Productive Life – New Perspectives

Matt Sattler

2024 High Plains Dairy Conference

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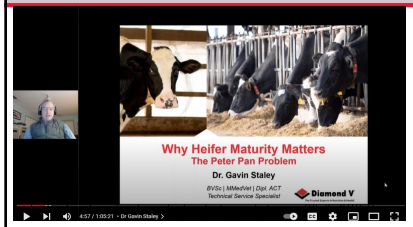
The Trusted Experts In Nutrition & Health

1

Diamond V – Productive Life History



- Dr. Gavin Staley
- What influences 'Elite' performance?
- 2016 – Heifer Maturity
- 2020/2021 – Productive Life and Golden Girls
- Thanks to Drs. Gavin Staley and Todd Birkle for contributions to these slides

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From the back end of the cow to the front end of the cow

Genetics/Reproduction → Feed Management/Nutrition

25-year continuous learning process of supporting clients in assessing opportunities, create solutions and utilizing their management data to monitor progress to drive performance and profitability.

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Is there an ideal time to trade in your spouse

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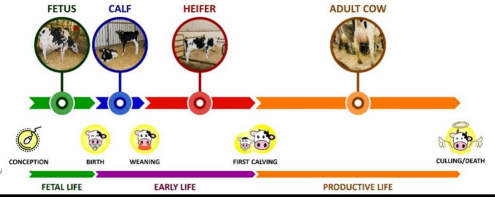
Trading in the family car

- New
  - Looks good
  - Reliable
  - Limited effort to maintain
  - High Cost
- Used
  - Shows it's age
  - Still gets the job done
  - Paid for – no car payment
  - But unknown repairs and maintenance expense
- Career Change
  - Is paid for
  - Dented, rusty, falling apart
  - Unreliable – could die tomorrow
  - Repairs and maintenance will burst the budget

5

What is Productive Life?

- "A long productive life is a desirable trait from several different perspectives. Longevity combines all of the characteristics that are directly associated with a cow's ability to successfully stay in the herd."
  - *Tsuruta et. al, (JDS 2005, Vol 88, No. 3)*
- "Productive lifespan of dairy cattle may be defined as the time from first calving to exit from the herd when the cow is no longer sufficiently productive."
  - *Albert De Vries PhD, (JDS 2020, Vol 103, No. 4)*



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Productive Life varies by geography and management style

Country	Average productive life*
New Zealand	4.2
United Kingdom	3.9
The Netherlands	3.7
Poland	3.3[4]
France	3.2[5]
China	2.7[6]
USA	2.7[7]
Canada	2.7[8]
Israel	2.5

Productive Life defined in study as "time span between first calving and culling"
Source: FAO

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Why should you care about Productive Life?
Zoetis/Compeer Financial Evaluation

Table 1. Correlations between NFI and key measures.

Variable	Correlation with NFI	Key Learnings
ECM shipped, lb/cow/day	0.18**	More milk per cow is profitable – effect of marginal milk
Heifer survival rate, %	0.15**	Keeping calves healthy is bene
21-day pregnancy risk	0.13*	Increased days op
Number heifers	0.10*	Maintaining he can improve
ECM shipped, herd total, cwt	0.10**	Profitability
Herd size, lactating	0.08*	Due to econo are more profita
Death loss, %	-0.11**	Death losses negative
Somatic cell count (SCC)	-0.12**	Investing to produce high quality milk is profitable
Labor cost[a]	-0.17**	A well-paid workforce is profitable
Net herd turnover cost[b]	-0.29**	Targeted culling and minimizing death losses improves profitability by increasing revenue from cow and milk sales

Correlation different from zero: *P < 0.05; **P < 0.01
[a] Labor cost, $ [illegible] or beef])
[b] Net herd rep

10 Drivers of Profitability – ALL directly or indirectly related to Productive Life

- Ongoing study
- 93 farms ranging from 500-4,700 cows

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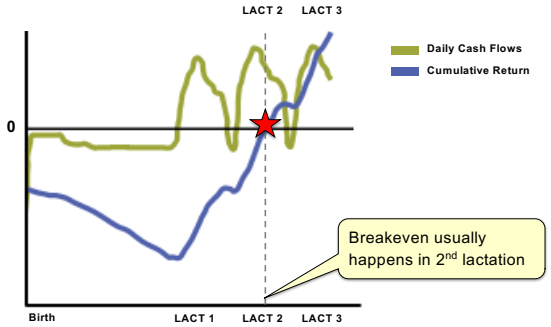
Every dairy cow has a breakeven point

Breakeven point: when milk production value equals total heifer raising cost



Source: Ferguson and Galligan, Western Canadian Dairy Symposium, 1995.

