

Huron Soil and Crop Improvement Association
Huron Soil and Water Conservation District
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1987
CONSERVATION
TRIAL REPORT

January 15th, 1988

"A Joint Agricultural Soil and Water Conservation Program."



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MANDATE

The primary objective of the Huron Soil & Crop Improvement Association (Huron Soil & Water Conservation District) is to co-ordinate the soil conservation and water quality programs of various groups and agencies, as they relate to agriculture. The District is set up to ensure grass roots input, involving at least as many soil and crop members as others combined, thereby giving it farmer credibility.

Chairman's Message

The past year has again shown agriculture's vulnerability to "mother nature". The County had exceptional yields in most areas, but also had some pockets which were below average.

The Huron Soil & Water Conservation District has again had a very successful year. Some of the highlights were the Conservation Day hosted by Jack & Norma MacGregor, the spring meeting, and the various crop tours which were held during the growing season.

The coming year promises to be very interesting as the Land Stewardship Program comes on stream. There is going to be an increased number of farmers looking for guidance and information as they set up their plan of action. They will be pleased to find that the District staff are a very capable group who are more than willing to take that extra step to share the knowledge they have gleaned from working with farmer co-operators.

These co-operators are the life line of the District, for it is they who do the actual work, and come up with a seemingly endless supply of innovations born from their successes and failures. We can all learn from these co-operators. It is becoming increasingly important that we pay more attention to soil conservation on our own farms. It may be easier to continue doing the same things because that's how it was done last year and the year before that. But most of us could do better. It may mean something as simple as a better rotation or switching to some ridge till, minimum till, or no till. These are decisions which must be made for each individual situation.

The most important ingredient to the success of past co-operators has been that once the decision has been made to adopt a conservation practice, they make a commitment to making it work for them.

I would like to thank the staff for all the help they have given me during my year as Chairman. It has been an enjoyable experience, and I wish everyone involved continued success.

Wayne Cantelon, Chairman

Weather Summary

Weather conditions during 1987 were variable depending on a farm's location. Most areas north of a line from Bayfield to Brucefield to Seaforth received regular, adequate, rainfall throughout the growing season. Some northern areas received heavy rainfall events, particularly in fall, making harvest difficult.

South of the same line, most areas received very little total rainfall. Most rains were very intermittent and many fields received as little as 1.5 inches of rain throughout the growing season. Severe thunderstorms in both areas dropped large amounts of rainfall in short time periods causing runoff and some erosion problems in unprotected fields.

Corn heat units averaged approximately 300 CHU's higher than average. Temperatures were moderate throughout the growing season and crops developed well from planting to harvest.

Conservation planted trials performed well despite wet or dry weather conditions. In wet conditions, residue protected the soil from water erosion. In dry conditions, the reduced tillage or no-till areas maintained the soil moisture due to the reduced evaporative losses with less tillage and the moisture retention influence of the residue mulch.

Conservation Equipment

There were six pieces of equipment available to co-operators in 1987. Available equipment included a new Kinze conservation planter, conservation drill, modified 28 percent applicator, modified anhydrous applicator, weigh wagon and modified mouldboard plow. This equipment is available for a small plot (10 acres) conservation trial.

The new Kinze conservation planter was acquired in 1987 to upgrade the corn and bean planting equipment available to co-operators. The planter is equipped with a bubble coulter ahead of the disc furrowers which are mounted in front of each row. Kinze fertilizer disc openers were used on the planter to evaluate their effectiveness in conservation systems.

The Kinze conservation planter is also equipped with three push (splitter) units to enable the planting of 15-inch row soybeans. This flexibility will enable the planting of beans in conditions which may be less than adequate for proper operation of the drill.

The modified mouldboard plow which was made available to landowners was previously equipped with twisted shovel teeth after the mouldboards had been removed. It can now be modified to accept sweep teeth as well, further increasing the flexibility of the equipment offered to co-operators.

The modified mouldboard plow will enable co-operators to evaluate a piece of equipment for primary tillage which will allow full tillage to be accomplished while maintaining surface residue cover.

Minimum Tillage

Minimum tillage consists of any system where an implement is used to prepare a seedbed while maintaining adequate surface residue cover for erosion control after planting.

Primary or fall tillage consisted of sweep bottom plowing (using sweep attachments on a mouldboard plow) which cut, lifted, and shattered the soil while maintaining residue cover. It is possible to duplicate these conditions with a chisel plow also, particularly if it is equipped with sweeps rather than twisted shovels. Some minimum tillage trials were not fall tilled.

Secondary or spring tillage was used to prepare a seedbed while maintaining surface residue. Land levelling, harrowing, and shallow cultivation were used to provide a level seedbed with some loose soil which could be firmed around the seed in the trench. Spring tillage also helped to incorporate some residue in high residue situations, or incorporate herbicides, nitrogen, and/or manure, and also loosen soil in compacted areas such as combine wheel marks.

Soil which was tilled tended to dry more quickly. This was a problem in some areas where lack of rainfall meant dry conditions, and excessive evaporative losses further aggravated the problem. Dry lumps can become quite hard and difficult to shatter with later passes.

Minimum tillage also helps control germinated annual weeds before planting, providing a generally weed free seedbed. Scuffling can also be used to control later weed escapes. Perennial weeds such as twitch grass, will be spread by tillage when rhizomes are cut and dragged around a field. This will occur whenever tillage is performed.

Timing of tillage is critical when the minimum number of passes are being used. Soil structure is the key factor to evaluate when a field should be tilled. Soils reach an optimum moisture content when aggregates don't smear but shatter into smaller pieces, for a desirable seedbed. However, if this same soil is tilled when too dry, it may not shatter but stick together in hard, firm lumps. It is important to till these fields when moisture conditions are right, despite when the crop is going to be planted.

No-Till

No till is often a misused term to describe a method of planting used by many farmers in the District. For our area, no till is not slot plant, it involves tillage in a limited area. No till consists of tilling a narrow 4-6" seedbed, achieved by using coulters mounted on front of the planter/drill.

