

DIRECT SEEDING INTO SOD – STRATEGIES FOR SUCCESS

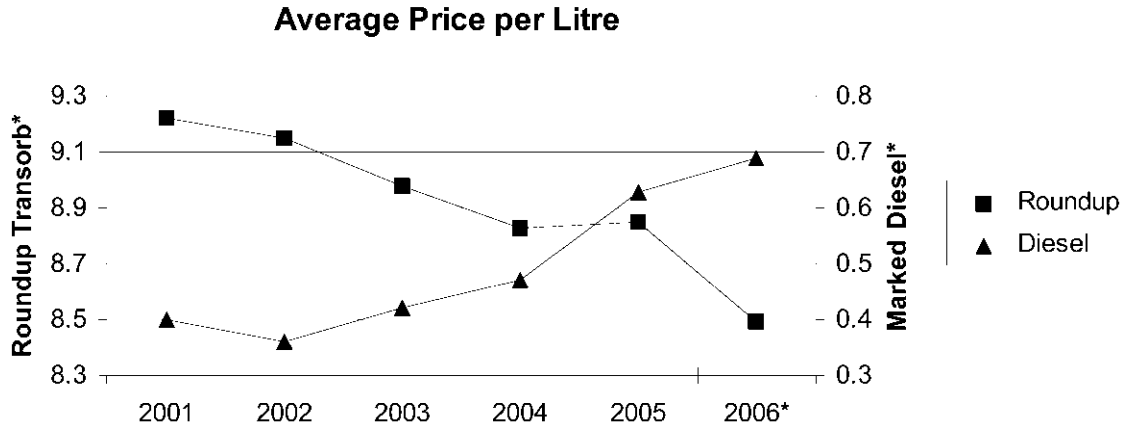
Rick Taillieu

Reduced Tillage LINKAGES

5712 - 48 Avenue, Camrose, AB. T4V 3J2 rick@reducedtillage.ca (780) 679-5174

Introduction

The practice of direct seeding into sod, also referred to as sod seeding, is now being widely used as a method of removing forage, pasture and grass seed stands from production. The increase in the cost of diesel fuel over the last several years has coincided with a decrease in the cost of glyphosate products that has made the economics of direct seeding into sod far more attractive than conventional (tillage based) methods of removal.



Source: Alberta Agriculture

*Notes: Roundup Weathermax pricing adjusted to Roundup Transorb equivalent based on active ingredient

Diesel Fuel – marked farm fuel with provincial allowance deducted

2006 figures based on 11 month average (Jan 2006-Nov 2006)

Direct seeding into sod further improves economics by decreasing labour and equipment requirements. Direct seeding into sod may save as many as 80 hours of labour compared to plowing, discing, cultivating and harrowing a quarter section in preparation for conventional seeding. Breaking sod is a series of high horsepower and high maintenance operations.

Many environmental and subsequent agronomic benefits are also gained versus conventional sod removal. These include increased moisture available at seeding time, eliminating virtually any risk from wind or water erosion and reducing soil carbon losses associated with intensive tillage practices.

Direct seeding into sod is a system that goes far beyond the act of actually seeding. This paper will outline some guidelines and strategies that are critical to successful sod seeding.



10 Strategies for Success

1. Not All Sod is Created Equal

While the principles of sod seeding apply to all types of sod (hay, pasture, grass seed crops), the system must be matched to the type of sod you are dealing with. The species composition, including the weed spectrum, will effect the choice of herbicide product used, the rate at which it is used and the timing of the application.

The thickness of the thatch layer and the rate of decomposition is very different depending on the type of sod, condition of the sod and climatic conditions. A three year old hay stand is very different than a 15 year old pasture. The condition of the sod combined with the expected performance of seeding equipment may influence your decision as to which crop to seed in a given field.

Soil fertility levels vary greatly among different fields, although generally speaking the fertility of sod fields is low. There are also other factors that need to be considered such as soil compaction and the presence of ground squirrels and badgers.

2. Realistic Expectations

Chances are (especially the first time) that your sod seeding won't look as good as when you conventionally removed sod with tillage. Field finish may look rough and emergence may be uneven depending on seeding equipment.

Yields will depend on how well the entire system is managed. Sod seeded fields can yield equal to or higher than similar stubble fields. Even if the yields are less than what would have been expected had the field been worked, the cost savings in the termination of the sod will result in higher margins.

What you can be guaranteed of is lower fuel bills, less labour requirements, reduced machinery usage and wear, no loss of production and the elimination of any risk of soil erosion.

