

**Final Technical Report**  
**FCEB Project #20**

# Final Report to the Florida Cattle Enhancement Board

## Project title and principal investigator contact information

Enhancement of pre- and post-weaning growth and carcass characteristics using the slick mutation. Principal investigator: Peter J Hansen, Dept of Animal Sciences, University of Florida, [pjhansen@ufl.edu](mailto:pjhansen@ufl.edu); 352-359-5753.

Co-principal investigators: Angela Gonella-Diaza, Mario Binelli, Nicolas DiLorenzo, and Tracy L. Scheffler, Department of Animal Sciences, University of Florida; Tad Sonstegard, Acceligen, Eagen, MN.

## Specific aims

The underlying hypothesis of this proposal is that the slick mutation in the prolactin receptor gene confers cattle in hot climates with increased ability to regulate body temperature and undergo growth. There is one specific aim:

Evaluate whether inheritance of a single allele of the slick mutation in the prolactin receptor gene confers beef cattle in Florida with superior ability for pre- and post-weaning growth and increased carcass characteristics.

If the hypothesis is correct, incorporation of the slick mutation in beef cattle populations in Florida will result in increased profitability because of higher weaning and postnatal weights and increased carcass characteristics.

The anticipated increase in resistance to heat stress caused by the slick allele would result in an improvement in animal health and welfare and reproductive efficiency and be directly relevant to those research priorities of the FCA. The proposal is also directly relevant to the FCA priority of improving animal genetics, although in a way different than classical crossbreeding.

## Approach

The experiment is being conducted at the North Florida Research and Education Center. During the fall breeding season, cows were timed inseminated with semen from the slick bull (named Stay Cool). The timed artificial insemination protocol was the 7-d CO-Synch + CIDR protocol. Cows will receive 100 µg gonadotropin releasing hormone (GnRH), i.m., and CIDR insertion in the vagina on day -9, 25 mg prostaglandin F<sub>2α</sub>, i.m., and CIDR removal on day -2 and 100 µg GnRH and insemination 56 ± 2 h later on day 0. Insemination was with conventional semen from the slick bull. Pregnancy diagnosis was by ultrasound examination at day 30 and 60. A total of 93 pregnancies were produced. Cows are anticipated to calve from November to January 2024.

At birth, calves will be weighed and height at the withers measured. A tissue sample will be collected from all calves, including those stillborn, and used to determine whether the animal inherited the slick mutation. It is anticipated that about 75% of the calves will inherit the mutation. If calving rate is 40%, there will be about 120 slick calves and 40 non-slick calves. Bull calves will be castrated at 2 mo of age or the age at which the ranch typically performs castration. Calves will be kept with their dams on bahiagrass pastures until weaning at ~205 d of age. Weight and height at the withers will be measured at weaning. In addition, hair color will be recorded and a 2 x 2 inch

section of the hair will be clipped at a standard location to measure hair weight. Ultrasound examination will be performed to estimate ribeye area and fat thickness. A Beef Improvement Federation-certified technician employed by Dr. Hansen will collect images using an ultrasound scanner with a 17.2-cm linear probe to estimate 12<sup>th</sup>-rib ribeye area and fat thickness over the 12<sup>th</sup> rib.

Backgrounding and finishing will be at a location chosen by the producer, with the preference that the location be in the Southeast or Texas. All animals, including steers and heifers, will be harvested at a commercial, cooperating meat facility under USDA-FSIS inspection using standard industry procedures. At 48 h, carcasses will be ribbed between the 12<sup>th</sup> and 13<sup>th</sup> ribs, and measurements of composition (ribeye area, fat opposite the eye, and percentage kidney, pelvic, heart fat) will be collected. Compositional measurements, along with hot carcass weight, will be used to calculate USDA yield grade, which incorporates both fat and muscling measurements to estimate carcass composition and total percent saleable product from major beef wholesale cuts. The formula for USDA yield grade is:  $YG = 2.5 + (2.5 \times \text{fat thickness, inches}) + (0.2 \times \%KPH) + (0.0038 \times \text{hot carcass weight, lb}) - (0.32 \times \text{ribeye area, in}^2)$ , where KPH = kidney, pelvic and heart fat. The USDA quality grade will be determined using intramuscular fat (marbling) and maturity.

