ASSOCIATION AMONG FLUID, GRAIN INTAKE AND WEIGHT GAIN IN HOLSTEIN BULL CALVES

A Thesis

by

MARCELO GONZALEZ FERREIRA

Submitted to the Office of Graduate Studies of
Texas A&M University
in partial fulfillment of the requirements for the degree of

MASTER OF SCIENCE

May 2009

Major Subject: Dairy Science

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Approved by:

Chair of Committee,	Michael Tomaszewski
Committee Members,	Glenn Holub
	Jason Sawyer
	David Anderson
Head of Department,	Gary Acuff

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ABSTRACT

Association Among Fluid, Grain Intake and Weight Gain in Holstein Bull Calves.

(May 2009)

Marcelo González Ferreira, D.V.M., National University of Asunción, Paraguay

Chair of Advisory Committee: Dr. Michael Tomaszewski

This study was conducted to determine water intake. Forty-four Holstein bull calves were evaluated to investigate the effects of starter intake, body weight, temperature and time to predict water intake. A model was developed using PROC GLM in SAS. Least square means separation were used to identify significant effects.

Starter intake was a significant variable ($P < 0.05$) in predicting the water intake of a calf, especially after day 21 when starter intake and water intake were both increasing. Water intake was increased by calves with fecal scores of 1 and 2. However, water intake was significantly different for calves with fecal scores of 3 or 4 with a ($P < 0.05$) which had decreased water intake. The interaction between scours and fecal score were not significant. Water intakes significantly differ in calves that had scour and in calves not experimented scours.

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1. INTRODUCTION

Studies determining the water intake of calves less than 4 wk of age are limited. Thickett et al. (1981) found a significant correlation of both live-weight gain and calf starter intake with water intake prior to weaning at 5 weeks. Jenny et al. (1978) measured daily ad libitum water intake of calves from 3 through 23 days of age. Water intake increased with increasing dry matter concentration of the milk replacer; however, calf starter was not provided. Atkeson et al. (1934) found that milk was the primary source of water during the first few weeks of the calf's life, but represented a decreasing percentage of the total water intake as the calf became older.

Preweaned calves often are not provided water except for that consumed with milk replacer (Kertz et al., 1984). These authors also reported that some dairy producers believe that supplemental water causes calves to scour. Jenny et al. (1978) noted that daily water intake increased 25 to 50% when calves scoured. However, they concluded that it is uncertain whether calves drank more water because of scouring, or if they scoured due to increased water intake. Kertz et al. (1984) observed that calves from either restricted water or ad libitum water treatments did not differ in the number of calves experiencing scours or in the extent of scouring.

Calves offered supplemental water gained more ($P<.05$) body weight and consumed more ($P<.05$) calf starter compared to calves without access to free water (Kertz et al., 1984). In that study, water intake remained low and variable until d

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This thesis follows the style of the Journal of Dairy Science.

18 of age. Water intake progressively increased after d 21. Beneficial effects of supplemental water for growing calves were attributed to maintaining water equilibrium and encouraging early calf starter intake.

Water intake of Holstein bull calves through 56 day of age was measured in 6 different trials over two years (Quigley, 2000). In these studies water intake was very closely correlated with starter intake. As calves consumed more starter they drank more water. These studies also found that as environmental temperature increased the calves drank more water. Additionally, they found that the amount of water consumed increases in an exponential, not linear function. Thirdly, they found that the amount of liquid in milk replacer affects the amount of additional water consumed. They concluded this relationship is due to the fact that increased water in milk replacer will reduce the need for additional water to be fed as liquid or “free” water.

Other factors need to be considered when allowing free access to water by calves. Water intake has been shown to be restricted due to taste and/or water quality. Beede (2005) concluded that oftentimes the quality and provision of free drinking water does not receive the attention necessary to ensure optimal nutrition. Thomas et al. (2007) reported that the addition of orange or vanilla flavor to the water did not affect ($P > 0.05$) the consumption of water compared with the control. However, it was found that intake of the dry starter increased in calves offered the orange flavored water treatment compared with the control or the vanilla flavored treatment. The increased dry feed intake agreed with the significant increase in weight gain measured in calves on the 3 orange flavor treatment. The orange flavor in water increased ($P < 0.05$) calf starter feed intake by 249 and 217 g/d compared with the control and vanilla flavor, respectively.