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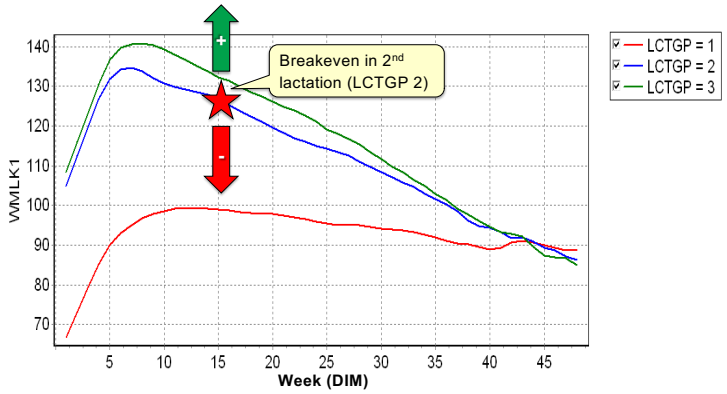
Breakeven usually occurs in 2nd lactation

PLOT WMLK1 BY LCTGP



Source: DairyComp 305

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Cows at Lact 3 and beyond are "Golden Girls" (heifer raising costs recuperated)

PLOT WMLK1 BY LCTGP

P&P = "Peaks and Persistence"
DIM = "Days in Milk"

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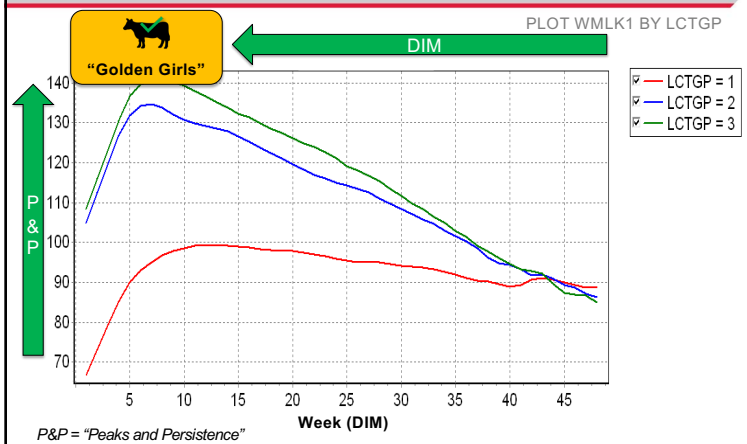
Two primary factors drive milk production for "Golden Girls" …

PLOT WMLK1 BY LCTGP



P&P = "Peaks and Persistence"
DIM = "Days in Milk"

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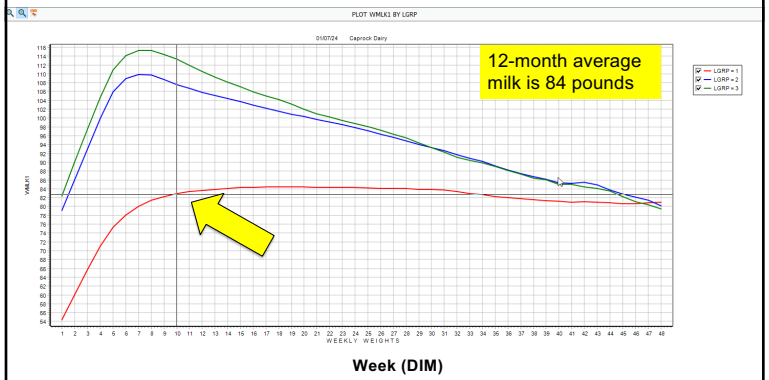
Lactation 1 week 10 milk production sets the bar for the entire herd

Week 10 Lact 1 milk approximates herd annual avg. milk



Week (DIM)

