Progress in Poultry - #42

Contemporary Layer Flock Performance Records
Analysis and Use - 2004-2005
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Introduction

During the last 50 years, flock records have evolved from simplistic daily counts of eggs for entire farms to automatic sensor counts for each row of a multi-tiered house for individual age groups. Egg weights were seldom monitored 30-years ago. Today, systems range from weekly house samples for single flocks to automatic systems within the egg processing plant for every single egg. Feed consumption records have evolved from practically none prior to the 1950's to daily monitoring with the use of feed tank scales.

Not only have the systems improved, as far as accuracy, timeliness, and convenience are concerned, but the details are much more sophisticated today and the uses for the information are much more comprehensive. Sensors are used to blend and move eggs into processing equipment for maximum efficiencies. With constant monitoring of egg sizes and quality, eggs can be processed with greater uniformity within legal definitions. With knowledge of a flocks' daily feed consumption, the composition of the daily diet, and recommended daily nutrient intake for more than 30 different nutrients, efficiencies of feed usage can be maintained at optimum levels. Today's feed efficiency levels of 1.75 to 2.00 pounds of feed to produce a pound of eggs rival that of our best commercial broiler flocks.

Progress of this nature has been possible because of the excellent computer-assisted record systems currently in use throughout the table egg industry. These systems provide continuous monitoring of major performance factors with comparisons of standards within the industry. With such systems, it's possible to measure progress over time, locate and correct management deficiencies and fine-tune the various management programs.

Improvements in flock performance in the egg industry have been phenomenal over the last 30 years of our flock monitoring studies. Egg numbers to 60-weeks of age have increased from 184 eggs per hen-housed in the mid-1970's to almost 230 eggs in the average flock today – an increase of almost 4-dozen eggs per hen.

During the same period, mortality has decreased from 10.8% to 60-weeks of age in the 1970's to around 4% in today's flocks. This represents a major accomplishment and can be attributed to both disease resistance in modern breeds as well as to strong disease prevention programs and biosecurity efforts.

Industry-wide feed consumption data did not become available until the mid-1980's. At that time, feed consumption levels ranged from 20 to 24 pounds per hundred hens per day to 60-weeks of age with an average of 22.1 pounds in 1985. Twenty years later (2003 hatch), this had decreased to 21 pounds. Feed conversion (pounds of feed to produce one-dozen eggs) had decreased from 3.50 pounds to 3.04 pounds.

Individual flock egg weight information in the U.S. didn't come along until about 1995. Interestingly, during the subsequent period, there has been absolutely no change in the average weights reported. In 1995, the average weight was 46.7 pounds per case; in the 2003 hatch, the average weight was 46.8 pounds. Total egg weight, though, increased from 28.6 pounds of eggs at 60 weeks to 29.6 pounds in the 2003 hatch as a result of higher egg production

Throughout this 30-year period, standards have changed (as noted), needs for more detailed information have come forth, and new programs require an accurate input of data when considering alternative systems. This publication is intended to demonstrate many of the performance relationships from an in-depth study of four of the most important traits:

<div align="center">
Egg production
Mortality
Egg weight
Feed consumption
</div>

The following subjects will be discussed in context with the current performance measurements:

1. The Data Base

Weekly flock performance data was obtained from published records from Chilson's Management Controls – a firm specializing in providing flock comparison information to the U.S. table egg industry. The data used for this study represents flock performance during the June 2004 through May 2005 period. The basic data set represents the average of approximately 10 to 30 flocks for each age (weekly)/month combination over a 12 month period for flocks between 21 and 105 weeks of age. This would represent approximately 20,000 individual weekly records. The measurements recorded included hen-day egg production, mortality, case weights, and feed consumption. Additional measurements were calculated from these.

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The first four columns of performance data in Tables 1 and 2 on pages 4 and 5 represent the simple monthly averages for the 12 months of the study. The remaining measurements were calculated by the author using the basic data.

The 'lifetime" for the average flock was assumed to be 105 weeks of age, therefore the data was broken down into the first cycle representing weeks 21 through 65, the molt period was considered the first 12 weeks of the molt, and the performance period during cycle 2 was considered to be from week 78 through week 105. Since every flock was not molted at the same age, 65 weeks was used to divide the two cycles. The continuity of the data appears to support this assumption.

Figures 1-4 on page 6 are performance curves of actual data based upon Tables 1 and 2. Because of the averaging procedure, zero egg production during the molt was not reached for any week. Individual flocks should sustain zero production for 2-3 weeks using modern molting methods.   The mortality curve shows a 3-week increase in mortality during the molt with subsequent rates returning to pre-molt levels.   In general, mortality rates increase with age irrespective of the use of molting.

Case weights (the weight of 30 dozen eggs) demonstrate a very smooth age-related curve. In general, 50-pound case weights appear to be an average for the entire 45-105 week period. Part of this is genetically controlled, but most egg producers prefer to maintain this weight relative to the pricing policies within the industry. Larger case weights, without premium egg prices for eggs above large, are considered less profitable.

Feed consumption during the 35 to 105 week period is fairly consistent at about 22 pounds per 100 hens per day (100 grams per hen per day) with the exception of the molt period. Once again, the feed consumption figures during the molt reflect different molting procedures and should not be considered typical of a given flock. The low level of feed consumption during the molt period is due to intentional feed restriction and the bird's reduced feed requirements for zero and/or low levels of production.

Table 1. Summary of results - Cycle 1

Age (wks)	Hen-day egg production%	Mortality %	Case Wt Lbs	Feed per 100	Feed g/day	Dozens per 100 hd's	Lbs of eggs per 100 hd's	Daily egg mass (g)	Egg wt (g/egg)	Feed conver (lbs/doz)	Feed efficiency (feed wt/ egg wt)
21	31.20	0.09	36.88	16.98	77.0	2.60	3.20	14.5	46.47	6.53	5.31
22	53.60	0.10	37.92	17.31	78.5	4.47	5.65	25.6	47.78	3.88	3.07
23	70.85	0.09	39.70	17.74	80.5	5.90	7.81	35.4	50.03	3.00	2.27
24	81.75	0.09	41.21	18.17	82.4	6.81	9.36	42.4	51.92	2.67	1.94
25	87.18	0.08	42.24	19.12	86.7	7.26	10.23	46.4	53.23	2.63	1.87
26	89.03	0.09	43.07	19.88	90.2	7.42	10.65	48.3	54.26	2.68	1.87
27	90.40	0.08	43.79	20.42	92.6	7.53	11.00	49.9	55.18	2.71	1.86
28	90.35	0.08	44.37	20.75	94.1	7.53	11.14	50.5	55.91	2.76	1.86
29	90.97	0.08	44.96	21.04	95.4	7.58	11.36	51.5	56.65	2.77	1.85
30	91.00	0.08	45.40	21.23	96.3	7.58	11.48	52.1	57.21	2.80	1.85
31	90.64	0.08	45.78	21.46	97.4	7.55	11.53	52.3	57.68	2.84	1.86
32	90.88	0.08	46.16	21.61	98.0	7.57	11.65	52.9	58.16	2.85	1.85
33	90.65	0.09	46.48	21.68	98.3	7.55	11.70	53.1	58.56	2.87	1.85
34	90.11	0.08	46.70	21.77	98.7	7.51	11.69	53.0	58.84	2.90	1.86
35	89.78	0.09	46.95	21.99	99.8	7.48	11.71	53.1	59.16	2.94	1.88
36	89.79	0.09	47.27	22.06	100.1	7.48	11.79	53.5	59.55	2.95	1.87
37	89.34	0.10	47.43	22.04	100.0	7.44	11.77	53.4	59.76	2.96	1.87
38	88.79	0.10	47.69	22.02	99.9	7.40	11.76	53.4	60.09	2.98	1.87
39	88.59	0.10	47.83	22.06	100.0	7.38	11.77	53.4	60.26	2.99	1.87
40	88.20	0.10	47.96	22.20	100.7	7.35	11.75	53.3	60.43	3.02	1.89
41	87.68	0.10	48.08	22.19	100.7	7.31	11.71	53.1	60.58	3.04	1.90
42	87.44	0.11	48.17	22.11	100.3	7.29	11.70	53.1	60.70	3.03	1.89
43	86.67	0.11	48.31	22.08	100.1	7.22	11.63	52.8	60.87	3.06	1.90
44	86.38	0.11	48.39	22.14	100.4	7.20	11.61	52.7	60.97	3.08	1.91
45	85.73	0.11	48.46	22.10	100.2	7.14	11.54	52.3	61.06	3.09	1.92
46	85.36	0.11	48.57	22.17	100.5	7.11	11.52	52.2	61.20	3.12	1.92
47	85.00	0.11	48.67	22.22	100.8	7.08	11.49	52.1	61.32	3.14	1.93
48	84.36	0.12	48.67	22.17	100.6	7.03	11.41	51.7	61.32	3.15	1.94
49	84.17	0.12	48.68	22.04	100.0	7.01	11.38	51.6	61.33	3.14	1.94
50	83.85	0.12	48.77	22.04	100.0	6.99	11.36	51.5	61.45	3.15	1.94
51	83.48	0.12	48.97	21.98	99.7	6.96	11.35	51.5	61.70	3.16	1.94
52	82.86	0.13	48.99	22.04	100.0	6.91	11.28	51.1	61.73	3.19	1.95
53	82.45	0.13	48.92	22.10	100.3	6.87	11.20	50.8	61.64	3.22	1.97
54	82.19	0.13	48.96	22.08	100.1	6.85	11.18	50.7	61.69	3.22	1.97
55	81.81	0.13	49.09	22.06	100.1	6.82	11.16	50.6	61.86	3.24	1.98
56	81.35	0.14	49.08	22.08	100.2	6.78	11.09	50.3	61.84	3.26	1.99
57	81.04	0.13	49.12	22.14	100.4	6.75	11.06	50.2	61.89	3.28	2.00
58	80.54	0.14	49.26	22.17	100.6	6.71	11.02	50.0	62.07	3.30	2.01
59	80.07	0.14	49.34	22.21	100.7	6.67	10.98	49.8	62.17	3.33	2.02
60	79.59	0.14	49.42	22.18	100.6	6.63	10.93	49.6	62.27	3.34	2.03
61	79.25	0.14	49.32	22.21	100.7	6.60	10.86	49.2	62.14	3.36	2.05
62	78.68	0.15	49.45	22.25	100.9	6.56	10.81	49.0	62.30	3.39	2.06
63	78.11	0.16	49.57	22.29	101.1	6.51	10.75	48.8	62.46	3.42	2.07
64	78.19	0.16	49.53	22.42	101.7	6.52	10.76	48.8	62.41	3.44	2.08
65	77.29	0.17	49.64	22.35	101.4	6.44	10.66	48.3	62.54	3.47	2.10
Average (21-65 wks)	83.04	0.11	46.96	21.45	97.3	6.92	10.88	49.33	59.17	3.16	2.04

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Summary of results - Cycle 2

Age (wks)	Hen-day %	Mortality %	Case Wt Lbs	Feed/100	Feed g/day	Dozens per 100 hd's	Lbs of eggs per 100 hd's	Daily egg mass (g)	Egg wt (g/egg)	Feed conver. (lbs/doz)	Feed efficiency (feed wt/ egg wt)
Molt wk 1	22.75	0.26	48.52	8.39	38.0	1.90	3.07	13.9	61.14	4.42	2.73
2	4.60	0.44	48.27	11.18	50.7	0.38	0.62	2.8	60.81	29.20	18.15
3	5.98	0.35	49.05	15.41	69.9	0.50	0.81	3.7	61.80	30.92	18.91
4	11.11	0.18	48.78	18.81	85.3	0.93	1.51	6.8	61.47	20.32	12.50
5	21.00	0.13	48.53	19.76	89.7	1.75	2.83	12.8	61.14	11.30	6.98
6	36.44	0.12	49.10	20.39	92.5	3.04	4.97	22.5	61.87	6.71	4.10
7	55.90	0.13	49.83	21.18	96.1	4.66	7.74	35.1	62.79	4.55	2.74
8	69.50	0.14	50.44	21.79	98.8	5.79	9.74	44.2	63.56	3.76	2.24
9	75.82	0.14	50.43	22.13	100.4	6.32	10.62	48.2	63.54	3.50	2.08
10	79.30	0.14	50.65	21.83	99.0	6.61	11.16	50.6	63.82	3.30	1.96
11	80.88	0.15	50.55	21.68	98.3	6.74	11.36	51.5	63.69	3.22	1.91
12	81.04	0.16	50.47	21.89	99.3	6.75	11.36	51.5	63.60	3.24	1.93
Average	45.36	0.19	49.55	18.70	84.84	3.78	6.31	28.64	62.44	10.37	6.35
Age											
78	81.30	0.15	50.20	21.74	98.6	6.77	11.34	51.4	63.25	3.21	1.92
79	81.05	0.16	50.10	21.77	98.7	6.75	11.28	51.2	63.13	3.22	1.93
80	81.16	0.15	49.99	21.94	99.5	6.76	11.27	51.1	62.99	3.24	1.95
81	81.03	0.16	50.27	22.18	100.6	6.75	11.31	51.3	63.34	3.28	1.96
82	80.66	0.17	50.35	22.09	100.2	6.72	11.28	51.2	63.44	3.29	1.96
83	80.31	0.17	50.20	22.19	100.7	6.69	11.20	50.8	63.25	3.32	1.98
84	79.83	0.16	50.16	22.10	100.2	6.65	11.12	50.4	63.20	3.32	1.99
85	79.83	0.17	50.19	22.16	100.5	6.65	11.13	50.5	63.23	3.33	1.99
86	79.82	0.18	50.22	22.04	100.0	6.65	11.13	50.5	63.27	3.31	1.98
87	79.27	0.18	50.09	22.12	100.3	6.61	11.03	50.0	63.12	3.35	2.00
88	78.93	0.18	50.29	22.07	100.1	6.58	11.03	50.0	63.37	3.36	2.00
89	78.61	0.17	50.29	22.07	100.1	6.55	10.98	49.8	63.37	3.37	2.01
90	78.07	0.18	50.27	22.07	100.1	6.51	10.90	49.4	63.34	3.39	2.02
91	77.82	0.19	50.38	22.08	100.2	6.49	10.89	49.4	63.48	3.41	2.03
92	77.37	0.19	50.31	22.06	100.1	6.45	10.81	49.0	63.39	3.42	2.04
93	76.99	0.19	50.34	22.00	99.8	6.42	10.77	48.8	63.43	3.43	2.04
94	76.63	0.19	50.30	21.91	99.4	6.39	10.71	48.6	63.38	3.43	2.05
95	76.08	0.19	50.45	21.94	99.5	6.34	10.66	48.4	63.56	3.46	2.06
96	75.74	0.21	50.39	22.15	100.5	6.31	10.60	48.1	63.49	3.51	2.09
97	75.43	0.20	50.47	22.22	100.8	6.29	10.57	48.0	63.59	3.53	2.10
98	74.88	0.20	50.63	22.24	100.9	6.24	10.53	47.8	63.79	3.56	2.11
99	73.97	0.21	50.59	22.10	100.2	6.16	10.39	47.1	63.74	3.59	2.13
100	74.22	0.21	50.73	22.20	100.7	6.19	10.46	47.4	63.92	3.59	2.12
101	73.85	0.21	50.71	22.28	101.0	6.15	10.40	47.2	63.89	3.62	2.14
102	72.84	0.21	50.81	22.35	101.4	6.07	10.28	46.6	64.02	3.68	2.17
103	71.91	0.22	50.80	22.36	101.4	5.99	10.15	46.0	64.00	3.73	2.20
104	71.38	0.22	50.88	22.31	101.2	5.95	10.09	45.8	64.11	3.75	2.21
105	70.67	0.22	50.95	22.17	100.6	5.89	10.00	45.4	64.19	3.76	2.22
Average	77.13	0.19	50.40	22.10	100.3	6.43	10.80	48.97	63.51	3.45	2.05

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Figure 1.

Lifetime Egg Production Curve
Ages: 21 to 105 weeks

Figure 2.

Lifetime Weekly Mortality Rate
Ages: 21 to 105 weeks

Figure 3.

Lifetime Case Weight Curve
Ages: 21 to 105 weeks

Figure 4.

Lifetime Feed Consumption Curve
Ages: 21 to 105

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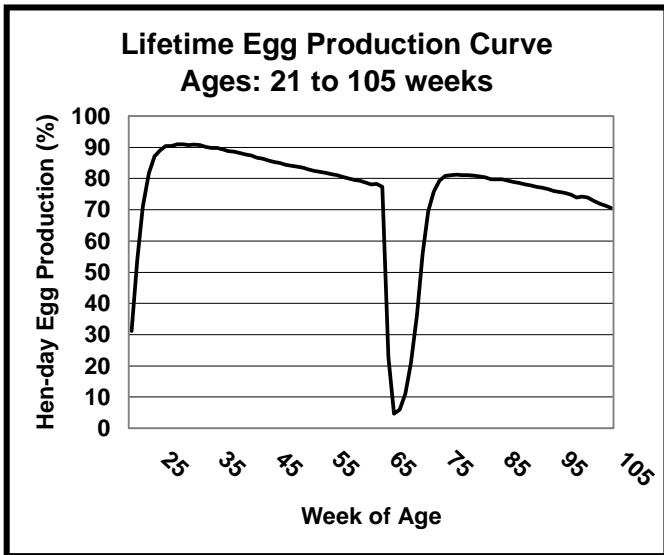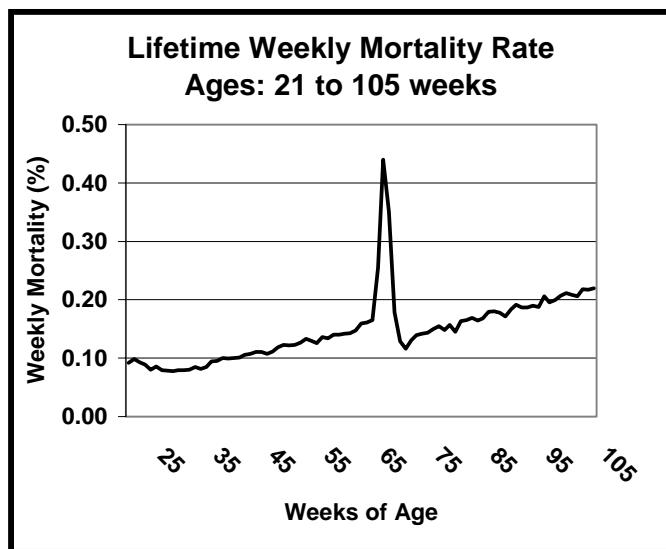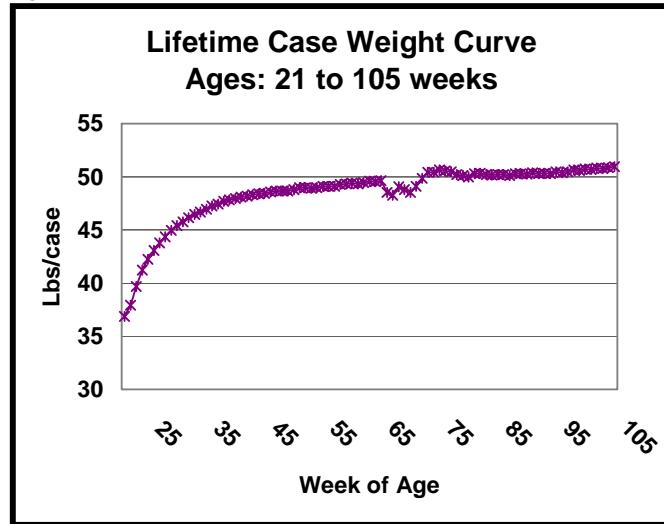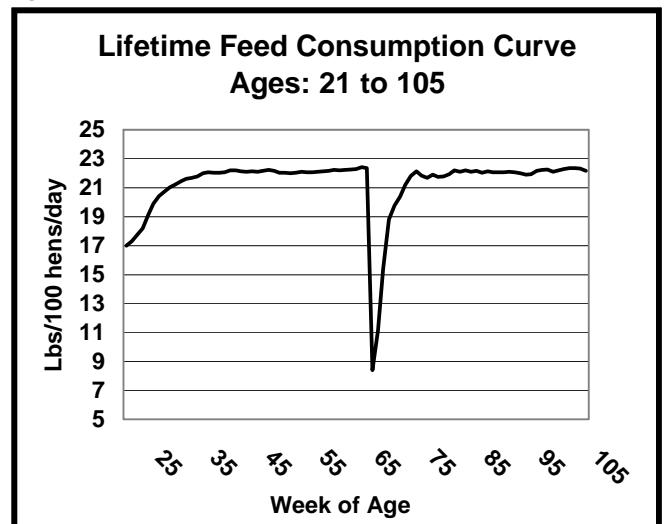
2. Comparison of Performance Between Production Cycles And Curve Fitting

Tables 3, 4, 5, and 6 list performance data by week of cycle with corresponding ages for the 1st and 2nd cycles of lay. Each week shows the difference in performance between cycles. Boxed data compares selected periods within cycles. The boxes at the right of each table list the differences between the two cycles for the first 8, 10, and 12 weeks of each cycle respectively. The box at the bottom of the data columns lists the average results for the 9th week through the 105th week of age and the corresponding results for the 1st week through the 105th week of age. Differences are shown in the two lower right-hand boxes.

