Reduced Tillage: How to Plan For Success

How to make reduced tillage work on your farm

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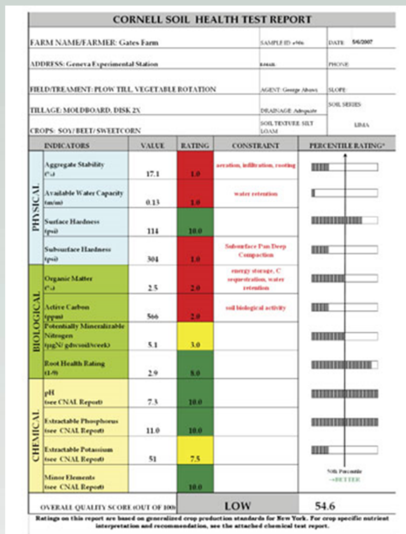
Profitable Reduced Tillage Practices are a Combination of

Planning



CORNELL SOIL HEALTH TEST REPORT

FARM NAME/FARMER: Gates Farm	SAMPLE ID	DATE 5/6/2007
ADDRESS: Geneva Experimental Station		PHONE
FIELD/TREAMENT: PLOW TILL, VEGETABLE ROTATION	AGENT: George Abawi	SLOPE
TILLAGE: MOLDBOARD, DISK 2X	DRAINAGE: Adequate	SOIL SERIES
CROPS: SOY/ BEET/ SWEETCORN	SOIL TEXTURE: SILT LOAM	LIMA

	INDICATORS	VALUE	RATING	CONSTRAINT	PERCENTILE RATING*
PHYSICAL	Aggregate Stability (%)	17.1	1.0	aeration, infiltration, rooting	
	Available Water Capacity (m/m)	0.13	1.0	water retention	
	Surface Hardness (psi)	114	10.0		
	Subsurface Hardness (psi)	304	1.0	Subsurface Pan Deep Compaction	
BIOLOGICAL	Organic Matter (%)	2.5	2.0	energy storage, C sequestration, water retention	
	Active Carbon (ppm)	566	2.0	soil biological activity	
	Potentially Mineralizable Nitrogen (µgN/ gdwsoil/week)	5.1	3.0		
	Root Health Rating (1-9)	2.9	8.0		
CHEMICAL	pH (see CNAL Report)	7.3	10.0		
	Extractable Phosphorus (see CNAL Report)	11.0	10.0		
	Extractable Potassium (see CNAL Report)	51	7.5		
	Minor Elements (see CNAL Report)		10.0		50th Percentile →BETTER
	OVERALL QUALITY SCORE (OUT OF 100)		LOW		54.6

Ratings on this report are based on generalized crop production standards for New York. For crop specific nutrient interpretation and recommendation, see the attached chemical test report.