The hypothesis of this study is that ad libitum water intake of Holstein bull calves can be affected by the addition of Betaine 96% to milk replacer at 2 g/d and the addition of Protimax® at label recommended amounts to milk replacer during the summer months when heat stress is experienced.

Furthermore, it is believed that consuming more ad libitum water will not increase the incidence of scours nor have any effect on fecal scores of calves during these conditions. However, it is reaffirmed that intake of calf starter will increase the amount of ad libitum water consumed by calves and that as calves become older they will consume more ad libitum water at an increasing amount in a heat stress environment.

The objective of this study was to determine water intake in Holstein bull calves through day 54 as a control and as compared to treatments with the addition of Betaine 96% and Protimax® at label recommended amounts to milk replacer.

In addition, the secondary objective of this study is to determine if calves that scour have an increased consumption of ad libitum water or if water intake is linearly associated with fecal scores.

Another objective of this study is to determine the association between the intake of calf starter and the intake of ad libitum water.

2. MATERIALS AND METHODS

Fifty-two Holstein-marked bull calves (1 to 3 d of age) were purchased from dairy herds located in Eastern New Mexico and the Texas Panhandle. All calves were to have received colostrum no later than two hours after birth, and weighed approximately 45 kg. The calves arrived at the Texas A&M University Farm, located 10 miles West of the Texas A&M University campus in College Station, via covered trailer on May 13, 2008, following 12 h of overnight transport.

Upon arrival, calves were weighed and randomly assigned to individual "Calftel" hutches (Hampel Corp., Germantown, WI). Hutches were placed on a grass sod surface that was slightly sloped to facilitate drainage and faced Southeast into the prevailing wind. At least 3 m meters separated each hutch to prevent physical contact among the calves. Hutches were moved daily to a clean area of sod to maintain cleanliness of the calves and to allow fecal scores to be made routinely. Fecal scores were based on guidelines suggested by Larson et al. (1977). The scores ranged from 1 through 4 and were based on the following characteristics: 1 = Normal, firm but not hard. Original form is distorted slightly after drooping to ground and settling; 2 = Soft, Does not hold form, piles but spreads slightly. (i.e., pudding like consistency) as defined by Dr. Glenn Holub (personal communication); 3 = Runny, Spreads readily to about 6 mm depth, (i.e., pancake batter like consistency); and 4 = Watery, Liquid consistency, splatters, (i.e., orange juice). Scores were assessed at 0600h daily for the entire period of the study (56 days). Scouring events were coded on a daily basis after fecal scores were made. If a calf was scouring, that is, the feces was liquid or score =4, the calf was scored with a yes as to scouring and a treatment was made to support the calf with Re-Sorb® (Pfizer Animal Health, Exton, PA) commercially available electrolytes . All calves with a fecal score of 1 to 3 were coded with a no treatment for that day.

Environmental data, including ambient temperature and percent relative humidity were recorded every 5 minutes on a HOBO® Recorder (Onset Computer Corp., Bourne, MA). Temperature Humidity Index (THI) were calculated based on the temperature and humidity each observation. The formula used to calculate THI =(1.98*(Ambient Temperature Fahrenheit-(0.55-0.0055*(% Relative Humidity))*(% Relative Humidity-58))-56.83).

