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United States Department of Agriculture

2021 Empire State Producers EXPO

New Hampshire

Natural Resources Conservation Service

No-till Sweet Corn and Pumpkins in NH

January 12th, 2021 | Chad Cochrane, Resource Conservationist, New Hampshire

Natural Resources Conservation Service

nrcs.usda.gov/

"As to methods there may be a million and then some, but **principles are few**. The man who grasps principles can **successfully select his own methods**.

The man who tries methods, ignoring principles, is sure to have trouble."

- *Harrington Emerson*

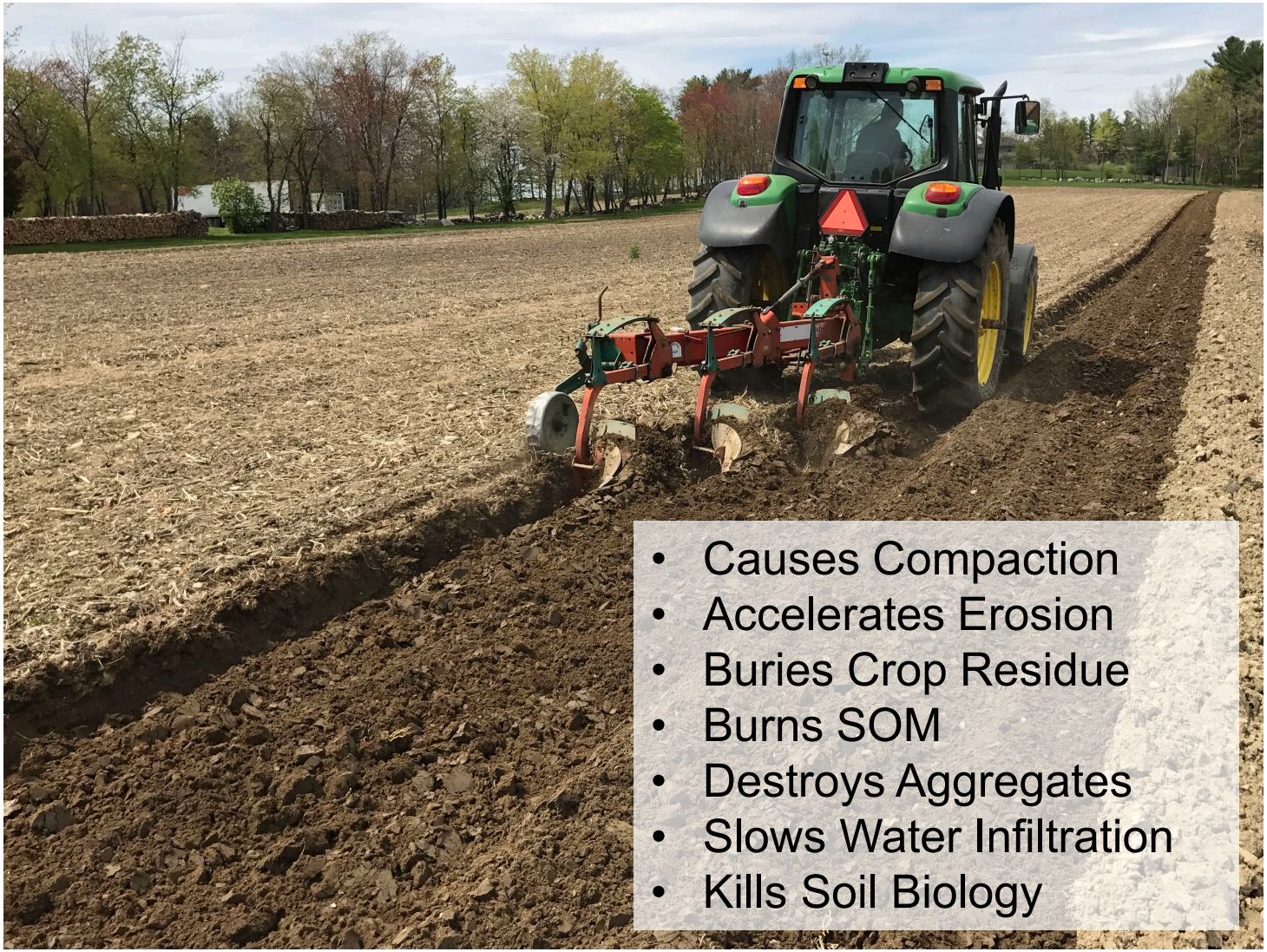
Why We Till

- **Mixes Soil >>** Incorporates manure & fertilizer
- **Warms soil >>** Exposes soil to sunlight
- **Dries soil >>** Exposes soil to sunlight
- **Prepares the seedbed >>** Makes planting easier
- **Releases nitrogen >>** Rapidly decomposes organic mater
- **Terminates cover crops & weeds**

- **We like to drive tractors!**
- **We like "clean" fields**
- **We've always done it**
- **We know it works**

Is it an efficient and sustainable way to farm?

