(93%) cotton and percent lint was similar in both pickers. The 15-inch row system with 27 000 plants/A gave higher lint yield (1491 lb/A) compared to 40-inch row cotton with 50 000 plants/A (1360 lb/A). Plant canopy closed 3 weeks earlier in twin-row cotton and 4 weeks earlier in 15inch row cotton than in 40-inch row cotton with a potential to eliminate at least one Roundup postemergence application.

Results of this one year study indicate that 15-inch row and twin-row planting systems using equal or less plant populations as that of 40-inch row system could produce lint yield equal or higher than 40-inch row system under both irrigated and non-irrigated conditions. It should be stressed that in 15-inch row system, lint yield was corrected for 80% of land area as 2 of 10 rows were skipped under tire tracks. Lint yields will increase as the number of rows planted per trip increase, for example, correction factor will be 90% for 2 of 20 and 93% for 2 of 30 rows skipped. Presently, no picker is available to harvest cotton in 10-inch twin-row system. However, if an adjustable row picker becomes available, twin-row of 15-inch apart on a 40-inch center is a possibility.

Conservation Tillage Strategies For Corn, Sorghum And Cotton

Presented by Charles Stichler

Agronomist, Stichler Agriculture Services

Conservation and reduced tillage continues to change and adaptations made to match the conditions of each producer and the problems encountered. With the shift in weeds and herbicide resistant bio-types beginning to appear in fields, producers must be aware and make hard choices. Rotating herbicides and using combinations to kill adapting weeds, will become more important if producers want to continue using reduces tillage as a viable option. Some limited tillage may be necessary to reduce the dependence on herbicides.

Fertilizer placement and compaction are also issues over a long period. Although crop roots are able to pick up nutrients from a small band – it will be important to move the band to different areas near the planted row. Crops with large root systems such as corn – often respond when roots throughout the soil have access to nutrients.

Stale seed beds in higher rainfall areas and strip tillage in other areas are predominately the most successful reduced tillage practices. Permanent equipment patterns, killing sorghum before harvest when possible and cotton as soon as possible after harvest continue to be important management practices.

Formulas work for “dead” things – but not for living organisms. Farming is “living” in the sense that each year, season and crop with its challenges are different.

Conservation Vs Conventional Tillage, Double Cropping And Cover Crop Effects On Crop Production And Water Use In Subtropical South Texas

Presented by Dr. Bob Wiedenfeld

Professor of Soil Science, Texas Ag. Experiment Station

Water availability for irrigation has become a major concern for South Texas. Conservation tillage offers the advantage of reduced field operations compared to conventional tillage which should result in lower costs, better yields and reduced risk. Water loss is reduced, soil structure improves, and oxidation of organic residues is not as rapid as tillage is reduced. Hopefully this will result more efficient water use as well as lower costs. Water savings due to reduced tillage, however, have thus far not been reported. Double cropping and cover crops offer the potential to increase organic matter accumulation improving soil properties, but will increase initial water requirements. Planting and weed control are major challenges for implementing conservation tillage. The objective of this study is to compare conservation vs conventional tillage, and also to evaluate fall double cropping and cool season cover crops compared to fall fallow under conservation tillage.

Materials & Methods

A study is being conducted in Lower Rio Grande Valley of Texas, an area with a climate that is subtropical (average daily temperature ranges from a high of 84°F in July to a low of 60°F in January), and semiarid (average annual rainfall < 24 in.). A biannual cotton sorghum rotation is being grown, and four cropping treatments are being applied:

1) conventional tillage - fall fallow;
2) conservation tillage - fall fallow;
3) conservation tillage - fall double crop;
4) conservation tillage - fall cover crop.

The double crops are corn following cotton, and soybean following sorghum; and the cover crops are black oats following cotton, and hairy vetch following sorghum. Spring crops are being furrow irrigated as required, and fall crops are being grown for the most part without irrigation. The study was initiated in the fall of 2002 and is currently in the 4 th spring crop, which will be the completion of the 2-year rotation for the 2nd time. Conventional tillage consists of shredding following crop harvest, disking several times, deep chisseling in 2 directions, disking several times again, then bedding up the land. The field is cultivated as required to control any weeds until the next crop is planted, and as the crop is grown. Conservation tillage attempts to leave previous crop residues on the soil surface as long as possible, and to reduce tillage operations. Cultivation is typically performed prior to any furrow irrigation in order to maintain raised beds to facilitate furrow irrigation. Weed control is performed using herbicides. Parameters being measured include various crop responses, irrigation requirements and changes in soil properties.

