



32nd Annual Cambridge Potato Conference, 2021

Robinson College, Cambridge 14 & 15 December



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UNIVERSITY OF
CAMBRIDGE

Richard Harding

Groundswell Agronomy



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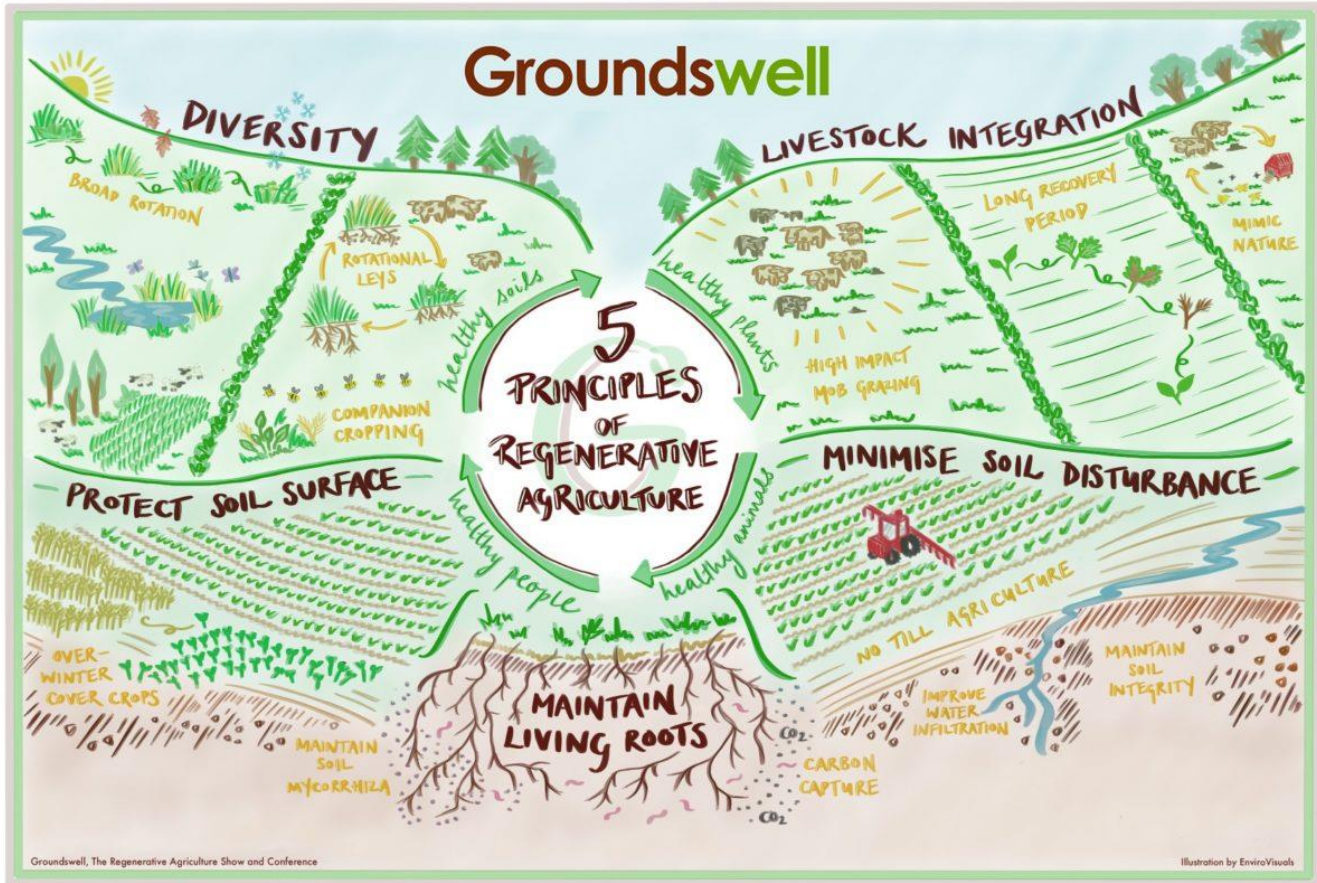


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Forget titles - focus on challenging convention?

Use the principles to inspire change and an alternative ways of thinking



What if....



Agronomic aims

- Return on investment
- Resilience
- Reliability
- Repeatability



Groundswell/ Land Family Business Benchmarking

Conventional v regenerative agriculture		
	Conventional	Regenerative
Variable costs	£434/ha	£357/ha
Machinery capital	£794/ha	£546/ha

“His results show that the Groundswell group achieved an average machinery capital per tonne of £74, while the same indicator in a conventional system was £91.”

