The Premium Beef on Dairy Program User's Manual

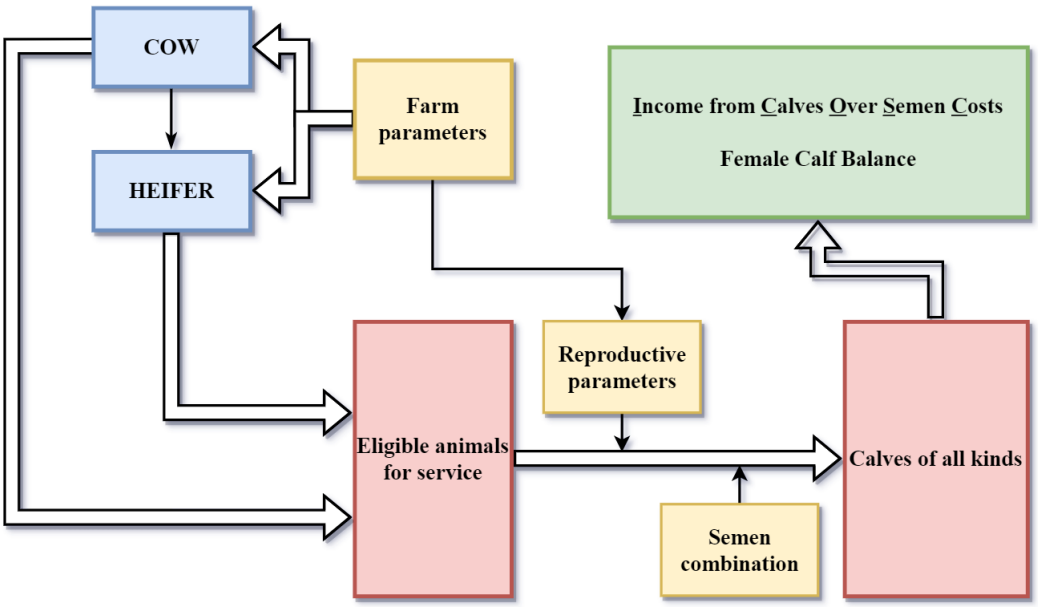
Income from Calves Over Semen costs (**ICOSC,** $/month) is an indicator of farm profitability. This tool calculates the Female Calf Balance (head/month) from the following calculation:

female calves per month =
female calves produced by defined semen strategy – female calves required for herd replacement

The tool may be found at https://DairyMGT.info **-> Tools -> Premium Beef on Dairy Program.** This user's manual is designed to help when using the tool.

The Sequentially Ordered Steps are as follows:

1. **Input general farm parameters**
   These inputs will be used by a simulation model, generating female calves required for replacement nine months from now and monthly eligible animals for each parity and service
2. **Adjust the number of eligible animals for service if necessary**
3. **Adjust semen characteristics of semen with on-farm data if necessary**
   Characteristics include female gender accuracy and conception rates for each parity and service.
4. **Choose semen combination and "Top & Bottom" strategy**
5. **Input economic parameters**
6. **Get final report**



Schematic Diagram of the Premium Beef on Dairy Program

Input Data Required:

1. General Farm Input

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Number of adult cows	1000
Current herd turnover ratio, %	35
Current adult herd 21-d pregnancy rate, %	20
Current heifer conception rate at 1st service, %	60
Average Service Rate for Heifers, %	75
Average Service Rate for Cows, %	60
Stillbirth + calf mortality, %	7
Female calvings required 9 months from now	38

- Number of adult cows: adult herd size, including lactating and dry cows
- Current herd turnover ratio (%): annually herd culling rate. This is calculated as:
  the number of cows leaving / the herd size in a year
- Current adult herd 21-day pregnancy rate (%):

  percentage of eligible cows that become pregnant every estrous cycle of 21 days. For example, 25% 21-day pregnancy rate means that a quarter of non-pregnant cows that are eligible to be inseminated will become pregnant every 21 days.
- Current heifer conception rate at 1st service (%): current conception rate for virgin heifers at first service.
- Average service rate for heifers (%): current approximate service rate for heifers. This is calculated as the
  number of heifer inseminations / number of heifers eligible for service during each 21-d cycle.
- Average service rate for cows (%): current approximate service rate for cows. This is calculated as the
  number of inseminations / number of cows eligible for service during each 21-d cycle.
- Stillbirth + calf mortality (%): rate of calves that die at calving or within 48 hours after calving (stillbirths) plus the rate of calf mortality through weaning

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	Service	# Animals Eligible for Service: Projected	Adjusted
Heifers	1st	37	
	2nd	20	15
	3rd	13	
	>3rd	25	
Lactation 1	1st	27	
	2nd	19	
	3rd	13	
	>3rd	35	
Lactation 2	1st	19	
	2nd	13	
	3rd	9	
	>3rd	23	
Lactation >2	1st	24	
	2nd	16	
	3rd	11	
	>3rd	39	

Users will know and will be able to edit:

- Female calvings required nine months from now: female newborn calves required to keep herd size due to the culling nine months from now.
- Monthly eligible animals for service: for each parity and service, the number of eligible animals can be adjusted according to the farm's situation. For example, users can manually type in 15 for the eligible number of heifers at 2nd service, instead of 18 generated by the tool.

