Pasture ecology and livestock parasite management

Bryony.sands@uvm.edu

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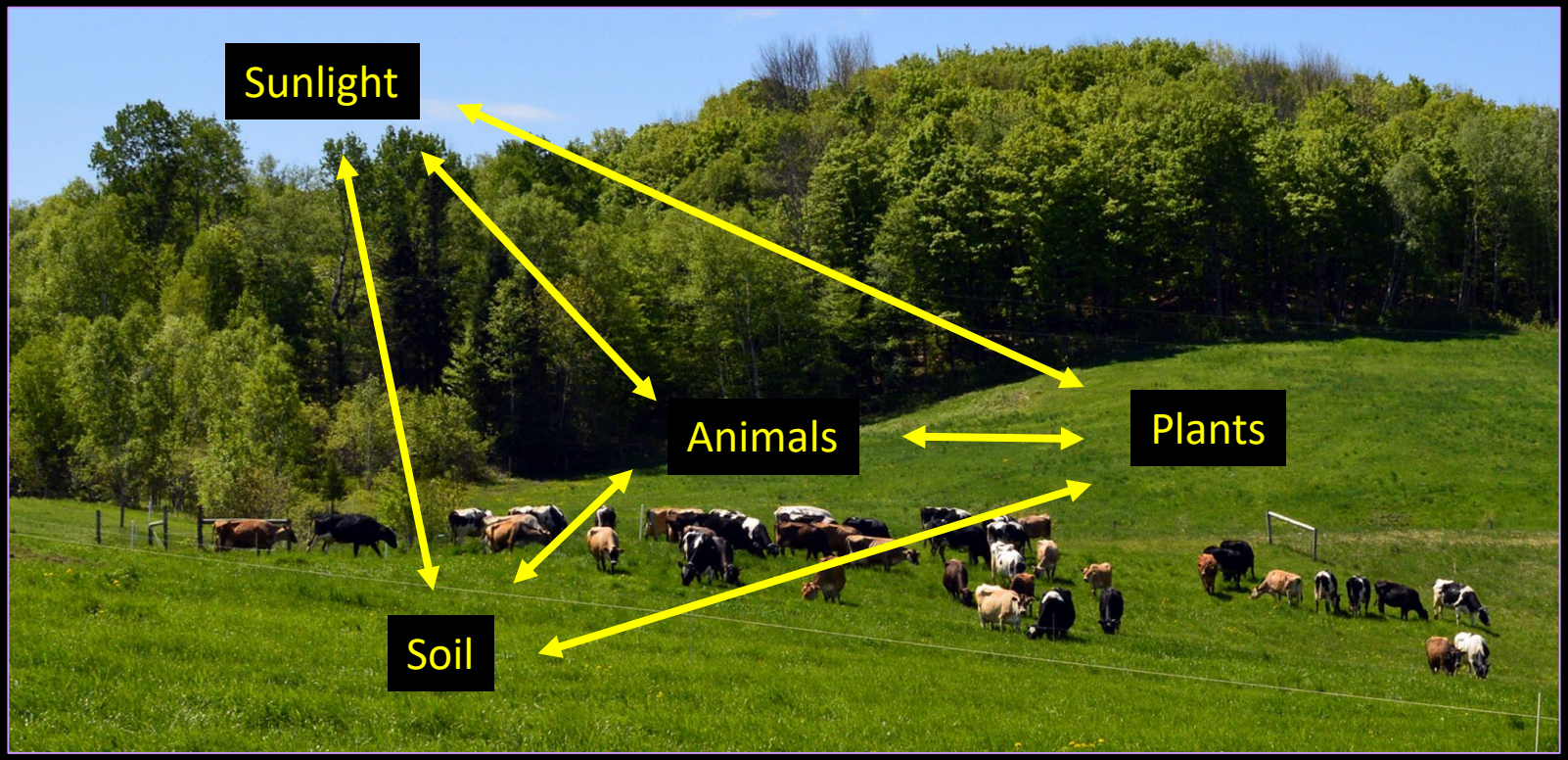
Overview

- The pasture ecosystem
- Parasite management
- IPM project
- Cattle lice project

The pasture ecosystem



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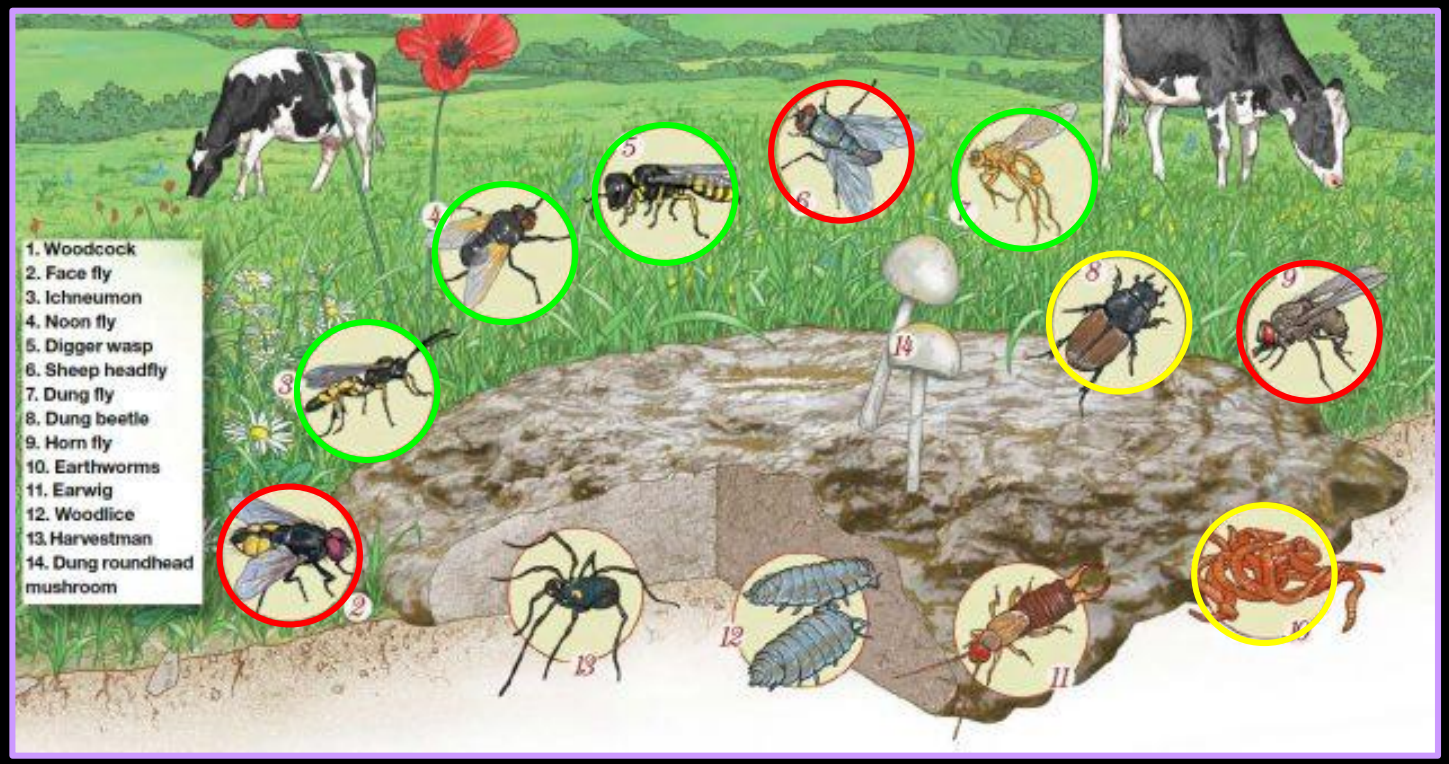
The Dung Ecosystem



