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Controlling Vent Trauma With Stockwound Sprays

A report for the Rural Industries Research and Development Corporation

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FOREWORD

The egg industry generally recognises that vent cannibalism is the biggest cause of loss in laying hens at present. There do not appear to be any figures on the extent of the problem in the industry, but one experiment found the level was 38 per cent of total mortality, and figures from the Victorian random sample layer test showed that vent trauma accounts for between 25 and 50 per cent of the total adult mortality.

The welfare implications of this problem are obvious, but the industry basically only has one means of controlling the problem and that is beak trimming, which itself has serious welfare implications.

To control cannibalism in strains known to be susceptible to this problem farmers usually resort to beak trimming a second time - usually at 14 weeks of age. It is estimated that 30 per cent of the birds in the egg industry in Western Australia are so treated. This of course involves additional trauma to the pullets involved and it appears no proper evaluation of the effects of second beak trimming on subsequent egg production has been carried out in Australia, and not much in the rest of the world.

Treatment of hens suffering prolapse with an oestrogen hormone has been shown to be effective in preventing mortality, improving production and rehabilitating affected hens (Bendheim et al, 1984). This technology does not appear to have been put into practice.

Spraying stockwound spray on traumatised vents is a practise carried out at the Medina Research Centre as a matter of routine but the benefits have never been quantified. There does not appear to be any research demonstrating the benefits or otherwise of using stock wound sprays to control vent trauma.This study has shown that spraying the vents of hens suffering vent trauma can be beneficial and can substitute for beak trimming a second time.

This project was funded from industry revenue which is matched by funds provided by the Federal Government and is an addition to RIRDC's diverse range of over 600 research publications. It forms part of our Egg R&D program, which aims to support improved efficiency, sustainability, product quality, education and technology transfer in the Australian egg industry.

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Peter Core
Managing Director
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Summary

Vent trauma is probably the biggest cause of mortality in the egg industry in the absence of the outbreak of infectious diseases. Practical experience had shown that treating the everted vent of hens suffering vent trauma with a stock wound spray could rehabilitate these hens. However quantitative information was needed on any reduction in mortality, affects on egg production and other performance factors.

Virtually all pullets are beak trimmed at day old or around 7 – 10 days of age. A big proportion (around 30 per cent) are again beak trimmed about 14 weeks of age. Apart from the need for more research on this practice it was felt spraying for vent trauma could substitute for the second beak trim and would, if successful, remove the need for a practice that has welfare objections among some.

Two strains were either beak trimmed at seven days only or again at 14 weeks of age. The vents of half the birds of each of these groups were sprayed with a stock wound spray when they had vent trauma during lay. The aims of the experiment were to assess the effects of beak trimming a second time and spraying the vents of hens suffering vent trauma, together with any strain effects on mortality, egg production, feed consumption, average egg weight, egg grades, age to reach 50 per cent lay, body weight and gross margin.

Beak trimming was done by an industry contractor using a Lyons machine. The precision, block trimming method was carried out at seven days old and half were re-trimmed at 14 weeks of age to trim back any regrowth and even the beaks up. The pullets were housed in laying cages at three hens per cage at 18 weeks of age after being reared on a maturity retarding light program. Hens had 480 cm^2 per hen floor space in the cages. They were given a 17 per cent protein mash during lay.

Overall mortality was low in the trial during lay because as well as the absence of any disease problems, cannibalism of any form was low in incidence The strains chosen proved to be less cannibalistic than hoped. Some of the low mortality can be attributed to the date of hatch (15 February, 1995), which was necessary to conform to the Egg Industry Research and Development Council's financial year funding requirements, and resulted in the pullets being hatched to mature close to the beginning of the financial year. Therefore they were grown on naturally declining day length which prevented them maturing too early and this would have reduced cannibalism. Thus it is considered that the effectiveness of spraying for vent trauma and beak trimming a second time was not given the best opportunity for the expression of each in this trial.

Nevertheless several treatment effects were apparent but the strain effect was the most dominant. However the interaction of strain with beak trimming for hen day and hen housed egg production, total weight of egg produced, feed conversion and gross margin showed that beak trimming a second time was beneficial for one strain but not the other. Therefore it is clear that strains that suffer higher mortality through vent cannibalism are likely to benefit from being beak trimmed a second time.

None of the three way interactions were significant for any of the factors measured.

