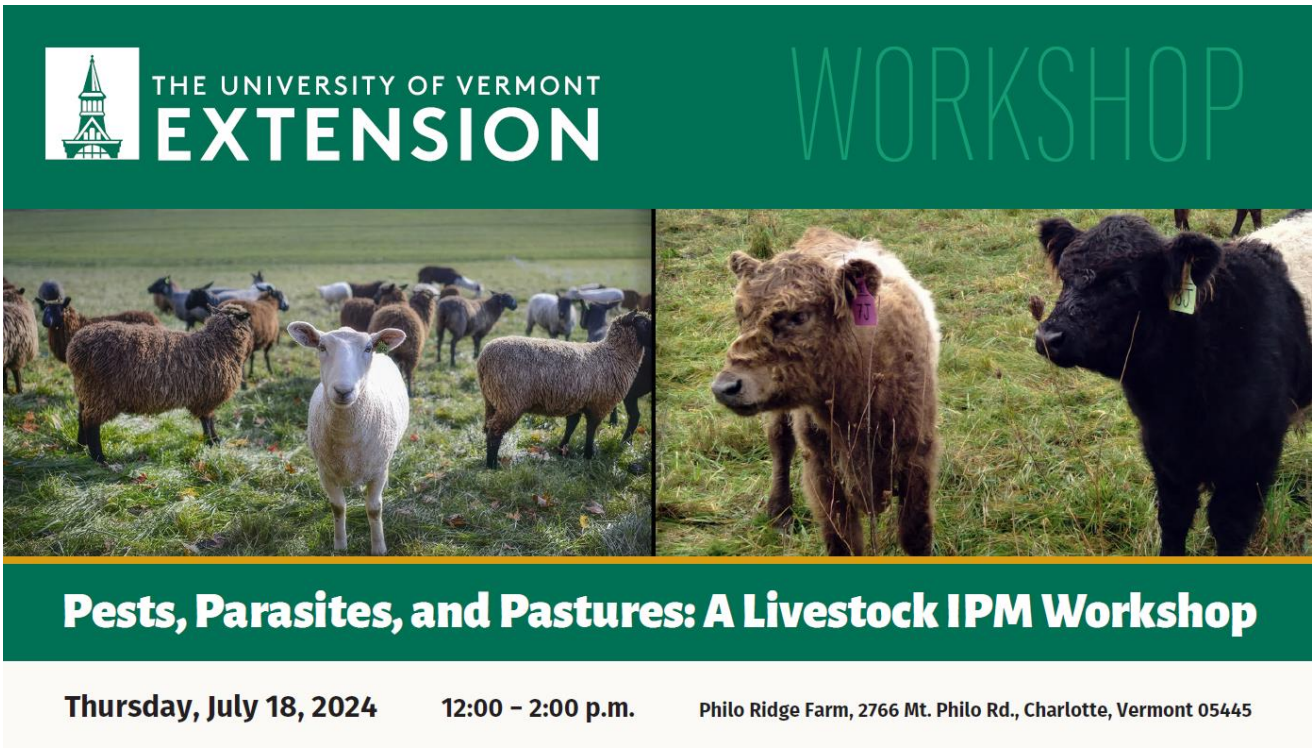
Bryony Sands, University of Vermont Extension



This summer workshop will give farmers an insight into ruminant pest and parasite management on their pastures and farms.

Ed Pitcavage and Isabelle Lourie-Wisbaum, land and livestock managers at Philo Ridge Farm, will share their experiences grazing cattle and sheep to achieve optimal pest and parasite control, as well as how they have managed winter lice populations using botanical treatments.

We will hear from UVM Extension Grazing Specialist Amber Reed, Extension Dairy Specialist Kelsie Meehan, and UVM Postdoctoral Research Fellow Bryony Sands. They will discuss ways that grazing management, alternative approaches, and IPM techniques can benefit livestock pest and parasite control for cattle and small ruminants.

