FLUID facts THE NATIONAL FERTILIZER SOLUTIONS ASSOCIATION

SIDEDRESS APPLICATION OF NITROGEN SOLUTIONS HELPS INCREASE NITROGEN USE EFFICIENCY

Efficient management of nitrogen (N) that leads to top yields with minimum loss to man's environment is the goal of many farmers. Combining a sidedressing of N solution, such as urea-ammonium-nitrate (UAN), with a complete starter plus a weed and feed program, is an excellent way to achieve maximum use of N and minimize N loss.

Where or When do N Sidedressings Provide Benefits to Farmers?

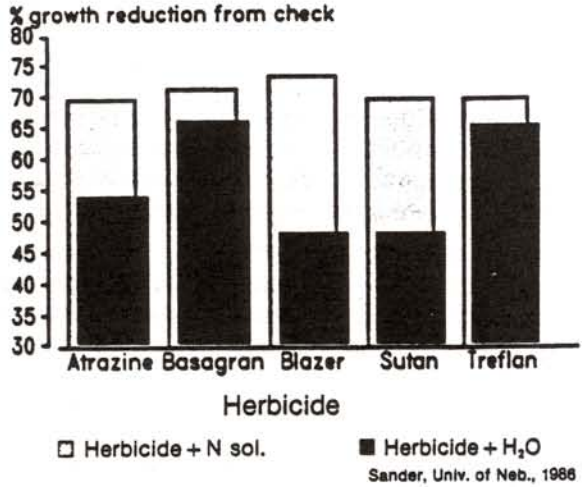
- **On deep sandy textured soils** - these soils are subject to permanent loss of nitrate N out of the root zone with heavy rainfall. Applying only part of the N at planting and waiting until a more expanded root system has developed before making the second application can improve efficiency by putting more roots in contact with N.
- **On poorly drained clayey textured soils** - these soils are prone to waterlogging after heavy rainfall which may cause denitrification. Denitrification is the gaseous loss of N that occurs when soil bacteria consume nitrate after soils are saturated with water. Delayed sidedress applications can be used to avoid N losses and replenish lost N.
- **On soils that tend to compact** - when soils compact, roots do not adequately penetrate row middles; therefore, broadcast or knifed N located in the middles may be poorly positioned for efficient uptake. A sidedressing of N solution close to the row can reduce yield loss due to compaction.
- **On fields that are infested with weeds** - weeds compete with crops for N and other nutrients. Nitrogen placed near the row away from weeds (growing in row middles) can increase crop N use efficiency and produce a competitive crop.
- **When N applications are intentionally delayed** - because of the possibility of a lower plant population than anticipated or delayed planting due to weather and other factors, scheduling N for the six to eight-leaf stage for corn can provide the opportunity to assess the remaining N requirement of an emerged crop and select the best N rate. **Caution:** Delaying an N application to the eight-leaf stage or later may require 75 lb N/ac or more at planting to meet N demands until a second application is made.
- **When using no-till or ridge-till practices** - sidedressing N solution with a coalter + narrow knife below old crop residues or into ridges causes only minor soil disturbance when placing N away from residues. Nitrogen in contact with crop residues, such as corn and grain sorghum, may be volatilized or tied up. Soybean residues do not usually tie-up N to any large degree. An alternative to a knifed sidedressing is delayed dribble banding, a proven high efficiency surface application method used in no-till that allows time for residues to decompose and concentrates N solution close to the row minimizing contact with residues.
- **When cultivating row middles** - when crops are cultivated it is economically and agronomically sound to also apply N solutions with the cultivator to take advantage of combining two operations. Cultivator sweeps or plows can be easily equipped with tubing that can be connected to pumps and saddle tanks or a nurse tank normally used to apply herbicides. With shallow cultivations, N can be applied two to three inches deep and six to eight inches from the row.
- **When N loss and/or potential N deficiency is recognized** - correcting losses of preplant N are necessary if N is leached or denitrified. A soil and tissue analysis can help determine the need for additional N which can be restored to the soil by dribbling, knifing or cultivating in N solutions. If spring rainfall regularly causes N loss, then sidedressing a major portion of the N should be considered.
- **When growing corn hybrids that are known to benefit from delayed N application** - some hybrids respond to higher fertility than others and are known to take up 50% or more N after mid-silk. Knifing or dribbling N solutions at the six to eight-leaf stage and dribbling a small amount at tasseling increases the probability that N will be available after mid-silk and meet high fertility requirements.