Excluding the first 9 weeks for each cycle, the differences in performance are as follows:

Hen-day egg production favors the 1st cycle flocks by 8.6%
Mortality favors the 1st cycle flocks by 0.07%/week
Case weights favor the 2nd cycle flocks by 2.4 pounds/case
Feed consumption favors the 1st cycle flocks by 0.09 pounds/100
hens per day – practically identical.

Table 7 summarizes the averages for each trait and for different periods.   Regression analyses were run on the 30 to 65 week periods of the first cycle and on the 75 to 105 week periods in the second cycle. Equations for the best fit of the data were determined. Straight lines fit the egg production and mortality data with R^2's in excess of 0.90 – a very good fit. Case weights and feed consumption curves were best fit with curvilinear shapes. Cycle 2 case weights and feed consumption appeared to be the most variable. In general, the egg production curves for the 2nd cycle had similar slopes to the 1st cycle.   This is generally misinterpreted by the industry.   In addition, the feed consumption data was practically identical between the two cycles – also commonly misunderstood.

Tables 8,9,10, and 11 show the comparison of actual with the calculated data based upon the equations in Table 7.

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Table 3. Comparison of performance between cycles

Hen-day Egg Production (%)

Week	Age cyc 1	Age cyc 2	% cyc 1	% cyc 2	Diff	
1	21	Molt wk 1	31.20	22.75	-8.45	
2	22	2	53.60	4.60	-49.00	
3	23	3	70.85	5.98	-64.87	
4	24	4	81.75	11.11	-70.65	
5	25	5	87.18	21.00	-66.18	
6	26	6	89.03	36.44	-52.58	
7	27	7	90.40	55.90	-34.50	Av diff (1-8 wks)
8	28	8	90.35	69.50	-20.86	**-45.89**
9	29	9	90.97	75.82	-15.15	
10	30	10	91.00	79.30	-11.71	Av diff (1-10 wks)
11	31	11	90.64	80.88	-9.76	**-39.39**
12	32	12	90.88	81.04	-9.84	Av diff (1-12 wks)
13	33	Age 78	90.65	81.30	-9.35	**-34.46**
14	34	79	90.11	81.05	-9.06	
15	35	80	89.78	81.16	-8.62	
16	36	81	89.79	81.03	-8.76	
17	37	82	89.34	80.66	-8.68	
18	38	83	88.79	80.31	-8.48	
19	39	84	88.59	79.83	-8.76	
20	40	85	88.20	79.83	-8.37	
21	41	86	87.68	79.82	-7.86	
22	42	87	87.44	79.27	-8.17	
23	43	88	86.67	78.93	-7.74	
24	44	89	86.38	78.61	-7.76	
25	45	90	85.73	78.07	-7.66	
26	46	91	85.36	77.82	-7.54	
27	47	92	85.00	77.37	-7.64	
28	48	93	84.36	76.99	-7.37	
29	49	94	84.17	76.63	-7.54	
30	50	95	83.85	76.08	-7.77	
31	51	96	83.48	75.74	-7.74	
32	52	97	82.86	75.43	-7.44	
33	53	98	82.45	74.88	-7.57	
34	54	99	82.19	73.97	-8.23	
35	55	100	81.81	74.22	-7.59	
36	56	101	81.35	73.85	-7.50	
37	57	102	81.04	72.84	-8.20	
38	58	103	80.54	71.91	-8.63	
39	59	104	80.07	71.38	-8.69	Av diff (9-105 wks)
40	60	105	79.59	70.67	-8.93	**-8.57**
41	61		79.25			
42	62		78.68			
43	63		78.11			Av diff (molt wk 1 to 105)
44	64		78.19			**-16.03**
45	65		77.29			

Averages to (60/105)

(9-105)	85.96	77.40
(1-105)	83.63	67.60

Table 4. Comparison of performance between cycles

Mortality rate (%)

Week	Age cyc 1	Age cyc 2	% cyc 1	% cyc 2	Diff	
1	21	Molt wk 1	0.09	0.26	0.16	
2	22	2	0.10	0.44	0.34	
3	23	3	0.09	0.35	0.26	
4	24	4	0.09	0.18	0.09	
5	25	5	0.08	0.13	0.05	
6	26	6	0.09	0.12	0.03	
7	27	7	0.08	0.13	0.05	Av diff (1-8 wks)
8	28	8	0.08	0.14	0.06	**0.13**
9	29	9	0.08	0.14	0.06	
10	30	10	0.08	0.14	0.06	Av diff (1-10 wks)
11	31	11	0.08	0.15	0.07	**0.12**
12	32	12	0.08	0.16	0.08	Av diff (1-12 wks)
13	33	Age 78	0.09	0.15	0.06	**0.11**
14	34	79	0.08	0.16	0.08	
15	35	80	0.09	0.15	0.06	
16	36	81	0.09	0.16	0.07	
17	37	82	0.10	0.17	0.07	
18	38	83	0.10	0.17	0.07	
19	39	84	0.10	0.16	0.07	
20	40	85	0.10	0.17	0.07	
21	41	86	0.10	0.18	0.08	
22	42	87	0.11	0.18	0.07	
23	43	88	0.11	0.18	0.07	
24	44	89	0.11	0.17	0.06	
25	45	90	0.11	0.18	0.07	
26	46	91	0.11	0.19	0.08	
27	47	92	0.11	0.19	0.08	
28	48	93	0.12	0.19	0.07	
29	49	94	0.12	0.19	0.07	
30	50	95	0.12	0.19	0.07	
31	51	96	0.12	0.21	0.08	
32	52	97	0.13	0.20	0.07	
33	53	98	0.13	0.20	0.07	
34	54	99	0.13	0.21	0.08	
35	55	100	0.13	0.21	0.09	
36	56	101	0.14	0.21	0.07	
37	57	102	0.13	0.21	0.07	
38	58	103	0.14	0.22	0.08	
39	59	104	0.14	0.22	0.08	Av diff (9-105 wks)
40	60	105	0.14	0.22	0.08	**0.07**
41	61		0.14			
42	62		0.15			
43	63		0.16			Av diff (molt wk 1 to 105)
44	64		0.16			**0.08**
45	65		0.17			

Averages to (60/105)	(9-105)	0.109	0.181
	(1-105)	0.105	0.188

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Table 5. Comparison of performance between cycles

Case weight (lbs)

Week	Age cyc 1	Age cyc 2	Cycle 1	Cycle 2	Diff	
1	21	Molt wk 1	36.88	48.52	11.64	
2	22	2	37.92	48.27	10.35	
3	23	3	39.70	49.05	9.35	
4	24	4	41.21	48.78	7.57	
5	25	5	42.24	48.53	6.28	
6	26	6	43.07	49.10	6.04	
7	27	7	43.79	49.83	6.04	Av diff (1-8 wks)
8	28	8	44.37	50.44	6.07	**7.92**
9	29	9	44.96	50.43	5.47	
10	30	10	45.40	50.65	5.25	Av diff (1-10 wks)
11	31	11	45.78	50.55	4.77	**7.41**
12	32	12	46.16	50.47	4.32	Av diff (1-12 wks)
13	33	Age 78	46.48	50.20	3.72	**6.93**
14	34	79	46.70	50.10	3.40	
15	35	80	46.95	49.99	3.03	
16	36	81	47.27	50.27	3.01	
17	37	82	47.43	50.35	2.92	
18	38	83	47.69	50.20	2.51	
19	39	84	47.83	50.16	2.33	
20	40	85	47.96	50.19	2.22	
21	41	86	48.08	50.22	2.14	
22	42	87	48.17	50.09	1.92	
23	43	88	48.31	50.29	1.98	
24	44	89	48.39	50.29	1.91	
25	45	90	48.46	50.27	1.81	
26	46	91	48.57	50.38	1.81	
27	47	92	48.67	50.31	1.65	
28	48	93	48.67	50.34	1.67	
29	49	94	48.68	50.30	1.62	
30	50	95	48.77	50.45	1.67	
31	51	96	48.97	50.39	1.43	
32	52	97	48.99	50.47	1.48	
33	53	98	48.92	50.63	1.71	
34	54	99	48.96	50.59	1.63	
35	55	100	49.09	50.73	1.64	
36	56	101	49.08	50.71	1.63	
37	57	102	49.12	50.81	1.69	
38	58	103	49.26	50.80	1.53	
39	59	104	49.34	50.88	1.54	Av diff (9-105 wks)
40	60	105	49.42	50.95	1.53	**2.40**
41	61		49.32			
42	62		49.45			
43	63		49.57			Av diff (molt wk 1 to 105)
44	64		49.53			**3.51**
45	65		49.64			

Averages to (60/105)	(9-105)	48.02	50.42
	(1-105)	46.64	50.15

Table 6. Comparison of performance between cycles

　　　Feed consumption (lbs/100/day)

Week	Age cyc 1	Age cyc 2	Cycle 1	Cycle 2	Diff	
1	21	Molt wk 1	16.98	8.39	-8.59	
2	22	2	17.31	11.18	-6.13	
3	23	3	17.74	15.41	-2.33	
4	24	4	18.17	18.81	0.64	
5	25	5	19.12	19.76	0.65	
6	26	6	19.88	20.39	0.51	
7	27	7	20.42	21.18	0.76	Av diff (1-8 wks)
8	28	8	20.75	21.79	1.04	**-1.68**
9	29	9	21.04	22.13	1.10	
10	30	10	21.23	21.83	0.60	Av diff (1-10 wks)
11	31	11	21.46	21.68	0.22	**-1.18**
12	32	12	21.61	21.89	0.29	Av diff (1-12 wks)
13	33	Age 78	21.68	21.74	0.06	**-0.94**
14	34	79	21.77	21.77	0.00	
15	35	80	21.99	21.94	-0.05	
16	36	81	22.06	22.18	0.12	
17	37	82	22.04	22.09	0.05	
18	38	83	22.02	22.19	0.17	
19	39	84	22.06	22.10	0.04	
20	40	85	22.20	22.16	-0.04	
21	41	86	22.19	22.04	-0.15	
22	42	87	22.11	22.12	0.01	
23	43	88	22.08	22.07	-0.01	
24	44	89	22.14	22.07	-0.07	
25	45	90	22.10	22.07	-0.03	
26	46	91	22.17	22.08	-0.08	
27	47	92	22.22	22.06	-0.16	
28	48	93	22.17	22.00	-0.17	
29	49	94	22.04	21.91	-0.13	
30	50	95	22.04	21.94	-0.10	
31	51	96	21.98	22.15	0.16	
32	52	97	22.04	22.22	0.18	
33	53	98	22.10	22.24	0.14	
34	54	99	22.08	22.10	0.02	
35	55	100	22.06	22.20	0.14	
36	56	101	22.08	22.28	0.19	
37	57	102	22.14	22.35	0.21	
38	58	103	22.17	22.36	0.19	
39	59	104	22.21	22.31	0.11	Av diff (9-105 wks)
40	60	105	22.18	22.17	-0.01	**0.09**
41	61		22.21			
42	62		22.25			
43	63		22.29			Av diff (molt wk 1 to 105)
44	64		22.42			**-0.26**
45	65		22.35			

Averages to (60/105)	(9-105)	21.98	22.08
	(1-105)	21.34	21.08

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Table 7. Summary (Comparisons of common periods - cycles 1 vs. 2)

	Period (wks)	Cycle 1 (21-60)	Cycle 2 (65-105)	Diff	Slope Cycle 1 30-65 wks	Slope Cycle 2 75-105 wks	Intercept Cycle 1	Intercept Cycle 2
Egg Production (% hen-day)	1 TO 40	83.63	67.60	-16.03	-0.4055	-0.3395	104.02	92.724
	9 TO 40	85.96	77.40	-8.56				
Mortality Rate (%/wk)	1 TO 40	0.105	0.188	0.083	0.0023	0.0025	0.0083	0.0711
	9 TO 40	0.109	0.181	0.072				
Case weight (lbs/case)	1 TO 40	46.64	50.15	3.51	$-0.0036x^2 + 0.4443x$	$-0.0022x^2 - 0.3733x$	35.763	66.212
	9 TO 40	48.02	50.42	2.40				
Feed consumption (lbs/100 hens/day	1 TO 40	21.34	21.08	-0.26	$0.0001446x^3 - 0.0214x^2 + 1.0416x$	$-0.0024x^2 + 0.054x$	5.4065	19.028
	9 TO 40	21.98	22.08	0.10				

Regression equations	X = age in weeks. Data compared = cycle 1 for 30-65 wks cycle 2 for weeks 75 to 105 wks with common starting point		R square
Egg production - cycle 1	$Y=-0.4055x + 104.02$		0.9956
Egg production - cycle 2	$Y=-0.3395x + 92.724$		0.9166
Mortality cycle 1	$Y=0.0023x + 0.0083$		0.9773
Mortality cycle 2	$Y=0.0025x + 0.0711$		0.9564
Case weight - cycle 1	$Y=0.0036x^2 + .04443x + 35.763$		0.9761
Case weight - cycle 2	$Y=0.0022x^2 - .3733x + 66.212$		0.8408
Feed consumption - cycle 1	$Y= 0.0001446x^3 - 0.0214x^2 + 1.0419x + 5.4065$		0.9342
Feed consumption - cycle 2	$Y= -0.002x^2 + 0.0541x + 19.028$		0.5502

Table 8. Actual vs. Calculated Data Points - Cycle 1 AND Cycle 2 *
Egg Production   **Equations**

		Cycle 1				Cycle 2	
	Slope	-0.4055				-0.3395	
	Intercept	104.02				92.724	
		Cycle 1 (actual)	**Cycle 1 (calculated)**	**1st cycle equivalent**	**Actual week**	**Cycle 2 (actual)**	**Cycle 2 (calculated)**
Week		(%)	(%)			(%)	(%)
30		91.00	91.86	30	75	79.30	82.54
31		90.64	91.45	31	76	80.88	82.20
32		90.88	91.04	32	77	81.04	81.86
33		90.65	90.64	33	78	81.30	81.52
34		90.11	90.23	34	79	81.05	81.18
35		89.78	89.83	35	80	81.16	80.84
36		89.79	89.42	36	81	81.03	80.50
37		89.34	89.02	37	82	80.66	80.16
38		88.79	88.61	38	83	80.31	79.82
39		88.59	88.21	39	84	79.83	79.48
40		88.20	87.80	40	85	79.83	79.14
41		87.68	87.39	41	86	79.82	78.80
42		87.44	86.99	42	87	79.27	78.47
43		86.67	86.58	43	88	78.93	78.13
44		86.38	86.18	44	89	78.61	77.79
45		85.73	85.77	45	90	78.07	77.45
46		85.36	85.37	46	91	77.82	77.11
47		85.00	84.96	47	92	77.37	76.77
48		84.36	84.56	48	93	76.99	76.43
49		84.17	84.15	49	94	76.63	76.09
50		83.85	83.75	50	95	76.08	75.75
51		83.48	83.34	51	96	75.74	75.41
52		82.86	82.93	52	97	75.43	75.07
53		82.45	82.53	53	98	74.88	74.73
54		82.19	82.12	54	99	73.97	74.39
55		81.81	81.72	55	100	74.22	74.05
56		81.35	81.31	56	101	73.85	73.71
57		81.04	80.91	57	102	72.84	73.37
58		80.54	80.50	58	103	71.91	73.03
59		80.07	80.10	59	104	71.38	72.69
60		79.59	79.69	60	105	70.67	72.35
61		79.25	79.28				
62		78.68	78.88				
63		78.11	78.47				
64		78.19	78.07				
65		77.29	77.66				

* Based upon regression curves for 1st cycle weeks 30-65 and 2nd cycle weeks 75 to 105
Molt was assumed to occur in the 66th week.

Table 9. Actual vs. Calculated Data Points - Cycle 1 and Cycle 2 *

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Mortality

Equations

		Cycle 1			Cycle 2	
	Slope	**0.0023**			**0.0025**	
	Intercept	**0.0083**			**0.0711**	
	Cycle 1 (actual)	**Cycle 1 (calculated)**	**1st cycle equivalent**	**Actual week**	**Cycle 2 (actual)**	**Cycle 2 (calculated)**
Week	(%/wk)	(%/wk)			(%/wk)	(%/wk)
30	0.079	0.077	30	75	0.143	0.146
31	0.079	0.080	31	76	0.150	0.149
32	0.080	0.082	32	77	0.155	0.151
33	0.085	0.084	33	78	0.148	0.154
34	0.082	0.087	34	79	0.157	0.156
35	0.085	0.089	35	80	0.145	0.159
36	0.094	0.091	36	81	0.163	0.161
37	0.095	0.093	37	82	0.165	0.164
38	0.100	0.096	38	83	0.169	0.166
39	0.099	0.098	39	84	0.164	0.169
40	0.100	0.100	40	85	0.168	0.171
41	0.101	0.103	41	86	0.179	0.174
42	0.106	0.105	42	87	0.180	0.176
43	0.108	0.107	43	88	0.178	0.179
44	0.111	0.110	44	89	0.172	0.181
45	0.111	0.112	45	90	0.183	0.184
46	0.108	0.114	46	91	0.192	0.186
47	0.112	0.116	47	92	0.187	0.189
48	0.118	0.119	48	93	0.187	0.191
49	0.123	0.121	49	94	0.190	0.194
50	0.122	0.123	50	95	0.188	0.196
51	0.123	0.126	51	96	0.206	0.199
52	0.127	0.128	52	97	0.196	0.201
53	0.133	0.130	53	98	0.199	0.204
54	0.130	0.133	54	99	0.207	0.206
55	0.126	0.135	55	100	0.212	0.209
56	0.136	0.137	56	101	0.208	0.211
57	0.134	0.139	57	102	0.206	0.214
58	0.140	0.142	58	103	0.218	0.216
59	0.140	0.144	59	104	0.218	0.219
60	0.142	0.146	60	105	0.219	0.221
61	0.143	0.149				
62	0.148	0.151				
63	0.159	0.153				
64	0.161	0.156				
65	0.165	0.158				

* Based upon regression curves for 1st cycle weeks 30-65 and 2nd cycle weeks 75 to 105
Molt was assumed to occur in the 66th week.

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Table 10. Actual vs. Calculated Data Points - Cycle 1 and Cycle 2 *

Case weights		Equations				
		Cycle 1			**Cycle 2**	
		$0.0036x^2 +$			$0.0022x^2 -$	
	Slope	$0.4443x$			$0.1774x$	
	Intercept	35.763			53.822	
	Cycle 1 (actual)	**Cycle 1 (calculated)**	**1st cycle equivalent**	**Actual week**	**Cycle 2 (actual)**	**Cycle 2 (calculated)**
Week	(Lbs)	(Lbs)			(Lbs)	(Lbs)
30	45.40	45.85	30	75	50.65	50.48
31	45.78	46.08	31	76	50.55	50.44
32	46.16	46.29	32	77	50.47	50.40
33	46.48	46.50	33	78	50.20	50.36
34	46.70	46.71	34	79	50.10	50.33
35	46.95	46.90	35	80	49.99	50.31
36	47.27	47.09	36	81	50.27	50.29
37	47.43	47.27	37	82	50.35	50.27
38	47.69	47.45	38	83	50.20	50.26
39	47.83	47.62	39	84	50.16	50.25
40	47.96	47.78	40	85	50.19	50.25
41	48.08	47.93	41	86	50.22	50.25
42	48.17	48.07	42	87	50.09	50.25
43	48.31	48.21	43	88	50.29	50.26
44	48.39	48.34	44	89	50.29	50.28
45	48.46	48.47	45	90	50.27	50.29
46	48.57	48.58	46	91	50.38	50.32
47	48.67	48.69	47	92	50.31	50.34
48	48.67	48.80	48	93	50.34	50.38
49	48.68	48.89	49	94	50.30	50.41
50	48.77	48.98	50	95	50.45	50.45
51	48.97	49.06	51	96	50.39	50.50
52	48.99	49.13	52	97	50.47	50.55
53	48.92	49.20	53	98	50.63	50.60
54	48.96	49.26	54	99	50.59	50.66
55	49.09	49.31	55	100	50.73	50.72
56	49.08	49.35	56	101	50.71	50.79
57	49.12	49.39	57	102	50.81	50.86
58	49.26	49.42	58	103	50.80	50.93
59	49.34	49.45	59	104	50.88	51.01
60	49.42	49.46	60	105	50.95	51.10
61	49.32	49.47				
62	49.45	49.47				
63	49.57	49.47				
64	49.53	49.45				
65	49.64	49.43				

* Based upon regression curves for 1st cycle weeks 30-65 and 2nd cycle weeks 75 to 105
Molt was assumed to occur in the 66th week.