Preparation

Practice

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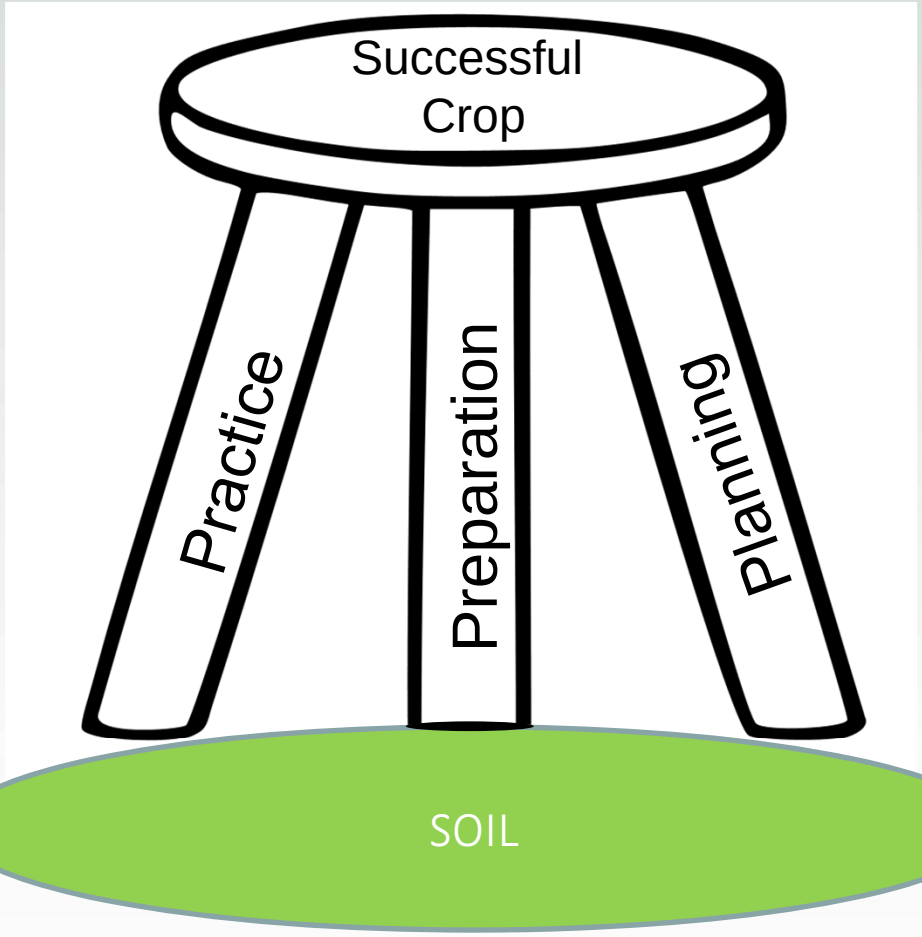
Profitable Reduced Tillage Is Like a Three Legged Stool



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Field-Based Planning

Well Drained soil planted after first cut

>21 ton corn silage at harvest
planted late June

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Moderately Well Drained Soil

Soils - Hydrologic Groups

- A - Well/excessively drained
- B - Moderately drained
- C - Poorly drained
- D - Very poorly drained

Town Boundary

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Field-Based Planning

System tiled field on moderately heavy soils

4.5 ton shell corn

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Poorly Drained by System Tiled

Soils - Hydrologic Groups

- A - Well/excessively drained
- B - Moderately drained
- C - Poorly drained
- D - Very poorly drained

Town Boundary

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Field-Based Planning

Drainage Issues???

