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Livestock Research

Fly Monitoring for Grazing Cattle - 2013

Staff Contact:
Margaret Dunn – (515) 232-5661
margaret@practicalfarmers.org

Cooperators:
- **Dave and Meg Schmidt – Exira**
- **Tom Cory – Elkhart**

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http://bit.ly/pfi_livestock

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In a Nutshell

- Control of flies and other parasites is important for livestock health, productivity, and farm economics.
- Fly observations were conducted approximately twice monthly.
- Tests were done to detect effects of different days, weather conditions, and other factors on the fly counts.
- Results from the Schmidt's this year suggest adequate fly control from the Ecto-Phyte™ and fly trap barrel.
- Results from the Corys suggest a seasonal increase in fly counts as the weather gets hot and dry, and then declining populations towards the end of summer.

Project Timeline:

May through October 2013

Photos of animals' shoulders and side were taken to measure horn flies, which feed on blood.

Background

Control of flies and other parasites is important for livestock health, productivity, and farm economics. The two most common cattle fly species are the horn fly (Haematobia irritans) and face fly (Musca autumnalis). Horn flies congregate on animals' shoulders and sides, where they feed on blood, causing anemia and reducing weight gain in addition to pain and irritation (Powell 1995b). Face flies congregate on animals' faces, where they feed on secretions and cause general irritation and spread disease (Powell 1995a). The direct effects of the flies – blood loss or disease transmission – are exacerbated by the indirect effect of reduced grazing time, as animals bunch up or seek areas where the flies are less severe. Chemical insecticides are effective at reducing fly populations (Harvey and Brethour 1979) but also damage beneficial species such as dung beetles (Strong 1993). Fly counts on animals vary among different breeds of animals, as well as the size of the animal (Brown et al. 1994). Practical Farmers designed a dual-purpose project. First, in-field fly counts were compared to counts from photographs, to see if a quick observation of cattle can be converted into "real" fly count numbers. Second, the efficacy of fly reduction strategies was monitored through these two fly count methods.

Materials and Methods

Each cooperator selected five cows at the start of the trial. Fly observations were conducted approximately twice monthly from May through September or October 2013. The time of each observation was recorded, as were weather conditions (temperature, wind, and sky appearance), location and appearance of cows (in shade or in the open; congregated or spread out), and any fly control methods in use. The number of face flies and horn flies on each of the five cows was estimated, and photographs were taken of the cows' faces and sides for subsequent counting.

Data were analyzed with SAS 9.3 (SAS Institute Inc., Cary, NC), and least-squares means are reported. Significance was established if $P \leq 0.05$, and tendencies noted if $0.05 < P \leq 0.1$. Tests were done to detect effects of different days, weather conditions, and other factors on the fly counts; most tests were done individually. Relationships were determined between the number of flies observed in the field and those in the pictures, and between the face and side of the animal.

Results

Dave and Meg Schmidt, Troublesome Creek Cattle Co.

The Schmidts have a herd of about 40 predominantly-Angus cattle; most are mature cows. The animals grazed pastures both on the home farm and near a neighbor. At times throughout the trial, cattle were exposed to two fly control methods. One was a Fly Killer Kover™ (Fly Killer Kover), a mineral feeder that applies a mix of mineral oil and Ecto-Phyte™ (Agri-Dynamics) to cattle when they consume the mineral. The other was a fly trap barrel in the pasture, usually near the mineral feeder or waterer. Cows were observed on eight days throughout the summer, between about 9am and 11am.

Fly counts, either on the face or side, and either through in-field or photo counts, were not affected by whether the sky was clear or cloudy. There were no observable animal-to-animal differences, and neither cow coat nor face color influenced any counts.

There were differences among days, wind conditions, ambient temperature, animal activity, and fly control treatments, detailed below and in **Table 1** and **Figure 1**.

