

Natural Breeding vs. Artificial Insemination: A Cost Comparison Analysis

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Introduction

- Natural Breeding
 - Mainly purchased from seed stock producers
 - Breeding soundness exam
 - Bulls are turned out during desired breeding season
- Artificial Insemination
 - Developed by two Russian scientists in the early 1900's
 - Allows bulls with high genetic merit available to everyone.
 - Used widely in the dairy industry
 - How is it done?

Problem

- Which type of breeding is more cost efficient?
 - Several costs associated with both types
 - Different bull to cow ratios
 - Different conception rates
 - Different synchronization methods

Study Assumptions

- Based on average prices in Southeastern Wyoming
- Based on a 500 head cow herd
- Costs figured on a per head basis
- Clean up bull costs based on natural breeding figures from this study.
- All cows are AI one time, and only 75% receive the prostaglandin shot.
- No additional genetics were accounted for just the cost to get the cow bred
- Assumed all pastures and facilities are owned

Natural Breeding Costs

- Average Price of Bulls
 - Five year life expectancy
- Feed
 - Alfalfa grass mix, wheat hay, protein barrels, mineral, salt.
- Vet Costs
 - Bull soundness exam, Ivormectin
- Labor and Equipment

Natural Breeding Costs Continued

Natural Breeding: Based on 500 head of cows and a bull covering 30 cows

Costs	Amount	Rate	Total Cost
Average Bull Cost	17	2500	8500
Feed:			
Alfalfa Grass Mix	3.15	95	5087.25
Wheat Hay	3.15	70	3748.5
Protein Barrels	0.06	85	86.7
Mineral	60	0.48	489.6
Salt	30	0.15	76.5
Vaccine & Vet Costs:			
Ivormec Pour On	0.018	50	15.3
Semen Test	1	35	595
Labor & Equipment	182.5	10	1825
Cumulative Total			20423.85
Total Cost Per Head			40.85

Natural Breeding Costs Continued

Natural Breeding: Based on 500 head of cows and a bull covering 25 cows

Costs	Amount	Rate	Total Price
Average Bull Cost	20	2500	10000
Feed:			
Alfalfa Grass Mix	3.15	95	5985
Wheat Hay	3.15	70	4410
Protein Barrels	0.06	85	102
Mineral	60	0.48	576
Salt	30	0.15	90
Vaccine & Vet Costs:			
Ivomec Pour On	0.018	50	18
Semen Test	1	35	700
Labor & Equipment	182.5	10	1825
Cumulative Total			23706
Total Cost Per Head			47.41

Natural Breeding Costs Continued

Natural Breeding: Based on 500 head of cows and a bull covering 20 cows

Costs	Amount	Rate	Total Price
Average Bull Cost	25	2500	12500
Feed:			
Alfalfa Grass Mix	3.15	95	7481.25
Wheat Hay	3.15	70	5512.5
Protein Barrels	0.06	85	127.5
Mineral	60	0.48	720
Salt	30	0.15	112.5
Vaccine & Vet Costs:			
Ivormec Pour On	0.018	50	22.5
Semen Test	1	35	875
Labor & Equipment	182.5	10	1825
Cumulative Total			29176.25
Total Cost Per Head			58.35

Artificial Insemination Costs

- Semen
- One Shot Prostaglandin
 - What is it?/How is it used?
- Technician Fees and Other Labor
- Semen Tank and AI Guns
- Miscellaneous Costs
 - AI Straws, Gloves, Lube...
- Clean up Bulls

Artificial Insemination Costs Continued

Artificial Insemination: Based on 500 head and a 80% Conception Rate

Costs	Amount	Rate	Total Cost	Avg. Cost/Hd.
Semen	500	20	10000	20
One Shot Prostaglandin	375	5	1875	3.75
Technician Fees	500	7.5	3750	7.5
Other Labor	67.5	10	675	1.35
AI Semen Tank and Guns	1	300	300	0.6
Miscellaneous Costs	500	0.35	175	0.35
Clean Bulls	100	47.41	4741	9.482
Total Costs			21516	
Total Costs Per Head			43.03	43.03

Artificial Insemination Costs Continued

Artificial Insemination: Based on 500 head and a 70% Conception Rate

Costs	Amount	Rate	Total Cost	Avg. Cost/Hd.
Semen	500	20	10000	20
One Shot Prostaglandin	375	5	1875	3.75
Technician Fees	500	7.5	3750	7.5
Other Labor	67.5	10	675	1.35
AI Semen Tank and Guns	1	300	300	0.6
Miscellaneous Costs	500	0.35	175	0.35
Clean Bulls	150	47.41	7111.5	14.223
Total Costs			23886.5	
Total Costs Per Head			47.77	47.77

Artificial Insemination Costs Continued

Artificial Insemination: Based on 500 head and a 60% Conception Rate

Costs	Amount	Rate	Total Cost	Avg. Cost/Hd.
Semen	500	20	10000	20
One Shot Prostaglandin	375	5	1875	3.75
Technician Fees	500	7.5	3750	7.5
Other Labor	67.5	10	675	1.35
AI Semen Tank and Guns	1	300	300	0.6
Miscellaneous Costs	500	0.35	175	0.35
Clean Bulls	200	47.41	9482	18.964
Total Costs			26257	
Total Costs Per Head			52.51	52.51

Results

Natural Breeding:	20:1	25:1	30:1
Cost/ Head	<i>\$58.35</i>	<i>\$47.41</i>	<i>\$40.85</i>
Artificial Insemination:	60% Conception Rate	70% Conception Rate	80% Conception Rate
Cost/Head	<i>\$52.51</i>	<i>\$47.77</i>	<i>\$43.03</i>

Results Continued

- Based solely on costs it is the most cost efficient to naturally breed considering a 30:1 bull to cow ratio.
- There are many factors that effect ones decision.

Similar Studies

- Mississippi State University
 - 100 head (85 cows and 15 heifers)
 - Different synchronization method
 - 25:1 bull to cow ratio
 - Used an abnormal amount of clean-up bulls
- Bryan Wilson- University of Wyoming
 - Various herd sizes and synchronization methods
 - 20:1 bull to cow ratio
 - Based on the study he assumed a 92% conception rate

Conclusion of Natural Breeding

- Pros
 - Less labor intensive
 - Less risky than AI
 - Cheaper more realistic choice for most operations
- Cons
 - Typically a longer calving season
 - Takes longer to introduce new genetics
 - Less uniformity within the herd

Conclusion of Artificial Insemination

- Pros

- Bulls with high genetic merit are available to everyone
- Possibility of increased calf performance
- Option to sell calves in a value added market

- Cons

- More labor intensive
- More risk involved
- Tends to be more expensive

Overall Conclusion

- Genetic potential may pay off more in the end
 - Higher weaning weights
 - Higher quality replacement heifers
 - Different marketing options
- Outcomes may vary upon on these
- One type of breeding may be more efficient in a different operation.

Recommendations

- One should consider each option and determine what is best for them.
- Try to incorporate AI within your operation to receive higher quality replacements
 - Heifers and Bulls
- Be aware of trends and new technology within the field of study.

Options for Further Studies

- What is the most efficient bull to cow ratio in a typical herd?
- Is there really value added to AI cattle?
- What is a normal conception rate when dealing with AI?
- Is there an ideal combination of the two types of breeding?

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Discussion & Questions

