

ESTRUS SYNCHRONIZATION PLANNER SPREADSHEET AND APPLICATION

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The process of selecting and implementing a program for synchronization of estrus and AI has become much easier. A short list of recommended protocols was developed by university personnel (Beef Reproduction Task Force) and a broader industry group (Beef Reproduction Leadership Team) to help reduce confusion from so many systems and improve overall success with estrus synchronization and AI. Extensive research and field trial data support the use of these protocols as described. The recommendations are updated annually to incorporate the most recent research. For a majority of producers, selecting a protocol from this list should improve the chances of a good response. Other protocols may work, but often involve additional steps and costs with no improvement in response.

An Excel-based planning tool was developed by Iowa State University known as the Estrus Synchronization Planner. This spreadsheet guides users through a process of selecting an appropriate protocol for the females to be synchronized and the amount of heat detection desired (Figure 1). For example, *bos taurus* heifers to be bred after observed estrus. To get the best response from the selected protocol it is important to follow the schedule of activities (Figure 2) for proper timing of treatments. Up to 3 protocols can be compared in a cost analysis (Figure 1 & 3). The cost response analysis (bottom of Figure 3) shows cost per AI pregnancy for the selected system based on expected conception and estrous response rates.

Fixed-timed insemination systems require a precise interval between the last prostaglandin (PG) injection and timed AI. Never synchronize more animals for fixed-timed AI than you can inseminate in a 3 to 4 hour time period. By asking what day and time you want to begin breeding, the planner calculates the precise day and hour other treatments of the protocol should be administered and places the information on a printable calendar (Figure 4). The calendar can help communicate to all team members what needs to happen on each day of the breeding program.

The planner can be downloaded at no charge from the Iowa Beef Center at http://www.iowabeefcenter.org/estrus_synch.html. On this web page you will also find tips for downloading and saving your copy of the Estrus Synchronization Planner. Before you download the spreadsheet it will ask for your contact information. This is very important as we will contact you by e-mail when updates are made to the planner. The current version is Synch 13, released in May of 2013.

Tips and other useful information can be found in the planner by moving your mouse over the red triangles in the upper right corner of cells. The worksheet, *Tips & Overview*, contains definitions of key terms and information on operation. There are additional reference materials related to synchronization of estrus and AI on the planner home page show above.



Estrus Synchronization Planner

synch 13

Producer Name: Shiloh Ranch
Address: _____
Town: _____
Phone Number: _____
Group: _____
Prepared by: Sandy Johnson
Phone Number: _____

Inputs Tips

| | | |
|--|---------------------------------------|---|
| Breed Type | <input type="text" value="1"/> | 1= <i>Bos taurus</i> , 2= <i>Bos indicus</i> influence |
| Date to start breeding: | <input type="text" value="6/1/2014"/> | (Example: 6/1/2013) |
| Time of day you want to breed: | <input type="text" value="7:00 PM"/> | |
| Detection-Insemination type: | <input type="text" value="1"/> | 1 = Estrus AI, 2 = Estrus AI & Clean-up AI, 3 = Fixed-Time AI |
| Estrus synchronization system: | <input type="text" value="6"/> | Select number from list of systems below. |
| Days from last AI to bull turn in: | <input type="text" value="9"/> | |
| Trips through the working facility: | <input type="text" value="2"/> | |
| Cost Comparison - Alternative 1: | <input type="text" value="16"/> | Select number from list of systems below. |
| <i>optional</i> Alternative 2: | <input type="text" value="31"/> | Select number from list of systems below. |

| Cow Systems |
|---|
| 7 = Select Synch |
| 14 = Select Synch + CIDR |
| 34 = PG 6 Day CIDR with E-AI |
| Less Preferred Systems |
| 1 = 1 Injection Prostaglandin (prior estrus detection) |
| 2 = 1 Injection Prostaglandin (no prior estrus detection) |
| 3 = 2 Injection Prostaglandin (no prior estrus detection) |
| 15 = 7-Day CIDR+PG |

| Heat detect & Breed |
|---|
| Heifer Systems |
| 1 = 1 Injection Prostaglandin (prior estrus detection) |
| 6 = MGA + Prostaglandin |
| 15 = 7-Day CIDR+PG |
| Less Preferred Systems |
| 3 = 2 Injection Prostaglandin (no prior estrus detection) |
| 12 = 7-11 Synch |
| 14 = Select Synch + CIDR |
| 30=14 Day CIDR+PG with E-AI |
| 34 = PG 6 Day CIDR with E-AI |