Nuisance
- Pest flies
- Parasitic nematodes

Beneficial
- Coprophagous
- Predatory

Ecosystem engineers
- Earthworms
- Dung beetles

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Predatory beetles and flies

Bryony.sands@uvm.edu

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Coprophagous beetles and flies

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Dung beetles

- Approx. 90 species in North America
- In decline globally

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Dung beetles in the Northeast

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Dung beetles in the Northeast

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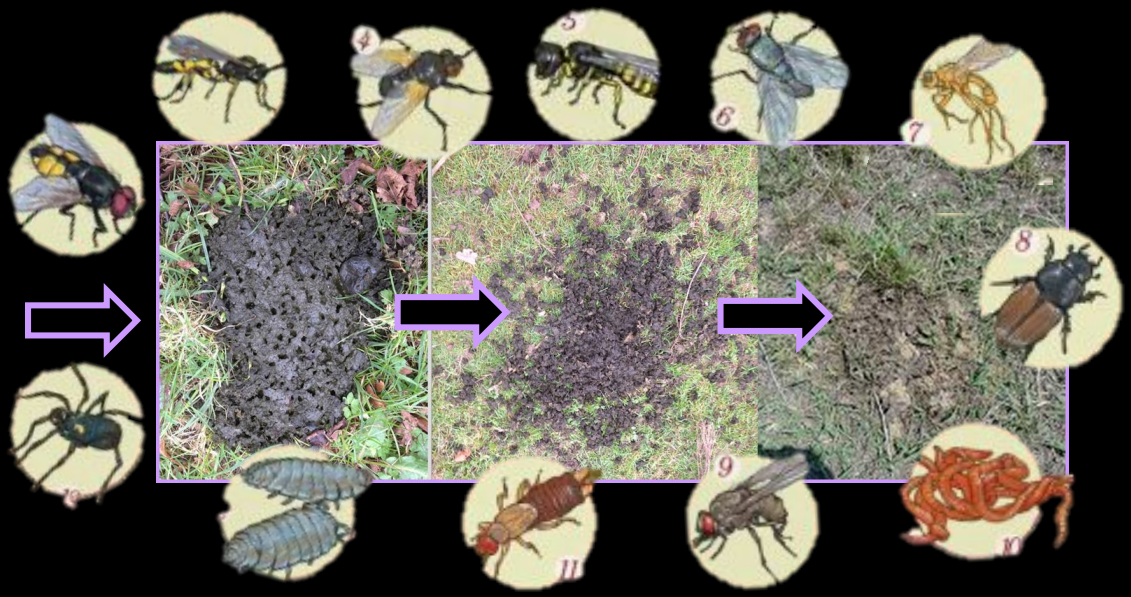
Pasture ecosystem services



- Nutrients
- Soil organic matter
- Biodiversity

- Dung decomposition
- Nutrient cycling
- Pasture fertility
- Pest fly and parasite control
- Prey items