The success of a no-till plot is dependent on a number of factors - the main factor being drainage of the soil. A well drained soil is a necessity. A well drained clay loam, with good structure, can do as well as a sandy soil when comparing with conventional tillage (T2000 - Don Lobb). Soil type is merely an excuse for failure.

Another factor involved in success is the method of applying the nitrogen. All nitrogen should be injected into the soil under the residue. Surface applied nitrogen can be lost to the atmosphere, especially when rainfall is lacking soon after application.

Weed control is another area of concern. The weed spectrum does change from annuals to perennials. Of major importance in either a ridge or no till system is use, of a proper burndown. As a rule, you should always plant in to a browned off (dead residue) field: This will minimize pest problems, and mechanical planting problems associated with green residue.

This year proved to be very successful with no till plots. In droughty areas, moisture was not a problem, since the moisture which was originally available had not been lost through increased evaporation due to tillage, at planting.

Herbicides

Growers within the District experienced a most favourable planting season extending from late April though early June. However, rainfall following planting was insufficient and surface-applied pre-emerge sprays were not activated in many cases. Broadleaf escapes appeared to be higher than normal. Post emerge herbicide applications if used at the proper time and rate proved quite effective in suppressing these weed flushes. Post-emerge applications are best used when weeds are small and actively growing.

Lower rates of Roundup in the spring used in conjunction with additives and/or other herbicides controlled perennials quite well. The importance of planting into dead plant material cannot be over emphasized. Early chemical control of weeds and/or cover crop before planting is necessary for consistent success in a minimum-tillage system. The following co-operator trials will illustrate the specific herbicides used and the problems encountered this year.

Pasture Renovation

The planting of legumes/grass seeding mixtures went well with very few problems experienced during planting. But the success of these plantings was determined by several other factors after planting.

Soil moisture played a major role in establishment. Where soil moisture was adequate, during or shortly after planting, the seeds germinated and established well (Greig). Consequently, where soil moisture was slight or non-existent, seeds had succumbed to drought stress, and as a result emergence was poor (Thornton, Clark).

Competition was a major problem again. When the pasture isn't properly grazed or burned down, new seedlings fail to emerge and compete successfully. Excessive competition for soil moisture from grasses and weeds during the relatively dry growing season was again the cause of poor emergence (Thornton, Clark).

Site specific timeliness of planting was observed to be critical to success. Early seeding into moisture in fertile, friable soil with reduced competition from established grasses and adequate subsequent rainfall is essential.

Crop Harvest

The 1987 harvest was carried out under reasonably dry conditions. It is important to remember that the harvest should take place in a manner which preserves the soil structure by minimizing soil compaction, smearing and rutting of fields.

It was noted in some of the trials that germination was poor in no till situations, where strips of heavy residue were present from combining of the previous year's crop.

In order to be successful in no till situations, combines should be set up to spread residue evenly over the soil surface.

Soil Compaction

Compaction is claimed to be a very negative influence on yields yet in each trial for 1987 there was a slight advantage to compaction of the soil. This is because of the close relationship between compaction and moisture conditions. In a dry year, a more compact soil will increase capillary water movement. Also, the soil can retain moisture longer in its fine pore space. Closer seed-soil contact speeds germination. If the rainfall is adequate and well spaced, no major stress will be applied on the plant. This spring was just that.

The negative aspects arise when conditions are less favourable for crop growth. Heavy rainfall over extended periods of time tends to easily saturate compacted soil leading to root aeration problems. Another factor in compact soil is restriction of root growth minimizing the ability to attain nutrients and moisture at a deeper depth. This can result in increased incidences of root rots, drought stress, disease problems, and nutrient deficiency.

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APPENDIX A

No Till Corn

Co-operator	Phil Clark
Address	RR #5, Goderich
Soil Type	Clay Loam
Drainage	Good
Previous Crops	1986-Soybeans, 1985-Corn
% Cover	15%
Planting Date	May 11/87
Rate	27,300 seeds/acre
Hybrid	Pioneer 3790, PAG 1120
Equipment	HSWCD Conservation Kinze Planter
Fertility	180 lbs./acre of 6-24-24
Insecticides	None
Herbicides	Atrazine 3 litres/acre + 0.9 litres/acre of Dual on May 12
Results	Harvested October 23/87

<u>Trial</u>	<u>Yield</u>	<u>% Moisture At Harvest</u>
Pioneer 3790	158 bu./ac.	24.2
PAG 1120	139 bu./ac.	21.0

Observations and Comments

Phil was pleased with his corn yields, especially P-3790. Nitrogen was not applied to this crop and he felt that his yields performed well. The variety PAG 1120 in other plots yielded less as was shown in this trial. Also, PAG 1120 showed more signs of noticeable lodging.

Minimum Till Corn Trial

Co-operator Ross Desjardine
Address RR #4, Parkhill
Soil Type Clay and Sandy Loam
Drainage Good
Previous Crop 1986 -Corn, 1985 -Winter Barley
% Cover 75%
Planting Date & Rate May 5/87 @ 26,300 seeds/acre
Hybrid Pride 2204
Tillage Chisel plowed area worked once in fall of 1986, and cultivated once in spring of 1987
Equipment HSWCD Conservation Kinze Planter
Fertility 127 lbs./acre of 6-24-24 banded with planter
Broadcast 300 lbs./acre of 6-24-16 in April 27/87 and in Fall
150 lbs./acre of 0-0-60 with Micromate
Cattle-manure-applied at 30 t/acre in spring
Surface applied 28% Nitrogen at 100 lbs./acre actual N
Herbicides Laddock postemerge at 3.0 litres/ha and Assist at 2 litres/ha

Results

<u>Trial</u>	<u>Yield (bu./ac.)</u>	<u>% Moisture At Harvest</u>
No Till No Manure	141	20.0
Chisel Plow	138.7	20.0
No Till With Manure	143.0	20.0

Comments

This was the first trial planted with the newly acquired Kinze conservation planter and several "bugs" had to be worked out. Surface applied 28% Nitrogen again proved ineffective as nitrogen deficiency was noticed by September 1st in the trial.

