

No-Till Alternative Available to Nova Scotia Producers

Continuous cultivation of agricultural fields has resulted in decreased amounts of organic matter, or carbon (C) based material. This lost C accumulates in the atmosphere as carbon dioxide (CO₂), a greenhouse gas (GHG) linked to global warming.

Conservation tillage saves resources!

No-till (i.e. zero-till or direct seeding), is a beneficial management practice (BMP) utilized to establish a crop with minor soil disturbance. This technique gained popularity in the 1960's when herbicides became the common method to control weeds, rather than cultivation.

No-till helps to increase the organic matter content of soil by:

- improving soil structure
- increasing soil organic matter
- reducing soil compaction
- limit soil loss by wind or erosion
- increasing soil moisture content
- better crop root exploration
- maintaining beneficial insect populations
- enhancing biodiversity

Carbon sequestration means conserving C that is already in the soil or removing CO₂ from the atmosphere. It has been estimated that up to 1.3 tonnes of CO₂ per hectare per year (or 1200 lbs per acre) can be sequestered in soils by adopting no-till practices, helping to reduce GHG emissions.



This seeder is available for rent on a demonstration basis to any Nova Scotia producer at low cost. For rental information, please contact the SCIANS Coordinators at (902) 890-1152

HOW IS IT DONE?

A no-till production system seeds a crop directly into the ground, leaving the soil undisturbed and retaining plant residues to further increase the organic matter content. Generally, a no-till drill is used, such as the Tye™ No-Till Seeder pictured below. A narrow slit is made in the soil allowing for a seed to be deposited, and a wheel then packs soil around the seed. This technique can be used under variety of weather conditions, soil types or crop covers. For best results, cover crops and pesticides are used to keep weeds at a minimum.

The benefits include:

- decreased fossil fuel consumption
- reduced labour
- time requirements are shorter
- equal or better yields
- improved environmental stewardship

These translate into reduced energy requirements, and greater profits for the individual producer.

WHERE TO START?

The Soil & Crop Improvement Association of Nova Scotia (SCIANS), together with the Environmental Management Program for Canadian Agriculture (EMP), established several corn, grain and forage sites throughout the province to promote the adoption of no-till practices. A Tye™ No-Till Seeder (shown below) was used for seeding.

More information can be found at www.scians.org

Tye™ No-Till Seeder Dimensions:

- Overall height 5' (1.5m)
- Overall length 111/2' (3.5m)
- Ground Clearance 8" (20cm)
- Main hopper capacity 2.0bu/ft (231l/m)
- Legume Hopper Capacity 0.3bu/ft (35l/m)
- Power Requirement 7-10hp.ft (17-24kw/m)

Standard Operating Procedure (SOP)

Inspecting the Seeder (Step 1):

- Check acre meter (A), and record number in the SCIANS log book found in the black toolbox (B). The acre meter number should be recorded before and after every use.
- Check fertilizer (C) /legume compartments (D, E) for build up/old materials or objects and clean before transport. Ensure cleanout door (F) at bottom of fertilizer compartment (C) is closed when finished. The door is located on the front and held closed by three rubber straps.
- Check the operation of the fluid meter wheels and individual seeders (G) by rotating the seeder drive wheel (H) in its normal direction; counter clockwise.

(Use caution to avoid causing damage to a potentially plugged seeder, or bent or frozen shaft.)
The seeders are located on the bottom of the seeding hoppers D & E.

- Inspect fertilizer and seeding tubes (I) for kinks, blockage, or sagging. Clean and adjust as required.
- Check and insure all chains (J) are flexible, properly aligned, and tightened.
- Inspect double disc opener blades (K) and coultter blades (L) for wear, damage, and proper alignment.
- Check and tighten all bolts and nuts as necessary.
- Inspect all bearings annually.