Poor planting conditions
Planted twice crop failed

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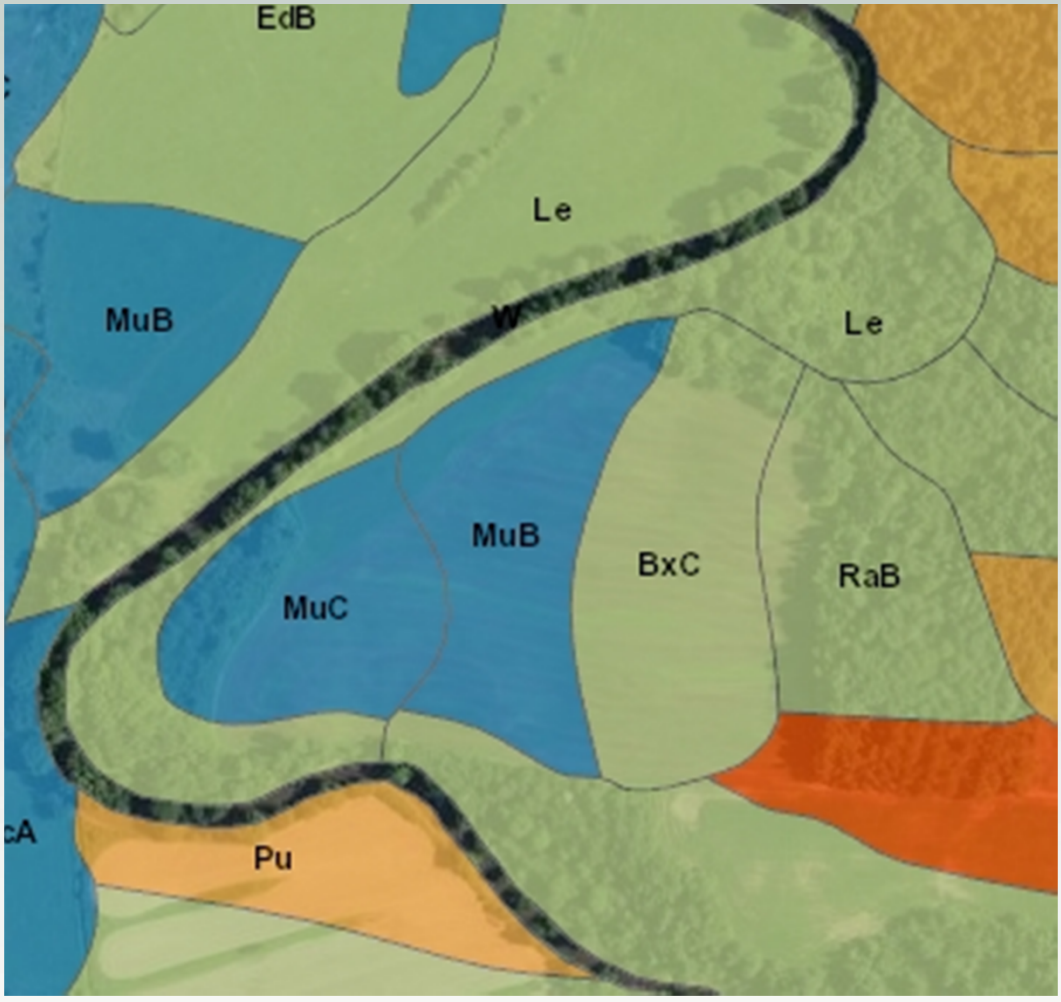
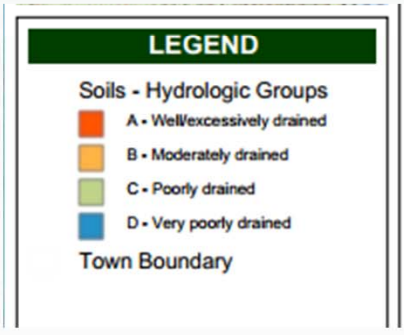
Most of this Field is on Very Poorly Drained Soils





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No-Till Annual Seeding Trial

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Field-Based Planning

Compaction/Weed Issues

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Field-Based Planning

Compaction/Weed Issues

Week weeks post planting

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Field-Based Planning

Poor drainage = poor results

Conventional till

No-Till

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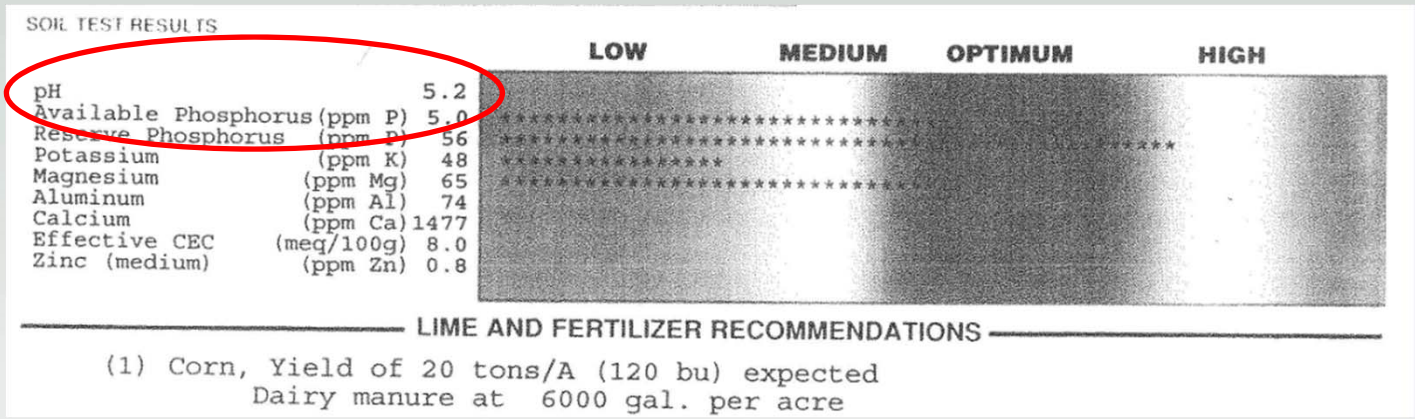
Field-Based Planning

