

Présentation of the Research Project :
« Development of a Protein Diet Adapted to the Ayrshire Breed »

Saint-Hyacinthe, March 1, 2017

Gérard Landry, agr.
Director of Animal Production Research

Development of a Protein Diet Adapted to the Ayrshire Breed

Goals

- To increased protein concentration in a diet served in two herds of Ayrshire dairy COWS
- To better meet the nitrogen requirements of Ayrshire cows to increase milk production and maintain high components

Farm 1

Control :

2nd calf & + : 18 % CP et 35 % NDP

1st calf : 17,5 % CP et 35 % NDP

Experimental 1 (+ 1,5 % CP) :

2nd calf & + : 19,5 % CP et 35 % NDP

First calf : 19 % CP et 35 % NDP

Experimental 2 (+ 1,5 % PB et + 5 % NDP) :

2nd calf & + : 19,5 % CP et 40 % NDP

First calf : 19 % CP et 40 % NDP

Farm 2

Control :

17,5 % CP et 42 % NDP

Experimental 1 :

19 % CP et 47 % NDP



Why Work on the Crude Protein and the Non-degradable Protein of the Ration?

Table 6. Nitrogen balance (g/d) in Holstein and Jersey cows measured at wk 5 before expected calving date (-5) and wk 6 and 14 of lactation

Item	Holstein			Jersey			SEM	<i>P</i> <		
	-5	6	14	-5	6	14		Breed	Week	Breed × week
Digested	128	395	404	96	261	277	15	0.001	0.001	0.001
Urine	125	192	211	81	130	163	12	0.001	0.001	0.312
Balance	5	203	190	15	130	114	12	0.001	0.001	0.001
Milk	—	206	196	—	132	137	7	0.001	0.586	0.135
Tissue	5	-4	-11	15	-1	-23	13	0.982	0.007	0.322
Utilization of apparently digested N, %										
Urine	96.6	48.7	52.8	84.5	50.2	58.7	3.1	0.634	0.001	0.075
Balance	3.4	51.3	47.3	15.3	49.8	41.4	3.0	0.645	0.001	0.078
Milk	—	52.4	49.2	—	50.5	49.4	1.9	0.652	0.226	0.560
Tissue	3.5	-1.1	-2.2	15.5	-0.8	-8.0	3.6	0.496	0.004	0.082

Source : Aikman et al., 2008. J. Dairy Sci., 91: 1103-1114.

Genetic Data of Cows Included in the Project at Both Farms

Table 1. Genetic evaluation of cows in the three treatments at Farm 1

Groupe	IPV	Lait	Gras	Prot.	% gras	% prot.	Conformation
Témoin	2 223	249	14	9	0,056	0,023	5
1,5 % PB	2 195	203	14	6	0,084	-0,007	4
1,5 % PB + 5 % PND	2 275	355	15	13	0,005	-0,003	6

Table 2. Genetic evaluation of cows in the two treatments at Farm 2

Groupe	IPV	Lait	Gras	Prot.	% gras	% prot.	Conformation
Témoin	2 223	445	22	16	0,04	0,02	4
1,5 % PB + 5 % PND	2 171	380	17	10	-0,19	-0,04	4

Data Collection

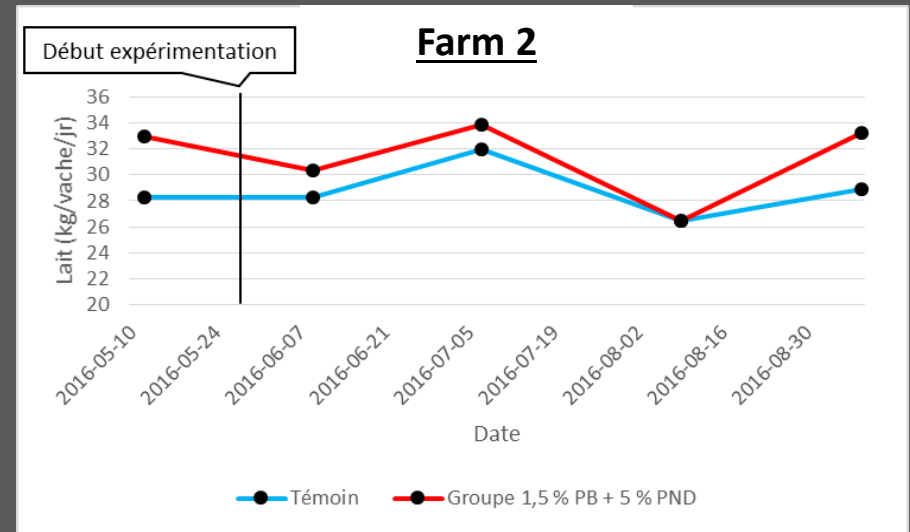
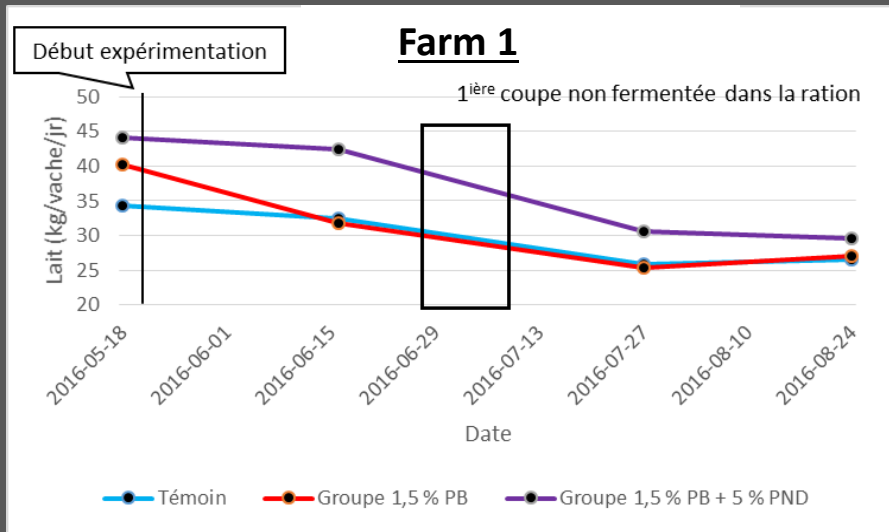
- Milk production and components (Valacta)
- Milk, fat and protein production at the Bulltank (Quebec Dairy Farmers) (PLQ)
- Ruminal pH of 15 cows (smaXtec bolus)
- Body condition

