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Monitoring gilt performance and retention as inputs to overall sow productivity

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Purpose and introduction

I am pleased to present this presentation with the perspective of a veterinarian working with a 30,000 sow production system. Herds for Holden Farms are generally located in Iowa and Minnesota. Our production system has some unique features which I will try to present carefully to make the best interpretation of the data.

A challenge for our system is to continue to improve productivity gains by fine tuning both our individual herd performance and our approach toward system-wide improvements. As our business continues to grow in overall size, it is important to continuously improve our methods and techniques on farm and in data analysis.

This paper will review our approach to analysis and tracking a key component of breeding herd performance – retention of breeding females once in the breeding herd.

The general purpose of this paper is to review some practical aspects of monitoring gilt performance and “retention” as steps towards improved breeding herd productivity.

Definitions and metrics

We will for the purposes of this presentation look at “retention” as the proportion of gilts entered into the sow

herd which reach third parity successfully. “Success” is the female that has farrowed the third litter and has “successfully” completed the third gestation. This definition may affect how you interpret other points presented in this paper or compare to your statistics.

Please note, in our production system, we have some conclusions around how to define successful retention of the gilt entering the breeding herd. We have looked at several measures, which is commonly done in pork production. Which statistic is the best to benchmark your herds may be different from our approach.

Figure 1 shows the system-wide parity distribution for our farms. Herds have reached mature parity distributions and we have no start-up herds in this analysis.

Metric #1: Proportion of culls which are P0, P1 or P2 females (or all three P0-P2 summed). This is a simple statistic to measure, and readily available for herds which do not use PigCHAMP, can be done in herds with simple hand-written records more easily than some of the other parameters. We use PigCHAMP as our sow information system, so I will describe how to extract the data quickly using PigCHAMP standard reports.

Figure 2 shows this approach for whole herd removals (mortality and culling) from a segment of our production

Figure 1: Distribution of ending female inventory/system-wide

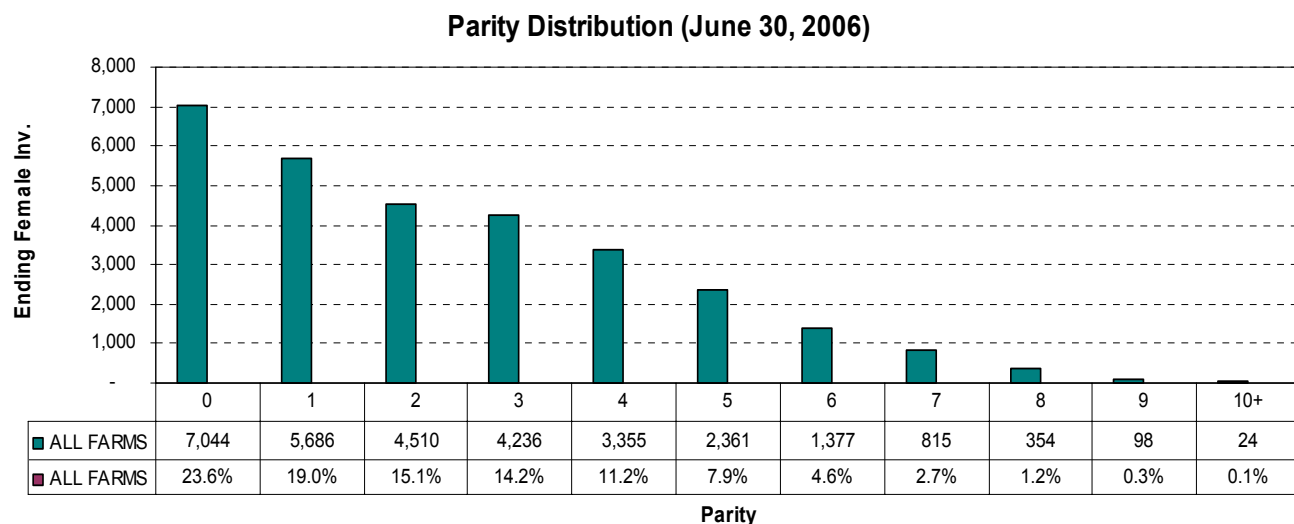
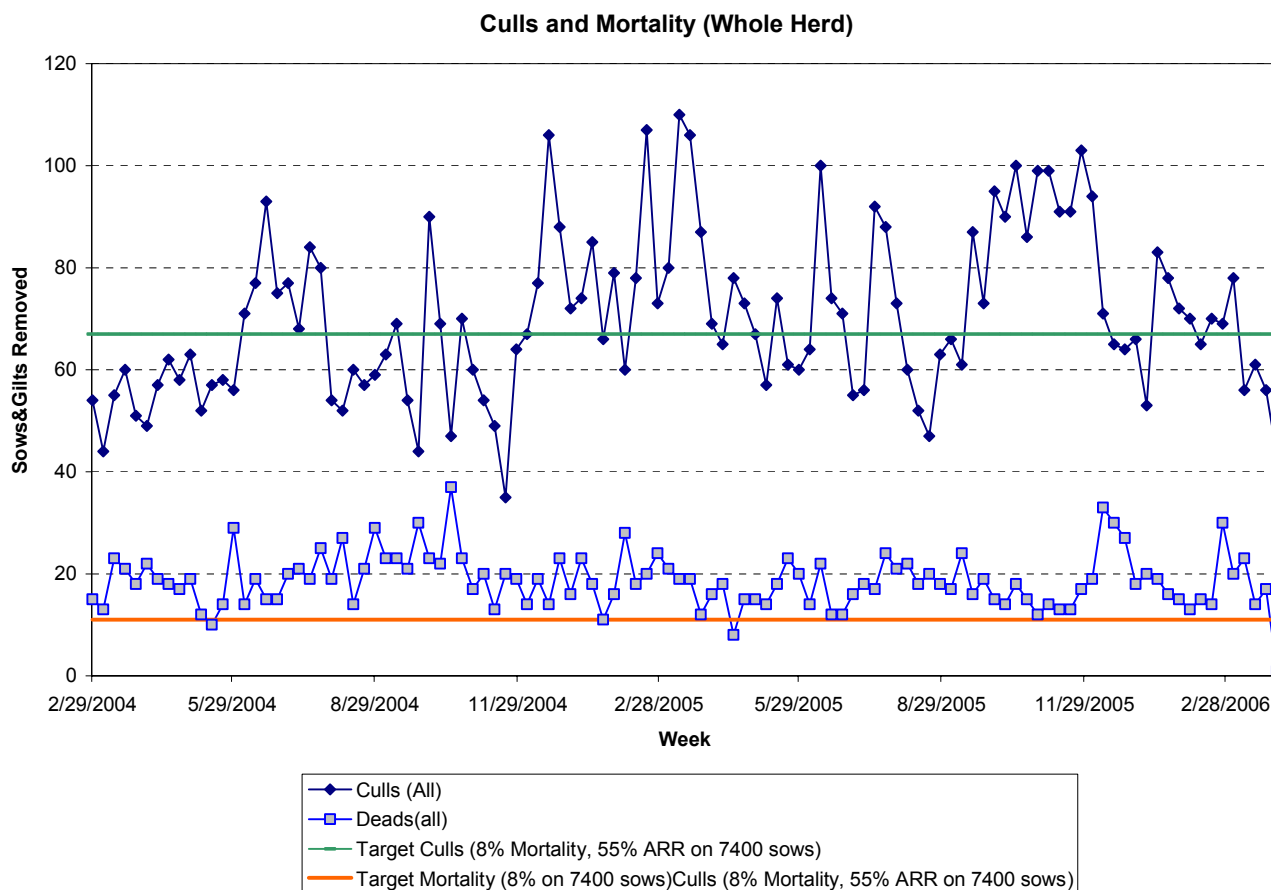