Fields with low testing ph should be addressed **before** converting to a reduced tillage system



SOIL TEST RESULTS

			LOW	MEDIUM	OPTIMUM	HIGH
pH		5.2				
Available Phosphorus	(ppm P)	5.0				
Reserve Phosphorus	(ppm P)	56				
Potassium	(ppm K)	48				
Magnesium	(ppm Mg)	65				
Aluminum	(ppm Al)	74				
Calcium	(ppm Ca)	1477				
Effective CEC	(meq/100g)	8.0				
Zinc (medium)	(ppm Zn)	0.8				

LIME AND FERTILIZER RECOMMENDATIONS

(1) Corn, Yield of 20 tons/A (120 bu) expected
Dairy manure at 6000 gal. per acre

Soil ph is very important to all cropping operations. Think of the ph as the broth of your plant's favorite soup.

Low ph = acidic = vinegar = nasty
High ph = basic = baking soda = nasty
Proper ph for your crop = chicken broth = tasty

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How ph Effects Crop Nutrients

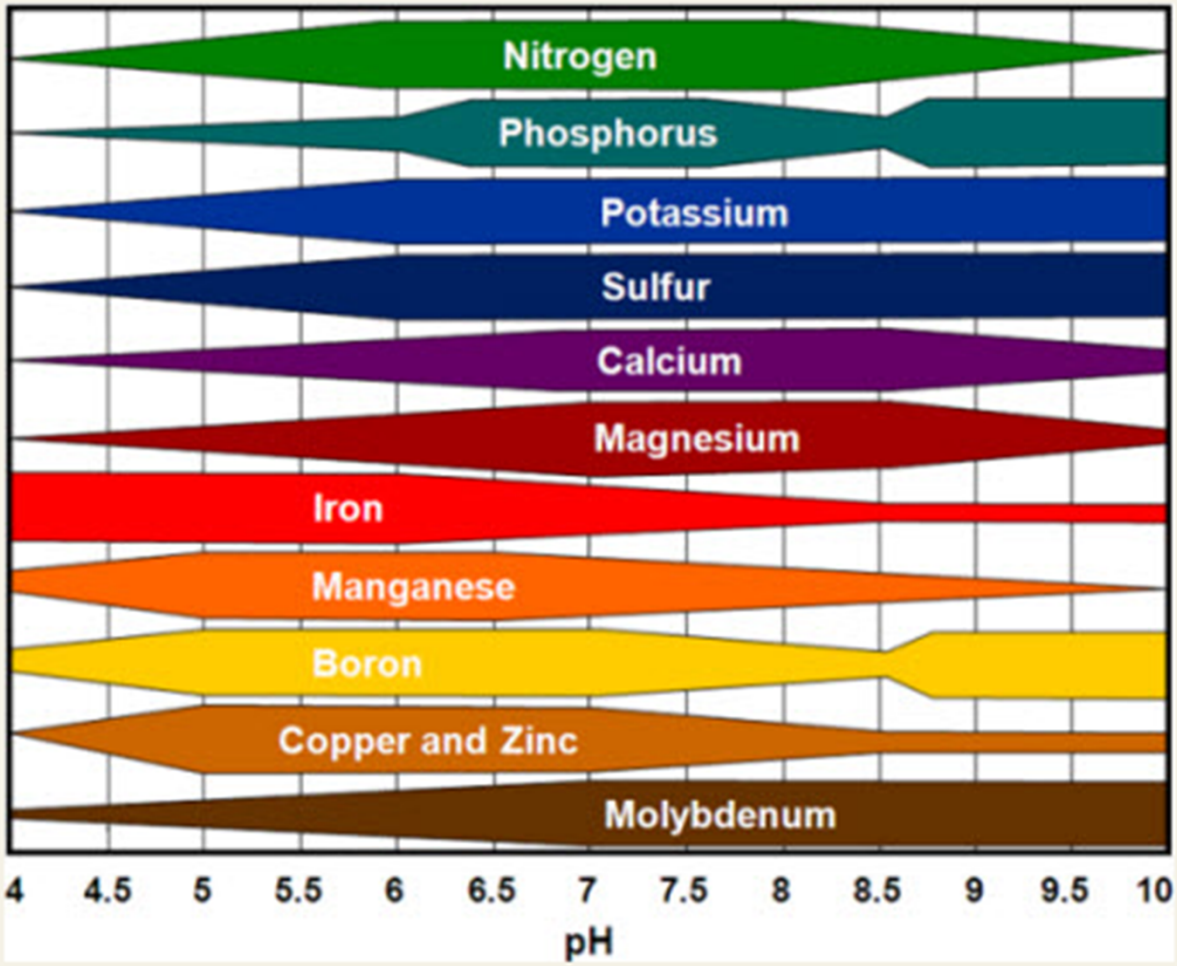

Figure 1. Relative availability of crop nutrients by soil pH.

Grain Crops between 6-7
Legumes between 6.5–7.0
Grasses between 6.0-6.5

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Field-Based Planning