smaXtec
INSIDE MONITORING



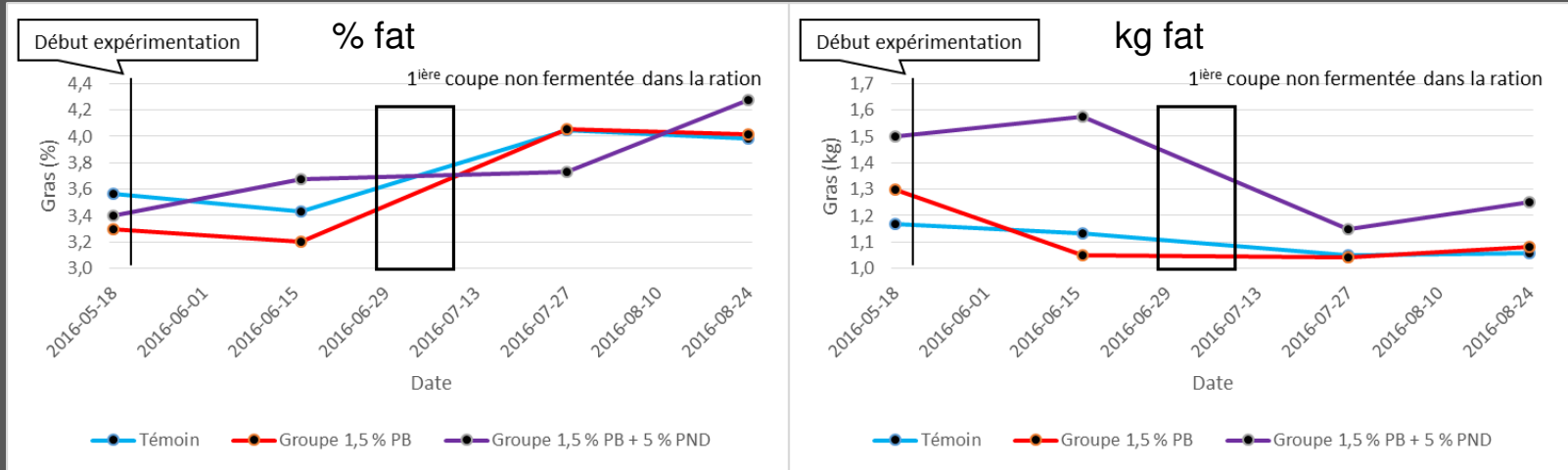
Résultats

Milk Production

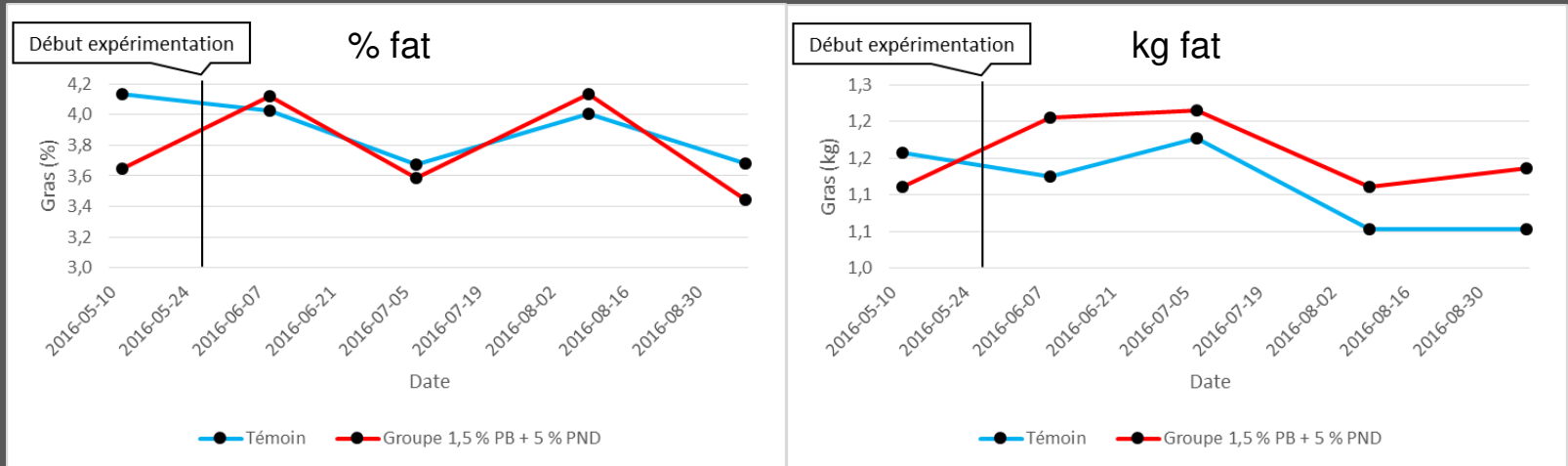


Fat

Farm 1

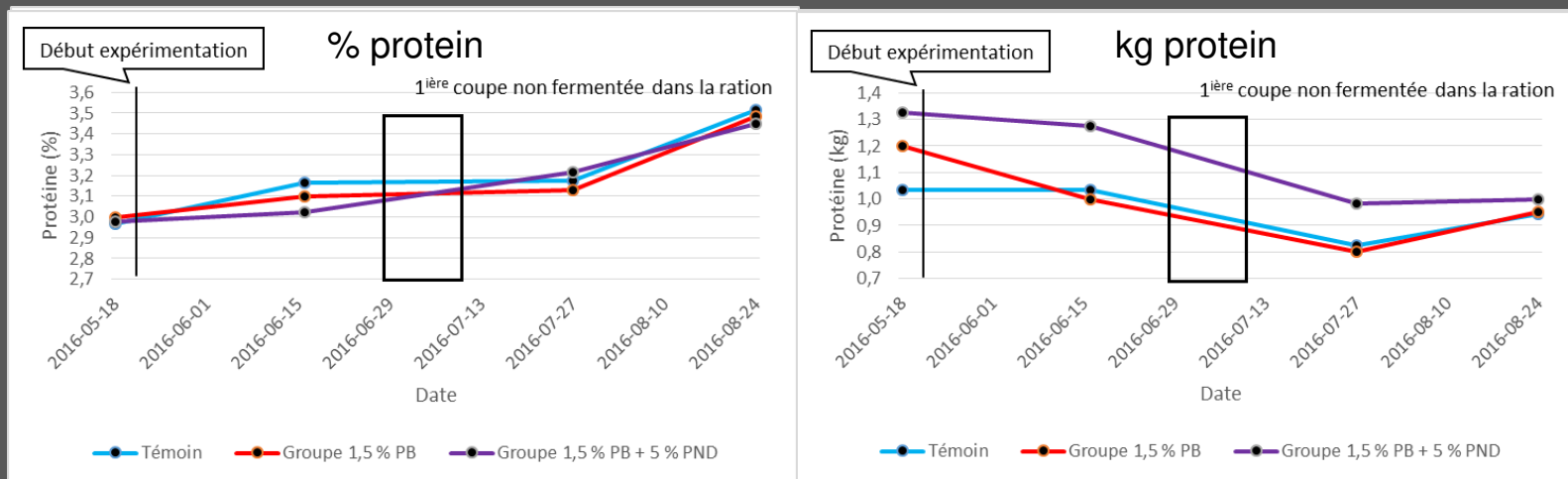


