Using Genomics for Selection in Dairy Cattle

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OUTLINE

Using Genomics

1. Selection & Mating
- When to genotype
- Who to genotype

2. Exercise using visual, pedigree information and heifer information
- Selection
- Mating

WHEN TO GENOTYPE

BREEDING OBJECTIVES

Breeding objectives determine when to genotype

- What are your goals for your dairy?
- When do you want to sort your females?

BEFORE WE GENOTYPE…

Identifying goals and choosing priorities

- Identify replacements
- Identify females that won't produce replacements
  - Breed to beef bulls
  - Breed to less expensive bulls
- Identify elite females
  - Sexed semen
  - Assisted Reproductive Technologies
  - Breed to better bulls
- Reduce effects of early disease
- Reduce generation interval

GENOTYPING EARLY

- Identification of replacements and elite females to sort heifers early for different levels of care
- Facilitates reducing generation interval by using assisted reproductive technologies
- Potential to further increase genetic progress

AFTER WEANING OR AFTER CO-MINGLING

Stratify females before breeding but with knowledge of resistance to BRD, scours, etc.

- Sort into breeding strategies by overall quality using selection indexes or to maximize complementarity with additional emphasis on specific traits
- Keep or cull

WHO TO GENOTYPE

BREEDING OBJECTIVES INFLUENCE WHO IS GENOTYPED

- Genotype more animals than you plan on keeping for replacements or elite females
- More you genotype, the choosier you can be for selecting your replacements resulting in faster genetic progress
- Genotyping more animals improves accuracy of keeping the right individuals

SUMMARY

- When genotyping is done and what cattle are genotyped should reflect the goals of the dairy
- Genomic selection increases the genetic progress of the dairy herd
- Genomic selection reduces financial risk by reducing the risk of animals who are poor performers

EXERCISE

Compare visual, relative and heifer genomic selection information on the heifers in your handouts

1. Would your selection decisions or rankings change if you used pedigree-based selection compared to genomic selection?
2. How are you measuring profitability and how does this match your PTAs?
3. How would this affect your profitability?
4. Which PTAs would you expect to be less affected by genomic selection?
5. Once you have selected the heifers, make decisions on who are elite, average and below average and how they would be mated.
6. Choose bulls from the handout for the heifers you selected based on their PTAs and your decisions in #4.

HANDOUT

In the Packet:

1. Selection/mating – you choose

- 20 heifers with pictures for visual assessment (phenotypic selection), pedigree information and individual genomic PTAs
- 4 bulls with PTAs and pictures

2. Economic selection indexes and their weights for each trait to determine if/which index you would like to use

EXAMPLE

Fluid Milk

1 Visual assessment

Pedigree information

Heifer	Sire Milk	Sire/Maternal Grandsire
1	422	345

What does a predicted transmitting ability (PTA) of 422 mean?

On average, that sire's offspring would produce 422 pounds more milk than average.

1 Visual assessment

Pedigree information

Heifer	Sire Milk	Sire/Maternal Grandsire
1	422	345.84

Heifer genomic information

Heifer	FM$	CM$	NM$	GM$	Milk	Fat (%)	Fat (lbs)	Pro (%)	Pro (lbs.)	SCS	PL	CCR	HCR
1	350	357	357	333	805	-0.06	15	0	26	3.05	2.5	0.8	0.5

WHAT DOES HER PTA MEAN?

Heifer genomic information

Heifer	FM$	CM$	NM$	GM$	Milk	Fat (%)	Fat (lbs)	Pro (%)	Pro (lbs.)	SCS	PL	CCR	HCR
1	350	357	357	333	805	-0.06	15	0	26	3.05	2.5	0.8	0.5

What does a predicted transmitting ability (PTA)for fluid milk of 805 for this heifer mean?

On average, her offspring would produce 805 pounds more milk than the average.

2 Visual assessment

Pedigree information

Heifer	Sire Milk	Sire/Maternal Grandsire
2	-246	251

Heifer genomic information

Heifer	FM$	CM$	NM$	GM$	Milk	Fat (%)	Fat (lbs)	Pro (%)	Pro (lbs.)	SCS	PL	CCR	HCR
2	212	291	282	265	-482	0.15	22	0.05	0	2.92	2.3	0.6	0.9

1

2

3

4

5

FLUID MILK RELATIVES' EXAMPLE

Heifer	Sire Milk	Sire/Maternal Grandsire
1	422	345
2	-246	251
3	2252	1708
4	830	579
5	1253	438

HEIFER'S PTA EXAMPLE

Heifer	FM$	CM$	NM$	GM$	Milk	Fat (%)	Fat (lbs)	Pro (%)	Pro (lbs.)	SCS	PL	CCR	HCR
1	350	357	357	333	805	-0.06	15	0	26	3.05	2.5	0.8	0.5
2	212	291	282	265	-482	0.15	22	0.05	0	2.92	2.3	0.6	0.9
3	379	327	335	294	1577	-0.04	50	-0.03	39	3.16	-0.9	-3.3	-0.8
4	-80	7	-2	10	-795	0.09	-6	0.06	-7	3.03	1.5	2.1	1
5	230	262	258	243	383	0.02	20	0.02	17	2.93	2.1	1.9	0.7

Heifer #3 has the highest milk PTA, but her NM$ is lower than heifer #1. Why?

RANK YOUR HEIFERS

Heifer #	Visual Rank	Sire PTA Rank	Sire/MGS PTA rank	Heifer PTA
1				
2				
3				
4				
5				

Bull 1

Production

Dtrs: 0 **Herds:** 0 **NM$:** +1075 **TPI®:** +2938

Milk	+1084 Lbs	81% Rel
Pro	+60 Lbs	+0.09%
Fat	+112 Lbs	+0.24%
FS	+320 Lbs	
CM$	+1091	
GM$	+1054	
FM$	+946	

Health & Fertility

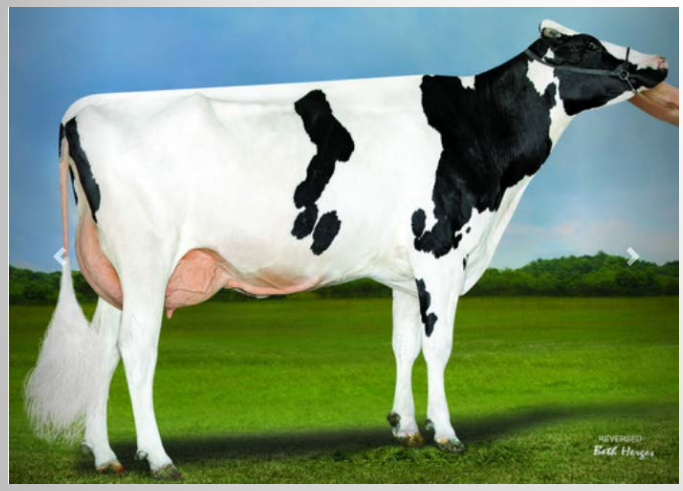
PL	+4.0	75% Rel
LIV	+2.7	71% Rel
DPR	-0.6	74% Rel
SCS	2.98	77% Rel
HCR	+2.2	72% Rel
CCR	+0.3	74% Rel
AHI	111	
Recessives	HH1T, HH2T, HH3T, HH4T, HH5T, HH6T, TC, TD, TL, TN, TR, TS, TV, TY	

Calving Traits

SCE	1.9%	75% Rel	47 Obs
DCE	1.8%	70% Rel	0 Obs
SSB	6.4%	65% Rel	47 Obs
DSB	3.5%	64% Rel	0 Obs

Conformation

Dtrs: 0 **Herds:** 0 **PTAT Rel:** 79%



Bull 2

Production

Dtrs: 0 **Herds:** 0 **NM$:** +1011 **TPI®:** +2898

Milk	+1612 Lbs	79% Rel
Pro	+65 Lbs	+0.05%
Fat	+123 Lbs	+0.21%
FS	-26 Lbs	
CM$	+1023	
GM$	+903	
FM$	+928	

Health & Fertility

PL	+4.8	74% Rel
LIV	+1.2	70% Rel
DPR	-2.5	73% Rel
SCS	2.84	75% Rel
HCR	-2.2	70% Rel
CCR	-1.1	73% Rel
AHI	95	
Recessives	HH1T, HH2T, HH3T, HH4T, HH5T, HH6T, TC, TD, TL, TN, TR, TS, TV, TY	

Calving Traits

SCE	2.1%	61% Rel	0 Obs
DCE	2.2%	57% Rel	0 Obs
SSB	5.5%	57% Rel	0 Obs
DSB	4.8%	54% Rel	0 Obs

MATE YOUR HEIFERS

Heifer #	Heifer strength	Heifer weakness	Sire #	Sire Strength	Sire Weakness
1	FM 805	Fat -0.06	2	FM 1612	HCR -2.2
2	HCR 0.9	FM -482	2	FM 1612	HCR -2.2
3					
4					
5					

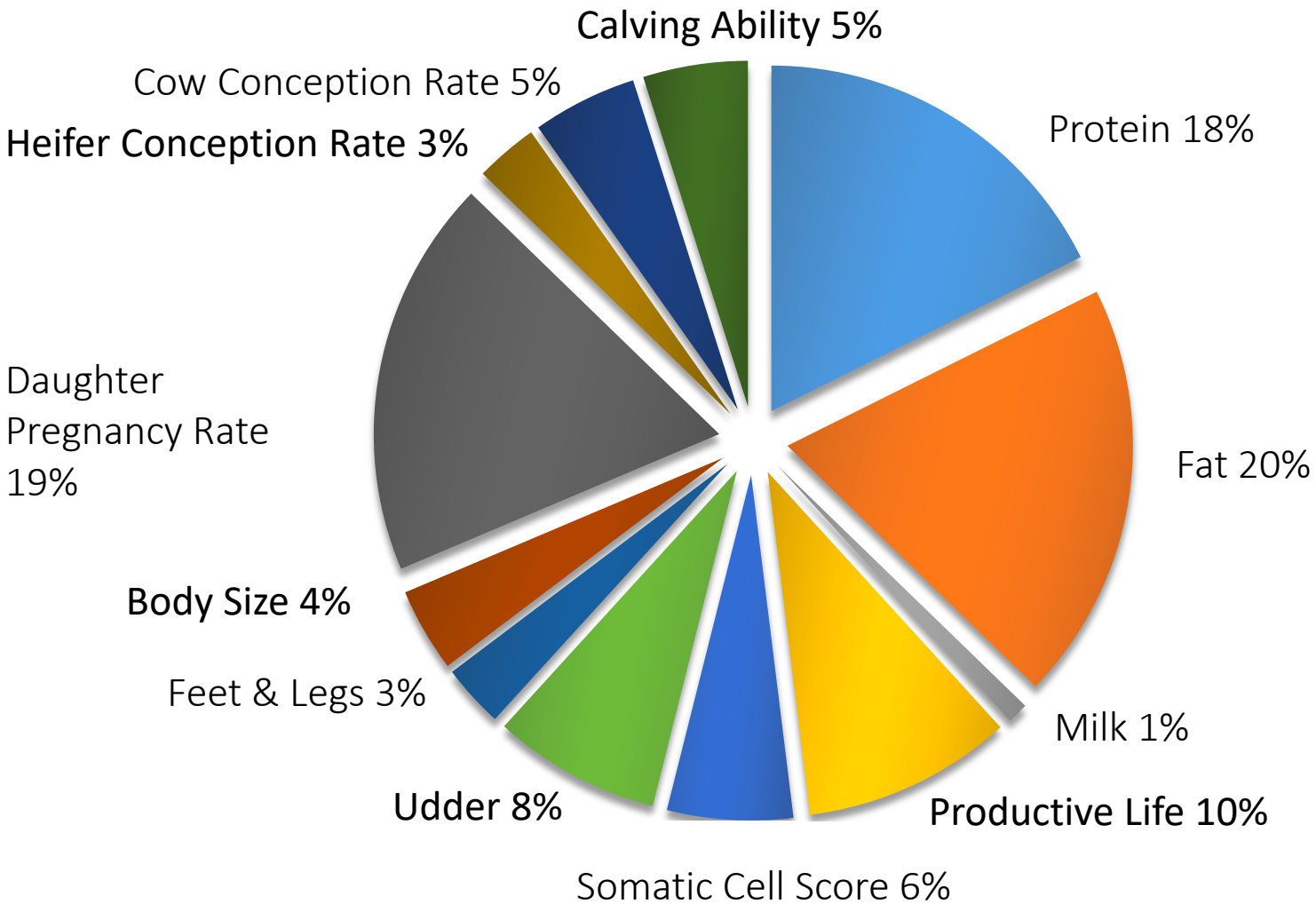
Choose mating strategy – How are you choosing the sire for heifer #1?

Heifer #1 Mating heifer strong in FM to sire strong in FM (positive assortative mating)

Heifer #2 mating heifer weak in milk to sire strong in milk (corrective mating)

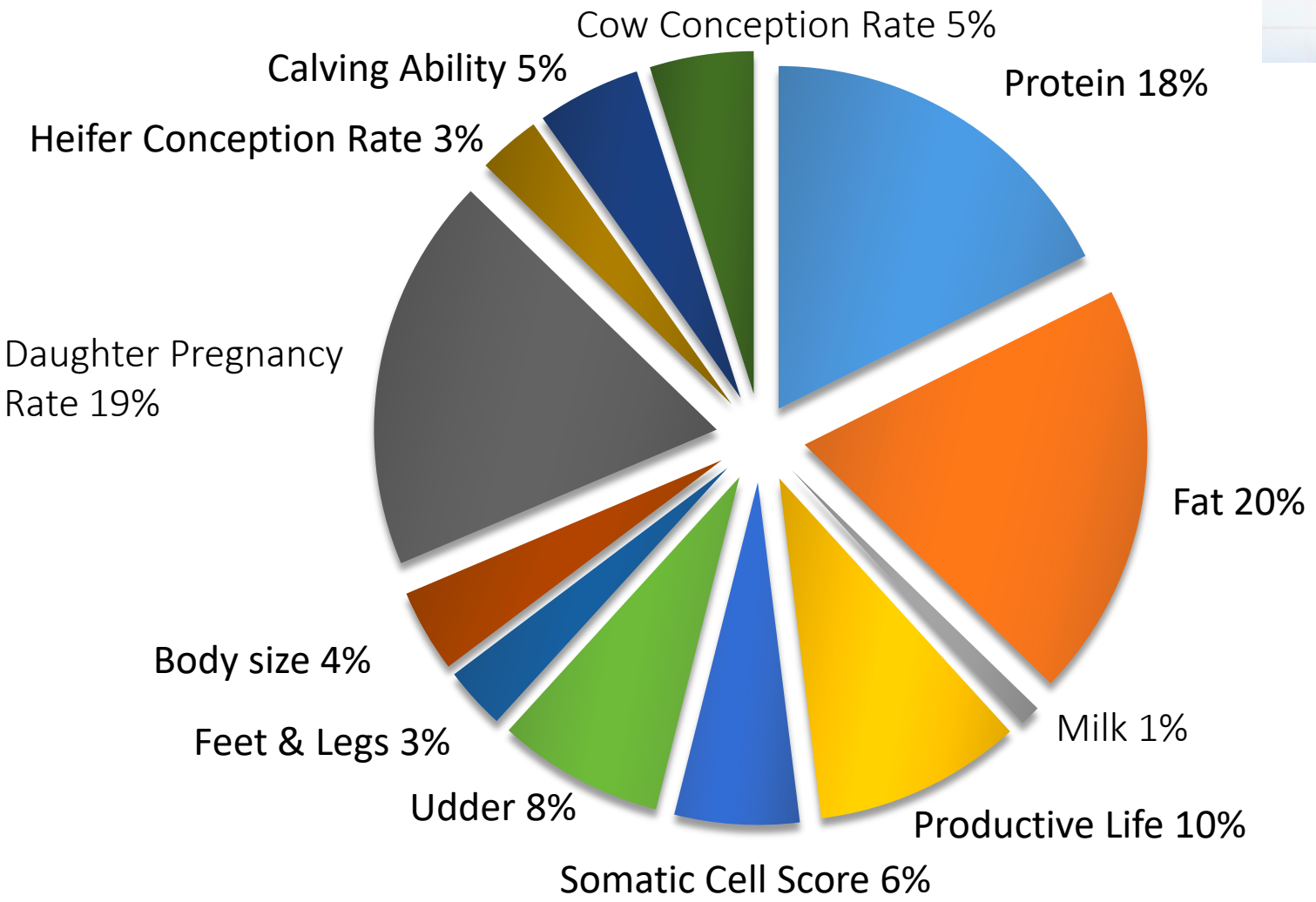
Genomic Selection Handout

Net merit $



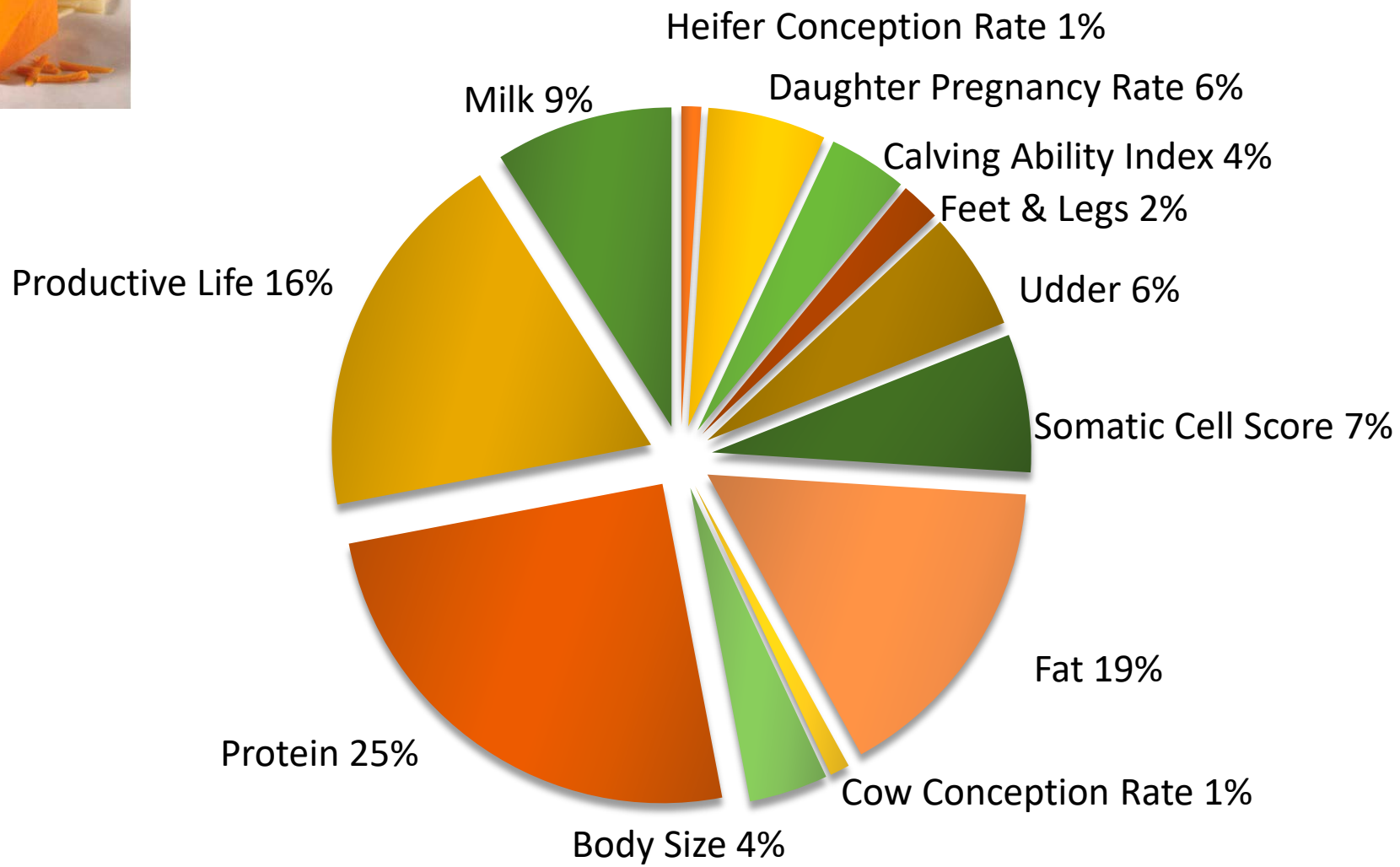
VanRaden and Cole, 2014; https://aipl.arsusda.gov/reference/nmcalc-2014.htm

Fluid Merit $



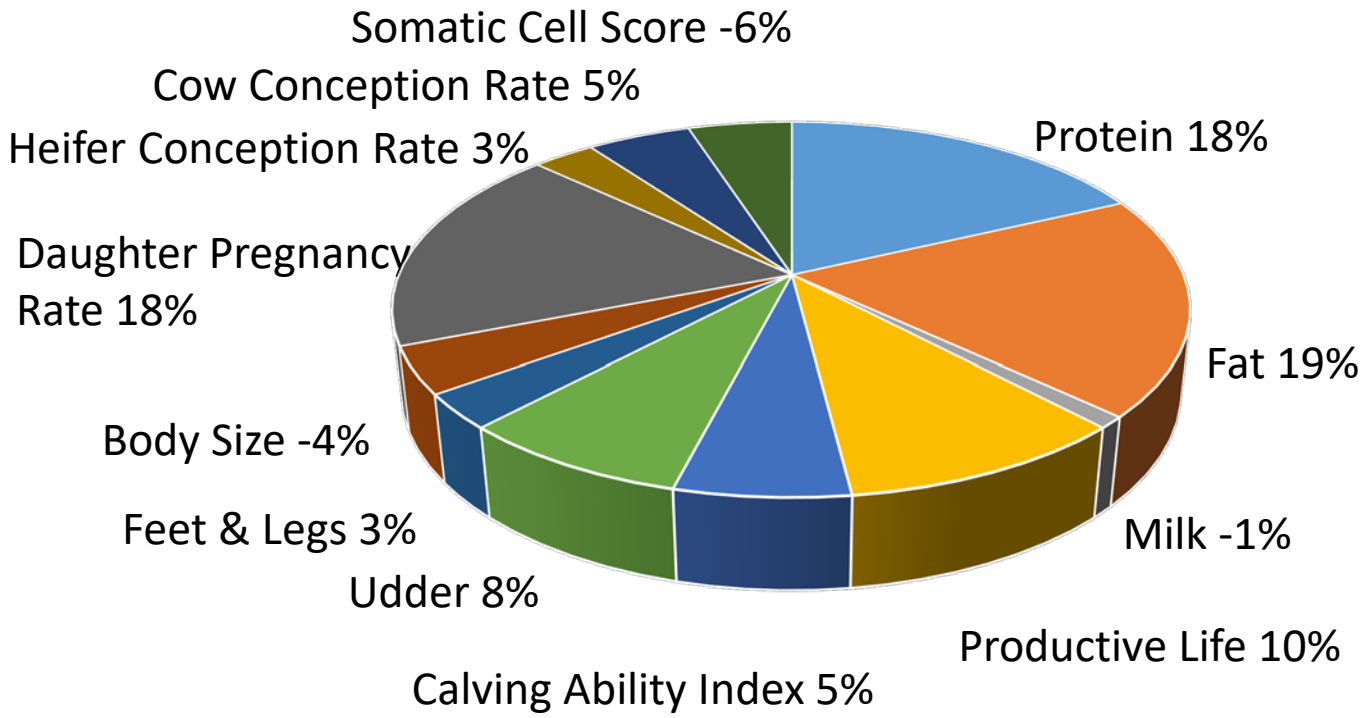
VanRaden and Cole, 2014; https://aipl.arsusda.gov/reference/nmcalc-2014.htm

Cheese merit $



VanRaden and Cole, 2014; https://aipl.arsusda.gov/reference/nmcalc-2014.htm

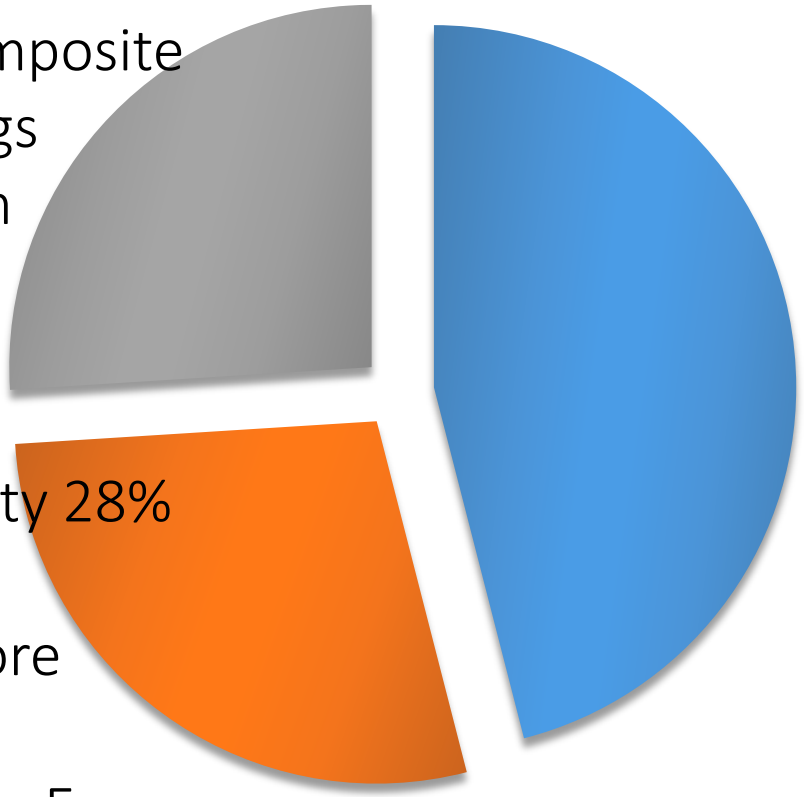
Grazing merit $



VanRaden and Cole, 2014; https://aipl.arsusda.gov/reference/nmcalc-2014.htm

TPI (Holsteins)

Conformation 26%
- Udder composite
- Feet & Legs
- Dairy form
- Type



Production 46%
-Fat
-Protein
-Feed Efficiency

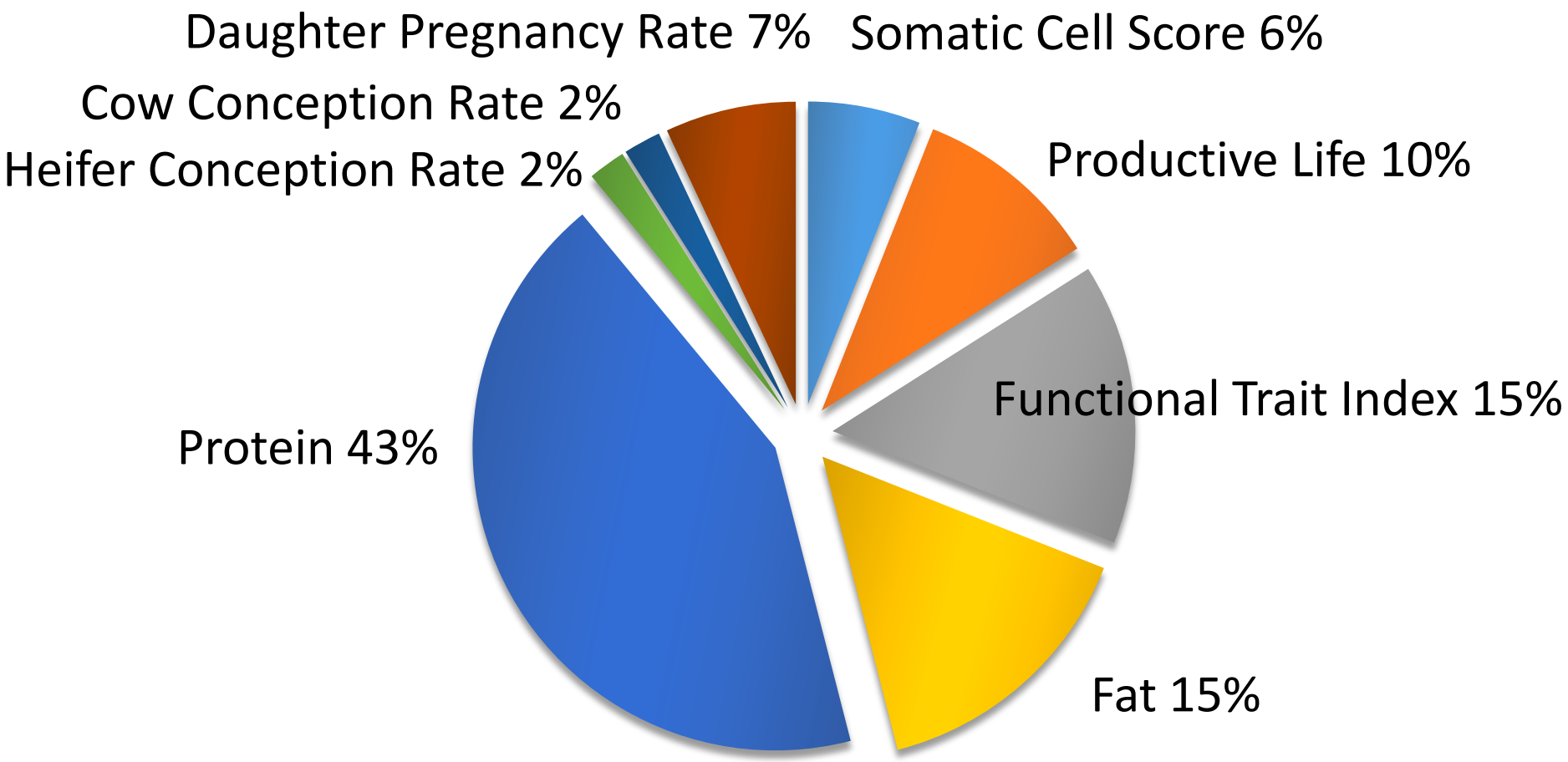
Health and Fertility 28%
- Productive Life
- Somatic Cell Score
- Fertility Index
- Daughter Calving Ease
- Daughter Stillbirth

Total Performance Index

- $$TPI = \left[\frac{27(PTAP)}{19.4} + \frac{16(PTAF)}{23.0} + \frac{3(FE)}{45} + \frac{8(PTAT)}{.73} - \frac{1(DF)}{1.0} + \frac{11(UDC)}{.8} + \frac{6(FLC)}{.85} + \frac{7(PL)}{1.26} - \frac{5(SCS)}{.13} + \frac{13(FI)}{1.0} - \frac{2(DCE)}{1.0} - \frac{1(DSB)}{0.9}\right] 3.8 + 2138$$

- PTAP – protein
- PTAF –fat
- FE- feed efficiency
- PTAT –type
- DF – dairy form
- UDC – udder composite
- FLC – feet & legs composite
- PTA – productive life
- SCS – somatic cell score
- FI – fertility index
- DCE – daughter calving ease
- DSB – daughter stillbirth

Jersey performance index



Neogen – Igenity® testing

- GGP HD150K $92-96
- 150k SNPs
- Reliabilities of 71-74%
- Supports Holstein, Brown Swiss, Ayrshire
- GGP LD $42-46
- ≈42k SNPs
- Reliabilities of 68-72%
- Supports Holstein, Brown Swiss, Ayrshire, Jersey, Guernsey, Gyr, Girolando

Product comparisons:
http://genomics.neogen.com/pdf/Igenity/AG258_IgenityCommercialDairyProductComparison.pdf

Neogen – Igenity® testing

- Igenity® Select $37-40
- 45 traits goes to CDCB
- 9k with custom content SNPs
- Reliability 67-71%
- Igenity® Essential $29-32
- 15 production traits, doesn’t go to CDCB
- 9K with custom content SNPs
- Reliability 60-65%
- 15 key traits for sorting heifers

Example Igenity® report on key traits

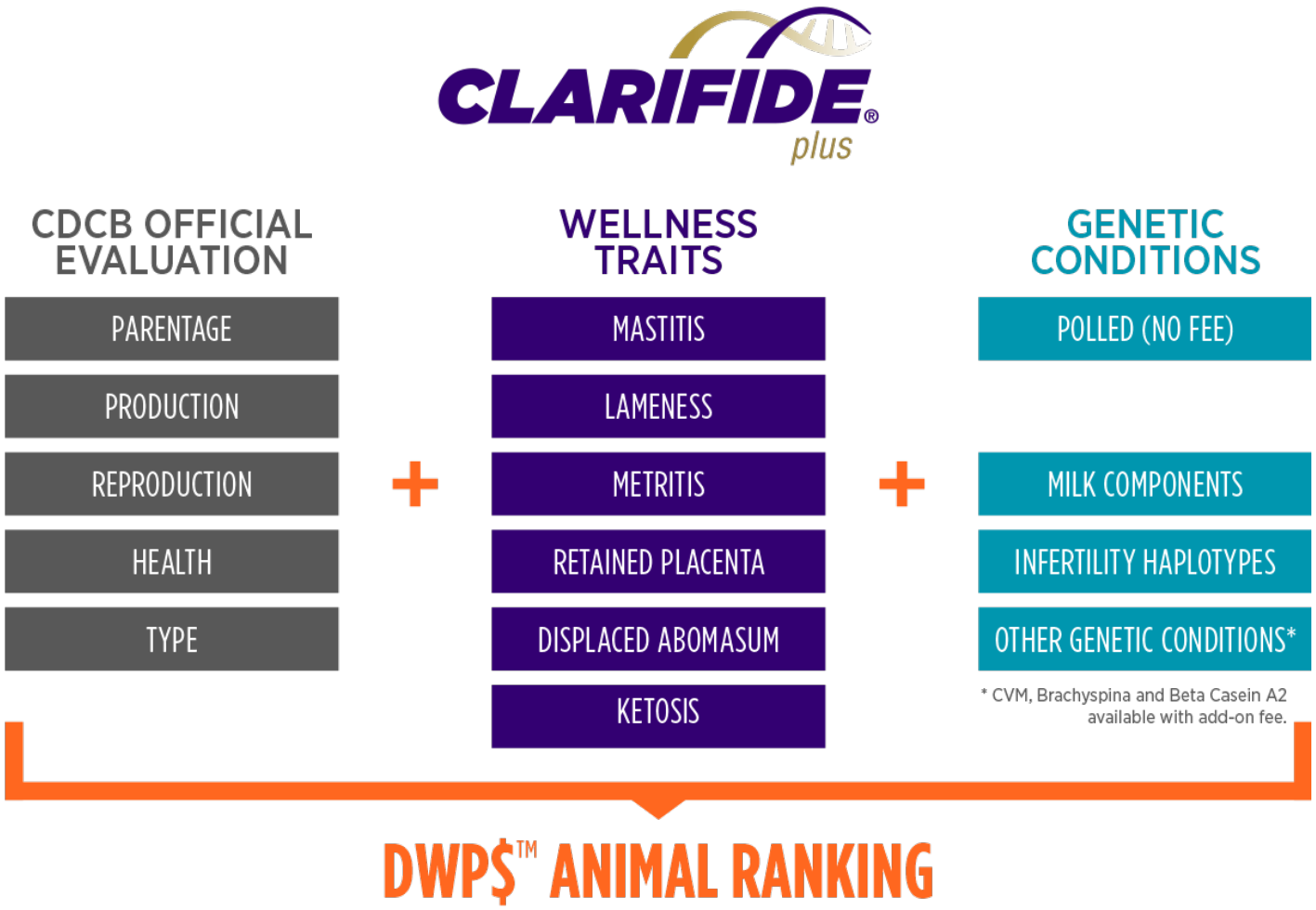
ID	GM$	NM$	NM$ Rank	NM$ USA % Rank	Milk Yield	Fat lbs	Pro lbs	SCS	PL	DPR	DCE	IPI
1	635	627	1	99%	1102	49	30	2.84	5.8	2.7	5.8	2363
2	577	597	2	99%	1192	53	39	2.65	5.5	1.8	6.8	2322
3	360	375	4	98%	1431	26	28	2.95	3.4	0.9	5.9	2066

- **GM$** - grazing merit $
- **NM$** - net merit $
- **SCS** - somatic cell score
- **PL** – productive life
- **DPR** – daughter pregnancy rate
- **DCE** – daughter calving ease
- **Milk yield** – differences in pounds of milk for a 305 day lactation
- **Fat lbs** – differences in pounds of fat for a 305 day lactation
- **Pro lbs** – difference in lbs. of protein yielded for 305 day lactation
- **IPI** – Igenity production index (same as TPI)
- **SCE** - Sire calving ease
- **HCR** - Heifer conception rate
- **CCR** - Cow conception rate
- **DSB** - Daughter stillbirth
- **SSB** - Sire service stillbirth

Igenity® Dashboard

- Interactive tool for interpreting genomic results
- Customize, sort, filter results
- Create custom indexes
- Designate a consultant where they can have access to data
- Compare rates of genetic gain between your and other herds
- https://www.igenitydashboard.com/Home/Login

Clarified Ultra Plus



Clarifide®

5 Full Composite Indexes

Net Merit $, Cheese Merit $, Fluid Merit $, Grazing Merit $, Total Performance Index (TPI),

11 Health & Repro Traits

SCS, DPR, HCR, CCR, Productive Life, Calving Ability, Sire & Daughter Calving Ease, Sire & Daughter Still Birth., Fertility Index
Liveability

5 Parentage & Inbreeding Info

Parentage (Sire & Dam), Maternal Grand Sire, Individual Genomic Inbreeding %, Future Inbreeding %.

