**Project/Activity Number: S1093**

**Project/Activity Title:** "Management systems for beef cattle reared in subtropical and tropical environments."

**Period Covered:** 11/2023 to 11/2024

**Date of this Report:** December 1st, 2024

**Date of Annual Meeting:** October 31st-November 1st, 2024 (Orlando, FL)

### S1093 Project Station Report Content

### Participants Attendance at Annual Meeting:

### Joao Vendramini – University of Florida

### Philip Moriel – University of Florida

### Reinaldo Cooke – Texas A&M University

### Kelsey Schubach – Mississippi State University

### Barbara Roqueto - Mississippi State University

### Marcelo Vedovatto – Louisiana State University

### Matheus Ferreira - Louisiana State University

### Juliana Ranches – Oregon State University

### Jessie Morrill– University of Nebraska

### John Arthington – University of Florida

**Absent from the meeting**

### Pedro Fontes – University of Georgia

### Vinicius Gouvea – Texas A&M University

### Tyron Wickersham – Texas A&M University

### Rodrigo Marques – Virginia Tech University

**Brief summary of minutes of annual meeting**

Business Meeting: November 1st, 2024

Meeting was opened by the chair at 8:30 a.m.

Election of officers for 2024-2025:

* Marcelo Vedovatto was elected Chair for 2024-2025.
* Barbara Reis was elected secretary for 2024-2025.

*Overall discussion by the group moderated by the chair:*

* Reinaldo Cooke explained how to report on the NIFA website. Published and ongoing manuscripts, extension reports, and abstracts should be reported. Each state should submit only one report, independent of the number of members. Reports should be submitted to Reinaldo Cooke, who will combine them into a single document. For the year 2025, reports should be submitted to Reinaldo Cooke by the day of the meeting.
* 2025 is the last year of the current multistate, however, it is planned to be renewed for 5 more years.
* Robert Godfrey could not attend the meeting but emailed the NIFA update that the group discussed. Joao Arthington suggested contacting the NIFA program person before submitting the proposal.
* Joao Vendramini asked if the group wanted to invite new members, and the group agreed that it would be beneficial to have new members, especially those who work in meat science and genetics.
* Reinaldo Cooke suggested each member bring a senior graduate student to present data at the next meeting.
* Barbara Reis proposed the next chair organize a visit to a university or plan an additional tour for the upcoming meeting.
* Joao Vendramini asked about the format for sponsoring future meetings. The University of Florida and Texas A&M will cover the meeting room and breakfast cost when the meeting is conducted in these states.
* Cliff Lamb asked the group to submit the report within 30 days of the meeting; next year, the project will go for internal review, and all reports must be uploaded.
* Jessie Morrill suggested conducting the next meeting in Nebraska. Joao Vendramini asked for a motion to vote “yes” or “no” for the location, and all members agreed to the location. The second option would be in Texas if Nebraska will not work for some reason. Cliff Lamb will need to approve the location suggested by the group. Marcelo Vedovatto or Reinaldo Cooke will communicate the definitive location to the group as soon as it is approved. The group agreed that the date for the next meeting would be around October 15th to early November 2025.
* Joao Vendramini asked for a motion to close the business meeting, and all members agreed. The meeting was closed.

**Accomplishments:**

**Objective 1. Identify and fully comprehend the biological functions associated with growth, health, and reproduction in *Bos indicus*-influenced cattle reared in tropical and subtropical environments**

*Florida*

* **Effects of breed on preferential intake of hydroxychloride and sulfate sources
of trace minerals in growing beef heifers. Conclusions**: Nelore heifers had greater preferential intake for mineral and protein supplements containing hydroxychloride vs. sulfate sources compared to Angus × Nelore heifers. Hydroxychloride sources encouraged voluntary intake and reduced variation in supplement consumption compared to SUL sources of the same metals.
* **Replacing sulfate with hydroxychloride sources of trace minerals to modulate
the growth performance and physiology of beef heifers during periods of feed restriction and high starch intake. Conclusions:** Nelore heifers offered hydroxychloride sources of Cu, Mn, and Zn exhibited greater plasma concentrations of IGF-1 and a temporary boost in ADG during nutrient surplus compared to those receiving sulfate sources. While hydroxychloride supplementation reduced the acute phase response early in nutrient restriction, it did not improve growth performance or other physiological indicators during nutrient restriction and starch challenges.
* **Breed and trace mineral source modulate the growth and physiology of beef heifers during periods of nutrient restriction and grazing forage at early vegetative stage.
Conclusions:** Breed modulated the physiology and growth of beef heifers during nutrient restriction, but did not impact growth and incidence of diarrhea during periods of grazing forage at early vegetative stage. Regardless of breed, replacing sulfate with hydroxychloride sources of Cu, Mn, and Zn led to minor positive effects on serum indicators, enhanced growth during nutrient restriction, and reduced diarrhea during grazing of early vegetative forage.
* **A 12-year summary of the effects of estrous synchronization and body weight at breeding on reproductive success of *Bos indicus*-influenced beef heifers grazing warm-season grasses. Conclusions:** *Bos indicus*-influenced beef heifers need to achieve ≥65% of mature BW at the start of the breeding season to optimize reproduction, whereas estrous synchronization protocols enhanced puberty attainment (regardless of BW) and early calving distribution when heifers were <65% of mature BW at the start of the breeding season.
* **Use of sunn hemp as forage for beef cattle. Conclusions:** The presence of pyrrolizidine alkaloids in sunn hemp may be the potential cause of decreased early-weaned calves forage intake and animal performance, thus feeding sunn hemp to early-weaned calves should be avoided.

*Texas*

* **Characterizing pregnancy losses in lactating Holstein cows receiving a fixed-timed artificial insemination protocol. Conclusions**: This experiment provides novel information about pregnancy losses in Holstein cows reared in tropical conditions, which totaled 28.5% from day 31 of gestation to calving and the majority resulted from fetal mortality after day 62 of gestation (17.8%). Pregnancy losses were mostly increased in multiparous compared with primiparous cows. Level of systemic inflammation during early gestation, based on serum haptoglobin on day 24 after FTAI, impaired pregnancy success on day 31 after FTAI and increased pregnancy losses resultant from late embryonic + early fetal mortalities. This experiment also suggests serum PAGs concentrations on day 31 of gestation as predictor of pregnancy loss during the initial 4 months of gestation, but not for losses occurring after day 120 of gestation.
* **Pregnancy losses in *Bos indicus-*influenced beef and dairy recipients assigned to a fixed-time embryo transfer protocol. Conclusions:** Most pregnancy losses occurred from early embryonic mortality in both scenarios, although late embryonic + fetal mortalities were elevated and should not be associated with reproductive diseases. Pregnancy losses were directly impacted by body condition score and management systems of beef recipient, and by season of the FTET event and *B. indicus* influence of donors and recipients in the dairy herd. Sire used for embryo production also influenced pregnancy losses in both systems, including a beef sire that yielded low embryonic + fetal losses, and a dairy sire that alleviated early embryonic losses during the warm season.
* **Characterizing pregnancy losses in *Bos indicus* beef females receiving a fixed-timed artificial insemination protocol. Conclusions:** This experiment provides novel information about pregnancy losses after day 30 of gestation in *B. indicus* cattle, with most losses occurring as fetal mortality and not affected by systemic inflammation during early gestation. Pregnancy losses were nearly doubled in precocious and conventional heifers compared with parous cows, demonstrating the relevance of this reproductive failure to *B. indicus* replacement heifers.