On the day of arrival, calves began a 2 day adaptation period with feedings of 4 L of milk replacer split to provide 2 L at 0600 and 2 L at 1800 h daily. The amount of milk replacer powder provided per calf included 0.45 Kg. per calf per day for the first 9 days and then 1.1% of BW adjusted weekly for each treatment group's mean body weight. Calves were fed with milk replacer using bottles with nipples. Milk replacer was prepared by adding powder to water at 43°C and mixing thoroughly with an electric mixer. Each calf received 2000 ml of water per feeding, which did not vary throughout the study, however, the percent of dry matter changed slightly as powder was adjusted weekly to group mean weights to equal 1.1% BW of milk replacer powder per day added to 2 L of water at each feeding. This was done to facilitate the study of the water intake and to have the water input via milk replacer constant. Calves were allowed 30 minutes

to consume the milk replacer or until interest in drinking was no longer evident. Refused feedings were recorded and calves that appeared dehydrated were offered via bottle with nipple 2 liters of a commercially available electrolyte solution Re-Sorb® (Pfizer Animal Health, Exton, PA). Calves that refused both the milk replacer and the electrolyte solution were fed via esophageal feeder to prevent further dehydration.
On d one, a blood sample was collected via jugular veinepuncture from each calf for evaluation of (serum or whole blood or plasma) IgG (Immunoglobulins G) and total serum protein (TSP) as an index of health status. All calves received a 7-way clostridial vaccine (Agri-labs, Schering-Plough Animal Health Corp., Union, NJ), an inactivated bacterin used for the prevention of Clostridium chauvoei, septicum, novyi, sordellii, perfringens Types C & D infections. This vaccine was administered at subcutaneously on day 10 to prevent *Clostridial* species diseases.

Following the 2 day adaptation period, calves were stratified by body weight and health status using the IGg blood level and TSP blood level. Within strata, calves were randomly assigned to one of four treatments. Treatments consisted of two animal feed supplements for dairy calves, Protimax® and Betaine 96% added to the milk replacer at the time of mixing. Treatment PRO included the addition of 4 grams per day of Protimax® added to the milk replacer for 7 days and then reduced to 2 grams daily for the next 14 days; Treatment BET consisted of 2 grams daily of Betaine added to the milk replacer from day 3 thru 56; Treatment P-B included 4 grams daily of Protimax for first 7 days and 2 grams daily for the following 14 days and 2 grams daily of Betaine day 3 to 56; Treatment CON was the control, milk replacer (Land O. Lakes Maxi Care 25%

crude protein, 20% crude fat). Calves received ad libitum water and ad libitum commercially available 18% protein calf starter feed (Calf Niblets, Gore Bros. Inc., Comanche, TX) beginning on the third day after calves were placed on treatments. Calf starter feed refusal was measured daily at 1800 h.

Body weight, wither height and heart girth was measured every 3.5 d.

Water intake was recorded daily at 0600h. Water buckets were initially filled with 6 L. of water. Daily at 1800 h measured amounts of water were added so that ad libitum water remained available. The following day at 0600 h, the remaining water was measured and subtracted from the total amount made available to the calf for 24 hours. Daily changes in water due to evaporation or rainfall was recorded via the use of a control bucket placed near the research site. That amount of rainwater collected or water lost via evaporation was recorded and adjustments were made for each calf's intake based on amount lost or gained for the day because the buckets were exposed to the open environment. Occasionally, buckets were contaminated with fecal material by the calves. When this happened, the buckets were removed, washed, rinsed with a chlorine solution, and refilled. Intake was not recorded for that calf for that day.

The study ended with forty-four calves remaining on study. Five calves died and 3 were deemed morbid during the trial. The main reason was severe cases of diarrhea during the first two weeks due to Salmonella species. Calves were weaned on Day 54 of the study.

Means, standard deviations and scatter plots were used to determine if there were any data outliers and/or missing values. A model was developed using General Linear Models procedures of SAS (SAS Institute, Cary, NC, USA). Least square means separation were used to identify significant effects.

The mathematical model used to describe an individual observation was:

$$Y_{ijklmpo} = \mu + T_i + D_j + C(T)_{ki} + F_l + S_m + T_p + W_o + {}_{ijklmpo}$$

Where: μ is the overall population mean of water intake, T is the effect of treatments (i = 1,2,3,4), D is the effect of day as a continuous variable (j = 1,... 16), C is the effect of the k_{th} calf (k =1, ,44) within i_{th} treatments , F is the effect of fecal score (l = 1,2,3,4), S is the class variable of scours treatment on any single day (m = 0,1) , T is the continuous effect of starter intake, W is the continuous effect of body weight, and is the random residual error term.