5 Production Traits

Milk Volume, Fat Volume, Protein Volume, Fat %, Protein%.

MANY Risk Mgmt Related

Specific Recessives: BLAD, DUMPS, Mulefoot, Chrondrodysplasia, Citrullinemia, Factor XI, CVM*, Brachyspina*,
5 **Breed Fertility Haplotypes**

4 Milk Protein Components

Alpha S-1 Casein, Beta Lactoglobulin, Kappa Casein I & II, Beta Casein A2*

22 Type Traits & Indexes

18 Linear Conformation Traits, Type-Final Score, and Udder, Feet &Leg, and Body Size Composites.

3 Additional Genetic Characteristics

Recessive Red (or Black), and Dominant Red coat color, Polled/Horned Gene*

Zoetis Enlight

- Reporting and analysis of results
- Benchmarking
- Youngstock, whole herd and individual reports
- Access databases such as TPI and NM$
- Interactive graphs

https://www.zoetisus.com/animal-genetics/dairy/enlight.aspx

Western Region Sustainable Agriculture Research & Education Program Outreach Pre-Workshop Survey

1. What does the acronym PTA stand for?
    a. Parent teacher association
    b. Predicted transmitting ability
    c. Progeny transmitted attribute
    d. Progeny transmitted attitude
2. If a cow has a PTA of +50 for milk yield it means that
    a. Its offspring will produce (on average) 50 pounds more milk than the average dairy cow
    b. The cow produced 50 pounds more milk than her herd mates
    c. The cow only produced 50 pounds of milk
    d. She will produce less milk than average
3. Genomic testing costs
    a. Less than $20/animal
    b. Less than $50/animal
    c. Less than $75/animal
    d. Greater than $75/animal
4. Genomic selection
    a. Increases the rate of genetic improvement
    b. Can be used as a marketing tool
    c. Can be used for selection and mating decisions
    d. All of the above
5. Genomic selection
    a. Is used to predict performance using genotypes
    b. Is useful for registered herds but not for most dairies
    c. Has yet to be shown to be cost effective
    d. Is rarely used
6. Risk management
    a. Includes dairy revenue protection insurance and Dairy Margin Coverage
    b. Are tools that reduce potential revenue losses
    c. Includes genomic selection because it increases accuracy of predictions of milk production
    d. All of the above

7. Have you used genomic selection before?
    a. Yes
    b. No
8. Are you interested in genetic testing to select replacement heifers?
    a. Yes, definitely
    b. Might give it a try
    c. Probably not
    d. No
9. Are you interested in using genomic testing to make breeding decisions?
    a. Yes, definitely
    b. Might give it a try
    c. Probably not
    d. No
10. If you work on or own a dairy, how many cows does the dairy milk?_____

11. If you work on or own a dairy, how many replacement heifers are selected each year?_____

Western Region Sustainable Agriculture Research & Education Program Outreach Post-Workshop Survey

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    a. Includes dairy revenue protection insurance and Dairy Margin Coverage
    b. Are tools that reduce potential revenue losses
    c. Includes genomic selection because it increases accuracy of predictions of milk production
    d. All of the above
7. Will you use genomic testing to select replacement heifers?
    a. Yes, definitely
    b. Might give it a try
    c. Probably not
    d. No

8. Will you use genomic testing to make breeding decisions?
    a. Yes, definitely
    b. Might give it a try
    c. Probably not
    d. No
9. Has this workshop been helpful in learning about genomic selection and new genetic tools?
    a. Yes
    b. A little
    c. Not really
    d. No
10. Would you be interested in further information on genomic selection?
    a. Yes
    b. No
11. Please provide suggestions below on how to improve this workshop. Thank you!

If you are a veterinarian, please answer the following:

12. In the next year I am likely to discuss aspects of this workshop
    a. with my peers
    b. as a resource I will make available to producers
    c. to improve advice/counsel I give to producers

13. The dairies that I have as clients represent approximately _____(how many) milking cows?

14. The dairies that I have as clients represent approximately_____ (how many) replacement heifers?

Western Region Sustainable Agriculture Research & Education Program Outreach Survey

Name (optional): _____ **Date of Event: _____**

Everyone	**Please circle one**		
Improved my awareness of the topics covered	Yes	No	NA
Provided new knowledge	Yes	No	NA
Provided new skills	Yes	No	NA
Modified my opinions and/or attitudes	Yes	No	NA

How many people do you estimate you will share some aspect of this project within the next 12 months? _____

Producers – In the next year I am likely to use some aspect of this project to

Adopt one or more of the practices shown	Yes	No	NA
Increase the operation's diversifications	Yes	No	NA
Reduce my use of purchased off-farm inputs	Yes	No	NA
Increase my networking with other producers	Yes	No	NA
Incorporate value-added into some aspect of my operation	Yes	No	NA

Professionals – In the next year I am likely to use some aspect of this project

In an education program that I plan or participate in	Yes	No	NA
As a resource I will make available to producers	Yes	No	NA
As a professional development tool for my peers	Yes	No	NA
To improve advice/counsel I give to producers	Yes	No	NA

Professionals – Please describe how you are likely to use some aspect of this project for an educational purpose?

USDA United States Department of Agriculture National Institute of Food and Agriculture

Western Region Sustainable Agriculture Research & Education Program Outreach

Heifer Ranking Worksheet

Selecting your heifers

Heifer's Number	Rankings			
	Heifer's Genomic Results	**Sire's Values Only**	**Sire + MGS Combined Values**	**Physical Appearance**
1				
2				
3				
4				
5				
6				
7				
8				
9				
10				
11				
12				
13				
14				
15				
16				
17				
18				
19				
20				

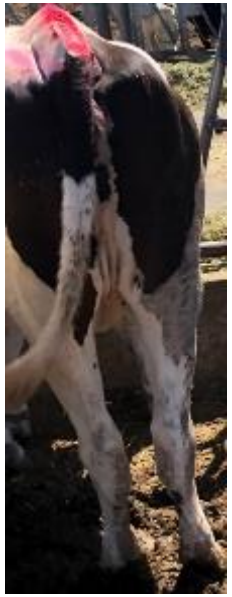
Bull Mating Sheet

Mating your chosen heifers

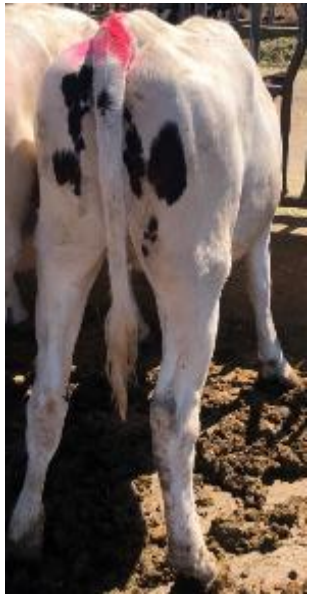
Heifer #	Heifer Strength	Heifer Weakness	Sire #	Sire Strength	Sire Weakness

Group 1

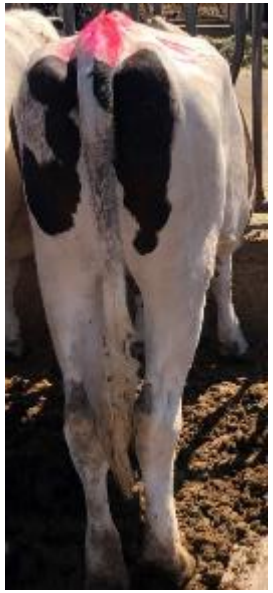
Heifer #1



Heifer #2

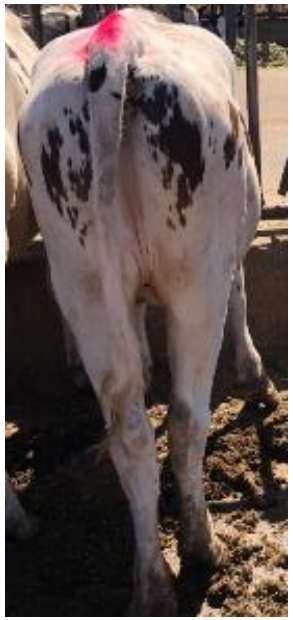


Heifer #3

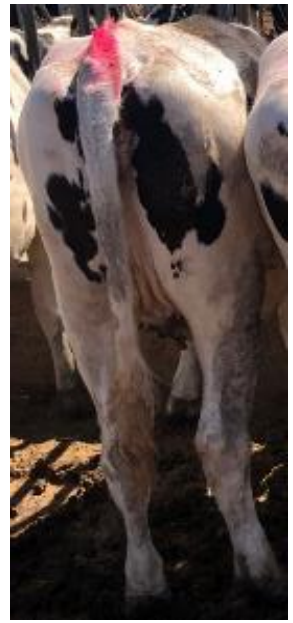


Heifer #4

Heifer #5

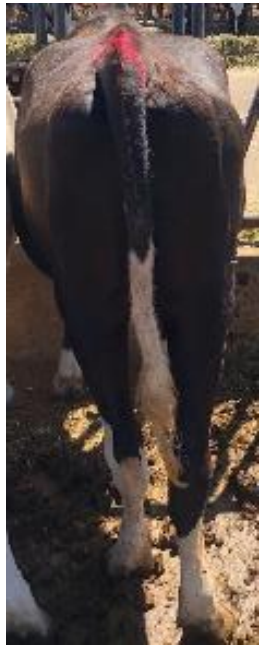


Heifer #6

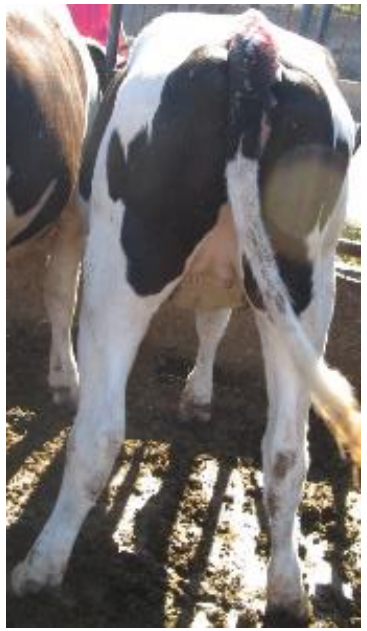


Heifer #7

Heifer #8

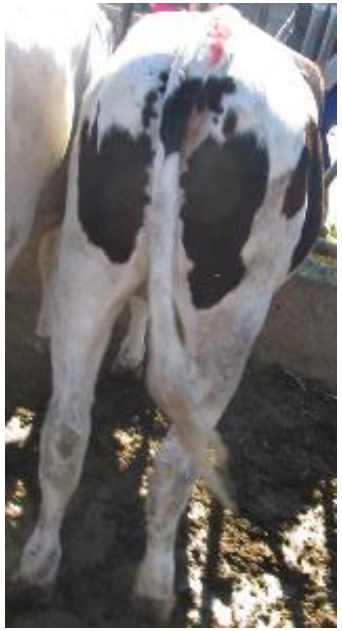


Heifer #9

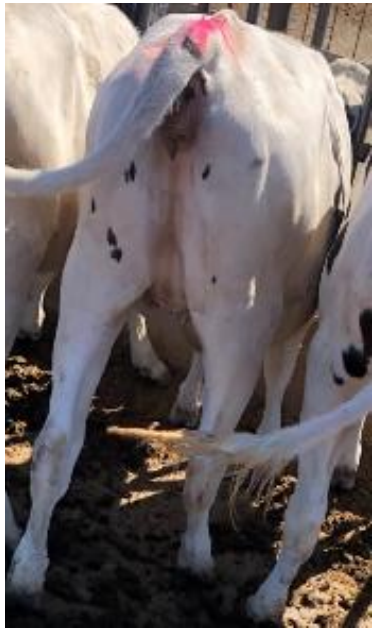


Heifer #10

Heifer #11



Heifer #12



Heifer #13

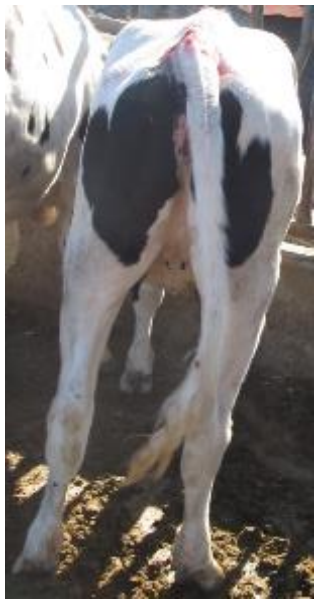
Heifer #14

Heifer #15

Heifer #16

Heifer #17

Heifer #18



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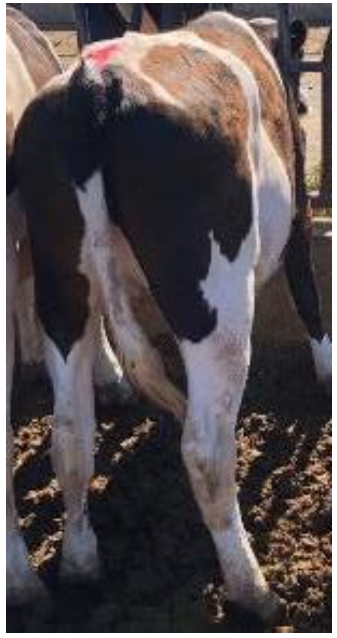
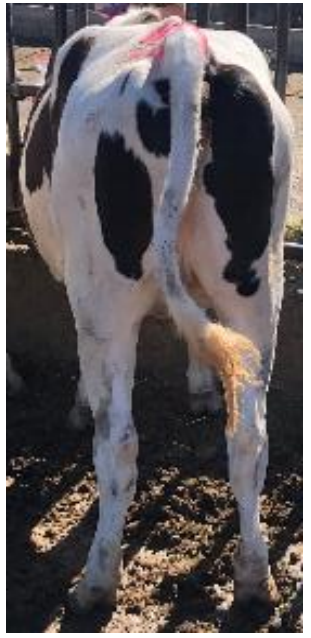
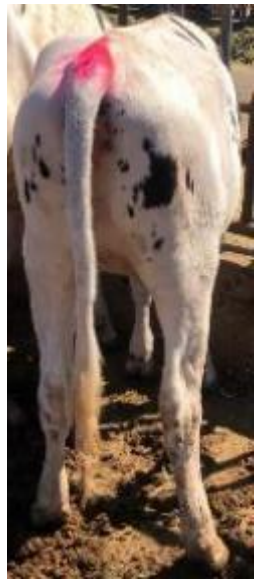


Heifer #20



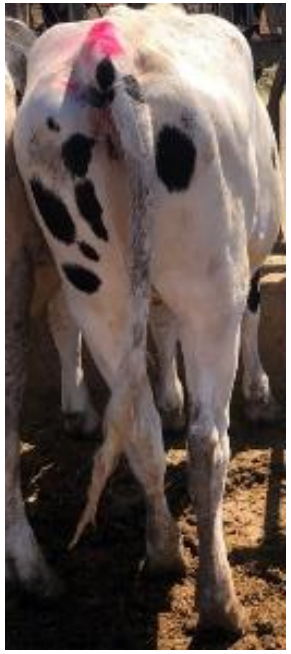
Group 2

Heifer #1



Heifer #2

Heifer #3

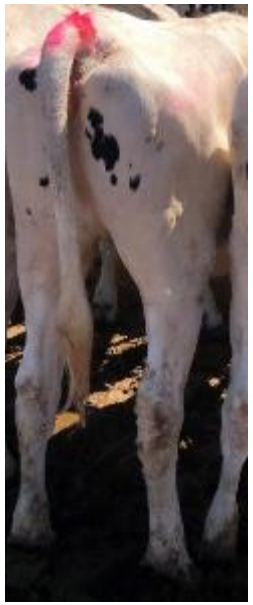


Heifer #4

Heifer #5

Heifer #6

Heifer #7



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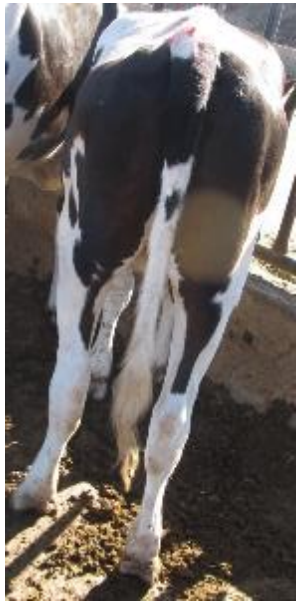

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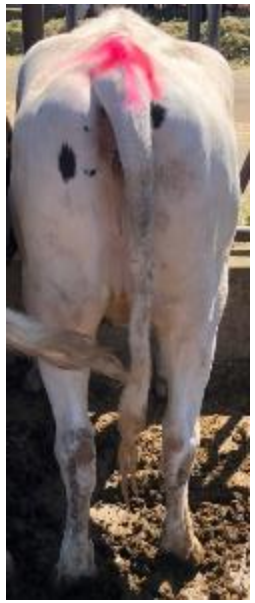
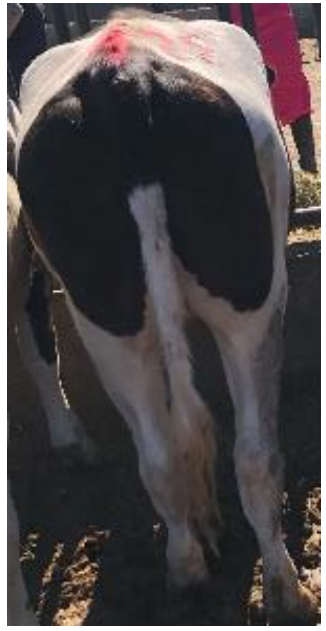
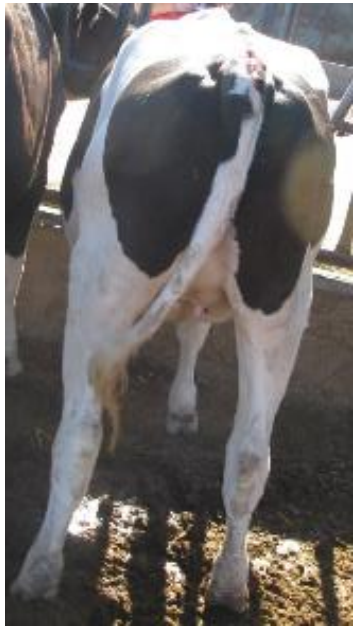


Heifer #10

Heifer #11



Heifer #12



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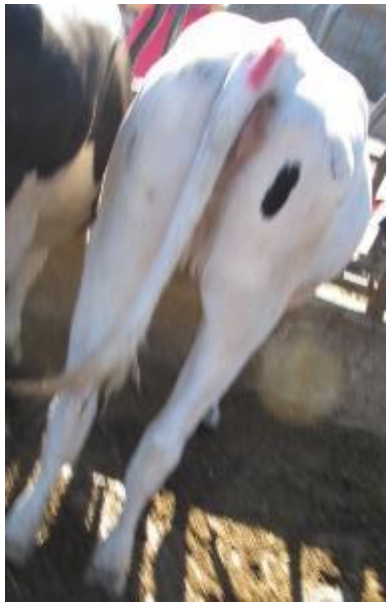

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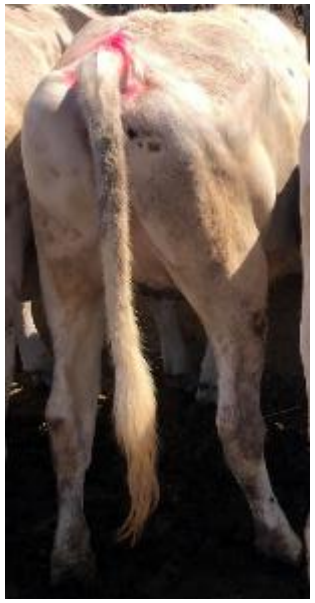

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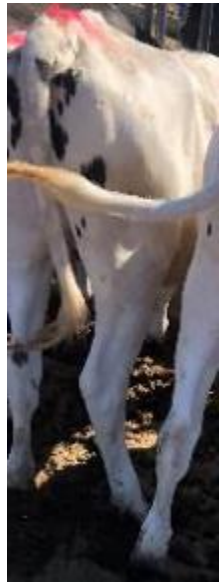

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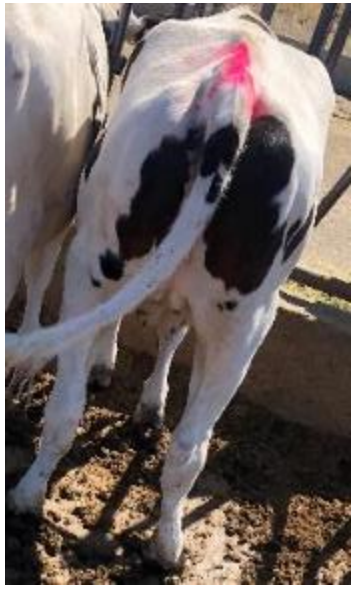
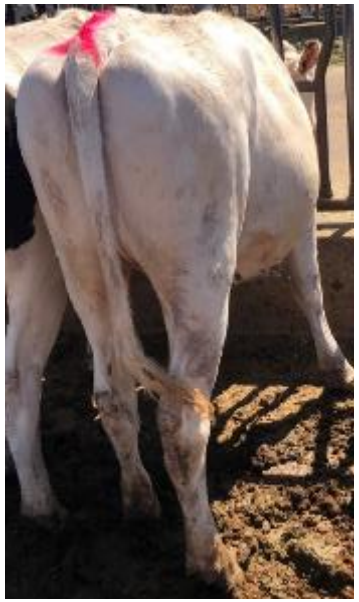


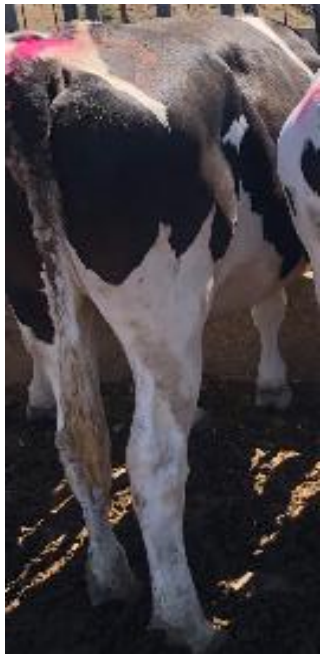
Heifer #17

Heifer #18



Heifer #19

Heifer #20

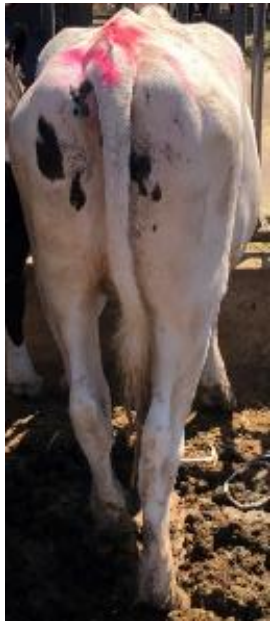


Group 3

Heifer #1

Heifer #2

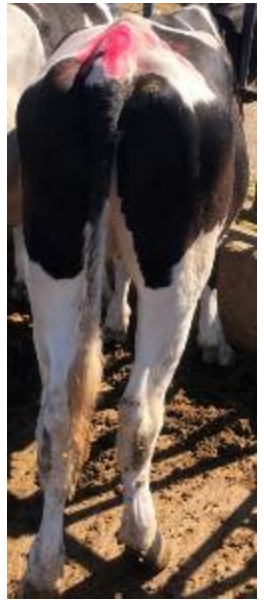
Heifer #3



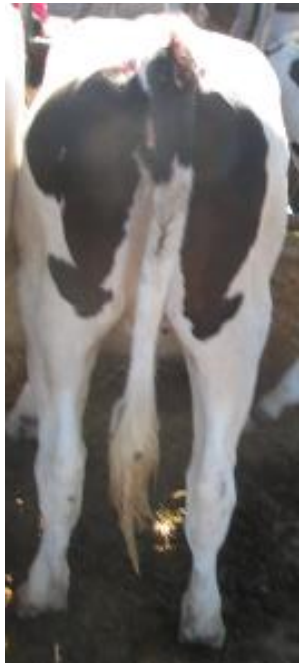
Heifer #4

Heifer #5

Heifer #6



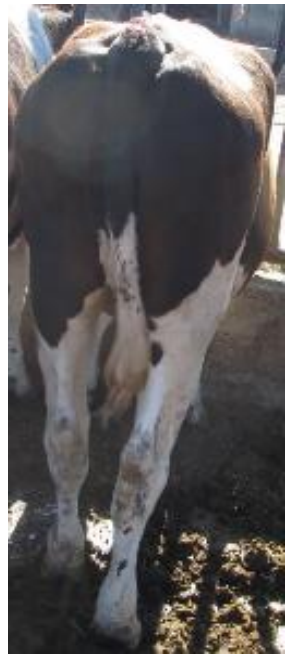
Heifer #7



Heifer #8

Heifer #9

Heifer #10



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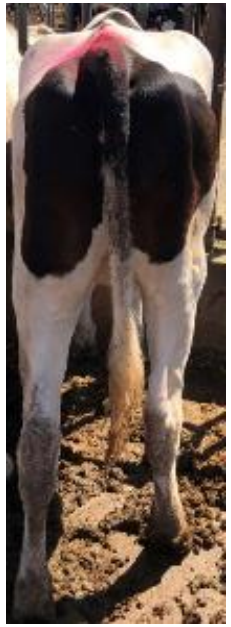
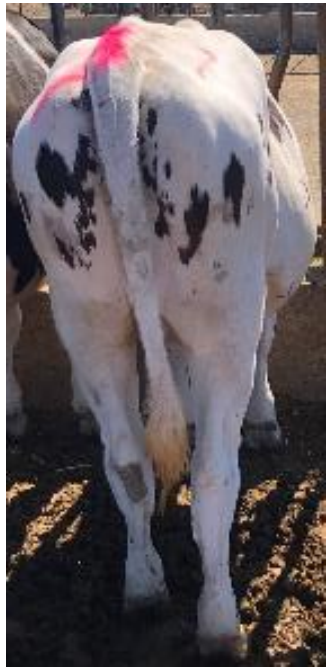