Germination and emergence was good and weed control was rated as good also.

Minimum Till Corn Variety Trial

Co-operator Eric Devlaeminck
Address RR #2, Lucan
Soil Type Clay Loam
Drainage Good
Previous Crop 1986-Soybeans
% Cover 5%
Planting Date May 4/87
Rate 27,700 seeds/acre
Hybrids PION 3949, Pride K228, PION 3803
Tillage Sweep bottom plowed in fall of 1986, land levelled in spring of 1987
Equipment Former HSWCD JD 7000 Conservation Planter
Fertility 150 lbs. 6-26-26
28% Scuffle and Sidedressed at 120 lbs. actual N/acre
Insecticides None
Herbicides Atrazine & Oil @ 5 lbs./acre post emerge
Results Date of Harvest: Oct. 1/87

<u>Trial</u>	<u>Yield</u>	<u>% Moisture At Harvest</u>
PION 3949	146.4	24.3
Pride K228	155.7	24.8
PION 3803	152.5	24.4

Comments

Moisture was limited throughout the growing season at this site. Spring soil conditions were dry, but adequately moist at 1½ inch seeding depth. Weed control in the trial was excellent.

Co-operator very pleased with planter performance and variety yields despite adverse moisture conditions (drought).

No Till vs Minimum Till & Insecticide Corn Trial

Co-operator	Doug Filsinger
Address	RR #1, Bluevale
Soil Type	Harriston/Teeswater Loam
Drainage	Fair
Previous Crop	1986-Corn, 1985-Barley
% Cover	No Till -50%; Min.Till -31%
Planting Date & Rate	No Till -May 7 at 30,800 seeds/acre Min. Till -May 6
Hybrid	Pride K-127, Pioneer 3953
Equipment	HSWCD Conservation Kinze Planter
Fertility	227 lbs./acre of 10-40-12; 28% N at 84 lbs./actual N/acre on June 3
Tillage	No-Till Minimum - Chisel plow once, cultivate once, then harrow pack
Insecticide	Counter 15G @ 9.2 lbs./acre
Herbicide	Bladex 4 kg/ha; banvel 0.3 L/ac.
Results	Harvested October 15 th

<u>Trial</u>	<u>Yield</u>	<u>% Moisture At Harvest</u>
1. Min Till P3953 (no insecticide)	139 bu./ac.	21.1
2. Min Till K-127 (no insecticide)	134 bu./ac.	22.8
3. No Till P-3953 (in furrow)	140 bu./ac.	21.1
4. No Till P-3953 (banded)	152 bu./ac.	21.5
5. No Till K-127(banded)	147 bu./ac.	24.4

Comments

Good moisture was available in no-till corn, helped with good yields.

No till yields were approximately 10 bushels greater than his farm average. Geoff noted that during the planting season there was more moisture available in the no till area. This was probably responsible for the speedy emergence.

Fertility Trial on Ridges - Broadcast vs Banded

Co-operator Ray Hogan
 Address RR #7, Lucknow
 Soil Type Sandy Loam
 Drainage Excellent
 Previous Crop 1986 -Corn, 1985 -Corn
 % Cover 45%
 Planting Date May 3
 Rate 28,000 plants per acre
 Hybrid Pioneer 3737
 Equipment Co-operator's John Deere 7000, modified for ridges
 Fertility 100 lbs./ac. 18-46-0 pre-plant either banded or Broadcast, 180 lbs. N; 80 P 0 lb., 80 K, 0 at planting
 Insecticide Counter @ 9.2 lbs./acre banded
 Herbicide 2,4-D 0.4 litre/acre post at 3 leaf stage
 2,4-D 0.6 litre/acre drop piped at 3 foot stage
 Results Harvest Date - November 2nd

	<u>Trial</u>		<u>Yield (Bu./Ac.)</u>	<u>% Moisture At Harvest</u>
1-1	P3737	(Broadcast)	148.0	20.3
2-1	P3737	(Banded)	151.9	20.2
1-2	P3737	(Broadcast)	152.5	19.9
2-2	P3737	(Banded)	152.5	20.4
1-3	P3737	(Broadcast)	152.5	20.2
2-3	P3737	(Banded)	149.1	20.4
1-4	P3737	(Broadcast)	147.2	20.6
2-4	P3737	(Banded)	143.6	20.4

Average Broadcast - 150.2 bu./ac.

Average Banded - 149.3 bu./ac.

Comments

Good weed control. Satisfied his own curiosity as to the benefits of banded vs broadcast fertilizer on his own farm.

No Till Corn Variety Trial

Co-operator Peter Johnson
Address RR #3, Lucan
Soil Type Bryanston Clay Loam
Drainage Good
Previous Crop % Cover Grain Corn
Planting Date May 7 & 8
Rate 29,700 plants per acre
Fertility 120 lbs./acre 8-32-16 with planter; 20%N (Aqua-145 lbs. actual N) on June 3
Hybrid Variety Trial
Equipment New Idea Double frame + extra frame with 2 coulters per row and disc furrowing units
Results Harvest Date: October 26/87

<u>Trial</u>	<u>Bu./Ac. Harvested</u>	<u>% Moisture At Harvest</u>
Pioneer 3790	127.8	20.1
Funks G4027	114.8	21.5
Pioneer 3790	126.5	20.2
Pioneer XC263	130.7	20.6
Pioneer 3790	126.4	20.6
Pride K2204	103.7	19.6
Pioneer 3790	125.7	20.2
N.K. PX9214	118.1	20.7
Pioneer 3790	131.1	20.4
N.K. PX9283	108.4	24.2
Pioneer 3790	126.3	19.6

Comments

This variety trial shows how each variety responds in a dry year.

Under no till conditions varieties that are tolerant to colder soils in the spring (ie. have good seedling and plant vigour) are desired.

In order to best compare varieties, relate it to the closest Pioneer 3790 yield, as they will take into consideration variability across the field.