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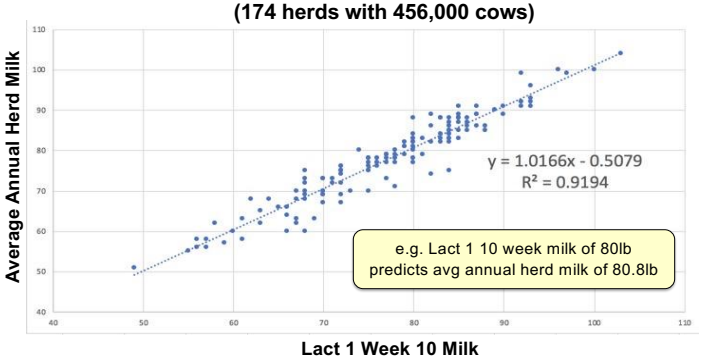
Lactation 1 week 10 milk production sets the bar for the entire herd

Lact 1 Week 10 milk & average annual herd milk (174 herds with 456,000 cows)



Source: 456k cows in 174 herds

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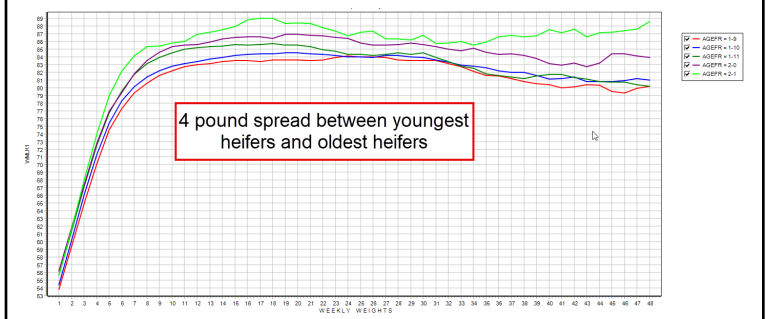
Age at freshening and growth to maturity influences peaks and productivity

Lactation 1



Week (DIM)

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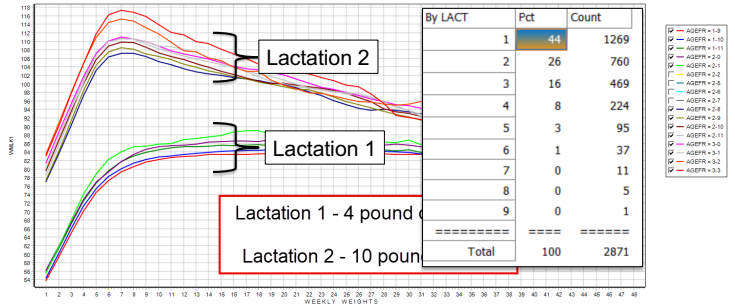
Age at freshening and growth to maturity influences peaks and productivity

Both Lactation 1 and Lactation 2



Week (DIM)

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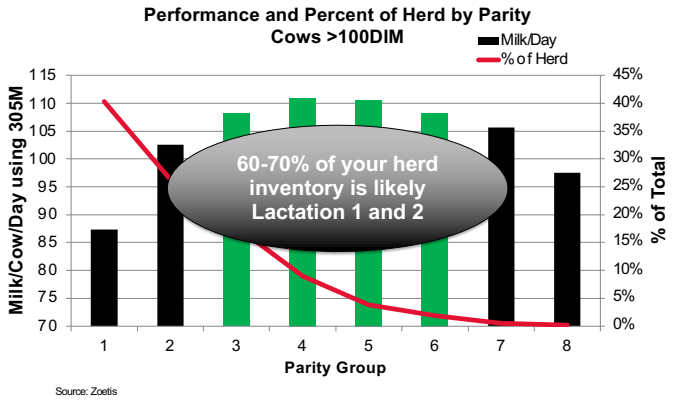
16

Where's the MILK . . . And Profitability



Source: Zoetis

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17

Gavin's Golden Girl Goals

- Target - >40% of the milking herd being Lactation 3+
- To achieve this:
  - Culling rate has to be maintained between 30-35%
  - Lactation 1 population in the range of 30-35%
  - Calf/heifer inventories 35-40% of the milking herd

18

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Case Study – Large Midwest Dairy
Production Summary by Weight Group - 2017

	Weight filters
WTG10	<1152 pounds
WTG11	1152-1255 pounds
WTG12	1256-1359 pounds
WTG13	>1359 pounds