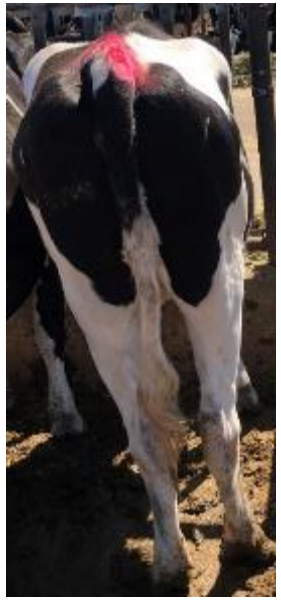
Heifer #12

Heifer #13



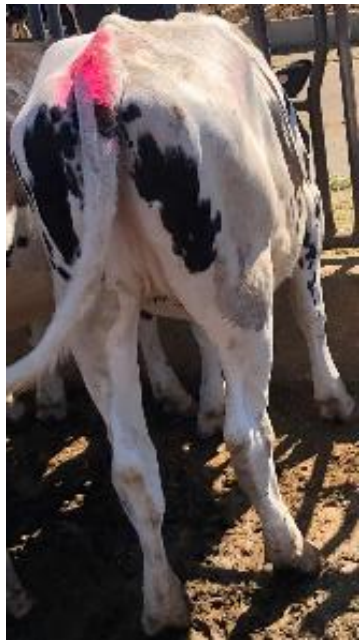
Heifer #14

Heifer #15



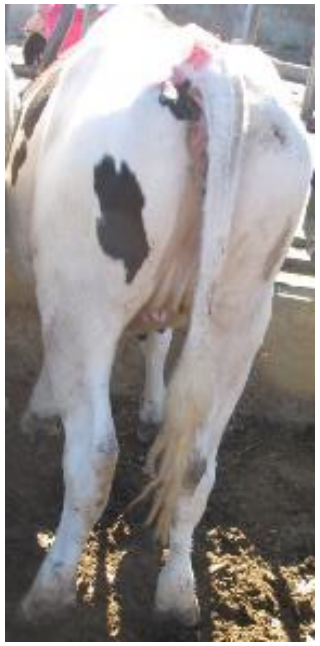
Heifer #16

Heifer #17



Heifer #18

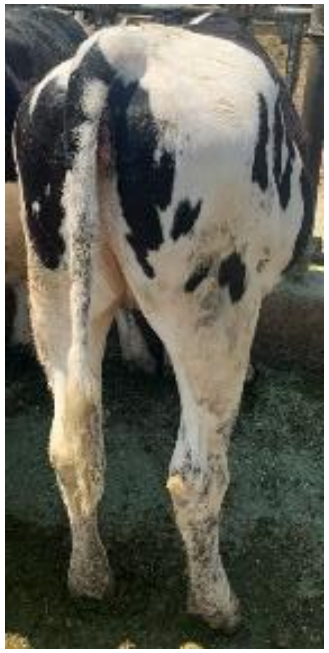
Heifer #19



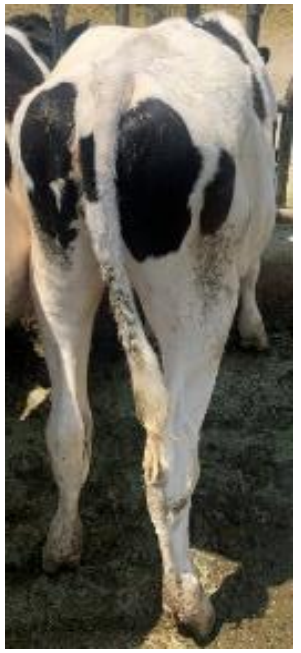
Heifer #20

Group 4

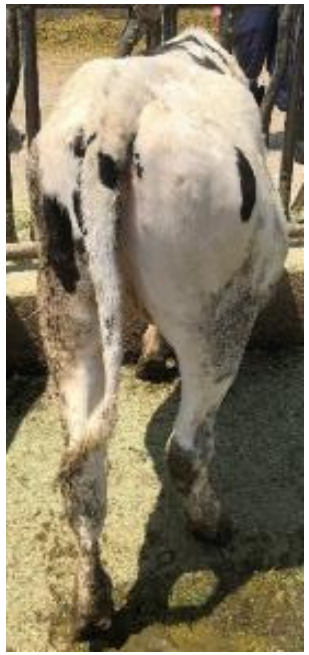
Heifer #1



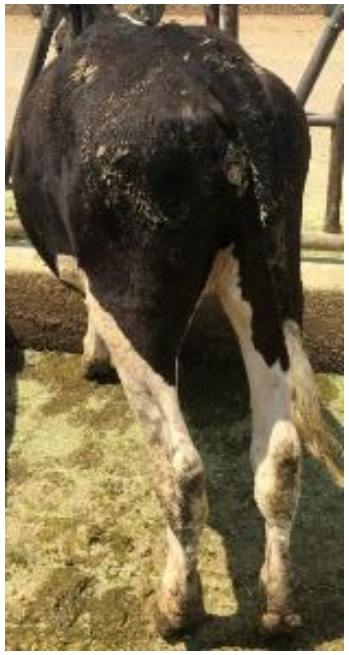
Heifer #2



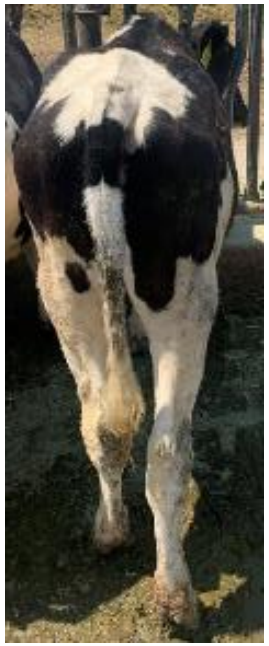
Heifer #3



Heifer #4

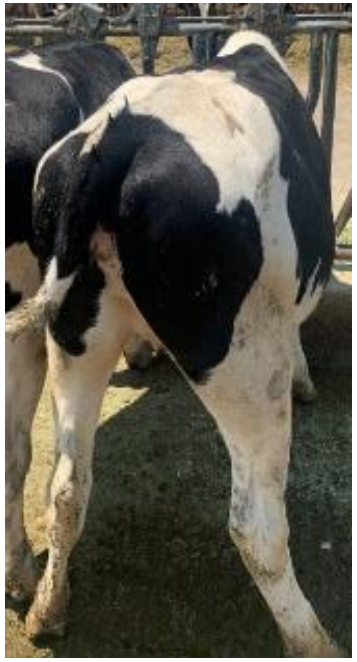


Heifer #5



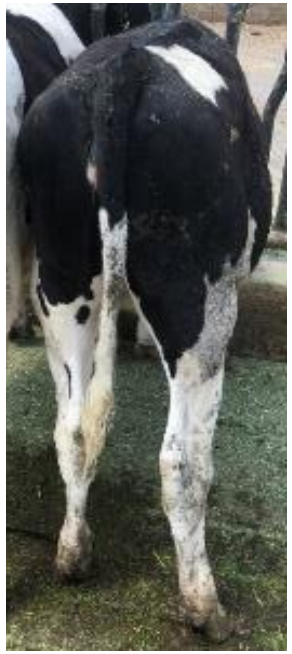
Heifer #6

Heifer #7

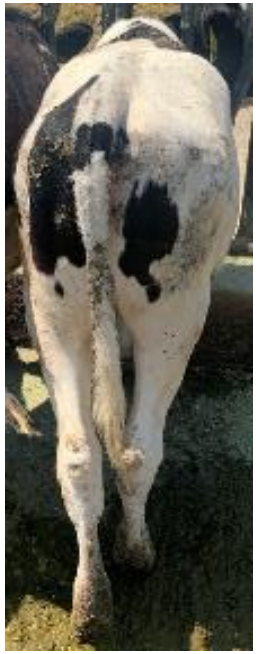


Heifer #8

Heifer #9



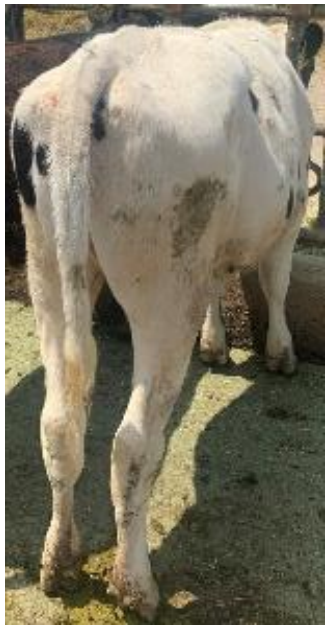
Heifer #10



Heifer #11

Heifer #12

Heifer #13



Heifer #14

Heifer #15

Heifer #16

Heifer #17

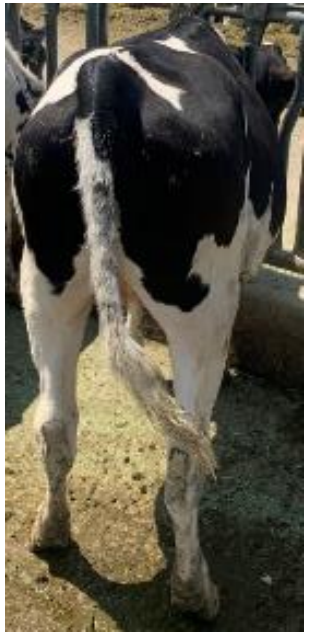
Heifer #18

Heifer #19

Heifer #20

Group 5

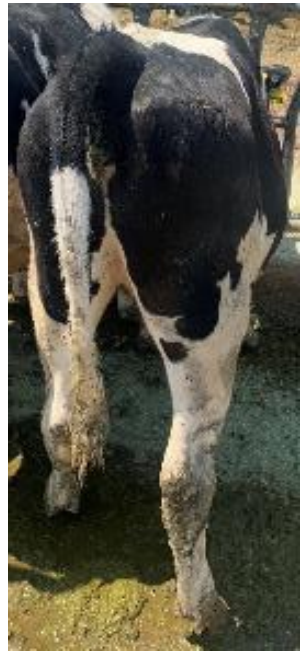
Heifer #1



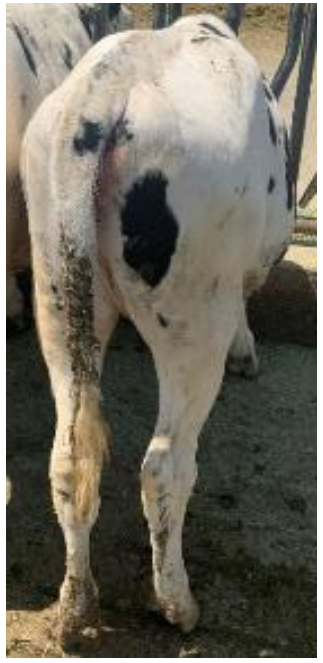
Heifer #2

Heifer #3

Heifer #4



Heifer #5

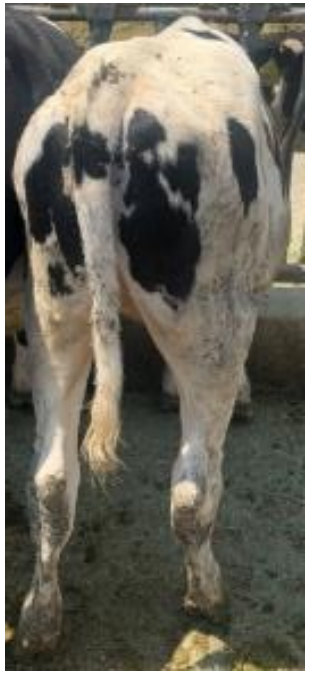


Heifer #6

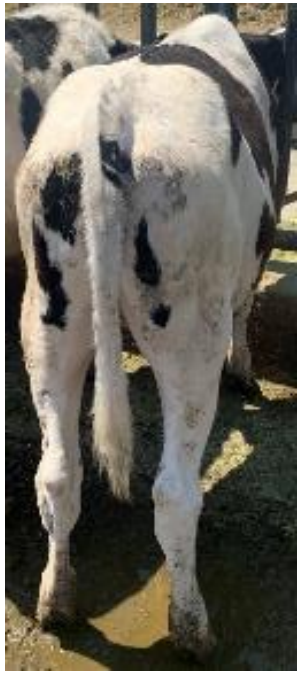
Heifer #7

Heifer #8

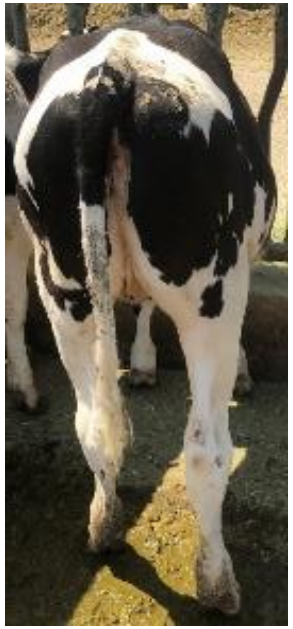
Heifer #9



Heifer #10

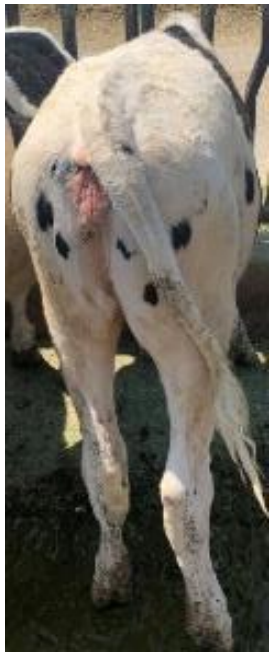


Heifer #11



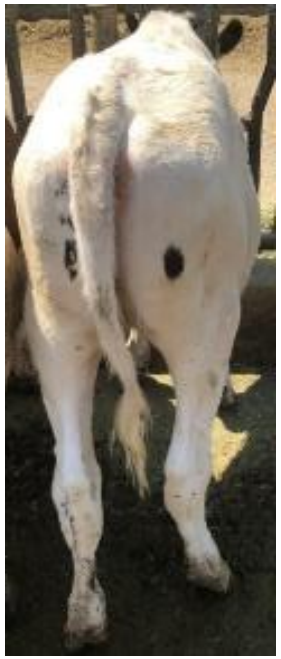
Heifer #12

Heifer #13

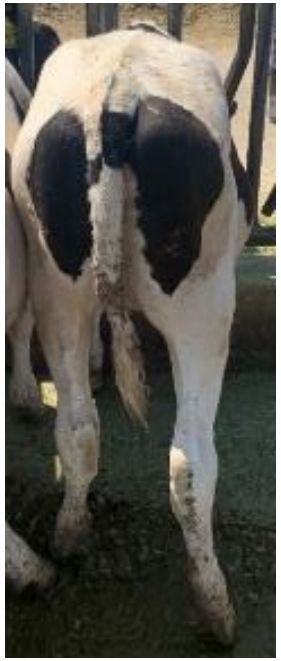


Heifer #14

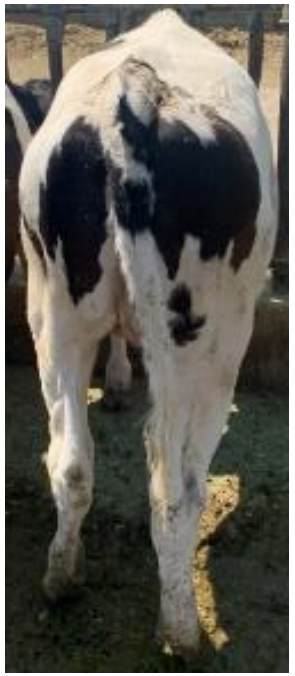
Heifer #15



Heifer #16

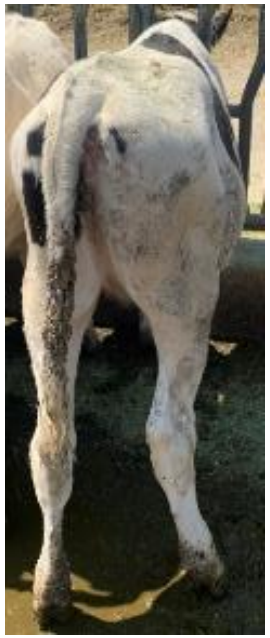


Heifer #17

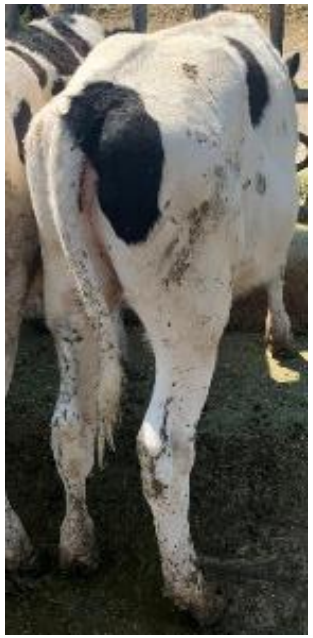


Heifer #18

Heifer #19



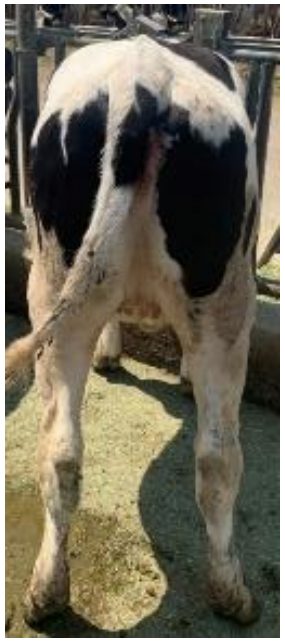
Heifer #20



Group 6

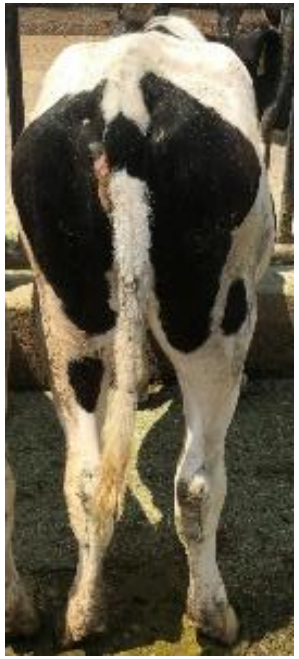
Heifer #1

Heifer #2

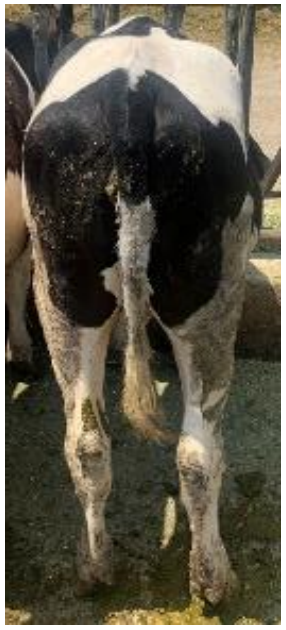


Heifer #3

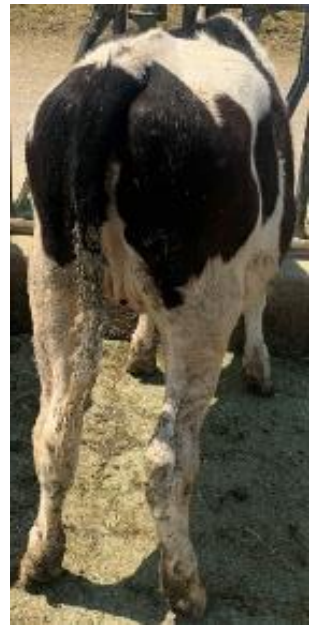
Heifer #4



Heifer #5



Heifer #6

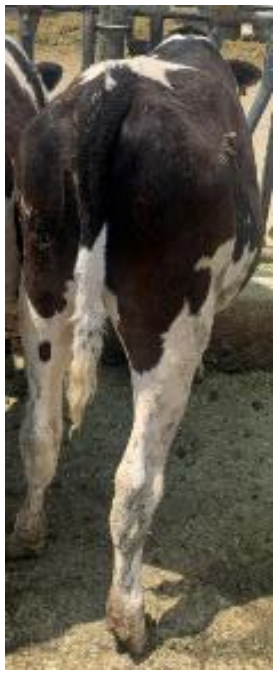


Heifer #7

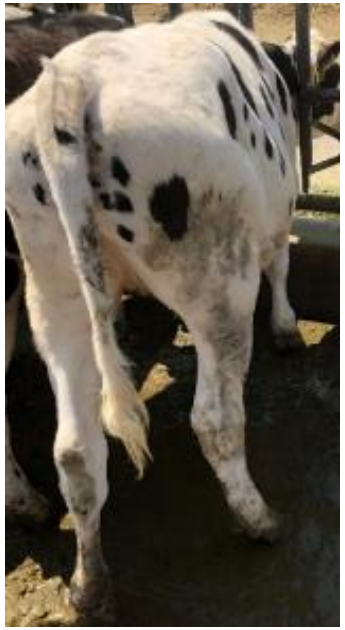
Heifer #8

Heifer #9

Heifer #10

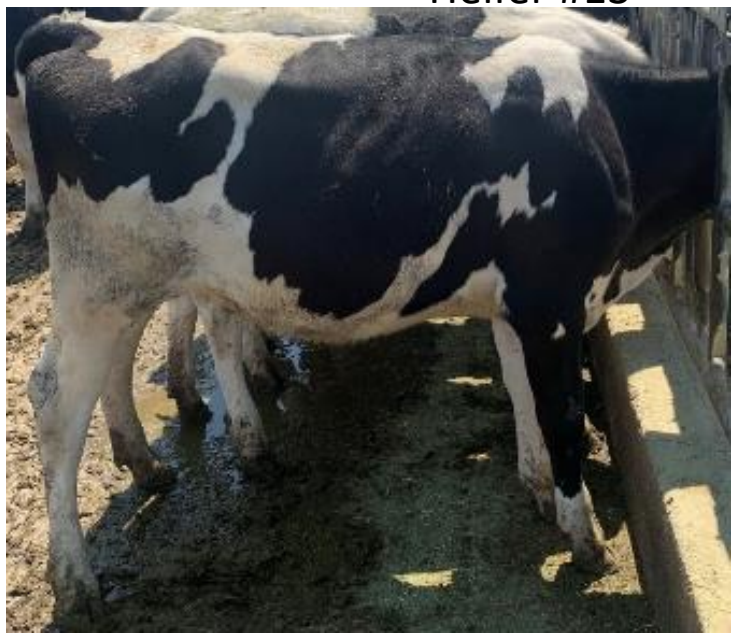


Heifer #11

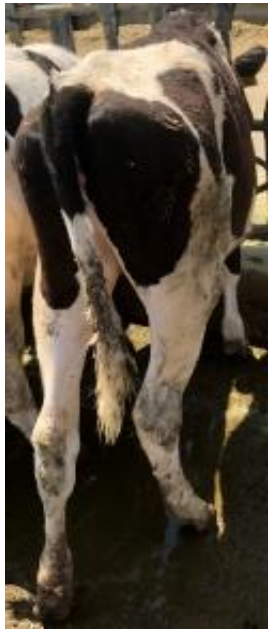


Heifer #12

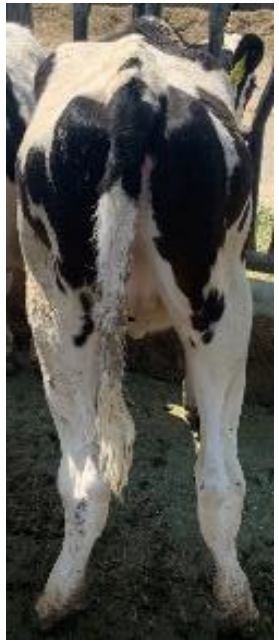
Heifer #13



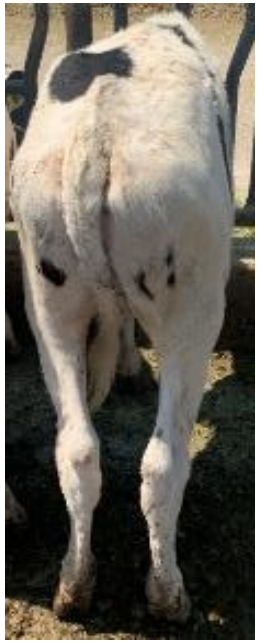
Heifer #14



Heifer #15



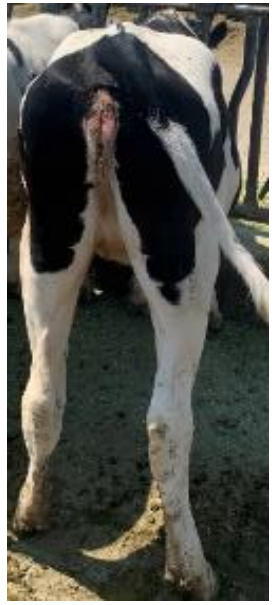
Heifer #16



Heifer #17

Heifer #18

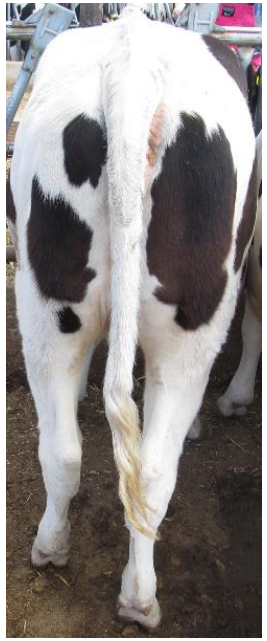
Heifer #19



Heifer #20

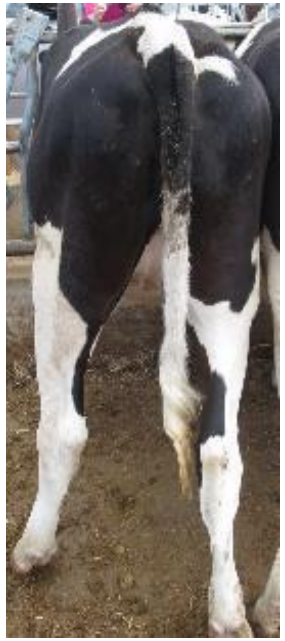
Group 7

Heifer #1

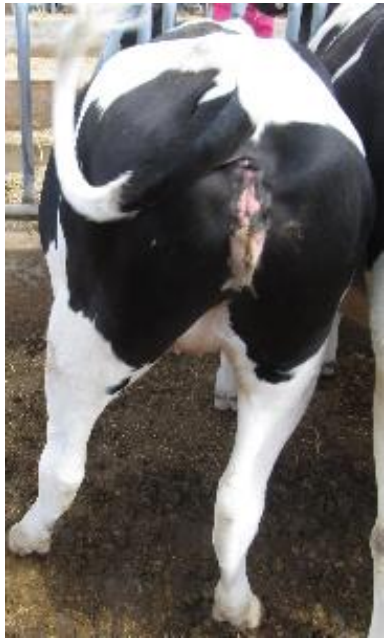


Heifer #2

Heifer #3



Heifer #4



Heifer #5

Heifer #6

Heifer #7

Heifer #8

Heifer #9

Heifer #10

Heifer #11

Heifer #12

Heifer #13

Heifer #14

Heifer #15

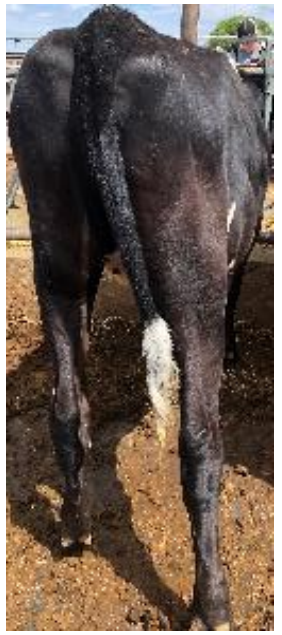
Heifer #16

Heifer #17

Heifer #18

Heifer #19

Heifer #20



Group 8

Heifer #1

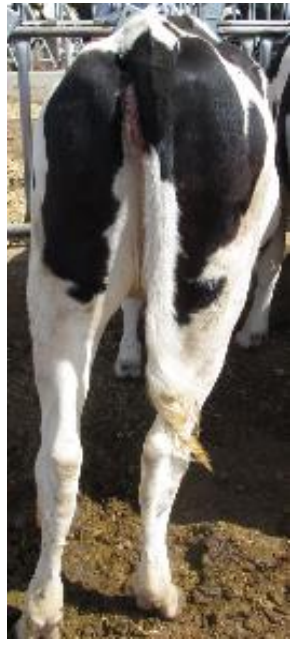
Heifer #2

Heifer #3

Heifer #4

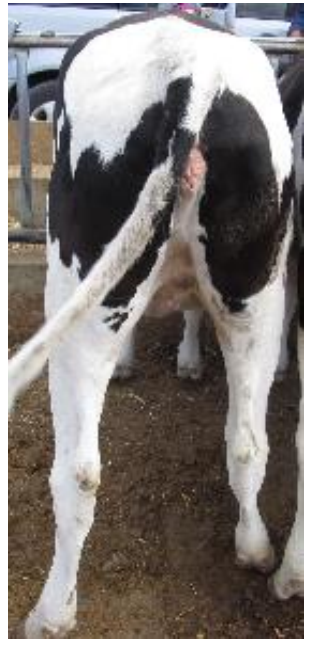
Heifer #5

Heifer #6



Heifer #7

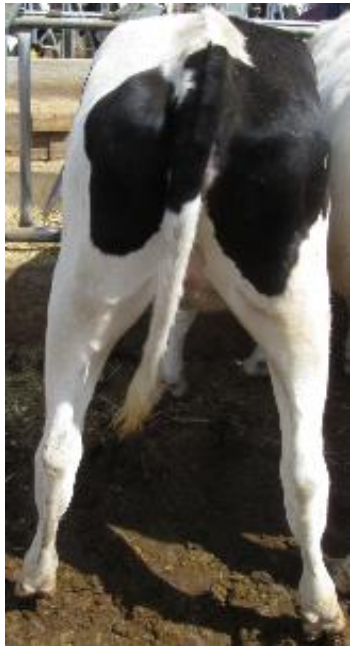
Heifer #8



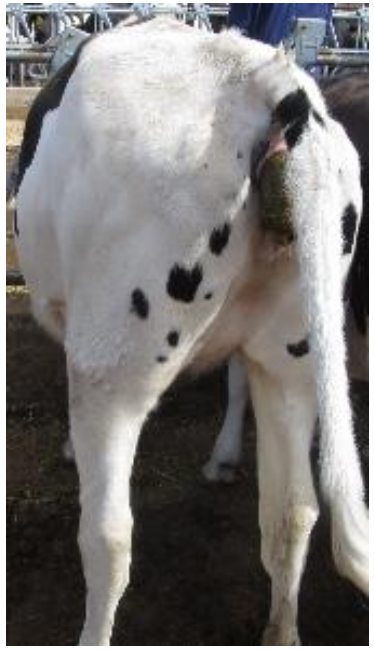
Heifer #9

Heifer #10

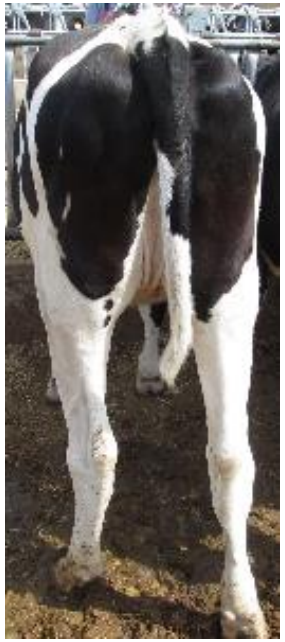
Heifer #11



Heifer #12



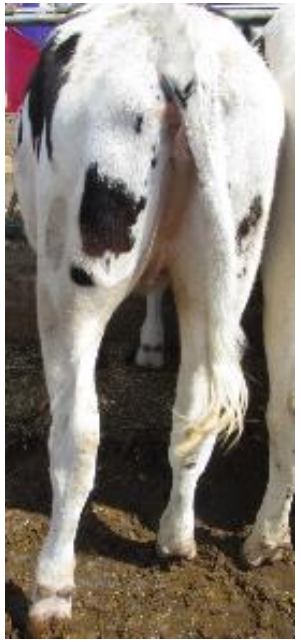
Heifer #13



Heifer #14

Heifer #15

Heifer #16



Heifer #17

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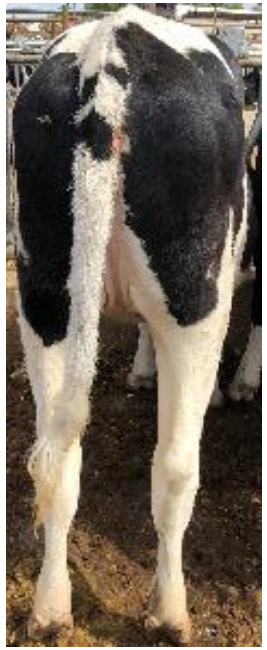

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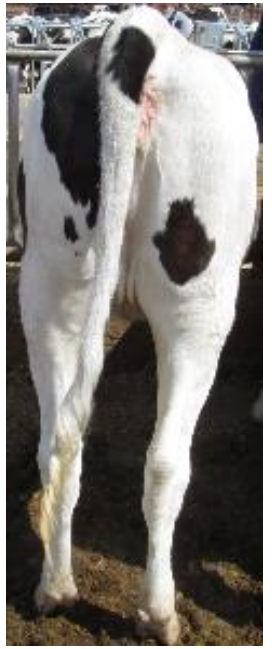
Heifer #20



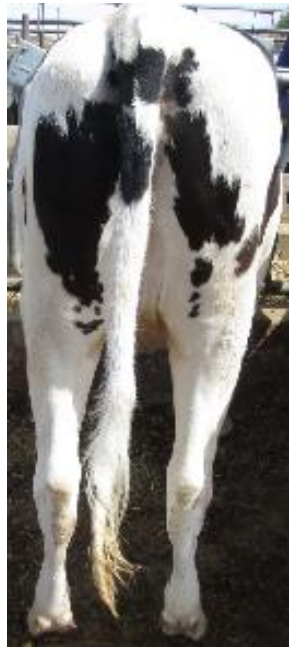
Group 9

Heifer #1

Heifer #2

Heifer #3

Heifer #4

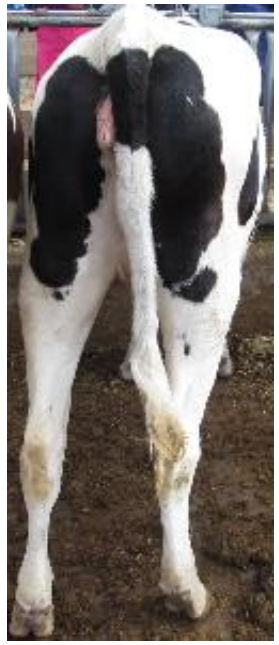


Heifer #5

Heifer #6

Heifer #7

Heifer #8



Heifer #9

Heifer #10

Heifer #11

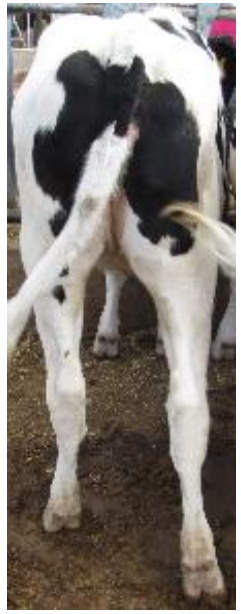
Heifer #12

Heifer #13

Heifer #14

Heifer #15

Heifer #16



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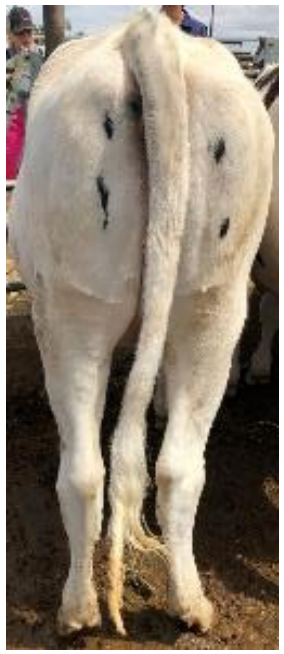
Heifer #18



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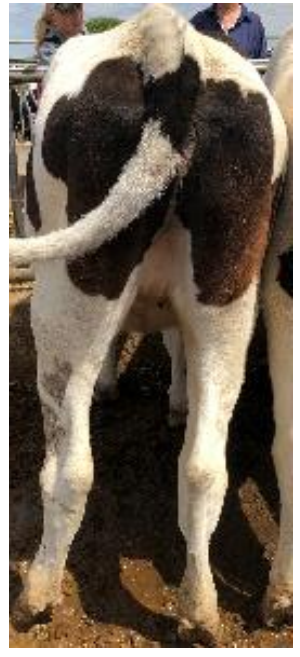
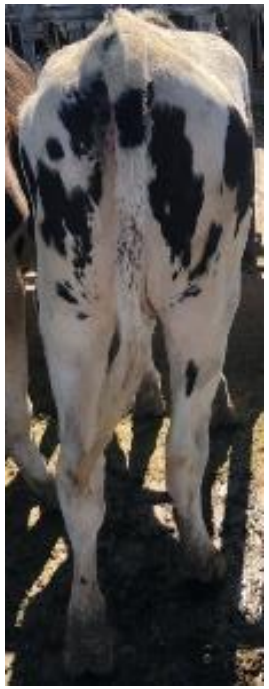
Heifer #20



Group 10

Heifer #1



Heifer #2

Heifer #3

Heifer #4

Heifer #5

Heifer #6

Heifer #7

Heifer #8

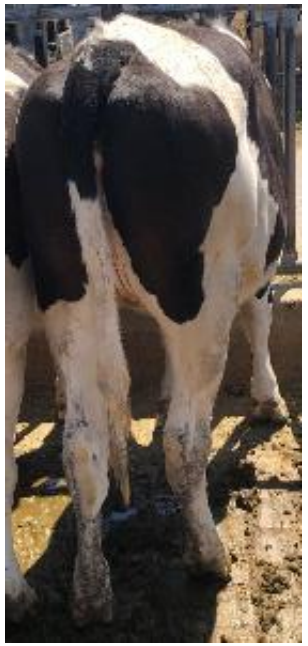
Heifer #9

Heifer #10

Heifer #11

Heifer #12

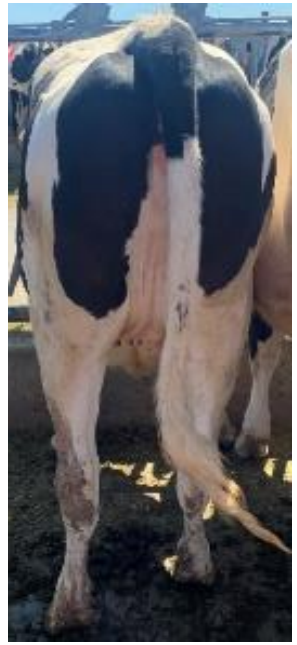
Heifer #13



Heifer #14

Heifer #15

Heifer #16



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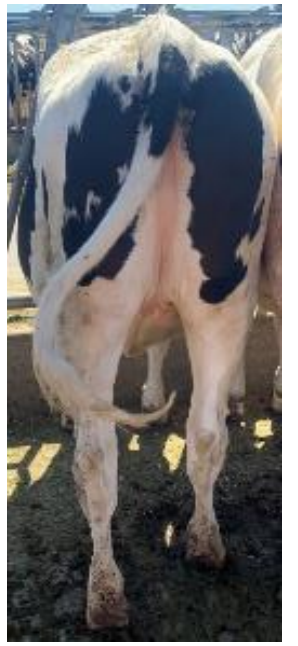
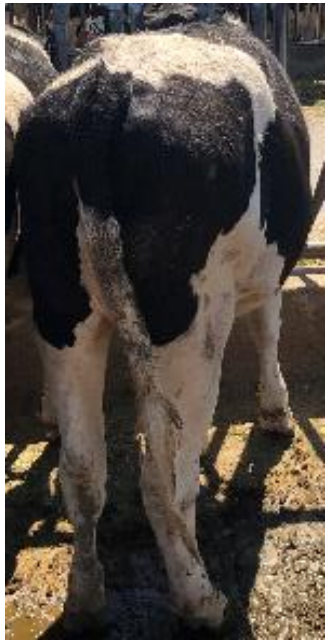
Heifer #18



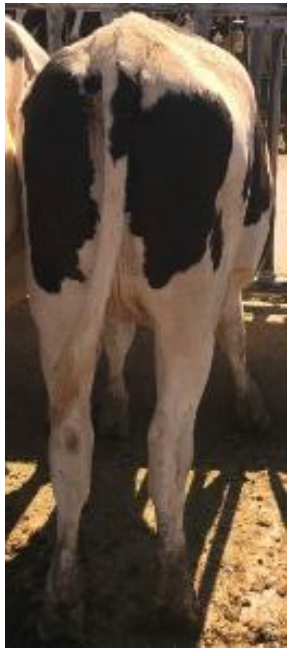
Heifer #19

Heifer #20

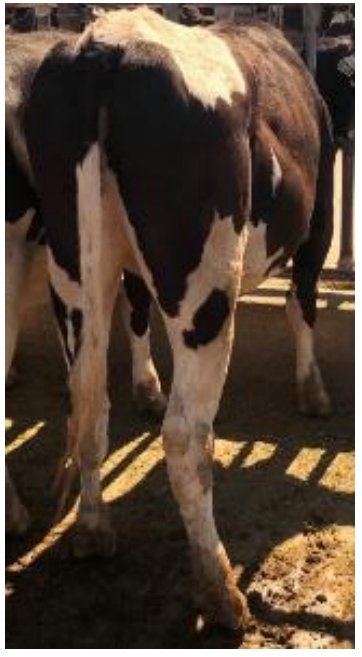


Group 11

Heifer #1



Heifer #2



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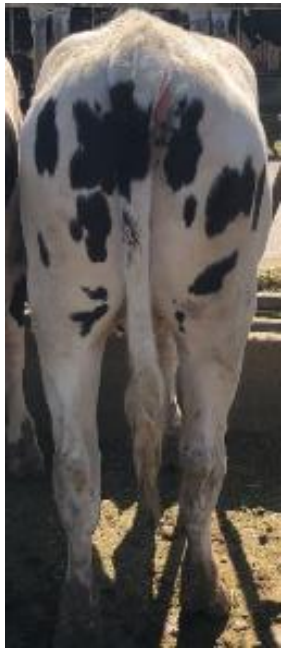
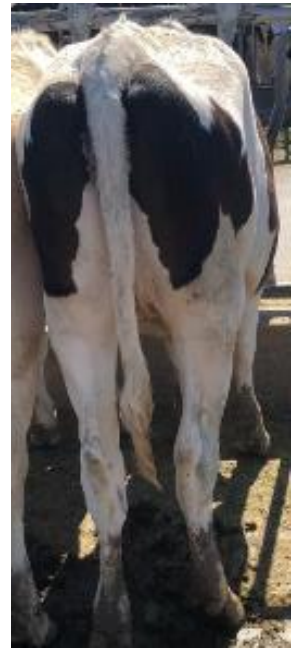
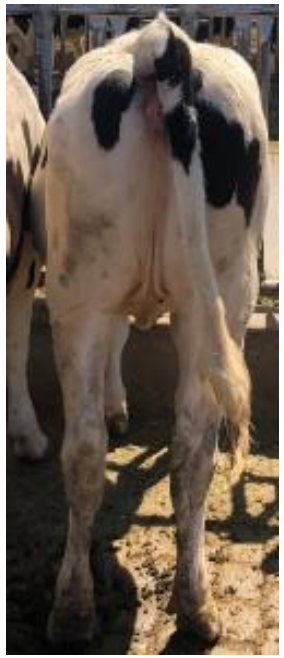