No Till Corn Nitrogen Trial

Co-operator Peter Johnson
Address RR #3, Lucan
Soil Type Bryanston Clay Loam
Drainage Good
Previous Crop Corn
% Cover N/A
Planting Date May 7 & 8
Rate 29,700 plants per acre
Hybrid Pioneer 3790
Fertility 120 lbs./acre 8-32-16 with planter
Nitrogen trial
Herbicides None
Insecticides Counter 15G (banded)

Results

<u>Nitrogen Level (lbs./acre)</u>	<u>Bu./Ac.</u>	<u>% Moisture</u>
50	103	20.2
0	79	20.0
200	109	19.7
0	80	20.2
120	107	20.0
0	80	19.3
80	101	19.8
0	79	19.7
150	111	19.7

Comments

Nitrogen was applied with a five-row applicator in the form of 20% Aqua. The nitrogen was applied in a band approximately 5 cm below the soil surface. The "0" lbs./acre is not a true zero because outside rows of plot would have access to a slight amount of nitrogen. Since the application was consistent over the whole test plot, the "0" lbs./acre serves as a reliable constant.

No-Till Corn Variety Trial

Co-operator Blythe Lannin
Address Hibbert Township, Perth County
Soil Type Clay Loam
Previous Crop Soybeans
% Cover 36%
Planting Date May 6, 1987 with J.D. 7000
Rate 27,500 seeds/acre
Hybrids 4555 Pickseed and Dekalb XL8
Fertility 135 lbs./acre 8-32-16 through planter
155 lbs. actual N-anhydrous - sidedress
Herbicides April 25/87 - Roundup - 1 litre/acre + Frigate - 7 oz./acre
June '87 - Atrazine - 1 lb./acre + oil @ 1¾ gal./acre
Results Harvest Date - November 3/87

<u>Trial</u>	<u>Dry Yield (Bu./Ac.)</u>	<u>% Moisture At Harvest</u>
Pickseed 4555	156	21.3
Dekalb XL8	133	22.4

Comments

Co-operator's John Deere 7000 has no special equipment except trash whippers.

Tillage 2000

Co-operator Don Lobb
 Address RR #2, Clinton
 Soil Type Sandy Loam, Silty Clay Loam
 Drainage Good
 Previous Crop
 Planting Date May 8
 Rate 27,000 plants per acre
 Hybrid Pioneer 3881
 Equipment Modified White (5100) for no till
 Fertility 210 lbs./acre of 7-26-26 with planter
 120 lbs. actual N as 28% injected on June 5/87
 Herbicides Both conventional and no till received Atrazine 90W @ 1.5 lbs./acre +
 Dual @ 0.8 litres/acre overall on May 13
 On June 22 Banvel @ 0.09 litres/acre + 0.3 litres/acre 2,4-D
 No till also received a burn down on May 4 of Roundup @ 0.6 L/acre
 Agral 90 as a spot treatment on 10% of acreage

Results

	Sandy Loam <u>(Dry Bu. /Ac)</u>	Silty Clay Loam <u>(Dry Bu./Ac.)</u>
No Till	161	146
Conventional	158	142

Comments

Don's Tillage 2000 plot is a seven year comparison of continuous no-till versus continuous conventional tillage. The plot will be intensively monitored for changes which may occur in the physical and chemical properties of the soil.

After seven years one can see that disturbing all of the soil isn't necessary to maintain yields equal to or greater than that of a conventional system even in the heavier silty clay loam area of the field.

No-Till Corn Variety Trial

Co-operator Gord Lobb
 Address RR #3, Clinton
 Soil Type Sandy Loam
 Drainage Good
 Previous Crop Soybean (no till)
 % Cover N/A
 Planting Date May 7/87
 Rate 27,000 plants per acre
 Hybrids Variety Trial
 Equipment Co-operator's International 800 (modified for no till)
 Fertility 135 lbs. N actual side dressed
 25 lb./acre with planter of 10-26-26
 Insecticides None
 Herbicides Roundup and 2,4-D preplant Dual - ½ lb./acre atrazine
 Results Harvest Date - October 13th

<u>Trial</u>	<u>Heat Unit Rating</u>	<u>Yield (Bu./Ac.)</u>	<u>% Moisture At Harvest</u>
1. Pride 237	2750	181	24.6
2. Limagrain LG 2350	2950	191	29.1
3. P-3737	3000	197	34.1
4. P-3906	3000	199	28.6
5. P-3790	2900	198	26.9
6. P-3803	2800	203	29.4
7. P-3881	2800	166	27.3
8. P-3925	2750	194	26.1
9. P-3902	2650	176	24.8
10. Pride K2204	2850	198	27.7
11. P-3929	2500	165	24.0

Comments

The crop emerged well with excellent growing conditions. Moisture was adequate and evenly spaced.

Weed control was excellent. The field was scuffled once to control the ground cherry.

Care must be taken when reviewing the yields. Gord felt that each variety yielded the full potential based on heat units.

No Till Corn

Co-operator	Don Miltenburg
Address	RR #7, Lucknow
Soil Type_	Brookston Clay Loam
Drainage	Good
Previous Crop	Oats seeded down with Red Clover -1986, Corn -1985
% Cover	79%
Planting Date	May 8/87
Rate	28,600 seeds/acre
Hybrid	Pioneer 3790
Equipment	HSWCD Conservation Kinze Planter
Fertility	127 lbs./acre 6-24-24; 28% N June 5120 lbs. actual N
Insecticide	None
Herbicide	2,4-D - 1 litre/acre preplant Roundup 1 litre/acre - May 13 Banvel - 0.3 litre/acre - May 20
Results	Date of Harvest: November 2 nd

<u>Trial</u>	<u>Yield</u>	<u>% Moisture At Harvest</u>
1. No Till P3790	149 bu./ac.	24.1

Comments

Overall, herbicide control was good, but it would have been more effective if this control would have been applied at an earlier date. Some soil moisture was lost from patches of persistent Red Clover. Consequently, emergence was slightly uneven in our no-till plot.