Why We Shouldn't Till



- Causes Compaction
- Accelerates Erosion
- Buries Crop Residue
- Burns SOM
- Destroys Aggregates
- Slows Water Infiltration
- Kills Soil Biology

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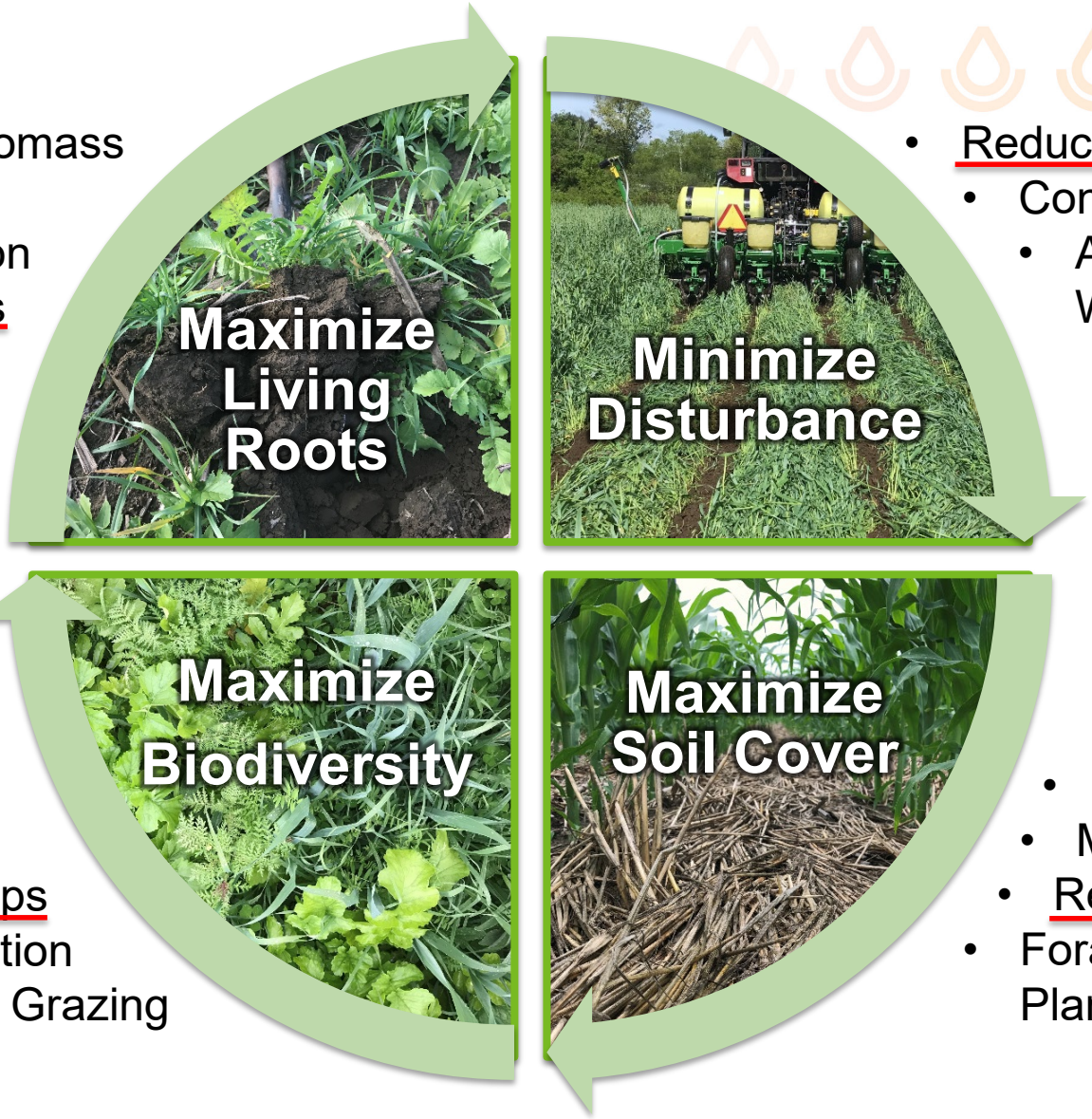
Soil Health Principals