[Ref; Regenerative farming data show variable costs cut by 18% - Farmers Weekly \(fwi.co.uk\)](#)

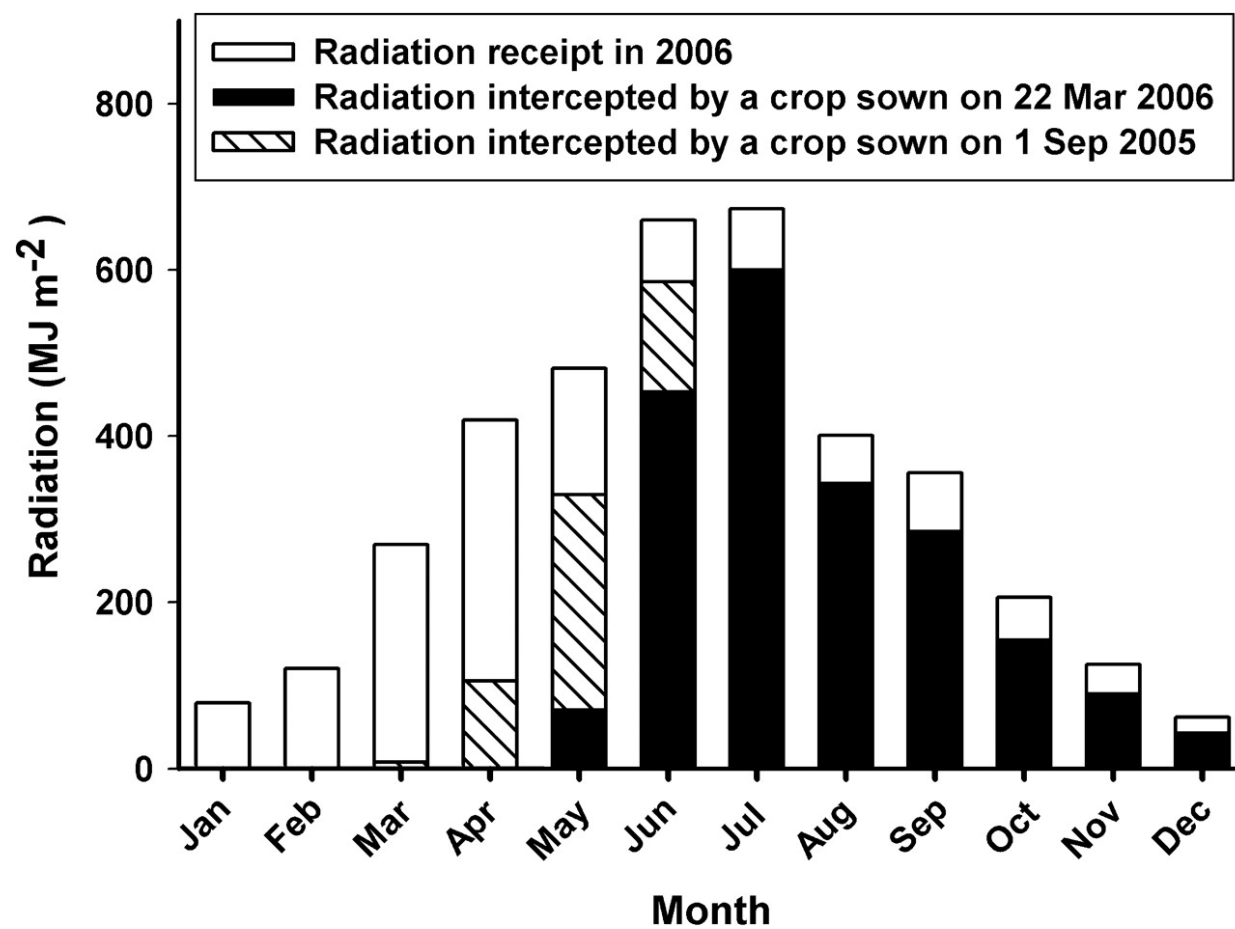
The reality of a Regenerative system

- Average output per hectare is 21% lower
- Variable costs are 18% lower
- Gross margin is 24% lower
- Labour and machinery costs are 32% lower
- Net margin very similar

***Risk is higher (attitude to risk)**



The monthly radiation receipt and the radiation intercepted in 2006 by simulated sugar beet canopies of crops sown in a sandy loam soil at Broom's Barn on 1 September 2005 (autumn-sown beet) and on 22 March 2006 (spring-sown beet).



More than a conscious decision, organic was an “instinct”.

Ref; La Vialla, Italy 2021



[Fattoria La Vialla](#)

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What is the most sustainable carbohydrate source...?