*Mississippi*

* **Impact of shade and chromium supplementation on performance, carcass characteristics and oxidative stress of finishing steers in hot environmental conditions. Conclusions**: Ongoing
* **Effects of sodium during late gestation of beef cows on performance, response to vaccination, acid-base balance, plasma metabolome, liver and muscle transcriptome of the offspring. Conclusions**: Ongoing
* **Effects of implant administration at birth and trace mineral injection at weaning on growth, inflammatory and immune responses of beef calves and their residual impact during the preconditioning phase. Conclusions**: Ongoing
* **Impacts of trace mineral source and ancillary drench on steer performance during a 60-day backgrounding phase. Conclusions:** While supplementing cattle with AAC or INR results in similar animal performance and clinical disease, AAC and APF reduces stress and acute phase protein responses in high-risk receiving cattle.
* **Integrated blood transcriptome and multi-tissue trace mineral analyses of healthy stocker cattle fed complexed or inorganic trace mineral supplement. Conclusions:** This study identified gene expression differences in high-risk cattle fed inorganic or amino acid complexed mineral supplements, revealing adaptive immune and metabolic mechanisms that may be improved by organic supplementation. These results suggest that tailored mineral supplementation may improve cattle immunity and mineral absorption.
* **Trace mineral supplementation strategies for beef cattle during feedlot receiving: A systematic review and meta-analysis. Conclusions:** On going.

*Louisiana*

* **Effects of temperament on metabolic and hormonal profile, performance and puberty attainment of grazing Brangus heifers. Conclusions:** Ongoing

*Nebraska*

* **Characterizing TPRV1 variants in *Bos indicus*-influenced and *Bos taurus* cattle. Conclusions:** Ongoing
* **Effects of bloom time and lean color on beef grading camera measures. Conclusions:** Increasing bloom time for up to two hours post-ribbing reduces marbling score outputs by beef grading cameras. Consideration should be given to the placement of camera grading equipment with respect to length of time between ribbing and grading and the length of time carcasses are held for regrading. Chilling time may affect visual properties of lean and/or intramuscular fat, and thus, grading camera outputs. Future research is needed to determine if cattle with inherently dark lean color receive lower marbling scores compared to cattle with more red lean color

**Objective 2. Develop management practices tailored to *Bos indicus*-influenced cattle reared in subtropical and tropical regions of the US**

*Florida*

* **Bakery waste supplementation to late gestating *Bos indicus*-influenced beef cows successfully impacted offspring postnatal performance. Conclusions:** Supplemental fat concentration fed to late-gestating beef cows had variable effects on calf performance. Low-fat bakery waste led to greatest calf preweaning growth, whereas high-fat bakery waste enhanced maternal reproduction and had minor benefits to calf humoral immune function.
* **Removing maternal heat stress abatement during gestation modulated postnatal physiology and improved performance of *Bos indicus*-influenced beef offspring. Conclusions:** Removing maternal access to artificial shade: (1) increased prepartum intravaginal temperature and plasma concentrations of cortisol but reduced prepartum BCS and plasma concentrations of IGF-1 in grazing *Bos indicus*-influenced beef heifers; and (2) increased post-weaning BW gain and had positive effects on humoral immune response of their offspring.
* **Maternal prepartum supplementation of protein and energy and body condition score modulated the performance of *Bos indicus*-influenced cow-calf pairs. Conclusions:** Precalving supplementation improved reproduction of cows with below optimal BCS and weaning weight of calves born from cows with BCS above optimal, whereas calving BCS was the major factor affecting postpartum BCS change and cow reproductive performance.
* **Maternal pre- and postpartum supplementation of a *Bacillus*-based DFM enhanced cow and calf performance. Conclusions:** Maternal supplementation of a *Bacillus*-based DFM increased prepartum BCS gain and postpartum plasma glucose concentration of heifers and led to positive carryover effects on post-weaning BW gain and humoral immune response in their offspring.
* **Stocking method effects on *Bos indicus* influenced cows grazing subtropical rangelands. Conclusions:** Grazing method did not affect forage characteristics and animal performance of mature cows grazing rangelands from January to April in Florida.
* **Stair-step supplementation of early-weaned calves grazing annual ryegrass. Conclusions:** The stair-step supplementation procedure did not impact forage characteristics and animal performance of early-weaned calves grazing annual ryegrass.

*Texas*

* **Supplementing yeast culture to beef heifers consuming a forage-based diet: effects on growth performance and ruminal fermentation responses. Conclusions:** Supplementing YC at 1.5 or 3.0 g/100 kg of BW linearly enhanced utilization of dietary nutrients and rumen VFA production, leading to improved ADG and G:F of beef heifers consuming a forage-based diet.
* **Supplementing a *Bacillus*-based probiotic to high-risk stocker cattle. Conclusions:** Supplementation with a probiotic based on ***B. subtilis*** and ***B. licheniformis*** to high-risk stocker cattle did not alleviate incidence of BRD signs nor improved ADG, but decreased acute-phase protein response, reduced steer mortality + removal, and increased pasture-based productivity during a 90-day grazing period.
* **Effects of moderate exercise regimen on** **development and puberty attainment of *Bos indicus*-influenced beef heifers reared in drylots at a high stocking density.**

**Conclusions:** Rearing Bos indicus-influenced beef heifersin drylots with high stocking density has detrimental effects to their puberty attainment, and the moderate exercise regimen partially alleviated this negative outcome.

* **Supplementing narasin or monensin to control coccidiosis in naturally infected calves. Conclusions:** Both ionophores were similarly effective in controlling coccidiosis upon completion of the 42-day study, although the anticoccidial effects of monensin were noted earlier in the experiment. Nonetheless, these results corroborate narasin as an efficient anticoccidial ionophore for naturally infected calves.
* **Administering the maternal appeasing substance (mBAS) before slaughter to improve carcass characteristics of finishing cattle.**

**Conclusions:** mBAS administration to finishing cattle using oilers during the last 7 days on feed alleviated the adrenocortical stress response elicited by the process of slaughter, which likely resulted in increased carcass dressing

* **An updated meta-analysis of the anti-methanogenic effects of monensin in beef cattle. Conclusions:** this study provides novel insights and further corroborates monensin as CH4 mitigation strategy in beef cattle operations. The most effective responses were observed during the first 79 days of monensin supplementation, and when monensin was included between 32 to 44 mg/kg of diet, was added to high-forage diets, and added to diets fed ad libitum.

*Mississippi*

* **Impact of nutritional management on beef heifers’ puberty attainment and physiology. Conclusions**: Ongoing.
* **Development of a system for assessing maternal behavior in post-partum crossbred cows and heifers. Conclusions:** The scoring systems established are effective in quantifying maternal behavior at calving in beef cows. However, these scoring systems should be refined to account for noted variability.
* **Impact of maternal behavior at calving on productivity in beef cows. Conclusions:** Multiparous dams with a low maternal aggression score at calving have increased calf mortality and subsequent, decreased weaning rate. Additional research is warranted to address the relationships among maternal behavior scores at calving and offspring productivity.
* **Feeding behavior of high-risk steers newly received for backgrounding.**  **Conclusions:** These results quantify the acclimation period of steers to a new environment and characterizes the learning and development of novel modes of eating. These results inform the development of behavioral expectations for newly received high-risk calves that can be used to monitor cattle health, understand cattle perception, and promote cattle welfare.
* **Describing the consumption of a granular mineral supplement containing chlortetracycline by gestating beef cattle on pasture. Conclusions:** As cow age increases, total CTC-medicated mineral consuming days and total CTC-medicated mineral consumption decrease. During this study, 7.45% (7/94) cows received an average CTC dose between 1.05-1.15 mg/kg/day through voluntary consumption of CTC-medicated mineral. Feeding a CTC-medicated mineral supplement in a free-choice manner did not ensure all cows consumed the labelled CTC dose of 1.1mg/kg/day.
* **Impact of postweaning stair-step nutritional regimen in beef heifers on reproductive development and productivity as primiparous cows. Conclusions:** On going.
* **Impact of fecal egg count during gestation on productive outcomes in beef cattle. Conclusions:** On going.