2. Reproductive Input

- Conception rates by parity and service number:
  - Parity covers heifer, 1st lactation, 2nd lactation, and 3rd and greater lactation
  - Service number includes 1st, 2nd, 3rd, and later services
- Conception rates by semen type:

  C - conventional dairy semen, **S** - sexed dairy semen, **B** - beef semen

  - Users can adjust these numbers with their farm data
  - Default conception rates of conventional dairy semen are estimated from a typical Wisconsin farm.
  - Default fertility of sexed dairy semen is considered as 80% of conventional dairy semen
  - Default fertility of conventional beef semen is considered as 100% of conventional beef semen
  - For male-sorted/Y-sorted beef semen, fertility might be lower than conventional beef semen.

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	Service	Conception Rate By Semen Type: C, %	S, %	B, %
Heifers	1st	60	48	60
	2nd	55	44	55
	3rd	50	40	50
	>3rd	40	32	40
Lactation 1	1st	45	36	45
	2nd	40	32	40
	3rd	35	28	35
	>3rd	25	20	25
Lactation 2	1st	40	32	40
	2nd	35	28	35
	3rd	30	24	30
	>3rd	20	16	20
Lactation >2	1st	35	28	35
	2nd	30	24	30
	3rd	25	20	25
	>3rd	15	12	15

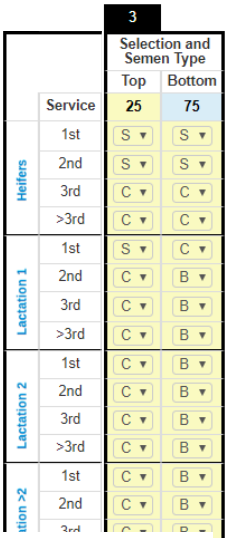
- Females, % by semen: female gender accuracy of certain semen type.
    - Default female gender accuracy for conventional dairy, sexed dairy, and conventional beef semen are 47%, 90%, and 50%, respectively.
    - For male-sorted/Y-sorted beef semen, female gender accuracy depends on users' data or source of semen product.

	C, %	S, %	B, %
Females, % by semen	47	90	50
Semen Cost, $/unit	15	35	15
Eartag cost, $/unit	0.5	0.5	3

3. Semen Combination Strategy

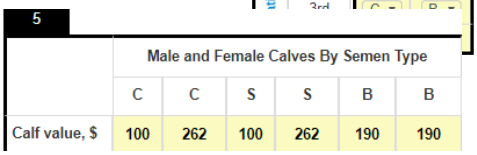
Same semen options as above, C, S and B.

- Users can also group eligible animals by genetic value by defining top animals. For example, for the 1st lactation group at 1st service, use 25% genetically superior cows bred for sexed dairy semen, and the rest 75% for conventional dairy semen.



4. Economic Input

- Semen costs for any type ($/unit)
- Ear tag cost ($/unit)
- Market calf prices:
    - Dairy female calf
    - Dairy female calf coming from sexed dairy semen
    - Dairy male calf
    - Dairy male calf coming from sexed dairy semen
    - Crossbred beef female calf
    - Crossbred beef male calf



Example illustration: For a 1,000-cow herd with 35% turnover ratio and a 20% 21-d pregnancy rate, it needs 38 female replacements nine months from now to keep a stable herd size. From the generated number of eligible animals and default semen profiles, the semen combination is:

