



Rotationally grazing hogs as a method of orchard floor management

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Introduction

- Organic food industry in Canada is growing and expected to continue to grow 15-20% per year
- Organic apples lead the Maritime organic retail produce market for local produce and comprise 24.8% of total sales
- In Annapolis Valley 6 certified organic apple producers
- Recent survey of organic and transitional apple growers in the Valley revealed concerns were apple maggot, controlling apple scab and weeds

Introduction

- Weeds rob moisture and nutrients from apple trees
- Mowing, mulching or flame-weeding
- Mowing not as effective as herbicide strip & makes harvesting drops difficult & time consuming
- Mulching may provide good weed control, but mice problems
- Apple maggot control - manually pickup windfall and drop apples & dispose to disrupt the life cycle
- Very labour intensive and it is difficult to collect all apples when there is not an effective method of grass control

Why Pigs?

- Gloucester Old Spot – “Orchard Pig”
- Nutrient source, alternative product
- Low to the ground
- Resources available
- Low pork prices = niche market?



Objective

To determine if grazing hogs at bloom and after harvest can be used as a form of organic orchard floor management



Site and Grazing

- 1 year
- Morristown, Nova Scotia, Canada
- Plots were 464.5m² (15.2m X 30.5m)
- 15 trees; 6 trees McIntosh and 9 trees Golden Russet
- Treatments
 - unmowed check
 - 10 pigs (46.5m²/pig)
 - 19 pigs (24.4m²/pig)
- Grazing was conducted during bloom (June 2005) and following harvest (October 2005)
- Moved after 2 days grazing, trts repeated in triplicate

Hog Management

- Conventional hogs (45kg)
- Certified organic hog grower for 1 month
- Acclimatized (outside & fence)
- Hay - prepare for grass
- White pigs (Duroc crosses) pre-bloom
- Coloured pigs (Durocs) post-harvest
- Nose rings to discourage rooting
- Feed available while grazing
- Huts for sleeping