SUM ... BY WTG FOR LACT=1 WTG>0

By WTG	Pct	Count	AvWEIGH	Av DIM	AvAGEFR	AvMLK1	AvP305M	Av PTAM
10	10	51	1096	53	678	67.7	18404	517
11	34	172	1211	60	683	72.4	19293	611
12	31	164	1303	71	687	74.7	19959	680
13	25	129	1418	73	702	82.6	21265	687
==========	====	======	========	========	========	========	========	========
Total	100	521	1280	66	688	75.2	19911	642

19

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Case Study – Large Midwest Dairy
Production Summary by Weight Group - 2017

	Weight filters
WTG10	<1152 pounds
WTG11	1152-1255 pounds
WTG12	1256-1359 pounds
WTG13	>1359 pounds

WTG Group	Av Weight Difference	Av P305M Difference	* Milk opportunity/weight difference
WTG10-WTG11	114	1,009	8.9
WTG11-WTG12	85	744	8.8
WTG12-WTG13	118	1,333	11.3

*** For every 1-pound improvement in post-calving weight, production was increased by 8.8 to 11.3 pounds of milk**

20

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Case Study – Large Midwest Dairy Management Changes

- 2017 - Strategic weight observations in heifer program
  - Assessed baseline
  - Validated performance impact
- 2017 – Today
  - Incorporated management changes – invested in raising more mature heifers
  - Been patient – giving their heifers/cows more time to mature. VWP adjustments:

	Heifers	Lactation 1	Lactation 2+
Original	385	60	60
Summer 2020	415	70	70
Spring 2022		80	73

  - Deliberate focus on shifting herd dynamics and building more 'Golden Girls'
  - Expanded by >2X to grow herd to 8,000+ cows

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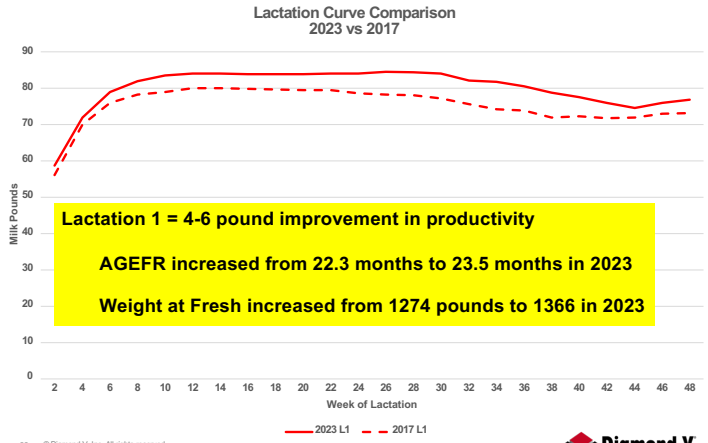
21

2023 vs 2017 Comparison



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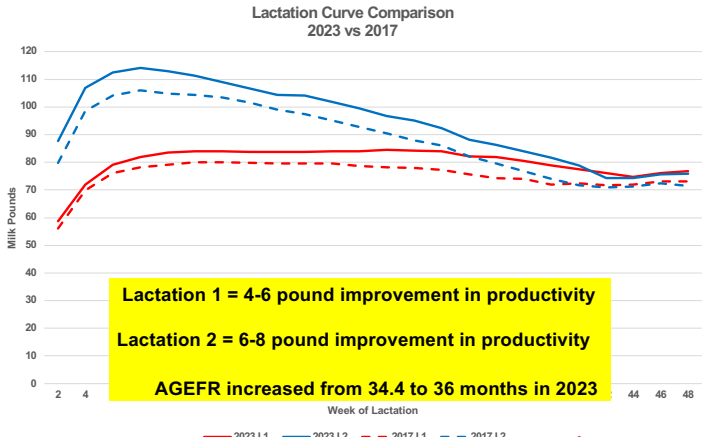
2017 vs 2023 Comparison



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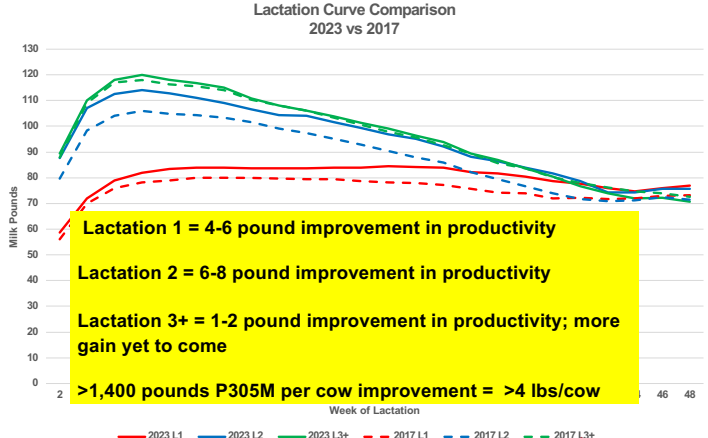
23