Heifer #4



Heifer #5

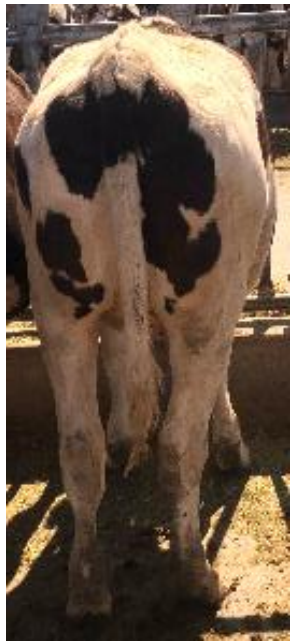
Heifer #6



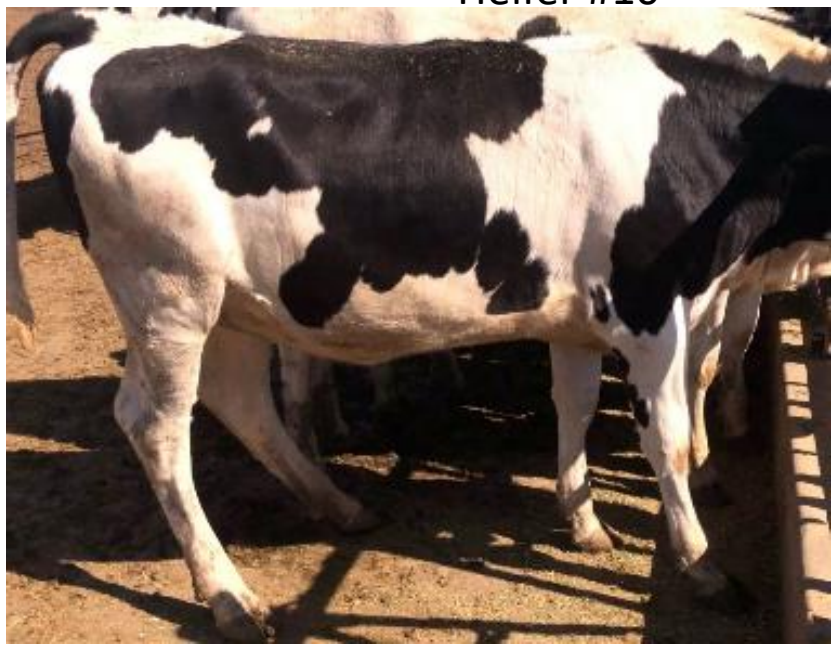
Heifer #7

Heifer #8

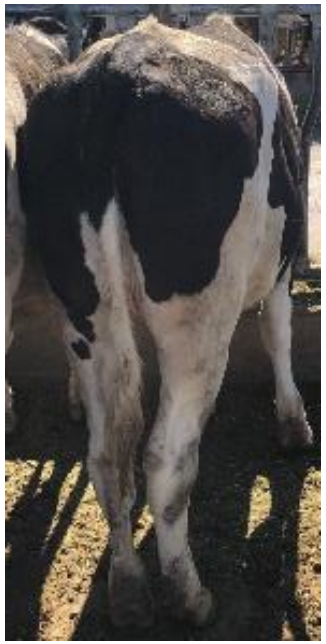
Heifer #9



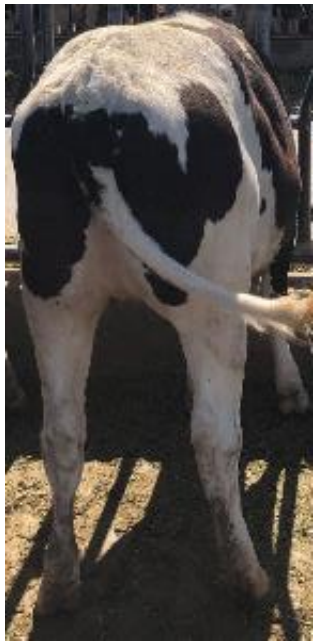
Heifer #10



Heifer #11

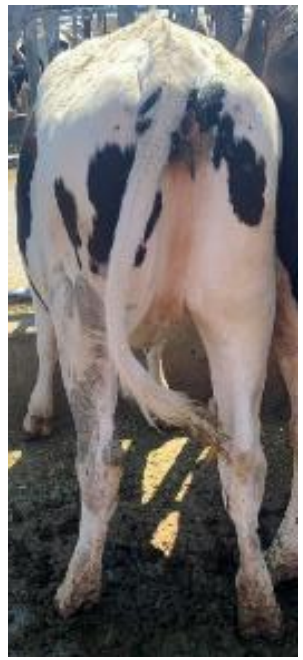


Heifer #12



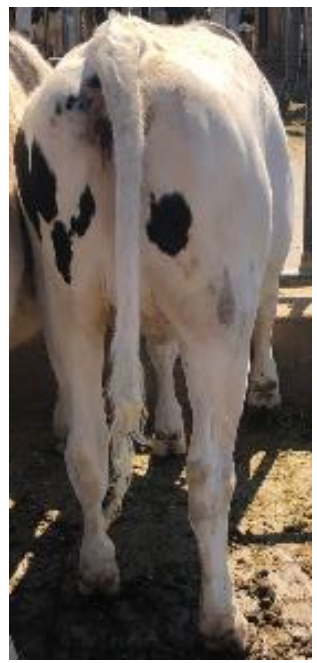
Heifer #13

Heifer #14



Heifer #15

Heifer #16



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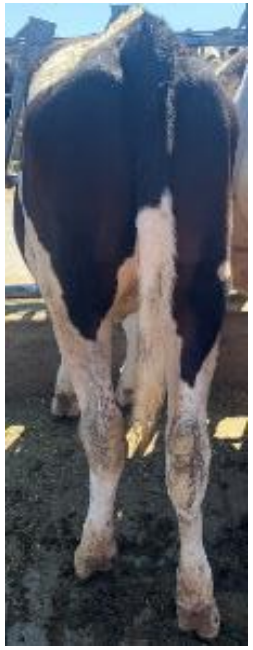
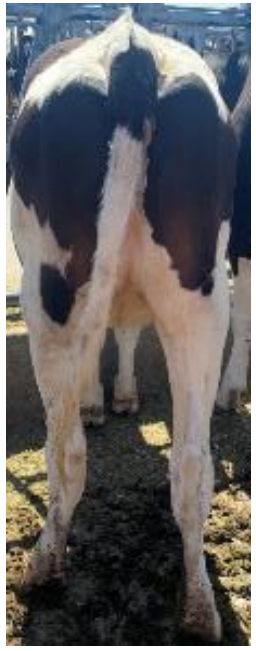
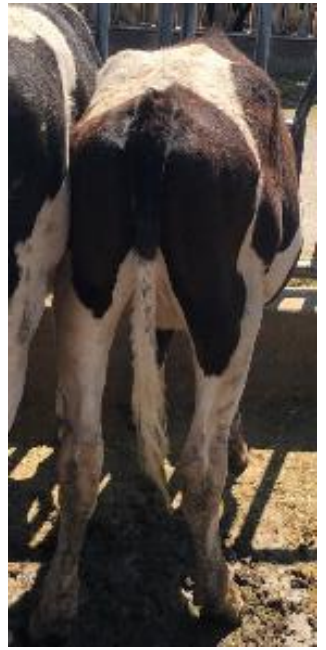


Heifer #18

Heifer #19

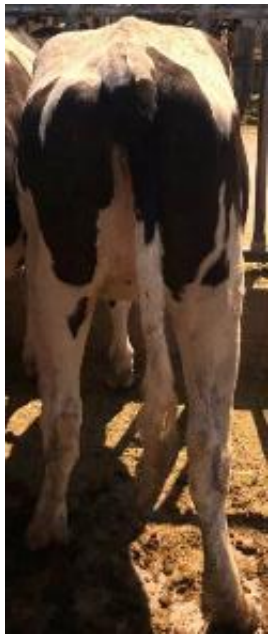


Heifer #20



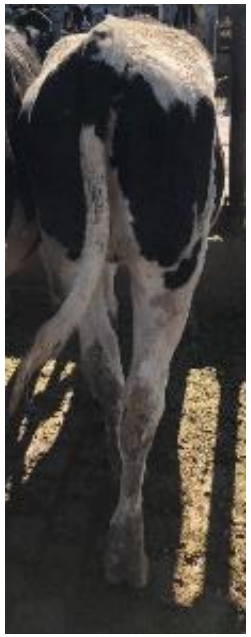
Group 12

Heifer #1

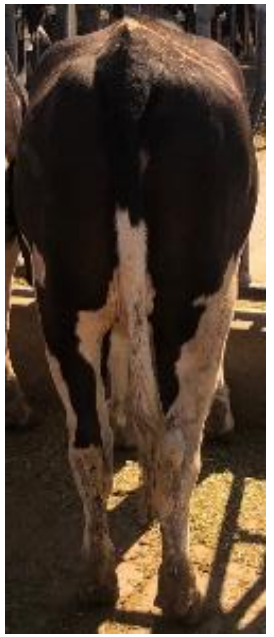


Heifer #2

Heifer #3



Heifer #4



Heifer #5

Heifer #6

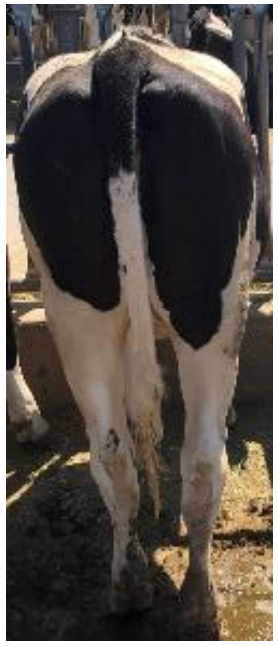
Heifer #7

Heifer #8

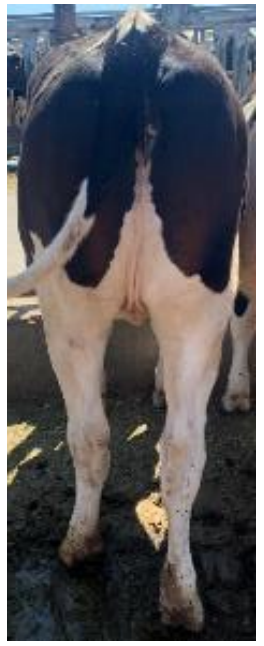
Heifer #9

Heifer #10

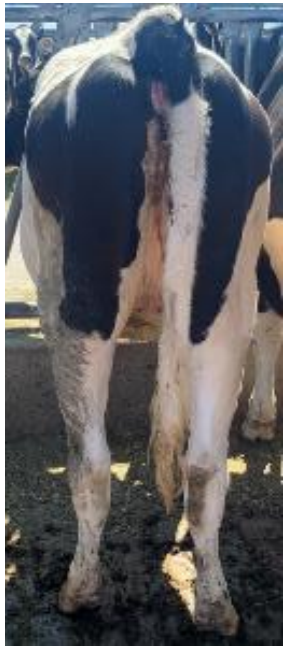
Heifer #11



Heifer #12



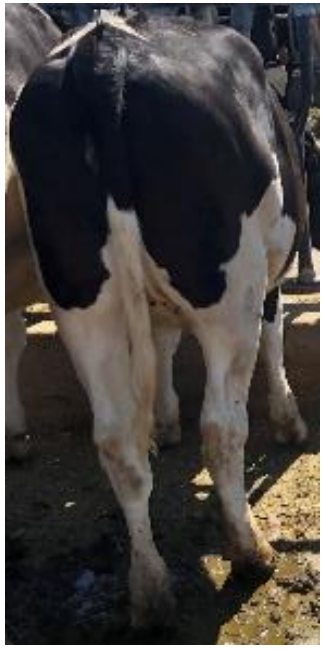
Heifer #13



Heifer #14

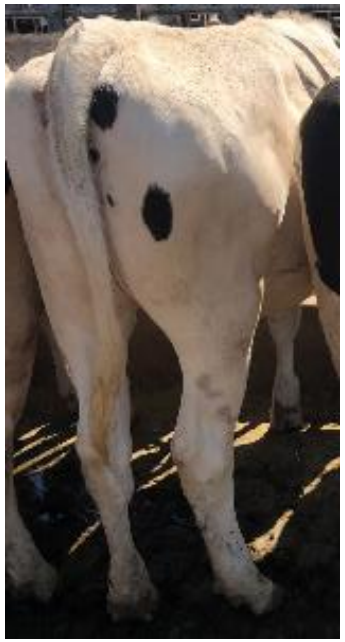
Heifer #15

Heifer #16



Heifer #17

Heifer #18



Heifer #19

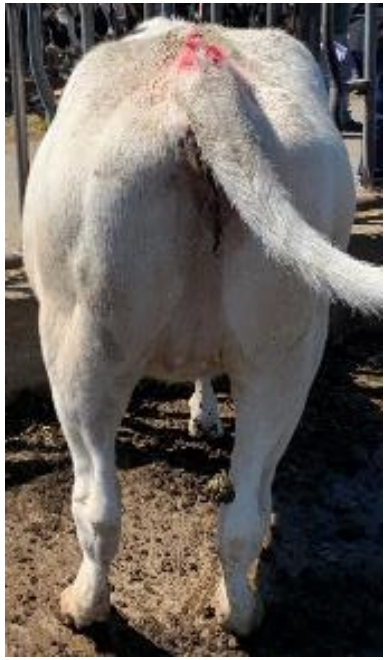
Heifer #20

Group 13

Heifer #1

Heifer #2

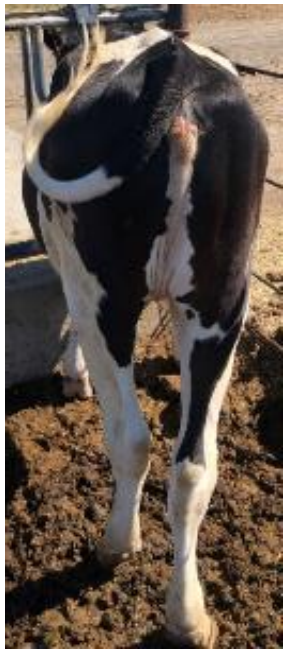
Heifer #3



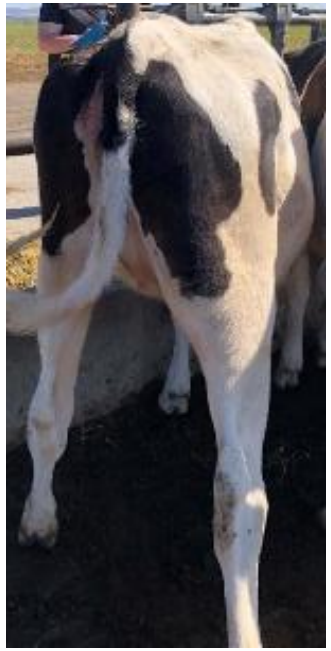
Heifer #4

Heifer #5

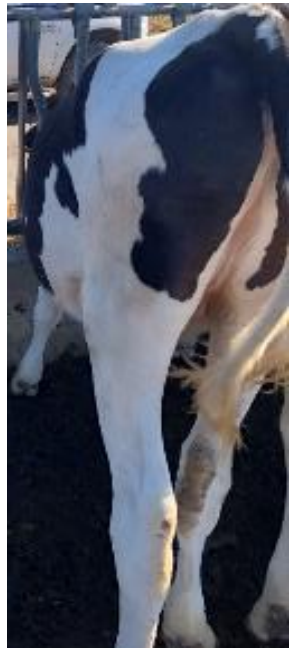

Heifer #6

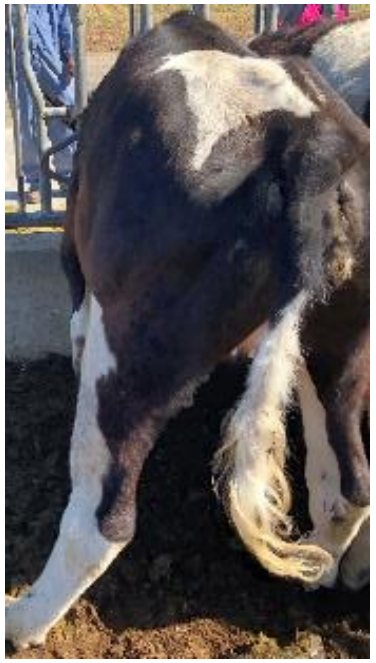
Heifer #7

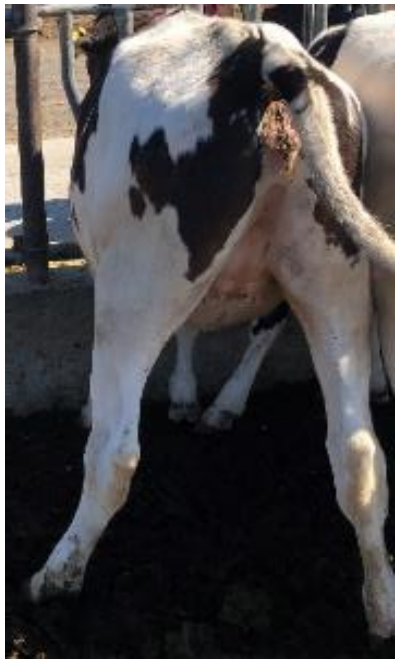
Heifer #8

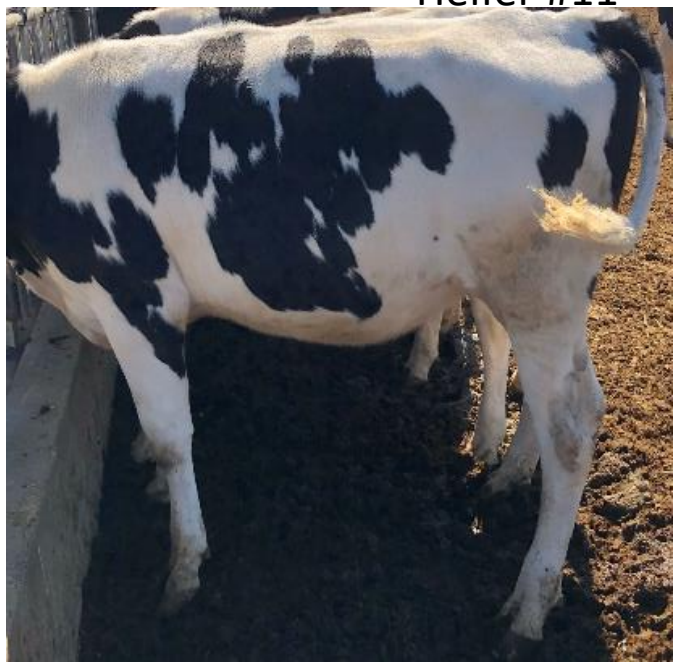
Heifer #9

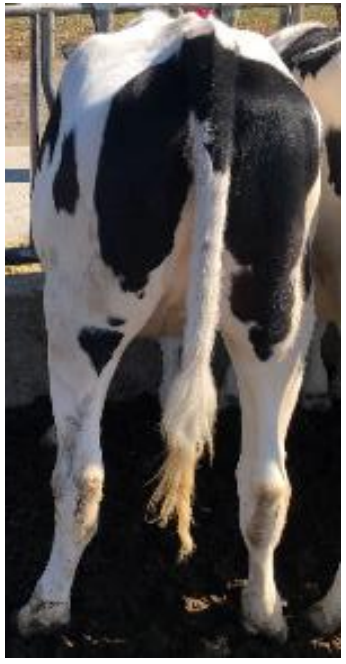


Heifer #10

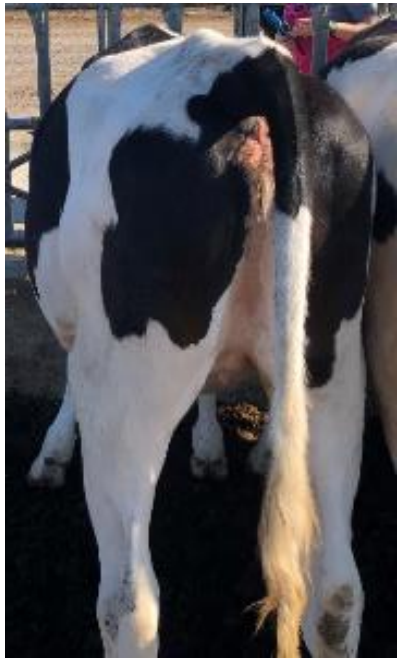


Heifer #11

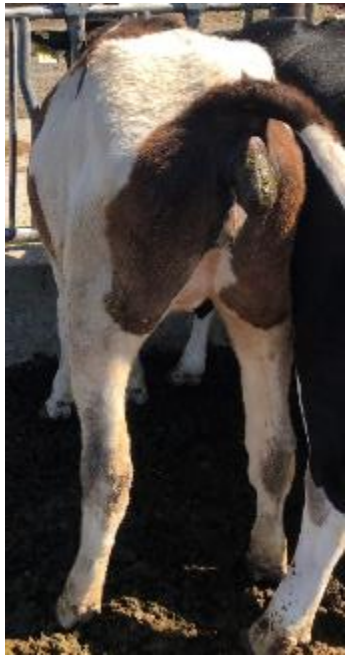




Heifer #12



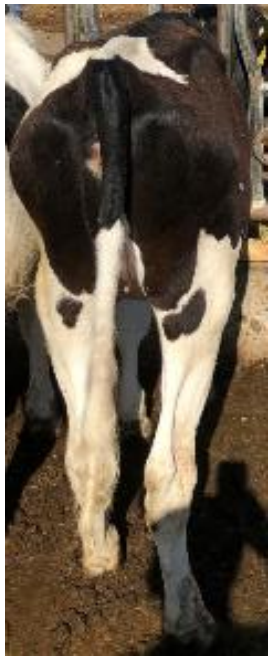
Heifer #13



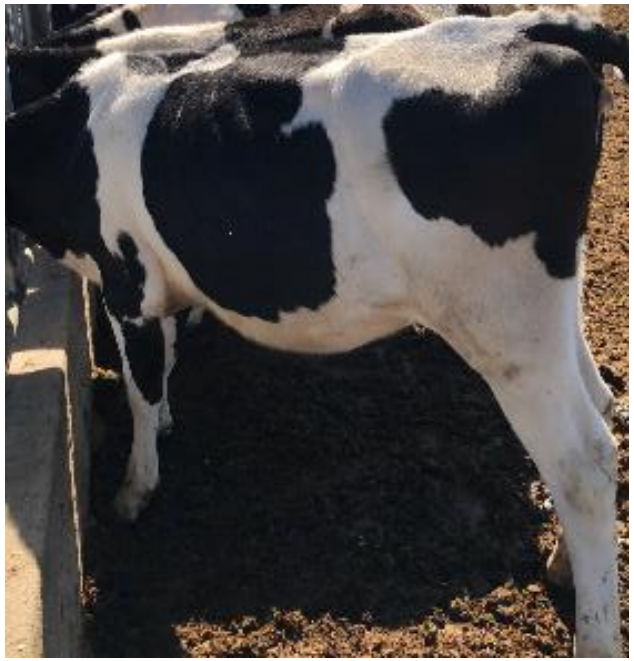
Heifer #14

Heifer #15

Heifer #16



Heifer #17



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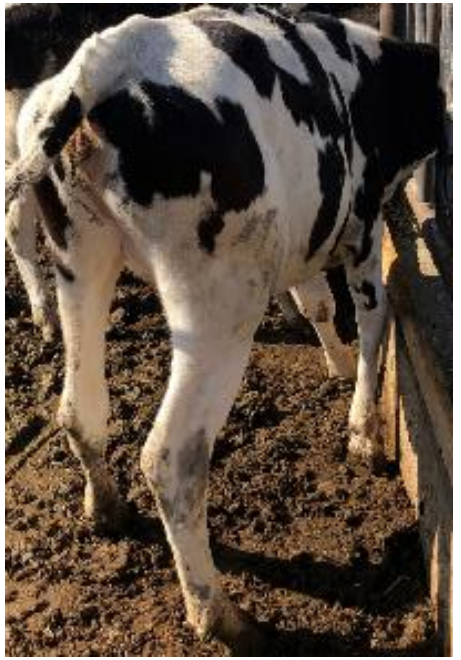


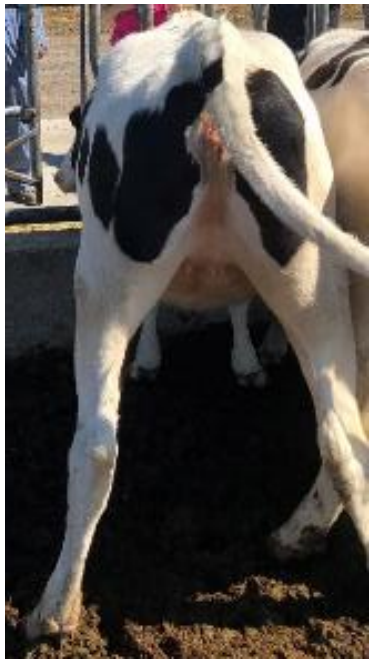
Heifer #19

Heifer #20

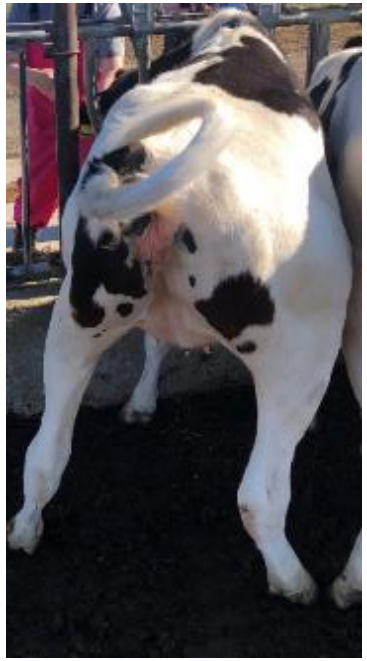
Group 14

Heifer #1

Heifer #2



Heifer #3



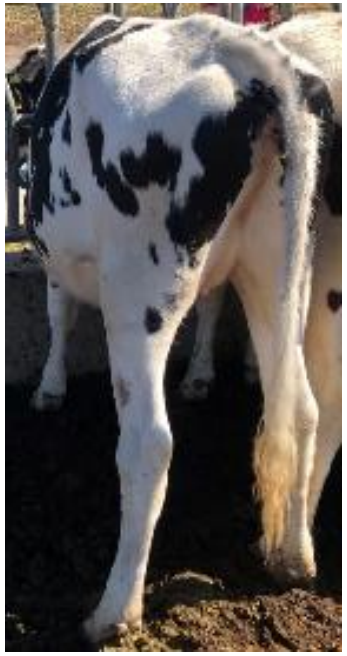
Heifer #4

Heifer #5

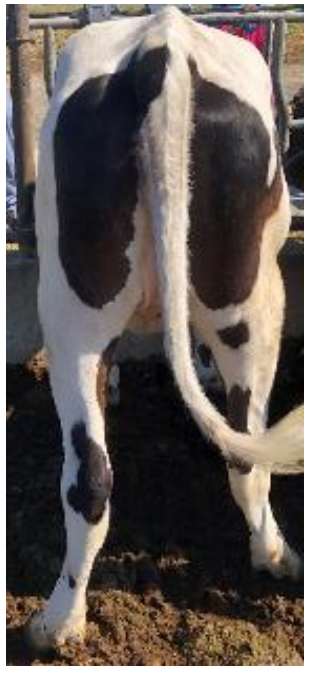
Heifer #6

Heifer #7

Heifer #8

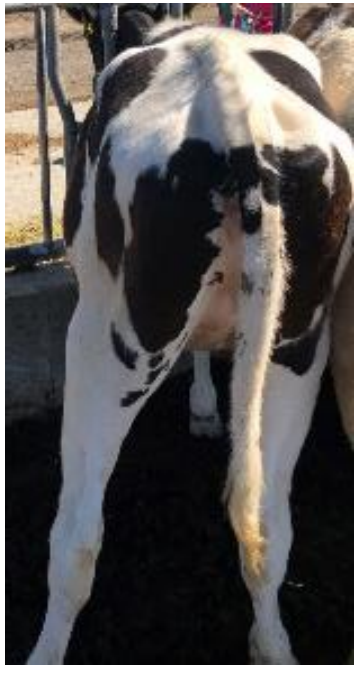


Heifer #9



Heifer #10

Heifer #11



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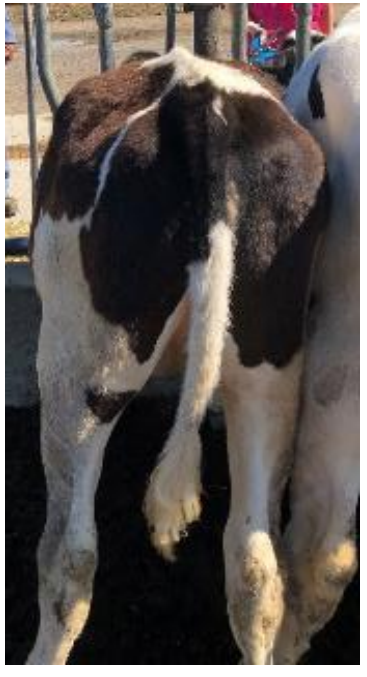
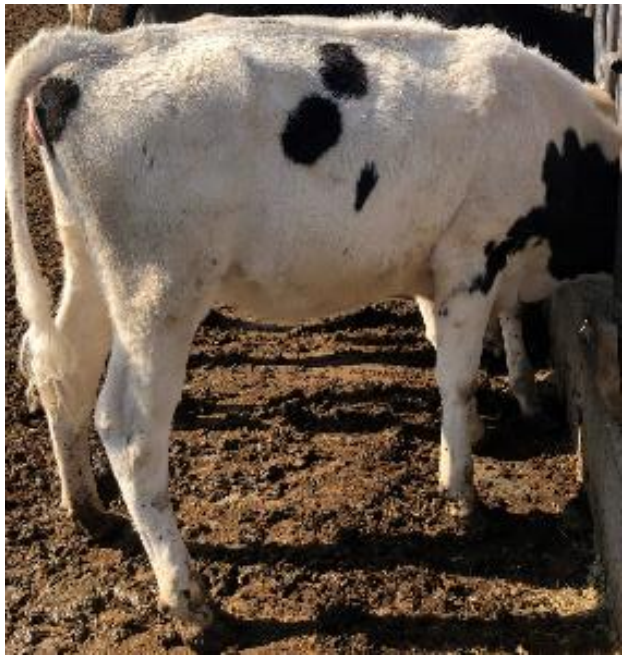