A rib section from the 9<sup>th</sup> rib to the 12<sup>th</sup>/13<sup>th</sup> interface will be removed; the 9-11 rib section will be used for compositional/chemical analysis, and the remainder for muscle fiber and muscle chemical analysis. The 9-11 rib section will be dissected into bone, fat, and lean tissues. Individual components will be weighed and subsequently recombined for chemical composition analysis. Tissues will be cut or sawed into small pieces, ground two times, mixed, and sampled. Samples will be stored at -80°C until proximate analysis. Samples will be analyzed for water content via gravimetric moisture loss using a drying oven; protein content using a nitrogen analyzer; crude fat content using petroleum ether for solvent extraction; and ash content using dry ashing. All methods will be conducted according to AOAC official methods of analysis.

Data will be analyzed by least-squares analysis of variance using the GLIMMIX procedure of the Statistical Analysis System (SAS, Cary NC).

**PLEASE REMIT TO:**

UNIVERSITY OF FLORIDA BOARD OF TRUSTEES  
 Contracts & Grants  
 PO Box 931297  
 Atlanta, GA 31193-1297

Invoice Date: 08/15/2024  
 Invoice Period: 05/01/2024 - 07/31/2024  
 Principal Investigator: Hansen, Peter J  
 Award Begin Date: 10/30/2023  
 Award End Date: 07/31/2024

**SPONSOR:**

FL CATTLE ENHANCEMENT BOARD  
 P.O. Box 421929  
 Kissimmee FL 34742-1929  
 United States

UF FEIN: 59-6002052

Sponsor Award ID: 20  
 Award Title: Enhancement of pre- and post-weaning growth and carcass characteristics with the slick mutation  
 Award Amount: \$71,209.60

<b>Invoice #</b>	I000130486
<b>UF Award #</b>	AWD15795
<b>Primary Project #</b>	P0324586
<b>Primary Department:</b>	60090000
<b>Current Invoice Amount:</b>	\$41,275.10

Description	Current	Cumulative
Personnel - Salary	\$5,023.26	\$12,051.99
Personnel - Fringe Benefits	\$322.72	\$918.55
Tuition	(\$1,008.73)	\$2,243.65
Materials and Supplies	\$17,366.68	\$25,728.46
Equipment	\$0.00	\$0.00
Contractual Services	\$809.20	\$8,160.70
Animal	\$14,279.96	\$14,279.96
Other Expenses	\$59.69	\$59.69
<b>Direct Cost</b>	<b>\$36,852.78</b>	<b>\$63,443.00</b>
<b>Facilities and Administrative Costs</b>	<b>\$4,422.32</b>	<b>\$7,613.19</b>
<b>Total</b>	<b>\$41,275.10</b>	<b>\$71,056.19</b>

For billing questions, please call 352.392.1235  
 Torres, Kannika S [kannika@ufl.edu](mailto:kannika@ufl.edu)  
 Please reference the UF Award Number and Invoice Number in all correspondence

By signing this report, I certify to the best of my knowledge and belief that the report is true, complete, and accurate, and the expenditures, disbursements and cash receipts are for the purposes and objectives set forth in the terms and conditions of the federal award. I am aware that any false, fictitious, or fraudulent information, or the omission of any material fact, may subject me to criminal, civil, or administrative penalties for fraud, false statements, false claims or otherwise. (U.S Code Title 18, Section 1001 and Title 31, Sections 3729-3730 and 3801-3812).

*Kannika Torres*

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 Certifying Official

Payment History	
Cumulative Invoices:	\$71,056.19
Payments Received:	\$29,781.09
Outstanding Balance:	\$41,275.10
Note: Outstanding balance includes current invoice amount	

FOR UF USE ONLY			Additional Projects: N	
Project ID	Deptid	Department Name	Current	Cumulative