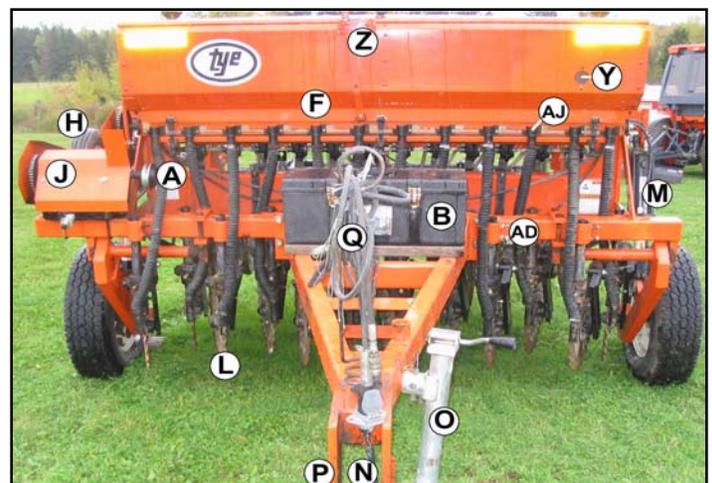
Transporting and Storage (Step 2):

- Ensure both lift cylinder lockup channels (M) are firmly locked in position on the lifts.

- Connect drill hitch (N) to truck tow bar.
- Place docking stand (O) in locked position.
- Fasten the transport chain (P) to the tractor.
- Connect lights and electrical (Q).
- Place rear harrow (R) in elevated position using the secure vertical lift chains (S) anchored in their keyhole brackets.
- Remove all fertilizer/legumes/seed from the hoppers and ensure lids and clean out doors (F) are shut. Lubricate inside of fertilizer compartment (C) with machine oil or silicone spray to prevent rust from fertilizer.
- Thoroughly rinse the double disc blades (K) coultter blades (L) and presswheel (T) with clean water after every use.
- Lubricate all moving parts.
- Ensure all hydraulic couplings, wires and chains are securely fastened (Q).

Setting up the Seeder (Step 3):

- Hook the drill (N) to the tractor drawbar.
- Raise the jack stand (O) and place in the locked transportation position.
- Connect hydraulic and electrical (Q) lines on seeder to couplers and ends on tractor.
- Ensure lights and hydraulics are working.
- **Wait** to fill the hoppers with fertilizer/seed. Filling the hopper in the field will prevent seed from packing the seed cups at the bottom of the hopper during transport.
- Transport to seeding location and remove the lift cylinder lockup channels (M) on **both** sides of the seeder. Channels can be stored in the black tool box (B) on seeder arms.
- For field setup & adjustments follow steps 4-5



Adjusting & Setting Components of the Drill (Step 4)

Turn off tractor when making any adjustments.
Begin by leveling the seeder.

- To level, adjust the clevis hitch (hitch connecting drill to tractor) (N).

For the seeder to work effectively the top of the grain box and tongue must be level with the ground when the drill is in planting position.

- Properly adjust the spring tooth harrow (R) located at the rear.

This can be done by adjusting the chains (S) in their eye holes at the back of the seeder.

If residue is raked up by the harrow during seeding, flatten the tine angle and increase the tractor speed slightly depending on field conditions, and experience.

Maintain caution when turning, crossing slopes and on rough slick muddy surfaces.

It is **not** recommended to turn with the drill in the ground. Turns >0.15 degrees should be avoided as unnecessary strain is placed on coulters (L), double disc openers (K), and presswheels (T).

Raise the drill to complete turns >15degrees.

The acceptable operating range is 4-9mph.

After following through steps 4A to 4D a **test strip** of 3m is recommended. Fine adjustments should then be made. The drill should be lowered only when the seeder is in motion.

Filling the Hoppers (Step 4A):

Large seed /Soybean compartment (D)

Small grain/ grass compartment - Rear (E)

Fertilizer compartment – Front (C)

Disperses fertilizer ahead of seedbed

- Lower folding double walk board (V) for easier access to the hoppers.
- Turn latch on top of hoppers (W) to open hopper lids.
- Check hoppers for any foreign objects and insure cleanout door (F) at bottom is closed.
- Fill the correct hoppers with dry granular fertilizer and/ or grain seed. Be sure to maintain equal level across hopper.

