CAN EGG PRODUCERS AFFORD TO NOT BEAK TRIM THEIR FLOCKS?

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ABSTRACT

A commercial flock of Hyline W-36 White Leghorns was studied to determine the economic effects of not trimming beaks compared to the typical practice of beak trimming at 7 weeks. A total of 71,040 birds were used for the laying segment of this experiment. Sixteen week-old pullets were housed in 32 rows of a fully automated commercial farm. Sixteen replicates of 2220 beak trimmed birds were compared with a similar number of non-trimmed birds. Records were maintained for 40 weeks from 18 to 58 weeks of age.

Hen-day egg production, hen-housed eggs, total mortality, average egg weight, total egg mass, and daily feed intake were all significantly affected by the treatments ($P = <.001$). Total egg income minus feed cost per hen housed was practically identical ($3.99 for the beak trimmed birds vs. $4.00 for the non-trimmed birds) at 58 weeks. Projection of results to 78 weeks resulted in a $.24 advantage for the beak trimmed birds.

INTRODUCTION

The majority of egg producers in the U.S. practice beak trimming in order to control cannibalism in their flocks. Numerous experiments have studied different trimming procedures, the age at which the flock is trimmed relative to attaining the highest subsequent performance, and the details of trimming which include blade temperatures, cauterization times, and the amount of beak to remove. Most of the research, where non-trimmed controls were used for comparison, demonstrate a reduction in mortality as a result of trimming. Other experiments show variable trimming effects on body weight, age at sexual maturity, egg weight, egg production and feed consumption. Few of the researchers studied results over the normal productive life of their flocks and none of the published reports analyzed the net economic effects of the procedures studied. The purpose of the current experiment was to measure the efficacy of not trimming the beaks of a low mortality strain of White Leghorns in a practical commercial environment.

MATERIALS AND METHODS

Seventy-five thousand Hyline W-36 replacement pullets were reared in an environmentally controlled commercial brood-grow cage house from one day of age to 16 weeks. At 7 weeks of age, approximately one-half were beak trimmed by an experienced service crew. Alternating rows were used for the non-trimmed half. The method of trimming resulted in the top beak extending 4 mm from the external nares and the bottom beak to be 1 mm longer. The flock was moved to an environmentally controlled 90,000 bird lay house equipped with five back to back (4 tiers) rows. The test birds were placed in 8 rows with the outside rows excluded from the experiment. A double Latin Square design was used with sixteen 2220 bird replicates for each of the two treatments.

Daily records were kept for eggs and mortality for ten 4-week periods. Egg weights, individual bird weights and feed consumption were sampled on one day at the mid-point of each period. Eggs were counted by electronic counters. Feed, egg, and body weights were measured from a representative location within each row. Feed measurements utilized an inserted feed trough over the regular mechanical feeder. This measured the 24 hour feed consumption of 36 hens.

Data was summarized every 28 days and statistically analyzed at the conclusion of the experiment (ANOVA). Egg weights were converted to egg value using standardized prices (55¢ per dozen for large eggs) for each size category and normal distribution of individual egg weights within the sampled case weights. All feed was charged at the rate of 16.5 cents per kg.

RESULTS

The traditional reason for beak trimming a flock is to lower the incidence of cannibalism. The results of a beak trimming experiment is, therefore, strongly affected by the strain of birds used - some strains exhibiting very little cannibalistic tendencies while others are very prone to this vice. The Hyline W-36 is known for its very low rate of mortality and in this experiment averaged only .10% per week. Even though, the non-trimmed birds exhibited a total almost 40% higher than the trimmed birds (4.73% vs 3.39%)($P = <.001$).

Egg production during the first 8 weeks was significantly higher in the non-trimmed birds, during the middle periods egg production was practically identical, but during the last 8 weeks, the trimmed birds laid at a higher rate. Overall, the non-trimmed birds laid at a 2% higher rate and produced 4.2 more eggs per hen housed ($P = <.001$). Egg size and total egg mass favored the non-trimmed birds ($P = <.001$). Egg weight averaged 58.9 grams per egg for the trimmed treatment compared to 59.7 grams per egg for the non-trimmed treatment. Average egg value did not differ between trimmed and untrimmed groups even though a significant difference in average egg weight was observed. Egg weights favored the non-trimmed birds during all periods but one.

