

# *Harold Perry*

## *Soil Health Journey*



# Perry Family Farm





# Perry Family Farm - 2021



Farm Land:

- 5000 acres (sandy to loamy soils)
- Own 34 irrigated quarters
- Rotate through 48 quarters



Potatoes



Grain

Process peas



HyTech Production Ltd.

Seed canola

Grain and corn silage



# Nuffield Scholarship 2006

- Healthier soils for healthier crops for a healthier population
- 6 weeks Global Focus Tour... 8 aussies, 2 kiwis, and a wedding
- 3 months travel independent study



# *What do I want to accomplish on my journey*



Sustainable



I must be sustainable...  
I'm still farming

Resilience



Regenerative  
agriculture



# Regenerative Agriculture Influencers

- Gerald Wiebe
- Brendon Rockey
- Gabe Brown
- Dwayne Beck





# Brendon Rockey “Pivots don’t get stuck anymore”





“Soil is so healthy, I don’t need pivots anymore”

Dwayne  
Beck





# Soil life



**More organisms in a tablespoon of healthy soil than people on earth**







***Photosynthesis***

***Plant shares  
sun's energy  
with soil biology  
(exudates)***

***Soil biology brings  
nutrients to plant in  
exchange for sun's  
energy (synergy)***

***Soil biology builds  
habitat for itself  
(organic matter and  
humus = soil health,  
rhizosheaths*** 11



# *Nutrient cycling*

*Self regulating through  
synergistic relationships  
with soil biology*



**Root Exudates** are the communication system between the plant and the soil.

Source: Phill Lee

**Image:** Root exudates (bubbles) releasing carbon into the soil to feed soil biology (mycorrhizal fungi)

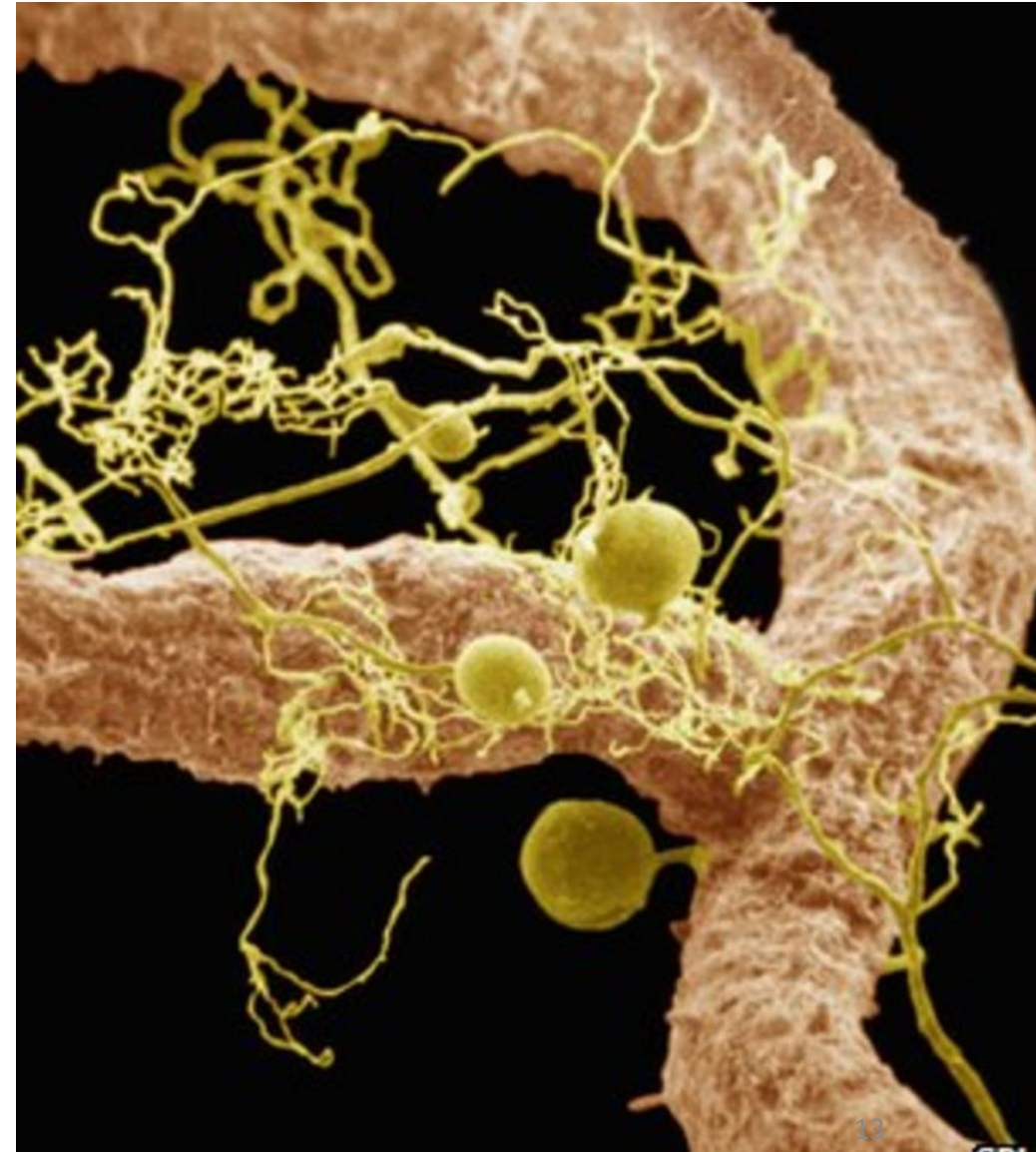