- Wind: the windiest days also had the most fly counts ($P < 0.05$); however, the two windiest days were also the warmest.
- Temperature: as ambient temperature increased from 60 to 80°F, face fly counts increased significantly ($P < 0.01$) while horn fly counts only tended to increase for in-field observations ($P = 0.09$).
- Cow activity: animals were noted as either being out grazing or bunched up. Activity did not affect horn fly count ($P > 0.10$), but face fly counts were greater when animals were bunched up than grazing ($P = 0.05$ for photo counts and $P = 0.08$ for in-field counts).
- Fly control: different treatments affected different fly counts. Face fly counts were lower when the barrel trap was present compared to either no treatment or both fly barrel and insecticide ($P = 0.02$ for photo counts and $P = 0.04$ for in-field counts). This is expected; barrel traps target face flies, and the Schmidt's observed the same reduction with barrel traps last year. Horn fly counts were greater when only the insecticide was present ($P < 0.01$ for photo and in-field counts), which is the opposite of what would be expected.

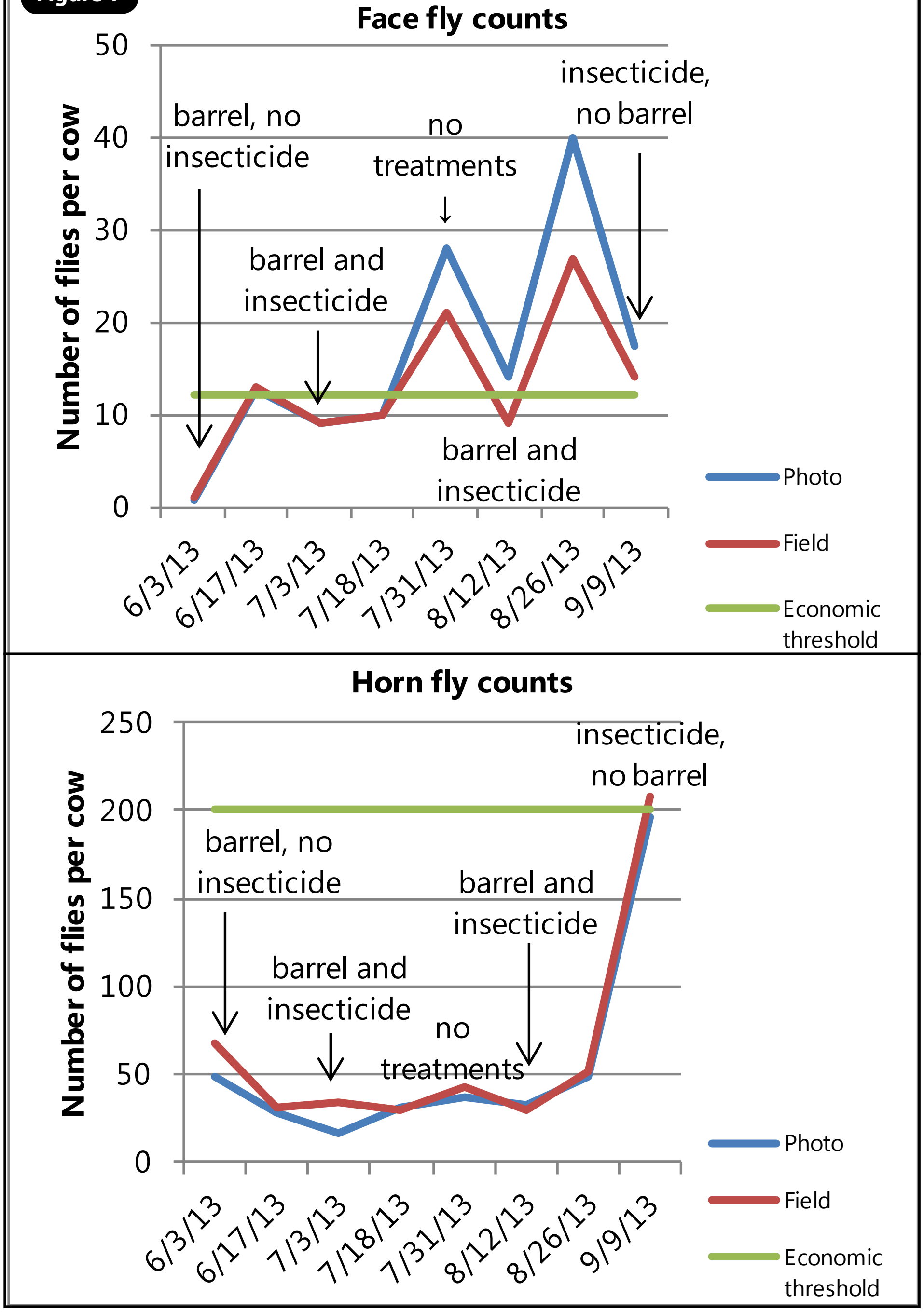
Table 1

Effects of wind, temperature, and animal activity on face and horn fly counts on cattle.

