

# Does Zero-Till Fit the Bill?

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*"It is amazing what this drill can seed into, it can slice into the thickest sod and the oldest pasture and a month later there are oat plants emerging? The trick is to not watch for the first 2 weeks as it takes longer to green up then in tilled fields."*

*Julie Robinson,  
Operator,  
Kilkerran*

## What is Zero-till?

**Zero-till** is the concept of **not tilling** a field **at all** prior to seeding in order to establish the current years crop.

**Conventional-till** includes plowing and/or discing, harrowing, and sometimes cultivating the field prior to seeding.

**Minimum-till** is when there is light cultivation/harrowing prior to seeding, only possibly on stubble or summer fallow land. This causes minimal soil disturbance prior to seeding and provides an adequate seed bed.



PRFA flexicoil drill seeding in sprayed out pasture.

So now the question becomes how is it possible to seed into a old hay of pasture field without tilling?

## Why Zero-till?

Field trials in the 1990's carried out by the Soil Conservation Branch of Alberta Agriculture Food and Rural Development, indicate that direct seeding of annual crops into pasture sod is feasible and it offers many benefits to growers.

### Benefits include:

- Protection of land from wind and water erosion
- Better management of soil moisture
- Saving time, fuel, and equipment
- Reduced cost

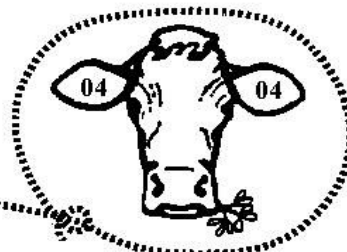
Sod seeding streamlines the cycling of perennial forage crops in rotation. Combined with direct seeding, tillage is no longer required to switch from forage to annual crops and back.

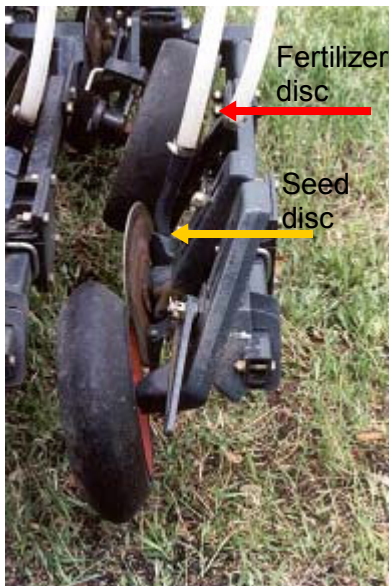
**IMPORTANT NOTE:** *back-to-back re-seeding, or sod seeding new perennial forage into live or terminated old sod is not recommended.*

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## Opener's

First things first, what is an **opener** and what is meant by **double shoot vs single shoot**?

### Ground opener

This is the soil engaging part of a planter. It is responsible for placement of seed and fertilizer. It has a soil-breaking wear point, a soil dividing body, and delivery tubes to guide seed and fertilizer to the furrow bottom. Also, it often has deflecting surfaces to guide soil back around the fertilizer bands and seed rows.

### A ground opener must:

- create distinct rows or bands of seed and fertilizer.
- create a good soil structure (fine aggregates) in the seed zone.
- resist wear. (Resistance performance is measured in terms of how many acres each opener plants. For example, if 40 openers on one machine plant 4000 acres, then each opener plants 100 acres.)
- scour well in moist and high clay content soils. (Many openers tend to build up with soil, causing the furrow opening

to be too large. As a result, the seed is generally not covered with sufficient soil.)

- leave the soil surface smooth enough for subsequent operations like crop spraying and harvesting.
- sufficiently "blacken" the soil surface in the seed row if there is a concern about soil being warm enough for seed germination.

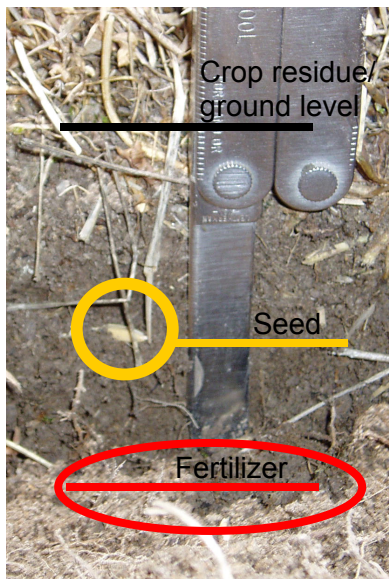
The terms "**single shoot**" and "**double shoot**" refer to how material (seed and fertilizer) is delivered by the planter to the ground opener.

