

Extension
UNIVERSITY OF WISCONSIN-MADISON

DAIRY WORKERS'

TRAINING MODULE **2**

REPRODUCTIVE SKILLS

Heifer Synchronization

DAIRY WORKERS

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Heifers... An investment in the future dairy herd

- High quality dairy replacements for improving genetic progress
- Heifer raising is the second largest expenditure on the farm

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Largest factor influencing heifer costs

Age at first calving

- Heifer housing
- Feed
- Labor
- Management

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Heifer reproduction goal



Raise heifers to reach a desired age and body weight early so they initiate puberty, establish pregnancy, and calve easily at a minimal cost



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Cows versus heifers

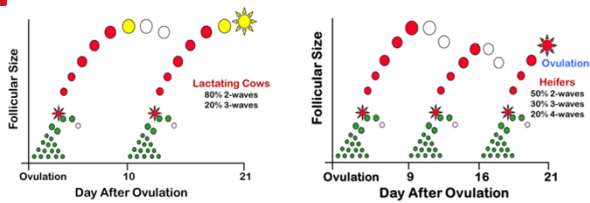
	Cows	Heifers
Estrus Duration	7.3 ± 7.2 hours	11.3 ± 6.9 hours
Conception Rate	<50	>50
Pregnancy Loss	High	Low
Multiple Ovulation	14%	5%
Twinning Rate	8%	-1%

Source: P. Fricke, UW Madison Department of Dairy Science



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Follicular waves



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Management barriers to high heifer fertility

- Optimal weight
- Heat detection
- Timing
- Compliance



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Targeted breeding approach



- Reach 55% of mature body weight the first 13 months
- Rebreed 1st group by 14 months of age
- Breed 100% of heifers for first time by 15 months

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Deciding when to breed Holstein heifers

Breeding Recommendations

Age = 13 months
Weight = 875 lb (396 kg)
Wither Height = 50 in (127 cm)


Calving Recommendations

Age at first calving = 22 - 24 months
Weight = 1250 lb (567 kg) post-calving
Wither Height = 55 in (140 cm)

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Breeding strategies for heifers

- Natural service
- Visual heat
- Systematic breeding system
 - Artificial insemination (AI) to observed heat
 - Prostaglandin program
 - Progesterone programs
 - Fixed-time AI



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Natural service



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Natural service


<p>Advantages</p> <ul style="list-style-type: none"> • Less labor with a lower level of skill than AI • No heat detection 	<p>Disadvantages</p> <ul style="list-style-type: none"> • Cost • Number of bulls • Performance and fertility • Breed date • Biosecurity • Genetics • Safety
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Utilizing natural service

- Breeding soundness exam (BSE)
- Physical exam
- Handling facilities
- Daily monitoring
- Rotate bull
- Less than 2.5 years of age
- 1 bull to 15 to 25 cows
- Nutrition
- Minimize heat stress
- Herd health



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Visual Heat & AI



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Advantages of artificial insemination

- Genetics
 - Proven, known genetics
 - Opportunity to increase genetic merit
- Economic advantage

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Visual heat

- Considerable time and labor
- Eliminates use of hormone injections
- Overall success depends on:
 - Number of heifers cycling
 - Accuracy of heat detection
 - Efficiency of heat detection



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Signs of estrus

Primary sign

- Standing to be mounted



Secondary signs

- Mounting other heifers
- Mucus discharge
- Swelling, reddening of vulva
- Bellowing, restlessness, and trailing
- Rubbed tail head, dirty flanks
- Chin resting, and back rubbing
- Sniffing genitalia



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Improving heat detection


- Housing
- Floor surface
- Feet & legs
- Status of herd mates
- Detection aids



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Estrus detection aids

- Record keeping
- Signs of estrus
- Mounting detection aids
- Activity monitors
- Hormone injections



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Systematic breeding



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Advantages of a systematic breeding program

- **Improve** efficiency of heat detection
- **Achieve** timelier first service
- **Reduce** variation in calving interval among heifers
- **Reduce** involuntary culling for reproductive reasons
- **Concentrate** labor for reproductive management to specific time periods
- **Improve** overall reproductive performance of herd



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Synchronize heats and induce ovulation

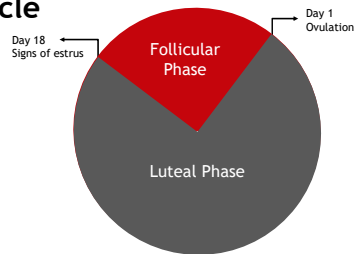
- Synchronizing allows use of natural estrous cycle
- Utilizing hormones must be administered at specific times following a proven standardized system
- Failure to follow leads to poor results and additional costs



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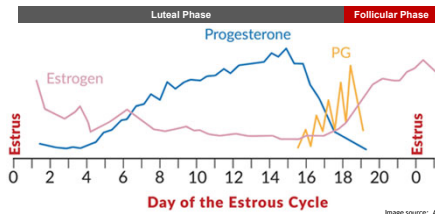
The estrous cycle

