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A COMPARISON OF FORCE MOLTING METHODS - IV

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The standard molting procedure recommended by the University of California was developed in 1965 and has been reevaluated in numerous comparison experiments. Each component has been analyzed and, when compared to newer techniques, has generally given equal or superior results.

The current set of experiments was designed to compare ad libitum feeding of milo during days 11 through 28 with a program of restricted milo feeding. In addition, we studied the effects of water removal and restricted milo without feed removal.

Experimental Procedure

Location: University of California, Moreno Ranch, Riverside County.

Housing: California open-type with curtains and hot weather foggers. Four hens per 16" wide by 12" deep cage.

Watering: One Swish cup at every other partition.

Duration of Experiment: December 8, 1981 to May 24, 1982 (24 weeks).

Stock: 360 Strain A.
360 Strain B.

Age: 68 to 92 weeks of age.

Experimental Design: Completely randomized, 6 replicates of 15 hens each x 2 strains x 4 treatments.

Measurements: Daily -- egg production, feed consumption and mortality. Every 4 weeks -- egg weights. Body weights were taken at 10, 28, and 56 days.

Treatments

1. Days 1-10 no feed, days 11-28 ad libitum cracked milo, then ad libitum layer ration (U.C.)

2. Days 1-10 no feed, days 11-28 .10 lb milo per hen-day, then ad libitum layer ration (U.C. + restricted milo).

3. Days 1-3 no water, days 1-10 no feed, days 11-28 ad libitum cracked milo, then ad libitum layer ration (U.C. + no water).

4. Days 1-28 .10 lb of cracked milo per hen-day. (restricted milo).

Diet Composition

Layer ration:

Ground Corn	40.7%
Milo	22.5
Soybean meal	8.0
Meat-bone meal	7.5
Limestone	7.5
Lo-gos cottonseed meal	5.0
Wheat mill-run	5.0
Dehydrated alfalfa meal	2.5
Hydroloyzed fat	.8
Vitamin pack, salt, methionine, and dicalcium phosphate	.5
	100.0

Estimated analyses:

Metabolizable energy	1273 kcal/lb.
Crude protein	17.0%
Crude fat	4.1
Crude fiber	3.5
Ash	11.7
Calcium	3.8
Phosphorus, available	.53
Sodium	.15
Methionine	.35
Methionine + Cystine	.61
Lysine	.81

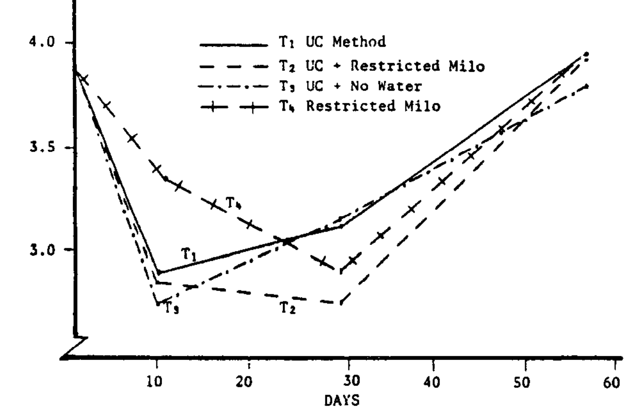
Artificial lights were turned off on day 1 through day 28 of the experiment. The natural day length at the beginning of the experiment was approximately 10 hours. Seventeen hours were given from day 29 to the end of the experiment. Water was available at all times except for the first 3 days in treatment #3.

Results

Results are listed in tables by molting method for strain A, then strain B, then for the combined strains, and then for strains A and B with combined methods.

Body weight losses were the greatest where feed and water were both limited (Method #3). Restricted feeding (Methods #2 & 4) resulted in a more prolonged loss of weight with 28-day weights less than 10-day weights. Body weights at 56 days were back to pre-molt weights with the exception of the no water treatment (Method #3). See Figure 1 and Table 1 on page 3.

FIGURE 1. BODY WEIGHT DURING THE MOLT PERIOD



Slight, but significant, differences in hen-day production, feed consumption, and mortality were observed during the 8 weeks of the molting period (Table 2). This was more significant in strain B than in strain A. The U.C. method with restricted milo feeding (Method #2) experienced unusually high mortality (10%) in strain B. This was almost five times as much as the ad libitum milo program (Method #1). This resulted in an overall higher mortality in the combined analysis as well (Table 2 on page 3).

