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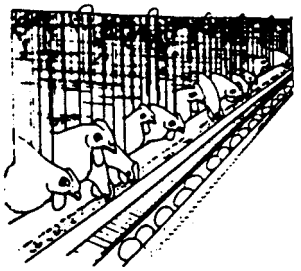


California Poultry Letter

MAY 1996

CAN EGG PRODUCERS AFFORD TO NOT BEAK TRIM THEIR FLOCKS?

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 randomly 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 $7.50 per **100** pounds.

RESULTS

The traditional reason for beak trimming a flock is to lower the incidence of cannibalism. The results of a beak trimming experiment are, therefore, strongly affected by the strain of birds used - some strains exhibit 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 .lO% per week. Despite this, the non-trimmed birds exhibited a total mortality 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 = < .OOl). 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 = < .OOl). 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 net 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.

Figure 1

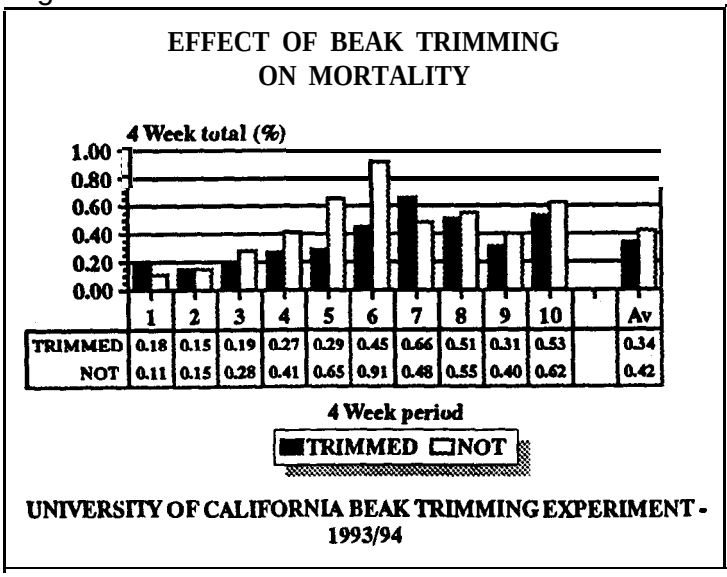


Figure 2

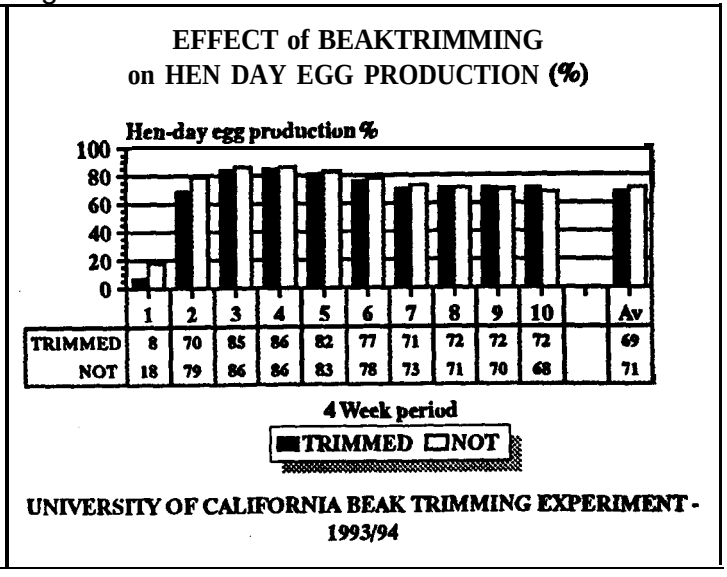
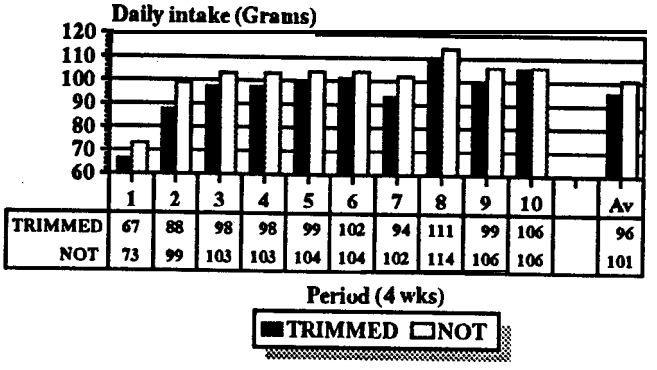


