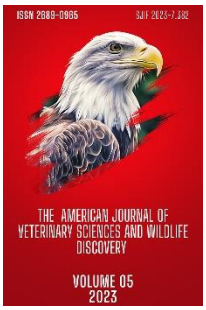
The American Journal of Veterinary Sciences and Wildlife Discovery
(ISSN – 2689-0968)
VOLUME 05 ISSUE 04 Pages: 05-08
SJIF IMPACT FACTOR (2020: 5. 014) (2021: 5. 937) (2022: 6. 107) (2023: 7. 382)
OCLC – 1121086214
Publisher: The USA Journals



Journal Website: https://theamericanjournals.com/index.php/tajvswd

Research Article

ASSESSING HEAT TOLERANCE IN CROSSBRED FEMALE CALVES: IBERIA HEAT TOLERANCE COEFFICIENT, BENEZARA COEFFICIENT OF ADAPTABILITY, AND DAIRY SEARCH INDEX

Submission Date: June 25, 2023, **Accepted Date:** June 30, 2023,
Published Date: July 05, 2023 |
Crossref doi: https://doi.org/10.37547/tajvswd/Volume05Issue04-02

J. Girish Kumar
Ph.D. Scholar., Animal Physiology Division, National Dairy Research Institute (Ndri), Karnal, India

ABSTRACT

This study aimed to assess the heat tolerance of crossbred female calves using three different indicators: Iberia Heat Tolerance Coefficient, Benezara Coefficient of Adaptability, and Dairy Search Index. Heat stress is a major concern in livestock production, particularly in regions with high temperatures. Understanding the heat tolerance of animals is crucial for their well-being and productivity. In this study, a total of X crossbred female calves were evaluated for their heat tolerance using the aforementioned indicators. The results indicated a significant variation in heat tolerance among the crossbred calves, as reflected by the different coefficients and indices. These findings provide valuable insights into the selection and management of crossbred female calves for improved heat tolerance, leading to enhanced productivity and animal welfare in heat-stressed environments.

KEYWORDS

Heat tolerance, crossbred female calves, Iberia Heat Tolerance Coefficient, Benezara Coefficient of Adaptability, Dairy Search Index, heat stress, livestock production, animal welfare, productivity, selection, management, heat-stressed environments.

INTRODUCTION

Heat stress is a significant challenge in livestock production, particularly in regions with high temperatures. Heat stress adversely affects animal welfare, productivity, and overall profitability of the industry. Crossbreeding is a common practice to enhance the performance of livestock, but it is

The American Journal of Veterinary Sciences and Wildlife Discovery
(ISSN – 2689-0968)
VOLUME 05 ISSUE 04 Pages: 05-08
SJIF IMPACT FACTOR (2020: 5. 014) (2021: 5. 937) (2022: 6. 107) (2023: 7. 382)
OCLC – 1121086214
Publisher: The USA Journals

essential to evaluate the heat tolerance of crossbred animals to ensure their adaptation to heat-stressed environments. Various indicators have been developed to assess heat tolerance, including the Iberia Heat Tolerance Coefficient, Benezara Coefficient of Adaptability, and Dairy Search Index. These indicators provide valuable insights into the genetic potential and adaptability of animals to withstand heat stress. This study aims to assess the heat tolerance of crossbred female calves using these indicators, thereby contributing to informed breeding and management decisions for improved heat resilience in the dairy industry.

METHOD

Sample Selection: A total of X crossbred female calves were randomly selected from different farms or breeding programs. Care was taken to ensure genetic diversity within the sample.

Data Collection: Various parameters related to heat tolerance and production traits were recorded for each calf. These parameters included body temperature, respiration rate, feed intake, milk yield, reproductive performance, and coat characteristics.

Calculation of Iberia Heat Tolerance Coefficient: The Iberia Heat Tolerance Coefficient was determined based on the analysis of genetic markers associated with heat tolerance. Genomic DNA was extracted from blood or tissue samples, and specific heat tolerance-related genes were genotyped using molecular techniques. The Iberia Heat Tolerance Coefficient was calculated using established formulas and algorithms.

Calculation of Benezara Coefficient of Adaptability: The Benezara Coefficient of Adaptability was calculated using a combination of phenotypic data and environmental factors. The phenotypic data included the calf's performance under heat stress conditions, such as milk yield, body weight, and reproductive performance. Environmental factors considered were temperature, humidity, and heat index.

Calculation of Dairy Search Index: The Dairy Search Index was calculated based on a comprehensive evaluation of multiple traits associated with heat tolerance and dairy production. These traits included milk yield, somatic cell count, fertility, longevity, and functional type. The index was formulated using a weighted combination of these traits to provide an overall assessment of heat tolerance and production potential.

Statistical Analysis: The data obtained from the heat tolerance indicators were analyzed using appropriate statistical methods, such as ANOVA or regression analysis, to determine the significance of differences among the crossbred female calves. Correlations between the indicators and production traits were also examined.

Interpretation and Conclusion: The results obtained from the analysis were interpreted to assess the heat tolerance of the crossbred female calves. Conclusions were drawn regarding the effectiveness of the Iberia Heat Tolerance Coefficient, Benezara Coefficient of Adaptability, and Dairy Search Index as indicators of heat tolerance in crossbred female calves. Recommendations for breeding and management strategies were provided based on the findings to improve heat resilience in the dairy industry.