Analysis of Variance and Least Square Means were computed using PROC GLM of SAS. Three models were applied to the dataset. The first model included day 1 through day 54. The second model was associated with calves receiving four treatments for the first 21 days of the trial. After day 21, calves no longer received Protimax®. Thus, Treatment PRO or P-B calves no longer received Protimax. Effectively, Treatment PRO became the same as Treatment CON and Treatment P-B tested only Betaine exactly the same as treatment BET for the remainder of the trial. Therefore, from day 21, calves in treatment PRO and CON and Treatment BET and P-B were treated alike. The interaction between both, fecal scores and scours with treatment were left out of the model because they were not significant.

3. RESULTS AND DISCUSSION

Figure 1, total fluid intake by day, includes the intake of 4L of water received with the milk replacer in addition to voluntary water intake by the calf. Total fluid intake generally increases across time for all treatments. On d 21 and 46 rainwater was collected into water buckets. The amount of rainwater collected in the control bucket was subtracted from the amount of water in the calves' buckets. On d 21 this amounted to a reduction of 340 ml. and on d 46 a reduction of 500 ml. On d 21, water consumption decreased for each treatment, except Treatment PRO. However, on d 46 all calves reduced their water intake because the ambient temperature was cooler than previous days and that the calves spent much of their time in the hutches and did not drink as much water as previous days.

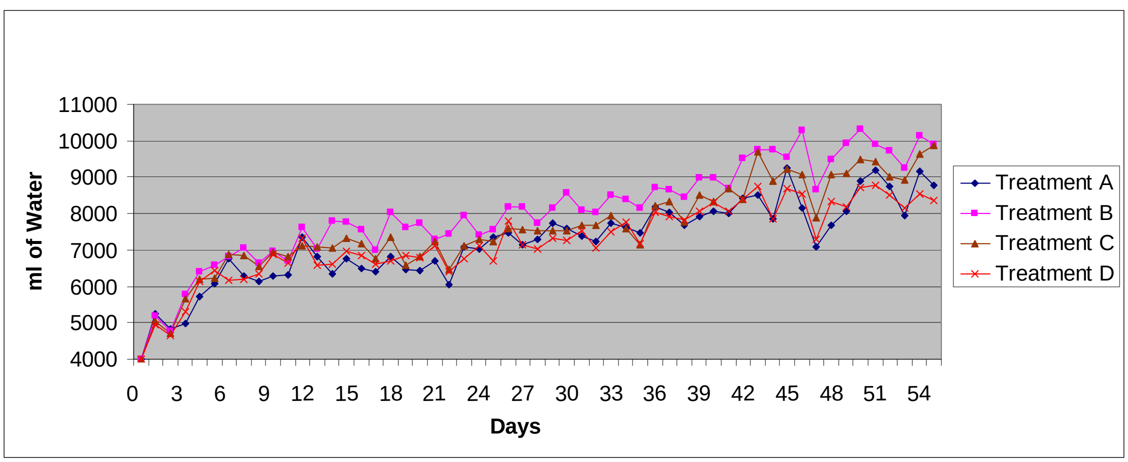

Figure 1. Average Total Fluid Intake by Treatments by Days

Figure 2 depicts average starter feed intake by day. In general, starter consumption increased with the calves' age. Just as there was a decrease in fluid intake on d 21, there was also a decrease in the amount of starter consumed. On d 46, starter intake was not measured and was deleted because rainwater covered the feed in the buckets and calves spent much of their time in the hutches during the rain.

