Northern NY Agricultural Development Program
2007-2008 Project Report

Determination of infectivity of *Fascioloides magna* in Northern New York cattle herds

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Background
There is growing interest in increasing the use of grasslands to improve animal performance and profitability. Grasslands can be used to improve the profitability of products for the commodity market such as stocker cattle or specialty markets, like the grass finished market. Additionally, the dairy industry utilizes pasture to supply a portion of the nutrients required by their cattle. Much of the pasture land in NNY is land not suitable for crop production due to low fertility, slope and drainage. Wet areas are often part of the pasture system and are breeding grounds for several internal parasites. The large liver fluke (*Fascioloides magna*) also known as the deer fluke has been found in the livers of slaughter cattle in two NNY plants. According to USDA regulations when a fluke is found in the liver it is condemned. While the value of liver is not a large part of income to the producer, heavy infestations can result in impaired animal performance. This affects growth rate in younger cattle and may impede reproductive efficiency in the cow herd. Deer flukes are common in other regions of the US, however the presence in our region has not before been documented. Unlike internal parasites common to this region, detection is not possible with fecal egg counts. Examination of the liver at slaughter is the best means to confirm the deer fluke infestation. The commonly used anthelmintics used in control of internal parasites have been shown to have limited effectiveness in controlling the deer fluke. Timing of treatment and changes in pasture management are the only known control. Therefore if grasslands are to be used more intensively in NNY especially those in wet areas, knowledge of the presence of liver flukes and resulting control measures need to be known.

Methods
Cooperative Extension Educators in each of the 6 NNY counties identified packing plants, both custom and USDA facilities and contacted them regarding their interest in participating in the study. A data entry sheet was developed to inventory and describe the

cattle slaughtered and the number of livers condemned. Digital cameras were provided to each of the participating plants. Participating plants were to record the number of condemned livers and if fluke infection was suspected, then samples of the liver were to be collected. Dr. Laura Raymond, DVM was hired to teach plant personnel how fill out the data entry sheet, look for flukes, collect and preserve liver samples if flukes were suspected and photograph the specimen. Data and specimen collection occurred from April 2008 through December 2008. Specimens were sent to the Cornell Diagnostic Lab for confirmation of presences of *Fascioloides magna (F. magna).*

Results

Data collected at the five plants are shown in Table 1, Appendix 1. Sample collection occurred from April through December 2008. The plants were located in Lewis, Jefferson and St. Lawrence Counties; two were USDA inspected and three were custom plants. Of the 16 cattle sampled 4 were female and 12 were male. The average age of the cattle sampled was 3.2 years; five head were 2 years of age or less. As the population of cattle in the region is predominantly of dairy breeding, it follows that 69% of the cattle sampled were Holstein or Ayshire. The body condition score of the cattle averaged 3.6 indicating that the majority of the cattle were in good condition.

Plants A & B cited USDA log books for number of cattle slaughtered. Plant B also used a USDA log book to determine the number of livers condemned for fluke infestation. All other data from the plants was estimated by the plant owner and/or USDA inspector. The total number of cattle slaughtered during the collection period was approximately 1425 (Table 2, Appendix 1). The protocol stated that samples would be collected from all condemned livers. Plant A only collected 4 samples from approximately 35% of the livers condemned for flukes. Of these four samples one was positive for *F. magna*; the remaining three samples contained black pigment which according to the Diagnostic Lab, is indicative of the presence of *F. magna*. Plant B collected samples on 6 of the 11 condemned livers. All six were positive for *F. magna*. Of the 200 cattle slaughtered by Plant C, only one liver contained a fluke which was positively identified as *F. magna*. The last two plants reported no flukes in livers during the sampling period.

If only the confirmed cases of *F. magna* were used, the rate of infection was just under 1% of the cattle slaughtered in the five plants. While there are several species of liver flukes, only *F. magna* was positively identified. According to the literature, the other two species of flukes do not have a range in habitat that includes northern New York. Therefore it is probably a reasonable assumption that if a liver is condemned for flukes, it is most likely due to *F. magna*. Based on this assumption, average infectivity rate was 25%, with a range of 0% - 35%.