Body weight was significantly lower in the beak trimmed birds. At the start of the experiment, this difference was 139 grams. At 58 weeks of age, the difference was 95 grams. A comparison of body weights against the breeder standard showed much better agreement between the standard and the beak trimmed birds than for the non-trimmed birds compared to the standard. In addition, a significantly greater flock uniformity was seen in the beak trimmed birds. Every 4 weeks, 192 individual body weights were taken for each treatment and uniformity (standard deviations) favored the trimmed birds in every period.

As a result of reduced body weights and slightly lower egg mass, the beak trimmed birds consumed significantly less feed than their untrimmed sisters. For the 40 weeks of the experiment, this amounted to a savings of 5.5% ($P = <.001$). An analysis of expected feed consumption based upon differences in body weight and egg mass accounted for 80% of the differences experienced (National Research Council - 1994). It was concluded that feed wastage was not a significant contributor to the differences in feed consumption experienced.

The economic analysis applied to the results of this experiment reveal a $.16 egg income minus feed cost advantage for the non-trimmed treatment by the end of period 3 as a result of its higher rate of egg production during the first 12 weeks of lay. This accumulative advantage decreased in period 4 and by period 10, the profitability of both treatments was essentially the same ($3.99 vs $4.00 for the trimmed vs non-trimmed treatments respectively). During periods 9 and 10, the trimmed birds actually experienced a 5¢+ profit per hen advantage for each 4-week period. When this is projected to the remaining weeks of a normal 78 week cycle, the beak trimmed flock would experience a $.24 per hen housed advantage over the non-trimmed birds. It is not known whether such advantages would extend into later cycles of production.

SUMMARY

Lifetime body weight can be affected by beak trimming methods during the grow stages. This may result in a reduction of feed consumption, egg numbers, egg weight and mortality. As a result of these combined changes, flock profitability may also be affected. If feed savings are sufficiently high relative to other changes in performance, flock profits may be significantly improved.

Extreme care must be taken when considering the "no trim" form of management. Elimination of beak trimming may seem to be an attractive goal, but it must be done with caution and careful consideration of all the consequences. The mortality differences observed in this experiment, although highly significant, were probably much less than would be expected with other beak trimming methods and/or strains of chickens. Higher mortality in untrimmed flocks would increase the economic benefit of beak trimming.

(1) 45th Western Poultry Disease Conference
May 1-5, 1996
Cancun, Mexico

"CAN EGG PRODUCERS AFFORD TO NOT BEAK TRIM THEIR FLOCKS ?"

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(2) Why Do We Beak Trim Our Flocks?

- The traditional reason is to reduce cannibalism.
- Beak trimming methods are not all the same.
- All strains may not react the same to the same type of trimming or have the same need.
- Some feel that other methods to control cannibalism are economically superior.
- Most consider beak trimming as a "necessary evil":
  - It's costly to do.
  - It may permanently harm the flock - especially if done poorly.
  - It is a highly criticized practice.
- No benefits other than a reduction in mortality are usually recognized and some question this.
- There is no good data comparing beak trimmed vs not trimmed flocks!

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BEAK TRIMMING EXPERIMENT - 1993/94

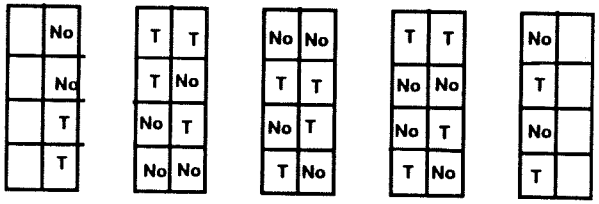
- No trim vs 6-7 week both beaks
- Hyline W-36 White Leghorns
- Hatched June 26, 1993
- Birds moved to lay at 16 weeks
- Test duration:
  - 18 weeks to 58 weeks of age (Aug. 6, 1994)
  - Ten 4-week periods
- 32 groups of 2220 hens each
  - 370 cages x 6/cage
  - 20" x 16" cages
  - 53.3" per hen
  - 16 replicates
  - 4 deck cages

(4) UNIVERSITY OF CALIFORNIA
BEAK TRIMMING EXPERIMENT - 1993/94

- Daily egg counts (auto counter)
- Daily mortality
- Every 4 weeks:
  - hen inventories
  - 24 hour feed consumption
    - feed trough insert
    - 36 bird sample
  - one day egg weights
    - one case (360 eggs)
  - body weights
    - 192 individual birds/treatment