Farm 2

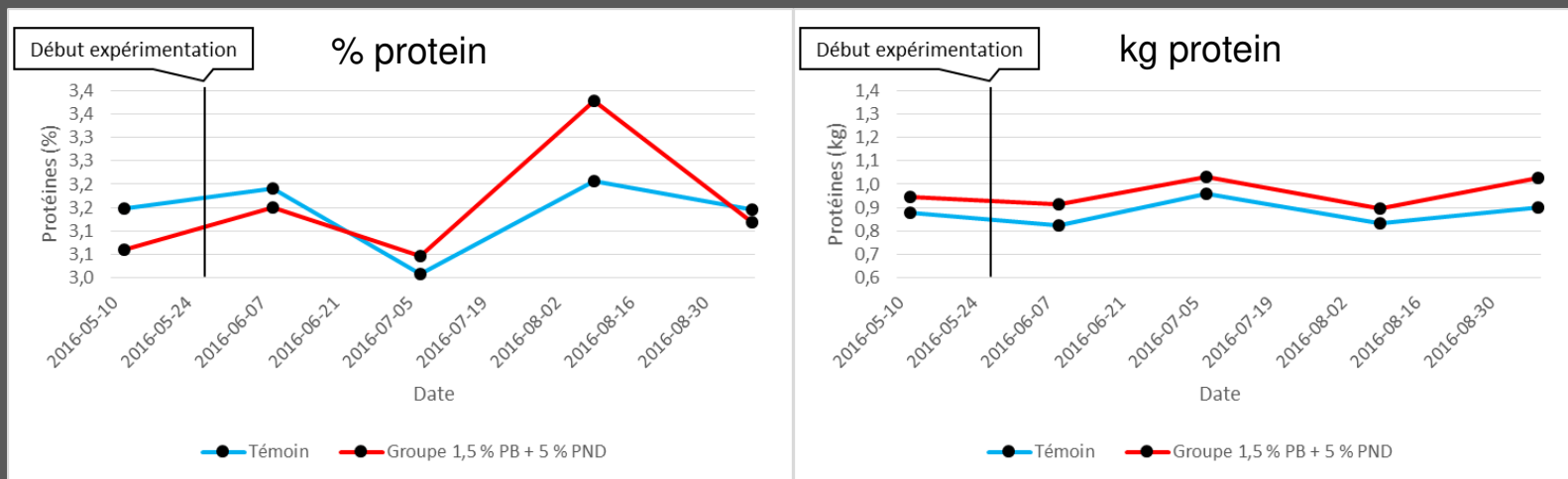


Potein

Farm 1



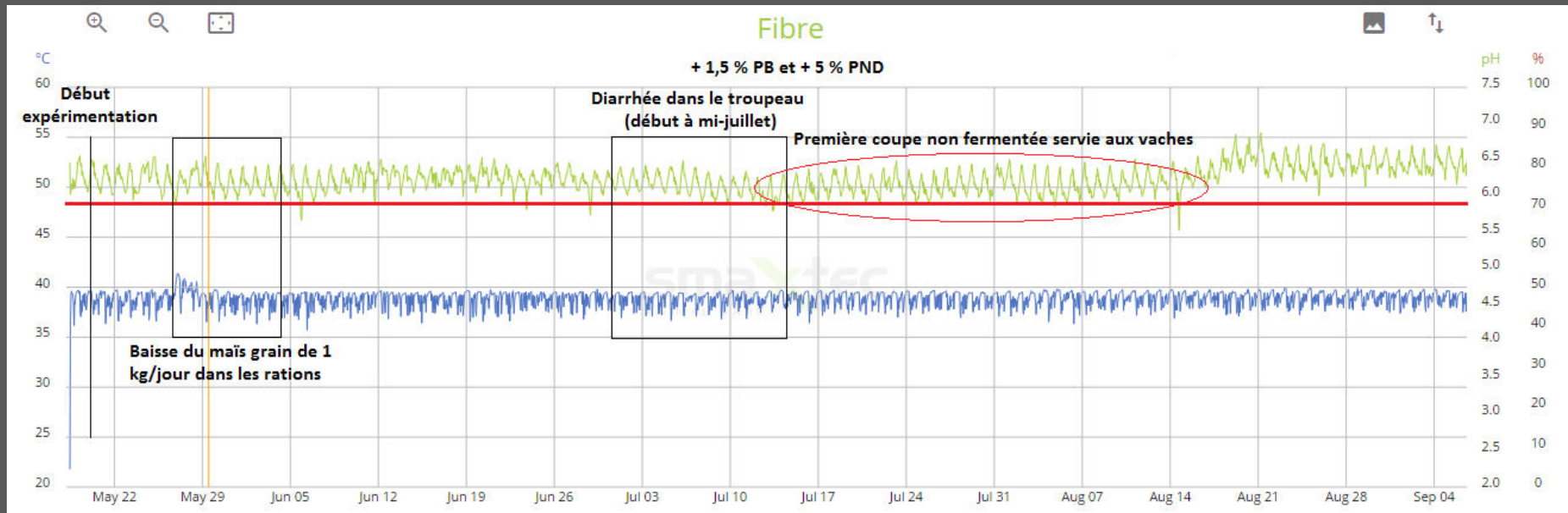
Farm 2



Ruminal pH

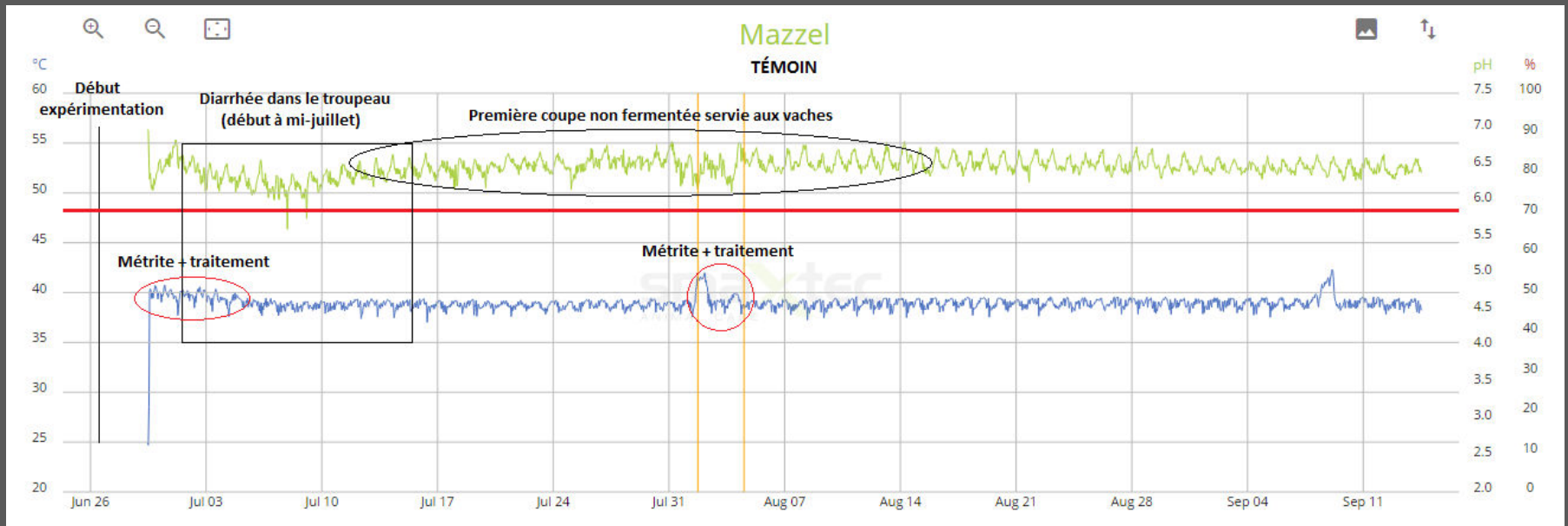
- No difference between treatments
- Some periods of acidosis explained in various ways (acute mastitis, unfermented silage or ration too rich in concentrates)