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Table 11. Actual vs. Calculated Data Points - Cycle 1 and Cycle 2*

Feed consumption   **Equations**

	Cycle 1				**Cycle 2**	
Slope	$0.0001446x^3 - 0.0214x^2 + 1.0419x$				$-0.002X^2 + 0.0541X$	
Intercept	5.4065				19.028	

	Cycle 1 (actual)	**Cycle 1 (calculated)**	**1st cycle equivalent**	**Actual week**	**Cycle 2 (actual)**	**Cycle 2 (calculated)**
Week	(Lbs)	(Lbs)			(Lbs)	(Lbs)
30	21.23	21.31	30	75	21.83	21.85
31	21.46	21.45	31	76	21.68	21.87
32	21.61	21.57	32	77	21.89	21.90
33	21.68	21.68	33	78	21.74	21.92
34	21.77	21.78	34	79	21.77	21.94
35	21.99	21.86	35	80	21.94	21.96
36	22.06	21.93	36	81	22.18	21.98
37	22.04	21.98	37	82	22.09	22.00
38	22.02	22.03	38	83	22.19	22.02
39	22.06	22.07	39	84	22.10	22.03
40	22.20	22.10	40	85	22.16	22.05
41	22.19	22.12	41	86	22.04	22.07
42	22.11	22.13	42	87	22.12	22.09
43	22.08	22.14	43	88	22.07	22.10
44	22.14	22.14	44	89	22.07	22.12
45	22.10	22.13	45	90	22.07	22.14
46	22.17	22.13	46	91	22.08	22.15
47	22.22	22.12	47	92	22.06	22.17
48	22.17	22.10	48	93	22.00	22.18
49	22.04	22.09	49	94	21.91	22.20
50	22.04	22.08	50	95	21.94	22.21
51	21.98	22.06	51	96	22.15	22.23
52	22.04	22.05	52	97	22.22	22.24
53	22.10	22.04	53	98	22.24	22.25
54	22.08	22.04	54	99	22.10	22.26
55	22.06	22.03	55	100	22.20	22.28
56	22.08	22.04	56	101	22.28	22.29
57	22.14	22.05	57	102	22.35	22.30
58	22.17	22.06	58	103	22.36	22.31
59	22.21	22.08	59	104	22.31	22.32
60	22.18	22.11	60	105	22.17	22.33
61	22.21	22.15				
62	22.25	22.20				
63	22.29	22.27				
64	22.42	22.34				
65	22.35	22.43				

* Based upon regression curves for 1st cycle weeks 30-65 and 2nd cycle weeks 75 to 105
Molt was assumed to occur in the 66th week.

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Performance Curves

.   Using the data from tables 8, 9, 10, and 11, performance relationship curves were developed for the 30 to 65 weeks of age period in cycle 1 and compared with the 75 to 105 week data from cycle 2. These ages were selected to avoid down and up shaped curves at the start of production and during the molt. These are addressed later in Table 12, 13, 14, and 15 and are depicted in Figures 9, 10, 11, and 12.

Egg Production

By 30 weeks of age, egg production has usually peaked and begins a steady decline until molt at 65 weeks of age. Most breeders depict this as a straight-line to at least this age. Some suggest that the decline lessens at later stages. Average results for the two entire cycles (with and without the first 8 weeks) are listed in Table 7. The calculated equations are shown for the downward slope portion only. Egg production declined at the rate of 0.4055% per week and 0.3395% per week for cycle 1 and 2 respectively. Hen-day egg production during this period averaged 85.96% and 77.40% for periods 1 and 2 – a difference of 8.56%. Weekly egg production during the first 8 weeks is shown in Table 12, and Fig. 9.

Mortality

The average weekly mortality rates for the periods compared above were 0.109% and 0.181% (this excludes the first 8-week period). Both cycles showed an increasing rate pattern with increasing age. The upward slopes were practically the same, increasing at the rate of 0.0023% per week in cycle 1 vs. 0.0025% per week in cycle 2. Weekly mortality during the first 8 weeks is shown in Table 13, and Fig. 10.

Case Weights

Egg weighs were significantly larger during cycle 2. Average weights during the selected periods were 48.02 pounds per case in cycle 1 vs. 50.42 pounds in cycle 2. Case weights during cycle 1 continued to increase throughout the entire period analyzed (30 to 65 weeks of age). Weights during the second cycle remained at 50 pounds or above for the entire period. Egg weights took a slight drop during the molt but commenced to increase each week until 51-pound case weights were reached during the last few weeks of the study (weeks 104 and 105).

Feed Consumption

Of the four traits measured, feed consumption proved to be the least predictable. Of particular interest are the comparable rates of feed consumption between the two cycles. During the 30 to 65 week period of cycle 1, feed consumption averaged 21.98 pounds per 100 hens per day (99.7 grams/day/hen). During cycle 2, the rate was 22.08 pounds (100.2 grams). Both curves were within the 22.0 to 22.5 pound range for the bulk of their respective periods. Polynomial regressions provided the best curve fitting for this measurement.

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Figure 5. Comparison of 1st (30-65 weeks) and 2nd (75-105 weeks) Cycles of Egg Production
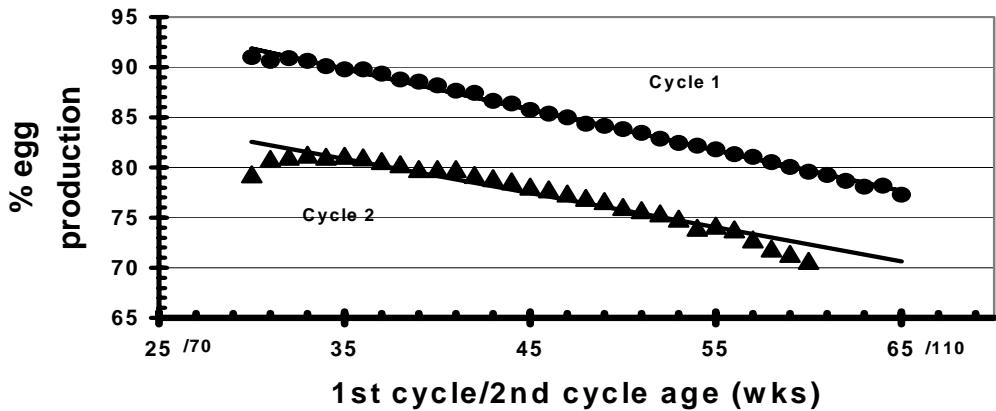
Figure 6. Comparison of 1st (30-65 weeks) and 2nd (75-105 weeks) Cycles - Mortality
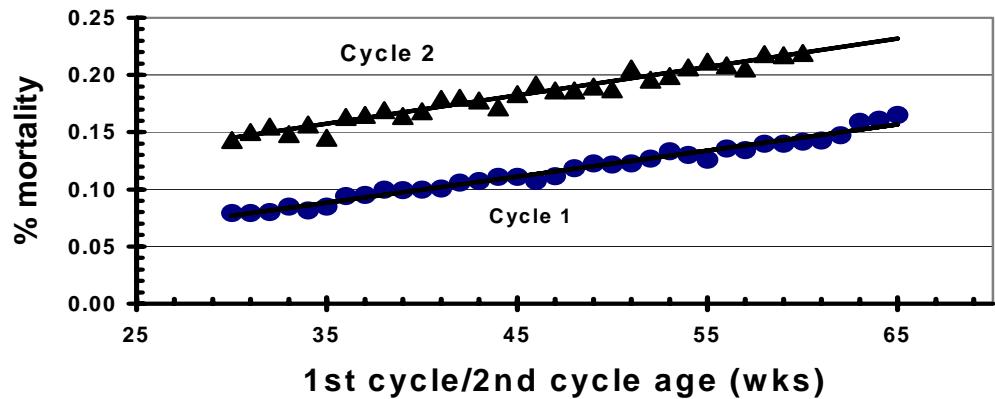
Figure 7. Comparison of 1st (30-65 weeks) and 2nd (75-105 weeks) cycles - Case Weights
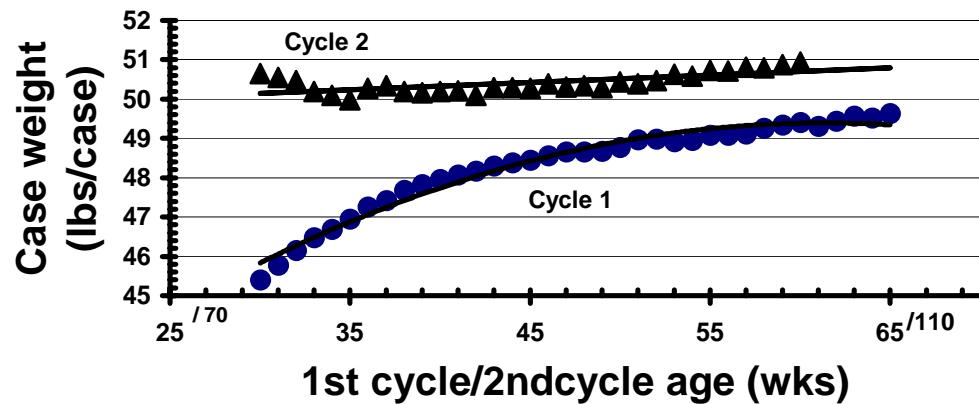
Figure 8. Comparison of 1st (30-65 weeks) and 2nd (75-105 weeks) Cycles - Feed Consumption
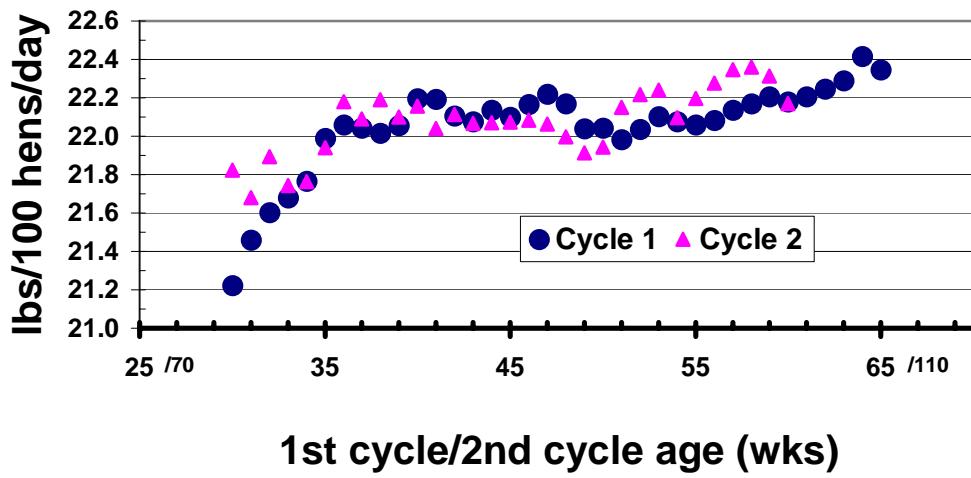
Pre-peak and Molt period analysis - Weeks 1-9 of each cycle

Table 12. Comparison of performance between cycles
       Hen-day Egg Production (%)

Week	Age cyc 1	Age cyc 2	% cyc 1	% cyc 2	Diff
1	21	1	31.20	22.75	-8.45
2	22	2	53.60	4.60	-49.00
3	23	3	70.85	5.98	-64.87
4	24	4	81.75	11.11	-70.65
5	25	5	87.18	21.00	-66.18
6	26	6	89.03	36.44	-52.58
7	27	7	90.40	55.90	-34.50
8	28	8	90.35	69.50	-20.86
9	29	9	90.97	75.82	-15.15

	Average	76.15	33.68	-42.47
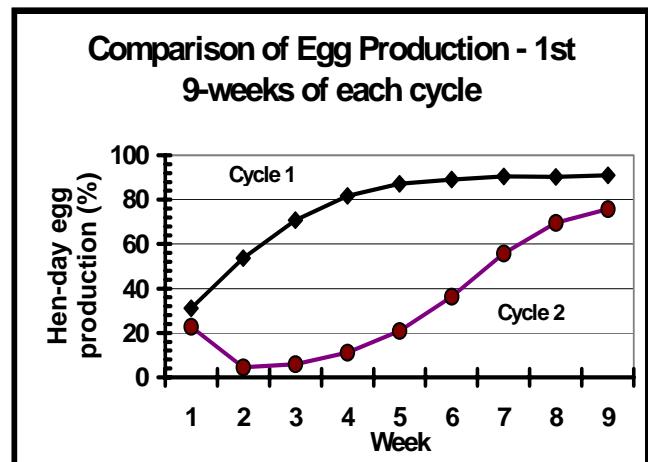
Table 13. Comparison of performance between cycles
       Mortality rate (%)

Week	Age cyc 1	Age cyc 2	% cyc 1	% cyc 2	Diff
1	21	1	0.09	0.26	0.16
2	22	2	0.10	0.44	0.34
3	23	3	0.09	0.35	0.26
4	24	4	0.09	0.18	0.09
5	25	5	0.08	0.13	0.05
6	26	6	0.09	0.12	0.03
7	27	7	0.08	0.13	0.05
8	28	8	0.08	0.14	0.06
9	29	9	0.08	0.14	0.06

	Average	0.09	0.21	0.12

Figure 9

Comparison of Egg Production - 1st 9-weeks of each cycle

Figure 10

Comparison of Weekly Mortality Rates - 1st 9-weeks of each cycle

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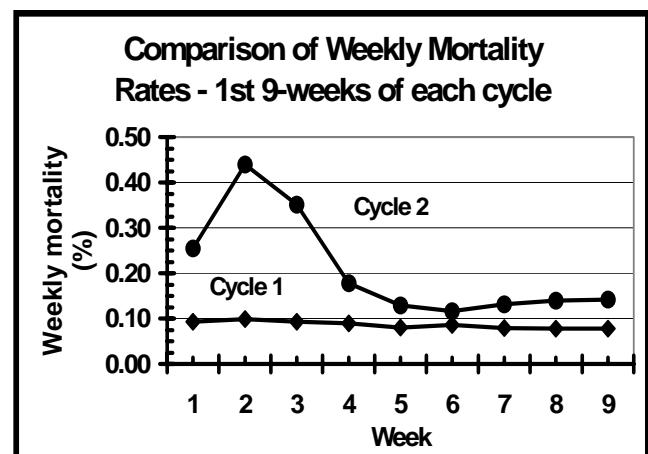
Table 14: Comparison of performance between cycles
Case weight (lbs)

Week	Age cyc 1	Age cyc 2	Cycle 1	Cycle 2	Diff
1	21	1	36.88	48.52	11.64
2	22	2	37.92	48.27	10.35
3	23	3	39.70	49.05	9.35
4	24	4	41.21	48.78	7.57
5	25	5	42.24	48.53	6.28
6	26	6	43.07	49.10	6.04
7	27	7	43.79	49.83	6.04
8	28	8	44.37	50.44	6.07
9	29	9	44.96	50.43	5.47
		Average	41.57	49.22	7.65

Figure 11

Comparison of Case Weights - 1st 9-weeks of each cycle
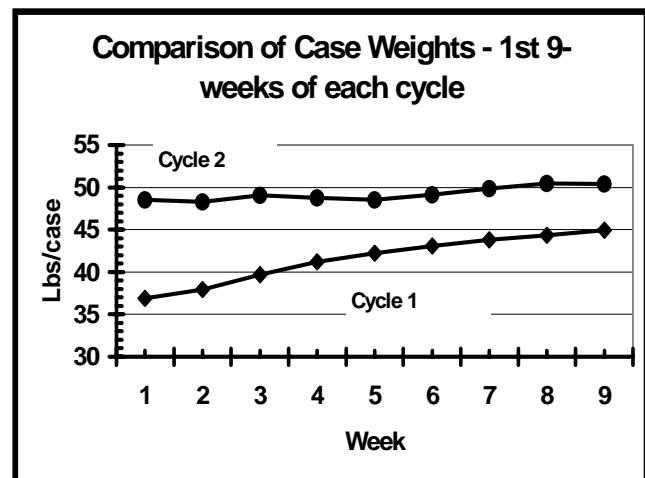
Table 15. Comparison of performance between cycles
Feed consumption (lbs/100/day)

Week	Age cyc 1	Age cyc 2	Cycle 1	Cycle 2	Diff
1	21	1	16.98	8.39	-8.59
2	22	2	17.31	11.18	-6.13
3	23	3	17.74	15.41	-2.33
4	24	4	18.17	18.81	0.64
5	25	5	19.12	19.76	0.65
6	26	6	19.88	20.39	0.51
7	27	7	20.42	21.18	0.76
8	28	8	20.75	21.79	1.04
9	29	9	21.04	22.13	1.10
		Average	19.04	17.67	-1.37

Figure 12

Cmparison of Feed Consumption - 1st 9-weeks of each cycle
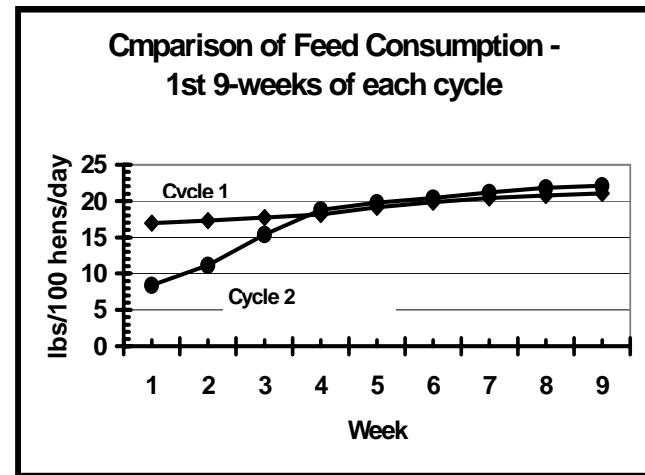
3. Flock Performance Projected Beyond Normal Molt Ages

Data for flocks beyond 80 weeks of age is quite limited and yet analyses for optimum cycle length are dependent upon this information. To estimate such information, the author has projected the cycle 1 curves to 105 weeks using the equations stated earlier. Only egg production rate and mortality rates were projected because of their highly significant upward and downward trend-lines. Egg weight and feed consumption curves were basically flat.

Table 16 lists the actual and projected performance for flocks from 30 to 105 weeks of age with and without a molt at 65 weeks of age for egg production and mortality. Figures 13 and 14 illustrate these trends.

Egg Production

The slope of the egg production curve between 35 and 65 weeks of age indicated a 0.406% loss of production with each extra week of age. When this is projected forward, we estimate the rate of lay at 105 weeks without molting as 61.4%. If the flock is molted at 65 weeks of age, the actual rate of lay was 70.7%. The comparable rates of lay for the 66 to 105 weeks of age period are estimated to be 69.4% for the non-molted hens vs. 67.6% for the molted hens – a difference of 1.8% rate of lay in favor of the non-molted system.

Mortality

The slope of the mortality curve between 35 and 65 weeks of age indicated a 0.0083% increase in the mortality rate with each successive week of age. When this is projected forward, it amounts to a 0.250% weekly rate at 105 weeks of age compared to actual data for molted flocks of 0.219%. The comparable rates of mortality for the 66 to 105 weeks of age period are estimated to be 0.205% and 0.188% for the cycle 1 and cycle 2 systems respectively. This is equal to 8.20% for cycle 1 and 7.53% for cycle 2.

