RURAL INDUSTRIES RESEARCH
& DEVELOPMENT CORPORATION

Travel report -

6th European Symposium on Poultry Welfare

Switzerland, September 1-4 2001

A report for the Rural Industries Research and Development Corporation

by P C Glatz

March 2002

RIRDC Publication No W02/008
RIRDC Project No TA001-32

ISSN 1440-6845

6th European Symposium on Poultry Welfare – Switzerland, September 1-4 2001
Publication No. W02/008
Project No. TA001-32

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Published on the web in March 2002

CONTENTS

	PAGE
Summary	4
Schedule	5
Report of travel	6
Purpose	6
Achievements	6
Issues at conference	7
Benefits to grantee	11
Benefits to industry	12
Recommendations	12
Dissemination	13
Acknowledgement	13
Publications	13
Copies of Publications	15

TRAVEL REPORT SUMMARY

Phil Glatz attended the 6th European Symposium on Poultry Welfare in Zollikofen Switzerland from the 1st– 4th September 2001, and contributed 5 papers; four as first author and one as second author. The papers submitted were;

"Developing an accreditation system for beak trimming in Australia" by PC Glatz, M Bourke, JL Barnett and KL Critchley;
"Effect of claw abrasives on mortality in caged layers under Australian housing conditions" by PC Glatz;
"Eco shelter housing of free range poultry integrated into a pasture crop rotation system in the wheat belt of Australia" by PC Glatz and Y Ru;
"The effect of declawing on behaviour of ostriches" by PC Glatz
"The development of a comprehensive audit for the Australian chicken meat industry and its evaluation" by JL Barnett, PC Glatz and A Almond.

Phil Glatz also attended two workshops prior to the conference on 1st September 2001 and a post conference tour

Workshop 1-"Furnished cages in research and commercial production"
Workshop 2-" Organic farming of laying hens: balance between bird and environment".
Tour-"Visit aviary egg production units, free range broiler and turkey facility" in Switzerland

The main reasons why Phil Glatz attended the conference was to obtain information that would benefit the progress of his current RIRDC projects. In particular;

Obtain European researchers evaluation of the beak trimming accreditation program being developed in Australia and opinions on declawing of emus and ostriches.
Discuss implications of including claw abrasives in layer cages with EU researchers currently trialing various claw abrasives.
Evaluate the potential in Australia of any innovative free range and organic farming systems practices currently being researched in Europe.
Assess the current trends in poultry production systems in Europe.

The major benefits gained by Phil Glatz from attending the conference were as follows;

Considerable support for the beak trimming accreditation program being developed in Australia, although criticism of the severity of beak trimming and the practice of declawing in emus and ostriches. Interest was shown by Deans Foods in implementing the beak trimming program in the UK.

Despite years of EU research, levels of feather pecking and cannibalism in poultry (including quail) housed in alternative systems remains a huge problem. Adoption of new standards of beak trimming in the EU would resolve the issue while the geneticist attempt to develop less aggressive strains of birds.

Agreement by EU researchers that use of abrasive paint has greater potential as a claw abrasive than current claw abrasives being used in Europe.

The potential to improve the ranging ability of birds in alternative systems by use of shelterbelts, crop rotations, sand baths and placement of odours familiar to the birds in the range areas. A similar strategy could be exploited in ratites.

The EU recommends the housing of birds in alternative systems. Opinion and individual country policy is divided on the suitability of types of furnished cages, aviaries and free range systems. The high level of subsidies paid to farmers in some countries is enabling some of these systems to remain profitable despite continuing problems with feather pecking, cannibalism, egg quality and bird health.

The Australian Industry needs to be cautious in adopting some of the alternative caging and housing systems. A full welfare and production evaluation of these systems is required in Australia. A specialist management committee comprising producers, researchers and welfarists is needed to provide advice on whether such systems are suitable and economically viable for the Australia Industry.

SCHEDULE

August 30th, 2001	Travel from Adelaide to Zurich and then by rail from Zurich to Bern
September 1st, 2001	Attend furnished cage and organic farming workshop
September 2nd –4th, 2001	Attend welfare conference Deliver beak trimming paper, display posters, discuss beak trimming, free range and organic systems, declawing and cage abrasive with colleagues
September 4th, 2001	Farm visits to free range layer, broiler and turkey farms and aviary egg production systems
September 6th	Travel from Bern to Zurich by rail and then from Zurich to Adelaide

REPORT OF TRAVEL

Purpose

Attend 2001, 6th European Symposium on Poultry Welfare Sept 1-4, 2001

Present papers, and posters on current RIRDC projects; re beak trimming accreditation; claw abrasives for laying hens; declawing of ostrich chicks and free range production systems.