Heifer #13

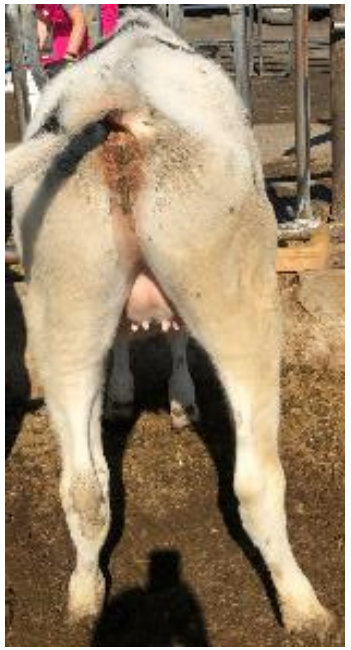
Heifer #14



Heifer #15

Heifer #16

Heifer #17



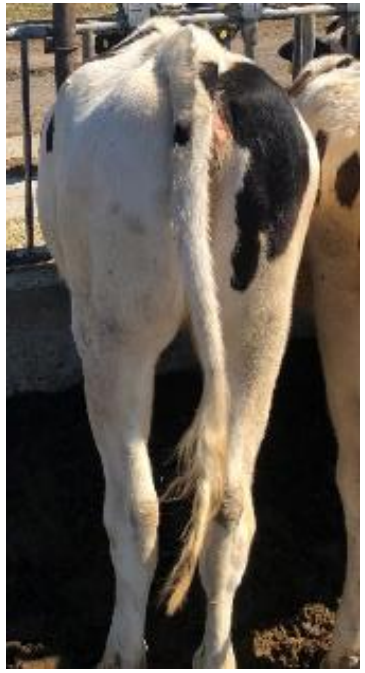
Heifer #18

Heifer #19

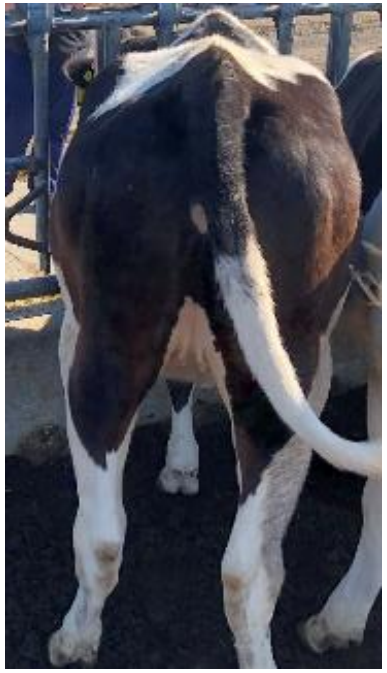
Heifer #20

Group 15

Heifer #1

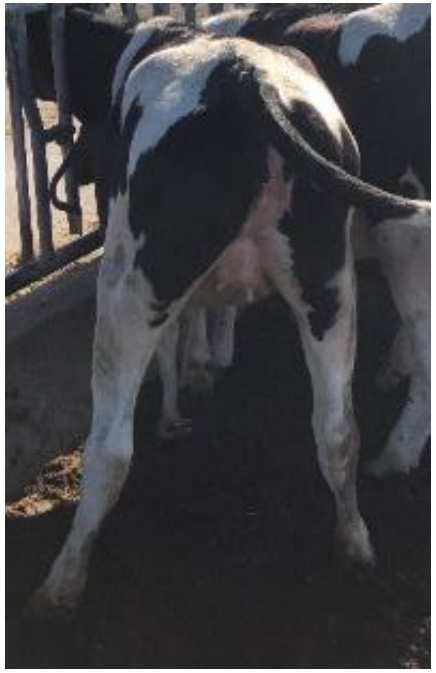


Heifer #2



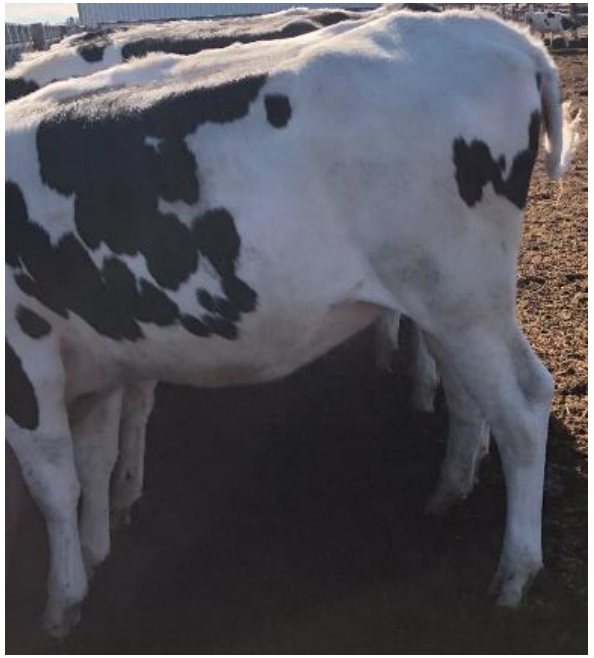
Heifer #3

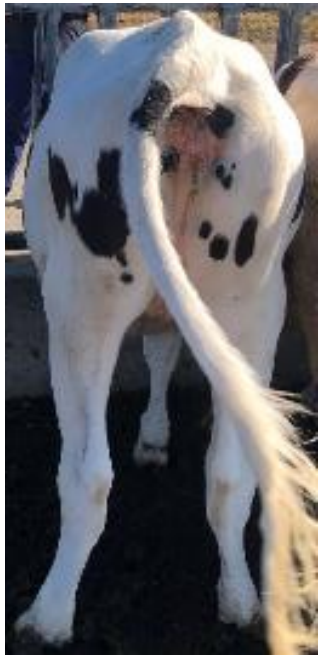
Heifer #4



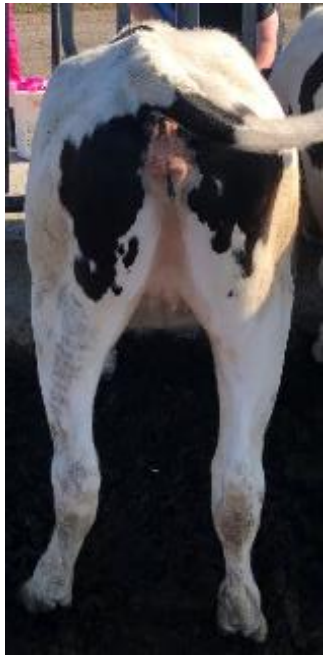
Heifer #5

Heifer #6





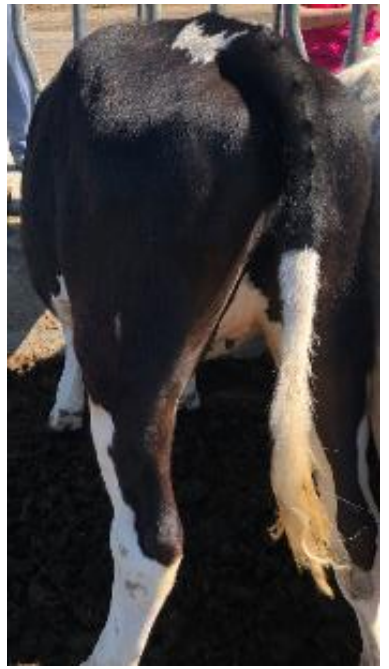
Heifer #7



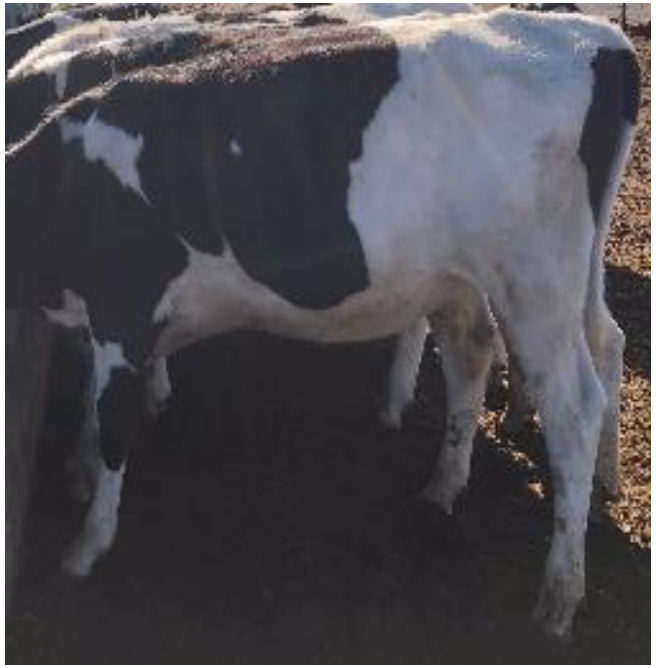
Heifer #8

Heifer #9

Heifer #10



Heifer #11



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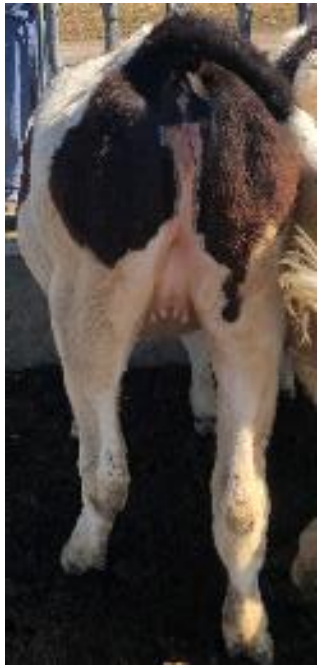

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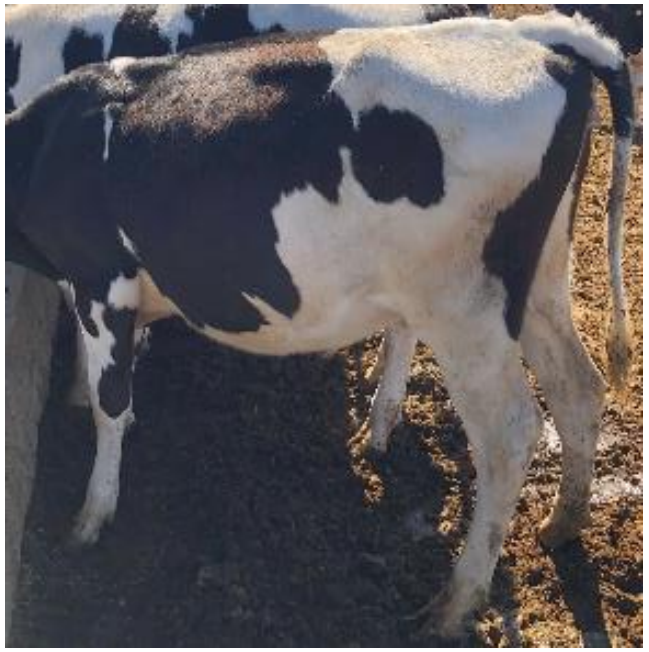
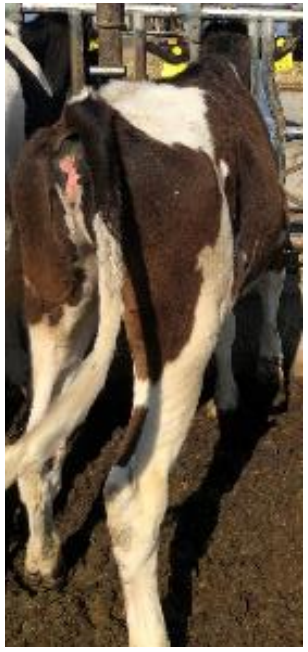


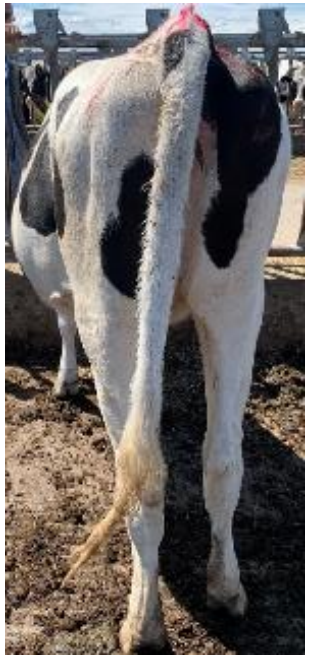
Heifer #14

Heifer #15



Heifer #16

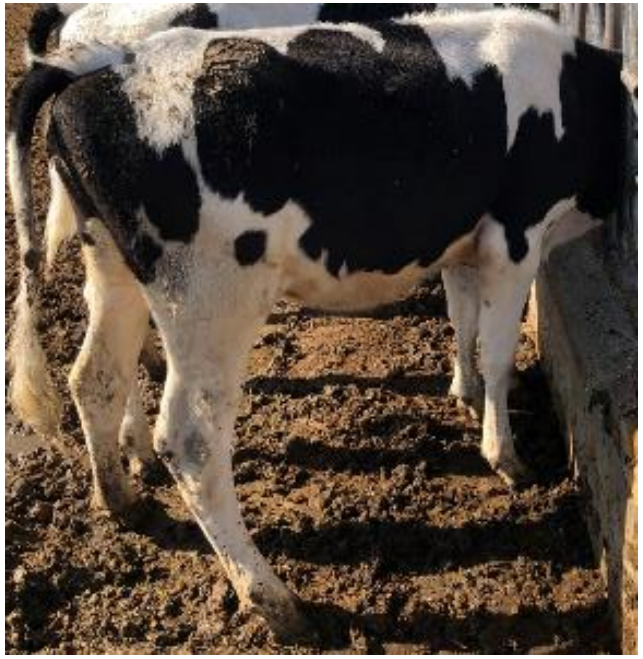
Heifer #17



Heifer #18

Heifer #19

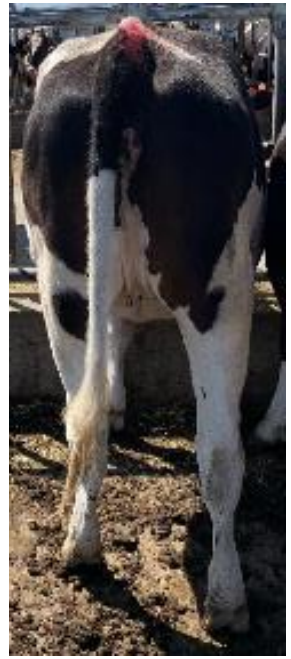
Heifer #20



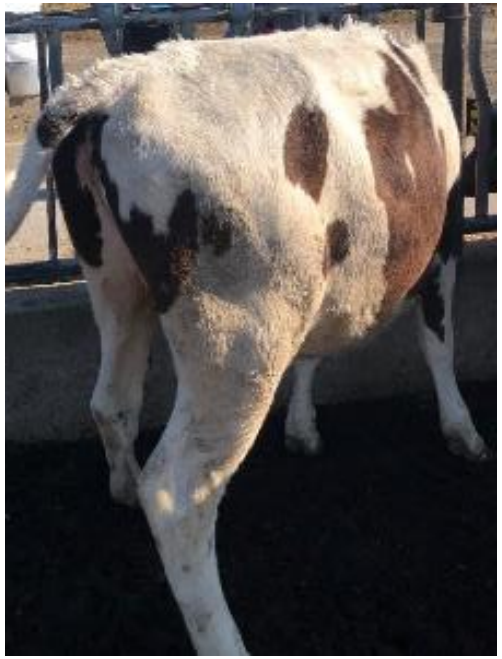
Group 16

Heifer #1

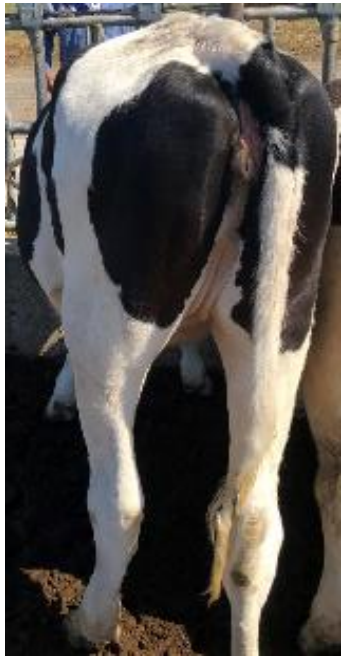
Heifer #2



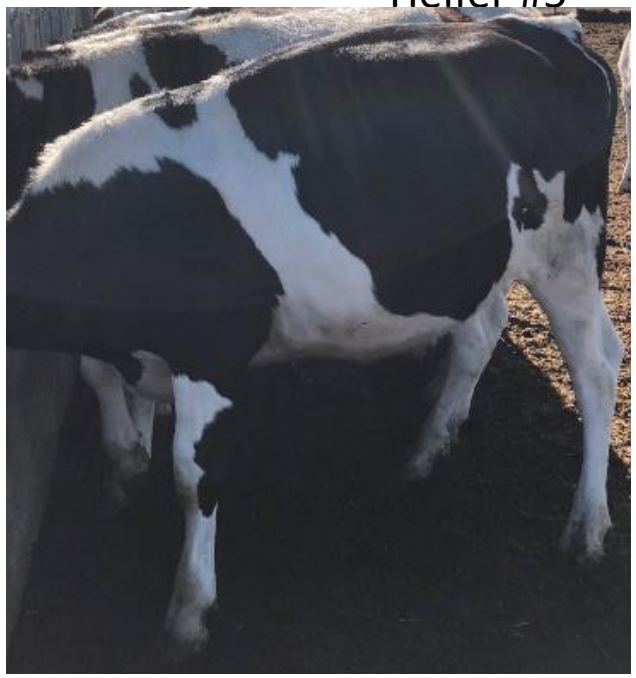
Heifer #3

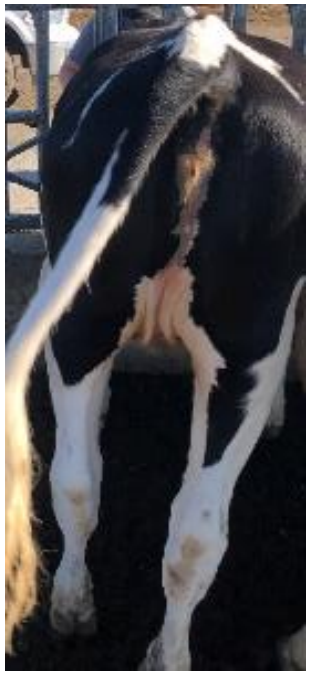


Heifer #4

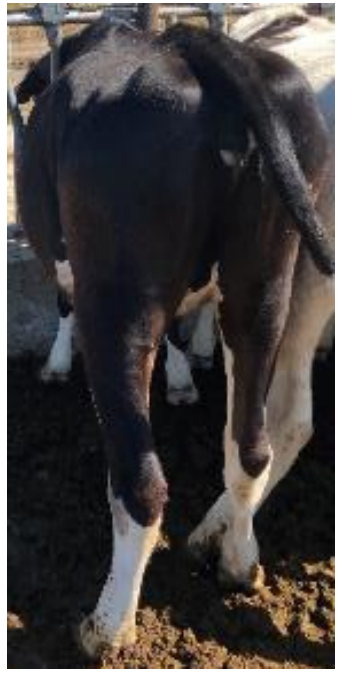


Heifer #5

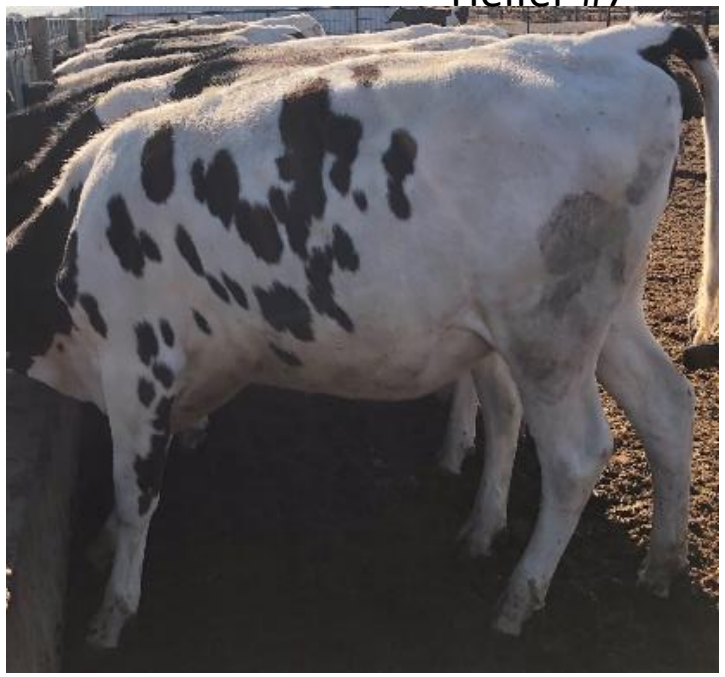


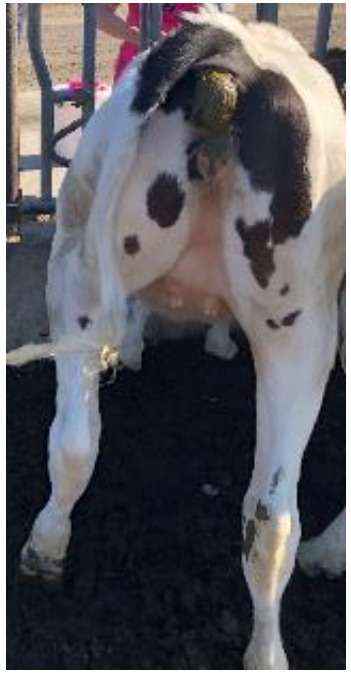


Heifer #6

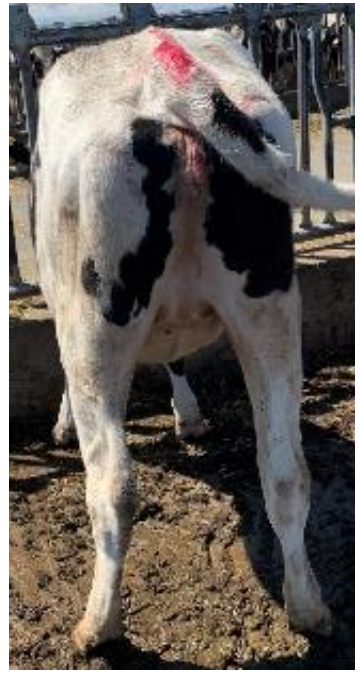


Heifer #7

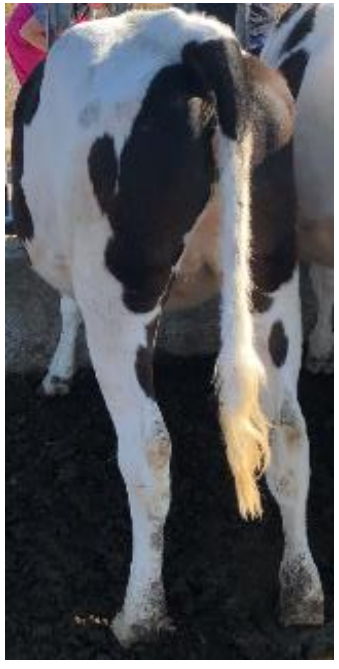




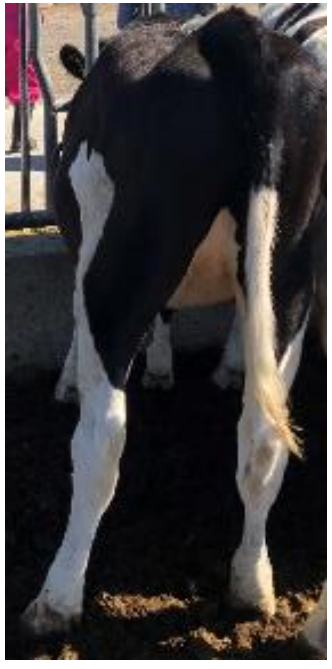
Heifer #8



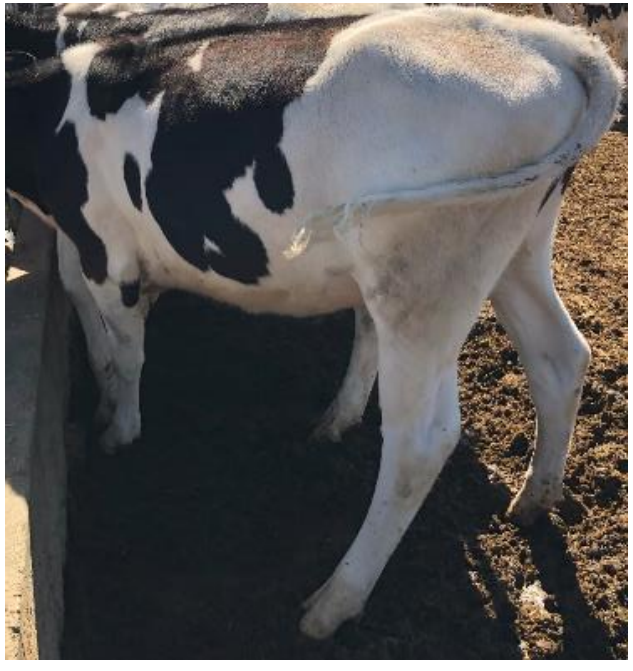
Heifer #9

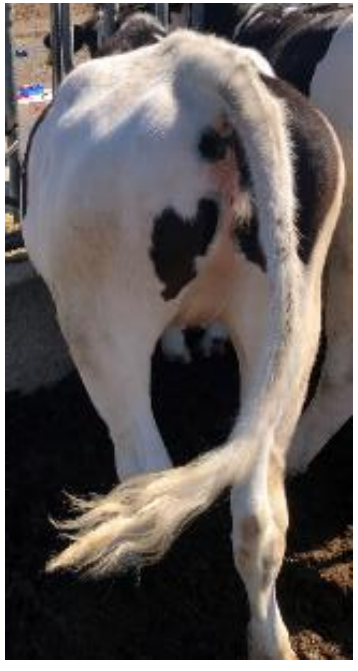


Heifer #10



Heifer #11

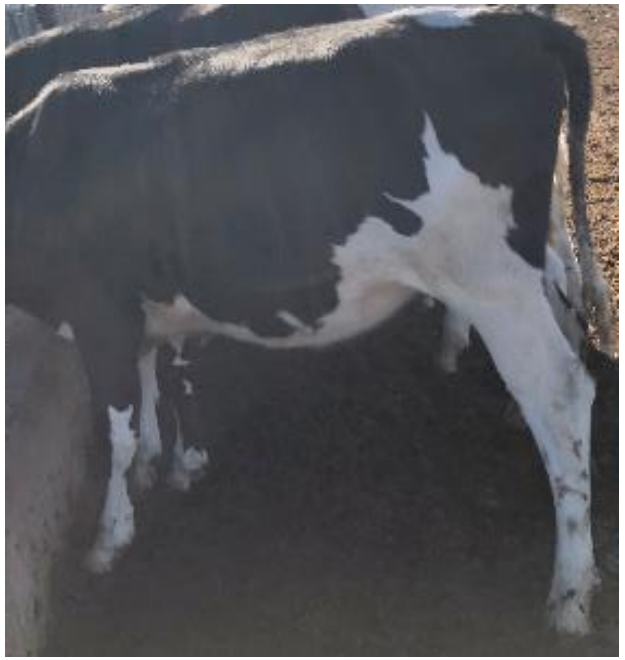


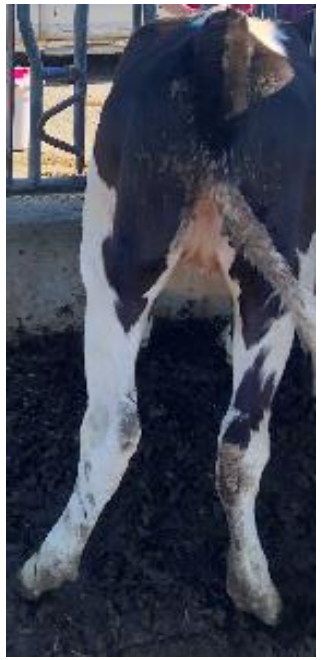


Heifer #12

Heifer #13

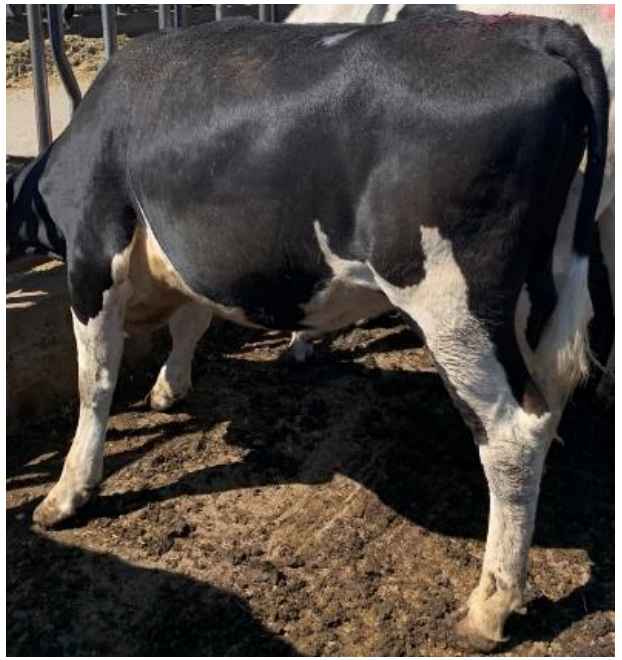
Heifer #14

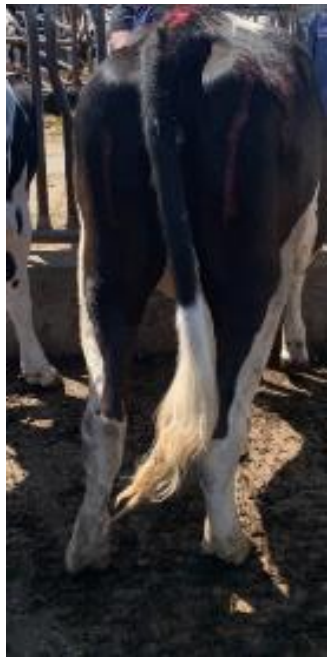




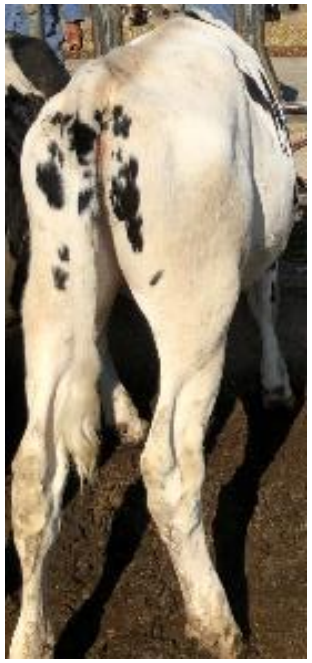
Heifer #15

Heifer #16





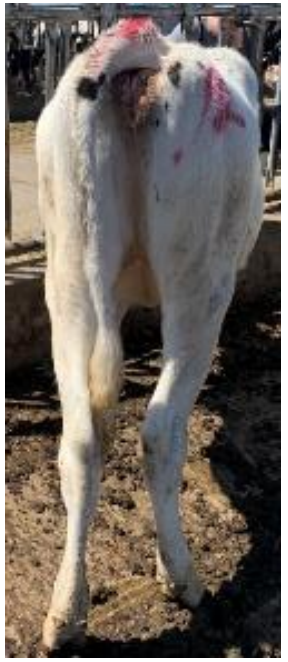
Heifer #17



Heifer #18

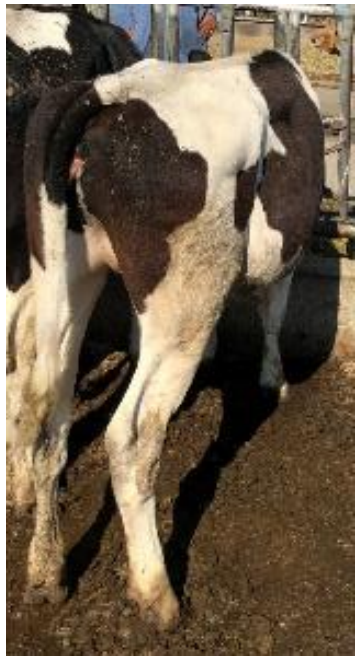
Heifer #19

Heifer #20



Group 17

Heifer #1



Heifer #2

Heifer #3

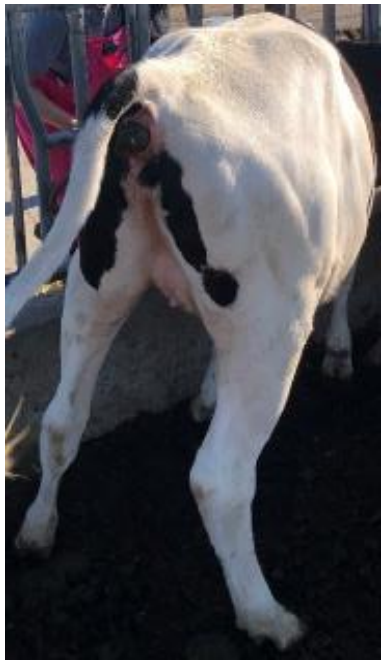
Heifer #4

Heifer #5

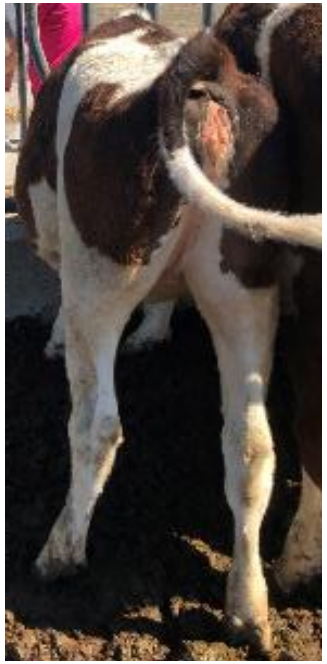
Heifer #6

Heifer #7

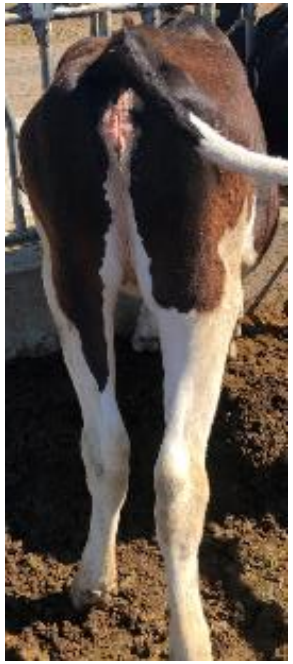
Heifer #8



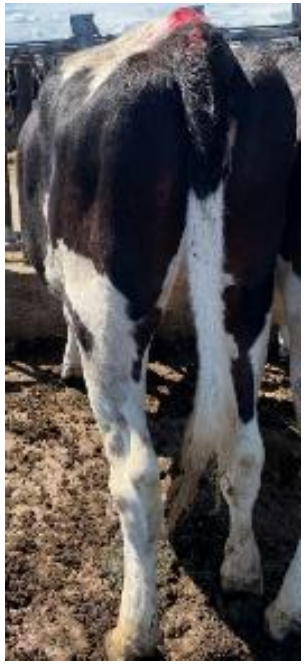
Heifer #9



Heifer #10

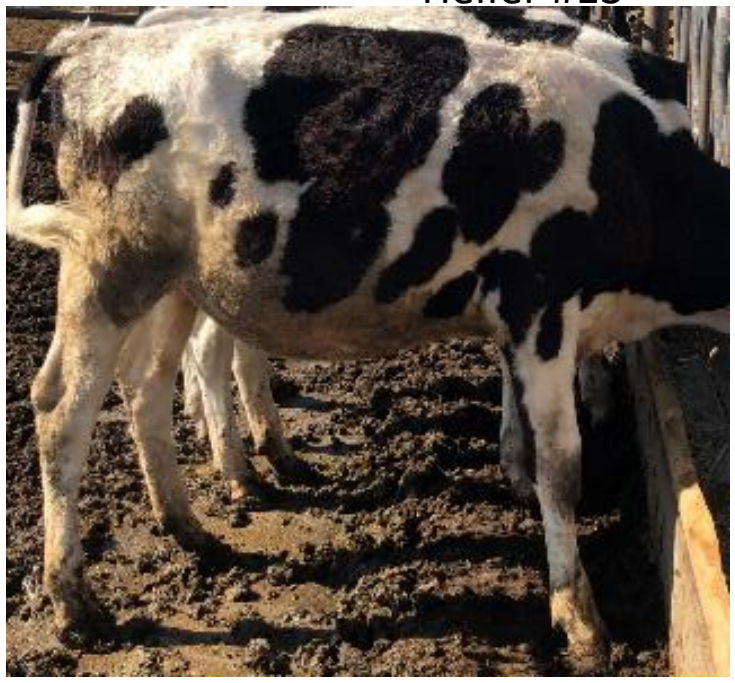


Heifer #11



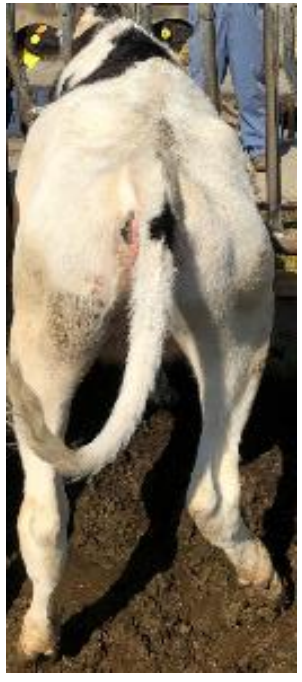
Heifer #12

Heifer #13



Heifer #14

Heifer #15



Heifer #16

Heifer #17

Heifer #18

Heifer #19

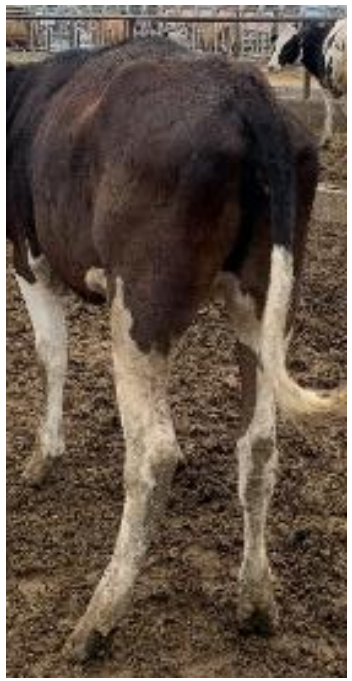
Heifer #20

Group 18

Heifer #1

Heifer #2

Heifer #3



Heifer #4

Heifer #5

Heifer #6

Heifer #7

Heifer #8

Heifer #9

Heifer #10

Heifer #11

Heifer #12

Heifer #13

Heifer #14

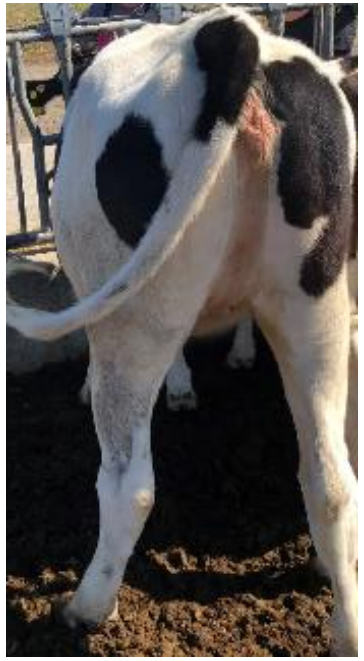
Heifer #15

Heifer #16

Heifer #17

Heifer #18

Heifer #19



Heifer #20

Group 19

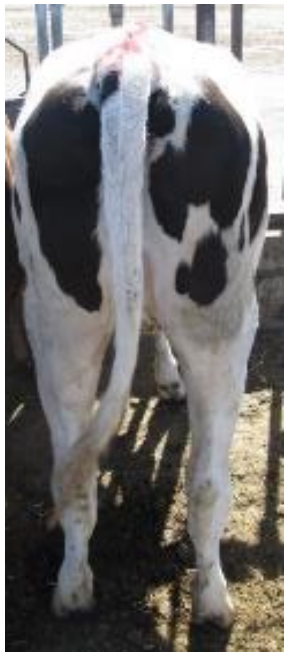
Heifer #1

Heifer #2

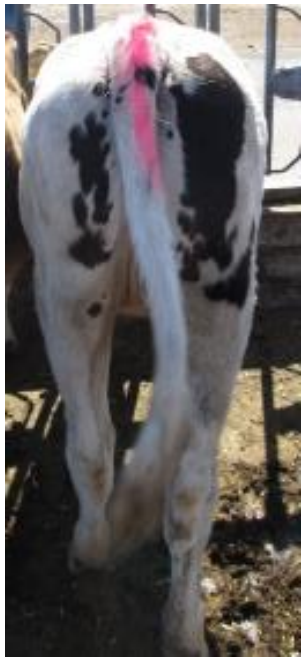
Heifer #3

Heifer #4

Heifer #5



Heifer #6



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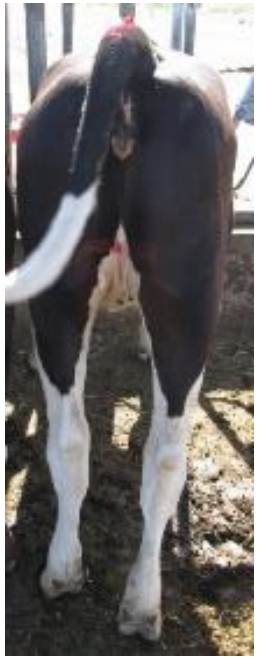
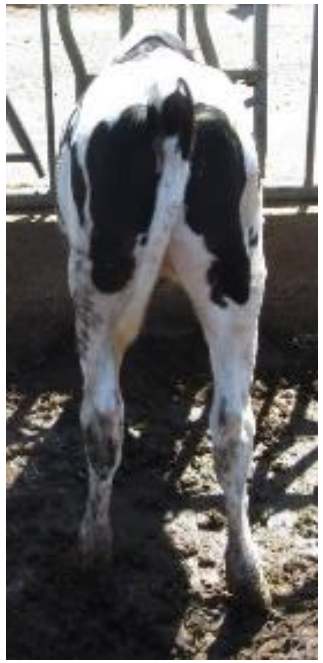


