

Best management practices for integrating hogs in a cover-vegetable rotation

The Institute of Sustainable Food Systems



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This work and research took place on the shared, traditional, ancestral, and unceded territories of the scəw'aθən (Tsawwassen), x^wməθk^wəy'əm (Musqueam), and other Coast Salish Peoples.

We extend our appreciation to these First Nations for the opportunity to do this work and continue to work on these lands.



scəw'aθən məsteyəx^w

TSAWWASSEN FIRST NATION

Outline

- Research conception and objectives
- Materials and methods
- Hog grazing best practices
- Results and conclusions

Research Conception

- Many market crop farmers routinely put some growing acreage into cover crops - crop rotation plan
- Incorporate cover crops up to 3 times per year (spring, summer and fall)
 - add soil organic matter
 - enhance fertility
 - control weeds, diseases
- Practice of tilling cover crops to terminate growth negatively impacts soil structure and biological activity

Research Conception

- Specific to our area (Fraser Delta) - effects are exacerbated in clay textured soils
- Management may require machinery, implements not available to smaller scale, start up market crop farmers

Research Objectives

- Find regenerative ways to manage cover crops and on-farm fertility while reducing reliance on extensive use of tractor tillage
- Investigate the potential benefits from integration of hogs into vegetable production on soil quality, nutrient life cycle, weed management, subsequent vegetable harvest
- Determine the best management practices for rotating hogs through cover crops pasture

Materials and methods

- Two treatments: Grazing (hogs) and Tillage
- Main-plot: 30 ft x 230 ft
- Subplots: 6 per main-plot for grazing (30x38 ft)
- Replicated 4 times in field

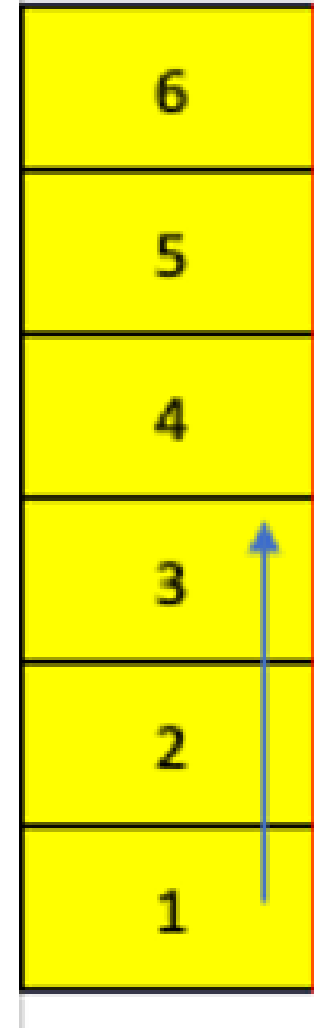
Materials and methods

Block 1		Block 2		Block 3		Block 4		
6	12	18	24	30	36	42	48	
5	11	17	23	29	35	41	47	
4	10	16	22	28	34	40	46	
3	9	15	21	27	33	39	45	
2	8	14	20	26	32	38	44	Subplot (48)
1	7	13	19	25	31	37	43	
A	B	C	D	E	F	G	H	
	Plot (8)							

- Yellow main plots were grazed, White main plots were tilled
- Hogs were moved through subplots in direction of arrow

Rotation Strategy

- Hogs were rotated through the 6 subplots based on how fast they ate down the cover crop
- 6 subplots was based on a roughly one week per plot schedule, planning on enough regrowth in that time
- Hogs were rotated through the 6 subplots twice



Rotation strategy

- In experience, rotation worked well on first round through subplots
- Start to run into some cover crop maturation issues - mixes like peas and oats work well in that scenario
- When modeling for your own farm, extend time in plots or number of plots depending on cover and stocking density



Cover Crops Included

- Spring – Oats, Ladino Clover, Field Peas
- Summer – Sudex, buckwheat, ladino clover
- Fall – Fall rye, Vetch



July 2 - fencing into spring cover



Fencing

- Two strand system using Gallagher Turbo braid
- Annually placed plot fencing, with mobile subplot cross fences
- 7/8" Fibreglass rod posts
- Solar Fence Energizer



July 2 – pigs into main plots



Housing

- Combination of wooden frames and cattle panel mesh roof
- Added supporting hoops (emt conduit) to prevent hogs sitting and bending roof
- Tarping the roof provided shelter and shade
- Could easily do an all metal frame -could hold up better to hog usage



Housing

- Handles on one end with wheels on other allows for easy movement
- Designed to be able to be moved by one person and survive two seasons