Effect	Value	Face flies, photo	Face flies, in-field	Horn flies, photo	Horn flies, in-field
Wind	Calm	15.0 b	13.3 b	28.4 b	34.3 b
	Light breeze	7.4 b	5.0 c	40.7 b	48.5 b
	Stiff breeze	28.6 a	20.5 a	122.1 a	130.0 a
Temperature (°F)	60	0.6 c	1.0 c	48.4	67.0 y
	65	28.0 a	21.0 a	37.4	43.0 y
	70	13.4 b	11.0 b	30.7	30.5 y
	75	9.6 bc	9.5 b	23.8	31.5 y
	80	28.6 a	20.5 a	122.1	130.0 x
Animal activity	Grazing	13.8 b	11.3 y	62.3	68.0
	Bunched up	24.5 a	18.0 x	32.5	43.0

Within a column, values followed by different letters are different (a-c, $P < 0.05$) or tend to differ (x-y, $P < 0.10$).

Figure 1



According to data from West Virginia University, there are approximate fly load levels above which the animals are likely suffering enough to cause reduced weight gains or health, and thus an economic disadvantage to the producer. These levels are 12 face flies and 200 horn flies per cow. There were four days on which the face fly counts were above this economic threshold and only one day when the horn fly level was above the economic threshold (Figure 1). This is similar to results from the first year of the trial (Dunn 2013), when two days had above-threshold horn fly numbers and six days were above the face fly threshold. The average face fly count (based on photos) was 27 in 2012 but only 16 in 2013; the average horn fly count was 168 in 2012 but only 55 in 2013. While weather plays a great role in fly populations and data from only two years can be compared, these results suggest that the Schmidts' management system and fly control methods are reducing stress on their cattle.

When designing the project, it was assumed that a photograph of a cow captures a good estimate of the actual fly load at the time, and is more accurate than a person trying to count flies. Comparing the in-field fly counts to those from a photo demonstrates how accurate an observer can be in quick estimations. In 2012, the in-field observation counted only about 82% of the "actual" number of flies seen in the photo. Face fly counts in the field, however, were 119% of the photo count. Movement of the cow's head and frequent movement of a small number of flies may have been responsible for face fly inaccuracies, whereas on the side, there is less movement of the animal itself and fly numbers were greater. In 2013, in-field counts of face flies were 118% of the photo, similar to that of the year before. In-field horn fly counts, however, were 199% of the photo, very much the opposite of the year before. There were far fewer horn flies in 2013, so perhaps the movement of fewer flies was more distracting for the observer.

Tom Cory, Cory Family Farm

The Corys graze finishing White Park cattle alongside sheep, rotating the animals to new paddocks daily to reduce the buildup of manure and flies. The pastures are unshaded, so keeping the animals fly-free and comfortable in the heat is important. Tom sprays his cattle with Basic H™ (Shaklee Co) as an insect repellant. Cattle were observed every three weeks, starting at the end of May.

Fly counts were estimated in-field, on the animals' sides and faces, and were given a ranking from 1 (few flies, if any) to 5 (several hundred). Weather was not used in analysis, as all the observation days were warm. However, Tom noted that when the weather turned from being a cool wet spring to a hot dry summer, the fly counts escalated quickly. Animal activity was not reported; however, as there was no shade in the pastures, the cattle could not congregate in a cooler area. Since all cattle were White Park, which have a fairly uniform appearance (white body with black nose, eyes, and ears), coat color was not a factor. Still, Tom noted that animals with more black or slightly darker skin or spots, appeared to have more flies on them. Brown et al. (1994) also reported greater fly load on dark- compared to light-coated cattle.