*Louisiana*

* **Impact of a trace mineral injection at weaning on growth, behavior, and inflammatory, antioxidant, and immune responses of beef calves. Conclusions:** In conclusion, ITM application at weaning improved Cu and Se status, enhanced antioxidant and immune responses, and reduced stress and inflammation in calves, though it did not affect growth.
* **Effects of injectable trace minerals (Cu, Zn, Se, and Mn) and vitamins (A and E) on reproduction and antioxidant responses of *Bos indicus* beef females synchronized to fixed-time AI. Conclusions:** The administration of TMVI at the beginning of a fixed-timed AI protocol reduced the inflammatory responses and improved the antioxidant response and reproduction parameters, mainly in females with low BCS.
* **Effects of an appeasing substance application at weaning on growth, stress, behavior, and response to vaccination of Bos indicus calves. Conclusions:** The BAS administration improved BW, reduced temperament and serum cortisol concentration, and improved behavior and response to vaccination.
* **Appeasing substance administration at feedlot entry impacted temperament, pen behavior, immunocompetence, and meat quality of beef heifers. Conclusions:** BAS administration at feedlot entry increased growth, reduced stress, and inflammation, and improved humoral immune responses, behavior, and meat quality of heifers.
* **Effect of provision of artificial shade and chromium supplementation during mid and late gestation to fall-calving beef cows under heat stress conditions: performance, immunocompetence and physiological responses of cow-calf pairs. Conclusions:** On going

### Impact Statements

* + Differences in variants exist between *Bos indicus* and *B. taurus* breeds for transient receptor potential vanilloid 1 (TRPV1); TRPV1 variants in *B. taurus* are predicted to be deleterious, which may be correlated with greater susceptibility to heat stress compared to *B. indicus.*
	+ Unbloomed, dark lean color results in lower grading camera marbling scores compared to bloomed, redder lean color. These findings may have important implications for *Bos indicus* cattle, which may require longer feeding time, and thus may have, different lean color compared to *B. taurus* breeds.
	+ Nelore heifers preferred mineral and protein supplements with hydroxychloride over sulfate sources, showing more consistent intake compared to Angus × Nelore heifers.
	+ Nelore heifers supplemented with hydroxychloride sources of Cu, Mn, and Zn had a brief increase in average daily gain during nutrient surplus, compared to those on sulfate sources.
	+ Breed influenced the physiology and growth of beef heifers during nutrient restriction. Replacing sulfate with hydroxychloride sources of Cu, Mn, and Zn had minor positive effects on serum indicators, boosted growth during nutrient restriction, and reduced diarrhea during grazing.
	+ *Bos indicus*-influenced beef heifers need to achieve ≥65% of mature body weight at the start of the breeding season to optimize reproduction.
	+ Low-fat bakery waste led to greatest calf preweaning growth, whereas high-fat bakery waste enhanced maternal reproduction and had minor benefits to calf humoral immune function.
	+ Removing maternal access to artificial shade reduced maternal prepartum body condition score but boosted offspring post-weaning growth performance and humoral immune response.
	+ Precalving supplementation improved reproduction of thin cows and weaning weight of calves born from cows with optimal body condition score at calving.
	+ Maternal supplementation of a *Bacillus*-based DFM increased enhanced maternal performance and offspring growth and immune response.
	+ Feeding sunn hemp may decrease the value of early-weaned beef calves by $ 55/head (considering the market price of $2.50/lb and 90 d feeding period )
	+ The use of rotational stocking in cows grazing rangelands in Florida increases production cost due to fencing and labor and does not increase animal performance and vegetation characteristics.
	+ Fixing the supplementation level of early-weaned claves grazing annual ryegrass during the winter is a feasible management practice to optimize animal performance and forage utilization.
	+ Lactating Holstein cows reared in tropical conditions lost 28.5% of the pregnancies after day 31 of gestation. Most of these losses were caused by fetal mortality after day 62 gestation (17.8%)
	+ Timed embryo transfer allows evaluation of pregnancy losses throughout gestation. In dairy and beef systems within tropical environments, most pregnancy losses occurred from early embryonic mortality. Late embryonic + fetal mortalities were also elevated and not related to diseases
	+ In tropical cow-calf systems, *Bos indicus* females lost 22.1% of the pregnancies after day 30 of gestation. Most of these losses were caused by fetal mortality from day 60 to 150 of gestation
	+ Yeast cultures from *Saccharomyces cerevisiae* can be used as feed additive to improve growth performance of beef cattle consuming forage-based diets
	+ Supplementing a *Bacillus subtilis* + *B. licheniformis* probiotic to high-risk cattle increased pasture-based liveweight production by 28% in a 90-day stocker production system.
	+ Stocking density and exercise opportunities should be considered to improve heifer welfare and reproductive development in intensive drylot systems, as lack of exercise directly contributes to delayed reproductive development of drylot heifers
	+ Narasin is an efficient anticoccidial ionophore for naturally-infected calves.
	+ Administering the maternal bovine appeasing substance to finishing cattle prior to slaughter increased carcass dressing and reduced the proportion of dark cutters by more than half.
	+ Inclusion of monensin into beef cattle diets decreased in vivo methane production by 15%.
	+ Gene expression differences exist in high-risk cattle fed inorganic or amino acid complexed mineral supplements, revealing adaptive immune and metabolic mechanisms that may be improved by organic supplementation.
	+ Supplementing organic complexed Cu, Co, Mn, and Zn to high-risk beef steers partially reduced stress and acute phase response associated with receiving.
	+ Maternal aggression and mothering ability are effective in quantifying maternal behavior at calving in beef cows.
	+ Multiparous dams with a low maternal aggression score at calving have increased calf mortality and subsequent decreased weaning rate.
	+ Feeding a CTC-medicated mineral supplement in a free-choice manner did not ensure all cows consumed the labelled CTC dose of 1.1mg/kg/day.

### The application of a trace minerals injection at weaning improved Cu and Se status, enhanced antioxidant and immune responses, and reduced stress and inflammation in calves, though it did not affect growth of *Bos indicus* calves.

### The application of a trace minerals and vitamins injection at the beginning of a fixed-timed AI protocol reduced the inflammatory responses and improved the antioxidant response and reproduction parameters, mainly in *Bos indicus* females with low body condition score.

### The administration of a bovine appeasing substance at weaning improved body weight, reduced temperament and serum cortisol concentration, and improved behavior and response to vaccination of grazing *Bos indicus* beef calves.

### The administration of a bovine appeasing substance at feedlot entry increased growth, reduced stress, and inflammation, and improved humoral immune responses, behavior, and meat quality of Brangus heifers.

### Provision of artificial shade assisted beef cows under heat stress conditions maintain BCS and reduce intravaginal temperature, but no effect of Cr supplementation was observed. On the other hand, artificial shade combined with Cr supplementation during mid and late gestation enhanced cows body weight.