Figure 3

EFFECT OF BEAK TRIMMING
ON DAILY FEED CONSUMPTION

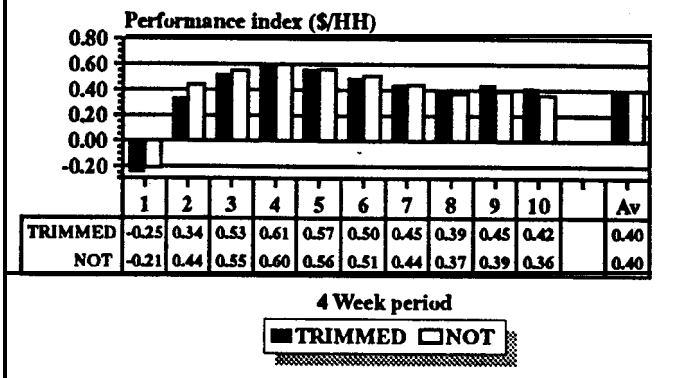


	1	2	3	4	5	6	7	8	9	10		Av
TRIMMED	67	88	98	98	99	102	94	111	99	106		96
NOT	73	99	103	103	104	104	102	114	106	106		101

UNIVERSITY OF CALIFORNIA BEAK TRIMMING EXPERIMENT - 1993/94

Figure 4

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

Figure 5

Summary of Results

University of California Beak Trimming Experiment - 1993/94

Trait	Beak Trimmed	Not Trimmed	Stat. Significance
Hen day %	693	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	238	ns
Av. egg value (cts/doz)	52.4	32.7	ns
Profit index ($)	3.99		••

Weeks 18 through 58

Figure 6

Projected Economic Advantage of Beak 'Rimming

(projected to 78 Weeks of Age)

To week	Period advantage (cents)	Accumulated advantage (cents)
22	-4.3	43
26	-10.1	-14.4
30	-1.5	-15.9
34	0.0	-15.1
38	0.7	-144
42	-0.6	-15
46	1.4	-13.6
50	23	-11.3
54	5.4	4.9
58	5.2	-1
62 (est)	5	4
66 (est)	5	9
76 (est)	5	14
74 (est)	5	19
78 (est)	5	+24

SPENT FOWL REMOVAL: A NEW WAY OF DOING THINGS

Egg companies need to replace flocks in a timely manner to match production levels to market requirements. Traditionally, poultry meat processors have taken spent hens at a price which gave old flocks some salvage value. In the last couple of years, however, processors have become less willing to buy spent hens because of the small yields from these hens, coupled with processing difficulties and competing supplies of poultry meat. To keep spent hens from becoming an increasing liability to egg producers, a new market needs to be established for these birds. Spent fowl might be used in pet food, but without a centralized site to kill the hens, the freshness required of such a product would dictate that they be processed on the farm. While not entirely out of the question, no market is apparent which would pay the premium necessary to cover the costs of an on-farm processing system. Georgia is fortunate in having a poultry byproducts rendering industry which has the capacity to handle large numbers of spent layers. The hens must arrive at the rendering plant dead, however, meaning that they must be killed on the farm.

On-farm killing of spent hens could be damaging to the public image of egg producers if not handled carefully. No procedure for on-farm killing should be accepted unless it can guarantee a humane kill. One temptation to be avoided is the use of engine exhaust to kill hens. Engine exhaust is a blend of gases, with carbon monoxide usually at levels much lower than necessary to quickly kill hens. It can contain irritant substances as well. The American Veterinary Medical Association (AVMA) does not approve the use of engine exhaust to kill animals.

Three methods could be used to kill hens on farms. The AVMA currently approves cervical dislocation for the euthanasia of poultry, but recent research in Britain has indicated that this procedure may not induce instantaneous unconsciousness in chickens. An electrical stunner of the type used in commercial processing plants could be adapted to kill hens on farms if incorporated into a shackle line installed on a truck trailer. The approach would be attractive if procedures such as on-farm scalding and feather picking were needed to prepare carcasses for processing, but for the time being, the investment needed to construct and operate such a system appears to be prohibitive. Modified atmosphere killing is another method approved by the AVMA for killing poultry. Gases such as CO_2 can dilute air so there is not enough oxygen to support life. Modified atmosphere killing is safe for humans because the gas used is not poisonous, and outside its container does not directly threaten human health. A poisonous gas like carbon monoxide, on the other hand, has a direct lethal metabolic effect, and can kill even in the presence of sufficient oxygen to keep hens (or people) alive under normal circumstances. The use of carbon monoxide for on-farm killing of spent hens poses a serious safety threat to humans and is not recommended.

