OPEN ACCESS Freely available online

Advances in dairy Research

Perspective

Factors Influencing Cow Milk Production

Calo Cosima*

Department Dairy Production, University of Milan, Milan, Italy

INTRODUCTION

Milk production in dairy cattle is predominantly determined by genetic and environmental factors, and thus this trait has been reported to be influenced by a variety of factors such as breed, genetic make-up, parity or lactation order, age, dietary composition, season, heat stress, and agro-ecological zone differences. As a result, it is critical to consider these criteria while selecting the appropriate breed(s) to enhance milk production. Heritability is an essential genetic characteristic that provides a better knowledge of trait variation and the prospect of genetic improvement (h2). Furthermore, environmental variables were discovered to impact milk yield heritability, indicating a genotype environment interaction. The h2 estimations for milk output in these animals varied from 0.111 to 0.176 in general. Similarly, the genetic characteristics of the milk production trait of Iranian cattle under heat stress were calculated. According to their findings, the h2 of milk production varied from 0.1 to 0.22. THI and milk production were also found to be favorably associated within a 0.1-0.9 range. Heat stress is a prominent problem among environmental variables affecting milk production. To maintain homeostasis, the animal must make multiple physiological adaptations that affect its eating pattern, rumen functioning, and udder health, resulting in a decrease in milk production efficiency.

DESCRIPTION

The effect of heat stress on milk production and composition

Heat stress affects dairy cattle in both direct and indirect ways, decreasing both milk output and milk quality. Increasing warmth and/or humidity causes animals to consume less feed, resulting in a drop in most productive activities. Heat stress impairs mammary gland proliferation and development during the dry period, resulting in a reduction in milk supply. This scenario causes a large decline in milk output in dairy cattle, particularly in top producers. The drop in milk output due to heat stress might be as much as 10%-15% on farms that use cooling procedures, and it can be as much as 40%-50% when no cooling management is used.

When 12 breastfeeding dairy goats are subjected to heat stress in a climatic laboratory, their milk output drops by 53% on day four. Heat stress has an impact not only on milk quantity but also on milk quality. Summer milk output (10%), casein percentage (2.18% *vs.* 2.58%), and casein number (72.4% *vs.* 77.7%) were all lower in summer than in spring. Heat stress also modifies the lipid profile of milk, with considerable alterations in the triacylglycerol and polar lipid profiles. Thus, safeguarding cow productivity from the negative effects of climate change is a growing issue, and appropriate efforts must be made in producing thermal resilient cattle breeds.

Heat stress and economic losses in the dairy sector

The global cattle sector is indeed very dynamic and represents a considerable asset worth at least 1.4 trillion USD. Its contribution of agricultural GDP has already reached 33% and is rapidly increasing. However, the livestock system is badly impacted by the difficulties of changing climatic circumstances. Several studies have found a link between heat stress and milk production characteristics. This drop in output has also resulted in severe economic losses. Heat stress causes an annual economic loss of between 1.69 billion and 2.36 billion USD in the dairy sector in the United States.

Furthermore, with the growing global warming scenario, heat stress was anticipated to worsen milk production losses throughout dairy farms in the United Regions, with an average reduction of 0.6% in 2010 to 1.4% in 2030, which may reach 2% in a few states. Furthermore, heat stress was found to diminish milk production in a research done at the university of manitoba in Canada, resulting in an economic loss of more than $0.45/cow/day. Heat stress was also forecast to have an impact on European countries, with a 3.5% drop in milk output, representing a monthly financial loss to farmers of roughly 6.6% compared to the current situation.

Furthermore, China, the world's third largest milk producer, is expected to lose milk output, which is expected to rise to 47% by 2050. Heat stress was also shown to have a severe impact on milk

Correspondence to: Calo Cosima, Department Dairy Production, University of Milan, Milan, Italy; E-mail: calo_cosima@gmail.com

Received: 16-Dec-2022, Manuscript No. ADR-23-20956; **Editor assigned:** 19-Dec-2022, PreQC No. ADR-23-20956 (PQ); **Reviewed:** 02-Jan-2023, QC No. ADR-23-20956; **Revised:** 06-Mar-2023, Manuscript No. ADR-23-20956 (R); **Published:** 13-Mar-2023, DOI: 10.35248/2329-888X. 23.11.623

Citation: Cosima C (2023) Factors Influencing Cow Milk Production. J Adv Dairy. 11:623.

production in India, accounting for an annual milk loss of 1.8 MT, resulting in a 0.38 billion USD economic loss. This demands the urgent need to discover a solution to heat-associated decrease in milk through the development of ameliorative techniques. There have been findings that indicate ambiguity in the performance of genetically superior animals when exposed to a new environment.

Genotype environment interactions

Genotype Environment interaction (GE) studies can predict how an animal will behave in a new setting and assist to assess the amount of uncertainty. This interaction occurs when various environments have an unequal impact on the different genotypes. As a result, before creating a selection policy, it is vital to understand the production environment because interactions between genetic and environmental factors may impair the animal's performance efficiency. When high yielding dairy cows from temperate regions were brought to be grown in tropical settings, they failed to show their productive potential. Nonetheless, throughout the ages, tropical dairy cow groups have gained phenotypic features that confer superior climatic resistance and productive performance.

CONCLUSION

The genetic structure of the purebred holstein population, for example, has been significantly modified over the past 80 years of evolution by having phenotypic traits that differ significantly from those of modern temperate climate holstein breeds, particularly those related to cutaneous surface characteristics. The presence of GE in the population would imply a shift in animal performance, which would account for re-ranking in different situations. As a result, it is critical to assess the level of GE for heat tolerance before performing thermos tolerance selection. There are several statistical models for evaluating GE, but the two most used are the Response norm Model (RM) and the multiple trait model.