Discuss beak trimming of layers and declawing of ostriches and emus with European colleagues

Evaluate poultry free range and organic production systems.

Discuss with EU colleagues the most suitable claw abrasive to use in layer cages, and reasons for prolapse and cannibalism in layers using claw abrasives under Australian conditions.

Visit free range turkey, layer and broiler farms and aviary production systems

Major Achievements

Phil Glatz met with European colleagues and discussed issues associated with beak trimming, free range production systems, declawing of ratites and use of claw abrasives.

European colleagues agree abrasive paint is an effective claw abrasive and will undertake trials with the abrasive paint which was successfully used as a claw abrasive in Roseworthy trials. The use of abrasive paint however did cause an increase in prolapse and mortality in one trial under Australian conditions. The Europeans researchers suggested this occurred because of the lack of nest boxes in Australian cages.

Feather pecking and cannibalism is a huge problem in alternative systems in Europe and adoption of appropriate beak trimming techniques is desirable. Current methods and levels of beak trimming being practiced in the EU only offer a short-term solution for the prevention of cannibalism. Many layers in Europe therefore are subject to the dual stress of beak trimming and subsequent cannibalism. Deans Foods, UK, showed interest in adopting the beak trimming accreditation program being developed in Australia. It was considered that developing accreditation programs for declawing of ratites should also be considered.

Integrating poultry into farm cropping/pasture program was thought to be a useful approach to enhancing free range production systems. European researchers are designing alternative layouts for free range systems and inclusion into a farm cropping program offers a wider variety of options to overcome the poor use of free range by birds and persistent pecking problems.

The European view on viability of furnished cages is mixed as mortality and egg quality problems persist. Some countries offer subsidies for housing of birds in alternative systems. Farmers are still able to make a profit from these enterprises despite considerable cannibalism, feather pecking, and poor egg quality and health issues. There is a mixed view on the best alternative system, some researchers in Europe prefer aviaries, and others furnished cages. In general European

researchers consider a furnished cage is “still a cage” whether it has furnished options included in it or not.

ISSUES AT THE CONFERENCE

The conference focused on housing systems for layers, welfare aspects of chicken meat production, feeding aspects and poultry welfare, feather pecking and cannibalism.

FURNISHED CAGE WORKSHOP

There are a number of European countries promoting the use of the furnished cage as it enables the bird to undertake a wider repertoire of behaviours while retaining the production and health advantages of conventional cages.

Preliminary results from Gleadthorpe suggest performance in furnished cages (with nest box, dust box, perch and up to 10 birds/cage) is equivalent to conventional cages. There appears to be no effect of cage height (38 vs 45 cm) or stocking rate (609 – 870 cm^2) on body weight, egg weight or egg production. Birds with more space had poorer feather cover while there was slightly greater foot damage for birds housed at higher stocking density.

In the Netherlands work is being conducted on large furnished cages (20 hens or more) and making comparisons with small group cages. There is a perception a large cage (holding 20-50 hens) looks “less like a cage” than current furnished cages holding up to 10 birds. However the point was also made a cage is “still a cage” whether it is big or small. Because beak trimming is forbidden in the Netherlands, bird mortality is high in large furnished cages, toe pecking is prevalent especially in white strains and egg quality (dirty, hairline cracks) needs substantial improvement. Work needs to be undertaken on providing suitable baffles and appropriate abrasives in these cages to ensure effective claw shortening.

In Sweden there is a compulsory evaluation program for commercial systems in animal production; in particular for small-furnished cages. The 8 hen Victorrson cage has been accepted for full commercial use. A high % of cracked and dirty eggs remains a problem and the occasional poor results from these systems due to cannibalism is tolerated. Further work is required on the design of the perch and the nest box size.

EU requirement for all new cages installed by 2003 to be furnished may need to be reconsidered.

ORGANIC FARMING WORKSHOP

There is an increasing demand for organic products and the number of organic farms are increasing rapidly in Europe.

France has 4.6 million birds, Denmark 700,000; UK 400,000 and the Netherlands 100,000 on organic farms.

The major problem associated with organic poultry farming is feather picking and cannibalism (12-30%), bird health, environmental impacts and high cost of labour (1 labour unit/8000 birds).
The success of the organic system is dependent on the layout of the poultry house and free-range design, suitable strains of birds and ensuring correct management procedures. Work is underway in Germany developing a strain suitable for use in organic farming. Current strains are not suitable.
Integrating poultry into farm cropping/pasture program was considered a useful approach to enhancing free range production systems. European researchers are designing alternative layouts for free range systems and inclusion into a farm cropping program offers a wider variety of options to overcome the poor use of free range by birds and persistent pecking problems.