Cow with good ruminal health (ph predominantly between 5.8 and 6.4)



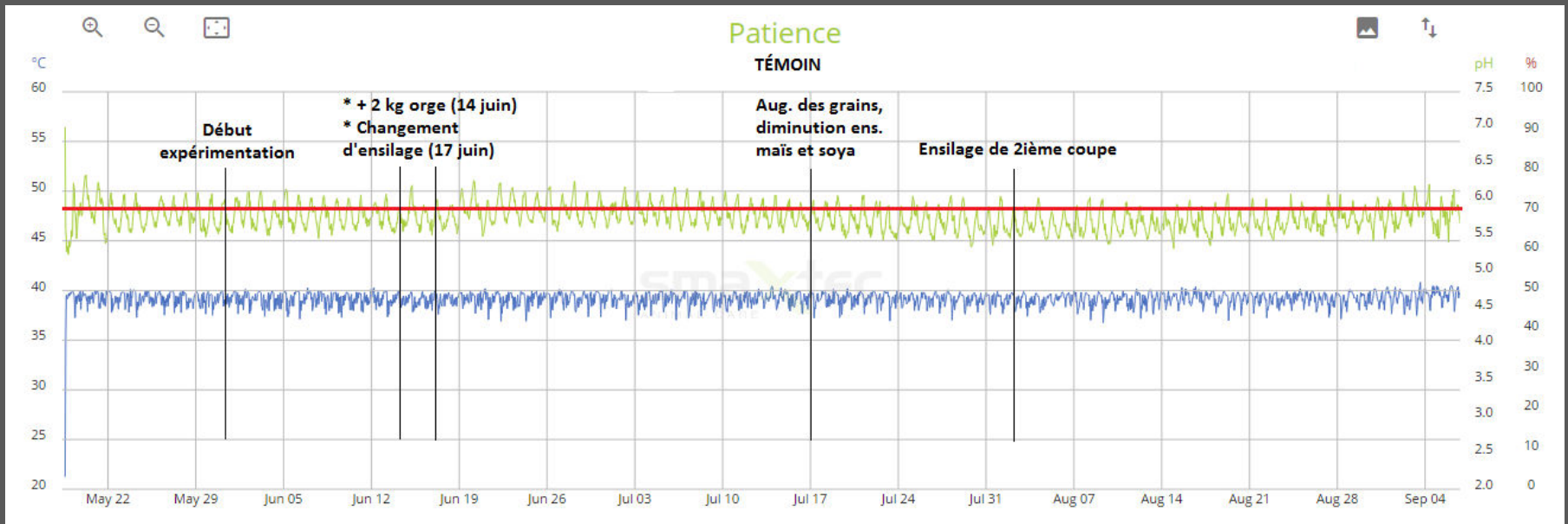
Ruminal pH (continued)

Cow whose rumen is not working at full capacity (pH too high). It's milk production and it's components were low



Ruminal pH (continued)

Cow First calf receiving a ration too rich in concentrates (TMR)



Body Condition

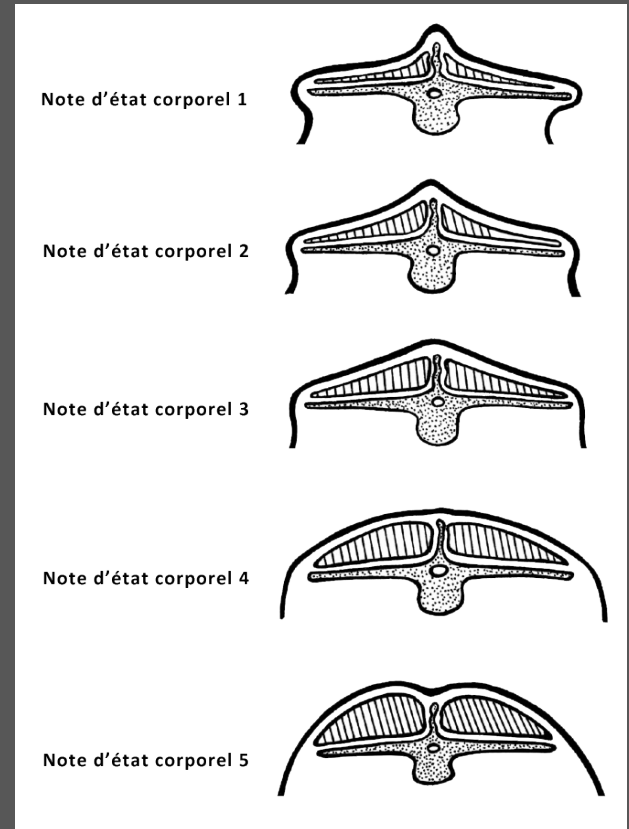
Farm 1

Hypothesis :