Housing shelters



Water System

- System devised to limit spillage in the plot
- 1.5 gal/pig/day – 20 gallon barrels
- Nipple attached to barrel and placed inside the fence
- Hogs could drink but not interact meaningfully with the barrels
- Fence management was important



Water System





Water system in larger areas



- Expanded idea to full plot with a large IBC tote
- Good success with attaching nipples with reinforced fiberglass shingle



Aug. 17 – summer cover crop



Sept. 30 - tillage plots



Sept. 30 - hog plots



Vegetables following hogs the subsequent year

- In each main plot (230 ft)
- Butternut squash – 2 rows at 3 x 5 ft spacing
 - Hand seeded
- Sweet corn - 6 rows at 6 x 30 in.
 - Jang seeded

- Sampling - weed percent cover, yield and crop performance

July 29 - squash and corn



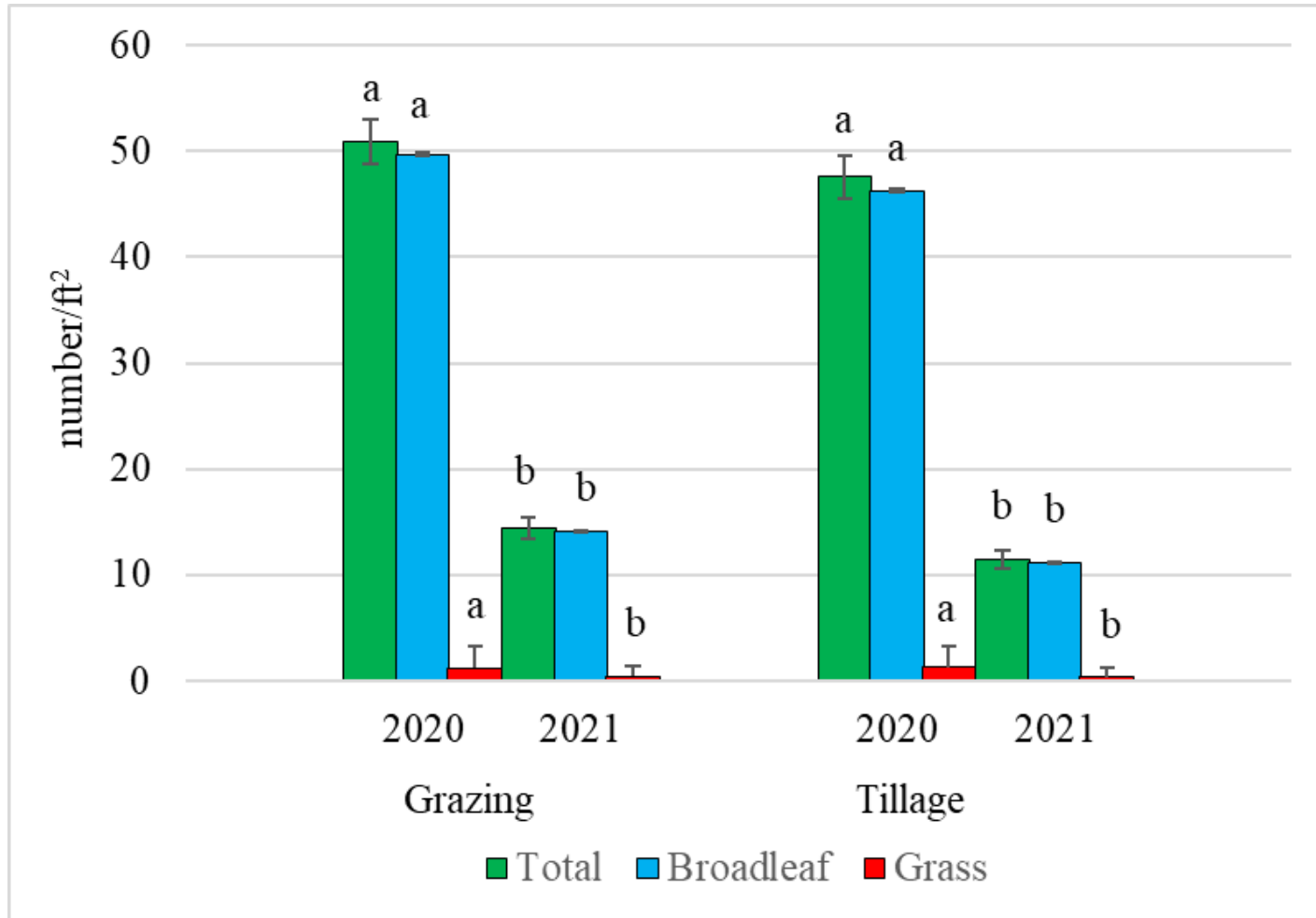
Impact on soil

- Saw impacts of treatments across many parameters
- Not a substantial difference between treatments
- Interesting to see if soil will change in shorter term project

Table 2. The effect of timing on soil available nitrate (NO₃) at 0-15cm and 15-30 cm, bulk density (BD), volumetric water content (VWC), and electrical conductivity (EC).