AVIARIES/FREE RANGE FARMS IN SWITZERLAND

In 1991 Switzerland banned the conventional cage and provided incentive payments for farmers to engage in aviary farming. The advantages of the aviary system compared to furnished cage are the rest areas for birds away from the feeders and drinkers reducing disturbance and conflict. Switzerland banned the early models of the furnished cage in 1998.
Initial problems in aviaries with coccidiosis have been overcome with use of the vaccine.
In 1998, 28% of stock were infected with worms but this has been reduced to 5%.
Cannibalism remains a problem and beak tipping (removal of tip of beak only) is used. (It is highly unlikely beak tipping will offer a solution to reducing the high levels of cannibalism being reported in aviaries and other alternative systems where light intensity cannot be controlled).
A visit to aviaries on the farm tour showed up the main problems with aviary systems; i.e. dusty environment in the house, soiled birds, feather pecking (particularly around the neck), toe pecking and foot lesions and a significant number of hens which would normally be culls hens. In aviaries it is difficult for the stockperson to catch and inspect birds.
Use of the range areas by birds at the time of the visit was low. A significant number of hens were probably in the nesting/laying phase at the time of the visit. On the other hand, a visit to another farm showed a low body weight strain of free range broilers was making very good use of the free range. Likewise free range turkey growers on another property were making good use of the range area.
Bird mobility, age, stage of production and outdoor design all contribute to differences in the use of the range.

ON FARM HOUSING ASSESSMENT

Indexes are being used in Europe to assess housing conditions and bird welfare to meet legal regulations for product labelling.
One on-farm welfare housing assessment presented at the conference provided high scores for optimum density, ability of birds to access feed, water, perches, nests, outdoor runs, litter scratching areas and plumage condition. Surprisingly lower scores were given for bird health and air quality.
Scoring of farms took about ¾ hour, is 80% reliable and operators must be trained.

VOCALISATION IN POULTRY

The gakel call is a non invasive measure of frustration in birds. The gakel call could be used as a scale of determining frustration in birds, but there is a difference in researchers opinions on the types of calls and their meaning.
Birds show a large variation in gakel calls from soft to very loud and the number of gakel calls increases with food and water deprivation.
High pitch tones are interpreted as friendly tones to other birds, while low pitched tones are for enemies.
Bird vocalisation should not be overlooked as one of the measures to determine welfare.

MAJOR ISSUES FOR THE BROILER INDUSTRY IN EUROPE

The main topics under review in the broiler industry in Europe are leg weakness, stocking density, light, feeder and drinker space, environment, litter quality and inspection frequency.
In Europe mortality from leg problems is 2%-4%. Leg disorders range from 10-30%
The increase in broiler body weight has resulted in a reduction in activity of birds from 12% to 4%.
Detrimental alterations in muscle characteristics in modern broilers is resulting in the blood supply not being able to meet demand for muscle cell growth.
Welfare groups are placing increased pressure on the broiler industry, although there is a current debate on whether a higher stocking density could be used when there is better climate control in broiler sheds.
RSPCA are recommending 30 kgs/m^2 . Birds spend less time in deep panting at the lower stocking densities and thermal comfort improves for the birds if density is less that 34 kg/m^2.
Male birds walk faster than females although frustration can increase walking speed. Males also vocalise more than females and are more motivated.
The difference in vocalisation recorded suggests that motivational consequence of reduced food.
Research is examining whether additional areas for exercises for broilers e.g. treadmill can improve bone density.
Alternative light schedules, increasing the distance between drinkers and feeders and providing sand trays are other items being used to encourage birds to exercise

more but there have been few changes noticed in locomotion activities or in production performance.
An apparatus with a ramp, perch, dust bath and rest area is being tested in the US to improve locomotion. Gait score of broilers has improved. Lame birds spend less time on the apparatus and tend to perch at the lowest level on the apparatus.
Studies continue on restricted feeding of broiler breeders and physiological responses and sequential feeding of broiler growers to improve activity.

WELFARE CAMPAIGNS

Welfare groups are concerned about leg problems in broilers and will mount an international campaign in 2002 to highlight the issue. Industry in Australia must be prepared and have a response and R&D strategy in place to resolve the key issues of concern under Australian conditions, particularly leg weakness and stocking density.
The Humane Society in America have employed Mike Appleby (prominent UK welfare researcher) who is likely to be very effective in convincing the American Society of the need to improve the welfare of animals and follow the lead of Europe.

