

The Importance of Statistics in Modern Animal Husbandry

Chandragiri Pragnya^{1*}

Assistant Professor, Department of Animal Genetics and Breeding, College of Veterinary Science, Korutla, Jagtial, Telangana -505326.

*Corresponding email address:

pragnyachandragiri@gmail.com

doi.org/10.5281/VeterinaryToday.22161444

Introduction

Animal husbandry has changed a lot over the years. It is no longer based only on experience and traditional methods. Advances in nutrition, genetics, animal health, and precision livestock farming have made data an essential resource. Statistics provides the tools needed to collect, organize, analyze, and interpret this data, enabling evidence-based decisions that improve livestock productivity, profitability, and sustainability. Statistics is used in almost every area of animal husbandry. It helps farmers, veterinarians, researchers, and policymakers make better decisions based on facts and data.

1. Using Farm Records for Better Decisions

Every livestock farm collects useful information every day, such as milk production, body weight, feed intake, breeding records, disease cases and animal deaths. Statistics helps organize and study this information. It shows patterns, compares the performance of animals, and helps farmers make better decisions. As a result, farmers can improve animal health, increase production, reduce costs, and manage their farms more effectively.

2. Improving Breeding Programs

Genetic improvement is one of the most important applications of statistics in animal husbandry. Statistical analysis helps to estimate breeding values, heritability and genetic correlations among traits. These analyses help breeders to select superior animals with more accuracy, leading to improved productivity, disease resistance, fertility and longevity.

3. Enhancing Animal Nutrition

Nutrition plays a key role in maintaining the health, growth, reproduction, and production performance of livestock. Balanced nutrition is essential for healthy and productive livestock. Statistics helps compare different feed ingredients, assess their effects on growth rate, milk yield, meat production, egg production, feed conversion efficiency and overall animal health. Feeding experiments are designed and analyzed using statistical methods to identify the most effective and economical feeding practices for different species, breeds, and age groups. This improves feed efficiency, reduces waste, lowers production costs, and increases animal productivity.

4. Disease Surveillance and Animal Health

Animal health management is one of the most important aspects of successful livestock production. Diseases can reduce animal productivity, increase mortality and cause economic losses to farmers.



Statistics plays a critical role in veterinary medicine by

- monitoring disease patterns
- estimating prevalence and incidence
- identifying risk factors
- evaluating the effectiveness of vaccines and treatments.
- Regular analysis helps to early detection of outbreaks, allowing timely preventive measures such as vaccination, isolation, and improved management practices.

5. Supporting Research and Innovation

Scientific research in animal husbandry relies heavily on statistical methods. When researchers test new feeds, medicines, breeding methods, housing systems, or management practices, they collect a large amount of data from animals. Statistical methods help them organize, analyze, and understand this data correctly. Researchers use appropriate experimental designs and analyze data accurately. Statistical tools help distinguish genuine treatment effects from random variation, leading to evidence-based recommendations for the livestock industry.

6. Improving Farm Economics

Livestock farming is both a biological and an economic enterprise. Farmers spend money on feed, medicines, labor, housing, transportation, and other expenses. Statistics helps calculate these production costs and compare them with the income earned from selling milk, meat, eggs, wool, or other livestock products. This allows farmers to know whether their farm is making a profit or a loss and also useful to analyzing market trends, and forecasting future demand. These analyses enable farmers and policymakers to make sound financial decisions and improve the economic sustainability of livestock production.

7. Quality Assurance and Food Safety

Consumers increasingly expect safe and high-quality animal products. Statistical quality control methods are used to regularly check the quality of animal products. For example, milk is tested for fat content, protein, bacterial count, and harmful substances, while meat and eggs are checked for freshness, cleanliness, and contamination. The collected data is analyzed to determine whether the products meet the required quality standards. Regular statistical monitoring helps maintain production standards, detect quality deviations, and ensure compliance with food safety regulations.

8. Supporting Policy and Development

Governments and development agencies depend on statistical information for livestock censuses, disease surveillance and policy planning. In addition, reliable statistical information helps governments plan and invest in breeding programs, veterinary services, animal health care, infrastructure, feed resources, training, and extension services. It also supports the development of policies and schemes that improve livestock productivity, increase farmers' incomes and ensure sustainable livestock development.

9. Precision Livestock Farming

Modern livestock farming uses advanced technologies such as sensors, wearable devices, automated milking systems, cameras, and artificial intelligence to collect a large amount of information about animals. These technologies continuously record data such as body temperature, heart rate, activity level, feed intake, milk production, body weight, and animal behavior. Statistical methods are fundamental for analyzing these datasets, enabling precision livestock farming that improves animal welfare, productivity, and resource efficiency.

Conclusion

Statistics has become an indispensable component of modern animal husbandry. It supports scientific research, improves nutrition and breeding, strengthens disease control, enhances farm management, and contributes to sustainable livestock production. As agriculture becomes increasingly data-driven, the role of statistics will continue to expand, helping farmers and researchers make informed decisions that improve animal health, productivity, and economic returns.

REFERENCES

- Dohoo, I., Martin, W., & Stryhn, H. (2012). *Methods in Epidemiologic Research*. VER Inc., Charlottetown, Canada.
- Falconer, D. S., & Mackay, T. F. C. (1996). *Introduction to Quantitative Genetics* (4th ed.). Longman, Harlow, UK.
- FAO. (2019). *Precision Livestock Farming: Applications and Opportunities in Sustainable Animal Production*. Food and Agriculture Organization of the United Nations, Rome, Italy.
- FAO. (2023). *The State of Food and Agriculture: Revealing the true cost of food to transform agrifood systems*. Food and Agriculture Organization of the United Nations, Rome, Italy.
- Montgomery, D. C. (2017). *Design and Analysis of Experiments* (9th ed.). John Wiley & Sons, Hoboken, New Jersey, USA.
- Mrode, R. A. (2014). *Linear Models for the Prediction of Animal Breeding Values* (3rd ed.). CABI Publishing, Wallingford, UK.
- Snedecor, G. W., & Cochran, W. G. (1989). *Statistical Methods* (8th ed.). Iowa State University Press, Ames, Iowa, USA.

Steel, R. G. D., Torrie, J. H., & Dickey, D. A. (1997). *Principles and Procedures of Statistics: A Biometrical Approach* (3rd ed.). McGraw-Hill, New York, USA