



# McNay Reproductive Efficiency Report

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Iowa State University's McNay Memorial Research and Demonstration Farm is home to a 400-cow purebred Angus herd that has been selected since 1996 for increased marbling. Based on previous production records, the overall artificial insemination rate had fallen below the target percentage for Angus cows below 40%. The goal of the farm at this point was to complete an assessment on previous calving and breeding records and determine opportunities to increase the artificial insemination for the herd.

## Materials and Methods

Production records through 2019 and 2018 were analyzed using Microsoft Excel. The artificial insemination rates and pregnancy rates were determined between pregnancy checks (palpation or ultrasound) and calving data from the following years. Both methods were compared to determine if one was more accurate. The artificial insemination rate was calculated by the number of cows or heifers confirmed to artificial insemination divided by the number of cows or heifers exposed. The pregnancy rate was calculated by the number of cows or heifers confirmed pregnant divided by the number of cows or heifers exposed; this included the artificial inseminated (AI) confirmed cows and heifers. The rates were also analyzed by the cow management group, body condition score, and the person listed as the artificial inseminator for that cow. A breeding distribution chart was analyzed using the pregnancy check dates based on a 21-day estrous cycle. This assumes that a cow will only be bred once every 21 days due to the average estrous length. Finally, production records were analyzed, looking at the percent change between calving and breeding in 21-day intervals. This was determined based on calving records of 2019 of each animal, determined what interval the cow calved in, and compared it to the breeding interval based on her pregnancy check dates in 2020.

Routine farm visits were also completed to observe AI protocols and implementation, normal farm practices, pasture and feedstuff availability, and routine vaccinations. Once data and observations were compiled, action plans were developed to increase artificial insemination rates.

## Results

The total AI percentage for the 2020 breeding season was 25%, and the pregnancy rate was 81% (Table 1). Based on this information, it was determined there were areas to improve on the reproductive efficiency of the McNay herd. Target areas of reproductive efficiency were determined to be the conception rate, particularly the young cows, the overall AI conception rate, and the overall pregnancy distribution. Based on production records from the 2019 and 2020 calving seasons, a small percentage of early embryonic death, abortions, dystocias, or neonatal mortality were reported. Additionally, breeding records for the bulls used in each breeding season were analyzed and determined each bull had a passing breeding soundness examination based on the Society for Theriogenologist guidelines.

**Table 1. AI Rate and Pregnancy Rate for breeding seasons 2020 and 2021.**

	AI Rate 2020	AI Rate 2021	Pregnancy Rate 2020	Pregnancy Rate 2021
Total	25%	63%	81%	92%
Heifers	29%	62%	85%	89%
2nd Calf Heifers	29%	61%	78%	94%
Young Cows	19%	72%	78%	94%
Old Cows	22%	55%	84%	91%

The bulls were placed in with the herd ten days after fixed-time AI at a stocking ratio of 1:25. Observations were recorded during fixed time AI to determine that water bath temperature was consistent, semen handling was appropriate, and overall technician technique. The bull selection in the year 2020 for AI was based on internally developed bulls collected at a local bull stud and frozen. Mating selections were made through an employee based on certain genetic traits. In the 2021 breeding season, bulls were selected from a commercial sire company, and no internally developed bulls were used. Both 2020 and 2021 utilized a 7-day Co Synch fixed-time AI protocol. The cows with a greater postpartum interval of 45 days were selected to be inseminated in the breeding season in 2021 compared to all cows in 2020. The average body condition score for the herd in 2020 and 2021 was 5.5 of 9. This illustrates the cows were considered in good body condition. It was also observed that from 2020 and 2021, there was no difference in the forage quality, need for supplementation, changes in rations, or minerals.

Not only was pregnancy rate and AI rate an improvement between the years, but 38% of the 2nd calf heifers improved their breeding time from the previous calving date by at least 21 days. Additionally, 49% and 34% of young and old cows, respectively, improved their breeding time from their previous calving date by at least 21 days.

The improvement of reproductive efficiency can be attributed to focusing AI protocols on cows with greater than a 45-day postpartum interval and utilizing commercially available semen. There is still improvement needed to increase the overall reproductive efficiency by selecting for reproductive efficiency traits and carcass and marbling. However, it will be a slow, gradual improvement but maintained positively.

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