3. Timing of Termination with Herbicides

Terminating the sod stand the year prior to seeding consistently delivers the best results. This provides a lengthy period of time for the sod to decompose, which will make seeding into it much easier. Once a sod has had the fall and winter to decompose, seeding is possible with almost all air drills and openers on the market. All openers, aside from disc openers, will have a difficult time slicing through sod that is not decomposed. Problems encountered will include sod rolling, improper furrow closing, poor seed to soil contact, and uneven depth control and fertilizer separation with double shoot systems.

Late summer and fall applications are more effective as hard to kill perennials are moving sugars to the roots and will transport the herbicide with them. It is important that there is adequate plant growth at the time of application to ensure herbicide uptake. Spraying sod out three to seven days prior to the last cut or grazing operation works best. Forage seed growers should not spray before seed harvest. Allow 6" – 8" leaf re-growth before spraying.

Termination the year prior also allows additional moisture to be stored in the soil and allows for the dissipation of fungal populations in the killed sod. Fungal populations can be very high in freshly killed sod. The fungus can affect seedling growth and emergence. Prochnau and Jensen (1995) noted high levels of fungal diseases on barley seeded into sod when the sod was spring sprayed. Smiley et al. (1992) noted that as the time between glyphosate application and seeding of barley decreased, the severity of Rhizoctonia root rot increased and grain yield decreased; also that numerous fungal disease organisms could transfer from the dying roots of the existing grass onto the healthy roots of the barley seedlings.

Spring termination often has inferior results in terms of herbicide and seeding performance. Only very low disturbance seeding equipment such as disc drills are able to seed into spring killed sod with any level of success. Spring spraying will delay seeding operations.



Removal of Alfalfa With Herbicides Applied in The Fall vs Spring (Monsanto, 1995)

TREATMENT	RATE L/acre	% CONTROL Fall Applied	% CONTROL Spring Applied
Roundup	1	90	20
Roundup	1.5	93	33
Roundup	2	96	53
Roundup+2,4-D	1+.400	95	86
Roundup+2,4-D	1.5+.400	95	91

Control of Grasses With 1 l/acre Of Roundup - Spring Applied (Dan Cole, 1994)

GRASS SPECIES	Percent Visual Control (0-100%)		
	June 94	Sept 94	July 05
Timothy	90	96	74
Orchard grass	86	26	14
Crested wheatgrass	91	91	14
Pubescent wheatgrass	94	95	94
Creeping red fescue	66	34	0
Meadow foxtail	45	65	30
Smooth brome	68	40	51
Tall fescue	96	94	86
Meadow brome	90	65	30

Control of Grasses With 2 l/acre Of Roundup - Fall Applied (Dan Cole, 1999)

GRASS SPECIES	Percent Visual Control (0-100%)		
	Sept 99	May 00	JULY 00
Timothy	41	100	98
Orchard grass	70	100	100
Crested wheatgrass	80	100	99
Creeping red fescue	36	89	71
Meadow foxtail	40	98	95
Smooth brome	63	100	99
Tall fescue	43	100	98
Meadow brome	45	100	98

4. Adequate Herbicide Rates for Termination

The general recommendation is to fall apply two litres of glyphosate or one and a half litres of glyphosate plus an additional broadleaf component for alfalfa stands. It is important that these high rates of glyphosate are applied in the fall and not split between fall and spring.

Using one litre in the fall and one litre in the spring is not the same as two litres in the fall – the results are often very disappointing.

Remember that 2 litres in the fall with custom application is around \$15/acre, which is less costly than even a single pass with a double disc.

5. Pre-seeding Assessment

In the spring be prepared to assess the sod and target re-growth in the pre-seed window with an additional herbicide application, keeping in mind the herbicide applied was a tillage replacement and now you are managing for the new crop – treat it like any other pre-seed assessment.

Using a shovel, examine the sod in several areas of the field. It is important to assess the thatch layer you are planning to seed into as it may effect your decision about what kind of crop to grow into it.



Make sure you soil test prior to seeding if you haven't already done so in the fall. Use a Brown soil probe to determine the moisture in the soil profile to further aid in cropping decisions.

6. Fertilizing for Success

Many pastures and hay land have very low fertility and soil testing is a good investment. When sod was broken with tillage, there was rapid mineralization of the organic matter that provided a flush of nitrogen – with direct seeding into sod that release becomes a very slow release process so you need to fertilize to optimize production.

In hay fields pay close attention to all the nutrient levels, as the continual export of above ground growth may have resulted in low levels of nutrients other than nitrogen.

When applying fertilizer use the recommended guidelines for the amount of fertilizer that can safely be placed with the seed – double shoot seed systems remove this limitation.

7. Crop Selection

Decaying sod and thick thatch is not an ideal seedbed for most crops. Seeding a forage back into a terminated forage has produced very limited success and is still considered high risk and requires realistic expectations. Forage seed needs to be shallow seeded and that is not easy to do into sod.