2017 vs 2023 Comparison All Lactations



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24

2017 vs 2023 Comparison

	2017	2023	Difference
Age at Fresh – L1	22.3	23.5	+1.2 months
Age at Fresh – L2	34.3	36	+1.7 months
Weight at Fresh – L1	1274	1366	+92 pounds
Turnover Rate	35%	32%	-3%
% Lactation 4+ cows	20%	28%	+8%
Average Lactations	2.3	2.6	+0.3
L1 P305M	21,112	22,555	+1,443 pounds
L2 P305M	25,094	27,288	**+2,194 pounds**
L3+ P305M	27,253	28,092	+839
All P305M	24,557	25,966	+1,409 pounds
Herd FCM	96	100	**+4 pounds**

25

How to Assess and Improve Productive Life

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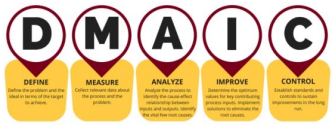
- Step 5 – Repeat steps 1-4



26

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27

Do my heifers measure up?

- Must first understand mature body size at the dairy
  - Lactation 3 and 4 cows 80-120 DIM are a representative sample of mature cows
  - Weigh 15-25 to develop you Mature Weight benchmark
- Industry Standards for Growth
  - Weaning – double body weight by weaning
  - Pre-breeding – 55% of mature body size at breeding
  - Post calving – 85% of mature body size post calving
- Example – 1,500 pound mature cow with 85 pound birthweight
  - Wean weight – 170 pounds
  - Prebreed at 400 days old – 825 (ADG of 1.85 lbs/day)
  - Post calving at 700 days old – 1,275
- Sattler challenge – Let's manage to be better than average!

28

Do my heifers measure up?

- Set goals to fit your program
- Two approaches to achieving goals
  - Extend VWP to give heifers more time
    - Adding days to the program is EXPENSIVE
    - Can create a whole in your heifer inventory if not managed well
  - Assess your nutrition program
    - Can formulations be tweaked to target higher ADG?
    - Targeting mature growth not simply weight

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29

So how many heifers do you need?

30

How to determine heifer needs

Equation: 2*(Herd size)*(**TOR**)*(**AFC**/24)*(1+**NCR**)

Variables:

TOR
- Turnover rate ("culling rate")
- Expressed as a decimal fraction

AFC
- Age at first calving (months)

NCR
- Non-completion rate
- Heifers born alive (not DOA) that leave before entering the herd
- Expressed as a decimal fraction

Source: David Vagnoni, Ph.D, Cal Poly

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31

Non-completion Rate

Command ? EVENTS EC=1 EC=14 EC=15\6YS FOR GNDR=F BDAT=3.1.21-3.1.22

Reports

Lists

29% did not 'graduate'

Event	Total	<31	60	90	120	150	180	210	240	270	300	330	>330
BORN	3297	3297	0	0	0	0	0	0	0	0	0	0	0
SOLD	426	0	0	0	1	11	7	5	5	1	5	4	387
DIED	526	277	31	32	49	40	17	15	13	3	4	1	44
TOTALS	4249	3574	31	32	50	51	24	20	18	4	9	5	431

- What is the probability of a calf born today entering the milking string within 24 months?
- Analysis:
  - Step back to heifers born 2-3 years ago
  - Evaluate proportion that remain active at the dairy
- **CAUTION**
  - **Results can be alarming – as high as 25-30% not 'graduating' to the milking string**
  - **Making decisions today based on performance from 2-3 years ago**

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32

Monitoring Replacement Needs

- How are you monitoring projected heifer inventories?
- Who is responsible for it?
- How often do you re-evaluate?
- Trust but verify!