There was a spray by beak trimming interaction for mortality. Hens beak trimmed once only, had reduced mortality when their vents were sprayed with a stock wound spray but there was no additional benefit when the hens were beak trimmed twice. Thus despite the fact that overall mortality was low in the trial there was still a benefit, for both strains, in spraying the vents of hens suffering vent trauma if they had only been beak trimmed once. Using a stock wound spray to treat vent trauma may be viewed as a substitute for beak trimming a second time (mortality was as low as for hens beak trimmed a second time).

Vent cannibalism accounted for 40.7 per cent of all deaths, and the other major categories were egg bound or egg impacted, 24.1 per cent and egg peritonitis, 22.2 per cent.

Spraying with a stock wound spray for vent trauma gave better feed conversion compared to hens that were not sprayed. When the components of feed conversion are looked at it can be seen that sprayed treatments had higher hen day egg mass. Therefore, there is an indication that vent spraying improved egg output and the results show this derived from both higher egg production and average egg weight.

The only other treatment effect besides strain was the effect of beak trimming on maturity where beak trimming a second time caused a delay in maturity. Beak trimming a second time also resulted in lower bodyweight and feed consumption during rearing.

The time required for spraying the vents of hens from cages with bloodstained eggs is considerable. Based on the data given in the results it can be calculated that 70 minutes is required per 1000 hens per week. This experiment did not consider whether greater or lesser frequency of spraying was needed but if once per week was sufficient then this time would be one third of the time devoted in this trial. Whatever the economics of the operation are, animal welfare considerations may dictate that vent spraying be used as an alternative to beak trimming a second time.

In conclusion, the results show that the benefits of beak trimming a second time are largely strain dependent. Spraying the birds vent was as effective in reducing mortality as beak trimming a second time and so could be used instead of the second beak trim to reduce mortality. There was also the added benefit of an improvement in feed conversion when the vents of hens were sprayed. Therefore, there were economic benefits in spraying rather than practicing a second beak trim and there was a definite welfare advantage. These benefits need to be evaluated against the cost involved in adopting vent spraying as a practice and the potential cost saving in eliminating a second beak trimming if this is routinely practiced.

If it can be shown that hens suffering vent trauma can be rehabilitated by this technique then hens should not be left untreated. In this experiment the rehabilitation of hens was not directly assessed in terms of what happened to individual hens that had vent trauma and were or were not sprayed. However mortality was reduced with spraying and this would indicate that vent traumatised hens were rehabilitated.

Introduction

Vent trauma is probably the biggest cause of mortality in the egg industry. Bishop and Dhaliwal (1994) found mortality from vent pecking and various complications due to vent pecking to be the main cause of death and comprised 38 per cent of all deaths during lay. Parkinson (1990) quoted figures from the Victorian random sample layer test showing that vent trauma accounts for between 25 and 50 per cent of the total adult mortality of eight per cent. He stated that the application of these standards to the national flock indicates that production losses attributable to vent trauma, would be approximately six to ten eggs per hen housed, plus the loss of 300,000 hens on an annual basis.

Practical experience has shown that treating the everted vent of hens suffering vent trauma with a stock wound spray can rehabilitate these hens. Thus mortality can be reduced and hens brought back into production but the benefits of this procedure have not been quantified. In addition the need to beak trim a second time in some strains may be eliminated.

Sprays such as Cetrigen, Chloromide, Aroclenz and Stop Bite Spray have been tried and generally they all seem to work. Chloromide has a hot pink colour and occasionally leaves a pink stain on a few eggs. The others have not had any staining problems. Other sprays have been tried which are not on the market anymore and they also seemed to work. It was decided to use Cetrigen in this experiment because by subjective assessment it seemed to work best and leaves no colour stain on the egg when laid. Each millilitre of Cetrigen contains the following:

Cetrimide 1 mg
Diethyltoluamide 40 mg
Di - N - propyl isocinchomeronate 20 mg
Rhodamine B 1.2 mg
Purple dye (unspecified)
Insect repellants (unspecified)

The practice involves looking for bloodstained eggs on the rollout egg trays each day. Where a blood stained egg is found there is invariably one bird in the corresponding cage with a traumatised vent. The vent can be readily everted using a simple, easily applied technique, and when the injury is found the vent is treated with the stockwound spray. The technique is basically the same as that used for artificial insemination. As inspection of the hens should be carried out daily it can be incorporated in this routine. The time involved from identifying a blood stained egg to inspecting the hens in the cage and final treatment of the hen with an injured vent would be about 1 minute. Eggs can be quickly identified for blood stains on the egg trays as an operator walks along the cage rows. This practice involves a fairly large time commitment but it needs to be weighed up against the cost of beak trimming a second time and the welfare implications of the second beak trim. In any event it is difficult to justify that injured birds remain untreated and where an egg is blood stained there is strong evidence of vent trauma.