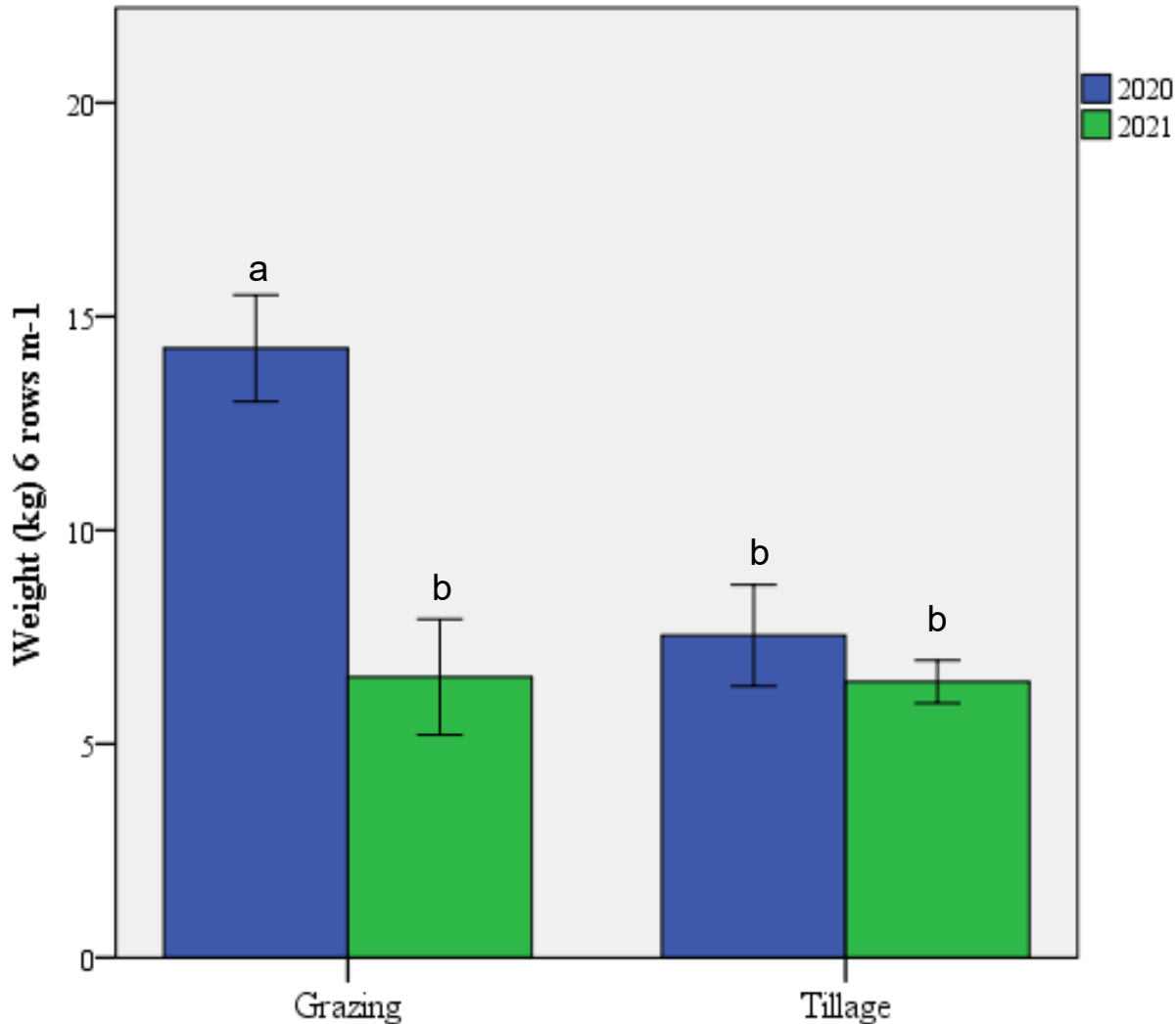
Timing	NO ₃		BD	VWC	EC	
	0-15 cm				Grazed	Tillage
	Grazed	Tillage				
	mg kg ⁻¹		kg cm ⁻³	- % -	mS cm ⁻¹	
Before	1.64	1.40	1.09	45.98	0.69	0.84
After	0.85	1.06	0.98	30.97	0.22	0.17

