titled "Mineral Nutrition of Soybeans," has some information about nutrient requirements of soybeans that should be considered in developing soybean fertility management programs.

Soybean plants may accumulate up to 300 pounds of N, 60 pounds of P_2O_5 and 120 pounds of K_2O in achieving a 50-bushel per acre yield. By maturity (R8), the seed may contain more than 65 percent of all nitrogen, 73 percent of all phosphorus and 55 percent of all potassium uptake by the above-ground portion of the plant. Harvesting 50 bushels of soybean seed per acre can remove 200 pounds of N, 38 pounds of P_2O_5 and 63 pounds of K_2O .

MAINTAIN NUTRIENT BALANCE

Dr. Ron Mulford, University of Maryland, is the project leader for a Fluid Fertilizer Foundation (FFF)-supported study on intensive wheat production. Using winter wheat as the base crop, Mulford is developing a crop production system that produces three crops in two years. Soybeans are no-till planted in wheat stubble following wheat harvest and no-till corn is planted the following spring. Double-crop soybean yields have reached a high of 60 bushels per acre, with averages around 44 bushels per acre.

Mulford's data emphasize the importance of maintaining a high level of all essential plant nutrients to produce optimum yields of all three crops in the rotation (Table 1). Soil samples should be collected after corn harvest to check soil fertility levels before seeding wheat. Calcium and magnesium should be applied if required.

Sulphur at a total rate of 15 to 20 pounds per acre should be applied routinely on wheat. A typical program begins with 250 to 300 pounds per acre of 0-20-20 broadcast applied and plowed down, followed by a broadcast application of 5-10-20 disked in ahead of wheat seeding.

In the spring at wheat green-up, UAN solution plus herbicide is top dressed at the rate of 40-60 pounds of N per acre. Rate is determined by soil type and crop potential. The final N treatment is a stream of UAN solution applied in 10-inch spaced bands at Feekes growth stage 5 (before stem elongation). The application rate is adjusted by soil type in a range of 40 to 60 pounds of N per acre.

This program feeds a wheat crop that can produce yields above 100 bushels per acre and sets the nutrient table for the soybean crop that is planted immediately after wheat harvest. Mulford points out that if a wheat fertility program does not supply enough residual nutrients for a good yield of soybeans, fertilizer should be applied when the soybeans are planted. Some dealers report that they are selling starter fertilizer for soybeans and getting good response.

N RESPONSE

An experiment conducted by researchers at Mississippi State University showed that double-crop soybeans planted in wheat stubble respond to supplemental nitrogen. Soybeans that received 25 pounds of N per acre applied in a band four inches to the side of the seed row immediately after planting had more growth and a greener color four weeks after planting than did those without supplemental N.

Table 1 Nutrient Removal by a 60 bu/A wheat and 40 bu/A soybean Double Crop

	60 BU/A WHEAT	40 BU/A SOYBEANS	TOTAL
	LB/A		
N	90	160*	250*
P_2O_5	33	32	65
K_2O	20	56	76

* Soybeans fix most of their nitrogen from the air under normal yield conditions.



The yield response to N, averaged over two years, was 4.7 bushels per acre. Soybeans planted in standing stubble averaged 24.4 bushels per acre without supplemental N and 29.1 bushels per acre with supplemental N.

Based on this study, a low rate (20-25 pounds per acre) of N applied with a starter attachment could be a good investment on no-till double-crop soybeans planted in standing wheat stubble.

Cost of Starter N Fertilizer	\$5.00 - 6.25
Gross Return from Additional Yield	\$23.50
Net Direct Return per Acre	\$17.25 - 18.50
<i>(Attributed to N Fertilizer)</i>	
Assumes N at \$0.20 - 0.25 /lb and soybeans at \$5.00/bu.	

In Mulford's system, wheat is harvested to leave a stubble that is no taller than 10 inches. Soybeans are planted in 15-inch rows at a plant population of three to four plants per foot of row as early as possible. No-till corn follows soybeans as the third crop in the rotation. Corn yields have averaged 20 to 22 bushels per acre more following the wheat-soybean crops than in continuous corn.

As farmers strive to improve the profitability of crop production, double cropping soybeans and wheat is a practice to watch.

NO-TILL DOUBLE CROP SOYBEANS

ADVANTAGES

- Profit potential by spreading fixed costs over another crop
- Extends cover for erosion control
- Value of residual N from soybean stubble

CHALLENGES

- Requires closer management of P, K and micronutrients from wheat to soybeans
- Variable moisture availability for two crops during summer
- Wheat straw management affects weed control and planting uniformity