| | | | | | | | | | |
|------------------------|---|------------------------------|---|--------------------------------------|--------------------------------------|-------------------------------------|--------------------------------------|--------------------------------------|--------------------------------------|
| Head in group: | <input type="text" value="100"/> | Daily Lbs./Hd. | <input type="text" value="20"/> | Cost / Lb | <input type="text" value="\$0.060"/> | PG (\$/dose): | <input type="text" value="\$2.80"/> | | |
| Labor Estimate: | <input type="text" value="62.0"/> hours | Forage: | <input type="text" value="4"/> | <input type="text" value="\$0.110"/> | GnRH (\$/dose): | <input type="text" value="\$2.90"/> | CIDR (\$/insert): | <input type="text" value="\$11.00"/> | |
| Labor Charge: | <input type="text" value="\$13.50"/> \$/hour | MGA: | <input type="text" value="1"/> | <input type="text" value="\$0.200"/> | Supplement: | <input type="text" value="0.25"/> | <input type="text" value="\$0.250"/> | Semen (\$/unit): | <input type="text" value="\$25.00"/> |
| Yardage: | <input type="text" value="\$0.30"/> \$/hd/day | User Defined Charges: | Name of Item: <input type="text" value="Estroject"/> | No.Units | <input type="text" value="100"/> | Cost - \$ per Unit: | <input type="text" value="\$1.10"/> | | |
| | | | Name of Item: <input type="text"/> | No.Units | <input type="text"/> | Cost - \$ per Unit: | <input type="text"/> | | |
| | | | Name of Item: <input type="text"/> | No.Units | <input type="text"/> | Cost - \$ per Unit: | <input type="text"/> | | |

Figure 1. Estrus Synchronization Planner spreadsheet, *Planner* worksheet. Insert desired choices and values.

9/13/13

Estrus Synchronization Planner



Date to start breeding: 6/1/2014
 Clean-up bull turn in date: 6/16/2014
 Start of calving season: 3/9/2015

Producer Name: Shiloh Ranch
 Address: _____
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 Phone Number: _____
 Group: _____
 Prepared by: Sandy Johnson
 Phone Number: _____

| 6 = MGA + Prostaglandin | | |
|--|-----------------|---|
| Comments | | Estimated average number of times per head through the working facility: <u>2</u> |
| <p>This system is highly recommended for heifers and works effectively in postpartum cows. Estrus detection should begin at the time of PG administration. Majority will exhibit estrus between 48 and 96 hours after PG. Daily intake during MGA feeding is critical, may require drylot feeding. Deliver MGA in either a well mixed ration or a supplement with not less than 3-5 lbs fed per head per day. For either MGA feeding methodology provide adequate bunk space(12 in. for TMR, 18 in. for MGA + grain only). Immediate addition of clean-up bulls could lead to questions about parentage.</p> | | |
| Date of Activity | Day of the Week | Description of Activity |
| 04/30/14 | Wednesday | Start feeding Melengestrol Acetate (MGA) at .5 mg/hd/day. Continue feeding until 5/13/2014. |
| 05/13/14 | Tuesday | Last day to feed MGA at .5 mg/hd/day. |
| 05/15/14 | Thursday | Large numbers of females will show heat the next 4 days - DO NOT BREED! |
| 06/01/14 | Sunday | Inject Prostaglandin (PG) to all females. Start heat detection. Breed females AI 10-14 hours after standing heat. |
| 06/02/14 | Monday | Continue heat detection. Breed females AI 10-14 hours after standing heat. |
| 06/03/14 | Tuesday | Peak heat at 60 - 72 hours after PG. Continue heat detection. Breed females AI 10-14 hours after standing heat. |
| 06/07/14 | Saturday | Last day of heat detection. Breed females AI 10-14 hours later if showing standing heat. |
| 06/16/14 | Monday | Turn clean up bulls in with females. Immediate addition of clean-up bulls could lead to questions about parentage. |

Figure 2. Estrus Synchronization Planner spreadsheet, page 1 of *Print Out* worksheet. Information based on selections made in *Planner* worksheet.