- The addition of crude protein to the diet would allow cows to use their body fats better in early lactation to produce more milk

Observations :

- At the peak of lactation, an average body condition of 2.5 to 3 for cows in the experimental group
- Less important fattening after peak in cows receiving more crude protein in the diet



Technical-economic Analysis

Farm 1

Price in effect at project :

- Soybean meal: 541 \$/t
- Corn : 200 \$/t
- Wet barley : 165 \$/t
- Synchro 5060 : 754 \$/t

Calculateur de revenu en production laitière				
Groupe TÉMOIN				
Moyenne du troupeau		8 632	kg/année	
Moyenne/vache/jour		28,30	kg/jour	
Quantité de lait livrée/jour		0,2830	hectolitre	
Pourcentage de gras	3,87	1,0953	kg	
Pourcentage de protéines	3,18	0,9000	kg	
Pourcentage de lactosérum	5,68	1,6075	kg	
Kg de solides totaux		3,6028	kg	
				Revenu brut
Prix kg de gras	10,4	\$/kg		11,391 \$
Prix kg de protéines	7,61	\$/kg		6,849 \$
Prix kg de lactosérum	1,54	\$/kg		2,476 \$
Prime kg de matière grasse	0,1083	\$/kg matière grasse		0,119 \$
Prime de qualité	0	\$/hl		0,000 \$
				20,834 \$/jour
Déduction				
Adm. plan conjoint	0,0364	\$/kg solide totaux		0,131 \$
Publicité	0,1132	\$/kg solide totaux		0,408 \$
Développement	0,0008	\$/kg solide totaux		0,003 \$
Transport	2,5562	\$/hl		0,723 \$
				1,265 \$/jour
Revenu net		19,57	\$/jour	

Calculateur de revenu en production laitière				
Groupe EXPÉRIMENTAL (+1,5 % PB et + 5 % PND)				
Moyenne du troupeau		10 431	kg/année	
Moyenne/vache/jour		34,20	kg/jour	
Quantité de lait livrée/jour		0,3420	hectolitre	
Pourcentage de gras	3,8	1,2996	kg	
Pourcentage de protéines	3,22	1,1012	kg	
Pourcentage de lactosérum	5,68	1,9426	kg	
Kg de solides totaux		4,3434	kg	
				Revenu brut
Prix kg de gras	10,4	\$/kg		13,516 \$
Prix kg de protéines	7,61	\$/kg		8,380 \$
Prix kg de lactosérum	1,54	\$/kg		2,992 \$
Prime kg de matière grasse	0,1083	\$/kg matière grasse		0,141 \$
Prime de qualité	0	\$/hl		0,000 \$
				25,029 \$/jour
Déduction				
Adm. plan conjoint	0,0364	\$/kg solide totaux		0,158 \$
Publicité	0,1132	\$/kg solide totaux		0,492 \$
Développement	0,0008	\$/kg solide totaux		0,003 \$
Transport	2,5562	\$/hl		0,874 \$
				1,527 \$/jour
Revenu net		23,50	\$/jour	