- 2 major phases
 - Follicular phase
 - Luteal phase

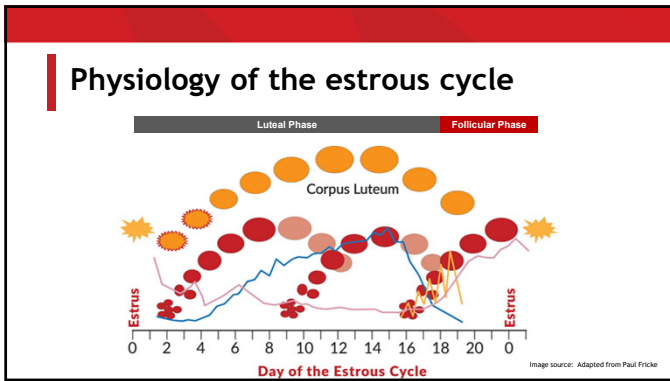


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Hormones of the estrous cycle



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Hormonal manipulation of ovarian function in heifers*

- Progestin
 - CIDR® Intravaginal Insert (Zoetis)
- Prostaglandin F_{2α}
 - Lutylase® (Zoetis)
 - Estrumate® (Merck)
- Gonadotrophin Release Hormone
 - Factrel® (Zoetis)
 - Fertagyl® (Merck)
 - Cystorelin® (Boehringer Ingelheim)

*FDA approved drugs for synchronizing estrous cycles in cows or heifers. Must be prescribed through a Veterinarian-Client-Patient Relationship (VCP).

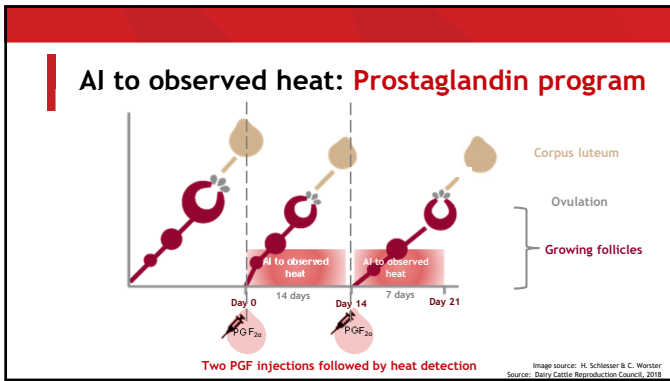
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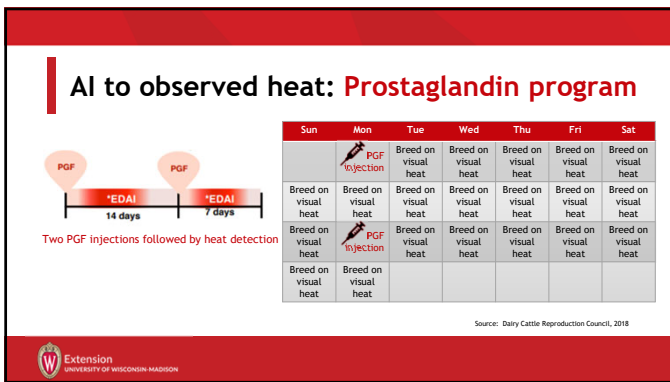
Systematic breeding: AI to observed heat

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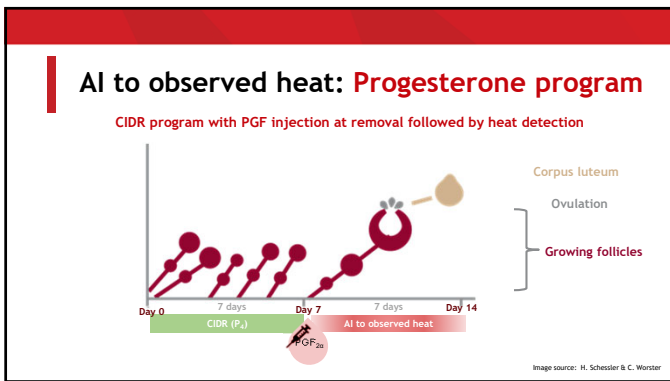
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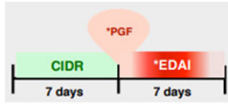


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AI to observed heat: Progesterone program



CIDR program with PGF injection at removal followed by heat detection

Sun	Mon	Tue	Wed	Thu	Fri	Sat
	CIDR insertion	CIDR	CIDR	CIDR	CIDR	CIDR
CIDR	CIDR removal PGF injection	Breed on visual heat	Breed on visual heat	Breed on visual heat	Breed on visual heat	Breed on visual heat
Breed on visual heat	Breed on visual heat					

Source: Dairy Cattle Reproduction Council, 2018



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Systematic breeding: Fixed-time AI