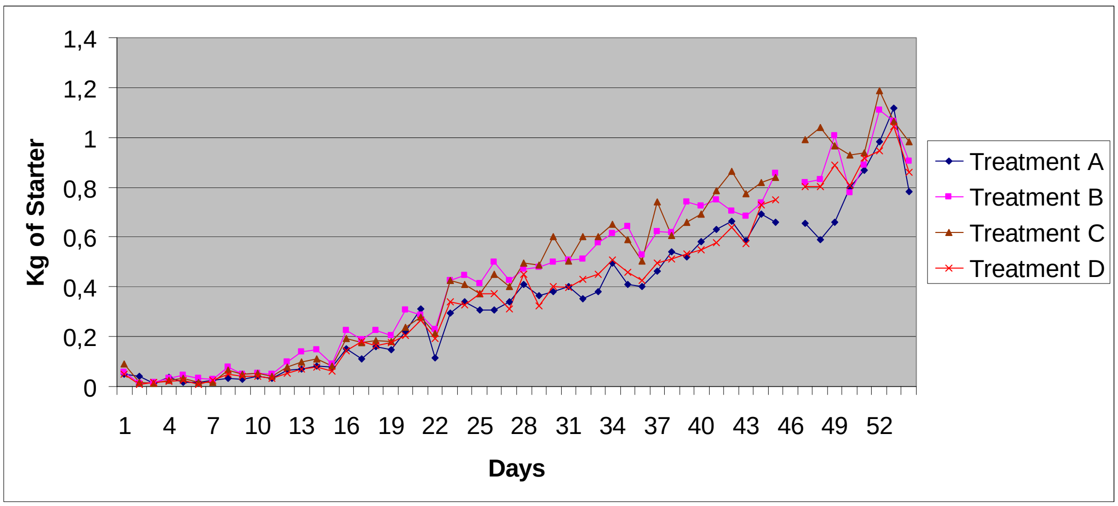

Figure 2. Average Starter Intake by Treatment by Days

Figure 3 illustrates average body weights by treatment. Average body weight tended to decrease through day 9 and started to increase after that. Calves did not recover their initial body weight until d 19. This agrees with the work of Kertz et al. (1984) who found that water intake remains low and is variable until d 18 and reported that providing supplemental water is beneficial to the growing calf maintaining water equilibrium and encouraging calf starter intake.

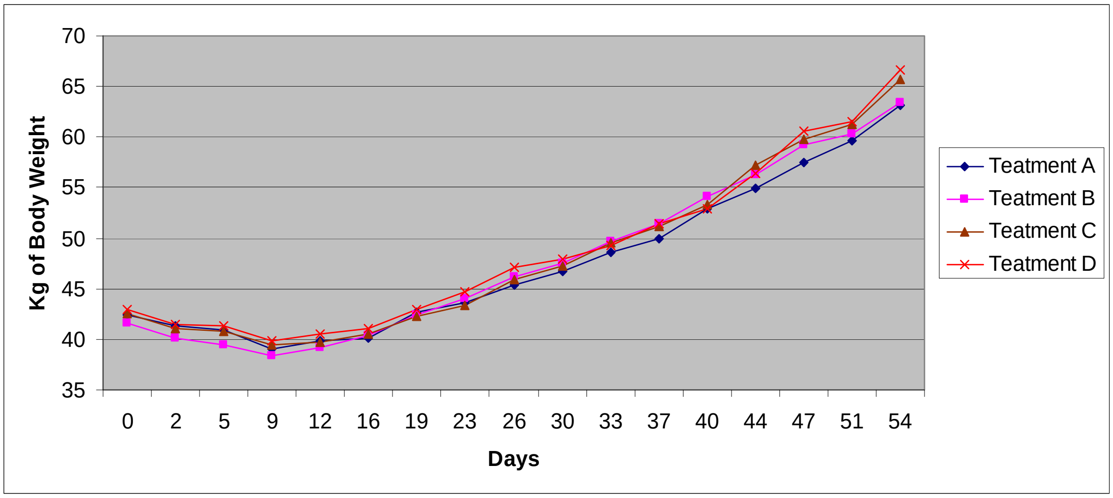

Figure 3. Average Body Weight by Treatments by Days

3.1 Analysis of Data

Table 1 illustrates the ANOVA associated with water intake as the dependent variable from day 1 to 54.