Table 16. Actual vs. Calculated Data Points - cycle 1 vs. cycle 2.
       (To 105 weeks of age)

Egg Production
Projected for Extended Cycle 1   **Mortality**

		Cycle 1		Cycle 1	
Slope		**-0.4055**		**0.0023**	
Intercept		**104.02**		**0.0083**	

AGE		Cycle 1 (calculated + projected)	Cycle 1 (actual)	Cycle 1 (calculated + projected)	Cycle 2 Actual
30	Calculated	91.86		0.077	
31		91.45		0.080	
32		91.04		0.082	
33		90.64		0.084	
34		90.23		0.087	
35		89.83		0.089	
36		89.42		0.091	
37		89.02		0.093	
38		88.61		0.096	
39		88.21		0.098	
40		87.80		0.100	
41		87.39		0.103	
42		86.99		0.105	
43		86.58		0.107	
44		86.18		0.110	
45		85.77		0.112	
46		85.37		0.114	
47		84.96		0.116	
48		84.56		0.119	
49		84.15		0.121	
50		83.75		0.123	
51		83.34		0.126	
52		82.93		0.128	
53		82.53		0.130	
54		82.12		0.133	
55		81.72		0.135	
56		81.31		0.137	
57		80.91		0.139	
58		80.50		0.142	
59		80.10		0.144	
60		79.69		0.146	

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61		79.28		0.149	
62		78.88		0.151	
63		78.47		0.153	
64		78.07		0.156	
65		77.66		0.158	
66	Projected	77.26	22.75	0.160	0.255
67		76.85	4.60	0.162	0.440
68		76.45	5.98	0.165	0.351
69		76.04	11.11	0.167	0.178
70		75.64	21.00	0.169	0.129
71		75.23	36.44	0.172	0.116
72		74.82	55.90	0.174	0.131
73		74.42	69.50	0.176	0.139
74		74.01	75.82	0.179	0.142
75		73.61	79.30	0.181	0.143
76		73.20	80.88	0.183	0.150
77		72.80	81.04	0.185	0.155
78		72.39	81.30	0.188	0.148
79		71.99	81.05	0.190	0.157
80		71.58	81.16	0.192	0.145
81		71.17	81.03	0.195	0.163
82		70.77	80.66	0.197	0.165
83		70.36	80.31	0.199	0.169
84		69.96	79.83	0.202	0.164
85		69.55	79.83	0.204	0.168
86		69.15	79.82	0.206	0.179
87		68.74	79.27	0.208	0.180
88		68.34	78.93	0.211	0.178
89		67.93	78.61	0.213	0.172
90		67.53	78.07	0.215	0.183
91		67.12	77.82	0.218	0.192
92		66.71	77.37	0.220	0.187
93		66.31	76.99	0.222	0.187
94		65.90	76.63	0.225	0.190
95		65.50	76.08	0.227	0.188
96		65.09	75.74	0.229	0.206
97		64.69	75.43	0.231	0.196
98		64.28	74.88	0.234	0.199
99		63.88	73.97	0.236	0.207
100		63.47	74.22	0.238	0.212
101		63.06	73.85	0.241	0.208
102		62.66	72.84	0.243	0.206
103		62.25	71.91	0.245	0.218
104		61.85	71.38	0.248	0.218
105		61.44	70.67	0.250	0.219
	Average	69.35	67.60	0.205	0.188
	66-105 wks				

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			Total	8.198	7.532
			66-105 wks		

Figure 13. Extension of cycle 1 egg production is based upon 30 to 65 week calculated regression curve. Cycle 2 data are actual.
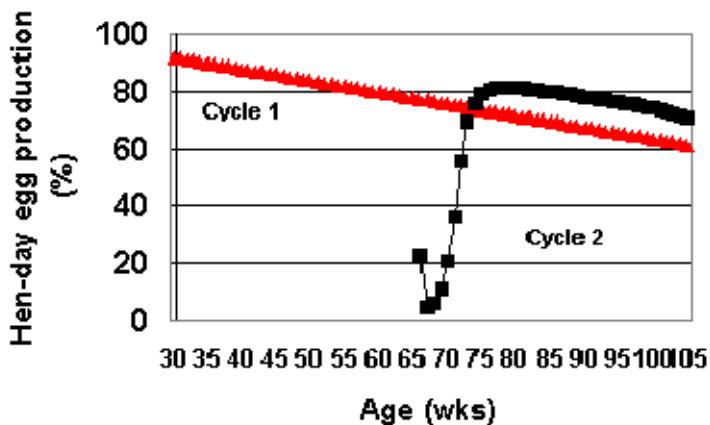

Figure 14. Extension of cycle 1 mortality rate is based upon 30 to 65 week calculated regression curve. Cycle 2 data are actual.
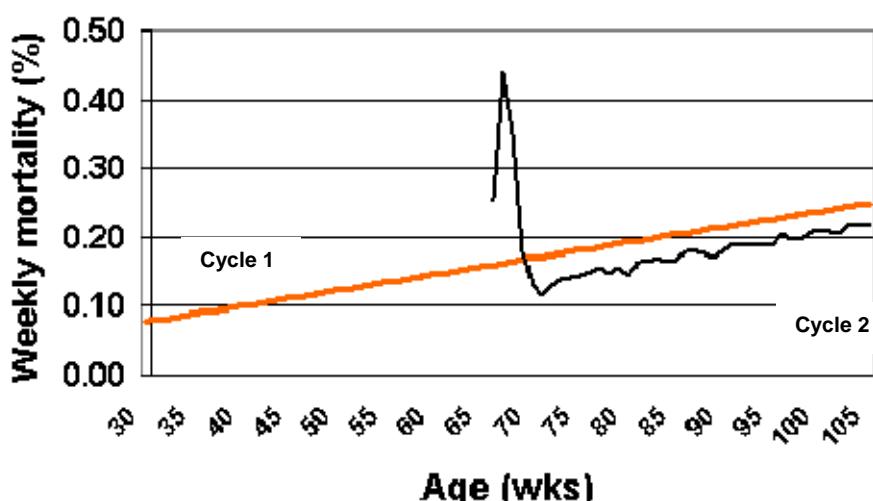
4. Seasonal Effects on Performance

All data were published on a calendar-based month. The performance reported therefore represents a given weekly rate within the stated month. This allows us to study the effects of the month of the year on performance at any given age. Several decades ago, the month of the year had a major effect on flock performance. With today's light and temperature controlled environmental housing, most egg producers experience only small performance variation due to temperature. A previous study by the author showed only a 5° F. difference between average temperatures for the summer and winter seasons. Air quality and exposure to natural light patterns (through the ventilation systems) may contribute to more performance variation than does temperature in well-managed houses.

Egg Production

Tables 17 and 21 list the weekly egg production rates for cycle 1 and cycle 2 flocks. A bar graph (Figures 15-17) illustrates the variation in egg production by month with the low and high performance listed by month. Even though there was less than a 2% variation between months, there was a definite trend for higher egg production in the spring with the highest rate occurring in May and the lowest rate in September. Egg production during the second cycle favored June with the poorest production during the winter months.

Mortality

Tables 18 and 21 list the weekly mortality rates for cycle 1 and cycle 2 flocks. The bar graph (Figures 18-20) shows reduced rates during July and September and the highest rates in December, January, and February in cycle 1. Rates in cycle 2, though, appear to be the highest in July-October but at a much lower rate in December, January and February – the opposite of what occurred in Cycle 1. This apparent interaction of season and cycle relative to mortality is a very interesting relationship. Cycle differences in mortality are much higher during the summer comparisons as opposed to the winter ones.

Case Weights

Summer vs. winter case weights showed approximately one-half pound differences in both cycles   (Tables 19 and 21 and Figure 21-23) This is equivalent to 0.8 to 0.6 grams/egg for cycles 1 and 2 respectively. The curves are quite consistent with the possible exception of February during the molt period and cycle 2.

Feed Consumption

Summer and winter feed consumption followed a similar pattern to case weights. (Tables 20-21 and Figures 24-26)   Feed consumption during cycle 1 varied from 20.8 to 21.9 pounds/100 hens per day (94.3 to 99.5 grams). Feed consumption during cycle 2 varied from 21.5 to 22.6 pounds (97.5 to 102.6 grams). A comparison of 21 to 65 week of age feed consumption vs. 78 to 105 weeks showed a 0.65-pound higher feed consumption in the second cycle. (Not including the 12-week molt period).

Table 17. Hen-day Egg Production by Age and Month of the Year - June 04 to May 05 data
Seasonal

Age	Hen-day egg production (%)												
	J	F	M	A	M	J	J	A	S	O	N	D	AV
21	29.53	28.20	39.20	29.07	37.35	33.14	36.70	29.18	25.96	25.95	28.52	31.56	31.20
22	54.57	52.93	59.61	54.83	60.51	58.88	55.12	52.50	47.02	49.66	43.15	54.40	53.60
23	73.96	73.91	74.32	73.89	76.46	72.36	72.89	69.09	63.33	67.08	62.36	70.53	70.85
24	83.46	80.74	84.25	85.11	83.83	82.76	80.09	82.27	79.63	81.21	75.91	81.77	81.75
25	87.75	87.99	87.95	89.86	88.26	88.35	86.00	86.64	85.17	86.88	84.08	87.19	87.18
26	90.13	88.46	90.99	91.85	90.18	91.00	86.97	87.64	89.00	87.45	87.43	87.20	89.03
27	90.44	90.70	92.31	92.31	92.23	90.43	88.48	89.40	90.63	87.81	90.94	89.14	90.40
28	90.19	90.76	91.16	92.37	92.30	89.69	89.77	87.49	90.66	88.81	90.66	90.38	90.35
29	90.36	90.95	91.23	91.95	92.71	90.96	90.81	89.69	91.12	90.36	91.11	90.41	90.97
30	90.91	90.84	91.82	91.67	93.21	90.57	90.27	90.45	90.95	90.62	89.75	90.99	91.00
31	90.76	88.07	90.30	91.49	93.25	91.57	90.47	90.04	89.76	91.27	90.21	90.48	90.64
32	90.76	89.79	91.05	91.18	92.77	92.42	90.52	90.57	89.61	91.39	89.88	90.63	90.88
33	90.59	90.31	90.69	90.64	92.21	91.84	89.80	90.67	89.69	91.41	89.85	90.06	90.65
34	90.51	90.61	90.54	91.13	90.69	91.34	89.20	89.77	89.76	89.51	89.41	88.79	90.11
35	89.33	87.93	89.83	91.04	90.07	91.53	88.79	90.16	89.54	89.86	89.88	89.36	89.78
36	88.99	90.14	89.67	89.91	90.41	91.10	89.05	90.10	89.18	89.53	90.44	88.95	89.79
37	88.97	89.56	89.67	89.26	90.04	90.11	89.18	88.77	89.47	88.49	90.47	88.07	89.34
38	87.74	88.86	89.51	89.33	89.95	88.94	88.81	88.54	88.87	87.73	89.64	87.54	88.79
39	87.82	88.58	89.63	88.96	88.83	88.36	87.85	88.16	89.49	88.21	88.80	88.36	88.59
40	87.87	88.00	88.87	88.71	88.28	88.46	87.62	87.09	88.68	88.45	87.64	88.73	88.20
41	86.99	87.35	88.41	87.90	87.84	88.04	87.34	86.95	87.55	88.16	86.87	88.80	87.68
42	86.31	86.99	87.84	87.44	88.38	87.46	87.30	86.17	86.82	88.64	87.28	88.61	87.44
43	86.68	86.50	86.10	87.09	88.04	85.20	86.03	86.46	86.35	87.34	87.12	87.12	86.67
44	86.52	86.37	85.99	87.35	86.49	86.39	85.50	86.94	85.09	87.52	86.34	86.01	86.38
45	86.83	85.72	85.13	86.96	85.81	85.76	83.96	86.55	84.50	86.28	86.29	84.92	85.73
46	86.35	84.78	84.99	86.35	85.30	86.26	83.58	85.71	84.50	85.46	86.16	84.91	85.36
47	85.56	84.91	84.40	85.29	85.33	85.42	83.87	84.88	85.24	84.57	85.50	85.08	85.00
48	85.00	82.71	84.00	84.09	85.41	84.59	84.40	83.45	85.28	83.80	85.30	84.31	84.36
49	84.50	83.15	84.07	83.41	85.57	84.04	83.85	83.20	84.87	84.51	84.68	84.20	84.17
50	82.79	84.36	83.24	83.50	85.40	82.71	84.51	82.65	84.44	84.38	83.99	84.23	83.85
51	82.76	84.22	82.63	82.47	84.41	83.81	83.53	83.04	83.88	84.07	83.54	83.38	83.48
52	81.38	83.56	82.14	82.60	83.32	83.48	83.22	83.43	81.98	83.65	83.74	81.83	82.86
53	82.12	82.06	82.71	82.57	82.12	82.76	82.57	83.67	81.36	83.28	83.12	81.07	82.45
54	82.50	80.43	82.84	81.92	81.31	82.63	82.98	83.10	81.34	82.92	82.94	81.40	82.19
55	82.04	80.60	83.02	81.20	80.97	81.95	81.80	81.94	81.00	83.01	82.39	81.77	81.81
56	80.98	80.61	81.95	81.10	80.29	81.23	81.53	82.84	82.04	81.20	81.61	80.80	81.35
57	81.46	80.12	80.42	81.03	81.34	81.24	81.31	81.95	81.88	80.61	81.60	79.52	81.04
58	79.98	80.18	79.09	81.11	81.21	80.13	80.44	81.59	81.45	80.32	80.99	80.00	80.54
59	78.95	78.27	78.98	80.71	80.38	79.28	79.75	80.86	80.84	81.51	80.61	80.75	80.07
60	77.72	79.69	79.28	80.48	78.65	79.14	79.45	79.55	79.44	81.15	80.45	80.12	79.59
61	77.82	79.70	78.11	79.04	79.63	78.87	78.54	80.11	79.12	80.36	79.34	80.33	79.25
62	78.23	79.00	78.07	78.40	78.95	78.71	77.93	79.53	78.47	79.09	78.69	79.10	78.68
63	77.68	76.47	77.07	78.37	78.95	78.66	77.50	78.99	79.90	78.69	78.34	76.65	78.11
64	79.09	76.87	77.32	77.62	79.50	77.74	77.14	78.59	78.94	79.24	79.25	76.99	78.19
65	79.16	76.00	77.86	76.79	78.13	77.73	74.65	76.69	78.14	78.76	77.87	75.67	77.29
Average	82.98	82.62	83.52	83.54	84.14	83.49	82.69	82.82	82.49	82.89	82.54	82.71	83.04

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(cont.) Hen-day Egg Production by Age and Month of the Year - June 04 to May 05 data - Cycle 2
Seasonal

Summary by month of record

Age	Hen-day egg production (%)												
	J	F	M	A	M	J	J	A	S	O	N	D	AV
Molt wk 1	20.37	20.94	27.21	17.77	21.90	21.72	19.67	30.89	19.71	19.18	18.64	34.99	22.75
2	5.68	5.26	12.49	0.47	6.92	8.15	7.52	0.78	1.72	0.71	0.11	5.34	4.60
3	4.90	6.23	19.40	0.69	5.39	9.16	11.08	0.16	0.93	0.28	1.65	11.87	5.98
4	6.74	12.07	28.29	4.57	9.07	11.19	12.64	6.53	3.57	3.26	7.80	27.56	11.11
5	13.18	16.72	34.73	11.99	14.04	27.08	19.66	20.96	10.14	10.93	23.36	49.17	21.00
6	22.88	30.20	42.10	36.71	34.58	43.62	42.58	42.02	31.91	24.28	33.80	52.62	36.44
7	48.34	48.69	59.15	63.53	58.18	53.87	60.67	62.34	55.45	48.19	62.49	49.89	55.90
8	72.87	60.77	71.22	76.58	68.46	71.26	70.13	73.47	70.29	64.50	71.65	62.75	69.50
9	76.09	71.47	73.03	77.52	76.17	78.07	76.32	78.40	77.06	73.87	75.46	76.43	75.82
10	79.68	79.32	76.81	80.58	81.30	80.95	78.43	79.60	78.83	78.75	78.10	79.24	79.30
11	79.61	80.80	79.57	81.89	84.43	81.29	79.90	81.16	80.71	80.21	80.64	80.29	80.88
12	81.02	83.92	79.80	81.44	80.46	81.40	79.63	80.50	80.98	80.88	80.75	81.74	81.04
Average	42.61	43.03	50.32	44.48	45.08	47.31	46.52	46.40	42.61	40.42	44.54	50.99	45.36
Age													
78	81.29	81.31	83.63	81.14	80.46	82.50	79.91	81.10	80.26	80.77	81.76	81.41	81.30
79	81.28	79.86	84.34	80.54	81.35	81.24	80.40	80.61	80.14	79.92	81.74	81.12	81.05
80	81.03	79.13	86.24	81.41	80.80	80.77	80.89	82.27	79.81	79.38	80.87	81.32	81.16
81	80.33	81.49	82.81	81.73	81.38	80.19	80.84	81.45	80.64	79.80	80.26	81.43	81.03
82	80.79	79.40	82.15	81.84	80.89	79.83	81.65	80.23	79.92	79.92	80.95	80.31	80.66
83	80.13	80.00	79.96	81.54	80.79	80.82	79.94	80.25	80.51	79.88	79.79	80.14	80.31
84	80.22	81.59	78.66	80.45	79.82	80.94	79.93	79.77	78.66	79.66	79.10	79.13	79.83
85	80.09	80.14	78.90	79.33	80.45	81.67	79.67	81.00	78.58	80.08	80.17	77.90	79.83
86	80.02	79.89	78.48	80.13	80.85	81.60	79.32	80.81	79.05	79.17	79.89	78.63	79.82
87	80.07	79.64	79.04	78.69	81.07	78.88	79.37	79.27	78.52	79.10	79.06	78.51	79.27
88	77.77	79.21	79.57	78.63	80.28	79.95	79.23	78.47	79.16	78.17	79.32	77.38	78.93
89	77.72	78.94	78.58	78.53	79.23	79.33	78.19	78.94	79.27	78.03	78.37	78.24	78.61
90	77.33	78.48	78.99	77.56	78.31	78.27	78.13	77.59	77.78	78.28	78.55	77.51	78.07
91	76.71	77.29	78.13	77.71	78.29	79.35	77.71	78.08	77.84	77.69	78.33	76.75	77.82
92	75.66	76.39	77.48	77.42	77.43	78.52	77.28	78.65	76.41	77.55	78.26	77.38	77.37
93	76.25	75.59	76.91	77.08	77.32	77.36	76.51	76.60	77.87	77.92	77.24	77.20	76.99
94	75.84	75.88	76.23	77.30	77.18	77.01	76.84	76.33	77.17	76.36	76.78	76.68	76.63
95	76.02	75.00	75.51	76.47	76.25	75.48	76.45	77.19	76.80	76.24	76.01	75.49	76.08
96	75.64	75.02	74.16	76.04	76.04	76.71	75.88	75.78	77.55	75.57	76.44	74.03	75.74
97	75.66	74.62	74.90	75.31	75.81	76.12	75.23	75.77	76.21	75.49	76.21	73.77	75.43
98	75.10	74.16	74.52	74.60	75.29	76.88	74.29	74.20	74.86	74.65	75.19	74.82	74.88
99	75.25	72.23	73.85	74.44	76.08	74.09	73.83	72.11	75.54	74.23	74.67	71.26	73.97
100	73.58	73.41	74.34	74.53	75.07	75.17	76.01	74.59	74.28	74.76	74.10	70.80	74.22
101	73.13	73.33	72.10	74.00	73.88	77.32	73.55	74.77	73.24	74.50	73.41	72.99	73.85
102	73.12	71.31	71.17	73.40	73.07	75.44	72.27	72.89	74.43	73.45	71.51	72.00	72.84
103	72.21	71.07	69.44	72.30	72.80	74.60	71.07	71.74	73.39	70.09	72.64	71.58	71.91
104	70.98	67.32	69.96	72.44	71.80	72.80	70.08	73.69	72.41	73.12	71.96	70.02	71.38
105	69.81	70.70	70.62	69.26	70.76	72.74	66.71	72.91	72.53	72.64	72.16	67.15	70.67
Average	76.89	76.51	77.17	77.28	77.60	78.06	76.83	77.40	77.24	77.02	77.31	76.25	77.13