# Fungal-Plant Networks with Mycorrhizae



**Image:** Fungal hyphae network that acts as an extended root system for the plant.

<https://www.coversandco.ca/mycorrhizal-fungi>





# Why diversity?





# Soil life... soil resilience, pest reduction

**Competition for space**

**...in the soil**

**...in the air**

**...on the plant above and  
below ground**





# Soil life





# Biology reduces sprays

## Parasitic insects, encouraged by flowering cover crops



# Practices that reduce or kill soil biology

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Nitrogen and phosphorous fertilizer  
indirectly reduce soil biology

Pesticides

Tillage

Compaction

Damn right... I know!



# Soil erosion





# Living roots hold and feed the soil





# From conventional fall tillage to direct ridging





# Fall Ridging



Seed soil contact before Schmeiser packer





# Evolution of fall ridging



w/o Schmeiser Packer



with Schmeiser Packer



# Better soil structure single pass fall ridge

One Pass



Two passes





# Cover crops Dec 21, 2019, smell clover + grass





# Powerhill to terminate cover crop before planting





# Adjusting planters





# Organic amendments, Compost





# Compost effects



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The Science of Higher Yields

Perry Produce Ltd.  
Box 210  
Coaldale, AB T1M 1M3

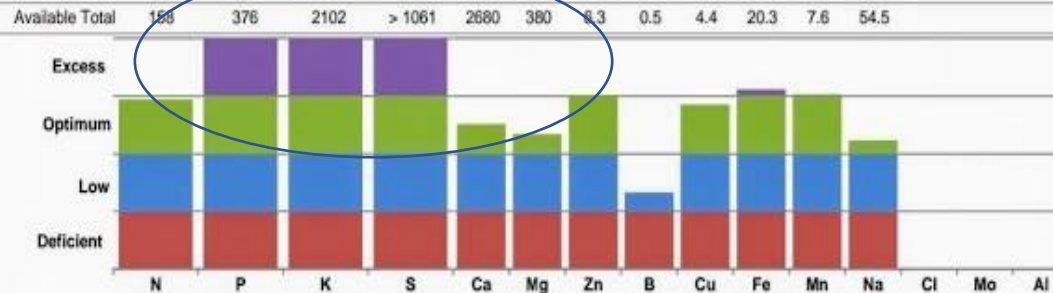
Report #: 80314  
Report Date: 12/5/2019  
Received: 12/3/2019  
Completed: 12/5/2019  
Test Package: SF14

Project:  
Grower: Perry Produce  
Farm:  
Field: SE 12-10-19  
H<sub>2</sub>O Mgmt: Irrigated

3510 6th Ave North  
Lethbridge, AB T1H 5C3  
403-328-1133  
www.downtoearthlabs.com  
info@downtoearthlabs.com