Table 1. Body Weight - 10, 28 & 56 Days

Treatment	Strain	Weight (lbs) 10 days	28 days	56 days	Weight Change %[2] 10 days	28 days	56 days
1 U.C.	A	3.02 b[1]	3.37 c	4.03 b	-22.8 b	-13.8 a	+3.1 b
2 U.C. + Rest. Milo		2.83 a	2.76 a	3.89 ab	-27.6 c	-29.4 c	- .5 ab
3 U.C. + No Water		2.75 a	3.23 c	3.78 a	-29.7 c	-17.4 a	-3.3 a
4 Rest. Milo		3.48 c	3.00 b	4.05 b	-11.0 a	-23.3 b	+3.6 b
1 U.C.	B	2.75 a	3.09 b	3.89	-28.6 b	-19.7 a	+1.1
2 U.C. + Rest. Milo		2.84 a	2.77 a	3.98	-26.2 b	-28.1 b	+3.4
3 U.C. + No Water		2.74 a	3.12 b	3.79	-28.8 b	-19.0 a	-1.6
4 Rest. Milo		3.24 b	2.80 a	3.85	-15.8 a	-27.3 b	0
1 U.C.	Combined	2.89 a	3.23 c	3.96 b	-25.5 b	-16.8 a	+2.1 b
2 U.C. + Rest. Milo		2.83 a	2.76 a	3.93 b	-27.1 b	-28.9 c	+1.3 b
3 U.C. + No Water		2.75 a	3.17 c	3.78 a	-29.1 b	-18.3 a	-2.6 a
4 Rest. Milo		3.36 b	2.90 b	3.95 b	-13.4 a	-25.3 b	+1.8 b
Treatments Combined	A	3.02 b	3.09 b	3.93	-22.8 a	-21.0 a	+ .5
	B	2.89 a	2.94 a	3.88	-24.4 b	-23.6 b	+ .8

1 Treatment means within the same section and in the same column with different letters are significantly different (P<0.05) (All tables).
2 Initial weights: Strain A - 3.91 lbs, Strain B - 3.85 lbs.

Table 2. Egg Production, Egg Weight, Feed Consumption & Mortality - First 8 Weeks

Treatment	Strain	Hen-day egg production (%)	Egg weight (g)	Feed consumption (lbs/hen/day)	Mortality (%)
1 U.C.	A	10.1	65.3	.174 a	4.4
2 U.C. + Rest. Milo		8.5	64.4	.164 b	3.3
3 U.C. + No Water		9.2	65.5	.175 a	1.1
4 Rest. Milo		10.8	65.7	.174 a	0
1 U.C.	B	13.0 ab	64.8	.187 a	2.2 b
2 U.C. + Rest. Milo		11.6 b	64.8	.168 b	10.0 a
3 U.C. + No Water		15.1 a	65.3	.189 a	3.3 b
4 Rest. Milo		14.0 ab	64.4	.185 a	2.2 b
1 U.C.	Combined	11.5 ab	65.1	.180 a	3.3 ab
2 U.C. + Rest. Milo		10.0 b	64.6	.166 b	6.7 a
3 U.C. + No Water		12.2 a	65.4	.182 a	2.2 b
4 Rest. Milo		12.4 a	65.1	.180 a	1.1 b
Treatments Combined	A	9.6 b	65.2	.172 b	2.2
	B	13.4 a	64.8	.182 a	4.4

A 24-week molting experiment is probably too short to adequately evaluate different molting programs. Some treatments may result in a slower rate of lay coming into production but will lay at a higher level for a longer period of time. Most commercial second-cycle laying periods are 35-45 weeks long. Table #3 illustrates the period-by-period differences in rate of lay.

Table 3. Hen-day Production by 4-week Period

Treatment	Strain	Period 1	2	3	4	5	6
				(%)			
1 U.C.	A	4.2 b	16.0	75.4	79.1	72.5	70.9
2 U.C. + Rest. Milo		3.9 b	13.1	77.1	79.3	75.2	75.5
3 U.C. + No Water		2.6 a	15.9	72.1	76.6	74.6	75.0
4 Rest. Milo		6.0 c	15.6	73.6	76.9	74.0	70.1
1 U.C.	B	2.9 a	23.1 ab	80.8	80.4	76.1	78.0
2 U.C. + Rest. Milo		3.1 a	20.2 a	75.8	83.4	80.7	79.3
3 U.C. + No Water		2.4 a	27.9 b	82.4	85.3	81.0	78.9
4 Rest. Milo		5.6 b	22.5 ab	78.6	80.9	77.2	78.0
1 U.C.	Combined	3.6 b	19.5 ab	78.1	79.7	74.3	74.4
2 U.C. + Rest. Milo		3.5 b	16.6 a	76.5	81.4	77.9	77.4
3 U.C. + No Water		2.5 a	21.9 b	77.3	81.0	77.8	76.9
4 Rest. Milo		5.8 c	19.1 ab	76.1	78.9	75.6	74.1
Treatment Combined	A	4.2 a	15.1 a	74.5 a	78.0 a	74.1 a	72.9 a
	B	3.5 b	23.4 b	79.4 b	82.5 b	78.7 b	78.6 b

Overall average rate of lay was not significantly different by treatment. Hen-housed egg production was not significantly different except for treatment #2. This was a result of the high mortality rate during the molting period in strain B (Table 4).