No-Till Corn Trial

Co-operator	Jim Scott
Address	RR #2, Lucan
Soil Type	Silt Loam over Gravel
Drainage	Excellent
Previous Crop	1986 -Wheat, 1985 -Soybeans
% Cover	90% with Red Clover
Planting Date	May 19/87
Rate	29,600 seeds per acre
Hybrid	Pion 3949, Pion 3902
Equipment	HSWCD Conservation Kinze Planter & Wilf Riddell Conservation Planter
Fertility	106 lbs./acre of 12.5-50-0 15 tons/acre cattle manure spring broadcast plus N from Red Clover
Insecticides	Banvel @ ½ litre/acre and Atrazine @ 3.4 lbs./acre tank mixed
Herbicides	and applied on May 13
Results	Date of Harvest: October 23/87

<u>Trial</u>	<u>Yield</u>	<u>% Moisture At Harvest</u>
3949 HSWCD Planter	75.8	34.0
3902 HSWD Planter	82.1	35.2
3949 Riddell Planter	82.6	35.1
3902 Riddell Planter	84.1	33.1

Comments

This corn field was planted into Red Clover which had not been controlled (killed) preplant. The Red Clover had drawn considerable moisture from the soil and conditions were overly dry at planting. Difficulty was also experienced with adequate closing of the seed trench and removal of Red Clover from the row areas.

The co-operator felt he was quite happy to have achieved the yields as the field was planted late and moisture stress was a problem throughout the growing season. He felt that if the soil had been worked, there would have been even less available moisture. The HSWCD planter may not have penetrated the soil as well as Riddell's planter due to less weight, hence lower yield.

No Till vs Minimum Till & Insecticide Corn Trial

Co-operator	Harry Winkel
Address	RR #1, Fordwich
Soil Type	Harriston Loam
Drainage	Good
Previous Crops	No Till Corn 1986
% Cover	No Till - 52%
Planting Date & Rate	May 8/87 @ 26,500 seeds/acre
Hybrid	Pioneer 3851
Equipment	HSWCD Conservation Kinze Planter and Co-operator's No Till Planter
Fertility	U.A.N. 20% Nitrogen @ 70 lbs. actual/acre 2250 lbs./acre of manure
Insecticides	Counter in Furrow- 9.2 lbs./acre Dyfonate banded - 5 ½ lbs./acre
Herbicides	Dual 1½ litres/acre on May 20 Atrazine 1 lb./acre on May 26 pre-emerge
Results	Harvest Date - October 15 th

<u>Trial</u>		<u>Yield (Bu./Acre)</u>	<u>% Moisture</u>
No-Till P3851	(Counter in Furrow)	114	24.2
No-Till P3851	(Check Strip)	126	24.5
No-Till P3851	(Dyfonate Banded)	124	24.3
Min-Till P3851	(Co-operator's Planter)	117	23.9

Comments

Harry was pleased with the results he was able to obtain from his modified I.H. Early Riser Planter. In 1986 this planter was used for the first time in a no till situation, with no modifications (not even adjustments to spring tension) and no disc furrowers. With this set up he was having problems with heavy residue. Therefore, this year trash whippers were added and consequently were more effective in removing most of the residue that was directly over the seed row. Harry feels he can improve on this set up by adding coulters in front of each seed opener.

In 1988, he hopes to have these changes completed and use it to plant 26 acres no till.

APPENDIX B

No Till Soybeans 30" vs 15" Rows

Co-operator Wayne Cantelon
 Address RR #4, Seaforth
 Soil Type Fox Sandy Loam
 Drainage Fair
 Previous Crop 1986 - Soybeans
 % Cover 25%
 Planting Date & Rates May 26 - KG60 @ 204,00 seeds/acre
 Libras 15" 331,500 seeds/acre
 Libras 30" 179,600 seeds/acre
 Variety KG30, OAC Libra
 Equipment HSWCD Conservation Kinze Planter and Co-operators IH Cyclo
 800 Planter 30" Rows
 Fertility None
 Insecticides None
 Herbicide Roundup - ½ litre/acre preplant; 2,4-D Ester ½ L/acre;
 Agral 90 -1 litre/200 gallon
 Patoran 400 g/L at 4.0 L/ha; Lorox 1.5 kg/ha;
 Basagran 2.25 L/ha, 2 L/ha assist
 Results Date of Harvest: October 14/87

<u>Trial</u>	<u>Yield</u>	<u>% Moisture At Harvest</u>
KG6015"@ 88lbs. (No Till)	48.6	14.4
Libra 15"331,500 (No Till)	47.4	14.6
Libra30"179,000 (No Till)	40.5	14.7
Libra No Till 30"179,000 Co-operator's Planter	42.0	14.6
Libra Cultivated Co-operators Planter	38.7	14.8
KG60 Cultivated Co-operators Planter	43.7	14.8

Observations & Comments

This field was first year soys in 1986. Was left untouched until May 15th, 1987 when it was sprayed with Roundup to control twitch, etc. The no-till area received an application of Lorox just prior to emergence. The cultivated ground had Lorox on some of it, Patoran on the rest. Emergence was good everywhere. Weed control on no-till ground was excellent. No further control required. Weed control on cultivated ground failed to control broadleaves, resulting in an application of Basagran being applied. No further grass control required.

Yields speak for themselves. The weed control problems were a puzzle but the bottom line was that my costs were considerably less on the no till section.

No Till Soybeans

Co-operator	Phil Clark
Address	RR #5, Goderich
Soil Type	Clay Loam
Drainage	Good
Previous Crops	1986 - Soybeans; 1985 - Corn
% Cover	15%
Planting Date & Rate	May 11/87 @ 82 lbs./acre
Variety	Northrup King B-152
Equipment	Co-operator's
Fertility	None
Insecticides	None
Herbicides	1.0 litres/acre of Lorox
Results	Harvest date: October 5/87

<u>Trial</u>	<u>Yield</u>
No Till B-152	49 bu./ac.

Comments

Phil was pleased with yields in the trial. It compared well with yields on rest of the farm.

