Regenerative Agriculture

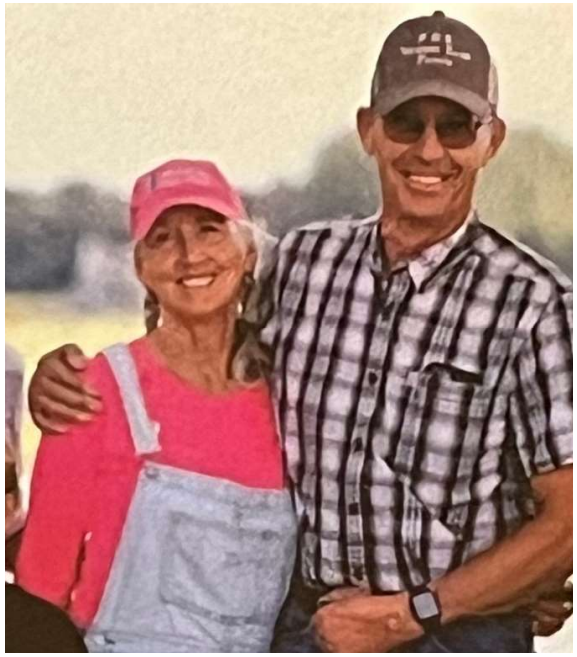
Presented by
Kate Vander Zaag

Date:
January 2025

About Me:

Kate Vander Zaag

-BSc. from the University of Guelph in Crop Science
-35 years of cash-crop farming in Alliston, Ontario with my husband and our children
-Our main crop is potatoes



About You:

Few questions to get a sense of who is in the crowd. By a show of hands...

Sustainability

Known Practices

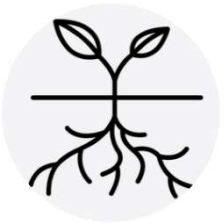
1. Human and workplace rights
2. Environment and ecosystems
3. Animal welfare and health
4. Farm management systems (4 R's)

5 Principles of Soil Health

1. Soil Armour

2. Diversity

3. Continual Live Plant / Root



4. Livestock Integration

5. Minimizing Soil Disturbance

Regenerative Agriculture

Principle 1: Soil Armour

Principle 2: Diversity

Principle 3: Continual Live Root

Principle 4: Livestock Integration

Principle 5: Limit Soil Disturbance

Principle 6: Reduced Inorganic Inputs

Principle 7: Reduced Pesticide Use

Part 2:

Our Journey

Educators

Julian Suurd	A crop consultant: who made a big impact on us and the farm business told us about the ACREs conference
Dr. Christine Jones	At the ACREs conference the following year, I was introduced to a course with Dr. Christine Jones from Australia
John Kempf	Is the founder of “Advancing Eco Agriculture” (AEA)

"Photosynthetic rate as high as possible. Photosynthetic period as long as possible"

Harvesting winter wheat, underseeded with red clover

Our first multi-species cover crop

Successful cover crop, son Jacob for scale

Mowing our huge bio-mass multi-species

After mowing, sorghum emergence

Sorghum growth

Chopping sorghum

Seeding cover crop into wheat stubble

Clover

Part 3:

Cover Crops

Benefits of Cover crops

- Mobilization of phosphorus
- Flowers to attract predators
- Deep tillage
- Soil armour
- Home for animals
- Nitrogen scavenger
- Nitrogen fixers
- Nematode suppression
- Weed suppression
- Reduction of fertilizer use
- Water holding capacity
- Water infiltration
- Temperature moderation

Cover Crop Species

Cool Season Broad-Leaf

- chuckling vetch
- desi chick pea
- nitro radish
- broadleaf mustard
- impact forage collards
- purple top turnips
- peas
- lentils