In Western Australia it is reckoned that 30 per cent of the State’s hens are beak trimmed twice. The strains available in the industry were changing at the commencement of the

experiment due to the introduction of foreign strains into the country, and so little was known of the cannibalistic tendencies of the strains chosen.

Research into the effects of beak trimming a second time is not extensive. As beak trimming a second time is a common practice it is important to determine its benefits or problems.

Objectives

1. To determine whether spraying the vent, when everted, of laying hens, suffering vent trauma, with a commercial stockwound preparation reduces mortality and improves production compared to untreated flocks.

2. To determine whether spraying the vent, when everted, of laying hens, suffering vent trauma, with a commercial stockwound preparation can eliminate the need for a second beak trim.

3. To determine whether beak trimming a second time reduces mortality and improves production compared to flocks beak trimmed once.

4. To determine when hens have been beak trimmed a second time, whether treating the vents of any hens suffering vent trauma with a commercial stockwound spray results in any improvement in mortality and production compared to untreated flocks.

Method

Experimental Design

The treatments were beak trimming once or twice by sprayed or not sprayed by two strains to give a 2 x 2 x 2 factorial experiment with eight replications. The treatments are listed below:

1. Strain A - Beak trimmed at 7 days of age - no treatment (Controls).

2. Strain A - Beak trimmed at 7 days of age - spray treated.

3. Strain A - Beak trimmed at 7 days and 14 weeks of age.

4. Strain A - Beak trimmed at 7 days and 14 weeks of age - spray treated.

5. Strain B - Beak trimmed at 7 days of age - no treatment (Controls).

6. Strain B - Beak trimmed at 7 days of age - spray treated.

7. Strain B - Beak trimmed at 7 days and 14 weeks of age.

8. Strain B - Beak trimmed at 7 days and 14 weeks of age - spray treated.

The treatments were arranged in a randomised block design. Total number of hens were 960 with 120 hens per treatment. The treatments and production measurements were maintained from 18 to 72 weeks of age.

Strain A were Isa Browns and Strain B were Hyline Browns.

Detailed Methods

Standard Medina Research Centre rearing procedures were used. A lighting program designed to prevent early maturity appropriate to the season of hatch was used. As the

pullets were hatched 15 February, 1995 they were given a constant 16 hour day until seven weeks of age. They were then reared on naturally declining light until they were 16 weeks of age when the daylength was 10 hours 48 minutes. At this point the photoperiod was increased by 40 minutes per week until they were 18 weeks of age when they were shifted to the cage-laying house and given a photoperiod of 15 hours per day. The pullets were full fed during rearing. Restricted feeding was not practiced during rearing because extensive experience has given dubious results and it seems to be less and less applicable to modern layers.

The pullets were housed in the laying cages at 18 weeks of age; the aim being to house them just at first egg to avoid early light stimulation of the laying house photoperiod which was 15 hours.

Daily inspections of the eggs on the rollout egg trays in the stock - wound spray treatments were made for blood stained shells just prior to the eggs being collected. Where a blood stained egg was identified the vents of the birds in the corresponding cage were inspected and sprayed with a stock - wound spray if vent trauma was identified.

The laying cages were stocked at three birds per cage, which gave a density of 480 cm^2 per hen with 13 cm per hen of feeding space. Cooling of the hens when the temperature exceeded 29° C was achieved by high-pressure foggers in an insulated shed. Temperatures inside the laying house were kept below 33° C and generally below 30° C.

The pullets were beak trimmed according to normal industry practice by an industry contractor who does about 95 per cent of the birds in the industry. The beaks were "block" and “precision” beak trimmed at seven days of age using a Lyon Electric Co. machine. "Block" trimming means that about a third to one half of both beaks were removed with the one cut. In this case the bottom beak was left slightly longer than the top beak by means of squeezing back under the lower beak at it’s base with the index finger. “Precision” trimming means that a hole in a plate through which the beak is inserted onto the cutting bar is used to regulate the amount of beak cut off. At 14 weeks of age half the hens of each strain were beak trimmed a second time by the same contractor. This trim was very light, the main purpose being to even up the length of the beaks of each hen and square them off so they were not pointed. The amount of beak trimmed at this stage depended on the amount of regrowth.

