Senepol Symposium, St. Croix, USVI November 8-10, 2002

Results of SCBA Sire Test in Paraguay

John D. Hough[1a], J. Keith Bertrand[2] and José Pereira[3]

[1]EPD International, Inc., Statham, Georgia, USA
[2] University of Georgia, Athens, Georgia
[3]Ganadera Sesenta y Tres, Asuncion, Paraguay

Summary

A Senepol demonstration project was conducted on three commercial ranches in Paraguay starting in 1998. One calf crop was produced sired by 10 Senepol sires mated to native Zebu x British cows of varying percentages. A total of 337 calves were produced with a least one recorded measurement. Traits measured included birth, weaning and yearling weights as well as long yearling ultrasound fat thickness, ribeye area and intramuscular fat. This research / demonstration project was considered extremely successful by those involved. Significant sire differences were shown for most traits measured. Results very highly correlated to EPDs calculated from the Senepol National Genetic Evaluation. Yearling weight was the least correlated trait to EPDs. Carcass EPDs generated from this project have been very well received by Senepol breeders worldwide. Distribution of Senepol genetics throughout South America has been a direct result of this project.

Introduction

The Senepol Cattle Breeders Association (SCBA) had a desire to promote Senepol genetics in South America. The SCBA concluded it would be beneficial to conduct a demonstration project within South America to directly demonstrate the usefulness of Senepol genetics within that environment. In 1998 Jerry White, Senepol breeder and SCBA board member, initiated a cooperative research/demonstration project between US Senepol breeders and three commercial cattle ranches in central Paraguay. Mr. White oversaw the overall project. Dr. J. Keith Bertrand of the University of Georgia designed project and individual animal matings. Matings were stratified across herd, breed of dam and age of dam. Maintaining “connectedness” for the genetic analysis was utmost priority. José Pereira, owner of one of the Paraguayan ranches, managed project in Paraguay. The objectives of this project were to a) evaluate specific US sires for growth and carcass traits, b) to generate ultrasound measurements to calculate carcass EPDs, as well as birth, weaning and yearling EPDs and 3) to demonstrate the production of Senepol-sired calves in South America.

[a] Corresponding author: EPD International, Inc., PO Box 808, Statham, Georgia, Phone: 770/725-9811 Ext. 13, Fax: 770/725-5281, email: jhough@epdinternational.com

Materials and Methods

Semen from 10 US Sires was sent to Paraguay late in 1998. Table 1 lists these 10 Fullblood Senepol sires and number of calves produced. This semen was bred to native Zebu x British cows on 3 Paraguayan Ranches. Table 2 lists the 3 ranches and numbers of calves produced on each ranch. A total of six unique totally nested dam breed types were represented on the 3 ranches. Each dam breed type was managed differently and thus each was considered a contemporary group. Table 3 lists the six dam breed types, their breed combination and number of progeny produced by each. There were a total of 178 male and 159 female calves produced. Table 4 shows the number of progeny per dam age classification and the days of age range per classification. Table 5 shows the distribution of calves across herds and sires. Connectedness was a primary concern with the design to insure appropriate design for the Senepol National Cattle Evaluation Program. Table 6 shows the sire by breed of dam (or contemporary group) distribution. The number of calves per age of dam and herd combination is show in table 7.

Calves were born in 59-day period between August 14 and October 12, 1999. A total of 337 calves were produced in the project with at least one recorded measurement. There were 33.7 calves produced per sire. Calves were weaned at 222 ± 16 days of age and yearling weights were collected at 404 ± 13 days of age. Ultrasound data was collect at 653 ± 13 days. All calves were managed under commercial Paraguayan conditions in 6 total contemporary groups. No creep feed was administered. All males were castrated prior to weaning. Ultrasound collected by BIF / AUP certified technician, Rethel King of Harrisonville, Arkansas with an Aloka 500V ultrasound machine utilizing Designer Genes automated software.

Traits (dependent variables) measured included birth weight (Bwt), weaning weight (Wnwt), yearling weight (Yrwt), ultrasound fat thickness (Fat), ultrasound ribeye area (REA) and ultrasound intramuscular fat percentage (IMF). The statistical utilized the SAS System, version 8.02.

Results and Discussion

Table 8 lists each of the dependent analysis variables as well as the covariates used in the statistical analysis. Given are the counts, means, standard deviations, minimums and maximums. These results are representative of an extensive management system in South America. Ultrasound measurements are typically collected at an earlier age (12 to 16 mo), but because of the management and no intact males being represented, it was decided an older age was more appropriate.

Table 9 outlines the statistical model and significant effects for each of the six analysis variables. The birth weight analysis included the fixed effects of sire, sex, contemporary group, age of dam, sex X contemporary group and sex X age of dam interaction. The sire and contemporary group effects were significant at the .05 level. Sex X age of dam approached significance.

Weaning weight included effects for sire, sex, contemporary group, age of dam, sex X contemporary group and sex X age of dam interaction along with a linear covariate for the weaning age of the calf. Significant sources of variation were found for sire, sex, contemporary group, age of dam, sex X contemporary group and the calf age covariate.