Pregnancies by month due

		Lactation=0			Lactation>0										
Month Due	Conv	Sexed	Beef	Conv	Sexed	Beef	Other	Hfr pregs	Cow pregs	Total pregs	Live female calves (640)	Females 2milk (525)	Dairy bulls	Beef
Feb-24	0	421	19	55	281	185	197	440	718	1158	582	477	8	169
Mar-24	0	588	15	70	324	163	177	603	734	1337	760	623	1	147
Apr-24	0	469	15	0	367	129	69	484	565	1049	664	545	0	120
May-24	0	557	23	0	267	178	113	580	558	1138	665	545	0	167
Jun-24	0	452	40	0	247	301	246	492	794	1286	562	461	1	284
Jul-24	0	477	47	0	198	404	408	524	1010	1534	547	449	5	375
Aug-24	0	497	50	0	258	903	26	547	1187	1734	608	498	6	784
Sep-24	0	395	34	0	317	814	0	429	1131	1560	565	463	5	696

DOA rate	3%
Survivability	82%
Conv Hfr ratio	48%
Sexed Hfr ratio	90%
Heifer abort rate	3.5%
Milking herd abort rate	6.0%
PG Cull Rate	10.0%

33

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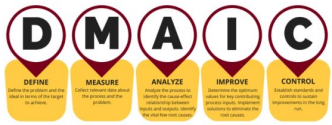
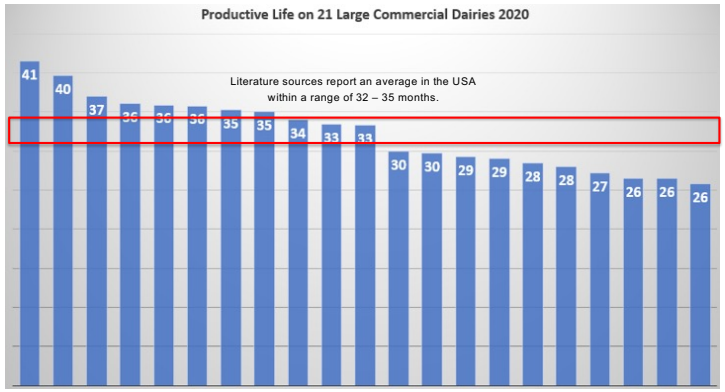


34

Productive Life Review of 21 Large Commercial Dairies



Source: Birkle, 21 commercial herds; Avg PL source DeVries, MDPI, Staley.

35

Case Study Dairy vs SW Dairies

	Case Study Dairy	SW Dairies
Age at Fresh – L1	23.5	21.7 to 25.1
Age at Fresh – L2	36	34 to 37.9
Weight at Fresh – L1	1366	NA
Turnover Rate	32%	24% to 47%
% Lactation 4+ cows	28%	10% to 27%
Average Lactations	2.6	1.9 to 2.7
Herd FCM	100	59 to 101

- Comparison vs group of 16 SW Dairies
- Wide range of demographics and performance in this set of dairies – Opportunities Exist!

36

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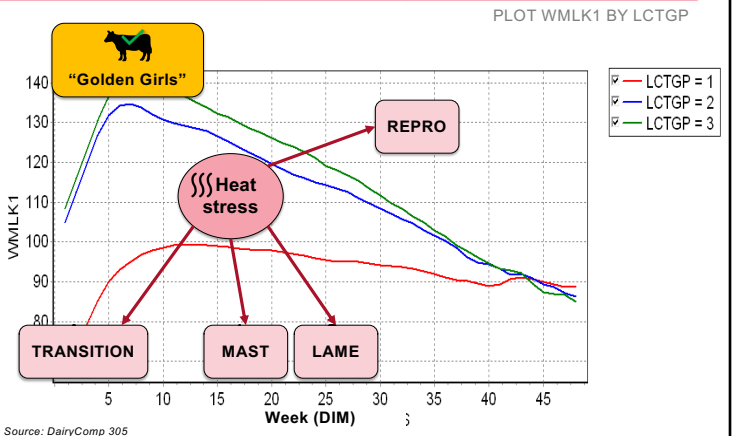
Culling and "The Four Horsemen of the Apocalypse" (the "leaky bucket")