ODOURS

Odours and pheromones control social behaviour in chickens.
Free range birds have a fear of novelty and familiar odours may reduce this fear.
Familiar odours are reassurring.
Placement of used litter or other familiar odours from shelters into free range paddocks may be one strategy to encourage greater use of the range by birds.

FEATHER PECKING AND CANNIBALISM

Feather pecking and cannibalism remains a significant problem for poultry (including quail) in alternative systems in Europe.
Despite years of research little progress has been made on resolving the issue.
Cannibalism cannot be explained by feeding efficiency or coping ability.
Heritability of feather pecking ranges from 0.15 – 0.32. Brown layers are more prone to engaging in pecking. Low feather pecking lines have been developed in the USA.
Transgenic technology probably offers the quickest solution to reducing pecking problems in poultry.
Research techniques using novel object tests are not suitable for predicting feather pecking.
In some lines genetic variation in behaviour is quite low.

BEAK TRIMMING/DECLAWING

The attitude from a number of researchers in Europe toward using beak trimming as a method to reduce mortality remains negative. Outbreaks of feather pecking and cannibalism and subsequent mortality are tolerated.
Recent studies on beak trimming conducted in Australia and in the UK have not been considered by researchers in developing current opinions .
Likewise little notice has been taken by European researchers on the work undertaken on declawing in ratites. Some researchers were concerned more emphasis was being placed on product quality rather than bird welfare.
Beak trimming and declawing reports on RIRDC website and recent papers have been sent to researchers in the UK, Netherlands and Switzerland. Comments received back have indicated the reports were most informative.
The severity of beak trimming currently being used in Europe (1/3rd upper beak or beak tipping) is not effective over the long term in reducing feather pecking and cannibalism. The beak regrows and most flocks will recommence feather pecking. Birds which have access to litter or free range will naturally wear down their beak by 18 weeks and beak appearance will be similar at housing whether the beak has trimmed or not.
Accrediting trimmers was viewed by researchers as a positive step toward improving the practice of beak trimming. Deans Foods expressed an interest in implementing the accreditation program. Contact will be made with the company when the program has been approved in Australia.

SURVEY WORK

Survey work in the UK on alternative systems has shown increases in feather picking is related to poor use of the range, poor litter condition and frequent changes of diet. The use of bell drinkers increases the risk of feather pecking by 11 times.
More than 2% of the birds have damage from feather pecking and it is critical to improve the use of the free range because it lowers zone stocking density and increases foraging behaviour.
Survey work proposed in Australia on production systems would be a useful adjunct to the UK work.

BENEFITS AND SIGNIFICANCE OF TRAVEL TO GRANTEE

Phil Glatz was able to meet with European colleagues and discuss issues associated with beak trimming, free range production systems, declawing of ratites and cage abrasives. This has provided him with numerous ideas which could be tested in Australia.
European colleagues brought Phil Glatz up to date with the latest studies being undertaken on claw abrasives in cages. It was clear the results obtained in Australia with abrasive paint has encouraged some of the European researchers to trial the

paint under their research conditions. This confirms why it is important in Australia to rigorously test European recommendation before adoption.

Australia is leading the world in accrediting beak trimmers. Phil Glatz provided numerous researchers in the Europe the RIRDC website giving the latest information on beak trimming. Interest was shown by Deans Foods, UK in adopting the beak trimming accreditation program being developed in Australia.

Integrating poultry into farm cropping/pasture program was considered a useful approach to enhancing free range production systems. European researchers are designing alternative layouts for free range systems which give a wider variety of options to overcome the poor use of free range by birds in organic and free range systems.

There is a mixed view on viability of furnished cages in Europe. Testing of the systems in Australia is essential. Aviaries are considered by some to be the best production system but many problems still need to be resolved.

BENEFITS TO RURAL INDUSTRY

The process being undertaken in Australia to accredit beak trimmers was supported by European researchers and will give the practice more creditability.

Feather pecking and cannibalism in alternative systems is Europe is a problem which is being tolerated. Research is being undertaken to reduce feather pecking but the issue has not been resolved. The community needs to be more involved in making judgments on whether non trimmed birds, which suffer from cannibalism is preferable to birds subject to beak trimming.

There is considerable difference in opinion in Europe on whether furnished cages are a long term solution to the housing of birds. Aviaries offer an option but Industry in Australia need to carefully assess whether such systems will be suitable. A comprehensive welfare appraisal of birds in these systems compared to current systems is required.