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Table 18. Mortality Rate by Age and Month of the Year - June 04 to May 05 data												
	Seasonal											
Age	Mortality (%)											
	J	F	M	A	M	J	J	A	S	O	N	D	AV
21	0.09	0.09	0.06	0.06	0.09	0.09	0.10	0.11	0.09	0.07	0.11	0.15	0.09
22	0.11	0.13	0.08	0.07	0.10	0.10	0.10	0.14	0.08	0.08	0.10	0.09	0.10
23	0.09	0.14	0.10	0.06	0.08	0.10	0.09	0.10	0.09	0.09	0.09	0.09	0.09
24	0.08	0.12	0.09	0.06	0.10	0.07	0.10	0.09	0.08	0.08	0.11	0.09	0.09
25	0.07	0.10	0.11	0.07	0.08	0.06	0.09	0.08	0.07	0.07	0.07	0.09	0.08
26	0.06	0.09	0.09	0.06	0.07	0.07	0.09	0.10	0.10	0.10	0.11	0.09	0.09
27	0.08	0.07	0.10	0.05	0.06	0.07	0.08	0.08	0.08	0.09	0.11	0.08	0.08
28	0.07	0.07	0.10	0.05	0.05	0.09	0.09	0.08	0.07	0.08	0.11	0.08	0.08
29	0.08	0.07	0.09	0.05	0.06	0.07	0.07	0.09	0.07	0.08	0.08	0.12	0.08
30	0.08	0.07	0.07	0.07	0.07	0.08	0.08	0.07	0.08	0.08	0.08	0.12	0.08
31	0.08	0.07	0.07	0.09	0.06	0.07	0.07	0.10	0.08	0.08	0.07	0.11	0.08
32	0.09	0.07	0.09	0.08	0.06	0.07	0.07	0.10	0.08	0.07	0.08	0.10	0.08
33	0.08	0.08	0.07	0.09	0.06	0.08	0.12	0.10	0.12	0.07	0.07	0.08	0.09
34	0.10	0.09	0.07	0.10	0.07	0.07	0.09	0.09	0.07	0.08	0.08	0.07	0.08
35	0.10	0.09	0.08	0.06	0.07	0.08	0.09	0.09	0.08	0.12	0.09	0.07	0.09
36	0.12	0.11	0.09	0.09	0.08	0.09	0.10	0.09	0.08	0.11	0.08	0.09	0.09
37	0.15	0.10	0.08	0.09	0.08	0.10	0.11	0.10	0.08	0.09	0.08	0.08	0.10
38	0.13	0.10	0.09	0.08	0.09	0.08	0.11	0.09	0.09	0.13	0.10	0.11	0.10
39	0.12	0.11	0.11	0.10	0.10	0.08	0.10	0.10	0.09	0.08	0.10	0.10	0.10
40	0.10	0.13	0.12	0.10	0.09	0.09	0.08	0.11	0.09	0.09	0.11	0.09	0.10
41	0.09	0.14	0.11	0.09	0.08	0.09	0.09	0.12	0.09	0.10	0.10	0.11	0.10
42	0.10	0.13	0.15	0.11	0.07	0.09	0.09	0.11	0.09	0.10	0.11	0.12	0.11
43	0.10	0.10	0.15	0.11	0.08	0.11	0.09	0.09	0.12	0.10	0.09	0.15	0.11
44	0.11	0.09	0.12	0.11	0.10	0.10	0.09	0.09	0.12	0.15	0.10	0.15	0.11
45	0.11	0.10	0.15	0.11	0.12	0.08	0.11	0.10	0.12	0.10	0.10	0.13	0.11
46	0.13	0.11	0.10	0.11	0.12	0.08	0.13	0.09	0.10	0.09	0.11	0.12	0.11
47	0.13	0.11	0.10	0.13	0.12	0.08	0.13	0.10	0.10	0.11	0.11	0.12	0.11
48	0.13	0.15	0.10	0.13	0.12	0.11	0.14	0.10	0.10	0.12	0.11	0.11	0.12
49	0.13	0.15	0.11	0.12	0.13	0.12	0.18	0.11	0.09	0.11	0.10	0.12	0.12
50	0.13	0.14	0.12	0.13	0.12	0.13	0.14	0.11	0.09	0.11	0.10	0.14	0.12
51	0.13	0.13	0.12	0.13	0.12	0.14	0.12	0.14	0.09	0.12	0.10	0.13	0.12
52	0.13	0.14	0.15	0.13	0.13	0.13	0.13	0.14	0.10	0.11	0.10	0.13	0.13
53	0.15	0.14	0.14	0.14	0.12	0.12	0.13	0.14	0.16	0.12	0.13	0.11	0.13
54	0.15	0.14	0.14	0.14	0.13	0.12	0.13	0.14	0.10	0.10	0.16	0.11	0.13
55	0.12	0.15	0.14	0.15	0.13	0.12	0.11	0.13	0.12	0.10	0.14	0.10	0.13
56	0.13	0.13	0.16	0.14	0.16	0.14	0.11	0.13	0.13	0.11	0.16	0.13	0.14
57	0.14	0.12	0.17	0.16	0.13	0.14	0.12	0.13	0.12	0.11	0.11	0.16	0.13
58	0.13	0.14	0.15	0.17	0.12	0.15	0.14	0.14	0.14	0.11	0.11	0.18	0.14
59	0.14	0.14	0.14	0.18	0.14	0.12	0.15	0.12	0.17	0.11	0.11	0.16	0.14
60	0.14	0.14	0.12	0.21	0.15	0.15	0.15	0.12	0.13	0.14	0.12	0.13	0.14
61	0.14	0.16	0.13	0.19	0.15	0.15	0.15	0.11	0.14	0.15	0.12	0.12	0.14
62	0.16	0.14	0.14	0.16	0.18	0.14	0.15	0.14	0.12	0.16	0.14	0.14	0.15
63	0.17	0.15	0.15	0.16	0.22	0.13	0.16	0.17	0.11	0.20	0.14	0.15	0.16
64	0.17	0.13	0.18	0.16	0.17	0.17	0.18	0.19	0.11	0.18	0.15	0.14	0.16
65	0.17	0.13	0.17	0.14	0.22	0.17	0.20	0.19	0.12	0.15	0.18	0.14	0.17
Average	0.12	0.12	0.11	0.11	0.11	0.10	0.11	0.11	0.10	0.11	0.11	0.12	0.11

(cont) Mortality Rate by Age and Month of the Year - June 04 to May 05 data - Cycle 2
Seasonal

Summary by month of record

Age	Mortality (%)												
	J	F	M	A	M	J	J	A	S	O	N	D	AV
Molt wk 1	0.32	0.44	0.24	0.33	0.23	0.19	0.21	0.21	0.23	0.23	0.11	0.32	0.26
2	0.72	0.52	0.60	0.47	0.54	0.45	0.24	0.24	0.39	0.39	0.14	0.58	0.44
3	0.40	0.27	0.26	0.38	0.39	0.31	0.33	0.33	0.35	0.25	0.40	0.54	0.35
4	0.15	0.18	0.13	0.23	0.13	0.22	0.17	0.17	0.21	0.11	0.13	0.31	0.18
5	0.13	0.12	0.14	0.12	0.11	0.13	0.18	0.18	0.13	0.09	0.13	0.09	0.13
6	0.13	0.10	0.11	0.13	0.12	0.11	0.13	0.13	0.16	0.08	0.10	0.09	0.12
7	0.17	0.12	0.12	0.15	0.15	0.13	0.15	0.15	0.12	0.11	0.11	0.09	0.13
8	0.18	0.12	0.12	0.13	0.17	0.16	0.15	0.15	0.17	0.14	0.10	0.08	0.14
9	0.14	0.14	0.11	0.19	0.13	0.17	0.15	0.15	0.14	0.19	0.10	0.09	0.14
10	0.10	0.17	0.14	0.16	0.15	0.15	0.15	0.15	0.11	0.16	0.18	0.10	0.14
11	0.11	0.15	0.14	0.14	0.19	0.15	0.17	0.17	0.14	0.16	0.15	0.13	0.15
12	0.11	0.18	0.15	0.15	0.15	0.16	0.17	0.17	0.15	0.18	0.15	0.14	0.16
Average	0.22	0.21	0.19	0.22	0.21	0.19	0.18	0.18	0.19	0.17	0.15	0.21	0.19
Age													
78	0.18	0.10	0.15	0.16	0.12	0.11	0.14	0.14	0.16	0.19	0.21	0.12	0.15
79	0.12	0.10	0.16	0.15	0.16	0.15	0.16	0.16	0.17	0.25	0.15	0.15	0.16
80	0.14	0.10	0.11	0.15	0.17	0.14	0.14	0.14	0.15	0.16	0.17	0.17	0.15
81	0.13	0.15	0.19	0.13	0.21	0.15	0.16	0.16	0.17	0.16	0.16	0.19	0.16
82	0.13	0.15	0.23	0.15	0.19	0.16	0.15	0.15	0.18	0.19	0.14	0.16	0.17
83	0.13	0.16	0.19	0.15	0.19	0.19	0.19	0.19	0.15	0.19	0.15	0.15	0.17
84	0.13	0.14	0.15	0.17	0.16	0.20	0.17	0.17	0.20	0.17	0.16	0.15	0.16
85	0.14	0.13	0.19	0.19	0.14	0.20	0.18	0.18	0.19	0.19	0.15	0.14	0.17
86	0.16	0.14	0.18	0.19	0.14	0.18	0.19	0.19	0.16	0.32	0.16	0.14	0.18
87	0.15	0.16	0.16	0.23	0.15	0.19	0.21	0.21	0.18	0.23	0.16	0.13	0.18
88	0.17	0.16	0.17	0.21	0.17	0.15	0.18	0.18	0.16	0.20	0.21	0.17	0.18
89	0.17	0.15	0.14	0.21	0.19	0.15	0.18	0.18	0.16	0.19	0.17	0.17	0.17
90	0.17	0.14	0.16	0.20	0.23	0.15	0.22	0.22	0.17	0.21	0.16	0.17	0.18
91	0.16	0.16	0.14	0.20	0.27	0.17	0.22	0.22	0.19	0.22	0.18	0.17	0.19
92	0.15	0.16	0.15	0.19	0.22	0.18	0.25	0.25	0.19	0.18	0.16	0.16	0.19
93	0.16	0.18	0.16	0.15	0.22	0.19	0.23	0.23	0.19	0.17	0.22	0.14	0.19
94	0.18	0.17	0.17	0.15	0.22	0.20	0.23	0.23	0.20	0.18	0.19	0.16	0.19
95	0.18	0.16	0.17	0.18	0.19	0.23	0.20	0.20	0.18	0.21	0.19	0.16	0.19
96	0.16	0.25	0.18	0.18	0.20	0.18	0.28	0.28	0.18	0.22	0.19	0.17	0.21
97	0.18	0.16	0.20	0.17	0.20	0.23	0.22	0.22	0.19	0.21	0.17	0.20	0.20
98	0.18	0.16	0.19	0.20	0.20	0.22	0.23	0.23	0.20	0.20	0.18	0.20	0.20
99	0.16	0.23	0.17	0.19	0.19	0.21	0.25	0.25	0.21	0.25	0.18	0.19	0.21
100	0.18	0.18	0.20	0.22	0.22	0.21	0.24	0.24	0.19	0.22	0.24	0.20	0.21
101	0.19	0.19	0.18	0.21	0.17	0.23	0.21	0.21	0.23	0.18	0.29	0.21	0.21
102	0.21	0.19	0.20	0.19	0.16	0.18	0.22	0.22	0.22	0.20	0.28	0.20	0.21
103	0.24	0.18	0.22	0.21	0.26	0.17	0.23	0.23	0.20	0.22	0.29	0.17	0.22
104	0.21	0.20	0.21	0.19	0.24	0.19	0.26	0.26	0.22	0.21	0.22	0.20	0.22
105	0.25	0.19	0.20	0.22	0.24	0.18	0.26	0.26	0.19	0.22	0.21	0.21	0.22
Average	0.17	0.16	0.18	0.18	0.19	0.18	0.21	0.21	0.19	0.21	0.19	0.17	0.19

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Table 19. Case Weights by Age and Month of the Year - June 04 to May 05 data												
	Seasonal												
Age	Case weight (lbs)											
	J	F	M	A	M	J	J	A	S	O	N	D	AV
21	37.12	36.44	36.60	37.13	36.80	36.75	36.67	36.82	36.80	37.08	36.42	37.93	36.88
22	38.29	37.65	37.95	38.25	37.95	38.18	38.26	37.29	38.19	36.88	37.30	38.82	37.92
23	39.61	39.23	39.70	40.58	39.36	40.13	39.73	39.70	39.50	39.12	39.62	40.15	39.70
24	40.94	41.21	41.09	41.45	41.06	41.22	41.47	41.01	41.05	41.29	40.73	42.00	41.21
25	42.35	42.27	42.23	42.24	42.19	41.42	42.33	42.62	41.98	42.15	42.25	42.88	42.24
26	43.53	43.28	42.83	42.95	43.18	42.49	43.08	43.36	42.60	43.03	42.72	43.73	43.07
27	44.32	43.65	43.54	43.74	43.73	43.46	44.68	43.75	43.66	43.37	43.36	44.26	43.79
28	44.46	44.52	44.46	44.16	44.58	43.83	44.53	44.24	44.32	44.03	44.09	45.22	44.37
29	45.17	44.95	45.37	44.84	45.15	44.55	44.75	44.65	45.19	44.51	44.60	45.79	44.96
30	45.34	45.70	45.78	45.24	45.37	45.37	45.49	44.85	45.66	44.99	45.34	45.69	45.40
31	45.85	46.42	46.04	45.68	45.70	45.17	45.94	45.79	45.65	45.64	45.74	45.69	45.78
32	46.47	46.54	45.82	45.94	46.20	46.32	46.08	46.31	45.79	46.11	46.23	46.05	46.16
33	46.81	46.82	46.21	46.42	46.11	46.52	46.45	46.36	46.29	46.85	46.37	46.52	46.48
34	47.15	46.94	46.92	46.81	46.43	46.49	46.57	47.06	46.47	46.73	46.39	46.42	46.70
35	47.39	47.26	47.45	47.03	46.51	46.69	46.65	46.96	46.79	47.16	47.01	46.55	46.95
36	47.48	47.84	47.63	47.36	47.03	46.96	46.90	47.47	47.18	47.31	47.26	46.76	47.27
37	47.63	47.84	47.86	47.35	47.47	46.88	47.26	47.61	47.40	47.72	47.49	46.68	47.43
38	48.09	47.88	47.96	47.64	47.77	47.07	47.34	48.04	47.67	47.77	47.62	47.43	47.69
39	47.90	48.20	48.02	48.11	47.81	46.94	47.45	48.51	47.70	47.76	48.02	47.49	47.83
40	47.98	48.30	48.29	48.48	47.61	47.66	47.50	47.93	47.98	47.81	48.17	47.86	47.96
41	47.99	48.53	48.38	48.20	47.58	47.95	47.54	47.83	48.41	47.95	48.45	48.12	48.08
42	48.41	48.54	48.48	48.30	47.86	47.95	47.39	47.83	48.49	48.25	48.45	48.10	48.17
43	48.16	48.73	48.81	47.97	48.28	48.04	47.83	48.27	48.70	48.17	48.38	48.36	48.31
44	48.09	48.78	48.51	48.30	48.82	47.90	47.98	48.61	48.28	48.34	48.43	48.60	48.39
45	48.37	48.54	48.65	48.60	48.65	47.99	48.19	48.19	48.24	48.67	48.47	48.95	48.46
46	48.51	49.00	48.85	48.71	48.58	48.29	48.46	48.15	48.30	48.80	48.31	48.89	48.57
47	48.99	48.41	49.41	48.78	48.60	48.39	48.66	48.02	48.41	48.93	48.56	48.82	48.67
48	49.01	48.54	49.07	48.71	48.66	48.70	47.89	48.43	48.90	48.58	48.75	48.80	48.67
49	49.02	48.76	48.83	48.88	48.89	48.46	47.74	48.63	48.67	48.43	48.77	49.04	48.68
50	49.32	48.95	48.96	49.08	48.88	48.29	47.84	48.56	48.50	48.83	49.12	48.95	48.77
51	49.40	49.24	48.98	49.35	48.88	48.53	48.38	49.03	48.22	49.29	49.11	49.17	48.97
52	49.38	49.27	48.83	49.45	49.11	48.47	47.93	48.81	48.73	49.10	49.37	49.45	48.99
53	49.46	49.36	49.05	49.23	48.98	48.65	48.23	48.33	48.47	49.06	49.10	49.14	48.92
54	49.48	49.76	49.01	49.21	48.91	48.90	47.57	48.37	49.01	48.95	49.11	49.26	48.96
55	49.48	49.50	49.37	49.22	49.11	48.70	48.32	48.51	49.46	48.78	49.15	49.52	49.09
56	49.74	49.38	49.40	49.11	49.60	48.96	48.14	48.37	48.82	48.99	48.97	49.50	49.08
57	49.27	49.52	49.64	49.24	49.65	48.68	48.34	48.53	48.94	49.23	49.10	49.26	49.12
58	49.62	49.60	49.93	49.20	49.67	49.31	48.71	48.14	48.93	49.26	49.40	49.37	49.26
59	49.47	49.81	50.08	49.29	49.58	49.49	48.73	48.60	48.88	49.46	49.23	49.50	49.34
60	49.52	50.04	49.89	49.33	49.04	49.55	48.97	48.63	49.39	49.72	49.36	49.58	49.42
61	49.17	49.72	49.74	49.61	48.99	49.42	48.86	48.93	49.24	49.51	49.50	49.14	49.32
62	49.62	49.90	49.91	49.76	49.57	49.07	49.31	48.78	49.37	49.59	49.40	49.07	49.45
63	49.69	50.13	50.04	49.98	49.43	49.12	49.26	49.13	49.37	49.46	49.72	49.49	49.57
64	49.69	48.42	50.38	49.97	49.91	48.75	49.27	49.48	49.18	49.41	50.30	49.63	49.53
65	49.90	50.12	50.06	50.02	49.76	49.04	49.01	49.61	49.24	49.32	49.88	49.70	49.64
Average	47.17	47.19	47.20	47.09	46.96	46.68	46.62	46.76	46.84	46.92	46.96	47.14	46.96

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(cont) Case Weights by Age and Month of the Year - June 04 to May 05 data - Cycle 2
Seasonal

Summary by month of record

Age	Case weight (lbs)												
	J	F	M	A	M	J	J	A	S	O	N	D	AV
Molt wk 1	47.93	49.60	49.54	48.52	48.82	47.97	48.83	47.61	48.37	46.13	49.19	49.75	48.52
2	47.71	47.34	48.76	48.56	48.26	48.68	49.24	47.16	47.49	47.87	49.29	48.83	48.27
3	48.83	46.71	51.00	48.30	48.74	49.51	48.60	48.79	48.30	48.41	49.79	51.60	49.05
4	48.60	47.15	50.49	49.14	47.46	49.82	49.10	47.38	47.66	48.12	49.32	51.17	48.78
5	49.23	46.79	49.73	48.78	48.55	48.94	47.45	48.51	46.85	47.71	49.16	50.62	48.53
6	48.67	48.78	49.27	49.38	49.64	49.39	49.30	48.77	48.07	48.36	49.25	50.33	49.10
7	50.42	49.59	49.93	50.44	50.64	49.82	49.85	49.51	49.21	48.78	49.68	50.13	49.83
8	50.96	49.84	50.37	51.27	50.80	51.17	50.45	50.09	49.88	49.36	50.54	50.57	50.44
9	50.84	50.35	50.50	50.64	50.82	50.30	50.58	50.54	50.18	49.70	50.45	50.23	50.43
10	50.89	51.11	50.13	50.97	51.92	50.59	50.53	50.69	50.12	50.43	49.70	50.72	50.65
11	50.85	50.97	50.35	50.90	51.53	51.03	50.23	50.01	50.06	50.18	49.84	50.65	50.55
12	50.53	50.56	50.39	50.76	50.97	50.65	50.32	50.54	50.52	50.28	49.22	50.93	50.47
Average	49.62	49.07	50.04	49.81	49.85	49.82	49.54	49.13	48.89	48.78	49.62	50.46	49.55
Age													
78	49.43	49.67	51.03	50.18	51.17	50.25	50.16	49.76	50.40	49.97	50.40	49.92	50.20
79	49.45	49.51	50.28	49.57	50.82	50.63	49.71	50.12	50.13	50.15	50.83	50.01	50.10
80	49.79	49.71	48.48	50.24	50.54	49.67	50.34	50.28	50.01	50.03	50.63	50.14	49.99
81	50.03	50.21	50.73	49.99	50.28	50.20	50.62	50.46	49.86	50.49	50.01	50.36	50.27
82	50.33	49.92	50.96	50.34	50.08	51.36	50.37	50.25	50.23	50.30	49.66	50.37	50.35
83	50.06	49.04	50.45	50.56	50.42	50.18	50.02	50.30	50.21	50.29	49.90	50.91	50.20
84	50.12	49.25	50.15	50.41	50.42	50.62	50.03	50.32	50.04	50.10	50.07	50.33	50.16
85	50.63	49.05	50.33	50.72	50.29	50.42	50.10	50.21	49.85	50.06	50.20	50.36	50.19
86	50.34	49.90	50.36	49.97	50.80	49.64	50.11	50.55	49.99	50.19	50.66	50.08	50.22
87	50.35	49.37	49.68	50.44	50.25	49.67	50.07	50.53	49.93	50.30	50.66	49.88	50.09
88	50.38	50.12	49.82	50.07	50.30	50.68	49.56	50.51	50.22	50.47	50.96	50.39	50.29
89	50.91	50.13	49.44	50.13	50.83	50.09	50.31	50.34	50.05	50.35	50.41	50.53	50.29
90	50.77	49.87	49.95	50.14	50.65	50.26	49.59	50.11	50.62	49.97	50.36	50.92	50.27
91	50.79	50.33	50.34	49.43	50.84	49.99	50.25	50.13	50.71	50.27	50.62	50.89	50.38
92	50.55	50.46	50.48	49.37	50.17	50.10	50.25	49.87	50.84	50.38	50.78	50.48	50.31
93	50.75	49.92	50.40	49.76	50.24	50.38	50.06	50.05	50.75	50.56	50.46	50.74	50.34
94	50.80	50.36	50.40	49.54	50.06	50.15	50.21	49.93	50.50	50.99	50.26	50.38	50.30
95	50.97	50.88	50.61	49.48	50.52	50.08	50.47	49.88	50.74	50.95	50.35	50.41	50.45
96	51.00	50.66	50.95	50.11	49.29	50.03	50.51	50.48	49.74	50.74	50.43	50.75	50.39
97	50.81	50.86	51.02	50.16	49.05	49.86	50.41	50.27	50.79	51.04	50.61	50.75	50.47
98	50.67	51.04	50.97	50.00	50.55	49.91	50.32	50.56	50.79	51.02	50.82	50.90	50.63
99	50.35	51.32	51.18	50.34	49.74	50.17	50.45	50.38	50.61	50.75	51.02	50.73	50.59
100	50.54	51.49	51.37	50.55	50.10	49.85	50.39	50.38	51.21	50.95	51.21	50.76	50.73
101	50.86	51.03	51.05	51.07	49.73	49.83	50.65	50.53	51.14	50.82	50.92	50.85	50.71
102	50.76	50.80	51.11	51.32	49.81	50.46	50.91	50.57	51.05	50.98	51.10	50.83	50.81
103	50.73	50.58	51.32	51.03	50.26	50.03	50.86	50.39	50.93	50.98	51.12	51.32	50.80
104	51.15	50.89	51.54	50.82	50.22	50.66	50.30	50.61	50.61	51.17	51.13	51.48	50.88
105	51.35	50.80	51.24	52.00	50.56	50.18	50.27	50.49	50.78	50.98	51.17	51.56	50.95
Average	50.52	50.26	50.56	50.28	50.29	50.19	50.26	50.30	50.45	50.54	50.60	50.61	50.40