Minimum Till Soybeans Into Corn Residue

Co-operator Eric Devlaeminck
Address RR #2, Lucan
Soil Type Clay Loam
Drainage Good
Previous Crop 1986 -Min. Till Corn, 1985- Corn Silage
% Cover 27%
Planting Date May 15 @ 80 lbs./acre & Rates
Hybrid Pride AP10, PION 0877, WGT APACHE Pride PS80, Asgrow 1895 Variety Trial
Tillage Sweep bottom plowed on November 26/86 Harrowed and packed on May 11/87
Equipment HSWCD Conservation Kinze Planter
Fertility 127 lbs. 6-25-27 banded with planter
Insecticides None
Herbicides Roundup 1 litre/acre spot sprayed on May 11/87
Afesin @ 2 litres/acre plus 1 litre/acre oil broadcast on May 13/87;
Basagran & Assist @ 1 litre/acre each, broadcast on June 19/87
Results Date of Harvest: September 26/87

<u>Trial</u>	<u>Yield</u>	<u>% Moisture At Harvest</u>
APACHE	40.6	12.1
0877	42.6	12.7
AP10	45.1	12.1
PS80	44.0	13.3
1895	45.3	13.3

Comments

Sweep bottom plowing (Eagle minimum till bottoms) loosened soil in the fall while maintaining adequate residue cover. Spring planting conditions were excellent with a friable, moist seedbed being planted.

Weed control was good, but required extra treatment. No difficulties were experienced at harvest due to corn residue. Dry weather conditions were experienced at this site throughout the growing season.

No Till Soybean Variety Trial

Co-operator	Doug Filsinger
Address	RR #1, Bluevale
Soil Type	Harriston Loam
Drainage	Good
Previous Crop	1986-Beans, 1985-Wheat
% Cover	No till - 40%
Planting Date	No till - May 25 at 120 lbs./acre
& Rate	Min till - May 26 at 114 lbs./acre
Variety	Bicentennial & KG-30
Equipment	HSWCD Conservation Best Drill
Fertility	Nitragin Granular inoculant @ 10 lbs./acre
Insecticide	None
Herbicide	Roundup @ 1 litre/acre - May 10 Dual & Lorox - 0.8 litre/acre of each
Tillage	No till - no tillage Min till - fall chisel once, disc twice in the spring
Results	Harvest Date - October 13 th

<u>Trial</u>	<u>Yield</u>	<u>% Moisture At Harvest</u>
No Till Bicentennial	37.9	15.7
No Till KG-30	43.8	15.5
Min. Till Bicentennial	40.5	15.6
Min. Till KG-30	44.3	15.3

Comments

No till plots had better germination during the dry spring, due to moisture holding capability of residue.

Doug commented that the yields from this trial were down 8-10% compared to his farm average. It should be noted that both hybrids had a poor seed germination, especially Bicentennial (King). Therefore, test results from these varieties were put at a disadvantage from the beginning.

With this in mind, Doug was very pleased with resulting yields and feels he would have obtained impressive yields with better seed quality.

No Till vs Tilled Soybeans

Co-operator Don Lobb
 Address RR #2, Clinton
 Soil Type Harriston Loam - Trial 1
 Harriston Silty Clay Loam - Trial 2
 Drainage Good
 Previous Crop Wheat% Cover
 Planting Date May 26, 1987
 Rate 70 lbs. per acre
 Hybrid Pioneer 0877
 Equipment Don Lobb No Till Planter (White) in April
 Fertility 0-26-26 bulk spread @ 150 lbs./acre
 7-26-26 with planter @ 100 lbs./acre
 Insecticide None
 Herbicides No till & tilled plots - 0.9 litre/acre Dual & 0.8 litre/ac. Afolan on May 27
 No till also received 0.6 litre/acre Roundup + 36 ml of Agral 90 on May 9
 Results Harvested on October 14/87

<u>TRIAL 1</u>	<u>Yield (Bu./Ac.)</u>	<u>% Moisture At Harvest</u>
Tilled Straw Removed	59.8	11.5
No Till Straw Removed	50.9	11.5
Tilled Straw Left	50.1	11.7
No Till Straw Left	51.6	11.5
Tilled Extra N.	51.6	11.4
No Till Extra N.	51.0	11.3

<u>TRIAL 2</u>	<u>Yield (Bu./Ac.)</u>	<u>% Moisture At Harvest</u>
Tilled Straw Removed	45.1	11.3
No Till Straw Removed	42.5	11.3
Tilled Straw Left	45.0	11.5
No Till Straw Left	47.7	11.3
Tilled Extra N	47.5	11.2
No Till Extra N	43.9	11.2

Comments

The results for tilled with straw removed are inflated as a result of small plot combining in Results for Trial 1.

Concern of allelopathic problem in soybeans or corn following wheat has been raised. Don has experienced yield losses of up to 20% on a crop of beans when following wheat. The problem is not evident in a trial conducted similar to the trial above in 86 and 87. Don feels that by killing off volunteer wheat early that any toxic problem would be eliminated. Planting into wheat may only be a problem when volunteer wheat is not killed early enough.

Soybean Variety Trial

Co-operator Gord Lobb
Address RR #3, Clinton
Soil Type Sandy Loam
Drainage Good
Previous Crop Corn - No Till
% Cover
Planting Date May 21/87
Rate 70 lbs./acre
Varieties Maple Arrow, Libra, Apache, KG30
Equipment International 800 (Modified for no till)
Fertility 7-26-27 250 lb./acre
Insecticide None
Herbicide Roundup @ 1 litre/acre and Dual @ 1.0 litres/acre & Afolon @ 0.9 litres/acre

Results

<u>Trial</u>	<u>Yield</u>	<u>% Moisture At Harvest</u>
Maple Arrow	37.6 bu./acre	14.8
Libra	47.6 bu./acre	14.7
Apache	42.7 bu./acre	14.7
KG30	39.9 bu./acre	14.7

Comments

Crop grew under "ideal" conditions; with timely rains. Weed control was good.

Yield differences reflect maturity range of varieties used.