Cool Season Grasses

- oats
- flax

Warm Season Broad-Leaf

- buckwheat
- sunflower

Warm Season Grasses

- pearl millet
- brown top millet
- BMR grazing corn

What they do

Buckwheat	Mobilization of phosphorus Flowers for attracting predators
Radish, Turnip	Deep tillage Nitrogen scavenger Weed suppression
Lentils, Peas	Nitrogen fixers
Millet	Nematode suppression Subsoil conditioner

Early cover crop growth

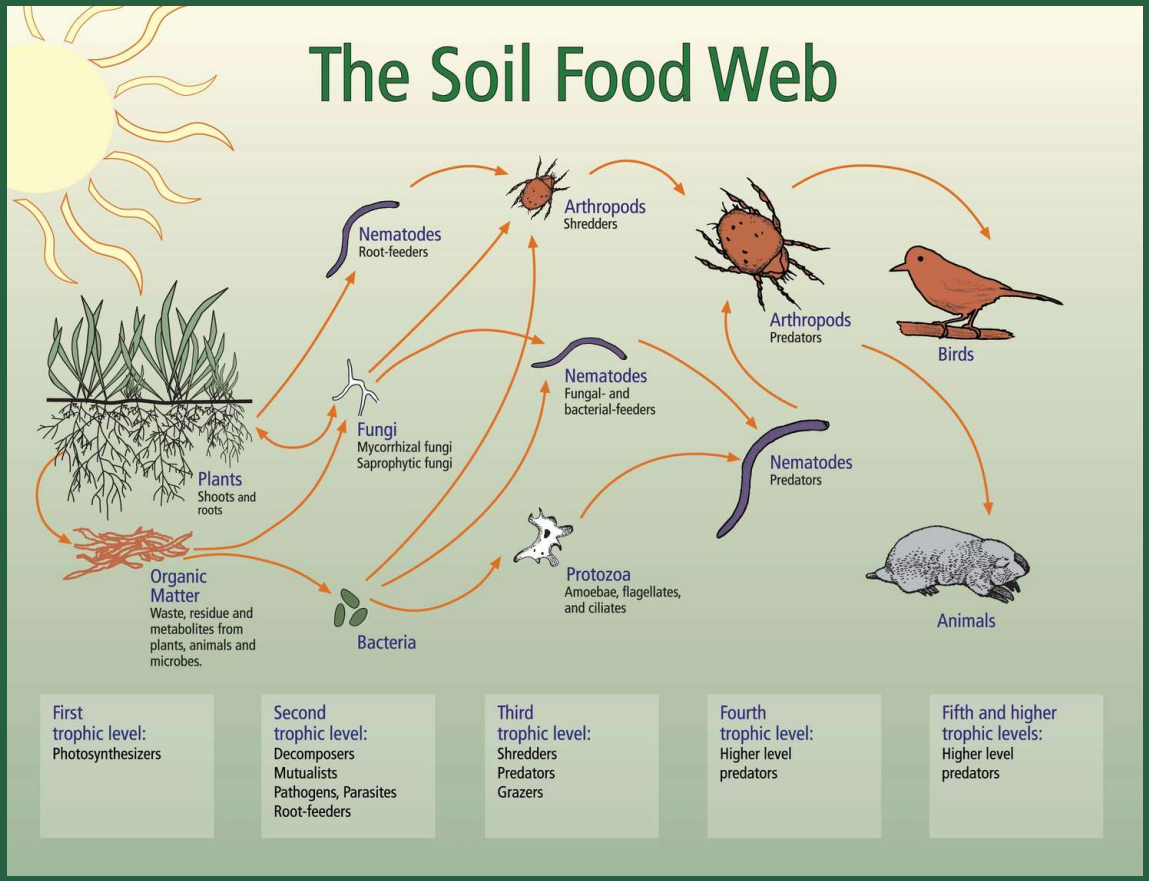
Fall multi species cover crop

Our CC blends

'Nitro Seasonal Cocktail'	'Nitro Winter Cocktail'
33% Oats	35% Oats
4% Nitro radish	2% Nitro radish
2% Turnips	2% Turnips
2% Pearl Millet	2% Pearl Millet
2% Sorghum Sudangrass	2% Sorghum Sudangrass
1% Phacelia	1% Phacelia
2% Sunflowers	2% Sunflowers
2% Sun Hemp	2% Vivant Hybrid Brassica
5% Faba Beans	2% Sun Hemp
7% TNT Brand Hairy Vetch	5% Faba Beans
13% Crimson Clover	12% TNT Brand Hairy Vetch
2% Berseem Clover	13% Crimson Clover