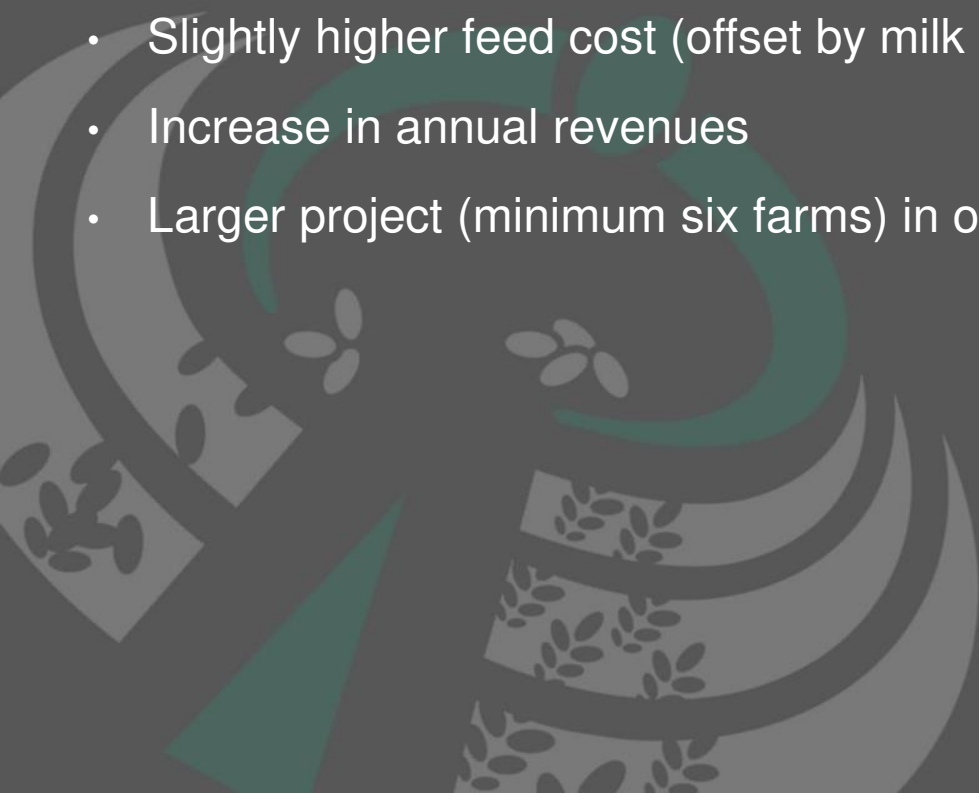
Technical-economic Analysis

Farm 2

Calculateur de revenu en production laitière				
Groupe TÉMOIN				
Moyenne du troupeau		8 815	kg/année	
Moyenne/vache/jour		28,90	kg/jour	
Quantité de lait livrée/jour		0,2890	hectolitre	
Pourcentage de gras	3,81	1,1012	kg	
Pourcentage de protéines	3,04	0,8786	kg	
Pourcentage de lactosérum	5,68	1,6416	kg	
Kg de solides totaux		3,6214	kg	
				Revenu brut
Prix kg de gras	10,4	\$/kg		11,452 \$
Prix kg de protéines	7,61	\$/kg		6,686 \$
Prix kg de lactosérum	1,54	\$/kg		2,528 \$
Prime kg de matière grasse	0,1083	\$/kg matière grasse		0,119 \$
Prime de qualité	0	\$/hl		0,000 \$
				20,786 \$/jour
Déduction				
Adm. plan conjoint	0,0364	\$/kg solide totaux		0,132 \$
Publicité	0,1132	\$/kg solide totaux		0,410 \$
Développement	0,0008	\$/kg solide totaux		0,003 \$
Transport	2,5562	\$/hl		0,739 \$
				1,283 \$/jour
Revenu net		19,50	\$/jour	

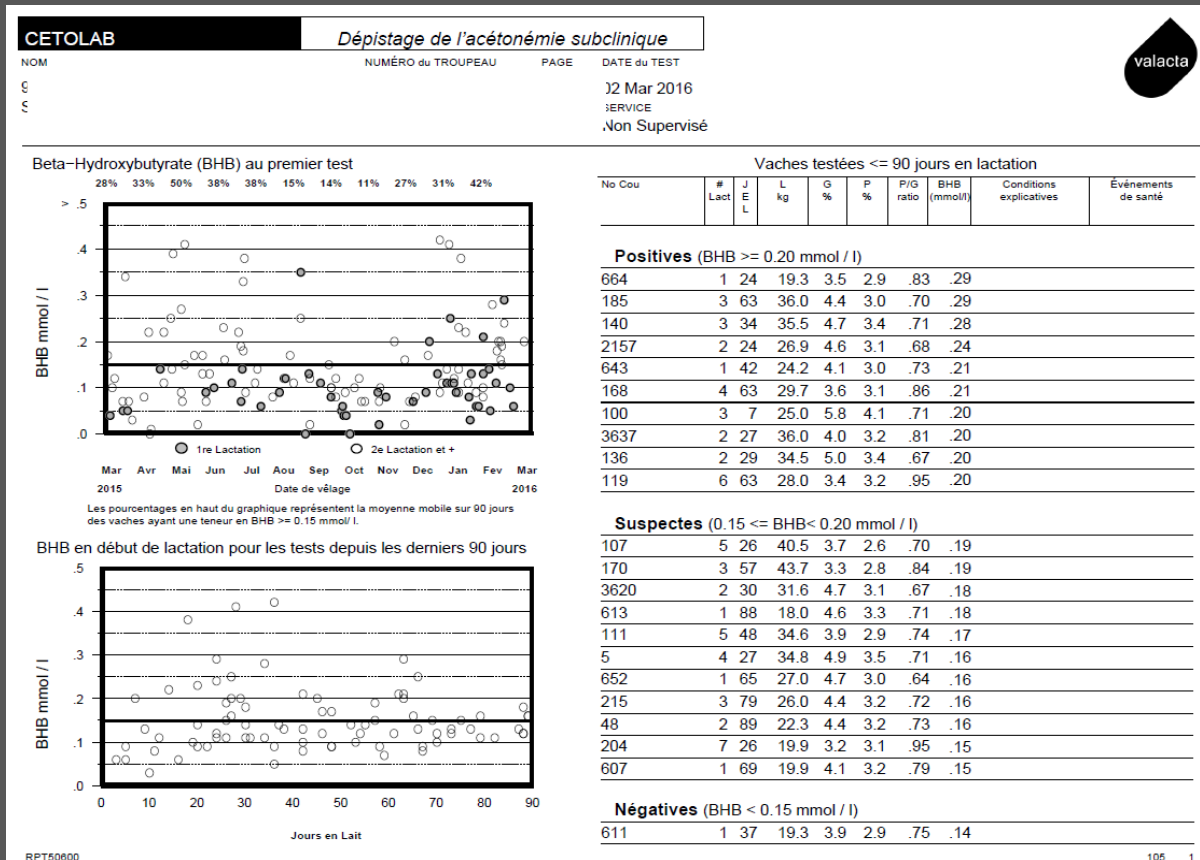
Calculateur de revenu en production laitière				
Groupe EXPÉRIMENTAL (+1,5 % PB et + 5 % PND)				
Moyenne du troupeau		9 455	kg/année	
Moyenne/vache/jour		31,00	kg/jour	
Quantité de lait livrée/jour		0,3100	hectolitre	
Pourcentage de gras	3,77	1,1687	kg	
Pourcentage de protéines	3,13	0,9703	kg	
Pourcentage de lactosérum	5,68	1,7608	kg	
Kg de solides totaux		3,8998	kg	
				Revenu brut
Prix kg de gras	10,4	\$/kg		12,154 \$
Prix kg de protéines	7,61	\$/kg		7,384 \$
Prix kg de lactosérum	1,54	\$/kg		2,712 \$
Prime kg de matière grasse	0,1083	\$/kg matière grasse		0,127 \$
Prime de qualité	0	\$/hl		0,000 \$
				22,377 \$/jour
Déduction				
Adm. plan conjoint	0,0364	\$/kg solide totaux		0,142 \$
Publicité	0,1132	\$/kg solide totaux		0,441 \$
Développement	0,0008	\$/kg solide totaux		0,003 \$
Transport	2,5562	\$/hl		0,792 \$
				1,379 \$/jour
Revenu net		21,00	\$/jour	