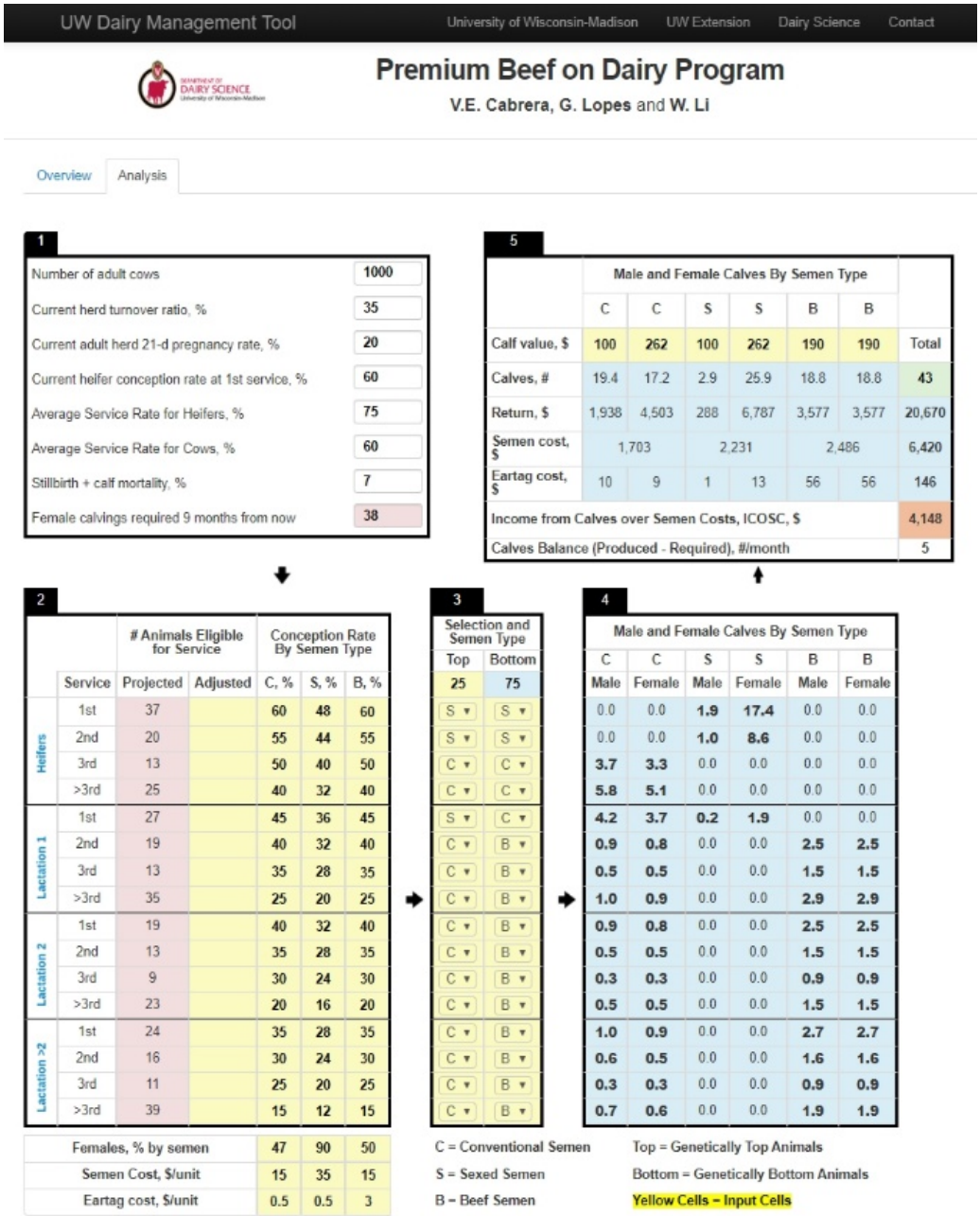
- Heifers: sexed dairy semen all heifers at 1st and 2nd services and conventional dairy semen for the rest.
- Lactation 1: at 1st service, sexed dairy semen for 25% of genetically superior cows and conventional dairy semen for the rest 75% cows; at later services, conventional dairy semen for 25% of genetically superior cows and conventional beef semen for the rest 75% cows.
- Lactation 2 and later: conventional dairy semen for 25% of genetically superior cows and conventional beef semen for the rest 75% cows
- The above semen combination results in $4,148/month ICOSC, and 5 extra (43-38) replacement calves.

General Recommendations

Users customize their scenarios to increase ICOSC while having enough replacements. Keep in mind the following:

- The optimal semen combination is farm-specific and market-specific.
- Reproductive performance is a limiting factor of farm profitability on using beef semen, even when the beef market is favorable.
- Higher reproductive performance prompts more beef semen use and greater ICOSC.
- ICOSC of higher reproductive performance farms is more sensitive to calf prices.
- ICOSC of lower reproductive performance farms is more sensitive to semen costs.
- Benefits from beef semen used in marginal cattle could financially support the use of more sexed semen.
- Female calf balance tends to be zero for maximizing ICOSC.

- Low herd turnover ratio improves farm capacity of using beef semen by decreasing the overall replacement demand.
- The optimal semen combination usually places expensive sexed semen on more fertile animals, such as heifers, and at 1st service.
- Using beef semen decreases the farm's heifer inventory and subsequent replacement rearing cost. The cost to raise replacement heifers is much higher than the revenue from selling crossbred calves.



Author: Victor Cabrera, Ph.D., Professor, UW-Madison Division of Extension Specialist in Dairy Farm Management and Wen Li, MS Student. Reviewers from UW-Madison Division of Extension: Matt Akins, Assistant Scientist Dairy Specialist, Department of Dairy Science and Sandra Stuttgen, DVM, Agriculture Educator