Where possible try to start reduced tillage coming out of sod and use available genetic technology to assist with weed and pest control.

In no-till cropping systems weed and pest pressure can be reduced by rotating crops frequently and implementing cover crop strategies on your farm. If you want to use no-till in a continuous corn rotation you may need to consider looking for symbols like these on your bags of corn.

https://www.pioneer.com/home/site/us/products/corn-silage/seed-technology/

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UVM Extension's White 8100 Planter

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First week on Job

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Machine Preparation

Took off Coulters in front of Vee openers off along with fixed row cleaners

Installed Yetter Floating Row Cleaners

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More Changes

Installed Thompson Closing wheels

Removed the zone tiller

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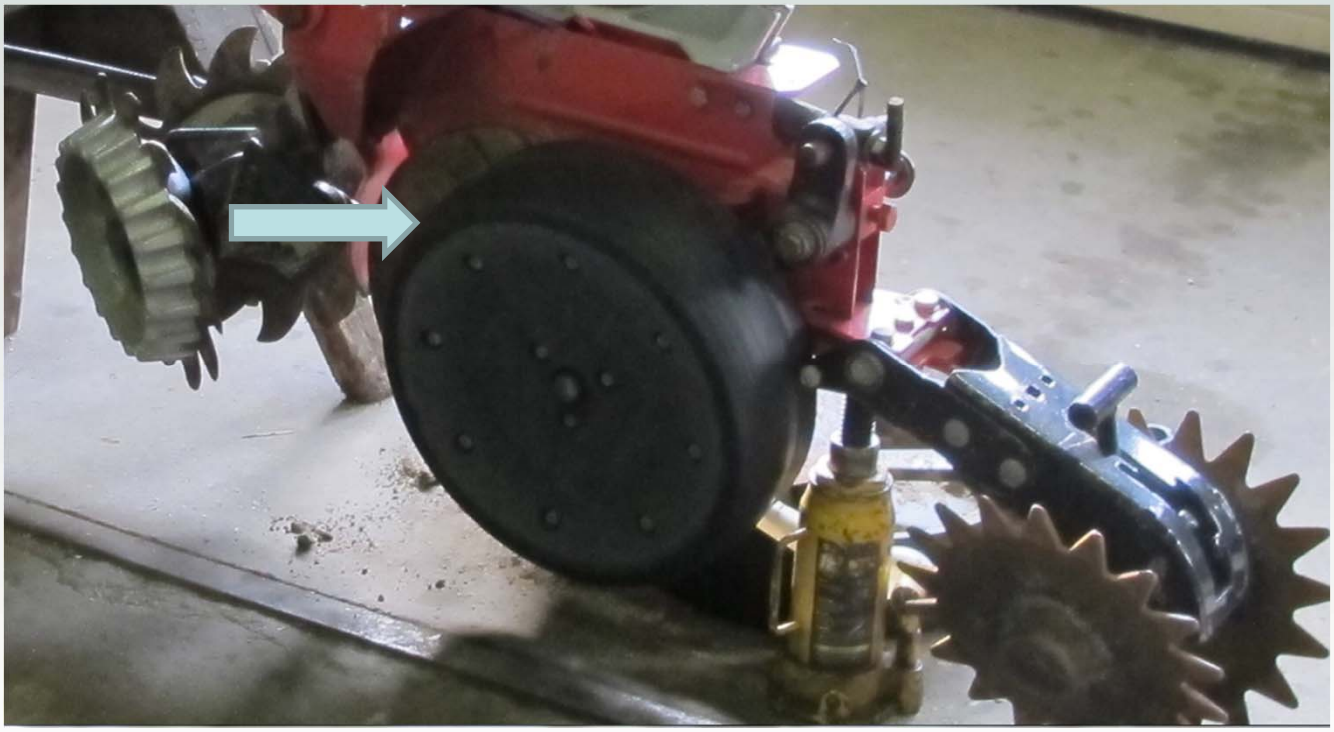
Machine Preparation