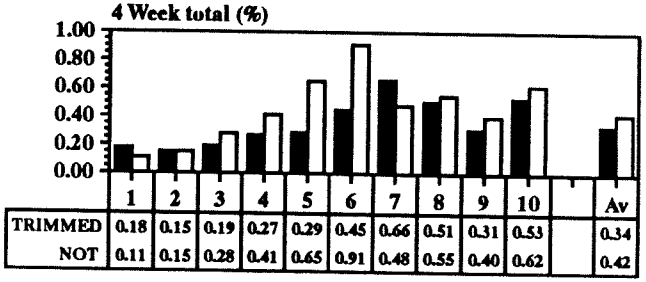
(5) Experimental Design

(End view of 4 tier cage units)



16 replicates per treatment (2) = 32 rows
2220 hens per replicate
2 treatments (no = not trimmed, T = trimmed

(6) EFFECT OF BEAK TRIMMING ON MORTALITY



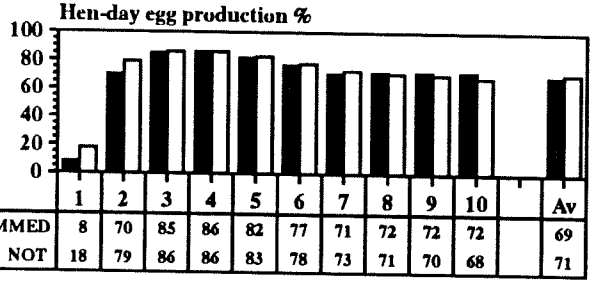
	1	2	3	4	5	6	7	8	9	10		Av
TRIMMED	0.18	0.15	0.19	0.27	0.29	0.45	0.66	0.51	0.31	0.53		0.34
NOT	0.11	0.15	0.28	0.41	0.65	0.91	0.48	0.55	0.40	0.62		0.42

4 Week period

TRIMMED NOT

UNIVERSITY OF CALIFORNIA BEAK TRIMMING EXPERIMENT - 1993/94

(7) EFFECT of BEAK TRIMMING on HEN DAY EGG PRODUCTION (%)



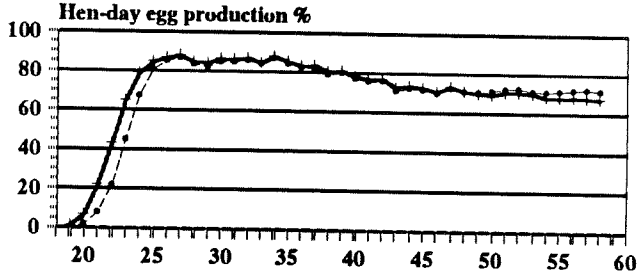
	1	2	3	4	5	6	7	8	9	10		Av
TRIMMED	8	70	85	86	82	77	71	72	72	72		69
NOT	18	79	86	86	83	78	73	71	70	68		71

4 Week period

TRIMMED NOT

UNIVERSITY OF CALIFORNIA BEAK TRIMMING EXPERIMENT - 1993/94

(8) COMPARISON OF HEN DAY EGG PRODUCTION BEAK TRIMMED BIRDS VS NON BEAK TRIMMED



Age in weeks

TRIMMED NOT

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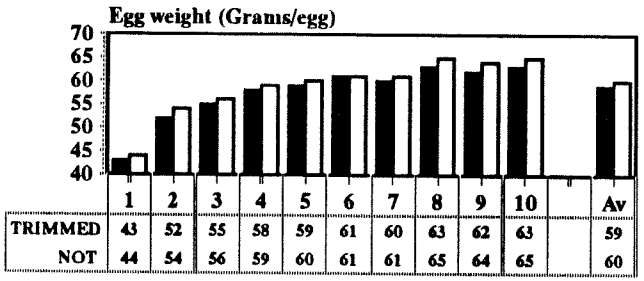
(9) EFFECT OF BEAK TRIMMING ON EGG WEIGHT