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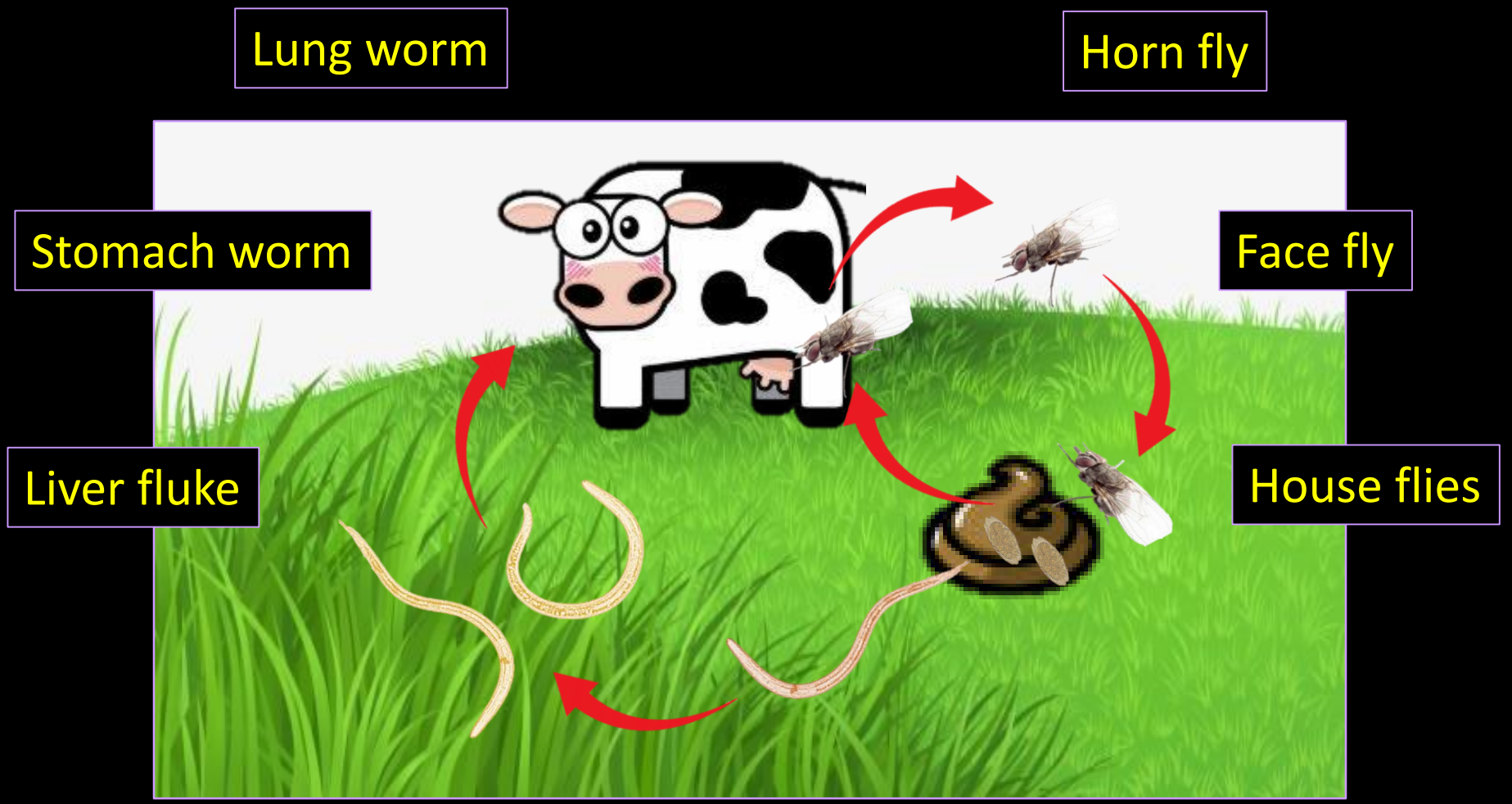
Pests and parasites



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Pests and parasites

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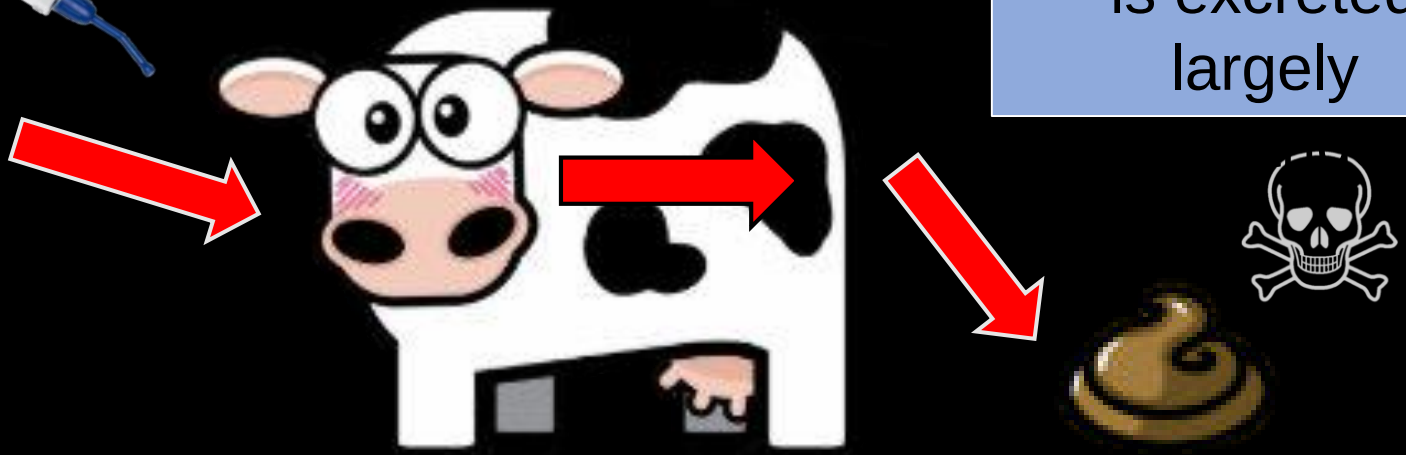
Veterinary parasiticides

1. Development of resistance
2. Environmental impacts
3. Organic production - restrictions



90% of the dose is excreted largely

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Integrated Parasite Management

Diagnostics

Product choice and rotation

Targeted Selective Treatment

Natural immunity

Grazing strategies

Botanical treatments

Natural enemies / biological control

Beneficial insects

Traps

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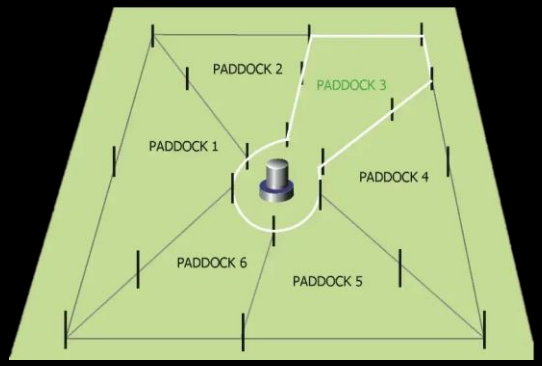
Integrated Parasite Management

