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Description of AgriTech Analytics Bull Fertility Summary

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Achieving pregnancy in today's high-producing dairy cows is a challenge on many farms. Several factors have a large impact on reproductive efficiency, including nutrition, cow comfort, heat abatement, estrus detection, and inseminator proficiency. Therefore, developing a sound reproductive management program should be the priority. Once this is accomplished, producers may be able to achieve an additional improvement in conception rate by using service sires that have shown superior fertility on other commercial dairies. For this reason, AgriTech Analytics provides bull fertility rankings for its members.

The latest AgriTech Analytics Bull Fertility Summary leverages sophisticated artificial intelligence to provide deeper insights into service sire fertility performance. Using proven XGBoost machine learning technology, this approach delivers more comprehensive and accurate fertility predictions for the dairy industry.

Our AI-driven model goes beyond traditional methods by intelligently analyzing the complex relationships between multiple critical factors. The model accounts for the effects of herd, year, month, state, stud code, age at breeding, lactation, service number, DIM at service, semen type, stud code, and early lactation milk production to provide dairy producers with enhanced fertility intelligence.

This advanced analytical approach enables farmers and breeding professionals to make more informed, data-driven decisions when selecting service sires. By accounting for the intricate interplay of factors that influence breeding success, producers can optimize reproductive outcomes and improve herd efficiency.

The result is a powerful tool that supports better genetic progress, enhanced herd performance, and improved profitability through smarter, more precise sire selection backed by comprehensive fertility modeling.

The analysis was based on 7,102,064 insemination records from 2,130,886 cows in 547 AgriTech herds in 27 states. Inseminations that occurred between Start Date: December 17, 2021, and Stop Date: December 16, 2025 were included in the analysis.

Unlike some bull fertility rankings using data from commercial dairies, this analysis is based on confirmed pregnancies only. Each insemination record was required to have one of three outcomes reported within 60 days: 1) a subsequent breeding, 2) an "open" vet check, or 3) a "pregnant" vet check. The average confirmed pregnancy rate for herds in this analysis was N/A. Because veterinary pregnancy check information is used, the resulting sire rankings should be more accurate and stable than rankings based on non-return rates, in which a cow is assumed to be pregnant if no additional AI breedings are reported.

Data from 16,529 service sires were included in the analysis. Because most AgriTech herds are rather large, it was possible to account for the effects of lactation number, peak milk yield, days in milk, and the interaction of breed of service sire (Holstein, Jersey, Angus / Limousin / Simmental / Kobe (Wagyu), or Other) with breed of cow (Holstein, Jersey, or Other) and type of semen (conventional or sexed) on a within-herd

basis. For example, differences between herds in the grouping of cows (by age or production level), the energy balance of early vs. late lactation cows, or the pattern of usage of sexed versus conventional semen or dairy versus beef semen were factored in this analysis.

Results are available for conventional semen of 6,140 Holstein, 1,015 Jersey, 2,244 Angus, 163 Simmental, 87 Limousin, 0 Kobe (Wagyu), and 281 Charolais bulls with at least 300 inseminations in 10 or more herds, as well as sexed semen of 4,829 Holstein and 1,306 Jersey bulls that met the same criteria. Bulls are grouped into quintiles, such that each bull receives a rating ranging from "five-star" (highest fertility) to "one-star" (lowest fertility).