From day old to seven weeks of age the pullets were fed an 18 per cent protein crumble and during this period they were raised on litter. They were then fed a 17 per cent protein mash to 12 weeks of age followed by a 15 per cent mash to 18 weeks of age. During the latter two periods they were housed in rearing cages.

All hens that died were submitted to a veterinarian for the diagnosis of the cause of death.

Measurements and Observations

1. Egg production and mortality of each replicate were recorded daily and the cause of death determined by a veterinarian. The vents of any birds that died were examined by a veterinarian for any general evidence of any effect of the spray chemicals on the tissues of the vent.
2. Egg weights and grading of each replicate were carried out fortnightly on a three day egg collection.
3. The time taken to treat the vents of hens with Cetrigen was recorded.

4. All feed issued was weighed and recorded and a feed weigh - back carried out at four weekly intervals for each replicate.
5. Bodyweights for each replicate were measured at the beginning and completion of the experiment.

Results

REARING

Mortality between day old and 18 weeks of age was 1.5 per cent for strain A and 2.9 per cent for strain B.

Bodyweight at 18 weeks of age for strain A, once and twice beak trimmed, were 1.46 and 1.43 kg respectively, and for strain B, they were 1.54 and 1.43 kg respectively.

Feed consumption during rearing is shown in Table 1. for the different treatments. Although feed consumption is shown from 7 to 14 weeks and from 14 to 18 weeks, no feed weigh back was done at 14 weeks of age and the split is only shown to give an idea of the effect of beak trimming at 14 weeks of age. Thus no effect can be seen up to 14 weeks of age, but a depression in feed consumption can be seen for each strain where the birds were trimmed twice, particularly for strain B. These results are consistent with the bodyweight results at 18 weeks of age.

Table 1. Effect of rearing treatments on feed consumption (bird day basis).

Treatment	0 – 7 weeks of age (kg/bird)	7 – 14 weeks of age (kg/bird)	14 – 18 weeks of age (kg/bird)	7 – 18 weeks of age (kg/bird)
Strain A – Trimmed once	-	4.30	1.17	5.47
Strain A – Trimmed twice	-	4.29	1.10	5.39
Mean Strain A	1.34	4.295	1.135	5.43
Strain B – Trimmed once	_	4.29	1.28	5.57
Strain B - Trimmed twice	_	4.30	0.95	5.25
Mean Strain B	1.21	4.295	1.115	5.41

LAYING

None of the three way interactions for any of the factors measured were significant and so they are not reported in these results.

Mortality

A Chi-squared test was carried out on the mortality data because of the distribution of the data. The test showed (Table 2) that strain A had significantly higher mortality (P=0.015) than strain B and that there was a significant spray by trimming interaction (P=0.014).

Spraying with a stock wound preparation reduced mortality when the hens were only beak trimmed once, but had no additional benefit when the hens were beak trimmed twice (3.3 versus 10.0 per cent respectively for once only beak trimming and 5.0 versus 4.2 per cent respectively for beak trimming a second time).

Vent cannibalism accounted for 40.7 per cent of all deaths, while egg bound or egg impacted accounted for 24.1 per cent. Egg peritonitis 22.2 per cent, prolapse 5.6 per cent and unknown 7.4 per cent made up the remainder. Within the vent cannibalism category 7.4 per cent of total deaths were also egg bound and 20.4 per cent were also prolapsed.

No evidence of any effect of the Cetrigen spray on the tissues of the vent were found.

Table 2. Effect of treatments on mortality, egg production, average egg weight and average egg price.