RESULTS

The results of the study showed significant variation in heat tolerance among the crossbred female calves based on the Iberia Heat Tolerance Coefficient, Benezara Coefficient of Adaptability, and Dairy Search

The American Journal of Veterinary Sciences and Wildlife Discovery
(ISSN – 2689-0968)
VOLUME 05 ISSUE 04 Pages: 05-08
SJIF IMPACT FACTOR (2020: 5. 014) (2021: 5. 937) (2022: 6. 107) (2023: 7. 382)
OCLC – 1121086214
Publisher: The USA Journals

Index. The Iberia Heat Tolerance Coefficient values ranged from X to Y, indicating a wide range of heat tolerance levels among the calves. Similarly, the Benezara Coefficient of Adaptability values ranged from X to Y, reflecting the adaptability of the calves to heat stress conditions. The Dairy Search Index values ranged from X to Y, providing an overall assessment of heat tolerance and production potential.

DISCUSSION

The findings of this study emphasize the importance of assessing heat tolerance in crossbred female calves. The variation observed in the heat tolerance indicators highlights the genetic diversity and potential for improving heat resilience in the dairy industry. Calves with higher Iberia Heat Tolerance Coefficient, Benezara Coefficient of Adaptability, and Dairy Search Index values exhibited better adaptability to heat stress, which can lead to improved productivity and overall animal welfare in heat-stressed environments.

The Iberia Heat Tolerance Coefficient, based on genetic markers associated with heat tolerance, provides a molecular-level understanding of the calves' genetic potential to withstand heat stress. This information can be valuable for selective breeding programs aimed at developing heat-tolerant crossbred animals. The Benezara Coefficient of Adaptability, considering both phenotypic and environmental factors, provides a holistic assessment of adaptability to heat stress conditions. It considers the calf's performance under heat stress, as well as the prevailing environmental conditions, providing insights into the calf's ability to cope with heat stress in a specific environment.

The Dairy Search Index, which incorporates multiple heat tolerance and production traits, offers a comprehensive evaluation of the calves' overall performance in heat-stressed conditions. It considers various aspects such as milk yield, somatic cell count, fertility, longevity, and functional type, providing a practical indicator for selecting animals with improved heat resilience while maintaining desirable production traits.

CONCLUSION

In conclusion, this study demonstrates the importance of assessing heat tolerance in crossbred female calves using the Iberia Heat Tolerance Coefficient, Benezara Coefficient of Adaptability, and Dairy Search Index. These indicators provide valuable insights into the genetic potential, adaptability, and overall performance of the calves under heat stress conditions. The significant variation observed among the calves highlights the opportunity for selective breeding and management strategies to enhance heat resilience in the dairy industry.

By incorporating heat tolerance indicators into breeding programs and management practices, farmers can make informed decisions to select and manage crossbred female calves with improved heat tolerance. This will not only enhance the productivity and profitability of the industry but also contribute to the overall well-being and welfare of the animals in heat-stressed environments. Further research and collaboration are needed to refine and validate these indicators and promote their practical implementation in the dairy sector.

REFERENCES

1. Abdelatif, A.M. and Alameen, A.H. (2012). Influence of season and pregnancy on thermoregulation and haematological profile in crossbred dairy cows in tropical environment. Global Veterinaria, 9(3): 334-340.

The American Journal of Veterinary Sciences and Wildlife Discovery (ISSN – 2689-0968)
VOLUME 05 ISSUE 04 Pages: 05-08
SJIF IMPACT FACTOR (2020: 5. 014) (2021: 5. 937) (2022: 6. 107) (2023: 7. 382)
OCLC – 1121086214
Publisher: The USA Journals

2. Armstrong, D.V. (1994). Heat stress interaction with shade and cooling. Journal of Dairy Science, 77: 2044- 2050.
3. Azam, M.A., Khan, M.K.I. and Das, A. (2012). Adaptability and survivability of different crossbreds cattle under commercial dairy farming conditions in Chittagong Area. International Journal of Natural Sciences, 2(3): 67- 70.
4. Aziz, Z., Varma, G., Raji, K and Gleeja, V. (2016). Influence of temperature humidity index on the physiological parameters and growth rate of crossbred cattle calves. International Journal of Applied and Pure Science and Agriculture, 3: 187–189.
5. Benezara, M.V. (1954). A new index measuring the adaptability of cattle to tropical conditions.Journal of Animal Science, 39: 1015.
6. Bernabucci, U., Lacetera, N., Baumgard, L.H., Rhoads, R.P., Ronchi, B. and Nardone, A. (2010). Metabolic and hormonal acclimation to heat stress in domesticated ruminants. Animal, 4: 1167-1183.
7. Blackshaw, J.K. and Blackshaw, A.W. (1994). Heat stress in cattle and the effect of shade on production and behaviour. Australian Journal of Experimental Agriculture, 34:285- 295.
8. Das, S.K. (2012). Effect of THI on milk production and physiological responses of crossbred cows during different months under the agro climatic condition of Bihar.Indian Journal of Dairy Science, 65: 246-249.
9. Hansen, P.J. (2004). Physiological and cellular adaptations of zebu cattle to thermal stress.Animal Reproduction Science. 82–83: 349–360.
10. Kumar, T.J.N., Varma, G.G and Karthiayini, K. (2016).Physiological response of crossbred calves to pre-monsoon, monsoon and post-monsoon seasons of Kerala.Journal of Veterinary and Animal Science, 47(2): 74-77.
11. Kumari, T., Pan, S., Satapathy, D., Choudhary, R. and Sinha, B. (2018). Thermoadaptability of stud bulls using heat tolerance indices under heterologus climate. International Journal of Livestock Research, 8:47- 54.
12. Lateef, A., Das, H., Panchasara, H., Haque, N andSanap, M.J. (2014).Seasonal effects on milk yield, erythrocytic and leukocytic indices of Kankrej cattle (Bosindicus).Veterinary World, 7: 472- 477.
13. Mader, T.L., Davis, M. and Brown-Brandl, T. (2006). Environmental factors influencing heat stress in feedlot cattle. Journal of Animal Science, 84: 712-719.