Source: DairyComp 305

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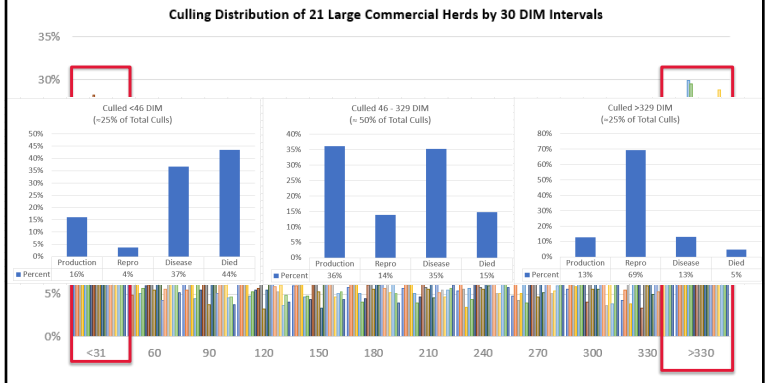
38

Distribution of and recorded culling reasons
21 Large Commercial Herds



Source: Birkle, 21 commercial herds

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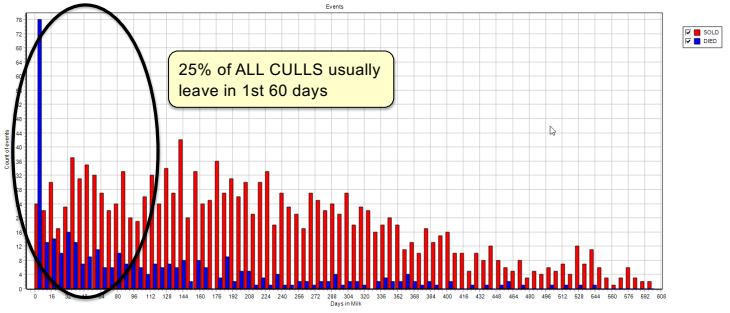
When are cows being culled?



Source: DairyComp 305

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Why are cows being culled?

(ECON FOR LACT>0\E)

DCAR	Jan**	Feb23	Mar23	Apr23	May23	Jun23	Jul23	Aug23	Sep23	Oct23	Nov23	Dec23	Total
Respiratory	5	3	9	5	2	2	5	6	1	3	1	6	48
Low Production	107	29	68	82	19	33	41	48	12	85	47	158	729
Reproduction - Open	101	51	53	112	24	63	66	137	25	140	126	168	1066
47	0	1	0	0	0	0	1	0	0	0	0	0	2
54	0	0	0	0	0	0	0	0	0	0	1	0	1
63	0	0	0	0	0	0	0	0	1	0	0	0	1
74	0	0	0	0	0	0	0	0	0	1	0	0	1
Totals	511	427	344	323	217	371	283	451	404	614	537	749	5231

- How consistently are 'reasons' being recorded accurately?
- Do you have checks/balances in place to monitor these recorded reasons?
- What can we learn from the data?

Source: DairyComp 305

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41

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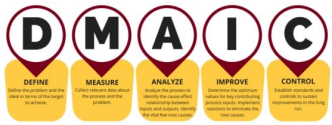

42

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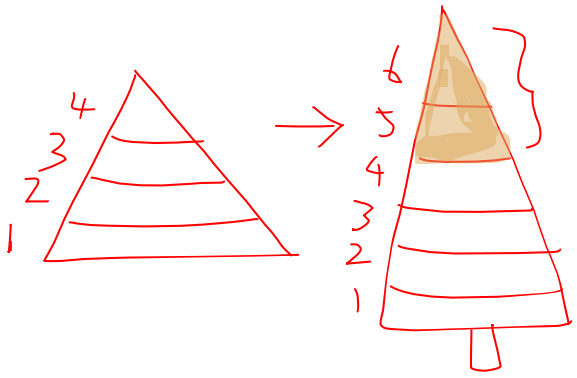
Dr. Staley's = "Lactree"



43

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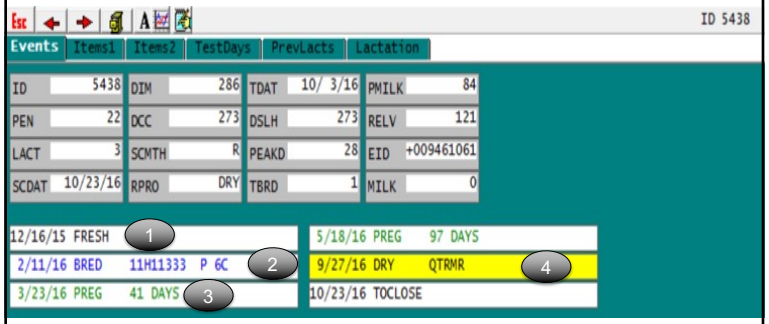
The 4-event cow



