Economic Effects of Estrus Synchronization and Artificial Insemination

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Current Status of AI

- Fewer than 10% of beef producers currently use estrus synchronization and AI (ESAI).
  - 13.6% of operations in the West
  - 11.5% of operations in the Central
  - 4.9% of operations in the South Central
  - 5.5% of operations in the East

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Why?

Reason	Percentage
Labor / Time	39%
Cost	17%
Too complicated	17%
Lack of facilities	11%
Other	14%
Does not work	2%

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Summary

- Cost per pregnancy of natural service versus AI
- Short-term economics of ESAI
- Long-term economics of ESAI
- Real world examples of impact

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Cost per Pregnancy

Pregnancies are free…..Right?!

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Purchase Price	$ 2,000.00	$ 2,500.00	$ 3,000.00	$ 4,000.00	$ 5,000.00
Salvage Value	$ 1,620.00	$ 1,620.00	$ 1,620.00	$ 1,620.00	$ 1,620.00
Summer Pasture	$ 125.00	$ 125.00	$ 125.00	$ 125.00	$ 125.00
Hay	$ 326.20	$ 326.20	$ 326.20	$ 326.20	$ 326.20
Protein, Mineral	25.00	25.00	25.00	25.00	25.00
Labor	50.00	50.00	50.00	50.00	50.00
Vet	40.00	40.00	40.00	40.00	40.00
Repairs	31.00	31.00	31.00	31.00	31.00
Misc	7.00	7.00	7.00	7.00	7.00
Interest	21.15	21.15	21.15	21.15	21.15
Total Input	625.35	625.35	625.35	625.35	625.35
Deprec on Equipment	12.39	12.39	12.39	12.39	12.39
Deprec on Bull	126.67	293.33	460.00	793.33	1,126.67
Interest on bull	126.70	144.20	161.70	196.70	231.70
death loss	20.00	25.00	30.00	40.00	50.00
Total Fixed	285.76	474.92	664.09	1,042.42	1,420.76
Total Cost/yr	911.10	1,100.27	1,289.44	1,667.77	2,046.10

Adapted from Johnson et al., 2003

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Bull Purchase price		$ 2,000.00	$ 2,500.00	$ 3,000.00	$ 4,000.00	$ 5,000.00
	Cows Exposed Per Year	Cost per Pregnancy				
Pregnancy Rate						
80%	15	75.93	91.69	107.45	138.98	170.51
	20	56.94	68.77	80.59	104.24	127.88
	25	45.56	55.01	64.47	83.39	102.31
	30	37.96	45.84	53.73	69.49	85.25
	35	32.54	39.30	46.05	59.56	73.08
	40	28.47	34.38	40.29	52.12	63.94
	50	22.78	27.51	32.24	41.69	51.15
85%	15	71.46	86.30	101.13	130.81	160.48
	20	53.59	64.72	75.85	98.10	120.36
	25	42.88	51.78	60.68	78.48	96.29
	30	35.73	43.15	50.57	65.40	80.24
	35	30.63	36.98	43.34	56.06	68.78
	40	26.80	32.36	37.92	49.05	60.18
	50	21.44	25.89	30.34	39.24	48.14
90%	15	67.49	81.50	95.51	123.54	151.56
	20	50.62	61.13	71.64	92.65	113.67
	25	40.49	48.90	57.31	74.12	90.94
	30	33.74	40.75	47.76	61.77	75.78
	35	28.92	34.93	40.93	52.95	64.96
	40	25.31	30.56	35.82	46.33	56.84
	50	20.25	24.45	28.65	37.06	45.47

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Summary

- Cost per pregnancy varies dramatically even in natural service breeding systems
- Cost per pregnancy is approximately similar between ESAI and natural service if calculated on an equivalent production basis.

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Is Estrus Synchronization and AI Profitable?

Short-term Impact

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ESAI Improves Profitability

- 8 herds (1,197 cows)
- Two groups
  - FTAI + Natural service (n = 582)
  - Natural service (n = 615)
  - Bulls were removed 42-71 days from FTAI. Most farms removed the bulls after 60 days.

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AI Partial Budget

- Increased Return
  - Heavier calves
  - Improved genetics
  - More calves
  - More uniform
- Decreased Returns
  - Fewer cull bulls
  - Fewer cull cows??
- Decreased Costs
  - Cow:bull reduction
  - Improved calving ease
  - Concentrated calving
- Increased Costs
  - Labor
  - Facilities
  - Supplies

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Results

Trt	N	Weaning %	Days to Calving	#WW (lbs)/ cow exposed	$$
FTAI	582	84	26.8 ± .8	425.48 ± 9.5	+ $49.14
NS	615	78	31.3 ± .8	386.98 ± 9.5	

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Is Estrus Synchronization and AI Profitable?

Long-term Impact

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True Impact of ESAI

- Greatest benefits of ESAI are realized after multiple generations.
- Takes five years to see the actual impact of maternal genetics.

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Long-Term ESAI

- Data is difficult to collect
- Field study designed to examine the impact of ESAI on cow productivity – 10 year project
  - Caution: no control
- Two farms
  - Large = 140-180 cows
  - Average = 25 cows

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Reproductive Plan

1. Maternally-oriented genetics
   - Environment
     - Labor
     - Nutrient supply
   - Marketing
2. Crossbreed
3. FTAI + natural service

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Goal

- Increase the pounds of calf weaned per pound of cow exposed
  - Mature weights of the cows were out of hand
  - Calving season were long (120+ days)
  - Efficiency was low

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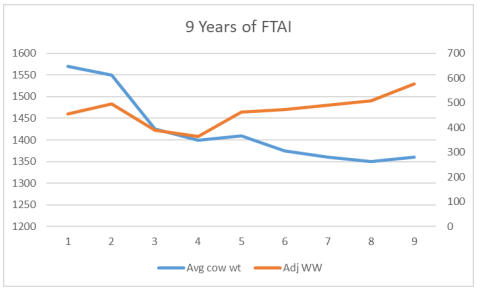
Large Farm



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Large Farm

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Average Herd

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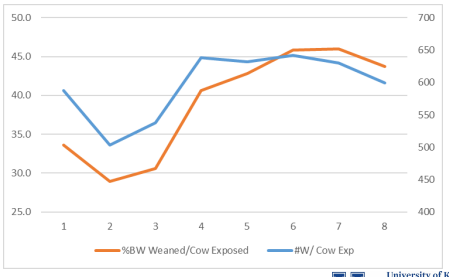
Average Herd



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Summary

- ESAI is a profitable enterprise both in the short- and long-term
- Returns could be greatly increased if producers take advantage of added value of their product
  - Key: Identify your target and breed to hit that target

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