- Forage & Biomass Planting
- Crop Rotation
- Cover Crops



- Reduced Tillage
- Controlled Traffic
- Avoid Tillage When Wet

- Livestock
- Cover Crops
- Crop Rotation
- Rotational Grazing

- Cover Crops
- Mulching
- Reduced Tillage
- Forage & Biomass Planting

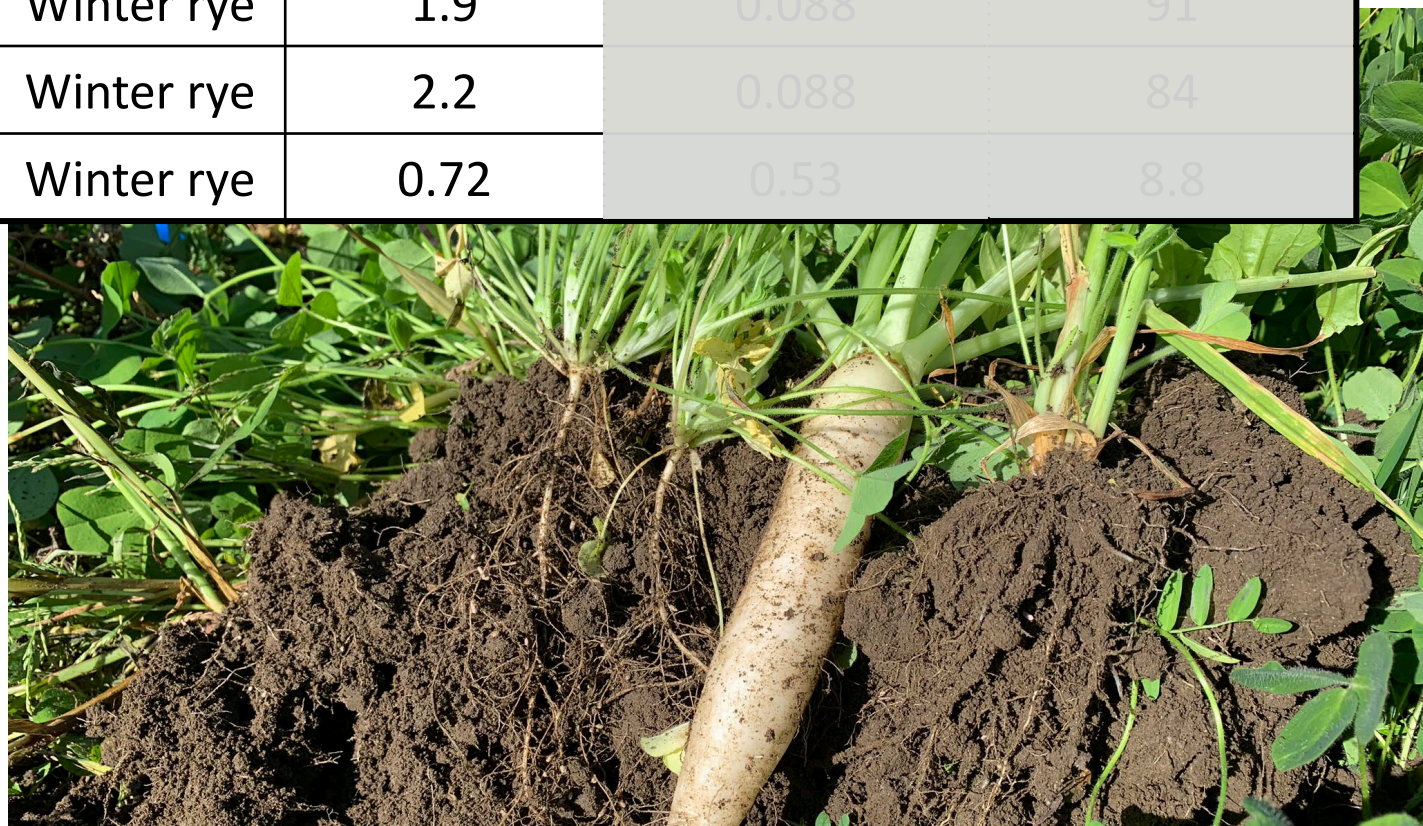
Why No-till?