Table 1. ANOVA of Water Intake from Day 0 to 54.

ANOVA Table			
Source	DF	Mean Square	Pr > F
Treatment	3	12743807	< 0.0001
Day	16	10264197	< 0.0001
Calf (Treatment)	40	13756469	< 0.0001
Fecal	3	3373195	0.0097
Scours	1	6775077	0.0057
Starter	1	19812350	< 0.0001
Body Weight	1	10698550	0.0005
Error	602	879346	

The adjusted average daily water intake was 3548 ml per day with an R^2 of .765. No interactions were found to be significant and were not included in the analysis. When fecal scores and scours variables were added separately to the model, they were not significant and only slightly reduced the R^2. Since they were measuring two different sources of variation, they were both included in the model.

Source of variation were separated using least square means and the results are presented in the following tables. Table 2 depicts the least squares mean water intake by treatments. Calves fed Trt BET consumed more water than calves fed any other treatment ($P < 0.05$). Calves fed Trt PRO consumed less water than those fed Trt CON (control; $P < 0.05$), While those consuming Trt P-B consumed a quantity of water intermediate between Trt PRO and CON.

Table 2. LSM for Treatment of Water Intake from Day 0 to 54.

Least Square Means of Additional Water Intake	
Treatment PRO (Protimax)	3316^{b}
Treatment BET (Betaine)	3940^{a}
Treatment CON (Control)	3543^{b}
Treatment P-B (Protimax x Betaine)	3350^{ab}

$^{a, b}$. Rows with the same superscripts are not significantly different from each other ($P < 0.05$).

Table 3 provides mean water intake by day. Water intake on d 2 was the lowest observed ($P < 0.05$). Water intake on d 0 was intermediate to d 1 and most other observations. This was the initial day after arrival and all calves were stressed and not functioning normally. On d 9, 12, and 44 water intake was greater than on other days. In general, after adjusting water for other effects in the model, water consumption was relatively stable over time once the initial stress of relocation was overcome.

Table 3. LMS for Days of Water Intake from Day 0 to 54.

	LSM for water (ml)
Day	
0	2174[c]
2	1733[c]
5	3459[b]
9	4016[a]
12	4012[a]
16	3590[b]
19	3645[b]
23	3596[b]
26	3581[b]
30	3712[bc]
33	3750[b]
37	3609[b]
40	3813[b]
44	4367[a]
47	3503[b]
51	3660[b]
54	3808[b]

[a, b]. Rows with the same superscripts are not significantly different from each other ($P < 0.05$).

Table 4 provides Least Squares Means water intake associated with different levels of fecal scores. Calves with fecal score of 1 through 3 consumed significantly more water than calves with a fecal score of 4. Scores 1 and 2 consumed more water than calves with scores of 3 and 4. Calves with a 2 consumed the most water. Calves with a 3 and 4 also were not different in amount of water consumed.

Table 4. LSM for Fecal Scores of Water Intake from Day 0 to 54.

	Total Water LSMEAN (ml)
Fecal	
1	3697^{abc}
2	3836^{ab}
3	3533^{acd}
4	3082^{cd}

^{a,b,c,d}. Rows having different superscripts are significantly different form each other (P < 0.05).

Scours in the model indicated whether the calf was treated for scours or dehydration for that day and were binomial and were scored 1 for yes and 0 for no treatment. Fecal Scores were different than Scours. Calves that had scours drank 3811 ml. of water versus calves not having scours 3263 ml. The interaction between scours and fecal score were not significant.

Table 5 presents the Analysis of Variance for day 0 to 21 of the study.

Table 5. ANOVA of Water Intake from Day 0 to 21.

ANOVA Table			
Source	DF	Mean Square	Pr > F
Treatment	3	2116744	0.0643
Day	16	15782706	< 0.0001
Calf (Treatment)	40	5641829	< 0.0001
Fecal	3	3032702	0.0161
Scours	1	2546988	0.0872
Starter	1	2600649	0.084
Body Weight	1	1561885	0.1798
Error	197	861965	

The original model for day 1-54 treatment, scours, starter and body weight were significant. However, in the model for day 0 to 21, they were not. However, these variables were left in the model to test if the least square means were different. The R_2 for this model was 0.71. The mean was 2403 ml. of water daily intake for days 0 to 21.

