RESIDUE MANAGEMENT FOR NO-TILL WHEAT

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OBJECTIVE:

This study will compliment other studies investigating practices that would best allow for no-till planting of wheat into corn residue. This study continues the comparison of different methods and timing of mechanical shredding of corn stalks of different corn maturities against no shredding and no corn residue.

METHODS:

Corn was planted at the rate of 26,000 seeds/ac using an early season variety (Pioneer 33Y18) and a late variety (Pioneer 3167). The average yields of the corn was bu/ac for the late season and bu/ac for the early season. Both varieties were harvested at 19% moisture and harvest dates were 8-26-98 and 9-8-98 for the early and late corn.

All mechanical shredding was completed immediately after harvest of each corn variety, except for Treatment 9 which was flailed immediately after wheat planting. All residue was removed from Treatment 1, but the plots were **not** tilled.

Wheat (Pioneer 2540) was planted no-till at the rate of 35 seeds/sq ft. with a 7 inch row spacing. Gramoxone was applied after planting and a total of 120 lbs/ac of N was applied with ½ on Feb. 10 and ½ on March 18. Harmony Extra was applied on March 29 and Tilt on May 3 and Warrior insecticide on Nov. 12 and Dec. 16

TREATMENTS:

1. Remove all corn residue and plant into clean residue conditions (full season corn).
2. Plant at an angle into standing harvesting corn stalks (full season corn).
3. Plant direclty into standing corn residue, not angled (full season

corn).
4. Plant directly into standing corn residue, not angled (full season corn).
5. Increased wheat seeding rate (15%).
6. Plant directly into standing corn residue, not angled (early season corn).
7. Rotary mow corn residue after harvest and plant into mowed residue (full season corn).
8. Flail mow corn residue after harvest and plant into mowed residue (full season corn).
9. Flail mow corn residue after harvest and plant into mowed residue (early season corn).
10. Plant directly into standing harvested corn and flail mow after planting (full season corn).
Spray UAN on residue at 40 lbs/ac N immediately after harvest.
11. Flail mow corn residue after harvest and plant into mowed residue (full season corn).
Apply solid Ammonium Nitrate at 40 lb/ac N after wheat planting.

RESULTS:

Residue

The amount of residue cover after planting is shown in Table 1. Only 7% of area was covered when the residue was removed. When the residue was not removed, two treatments resulted in less residue after planting than the other treatments. Planting directly into standing stalks of early maturing corn and spraying 40 lb/ac of N as UAN on full season corn stalks both resulted in less residue after wheat planting. This was probably due to a more decomposition of the corn stalks prior to planting.

TABLE 1. EFFECT OF RESIDUE MANAGEMENT ON PERCENT OF SOIL COVER AFTER PLANTING WHEAT

Treatment	Corn Maturity	Soil Cover (%)
1. Removed all corn residue	Full	7 a
2. Residue behind combine (as is) diagonally planted	Full	96 c
3. Residue behind combine (as is)	Full	96 c
4. Residue behind combine (as is) 15% increased seed rate	Full	95 c
5. Residue behind combine (as is)	Early	83 b

6. Rotary mowed after harvest	Full	93 bc
7. Flail mowed after harvest	Full	96 c
8. Flail mowed after harvest	Early	97 c
9. Flail mowed after wheat planting	Full	99 c
10. Flail mowed after harvest N sprayed on corn stalks	Full	82 b
11. Flail mowed after harvest N on wheat after planting	Full	95 c

Wheat Stands

Stands of wheat in the fall are seen in Table 2. The highest stands were in the treatment with a 15% increase in seeding rate and the treatment with all residue removed. The treatment with UAN sprayed on residue after corn harvest resulted in one of the higher wheat stand counts and lowest corn residue covers.

There was no difference between any of the other treatments. So, shredding or not shredding was not an issue as well as early or late maturing corn.

In 1998, flail shredding stands were better than the rotary mowed or planting into standing corn treatments. There was no difference in 1999 and some of this may have been due to excellent stand establishment weather conditions.