Protect
Soil Habitat
& Organic
Matter

- Stable aggregates
- Manage erosion
- Buffer temperature
- Reduce evaporation
- Increase infiltration
- Maintain SOM

Why No-till?

Management Scenario		Soil Health Scores		
Primary Tillage	*Cover Crops*	*Soil Erosion (tons/ac./yr.)*	*Soil Conditioning Index (SCI)*	*Soil Tillage Intensity Rating (STIR)*
Moldboard plow	Winter rye	2.8	-0.061	110
Chisel plow	Winter rye	1.9	0.088	91
Disk	Winter rye	2.2	0.088	84
No-till	Winter rye	0.72	0.53	8.8



Why No-till?

Soil Health

- Long-term improvements to yield
- Yields more consistent year-to-year
- More resilient to bad weather
- Lower inputs

Time

- Single pass planting
- No field prep

Economic

- Less equipment to repair and maintain
- Reduced labor costs
- Saves fuel

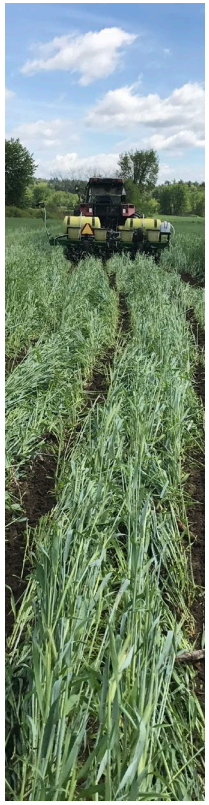
No-till Techniques

Tillage

- Prepare seedbed and terminate cover crop
- Cover crops can increase tillage!
- Kills cover crop early >> reduced growth/reduced benefit

Traditional No-till

- “Spray & Wait” technique
- Kills cover crop early >> reduced growth/reduced benefit



No-till Techniques

Timing Challenges

- Must wait for adequate soil temperature
- Use full-till and/or zone-till for earlier planting
- Early no-till vigor will be slow
- May need to overlap plantings for weekly harvest windows

No-till Techniques

6/20/2019

No-till Techniques

7/2/2019

No-till Techniques

7/12/2019

No-till Retrofits

Program

- Provide on-farm advice for converting corn planters to no-till
  - Jeff Sanders, UVM Extension & Private Consultant & Farmer
- Help choosing the right approach and equipment to purchase
- Get answers to questions about no-till

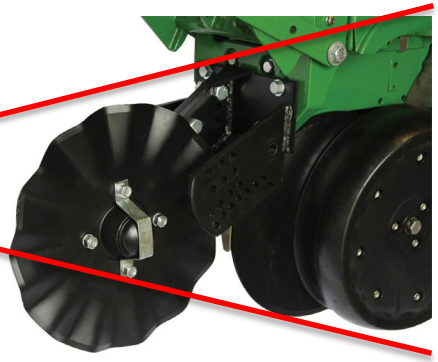
- Farmers purchase approved equipment and install
  - 75/25 Cost-share for equipment cost

- In-field advice on planter set-up and operation

No-till Retrofits

Row Cleaners

Coulters



Closing Wheels

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No-till Retrofits

Seed Firmers

Fertilizer Systems

Down Pressure Springs

Updated Closing Wheel Tailpiece

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No-till Planter Retrofit Program

No-till Planter Retrofit Program

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No-till Techniques

Tillage

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Traditional No-till

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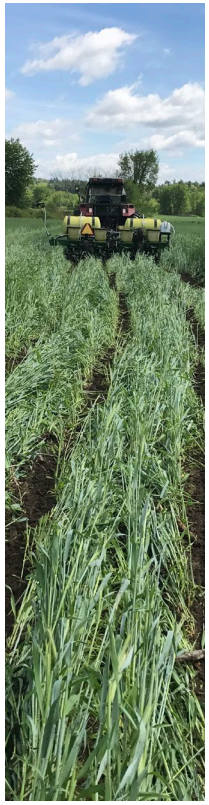
Planting Green

- Plant into “green” living cover crops
- Terminate the cover crop after planting with herbicide
- Maximize growth/maximize benefits