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Ref; Wakelyns Autumn 2021

Or...

“Is inefficiency more efficient than efficient?”

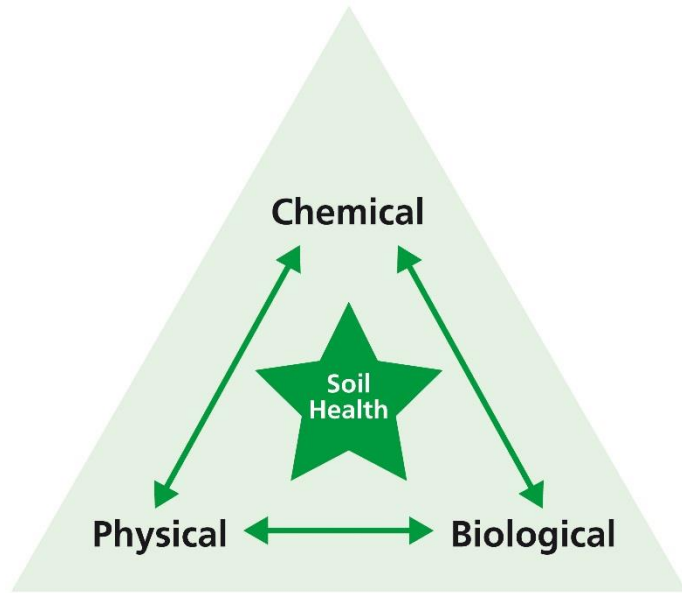
I think it is....



Victoria Sweet – Gods Hotel (Riverhead Books)



Healthy Soil



- A healthy soil should encompass
 - Presence of diverse soil ecosystem
 - High levels of biological activity
 - Stabilised soil pH
 - Increase and retain nutrients
 - Good soil structure and workability
 - Retain moisture