In terms of rotation – the best success in re-establishing a forage has been to have a one or two year rotational break in between forage crops allowing ample time for the sod to complete decay. Silage, swath grazing, green feed and yellow feed cereal crops can accomplish this for the cattleman.

Barley and oats work the best – they are vigorous, competitive crops that have very good broadleaf herbicide options. Herbicide options are very important when seeding with a shank type drill. The disturbance will often result in a flush of weeds that may have laid dormant during the sod phase. It is not uncommon to see alfalfa persist into the subsequent crop. Cereal crops also provide flexibility in terms of end use as they can be combined, silaged, baled for greenfeed or swath grazed. Barley and oats also provide some flexibility in terms of seeding date and are capable of emerging from deeper seed depths.

Wheat results obtained by producers are highly variable. There are reports of excellent yields and reports of disappointing failures. The variability may result from the wide variation in sod, the use of seed treatments, fertility and seeding dates.

Canola is often a popular choice because of the herbicide performance in crop. Results have ranged from excellent to terrible. This is primarily related to the fact that not all sod is created equal and neither are all seeding systems. Canola tends to work better when seeded into grass sod. Keep in mind when examining your sprayed sod that canola is a small seed that needs to be seeded shallow and will not emerge from under clumps of sod. Lower disturbance drills and in particular disc drills have provided the best results. Be careful not to plant the wrong crop just because you want to use more glyphosate in the crop year.

Peas can also work for sod seeding. Peas perform well when seeded deeper and thrive in low nitrogen soils. One problem is that they are poor competitors with weeds and have very limited herbicide options (especially if alfalfa comes back). You may also not want to harvest a lodged pea crop if the field finish was rough.

Winter cereals can also work. The sod needs to be sprayed earlier to allow enough time for decomposition of the sod prior to seeding in September. It is important that you are able to ensure an ability to seed shallow and to maintain adequate snow catch potential for winter survival. Sprayed alfalfa that is cut a little higher provides borderline snow catch – depending on the alfalfa stand being terminated.

8. Seeding Management

- **Seed Depth** – make sure the seed is being placed into mineral soil and has adequate soil cover – more mistakes are made by seeding too shallow resulting in the seed being stranded in the thatch layer.
- **Seed Quality** – use good quality seed with high vigour. Sod is the least friendly environment that you will seed into. It is worth using certified seed and getting the seed tested.
- **Seed Rate** – use a seeding rate calculator to target a desired plant stand. Use a higher than normal seedling mortality percentage when seeding into sod to compensate for the challenging seedbed conditions.
- **Seed Treatments** – as all sod is not created equal – who knows what is lurking in your seedbed – this is an investment that often pays dividends
- **Seed Placed Fertilizer** – follow recommended guidelines for seed placed fertilizer, excessive seed placed fertilizer will hurt stand establishment
- **Seeding speed** – watch your speed – seeding too fast can cause more sod to roll up resulting in poor seed to soil contact and leaves an undesirable field finish. Higher seeding speeds result in less accurate depth control, especially in sod, and can also result in seed falling into the fertilizer trench with double shot openers.
- **Check your depth and seed placement often.** Sod is highly variable and field entrances and headlands are often more compacted than the rest of the field.



9. Seeding Equipment

If you follow the previous recommendations then your chances for success are high regardless of which seeding equipment you choose. If you are getting custom seeding done then it is more important to have an experienced operator than the ideal drill.

An air drill or box drill designed for direct seeding are the best options as they have the weight and the strength to handle sod seeding.

Disc drills are an excellent choice as they offer the least disturbance, best field finish and have the ability to slice through the sod without any sod rolling up. This minimal disturbance will often produce the cleanest field, as no buried weed seeds were disturbed during the seeding process.

With shank type drills, the smaller the opener and the wider the row spacing, the easier it is to slice through the sod. Slower seeding speeds and careful monitoring of soil flow and depth are more important with shank drills.

Land rolling after seeding will help with field finish and improve seed to soil contact – just make sure that you are not rolling large clods back over top of the seed row.

10. Systems approach

Take a full system approach to direct seeding into sod. All of the components of the system (points 1-9) have a direct effect on all the other points. Attempting to cheat the system by taking a shortcut on any of the aspects can turn a promising opportunity into disappointing results.

Conclusion

Direct seeding into sod is a growing trend and a practice that is successful for many Alberta producers in a wide range of soil and climatic conditions with almost every type of seeding equipment on the market.

The Reduced Tillage LINKAGES agronomists are there to help you succeed. They can also put you in touch with successful direct seeders who seed with the same equipment as you through their confidential Farmer to Farmer Network. Visit www.reducedtillage.ca for more information.

References

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