Heifer #8

Heifer #9

Heifer #10

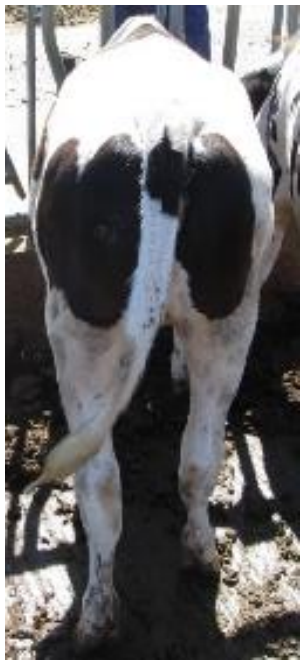
Heifer #11



Heifer #12

Heifer #13

Heifer #14



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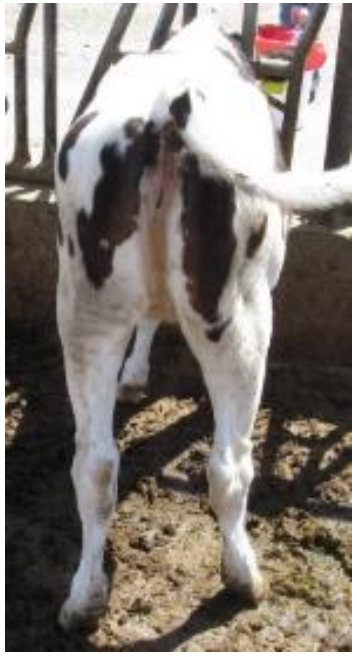


Heifer #16

Heifer #17

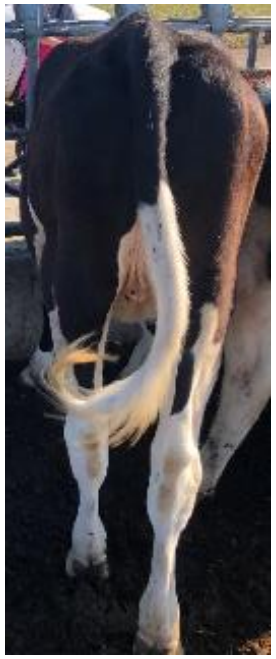
Heifer #18

Heifer #19

Heifer #20

Group 20

Heifer #1



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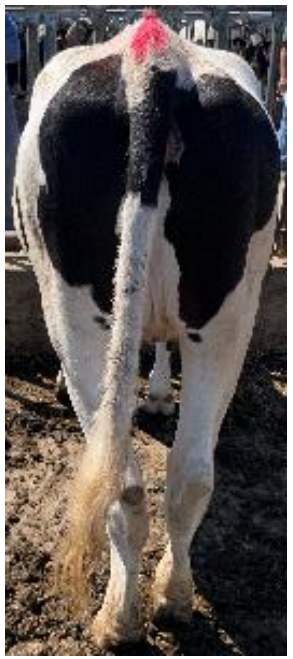
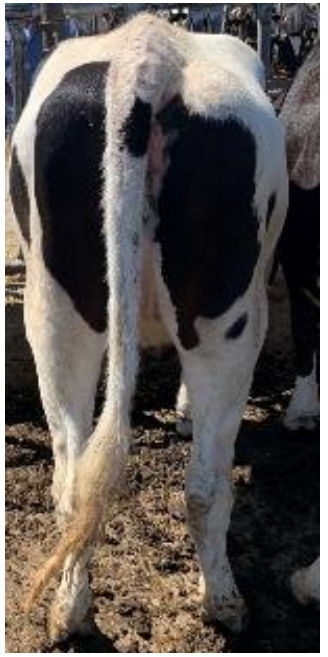


Heifer #3

Heifer #4



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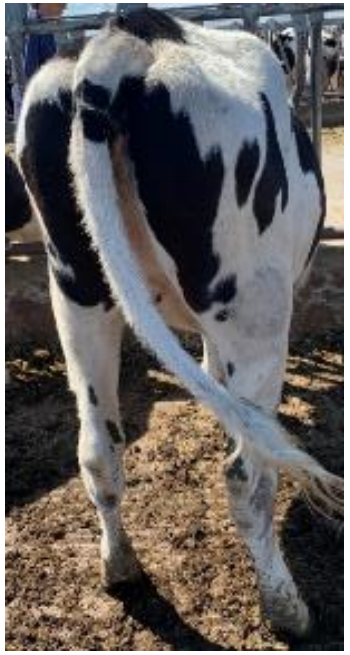
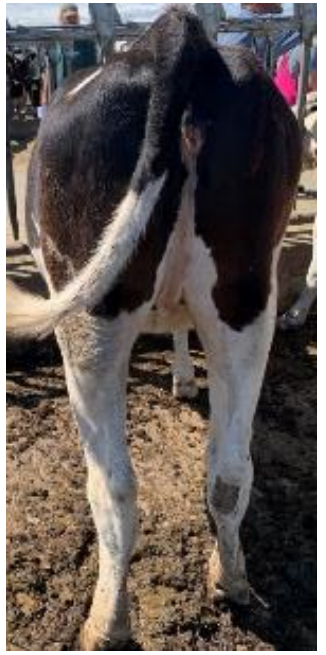
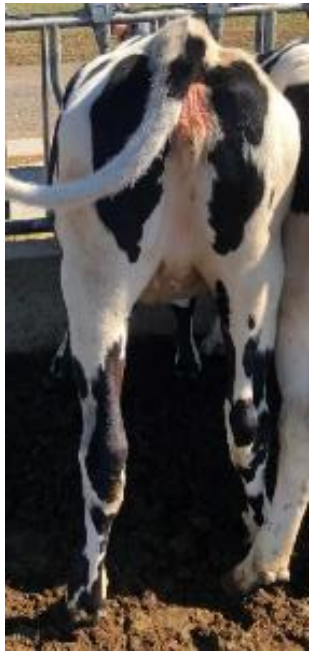


Heifer #6



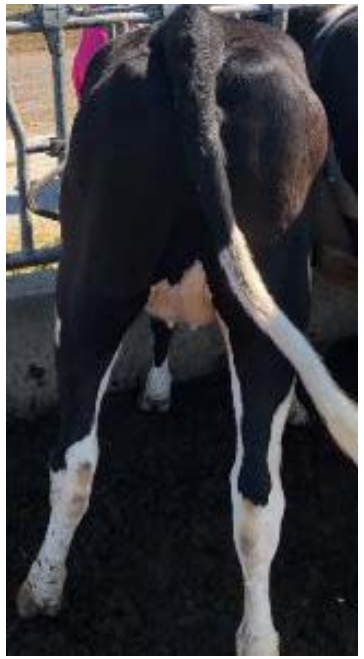
Heifer #7



Heifer #8

Heifer #9

Heifer #10

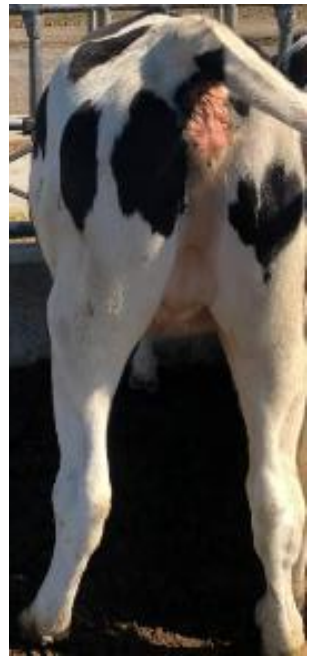


Heifer #11

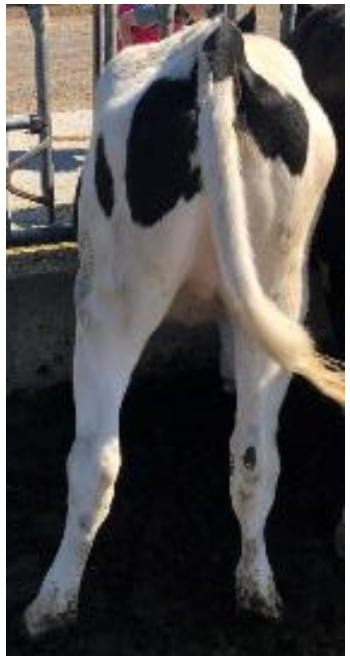
Heifer #12

Heifer #13

Heifer #14



Heifer #15



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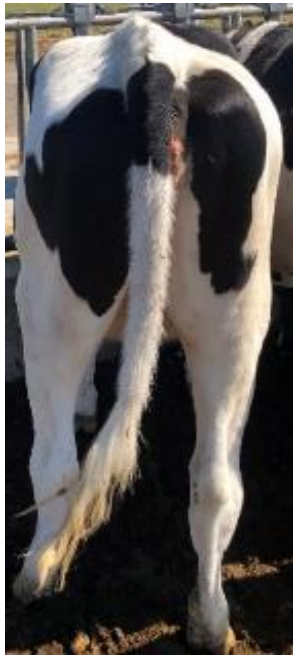

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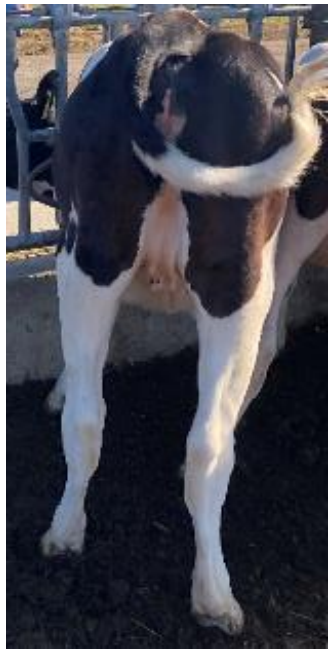

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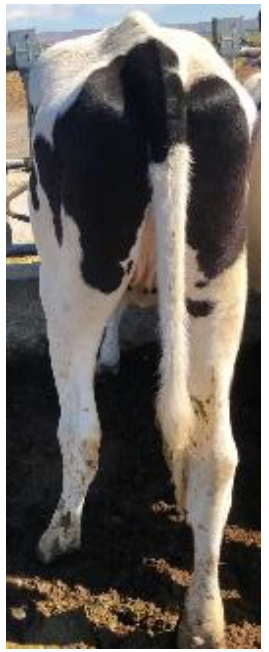

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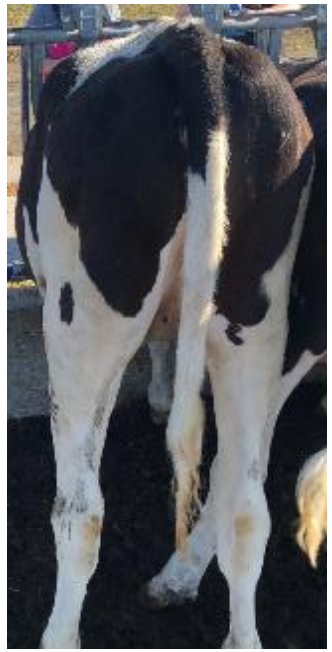

Heifer #20

Heifer Sire Data

Heifer #	NM$	Milk	CM$	Fat (lbs)	Pro (lbs.)	SCS	PL	CCR
1	636	1813	634	74	47	2.55	5.4	0
2	636	1813	634	74	47	2.55	5.4	0
3	669	1498	689	80	54	2.77	5.1	0
4	755	817	785	103	40	2.78	5.8	-0.1
5	677	1114	716	69	55	2.81	5.2	1.4
6	669	1498	689	80	54	2.77	5.1	0
7	669	1498	689	80	54	2.77	5.1	0
8	669	1498	689	80	54	2.77	5.1	0
9	669	1498	689	80	54	2.77	5.1	0
10	669	1498	689	80	54	2.77	5.1	0
11	669	1498	689	80	54	2.77	5.1	0
12	679	253	721	67	29	2.68	6.5	4.1
13	608	1272	637	66	51	2.63	5.2	-1.1
14	673	1516	682	95	50	2.91	4.2	-2.2
15	669	1498	689	80	54	2.77	5.1	0
16	673	1516	682	95	50	2.91	4.2	-2.2
17	679	253	721	67	29	2.68	6.5	4.1
18	639	461	665	72	27	2.81	4.9	1.1
19	679	253	721	67	29	2.68	6.5	4.1
20	673	1516	682	95	50	2.91	4.2	-2.2

Heifer Sire + MGS Data

Heifer #	NM$	Milk	CM$	Fat (lbs)	Pro (lbs.)	SCS	PL	CCR
1	558	1411	568	72	44	2.64	3.89	-1.29
2	609	1431	613	53	45	2.59	5.15	-0.17
3	514	1239	522	62	39	2.76	3.89	-0.59
4	573	405	611	62	33	2.81	5.15	1.85
5	682	752	714	56	45	2.77	5.74	2.28
6	515	1064	530	58	39	2.77	3.89	0.07
7	505	1091	524	54	41	2.68	4.46	1.02
8	596	977	628	68	47	2.76	4.62	-0.40
9	596	977	628	68	47	2.76	4.62	-0.40
10	569	1604	572	65	48	2.83	4.13	0.43
11	580	1203	604	76	49	2.79	3.70	-1.29
12	599	134	646	62	30	2.77	4.82	4.16
13	607	938	630	65	45	2.79	4.26	-0.46
14	507	1103	519	64	38	2.78	3.86	-0.43
15	637	1427	660	74	53	2.66	4.82	0.92
16	519	866	543	57	40	2.89	4.09	0.46
17	604	474	634	64	29	2.71	5.58	2.18
18	635	871	651	74	32	2.69	5.12	0.36
19	602	156	649	59	30	2.70	5.54	2.31
20	567	1121	584	73	43	2.84	4.06	-1.16

Group 1

Heifer Genomic Data

Heifer ID	NM$	Milk	CM$	Fat (lbs)	Pro (lbs.)	SCS	PL	CCR
1	536	1255	537	67	32	2.76	3.00	-2.10
2	528	457	534	24	12	2.64	6.40	2.00
3	453	804	457	60	23	2.79	2.50	-1.60
4	658	390	672	64	31	2.82	4.30	2.50
5	703	47	725	47	27	2.65	5.70	3.50
6	830	1496	835	90	46	2.78	4.10	-0.80
7	437	1003	444	30	34	2.77	3.40	-0.90
8	566	834	576	51	41	2.95	3.10	0.40
9	692	377	714	65	36	2.62	5.40	-1.20
10	598	450	607	60	23	2.85	4.40	1.10
11	509	510	526	32	29	2.58	5.10	0.90
12	683	172	699	57	30	2.88	5.10	2.90
13	506	756	512	29	31	2.94	4.20	-0.20
14	628	1045	637	81	44	2.91	2.80	-1.60
15	526	137	541	46	17	2.65	4.70	1.40
16	498	447	501	61	14	2.88	3.10	-0.70
17	664	606	673	73	27	2.81	4.80	-0.30
18	716	1104	726	70	40	2.72	4.60	-0.80
19	701	-50	717	72	22	2.85	4.90	2.50
20	735	1532	739	68	54	3.02	3.50	0.80

HCR
-0.2
-0.2
1.3
-1.4
1.7
1.3
1.3
1.3
1.3
1.3
1.3
1.7
1.4
-1.6
1.3
-1.6
1.7
-0.2
1.7
-1.6

HCR
-0.46
-0.20
0.76
0.10
1.45
0.89
0.23
0.20
0.20
1.02
0.53
2.01
1.22
-1.68
0.89
-0.03
1.12
0.79
0.46
-1.32

HCR
-1.10
-0.20
0.80
-0.20
2.30
1.60
-0.60
1.10
0.50
0.20
-0.90
1.90
1.10
-2.00
1.80
-0.80
0.00
-0.10
0.20
-1.00

Heifer Sire Data

Heifer #	NM$	Milk	CM$	Fat (lbs)	Pro (lbs.)	SCS	PL	CCR
1	679	253	721	67	29	2.68	6.5	4.1
2	676	129	719	86	27	2.72	5.4	2
3	679	253	721	67	29	2.68	6.5	4.1
4	679	253	721	67	29	2.68	6.5	4.1
5	679	253	721	67	29	2.68	6.5	4.1
6	679	253	721	67	29	2.68	6.5	4.1
7	679	253	721	67	29	2.68	6.5	4.1
8	679	253	721	67	29	2.68	6.5	4.1
9	679	253	721	67	29	2.68	6.5	4.1
10	676	129	719	86	27	2.72	5.4	2
11	608	1272	637	66	51	2.63	5.2	-1.1
12	673	1516	682	95	50	2.91	4.2	-2.2
13	679	253	721	67	29	2.68	6.5	4.1
14	661	1293	671	78	40	2.63	6.1	-0.9
15	679	253	721	67	29	2.68	6.5	4.1
16	799	624	828	121	34	2.78	3.9	0.5
17	669	1498	689	80	54	2.77	5.1	0
18	661	1293	671	78	40	2.63	6.1	-0.9
19	679	253	721	67	29	2.68	6.5	4.1
20	799	624	828	121	34	2.78	3.9	0.5

Heifer Sire + MGS Data

Heifer #	NM$	Milk	CM$	Fat (lbs)	Pro (lbs.)	SCS	PL	CCR
1	576	782	593	56	31	2.77	5.05	3.14
2	635	320	669	61	32	2.70	5.15	1.16
3	604	474	634	64	29	2.71	5.58	2.18
4	577	460	616	54	34	2.69	5.58	3.56
5	552	110	589	58	21	2.63	5.25	3.63
6	661	733	688	70	33	2.60	6.17	2.34
7	627	457	671	53	37	2.68	5.97	3.89
8	552	110	589	58	21	2.63	5.25	3.63
9	599	134	646	62	30	2.77	4.82	4.16
10	584	300	624	80	31	2.76	3.89	0.03
11	540	1054	570	67	47	2.70	3.76	-2.01
12	633	1235	645	67	47	2.83	4.36	-1.62
13	637	402	671	48	33	2.68	5.87	2.54
14	572	1032	581	49	33	2.62	5.78	0.10
15	599	134	646	62	30	2.77	4.82	4.16
16	735	526	759	105	34	2.83	3.56	1.25
17	631	1223	649	57	50	2.74	4.95	-0.17
18	572	1032	581	49	33	2.62	5.78	0.10
19	632	273	672	67	31	2.81	5.25	2.90
20	716	646	741	84	36	2.74	4.16	0.17

Group 2

Heifer Genomic Data

Heifer ID	NM$	Milk	CM$	Fat (lbs)	Pro (lbs.)	SCS	PL	CCR
1	590	-265	610	32	15	2.67	5.60	3.80
2	544	574	555	38	27	2.74	4.50	1.10
3	667	265	682	56	26	2.74	4.90	1.40
4	461	241	471	44	21	2.90	3.10	1.30
5	450	245	456	47	17	2.97	3.40	2.00
6	574	672	586	33	28	2.65	5.40	2.40
7	500	-205	517	27	18	2.81	4.60	4.10
8	651	-543	675	53	9	2.54	6.00	4.10
9	596	-158	615	59	23	2.86	3.40	4.00
10	606	340	620	64	25	2.73	4.40	0.10
11	645	427	664	69	37	2.75	4.20	0.50
12	683	1422	689	76	44	2.76	3.20	-0.80
13	615	528	625	42	26	2.77	4.60	2.40
14	729	654	744	55	33	2.65	6.00	1.20
15	521	843	523	38	21	2.79	3.90	-0.80
16	722	184	742	78	28	2.64	4.60	2.40
17	644	693	659	63	40	2.82	3.30	0.80
18	611	451	615	48	12	2.78	5.60	1.70
19	641	-48	658	43	22	2.82	4.80	2.50
20	846	610	863	73	43	2.83	5.20	2.60

HCR
1.7
2.1
1.7
1.7
1.7
1.7
1.7
1.7
1.7
2.1
1.4
-1.6
1.7
3
1.7
0.1
1.3
3
1.7
0.1

HCR
1.29
1.32
1.12
1.45
1.39
2.05
2.18
1.39
2.01
1.06
0.59
-1.12
1.06
2.67
2.01
1.16
0.79
2.67
1.49
0.00

HCR
1.70
1.60
0.50
0.10
0.30
1.80
2.40
1.00
1.90
1.20
0.80
-2.00
1.10
2.30
-0.50
2.20
0.60
3.10
1.50
1.50

Heifer Sire Data

Heifer #	NM$	Milk	CM$	Fat (lbs)	Pro (lbs.)	SCS	PL	CCR
1	636	1813	634	74	47	2.55	5.4	0
2	644	1448	672	108	62	3.1	1.4	-1.4
3	679	253	721	67	29	2.68	6.5	4.1
4	669	1498	689	80	54	2.77	5.1	0
5	636	1813	634	74	47	2.55	5.4	0
6	608	1272	637	66	51	2.63	5.2	-1.1
7	679	253	721	67	29	2.68	6.5	4.1
8	636	1813	634	74	47	2.55	5.4	0
9	679	253	721	67	29	2.68	6.5	4.1
10	608	1272	637	66	51	2.63	5.2	-1.1
11	504	789	521	61	34	2.99	3.1	-0.2
12	679	253	721	67	29	2.68	6.5	4.1
13	677	1114	716	69	55	2.81	5.2	1.4
14	669	1498	689	80	54	2.77	5.1	0
15	636	1813	634	74	47	2.55	5.4	0
16	673	1516	682	95	50	2.91	4.2	-2.2
17	639	461	665	72	27	2.81	4.9	1.1
18	608	1272	637	66	51	2.63	5.2	-1.1
19	673	1516	682	95	50	2.91	4.2	-2.2
20	679	253	721	67	29	2.68	6.5	4.1

Heifer Sire + MGS Data

Heifer #	NM$	Milk	CM$	Fat (lbs)	Pro (lbs.)	SCS	PL	CCR
1	465	1186	463	49	31	2.69	4.03	-0.13
2	563	1170	593	95	54	3.01	1.25	-2.21
3	599	134	646	62	30	2.77	4.82	4.16
4	580	1203	604	76	49	2.79	3.70	-1.29
5	549	1490	558	58	46	2.60	4.85	0.86
6	464	942	489	45	39	2.59	4.52	0.30
7	552	110	589	58	21	2.63	5.25	3.63
8	598	1487	613	57	49	2.59	5.25	1.19
9	511	270	545	46	24	2.62	5.38	3.73
10	555	828	594	59	45	2.67	4.69	-1.12
11	446	931	460	57	37	2.99	1.98	-0.46
12	604	474	634	64	29	2.71	5.58	2.18
13	569	856	607	56	46	2.78	4.72	1.22
14	580	1203	604	76	49	2.79	3.70	-1.29
15	555	1438	558	62	41	2.71	4.65	0.46
16	582	1215	600	86	46	2.88	3.10	-2.74
17	611	539	634	51	32	2.76	4.82	0.56
18	590	1074	615	48	48	2.64	5.02	-0.89
19	640	1438	656	84	50	2.75	4.22	-0.53
20	632	273	672	67	31	2.81	5.25	2.90

Group 3

Heifer Genomic Data

Heifer ID	NM$	Milk	CM$	Fat (lbs)	Pro (lbs.)	SCS	PL	CCR
1	385	378	385	47	2	2.78	2.70	-0.30
2	484	1284	486	71	47	3.11	1.70	-2.90
3	549	48	566	42	23	2.76	4.30	3.40
4	614	1375	626	49	55	2.78	4.30	-1.70
5	590	524	600	57	23	2.70	3.80	1.80
6	416	1041	424	21	40	2.82	4.40	1.20
7	433	231	446	26	21	2.74	4.30	3.20
8	728	1276	740	51	45	2.59	5.80	0.60
9	567	170	583	45	29	2.88	3.70	1.80
10	467	737	477	42	32	2.74	3.40	-2.20
11	574	1003	580	53	38	2.94	2.90	0.60
12	459	-97	467	41	6	2.82	4.40	2.70
13	877	2210	882	67	67	2.74	5.10	-0.20
14	542	2216	537	34	51	2.81	4.30	-1.40
15	561	1516	563	61	45	2.87	2.00	-2.10
16	486	980	494	33	38	2.86	3.50	-2.40
17	770	1287	777	67	44	2.80	4.80	0.70
18	417	1051	421	5	29	2.76	5.10	0.40
19	673	1241	681	84	44	2.81	2.40	-2.30
20	547	37	560	42	17	2.80	4.50	2.90

HCR
-0.2
-1
1.7
1.3
-0.2
1.4
1.7
-0.2
1.7
1.4
1.2
1.7
1.7
1.3
-0.2
-1.6
-0.2
1.4
-1.6
1.7

HCR
-0.23
-0.99
2.01
0.53
0.20
0.30
1.39
0.92
0.50
0.26
0.89
1.12
0.86
0.53
0.50
-1.39
-0.20
0.86
-1.02
1.49

HCR
-1.20
0.60
1.80
-0.60
2.40
-0.20
1.20
0.60
1.10
-1.10
0.90
1.60
1.30
0.00
-0.70
-1.00
0.70
0.30
-1.80
1.50

Heifer Sire Data

Heifer #	NM$	Milk	CM$	Fat (lbs)	Pro (lbs.)	SCS	PL	CCR
1	681	859	715	100	46	2.94	3.7	0.7
2	762	572	805	105	41	2.8	4.5	1.3
3	681	859	715	100	46	2.94	3.7	0.7
4	681	859	715	100	46	2.94	3.7	0.7
5	608	1035	635	81	47	2.98	2.2	0.7
6	762	572	805	105	41	2.8	4.5	1.3
7	555	1654	564	67	56	3.06	3.1	0
8	681	859	715	100	46	2.94	3.7	0.7
9	555	1654	564	67	56	3.06	3.1	0
10	681	859	715	100	46	2.94	3.7	0.7
11	681	859	715	100	46	2.94	3.7	0.7
12	722	698	753	89	40	3	5	1.4
13	733	1518	749	87	53	2.86	5.7	1.3
14	650	1231	664	83	46	3.03	4.4	1
15	578	597	629	65	50	3.02	3.8	1
16	762	572	805	105	41	2.8	4.5	1.3
17	650	1231	664	83	46	3.03	4.4	1
18	762	572	805	105	41	2.8	4.5	1.3
19	762	572	805	105	41	2.8	4.5	1.3
20	762	572	805	105	41	2.8	4.5	1.3

Heifer Sire + MGS Data

Heifer #	NM$	Milk	CM$	Fat (lbs)	Pro (lbs.)	SCS	PL	CCR
1	604	729	640	85	43	2.89	3.63	1.39
2	712	897	743	99	44	2.77	4.32	0.23
3	648	1153	681	86	54	2.91	3.86	0.23
4	620	1139	638	87	44	2.90	3.56	0.76
5	468	801	493	60	38	2.87	2.34	1.39
6	661	528	702	89	39	2.80	3.66	1.29
7	473	1227	488	53	46	2.94	3.20	0.23
8	642	827	669	95	40	2.86	3.53	0.50
9	518	1295	530	64	46	2.96	3.14	-0.17
10	641	677	671	94	38	2.91	3.47	-0.33
11	648	1153	681	86	54	2.91	3.86	0.23
12	662	853	691	91	43	2.92	3.53	0.33
13	683	1588	704	78	59	2.86	5.18	0.63
14	669	1280	693	90	53	2.94	3.76	0.63
15	536	556	583	62	46	2.94	3.70	1.58
16	570	710	601	69	38	2.79	4.03	0.96
17	595	1066	614	78	43	2.94	3.76	0.23
18	660	809	694	87	42	2.74	3.93	0.76
19	717	784	750	97	42	2.85	4.42	1.19
20	669	565	705	96	38	2.89	3.40	0.86

Group 4

Heifer Genomic Data

Heifer ID	NM$	Milk	CM$	Fat (lbs)	Pro (lbs.)	SCS	PL	CCR
1	352	568	361	50	33	2.97	1.60	0.50
2	584	667	594	85	37	2.97	1.70	-1.40
3	431	-396	447	41	9	2.79	3.80	2.30
4	503	393	516	39	29	2.85	3.50	1.90
5	496	807	498	32	29	3.03	2.80	1.60
6	587	-193	608	53	20	2.70	4.80	2.30
7	393	1788	385	34	47	3.20	0.40	-3.00
8	385	-121	394	51	12	2.99	2.40	0.80
9	340	1125	337	41	32	3.07	1.00	-1.00
10	563	652	570	64	26	2.83	2.90	-0.50
11	545	1126	551	39	40	2.83	3.50	-0.30
12	523	880	529	47	34	2.92	2.90	-0.90
13	512	-139	523	47	10	2.88	3.80	4.10
14	482	383	490	60	23	2.91	2.60	0.60
15	474	257	485	49	30	3.04	2.90	1.30
16	346	441	353	36	20	2.83	2.60	-1.10
17	423	778	425	37	27	3.02	2.60	0.40
18	463	735	474	48	36	2.85	1.60	-2.50
19	561	-51	578	73	23	2.84	3.10	2.20
20	441	808	441	40	27	3.07	1.80	0.90

HCR
0.6
1.5
0.6
0.6
0.7
1.5
0
0.6
0
0.6
0.6
0.7
1
1.9
0.8
1.5
1.9
1.5
1.5
1.5

HCR
1.12
0.76
-1.02
1.19
0.83
1.52
-0.56
0.89
0.10
0.59
-1.02
-0.07
-0.76
1.95
1.25
1.45
0.99
0.46
1.62
1.12

HCR
1.20
0.10
0.30
-0.50
1.50
1.00
-0.50
0.90
-0.70
-0.40
-1.60
-0.80
1.80
0.00
2.00
-0.30
0.60
0.30
2.30
2.20

Heifer Sire Data

Heifer #	NM$	Milk	CM$	Fat (lbs)	Pro (lbs.)	SCS	PL	CCR
1	681	859	715	100	46	2.94	3.7	0.7
2	762	572	805	105	41	2.8	4.5	1.3
3	681	859	715	100	46	2.94	3.7	0.7
4	681	859	715	100	46	2.94	3.7	0.7
5	722	698	753	89	40	3	5	1.4
6	722	698	753	89	40	3	5	1.4
7	722	698	753	89	40	3	5	1.4
8	722	698	753	89	40	3	5	1.4
9	681	859	715	100	46	2.94	3.7	0.7
10	762	572	805	105	41	2.8	4.5	1.3
11	578	597	629	65	50	3.02	3.8	1
12	681	859	715	100	46	2.94	3.7	0.7
13	722	698	753	89	40	3	5	1.4
14	722	698	753	89	40	3	5	1.4
15	722	698	753	89	40	3	5	1.4
16	762	572	805	105	41	2.8	4.5	1.3
17	578	597	629	65	50	3.02	3.8	1
18	578	597	629	65	50	3.02	3.8	1
19	762	572	805	105	41	2.8	4.5	1.3
20	762	572	805	105	41	2.8	4.5	1.3

Heifer Sire + MGS Data

Heifer #	NM$	Milk	CM$	Fat (lbs)	Pro (lbs.)	SCS	PL	CCR
1	604	729	640	85	43	2.89	3.63	1.39
2	714	941	745	95	45	2.82	4.59	0.63
3	620	1139	638	87	44	2.90	3.56	0.76
4	607	924	636	79	45	2.93	3.60	0.63
5	499	458	525	66	30	3.01	2.57	0.89
6	668	571	696	87	34	2.95	4.32	0.13
7	626	789	652	76	41	3.04	4.13	1.35
8	638	948	660	80	43	3.00	3.96	0.36
9	641	677	671	94	38	2.91	3.47	-0.33
10	714	941	745	95	45	2.82	4.59	0.63
11	461	694	501	50	46	2.98	3.10	0.20
12	607	717	643	86	42	2.89	3.14	0.89
13	626	789	652	76	41	3.04	4.13	1.35
14	696	1137	719	87	48	2.93	4.88	1.02
15	676	1046	707	79	50	2.95	4.72	0.69
16	664	865	694	90	43	2.87	3.63	0.30
17	553	1144	587	66	55	2.99	2.77	0.53
18	528	278	571	59	34	2.88	3.86	0.00
19	660	809	694	87	42	2.74	3.93	0.76
20	669	565	705	96	38	2.89	3.40	0.86

Group 5

Heifer Genomic Data

Heifer ID	NM$	Milk	CM$	Fat (lbs)	Pro (lbs.)	SCS	PL	CCR
1	305	31	316	50	22	3.05	0.80	1.00
2	470	232	481	49	19	2.80	3.50	2.10
3	570	590	577	57	29	2.95	3.40	0.20
4	565	66	577	63	22	2.93	3.40	1.10
5	81	-842	88	17	-12	3.01	0.70	1.10
6	601	238	609	43	18	2.89	4.90	2.90
7	453	255	460	34	23	3.05	3.60	1.70
8	598	1015	599	52	32	3.00	3.90	0.80
9	462	1016	462	47	36	3.12	2.20	-0.60
10	556	183	569	46	22	2.82	4.40	1.70
11	329	392	336	21	25	3.03	2.80	1.80
12	441	104	451	57	14	2.82	2.70	0.50
13	570	112	582	54	24	2.98	3.30	1.90
14	558	373	569	67	32	3.05	2.40	1.00
15	615	460	620	65	24	3.03	3.50	1.50
16	526	908	527	64	32	3.05	1.90	0.30
17	343	611	350	40	37	3.16	0.40	0.70
18	265	-8	275	43	23	3.13	0.30	-0.50
19	477	230	489	63	17	2.71	2.70	-1.70
20	673	57	691	81	22	2.69	3.80	-0.90