### Published Works (related to Objectives 1 and 2 only)

*Refereed Journal Articles*

1. Brauner, C. C., V. S. Izquierdo, J. M. B. Vendramini, and P. Moriel. 2024. A 12-year summary of the effects of estrous synchronization and body weight at breeding on reproductive success of *Bos indicus*-influenced beef heifers grazing warm-season grasses. Applied Anim. Sci. *Accepted Oct 12, 2024.*
2. Izquierdo, V. S., B. S. Menezes, M. G. Lopes, E. G. Malaguez, F. Lopes, F. M. Pereira, C. C. Brauner, P. Moriel, M. N. Corrêa, and E. Schmitt. 2024. Rumen-protected methionine modulates body temperature and reduces the incidence of heat stress temperatures during hottest hours of the day of grazing heat-stressed *Bos indicus* beef cows. Anim. Sci. J. 95(1):e13980. [doi:10.1111/asj.13980](https://doi.org/10.1111/asj.13980)
3. Izquierdo, V. S., B. I. Cappellozza, J. V. L. Silva, G. C. M. Santos, A. Miranda, J. H. J. Bittar, A. Pickett, S. Mackey, R. F. Cooke, J. M. B. Vendramini, and P. Moriel. 2024. Maternal pre- and postpartum supplementation of a *Bacillus*-based DFM enhanced cow-calf performance. J. Anim. Sci. 102:skae110. [doi:10.1093/jas/skae110](https://doi.org/10.1093/jas/skae110)
4. Moriel, P., M. Vedovatto, V. Izquierdo, E. A. Palmer, and J. M. B. Vendramini. 2024. Maternal precalving supplementation of protein/energy and body condition score modulate the performance of *Bos indicus*-influenced cow-calf pairs. Anim. Reprod. Sci. 262:107433. [doi:10.1016/j.anireprosci.2024.107433](https://doi.org/10.1016/j.anireprosci.2024.107433)
5. Sousa, L. M., W. L. Souza, K. A. Oliveira, I. A. Cidrini, P. Moriel, H. C. R. Nogueira, I. M. Ferreira, G. D. Ramirez-Zamudio, I. M. Oliveira, L. F. Prados, F. D. Resende, and G. R. Siqueira. 2024. Herbage allowance from mid to late gestation modulates beef cows prepartum performance and preweaning growth of their female offspring. Animals. 14(1):163. [doi:10.3390/ani14010163](https://doi.org/10.3390/ani14010163)
6. Souza, I. R. T., P. Moriel, M. H. Barbosa, M. E. Rezende, F. Biazotto, G. V. A. R. Camargo, K. V. Z. Augusto, M. A. F. Porcionato, D. B. Araujo, and J. L. M. Vasconcelos. 2023. Effects of breed on preferential intake of hydroxychloride and sulfate sources of trace minerals in growing beef heifers. Trans. Anim. Sci. 7(1):txad130. [doi:10.1093/tas/txad130](https://doi.org/10.1093/tas/txad130)
7. Pedro, A. E., G. L. Pereira, J. A. Torrecilhas, R. N. S. Torres, G. D. Ramirez-Zamudio, W. A. Baldassini, L. A. Chardulo, R. A. Curi, G. H. Russo, J. A. Napolitano, G. L. B. Tinoco, T. B. Mariano, J. L. Caixeta, and P. Moriel. 2023. Early weaning possibly increases the activity of lipogenic and adipogenic pathways in intramuscular adipose tissue of Nellore calves. Metabolites. 13(9):1028. [doi:10.3390/metabo13091028](https://doi.org/10.3390/metabo13091028)
8. Izquierdo, V. S., J. V. L. Silva, J. Ranches, G. C. M. Santos, J. A. Carroll, N. C. Burdick Sanchez, J. H. J. Bittar, J. M. B. Vendramini, and P. Moriel. 2023. Removing maternal heat stress abatement during gestation modulated postnatal physiology and improved performance of *Bos indicus*-influenced beef offspring. J. Anim. Sci. 101:skad250. [doi:10.1093/jas/skad250](https://doi.org/10.1093/jas/skad250)
9. Izquierdo, V. S., J. V. L. Silva, E. Palmer, J. Ranches, J. H. J. Bittar, G. C. M. Santos, A. Pickett, R. F. Cooke, J. M. B. Vendramini, and P. Moriel. 2023. Bakery waste supplementation to late gestating Bos indicus-influenced beef cows successfully impacted offspring postnatal performance. J. Anim. Sci. 101:skad244. [doi:10.1093/jas/skad244](https://doi.org/10.1093/jas/skad244)
10. Sousa, L. F., E. F. Brito, A. T. Ramos, R. E. Mora-Luna, P. Moriel, J. M. B. Vendramini, and J. F. Ferreira. 2023. Spatial variability of the occurrence of lesion on cattle carcasses in association with pre-slaughter factors in the forest-savannah transition zone. R. Bras. Zootec. 52:e20220014. [doi:0.37496/rbz5220220014](http://dx.doi.org/10.37496/rbz5220220014)
11. Oliveira, H. M. R., J. M. B. Vendramini, J. Garzon, H. M. Silva, I. M. Ferreira, E. Palmer, and P. Moriel. 2023. Effects of frequency of concentrate supplementation on performance of early-weaned beef calves consuming annual ryegrass. Applied Anim. Sci. 39:33-39. [doi:10.15232/aas.2022-02367](https://doi.org/10.15232/aas.2022-02367) \*Editor’s choice April 2023.
12. Amorín, R., L. Liu, P. Moriel, N. DiLorenzo, P. A. Lancaster, and F. Peñagaricano. 2023. Maternal diet induces persistent DNA methylation changes in the muscle of beef calves. Scientific Reports. 13:1587. [doi:10.1038/s41598-023-28896-3](https://doi.org/10.1038/s41598-023-28896-3)
13. Garzon, J., J.M.B. Vendramini, M.L. Silveira, J.C.B. Dubeux Jr., L.E. Sollenberger, H.L. Liao, H.M.S. da Silva, V.C. Gomes, and H.M.R. Oliveira. 2024. Aeschynomene overseeding and N fertilization effects in bahiagrass litter decomposition. Agron. J. 116:1455-1465 https://doi.org/10.1002/agj2.21561
14. Vinning, P., P.A. Lancaster, N. DiLorenzo, G.C. Lamb, and J.M.B. Vendramini. 2024. Similar feed intake levels yield no differences in energy utilization between beef heifers identified as low (efficient) and high (inefficient) residual feed intake. Anim. Prod. Sci. https://doi.org/10.1071/AN23269
15. Silveira, M.L., P.J.R. da Cruz, J.M.B. Vendramini, E. Boughton, R. Bracho, and A.S. Cardoso. 2024. Opportunities to increase soil carbon sequestration in grazing lands in the southern USA. Grassland Research 3:69-78 <https://doi.org/10.1002/glr2.12074>.
16. Munhoz, S. K., R. F. Cooke, A. K. Munhoz,C. P. Prado, M. H. C. Pereira, and J. L. M. Vasconcelos. 2023. Pregnancy losses in *Bos indicus-*influenced beef and dairy recipients assigned to a fixed-time embryo transfer protocol. Anim. Reprod. Sci. 264:107471
17. Prado, C. P., R. F. Cooke, A. K. Munhoz,S. K. Munhoz, M. C. G. de Sousa, V. M. P. da Silva, K. G. Pohler, and J. L. M. Vasconcelos. 2023. Characterizing pregnancy losses in *Bos indicus* beef females receiving a fixed-timed artificial insemination protocol. Theriogenology 215:144-150.
18. Pickett, A. T., R. F. Cooke, I. S. de Souza, W. A. de Souza, G. A. Monteiro, M. B. do Prado, V. N. Gouvêa, R. C. Araujo, and S. J. Mackey. 2024. Supplementing yeast culture to beef heifers consuming a forage-based diet: effects on growth performance and ruminal fermentation responses. J. Anim. Sci. (*in review*) JAS-2024-9115
19. Mackey, S. J., R. F. Cooke, A.T. Pickett, B. I. Cappellozza, K. M. Harvey, and B. B. Karisch. 2024. Supplementing a Bacillus-based probiotic to high-risk stocker cattle. J. Anim. Sci. 102: skae209
20. Harvey,K. M., R. F. Cooke, A. T. Pickett, J. Cordero, M. E. Drewery, L. W. Rahmel, C. L. Daigle, T. Martins, and S. J. Mackey. 2024. Effects of moderate exercise regimen on development and puberty attainment of beef heifers reared in drylots at a high stocking density. J. Anim. Sci. 102:skae150
21. Leiva, T., R. F. Cooke, P. V. F. Lasmar, R. L. Valarelli, J. M. C. de Simas, D. M. B. Zapa, L. F. M. Couto, L. M. Heller, and W. D. Z. Lopes. 2024. Supplementing narasin or monensin to control coccidiosis in naturally infected calves. Transl. Anim. Sci. 8:txae069
22. Mackey, S. J., R. F. Cooke, and A. T. Pickett. 2024. Administering the maternal appeasing substance before slaughter to improve carcass characteristics of finishing cattle. Transl. Anim. Sci. 8:txae048.
23. Cooke, R. F., L. R. Eloy, S. C. Bosco, P. V. F. Lasmar, J. M. C. de Simas, T. Leiva, and S. R. de Medeiros. 2024. An updated meta-analysis of the anti-methanogenic effects of monensin in beef cattle. Transl. Anim. Sci. 8:txae032
24. Vedovatto, M., M. F. L. Ferreira, A. K. Edwards, J. A. Gurie, H. Marcon, J. Ranches, B. R. Reis, D. G. Vieira, E. A. Lima, M. Santos, G. L. Franco. 2024. Impact of a trace mineral injection at weaning on growth, behavior, and inflammatory, antioxidant, and immune responses of beef calves. Trans. Anim. Sci. *In press.*
25. Scott, M. A., K. M. Harvey, B. B. Karisch, A. R. Woolums, R. M. Tracy, J. R. Russell, and C. L. Engel. 2024. Integrated blood transcriptome and multi-tissue trace mineral analyses of healthy stocker cattle fed complexed or inorganic trace mineral supplement. Animals. doi.org/10.3390/ani14152186.
26. Cordero, J. F., K. M. Harvey, M. E. Drewery, M. G. McKnight, B. B. Karisch, L. S. Durst, E. A. Colombo, R. F. Cooke, and J. R. Russell. 2024. Impacts of trace mineral source and ancillary drench on steer performance during a 60-day backgrounding phase. Animal. doi.org/10.1016/j.animal.2024.101080.
27. Jumper, W. I., C. C. Brown, S. Lee, D. Cook, J. M. Stilwell, and K. M. Harvey. 2024. Case report: Investigating an outbreak of tremorgenic mycotoxicosis in beef cows on pasture in Mississippi due to ergot (*Claviceps paspali*) production in Dallisgrass (*Paspalum dilatatum*). Bov. Pract. 58(2):59-68
28. Green, M. M., A. R. Woolums, B. B. Karisch, K. M. Harvey, S. F. Capik, and M. A. Scott. 2023. Influence of the at-arrival host transcriptome on bovine respiratory disease incidence during backgrounding. Vet. Sci. doi.org/10.3390/vetsci10030211.
29. Vedovatto, M., M. F. Ferreira, A. K. Edwards, J. A. Gurie, H. Marcon, J. Ranches, B. R. Reis, D. G. Vieira, E. A. Lima, M. Santos, and G. L. Franco. 2024. Impact of a trace mineral injection at weaning on growth, behavior, and inflammatory, antioxidant, and immune responses of beef calves. *Translational Animal Science.* Accepted for publication.
30. Silva, L. G., M. Vedovatto, J. Ranches, M. F. Ferreira, E. A. Lima, F. J. C. Faria, L. C. L. Ferreira, R. L. Goncalves, and G. L. Franco. 2024. Effects of injectable trace minerals (Cu, Zn, Se, and Mn) and vitamins (A and E) on reproduction and antioxidant responses of Bos indicus beef females synchronized to fixed-time AI. *Animal Reproduction Science* (under review).
31. Vieira, D. G., M. Vedovatto, H. J. Fernandes, E. D. A. Lima, M. C. D’Oliveira, U. D. A. Curcio, J. Ranches, M. F. Ferreira, O. A. D. Sousa, B. I. Cappellozza, and G. L. Franco. 2023. Effects of an appeasing substance application at weaning on growth, stress, behavior, and response to vaccination of *Bos indicus* calves. *Animals* 13:3033. <https://doi.org/10.3390/ani13193033>.
32. Vieira, D. G., M. Vedovatto, M. F. Ferreira, J. Ranches, B. I. Cappellozza, O. A. de Sousa, N. Canuto, M. de N. B. Gomes, and H. J. Fernandes. Appeasing substance administration at feedlot entry impacted temperament, pen behavior, immunocompetence, and meat quality of beef heifers. *Animals* (under review).