Rainfall simulator



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Simulated 25mm rain



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Simulated 25mm rainfall



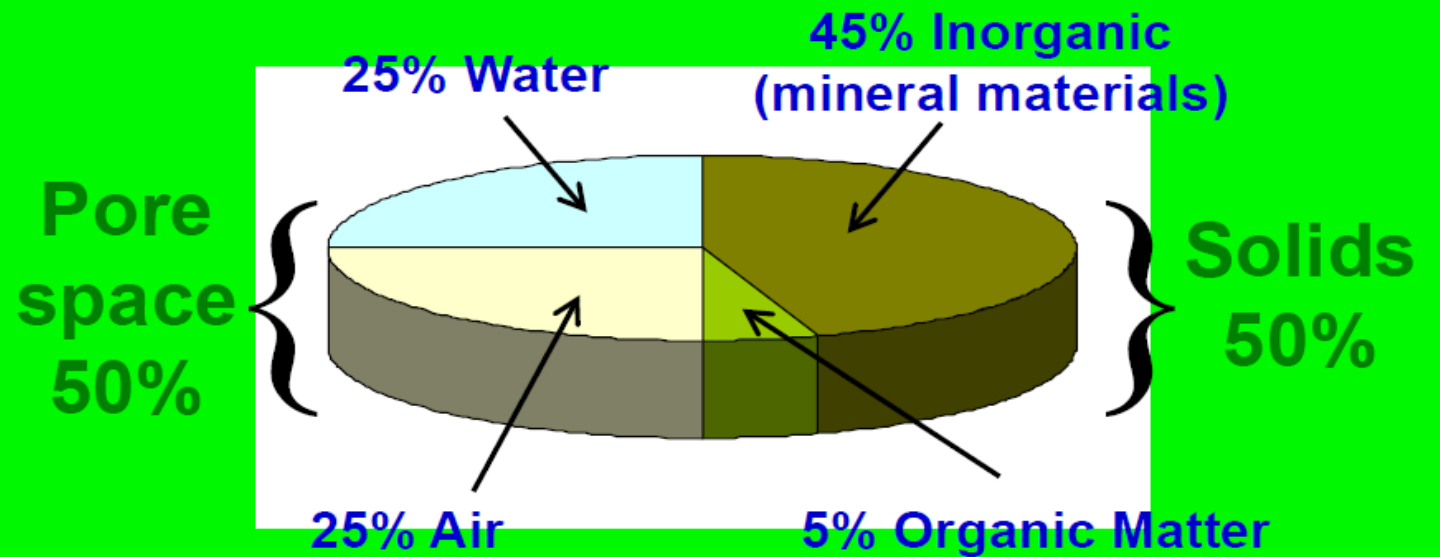
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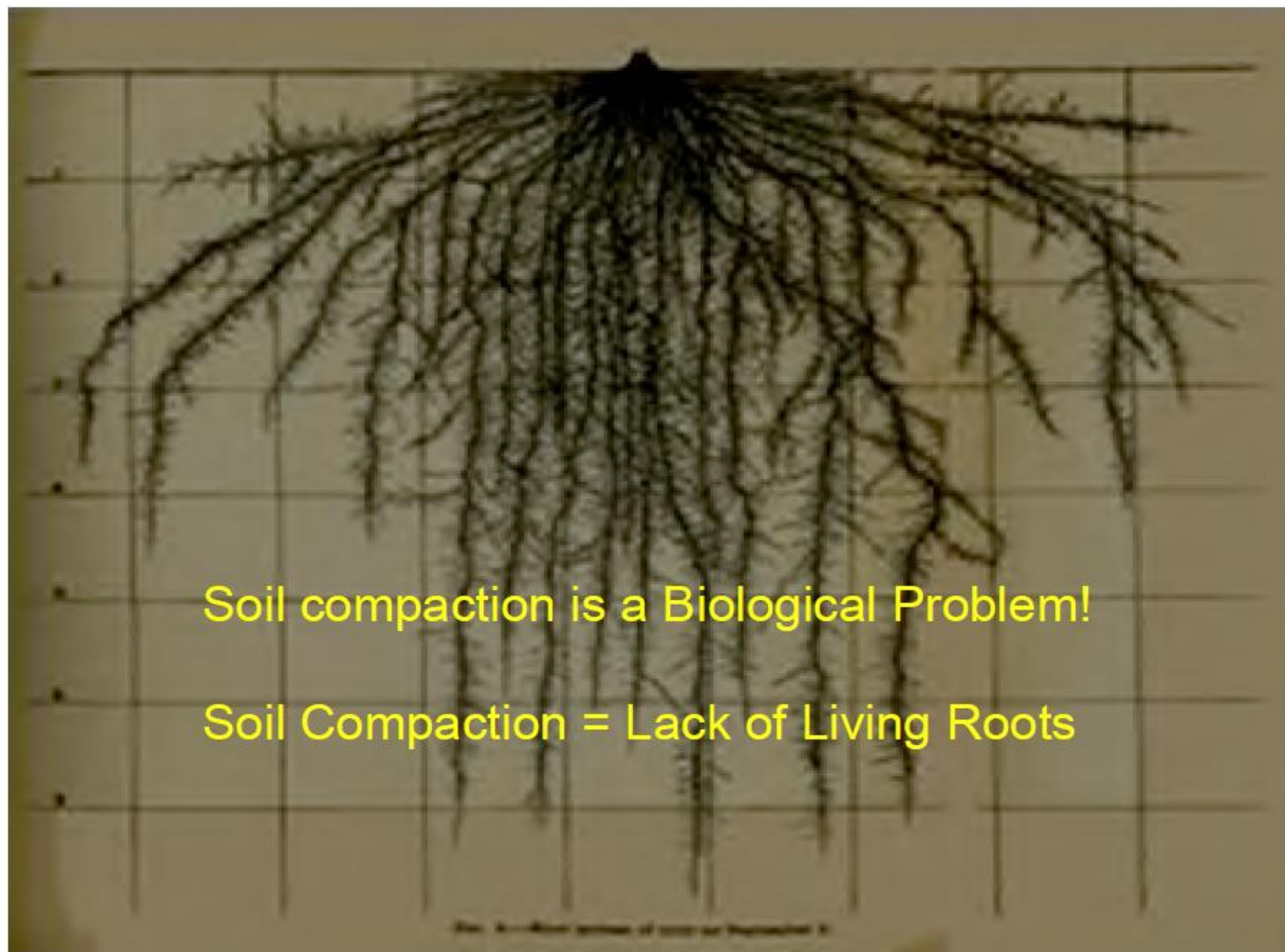


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Ideal Soil Composition







Can Cover crops....?

Replace steel with roots...?

Diesel with photosynthesis...?

Nitrogen with nodules...?

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Cover crops..?

1. Firstly, make every cover crop a cash crop

2. Farming is;

50% Growing

50% Marketing

3. Diversity is king in everything



Wakelyns Bakery Suffolk

Imagining the Waveney Valley, Friday 26th November 2021

A celebration of farming and food systems and an opportunity to
imagine a flourishing future for the Waveney Valley

at The Depot, Sotterley Estate, Brampton
with Hodmedod's, DiverIMPACTS and the Organic Research Centre

Menu from Wakelyns Bakery, Wakelyns Organic Agroforestry, Fressingfield, Suffolk

A celebration of this abundant season and the land and food of the Waveney Valley,
all of the seeds, farmers, growers, millers, cooks, bakers, food retailers and
everyone in our small food network, near and far,
from the soil to our plates

Real Bread at the Centre of Every Table

Wholegrain YQ Wakelyns population wheat loaves
Hemp seed and flour, camelina, coriander, hazelnut and carrot crackers
Raw salted butter

Squash squash

Stew and SquAsh!