Treatment	Mortality (%)	Egg prod. - hen day (Eggs.)	Egg prod. - hen housed (Eggs)	Average egg weight (g)	Average egg price (c/doz.)
1	15.8	296.7	278.9	61.4	191.6
2	5.0	306.9	298.8	61.6	193.4
3	4.2	310.4	306.3	61.6	193.6
4	6.7	313.9	301.7	61.4	192.5
Mean Strain A	7.9	307.0	296.4	61.5	192.8
5	5.8	306.5	297.5	64.1	196.3
6	1.7	307.4	305.9	63.8	195.9
7	4.2	300.8	294.0	63.3	195.7
8	3.3	305.3	298.5	64.0	195.3
Mean Strain B	3.8	305.0	299.0	63.8	195.8
Strain (S)	*	N.S.	N.S.	***	***
S.E.D. (S)	1.46	3.1	4.0	0.2	0.5
Spray (Sp)	N.S.	N.S.	N.S.	N.S.	N.S.
S.E.D. (Sp)	1.46	3.1	4.0	0.2	0.5
Trimming (T)	N.S.	N.S.	N.S.	N.S.	N.S.
S.E.D.(T)	1.46	3.1	4.0	0.2	0.5
SxSp	N.S.	N.S.	N.S.	N.S.	N.S.
S.E.D. (SxSp)		4.4	5.7	0.3	0.7
SpxT	*	N.S.	N.S.	N.S.	N.S.
S.E.D. (SpxT)		4.4	5.7	0.3	0.7
SxT	N.S.	*	*	N.S.	N.S.
S.E.D. (SxT)		4.4	5.7	0.3	0.7

Egg Production

There were no treatment effects for hen day egg production (Table 2) apart from a strain by beak trimming interaction (P=0.026). Beak trimming a second time increased egg production for strain A compared to one beak trim (312 compared to 302 eggs, respectively) but had no effect for strain B (303 compared to 307 eggs, respectively). Note that the 5 per cent L S. D. was 8.8

Birds that were spray treated laid 308 eggs compared to 304 for birds that were not sprayed. Likewise birds that were beak trimmed a second time laid 308 eggs compared to 304 for birds that were beak trimmed only once. These differences were not significant.

The treatment effects for hen housed egg production were the same as for hen day egg production (Table 2). Thus the strain by beak trimming interaction was significant (P=0.014). When strain A was beak trimmed twice they laid 304 eggs compared to only 289 when trimmed once only whereas strain B laid 296 and 302 eggs, respectively (5 per cent L. S. D. was 11.4).

On a hen housed basis, birds that were spray treated laid 301 eggs compared to 294 for birds that were not sprayed. Similarly birds that were beak trimmed a second time laid 300 eggs compared to 295 for birds that were beak trimmed only once. These differences were not significant.

Average Egg Weight

A significant difference was found between the two strains (P<0.001), but there were no other treatment effects (Table 2). Strain B laid larger eggs than strain A (63.8g compared to 61.5g, respectively).

Average Egg Price

As for average egg weight, the difference between the two strains was significant for average egg price(P<0.001), with no other treatment effects (Table 2). Average egg price for strain B was higher than for strain A (195.8 compared to 192.8 c/doz. respectively).

Total Weight of Egg Produced (Egg Mass)

On a hen day basis strain B produced more egg mass than strain A (P < 0.01) as shown in Table 3. Strain B produced 19.5 kg of eggs compared to 18.9 kg of egg produced by strain A.

Birds that were spray treated had an egg mass of 19.3 kg compared to hens that were not at 19.0 kg, and the treatments were nearly significantly different (P = 0.07). When birds were beak trimmed a second time they laid 19.3 kg whereas they only laid 19.1 kg when beak trimmed only once.

The strain by trimming interaction for hen day egg mass was significant (P < 0.01). Beak trimming a second time improved egg mass for strain A compared to beak trimming once only (19.2 compared to 18.6 kg respectively) whereas there was no difference for strain B (19.3 compared to 19.6 kg respectively). The L. S. D. was 0.5.

Table 3 shows the treatment effects for hen housed egg mass were similar to those for hen day egg mass. Thus the egg mass for strain B (19.1 kg) was greater than the egg mass for strain A (18.2 kg), P < 0.001. Birds that were sprayed laid 18.9 kg compared to 18.2 kg for birds that were not sprayed, and birds that were trimmed twice laid 18.8 kg compared to 18.5 kg for birds that were only trimmed once.

There was a significant (P < 0.01) strain by beak trimming interaction for hen housed egg mass with the hens responding in the same way as for hen day egg mass. When beak trimmed a second time strain A laid 18.7 kg of eggs but only 17.8 kg of eggs when beak trimmed once only, whereas strain B laid 18.8 and 19.3 kg of eggs respectively (L. S. D. = 0.69)

Note that the interaction was similar to that for hen day and hen housed egg production, but the effect was stronger for egg mass indicating egg weight was involved in the interaction.

Feed Consumption

There were no significant treatment effects for feed consumption (Table 3).