No Till vs Till Soybeans

Co-operator Murray Lobb
Address RR #2, Clinton
Soil Type Harriston Loam to Sandy Loam
Drainage Good
Previous Crop Soybeans
% Cover 15-25%
Planting Date May 24/87
Rate 75 lbs./acre
Variety Pioneer 0877
Equipment Planted with Don Lobb's Corn Planter which has been modified for no till
Fertility 155 lbs./acre 9-23-30
Insecticides None
Herbicides Spot sprayed Roundup 0.6 litre/acre
Lorox 0.85 litre/acre
Poast 0.6 litre/acre

Results

Trial	<u>Yield (Bu./Ac.)</u>	<u>% Moisture At Harvest</u>
4 year no till	44.4	16.1
Tilled after 3 year		
No till	48.5	15.9
Continuous till	44.2	15.5
7 year no till	48.6	16.1

Comments:

Poor control of weeds due to dry conditions early in the growing season. Variety that was planted on the trial area did not yield as well as the Pride KG60 variety (49 ac. yielded 48.3 bu./ac.).

The increase in yield as a result of tilling after three years of no till is a normal yet short lived response. This may be due to the breakdown of accumulated surface residue once incorporated.

No Till Soybeans

Co-operator Tony Van Bakel
Address RR #1, Blyth
Soil Type Harriston Clay Loam
Drainage Good
Previous Crops 1986-Soybeans, 1985-Soybeans
% Cover 25% after planting
Planting Date May 22/87
Rate 65 and 70 lbs./acre
Variety Maple Arrow
Equipment HSWCD Conservation Kinze Planter
Fertility None
Insecticides None
Herbicides Roundup 1 litre/acre pre-emerge spot spray
Afolan 0.9 litre/acre
Poast @ 0.4 litre/acre

Results

<u>Trial</u>	<u>Yield (Bu./Ac.)</u>	<u>% Moisture At Harvest</u>
No Till	38.4	14.5
Low Seeding Rate	37.6	14.6
Min. Till	40.4	14.6

Comments

Soil conditions were excellent at planting with a moist, friable seedbed. Germination and emergence of the soybeans was good. Moisture conditions were adequate throughout the growing season. Weed control was good and there were no major differences between plots. Co-operator is happy with no till yields.

APPENDIX C

No Till Wheat
(Seeding Rate Trial)

Co-operator Eric Devlaeminck
Address RR #2, Lucan
Soil Type Clay Loam
Drainage Good
Previous Crop 1986-Soybeans; 1985-Wheat
% Cover³ 0%
Planting Date Oct. 20/86 @ 120 lbs./acre, 105 lbs./acre
& Rate and 90 lbs./acre
Variety Augusta
Equipment HSWCD Conservation Best Drill
Fertility 200 lbs. urea broadcast in spring
Insecticides None
Herbicides None
Results Date of Harvest: July 17/87

<u>Trial</u>	<u>Yield</u>	<u>% Moisture At Harvest</u>
120 lb./acre	69	15.0
110 lb./acre	64	15.0
90 lb./acre	68	14.7

Observations and Comments

Very dry moisture conditions in spring at this location. Wheat did not tiller well, consequently, higher seeding rate meant more head per square metre at harvest in higher seeding rate area, although heads probably not as large as heads at 90 lb. rate.

Lower seeding rate of 90 lbs./acre was harvested close to a windbreak, which may account for the slightly higher yield, despite lower seeding rate. Yields in this location were excellent when compared to conventionally planted wheat yields.

Winter Wheat Into Soybean Residue

Co-operator	Mel Ritchie
Address	RR #3, Lucknow
Soil Type	Clay Loam
Drainage	Good
Previous Crop	1986-soybeans, 1985-oats
% Cover	26%
Planting Date	Nov. 22/86
Rate	170 lbs./acre
Variety	Augusta
Equipment	HSWCD Conservation Best Drill
Fertility	75 units actual N as urea with Red Clover
Insecticides	None
Herbicides	None
Results	Harvested - July 21 st

<u>Trial</u>	<u>Yield (Bu./Ac.)</u>	<u>% Moisture At Harvest</u>
No Till Winter Wheat	65.6	17.5

Observations & Comments

Mel feels that germination was not as good due to combining of previous crop (soybeans). Residue from straw should have been spread out full width, instead of strips of heavy residue. Conditions during planting were very wet and consequently planting was difficult. Mel was pleased with the results, especially with the presence of the above-mentioned problems.

APPENDIX D

No Till vs Conventional Barley

Co-operator Reid Wilson
Address RR #1, Newton
Soil Type Clay Loam
Drainage Moderate to well
Previous Crop 1986-Corn, 1985-Corn
% Cover No till - 78%; Conventional - 8%
Planting Date April 22/87 @ 120 lbs./acre
& Rate Barley seeded down with 5 lbs./acre of Red Clover
Variety Rodeo
Equipment HSWCD Conservation Best Drill
Fertility 100 lbs. urea and 150 lbs. 6-24-24 /acre hog manure 4000 gal./ac.
Insecticides
Herbicides MCPA ½ litre/acre
Results Harvest Date: August 13/87

<u>Trial</u>	<u>Yield</u>	<u>% Moisture At Harvest</u>
No Till with hog manure	63.1	14.7
No Till, no manure	56.1	15.7
Conventional tilled and manure 1 year ago	66.6	15.4
Conventional tilled and manured	67.2	15.7
Conventional tilled, no manure	59.5	16.4

Comments

Poor penetration of drill in combine wheel tracks from the fall of 1986. Crop came up later in wheel tracks, was shorter throughout the season - obviously part of the reason for lower yields. Approximately 4,000 gallons/acre of liquid hog manure was applied after planting. No till with manure emerged earlier than non-manured. Manure may have sealed soil over seed rows, improving germination.