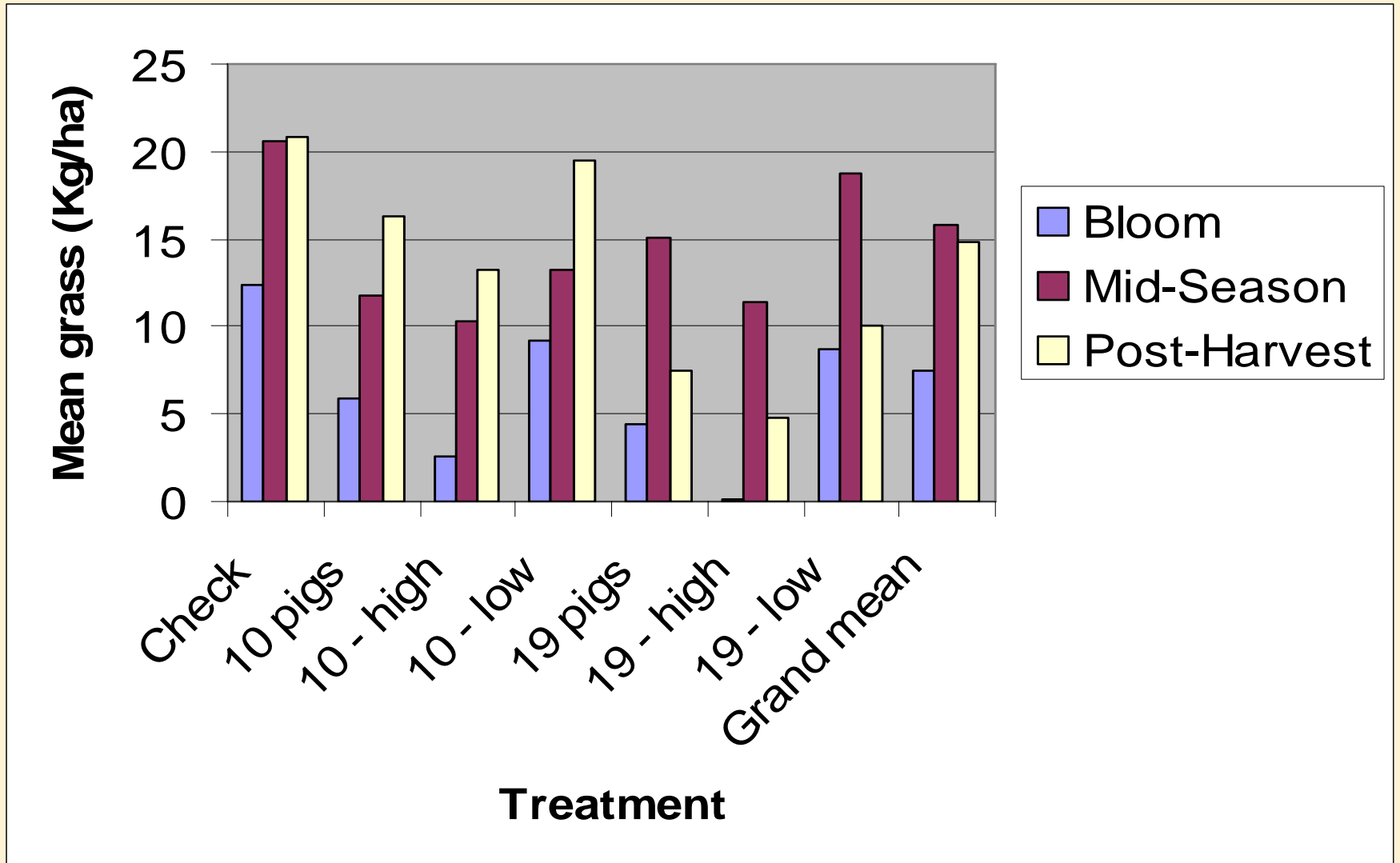
Data Collection

- Grass measurements
 - Randomly taken 30m² within each plot
 - 6 samples, 3 high traffic, 3 low traffic
 - Immediately after grazing and mid-season (August)
- *E.coli* and Total Coliforms
 - Leaves, fruit, soil and manure analysed
 - Following spring grazing period & before harvest
 - Aseptic techniques, and transferred on ice for analysis
 - Samples were taken in triplicate from each plot, combined and homogenized to form one sample
- Drop apples not harvested, remained in orchard
- Remaining drop apples collected & weighed to determine amount consumed

Data Analysis

- GenStat version 8
- High traffic and low traffic samples combined to compare to the check
- Grass data were analyzed using an ANOVA check plus factorial
- Drop apple data - basic statistics
- Total Coliform and *E. Coli* - discussed per sample analyzed

Grazing Results



Grazing Results

Comparison	F-probability		
	Bloom	Mid-Season	Post-Harvest
Check vs Treatments	< .001	< .001	< .001
Low vs high density	0.434	0.137	< .001
traffic areas within trts	< .001	0.021	0.014
traffic areas 10 pigs vs traffic areas 19 pigs	0.579	0.319	0.807

At 95% confidence level

Light Density (10 pigs): Spring



High Traffic

Check

Low Traffic

Heavy Density (19 pigs): Spring



High Traffic

Check

Low Traffic

Light Density (10 pigs): Mid-Season



High Traffic

Check

Low Traffic

Heavy Density (19 pigs): Mid-Season



High Traffic

Check

Low Traffic

Light Density (10 pigs): Fall



High Traffic

Check

Low Traffic

Heavy Density (19 pigs): Fall



High Traffic

Check

Low Traffic

E.coli

Sample	Check (<i>E.coli</i> /g)		10 pigs (<i>E.coli</i> /g)		19 pigs (<i>E.coli</i> /g)	
	Bloom	Pre-harvest	Bloom	Pre-harvest	Bloom	Pre-harvest
Soil – high traffic	n/a*	n/a	1	1	2	2
Soil – low traffic	n/a	n/a	nd	nd	nd	nd
Soil – random	nd**	nd	12	nd	nd	nd
Soil – conc. manure	n/a	n/a	2	n/a	6	n/a
Apples	n/a	nd	n/a	nd	n/a	nd
Manure	n/a	n/a	2070000	15	19000	8
Leaves	nd	nd	nd	nd	nd	nd

Total Coliforms

Sample	Check (TC/g)		10 pigs (TC/g)		19 pigs (TC/g)	
	Bloom	Preharvest	Bloom	Preharvest	Bloom	Preharvest
Soil – high traffic	n/a*	n/a	108	64	319	89
Soil – low traffic	n/a	n/a	88	65	48	74
Soil – random	36	54	58	86	69	92
Soil–conc. manure	n/a	n/a	33	n/a	79	n/a
Apples	n/a	127	n/a	152	n/a	83
Manure	n/a	n/a	2180000	95	58000	64
Leaves	2	39	3	26	3	30

Drop Apples Remaining

Density	Mean (kg/ha)	Std Dev. (kg/ha)
Check	53.25	15.35
10 pigs	1.94	0.65
19 pigs	2.01	0.54



Summary

- Pig behaviour
- Effective at grass control
- Further research to determine differences between densities
- Require further research to understand bacteria implications
- Effective at drop collection
 - Golden Russet and McIntosh
- Further research to determine opportunities

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Questions??