



FLUID FACTS

NFSA AGRONOMIC NEWSLETTER

SIDEDRESSING: FLEXIBILITY FOR FLUID NITROGEN MANAGEMENT

University and industry research has shown that sidedressing is an effective management practice to increase crop yield and minimize environmental impact. For example, Purdue University's agronomy guide (Corn, AV-171 "Corn Fertilization in Indiana") states that, "historically, sidedressing gives the highest efficiency of any N management system."

The University of Nebraska also has shown that sidedressing N on the average is "about 10 percent more effective than a spring application or about 25 percent more effective than fall application" ("Soil Science News" Volume VII, No. 21, Nov. 6, 1985).

Another long-term study by University of Nebraska researchers (1969-83) showed that knife band sidedress (SD) applications of UAN produced higher corn and grain sorghum yields than knife band applications at planting (PT) at comparable N rates. At the highest N rates there was no significant difference in yield.

Table 1

N RATE UAN	CORN		INCREASED REVENUE DUE TO SIDEDRESS	GRAIN SORGHUM		INCREASED REVENUE DUE TO SIDEDRESS
	SD	PT		SD	PT	
LBS/AC	— BU/AC —		\$/AC	— BU/AC —		\$/AC
0	90			97		
80	134	124	22.50	123	119	10.00
160	145	138	15.75	124	121	7.50
240	142	140	4.50	120	120	0
Mean	140	134		123	120	

Dollar amounts assume corn at \$2.25/bu and grain sorghum at \$2.50/bu.
University of Nebraska

From these data, it is apparent that N application timing is an important factor to consider as Best Management Practices (BMP) are developed.

MAINTAINING ADEQUATE N

Although fluid dealers and their producer customers recognize the agronomic merit of sidedress N, most understand there are times when wet field conditions prevent sidedressing. For some, that situation occurred in 1990.

One of the goals of N management is to ensure that plants always have access to adequate N. When plants show visual symptoms of N deficiency, chances are yields will suffer.

A major advantage that UAN nitrogen solution has over anhydrous ammonia and dry nitrogen products is a wide range of application options. Broadcast, dribble band and subsurface band placement are available to almost every grower. Custom application; application with tillage, planter and cultivation implements; and fertigation are all popular methods to apply fluid product. Fluid N fertilizer can even be dribbled into standing four-foot corn using high clearance field equipment.

With inherent handling advantages and application options, it is not surprising to see the volume of UAN nitrogen solution being used in split application N management programs today. Fluid dealers and their customers are taking advantage of research results that show the benefits of compromising between all-preplant or all-sidedress practices.

NEBRASKA RESEARCH

Research conducted by University of Nebraska agronomists in 1989 shows that split N application can result in a significant crop response. Experiments were conducted at five locations with varying soil types. Six rates of N were applied at each site (0, 40, 80, 120, 160 and 200 lbs/ac) in three basic N management systems (preplant, split-applied and sidedress). The

split-applied had 40 lbs/ac N applied prior to planting with the remainder applied at sidedress time (V-6 growth stage).



The results confirm the advantage of sidedress over preplant (see Figures 1 and 2). At four of the five locations sidedress was better than preplant. At all five locations, split-applied was better than preplant. And perhaps the most interesting observation, at four of the five locations, split-applied performed better than sidedress.