## Soil Nutrients

		Macros			Secondary			Micros								
Lab ID	Depth	NO3-N lbs/ac	P lbs/ac	K lbs/ac	SO4-S lbs/ac	Ca ppm	Mg ppm	Zn ppm	B ppm	Cu ppm	Fe ppm	Mn ppm	Na ppm	Cl ppm	Mo ppm	Al ppm
191203J001	0-12	84	376	2102	261	2680	380	6.3	0.5	4.4	20.3	7.6	54.5			
191203J002	12-24	74			> 800											



## Soil Characteristics

Lab ID	Depth	OM	Estimated N Release	pH	Sol Salts	Lime Req.	% Base Saturation					ECEC	K/Mg Ratio
		%	lbs/ac	1:1	1:1 dS/m	tonne/ha	Ca	K	Mg	Na	H	Total	-
191203J001	0-12	2.7	30	7.8	0.5	0	74	7.4	17.3	1.3	0	100	18.1
191203J002	12-24			7.7	1								0.43

## Soil Texture Characteristics

Lab ID	Customer	Texture	Sand	Silt	Clay	CEC
			%	%	%	meq/100g
191203J001		Clay Loam	39.1	33.9	27	

Compost 1 every 4  
years for 30 years



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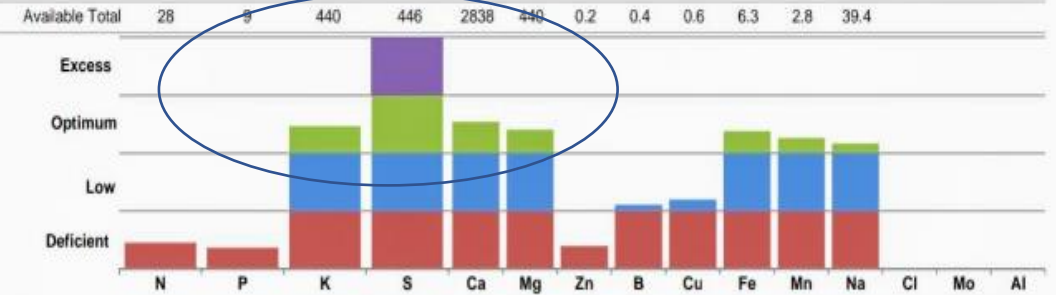
Report #: 79882  
Report Date: 11/28/2019  
Received: 11/25/2019  
Completed: 11/28/2019  
Test Package: SF14

Project:  
Grower: Perry Produce  
Farm:  
Field: SE 22-10-19 R/O  
H<sub>2</sub>O Mgmt: Irrigated

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## Soil Nutrients

Lab ID	Depth	Macros			Secondary			Micros								
		NO3-N lbs/ac	P lbs/ac	K lbs/ac	SO4-S lbs/ac	Ca ppm	Mg ppm	Zn ppm	B ppm	Cu ppm	Fe ppm	Mn ppm	Na ppm	Cl ppm	Mo ppm	Al ppm
191125Q016	0-12	18	9	440	78	2838	440	0.2	0.4	0.6	6.3	2.8	39.4			
191125Q017	12-24	10			368											



## Soil Characteristics

Lab ID	Depth	OM	Estimated N Release	pH	Sol Salts	Lime Req.	% Base Saturation					ECEC	K/Mg Ratio
		%	lbs/ac	1:1	1:1 dS/m	tonne/ha	Ca	K	Mg	Na	H	Total	-
191125Q016	0-12	1.7	19	8.1	0.3	0	77.7	1.5	19.9	0.9	0	100	18.2
191125Q017	12-24			8	0.6								0.08

## Soil Texture Characteristics

Lab ID	Customer	Texture	Sand	Silt	Clay	CEC
			%	%	%	meq/100g
191125Q016		Clay Loam	40.2	31.9	27.8	