HCR
0.6
1.5
0.6
0.6
0.7
0.7
0.7
0.7
0.6
1.5
0.8
0.6
0.7
0.7
0.7
1.5
0.8
0.8
1.5
1.5

HCR
1.12
0.46
1.19
-0.26
0.66
0.66
0.69
-0.53
0.59
0.46
-1.02
0.92
0.69
0.43
-0.96
0.00
0.92
0.26
0.46
1.12

HCR
1.80
1.00
0.30
0.20
-1.00
1.70
1.30
-1.20
1.20
-0.50
1.50
0.50
2.10
1.30
0.10
0.90
0.80
-0.90
-0.20
-0.20

Heifer Sire Data

Heifer #	NM$	Milk	CM$	Fat (lbs)	Pro (lbs.)	SCS	PL	CCR
1	555	1654	564	67	56	3.06	3.1	0
2	681	859	715	100	46	2.94	3.7	0.7
3	762	572	805	105	41	2.8	4.5	1.3
4	681	859	715	100	46	2.94	3.7	0.7
5	681	859	715	100	46	2.94	3.7	0.7
6	578	597	629	65	50	3.02	3.8	1
7	722	698	753	89	40	3	5	1.4
8	762	572	805	105	41	2.8	4.5	1.3
9	762	572	805	105	41	2.8	4.5	1.3
10	681	859	715	100	46	2.94	3.7	0.7
11	722	698	753	89	40	3	5	1.4
12	578	597	629	65	50	3.02	3.8	1
13	681	859	715	100	46	2.94	3.7	0.7
14	681	859	715	100	46	2.94	3.7	0.7
15	578	597	629	65	50	3.02	3.8	1
16	722	698	753	89	40	3	5	1.4
17	555	1654	564	67	56	3.06	3.1	0
18	681	859	715	100	46	2.94	3.7	0.7
19	762	572	805	105	41	2.8	4.5	1.3
20	762	572	805	105	41	2.8	4.5	1.3

Heifer Sire + MGS Data

Heifer #	NM$	Milk	CM$	Fat (lbs)	Pro (lbs.)	SCS	PL	CCR
1	565	1677	582	65	61	2.99	3.47	-0.23
2	604	729	640	85	43	2.89	3.63	1.39
3	657	540	699	88	40	2.80	4.16	1.78
4	596	450	628	82	32	2.83	3.80	-0.20
5	670	1013	696	95	45	2.83	3.96	0.17
6	502	1005	538	54	53	3.00	2.64	0.89
7	676	1046	707	79	50	2.95	4.72	0.69
8	698	674	740	93	44	2.79	4.06	1.95
9	712	897	743	99	44	2.77	4.32	0.23
10	547	723	574	72	37	2.87	3.66	1.06
11	629	542	666	71	38	2.87	4.46	1.88
12	547	582	588	70	44	3.04	2.94	0.66
13	637	686	672	88	41	2.84	3.63	1.09
14	596	450	628	82	32	2.83	3.80	-0.20
15	488	685	526	58	43	2.92	2.77	-0.30
16	622	642	649	69	35	2.89	4.62	0.83
17	530	1962	535	69	62	3.03	2.44	-1.39
18	669	1243	694	94	51	2.89	4.03	0.56
19	637	682	672	82	41	2.86	3.96	1.42
20	655	458	700	81	38	2.74	4.13	1.82

Group 6

Heifer Genomic Data

Heifer ID	NM$	Milk	CM$	Fat (lbs)	Pro (lbs.)	SCS	PL	CCR
1	340	1058	339	35	30	2.98	1.50	-1.00
2	433	404	439	48	21	2.93	2.30	2.80
3	452	289	463	51	24	2.90	2.20	0.70
4	652	1289	656	64	49	3.05	3.20	0.30
5	182	190	188	35	15	2.95	1.10	0.00
6	212	-11	221	33	21	3.13	-0.20	-0.80
7	627	824	628	59	24	2.93	3.40	1.30
8	561	428	570	71	29	3.00	2.00	0.60
9	493	-321	512	72	17	2.80	2.60	0.70
10	354	48	360	55	14	3.08	1.90	1.30
11	547	236	559	51	23	2.82	4.00	0.40
12	375	798	377	43	36	3.26	0.90	0.20
13	363	-156	375	43	12	2.84	3.20	1.00
14	357	-557	372	69	7	2.93	1.80	0.10
15	406	396	414	28	28	3.05	2.50	-0.50
16	592	930	595	53	38	3.14	3.40	0.40
17	383	881	386	47	34	3.07	1.20	-1.00
18	458	1200	452	43	29	3.11	3.30	1.20
19	666	432	678	85	30	2.89	3.30	-0.70
20	464	148	476	62	21	2.88	1.80	1.10

HCR
0
0.6
1.5
0.6
0.6
0.8
0.7
1.5
1.5
0.6
0.7
0.8
0.6
0.6
0.8
0.7
0
0.6
1.5
1.5

HCR
-1.42
1.12
1.72
0.13
0.07
0.89
-0.96
0.73
0.76
0.10
1.09
0.66
0.69
0.13
0.66
1.29
-0.63
0.36
1.09
1.62

HCR
0.20
3.10
0.60
0.70
-0.40
-0.80
1.30
1.90
0.70
2.20
1.30
-0.30
0.70
1.50
0.20
0.30
-0.20
1.40
-0.70
2.10

Heifer Sire Data

Heifer #	NM$	Milk	CM$	Fat (lbs)	Pro (lbs.)	SCS	PL	CCR
1	359	-1047	438	36	16	2.83	3.6	4.8
2	559	1181	579	72	45	2.77	3.4	0.4
3	630	1251	651	74	50	2.98	4.1	2
4	755	817	785	103	40	2.78	5.8	-0.1
5	755	817	785	103	40	2.78	5.8	-0.1
6	755	817	785	103	40	2.78	5.8	-0.1
7	617	517	655	77	39	3	2.8	1.5
8	486	1017	513	57	46	2.93	3	0.1
9	559	1181	579	72	45	2.77	3.4	0.4
10	517	1366	542	48	53	2.75	3.6	-0.2
11	653	739	666	84	28	2.82	5.1	0.6
12	630	1251	651	74	50	2.98	4.1	2
13	617	517	655	77	39	3	2.8	1.5
14	517	1366	542	48	53	2.75	3.6	-0.2
15	559	1181	579	72	45	2.77	3.4	0.4
16	359	-1047	438	36	16	2.83	3.6	4.8
17	605	1272	630	73	53	2.93	3	1.3
18	755	817	785	103	40	2.78	5.8	-0.1
19	519	730	531	37	25	2.69	5.6	2.2
20	605	1272	630	73	53	2.93	3	1.3

Heifer Sire + MGS Data

Heifer #	NM$	Milk	CM$	Fat (lbs)	Pro (lbs.)	SCS	PL	CCR
1	344	-556	405	33	19	2.79	3.53	3.40
2	541	1529	554	71	52	2.82	2.51	0.13
3	625	1409	640	68	52	2.92	3.43	0.69
4	590	676	618	81	35	2.76	4.26	0.10
5	634	1047	656	79	42	2.77	5.02	0.07
6	635	626	672	88	39	2.78	4.49	-0.96
7	451	94	488	54	24	2.85	2.24	0.69
8	427	806	454	47	39	2.85	3.14	0.30
9	519	1758	525	69	54	2.81	2.61	-0.59
10	403	1282	419	50	47	2.86	1.58	-1.72
11	600	879	617	73	36	2.84	4.13	1.65
12	570	988	598	68	46	2.92	3.89	2.24
13	558	1320	575	72	50	2.97	2.21	0.13
14	523	1511	542	50	53	2.76	3.63	-0.73
15	476	914	498	57	38	2.75	3.40	0.50
16	397	-734	455	41	18	2.81	2.94	3.83
17	554	1071	577	49	48	2.78	3.83	1.98
18	615	1024	636	84	41	2.79	4.22	-1.55
19	493	1460	493	46	41	2.76	4.06	0.59
20	559	796	581	66	42	2.88	2.54	1.52

Group 7

Heifer Genomic Data

Heifer ID	NM$	Milk	CM$	Fat (lbs)	Pro (lbs.)	SCS	PL	CCR
1	255	-282	268	5	10	2.90	3.40	3.50
2	114	225	127	14	26	2.91	-0.20	-0.70
3	498	768	507	32	33	2.82	3.40	1.10
4	374	514	375	45	16	2.94	3.10	-0.80
5	601	827	608	54	33	2.88	4.60	-0.80
6	345	-476	354	48	-1	2.95	3.40	1.40
7	344	185	352	29	17	2.91	2.40	1.00
8	95	-150	97	11	1	3.04	0.50	-0.10
9	229	353	235	26	15	2.87	1.40	0.50
10	368	481	381	26	28	2.74	2.30	-1.90
11	676	592	686	69	30	2.84	3.70	0.10
12	483	675	489	34	33	3.05	2.80	2.50
13	341	233	343	47	15	3.14	0.90	0.30
14	383	487	390	16	22	2.84	4.10	1.90
15	393	617	398	33	22	2.84	3.40	-0.10
16	187	-254	199	-14	11	2.92	3.00	3.80
17	551	343	565	63	25	2.76	2.70	0.10
18	269	277	275	37	19	2.97	1.20	-1.70
19	545	1461	547	38	43	2.89	3.30	0.60
20	370	188	379	38	23	3.04	1.40	0.60

HCR
5.4
-0.9
1.8
-1.4
-1.4
-1.4
2.9
0.4
-0.9
-2
-1.4
1.8
2.9
-2
-0.9
5.4
0.9
-1.4
2.1
0.9

HCR
3.00
-0.20
1.45
-0.46
-0.43
-1.62
0.79
-0.30
-1.68
-1.78
-0.40
1.91
0.83
-0.66
-1.16
3.93
1.65
-2.48
0.30
0.96

HCR
3.50
-2.00
1.30
-0.80
0.00
0.20
2.40
-1.20
0.50
-3.10
-0.80
1.50
2.80
0.10
-0.80
4.30
0.90
-2.60
0.70
1.60

Heifer Sire Data

Heifer #	NM$	Milk	CM$	Fat (lbs)	Pro (lbs.)	SCS	PL	CCR
1	510	-91	557	61	23	2.75	4.7	4.6
2	630	1251	651	74	50	2.98	4.1	2
3	654	1018	682	83	43	2.6	4.6	2.1
4	538	372	565	77	26	2.88	2.1	1.1
5	519	730	531	37	25	2.69	5.6	2.2
6	654	1018	682	83	43	2.6	4.6	2.1
7	517	1366	542	48	53	2.75	3.6	-0.2
8	617	517	655	77	39	3	2.8	1.5
9	654	1018	682	83	43	2.6	4.6	2.1
10	755	817	785	103	40	2.78	5.8	-0.1
11	651	930	655	28	25	2.72	5.5	3.4
12	653	739	666	84	28	2.82	5.1	0.6
13	559	1181	579	72	45	2.77	3.4	0.4
14	359	-1047	438	36	16	2.83	3.6	4.8
15	684	1511	694	84	50	2.92	4.3	0.1
16	617	517	655	77	39	3	2.8	1.5
17	617	517	655	77	39	3	2.8	1.5
18	559	1181	579	72	45	2.77	3.4	0.4
19	698	1648	722	97	62	2.83	2.7	-2.9
20	654	1018	682	83	43	2.6	4.6	2.1

Heifer Sire + MGS Data

Heifer #	NM$	Milk	CM$	Fat (lbs)	Pro (lbs.)	SCS	PL	CCR
1	505	105	538	69	22	2.83	3.76	2.41
2	552	1334	568	60	49	2.90	3.89	1.45
3	578	1032	595	67	40	2.74	3.63	0.83
4	460	912	476	54	35	2.86	2.64	0.53
5	449	617	460	35	23	2.84	4.49	2.08
6	582	1650	593	76	52	2.70	3.40	0.53
7	428	1034	454	46	45	2.78	2.18	-0.92
8	560	1393	572	70	49	3.02	2.74	0.43
9	600	1481	617	83	52	2.74	3.37	-0.13
10	609	900	628	74	37	2.87	5.02	-0.30
11	580	1592	575	40	41	2.78	3.99	1.39
12	521	1081	537	54	41	2.88	4.46	0.53
13	551	1389	566	65	48	2.77	3.50	-0.33
14	362	-410	419	40	21	2.80	3.07	3.00
15	587	1505	596	66	49	2.86	4.03	0.20
16	512	1007	535	54	44	2.94	3.10	0.79
17	543	849	571	62	42	2.92	3.04	1.12
18	499	1097	511	63	39	2.81	3.27	-0.20
19	602	1129	620	81	48	2.88	2.31	-2.01
20	539	963	561	70	39	2.65	3.30	0.43

Group 8

Heifer Genomic Data

Heifer ID	NM$	Milk	CM$	Fat (lbs)	Pro (lbs.)	SCS	PL	CCR
1	216	-715	230	19	-3	2.84	3.20	3.30
2	471	650	478	31	21	2.70	3.50	-0.10
3	258	105	263	27	17	3.14	1.70	1.50
4	540	1232	538	66	33	2.98	1.10	-1.90
5	695	771	702	70	33	2.95	5.10	-0.20
6	331	-149	342	61	5	2.72	1.90	0.40
7	560	1382	568	61	49	2.83	1.90	-1.60
8	288	13	303	10	18	2.76	2.70	0.90
9	296	804	299	28	29	2.97	2.60	-0.70
10	463	335	475	67	23	2.77	2.40	0.00
11	530	187	539	30	19	2.91	4.00	1.20
12	398	-151	410	52	13	2.92	2.20	1.50
13	468	123	481	55	26	3.01	1.90	0.20
14	326	205	333	21	11	2.79	2.80	1.90
15	159	810	159	27	19	2.86	0.40	-1.90
16	161	-992	175	27	-8	2.93	2.20	3.10
17	221	225	227	21	19	3.02	0.70	-0.80
18	480	34	496	52	20	2.73	2.70	1.10
19	295	-217	306	18	3	2.73	3.30	0.30
20	366	442	370	36	24	3.07	1.10	-0.20

HCR
3.9
1.8
3.1
1.4
2.1
3.1
-2
2.9
3.1
-1.4
3.4
-1.4
-0.9
5.4
1.7
2.9
2.9
-0.9
-0.8
3.1

HCR
2.21
1.68
2.67
0.50
2.11
0.96
-1.62
1.82
1.39
-0.89
1.16
-0.99
0.07
3.43
1.62
1.49
2.41
-1.19
-0.23
2.18

HCR
2.10
1.20
1.50
-0.70
-0.20
2.90
1.80
-1.20
-1.40
2.10
0.70
1.20
-0.10
1.30
0.50
1.80
1.20
0.40
1.60
0.40

Heifer Sire Data

Heifer #	NM$	Milk	CM$	Fat (lbs)	Pro (lbs.)	SCS	PL	CCR
1	654	1018	682	83	43	2.6	4.6	2.1
2	654	1018	682	83	43	2.6	4.6	2.1
3	755	817	785	103	40	2.78	5.8	-0.1
4	630	1251	651	74	50	2.98	4.1	2
5	486	1017	513	57	46	2.93	3	0.1
6	755	817	785	103	40	2.78	5.8	-0.1
7	653	739	666	84	28	2.82	5.1	0.6
8	755	817	785	103	40	2.78	5.8	-0.1
9	519	730	531	37	25	2.69	5.6	2.2
10	538	372	565	77	26	2.88	2.1	1.1
11	519	730	531	37	25	2.69	5.6	2.2
12	519	730	531	37	25	2.69	5.6	2.2
13	559	1181	579	72	45	2.77	3.4	0.4
14	605	1272	630	73	53	2.93	3	1.3
15	755	817	785	103	40	2.78	5.8	-0.1
16	755	817	785	103	40	2.78	5.8	-0.1
17	486	1017	513	57	46	2.93	3	0.1
18	486	1017	513	57	46	2.93	3	0.1
19	617	517	655	77	39	3	2.8	1.5
20	504	951	511	41	29	2.7	5.2	1.6

Heifer Sire + MGS Data

Heifer #	NM$	Milk	CM$	Fat (lbs)	Pro (lbs.)	SCS	PL	CCR
1	585	1723	590	74	52	2.75	3.93	0.83
2	495	934	518	56	39	2.71	3.99	1.45
3	589	1132	615	66	49	2.85	4.92	0.07
4	503	1190	522	56	46	2.90	2.90	0.30
5	431	1032	448	44	41	2.97	3.17	-0.17
6	589	1132	615	66	49	2.85	4.92	0.07
7	581	1466	582	77	43	2.85	3.73	-0.46
8	603	1205	621	72	45	2.80	5.08	-0.26
9	483	331	509	44	22	2.67	4.55	1.45
10	506	1224	515	72	41	2.89	1.75	-0.13
11	433	1075	447	23	39	2.80	4.79	1.58
12	483	331	509	44	22	2.67	4.55	1.45
13	538	1171	560	65	47	2.81	3.00	1.52
14	506	975	525	58	41	3.00	2.77	1.49
15	681	724	706	90	37	2.68	4.98	-0.73
16	605	830	629	83	37	2.77	4.09	-1.02
17	489	1062	516	55	48	2.91	2.74	1.32
18	557	997	574	62	40	2.95	3.76	0.50
19	524	826	550	67	40	2.94	2.24	-0.50
20	501	1437	504	55	43	2.81	3.76	-0.46

Group 9

Heifer Genomic Data

Heifer ID	NM$	Milk	CM$	Fat (lbs)	Pro (lbs.)	SCS	PL	CCR
1	397	-227	411	46	15	2.90	2.00	0.50
2	397	-231	414	54	16	2.80	1.70	1.10
3	566	937	572	63	34	2.88	4.00	-0.40
4	613	456	624	62	30	2.91	3.50	0.30
5	-7	-323	2	-5	6	2.99	-0.40	0.00
6	381	190	389	35	17	2.89	2.70	-0.10
7	595	1028	599	78	39	3.01	0.60	-2.10
8	666	758	679	75	41	2.85	3.70	1.50
9	409	481	411	20	17	2.93	3.20	0.90
10	385	311	388	33	21	3.16	0.70	-0.20
11	416	621	420	8	16	2.73	5.20	3.90
12	639	305	649	59	19	2.75	4.50	1.60
13	270	744	272	24	20	2.86	1.20	-0.60
14	451	323	459	23	23	2.98	2.90	2.30
15	430	284	434	66	12	2.88	2.80	-1.00
16	372	695	373	50	19	2.89	1.90	-2.50
17	463	896	472	25	38	2.86	4.10	2.20
18	306	385	311	29	22	3.04	1.80	0.30
19	409	117	415	60	9	2.86	1.90	-0.30
20	470	1551	463	38	31	2.90	3.00	-0.60

HCR
3.1
3.1
-1.4
1.8
0.4
-1.4
-1.4
-1.4
2.1
1.4
2.1
2.1
-0.9
0.9
-1.4
-1.4
0.4
0.4
2.9
1.2

HCR
1.95
0.23
-0.99
0.89
0.30
-0.99
-2.01
-1.35
1.12
-0.17
1.32
1.12
-0.07
1.32
-0.92
-0.79
0.79
0.33
0.36
0.13

HCR
1.20
2.00
-0.80
0.70
-1.10
-1.30
-1.60
0.70
1.30
1.80
2.90
0.90
-1.70
1.00
-1.00
-2.10
-0.50
-0.50
0.10
1.50

Heifer Sire Data

Heifer #	NM$	Milk	CM$	Fat (lbs)	Pro (lbs.)	SCS	PL	CCR
1	559	1181	579	72	45	2.77	3.4	0.4
2	584	2095	585	68	62	2.93	3.7	0.3
3	733	1518	749	87	53	2.86	5.7	1.3
4	854	2015	857	80	62	2.88	4.8	0.7
5	733	1518	749	87	53	2.86	5.7	1.3
6	486	1017	513	57	46	2.93	3	0.1
7	639	1328	683	74	66	2.89	3.7	0.2
8	681	859	715	100	46	2.94	3.7	0.7
9	693	981	728	96	50	2.92	3.2	-0.5
10	681	859	715	100	46	2.94	3.7	0.7
11	718	1037	751	92	48	2.75	5.8	1.2
12	681	859	715	100	46	2.94	3.7	0.7
13	854	2015	857	80	62	2.88	4.8	0.7
14	681	859	715	100	46	2.94	3.7	0.7
15	733	1518	749	87	53	2.86	5.7	1.3
16	681	859	715	100	46	2.94	3.7	0.7
17	789	632	819	115	37	2.94	4.4	-1.1
18	681	859	715	100	46	2.94	3.7	0.7
19	681	859	715	100	46	2.94	3.7	0.7
20	681	859	715	100	46	2.94	3.7	0.7

Heifer Sire + MGS Data

Heifer #	NM$	Milk	CM$	Fat (lbs)	Pro (lbs.)	SCS	PL	CCR
1	479	1140	492	54	41	2.86	3.43	0.03
2	492	1518	502	54	50	2.85	3.60	0.43
3	591	1138	604	68	41	2.95	4.55	1.49
4	626	1710	627	71	52	2.94	2.38	-1.12
5	637	2053	634	77	58	2.92	4.65	0.30
6	426	1337	442	41	49	2.89	3.23	-0.13
7	572	1855	593	70	68	2.89	2.81	-0.73
8	556	702	587	75	39	2.86	3.60	0.69
9	611	1699	620	83	56	2.96	3.00	-0.89
10	600	1545	614	87	54	2.93	2.81	-0.40
11	581	820	605	71	38	2.88	4.62	1.42
12	585	1298	608	91	53	3.05	1.95	-0.59
13	654	1923	663	51	63	2.92	4.26	0.59
14	600	1545	614	87	54	2.93	2.81	-0.40
15	637	2053	634	77	58	2.92	4.65	0.30
16	556	703	581	76	37	3.00	3.23	1.09
17	677	439	714	85	35	2.85	4.62	0.00
18	618	1376	639	94	54	2.97	2.77	-1.06
19	603	1618	611	85	54	2.98	3.33	-0.10
20	585	1298	608	91	53	3.05	1.95	-0.59

Group 10

Heifer Genomic Data

Heifer ID	NM$	Milk	CM$	Fat (lbs)	Pro (lbs.)	SCS	PL	CCR
1	306	778	308	26	21	2.85	1.80	0.70
2	298	767	300	31	26	2.97	1.60	0.00
3	648	1328	651	52	43	2.93	4.10	0.80
4	476	1118	482	46	38	2.86	2.20	-1.20
5	386	1255	380	33	36	3.21	1.40	-0.20
6	354	400	360	27	21	2.94	2.60	0.10
7	436	309	453	59	30	2.73	1.80	-1.90
8	678	633	687	78	31	2.92	3.50	-0.10
9	330	583	336	28	24	2.86	2.50	-0.40
10	400	354	409	54	24	2.92	2.20	-0.40
11	558	81	575	47	23	2.76	4.60	3.00
12	440	1052	441	39	34	3.05	2.70	-0.10
13	522	1613	522	59	52	3.11	2.20	-2.10
14	404	1046	403	50	34	3.11	1.80	0.00
15	452	581	457	44	24	2.96	3.50	-0.70
16	442	677	443	70	23	3.01	0.80	-0.20
17	699	388	714	52	33	2.86	5.30	1.80
18	454	1129	453	47	36	3.10	2.60	-0.50
19	362	124	371	48	19	3.00	1.90	-0.50
20	608	906	614	72	38	3.00	2.80	-1.20

HCR
-0.9
0.9
1
-0.1
1
0.4
-1.2
0.6
-0.1
0.6
-2.4
0.6
-0.1
0.6
1
0.6
0.8
0.6
0.6
0.6

HCR
-0.56
0.03
1.39
-0.53
0.56
-0.17
-1.88
-0.17
-0.17
-0.69
-0.86
0.30
-0.13
-0.69
0.56
1.12
1.02
-0.26
0.30
0.30

HCR
0.40
-0.30
1.90
-0.90
-0.10
-1.80
-2.40
1.10
0.20
0.80
-1.50
0.30
-1.90
-0.10
-1.00
-0.50
2.60
0.50
0.10
-1.40

Heifer Sire Data

Heifer #	NM$	Milk	CM$	Fat (lbs)	Pro (lbs.)	SCS	PL	CCR
1	528	-182	579	93	26	2.98	0.5	-1.8
2	428	125	436	50	21	3.08	1.6	-0.3
3	559	1181	579	72	45	2.77	3.4	0.4
4	639	1328	683	74	66	2.89	3.7	0.2
5	505	428	554	61	44	3.06	2.4	2.3
6	733	1518	749	87	53	2.86	5.7	1.3
7	505	428	554	61	44	3.06	2.4	2.3
8	559	1181	579	72	45	2.77	3.4	0.4
9	854	2015	857	80	62	2.88	4.8	0.7
10	733	1518	749	87	53	2.86	5.7	1.3
11	681	859	715	100	46	2.94	3.7	0.7
12	789	632	819	115	37	2.94	4.4	-1.1
13	681	859	715	100	46	2.94	3.7	0.7
14	789	632	819	115	37	2.94	4.4	-1.1
15	559	1181	579	72	45	2.77	3.4	0.4
16	750	1482	759	130	49	2.97	1.9	0.7
17	718	1037	751	92	48	2.75	5.8	1.2
18	681	859	715	100	46	2.94	3.7	0.7
19	718	1037	751	92	48	2.75	5.8	1.2
20	723	924	772	105	56	2.83	3.3	0.1

Heifer Sire + MGS Data

Heifer #	NM$	Milk	CM$	Fat (lbs)	Pro (lbs.)	SCS	PL	CCR
1	412	142	450	63	28	2.96	1.29	-1.12
2	424	124	432	50	21	3.05	1.58	-0.30
3	476	914	498	57	38	2.75	3.40	0.50
4	572	1855	593	70	68	2.89	2.81	-0.73
5	378	35	421	44	27	2.89	1.98	1.22
6	652	1811	661	85	59	2.91	4.09	-0.66
7	440	573	476	55	39	2.95	1.85	0.56
8	494	1061	512	63	40	2.76	2.94	0.10
9	732	1721	743	70	58	2.88	3.93	1.72
10	637	2053	634	77	58	2.92	4.65	0.30
11	618	958	649	83	48	2.92	3.20	1.72
12	637	902	658	92	39	2.90	3.30	-2.21
13	585	1075	610	77	46	2.88	3.63	0.59
14	646	699	670	92	35	2.87	3.60	-0.89
15	537	944	553	77	37	2.85	2.90	-0.36
16	710	1467	717	116	50	2.95	1.49	-0.73
17	560	817	592	75	41	2.78	3.63	0.00
18	525	778	549	73	38	2.93	2.90	1.62
19	643	1494	663	88	55	2.84	4.16	-0.73
20	568	1203	607	68	59	2.89	3.27	0.20

Group 11

Heifer Genomic Data

Heifer ID	NM$	Milk	CM$	Fat (lbs)	Pro (lbs.)	SCS	PL	CCR
1	440	289	449	55	26	3.01	1.10	-2.00
2	519	310	529	67	28	3.02	1.50	0.00
3	469	799	476	20	32	2.85	4.10	0.70
4	320	1609	318	18	51	3.17	1.10	-1.00
5	442	-136	456	64	24	3.06	0.50	-0.40
6	508	1512	503	42	44	3.16	2.40	-1.80
7	299	718	300	32	29	3.17	1.00	-1.10
8	387	780	394	27	32	2.88	2.20	-0.20
9	517	1394	517	57	41	2.96	2.60	0.60
10	449	1213	449	42	39	3.10	2.40	-0.40
11	441	747	450	40	35	2.89	2.70	1.10
12	641	326	648	62	16	2.83	4.70	1.70
13	345	161	355	36	21	2.93	2.10	2.70
14	372	49	377	35	6	2.86	2.90	0.60
15	369	456	377	32	25	2.93	2.30	1.60
16	598	495	611	81	32	2.85	1.90	-0.80
17	439	317	449	46	27	2.97	2.20	0.90
18	415	476	416	39	16	2.99	3.00	1.20
19	697	847	710	67	43	2.88	3.60	-1.10
20	425	733	436	52	37	2.90	1.70	-0.50

HCR
-0.8
0.9
-0.9
-1.2
4.3
1
4.3
-0.9
-0.1
1
0.6
0.8
0.6
0.8
-0.9
0
-2.4
0.6
-2.4
0.2

HCR
-2.34
0.89
-1.16
-1.88
1.72
0.00
2.97
-0.73
0.46
0.56
0.92
-1.02
0.89
0.40
-0.96
-0.17
-1.88
1.25
-2.24
0.07

HCR
-1.20
0.40
0.70
-1.00
1.70
-0.10
1.50
-0.10
0.50
-1.10
1.00
0.50
1.80
-0.30
0.20
-0.50
0.10
1.90
-2.00
0.10

Heifer Sire Data

Heifer #	NM$	Milk	CM$	Fat (lbs)	Pro (lbs.)	SCS	PL	CCR
1	559	1181	579	72	45	2.77	3.4	0.4
2	733	1518	749	87	53	2.86	5.7	1.3
3	854	2015	857	80	62	2.88	4.8	0.7
4	605	1272	630	73	53	2.93	3	1.3
5	681	859	715	100	46	2.94	3.7	0.7
6	681	859	715	100	46	2.94	3.7	0.7
7	681	859	715	100	46	2.94	3.7	0.7
8	605	1272	630	73	53	2.93	3	1.3
9	681	859	715	100	46	2.94	3.7	0.7
10	681	859	715	100	46	2.94	3.7	0.7
11	681	859	715	100	46	2.94	3.7	0.7
12	789	632	819	115	37	2.94	4.4	-1.1
13	808	1419	844	115	62	2.8	3.9	-1.6
14	789	632	819	115	37	2.94	4.4	-1.1
15	854	2015	857	80	62	2.88	4.8	0.7
16	733	1518	749	87	53	2.86	5.7	1.3
17	681	859	715	100	46	2.94	3.7	0.7
18	733	1518	749	87	53	2.86	5.7	1.3
19	681	859	715	100	46	2.94	3.7	0.7
20	723	924	772	105	56	2.83	3.3	0.1

Heifer Sire + MGS Data

Heifer #	NM$	Milk	CM$	Fat (lbs)	Pro (lbs.)	SCS	PL	CCR
1	511	1142	525	52	38	2.74	3.83	0.40
2	620	1510	633	68	51	2.82	4.95	0.99
3	746	1939	749	71	59	2.84	4.42	-0.13
4	493	1097	510	59	44	2.91	2.18	-0.36
5	540	1160	569	64	52	2.96	3.53	0.59
6	468	650	492	65	34	2.88	2.67	0.23
7	632	1176	656	84	49	2.88	3.70	-0.13
8	516	1324	533	65	50	2.89	2.38	-0.63
9	560	927	581	72	41	2.97	3.63	0.23
10	556	702	587	75	39	2.86	3.60	0.69
11	600	1545	614	87	54	2.93	2.81	-0.40
12	631	777	650	82	35	2.97	4.09	-0.96
13	669	1445	695	87	57	2.79	3.76	-0.92
14	655	610	682	84	33	2.83	4.46	0.73
15	732	2139	733	81	65	2.93	3.50	-1.06
16	637	2053	634	77	58	2.92	4.65	0.30
17	556	702	587	75	39	2.86	3.60	0.69
18	624	851	652	77	40	2.78	4.62	0.86
19	556	702	587	75	39	2.86	3.60	0.69
20	716	915	764	104	55	2.80	3.27	0.10

Group 12

Heifer Genomic Data

Heifer ID	NM$	Milk	CM$	Fat (lbs)	Pro (lbs.)	SCS	PL	CCR
1	272	704	273	22	17	2.82	2.20	0.60
2	448	1040	451	48	35	2.96	2.50	0.10
3	652	1715	653	45	43	2.71	4.90	0.00
4	248	442	251	28	19	3.03	0.90	0.10
5	581	864	583	62	35	3.12	2.40	1.60
6	297	672	296	48	25	3.17	0.40	-0.50
7	554	506	566	74	34	2.92	2.60	-0.60
8	305	1135	304	20	30	2.95	1.60	-0.60
9	398	184	405	71	23	3.14	0.60	-1.60
10	363	876	363	39	26	2.98	2.40	0.80
11	655	925	666	86	42	2.85	2.50	-2.20
12	589	40	600	72	17	2.89	3.20	-1.10
13	588	966	594	77	38	2.91	2.30	-1.30
14	447	74	456	69	18	3.00	0.90	-1.20
15	506	1545	505	64	43	2.95	2.40	-0.60
16	605	1174	605	54	36	3.01	4.00	-0.40
17	525	974	530	48	38	2.98	3.40	1.20
18	519	751	528	45	36	2.95	3.70	1.50
19	529	1001	530	63	36	3.08	2.10	-0.20
20	344	253	350	43	17	2.98	2.10	-0.70

HCR
-0.9
1
-0.1
0.9
0.6
0.6
0.6
0.9
0.6
0.6
0.6
0.8
-0.3
0.8
-0.1
1
0.6
1
0.6
0.2

HCR
-0.53
1.16
0.59
0.00
0.33
0.63
1.06
-0.96
0.43
-0.17
-0.69
0.56
0.30
0.76
-0.73
0.56
-0.17
0.40
-0.17
0.20

HCR
0.50
0.00
0.10
0.10
1.70
0.60
-0.90
-0.70
-0.60
-0.70
-2.10
-1.00
-1.20
-0.20
-2.10
-0.30
-0.30
1.60
1.20
-0.60

Heifer Sire Data

Heifer #	NM$	Milk	CM$	Fat (lbs)	Pro (lbs.)	SCS	PL	CCR
1	447	422	478	35	29	2.76	4.2	4.1
2	488	-246	513	48	6	2.85	5.2	2
3	669	761	700	82	37	2.62	5.5	0.8
4	621	2252	613	79	61	2.94	2.8	-0.6
5	621	2252	613	79	61	2.94	2.8	-0.6
6	475	603	507	33	33	2.6	5.2	2.9
7	484	239	521	45	27	2.79	4.4	4.9
8	621	2252	613	79	61	2.94	2.8	-0.6
9	621	2252	613	79	61	2.94	2.8	-0.6
10	621	2252	613	79	61	2.94	2.8	-0.6
11	621	2252	613	79	61	2.94	2.8	-0.6
12	621	2252	613	79	61	2.94	2.8	-0.6
13	475	603	507	33	33	2.6	5.2	2.9
14	621	2252	613	79	61	2.94	2.8	-0.6
15	447	422	478	35	29	2.76	4.2	4.1
16	621	2252	613	79	61	2.94	2.8	-0.6
17	621	2252	613	79	61	2.94	2.8	-0.6
18	447	422	478	35	29	2.76	4.2	4.1
19	621	2252	613	79	61	2.94	2.8	-0.6
20	447	422	478	35	29	2.76	4.2	4.1