Conclusions/Outcomes/Impacts

The cattle that were infected with *F. magna* were generally older than two years of age and in relatively good body condition. Most authors feel that cattle can withstand up to moderate levels of infection with little impact on animal performance, yet the data found in the literature is inconclusive. The data from this survey would indicate that based on body condition score, cattle were not being adversely affected by fluke infestation. Most of the cattle in this survey were young dairy bulls (< 4 years old), which is probably more a function of the type of cattle slaughtered in Plant B than a description of the cattle most

susceptible to infection. However, many of these bulls came from a dairy heifer raising operation which included a significant period of time grazing in swampy areas. With the allegedly high level of infection in Plant A, a more thorough characterization of the cattle in this plant might be more enlightening.

Based on the literature control of *F. magna* involves removing the intermediate host (snail) or definitive host (white-tailed deer) or reducing cattle exposure to these hosts. Given that most pastures consist of swampy areas in ideal deer habitat, these controls may not be practical. Limited success with anthelmintics has been reported in the literature; however the products are not labeled for control of *F. magna* in cattle. The products are albendazole (Valbazen® Suspension) and clorsulon (CURATREM®). Producers suspicious of fluke infection should work with their herd veterinarian to determine management options for prevention and control.

Outreach

A Power Point presentation was given Essex, Clinton, Franklin and St. Lawrence Counties in July, 2008 and Essex, St. Lawrence and Jefferson Counties in November, 2008. The presentation reviewed the project, results and discussed prevention and treatment options for the large liver fluke.

Next steps

What need to be better understood is why the one plant had such a high degree of condemned livers due to flukes. The USDA inspector in that plant was interested in this study and perhaps a more controlled data collection system could be designed. This may locate a geographical area or type of cattle that are particularly prone to *F. magna* infestation.

Reports and/or articles in which results of this project have already been published.

"Deer parasite found in North Country beef cattle" Watertown Daily Times. January 14, 2009.
http://www.watertowndailytimes.com/article/20090114/NEWS03/301149970

"Beef-cattle parasite found in local area" The Press Republican. January 18, 2009.
http://www.pressrepublican.com/archivesearch/local_story_018001706.html

"Beef cattle parasite found in Northern New York. The Post Standard. January 13, 2009.
http://blog.syracuse.com/farms/2009/01/beef_cattle_parasite_found_in.html

For more information

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Appendix 1.

Table 1. Data collected for survey of *Fascoilodes magna* in Northern New York, April – December 2008

Plant name	Sex	Age, yr	Breed	BCS[1]	County	Liver Sample	Result
A	m	1.5	Holstein	3	St. Lawrence	y	positive
A	m	2	Angus	3	St. Lawrence	y	negative[2]
A	f	6	Hereford	5	-	y	negative[2]
A	f	3	Holstein	3	St. Lawrence	y	negative[2]
B	m	4	Angus	3	St. Lawrence sale barn	y	positive
B	m	-	Holstein	-	Lewis	y	positive
B	f	4	Holstein	3	-	n	
B	m	2	Holstein	3	Lewis	y	positive
B	m	4	Red Angus	1	Lewis	y	positive
B	m	4.5	Holstein	3	St. Lawrence sale barn	y	positive
B	m	3	Holstein	5	Lewis	y	positive
B	m	4	Ayshire	3	St. Lawrence	n	
B	m	2	Holstein	5	-	n	
B	m	3	Holstein	5	Lewis	n	
B	m	3	Holstein	5	Lewis	n	
C	f	2	Angus cross	4	Jefferson	y	positive
D	No flukes found						
E	No flukes found						

[1]Body Condition Score (1=lean 5=fat)
[2]No fluke found but black pigment which is associated with *Fascioloides magna*

Table 2. Cattle slaughtered and flukes identified April – December, 2008

Plant	No. slaughtered	No. flukes[1]	%
A	994	348 (4)	35
B	101	11 (6)	11
C	200	1 (1)	1
D	40	0	0
E	90	0	0

[1]Value in parenthesis is number of *Fascioloides magna* confirmed by Cornell Diagnostic laboratory