Feed Conversion

Strain B's feed conversion ratio (2.10) was better than strain A's (2.14), P < 0.01 , reflecting the greater egg mass output of strain B (Table 3).

Birds that were spray treated for vent trauma had a better feed conversion than those that were not spray treated (P < 0.05, 2.10 versus 2.14 respectively). As hen day egg mass was greater for birds that were sprayed, although this was not significant, it can be expected that this was the main factor in this better feed conversion.

The feed conversion of birds beak trimmed twice was 2.12 compared to 2.13 for birds only beak trimmed once but there was no significant difference.

There was also a strain by beak trimming interaction (P < 0.01), where a second beak trim improved feed conversion for strain A but there was no difference for strain B (2.11 versus 2.18 for strain A respectively and 2.12 versus 2.07 for strain B respectively, with an L. S. D. of 0.05). This result reflects the results for egg mass.

Gross Margin

Only the strain by beak trimming interaction showed a significant treatment effect where P < 0.01, (Table 3). Beak trimming a second time increased the gross margin for strain A compared to only one beak trim, whereas there was no difference for strain B ($21.58 versus $19.67 for strain A, respectively, and $21.09 versus $21.94 for strain B, respectively, with an L. S. D. of $1.38). This result reflects the previous results for egg mass and feed conversion.

Although the gross margin was nearly a dollar more for strain B than strain A ($21.52 versus $20.62 respectively) the difference was not significant. The gross margin for birds that were sprayed was $21.48 compared to $20.66 for unsprayed birds. For birds beak trimmed a second time the gross margin was $21.34 versus $20.80 for birds beak trimmed once only.

The spray by beak trimming interaction was nearly significant (P = 0.052). Spraying when the birds had been beak trimmed only once produced a large increase in gross margin ($21.70)compared to not spraying ($19.91), but there was little difference when the birds had been beak trimmed twice ($21.26 and $21.41, respectively).

Table 3. Effect of treatments on hen day and hen housed egg mass, feed consumption, feed conversion, and gross margin per hen housed.

Treatment	Egg mass - hen day (kg/hen)	Egg mass - hen housed (kg/hen)	Feed Consumption (g/hen day)	Feed Conversion (kg feed / kg egg)	Gross margin / hen housed ($)
1	18.2	17.1	111	2.22	18.31
2	18.9	18.4	111	2.14	21.02
3	19.1	18.9	111	2.11	21.96
4	19.3	18.5	112	2.11	21.20
Mean Strain A	18.9	18.2	111	2.15	20.62
5	19.7	19.1	112	2.08	21.51
6	19.6	19.5	111	2.07	22.37
7	19.1	18.6	112	2.14	20.87
8	19.6	19.1	113	2.10	21.32
Mean Strain B	19.5	19.1	112	2.10	21.52
Strain (S)	**	***	N.S.	**	N.S.
S.E.D. (S)	0.18	0.24	0.59	0.02	0.49
Spray (Sp)	N.S.	N.S.	N.S.	*	N.S.
S.E.D. (Sp)	0.18	0.24	0.59	0.02	0.49
Trimming (T)	N.S.	N.S.	N.S.	N.S.	N.S.
S.E.D.(T)	0.18	0.24	0.59	0.02	0.49
SxSp	N.S.	N.S.	N.S.	N.S.	N.S.
S.E.D. (SxSp)	0.25	0.34	0.83	0.02	0.69
SpxT	N.S.	N.S.	N.S.	N.S.	N.S.
S.E.D. (SpxT)	0.25	0.34	0.83	0.02	0.69
SxT	**	**	N.S.	**	**
S.E.D. (SxT)	0.25	0.34	0.83	0.02	0.69

Table 4. Effect of treatments on egg grades, maturity and body weight at end of lay.