Figure 2: Examples of run chart for culls and mortality



system, with data from basic PigCHAMP Performance Monitor. This is quick review of culling and mortality vs. pre-determined targets.

A specific Performance Monitor by Parity is needed to evaluate individual P0, P1 and P2 proportional culling over time.

Metric #2: Retention: This metric we have come to accept is “retention” of a group of cohort gilts within the breeding herd, i.e. what proportion of a group of gilts, regardless of whether the group size is 10, 100 or 1,000 gilts entered into the herd, survive and successfully farrow their third litter. We can pull this information quickly from PigCHAMP into Excel and summarize the data into groups using 2 steps (1 to define entry groups, and the second to drop into a Pivot table).

Metric #3: Gilt Performance in litter size. This is an important aspect of successful gilt selection, preparation and breeding. If we are focused on improving both productivity and retention, an initial step is to assess Parity 1 performance and how we improve upon gilt performance with successive groups entered.

Note: data recording variances in herds 5 and 9 relate to lower “variation” in Parity 1 TB and PBA, not something

we are doing or have done on improving variability.

Metric #4: The herd performance. Following our removal decisions, how productive is the herd that remains. We often look at litter size by parity, but what about the lifetime performance of the animals in the “current” population. **Table 3** gives an alternative way of looking at the herd composition, or the result of culling and removal.

Further data will be presented in the session to show system and individual farm performance.