Table 6 contains the Least Square Mean values for treatments in the model for 0 to 19 days. Significant differences were found among the least squares means for treatments. Treatment PRO, CON and P-T were significantly different than BET while BET, CON and P-B were significantly different from PRO.

Table 6. LSM for treatment of Water Intake from day 0 to 19.

Least Square Means of Additional Water Intake	
Treatment PRO	2069^{a}
Treatment BET	2547^{b}
Treatment CON	2404^{ab}
Treatment P-B	2352^{ab}

[a, b]. Data having different superscripts are significantly different form each other ($P < 0.05$).

Table 7 illustrates Least Squares Means of days for water intake. Day 2 is significantly different from all days except from day 0. This was anticipated due to the stress experienced by calves at this part of the experiment.

Table 7. LSM for Days of Water Intake from Day 0 to 19.

	LSM for Water (ml)
Day	
0	1328[b]
2	971[b]
5	2672[a]
9	3014[a]
12	3020[a]
16	2514[a]
19	2880[a]

[a]. Rows with the same superscripts are not significantly different from each other ($P < 0.05$).

Table 8 contains the LSM for Fecal Score. Calves with more "normal" fecal scores of 1 or 2 drank more water than calves that had "loose" fecal scores of 3 or 4.

Table 8. LSM for Fecal Scores of Total Water from Day 0 to 21.

	Water Intake LSMEAN (ml)
Fecal	
1	2665[a]
2	2625[a]
3	2206[b]
4	1875[b]

[a]. Data having different superscripts are significantly different form each other ($P < 0.05$).

Table 9 contains the ANOVA associated with total water intake from day 21 to 54 of the study.

Table 9. ANOVA of Water Intake from Day 21 to 54.

ANOVA Table			
Source	DF	Mean Square	Pr > F
Treatment	3	8125646	< 0.0001
Day	16	1997258	0.0069
Calf (Treatment)	40	9468991	< 0.0001
Fecal	3	1837743	0.0701
Scours	1	24716	0.8583
Starter	1	13402637	< 0.0001
Body Weight	1	11391401	0.0001
Error	356	275758223	

This model had an R^2 of 0.757, which is very close to the R^2 obtained in the overall ANOVA of the original model including all days. However, in this model, scours and fecal score were not significant due to the low number of calves experiencing scours after day 21. The mean daily water intake is 4246 ml.

Table 10 contains the LSM by treatment for days 21 to 54. Treatment PRO, CON and P-B were significantly different from BET. Calves that were on Protimax®, consumed less water than all other treatments. Treatment P-B should be increased after day 21, because only Betaine remains in this treatment. However, treatment P-B was not significantly different from the control.

Table 10. LSM for Treatment of Water Intake from Day 21 to 54.

Least Square Means of Additional Water Intake	
Treatment PRO	3803[b]
Treatment BET	4356[a]
Treatment CON	3885[b]
Treatment P-B	3686[b]

[a] . Data having different superscripts are significantly different form each other (P < 0.05).

Table 11 illustrates that no differences were found in water intake among the differing fecal scores after day 21.

Table 11. LSM for Fecal Scours of Total Water from Day 21 to 54.

	Total Water LSMEAN (ml)
Fecal	
1	8113.03
2	8305.29
3	8316.32
4	6995.58

4. CONCLUSION

Water appears to have a relationship with starter intake as starter intake is a significant variable in predicting the water intake of a calf, especially after day 21 when starter intake and water intake are both increasing. Prior to 21 days, the relationship between water intake and starter intake is not significant but does trend to be related.

Water intake is increased by calves with fecal scores of 1 and 2. These fecal scores are acceptable for calf raisers and indicate normal stools. However, calves with fecal scores of 3 or 4 have decreased water intake which may contradict Jenny et al, 1978. This finding is especially significant during the first 21 days of a calf's life when water intake is more variable and the stress of scours is more likely to occur.