Treatment	Egg grades			Age at 50% lay (days)	Body weight at 75 w.o. (kg)
	% 67g eggs	% 61g eggs	% seconds		
1	12.4	34.1	6.1	149.8	2.08
2	13.2	35.7	5.1	150.3	2.00
3	14.9	35.2	5.6	150.6	2.09
4	12.5	35.2	5.8	150.6	2.09
Mean Strain A	13.2	35.1	5.6	150.3	2.07
5	26.6	41.2	4.6	151.1	2.22
6	24.9	38.2	4.9	151.0	2.20
7	22.9	39.4	4.2	151.9	2.24
8	26.5	36.5	5.2	152.3	2.23
Mean Strain B	25.2	38.8	4.7	151.6	2.22
Strain (S)	***	**	**	***	***
S.E.D. (S)	1.52	1.21	0.27	0.31	0.02
Spray (Sp)	N.S.	N.S.	N.S.	N.S.	N.S.
S.E.D. (Sp)	1.52	1.21	0.27	0.31	0.02
Trimming (T)	N.S.	N.S.	N.S.	*	N.S.
S.E.D.(T)	1.52	1.21	0.27	0.31	0.02
SxSp	N.S.	N.S.	N.S.	N.S.	N.S.
S.E.D. (SxSp)	2.15	1.71	0.38	0.44	0.03
SpxT	N.S.	N.S.	N.S.	N.S.	N.S.
S.E.D. (SpxT)	2.15	1.71	0.38	0.44	0.03
SxT	N.S.	N.S.	N.S.	N.S.	N.S.
S.E.D. (SxT)	2.15	1.71	0.38	0.44	0.03

Egg Grades

The only treatment effect for the large egg grades (67 and 61g grades) was the strain effect (Table 4). Strain B laid more eggs in each of these two grades than strain A ($P < 0.001$ and 0.01 for the 67 and 61 g grades respectively). Strain B also laid less second grade eggs than strain A ($P < 0.01$).

Maturity (age at 50% lay)

As shown in Table 4 strain B matured later than strain A (151.6 versus 150.3 days respectively, $P < 0.001$). Beak trimming a second time also caused a delay in maturity (151.3 versus 150.5 days respectively, $P < 0.05$). There was no other treatment effect for maturity.

Bodyweight at End of Lay (75 weeks of age)

Strain B was heavier than strain A at the end of lay (Table 4). Strain B weighed 2.22 kg compared to strain A weighing 2.07 kg ($P < 0.001$). The effect of beak trimming was nearly significant ($P = 0.056$) with birds beak trimmed twice weighing 2.17 kg and birds beak trimmed once weighing 2.12 kg.

Time Taken to Spray the Vents of Hens

An average of 17 hens (3.5 per cent) were sprayed on each occasion and the average time taken to spray each hen over the period of the trial was 40 seconds. This treatment was typically carried out on a Monday, Wednesday and a Friday.

Discussion

In this study although no analysis of variance was carried out on the rearing results it appeared that reduced bodyweight at 18 weeks of age was coincident with reduced feed consumption in the period following the second beak trimming in those treatments that were beak trimmed a second time. Carey and Lassiter (1995) reported the same result. Lee and Craig (1990) found a significant reduction in feeding activity and feed intake among beak trimmed birds that persisted for three weeks following beak trimming.

Overall mortality was low in the trial during lay because as well as the absence of any disease problems, cannibalism of any form was low in incidence The strains chosen proved to be less cannibalistic than hoped . However strain A had over twice the mortality of strain B. Some of the low mortality can be attributed to the date of hatch. To conform to Egg Industry Research and Development Council's financial year funding requirements the pullets were grown on naturally declining day length which prevented them maturing too early and this would have reduced cannibalism. Thus it is considered that the effectiveness of spraying for vent trauma and beak trimming a second time was not given the best opportunity for expression in this trial.

Nevertheless, several treatment effects were apparent but the strain effect was the most dominant. However, the interaction of strain with beak trimming for egg production, total weight of egg produced, feed conversion and gross margin showed that beak trimming a second time was beneficial for one strain but not the other. Therefore it is clear that strains that suffer higher mortality through vent cannibalism are likely to benefit from being beak trimmed a second time. No interactions were found between strain and beak trimming once or a second time by Carey and Lassiter (1995) and Kuney and Bell (1982). Craig (1992) found strain by beak trimming interactions where hens beak trimmed twice took longer to

reach 50 per cent lay than hens trimmed once only in one strain, and egg weight was greater for twice trimmed hens than once only trimmed hens in one strain.

In this experiment the effect of beak trimming on maturity was a main effect. Beak trimming a second time caused a delay in maturity (Note the rearing results where beak trimming a second time caused lower feed consumption and lower bodyweight at 18 weeks of age). This was the only significant effect of beak trimming on any measurement. Likewise Carey and Lassiter (1995) found no differences among beak trimming treatments in mortality, egg production, egg weight, egg mass, or feed conversion. Only feed consumption was found to be greater for birds beak trimmed at 10 days than for those beak trimmed at 84 days as well. Similarly, Craig (1992) found no differences in mortality, hen day rate of lay and hen housed rate of lay and egg mass between hens that had been beak trimmed once or twice. Hens trimmed once only laid smaller eggs than birds trimmed twice. On the other hand, in a trial where three beak trimming methods were tested with two strains the results generally favoured those hens that had been beak trimmed twice compared to trimming once only at six to ten days old (Kuney and Bell, 1982).