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Growing Degree Days

Year	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual
2007	1	0	0	37	254	488	588	583	369	167	0	0	2487
2008	0	0	0	87	179	516	659	531	363	50	32	0	2417
2009	0	0	0	80	216	426	546	637	303	38	3	0	2249
2010	0	0	0	80	344	467	732	615	391	65	0	0	2694
2011	0	0	0	56	325	390	425	566	421	101	15	0	2299
2012	0	0	64	69	346	476	700	683	370	141	4	0	2853
2013	0	0	0	57	324	520	768	596	291	129	11	0	2696
2014	0	0	0	46	240	519	663	516	372	152	6	0	2514
2015	0	0	0	26	398	306	641	667	514	63	30	6	2651
2016	0	0	23	53	317	522	712	711	441	133	6	0	2918
2017	0	0	0	132	236	514	623	569	481	238	15	0	2808
Mean	**0**	**0**	**8**	**66**	**289**	**468**	**642**	**607**	**392**	**116**	**11**	**1**	**2599**

Cover Crops

Corn Growth Zone
2398 GDD

Cover Crops

Hanover, NH

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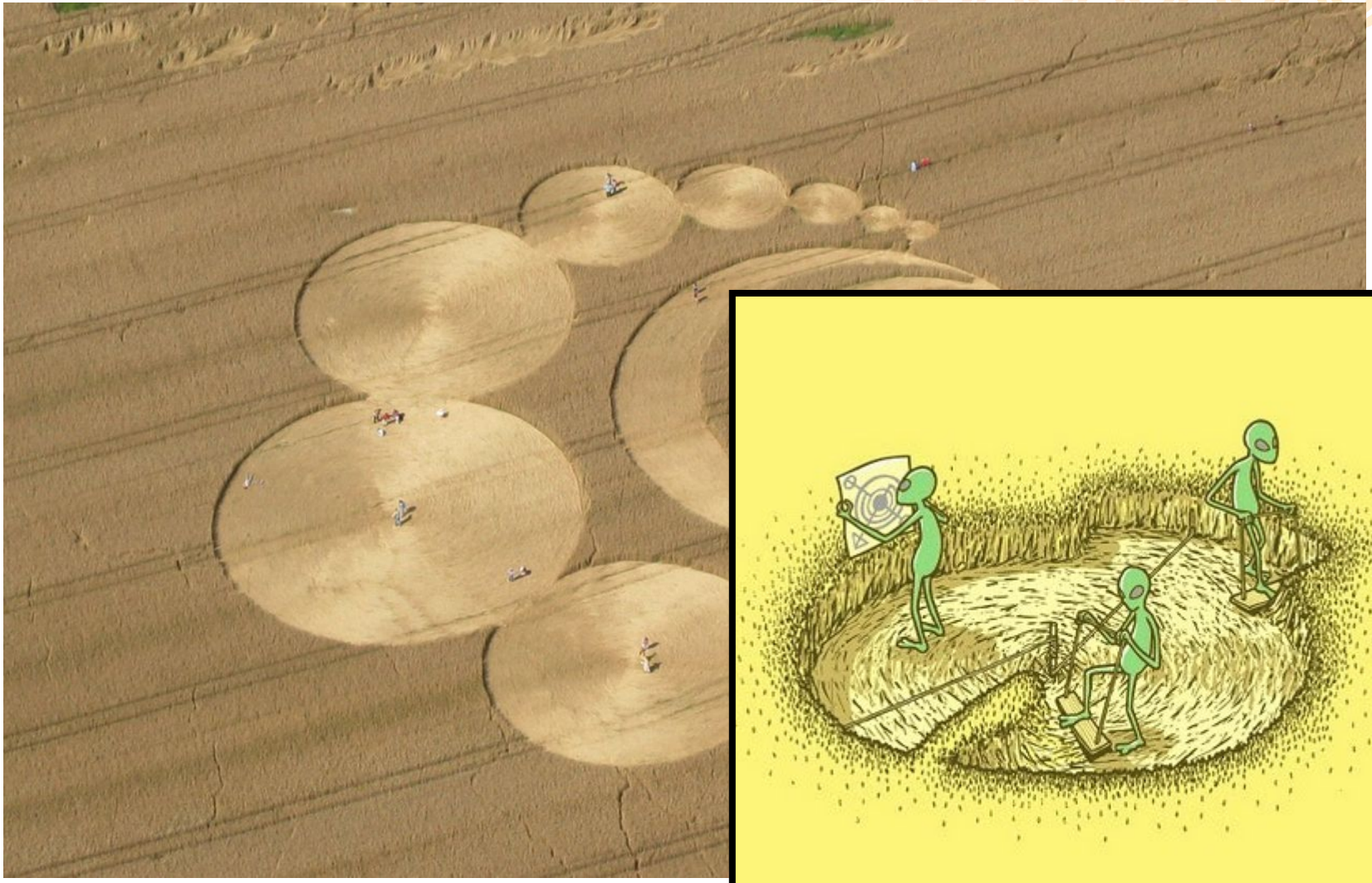
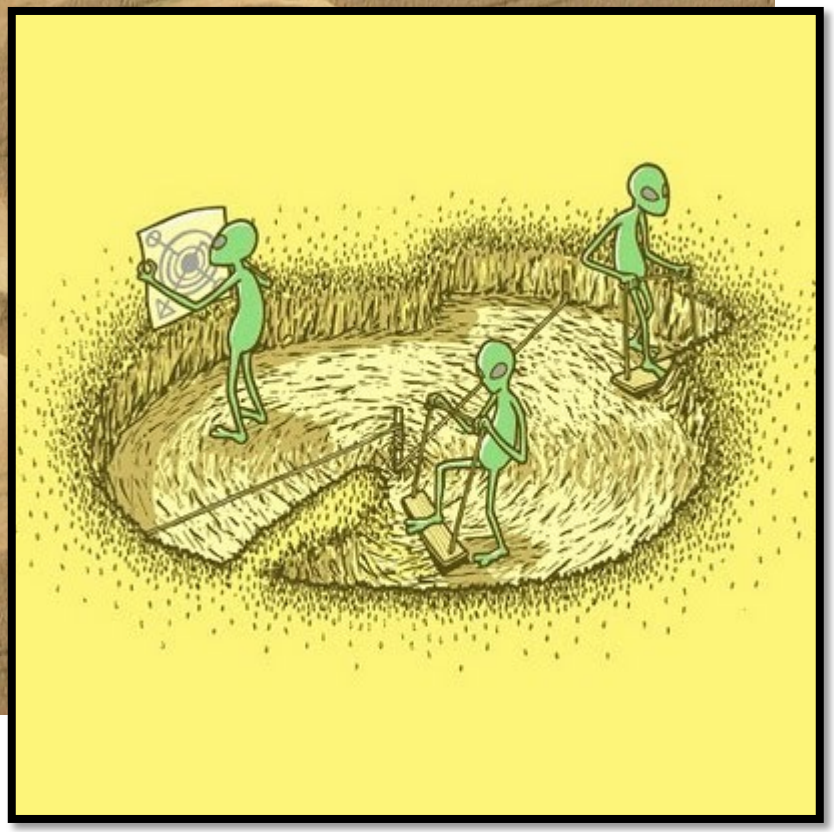
Cover Crop Rollers