Natural enemies / biological control

Diagnostics

Grazing strategies



Beneficial insects

Botanical treatments

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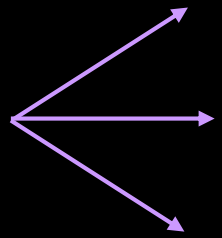
Methods

29 grazing dairy farms in VT and NY

Grazing strategies:

- Continuous
- Rotational
- 'MIG'



Treatments:

- Chemical parasiticides
- Botanical (essential oils)
- Natural enemies – biological control

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Measured

Internal parasites

Soil health

Pest flies

Beneficial insects

- Dung beetles
- Flies
- Hymenoptera

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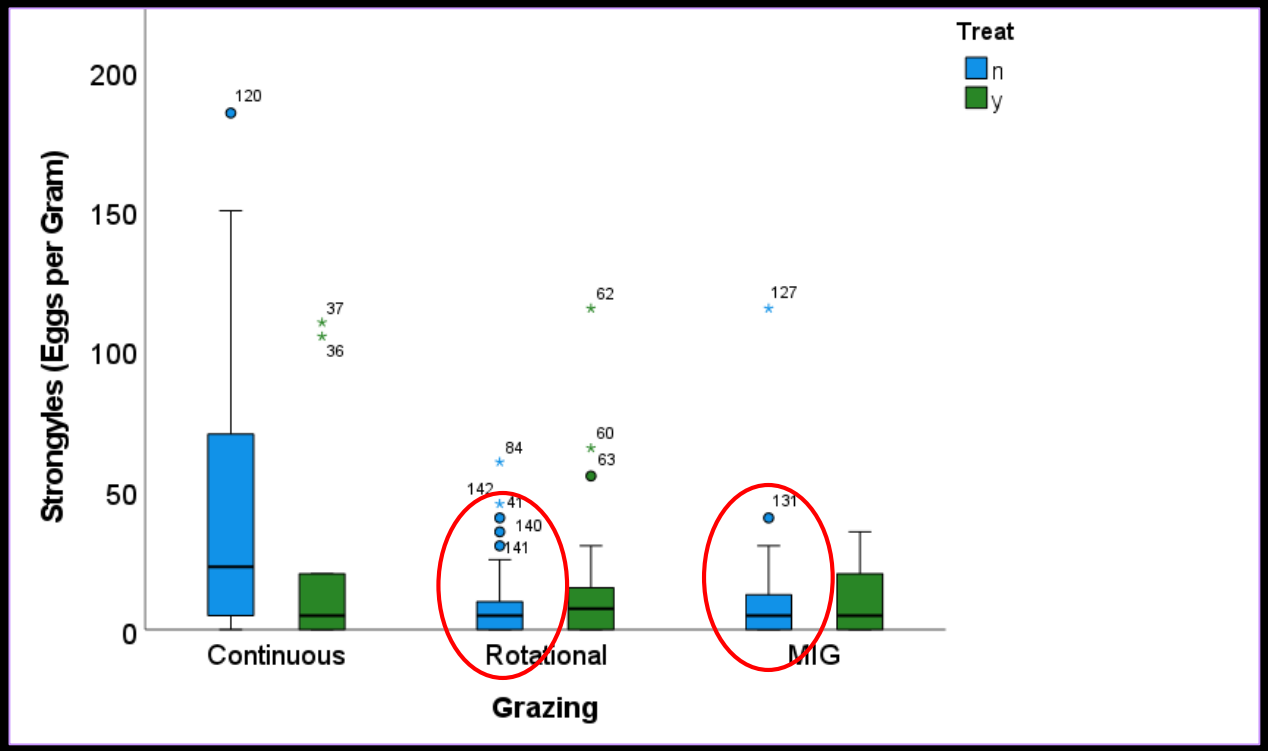
Results

Internal parasites



For farms not using chemical parasiticides, grazing strategies effectively controlled internal parasites

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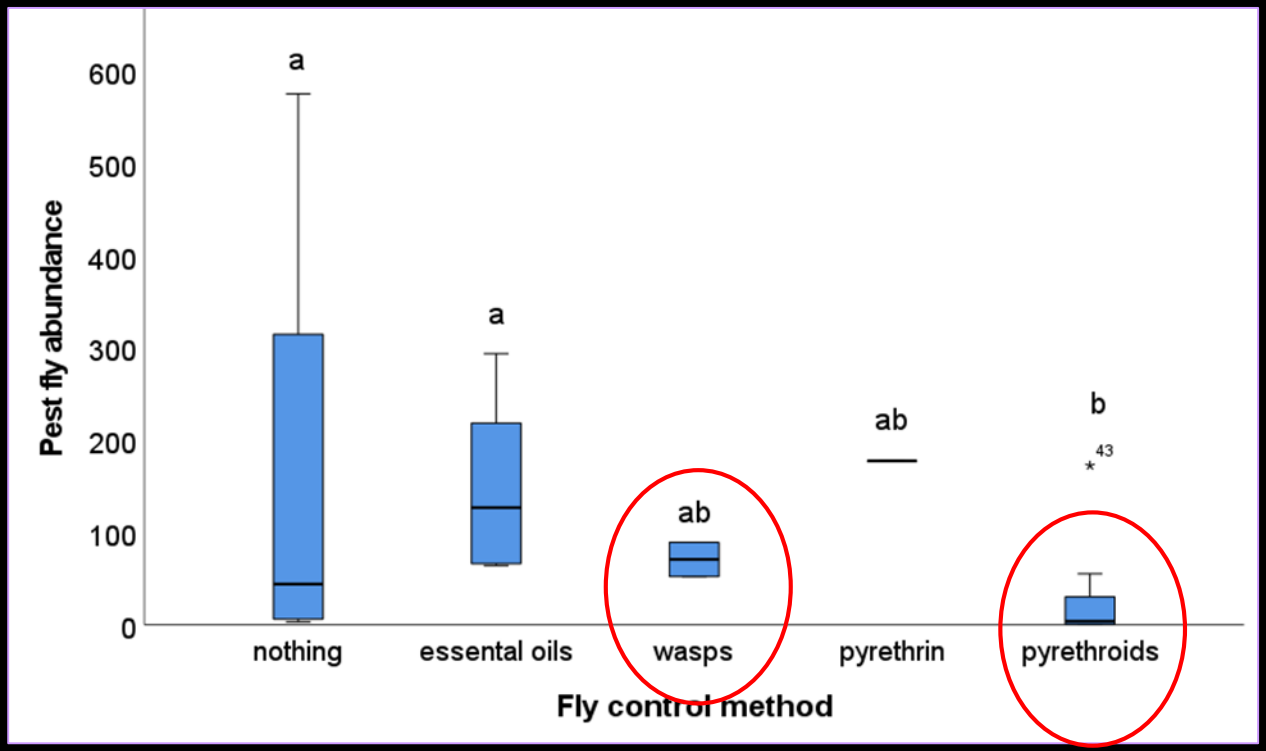
Results