*Oral and Poster Abstracts*

1. **Morrill, J.C.**, W.J. Horne, and B.L. Gwartney. 2024. Effects of bloom time on beef grading camera measures. (Reciprocal Meat Conference, Oklahoma City, OK)
2. Izquierdo, V. S., B. I. Cappellozza, A. Gonella-Diaza, N. Ashrafi, R. A. Mimi, S. F. Graham, J. M. B. Vendramini, and **P. Moriel**. 2024. Effects of maternal pre- and post-partum supplementation of a *Bacillus*-based DFM on plasma metabolome profile of *Bos indicus*-influenced heifers and their offspring. J. Anim. Sci. 102(3):390-391. [doi:10.1093/jas/skae234.443](https://doi.org/10.1093/jas/skae234.443)
3. **Moriel, P**., V. S. Izquierdo, J. M. B. Vendramini. 2024. Short- and long-term effects of heat stress in cow-calf pairs adapted to tropical and subtropical regions. J. Anim. Sci. 102(3):17-18. [doi:10.1093/jas/skae234.018](https://doi.org/10.1093/jas/skae234.018)
4. Izquierdo, V., J. M. B. Vendramini, and **P. Moriel**. 2024. Awardee Talk: Nutritional management to optimize cow-calf production in Southeast. J. Anim. Sci. 102(3):357-358. [doi:10.1093/jas/skae234.408](https://doi.org/10.1093/jas/skae234.408)
5. **Moriel, P**., V. Izquierdo, C. Brauner, and J. M. B. Vendramini. 2024. Overview of probiotic supplementation and opportunities to improve cow-calf production. J. Anim. Sci. 102(3):391-392. [doi:10.1093/jas/skae234.444](https://doi.org/10.1093/jas/skae234.444)
6. Souza, I. R. T., **P. Moriel**, G. R. R. Monar, P. H. L. Lima, A. A. B. M. Carvalho, G. F. Oliva, K. V. Z. Augusto, M. A. F. Porcionato, D. B. Araujo, and J. L. M. Vasconcelos. 2024. Impacts of supplementing sulfate vs. hydroxychloride sources of Cu, Mn, and Zn on heifer growth performance and physiology during feed restriction and high-starch challenge periods. J. Anim. Sci. 102(3):74-75. [doi:10.1093/jas/skae234.083](https://doi.org/10.1093/jas/skae234.083)
7. Izquierdo, V. S., B. I. Cappelloozza, J. V. L. Silva, G. C. M. Santos, A. Miranda, J. H. J. Bittar, A. Pickett, S. Mackey, R. F. Cooke, J. M. B. Vendramini, and **P. Moriel**. 2024. Maternal pre- and post-partum supplementation of Bacillus-based DFM enhanced cow and calf performance. J. Anim. Sci. 102:33-34. [doi:10.1093/jas/skae019.038](https://doi.org/10.1093/jas/skae019.038)
8. Bennett, A., C. C. Constantino Rocha, A. Waheed, M. Brown, G. D. De Melo, R. Marcello, R. Chebel, **P. Moriel**, R. Krisher, K. G. Pohler, P. J. Hansen, and M. Binelli. 2024. Assessing abundance of pregnancy markers among fertility-classified beef cows. J. Anim. Sci. 102:25-26. [doi:10.1093/jas/skae019.029](https://doi.org/10.1093/jas/skae019.029)
9. Rocha, C. C. C., A. B. Montevecchio, M. Mazziotta, A. Bennett, A. Waheed, M. Campbell, M. Rubessa, R. Krisher, **P. Moriel**, P. J. Hansen, R. Chebel, and M. Binelli. 2024. Estradiol and folicular growth are associated with estrous behavior monitored by na accelometer in grazing beef cows. J. Anim. Sci. 102:37-38. [doi:10.1093/jas/skae019.041](https://doi.org/10.1093/jas/skae019.041)
10. Brauner, C., V. S. Izquierdo, J. M. B. Vendramini, and **P. Moriel**. 2024. A 12-year summary effects of body weight at breeding and synchronization protocols on reproductive success of Bos indicus-influenced beef heifers grazing warm-season grasses. J. Anim. Sci. 102:65-66. [doi:10.1093/jas/skae019.077](https://doi.org/10.1093/jas/skae019.077)
11. Silva, J.V.L., J.M.B. Vendramini, H.M. Silva, H.M. de Oliveira, J. Garzon, D. Cook, D. Gardner, and **P. Moriel**. Use of sunn hemp as forage for early-weaned beef calves. American Forage and Grassland Council 2024 Conference, Mobile, AL.
12. Izquierdo, V. S., J. Silva, E. Palmer, J. Ranches, J. Bittar, A. Pickett, R. F. Cooke, J. Vendramini, and P. Moriel. 2023. Bakery waste supplementation to late gestating Bos indicus-influenced beef cows successfully impacted offspring postnatal performance. J. Anim. Sci. 101:76-77. [doi:10.1093/jas/skad281.093](https://doi.org/10.1093/jas/skad281.093)
13. Silva, J.V.L., J.M.B. Vendramini, H.M. Silva, H.M. de Oliveira, J. Garzon, D. Cook, D. Gardner, and **P. Moriel.** 2023. Use of sunn hemp as forage for early-weaned beef calves. J. Anim. Sci. 101:376-377. [doi:10.1093/jas/skad281.447](https://doi.org/10.1093/jas/skad281.447)
14. Izquierdo, V., J. Lazarin, H. Silva, J. Ranches, J. A. Carroll, N. C. Burdick-Sanchez, J. Bittar, J. Vendramini, and **P. Moriel**. 2023. Impacts of pre- and postpartum heat stress abatement on physiology and performance of grazing *Bos indicus*-influenced cow-calf pairs. J. Anim. Sci. 101(1):41-41. [doi:10.1093/jas/skad068.047](https://doi.org/10.1093/jas/skad068.047)
15. Lazarin, J., J. Vendramini, **P. Moriel**, H. Silva, V. Izquierdo, J. Garzon, and N. Lage. 2023. Supplementation level effects on early weaned beef calves receiving annual ryegrass. J. Anim. Sci. 101(1):17-18. [doi:10.1093/jas/skad068.020](https://doi.org/10.1093/jas/skad068.020)
16. Lazarin, J.V.S., J.M.B. Vendramini, H. M. Silva, H. M. de Oliveira, J. Garzon, D. Cook, D. Gardner, and P. Moriel. 2024. Use of sunn hemp as forage for early-weaned beef calves. 2024 American Forage and Grassland National Meeting, Mobile, AL.
17. Vendramini, J., J. Lazarin, M. L. Silveira, H. Da Silva, H. De Oliveira, J. Garzon, D. Cook, D. Gardner, R. Cooke, and P. Moriel. 2024. Use of sunn hemp as forage for beef cattle. 75th European Association of Animal Production Annual Meeting, Florence, Italy.
18. Silveira, M., J. Vendramini, and R. Bracho. Carbon dynamics and greenhouse fluxes in subtropical grazing lands. 75th European Association of Animal Production Annual Meeting, Florence, Italy.
19. Vendramini, J. M. B., and P. Moriel. 2024. Microbial inoculant effects on cool- and warm-season grass silage. 2024 ASAS International Meeting, Calgary, AB.
20. Lazarin, J. V., J. M. B. Vendramini, and P. Moriel. 2024. Microbial inoculant effects on limpograss silage. 2024 ASAS International Meeting, Calgary, AB.
21. Cooke, R. F., S. Mackey, F. Cooke, A. Pickett, K. Harvey, B. Karisch, and B. Cappellozza. 2024. Supplementing Bovacillus to weaned beef steers during a 90-day grazing period. EAAP Book of Abstracts (75th Annual Meeting, Florence, Italy):275