TABLE 2. EFFECT OF RESIDUE MANAGEMENT ON WHEAT STAND IN NOVEMBER

Treatment	Corn Maturity	Wheat Stand Plants/sq ft.
1. Removed all corn residue	Full	35.2 ab
2. Residue behind combine (as is) diagonally planted	Full	32.9 bcd
3. Residue behind combine (as is)	Full	34.1 bcd
4. Residue behind combine (as is) 15% increased seed rate	Full	37.8 a
5. Residue behind combine (as is)	Early	31.2 d
6. Rotary mowed after harvest	Full	31.9 bcd
7. Flail mowed after harvest	Full	32.1 bcd
8. Flail mowed after harvest	Full	32.2 bcd
9. Flail mowed after wheat planting	Full	32.6 bcd
10. Flail mowed after harvest N sprayed on corn stalks	Full	34.7 abc

11. Flail mowed after harvest N on wheat after planting	Full	31.3 cd

Visual Observation During Spring Growth

The warm winter and early spring encouraged high tillering and high amounts of growth on all plots. Unlike last year, there were no visual differences in the treatments during the season. The only exception was where nitrogen was applied in the fall which caused these treatments to have more growth and lodging during the season.

Yields

The yields are found in Table 3 and are very high this year due to favorable weather conditions. Head counts were high in all the treatments due to the warm winter so there was very little correlation between stands and yields. In fact, the treatment where all the residue was removed had one of the highest stand counts but the lowest yield.

The highest yield occurred where the residue was left standing and the wheat was planted at an angle (diagonally) to the old corn rows. Flail mowing treatments also had some of the higher yielding treatments.

Basically, there was little difference between yield. It appears that fall application of nitrogen, as well as removing of the residue, before wheat planting were not helpful.

TABLE 3. EFFECT OF RESIDUE MANAGEMENT ON WHEAT YIELDS

Treatment	Corn Maturity	Yield (13.5% H_20) (bu/ac)
1. Removed all corn residue	Full	104.6 b
2. Residue behind combine (as is) diagonally planted	Full	118.6 a
3. Residue behind combine (as is)	Full	106.7 ab
4. Residue behind combine (as is) 15% increased seed rate	Full	111.2 ab
5. Residue behind	Early	101.6 b
6. Rotary mowed after harvest	Full	107.9 ab
7. Flail mowed after harvest	Full	112.3 ab
8. Flail mowed after harvest	Early	107.9 ab
9. Flail mowed after wheat planting	Full	112.5 ab
10. Flail mowed after harvest N sprayed on corn stalks	Full	110.7 ab

11. Flail mowed after harvest N on wheat after planting	Full	105.2 b

Double-Cropped Soybean Stands

Doubled-cropped soybeans planted after wheat harvest (Table 4) give some interesting results. All stands were adequate for maximum soybean yields and the differences were relatively small. Planting wheat diagonally across old corn rows resulted in best soybean stands in 1998 but was among the lowest in 1999. Soybean stands behind rotary mowed corn stalks before planting of wheat was low both years so this may not be the best practice concerning double-cropped planting.

The 15% increase in seeding rate also resulted in less double-cropped soybean stands. This practice may increase the planting problems with soybeans.

All other treatments resulted in excellent stands showing little differences over the two years.

TABLE 4. EFFECT OF RESIDUE MANAGEMENT ON SOYBEAN STANDS PLANTED AFTER WHEAT HARVEST

Treatment	Corn Maturity	Soybean Stands Plants/Row Ft.
1. Removed all corn residue	Fall	7.35 a
2. Residue behind combine (as is) diagonally planted	Full	6.45 bc
3. Residue behind combine (as is)	Full	7.25 ab
4. Residue behind combine (as is) 15% increased rate	Full	6.45 bc
5. Residue behind combine as is)	Early	6.70 abc
6. Rotary moved after harvest	Full	5.95 c
7. Flail mowed after harvest	Full	6.80 abc
8. Flail mowed after harvest	Early	7.40 a
9. Flail mowed after wheat planting	Full	7.30 ab
10. Flail mowed after harvest, N sprayed on corn stalks	Full	6.55 abc
11. Flail mowed after harvest, N on wheat after planting	Full	7.15 ab

CONCLUSIONS:

There were little differences in stand counts or yields for any of the treatments. Excellent stands were achieved by all methods used. The 15% increased seeding rate treatment and the removing of all of the

corn residue gave slightly higher stands but the increase was small and did not result in higher yields.

The favorable winter and spring conditions resulted in excellent tillering and high yields on all treatments in 1999.

The conditions in 1998 were not as favorable and flail shredding of corn was a favored treatment. The experiment results in more helpful information during unfavorable years.