Results – impact on weeds



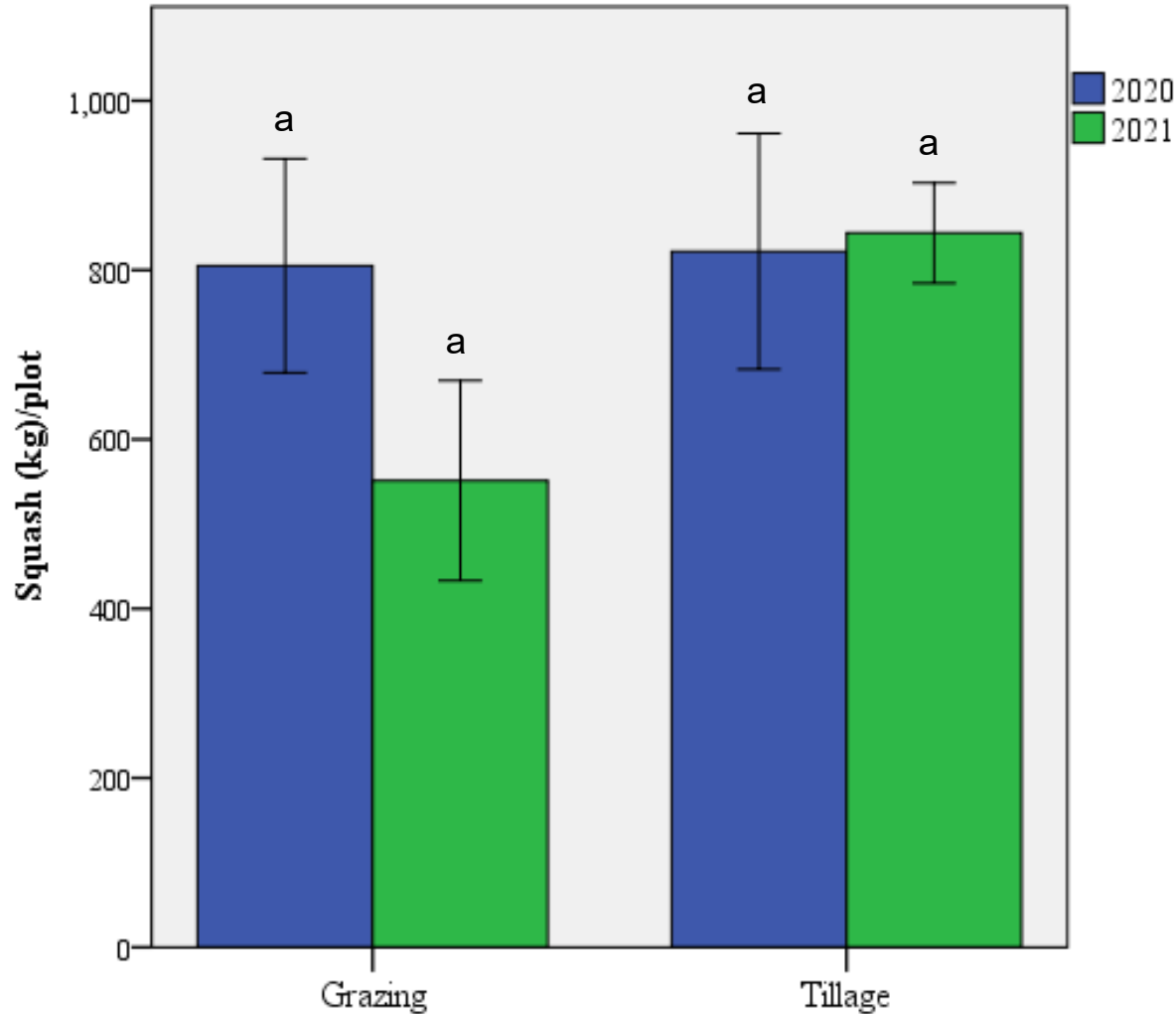
ANOVA: treatment, year, treatment*year

Results – Corn yields



ANOVA: treatment, year, treatment*year

Results- Squash yield



ANOVA: treatment, year, treatment*year

Conclusions

- No statistical treatment differences in weeds
 - Although tillage did have lower numbers
- Year was significant in number of weeds
- Treatment*year significant in corn yields
 - 2020 yields were larger than 2021 overall
- No differences in squash yield

Conclusions

- Successful hog rotation system- low labour and cost
- Grazing didn't impact weed seed bank to the next crop
 - Need more time
- Corn is a heavy N user, perhaps see difference in yield due to hog nutrient input

Acknowledgements

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