AGRITECH ANALYTICS

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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 first 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 service sire fertility rankings to its members.

The analysis was based on 4,246,645 insemination records from 1,448,141 cows in 534 AgriTech herds in 25 states. Inseminations that occurred between March 1, 2018 and February 28, 2021 were included in the analysis.

Because the quality and completeness of these data varies between farms, several restrictions were applied to ensure the accuracy of the resulting information. Up to eight inseminations per lactation were used for each cow, and each occurred between 35 and 305 days postpartum. A minimum of seven days was required between repeat inseminations, and a valid NAAB code for the service sire was required for all inseminations. Each herd was required to have a minimum of 25 inseminations, each herd-year-month contemporary group was required to have a minimum of 5 inseminations.

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. Records from cows that were culled less than 60 days after breeding, as well as cows that were bred less than 60 days prior to the most recent herd test, were excluded. The average confirmed pregnancy rate for herds in this analysis was 34.7%. 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 13,904 service sires were included in the analysis. The data were analyzed with a "threshold model", and this accounts for the fact that inseminations have an "all-or-nothing" outcome, rather than a continuous (bell-shaped) distribution of scores. 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, 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 taken into account.

Results are available for conventional semen of 844 Holstein, 101 Jersey, 161 Angus, and 6 Simmental bulls with at least 300 inseminations in 10 or more herds, as well as sexed semen of 198 Holstein and 138 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). Note that comparisons of individual bulls are only valid within breed and semen type – do not attempt to compare the fertility of bulls of different breeds with each other, or the fertility of sexed versus conventional semen.