

# No-till

- \* *economically sound*
- \* *agronomically superior*
- \* *environmentally safer*

On The Plains



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### Concept Seeder

The purpose of this project is to build a seeder which tests the feasibility of combining the best concepts presently utilized on row-crop planters with the best concepts available in high-capacity air seeders to make a single machine capable of accurately seeding all crops grown or being considered at the Dakota Lakes Research Farm. It also a goal to incorporate some precision farming concepts into this seeder. This machine is not meant to demonstrate final design. That will be better done by commercial companies.



#### Advantages of row-crop seeders:

Extremely accurate depth control.

Singulation (counting) of seeds.

Numerous after market options available for residue management.

Multiple options for fertilizer placement.

Openers work well in wet conditions if properly modified.

#### Disadvantages of row-crop seeders:

Expensive on a per foot basis when rows are narrowed.

High maintenance costs with some designs.

Limited capacity for both seed and fertilizer.

Require substantial time and expense to change between crops.

#### Advantages of air delivery based seeders.

Easily filled, emptied, and transported.

Minimal amount of moving parts. (low maintenance)

Large capacity tank to increase efficiency.

### **Disadvantages of traditional air delivery based seeders.**

Most lack accurate depth control capability.

Most have limited capability in high residue situations.

Seed metering based on volume not singulation.

Limited capability in wet conditions.

### **Disadvantages of present no-till drills:**

Intermediate in depth control accuracy between air seeders and row-crop planters. (no parallel linkage)

Metering done on volume basis not singulation.

Limited capacity.

Difficult to transport, fill, and empty.

Very limited capability for fertilizer placement.

Little or no ability to manage residue (move residue from the row area)

### **Disadvantages of most present designs:**

Downpressure capability determined by frame weight.

a. Excessively heavy for wet conditions.

b. Insufficient for hard conditions.

Seeding and fertility rate changes occur across the entire width of the bar.

a. Limits accuracy of variable rate technology.

### **Basic Design Concepts being Demonstrated by this Seeder.**

#### **Ground engaging components:**

Use of parallel linkage system for better depth control accuracy.

Multiple rows per parallel link when seeding close grown crops.

a. Retains accuracy for row crops.

- b. Reduces costs for close-seeded crops.
- c. Extra openers easily and quickly lifted or removed

Residue manager/fertilizer opener combination on same parallel link.

- a. Reduced cost and weight.
- b. Allows use of high N rates in proximity to row(s) without damage.
- c. Provides residue managing capability in close grown crops.

Four functions achieved with one parallel link: Fertilizer, residue manager, and two seed openers.

Non-uniform row spacing patterns possible. Spacing of 9-6-9-6-9 with 15 in. centers for the row crops.

- a. Places two rows in a 6 inch clean zone which contains all fertilizer.
- b. Residue moved to wider gap. Controls weeds
- c. Wider gap allows air movement and improves trash clearance.
- d. With 20 inch centers this pattern could be 10-10-10.
- e. All openers can be used for seed if desired. Produces 9-3-3-9 or 5 inch patterns.

### **Seed and Fertilizer Distribution:**

Three tanks, Seed, N, and P. Use N tank for seed in peas and soybeans.

All N in separate opener. Use center opener for wheat and other small grains. Use a side openers for corn to ensure separation.

Keep seed and P separate through use of splitters, otherwise monitor failure will result.

Need monitor sufficiently sensitive to count small seeds (wheat, canola, flax)

Use seed population instead of volume.

Cyclo drums can also be used to meter (not necessarily singulate) small seeds. Variable rate can all be done at the bar with the tank being the server at all times.

Use Raven Electric drives to run all tanks. Allows for variable rates, without having to use excess hydraulics.

8. With the use of monitors, the flow from each tank can be controlled individually.

### **Electronically Controlled Depth Control:**

Using a tall 2 in. wide tire in the clean zone of the planter, monitors sense the pressure on the tire. Readings are then taken and averaged for use in setting active hydraulic pressure.

### **Weight Distribution**

All weight carried by tracks or large tires.

Bridge hitch allows weight of cart and tractor to be used as downpressure.

Bridge hitch allows frame weight to be carried by tractor or cart tires (tracks).

Electronic controls used to maintain frame height.

a. Needed to allow weight transfer.

b. Improves residue flow since there are no tires on the frame.

### **Obvious Advantages of this Concept Seeder:**

Mobility in the field, easy to transport, fill and empty.

Changing of seeds is done quickly and easily.

The same planter is used for all crops.

An excessively large tractor is not necessary to properly handle the planter.

Large capacity tanks allow for long runs before refilling.

Adaptable to precision farming.