More 4-event cows will help you achieve a goal of herd maturity

44

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Management considerations to promote the 4-event cow

- Heifer raising
  - Goal setting and monitoring
  - Investment vs. expense mentality
  - Focus on growth to maturity
- Transition Management
  - Pen stocking densities
  - Bunk space
  - Dry period/CU period length
- Cow Comfort
  - Lock up times
  - Corral/stall maintenance
  - Time budgets
  - Heat Abatement
- Nutrition
  - Diet consistency
  - Feed availability and accessibility
- Reproduction
  - Voluntary wait periods
  - Sync protocols/compliance
- Genetics
  - Selection intensity on health/wellness traits
  - Fertility
- Technology
  - Activity systems
  - Computer vision
  - Others . . .

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45

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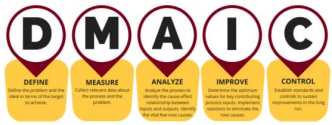
- Step 4 - Make management adjustments based on analysis (Step 3) to improve cow Profitable Productive Life.
- Step 5 – Repeat steps 1-4



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46

Benefit vs Bother Ratio

- Productive Life goals are NOT about chasing herd demographics.
- Goal - Productive Life efforts are to enhance productivity and retention within the herd to improve profitability.
  - Maintaining mature cows is NOT easy
  - Management team MUST be committed to putting forth the effort
  - Provide them with the resources necessary to succeed

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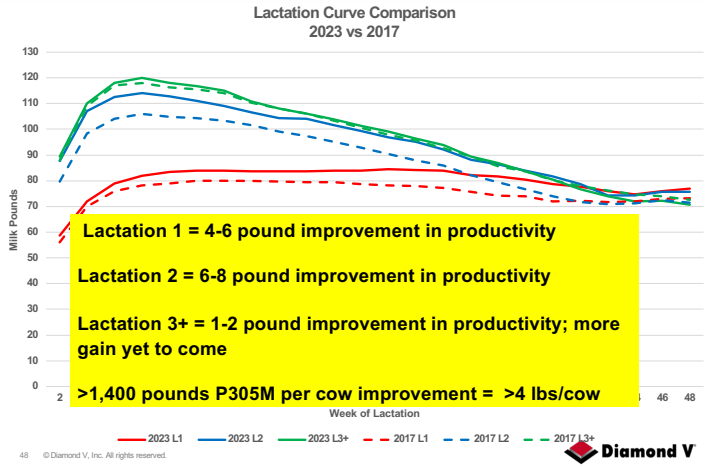
47

Productive Life focus does impact productivity and profitability



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48

Productive Life focus does impact productivity and profitability

	2017	2023	Difference
Age at Fresh – L1	22.3	23.5	+1.2 months
Age at Fresh – L2	34.3	36	+1.7 months
Weight at Fresh – L1	1274	1366	+92 pounds
Turnover Rate	35%	32%	-3%
% Lactation 4+ cows	20%	28%	+8%
Average Lactations	2.3	2.6	+0.3
L1 P305M	21,112	22,555	+1,443 pounds
L2 P305M	25,094	27,288	**+2,194 pounds**
L3+ P305M	27,253	28,092	+839
All P305M	24,557	25,966	+1,409 pounds
Herd FCM	96	100	**+4 pounds**

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49

Productive Life opportunities exist at nearly every dairy

	Case Study Dairy	SW Dairies
Age at Fresh – L1	23.5	21.7 to 25.1
Age at Fresh – L2	36	37.9
Prefresh Weight – L0	1366	NA
Turnover Rate	32%	24% to 47%
% Lactation 4+ cows	28%	10% to 27%
Average Lactations	2.6	1.9 to 2.7
Herd FCM	100	59 to 101

- Comparison vs group of 16 SW Dairies
- Wide range of demographics and performance in this set of dairies – Opportunities Exist!

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50

Wrap up - Next Steps

- Impacting change in Productive Life and Heifer Maturity is a long-term process and an investment.
- Organize your team and advisors to dive in and explore the opportunity at your dairy.
- Set goals and monitor progress.
- Diamond V is here to help.

Matt Sattler
msattler@diamondv.com
(608) 844-1001

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51