Slow cooked beef and beer stew with celery leaf, parsley, onions and carrots
Coral lentils with celeriac, carrots and parsley
Chard, kale and beetroot
SquAsh!

Autumn Abundance Pudding

Wholegrain YQ Wakelyns population wheat and buckwheat pastry tart with
Ashmead's Kernel, Leathercoat Russet, Egremont Russet, Falstaff and Elliston's Orange apples,
Vranja quince jam and candied Red Kuri squash, with fruit and vegetables from
the tree lines and crop alleys in Home and Water Field at Wakelyns
Black Hamburg raisins
Beurré Hardy and Concorde pear crisps, tree line 41, Home Field, Wakelyns
Apple molasses syrupy-sauce
Mascarpone

*We have a diversity-of-apples-pears-quince-raisin-and-candied-squash fruit compote
with buckwheat and hazelnut crumble for anyone who cannot eat dairy, eggs and gluten*

Marigold and lemon verbena tea

Please let a member of the cookery team know if
you have any allergies or dietary requirements

THANK YOU EVERYONE who has helped us with this evening's food

Farmers, growers, brewers, millers, cheese and butter makers, beekeepers, craftsmen, artists,
cooks, bakers and more, turn over for those people and places

Organic YQ Wakelyns population wheat flour from David and Amanda, and Paul and Mark, at Wakelyns,
and John and Guy Turner at Turners of Bytham, Grantham, milled by Lindsay, Keith and Josiah at
Hodmedod's

Hemp seeds and flour, coriander and camelina seeds, Hodmedod's

Tonda gentile hazelnuts, Piedmont, Charles, Food and Forest, nut suppliers funding UK agroforestry

Fen Farm Dairy raw salted butter and mascarpone, Jonny, Dulcie and the Fen Farm Dairy team, Bungay

Henstead Marsh Beef from Moss and Jo, Henstead, with cows who grew up on Sotterley Estate

Organic garlic and eggs, Bess, Jenny, Frida, Mike, Lindsay, Alice, Miranda and William

and the Maple Farm team, Kelsale

Organic rapeseed oil, Mike Stringer, Stringer and Son's, Yorkshire

Organic Coral lentils, Wakelyns, grown in collaboration with Hodmedod's

Organic chard, kale, celery leaves, beetroot and marigolds, Chloe, Holly and Rachel, RealVeg CSA,
Wakelyns

Onions, carrots and parsley, Hayley and the Greengrow Co-operative team, Beccles

Organic Buttercup, Red Kuri, Blue Ballet, Butternut and Sweet Dumpling squash grown with Marion in
Water Field, Wakelyns

Beer from ~~Adam~~ Kevin and Beccles Brew Co team, Sotterley Estate

Buckwheat from George, Fobbing Farms, Essex

Honey from Mark, Blackdog Apiary, Sotterley Estate

Organic apple molasses and cider vinegar, made from Wakelyns apple juice

A beautiful diversity of the organic fruit from the tree lines in Home and Water Fields at Wakelyns

Black Hamburg grapes from Bob, Essex, dried at Wakelyns Bakery

Lemon verbena from Holly, Burston

Henrietta and Maisie, Wakelyns Bakery, Wakelyns

Fay, The Woodland Haberdasher, Wakelyns

A note about the beef from Moss and Jo

Henstead Marsh Beef is a family run farm who look after a 50 head heard of Stabilizer cattle across 150
acres of marshland running alongside the River Hundred where they graze through the spring and
summer months and feed off marsh cut silage throughout the winter months. Their beef is dry hung for
42 days before butchering creating deep colour, deep flavour and tenderness.

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Whitechapel East London



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Companion crop of OSR, buckwheat, fenugreek and lentils



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Winter wheat drilled into OSR volunteers (no slug pellets)



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How do you come out of grass effectively?