Pest flies



Synthetic pyrethroids most effective, followed by parasitoid wasps

Influenced by grazing strategy

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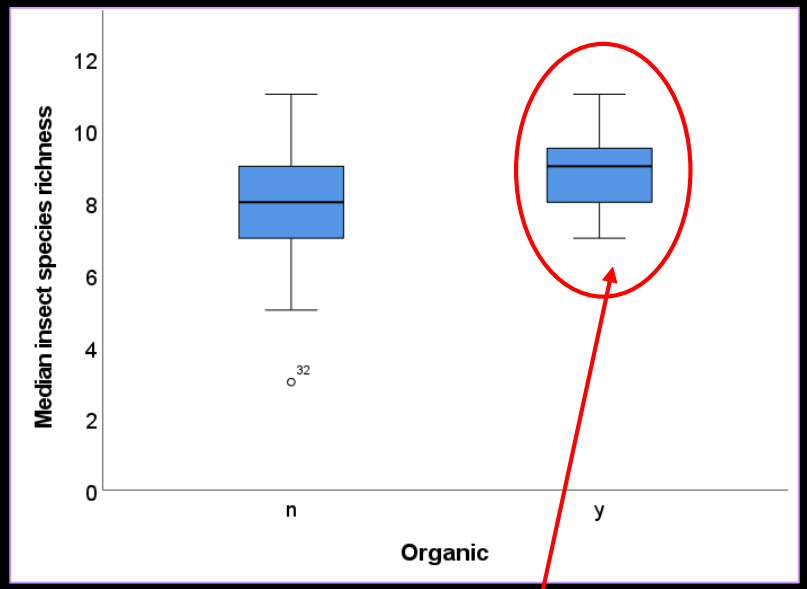
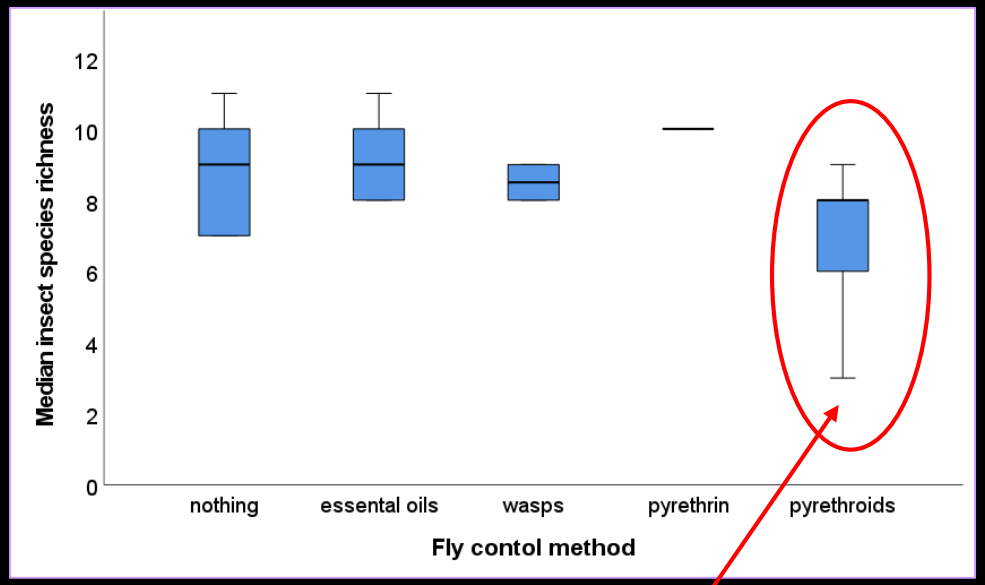
Results

Beneficial insects





Organic farms had significantly higher insect species richness

Driven by the effects of synthetic pyrethroid insecticides

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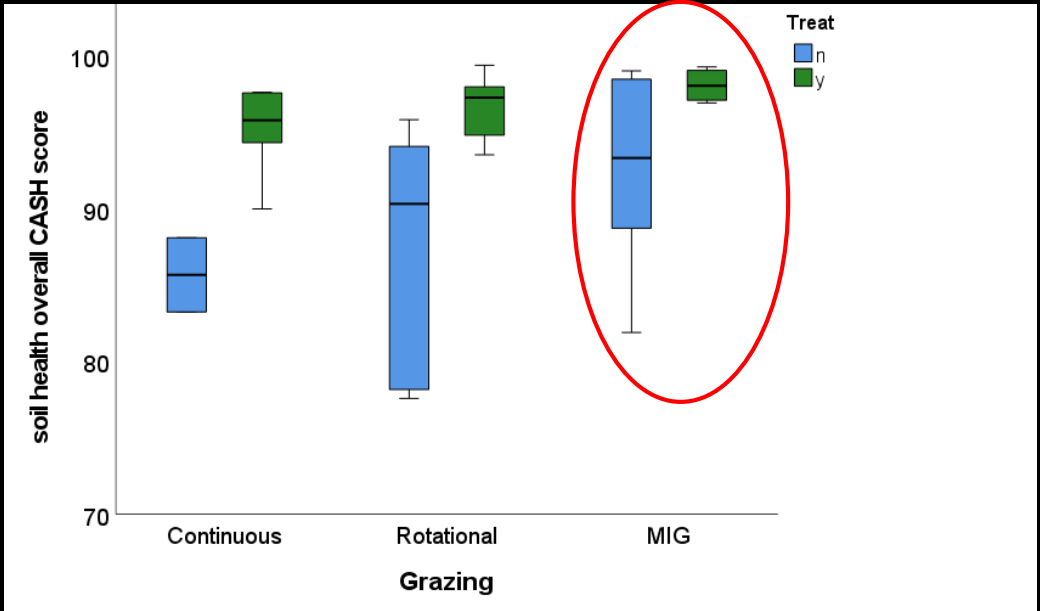
Results