The only effect of vent spraying independent of other treatments occurred with feed conversion where spraying traumatised vents resulted in an improvement. When the components of feed conversion are looked at it can be seen that sprayed treatments had higher hen day egg mass. Therefore, there is an indication that vent spraying improved egg output and the results show this derived from both higher egg production and average egg weight.

The spray by beak trimming interaction for mortality showed that treating the vent with a stock wound spray did reduce mortality compared to not spraying the vent when the birds had only been beak trimmed once. Thus despite the fact that overall mortality was low in the trial there was still a benefit, for both strains, in spraying the vents of hens suffering vent trauma if they had only been beak trimmed once. Using a stock wound spray to treat vent trauma may be viewed as a substitute for beak trimming a second time (mortality was as low as for hens beak trimmed a second time).

Although there were no significant spray by beak trimming interactions for egg production, total weight of egg produced, feed conversion and gross margin as there were for strain and beak trimming, the interactions are discernible for each of these factors. Thus under conditions where vent cannibalism occurs with greater incidence there is an indication from this data there may be significant interactions between spray treatment and beak trimming treatment on some production output factors.

It should be noted that while the stockwound spray treatment was effective it was noticed that after a period of time as lay declined, the hens became somewhat “refractory” to having their vents everted so they became more difficult to treat. As the hens aged and laid less, their cloacas or vents became dryer and more shrivelled, as would be expected, making it more difficult to evert the vent. However, the method does not involve the use of undue force, and if hens did not respond the first time the procedure was discontinued.

Deaths due to vent cannibalism were by far the greatest cause of overall mortality and this confirms the results of Bishop and Dhaliwal (1994). Hens that were egg bound constituted a large proportion of deaths and evokes the question — what causes hens to become egg bound? Is it related to vent trauma?

No reports where stock wound sprays were used to control vent pecking were found.

The time required for spraying the vents of hens with bloodstained eggs is considerable. Based on the data given in the results it can be calculated that 70 minutes is required per 1000 hens per week. This experiment did not consider whether greater or lesser frequency of spraying was needed but if once per week was sufficient then only one third of the time devoted in this trial would be necessary and this would greatly improve its economics. Whatever the economics of the operation are, animal welfare considerations may dictate that vent spraying be used as an alternative to beak trimming a second time.

Implications

This experiment has shown that vent spraying with a stock wound spray when hens suffer vent trauma can reduce mortality and overcome the need for a second beak trim.

The improvement in feed conversion when hens were sprayed occurred across strains, whereas beak trimming a second time only benefited one strain in the measurements where benefits were found.

Thus the mortality and feed conversion improvements from vent spraying should lead to improved profitability. In this regard the increase in gross margin on the vent sprayed, single beak trimmed treatment was nearly significant.

There are benefits in beak trimming a second time for strains that tend to have higher mortality and this is expressed in increased egg production, feed efficiency and gross margin.

This experiment indicates there is now an alternative to beak trimming a second time for egg producers that is effective, although more laborious. However there should not be any welfare implications for hens from vent spraying itself.

Hens that are suffering vent trauma should not remain untreated as vent spraying reduces mortality presumably through rehabilitating the hen.

The strain of hen is important and hens with a low propensity for vent cannibalism should be favoured.

Recommendations

1. The use of stock wound sprays to treat vent trauma in laying hens should be seriously considered as a routine practice by egg producers.
2. The cost of carrying out the procedure should not be measured simply in economic terms alone but welfare should also be considered as part of the equation. Thorough assessment of the welfare implications was beyond the scope of this study and further work in this area is needed.
3. Further research should be carried out to confirm these results as there appears to be no other work on the subject. This work should also look further at the economics of the practice.
4. Research should be carried out to develop more effective stock wound sprays, developed specifically for this purpose, as the only sprays available at present are for general use on stock wounds.

Intellectual Property

None

Communications Strategy

Publication in a scientific journal.

Preparation of magazine articles.

Address local producer groups in Western Australia through the W. A. sub branch of the World's Poultry Science Association.

Preparation of information bulletins published by AgWA.

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