	1	2	3	4	5	6	7	8	9	10		Av
TRIMMED	43	52	55	58	59	61	60	63	62	63		59
NOT	44	54	56	59	60	61	61	65	64	65		60

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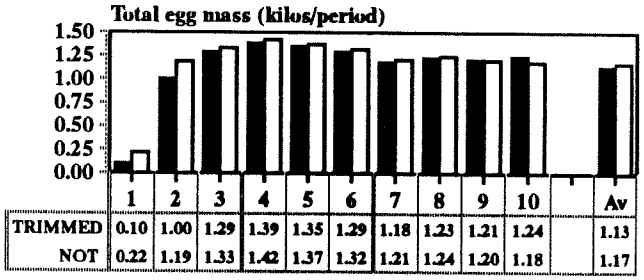
(10) EFFECT OF BEAK TRIMMING ON TOTAL EGG MASS



	1	2	3	4	5	6	7	8	9	10		Av
TRIMMED	0.10	1.00	1.29	1.39	1.35	1.29	1.18	1.23	1.21	1.24		1.13
NOT	0.22	1.19	1.33	1.42	1.37	1.32	1.21	1.24	1.20	1.18		1.17

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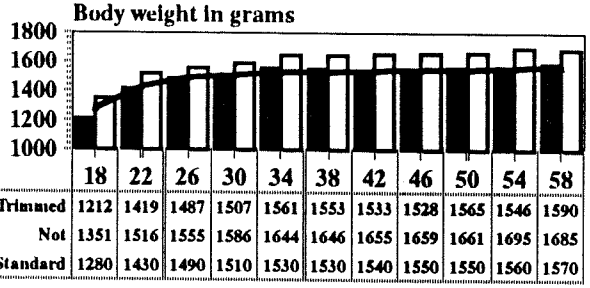
(11) EFFECT OF BEAK TRIMMING ON BODY WEIGHT



	18	22	26	30	34	38	42	46	50	54	58
Beak Trimmed	1212	1419	1487	1507	1561	1553	1533	1528	1565	1546	1590
Not	1351	1516	1555	1586	1644	1646	1655	1659	1661	1695	1685
Standard	1280	1430	1490	1510	1530	1530	1540	1550	1550	1560	1570

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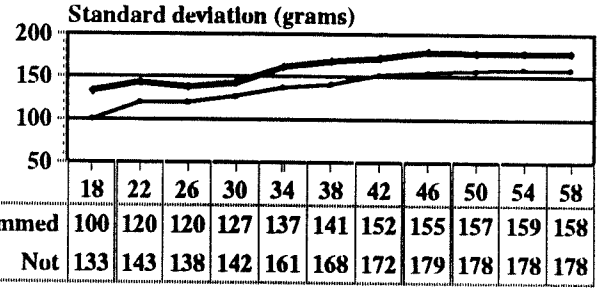
(12) Flock Uniformity Comparison Beak Trimmed vs Non-Trimmed



	18	22	26	30	34	38	42	46	50	54	58
Trimmed	100	120	120	127	137	141	152	155	157	159	158
Not	133	143	138	142	161	168	172	179	178	178	178

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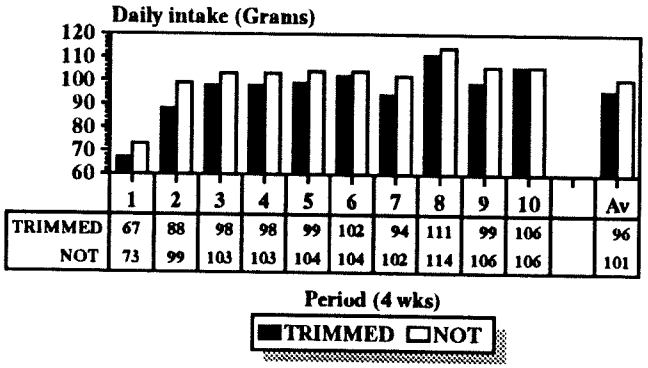
(13) EFFECT OF BEAK TRIMMING ON DAILY FEED CONSUMPTION