Summary

We are like many production systems in facing the challenge of reducing premature removals which we coached farm managers to make in order to make needed performance and genetic changes. It is critical that mindsets develop that support the metrics, and that metrics help develop the correct stockperson behaviors. A consistent and strict culling policy is difficult to maintain through normal challenges of disease/health cycles, herd closures, genetic “roll-overs” and culling decisions aimed at eliminating undesirable structure or characteristics. Retention is dynamic. I hope the tools and metrics presented are helpful in tracking and benchmarking herds within production

Table 1: Removed by parity from initial gilt cohorts (groups of 175) entered

Count of ID	REMOVEPARITY											Grand Total	removed	survive	remove %	survive %
	e-Group	0	1	2	3	4	5	6	7	8	9					
1	10	45	22	11	21	21	18	13	10	3		174	77	97	44%	56%
2	15	47	23	18	13	15	19	16	9			175	85	89	49%	51%
3	11	30	27	16	16	23	25	19	5	3		175	68	106	39%	61%
4	25	22	23	16	17	13	29	16			14	175	70	104	40%	60%
5	18	17	20	17	20	19	33	19			12	175	55	119	31%	69%
6	15	21	16	19	24	30	20	10			20	175	52	122	30%	70%
7	14	29	24	17	19	30	16				26	175	67	107	38%	62%
8	37	25	10	19	20	24	16				24	175	72	102	41%	59%
9	19	16	13	12	16	15	1				83	175	48	126	27%	73%
10	13	12	10	20	13	8					99	175	35	139	20%	80%
11	7	19	12	11	12	3					111	175	38	136	22%	78%
12	10	13	10	12	18						112	175	33	141	19%	81%
13	7	17	10	15	14						112	175	34	140	19%	81%
14	19	14	11	15	12						104	175	44	130	25%	75%
15	9	15	7	19							125	175	31	143	18%	82%
16	8	15	19	17							116	175	42	132	24%	76%
17	8	12	9	12							134	175	29	145	17%	83%
18	16	15	16	3							125	175	47	127	27%	73%
19	10	18	13								134	175	41	133	23%	77%
20	13	25	13								124	175	51	123	29%	71%
21	17	23	14								121	175	54	120	31%	69%
22	10	27	6								132	175	43	131	25%	75%
23	10	22									143	175	32	142	18%	82%
24	10	23									142	175	33	141	19%	81%
25	8	13									154	175	21	153	12%	88%
26	8										167	175	8	166	5%	95%
27	4										171	175	4	170	2%	98%
28	3										146	149	3	171	2%	98%
Grand Total	354	535	328	269	235	201	177	93	24	3	2654	4873	1217			

Table 2: Breakdown of parity 1 litter size; descriptive statistics for 12 months

Farm	Total Born (mean)	TB STDEV	TB SEM	PBA (mean)	ST DEV	SEM	N
1	12.04	3.05	0.10	11.05	2.91	0.09	989
2	12.27	3.09	0.08	11.27	3.05	0.08	1,505
3	12.41	2.99	0.16	11.35	2.93	0.16	335
4	12.26	3.40	0.09	11.01	3.18	0.09	1,364
5	11.18	2.28	0.07	10.05	2.42	0.07	1,164
6	11.75	3.31	0.08	10.72	3.07	0.08	1,514
7	11.94	3.08	0.05	10.96	2.94	0.05	4,224
8	12.02	3.30	0.11	10.72	3.19	0.11	856
9	12.18	2.01	0.05	11.09	1.87	0.05	1,426
10	12.59	3.32	0.08	11.38	3.07	0.07	1,723
11	12.56	2.94	0.09	11.45	2.95	0.09	1,048
Wt AVG	12.08			10.99			16,148

Table 3: Evaluation of underlying "survivor" herd

Data	Current parity										Grand Total
	0	1	2	3	4	5	6	7	8	9	
Average of LIFEAVETOTALBORN		11.59	12.06	12.16	12.09	12.21	11.90	12.17	11.94	12.29	11.96
Std Dev of LIFEAVETOTALBORN		3.21	2.45	1.90	1.82	1.64	1.57	1.34	1.41	0.94	2.36
Count of LIFEAVETOTALBORN		528	379	399	266	154	94	68	86	7	1,981
Average of LIFEAVEBORNALIVE		10.72	11.26	11.31	11.25	11.25	10.93	11.23	10.98	11.30	11.10
Std Dev of LIFEAVEBORNALIVE		2.97	2.13	1.75	1.68	1.39	1.43	1.23	1.30	0.90	2.15
Count of LIFEAVEBORNALIVE		528	379	399	266	154	94	68	86	7	1,981
Average of LIFETOTALNPD	36.4	46.8	54.4	61.2	65.5	71.6	85.1	104.3	109.1	117.6	55.8
Std Dev of LIFETOTALNPD	15.55	19.50	22.44	27.03	33.34	24.39	51.32	39.58	43.04	25.41	31.46
Average of LIFEPECTNPD	49.9	21.0	14.6	11.8	10.0	9.0	9.0	9.2	8.8	8.8	23.1
Std Dev of LIFEPECTNPD	28.02	7.89	5.50	4.68	4.16	2.90	4.10	2.98	3.15	1.86	
Count of ID (Proxy End Inv.)	672	528	379	399	266	154	94	68	86	7	2,653

systems and understanding the between-herd and between system differences that will help increase longevity and overall production.

Acknowledgements

Special thanks in the preparation of this paper to Nick Holden, Curt Hull, my team members at Holden Farms, and Dr. Jose Piva, PIC.