There were differences among observation days ($P < 0.05$, **Figure 2**). The number of both face and horn flies tended to increase throughout the early summer and peaked in July and August, then declined through September. This roughly corresponds to the increasing temperature, as Tom noted; the average daily maximum temperature for the area is reported on the figure (Iowa State Mesonet). The similar shape of the face and horn fly count curves (Figure 2) agree with Brown et al. (1994), who reported significant correlation between face and horn fly populations. This was not observed in the Schmidt's data, likely because the different fly control treatments targeted one or the other species, rarely both.

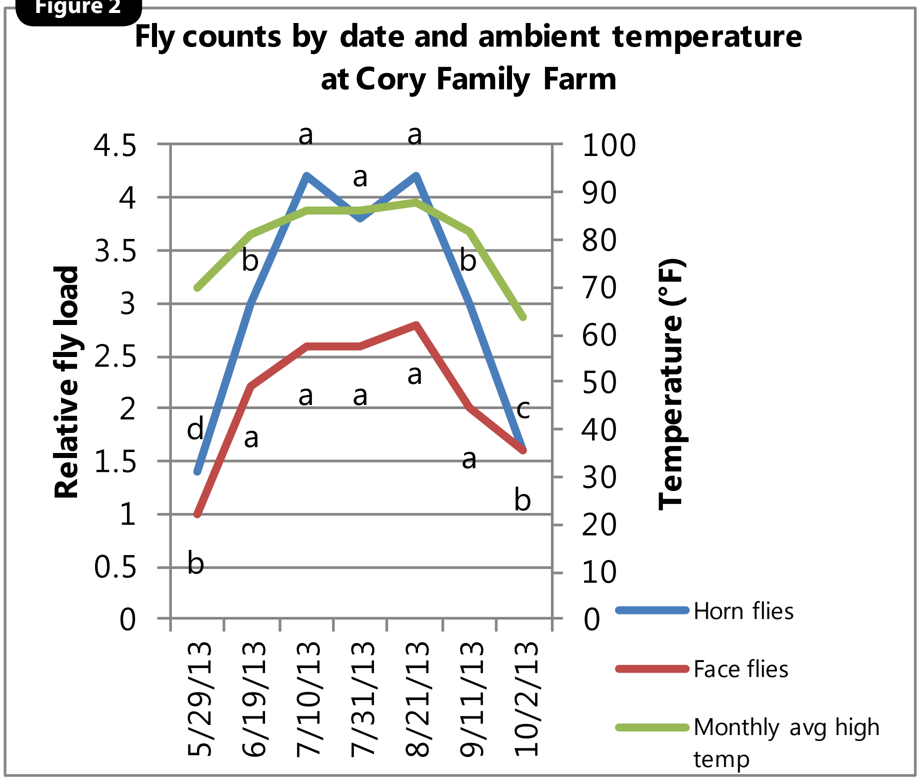
The fourth observation (July 31), one of the highest fly count days, was at the start of the second rotation through the paddocks; and the fifth observation (September 11), when fly counts began decreasing, was just before the start of the third. The animals were rotated frequently in an effort to reduce fly load – both face and horn flies have life cycles in the range of 2-3 weeks (Powell 1995a; Powell 1995b); these results suggest that the fly populations that had built up in the paddocks during and after grazing did not survive long enough for the return of the cattle some weeks later.

Conclusions and Next Steps

Results from the Schmidt's this year suggest adequate fly control from the Ecto-Phyte™ and fly trap barrel, as fly counts were lower than last year (though weather likely plays a role). They will continue the project next year. As their pastures become more productive, they may be able to rotate more frequently or give longer rest to paddocks, which will cut fly life cycles. In the meanwhile, the fly barrels and insecticide seem to be controlling flies fairly well.

Results from the Corys suggest a seasonal increase in fly counts as the weather gets hot and dry, and then declining populations towards the end of summer. Tom hopes to continue the project next year and will test out different supplementations and sprays for the cattle

Figure 2



Conclusions and Next Steps (cont.)

and pastures. In the past, he has added apple cider vinegar to the animals' water tanks, and would like to do so again, as it reportedly helps repel flies and improve animal health. He is also constantly trying new foliar and mineral fertilizers for his pastures – perhaps improved microbiota in the soil will allow faster breakdown of manure piles and improve animal health. Chickens may follow the sheep and cattle as well, to break open manure heaps and eat fly larvae.

Photos of animals' faces were taken to measure face flies.

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