Agenda

12:00: Welcome and housekeeping

12:05: Biosecurity brief with Amber Machia (UVM Extension)

12:15: Philo Ridge Farm overview with Ed and Isabelle

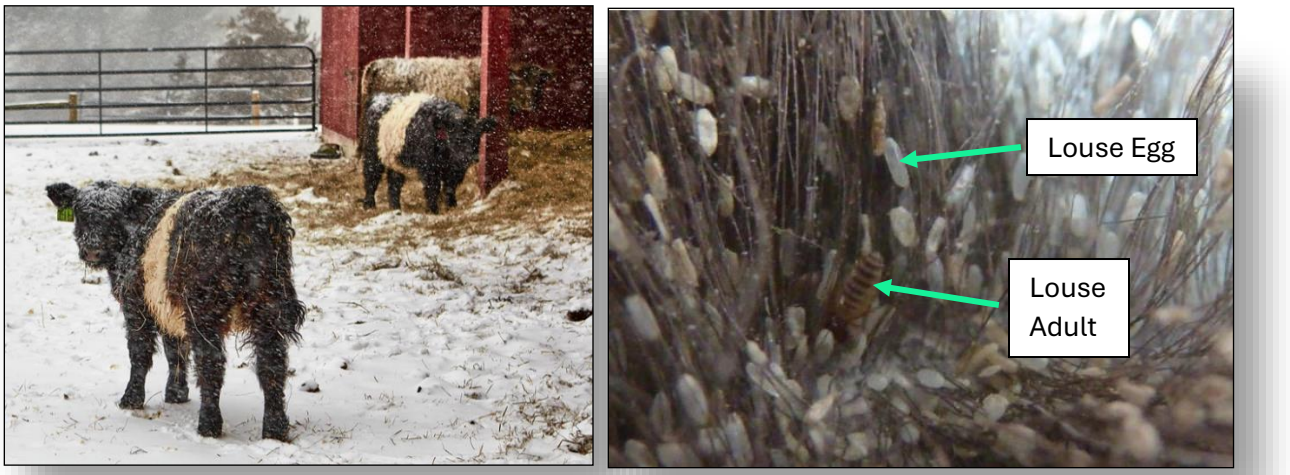
12:30: Winter pests and parasites discussion – cattle lice project

13:00: Grazing and pasture management for cattle pests and parasites discussion

13:30: Grazing and pasture management for small ruminant pests and parasites discussion

14:00: Wrap up and end of workshop

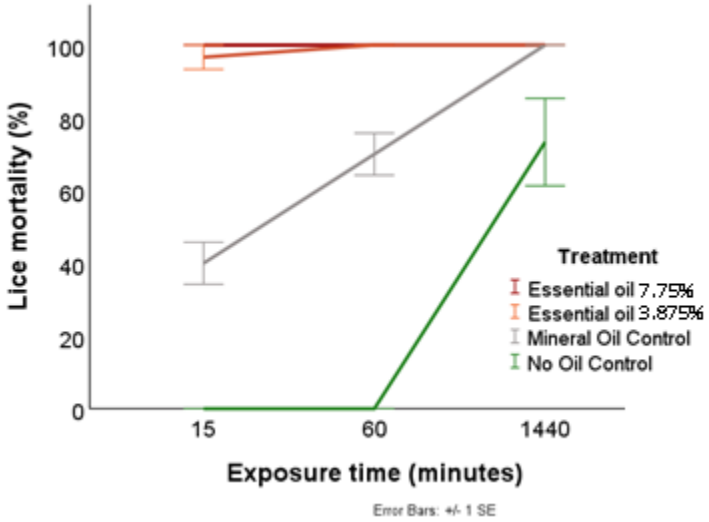
Research results – Essential oil formulations for winter cattle lice (2022-2023)



Formulation:

- Essential oils: 5% Lavender; 2.5% Clove, 0.25% Thyme.
- Diluted in a mineral oil base.
- E.g. to make 1 gallon, add 6.4 oz lavender, 3.2 oz clove, and 0.32 oz thyme and the rest mineral oil.