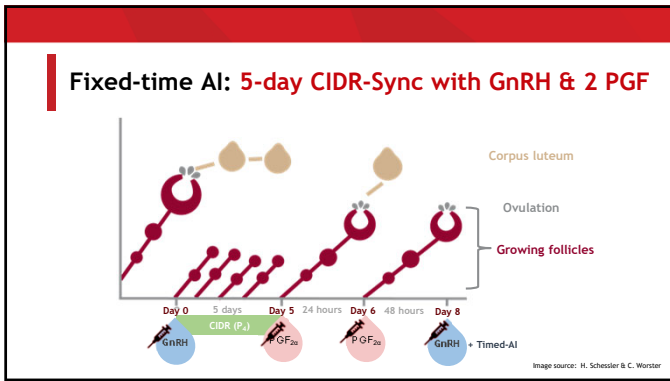
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Fixed-time AI systems

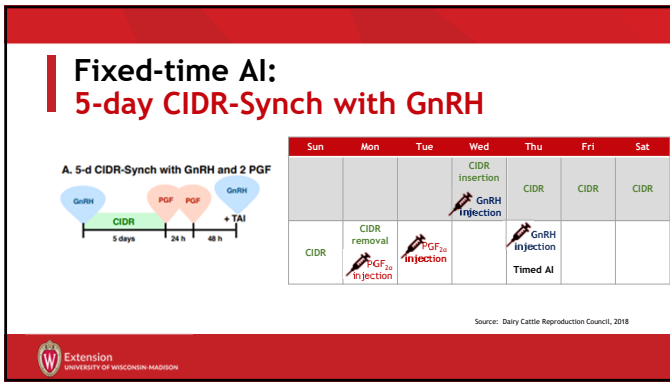
- Induce puberty in heifers
- Control timing of ovulation
- Eliminate need for estrus detection
- Allow all heifers inseminated on same day
- Higher drug costs and more trips through chute



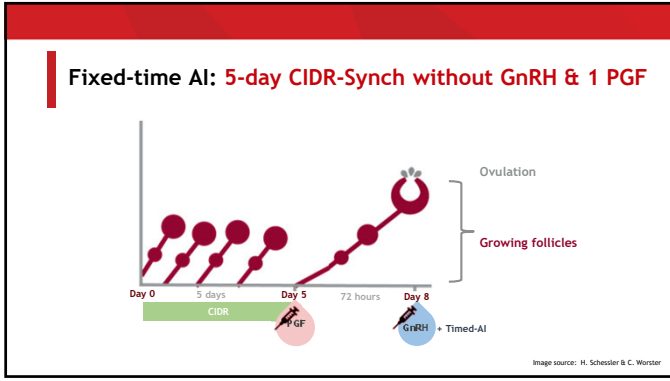
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Fixed-time AI: 5-day CIDR-Synch without GnRH

B. 5-d CIDR-Synch without GnRH and 1 PGF

Sun	Mon	Tue	Wed	Thu	Fri	Sat
CIDR	CIDR removal PGF _{2α} injection		CIDR insertion	CIDR GnRH injection Timed AI	CIDR	CIDR

Source: Dairy Cattle Reproduction Council, 2018

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Compliance

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Absolute compliance

What if you were only 90% compliant with the a 5-Day CIDR-Synch with GnRH Protocol?

Shot	Heifer 1	Heifer 2	Heifer 3	Heifer 4	Heifer 5	Heifer 6	Heifer 7	Heifer 8	Heifer 9	Heifer 10
1-GnRH	x	x	x	x	x	x	x	x	x	x
2-PGF		x	x	x	x	x	x	x	x	x
3-PGF	x	x	x	x	x	x	x	x	x	x
4-GnRH	x	x		x	x		x	x	x	x
Completed protocol	No	Yes	No	No	Yes	No	Yes	Yes	Yes	No

Source: Adapted from Dairy Cattle Reproduction Council

Will the protocol work for you?

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Cost factor of compliance


Considerations:

- GnRH = \$3.20 per dose
- Prostaglandin (PGF_{2α}) = \$2.50 per dose
- Cow handling = \$1 per cow
- CIDR application = \$9 to \$10 per cow

Protocols (excluding semen):

- 2 PGF_{2α} protocol = \$5.50 per heifer *(three handlings)*
- CIDR + PGF_{2α} protocol = \$14.50 per heifer *(three handlings)*
- 5-Day CIDR-Synch with GnRH protocol = \$23.40 per cow *(four handlings)*
- 5-Day CIDR-Synch without GnRH protocol = \$17.70 per heifer *(three handlings)*

Source: adapted from J. Fetzer, University of Minnesota College of Veterinary Medicine



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To achieve compliance


Correct injections | Correct cow | Correct days



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Synchronizing & inseminating best management practices

- Personnel
- Record keeping
- Facilities
- Animal handling



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Worker safety

- Do not work alone
- Properly restrain heifers
- Handle loaded syringes with care
- Never carry loaded syringes in pockets
- Keep needles properly covered
- Identify exit route
- Properly dispose of used needles and bottles
- Use all products according to label under the supervision of VCPR

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Hormone use and administration

Use hormones with caution

- Prostaglandin should not be used by pregnant females
- Progesterone can increase symptoms of pregnancy

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Heifers... An investment in the future dairy herd

- High quality dairy replacements for improving genetic progress
- Heifer raising is the second largest expenditure on the farm



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Heifer reproduction goal



Raise heifers to reach a desired age and body weight early so they initiate puberty, establish pregnancy, and calve easily at a minimal cost

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