

EQUIPMENT MODIFICATIONS AND RESULTS IN THE IMPERIAL VALLEY

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During the fall of 1983, I modified haying equipment to conform to controlled traffic harvesting based on an 80-inch wheel pattern. The equipment modified included: a New Holland swather, a New Holland basket rake setup, New Holland balers and a New Holland bale wagon. The equipment was then used on 650 acres of fourth year alfalfa and 300 acres of a new planting of alfalfa. The results I am presenting here are subjective in that I did not make any comparisons between the results obtained from controlled traffic harvesting and conventional or noncontrolled harvesting. Since the University is conducting rigorous studies regarding yield differences from the use of controlled traffic, I did not take the time and effort to determine what controlled traffic would have yielded differently than noncontrolled traffic harvesting.

The 650 acres of fourth year hay was on soil types varying from a Meloland fine sandy loam to Imperial clay. The new planting was on sandy loam and Imperial clay soil types. Overall the results were quite pleasing. Particularly noteworthy were the results obtained on the new planted heavy clay soils. This ranch varied quite significantly in salinity, running from 2.0 to 13.6 MMHO ECe. Where the salinity was low, the stand was excellent and very strong yielding. Where the salinity was higher, the stand was also strong, however growth was reduced due to the salinity. Despite the salinity and a hot summer, no stand loss occurred due to scalding. As a matter of fact, it usually took 5.5 to 6.0 inches of water at each irrigation compared to more normal values of 4.0 to 4.5 inches of water.

A few side benefits occurred on this hard soil that I had not planned on. For example: since I was only running over paths that had already been compacted, I was able to get in to cut quite a bit earlier than normal because concern over compaction was now less of a problem. This resulted in the wheel tracks in the clay soil becoming much like a road and made for much smoother running with the subsequent equipment. Conventional harvest methods on heavy soils normally becomes a contest to see which is going to break first, your teeth or the equipment, as you bounce over the large ruts and cracks.

A second benefit that occurred, due to being able to get in early after the last water, was that the regrowth for the next crop was able to keep right on coming so that by the time the bales were taken off, the next crop was already 4 to 7 days along in growth due to the sufficient soil moisture at time of cutting. In my experience, this is particularly beneficial on sandy soils that normally have to wait for the next irrigation before they will start their regrowth.

Each piece of the equipment needed to be modified to achieve the desired traffic lanes. The baler could be modified to either completely conform to controlled traffic or partially conform. When modified to conform completely, the baler wheels are completely within the traffic lanes. When modifying to only partially conform, the New Holland baler has the large (18 inches wide) wheel outside the traffic lanes, creating additional compaction, crown damage, and smashing of regrowth buds. On all the new planted alfalfa, I only used the completely modified baler, resorting to the partially modified baler only on the fourth year hay and then only when unable to get it baled with the fully controlled model.

The benefit of complete controlled traffic modification of the baler is easy to demonstrate and the cost is quickly paid back. The result of having that extra path for a partially modified baler, 1.5 feet wide, outside of the traffic lanes, is that you suffer an additional 5% of the field to compaction, crown damage and crushed regrowth. (An additional 1.5 feet run over for each 30 feet of crop width.) This 5% of the field not only does not receive the 20% additional yield that Bob Sheesley talks about, it suffers yield loss due to the stress it receives. Assuming that yield loss is 15%, then the total spread is 35% yield loss on 5% of the acres covered. The following calculation shows the result if one baler normally covers 500 acres per year on which a 9-ton yield is expected and which sells at a price of \$85.00/ton:

$$(500) \text{ Acres} \times (5) \% \text{ Area Affected} \times (9) \frac{\text{Tons}}{\text{Year}} \times (85.00) \frac{\text{\$}}{\text{TDN}} (35) \% \text{ Yield Loss} = \$6693.75/\text{year}$$

Advantages and Disadvantages of Controlled Traffic

Advantages

1. Reduced compaction.
2. Reduced incidence of root rots due to increased oxygenation and water penetration.
3. Undamaged regrowth so that the next crop is coming when the bales are off.
4. Able to enter field earlier after irrigation, allowing regrowth to continue, or begin sooner.
5. Able to enter field sooner after a rain to rake, bale hay, or remove bales.
6. Increased water percolation due to better soil structure, resulting in better salt removal by leaching.
7. Increased stand life.
8. Reduced requirement for weed control due to the alfalfa being more competitive.
9. Under conditions where replanting is necessary, the use of controlled traffic allows harvesting of established plants without significantly affecting replant. Actually aides replant by removing competition for sunlight.

Disadvantages

1. Expense to convert equipment.
2. After alfalfa is removed, the traffic lanes need to be subsoiled.
3. In fields with a high amount of fall, the soil in the tracks may wash.
4. Absolute necessity for weed control in traffic lanes, especially in bermuda-infested fields.

Equipment Modifications (illustrated with slides)

1116 NH swather uses wide main wheels, trailer wheels not in line.
Modified swather uses narrow main wheels, trailer wheels in line.

2. NH rake modified to put wheels in same spacing as swather. Rakes spread to achieve 80 inches on inside wheels.
3. Bale wagon modified to have front and rear wheels conform to 80 inch pattern.
4. Baler modified to put wheels on 80 inch pattern, drop chute modified to drop bales on pick up line of bale wagon.

Equipment modified to these configurations will be available. For further information I may be contacted at Holtville.