Cover Crop Rollers





Source: wikipedia.org

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Cover Crop Rollers

Cover Crop Rollers

Timing Key

Too Early = Cover Crops Spring Back, Zombie Covers

Too Late = Cover Crops Seed Back

Cereal Grains

- Fully Headed
- Pollen Shed
- Dry Down

Legumes

- 75% Bloom

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Cover Crop Rollers

No-till Planters w/ Rollers

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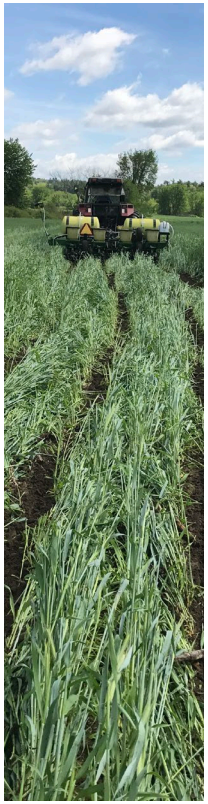

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Fall 2019

No-till Planters w/ Rollers

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No-till Planters w/ Rollers

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No-till Sweet Corn

No-till Pumpkins & Squash

Pumpkins & Squash

- Fewer herbicide options than sweet corn
- Hard to grow enough cover crop for full weed control
- May need to spray between rows with shields
- Beautiful, clean fruit on a bed of mulch

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No-till Pumpkins & Squash

Weed Suppression

- Cover crop mulch mat suppresses weed growth
- Must have adequate biomass (3 T/ac)
- Adding a legume will reduce N depression

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