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Your new T0 replacement

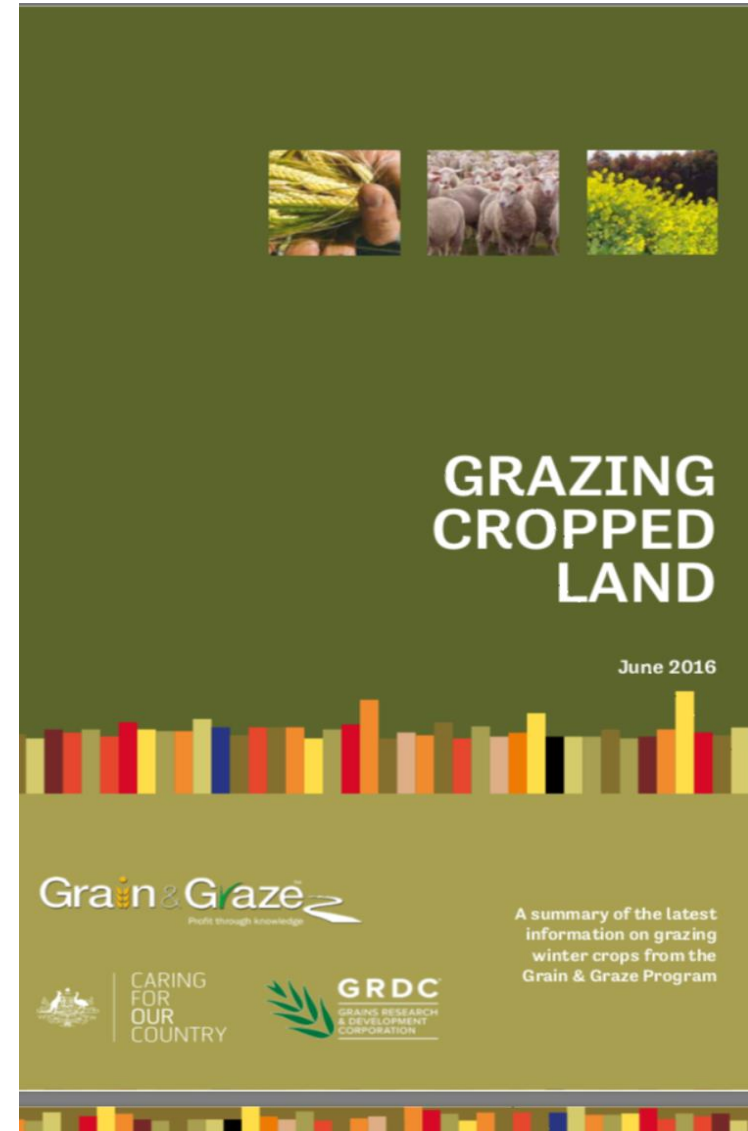


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Available at;

http://www.grainandgraze3.com.au/resources/Grazing_Cropped_Land_June_2016_.pdf



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How do you effectively monetise grass in the rotation?



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Ref; Roaming Dairy, Kingsclere Estate June 2019

Feed your soil like you would your livestock



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North Dakota; Soil profile after 20 years continuous no-till.

Mixing species to produce the highest yields

- biggest volume of biomass
- best quality and diversity

produce more
biomass

explore all the
nutrient sources
of the soil

improve soil
structure

manage ecologically
weeds

assurance of good
cover whatever

reduce seed cost

introduce relay
between plants

bring diversity and creativity in
rotations

Concept « biomax »
Maximal biomass et biodiversity

C:N Ratio of Organic Matter

As a rule of thumb:

At C:N > 20:1, NH_4^+ is immobilized (tied up)

At C:N < 20:1, NH_4^+ is mineralized (released)