| Cost Comparison of Three Selected Systems | | | | | 16 = Select Synch + CIDR with E-AI and Cleanup AI | | 31=14 Day CIDR+PG with E-AI and Cleanup AI |
|---|-------------------|--|--------------------|---------|---|---------|--|
| Cost Analysis Item: | Units | Cost/Unit | Total Cost | vs. | Total Cost | vs. | Total Cost |
| PG Cost | 100 | \$2.80 | \$280.00 | | \$280.00 | | \$280.00 |
| GnRH Cost | | \$2.90 | | | \$391.50 | | \$101.50 |
| MGA Supplement | 1400 | \$0.20 | \$280.00 | | | | |
| CIDR Cost | | \$11.00 | | | \$1,100.00 | | \$1,100.00 |
| Synchronization Cost Subtotal | | | \$560.00 | | \$1,771.50 | | \$1,481.50 |
| Detect/Mgt.Labor | 62.0 | \$13.50 | \$836.62 | | \$763.73 | | \$966.05 |
| Semen | 100 | \$25.00 | \$2,500.00 | | \$2,500.00 | | \$2,500.00 |
| EstroTECT | 100 | \$1.10 | \$110.00 | | \$110.00 | | \$110.00 |
| AI Cost Subtotal | | | \$3,446.62 | | \$3,373.73 | | \$3,576.05 |
| Total Cost (not including feed & yardage) | | | \$4,006.62 | | \$5,145.23 | | \$5,057.55 |
| Cost / Female Synchronized | | | \$40.07 | | \$51.45 | | \$50.58 |
| Feed & Yardage Costs | | | | | | | |
| Days in Drylot | | | 39 | | | | |
| Forage (lbs) | 78,000 | | \$4,680.00 | | | | |
| Grain (lbs) | 15,600 | | \$1,716.00 | | | | |
| Yardage (hd-day) | 3,900 | | \$1,170.00 | | | | |
| Supplement (lbs) | 975 | | \$243.75 | | | | |
| Feed & Yardage Cost Subtotal | | | \$7,809.75 | | | | |
| Total Cost | | | \$11,816.37 | | \$5,145.23 | | \$5,057.55 |
| <i>This feed & yardage cost does not credit in the cost of maintaining the female on pasture.</i> | | | | | | | |
| <i>\$/Synch AI = cost per successful AI pregnancy for the selected system under the given success rate.</i> | | | | | | | |
| Cost - Response Analysis: | | | | | 6 = MGA + Prostaglandin | | |
| Estrous Response Rate | | Conception Rate of those Responding to Synchronization | | | | | |
| | | 45% | 55% | 65% | 75% | 85% | |
| 75% | % AI Pregnant | 33.8% | 41.3% | 48.8% | 56.3% | 63.8% | |
| | \$/Synch AI preg. | \$100.20 | \$81.98 | \$69.37 | \$60.12 | \$53.05 | |
| 80% | % AI Pregnant | 36.0% | 44.0% | 52.0% | 60.0% | 68.0% | |
| | \$/Synch AI preg. | \$97.41 | \$79.70 | \$67.44 | \$58.44 | \$51.57 | |
| 85% | % AI Pregnant | 38.3% | 46.8% | 55.3% | 63.8% | 72.3% | |
| | \$/Synch AI preg. | \$94.94 | \$77.68 | \$65.73 | \$56.97 | \$50.26 | |
| 90% | % AI Pregnant | 40.5% | 49.5% | 58.5% | 67.5% | 76.5% | |
| | \$/Synch AI preg. | \$92.76 | \$75.89 | \$64.22 | \$55.65 | \$49.11 | |
| 95% | % AI Pregnant | 42.8% | 52.3% | 61.8% | 71.3% | 80.8% | |
| | \$/Synch AI preg. | \$90.80 | \$74.29 | \$62.86 | \$54.48 | \$48.07 | |

**This cost analysis does not include the feed & yardage cost subtotal which would be - \$78.10

Figure 3. Estrus Synchronization Planner spreadsheet, page 2 of *Print Out* worksheet. Information based on selections made in *Planner* worksheet. Compares cost of selected system to 2 alternatives. Cost response analysis shows costs based on varying conception and estrous response rates.