Results & Discussion

The primary differences in soil water use between the tillage & cropping treatments in this study occurred during the fallow periods due to differences in the cover that was left on the soil surface, and in the fall due to differences in water use by the crop being grown (Fig. 1). Water use by the spring crops was affected only slightly by tillage and soil cover, cotton using between 30.6 and 32.4 inches and sorghum using between 17.6 and 18.5 inches of water. Water loss during the fallow periods was reduced 25% by the retention of crop residue on the surface. Where no fall crop was grown, conservation tillage resulted in an average 11.5% reduction in water use compared to conventional tillage. The fall cover crops used an average 11.3 inches of additional water, but over half of that was recovered through savings from the reduced water loss due to the surface residue. Fall double crops use an additional 15 to 24 inches of water. Only about a third of this is recovered by reduced losses due to the crop residues. These differences are reflected in the amount of irrigation water required to furrow irrigate the cropping treatments the following spring (Fig. 2).

Crop yield responses to the tillage systems varied between years. In 2003 grain sorghum yields showed only slight treatment differences (Fig. 3). Cotton in 2004 (Fig. 4) and grain sorghum in 2005 (Fig. 3) both had lower yields where a fall double crop or winter cover crop had been grown the previous year compared to fall fallow. In 2006 cotton yields were not affected by tillage treatment (Fig. 4). No yield differences have been found between conventional and conservation tillage where the soil was left fallow the previous fall.

Although not always consistent, soil NO3 --N levels measured in January were highest for fall fallow (conservation and conventional tillage) compared to fall double cropping and cover crops most years, which may reflect immobilization of soil N by the fall crop (Fig. 5). Organic matter contents rose from 0.8% at the initiation of this study to 1.21% after the first year, but has remained constant thereafter (Fig. 6), and has shown no statistically significant differences due to the tillage treatments applied. Other studies have reported increases in organic C particularly near the surface at some point in time under no-till, but no increase in organic matter levels have been reported for any reduced tillage system that involves at least some tillage.

Conclusions

Conservation tillage in subtropical South Texas offers advantages over conventional tillage, but also poses significant challenges. New procedures and equipment modifications are required. Planting and weed control are difficult. Water savings are erratic depending on rainfall pattern, but improved soil moisture status at any given time would improve the changes of making a crop when drought conditions occur. Differences in soil water status so far have been due only to crop and surface residues, and not due to any long term changes in soil properties. Crop yields are the same between conservation & conventional tillage, but can be reduced by fall double cropping and winter cover crops. Substantially lower costs, however, due to fewer field operations would be a definite benefit of conservation tillage.

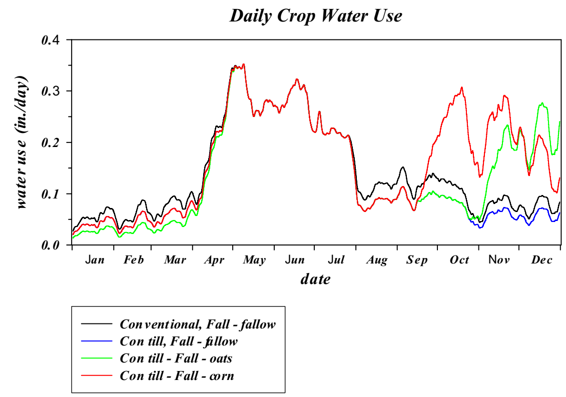

Figure 1. Daily crop water use based on ET for spring cotton followed by fall fallow, oats or corn.

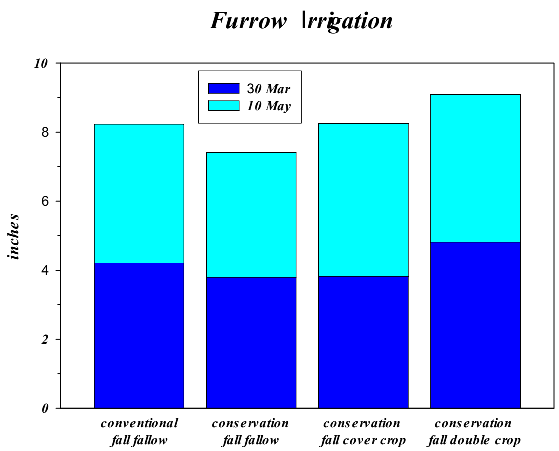

Figure 2. Amount of irrigation water applied on 2 dates.