Table 4. Egg Production, Mortality & Egg Weight - 24 Weeks

Treatment	Strain	Egg Production: Hen-day (%)	Egg Production: Hen-housed (eggs)	Mortality	Egg Weight (g)	Egg Weight: large & above (%)
1 U.C.	A	52.9	85.0	4.4	65.1	98.3
2 U.C. + Rest. Milo		53.7	87.2	4.4	64.9	99.2
3 U.C. + No Water		52.6	86.6	3.3	65.2	99.4
4 Rest. Milo		52.5	87.2	2.2	66.3	99.3
1 U.C.	B	56.2	91.0 b	7.8 ab	65.1	97.5 ab
2 U.C. + Rest. Milo		55.7	84.1 a	13.3 b	65.5	99.6 b
3 U.C. + No Water		59.2	95.7 b	5.6 a	65.4	98.6 b
4 Rest. Milo		56.4	91.6 b	6.7 ab	64.2	95.3 a
1 U.C.	Combined	54.6	88.0 ab	6.1	65.1	97.9 ab
2 U.C. + Rest. Milo		54.7	85.6 a	8.9	65.2	99.4 b
3 U.C. + No Water		55.9	91.2 b	4.4	65.3	99.0 b
4 Rest. Milo		54.5	89.4 ab	4.4	65.3	97.3 a
Treatments Combined	A	52.9 a	86.5 a	3.6 a	65.4	99.0 a
	B	56.9 b	90.6 b	8.3 b	65.1	97.8 b

The restricted fed groups (Methods #2 & 4) showed a slight savings in feed but all treatments had similar feed conversion (Table #5).

Table 5. Feed Consumption and Feed Conversion

Treatment	Strain	Feed consumption (lbs/hen/day)	Feed conversion (lbs/doz.)	Feed conversion (lbs/24-oz.doz.)	Feed: eggs
1 U.C.	A	.232	5.28	4.60	3.07
2 U.C. + Rest. Milo		.228	5.12	4.48	2.98
3 U.C. + No Water		.232	5.32	4.63	3.09
4 Rest. Milo		.233	5.33	4.56	3.04
1 U.C.	B	.239	5.10	4.45	2.97
2 U.C. + Rest. Milo		.233	5.04	4.37	2.91
3 U.C. + No Water		.239	4.85	4.20	2.80
4 Rest. Milo		.234	4.98	4.40	2.93
1 U.C.	Combined	.236 a	5.19	4.52	3.02
2 U.C. + Rest. Milo		.231 b	5.08	4.42	2.95
3 U.C. + No Water		.235 a	5.08	4.41	2.94
4 Rest. Milo		.233 ab	5.15	4.48	2.98
Treatments Combined	A	.231 b	5.26 a	4.56 a	3.04 a
	B	.236 a	4.99 b	4.35 b	2.90 b

Table 6 shows that overall profitability favored the U.C. + no water treatment (Method #3) in strain B. This was directly attributable to its high sustained rate of lay from period 3 on. This was not seen in strain A, nor was it statistically significant when strains were combined.

Table 6. Egg Income Minus Feed Cost, Egg Value & Feed Cost Per Dozen

Treatment	Strain	Egg income minus feed cost/hen-housed ($)	Average egg value* (¢/doz)	Feed cost** (¢/doz)
1 U.C.	A	1.26	59.9	42.2
2 U.C. + Rest. Milo		1.37	60.0	41.4
3 U.C. + No Water		1.27	60.0	42.6
4 Rest. Milo		1.25	60.0	42.8
1 U.C.	B	1.44 ab	59.8 ab	40.8
2 U.C. + Rest. Milo		1.36 b	60.0 a	40.6
3 U.C. + No Water		1.69 a	59.9 a	38.8
4 Rest. Milo		1.51 ab	59.7 b	40.0
1 U.C.	Combined	1.35	59.9 ab	41.5
2 U.C. + Rest. Milo		1.37	60.0 a	41.0
3 U.C. + No Water		1.48	59.9 a	40.7
4 Rest. Milo		1.38	59.8 b	41.4
Treatments Combined	A	1.29 b	59.9 a	42.2 a
	B	1.50 a	59.8 b	40.1 b

* 60¢/dozen for large eggs, 53¢/dozen for medium eggs, and 35¢/dozen for small eggs
** $8.00/100 lbs for lay feed, $6.50/100 lbs for Milo.

Discussion

The most significant result of this experiment is the demonstration of different responses to molting methods exhibited by different strains of chickens. Strain A reacted to each of the 4 molting methods in a similar manner. Numerical differences occurred but none were statistically significant over the entire test period.

Strain B, on the other hand, showed significant differences in hen-housed egg production, mortality, egg size, egg value, and egg income minus feed cost as a result of altering the molting method.

Most of the performance differences noted in Strain B were directly attributable to the high mortality rate in the U.C. plus restricted milo feeding program (Method #2) during the first 8 weeks of the molt. The mortality occurred in 3 of the 6 replicates in the second week of the test, before they were put back on feed, and in 4 replicates during the eighth week.

The mortality which occurred during the first 8 weeks of the test in Method #2 in strain B was significantly higher ($P<0.01$) than for the other treatments. Mortality occurred in 5 of the 6 replicates.

Summary

This and previous experiments have shown that different molting methods do not give identical responses. Strains may react differently to the same molting techniques.

Selection of a method must take into consideration all factors with particular attention given to the "bottom line" economic analysis.

Selected References

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