Tests on lice in the lab



In the laboratory, the formulation resulted in 100% louse mortality after 15 mins exposure (red line). At half the concentration (orange line) there was 97% louse mortality after 15 mins exposure. A control containing just mineral oil resulted in 40% lice mortality (grey line), and there was 0% mortality in another control containing no oils (green line).

Fig. 1 Cattle lice mortality after exposure to essential oil-based formulations. 100% mortality was seen after 24 hours for all groups because lice did not survive in the laboratory off-host.

Tests on lice in the field

We trialed the formulation with the herd of Belted Galloway cattle (Philo Ridge Farm, VT) by passing them through a chute, applying it along the back line, and brushing it into their coat.

At the beginning of the winter, the essential oils prevented lice infestation from building up in the treated group. In the untreated control group, lice numbers significantly increased over 4 weeks to an average of 32 lice per animal.

Later in winter, when lice numbers were high in the originally untreated group, the essential oils effectively reduced lice numbers to zero. Lice in the group that did not receive another treatment significantly increased to an average of 30 lice per animal.

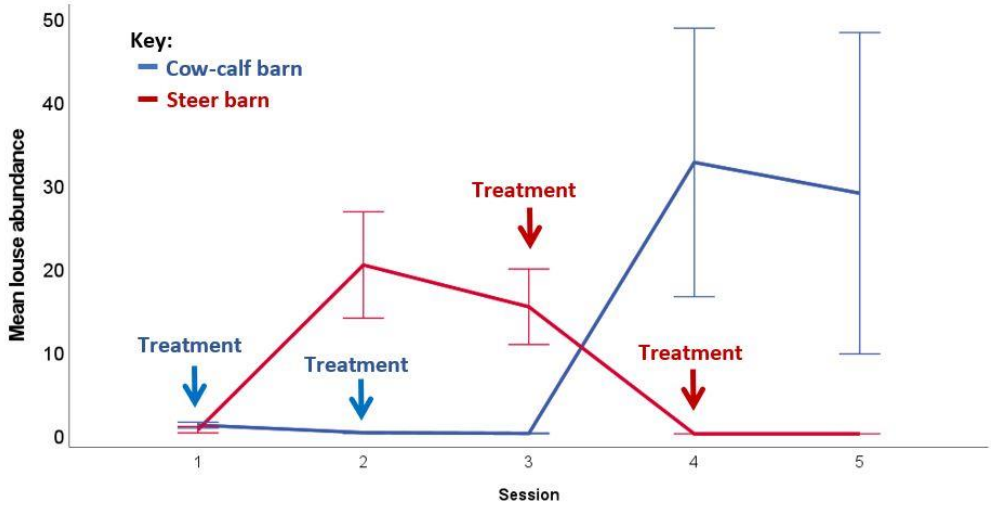


Fig. 2. Lice abundance on cattle housed in two separate barns. Arrows indicate when groups were treated with the essential oil formulation over winter (November 2022 —March 2023).

These results indicate that the essential oil formulation can effectively prevent as well as treat lice infestations in winter housed cattle.

Administering via a groomer-scratcher in the barn

To reduce time and labor costs of applying the essential oils to each cow individually, the formulation was used in cattle self-groomer-scratchers. Cattle are then able to self-administer the treatment on demand.