Estrus Synchronization Planner

9/13/13

6 = MGA + Prostaglandin

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Address: _____
Town: _____
Phone Number: _____
Group: _____
Prepared by: Sandy Johnson
Phone Number: _____

Date to start breeding: 6/1/2014
Clean-up bull turn in date: 6/16/2014
Start of calving season: 3/9/2015



| Sunday | Monday | Tuesday | Wednesday | Thursday | Friday | Saturday |
|--|-------------------------|--|-------------------------|---|-------------------------|-------------------------|
| 4/27/2014 | 4/28/2014 | 4/29/2014 | 4/30/2014 | 5/1/2014 | 5/2/2014 | 5/3/2014 |
| | | | * MGA @ 0.5 mg/hd/day | * MGA @ 0.5 mg/hd/day | * MGA @ 0.5 mg/hd/day | * MGA @ 0.5 mg/hd/day |
| 5/4/2014 | 5/5/2014 | 5/6/2014 | 5/7/2014 | 5/8/2014 | 5/9/2014 | 5/10/2014 |
| * MGA @ 0.5 mg/hd/day | * MGA @ 0.5 mg/hd/day | * MGA @ 0.5 mg/hd/day | * MGA @ 0.5 mg/hd/day | * MGA @ 0.5 mg/hd/day | * MGA @ 0.5 mg/hd/day | * MGA @ 0.5 mg/hd/day |
| 5/11/2014 | 5/12/2014 | 5/13/2014 | 5/14/2014 | 5/15/2014 | 5/16/2014 | 5/17/2014 |
| * MGA @ 0.5 mg/hd/day | * MGA @ 0.5 mg/hd/day | * MGA @ 0.5 mg/hd/day | | * Many females in heat next 4 days. DO NOT BREED! | | |
| 5/18/2014 | 5/19/2014 | 5/20/2014 | 5/21/2014 | 5/22/2014 | 5/23/2014 | 5/24/2014 |
| | | | | | | |
| 5/25/2014 | 5/26/2014 | 5/27/2014 | 5/28/2014 | 5/29/2014 | 5/30/2014 | 5/31/2014 |
| | | | | | | |
| 6/1/2014 | 6/2/2014 | 6/3/2014 | 6/4/2014 | 6/5/2014 | 6/6/2014 | 6/7/2014 |
| * Detect Estrus & Breed * Inject PG - all females | * Detect Estrus & Breed | * Detect Estrus & Breed * Peak Estrus | * Detect Estrus & Breed | * Detect Estrus & Breed | * Detect Estrus & Breed | * Detect Estrus & Breed |
| 6/8/2014 | 6/9/2014 | 6/10/2014 | 6/11/2014 | 6/12/2014 | 6/13/2014 | 6/14/2014 |
| | | | | | | |

Figure 4. Estrus Synchronization Planner spreadsheet, *Calendar* worksheet

To keep up with the latest technology, the Estrus Synchronization Planner will soon be available for your Android or I-phone device. When released, you will be able to find the mobile app in iTunes and Google Play Store or at www.beefrepro.info. The program will have the most critical but not all of the features of the full version. The breeding schedule created can be shared via e-mail. Screen shots of the program are shown below (Figures 5, 6 & 7). Input necessary information in steps one and two and the third screen provides the results.

The Estrus Synchronization Planner Spreadsheet and the associated version for hand held devices should help users select appropriate breeding systems and to deliver necessary treatments in a timely fashion. With these details covered, producers can focus on other aspects of animal nutrition and management, semen handling and insemination technique to further improve AI pregnancy rates.

ESP
Estrus Synchronization Planner

STEP ONE
Input Information

STEP TWO
Cow Systems

STEP THREE
Results

Herd Information

Head in group

Cows Heifers

Estrus Program

Date to start breeding

Time of day to breed

Last PG injection day/time

Detection / Insemination method

Days from last AI to bull turn in

Input Costs

Labor (\$/hour)

PG (\$/dose)

GnRH (\$/dose)

CIDR (\$/insert)

Semen (\$/dose)

NEXT >

CREATED BY 120 NORTHSIDE

Figure 5. Screen shot of first input screen of Estrus Synchronization Planner App.