15% Austrian Winter Peas	2% Berseem Clover
10% Forage Peas	18% Austrian Winter Peas

Part 4:

Soil Microbiology



Soil Food Web Diagram from the USDA

What does diversified soil biology do?

- Tillage- encouraging the earthworm population
- Food for Plants- bodies, waste, symbiotic relationship
- Manage micronutrients
- Increased water holding capacity
- Build stable soil aggregates
- Holds soil in place
- Nematicide
- Carbon cycling
- Nitrogen cycling
- Moderate soil temperature
- Manage disease pathogens

Part 5:

Combining the Two

Our Goals:

- Keep learning, trying, sharing
- Multi species cover crop
- Biological Diversity
- Cover is priority
- A winter cover and as crop (wheat, barley, rye, canola)
- Summer cover - interseed our wheat
- To improve species diversity in other crops
- Living roots all year long.
- Increase photosynthetic rate and period

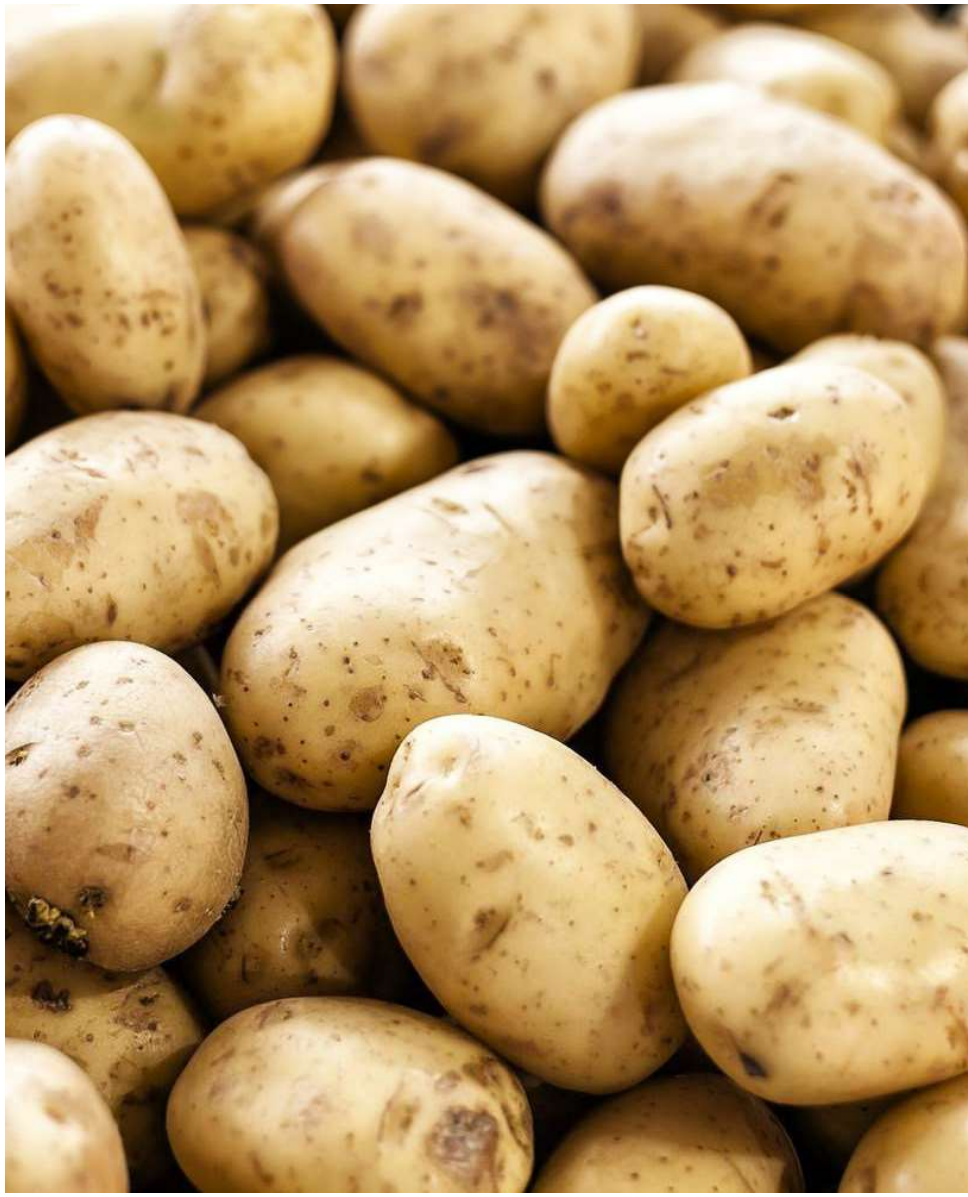
Our Philosophy:

Everything we do is to increase and help the microbiology of the soil where possible.

We aim to be Biological farmers.

We aim to be Pro-biotic as opposed to A-biotic.

We are aiming for a mix of new / old types of farming using new technologies.



The Future:

We want to challenge you and ourselves

- To observe all the details and figure out what is happening
- Trust In Nature/God
- Do not be afraid- just do it!! There are no mistakes on our farm only unplanned experiments
- Learn / exchange knowledge

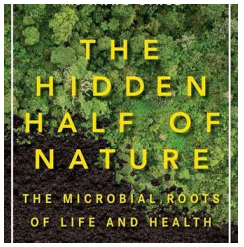
Thank you

Additional Resources

SUSAN AIMSWORTH

Crop Consultant

General Manager, Keystone Potato Producers Assoc.



THE HIDDEN HALF OF NATURE

Microbial roots of life and Health

GABE BROWN

Author

Dirt to Soil

JULIAN SUURD

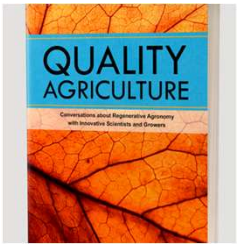
Crop Consultant

Farming pioneer and innovator

DR. CHRISTINE JONES

Researcher

Australian ground cover soil ecologist



JOHN KEMPF

Educator / Author

Founder of Advancing Eco Agriculture 'AEA'

DR. ELAINE INGHAM

American Microbiologist

Soil biology researcher and founder of Soil Foodweb Inc.

BRENDON ROCKEY

Rockey Farms

Third generation farmer in Center, Colorado

HAROLD PERRY

President of Perry Quest Ltd.

Fourth generation potato farm, in southern Alberta

Daughter Jessica (5'11 for scale) with 2024 catch of vetch

This particular field was left in cover for 18 months; multi-species blend was seeded in fall 2023, mowed in spring 2024, seeded in sorghum, and will be going into potatoes in spring of 2025

Sorghum Crop summer 2024

Root ball exposed after mowing and discing; note the nodules on hairy vetch (spring 2024)
Root balls and associated “garbage” are tricky to plant potatoes into. We have made adjustment to our planting equipment to accommodate, and have to let go of the desire for visually smooth hills

Underwear Experiment

A pair of standard cotton underwear was planted in with two of our multi-species cover crops at seeding

While both demonstrated significant breakdown, the pair in the field with a higher number of species showed more decay

buckwheat