Gauge Wheels must be properly adjusted against the vee openers or dirt will get knocked into trench before seed is dropped



Machine Preparation

Installed Keeton Seed Firmers

Installed heavy duty 3.5mm disk openers

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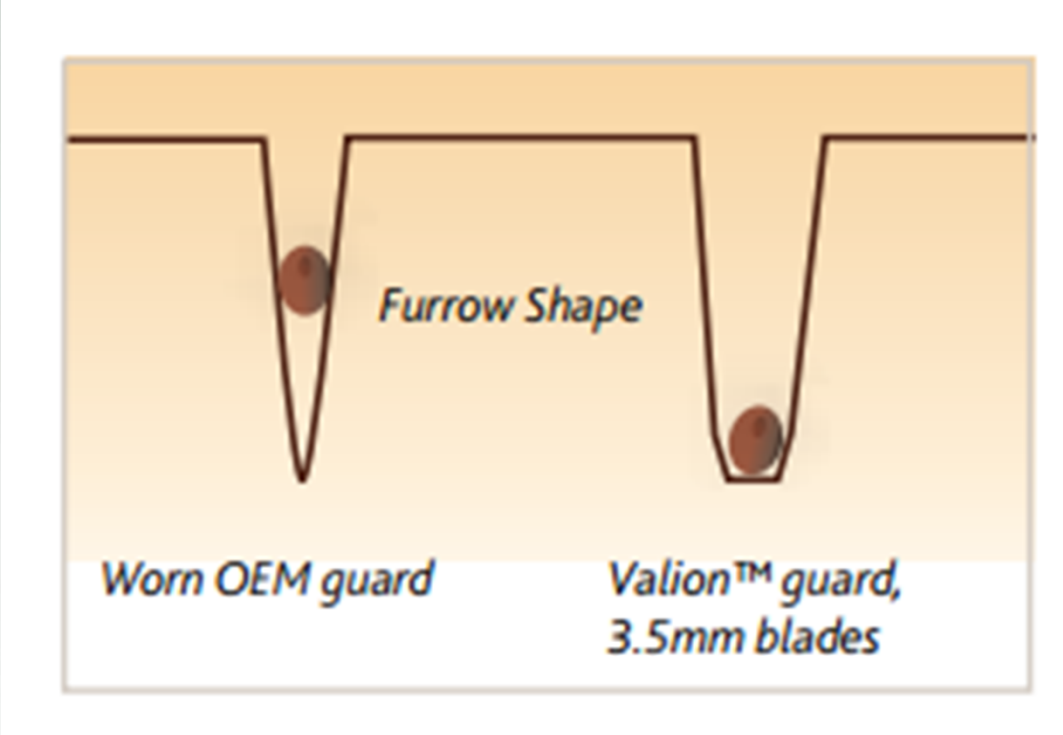
Seed placement is a Key to No-Till



http://exapta.com/exapta_2014catalog.pdf

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The Planter Now

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Machine Preparation

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Machine Preparation

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Practice = Experience = Better Results

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Equipment Considerations

Vertical Tillage

The machine does a very good job of
and anchoring residue with 7.25 disk spacing
Lots of adjustments to get desired results
Goal is to leave >30% residue (multch till), reduce plowpan,
Breakup compaction in the top 3 inches of soil.
Potential tool to help transition toward no-till