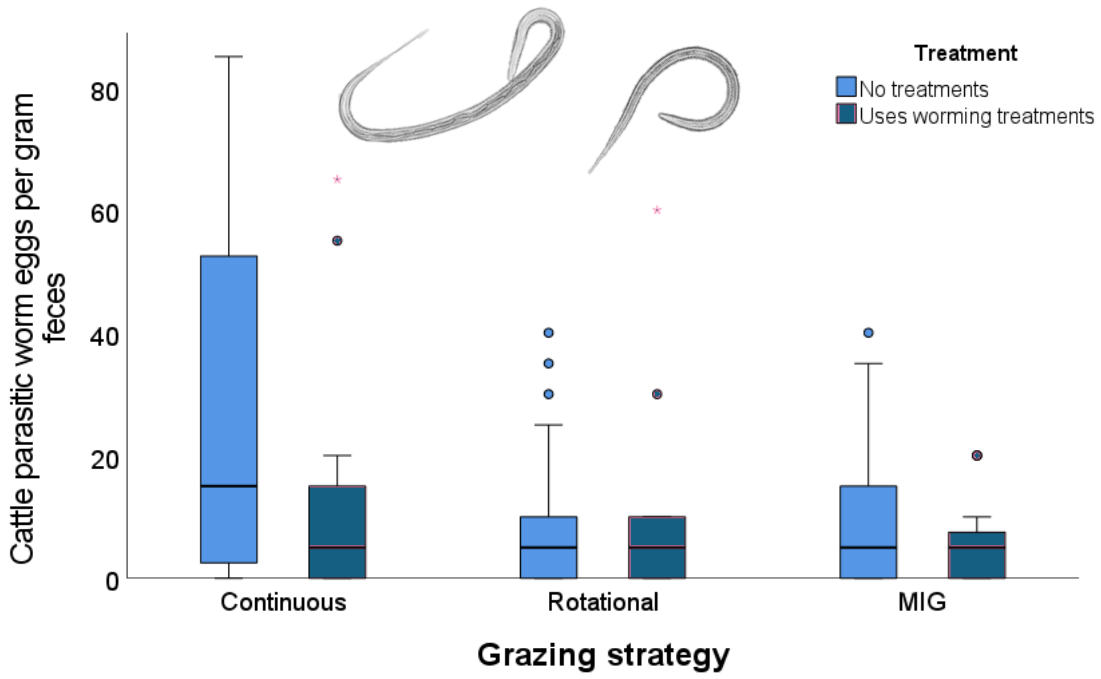
This helps to prevent lice populations building up, but is not as effective as administering the formulation directly to individual cattle. Effective management could be achieved through a combination of the cattle groomer-scratcher supplemented by individual treatment if needed. This is important for calves, which are more susceptible to lice and cannot reach the brushes.

Cattle self-administering the essential oils by using the groomer-scratcher in the barn.

Research results – IPM for grazing cattle project (2022)

Internal parasites – gastrointestinal nematode worms

Fecal Egg Counts were taken from grazing cattle on farms using different grazing practices, including continuous grazing, rotational grazing (cattle moved every 2-10 days), and management intensive rotational grazing (MIG) (cattle moved every 12-24 hrs.) Some farms were using chemical worming treatment (dark blue bars), and some were not using any worming treatments (light blue bars).



(Rotational grazing = cattle moved every 2-10 days. Management intensive rotational grazing (MIG) = cattle moved every 12-24 hrs.

Fig. 1. The impact of grazing strategy and chemical worming treatments on gastrointestinal nematode parasites of cattle.

- Rotational grazing strategies reduced internal parasites in cattle (worms and coccidia).
- Continuously grazed cattle that did not receive any worming treatments were at higher risk of worms.
- Rotational grazing and MIG reduced the risk of worms for farmers not using any worming treatments, to a level comparable to farms that were treating for worms.
- Rotational grazing strategies can reduce internal parasites in cattle without the need for worming treatments.

Pest flies

Pest fly populations breeding in manure on pastures were measured on farms using different grazing strategies and fly control management. We found face flies, horn flies, house flies, and blow flies breeding in cow patties.

Rotational grazing strategies did not reduce pest fly numbers (flies can easily travel and follow the herd around).