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Table 20. Feed Consumption by Age and Month of the Year - June 04 to May 05 data												
Seasonal												
Average												
Age	Feed consumption (lbs/100/day)											
	J	F	M	A	M	J	J	A	S	O	N	D	AV
21	17.08	17.73	17.19	18.34	17.18	17.01	16.50	15.46	14.78	16.10	17.85	18.48	16.98
22	17.73	17.55	17.68	17.75	17.85	17.47	16.99	16.07	15.69	16.52	18.30	18.14	17.31
23	18.30	17.83	18.06	18.53	18.47	17.56	17.16	16.86	16.39	17.29	18.33	18.07	17.74
24	18.34	18.44	18.33	18.64	18.78	18.13	17.61	17.92	16.70	18.00	17.84	19.34	18.17
25	18.97	19.26	19.57	19.79	19.41	19.07	18.31	18.41	18.60	18.75	18.98	20.27	19.12
26	20.22	20.13	20.12	20.13	20.38	19.94	18.95	19.12	19.36	19.29	19.92	20.99	19.88
27	20.63	20.75	20.54	20.59	20.94	20.19	19.53	19.69	20.20	20.13	20.14	21.74	20.42
28	21.54	21.41	20.89	21.11	21.21	20.12	20.26	19.64	20.68	20.32	20.56	21.24	20.75
29	22.30	21.45	21.35	21.09	21.47	20.57	20.57	20.08	20.72	20.78	20.77	21.28	21.04
30	22.11	21.65	21.47	21.02	21.43	21.14	20.78	20.58	21.14	21.20	20.87	21.31	21.23
31	22.20	22.22	21.79	21.75	21.82	21.10	20.54	21.14	21.07	21.30	20.89	21.72	21.46
32	22.16	22.36	21.81	21.71	21.50	21.51	20.63	21.19	21.37	21.50	21.70	21.82	21.61
33	21.83	23.13	21.91	21.92	21.53	21.52	20.88	21.06	21.22	21.68	21.22	22.26	21.68
34	21.98	23.55	22.28	21.94	21.94	21.53	20.27	21.05	21.52	21.44	21.70	22.01	21.77
35	22.00	23.08	22.85	22.14	21.63	21.74	21.46	21.25	21.51	21.71	22.23	22.29	21.99
36	22.20	23.18	22.75	22.41	22.09	21.63	21.60	21.45	21.47	21.60	22.19	22.17	22.06
37	22.35	22.28	23.16	22.17	22.14	21.54	21.27	21.66	21.68	21.87	22.51	21.89	22.04
38	22.20	21.74	23.34	22.51	22.33	21.26	21.42	21.39	21.59	21.97	22.28	22.17	22.02
39	21.84	22.25	22.63	22.87	22.55	21.27	21.25	21.62	21.80	22.14	22.17	22.28	22.06
40	21.83	22.46	23.01	23.08	22.26	21.84	21.25	22.48	21.38	22.29	22.17	22.32	22.20
41	21.87	22.73	22.51	23.09	22.14	22.00	21.61	21.65	21.85	22.04	22.33	22.51	22.19
42	21.80	22.55	22.14	23.13	22.35	21.99	21.49	21.65	21.69	21.78	22.23	22.50	22.11
43	21.99	22.11	22.27	22.51	22.55	22.05	21.65	21.86	21.65	21.86	22.30	22.12	22.08
44	22.33	22.11	22.22	22.54	23.06	21.76	21.43	22.06	21.52	21.80	22.21	22.61	22.14
45	22.60	21.88	22.67	22.44	23.10	21.85	21.42	21.68	21.44	21.69	22.18	22.26	22.10
46	22.65	21.96	22.26	22.38	23.61	22.09	21.40	21.71	21.55	21.64	22.29	22.45	22.17
47	22.70	22.44	22.52	22.14	23.45	22.20	21.40	21.23	22.04	21.67	22.15	22.69	22.22
48	22.54	22.71	22.02	22.13	23.09	22.22	21.45	21.30	21.92	21.83	22.32	22.51	22.17
49	22.52	22.97	21.22	22.01	22.77	22.11	21.50	21.13	21.35	22.04	22.09	22.77	22.04
50	22.36	23.00	21.96	22.20	22.14	22.25	21.49	21.28	21.63	22.03	21.85	22.32	22.04
51	22.65	22.54	22.12	21.98	21.87	22.46	20.93	21.67	21.49	22.05	21.84	22.21	21.98
52	22.38	22.94	22.17	22.01	22.23	22.03	21.17	21.46	21.38	22.45	21.85	22.36	22.04
53	22.43	22.64	22.58	22.17	22.19	22.46	21.12	21.39	21.55	22.01	22.54	22.15	22.10
54	22.55	22.85	22.55	22.04	22.34	21.84	21.13	21.51	21.55	21.75	22.48	22.32	22.08
55	22.30	22.51	22.67	21.99	22.11	21.48	21.00	21.46	22.17	21.73	23.10	22.19	22.06
56	22.56	22.80	22.61	22.15	22.12	22.05	21.38	21.13	21.77	21.70	22.59	22.14	22.08
57	22.52	22.55	22.62	22.20	22.20	21.95	21.36	21.14	21.90	21.74	22.52	22.94	22.14
58	22.35	22.76	22.66	22.22	22.12	22.18	21.90	21.16	21.50	22.10	22.12	22.98	22.17
59	22.12	22.93	22.69	22.44	22.09	22.00	21.94	21.39	21.68	22.10	21.99	23.12	22.21
60	21.86	22.60	22.70	22.47	22.04	21.83	22.20	21.47	21.37	22.17	22.16	23.29	22.18
61	22.03	22.88	22.21	22.97	22.17	22.41	22.10	21.50	21.27	22.14	22.15	22.66	22.21
62	22.39	22.63	22.79	22.67	22.56	22.33	22.22	21.49	20.97	22.26	22.34	22.30	22.25
63	22.40	22.64	22.73	23.22	22.73	22.04	21.54	21.94	21.09	22.30	22.39	22.46	22.29
64	22.67	22.37	23.07	22.91	22.91	22.35	22.16	22.54	21.70	21.78	22.41	22.12	22.42
65	23.34	22.36	23.13	22.65	22.78	21.66	21.57	22.24	21.56	21.87	22.36	22.64	22.35
Average	21.73	21.93	21.82	21.78	21.77	21.28	20.80	20.83	20.85	21.21	21.54	21.88	21.45

University of California

(cont) Feed Consumption by Age and Month of the Year - June 04 to May 05 data - Cycle 2
Seasonal

Summary by month of record

Age	Feed consumption (lbs/100/day)												
	J	F	M	A	M	J	J	A	S	O	N	D	AV
Molt wk 1	9.06	2.30	8.21	10.26	5.04	9.88	7.66	8.41	10.23	7.01	13.64	8.93	8.39
2	12.85	9.79	9.54	11.00	11.59	12.29	11.64	9.76	10.08	11.85	12.54	11.28	11.18
3	15.65	17.32	18.46	15.44	14.09	16.50	16.37	13.29	14.17	14.52	13.16	15.90	15.41
4	17.33	20.36	19.91	18.14	18.30	19.45	21.11	18.32	18.40	16.64	16.19	21.55	18.81
5	18.58	20.35	18.54	19.70	20.43	19.32	20.28	20.74	17.98	20.70	18.66	21.89	19.76
6	20.00	21.22	19.70	19.37	21.65	20.05	20.71	19.95	20.38	19.33	21.13	21.19	20.39
7	22.92	22.00	21.47	20.82	21.60	20.24	21.39	20.78	19.24	21.19	21.08	21.47	21.18
8	22.90	21.58	22.83	20.40	22.34	22.30	21.53	21.60	20.98	21.93	21.34	21.77	21.79
9	22.32	22.23	22.28	22.02	21.19	21.59	21.84	23.90	20.82	21.81	22.49	23.09	22.13
10	21.65	21.77	21.82	22.65	21.58	21.47	20.83	21.86	21.49	22.04	22.24	22.50	21.83
11	22.09	22.00	21.40	22.82	21.35	21.41	21.01	21.47	20.60	22.06	22.04	21.92	21.68
12	22.01	22.41	21.54	22.89	21.85	20.94	21.26	21.79	21.14	21.69	22.40	22.80	21.89
Average	18.95	18.61	18.81	18.79	18.42	18.79	18.80	18.49	17.96	18.40	18.91	19.52	18.70
Age													
78	22.27	20.20	22.72	23.14	22.00	20.79	21.25	21.08	21.37	21.19	22.36	22.54	21.74
79	22.90	21.44	22.08	21.97	22.25	21.16	21.43	21.45	21.16	20.95	21.98	22.41	21.77
80	22.87	21.44	22.12	22.00	22.93	21.05	22.04	21.36	21.30	21.16	22.03	22.99	21.94
81	22.73	22.60	22.14	21.97	24.29	20.87	21.82	21.62	21.45	21.61	21.67	23.41	22.18
82	22.74	22.09	22.41	22.09	22.68	21.46	21.53	21.56	21.34	21.96	22.06	23.15	22.09
83	22.86	21.93	22.07	22.40	23.06	22.09	21.77	21.44	21.25	22.12	21.69	23.61	22.19
84	22.52	23.09	21.69	22.25	22.23	22.55	21.49	21.52	21.43	22.04	21.89	22.48	22.10
85	23.19	22.60	22.25	21.89	22.11	22.72	21.84	21.93	21.21	21.78	22.09	22.27	22.16
86	22.79	23.17	22.07	21.83	22.07	22.11	21.33	21.96	21.21	21.56	22.26	22.12	22.04
87	22.73	22.91	22.36	22.24	21.91	22.04	21.37	21.99	21.53	21.62	22.49	22.19	22.12
88	22.72	22.78	22.65	22.30	21.60	21.81	21.70	21.80	21.66	21.43	22.50	21.86	22.07
89	22.71	22.73	22.54	22.69	21.79	21.47	21.28	22.07	21.61	21.45	22.20	22.29	22.07
90	22.48	22.90	23.15	22.22	21.44	21.63	21.21	21.50	22.07	21.56	22.08	22.63	22.07
91	22.38	22.70	22.65	22.51	21.96	21.58	21.08	21.45	22.26	21.71	22.19	22.52	22.08
92	22.22	22.75	22.97	22.35	22.71	21.27	21.00	21.49	22.05	21.71	21.85	22.39	22.06
93	22.06	22.80	22.77	22.60	22.10	21.14	21.28	21.32	21.97	21.76	21.82	22.36	22.00
94	22.24	22.37	23.03	22.94	22.08	21.10	21.29	20.87	21.51	21.93	21.82	21.79	21.91
95	22.34	22.26	22.92	22.94	22.02	21.26	21.31	21.36	21.15	22.06	21.57	22.12	21.94
96	22.52	22.54	22.66	23.37	22.60	21.62	21.54	21.57	21.36	22.19	21.79	22.03	22.15
97	22.49	22.28	22.76	23.08	23.43	21.80	21.72	21.89	21.01	22.08	22.25	21.81	22.22
98	22.45	22.11	22.50	23.36	23.34	21.87	21.49	21.75	21.63	22.14	22.27	21.98	22.24
99	22.22	22.70	22.50	22.89	23.00	21.69	21.33	21.33	21.78	21.85	22.09	21.80	22.10
100	21.96	23.00	22.89	22.66	22.77	22.24	21.60	21.50	21.89	21.55	22.68	21.63	22.20
101	21.68	23.00	21.81	23.10	22.97	22.56	22.02	21.64	21.63	21.96	22.43	22.51	22.28
102	21.84	22.70	22.26	22.89	23.50	22.42	21.60	21.68	22.38	21.69	22.67	22.54	22.35
103	22.32	22.13	22.62	22.49	23.97	22.10	21.29	21.82	21.91	21.48	22.66	23.55	22.36
104	21.87	22.11	22.87	22.23	23.61	21.93	21.79	22.14	21.68	21.62	22.50	23.41	22.31
105	21.78	22.05	22.96	22.21	23.30	21.68	21.19	21.88	21.25	21.98	22.72	23.04	22.17
Average	22.42	22.41	22.52	22.52	22.63	21.71	21.49	21.61	21.57	21.72	22.16	22.48	22.10

Table 21. Seasonal Data
First Cycle - 21 through 65 weeks of age

Month	HD %	Mortality (%)	Case wt.	Feed consumption
J	82.98	0.12	47.17	21.73
F	82.62	0.12	47.19	21.93
M	83.52	0.11	47.20	21.82
A	83.54	0.11	47.09	21.78
M	84.14	0.11	46.96	21.77
J	83.49	0.10	46.68	21.28
J	82.69	0.11	46.62	20.80
A	82.82	0.11	46.76	20.83
S	82.49	0.10	46.84	20.85
O	82.89	0.11	46.92	21.21
N	82.54	0.11	46.96	21.54
D	82.71	0.12	47.14	21.88
Av	83.04	0.11	46.96	21.45

Seasonal Data				
		12 weeks of the molt		
J	42.61	0.22	49.62	18.95
F	43.03	0.21	49.07	18.61
M	50.32	0.19	50.04	18.81
A	44.48	0.22	49.81	18.79
M	45.08	0.21	49.85	18.42
J	47.31	0.19	49.82	18.79
J	46.52	0.18	49.54	18.80
A	46.40	0.18	49.13	18.49
S	42.61	0.19	48.89	17.96
O	40.42	0.17	48.78	18.40
N	44.54	0.15	49.62	18.91
D	50.99	0.21	50.46	19.52
Av.	45.36	0.19	49.55	18.70

Seasonal Data				
		2nd Cycle - 78 through 105 weeks of age		
J	76.89	0.17	50.52	22.42
F	76.51	0.16	50.26	22.41
M	77.17	0.18	50.56	22.52
A	77.28	0.18	50.28	22.52
M	77.60	0.19	50.29	22.63
J	78.06	0.18	50.19	21.71
J	76.83	0.21	50.26	21.49
A	77.40	0.21	50.30	21.61
S	77.24	0.18	50.45	21.57
O	77.02	0.21	50.54	21.72
N	77.31	0.19	50.60	22.16
D	76.25	0.17	50.61	22.48
Av	77.13	0.19	50.40	22.10

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Figure 15. Hen-day Egg Production - Cycle 1

Egg Production and Month of the Year (21 - 65 wks of age)

Egg Production (%)

J F M A M J J A S O N D
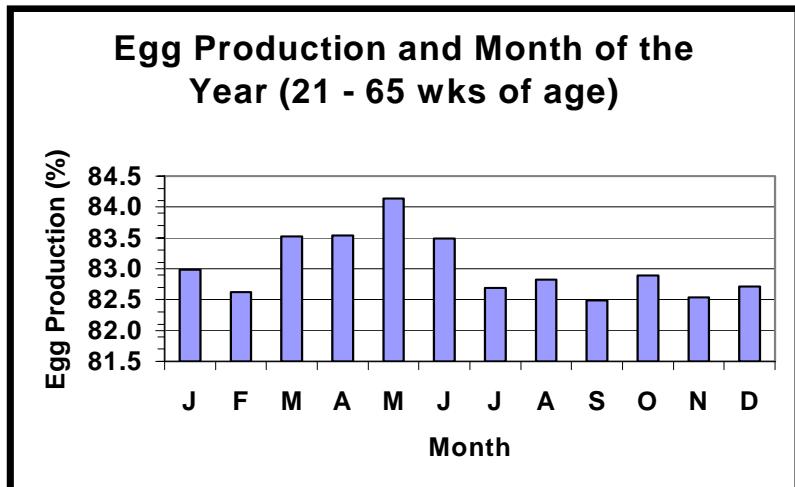
Month

Measure	%	Month
Average	83.04	
High	84.14	May
Low	82.49	Sept

Figure 16. Hen-day Egg Production - molt period

Egg Production and Month of the Year (first 12 wks of the molt)

Egg Production (%)

J F M A M J J A S O N D
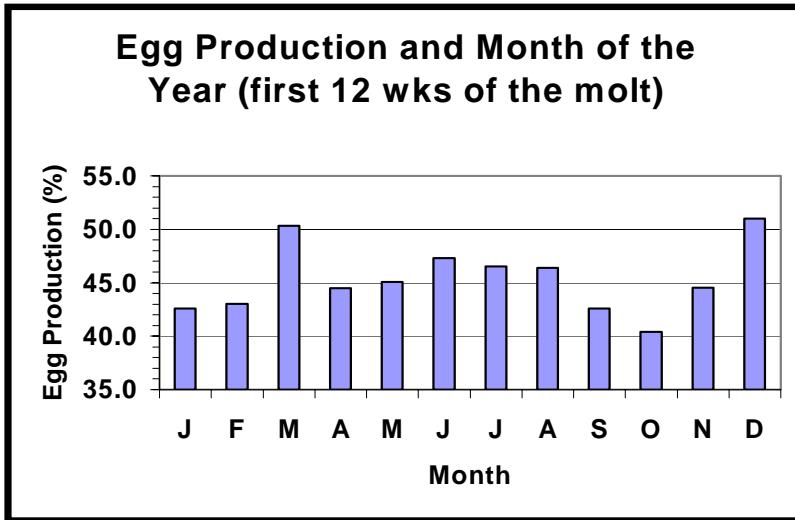
Month

Measure	%	Month
Average	45.36	
High	50.99	Dec
Low	40.42	Oct

Figure 17. Hen-day Egg Production - Cycle 2

Egg Production and Month of the Year (78 - 105 wks of age)

Egg Production (%)

J F M A M J J A S O N D
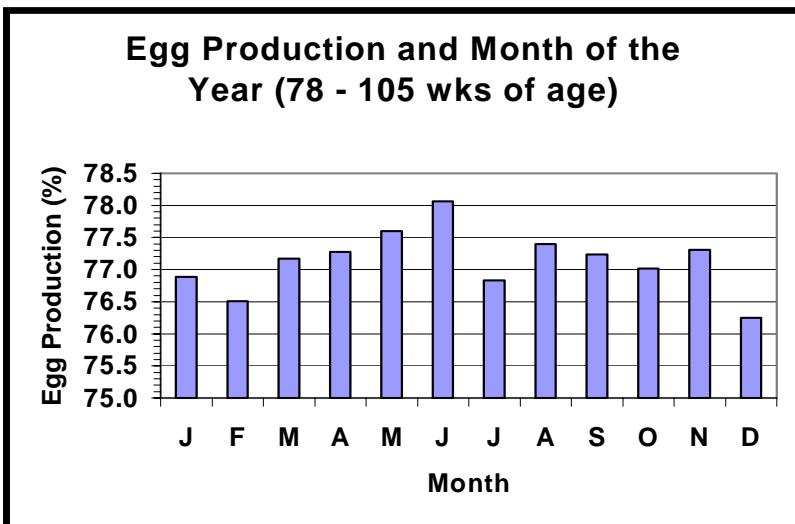
Month

Measure	%	Month
Average	77.13	
High	78.06	June
Low	76.25	Dec

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Figure 18. Mortality - Cycle 1

Mortality and Month of the Year
(21 - 65 wks of age)
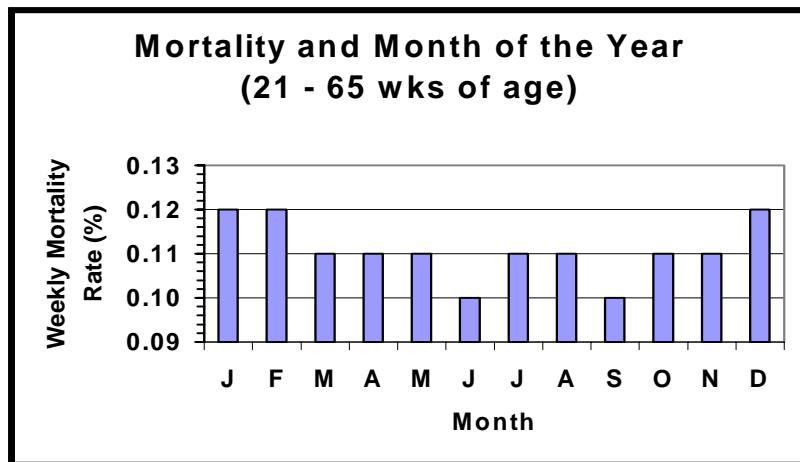
Measure	%	Month
Average	0.11	
High	0.12	Jan/Feb/Dec
Low	0.10	June/Sept

