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A web-based multi-breed platform to disseminate dairy cattle genetic evaluations

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Dairy cattle genetic evaluations use advanced methodological and analytical tools to predict reliable breeding values to support dairy breeders on making selection decisions to improve the performance of dairy herds. Results of genetic evaluations encompassing data on thousands of animals have been made available to dairy breeders, farmers and stakeholders in old-fashioned sire summaries printed reports, which are costly and time-consuming to compile, print, and distribute. Moreover, access and availability of these reports was limited and represented an important bottleneck that could be suppressed. To address these logistical inefficiencies, the primary goal of this study was to develop a dynamic, web-based platform that would enable immediate, centralized, and user-friendly access to genetic evaluation results. This was achieved by implementing a layered architecture. For the data persistence layer, a relational database schema was designed using PostgreSQL due to its robustness and the available tools to manage and interact with the stored data. For the application logic layer, vanilla PHP was initially used to build a data pipeline designed to ingest, validate, and load data from CSV files generated by genetic evaluations into the database. PHP was then employed to implement server-side logic, dynamically generating HTML by querying the database in response to user requests. Finally, the presentation layer was crafted to enhance user experience, using CSS and JavaScript to define the website's layout and style, and to ensure responsiveness, allowing for a more dynamic and interactive use, such as graph generation with the Google Charts API. Since the implementation of this platform, there has been a significant reduction in the time required to edit and disseminate the sire summaries, providing almost immediate access. Additionally, the platform catered to 1,844 herds and 319,107 animals. In 2024, the platform registered a total of 8,925 accesses. From January 1st to June 1st, 2025, there were 5,527 new accesses, which is a 155.05% increase compared to the 2,167 accesses recorded during the same period in 2024. These statistics demonstrate the efficiency and scalability of the developed platform. Implementing a web-based platform to disseminate the results of annual dairy cattle genetic evaluations was a remarkable step toward modernizing access to these results in Brazil and abroad. By replacing previous methods with a robust digital solution, it was possible to reduce time and costs associated with the process. Moreover, the platform broadened the accessibility to information by breeders, producers, technicians and researchers, in addition to fostering greater interactivity with the annual summary through incorporating features such as individual detailed animal reports, customizable graphs on various zootechnical indicators, besides a secure and exclusive area for breeders allowing access to their herds' nonpublic data. Future developments will focus on extending the system to integrate other breeds and further enhancing the breeder's area by providing more detailed and targeted information to support selection decisions.

Keywords: breeding value, genetic improvement, production system.

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