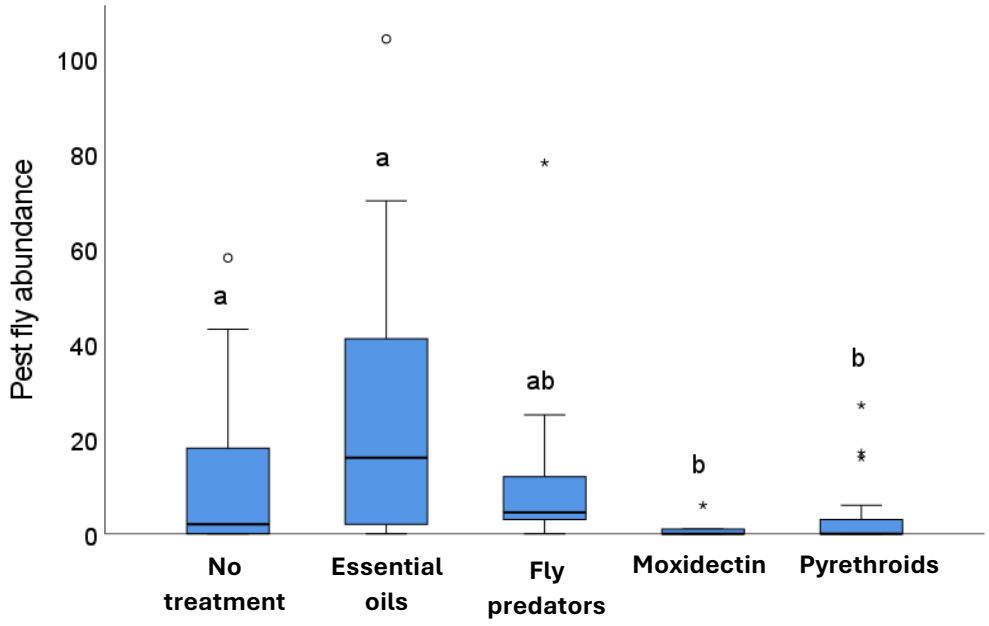
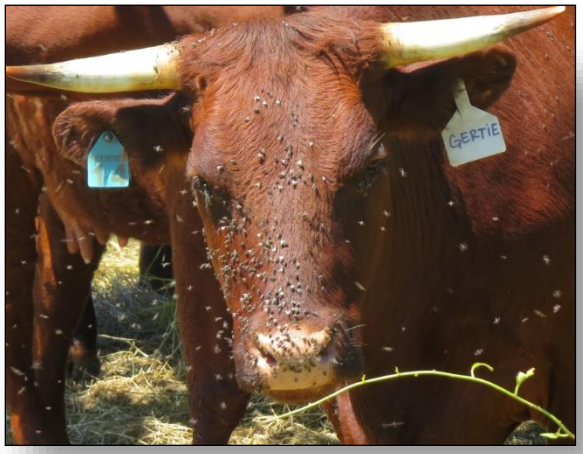


Fig. 2. The impact of different treatment strategies on pest fly abundances on pastures.

- Veterinary chemical treatments (moxidectin and pyrethroids) were most effective at controlling pest flies.
- Farms who released 'fly predators' (parasitoid wasps) also had reduced pest fly numbers.
- There was no statistical difference between farms using no fly treatments and those using essential oils, however we did not capture repellent effects of essential oils because we measured flies breeding in manure patties. Essential oils may still be effective at repelling flies from the cows. More research results pending – watch this space!

Other fly strategies – traps



Horse fly (top left), face flies (top right) and horn flies (bottom left). Horse flies and horn flies are biting flies and feed on blood, whereas face flies feed on secretions from the eyes and muzzle.

Cow Vac

Commercial vacuum fly trap (CowVac, Spalding Laboratories, Reno, NV) to control horn flies, stable flies, and face flies. As cows walk through the trap, flies are brushed off the face, flank, and back with hanging flaps and blown off the belly, udder, and legs from one side, and then vacuumed into a chamber from vacuum inlets opposite the blower and above the cow.

Research from the University of Minnesota has shown that this trap is effective at reducing horn fly populations by 44%. Stable flies and face flies were not significantly reduced by the trap.

Epps Biting Fly Trap

A large, solid surface surrounded by transparent areas (clear plastic deflectors) that create an object of interest to the fly. As flies approach the trap and try to fly around it, they will hit the deflectors and bounce down into the soapy water in the trays below.

Dish soap and water in the trays need to be kept topped up and can be messy.

Catches horse flies, deer flies, black flies, and stable flies. Not effective for house flies or face flies.

Horse-pal

A no mess and low maintenance trap that works using a visual bait – the black ball heats up mimicking the infrared body heat of an animal. Flies are attracted and then fly up and into the net, getting trapped in the jar on the top.

