

LATE SEASON SUPPLEMENTAL NITROGEN ON DOUBLE-CROPPED SOYBEANS

Curt Judy, Extension Agricultural Agent for Christian Co.
Lloyd Murdock, Extension Soils Specialist

Soybeans produce their own nitrogen for crop growth with the aid of nitrogen fixing bacteria in the soil that infect the soybean root and form nodules which contain the bacteria. This is a symbiotic relationship that benefits both the plant and the bacteria. The bacteria are able to take atmospheric nitrogen and convert it into a form of nitrogen that the plant can use. Much of the nitrogen requirement for soybean production begins at seed development. Soybean physiology studies suggest that the amount of nitrogen supplied for the soybean plant from fixation in the nodules is less than the potential needs of the soybean crop during seed fill. The soybean plant adjusts for the deficiency by translocating nitrogen from the leaves and stems to the seeds. This reduces the capacity of the leaves to produce photosynthetic products for filling the seed and has been the subject of many studies. In most cases, the addition of nitrogen has not increased yields or the increase in yields has been too low to be profitable.

Recently, there has been an increased interest at the producer level in the possibility of supplying nitrogen during seed development. Much of this interest comes from producers with double-cropped soybeans.

In 1996, supplemental nitrogen (N) was tried at four locations on double-cropped soybeans in Christian Co. and at two locations in 1997. Liquid UAN fertilizer (28% N) was dribbled beside the rows when the soybeans were either in full bloom or very early pod at the rate of 33 lbs of N/acre in 1996 and at 40 lbs of N/acre in 1997. Three replications were used at all locations in 1996 and in 1997, six replications were used at location five and two replications at location six.

**TABLE 1. EFFECT OF NITROGEN AT FULL BLOOM
ON YIELD OF DOUBLE-CROPPED SOYBEANS**

Year-Location	Row Width (inches)	Maturity Group	Yield (13% H ₂ O)		Profit (+) or Loss (-) from N \$/A**
			Nitrogen ----- bu/acre -----	None	
96 - 1	30	IV	43.8	45.1	-\$22.79
96 - 2	15	IV	45.2	43.9	-\$ 4.38
96 - 3	30	V	39.4*	38.0	-\$ 4.24
96 - 4	20	V	40.6	37.8	+\$ 7.48
97 - 5	18	IV	44.7*	42.5	- \$ 0.60
97 - 6	40	IV	43.3	40.8	+\$ 1.50

* Significantly different at the 0.05 level of probability.
 ** Assumed N cost at \$0.30/lb. and an application cost of \$4.00/ac. with \$7.00/bu. soybean prices.

The results from two years of trials indicates that the addition of nitrogen at full bloom has a tendency to result in a small but unprofitable yield increase.

Five of the six trials resulted in a small yield increase, but in only two of the trials were the yields significantly higher. The average yield increase for the six trials was 1.5 bu/ac.

Four of the six trials resulted in a net economic loss for the additional nitrogen added at full bloom. The average loss for the six trials was \$3.84/acre.

This research verifies previous research. Nitrogen added to the soybean plant in the reproductive stage of growth is, at best, only marginally effective and not profitable in most cases.