Evaluation of Pasture Dragging as Non-Chemical Control Method for Filth Fly Pests of Pastured Beef Cattle

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Abstract

A manual pasture dragging technique was investigated for its ability to suppress filth fly emergence from cattle pasture manure pies at the Dickinson College Farm. Cow pies were identified and randomly assigned to different smearing treatments. Pies were left uncovered for five to seven days to allow for desiccation, followed by trapping and identifying flies from each pie. Pasture dragging did not significantly decrease filth fly emergence, and on some dates the dragging treatment actually produced more flies than in control pies. These results do not support pasture dragging as an effective mechanical control for filth flies in this region. However, pasture dragging could be useful for breaking up cow pies in order to degrade them more rapidly.

Background

Figure 1. *Haematobia irritans* (horn fly), collected at Dickinson College Farm and viewed under a light microscope in 70 percent ethanol.

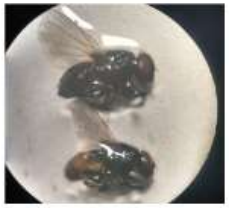

Figure 2. *Musca autumnalis* (face fly), female (top) and male (bottom), collected at Dickinson College Farm and viewed under a light microscope in 70 percent ethanol.

- Irritation caused by filth fly pests → limits the cows' feeding and growing efficiencies → significant economic losses
- Develop resistance to chemical controls (Oyarzún et al., 2008, Pickens and Miller, 1980)
- Kaufman (2011) suggested pasture dragging / smearing manure to kill immature flies
- 2018 - the farm constructed a pasture drag attached to a utility vehicle
  - •No statistically significant pattern between treatment (dragged pies vs. control) and fly emergence
  - •Unusually wet summer affected desiccation of cow pies
- 2020 - tested using a manual dragging technique (hand tool) to spread manure

Materials and Methods

- 4 rounds, 30 pies each
- Pies randomly assigned to a treatment - control, spreading to double the width, and spreading to triple the width
- Traps placed after 5-7 days

Figure 4. Each trap consisted of a large outer cone, stabilized by a fencing stake and landscaping staples, and a smaller cone attached to a mason jar.

- Flies euthanized and collected from each jar after day 14 and after day 21
- Identified and sorted into face flies, horn flies, house flies, and other flies
- Used HOBO data logger and rain gauge to collect temperature and precipitation data

Results and Discussion

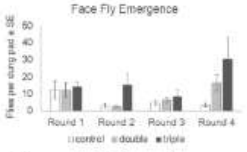

Figure 5. Effects of pasture dragging in each treatment (control, double, triple) on the average number of face flies per cow pie, +/- SE. An ANOVA analysis on a model including weather data and treatment determined a significant correlation between weather and face fly emergence for each treatment.

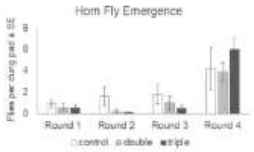

Figure 6. Effects of pasture dragging in each treatment (control, double, triple) on the average number of horn flies per cow pie, +/- SE. An ANOVA analysis on a model including weather data and treatment determined a significant correlation between precipitation and face fly emergence for each treatment.

The data show horn and face fly emergence was not reliably suppressed by this manure spreading technique. In fact, under some circumstances, the treatment increases face fly emergence. A possible explanation for this is that manure spreading removes the crusty top layer and leaves a moist surface which enhances fly survival and emergence. The ANOVA showed the effects of pasture dragging are often dependent on the weather conditions. In particular, horn fly emergence significantly increased in Round 4, around mid-to-late August 2020 when precipitation peaked.

Conclusions

Based on our results, the dragging/spreading technique is not a reliable mechanical method of fly control method for cattle pastures in the Mid-Atlantic region. This technique may be useful for other purposes, such as breaking up cow pies that may be inhibiting pasture regrowth. A future study could explore the use of a different field tool such as a spring-tooth harrow that would break manure into smaller clumps rather than having a smearing effect.

Acknowledgements

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