Organic matter
plus microbe N

C:N < 20:1

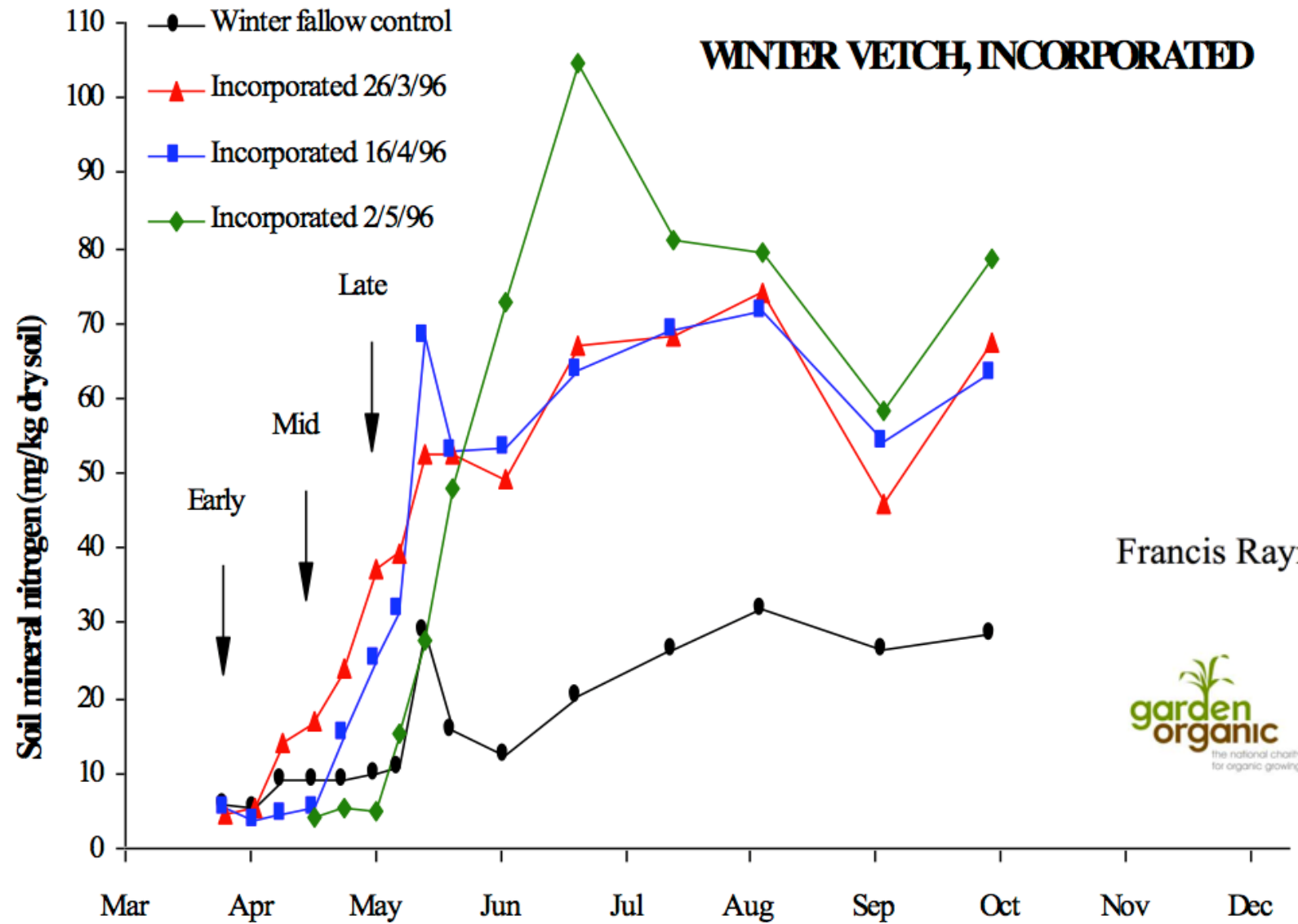
→

NH_4^+

←

C:N > 20:1

Typical C:N Ratio in soil is 10-12



Francis Rayns



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Part d'azote minéralisée potentiellement disponible pour la culture suivante en fonction du C/N des couverts (en % de l'azote stocké dans les couverts) – S. Minette ; CRA Poitou Charente

C/N	% de N relargué
< 15	50%
15 à 20	40%
20 à 25	30%
25 à 30	25%
> 30	20%

	Green Biomass (t/ha)	dry matter after 90 days (t/ha)	Amount of N (kg/ha)	plus impact of roots	C/N	potential return for next crop (kg/ha)
Sunflower	12,5	$0,16 \times 12,5 = 2$	$0,019 \times 2000 = 38$	$38 \times 1,1 = 42$	$42 / 1,6 = 26$	$42 \times 25\% = 10.5$
Phacelia	18	$0,11 \times 18 = 1,98$	$0,025 \times 1980 = 49$	$49 \times 1,1 = 54$	$42 / 2,5 = 17$	$54 \times 40\% = 21.5$
Fodder Peas	8	$0,12 \times 8 = 0,96$	$0,032 \times 960 = 31$	$31 \times 1,3 = 40$	$42 / 3,2 = 13$	$40 \times 50\% = 20$
Commun vetch	5	$0,2 \times 5 = 1$	$0,039 \times 1000 = 39$	$39 \times 1,1 = 43$	$42 / 3,9 = 11$	$43 \times 50\% = 21.5$
Total	43,5	5,94	157	179		73,5



The perfect summer cover crop!



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Steve Groff



Steve Groff

@CoverCropCoach

Winter squash harvest has begun! [#notill](#) [#covercrops](#)



4:53 pm · 31 Aug 2020 · Twitter for Android

16 Retweets 2 Quote Tweets 107 Likes

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Jay Fuhrer



Jay Fuhrer

Lead Educator

Jay Fuhrer is a soil health specialist employed by the Natural Resources Conservation Service in Bismarck, N.D. He has boots on the ground the last 38 years working with cropping systems, grazing systems, cover crops and gardens. Jay also has an extensive background working with groups and entities such as soil and water conservation districts; national and international no-till organizations; watersheds; farm organizations; urban groups; and more. Recently, Jay spends his time at the Menoken Farm minimizing soil disturbance, adding soil armor, maximizing plant diversity, maintaining living roots in the soil and integrating livestock.