A **single shoot system** has only one delivery line going to the ground opener. The line carries seed and possibly some granular fertilizer.

A **double shoot system** has two lines going to the ground opener. These may be two air flow lines or an air flow line and a liquid fertilizer or anhydrous ammonia (NH<sub>3</sub>) line.

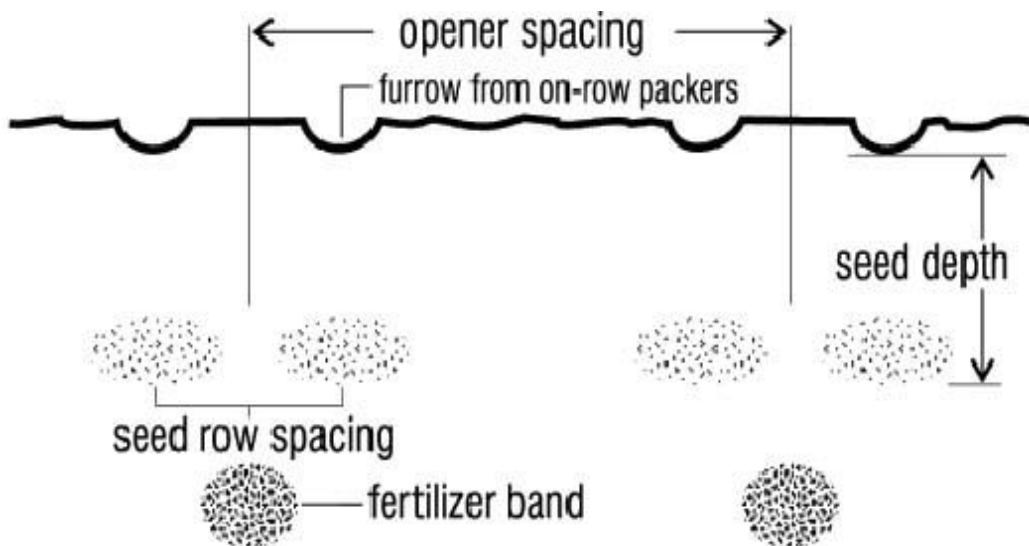
PRFA's drill is a double shoot disc opener called a Barton opener.

Above PRFA drill, one shank, fertilizer disc and cleaner wheel in front and seed disc



Above, soil profile of seed banded in same opening as the fertilizer but off to the side and 1 1/2 inches above.

Right, the opener spacing, seed and fertilizer placement. Illustrating the fertilizer band beneath the seed and the seed band off



*The mandate of Peace River Forage Association of BC is to develop forage opportunities that ..... are sociologically, ecologically, and economically sound.*

## Conventional Till vs Zero-till Plots

In year one plots, conventional till vs zero-till, often the conventional till plots were up faster, and looked better and sometimes had more yield. However, looks can be deceiving as we have learned, zero-till looks worse until about a month after seeding as there is stubble and residue that the plants have to grow through to give the green effect.

Also researchers claim it takes 2 years for the soil to adjust to the zero-till process and develop the right microorganisms and then the crops really take off.

In dry years such as this year, the zero till fields were the only fields with moisture.



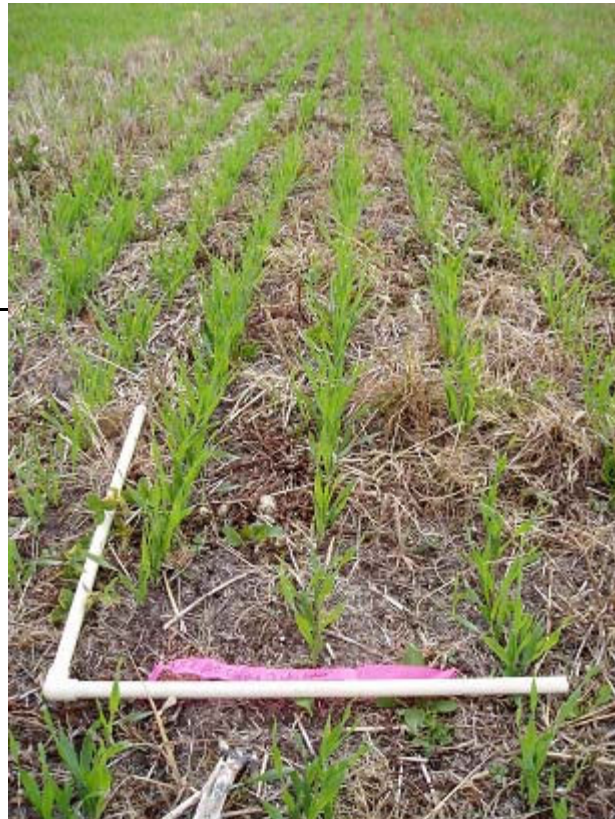
Above is a comparison between zero-till (left) and conventional till (right). This picture is take in year 2 of the trials but you can still see better ground cover and less cracks in the zero till side.