Sidedressing, a Part of a Total N Program for Corn

Total N requirements are determined by factors such as soil type, rainfall patterns, hybrid, planting date, stand, etc., and may best be met by meshing together a starter, weed and feed, and sidedress N application.

- **Starters** - A starter program that contains at least 10 to 30 lb N/ac plus possibly phosphorus, potassium, sulfur and minor elements depending on need, usually gets corn off to a good start, promotes early root growth, helps early assessment of crop stand and improves crop yield. Starters tend to get the crop ready to take advantage of other fertilizer additions and growing conditions.
- **Weed and Feed** - Nitrogen solution (50 to 75 lb N/ac) broadcast or applied in wide bands over the row can serve as a carrier and increase the effectiveness (phytotoxicity) of several herbicides while furnishing N to the developing crop. Figure 1 shows the advantage of using N solution as a herbicide carrier when compared to a water carrier.

Figure 1. Nitrogen Solution Improves Effectiveness of Certain Herbicides

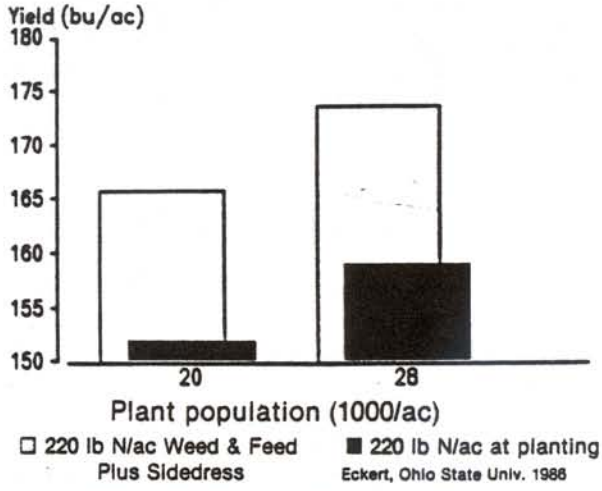


Joint application of these herbicides with N solution also results in energy and labor savings, reduces soil compaction and makes broadcast applications work better since weeds are eliminated from utilizing N.

- **Combining Weed and Feed N with Sidedress N for Late Planted Corn** - A broadcast weed and feed application, coupled with a sidedress N solution application, can produce high yields for late planted corn as demonstrated by the results of a May 30 planting in Ohio, shown in Figure 2.

In this study, a total of 220 lb N/ac was applied. A starter contained 20 lb/ac; 50 lb/ac was broadcast as weed and feed and 150 lb/ac was

Figure 2. Corn Yield as Affected by Plant Population and Method of N Solution Application



sidedressed at the six-leaf stage. The data show for this late planting that the 28,000/ac plant population produced higher yields than the 20,000/ac population and sidedress N increased yields when compared to applying all N at planting for both populations. Note that cutting back in plant population to 20,000 plants/ac and applying all N at planting (as might be influenced by a late planting), reduced yields by 22 bu/ac when compared to a combined weed and feed + sidedressing program used on 28,000 plants/ac.

The results in Figures 1 and 2 indicate a good probability of achieving excellent weed control and high N use efficiency that can contribute to high corn yields when a weed and feed practice is followed with sidedress N solution. Applying a sidedress dose of N to a more developed rooting system at the six-leaf stage instead of applying all N at planting may cause greater N contact with roots, less tie-up and less leaching. Other nutrients could also be applied in the sidedressing, if necessary.

Future N Management

Sidedressing N will likely play a larger role in future N management because of the need to more consistently satisfy crop N requirements and increase N use efficiency, while at the same time reducing potential losses to ground water. **Contact your fluid fertilizer dealer to determine best sidedress solution N management that fits your situation.**

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