Conclusion

- Trend in increased milk production and early lactation components (0-120 DIM)
 - No adverse effects of increased protein on ruminal health
 - Slightly higher feed cost (offset by milk production)
 - Increase in annual revenues
 - Larger project (minimum six farms) in order to verify the results
- 

A short overview of Ayrshire and tolerance to ketosis

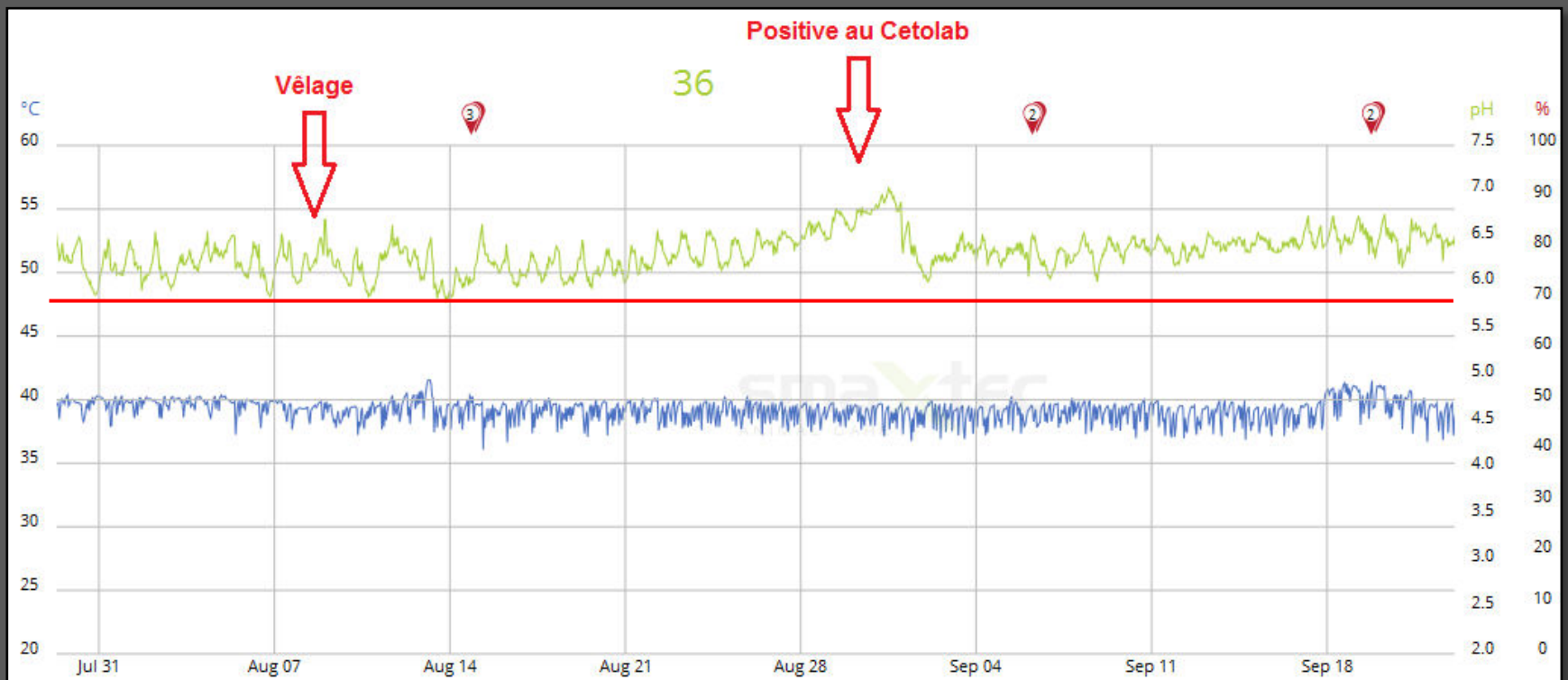
Cetolab data on farm of 110 lactating cows (90 % Ayrshire)



Only one cow was treated because it showed symptoms of ketosis

A short overview of Ayrshire and tolerance to ketosis (continued)

Ketosis visible on a graph of ruminal pH. Yet the producer saw no symptoms.
The cow was not treated, she ate well and had a normal production.



Financial partners



Thank you for your attention!



www.agrinova.qc.ca