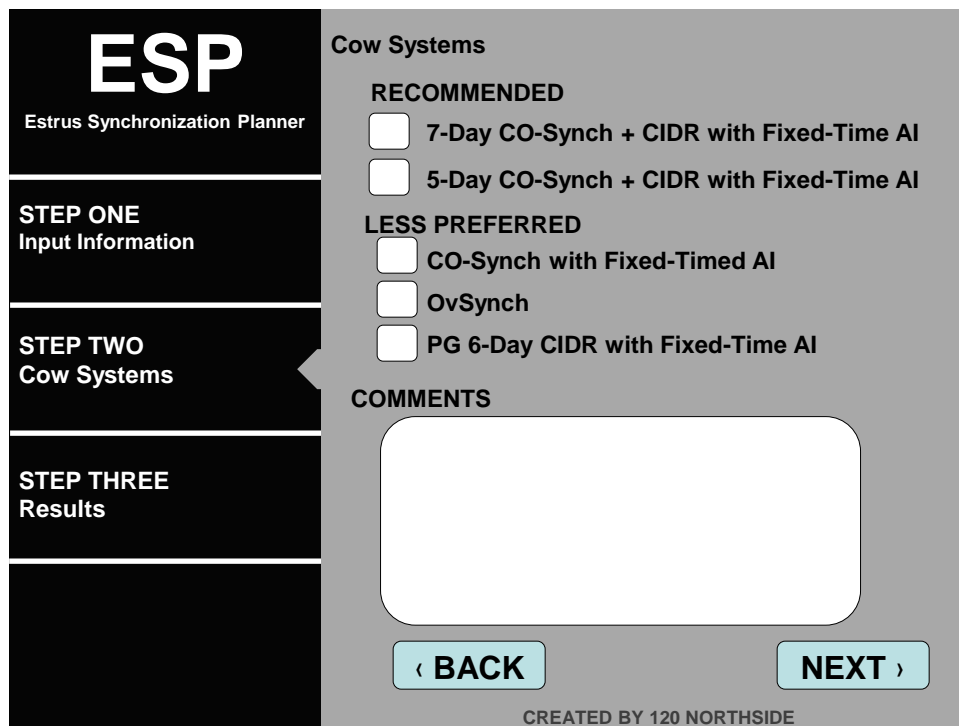


Figure 6. System selection input screen of Estrus Synchronization Planner App.

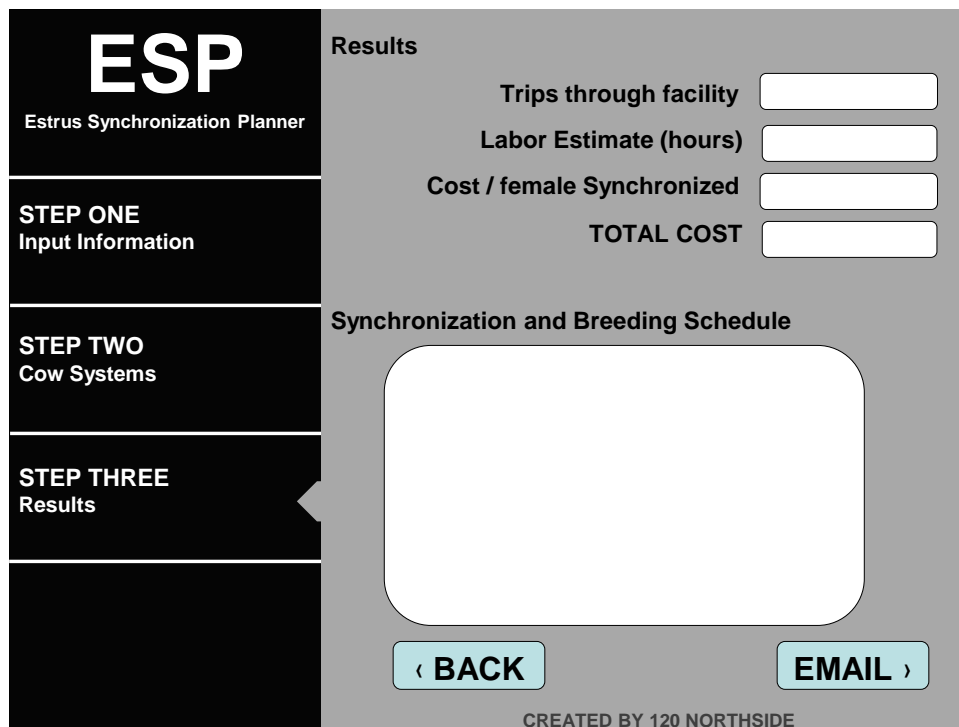


Figure 7. Results screen of Estrus Synchronization Planner App.