Yearling weight included effects for sire, sex, contemporary group, and age of dam along with a linear covariate for the yearling age of the calf. The effects for sex X contemporary group and sex X age of dam interaction were not significant and were deleted from the model because

they created non-estimable sire least squares means problems. Sire, contemporary group and the age covariate were very significant sources of variation, with age of dam approaching significance.

The same model was fit for the three ultrasound carcass traits. The models included effects for sire, sex, contemporary group, age of dam, sex X contemporary group and sex X age of dam interaction along with a linear covariate for the age of the calf at time of ultrasound measurement as well as a linear covariate for the weight of the calf at ultrasound measurement. The carcass traits showed much less significance than did the weight traits. Sire and sex X contemporary group was significant for Fat. Sex X contemporary group and the weight covariate were significant for REA. Only Sex X contemporary group was significant for IMF. The purpose of this analysis was to examine sire differences, thus the specific levels of the other effects in the model had only limited importance.

Tables 10 through 15 show the least squares means adjusted for each of the model effects, the standard error associated with that mean and the comparable EPD independently generated from the Senepol National Genetic Evaluation program for each of the six analysis variables Bwt, Wnwt, Yrwt, Fat, REA and IMF, respectively.

A simple linear regression was fit to test the significance between the least squares means and EPDs for each of the six dependent variables. Table 16 shows the levels of significance from this test. All traits except Yrwt were very significant, which was expected, since these measurements contributed towards the EPD analysis. The reason for the lack of significance in Yrwt is not know, but one would assume the level of management would be a contributing factor.

Table 17 shows the correlations between EPD and least squares means for each of the six variables. As in the regression significance test, Yrwt was the only variable not very highly significant.

Acknowledgements

This project was partially funded by and appreciation is expressed to USDA-FAS through US Livestock Genetics Export, Inc., b) owners of the ten Senepol sires represented in the project and 3) the Senepol Cattle Breeders Association.

Table 1. Sires represented and number of progeny produced.

Registration Number	Sire Name	Sire ID	Progeny per sire
1076492	ASL CR DUTCHMAN 26E	26E	34
1062010	CN 5562	5562	40
1067681	CN 5825C	5825C	42
1072179	CN 5938D	5938D	37
1072703	CN 5991D	5991D	31
1064154	WC 850	850	36
1073416	HBC HOT STUFF 8E	8E	26
1080307	MAGNUM 27	Magnum	33
1079233	NOCONA	Nocona	36
1063123	HBC CHIEF RENEGADE	Renegade	22

Table 2. Calves produced per herd.

Herd	Herd ID	Number Produced
Ganadera 63	G	168
Paraguay Holding	P	78
Sosa Ranch	S	91

Table 3. Calves per Dam Breed (CGroup).

Dam Breed Type*	Contemporary Group Code	Number of Calves Produced
BR57_SG29_SI14	G_1	61
SI57_BR29_SG14	G_2	87
SG100	G_3	20
BR50_AN50	P_4	62
BR75_AN25	P_5	16
AN75_BR25	S_6	91

*Number is % of breed represented; BR=Brahman, SG=Santa Gertrudis, SI=Simmental, AN=Angus.

Table 4. Calves per age of dam category.

Dam Age (yr)	Day Range*	Calves Produced
3	1004-1338	298
4	1339-1703	24
5	1704+	15

*BIF age of dam classification ranges.

Table 5. Calves per Sire x Herd

	Herd			
Sire	G	P	S	Total
26E	34	0	0	34
5562	30	10	0	40
5825C	0	18	24	42
5938D	18	0	19	37
5991D	14	17	0	31
850	36	0	0	36
8E	9	0	17	26
Magnum	10	5	18	33
Nocona	17	19	0	36
Renegade	0	9	13	22
Total	168	78	91	337

Table 6. Calves per Sire x Breed of Dam (Contemporary Group)

	Breed of Dam (CGroup)						
	AN75_BR25	BR50_AN50	BR57_SG29_SI14	BR75_AN25	SG100	SI57_BR29_SG14	Total
Sire	S_6	P_4	G_1	P_5	G_3	G_2	
26E	0	0	16	0	0	18	34
5562	0	0	0	10	10	20	40
5825C	24	18	0	0	0	0	42
5938D	19	0	18	0	0	0	37
5991D	0	17	0	0	0	14	31
850	0	0	18	0	0	18	36
8E	17	0	9	0	0	0	26
Magnum	18	0	0	5	10	0	33
Nocona	0	19	0	0	0	17	36
Renegade	13	8	0	1	0	0	22
Total	91	62	61	16	20	87	337

*Number is % of breed represented; BR=Brahman, SG=Santa Gertrudis, SI=Simmental, AN=Angus.

Table 7. Calves per Age of Dam x Herd.