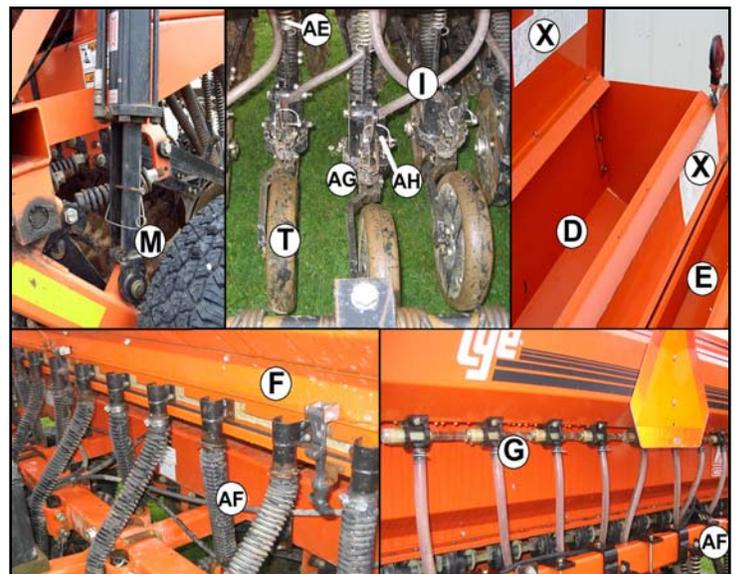
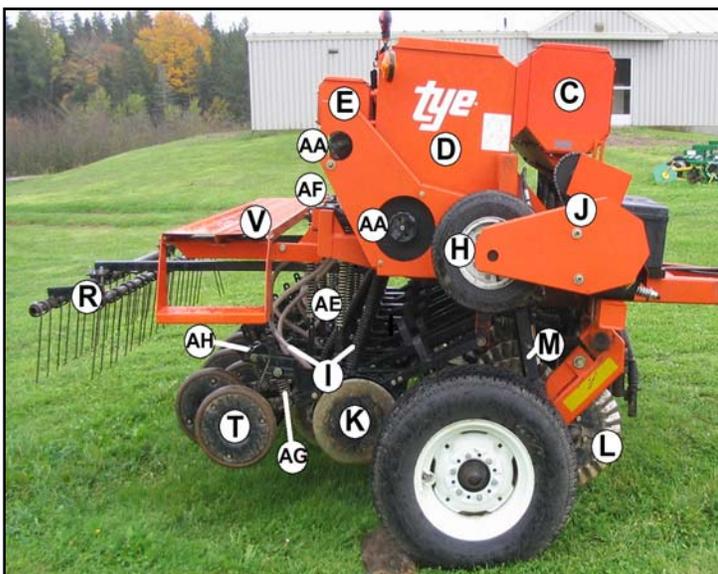
Take note of the fertilizer/ seeding rate charts (X) inside the lid of each hopper.

- Lower lids, and turn the latch; closing hopper.
- Refill as required. Be sure to maintain level.
- The fertilizer level can be viewed through a glass panel (Y) on the front of the seeder.

Fertilizer Rate Setting (4B)

Fertilizer application rate can be changed by altering the adjustment lever (Z). This adjusts the size of the metering gate hole (AI) at the front of the hopper. Black coiled fertilizer tubes (AJ) leave the metering gate hole from the front of the hopper. It is important to clean out the tubes and oil the hopper after every use. An application chart can be found inside the fertilizer compartment lid.

Fertilizer rate is most accurate when the metering gate hole is open between ¼” (6mm) to 1” (25mm).



Seeding Rate Setting (Step 4C)

To adjust the seeding rate (hoppers D and E)

- Check the recommended seeding rate chart found inside the lid of each hopper to be used.
- Large grains - hopper (C),
- Small grains - hopper (E)
- The handwheels (AA) located on the right side of the hoppers are used to adjust the seeding rate for each hopper.
- To adjust, loosen the large locking wing nut on top of the hand wheel. Turn the hand wheel while viewing the scale. Turning the hand wheel moves the seeder shaft and adjusts all seeders for the particular hopper at the same time. The scale should match the seeding rate set according to the seeding rate chart (X).
- Retighten the locking nut on the handwheel.

