VARIABLE SEEDING RATES IN TWIN ROW PLANTING AND MICRO MANAGEMENT OF NUTRIENTS

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Abstract

A large scale study to determine if twin row planting, utilizing particular fertility concepts and conservational practices, out produces conventional methods of planting and fertilizing. The primary goal of the study was to increase farmer profitability and promote methods of conservational tillage.

Introduction

We realized back in the early 80's that sunlight was a limiting factor in crop production. We looked for a planting method that would space out the plants and therefor give us a potential for higher yields. Our first twin row planter was built in 1979 and was retired in 1984. It planted the rows 8" apart on 36" centers. We felt that twin row was a practical approach as existing cultivators and combines would still be adaptable to the system. In the five years of planting corn, popcorn, soybeans, and sorghum, cultivation or combining was never a problem. We learned a wealth of knowledge over the five years with marginal results on some plots, and other plots having substantial yield increases. The increases were obtained when we used sound fertility management. Marginal yields were common with typical fertilizer applications used at that time. The problems that we encountered with the original planter was that we were not obtaining a "diamond" effect on the seed placement. If was immediately evident that if the spacing was not exact, if effected the ear size. Even though we had very good results, it did not appeal to the farmers interest to buy 16 planter units to build an eight row planter. It was cumbersome and expensive. At this time, our research stopped.

As time went on, futurist believe that there needs to be a movement towards higher yields, not just for feed stock, but also for ethanol production. As we pursue this goal, as an industry, we have to keep in mind other important issues. The most important issue involving higher production is the effect on the environment. Two other issues that come to the forefront is the practicality and the profitability for the farmer. Being in the fertilizer industry and farming at the same time, we set out to try and achieve higher yields and solve all of the issues. Our method is as follows.

Approach

THE PLANTER The starting point was to build a twin row planter that would give us a true stagger of the plants in the 8" rows. The planter should also have the ability of changing the population on each individual row (to be explained later). It should be able to incorporate the latest technologies as far as monitoring and on the go population changes. In the design of the planter. it should be user friendly and not as cumbersome as the original 1979 unit. In 2001 we successfully built two eight row planters that achieved all of the above. What is unique about the planters is that the individual planter unit will drop the two eight inch rows. This lowered the overall cost of the planter and condensed the amount of metal needed. We also incorporated our own design, a very inexpensive starter attachment.

We built an eight row 30". (keep in mind that it is actually 16 rows), and an eight row 36" planter. The intent of this was to see , first of all, if there was any yield variation between the two, and to also make the planter available to any farmer on differing row spacing.

TILLAGE In order to solve one of the environmental issues of soil erosion, we wanted to use the twin row in only a conservational tillage program. With the invention of the strip till equipment, we felt that this was truly one of the "missing links" from our early twin row research success. The **Yetter Maveric** strip till unit was used on all 2200 acres of twin row corn. This unit actually created the row for the planter and cleared past residue. A portion of the fertility was placed immediately under the row. Following emergence of the crops, they were either cultivated or a fertilizer injection rig was used to apply additional nitrogen. The only modification to the cultivators was narrowing the width of the shovels. At harvest time, no modifications were needed on the combine or the heads. The twin rows feed evenly and no ear loss occurred.

FERTILITY The number one environmental issue of high production is the overuse and misuse of fertilizer. "Fertility recovery" has to be a key word within the industry and should be implemented by every fertilizer dealer in the country. With that in mind, we incorporated all the agronomic facts that we know to be true as far a fertilizer is concerned. Using work done by the PPI, Herman Warsaw, Kansas State, Larry Murphy, and a host of other agronomists, we incorporated fertilizer micro management into the twin row. Positional availability, split applications, high nitrogen starters are the keys to twin row success. The strip till unit applied 100# actual nitrogen as either liquid or Nh3. A combination of ammonia and liquid phosphorous was deep placed under the twin row. The 100# rate of nitrogen was common on all plots and this number we felt comfortable with to minimize leaching. The phosphorous rate was at 60-70#. A high nitrogen starter was applied 2" to the side of each row. Typical plant food in the starter would average 40-25-0-10-.5. The balance of the nitrogen could either be applied with the cultivator, high injection rig, or through the pivot. The rate of nitrogen was different if the corn was following beans or not. We used a factor of .8# of N per bushels on all test plots.

TWIN ROW AND STRIP CROPPING If sunlight is the limiting factor, we carried the concept further by using a corn/soybean strip rotation. Our intention was to create more outside rows. As we planted the 8 rows of corn, we varied the population from the outside rows to the inside rows. Rows 1 & 8 (1, 2 15, & 16) were dropped at a combined total of 40,000 plants, rows 2 and 7 @ 36,000, rows 3 and 6 @ 32,000, and the inside rows were at 28,000. As we lowered the population towards the inside, this allowed more sunlight to infiltrate the lower population for better ear flex. The average in the system would be 34,000 plants and if each plant produced an eight ounce ear, the end result would be over 300 bushels per acre. This was merely a starting point on populations. In further studies, we will go both directions with the populations. One important item to note here is that as we varied the populations row to row, we also increased the amount of nitrogen as the populations increased. This was done as a liquid source, and with a series of orfices, we could pinpoint the actual amount applied.

Summary

For Dean and I, twin row planting is on course to do all that we want it to do. 300+ corn yields and 85+ soybean yields are well within our reach, and will happen shortly. Not only will we reach these levels, but they will be achieved profitably and with no adverse environmental impact. Most noticeable about the twin row is the stalk quality. It appears that with the additional sunlight, the stalks were twice the size of conventional planted corn. It also appeared that the twin row grew faster. Another observation, was that in the corn/soybean strips, 95% of the plants developed a second ear. Yield results are not available at this time, however yield projections range from 235 up to 280 bushels per acre depending on the quality of the field. These levels are 60-80 bushels better than a 10 year average on those farms.

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