APPENDIX E

Pasture Renovation (Seeding Rate Trial)

Co-operator	Phil Clark
Address	RR #5, Goderich
Soil Type	Sandy Loam
Drainage	Good
Previous Crop	1986-85 - pasture
% Cover	100%
Planting Date	April 24, 1987
Rate	12 lbs., 9 lbs., 6 lbs./acre (trial)
Variety	N K Spredor 2 Alfalfa
Equipment	HSWCD Conservation Drill
Herbicides	None

Observations & Comments

Drill was used to plant into grass (4-6") high. Drill was able to place seeds ½ - ¾" deep through grass. Most of the seeds were placed in the seed trench and coverage was good at seed depth. Area was to be pastured heavily after seeding until the alfalfa was well emerged. Unfortunately, cattle were not able to pasture area heavily enough and emergence has consequently been slow due to lack of moisture and competition from the established grasses in the field.

Pasture Renovation Seeding Rate Trial

Co-operator	David Stevens
Address	RR #1, Newton
Soil Type	Listowel Clay Loam
Drainage	Good
Previous Crop	Pasture for past two years
Planting Date	April 22/87
Rate	Rate trial, 6,9 and 12 lb./acre
Variety	Legume mixture containing Alsike, Ladino, White Dutch and Trefoil
Equipment	HSWCD Conservation Drill
Herbicides	None

Comments

No visible differences during the summer between the different seeding rate areas. Co-operator feels trial was successful. Competition was controlled by heavily grazing the area. Moisture was variable at planting, with timely showers through the season. As a result, crop emergence was uneven initially.

Fall Seeded Alfalfa Trial

Co-operator	Mel Greig
Address	RR #1, Gorrie
Soil Type	Harriston Loam
Drainage	Good
Previous Crop	Mixed Grain 1986-85
% Cover	100%
Planting Date	August 25th, 1987
Rate	12 lbs./acre
Variety	Oneida
Equipment	HSWCD Conservation Drill
Fertility	250 lbs./acre 6-24-24 prior to planting
Insecticides	None
Herbicides	Roundup - 1 litre/acre - August 18/87

Comments

Good penetration and excellent moisture was available for seeding into this mellow soil. Emergence was very good and appears to be higher than the conventional planted area. Co-operator is pleased with trial at this time.

Fall Seeded Alfalfa Seeding Rate in Trial

Co-operator	Bill Thornton
Address	RR #2, Gorrie
Soil Type	Harriston Loam
Drainage	Fair
Previous Crop	Hay since 1981
% Cover	100%
Planting Date	August 25, 1987
Rate	14, 18 lbs./acre
Variety	Oneida
Equipment	HSWCD Conservation Drill
Fertility	None
Insecticides	None
Herbicides	M.C.P.A. ½ litre/acre - August 20/87

Comments

Co-operator mowed grass August 10 prior to planting and has been able to keep grass cut short since. Soil moisture at seeding depth was not present at time of planting and consequently emergence has been slow.

APPENDIX F

Soil Compaction White Beans

Co-operator Bill Arthur
Address St. Marys
Soil Type Clay Loam
Drainage Good
Previous Crop Corn
% Cover 12-15%
Planting Date June 7/87
Rate 40 lbs./acre
Variety Stinger T8202
Equipment Co-operator's John Deere 7000
Fertility 100 kg/ha MAP, 40 kg. Potash with planter,
12.5 kg. N, 50 kg/ha P, 23.5 kg/ha K
Herbicides Treflan preplant incorporated 0.65 litre/ha
Post emergence Patoran @ 1.8 litre/ha

Results

<u>Trial</u>	<u>Yield</u>	<u>% Moisture At Harvest</u>
Conventional Tillage	33.5	16.8
Excessive Tillage	35.1	16.6
Wheel Track Plus Normal Tillage	33.8	16.6

Comments

Visually, no major difference. Do the extra passes with the cultivator justify the cost?

Each additional tillage pass destroys more soil structure resulting in a denser soil. An 18% increase in the bulk density of the excessively tilled plot was noticed over that of the normal tilled plot. No change was noticed in the wheel tracked plot.

White Bean Compaction Plot

Co-operator Bob McIntosh
Address RR #7, St. Marys
Soil Type Perth Silt Loam
Drainage Good
Previous Crop Soybeans
% Cover 10-15%
Planting Date May. 27/87
Rate 45 lbs./acre
Variety Ex Rico 23
Equipment Own Planter
Fertility 4 lbs. N., 20 lbs. P, 60K banded with planter
Insecticides
Herbicides ½ litre Treflan, p.p.i.; 1.1 litre of Patoran/acre
Results

<u>Trial</u>	<u>Yield (Bu./Ac.)</u>	<u>% Moisture At Harvest</u>
Normal Tillage 3 x Cultivator	35.9	18.7
Excessive Tillage 6 x Cultivator	38.3	19.0
Wheel Traffic Normal Cultivator	33.6	19.2

Comments

Normal till plot was partially washed out early in the spring and replanted. This might account for the lower yield. All plots were fall plowed.

Both plots on compaction shows a yield advantage to excessive tillage. This is expected in a drier year. Moisture is a key factor when studying compaction. Yield decreases will be noticed when moisture is in excess since aeration becomes a problem.

In a dry year with just enough moisture, a slightly compacted soil can actually be a benefit.

Soil Compaction Trial
(Tank Spread vs Manure Irrigation)

Co-operator Wayne Fear
 Address RR #4, Brussels
 Soil Type Clay Loam
 Drainage Good
 Previous Crops Corn
 % Cover 0%
 Planting Date May 6/87 @ 26,400
 & Rate
 Hybrid Pioneer 3949
 Equipment
 Fertility 6000 gal./acre of liquid hog manure
 150 lbs./acre 9-23-30 and 26 gal./acre U.A.N. 20% N
 Insecticides Counter - 9.2 lbs./acre
 Herbicides Eradicane, Laddock
 Results

<u>Trial</u>	<u>Yield</u>	<u>% Moisture At Harvest</u>
Manure spread with tanker	163.8	22.30
Manure spread with irrigation equipment	160.0	22.35

Comments

Soil was very dry at time of application. This is a major factor, since moisture allows compaction to occur more easily as moisture increases.

Even with the dry condition, the average bulk density in the tank spread area was 10% greater than that of the manurigated area. In this year, the increase was not a limiting factor.

Timely rains with no lengthy saturated period minimized any problems associated with the tighter compact soil.