	1	2	3	4	5	6	7	8	9	10		Av
TRIMMED	67	88	98	98	99	102	94	111	99	106		96
NOT	73	99	103	103	104	104	102	114	106	106		101

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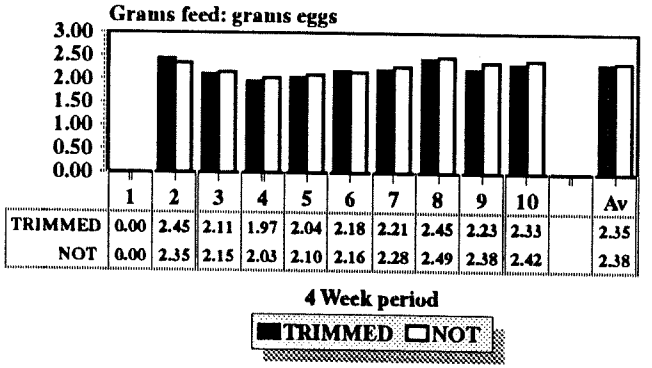
(14) Why Did the Non-beak Trimmed Birds Eat 5.5% More Feed?

- Body weight
  - 105 grams heavier birds
  - Requires 8 additional kilocalories/day for maintenance
- Daily egg mass
  - 1.75 grams more daily egg mass
  - Requires 3.6 additional kilocalories\day
- Calculated daily energy requirements
  - Beak trimmed = 263 kilocalories
  - Non-trimmed = 275
- Actual daily energy intake
  - Beak trimmed = 273
  - Non-trimmed = 288
- Expected increase due to body weight and egg mass equals 80% of observed.
- The difference in observed feed intake is not considered to be wastage !

Based on National Research Council - 1994

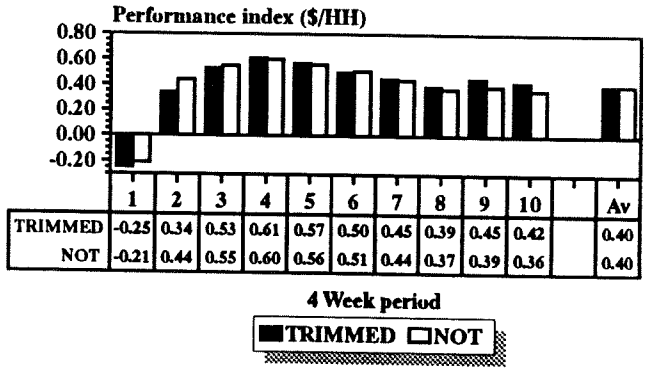
(15) EFFECT OF BEAK TRIMMING ON FEED EFFICIENCY



	1	2	3	4	5	6	7	8	9	10		Av
TRIMMED	0.00	2.45	2.11	1.97	2.04	2.18	2.21	2.45	2.23	2.33		2.35
NOT	0.00	2.35	2.15	2.03	2.10	2.16	2.28	2.49	2.38	2.42		2.38

UNIVERSITY OF CALIFORNIA BEAK TRIMMING EXPERIMENT - 1993/94

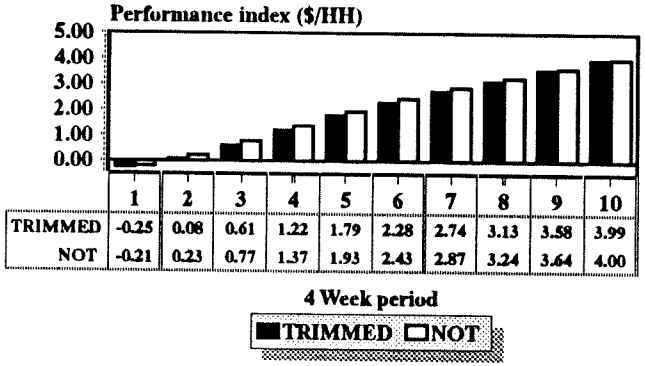
(16) EFFECT OF BEAK TRIMMING ON PERFORMANCE INDEX ($)



	1	2	3	4	5	6	7	8	9	10		Av
TRIMMED	-0.25	0.34	0.53	0.61	0.57	0.50	0.45	0.39	0.45	0.42		0.40
NOT	-0.21	0.44	0.55	0.60	0.56	0.51	0.44	0.37	0.39	0.36		0.40

UNIVERSITY OF CALIFORNIA BEAK TRIMMING EXPERIMENT - 1993/94

(17) EFFECT OF BEAK TRIMMING ON ACCUMULATED PERFORMANCE INDEX



	1	2	3	4	5	6	7	8	9	10
TRIMMED	-0.25	0.08	0.61	1.22	1.79	2.28	2.74	3.13	3.58	3.99
NOT	-0.21	0.23	0.77	1.37	1.93	2.43	2.87	3.24	3.64	4.00