22. Cooke, R. F., F. Cooke, S. Mackey, A. Pickett, and K. Harvey. 2024. Effects of moderate exercise regimen on reproductive development of replacement beef heifers reared in drylots at a high stocking density. EAAP Book of Abstracts (75th Annual Meeting, Florence, Italy):509
23. Vendramini, J., J. Lazarin, M. L. Silveira, H. Da Silva, H. De Oliveira, J. Garzon, D. Cook, D. Gardner, R. F. Cooke, and P. Moriel. 2024. Use of sunn hemp as forage for beef cattle. EAAP Book of Abstracts (75th Annual Meeting, Florence, Italy):218
24. Mackey, S. J., R. F. Cooke, A. Pickett, and B. Cappellozza. 2024. Supplementing Bovacillus to feedlot cattle finished under heat stress conditions. J. Anim. Sci. 102(Supplement 3):772-773.
25. Cooke, R. F., S. Mackey, F. Cooke, A. Pickett, K. Harvey, B. Karisch, and B. Cappellozza. 2024. Supplementing Bovacillus to weaned beef steers during a 90-day grazing period. J. Anim. Sci. 102(Supplement 3):395-396.
26. Cooke, R. F. and J. L. M. Vasconcelos. 2024. Pregnancy losses in *Bos indicus*-influenced cowherds. J. Anim. Sci. 102(Supplement 3):100-100.
27. Cooke, R. F., N. C. Kertz, A. Pickett, and S. Mackey. 2024. Administering the maternal bovine appeasing substance before slaughter to improve carcass characteristics of finishing cattle. J. Anim. Sci. 102(Supplement 3):560-561.
28. Cooke, R. F., S. Mackey, A. Pickett, E. Colombo, B. I. Cappellozza, B. B. Karisch, and K. M. Harvey. 2024. Supplementing Bovacillus to newly weaned beef steers during a 90-d grazing period. J. Anim. Sci. 102(Supplement 1):73-74.
29. Pickett, A., R. F. Cooke, L. W. Rahmel, S. Mackey, M. Drewery, J. Cordero, T. Mackey, C. L. Daigle, T. Martins, and K. M. Harvey. 2024. Effects of moderate exercise regimen on reproductive development of replacement beef heifers reared in drylots at a high stocking density. J. Anim. Sci. 102(Supplement 1):35–36.
30. McKnight, M., W. I. Jumper, K. M. Harvey, M. E. Drewery, C. W. Potts, J. F. Cordero, J. R. Russell, and D. R. Smith. 2024. Describing the consumption of chlortetracycline-containing mineral offered free-choice to pregnant commercial beef cows on pasture. 2024 Spring MSU Graduate Research Symposium Abstract Book.
31. McKnight, M., K. M. Harvey, B. B. Karisch, J. Cordero, M. Drewery, L. S. Durst, E. Colombo, R. F. Cooke, and J. R. Russell. 2024. Impacts of trace mineral source and ancillary drench on steer performance during a 60-day backgrounding phase. J. Anim. Sci. (E-Suppl. 3): *In press.*
32. Ramirez, B., H. McAllister, S. Capik, R. Valeris-Chacin, K. Harvey, B. Karisch, A. Woolums, P. S. Morley, L. Pinnell, and M. Scott. 2024. Update on the molecular epidemiological assessment of beef cattle management systems. CRAWD Abstract Book.
33. Jumper, W. I., M. G. McKnight, K. Harvey, J. F. Cordero, J. R. Russell, and D. R. Smith. 2024. Measuring intake of chlortetracycline-containing mineral offered free-choice to beef cows on pasture. CRAWD Abstract book.
34. Ramirez, B., H. McAllister, S. Capik, R. Valeris-Chacin, K. Harvey, A. Woolums, B. Karisch, and M. Scott. 2024. Longitudinal blood RNA-Seq analysis of cattle to determine the impact of vaccination and marketing on clinical BRD. CRAWD 2024 Abstract Book.
35. McKnight, M. M., W. I. Jumper, J. Cordero, K. M Harvey, J. R. Russell, and D. R. Smith. 2023. Describing the consumption of chlortetracycline-containing mineral offered free-choice to commercial beef cows on pasture. 2023 Spring MSU Undergraduate Research Symposium Abstract Book.
36. McKnight, M. M., W. I. Jumper, J. Cordero, K. M Harvey, J. R. Russell, and D. R. Smith. 2023. Describing the consumption of chlortetracycline-containing supplement offered free-choice to commercial beef cows on pasture. J. Anim. Sci. (E-Suppl. 3): 423-424.
37. Scott, M. A., K. M. Harvey, B. B. Karisch, A. R. Woolums, and J. R. Russell. 2023. Integrated transcriptome and multi-tissue mineral analyses of healthy stocker cattle fed complexed or inorganic trace mineral supplement. 56th AAPB Abstract Book.
38. Cordero, J. F., G. M. D’Souza, L. W. Rahmel, L. S. Durst, B. B. Karisch, C. L. Daigle, J. R. Russell, and K. M. Harvey. 2023. Feeding behavior of high-risk steers newly received for backgrounding. J. Anim. Sci. (E-Suppl. 3): 85-86.
39. Harvey, K., L. Rahmel, J. Cordero, B. Karisch, and J. Russell. 2023. Impacts of trace mineral source and ancillary drench on steer performance during backgrounding. 74th EAAP Abstract Book.
40. Siqueira, I., R. Gomes, H. Marcon, J. Chinaglia, M. Vedovatto, B. Reis and M. Ferreira. 2024. Nutritional and Management Strategies to Mitigate Heat Stress in Beef Cow-Calf Systems in the Southern US. 10th International Education Week Research Fair. Baton Rouge, LA.
41. Lima, E.A., Vedovatto, M., Farias, F., Ranches, J., Ferreira, M., Cappellozza, B.I., Souza, O. and Franco, G.L.L. 2024. Effect of an appeasing substance application on growth, stress, handling quality and reproduction of Bos indicus beef heifers synchronized to fixed-time AI. *Journal of Animal Science*. 102(Supplement\_1):62-63. <https://doi.org/10.1093/jas/skae019.074>.
42. Silva, L. G., M. Vedovatto, J. Ranches, M. F. Ferreira, E. A. Lima, F. J. C. Faria, L. C. L. Ferreira, R. L. Goncalves, and G. L. Franco. 2023. Effects of an injection of trace minerals (Cu, Zn, Se, and Mn) and vitamins (A and E) on reproduction and inflammatory responses of *Bos* indicus beef females synchronized to fixed-time AI. *Annual Meeting of the Brazilian Society of Embryo Technology – SBTE*, Campinas, São Paulo, Brazil.
43. Silva, L. G., M. Vedovatto, J. Ranches, M. F. Ferreira, E. A. Lima, F. J. C. Faria, L. C. L. Ferreira, R. L. Goncalves, and G. L. Franco. 2023. Effects of an injection of copper and zinc on reproduction and inflammatory responses of Bos indicus beef females synchronized to fixed-time AI. Annual Meeting of the Brazilian Society of Embryo Technology – SBTE, Campinas, São Paulo, Brazil