Soil Health



Farms grazing MIG had significantly higher overall soil health score

- Predicted soil protein
- Respiration
- Active carbon
- Bulk density

Farms treating for pests and parasites had higher soil health score

- More to learn about relationship between above-ground pasture biodiversity and the soil health indicators

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Take-home messages

For organic producers / those not wishing to use chemical parasiticides:

- **Grazing strategies can effectively control internal parasites of livestock**
- **Alternative treatments can suppress pest fly abundance - parasitoid wasps (fly predators) most effective**
- **Grazing strategies can improve soil health outcomes**

Livestock parasiticide treatments can reduce insect biodiversity on pastures

More research needed on relationship between above-ground diversity outcomes and soil health outcomes

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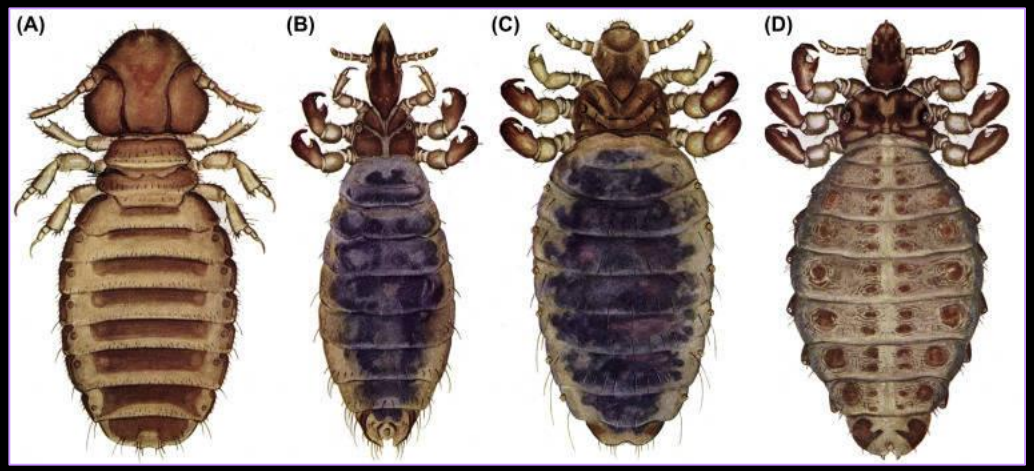
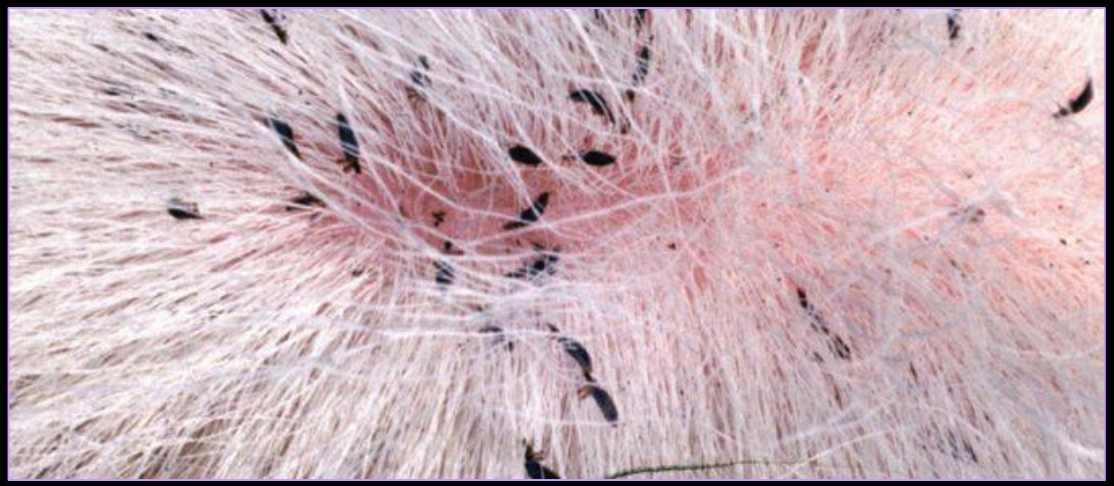
Cattle lice





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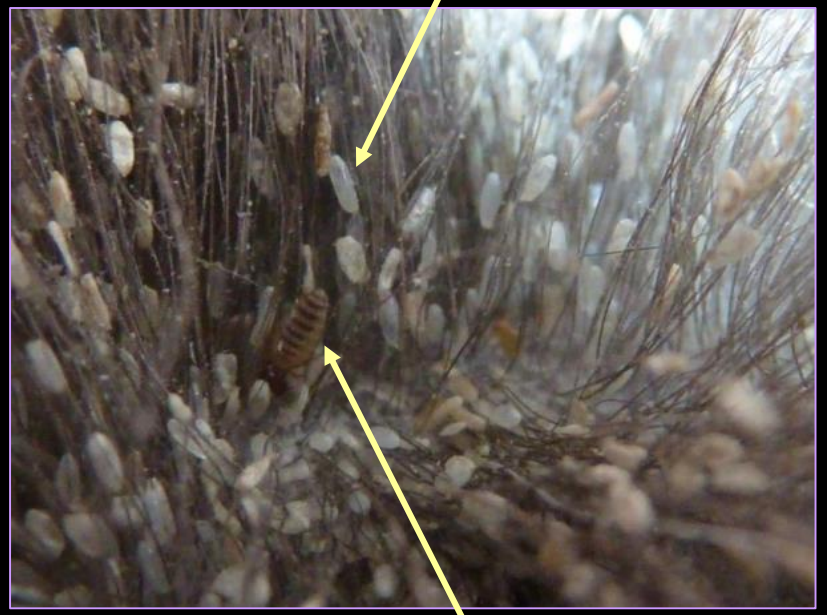
Cattle lice



- Populations explode in winter weather
- Transmission increases during winter housing

- Limited treatment options for organic producers

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Essential oils

- Botanical insecticides
- Plant secondary metabolites
- Deter insect herbivory
- Usually neurotoxic effects on insects.