Figure 19. Mortality - molt period

Mortality and Month of the Year
(first 12 wks of the molt)
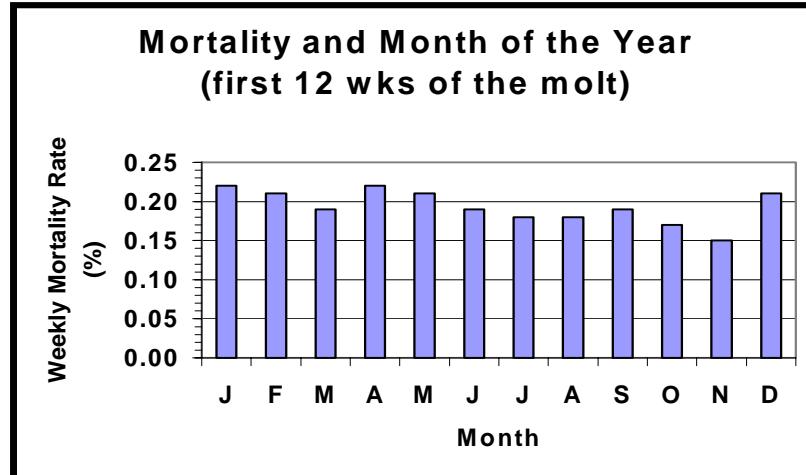
Measure	%	Month
Average	0.19	
High	0.22	Jan/Apr
Low	0.15	Nov

Figure 20. Mortality - Cycle 2

Mortality and Month of the Year
(78 - 105 wks of age)
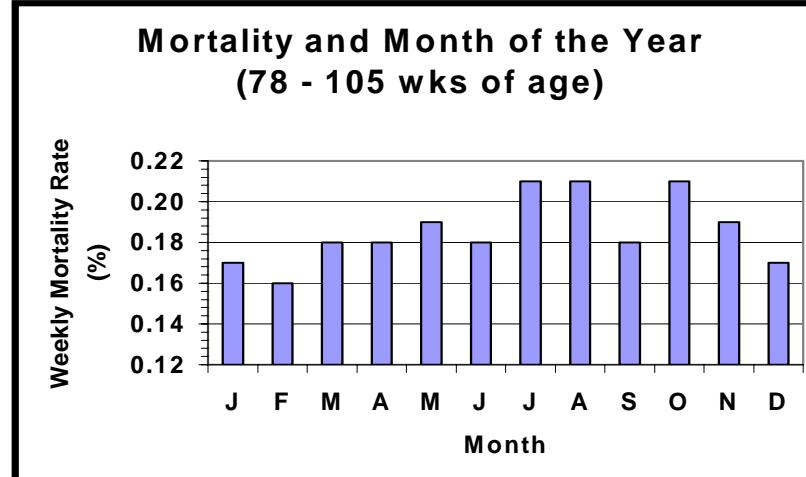
Measure	%	Month
Average	0.19	
High	0.21	July/Aug/Oct
Low	0.16	Feb

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Figure 21. Case weight - Cycle 1

Case Weight and Month of the Year
(21 - 65 wks of age)
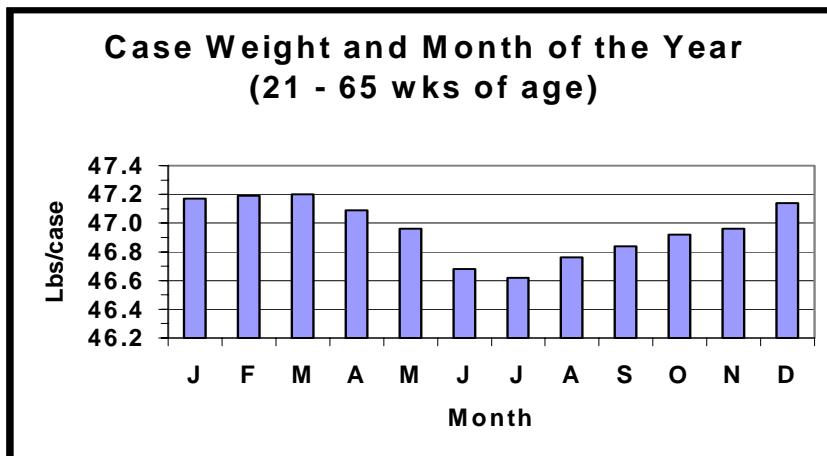
Measure	Lbs/case	Month
Average	46.96	
High	47.20	March
Low	46.62	July

Metric

Measure	G/egg
Average	59.2
High	59.5
Low	58.7

Figure 22. Case weight - molt period

Case Weight and Month of the Year
(first 12 wks of the molt)
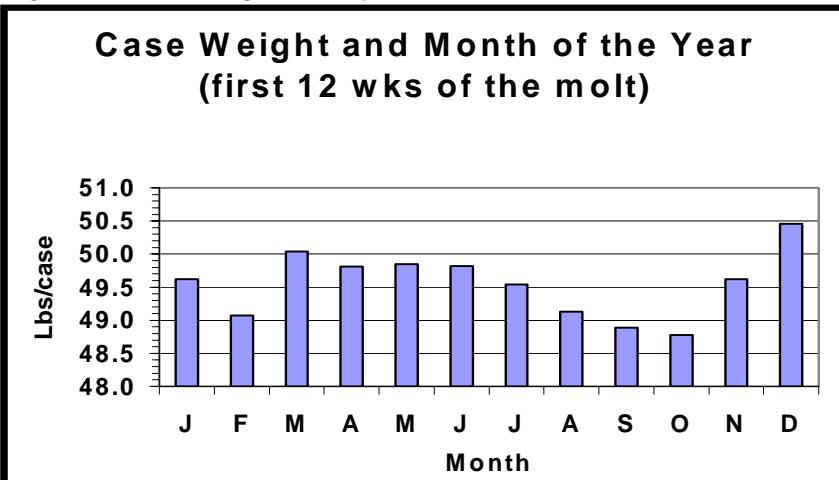
Measure	Lbs/case	Month
Average	49.55	
High	50.46	Dec
Low	48.78	Oct

Metric

Measure	G/egg
Average	62.4
High	63.6
Low	61.5

Figure 23. Case weight - Cycle 3

Case weight and Month of the Year
(78 - 105 wks of age)
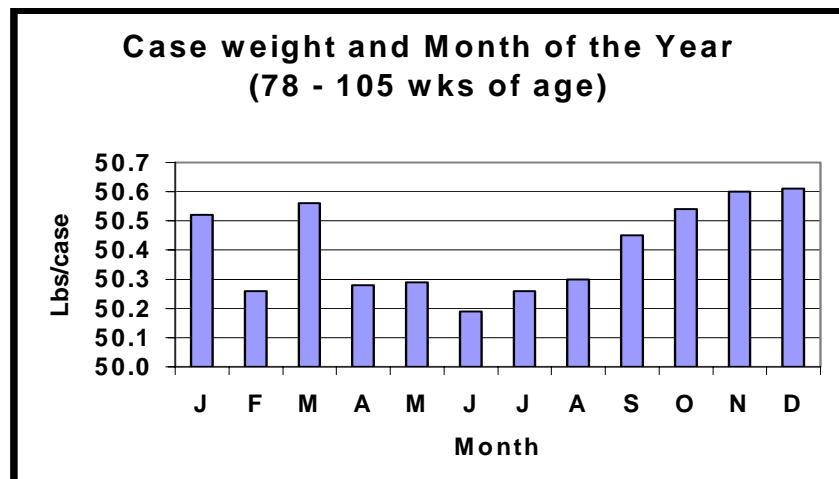
Measure	Lbs/case	Month
Average	50.40	
High	50.61	Dec
Low	50.19	June

Metric

Measure	G/egg
Average	63.5
High	63.8
Low	63.2

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Figure 24. Feed consumption - Cycle 1

Feed Consumption and Month of the Year (21 - 65 wks of age)
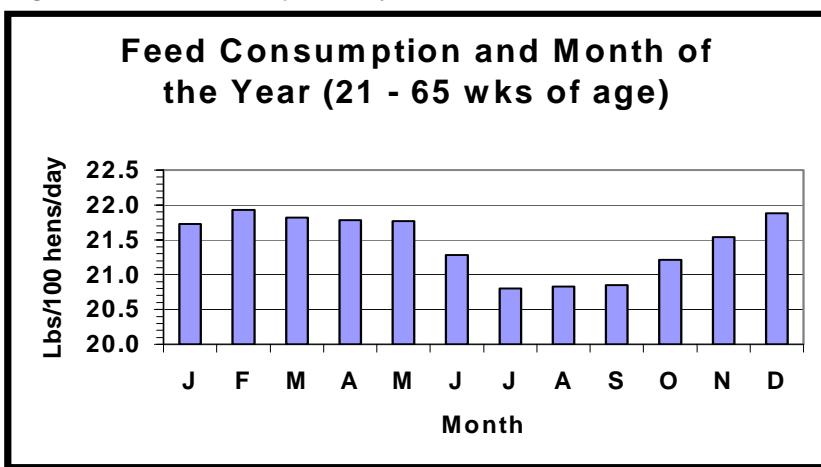
Measure	Lbs/100/day	Month
Average	21.45	
High	21.93	Feb
Low	20.80	July

Metric

Measure	G/hen/day
Average	97.3
High	99.5
Low	94.3

Figure 25. Feed consumption - molt period

Feed Consumption and Month of the Year (first 12 wks of the molt)
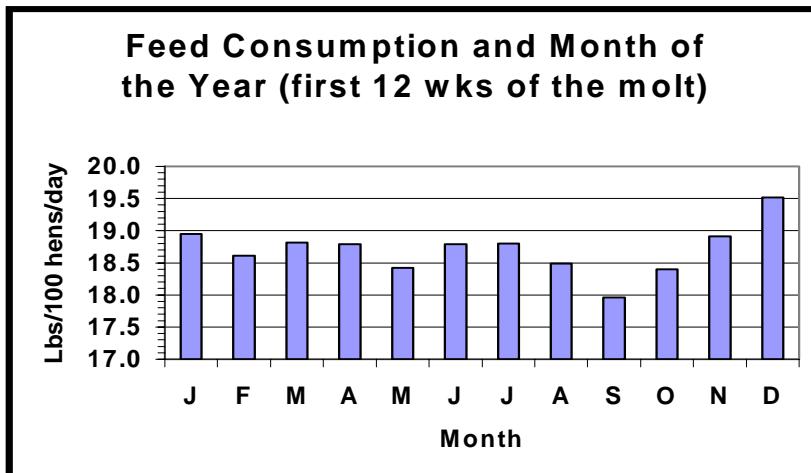
Measure	Lbs/100/day	Month
Average	18.70	
High	19.52	Dec
Low	17.96	Sept

Metric

Measure	G/hen/day
Average	84.8
High	88.5
Low	81.5

Figure 26. Cycle 2.

Feed Consumption and Month of the Year - (78 - 105 wks of age)
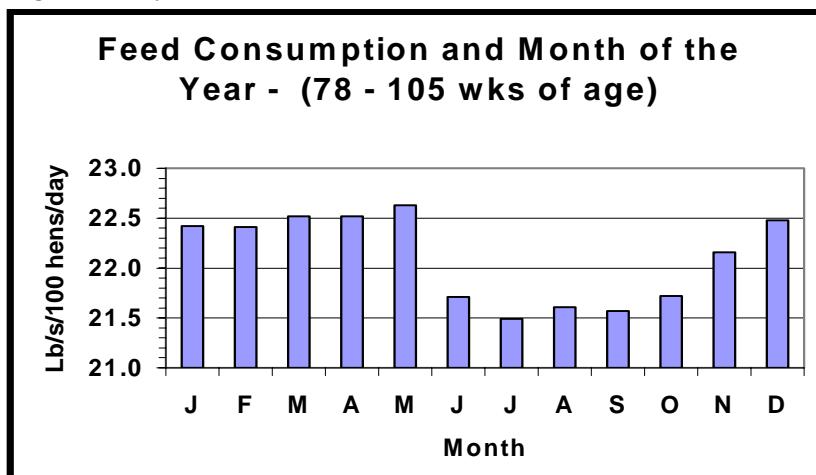
Measure	Lbs/100/day	Month
Average	22.10	
High	22.63	May
Low	21.49	July

Metric

Measure	G/day
Average	100.2
High	102.6
Low	97.5

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5. Flock Indexing

Flock indexing is a procedure to evaluate <u>multiple</u> factors of performance in table egg layer flock.   Weekly egg production, mortality, egg weight and feed consumption data are entered into a spread sheet along with standardized egg prices by size and feed prices to come up with a "bottom line" value for the flock. The purpose of this is to attempt to place the various factors of performance into perspective so that the performance, per se, can be compared economically from flock to flock over different periods of time. The standard index is calculated to 60 weeks of age. Indexes representing longer periods of time can be calculated but are more difficult to interpret because of varying molt ages.

This tool was first introduced in 1991 and has been used by Chilson's Management Controls as well as many egg producers on their own to evaluate their flocks. Even though the numbers are based upon U.S. dollars, it is best to think in terms of an index since prices and costs are standardized for comparison purposes at $0.55 per dozen for large eggs with a $7.50/100 pound feed price for all flocks.

Index values (as calculated by the author) are generally in the range of 5.50 to 6.00. Flocks are considered to be excellent when indexes exceed 6.00. The highest flock on which we have records was a 2003 flock of 44,000 hens that reached an index of 6.70. To do that, it required:
(The current study results are listed in parenthesis)

- 33 weeks of over 90% hen-day egg production **(8 weeks),**
- 88.9% rate of lay between 20 and 60 weeks of age **(82.0%)**
- 248.4 eggs per hen-housed to 60 weeks. **(230.9 eggs)**
- 49.2 pound average case weight **(46.8 pounds)**
- 0.120% average weekly mortality **(0.104%)**
- 33.9 pounds of eggs per hen housed **(29.9 pounds)**
- 55.2 grams of egg mass per day **(48.4 grams)**
- 21.6 pounds of feed per day **(21.2 pounds)**
- 2.92 pounds of feed per dozen eggs produced **(3.10 pounds)**
- 1.78 pounds of feed per pound of eggs **(1.99 pounds).**

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Tables 22A and B are the two index pages for a traditional 60 week of age comparison using the typical results from this study. Tables 22C and D represent a 65-40 flock sold at 105 weeks of age. The two-cycle flock produced 428.9 eggs to 105 weeks with an index of 10.08.

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Table 22A - Performance Factors - Cycle 1 to 60 wks of age

FLOCK PERFORMANCE INDEXING   (enter)   EXAMPLE FARM "A", FLOCK #1
20 WEEK HEN COUNT: 100,000

PERFORMANCE FACTORS   Date: November 11, 2005

1	2	3	4	5	6	7	8	9	10	11
AGE WKS	AVG HENS	(enter) % DIED	(enter) H.D. %	WKLY EGGS DOZEN	(enter) EW LB/CS	EW G/EGG	WT OF EGGS (CWT)	(enter) FD LBS/100	FEED USED (CWT)	EGGS/HH TO DATE
20	99955	0.09	20.0	11661	36.0	45.4	139.94	16.5	1154.5	1.4
21	99865	0.09	31.2	18175	36.9	46.5	223.44	17.0	1187.0	3.6
22	99765	0.10	53.6	31193	37.9	47.8	394.28	17.3	1208.9	7.3
23	99675	0.09	70.9	41195	39.7	50.0	545.15	17.7	1237.8	12.3
24	99586	0.09	81.8	47490	41.2	51.9	652.19	18.2	1266.6	18.0
25	99506	0.08	87.2	50604	42.2	53.2	712.50	19.1	1331.8	24.0
26	99416	0.09	89.0	51631	43.1	54.3	741.25	19.9	1383.5	30.2
27	99337	0.08	90.4	52384	43.8	55.2	764.63	20.4	1419.9	36.5
28	99257	0.08	90.4	52313	44.4	55.9	773.71	20.8	1441.7	42.8
29	99178	0.08	91.0	52630	45.0	56.6	788.74	21.0	1460.7	49.1
30	99099	0.08	91.0	52605	45.4	57.2	796.09	21.2	1472.7	55.4
31	99019	0.08	90.6	52355	45.8	57.7	798.94	21.5	1487.5	61.7
32	98940	0.08	90.9	52452	46.2	58.2	807.05	21.6	1496.7	68.0
33	98851	0.09	90.7	52272	46.5	58.6	809.86	21.7	1500.2	74.3
34	98772	0.08	90.1	51919	46.7	58.8	808.20	21.8	1505.2	80.5
35	98683	0.09	89.8	51682	47.0	59.2	808.82	22.0	1518.3	86.7
36	98594	0.09	89.8	51641	47.3	59.6	813.69	22.1	1522.5	92.9
37	98496	0.10	89.4	51337	47.4	59.8	811.64	22.0	1519.6	99.1
38	98397	0.10	88.8	50964	47.7	60.1	810.16	22.0	1516.7	105.2
39	98299	0.10	88.6	50798	47.8	60.3	809.90	22.1	1517.9	111.3
40	98201	0.10	88.2	50524	48.0	60.4	807.71	22.2	1526.0	117.3
41	98102	0.10	87.7	50176	48.1	60.6	804.16	22.2	1523.8	123.4
42	97994	0.11	87.4	49984	48.2	60.7	802.57	22.1	1516.7	129.4
43	97887	0.11	86.7	49489	48.3	60.9	796.94	22.1	1512.9	135.3
44	97779	0.11	86.4	49269	48.4	61.0	794.71	22.1	1515.4	141.2
45	97671	0.11	85.7	48845	48.5	61.1	789.00	22.1	1511.0	147.1
46	97564	0.11	85.4	48580	48.6	61.2	786.52	22.2	1514.1	152.9
47	97457	0.11	85.0	48322	48.7	61.3	783.95	22.2	1515.8	158.7
48	97340	0.12	84.4	47901	48.7	61.3	777.11	22.2	1510.6	164.4
49	97223	0.12	84.2	47736	48.7	61.3	774.59	22.0	1500.0	170.2
50	97106	0.12	83.9	47497	48.8	61.5	772.14	22.0	1498.2	175.9
51	96990	0.12	83.5	47231	49.0	61.7	770.96	22.0	1492.3	181.5
52	96864	0.13	82.9	46819	49.0	61.7	764.56	22.0	1494.4	187.2
53	96738	0.13	82.5	46527	48.9	61.6	758.70	22.1	1496.5	192.7
54	96612	0.13	82.2	46320	49.0	61.7	755.94	22.1	1493.2	198.3
55	96486	0.13	81.8	46046	49.1	61.9	753.46	22.1	1489.9	203.8
56	96351	0.14	81.4	45728	49.1	61.8	748.12	22.1	1489.2	209.3
57	96226	0.13	81.0	45489	49.1	61.9	744.81	22.1	1487.3	214.8
58	96091	0.14	80.5	45145	49.3	62.1	741.29	22.2	1493.3	220.2
59	95957	0.14	80.1	44819	49.3	62.2	737.12	22.2	1491.2	225.6
60	95822	0.14	79.6	44488	49.4	62.3	732.87	22.2	1489.1	230.9

		Summary of Performance (20 to 60 weeks of age)					
Hen day %	82.0		Av egg wt/case (lbs)		46.78		
Eggs/hen housed	230.9		Av egg wt/egg (g)		58.95		
Feed/day (lbs)	0.212		Av Mortality/week (%)		0.104		
Feed/dozen (lbs)	3.10		Total egg mass (kg/hh)		13.61		
Feed:Egg ratio	1.99		Av daily egg mass (g)		48.4	(per hen day)	

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Table 22B - Economic Factors - Cycle 1 to 60 wks of age