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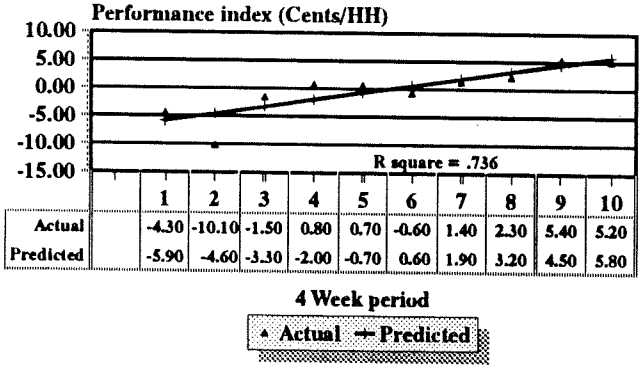
(18) Summary of Results

University of California Beak Trimming Experiment - 1993/94

Trait	Beak Trimmed	Not Trimmed	Stat. Significance
Hen day %	69.3	71.3	***
Eggs/HH	191.5	195.7	***
Total Mortality %	3.39	4.73	***
Av. Egg Wt. (g)	58.9	59.7	***
Total Egg Mass (kg)	11.27	11.68	***
Daily feed intake (g)	96	101.3	***
Feed/dozen (kg)	1.66	1.71	*
Feed:egg ratio	2.35	2.38	ns
Av. egg value (cts/doz)	52.4	52.7	ns
Profit index ($)	3.99	4	ns

Weeks 18 through 58

(19) BEAK TRIMMED ECONOMIC ADVANTAGE (Periods 1 through 10, 19-58 weeks of age)



	1	2	3	4	5	6	7	8	9	10
Actual	-4.30	-10.10	-1.50	0.80	0.70	-0.60	1.40	2.30	5.40	5.20
Predicted	-5.90	-4.60	-3.30	-2.00	-0.70	0.60	1.90	3.20	4.50	5.80

UNIVERSITY OF CALIFORNIA BEAK TRIMMING EXPERIMENT - 1993/94

(20) Projected Economic Advantage of Beak Trimming (projected to 78 Weeks of Age)

To week	Period advantage (cents)	Accumulated advantage (cents)
22	-4.3	-4.3
26	-10.1	-14.4
30	-1.5	-15.9
34	0.8	-15.1
38	0.7	-14.4
42	-0.6	-15
46	1.4	-13.6
50	2.3	-11.3
54	5.4	-5.9
58	5.2	-1
62 (est)	5	4
66 (est)	5	9
70 (est)	5	14
74 (est)	5	19
78 (est)	5	+24

(21) SUMMARY

- Lifetime body weight can be affected by beak trimming during the grow stage.
- Restriction in body weight may affect:
  - Feed consumption
  - Egg weight
  - Total egg mass
  - Economic performance
- Beak trimming also reduces:
  - Mortality - even in low mortality strains
  - Egg production - hen-housed and hen-day
- Extreme caution must be taken when considering a "no trim" option.

(22) Selected References on Beak Trimmed vs Non-trimmed Table Egg Layers

1. Hargreaves, R.C. and L.R. Champion, Poultry Science, 1965, Debeaking of Caged Layers, pp. 1123-1227.
2. Andrade, A.N. and J.R. Carson, Poultry Science, 1975, The Effect of Age at and Methods of Debeaking on Future Performance of White Leghorn Pullets, pp. 666-674.
3. Craig, J.V. and H.Y. Lee, Poultry Science, 1989, Genetic Stocks of White Leghorn Type Differ in Relative Productivity When Beaks Are Intact Versus Trimmed, pp. 1720-1723.
4. Kuo, F.L and J.V. Craig, Poultry Science, 1991, Selection and Beak-Trimming Effects on Behavior, Cannibalism, and Short-Term Production Traits in White Leghorn Pullets, pp.1057-1068.
5. Craig, J.V., J.A. Craig, and G.A. Milliken, Poultry Science, 1992, Beak Trimming Effects on Beak Length and Feed Usage for Growth and Egg Production, pp. 1830-1841.
6. Craig, J.V., Poultry Science, 1992, Beak Trimming Benefits Vary Among Egg-Strain Pullets of Different Genetic Stocks, pp. 2007-2013.