- 5% Lavender
- 2.5 % Clove
- 0.2% Thyme
- In mineral oil base

Bryony.sands@uvm.edu

Cattle lice

- 1 liter applied to back line and brushed in
- Two applications two weeks apart

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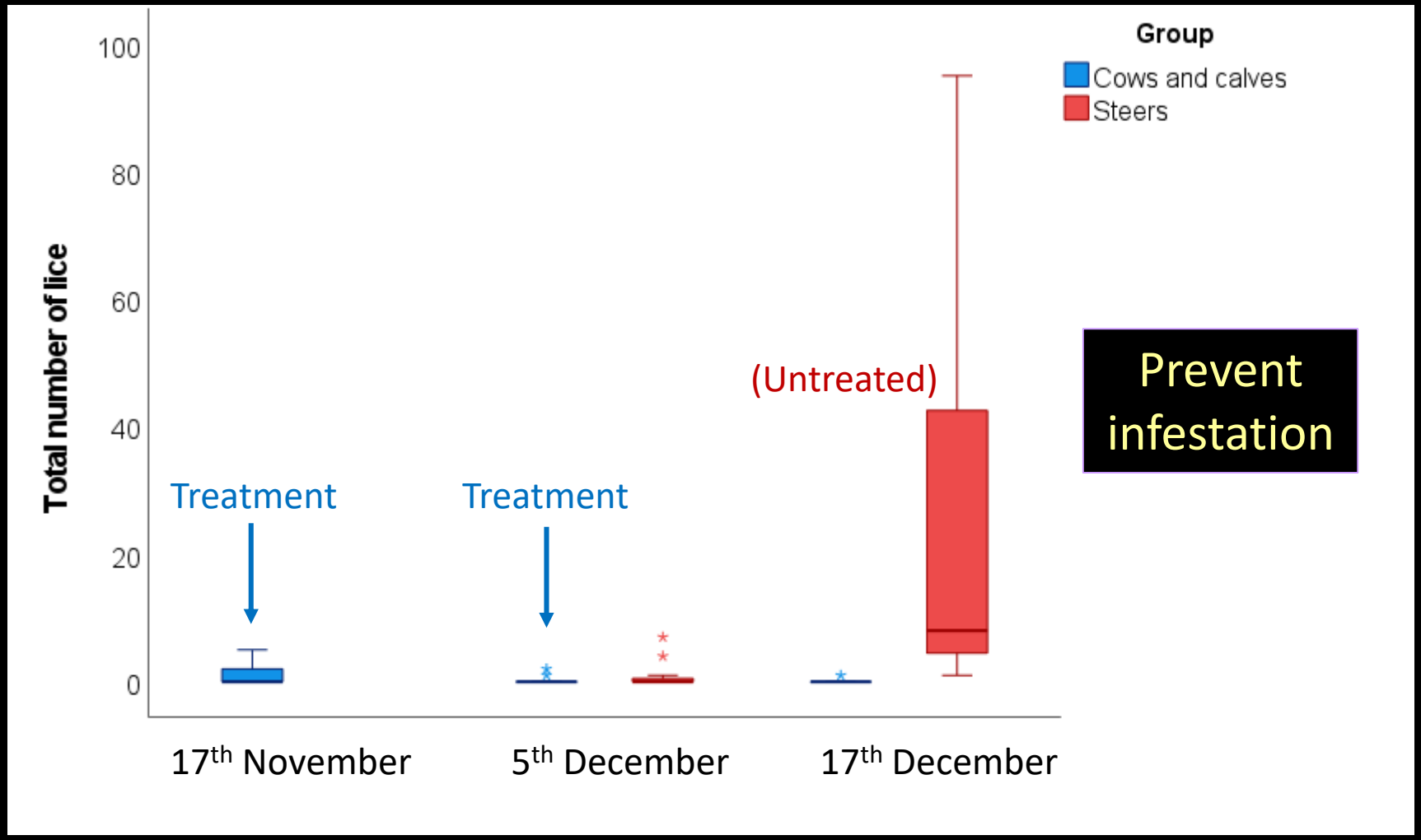
Trial 1 results