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APPENDIX A

Table A. Average daily fluid intake and Total flluid intake per 100 Kg. per calf per day.

	Total Fluid in ml.					Body Weight in Kg.					Starter Intake in Kg.					Total Fluid per 100 Kg. (ml./Kg.)				
	Treatment					Treatment					Treatment					Treatment				
Days	PRO	BET	CON	P-B	All	PRO	BET	CON	P-B	All	PRO	BET	CON	P-B	All	PRO	BET	CON	P-B	All
0	4000	4000	4000	4000	4000	42	42	43	43	42	0,00	0,00	0,00	0,00	0,00	9427	9622	9412	9316	9443
2	4845	4769	4723	4660	4749	41	40	41	41	41	0,04	0,01	0,02	0,01	0,02	11726	11898	11510	11256	11595
5	6065	6583	6219	6443	6327	41	39	41	41	41	0,02	0,05	0,03	0,03	0,03	14809	16672	15257	15575	15569
9	6291	6966	6932	6878	6767	39	38	39	40	39	0,03	0,05	0,05	0,04	0,04	16125	18146	17575	17269	17276
12	6810	7039	7075	6581	6876	40	39	40	41	40	0,06	0,10	0,08	0,05	0,07	17064	17950	17808	16244	17259
16	6395	7004	6745	6611	6689	40	40	40	41	41	0,15	0,22	0,19	0,14	0,18	15933	17330	16657	16108	16507
19	6430	7740	6818	6791	6945	43	42	42	43	43	0,15	0,20	0,18	0,18	0,18	15081	18229	16145	15809	16314
23	7022	7413	7303	7124	7215	44	44	43	45	44	0,30	0,43	0,43	0,34	0,37	16075	16829	16823	15925	16410
26	7159	8191	7571	7147	7517	45	46	46	47	46	0,31	0,50	0,45	0,37	0,41	15789	17746	16491	15180	16298
30	7392	8083	7675	7537	7672	47	48	47	48	47	0,38	0,50	0,60	0,40	0,47	15828	16995	16256	15735	16204
33	7605	8380	7586	7760	7833	49	50	50	49	49	0,38	0,58	0,60	0,45	0,50	15651	16872	15312	15771	15903
37	7684	8455	7779	7812	7933	50	51	51	51	51	0,46	0,62	0,74	0,50	0,58	15368	16449	15194	15209	15557
40	7993	8695	8675	8075	8360	53	54	53	53	53	0,58	0,73	0,69	0,55	0,64	15094	16049	16262	15260	15670
44	9237	9548	9233	8695	9178	55	56	57	56	56	0,69	0,74	0,82	0,73	0,74	16836	16952	16132	15416	16330
47	7676	9490	9065	8327	8639	58	59	60	61	59	0,65	0,82	0,99	0,80	0,82	13339	16004	15181	13739	14571
51	8738	9711	9025	8503	8994	60	60	61	62	61	0,87	0,89	0,94	0,92	0,90	14652	16118	14736	13815	14825
54	8770	9891	9881	8350	9223	63	63	66	67	65	0,78	0,90	0,98	0,86	0,88	13891	15594	15048	12525	14250
55	.	.	.	.	.	.	.	.	.	.	0,84	1,06	1,20	1,03	1,03	.	.	.	.	.
56	.	.	.	.	.	.	.	.	.	.	1,54	1,14	1,44	1,30	1,36	.	.	.	.	.
Total	7218	8061	7595	7236	7348	48	48	48	49	48	0,38	0,46	0,48	0,40	0,43	14864	16203	15400	14715	15293

VITA

Name: Marcelo González Ferreira

Address: Department of Animal Science
116. Kleberg Center
2471 TAMU,
College Station, TX 77843

Email Address: paratodomag@hotmail.com

Education: D.V.M., National University of Asunción, 2003. Paraguay
M.S., Dairy Science, Texas A&M University, 2009