Notes:

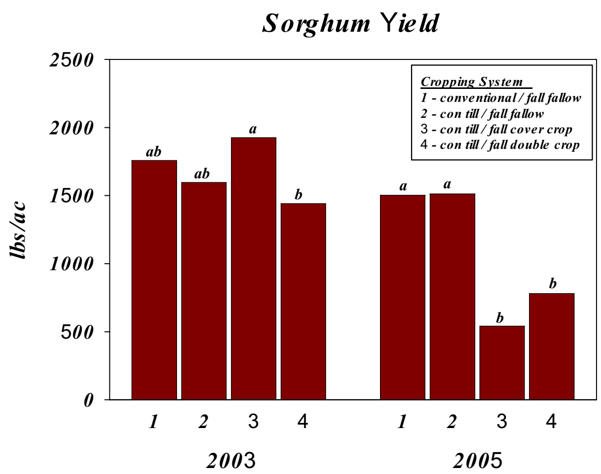

Figure 3. Grain sorghum yields.

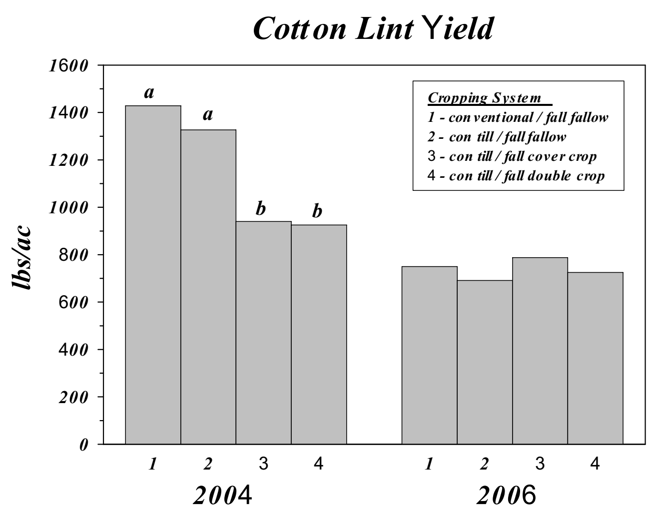

Figure 4. Cotton yields.

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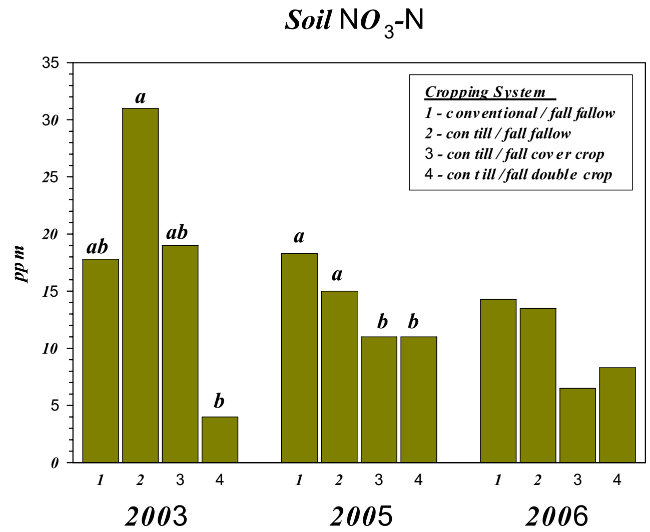

Figure 5. Soil NO3 -N during winter prior to planting spring crops.

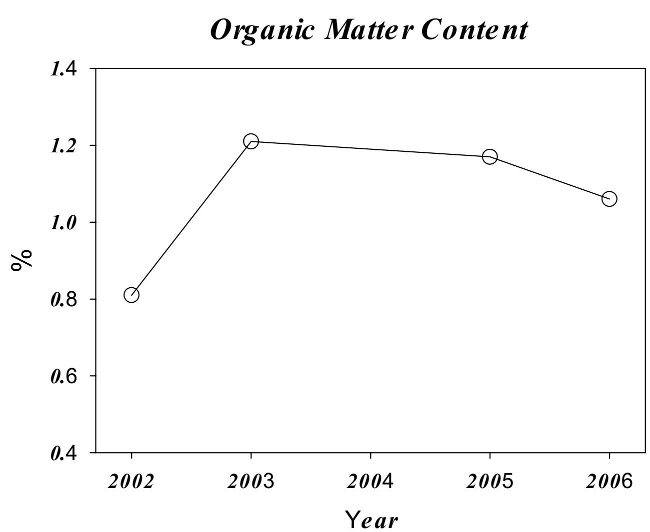

Figure 6. Soil organic matter content during winter prior to planting spring crops.