Very effective at catching horse flies and deer flies. Not designed to trap other flies.

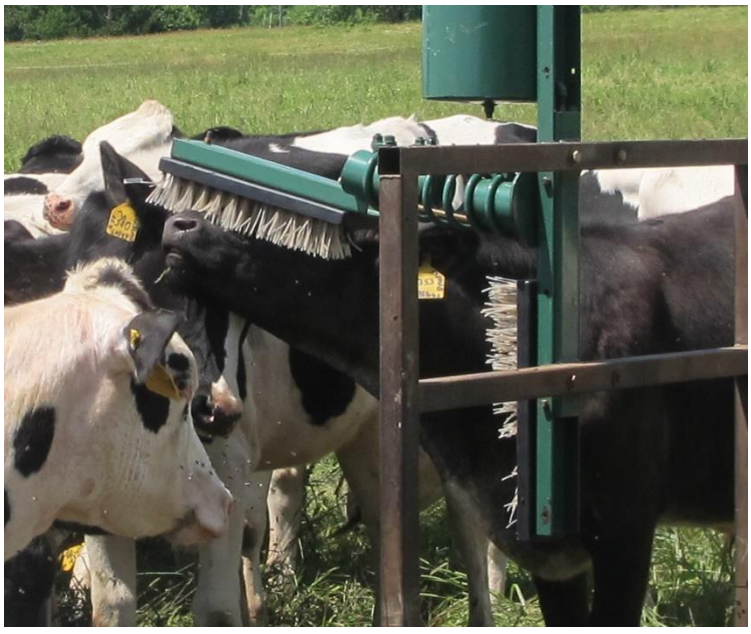
H-trap

Same principle as the Horse-pal above but a variation on the design.

Research in Florida and North Carolina suggested that this catches more flies than the Horse-pal, **however** we have trialed both traps in the Northeast and found the Horse-pal to be significantly more effective than the H-trap. The Horse-pal is also easier to handle and move around.

Groomer-scratcher with essential oils for flies

Works out in the pasture for flies as well as in the barn for lice! Cows love using this. Essential oils have low residual activity because they evaporate from the body quickly (spraying with essential oils only keeps flies off for a couple of hours). Using them like this in the groomer-scratcher means that cattle can reapply the formulation whenever they need to.



Cows use it for their body and their face.

It should be positioned at the appropriate height depending on the size/age of the animals.

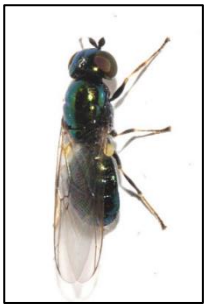
Dung beetles for pest and parasite control

Dung beetle (*Aphodius pedellus*)

Dung beetle (*Onthophagus hecate*)

Predatory beetle (Staphylinidae)

Predatory beetle Hydrophilidae (*Sphaeridium*)



Soldier fly *(Microchrysa polita)*

Parasidoid wasp (or 'fly predator') (*Muscidifurax raptor*)

Dung beetles decompose and recycle manure, improving soil health and quickly removing cow patties from pastures. They also suppress the transmission of livestock gastrointestinal parasites, and reduce pest fly numbers, by removing the manure habitat that pests and parasites develop in.

There are also beneficial flies which decompose manure, such as soldier flies and golden dung flies.

Other important insects that live in manure patties are parasitoid wasps (which destroy pest fly pupae), and predatory beetles (which eat pest fly larvae).

Many veterinary pest and parasite treatments kill beneficial insects in the dung, because they are insecticidal and are excreted in the manure after animals are treated.

Ivermectin, eprinomectin, and pyrethroids have the worst impacts on beneficial pasture insects. Fenbendazole (e.g. Safe-guard) and moxidectin (e.g, Cydectin) do not have such toxic impacts and are safer to use.

Dung beetle friendly practices:

- Graze for as long as possible
- Minimize use of pesticides (wormers, insecticides)
- Use IPM for pest and parasite control e.g. grazing management
- Integrate woodland habitat to support native dung beetle species