FIGURE 1

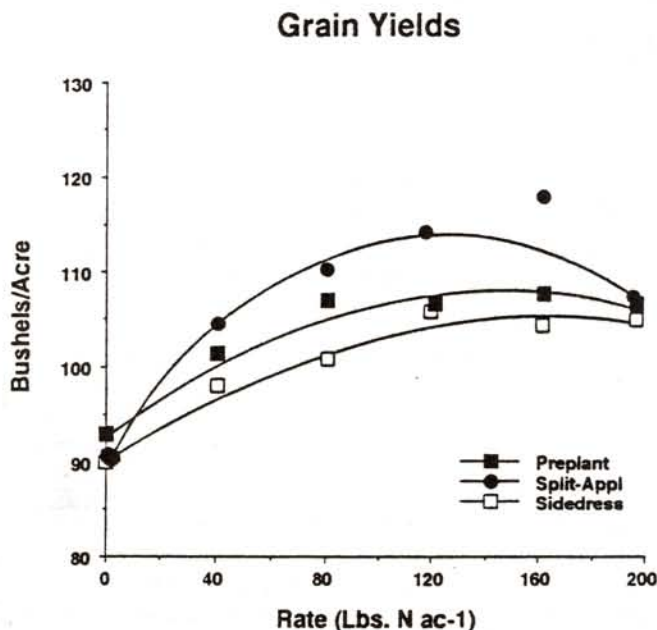
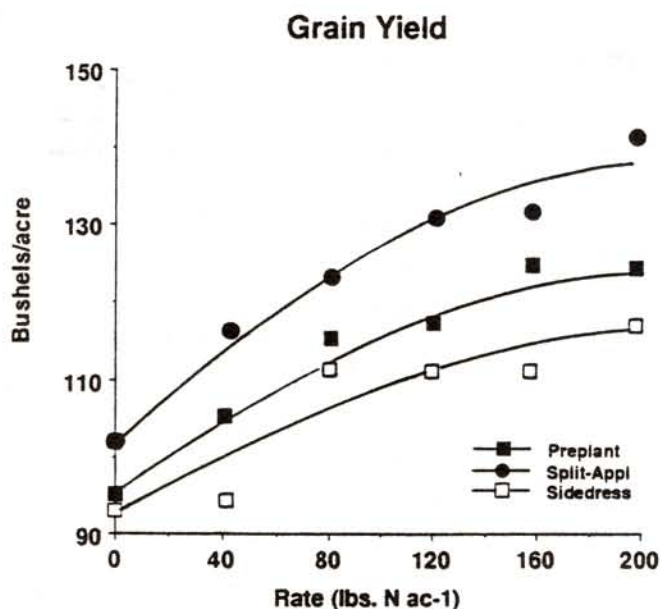


FIGURE 2



Yield response of corn to preplant, sidedress and split-application of UAN, Hamilton and Merrick County Nebraska.

APPLICATION LEVELS

Once a decision is made to split-apply nitrogen the question of how much to apply in the first increment must be answered. This is a difficult question to answer because there are many unknowns.

A corn plant will take up only about 30 percent of its nitrogen requirement through the first six weeks of growth. Dr. John Anderson, at North Carolina State University, stated in his 1990 annual report to the Fluid Fertilizer Foundation that 30 lbs/ac N applied in a 2x2 placed starter band (two inches to the side and two inches below the seed) can support ample plant growth for six weeks.

However, Anderson also observed that weather conditions can influence N uptake. When an extended dry period followed sidedressing at six weeks, plots receiving only 30 lbs/ac of starter N became N deficient although ample N had been applied. In this case, sidedress N was dribble banded in the row middle.

Apparently, without rainfall, the surface band N was not positionally available to plant roots. This indicates that total N in starter should be 40-50 pounds to cover plant requirements until rainfall makes the sidedress N available to plant roots, Anderson suggests. Another alternative could be subsurface band placement of sidedress N during dry conditions.

Agronomists generally agree that 40-50 lbs/ac N will be adequate for the first increment of a split-N management system. A 30-pound rate will be adequate if you are sure of the opportunity for timely sidedress.

Fluid Fertilizer Foundation-supported research indicates that in most years 65 to 75 percent of the total fertilizer N requirement can be applied by the time plants emerge in a well drained, medium textured soil. Many crop producers like to take advantage of a feed and weed application or combine nitrogen with other nutrients to save application trips when applying the first increment of a split-N management program. The second increment can be combined with a shallow cultivation or directed post-emergence herbicide spray for weed control.

Fluid Fertilizer Foundation-supported research projects conducted by the University of Missouri, Ohio State University and Pennsylvania State University have shown that dribble band or subsurface band application of UAN nitrogen solution will be more effective than broadcast non-incorporated application for no-till corn.

For sandy soils and/or environmentally sensitive areas almost all nitrogen research shows that only minimal amounts of fertilizer N should be applied prior to the time plants are established and actively growing. In most cases no more than 25 percent of the total fertilizer N requirement should be applied before plants have been growing for at least four weeks.

As the season progresses, carefully assess field conditions and yield potential to manage nitrogen use in the most environmentally and economically sound manner possible.