No compost



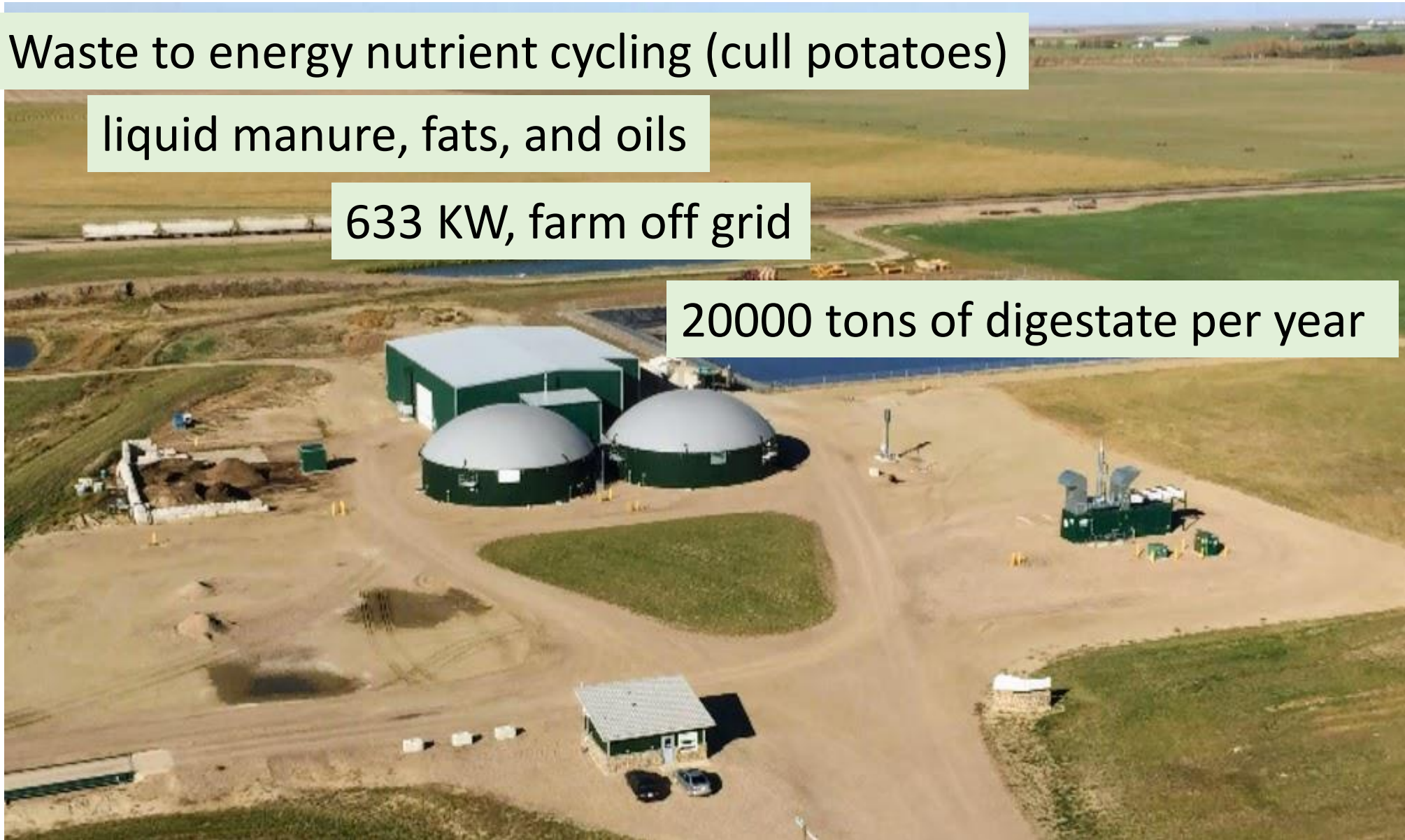
# Anaerobic digester

Waste to energy nutrient cycling (cull potatoes)