*Popular Articles*

1. Moriel, P. 2024. Program your calves for success. *Angus Beef Bulletin EXTRA.* 16:10B.
2. Moriel, P. 2024. Probiotic supplementation for beef females. *The Florida Cattlemen and Livestock Journal.*
3. Brauner, C., E. Schmitt, V. Isquierdo, and P. Moriel. 2024. Precalving body condition score and the decision about supplementing or not beef cows. *Revista Pecuária Sul*. Rio Grande do Sul, Brazil. 18:16-20.
4. Moriel, P. 2024. Nutritional impacts on beef cow reproduction. *The Florida Cattlemen and Livestock Journal.* 88(9):40-46.
5. Moriel, P. 2024. UF/IFAS Range Cattle Research and Education Center research update. *The Florida Cattlemen and Livestock Journal.* 87(9):102-108.
6. Moriel, P. Using body condition score to increase pregnancy success of beef cows and growth of their calves in Florida. Ona Summer Newsletter – Feature article. August 2024.
7. Brauner, C., E. Schmitt, V. Isquierdo, and P. Moriel. 2024. Developing replacement beef heifers. *Revista Pecuária Sul*. Rio Grande do Sul, Brazil. 17:13-16
8. Brauner, C., E. Schmitt, and P. Moriel. 2024. Using early weaning and creep-feeding in beef systems. *Revista Pecuária Sul*. Rio Grande do Sul, Brazil. 15:11-15
9. Moriel, P. 2024. Body condition score before and after calving determine pregnancy success of beef cows in Florida. *Article of the month (February), South Florida Beef Forage Program*.
10. Moriel, P. 2023. Fatty acid supplementation and pregnancy rates of beef cows. *The Florida Cattlemen and Livestock Journal.* 88(1):46-48.
11. Moriel, P. 2023. UF/IFAS Range Cattle Research and Education Center research update. *The Florida Cattlemen and Livestock Journal.* 87(9):102-108.
12. Moriel, P. 2023. Can we decrease frequency of concentrate supplementation for young growing beef calves? *Article of the month (February), South Florida Beef Forage Program*.