FLOCK PERFORMANCE INDEXING   EXAMPLE FARM "A", FLOCK #1

20 WEEK HEN COUNT: 100,000

ECONOMIC FACTORS

(1)	12	13	14	15	16	17	18	19	20	21	22	23	24	25
	FEED	FEED	AV EGG VALUE		EGG INCOME		EGG INCOME MINUS FEED COST ($)				EGG INCOME MINUS FEED COST PER HEN HOUSED ($)			
	COST	COST	VALUE		INCOME		CURRENT		TO DATE		CURRENT		TO DATE	
AGE	COST	$/DOZ	CTS/DOZ		($)									
WKS	($)		(no prem.)	(prem.)	(no prem.)	(prem.)	(no prem.)	(prem.)	(no prem.)	(prem.)	(no prem.)	(prem.)	(no prem.)	(prem.)
20	8659	0.743	32.2	32.0	3755	3735	-4904	-4924	-4904	-4924	-0.049	-0.049	-0.049	-0.049
21	8902	0.490	34.5	34.7	6265	6299	-2637	-2603	-7541	-7527	-0.026	-0.026	-0.075	-0.075
22	9066	0.291	37.4	37.7	11653	11765	2587	2698	-4955	-4829	0.026	0.027	-0.050	-0.048
23	9283	0.225	42.3	42.6	17437	17537	8154	8254	3199	3425	0.082	0.083	0.032	0.034
24	9500	0.200	46.1	46.1	21882	21896	12382	12396	15581	15821	0.124	0.124	0.156	0.158
25	9988	0.197	48.3	48.2	24423	24397	14435	14409	30016	30230	0.144	0.144	0.300	0.302
26	10376	0.201	49.7	49.7	25679	25654	15303	15278	45319	45508	0.153	0.153	0.453	0.455
27	10649	0.203	50.8	50.8	26618	26623	15969	15974	61287	61482	0.160	0.160	0.613	0.615
28	10813	0.207	51.6	51.6	26970	27018	16157	16205	77445	77687	0.162	0.162	0.774	0.777
29	10955	0.208	52.2	52.4	27474	27580	16519	16625	93964	94312	0.165	0.166	0.940	0.943
30	11045	0.210	52.6	52.9	27681	27839	16636	16794	110600	111106	0.166	0.168	1.106	1.111
31	11156	0.213	52.9	53.3	27717	27923	16561	16767	127161	127873	0.166	0.168	1.272	1.279
32	11225	0.214	53.2	53.7	27918	28177	16693	16952	143854	144825	0.167	0.170	1.439	1.448
33	11251	0.215	53.4	54.0	27935	28239	16684	16988	160538	161812	0.167	0.170	1.605	1.618
34	11289	0.217	53.6	54.2	27817	28151	16528	16862	177065	178674	0.165	0.169	1.771	1.787
35	11388	0.220	53.7	54.4	27764	28134	16376	16746	193442	195421	0.164	0.167	1.934	1.954
36	11419	0.221	53.9	54.7	27828	28246	16409	16828	209851	212248	0.164	0.168	2.099	2.122
37	11397	0.222	54.0	54.8	27703	28144	16306	16747	226157	228995	0.163	0.167	2.262	2.290
38	11375	0.223	54.1	55.0	27561	28038	16186	16663	242343	245657	0.162	0.167	2.423	2.457
39	11384	0.224	54.1	55.1	27501	27998	16117	16613	258460	262271	0.161	0.166	2.585	2.623
40	11445	0.227	54.2	55.2	27379	27892	15933	16447	274393	278718	0.159	0.164	2.744	2.787
41	11429	0.228	54.2	55.3	27213	27741	15784	16312	290177	295030	0.158	0.163	2.902	2.950
42	11375	0.228	54.3	55.3	27125	27664	15750	16289	305927	311319	0.158	0.163	3.059	3.113
43	11347	0.229	54.3	55.4	26881	27436	15534	16089	321461	327408	0.155	0.161	3.215	3.274
44	11365	0.231	54.3	55.5	26775	27339	15410	15973	336871	343381	0.154	0.160	3.369	3.434
45	11332	0.232	54.4	55.5	26555	27125	15223	15792	352094	359173	0.152	0.158	3.521	3.592
46	11356	0.234	54.4	55.6	26429	27011	15073	15655	367167	374828	0.151	0.157	3.672	3.748
47	11369	0.235	54.4	55.7	26303	26896	14934	15527	382101	390355	0.149	0.155	3.821	3.904
48	11330	0.237	54.4	55.7	26074	26661	14744	15332	396845	405687	0.147	0.153	3.968	4.057
49	11250	0.236	54.4	55.7	25985	26572	14736	15323	411581	421010	0.147	0.153	4.116	4.210
50	11236	0.237	54.5	55.7	25868	26465	14632	15228	426213	436238	0.146	0.152	4.262	4.362
51	11192	0.237	54.5	55.8	25749	26370	14557	15178	440770	451416	0.146	0.152	4.408	4.514
52	11208	0.239	54.5	55.8	25527	26145	14319	14937	455089	466354	0.143	0.149	4.551	4.664
53	11224	0.241	54.5	55.8	25359	25964	14135	14740	469224	481093	0.141	0.147	4.692	4.811
54	11199	0.242	54.5	55.8	25251	25859	14052	14660	483276	495753	0.141	0.147	4.833	4.958
55	11175	0.243	54.5	55.9	25118	25739	13943	14564	497219	510317	0.139	0.146	4.972	5.103
56	11169	0.244	54.5	55.9	24943	25559	13774	14390	510994	524707	0.138	0.144	5.110	5.247
57	11155	0.245	54.6	55.9	24818	25435	13663	14281	524657	538988	0.137	0.143	5.247	5.390
58	11199	0.248	54.6	56.0	24646	25277	13446	14077	538103	553065	0.134	0.141	5.381	5.531
59	11184	0.250	54.6	56.0	24476	25113	13292	13929	551395	566994	0.133	0.139	5.514	5.670
60	11168	0.251	54.6	56.1	24303	24945	13135	13777	564531	580771	0.131	0.138	5.645	5.808

				No premium	Premium			Price assumptions:		
Average egg value (cts/dozen)				0.526	0.535			Jumbo eggs @ $.60/dozen (premium)		
Average feed cost/dozen (cts)				0.233	0.233			Extra large eggs @ $.57 (premium)		
Egg income/hen housed ($)				10.12	10.29			Large eggs @ $.55		
Feed cost/hen housed ($)				4.48	4.48			Medium eggs @ $.46		
Egg income minus feed cost/hh ($)				5.65	5.81			Small eggs @ $.30		
								Feed @ $7.50/cwt		

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Table 22C - Performance Factors (Continued to 105 weeks of age)

PERFORMANCE FACTORS   Date: November 11, 2005

1	2	3	4	5	6	7	8	9	10	11
AGE WKS	AVG HENS	(enter) % DIED	(enter) H.D. %	WKLY EGGS DOZEN	(enter) EW LB/CS	EW G/EGG	WT OF EGGS (CWT)	(enter) FD LBS/100	FEED USED (CWT)	EGGS/HH TO DATE
61	95688	0.14	79.3	44236	49.3	62.1	727.24	22.2	1487.7	236.2
62	95545	0.15	78.7	43852	49.5	62.3	722.82	22.3	1488.1	241.5
63	95392	0.16	78.1	43465	49.6	62.5	718.18	22.3	1488.4	246.7
64	95239	0.16	78.2	43439	49.5	62.4	717.18	22.4	1494.7	251.9
65	95077	0.17	77.3	42866	49.6	62.5	709.30	22.4	1487.5	257.1
66	94830	0.26	22.8	12585	48.5	61.1	203.54	8.4	556.9	258.6
67	94413	0.44	0.0	0	48.3	60.8	0.00	11.2	738.9	258.6
68	94082	0.35	0.0	0	49.1	61.8	0.00	15.4	1014.9	258.6
69	93913	0.18	11.1	6086	48.8	61.5	98.96	18.8	1236.6	259.3
70	93791	0.13	21.0	11489	48.5	61.1	185.86	19.8	1297.3	260.7
71	93678	0.12	36.4	19913	49.1	61.9	325.91	20.4	1337.1	263.1
72	93557	0.13	55.9	30507	49.8	62.8	506.73	21.2	1387.1	266.7
73	93426	0.14	69.5	37876	50.4	63.6	636.83	21.8	1425.0	271.3
74	93295	0.14	75.8	41263	50.4	63.5	693.63	22.1	1445.2	276.2
75	93164	0.14	79.3	43096	50.7	63.8	727.61	21.8	1423.6	281.4
76	93025	0.15	80.9	43889	50.6	63.7	739.53	21.7	1411.7	286.7
77	92876	0.16	81.0	43905	50.5	63.6	738.64	21.9	1423.1	291.9
78	92736	0.15	81.3	43980	50.2	63.3	735.94	21.7	1411.3	297.2
79	92588	0.16	81.1	43775	50.1	63.1	731.04	21.8	1410.9	302.5
80	92449	0.15	81.2	43769	50.0	63.0	729.33	21.9	1419.8	307.7
81	92301	0.16	81.0	43628	50.3	63.3	731.07	22.2	1433.1	312.9
82	92144	0.17	80.7	43355	50.4	63.4	727.65	22.1	1424.8	318.1
83	91988	0.17	80.3	43094	50.2	63.3	721.11	22.2	1428.8	323.3
84	91840	0.16	79.8	42768	50.2	63.2	715.08	22.1	1420.8	328.4
85	91684	0.17	79.8	42695	50.2	63.2	714.29	22.2	1422.2	333.6
86	91519	0.18	79.8	42613	50.2	63.3	713.34	22.0	1412.0	338.7
87	91355	0.18	79.3	42243	50.1	63.1	705.32	22.1	1414.5	343.8
88	91190	0.18	78.9	41986	50.3	63.4	703.83	22.1	1408.8	348.8
89	91035	0.17	78.6	41745	50.3	63.4	699.78	22.1	1406.4	353.8
90	90871	0.18	78.1	41384	50.3	63.3	693.45	22.1	1403.9	358.8
91	90699	0.19	77.8	41173	50.4	63.5	691.43	22.1	1401.8	363.7
92	90526	0.19	77.4	40857	50.3	63.4	685.17	22.1	1397.9	368.6
93	90354	0.19	77.0	40579	50.3	63.4	680.91	22.0	1391.5	373.5
94	90183	0.19	76.6	40312	50.3	63.4	675.90	21.9	1383.1	378.3
95	90011	0.19	76.1	39947	50.5	63.6	671.78	21.9	1382.4	383.1
96	89822	0.21	75.7	39685	50.4	63.5	666.58	22.2	1392.7	387.9
97	89643	0.20	75.4	39443	50.5	63.6	663.57	22.2	1394.3	392.6
98	89463	0.20	74.9	39078	50.6	63.8	659.50	22.2	1392.8	397.3
99	89275	0.21	74.0	38522	50.6	63.7	649.60	22.1	1381.1	401.9
100	89088	0.21	74.2	38571	50.7	63.9	652.23	22.2	1384.4	406.5
101	88901	0.21	73.9	38298	50.7	63.9	647.36	22.3	1386.5	411.1
102	88714	0.21	72.8	37695	50.8	64.0	638.42	22.4	1387.9	415.7
103	88519	0.22	71.9	37132	50.8	64.0	628.76	22.4	1385.5	420.1
104	88324	0.22	71.4	36777	50.9	64.1	623.73	22.3	1379.4	424.5
105	88130	0.22	70.7	36331	51.0	64.2	617.02	22.2	1367.7	428.9

Summary of Performance (20 to 60 weeks of age)

Hen day %	75.1	Av egg wt/case (lbs)	48.37
Eggs/hen housed	428.9	Av egg wt/egg (g)	60.95
Feed/day (lbs)	0.212	Av Mortality/week (%)	0.146
Feed/dozen (lbs)	3.39	Total egg mass (kg/hh)	26.14
Feed:Egg ratio	2.10	Av daily egg mass (g)	45.8 (per hen day)

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Table 22D - Economic Factors (Continued to 105 weeks of age)

ECONOMIC FACTORS

(1)	12	13	14	15	16	17	18	19	20	21	22	23	24	25
	FEED	FEED	AV EGG VALUE		EGG INCOME		EGG INCOME MINUS FEED COST ($)			EGG INCOME MINUS FEED COST PER HEN HOUSED ($)				
	COST	COST	VALUE		INCOME		FEED COST ($)							
AGE	COST	COST	CTS/DOZ		($)		CURRENT		TO DATE		CURRENT		TO DATE	
WKS	($)	$/DOZ	(no prem.)	(prem.)	(no prem.)	(prem.)	(no prem.)	(prem.)	(no prem.)	(prem.)	(no prem.)	(prem.)	(no prem.)	(prem.)
61	11157	0.252	54.6	56.0	24156	24781	12998	13624	577529	594395	0.130	0.136	5.775	5.944
62	11161	0.255	54.6	56.1	23959	24595	12798	13434	590327	607829	0.128	0.134	5.903	6.078
63	11163	0.257	54.7	56.1	23759	24404	12596	13241	602923	621070	0.126	0.132	6.029	6.211
64	11210	0.258	54.7	56.1	23741	24381	12531	13171	615454	634241	0.125	0.132	6.155	6.342
65	11156	0.260	54.7	56.2	23438	24083	12282	12927	627736	647168	0.123	0.129	6.277	6.472
66	4177	0.332	54.4	55.6	6844	6993	2667	2816	630403	649984	0.027	0.028	6.304	6.500
67	5542	0	54.3	55.4	0	0	-5542	-5542	624862	644443	-0.055	-0.055	6.249	6.444
68	7612	0	54.5	55.9	0	0	-7612	-7612	617250	636831	-0.076	-0.076	6.173	6.368
69	9274	1.524	54.5	55.7	3315	3392	-5959	-5883	611291	630949	-0.060	-0.059	6.113	6.309
70	9730	0.847	54.4	55.6	6249	6385	-3481	-3345	607810	627604	-0.035	-0.033	6.078	6.276
71	10028	0.504	54.6	55.9	10863	11132	835	1104	608645	628708	0.008	0.011	6.086	6.287
72	10403	0.341	54.7	56.3	16692	17167	6289	6764	614934	635472	0.063	0.068	6.149	6.355
73	10688	0.282	54.8	56.5	20764	21414	10076	10727	625011	646199	0.101	0.107	6.250	6.462
74	10839	0.263	54.8	56.5	22620	23327	11781	12488	636791	658687	0.118	0.125	6.368	6.587
75	10677	0.248	54.9	56.6	23639	24402	12962	13724	649753	672411	0.130	0.137	6.498	6.724
76	10588	0.241	54.8	56.6	24068	24833	13479	14245	663233	686656	0.135	0.142	6.632	6.867
77	10674	0.243	54.8	56.5	24071	24828	13398	14155	676631	700811	0.134	0.142	6.766	7.008
78	10584	0.241	54.8	56.4	24093	24821	13509	14237	690139	715048	0.135	0.142	6.901	7.150
79	10582	0.242	54.8	56.4	23973	24686	13391	14104	703531	729152	0.134	0.141	7.035	7.292
80	10649	0.243	54.7	56.3	23961	24661	13313	14012	716843	743164	0.133	0.140	7.168	7.432
81	10748	0.246	54.8	56.5	23906	24636	13158	13888	730001	757051	0.132	0.139	7.300	7.571
82	10686	0.246	54.8	56.5	23762	24496	13076	13810	743077	770861	0.131	0.138	7.431	7.709
83	10716	0.249	54.8	56.4	23608	24321	12892	13605	755968	784466	0.129	0.136	7.560	7.845
84	10656	0.249	54.8	56.4	23426	24129	12771	13474	768739	797939	0.128	0.135	7.687	7.979
85	10667	0.250	54.8	56.4	23389	24094	12722	13427	781461	811367	0.127	0.134	7.815	8.114
86	10590	0.249	54.8	56.4	23346	24053	12756	13463	794217	824830	0.128	0.135	7.942	8.248
87	10609	0.251	54.8	56.4	23134	23820	12525	13211	806742	838042	0.125	0.132	8.067	8.380
88	10566	0.252	54.8	56.5	23007	23712	12441	13146	819183	851188	0.124	0.131	8.192	8.512
89	10548	0.253	54.8	56.5	22875	23576	12327	13028	831510	864215	0.123	0.130	8.315	8.642
90	10529	0.254	54.8	56.5	22676	23368	12147	12839	843657	877054	0.121	0.128	8.437	8.771
91	10514	0.255	54.8	56.5	22567	23268	12054	12754	855711	889808	0.121	0.128	8.557	8.898
92	10484	0.257	54.8	56.5	22390	23077	11905	12593	867616	902401	0.119	0.126	8.676	9.024
93	10436	0.257	54.8	56.5	22239	22926	11803	12490	879419	914891	0.118	0.125	8.794	9.149
94	10373	0.257	54.8	56.5	22091	22768	11717	12395	891137	927285	0.117	0.124	8.911	9.273
95	10368	0.260	54.8	56.5	21900	22587	11532	12219	902669	939504	0.115	0.122	9.027	9.395
96	10445	0.263	54.8	56.5	21753	22429	11307	11984	913976	951488	0.113	0.120	9.140	9.515
97	10457	0.265	54.8	56.5	21625	22305	11168	11848	925144	963335	0.112	0.118	9.251	9.633
98	10446	0.267	54.8	56.6	21434	22123	10988	11677	936132	975013	0.110	0.117	9.361	9.750
99	10358	0.269	54.8	56.6	21126	21802	10768	11444	946900	986457	0.108	0.114	9.469	9.865
100	10383	0.269	54.9	56.7	21161	21851	10778	11468	957678	997925	0.108	0.115	9.577	9.979
101	10399	0.272	54.9	56.6	21010	21694	10611	11295	968289	1009220	0.106	0.113	9.683	10.092
102	10410	0.276	54.9	56.7	20684	21366	10275	10957	978564	1020177	0.103	0.110	9.786	10.202
103	10391	0.280	54.9	56.7	20075	21046	9984	10654	988548	1030831	0.100	0.107	9.885	10.308
104	10345	0.281	54.9	56.7	20184	20856	9839	10510	998386	1041342	0.098	0.105	9.984	10.413
105	10258	0.282	54.9	56.7	19943	20612	9685	10355	1008071	1051696	0.097	0.104	10.081	10.517

				No premium	Premium			Price assumptions:	
Average egg value (cts/dozen)				0.536	0.548			Jumbo eggs @ $.60/dozen (premium)	
Average feed cost/dozen (cts)				0.254	0.254			Extra large eggs @ $.57 (premium)	
Egg income/hen housed ($)				19.16	19.60			Large eggs @ $.55	
Feed cost/hen housed ($)				9.08	9.08			Medium eggs @ $.46	
Egg income minus feed cost/hh ($)				10.08	10.52			Small eggs @ $.30	
								Feed @ $7.50/cwt	

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6. Replacement Flock Analyses

The selection of a replacement program for a company producing table eggs is highly dependent upon the comparative performance they're able to achieve in consecutive cycles of production. The data presented in this report should provide the egg producer with the common relationships between cycles and the input necessary for determining the optimal course of action. Such alternative include:

- Whether or not to molt at all.
- If molting is to be used, how many molts?
- How long should a cycle be?
- At what age to molt and/or to sell?
- How to initiate a molt?

In addition, local prices for eggs, ready-to-lay pullets, feed costs and salvage value for fowl (if any) are also important factors to consider when deciding upon a replacement program.

The data generated in this study were analyzed with the University of California's "Replacement Program Analysis". All performance values as reported in this study were used as input with the exception that we replaced the week 2 and 3 egg production rates at the start of the molt with zero %. Egg prices for this analysis were 55 cents/dozen for large eggs, 46 cents for medium eggs and 30 cents for small. Undergrade eggs were priced at 19 cents. Feed prices ranged from $6.50 to $7.50 per 100 pounds depending upon the rate of lay. Twenty-week old pullets were priced at $2.50 and fowl were considered to have no value.

The analysis includes 1st cycles of 50 to 100 weeks of age, 2nd and 3rd cycles from 25 to 50 weeks in length – 308 programs in all.

Results are expressed as egg and fowl income minus feed and pullet costs per hen-housed per 52 weeks of time (including 2-weeks of downtime between flocks).

Table 23 lists the best programs for the one, two, and three cycle choices. If values were the same, the shortest program was listed first.

Table 23. Economic values for different replacement programs

Program description	One-cycle	Two-cycle	Three-cycle
$/hen-housed/year	$4.19	$4.29	$4.12
	95-0-0	65-50-0 = 115 wks	50-40-40 = 130 wks
		70-50-0 = 120 wks	55-40-40 = 135 wks
			60-40-35 = 135 wks
			50-45-40 = 135 wks
			60-40-40 = 140 wks
			50-45-45 = 140 wks
			55-45-40 = 140 wks

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For this particular set of performance data and prices, the two-cycle flocks returned the highest incomes over a common 52-week period. The best one-cycle flock is probably excessive in length and would yield an excessive number of undergrade eggs.   A more typical 75-week program only generated $3.96 while an 80-week program yielded $4.08.

7. Summary

This rather extensive review of current table egg layer flock performance and it's related discussion of several important applications is intended to demonstrate ways of interpreting producer flock records and to apply such data to the choice of economically optimum production programs. The data chosen represents a major representative resource, but should not be a substitute for a company's own data.

We strongly recommend that all egg producers compile a representative profile for their flocks using a series of flocks over the last 1-2 years. This can serve as the basis for similar analyses as those included in the present discussion. Most importantly, you can apply your unique performance data to your own unique set of economic conditions (egg prices and costs). Decisions of this nature are dependent upon reliable and accurate data.

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