Heifer Sire + MGS Data

Heifer #	NM$	Milk	CM$	Fat (lbs)	Pro (lbs.)	SCS	PL	CCR
1	449	689	471	46	32	2.79	3.66	2.48
2	435	60	452	41	11	2.83	4.13	1.22
3	592	776	621	66	37	2.66	5.02	1.29
4	602	1928	595	63	53	2.99	2.97	0.20
5	506	1659	498	63	44	2.95	2.57	-0.33
6	473	775	494	40	32	2.69	4.16	1.68
7	355	252	379	31	18	2.77	3.47	3.04
8	503	1900	503	63	56	2.92	2.01	-0.07
9	563	1374	563	62	44	2.85	3.40	-0.30
10	503	1900	503	63	56	2.92	2.01	-0.07
11	564	1897	560	75	53	2.91	2.74	-0.63
12	544	1554	557	70	54	2.95	2.05	0.23
13	474	355	500	39	29	2.66	3.99	2.57
14	563	1374	563	62	44	2.85	3.40	-0.30
15	388	692	414	34	35	2.80	2.94	3.04
16	373	1406	369	54	41	2.94	0.86	-0.83
17	509	1645	508	64	52	2.94	1.78	-0.17
18	455	235	481	41	26	2.77	3.33	3.37
19	542	1667	541	63	48	2.93	2.84	-0.43
20	429	346	468	41	33	2.83	2.97	3.33

Group 13

Heifer Genomic Data

Heifer ID	NM$	Milk	CM$	Fat (lbs)	Pro (lbs.)	SCS	PL	CCR
1	389	-264	404	29	12	2.81	3.10	2.70
2	335	1577	327	50	39	3.16	-0.90	-3.30
3	314	142	321	13	12	2.88	3.20	3.00
4	578	1088	582	58	38	2.92	2.30	0.00
5	513	1261	514	59	41	3.06	1.50	-1.00
6	461	985	461	47	27	2.95	2.20	0.10
7	328	265	336	33	19	2.90	2.00	0.70
8	263	1218	255	23	26	3.06	1.10	0.50
9	238	865	236	6	18	2.89	3.10	1.10
10	211	991	211	31	37	3.15	0.00	-1.00
11	478	763	485	46	26	2.73	3.20	1.80
12	553	1188	556	72	39	2.97	1.90	-0.70
13	183	-179	194	-7	12	2.93	2.00	1.90
14	297	584	301	20	25	3.03	2.10	-0.50
15	341	1209	336	29	32	3.10	1.10	-0.50
16	252	1381	246	62	33	3.04	-1.90	-3.90
17	219	138	226	-16	4	2.68	4.30	3.80
18	355	1258	350	24	26	2.89	2.50	0.20
19	505	1012	511	59	34	2.81	1.90	-1.80
20	357	805	357	15	26	3.05	2.50	0.80

HCR
2.2
0.6
3.3
0
0
0.6
-2.1
0
0
0
0
0
0.6
0
2.2
0
0
2.2
0
2.2

HCR
0.83
0.46
3.33
0.66
0.63
1.22
-1.49
0.00
0.46
0.00
-0.63
0.99
0.76
0.46
1.45
-0.03
-0.20
1.82
0.03
2.44

HCR
0.90
-0.70
1.80
-0.40
0.70
1.10
-1.60
1.20
-0.50
0.10
-0.70
0.50
1.80
0.70
0.70
-1.30
1.20
0.30
-0.60
0.50

Heifer Sire Data

Heifer #	NM$	Milk	CM$	Fat (lbs)	Pro (lbs.)	SCS	PL	CCR
1	621	2252	613	79	61	2.94	2.8	-0.6
2	419	650	453	71	39	2.91	1	-3.9
3	621	2252	613	79	61	2.94	2.8	-0.6
4	621	2252	613	79	61	2.94	2.8	-0.6
5	621	2252	613	79	61	2.94	2.8	-0.6
6	447	422	478	35	29	2.76	4.2	4.1
7	456	830	482	37	38	2.81	4.2	2.3
8	621	2252	613	79	61	2.94	2.8	-0.6
9	419	650	453	71	39	2.91	1	-3.9
10	447	422	478	35	29	2.76	4.2	4.1
11	447	422	478	35	29	2.76	4.2	4.1
12	447	422	478	35	29	2.76	4.2	4.1
13	621	2252	613	79	61	2.94	2.8	-0.6
14	281	1253	299	32	48	2.97	0.5	1
15	621	2252	613	79	61	2.94	2.8	-0.6
16	621	2252	613	79	61	2.94	2.8	-0.6
17	553	1820	564	72	59	2.86	2	-1.9
18	447	422	478	35	29	2.76	4.2	4.1
19	621	2252	613	79	61	2.94	2.8	-0.6
20	621	2252	613	79	61	2.94	2.8	-0.6

Heifer Sire + MGS Data

Heifer #	NM$	Milk	CM$	Fat (lbs)	Pro (lbs.)	SCS	PL	CCR
1	578	1780	571	59	43	2.89	3.53	0.79
2	339	492	363	62	31	2.91	0.50	-3.96
3	522	1860	527	57	57	2.89	2.90	-0.56
4	536	1098	537	58	37	2.86	3.56	1.19
5	503	1900	503	63	56	2.92	2.01	-0.07
6	411	685	429	39	24	2.73	3.56	2.51
7	294	489	312	30	23	2.82	2.34	1.35
8	559	1334	560	63	44	2.85	3.37	0.86
9	457	748	481	58	33	2.77	1.65	-1.98
10	475	487	497	53	27	2.76	2.97	2.24
11	496	843	516	45	34	2.78	3.60	2.44
12	358	381	384	24	24	2.68	3.86	3.73
13	509	1645	508	64	52	2.94	1.78	-0.17
14	280	1042	289	37	38	3.05	0.07	-0.10
15	564	1897	560	75	53	2.91	2.74	-0.63
16	473	1589	474	53	45	2.80	2.94	0.63
17	354	1424	359	50	41	2.86	0.89	-1.72
18	504	758	525	39	35	2.82	3.96	2.90
19	500	1909	496	64	53	2.92	2.01	-0.50
20	503	1900	503	63	56	2.92	2.01	-0.07

Group 14

Heifer Genomic Data

Heifer ID	NM$	Milk	CM$	Fat (lbs)	Pro (lbs.)	SCS	PL	CCR
1	512	1272	508	25	29	2.93	3.60	3.00
2	26	701	28	-2	19	2.87	0.70	0.60
3	294	118	300	11	21	3.19	2.00	1.80
4	258	383	262	20	17	2.93	2.10	1.90
5	275	1338	268	25	32	3.11	0.90	0.70
6	372	-266	385	29	9	2.84	2.40	2.40
7	142	-23	142	8	1	3.04	0.70	0.50
8	257	-242	264	15	4	2.97	2.80	3.30
9	60	354	62	-4	15	3.02	0.50	1.00
10	412	1427	406	53	40	3.17	-0.10	-1.40
11	336	1627	320	24	21	2.99	2.30	-0.30
12	342	1415	338	35	32	2.94	1.30	-2.80
13	253	-147	264	37	15	2.97	1.10	0.70
14	119	-168	125	-21	2	2.91	3.00	4.50
15	217	245	222	22	13	2.93	1.40	1.70
16	548	964	557	73	46	3.02	0.90	1.90
17	136	68	132	9	5	3.29	0.40	-0.50
18	361	1215	355	28	28	3.04	1.10	0.40
19	471	1738	467	36	40	2.88	2.20	-0.90
20	282	-482	291	22	0	2.92	2.30	0.60

HCR
0
-1
0
0
0
2.2
3.5
0
-1
2.2
2.2
2.2
0
0
0
0
-0.9
2.2
0
0

HCR
0.92
-1.16
-1.22
0.13
0.00
1.72
3.17
-0.17
0.13
1.98
2.15
0.83
-0.20
-0.46
-0.63
-0.63
-0.63
1.49
0.00
0.00

HCR
1.80
-0.80
-0.20
0.70
0.60
0.70
2.60
0.20
0.20
0.40
1.00
-3.10
0.70
2.40
1.60
1.00
1.60
0.70
0.50
0.90

Heifer Sire Data

Heifer #	NM$	Milk	CM$	Fat (lbs)	Pro (lbs.)	SCS	PL	CCR
1	488	-246	513	48	6	2.85	5.2	2
2	447	422	478	35	29	2.76	4.2	4.1
3	454	468	473	30	44	2.92	3.2	0.4
4	621	2252	613	79	61	2.94	2.8	-0.6
5	475	603	507	33	33	2.6	5.2	2.9
6	447	422	478	35	29	2.76	4.2	4.1
7	621	2252	613	79	61	2.94	2.8	-0.6
8	227	-407	280	-18	20	2.94	4	5.8
9	621	2252	613	79	61	2.94	2.8	-0.6
10	447	422	478	35	29	2.76	4.2	4.1
11	227	-407	280	-18	20	2.94	4	5.8
12	553	1007	579	73	42	2.65	3.2	1.9
13	621	2252	613	79	61	2.94	2.8	-0.6
14	447	422	478	35	29	2.76	4.2	4.1
15	467	1244	471	68	39	2.94	2.7	-0.7
16	447	422	478	35	29	2.76	4.2	4.1
17	447	422	478	35	29	2.76	4.2	4.1
18	447	422	478	35	29	2.76	4.2	4.1
19	419	650	453	71	39	2.91	1	-3.9
20	621	2252	613	79	61	2.94	2.8	-0.6

Heifer Sire + MGS Data

Heifer #	NM$	Milk	CM$	Fat (lbs)	Pro (lbs.)	SCS	PL	CCR
1	285	-243	303	34	5	2.88	2.44	0.89
2	446	552	475	35	32	2.75	4.16	3.47
3	434	376	465	37	43	2.94	2.31	0.89
4	475	1450	472	62	42	2.91	1.58	-1.19
5	321	628	334	22	24	2.74	3.43	1.95
6	389	611	409	30	31	2.86	3.00	2.51
7	545	1728	544	65	50	2.97	2.94	0.07
8	272	-237	311	11	23	2.99	2.41	3.70
9	394	1575	388	50	45	3.01	1.75	-1.16
10	427	459	451	34	27	2.81	3.76	2.67
11	239	175	272	8	26	2.99	1.85	3.40
12	497	845	518	59	36	2.74	3.10	1.22
13	567	1651	562	71	49	3.01	2.44	0.07
14	449	689	471	46	32	2.79	3.66	2.48
15	492	1102	496	62	36	2.92	2.44	0.73
16	427	459	451	34	27	2.81	3.76	2.67
17	452	443	473	42	28	2.89	3.37	3.17
18	449	689	471	46	32	2.79	3.66	2.48
19	316	431	340	43	31	2.95	0.99	-1.78
20	544	1554	557	70	54	2.95	2.05	0.23

Group 15

Heifer Genomic Data

Heifer ID	NM$	Milk	CM$	Fat (lbs)	Pro (lbs.)	SCS	PL	CCR
1	328	1224	323	35	24	2.90	1.30	-0.90
2	421	-196	435	39	15	2.88	2.50	1.20
3	196	28	206	19	15	2.92	1.00	2.70
4	251	832	247	39	17	2.99	0.90	-2.80
5	189	-261	199	16	10	3.01	1.10	1.40
6	403	-69	416	23	16	2.85	3.10	3.30
7	530	694	533	64	30	3.06	2.10	1.70
8	-2	-795	7	-6	-7	3.03	1.50	2.10
9	211	72	216	19	8	2.95	1.80	0.00
10	338	194	349	15	20	2.89	2.60	0.40
11	336	1710	321	22	29	3.13	1.30	0.70
12	448	1291	446	43	30	2.85	2.30	-1.80
13	567	1197	567	68	34	2.92	2.00	-0.90
14	431	1816	423	53	44	3.08	0.60	-2.60
15	174	-47	181	4	0	2.68	2.60	2.90
16	378	1074	377	50	23	2.80	1.20	1.10
17	385	195	394	28	23	3.00	2.80	0.30
18	417	1979	409	50	51	3.14	0.40	-1.60
19	60	713	51	7	13	3.17	-0.60	-1.40
20	249	585	252	35	27	3.11	-0.10	-1.00

HCR
0.6
2.2
-0.9
0
0.6
2.2
0
3.1
0
2.2
3.1
-3
0
2.2
-1.9
2.2
2.2
2.2
-1
0

HCR
0.36
2.61
0.40
-0.33
0.33
1.49
0.63
1.49
-1.35
1.49
2.51
-1.95
0.76
0.83
-0.53
1.49
2.21
0.83
0.17
0.99

HCR
0.90
1.60
2.20
-2.70
-1.20
2.10
1.70
1.00
-0.40
-0.50
-0.50
-0.30
0.00
-0.80
1.00
1.20
-0.90
-0.40
1.20
-0.40

Heifer Sire Data

Heifer #	NM$	Milk	CM$	Fat (lbs)	Pro (lbs.)	SCS	PL	CCR
1	621	2252	613	79	61	2.94	2.8	-0.6
2	475	603	507	33	33	2.6	5.2	2.9
3	621	2252	613	79	61	2.94	2.8	-0.6
4	484	239	521	45	27	2.79	4.4	4.9
5	447	422	478	35	29	2.76	4.2	4.1
6	553	1820	564	72	59	2.86	2	-1.9
7	456	830	482	37	38	2.81	4.2	2.3
8	475	603	507	33	33	2.6	5.2	2.9
9	447	422	478	35	29	2.76	4.2	4.1
10	227	-407	280	-18	20	2.94	4	5.8
11	447	422	478	35	29	2.76	4.2	4.1
12	621	2252	613	79	61	2.94	2.8	-0.6
13	621	2252	613	79	61	2.94	2.8	-0.6
14	447	422	478	35	29	2.76	4.2	4.1
15	621	2252	613	79	61	2.94	2.8	-0.6
16	516	407	562	47	38	2.8	4.9	2.5
17	447	422	478	35	29	2.76	4.2	4.1
18	621	2252	613	79	61	2.94	2.8	-0.6
19	621	2252	613	79	61	2.94	2.8	-0.6
20	447	422	478	35	29	2.76	4.2	4.1

Heifer Sire + MGS Data

Heifer #	NM$	Milk	CM$	Fat (lbs)	Pro (lbs.)	SCS	PL	CCR
1	563	1374	563	62	44	2.85	3.40	-0.30
2	338	486	360	31	26	2.68	3.14	0.96
3	578	1780	571	59	43	2.89	3.53	0.79
4	446	336	469	45	23	2.87	3.04	2.41
5	421	457	441	38	24	2.85	2.90	1.88
6	416	1348	421	51	41	2.94	1.45	-0.92
7	352	695	367	28	27	2.91	2.90	1.85
8	482	692	501	29	25	2.67	5.12	3.10
9	421	457	441	38	24	2.85	2.90	1.88
10	240	154	276	0	26	2.92	2.81	3.73
11	427	459	451	34	27	2.81	3.76	2.67
12	500	1909	496	64	53	2.92	2.01	-0.50
13	545	1728	544	65	50	2.97	2.94	0.07
14	408	501	429	32	26	2.78	3.47	2.61
15	593	1767	589	70	50	2.92	2.51	0.79
16	444	592	473	43	31	2.81	4.39	1.02
17	475	597	497	35	26	2.67	3.76	3.30
18	524	1810	519	63	52	2.96	2.44	-0.13
19	524	1810	519	63	52	2.96	2.44	-0.13
20	463	573	481	30	22	2.78	4.46	3.89

Group 16

Heifer Genomic Data

Heifer ID	NM$	Milk	CM$	Fat (lbs)	Pro (lbs.)	SCS	PL	CCR
1	198	29	205	29	6	2.82	1.40	-2.40
2	190	212	197	17	13	2.87	1.60	1.00
3	200	423	201	17	16	3.04	1.80	-0.70
4	324	327	327	3	15	2.95	3.00	1.60
5	372	228	378	17	15	2.92	3.30	2.40
6	458	574	464	39	20	2.78	3.70	-0.30
7	150	-51	151	26	3	3.11	0.90	1.60
8	189	-2	193	26	3	2.88	1.10	-0.80
9	90	-727	105	-6	2	2.92	2.60	0.60
10	336	1205	328	50	27	3.11	-0.30	-0.90
11	341	124	352	25	17	2.84	2.40	1.80
12	266	249	277	8	20	2.81	2.40	-0.20
13	294	418	295	6	13	2.97	3.00	2.70
14	367	530	373	37	21	2.85	2.20	-0.30
15	251	-351	258	19	-5	2.82	3.50	1.80
16	181	655	186	9	21	2.80	2.20	0.30
17	411	79	417	43	8	2.87	3.10	0.90
18	265	895	266	13	23	2.83	2.70	0.80
19	540	1701	537	55	46	3.00	2.00	0.40
20	351	1512	343	41	32	3.00	0.60	0.80

HCR
0
0.6
0
-2.1
2.2
-0.9
3.5
0.6
2.2
3.1
2.2
0
0
2.2
0
3.5
2.2
0
0
2.2

HCR
0.46
0.66
0.92
-1.65
1.19
-0.53
2.38
1.32
1.19
2.05
1.49
0.00
0.63
1.52
0.73
1.68
2.24
0.30
0.30
2.38

HCR
0.40
-0.20
1.10
1.00
0.10
-0.40
-0.30
-0.90
0.20
-0.50
1.40
-0.70
2.80
2.00
1.70
0.90
2.70
2.00
2.00
0.80

Heifer Sire Data

Heifer #	NM$	Milk	CM$	Fat (lbs)	Pro (lbs.)	SCS	PL	CCR
1	454	468	473	30	44	2.92	3.2	0.4
2	516	407	562	47	38	2.8	4.9	2.5
3	553	1820	564	72	59	2.86	2	-1.9
4	227	-407	280	-18	20	2.94	4	5.8
5	621	2252	613	79	61	2.94	2.8	-0.6
6	475	603	507	33	33	2.6	5.2	2.9
7	621	2252	613	79	61	2.94	2.8	-0.6
8	553	1820	564	72	59	2.86	2	-1.9
9	621	2252	613	79	61	2.94	2.8	-0.6
10	669	761	700	82	37	2.62	5.5	0.8
11	621	2252	613	79	61	2.94	2.8	-0.6
12	621	2252	613	79	61	2.94	2.8	-0.6
13	621	2252	613	79	61	2.94	2.8	-0.6
14	621	2252	613	79	61	2.94	2.8	-0.6
15	621	2252	613	79	61	2.94	2.8	-0.6
16	447	422	478	35	29	2.76	4.2	4.1
17	281	1253	299	32	48	2.97	0.5	1
18	475	603	507	33	33	2.6	5.2	2.9
19	516	407	562	47	38	2.8	4.9	2.5
20	272	1281	276	37	40	2.96	0.5	-0.3

Heifer Sire + MGS Data

Heifer #	NM$	Milk	CM$	Fat (lbs)	Pro (lbs.)	SCS	PL	CCR
1	454	719	468	42	42	2.90	3.00	0.03
2	500	645	530	49	36	2.82	3.96	1.42
3	522	1366	529	66	48	2.95	1.91	-0.79
4	103	-256	136	-18	10	2.91	2.64	3.07
5	415	1557	412	58	46	2.90	1.78	-0.59
6	376	461	399	37	27	2.70	3.27	0.53
7	574	1593	570	68	46	2.91	2.61	0.17
8	491	1380	498	63	44	2.92	1.45	-2.08
9	414	1549	411	51	42	2.85	2.48	-0.40
10	518	614	542	70	34	2.70	3.20	-0.89
11	503	1900	503	63	56	2.92	2.01	-0.07
12	590	1695	586	82	48	2.88	2.05	-0.86
13	559	1556	560	70	54	2.95	2.05	0.23
14	545	1728	544	65	50	2.97	2.94	0.07
15	560	1760	564	64	53	2.87	3.23	0.36
16	427	459	451	34	27	2.81	3.76	2.67
17	340	1188	355	42	47	2.92	0.26	-0.79
18	379	362	402	32	24	2.69	3.17	1.12
19	453	491	485	40	32	2.80	3.93	1.55
20	227	997	224	28	28	3.01	0.50	0.23

Group 17

Heifer Genomic Data

Heifer ID	NM$	Milk	CM$	Fat (lbs)	Pro (lbs.)	SCS	PL	CCR
1	195	26	197	5	4	2.96	2.50	2.50
2	588	1269	586	63	33	2.92	2.00	-1.30
3	455	353	461	40	19	2.92	3.00	1.60
4	14	196	13	17	2	2.97	-0.60	-2.70
5	266	977	265	36	28	2.98	0.80	-0.70
6	193	947	192	24	22	2.86	0.90	-1.10
7	223	-504	228	15	-9	2.95	3.10	2.00
8	136	223	135	10	6	3.01	1.30	-0.70
9	248	-206	260	-7	12	2.90	3.40	1.10
10	304	1268	303	31	37	2.99	0.30	-1.00
11	203	-87	215	5	14	2.87	2.70	1.50
12	225	855	216	24	11	3.02	0.90	-0.90
13	276	1022	274	40	28	2.99	-0.10	-1.50
14	230	160	233	6	12	3.07	2.40	2.40
15	260	-80	276	7	15	2.74	2.60	1.40
16	347	556	350	20	21	2.96	2.30	1.80
17	114	142	113	5	0	2.96	1.60	0.90
18	190	-347	202	6	10	2.95	2.80	0.40
19	611	777	621	59	39	2.94	3.80	-0.10
20	92	200	98	19	12	2.87	0.00	1.20

HCR
-0.9
3.5
-0.9
3.1
0
0.6
0
-0.9
0
3.3
0
0
0
0
0
2.2
0
0.6
3.5
0

HCR
-1.22
3.14
0.17
1.95
-0.10
-0.10
0.23
-0.86
-0.30
1.58
0.00
0.53
0.96
0.63
1.16
1.49
0.17
0.07
2.38
0.07

HCR
0.80
0.20
0.60
-0.60
-0.80
-1.10
1.80
-1.90
0.90
0.00
1.40
0.20
-0.30
1.40
1.80
0.90
0.90
0.30
2.60
0.50

Heifer Sire Data

Heifer #	NM$	Milk	CM$	Fat (lbs)	Pro (lbs.)	SCS	PL	CCR
1	531	1252	524	67	36	3.24	3.4	2.7
2	589	1983	604	44	67	2.89	5.3	0.7
3	546	872	571	81	41	2.94	3	0.5
4	598	983	615	53	37	2.79	5.4	0.8
5	520	910	524	62	29	2.99	3.7	0.6
6	520	910	524	62	29	2.99	3.7	0.6
7	676	1020	714	54	55	3.07	5.5	3.7
8	676	1020	714	54	55	3.07	5.5	3.7
9	676	1020	714	54	55	3.07	5.5	3.7
10	589	1983	604	44	67	2.89	5.3	0.7
11	676	1020	714	54	55	3.07	5.5	3.7
12	604	650	644	79	41	2.75	3.2	0.8
13	676	1020	714	54	55	3.07	5.5	3.7
14	177	356	175	35	13	3.19	-0.9	-3
15	604	650	644	79	41	2.75	3.2	0.8
16	604	650	644	79	41	2.75	3.2	0.8
17	604	650	644	79	41	2.75	3.2	0.8
18	604	650	644	79	41	2.75	3.2	0.8
19	621	2252	613	79	61	2.94	2.8	-0.6
20	621	2252	613	79	61	2.94	2.8	-0.6

Heifer Sire + MGS Data

Heifer #	NM$	Milk	CM$	Fat (lbs)	Pro (lbs.)	SCS	PL	CCR
1	447	999	439	55	27	3.14	2.97	1.85
2	534	1706	545	41	56	2.89	4.42	1.25
3	451	459	479	64	29	2.85	2.57	1.16
4	487	1062	505	46	40	2.82	3.73	0.86
5	446	846	451	53	28	2.97	3.14	0.33
6	434	658	446	55	28	3.00	2.51	0.36
7	601	1017	626	46	47	3.05	5.61	3.14
8	590	687	625	56	43	2.98	4.36	2.81
9	533	522	561	39	33	2.96	5.18	2.71
10	544	1653	553	39	54	2.93	5.48	1.16
11	581	911	619	40	50	2.93	5.12	2.31
12	554	773	579	62	37	2.83	4.09	1.22
13	630	1229	656	55	52	2.94	5.08	2.18
14	222	372	230	41	17	3.03	-0.46	-1.68
15	539	933	567	61	43	2.82	3.40	0.79
16	539	933	567	61	43	2.82	3.40	0.79
17	539	933	567	61	43	2.82	3.40	0.79
18	423	154	460	49	25	2.80	2.84	1.49
19	503	1900	503	63	56	2.92	2.01	-0.07
20	503	1900	503	63	56	2.92	2.01	-0.07

Group 18

Heifer Genomic Data

Heifer ID	NM$	Milk	CM$	Fat (lbs)	Pro (lbs.)	SCS	PL	CCR
1	287	620	279	28	9	3.12	2.60	1.40
2	457	1723	455	19	49	3.02	2.40	-0.60
3	482	92	492	61	22	3.02	2.90	1.80
4	364	832	366	27	32	3.10	1.30	-0.70
5	384	238	388	33	14	2.97	2.60	0.70
6	457	1136	452	20	21	2.87	3.40	1.50
7	426	611	429	-1	28	3.12	3.70	3.30
8	569	-333	586	56	16	2.89	3.50	1.30
9	414	-100	425	27	13	2.89	3.50	1.60
10	414	119	426	33	18	2.83	3.50	0.80
11	581	687	587	33	34	3.05	3.70	3.20
12	529	624	535	47	25	2.87	3.80	0.80
13	370	786	373	11	36	3.21	2.80	1.70
14	329	89	341	18	19	2.86	2.30	1.20
15	303	354	315	41	27	2.87	1.30	-0.20
16	475	228	486	43	23	2.87	3.10	1.00
17	387	1073	392	39	40	3.00	1.60	-0.10
18	400	-692	422	41	9	2.78	3.50	2.70
19	280	-426	293	10	3	2.81	3.00	3.40
20	276	93	285	25	14	2.89	2.80	2.00

HCR
0.9
-0.4
0.2
0.7
-1.3
-1.3
1.2
1.2
1.2
-0.4
1.2
-1.7
1.2
-1.4
-1.7
-1.7
-1.7
-1.7
0
0

HCR
1.22
0.23
0.50
0.46
0.36
-1.49
1.95
0.92
-0.96
0.89
0.76
0.03
0.00
-0.59
-0.59
-0.59
-0.59
-0.99
0.00
0.00

HCR
1.50
0.30
-0.20
-0.40
-0.40
0.30
2.60
0.60
0.30
0.80
1.10
0.60
0.50
-0.60
-1.20
-0.20
-0.50
0.00
3.00
-1.30

Heifer Sire Data

Heifer #	NM$	Milk	CM$	Fat (lbs)	Pro (lbs.)	SCS	PL	CCR
1	531	1252	524	67	36	3.24	3.4	2.7
2	531	1252	524	67	36	3.24	3.4	2.7
3	531	1252	524	67	36	3.24	3.4	2.7
4	419	650	453	71	39	2.91	1	-3.9
5	531	1252	524	67	36	3.24	3.4	2.7
6	531	1252	524	67	36	3.24	3.4	2.7
7	531	1252	524	67	36	3.24	3.4	2.7
8	676	1020	714	54	55	3.07	5.5	3.7
9	177	356	175	35	13	3.19	-0.9	-3
10	604	650	644	79	41	2.75	3.2	0.8
11	581	206	626	47	33	2.9	5.1	1.9
12	581	206	626	47	33	2.9	5.1	1.9
13	581	206	626	47	33	2.9	5.1	1.9
14	581	206	626	47	33	2.9	5.1	1.9
15	639	1206	672	60	53	2.75	6.2	2.5
16	639	1206	672	60	53	2.75	6.2	2.5
17	639	1206	672	60	53	2.75	6.2	2.5
18	639	1206	672	60	53	2.75	6.2	2.5
19	639	1206	672	60	53	2.75	6.2	2.5
20	639	1206	672	60	53	2.75	6.2	2.5

Heifer Sire + MGS Data

Heifer #	NM$	Milk	CM$	Fat (lbs)	Pro (lbs.)	SCS	PL	CCR
1	482	1007	482	55	32	3.13	3.23	1.75
2	453	1028	453	54	33	3.16	2.61	3.00
3	452	1140	446	60	33	3.14	2.28	1.98
4	396	920	420	57	40	2.85	1.12	-4.16
5	398	978	388	48	26	3.19	2.41	2.21
6	504	1091	510	65	38	3.08	2.41	1.55
7	506	1171	500	54	34	3.16	4.22	2.48
8	676	913	712	71	49	2.94	4.95	2.24
9	296	883	302	52	32	3.06	-0.43	-3.40
10	470	618	496	56	33	2.85	2.64	-0.33
11	524	640	555	40	38	2.92	4.65	1.52
12	512	477	543	52	33	2.92	3.20	1.02
13	613	376	654	66	35	2.83	4.69	1.06
14	486	381	518	43	31	2.91	4.06	1.19
15	512	854	544	54	44	2.84	4.16	1.62
16	547	1143	573	64	48	2.78	4.22	1.02
17	514	1209	542	50	51	2.80	4.26	1.98
18	625	967	660	65	48	2.81	5.02	2.15
19	503	1017	518	45	36	2.68	4.79	2.34
20	512	854	544	54	44	2.84	4.16	1.62

Group 19

Heifer Genomic Data

Heifer ID	NM$	Milk	CM$	Fat (lbs)	Pro (lbs.)	SCS	PL	CCR
1	340	791	334	36	21	3.20	1.10	1.20
2	312	980	309	41	30	3.14	1.00	0.80
3	464	547	463	45	21	3.16	2.50	2.00
4	74	410	72	4	8	2.96	0.10	-0.30
5	181	-190	183	4	1	3.10	1.80	3.10
6	178	-554	187	25	-1	2.98	1.50	1.40
7	505	960	499	46	25	3.16	3.30	1.50
8	432	270	441	29	25	3.05	3.00	1.30
9	293	283	303	33	27	3.00	1.10	-0.10
10	-105	-1769	-95	-25	-32	3.12	2.90	3.40
11	201	230	202	2	10	3.01	2.10	0.10
12	336	352	336	20	13	3.06	2.80	1.30
13	405	512	410	22	21	2.91	3.10	-0.20
14	114	-39	121	-7	10	2.95	1.20	0.80
15	641	650	654	30	37	2.86	4.30	2.90
16	455	493	460	23	18	2.82	3.80	1.90
17	516	430	533	29	32	2.72	4.30	2.00
18	694	868	711	61	46	2.74	3.50	-1.20
19	344	-216	355	14	7	2.81	3.60	3.10
20	609	848	618	39	41	2.99	3.30	2.00

HCR
0.9
0.9
0.9
-1
0.9
0.9
0.9
1.2
-1.4
-1.7
2
2
2
2
1
1
1
1
1
1

HCR
0.63
1.55
-0.17
-2.01
0.66
1.12
1.75
0.76
-1.88
-2.21
1.85
1.78
1.29
2.54
0.03
0.73
0.66
1.62
0.92
0.03

HCR
0.60
0.20
-0.10
-1.00
0.70
1.10
2.00
0.10
-1.20
0.90
0.50
1.00
-0.80
1.30
1.20
-0.30
0.50
-0.40
-0.40
1.20

Heifer Sire Data

Heifer #	NM$	Milk	CM$	Fat (lbs)	Pro (lbs.)	SCS	PL	CCR
1	456	830	482	37	38	2.81	4.2	2.3
2	621	2252	613	79	61	2.94	2.8	-0.6
3	621	2252	613	79	61	2.94	2.8	-0.6
4	272	1281	276	37	40	2.96	0.5	-0.3
5	621	2252	613	79	61	2.94	2.8	-0.6
6	281	1253	299	32	48	2.97	0.5	1
7	467	1244	471	68	39	2.94	2.7	-0.7
8	621	2252	613	79	61	2.94	2.8	-0.6
9	621	2252	613	79	61	2.94	2.8	-0.6
10	621	2252	613	79	61	2.94	2.8	-0.6
11	553	1007	579	73	42	2.65	3.2	1.9
12	621	2252	613	79	61	2.94	2.8	-0.6
13	447	422	478	35	29	2.76	4.2	4.1
14	669	761	700	82	37	2.62	5.5	0.8
15	467	1244	471	68	39	2.94	2.7	-0.7
16	621	2252	613	79	61	2.94	2.8	-0.6
17	447	422	478	35	29	2.76	4.2	4.1
18	621	2252	613	79	61	2.94	2.8	-0.6
19	447	422	478	35	29	2.76	4.2	4.1
20	669	761	700	82	37	2.62	5.5	0.8

Heifer Sire + MGS Data

Heifer #	NM$	Milk	CM$	Fat (lbs)	Pro (lbs.)	SCS	PL	CCR
1	404	871	420	36	31	2.81	3.93	0.89
2	544	1554	557	70	54	2.95	2.05	0.23
3	544	1554	557	70	54	2.95	2.05	0.23
4	174	889	178	23	29	2.93	0.26	-1.02
5	560	1760	564	64	53	2.87	3.23	0.36
6	288	1242	299	39	45	3.00	0.13	-0.20
7	421	1043	425	54	33	2.89	2.48	-0.56
8	564	1897	560	75	53	2.91	2.74	-0.63
9	564	1897	560	75	53	2.91	2.74	-0.63
10	570	1863	564	70	51	2.91	2.57	-0.63
11	491	843	508	63	33	2.78	2.24	0.43
12	522	1860	527	57	57	2.89	2.90	-0.56
13	463	573	481	30	22	2.78	4.46	3.89
14	534	916	561	65	40	2.71	3.80	0.86
15	356	973	353	48	28	3.00	1.95	-0.03
16	601	1941	594	66	54	3.01	2.87	0.66
17	429	346	468	41	33	2.83	2.97	3.33
18	500	1909	496	64	53	2.92	2.01	-0.50
19	429	346	468	41	33	2.83	2.97	3.33
20	592	776	621	66	37	2.66	5.02	1.29

Group 20

Heifer Genomic Data

Heifer ID	NM$	Milk	CM$	Fat (lbs)	Pro (lbs.)	SCS	PL	CCR
1	307	1238	303	36	26	2.89	0.60	0.00
2	136	992	134	7	30	3.09	0.50	-1.90
3	256	977	258	35	36	3.06	-0.10	-0.50
4	293	224	301	18	15	2.88	2.30	2.80
5	89	-130	100	39	12	2.88	-0.70	-2.40
6	210	548	217	19	29	3.02	1.20	-1.40
7	99	-59	101	15	5	3.09	0.20	0.50
8	151	192	159	4	16	2.88	1.50	1.20
9	537	1462	535	61	38	2.90	2.10	-0.50
10	266	739	263	29	21	3.08	0.80	-0.30
11	219	1504	209	31	34	3.15	-1.00	-2.90
12	450	1206	443	53	32	3.23	0.40	-1.70
13	273	107	276	-11	6	2.90	3.70	3.50
14	386	1181	383	26	22	2.80	2.40	0.00
15	308	350	313	13	15	2.87	3.50	1.70
16	150	672	152	1	29	3.15	1.40	-0.30
17	524	750	531	25	37	3.04	3.50	2.50
18	427	-18	441	29	18	2.87	2.40	1.00
19	556	1849	546	57	41	3.05	1.80	-2.10
20	440	1310	446	66	51	2.99	0.00	-1.90

HCR
3.5
0
0
0
0
0
-1.9
0
0
0
-3
0
2.2
3.3
-1.9
0
2.2
0
2.2
3.3

HCR
1.68
0.99
0.99
-0.33
1.16
0.30
-1.19
-0.63
-0.63
0.83
-2.24
-1.22
2.38
2.18
-1.19
0.50
2.44
0.00
2.44
3.33

HCR
0.20
-1.30
2.00
2.00
-2.10
-0.90
0.50
1.90
-0.70
0.20
-0.70
0.10
0.30
0.00
0.00
-1.10
0.90
0.60
-0.40
0.10