	Herd			
Age of Dam	G	P	S	Total
3	156	51	91	298
4	2	22	0	24
5	10	5	0	15
Total	168	78	91	337

Table 8. Variable Counts, Means, Standard Deviations, Minimums and Maximums

Variable	N	Mean	Std Dev	Minimum	Maximum
Bwt (lb)	337	72.13	9.54	46	97
Wnwt (lb)	318	412.1	52.3	273	595
Yrwt (lb)	264	550.2	103.4	340	904
USWt (lb)	305	795.0	124.5	534	1202
Fat (in)	305	0.1341	0.0518	0.03	0.37
REA (sq in)	305	8.955	1.448	5.7	13.0
IMF (%)	305	3.252	0.962	1.74	6.88
Dam Age, d	337	1176.8	254.4	1058	2956
Dam Age, yr	337	3.160	0.474	3	5
Wn Age, d	318	222.07	16.10	178	250
Yr Age, d	264	404.19	12.71	369	427
US Age, d	305	653.04	12.57	619	676

Table 9. Statistical models and significant effects for each dependant variable.

Effect	Bwt	Wnwt	Yrwt	Fat	REA	IMF
Sire	*	***	***	*	ns	ns
Sex	ns	+	ns	Ns	ns	ns
Cgroup	*	***	***	Ns	ns	ns
Dam Age	ns	**	+	Ns	ns	ns
Sex * CGroup	ns	***	X	***	*	*
Sex * Dam Age	+	ns	X	Ns	ns	ns
Wn Age (cov)	X	***	X	X	X	X
Yr Age (cov)	X	X	***	X	X	X
US Age (cov)	X	X	X	Ns	ns	ns
USWt (cov)	X	X	X	Ns	***	ns

X=Effect not in model, ns=P>.10, +P<.10, *=P<.05, **=P<.01, ***=P<.001

Table 10. Birth weight least squares means, standard errors and EPD for sire.

Sire	Mean	Std Error	EPD
5825C	70.74	1.96	-0.1
5991D	70.76	2.35	-0.3
5562	70.90	1.93	-0.1
Renegade	73.28	2.37	3.3
5938D	74.18	2.07	1.7
850	75.95	2.10	2.8
8E	76.08	2.27	2.7
Nocona	76.08	2.14	3.5
Magnum	76.14	2.08	2.6
26E	77.75	2.14	3.0

Table 11. Weaning weight least squares means, standard errors and EPD for sire.

Sire	Mean	Std Error	EPD
5938D	436.3	8.5	29.1
850	423.9	8.6	12.3
26E	423.3	8.6	14.0
Nocona	418.6	8.7	13.6
5562	413.7	7.7	8.2
8E	409.1	9.0	11.7
5825C	400.6	7.9	7.9
Magnum	400.6	8.3	3.0
5991D	393.7	9.6	3.7
Renegade	372.8	9.5	5.2

Table 12. Yearling weight least squares means, standard errors and EPD for sire.

Sire	Mean	Std Error	EPD
Nocona	567.8	11.5	17.7
5562	566.5	9.7	9.8
850	563.1	11.3	11.5
Magnum	560.3	11.7	5.6
26E	555.0	11.5	16.0
5938D	549.8	13.6	33.4
5991D	533.3	12.4	6.1
8E	527.5	14.1	12.3
5825C	523.0	11.7	9.9
Renegade	510.5	12.3	11.3

Table 13. Fat thickness least squares means, standard errors and EPD for sire.

Sire	Mean	Std Error	EPD
5938D	0.1032	0.0106	-0.008
26E	0.1108	0.0109	-0.004
8E	0.1111	0.0115	-0.005
5825C	0.1117	0.0099	-0.007
Renegade	0.1181	0.0118	-0.005
Nocona	0.1222	0.0109	0.001
850	0.1228	0.0106	0.006
5991D	0.1296	0.0118	0.004
5562	0.1362	0.0095	0.006
Magnum	0.1564	0.0108	0.017

Table 14. Ribeye area least squares means, standard errors and EPD for sire.

Sire	Mean	Std Error	EPD
850	9.574	0.305	0.43
5991D	9.354	0.339	0.15
5562	9.294	0.273	0.20
26E	9.245	0.313	0.21
5938D	9.168	0.305	0.29
Nocona	9.164	0.314	0.18
5825C	9.024	0.285	-0.02
Magnum	8.764	0.311	0.01
Renegade	8.481	0.340	-0.23
8E	8.471	0.330	-0.21

Table 15. Intramuscular fat least squares means, standard errors and EPD for sire.

Sire	Mean	Std Error	EPD
5825C	3.470	0.206	0.36
5991D	3.344	0.246	0.20
Magnum	3.285	0.226	0.10
5562	3.215	0.198	0.11
850	3.210	0.221	0.10
5938D	3.128	0.221	0.03
8E	3.061	0.239	0.02
Renegade	2.931	0.247	-0.10
26E	2.900	0.227	-0.16
Nocona	2.844	0.228	-0.19

Table 16. Level of significance for sire EPDs predicting sire LS means.

Trait	Significance Level
Bwt	0.0010
Wnwt	0.0059
Yrwt	0.6483
Fat	<.0001
REA	<.0001
IMF	<.0001

Table 17. Product moment correlations between sire EPDs and sire LS means

Trait	Correlation
Bwt	0.87***
Wnwt	0.80**
Yrwt	0.17
Fat	0.96***
REA	0.94***
IMF	0.98***

** = P < .01, *** = P < .001