Photo precedes - Weston Park Farms updated anti slavery policy....!



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July 2015

1. 0.5 acre trial
2. 3 beds with 4 rows 0.5m apart – two inoculated with Plantworks mycorrhizal fungi
3. 6 meters between beds
4. rest of the field is spring oats



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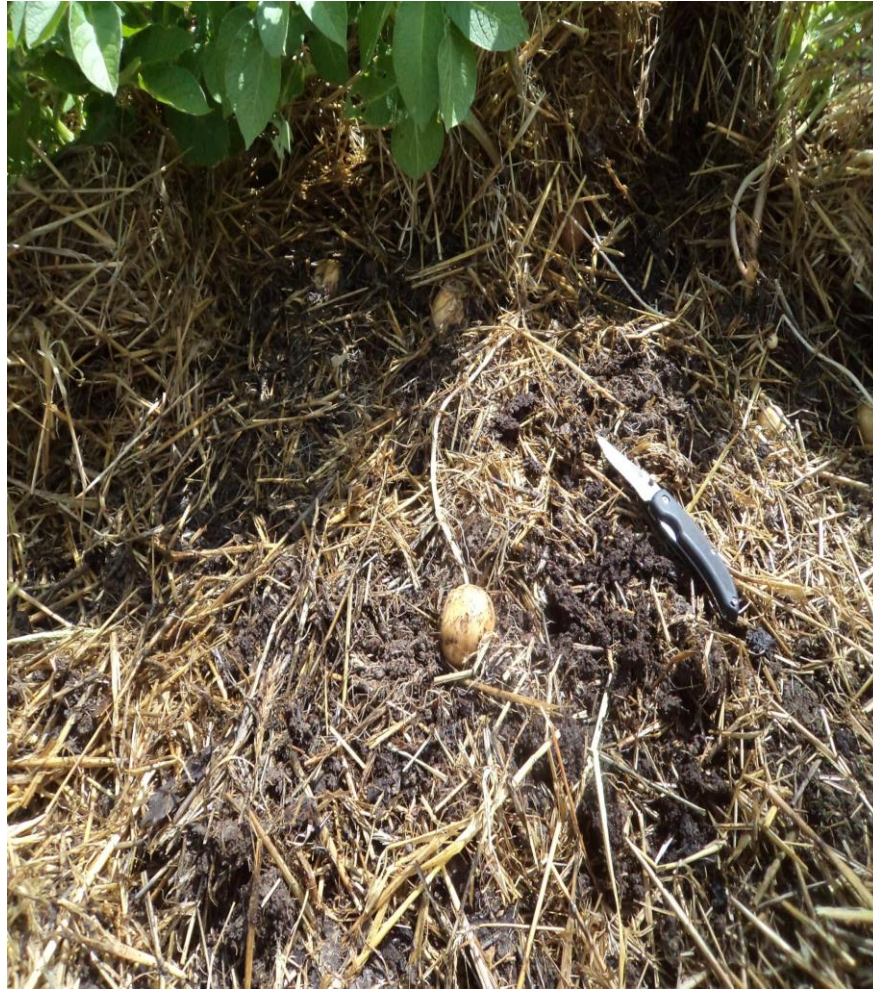
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Left bed no nitrogen applied – only difference was a Mycorrhizal fungi application...?



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July 25th 2015

Post desiccation October 2015



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Just to prove we did harvest a viable yield



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Unreplicated trial results 2015

- Untreated plot - no mycorrhizal inoculant, 40t ha FYM and full fungicide program 36t/ha (yield scaled up from 5 sqm sample plots).
- Treated plot 54t/ha. 10-15% slug/mice damage or otherwise damaged at lifting (included in the weighing).
- Result down to inaccurate spreading of FYM

Why no-till potatoes

- Quickly improve OM levels and soil structure of arable land with a high value cash crop while using straw as a mulch and rotate carbon and fertility round an arable rotation.
- To answer the question how do we grow potatoes truly sustainably?
- Can we grow potatoes more reliably without irrigation or cultivations
- See potatoes as seasonal..?
- Reduce herbicide costs and improve skin finish of next squash crop/ bi crop?



Systems approach – high value wide row crop follows to retain mulch



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Thank you for listening

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