Bryony.sands@uvm.edu

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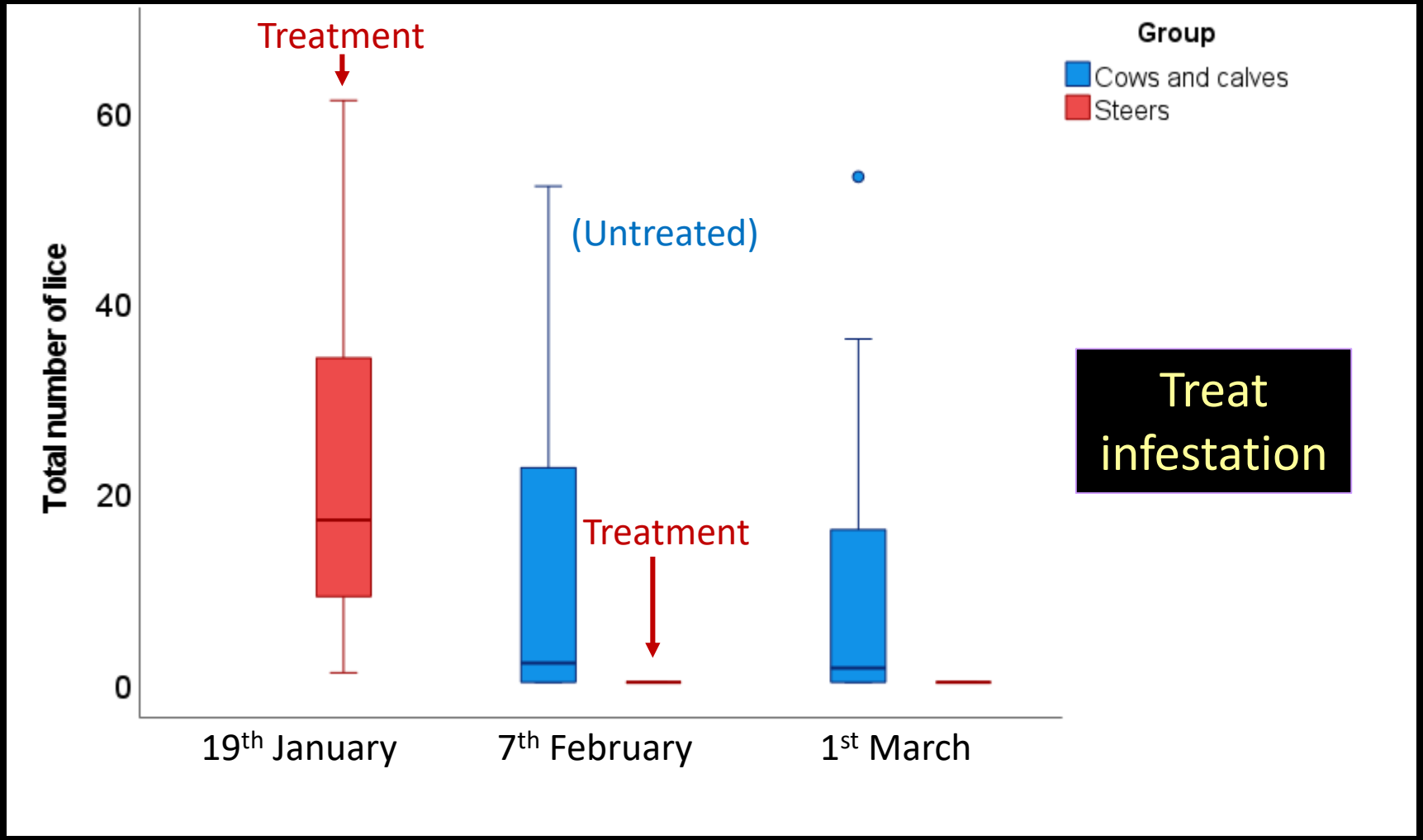
Trial 2 results



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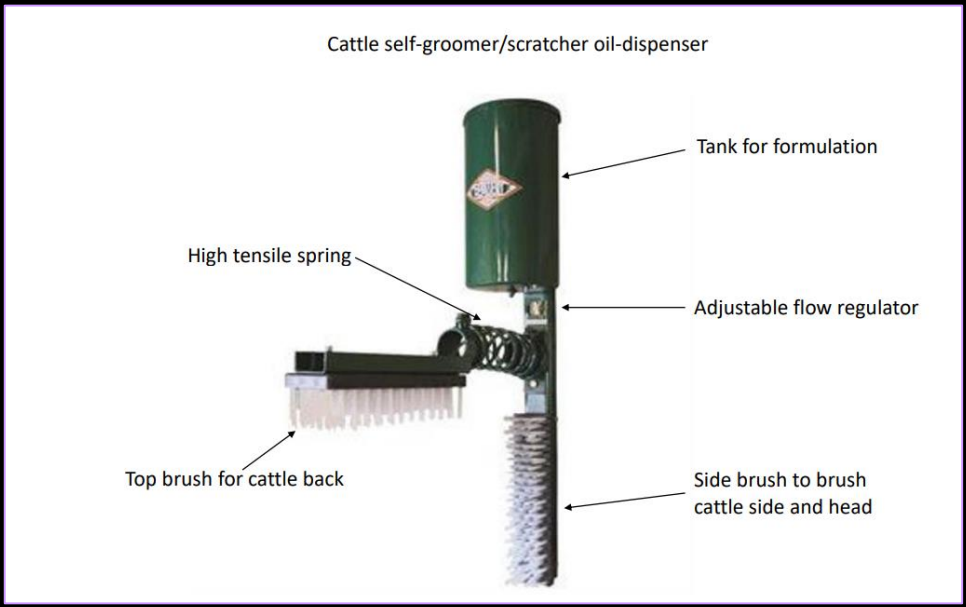
Take-home messages

- **Essential oil-based formulations can effectively prevent and treat winter lice of cattle**

- **Application method improvements to save time and labour….**
  - **Calves bigger issue**



Bryony.sands@uvm.edu

Thank you!

Northeastern IPM Center
Northeast SARE
UVM Extension
Ed, Isabelle, Evan at PRF

Heather Darby
Julia Gorenstein
Lauren Giroux
John Bruce

Bryony.sands@uvm.edu

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Compound	Environmental Toxicity	Environmental Persistence	Bio-accumulative	Mobility	TOTAL	CONCERN
Clorsulon (benzenesulphonamide – flukicide)	1	3	1	3	8	LOW
Closantel (salicylanilide – flukicide)	2	2	1	1	6	LOW
Deltamethrin	4	2	1	1	8	MED
Diclazuril (triazinone – antiprotozoal)	1	4	1	2	8	LOW
Doramectin	5	5	2	1	13	HIGH
Eprinomectin	4	4	2	1	11	HIGH
Ivermectin	5	4	2	1	13	HIGH
Levamisole Hydrochloride	1	2	1	1	5	LOW
Moxidectin	3	4	2	1	10	MED
Nitroxynil (flukicide)	1	1	1	1	4	LOW
Triclabendazole	3	4	1	1	9	MED

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