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Equipment Considerations

Manure Injection

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Equipment Considerations

Aerway

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Helicopter for applying cover crops

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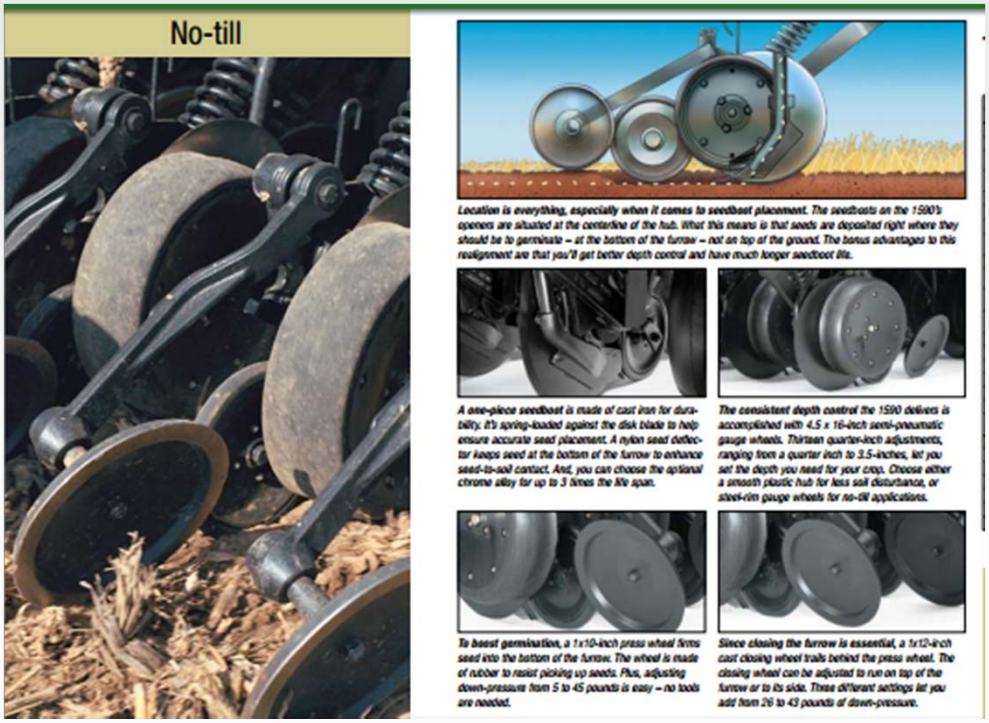
No-till Drills
Single Disk Opener



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https://www.deere.com/en_US/docs/non_current/dsaa39465_box_drills_lit.pdf

No-till Drills
Double Disk Opener

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Strip-Till
Blue-Jet Strip Tiller

http://www.blu-jet.com/striptillpicsflash.htm

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New Technologies

New Technologies

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Things to Keep in Mind

- Everything has it's place. No-Till is not for all soil types or farmer types.
- Do not plant no-till on your worst pastures and fields and expect great results. No-Till is more of a precision ag. technique requiring higher levels of management.
- Soil Conditions must be dry for best outcomes
- Do Not Mud In Seed!!! Just because no-till drills and planters will go when conventional options are gone doesn't mean you should sidewall compaction will not let the seed get a good start.
- Under good conditions no-till can compete with conventional tillage resulting in major time savings at a busy time of year for the farmer and significant environmental benefits for surface waters.
- Factors effecting yield in order of importance: 1) Weather, 2) Nitrogen, 3) Hybrid Selection, 4)Rotation, 5) Plant Population, 6) Tillage 7)Growth Regulators
- Reduced Tillage under Good Conditions can produce as good a yield if everything is done correctly and it will always help soil heath and reduce environmental impacts of tilling the soil.

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Wrapping Up

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Corn planted in 30 inch rows only uses about 14.5% of an acre's surface area.

It makes sense in certain situations to reduce tillage and reduce input costs and protect your top soil from the damage and erosion it will be prone to if you aggressively till it.

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