The University of Georgia has developed a mobile modified atmosphere killing (MAK) unit which can be rolled into the aisles of commercial layer houses for the purpose of killing spent hens. The design and operation of this unit will be described in a subsequent Poultry Tip. In brief, the unit has a chamber which holds carbon dioxide and hens are placed into this chamber immediately after removal from their cages. Studies by other researchers have indicated that chickens become

TABLE 1. PROSPECTIVE CATCHING CREW REVENUES USING MAK UNITS OR HANDING CARTS.'

	MAK Unit	Hanging Cart
Catching	5.5¢/hen	S.SC/hen
CO_2	(0.5¢/hen)	-
Hens/Load	250	144
Return/Load	$12.50	$7.92

'Parentheses indicate a negative value.

unconscious within 30 seconds and die within 2 minutes in a 45% CO_2 atmosphere.

The MAK unit has proven very effective in on-farm trials. Since 250 hens can be loaded into the unit in 7 minutes, it should be possible to recover the cost of the carbon dioxide needed to kill the hens. With CO, at a price of 35¢/lb, the cost per hen killed is about 0.5¢. Assuming that a catching crew is paid 5.5¢/hen and that the number of loads the crew could remove from a hen house in a given time would be the same if it used MAK units or the traditional handing carts, the crew could earn $12.50 with the MAK units in the time it could earn $7.92 with the hanging carts (Table 1). If an egg company were to handle its own spent fowl removal, and assuming for the sake of argument that labor costs for the job are S.SC/hen using hanging carts, MAK units could reduce the cost to 3.7¢/hen (i.e., ((5.5¢/hen)/(250 hens per MAK unit/144 hens per hanging cart)) + (0.5¢ for CO_2/hen) = 3.7¢/hen). The relative advantage of using MAK units would depend of course on labor costs, the capacity of the MAK unit being used, the efficiency of the system used to transfer dead hens from the MAK unit to the truck trailer, and the price of CO_2. On the other hand, cost comparisons have reduced importance if there is no choice but to find a feasible method to kill and remove hens from layer houses.

The MAK unit gives the egg industry a means for cost-effective and humane on-farm killing of spent hens, with the option of delivering carcasses to a renderer.

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Extension Poultry Scientist
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THE CORRELATION OF WATER QUALITY TO VARIOUS PERFORMANCE MEASUREMENTS IN COMMERCIAL LAYING FLOCKS

At the 1994 Pacific Egg and Poultry Association Convention, poultry researcher Dr. Nick Zimmerman of Washington State University (now at the University of Maryland) presented a paper on "The Influence of Drinking Water Quality on Laying Hen Performance". Water samples were taken from 24 state of Washington egg farms and compared with their performance between 30 and 60 weeks of age. Zimmerman summarized his findings as follows:

"Many significant positive and negative correlations were observed between the measured drinking water inclusions and laying hen performance variables". He went on to add - there were "negative relationships between hen-housed egg production and drinking water electrical conductivity, sodium, chloride, and sulfate (levels in the water). Increasing levels of these inclusions decreased hen-housed egg production. Hen-day egg production was also negatively affected by nitrates".

Dr. Zimmerman also looked for relationships (correlations) between different performance measurements. The following relationships were statistically significant at the P=.OS level:

Higher body weight at housing was associated with higher average hen-housed and hen-day egg production rates; the higher the hen-housed egg production, the smaller the eggs; the higher the peak production, the greater the number of weeks over 90% egg production; the later the age at housing, the poorer the feed conversion.

Many other relationships were seen in this extensive study. **Copies of the report can be obtained from Dr. Zimmerman at the University of Maryland, 11990 Strickland Drive, Princess Anne, MD 21853.**

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MONITORING MAREK 'S DISEASE VACCINE TITERS IN THE HATCHERY

At a recent Pennsylvania State University Poultry Sales and Service Conference, Dr. Sandra S. Cloud of the University of Delaware discussed her research relating to the loss of vaccine titers in vaccination machines. Dr. Cloud described testing procedures which can be used in hatcheries and her observations of titer losses in three East Coast hatcheries.

Significant losses in titer were associated with the distance of the vaccinator (machine) from the source of vaccine, the length and slope of the vaccine delivery tubing and the presence of beak trimming equipment (heat). Losses associated with distance and/or tubing configuration approached 50% in individual cases. Losses associated with beak trimming were in the 10-20% range. Corrections of problems were made by reconfiguring the delivery tubing system to shorten the distance between the vaccine supply and the vaccinator and by increasing the slope of the tubing.

A copy of this report can be obtained from Dr. Santra Cloud, The University of Delaware, Department of Animal & Food Science, 040 Townsend Hall, Newark, DE 19717-1303,

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