liquid manure, fats, and oils

633 KW, farm off grid

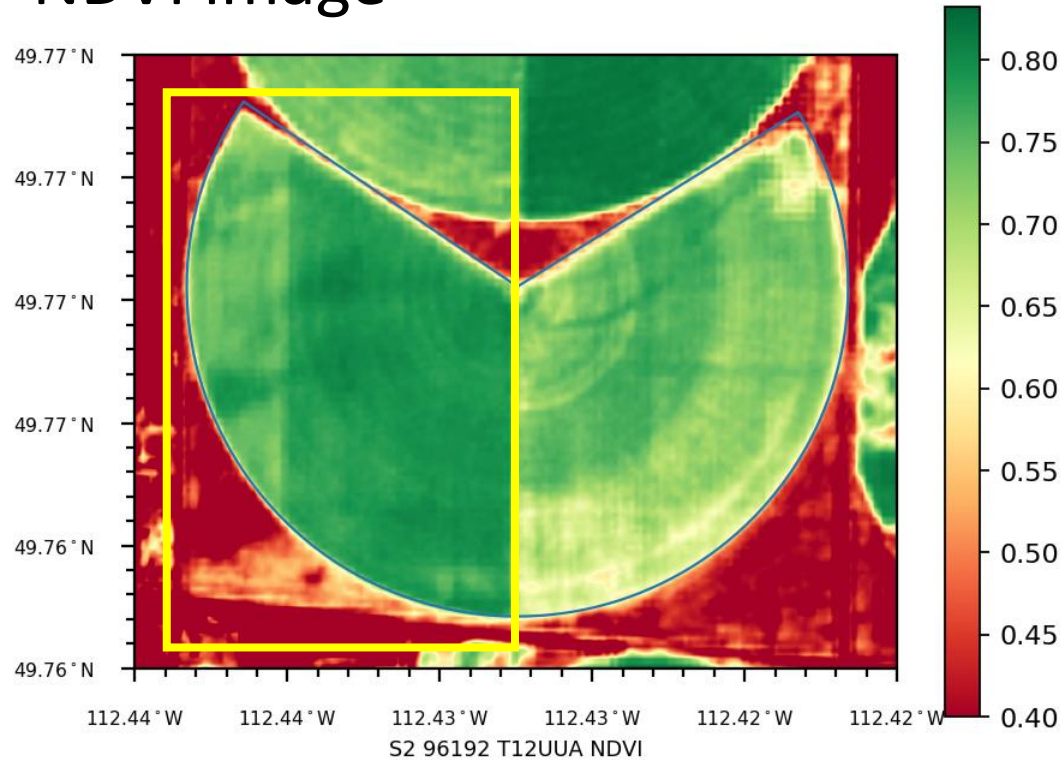
20000 tons of digestate per year





# Liquid digestate land applied

## NDVI image



Noticeable difference in test strip





# How we use fertilizers

## Dry spread

- ESN + AMS
- KCl + K<sub>2</sub>SO<sub>4</sub>
- Variable rate available

## At planting (liquid)

- Phosphours 10-34-0
- Boron
- Humic acid
- Biologicals “multiple species”
- Fish
- Kelp

## In season (fertigation)

- UAN 28-0-0
- ATS 15-0-0-20
- 3-10-10
- Humic acid

## Making decision

- Soil sampling (yearly)
- Weekly petiole and soil analysis
- Veris maps for variable rate applications



# Green manure - 1 field / year... Needs fertilizer





# Grazing mix species selected to reduce early die





# Mob grazing with cattle



Species	Green Manure		
	4-Jun		
	target rate (lb/ac)	Cost \$/ac	#seeds/sq ft
Oats	7.3	\$ 0.6	2.0
Sorghum Sudangrass	22.8	\$ 42.2	9.4
Canadian Forage Pearl Millet	3.1	\$ 15.4	4.9
Clover, Sweet YB	0.8	\$ 1.9	3.2
Clover, Crimson	1.5	\$ 3.5	4.1
Soybean	14.8	\$ 10.1	1.1
Flax	3.1	\$ 1.6	5.1
Collards, Forage	0.8	\$ 3.4	3.1
Oilseed radish	1.7	\$ 5.9	1.0
Kale	0.8	\$ 3.5	3.1
	Total rate (lb/ac)	Total cost (\$/ac)	Total #seeds/sq ft
	78.0	\$ 90.4	45.7



# Tram lines to reduce compaction





# All equipment folds up for transport





# Targeting Soil Compaction with Controlled Traffic





# Duals compared to middle row infiltration





# *Biodiversity in dryland inoculum for crop*





# Soil Health, Observations

- **Reduced synthetic inputs**
  - Seed treatments
  - Fungicides
  - Nitrogen (VRA)
- **Yield and quality stability**
- **Less dirt lumps at harvest**
- **Improved water infiltration**
- **Feed your cover crop**