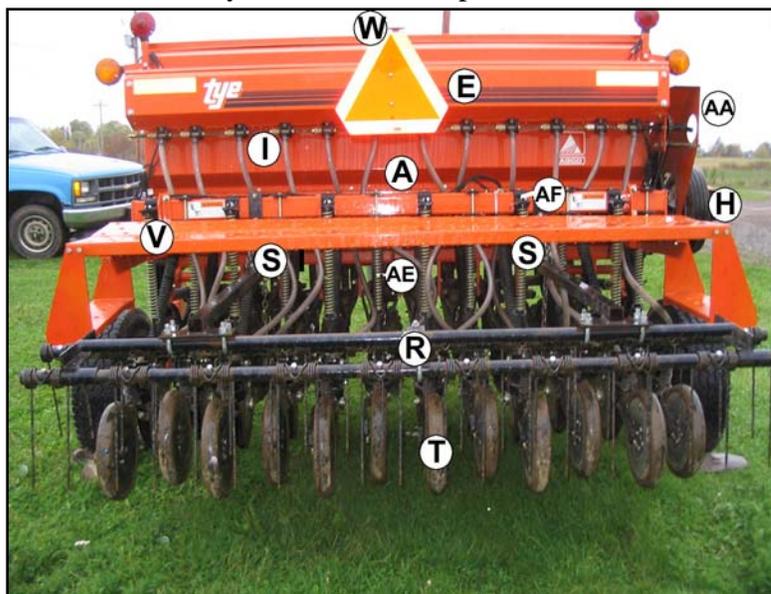
The seeding rate is now set and the level can be monitored from the tractor by looking at the seed level indicator (AF).

Seeding Depth Setting (Step 4D):

Seeding depth placement is determined by a combination of 1) drill height, 2) coulter depth, 3) row unit pressure rod spring setting, 4) and down pressure spring press wheel setting.

All should be considered when adjusting as one could counter act the other.

When the seed depth setting is completed the drill should be ready for a 3m test strip.



- 1) The drill height is controlled by tractor hydraulics, and should be done only when the seeder is in motion. Lowering a stationary drill can cause the equipment to clog. Before lowering, first check to ensure the lift cylinder lockup channels are removed. If the seeding depth is too deep when lowered, washers found in the black tool box (B) can be placed on the lift cylinders (M) providing height. If the drill is not heavy enough to penetrate the ground, up to 200lb of tractor suitcase weights can be added to the weight bar (AC). (keep in mind seed and fertilizer also affects drill weight)
- 2) The coulter blades (L) are used to initially cut the sod. They should only need adjusting when the blades wear. The shaft holding the coulter blades to the rest of the seeder determines the blade height. To adjust the height, loosen the two bolts (AD) at the top of the shaft. Slide the shaft to its new position, and tighten the bolts. They should be set no more than ½ inch (12mm) below the desired planting depth.
- 3) The pressure rod springs (AE) apply pressure to the double disc opener blades (K) holding them at the bottom of the coulter track forcing the slit cut by the coulter blades open; enabling seed to be placed in the seed bed. The springs should be adjusted so there is adequate spring pressure holding the double disc in the bottom of the coulter track. A rod running through the center of the spring serves as an indicator of the pressure. The bolt (AF) at the top of the rod should not contact the pressure rod guide. To adjust the spring pressure, simply reposition the pin located on through the rod at the bottom of the spring.
- 4) The row unit down pressure spring (AG) is used to increase or decrease pressure on the presswheel (S) The presswheel fine tunes the planting depth by applying downward pressure on the soil which slightly lifts the drill and packs the seed in the seed bed. To adjust the presswheel and down pressure spring move the pin (AH) located above the presswheel to the proper setting. After setting check seed placement depth with 3m test strip to ensure a proper burial depth is reached.