### *Scientific and Outreach Oral Presentations* (related to Objectives 1 and 2 only)

1. Moriel, P. 2024. *Seminar.* Nutrition for beef females. Deseret Ranch visit*.* Sep. 20, 2024. St. Cloud, FL. 40 attendees.
2. Moriel, P. 2024. Cow herd nutrition during pregnancy: impact on subsequent fertility and offspring performance. Proceedings 2024 Applied Reproductive Strategies in Beef Cattle, September 4-5, 2024, Athens, GA.
3. Moriel, P. 2024. *Seminar.* Ruminant nutrition symposia:Overview of probiotic supplementation and opportunities to improve cow-calf production. 2024 American Society of Animal Science, Calgary, Canada. Jul 23rd, 2024. 200 attendees.
4. Moriel, P. 2024. *Seminar.* Animal Behavior and Well-being Symposia: Short- and long-term effects of heat stress in cow-calf adapted to tropical and subtropical regions. 2024 American Society of Animal Science, Calgary, Canada. Jul 22nd, 2024. 100 attendees.
5. Moriel, P. 2024. *Seminar.* ASAS-WSASAS Beef Species Symposia:Impacts of supplementing sulfate vs. hydroxychloride sources of Cu, Mn, and Zn on heifer growth performance and physiology during feed restriction and high-starch challenge periods. 2024 American Society of Animal Science, Calgary, Canada. Jul 22nd, 2024. 200 attendees.
6. Moriel, P. 2024. *Seminar.* Impacts of BCS and probiotics on cow-calf production. Ona in-service training, Range Cattle REC, University of Florida, Ona. May 23rd, 2024. 11 attendees.
7. Moriel, P. 2024. *Seminar.* Nutritional impacts on female reproduction. Ona highlight, University of Florida, Ona. May 21st, 2024. 25 attendees.
8. Moriel, P. 2024. *Seminar.* Probiotic supplementation for replacement beef heifers. 73rd Florida Beef Cattle Short Course, University of Florida, Gainesville. May 10th, 2024. 200 attendees.
9. Moriel, P. 2024. *Seminar.* Nutrition for reproduction. 2024 Reproductive Management School. April 16th, 2021, Clewiston, FL. 20 attendees
10. Moriel, P. 2024. *Seminar.* Fetal programming and importance of body condition score. 2024 Reproductive Management School. April 16th, 2021, Clewiston, FL. 20 attendees
11. Moriel, P. 2024. *Seminar.* Nutritional management to optimize cow-calf production in the Southeast *–* 2024 Florida Ruminant Nutrition Symposium. Feb. 28, 2024. Gainesville, FL. 300 attendees.
12. Moriel, P. 2024. *Seminar.* Managing cow body condition score *–* Cattlemen’s Roundtable. Feb. 21, 2024. Okeechobee, FL. 40 attendees.
13. Moriel, P. 2023. *Seminar.* Heat stress in grazing beef cattle in Florida – Adams Ranch Field Day*.* Nov. 8, 2023. Fort Pierce, FL. 30 attendees.
14. Moriel, P. 2023. *Seminar.* Early weaning. Winter Supplementation – South Florida Beef and Forage Program*.* Sep. 14, 2023. Okeechobee, FL. 40 attendees.
15. Rosasco, S., and P. Moriel. 2023. *Seminar.* Management strategies to enhance fertility and longevity in replacement heifers. Proceedings 2023 Applied Reproductive Strategies in Beef Cattle, September 6-7, 2023, Cheyenne, Wyoming. 200 attendees.
16. Moriel, P., and S. Rosasco. 2023. *Seminar.* Pre- and post-calving nutrition: which one is more important? Beef Reproduction Task Force – Spring Webinar Series – June 27th, 2023. 88 attendees. 302 YouTube Views.
17. Moriel, P. 2023. *Seminar.* Pre- and post-calving nutrition: which one is more important? 6th Annual Nutrition for Beef Females – June 6th, 2023, Seminole tribe, FL. 54 attendees.
18. Moriel, P. 2023. *Seminar.* Pre- and post-calving nutrition: which one is more important? 6th Annual Nutrition for Beef Females – May 31th, 2023, Ona, FL. 46 attendees.
19. Moriel, P. 2023. *Seminar.* Pre- and post-calving nutrition: which one is more important? 6th Annual Nutrition for Beef Females – May 24th, 2023, Dade City, FL. 39 attendees.
20. Moriel, P. 2023. *Seminar.* Fatty acid supplementation to increase pregnancy rates in multiparous beef cows. 72nd Florida Beef Cattle Short Course, University of Florida, Gainesville. May 12th, 2023. 200 attendees.
21. Supplementing Bovacillus to weaned beef steers during a 90-day grazing period. EAAP 75th Annual Meeting, Florence, Italy.
22. Effects of moderate exercise regimen on reproductive development of replacement beef heifers reared in drylots at a high stocking density. EAAP 75th Annual Meeting, Florence, Italy.
23. Supplementing Bovacillus to weaned beef steers during a 90-day grazing period. ASAS 2024.
24. Pregnancy losses in *Bos indicus*-influenced cowherds. ASAS 2024.
25. Administering the maternal bovine appeasing substance before slaughter to improve carcass characteristics of finishing cattle. ASAS 2024.
26. Supplementing Bovacillus to newly weaned beef steers during a 90-d grazing period. ASAS Southern Section 2024.
27. Effects of moderate exercise regimen on reproductive development of replacement beef heifers reared in drylots at a high stocking density. ASAS Southern Section 2024.

*Scientific and Outreach oral presentation* **(related to Objectives 1 and 2 only).**

1. K. M. Harvey. 2024. Impact of temperament and stress on reproduction. Applied Reproduction
2. Strategies in Beef Cattle – Athens, GA (09/05/2024).
3. K. M. Harvey. 2024. Body condition score: Impacts on cow productivity. Itawamba County Cattlemen’s Meeting – Fulton, MS (08/01/2024)
4. K. M. Harvey. 2024. Mineral nutrition and impacts on cow productivity. Lee County Cattlemen’s Meeting – Tupelo, MS (05/17/2024)
5. B.R. dos Reis. 2024. Beef cattle Winter Nutrition Strategies. In: Lincoln Cattlemen Meeting- Brookhaven, MS (03/05/2024).
6. B.R. dos Reis. 2024. Beef cattle Nutrition Strategies. In: Pearl River Cattlemen Meeting- Poplarville, MS (02/28/2024).
7. K. M. Harvey. 2024. Beef cattle nutrition. MSU Extension – North MS Beef Expo, Ripley, MS. (11/02/2023)
8. B.R. dos Reis. 2023. Weaning Management. In: Hancock Cattlemen Meeting- Kiln, MS (10/05/2023).
9. K. M. Harvey. 2023. Applied research to improve cattle productivity. Pontotoc County Cattlemen’s Meeting – Pontotoc, MS (05/18/2023).
10. K. M. Harvey. 2023. Methods of pregnancy detection. Beef Repro Boot Camp – Prairie, MS (04/28/2023)
11. K. M. Harvey. 2023. Stockmanship and low stress cattle handling. Lee County Cattlemen’s Meeting – Tupelo, MS (04/20/2023).
12. Ferreira, M. 2024. *Seminar.* Heat stress in grazing cattle. Northwest Region Beef and Forage Field Day. Red River Research Center, April 24th.
13. Ferreira, M. 2024. *Seminar*. Heat stress in grazing cattle. DeSoto Parish Cattleman’s Field Day. May 10th.
14. Vedovatto, M. 2024. *Seminar*. Mineral nutrition for grazing beef cattle. Agrischool Nutriflex. Timac Agro - Brazil. March 3.
15. Vedovatto, M. 2024. *Seminar*. 1) Backgrounding calves: management decision and opportunities and 2) Current Research Projects being conducted at Iberia Research Center: preliminary results. Acadiana 2024 Spring Beef Cattle Field Day. Iberia Research Center, Jeanerette, LA, Mar 16.
16. Vedovatto, M. 2023. *Seminar*. Results of our experiment of an appeasing substance administration in beef cattle. Welfare at weaning meeting. Nutricorp - Brazil. May 25, 2023.
17. Vedovatto, M. 2023. *Seminar*. Current experiments being conducted at DLREC. Louisiana Forage Conference. Alexandria, LA. Dec 1.
18. Vedovatto, M. 2023. *Seminar*. Management systems for beef cattle reared in subtropical and tropical environments. USDA multi-state meeting. Montgomery, TX, Nov 6-8.
19. Vedovatto, M. 2023. 1) *Seminar*. Weaning Methods and Management and 2) Current research projects being conducted at Iberia Research Center. Acadiana 2023 Fall Beef Cattle Field Day. Iberia Research Center, Jeanerette, LA, Oct 21.
20. Vedovatto, M. 2023. *Seminar*. Experiences in Animal Science, Cattle. Dean Lee Research and Extension Center Tour Day - Junior Ag Leadership Class. Alexandria, LA, Oct 16.
21. Vedovatto, M. 2023. *Seminar*. 1) Weaning Methods and Calf Performance and 2) Mineral Nutrition on Livestock Productivity. Northeast Louisiana Beef and Forage Field Day. Goldmine Plantation, South Richland Parish, LA, Sept 21.
22. Vedovatto, M. 2023. *Seminar*. Minerals and Vitamins for Beef Cattle. LSU Agcenter Livestock and Forages Agent Training. Alexandria, LA, Sep 14. Talk.
23. Vedovatto, M. 2023. *Seminar*. 1) Weaning Methods and Management and 2) Current Research Projects at Dean Lee. Beef & Forage Field Day. Alexandria, LA, Sep 14, 2023.

### Fund leveraging, specifically, collaborative grants between stations and members.

### USDA-NIFA AFRI 2022-07856. Unraveling the benefits of omega-6 fatty acids to pregnancy establishment and maintenance in beef females. Texas A&M (R. F. Cooke, K. G. Pohler, and R. C. Cardoso), University of Georgia (P. L. P. Fontes), and Virginia Tech (V. R. G. Mercadante)

### USDA-NIFA AFRI 2020-05276. Stocking density and management considerations for beef heifers reared in drylots. Texas A&M (R. F. Cooke, K. G. Pohler, and R. C. Cardoso), Mississippi State University (K. Harvey)

 **Other relevant accomplishments and activities.** Nothing to report