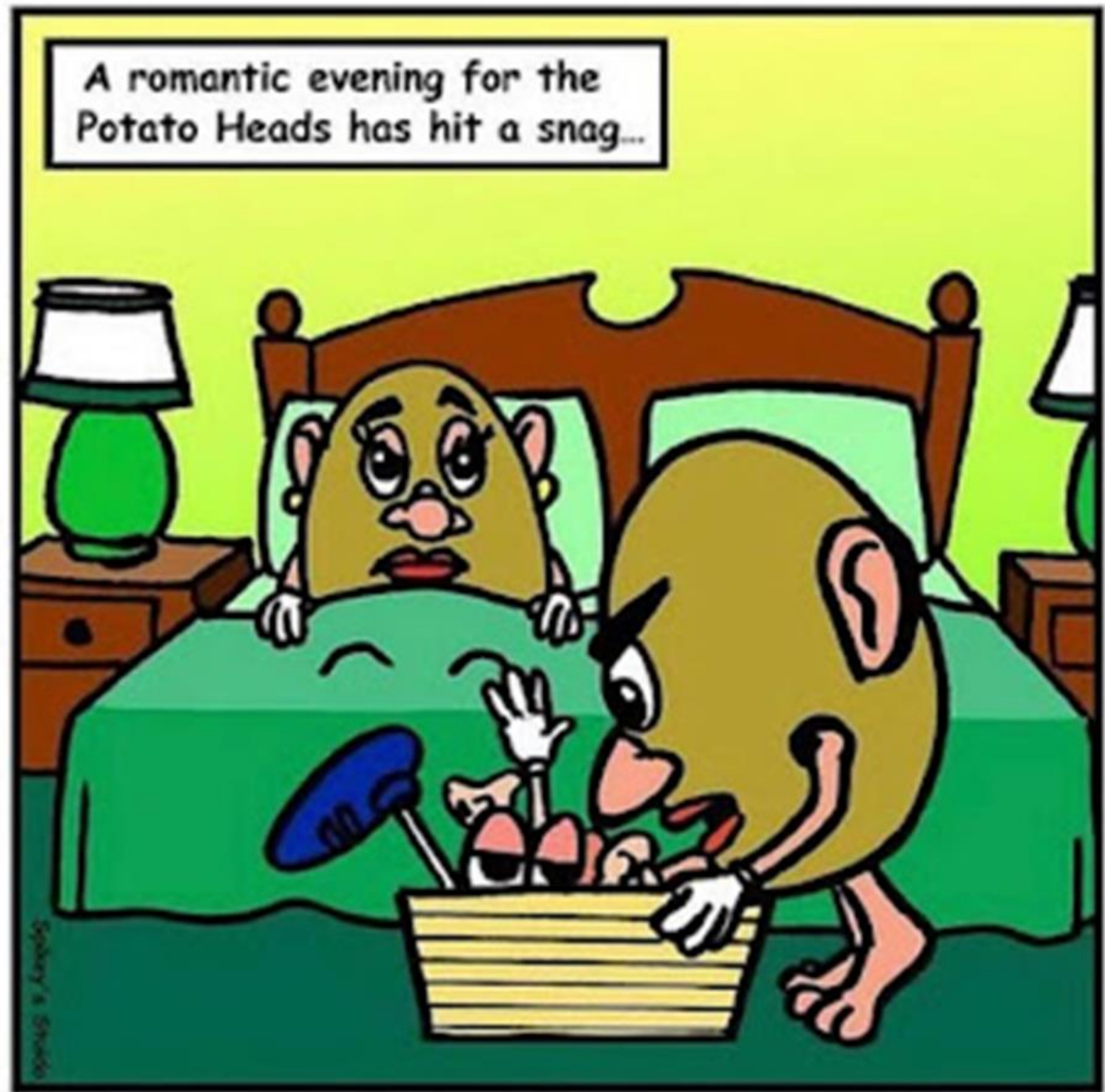
# Soil Health, Path forward

- Reduce tillage
- Selection of Cover Crop species (and varieties) to tackle soilborne pathogens
- Alternatives for herbicides
- Increase fungal populations
- Benchmarking Soil Health
- Make most efficient use of short growing season





Thank  
you



"It has to be in here somewhere!"