## What Didn't Work for Us

1. Direct seeding **forages** into an **existing forage pasture or hayland**. These fields needed to be sprayed out to have success. It just didn't work to fill in bare spots in the fields.
2. Direct seeding **forages** into **sprayed out forages**, even if sprayed out successfully going right back into a forage stand without cereal in between had minimal success. It seems to take at least one year of cereals and then a good forage stand can be established.



Above is an example of direct seeding into an existing forage stand without spraying. Hardly any plants emerged and the grasshoppers polished these few plants off as they emerged. Right is in the same quarter of land but this pasture was sprayed prior to seeding with 1.5 l/ac of glyphosate (360 g/L). This is 3 weeks after seeding in both pictures.



Zero-till/Direct Seeding demonstrations on forage has been ongoing for 4 years with PRFA  
 Check out the website at [www.peaceforage.bc.ca](http://www.peaceforage.bc.ca)

### Factors of success producers can control:

- \* Timing of seeding
- \* Depth of seeding
- \* Seeding and fertilizer rates
- \* Quality of pre-seeding burnoff
- \* Timing of pre-seeding burnoff

### More difficult to control:

- \* Percipitation

### Switching to Zero-till

- \* Weed Control
- \* preferably fall spraying
- \* Residue management, making sure there is not too much residue
- \* One year of cereals between forage stands

### How does an idea grow into a R & D project?

1. Idea/issue discussed.
2. Contact person from the Board of Directors.
3. Industry funds organized from membership fees, cooperators or agri-businesses.
4. Matching funds from an appropriate government source.
5. People contracted to carry out the work.
6. Reporting to funding partners/membership.

## Drill Challenges

As with any airdrill system the learning curve is steep and the consequences very obvious 2 weeks after seeding. The PRFA drill has an air system that blows the seed down the lines and into the ground.

The seed and fertilizer metering is still mechanically driven but the flow of air determines rather than seed blows on into the ground or plugs. The air flow is run by a hydraulic fan.

On this particular system it is very difficult to tell by your monitor if you have a blockage, only major blockages, i.e. a main line providing a quarter of the drill with air, will register on the monitor. This means it is very important to check each opener for blockages when filling.

## Summary

Zero-till is not the end all be all for forage producers but it does have its advantages:

- Protection of land from wind and water erosion.
- Better management of soil moisture.
- Saving time, fuel, and equipment
- Reduced cost

Keep in mind that weed control is essential.

This may be the best way for you to rejuvenate a forage stand especially if you have soil erosion or moisture concerns.

## Good Seed Bed

This drill is designed to seed into sod; therefore, when it is used in tilled soil conditions its seeding depth is variable and overall ease of seeding is decreased.

Even in dry conditions we have been able to seed at a depth of about 4 inches.

The better condition the soil and seed bed is in the more seed to soil contact there is, which is imperative to getting a good catch.

## Weed Control is a Must

We have learned that good weed control is one of the primary factors in seeding success. Fall weed control seems to result in the best weed control and the best soil moisture level in the spring.

If weed control is left until spring, spraying as close to the seeding date seems to be the most effective way to go. If you spray 2 weeks prior to seeding it seems a new flush of weeds is trying to establish at the same time as the seedlings. We have even had success with spraying the day of or the day after seeding.

In the past, when spraying out old hay or pasture stands, producers have tried to get away with 1 L/ac of glyphosate (360 g/L), however we are finding that its better to go 1.5 L/ac or 2 L/ac for dense stands. If you don't get a good kill, you will have a poor

**Compiled by:** Julie Robinson **Sources:** <http://www.reducedtillage.ca/factsheets.html#general>

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