Considerable potential exists to improve the use of the free range by birds using alternative layouts in the shelter to reduce congestion around feeders, drinkers, perches, nest boxes and other rest areas. The use of familiar odours to encourage birds out onto the range and incorporation of shelter belts and dust bathing areas should be examined.

RECOMMENDATIONS TO RIRDC AND INDUSTRY

Results of RIRDC funded research on bird welfare in Australia should be circulated to key welfare scientists in Europe as soon as the final report is approved. Consideration needs to be given by the Europeans to alternative philosophies on welfare appraisal and the reasons for differences in results obtained under Australian conditions (eg. claw abrasives, solid sides). Regular updates on European findings should be disseminated and discussed within Industry. This could achieved through a discussion group over the internet.

European housing recommendations need to be fully tested under Australian conditions, before introduction. A comprehensive welfare evaluation of birds in these systems needs to be conducted

Alternative methods to improve the use of the range by birds should be investigated. These include shelter belts, dust bathing areas and redesigning placement of feeders, drinkers and rest areas to reduce disruption to bird traffic flow. These studies would benefit free range farmers including organic farmers and ratite farmers.

RIRDC should actively promote the beak trim accreditation process to the EU. Most Europeans researchers have little experience with beak trimming or have not kept up to date with the literature.

The Chicken Meat Industry needs to be aware of a welfare campaign to be launched in 2002 criticising, in particular, leg weakness and stocking density. Other issues that need to be addressed include light, feeder and drinker space, environment, litter quality and inspection frequency.

DISSEMINATION OF REPORT

Circulate to RIRDC egg, chicken meat, new animal products and resilient farming systems.

ACKNOWLEDGEMENT

The author of this report is very grateful for the funds provided by RIRDC to undertake this travel.

PUBLICATIONS

Barnett, J.L., Glatz, P.C. and Almond, A: (2001). A welfare audit for the broiler industry. *Proceedings of the 6th European Symposium on Poultry Welfare, Zollikofen, pp 272-274*

Glatz, P.C. (2001). Effect of declawing ostriches on behaviour of ostrich chicks. *Proceedings of the 6th European Symposium on Poultry Welfare, Zollikofen, pp 302-304*

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COPIES OF PUBLICATIONS

Barnett, J.L., Glatz, P.C. and Almond, A: (2001). The development of a comprehensive welfare audit for the Australian Chicken Meat Industry and its evaluation. *Proceedings of the 6th European Symposium on Poultry Welfare, Zollikofen, pp 272-274*

THE DEVELOPMENT OF A COMPREHENSIVE WELFARE AUDIT FOR THE AUSTRALIAN CHICKEN MEAT INDUSTRY AND ITS EVALUATION

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Introduction

Quality Assurance (QA) programmes within the animal industries in Australia predominantly focus on food safety and biosecurity. While the chicken meat industry in Australia has not been a major target of animal welfare groups, the industry nevertheless considered that there was a need, coinciding with a more informed and demanding customer base, to expand their quality assurance to include animal welfare issues. Thus, the industry has been a proactive partner in preparing the audit documentation in this project. Chicken meat companies already provide information on animal welfare and growers/unit managers already largely implement this information. One purpose of audit documentation is to provide some certainty for all staff involved, so that they, the company, consulting veterinarians, the public and any internal or external auditors are asking the same questions. This project has put together all the welfare information from the literature and experts in Australia to provide the first comprehensive welfare audit, based on agreed questions, for an animal industry. This paper also describes a small evaluation trial of part of the documentation.

Materials and Methods

The documents were developed over 2 years by a Management Group comprising representatives of industry, animal welfare groups, and teaching and research organizations. Documentation has been prepared in separate booklets for the hatchery, broiler, breeder rearer, breeder layer and pick-up, transport and processing sectors of the chicken meat industry. To ensure ownership of the project there were terms of reference that had clear objectives and a dispute resolution procedure, regular meetings with minutes and documented actions, provision of updated documentation, ample opportunity for input by members both at meetings and outside of the meetings, inputs from relevant colleagues and organised visits by welfare group representatives to see all aspects of production and processing. It was not the purpose of the audit either to require change to current industry practice or to resolve controversial issues, rather it was to identify and encourage best practice for each sector of the industry.

To evaluate part of the broiler documentation, 24 broiler farms contracted to one company were used. The company provided production data and the farms were ranked according to their Performance Indicator Factor (PIF). PIF = [(weight(kg)/age(days)/FCR{kg feed/kg liveweight})*Live % {birds alive at the end of grow out/birds housed}]*100). The farms were ranked from 1 (best) through to 24 (worst) and from this ranking, farms with similar production performance for the previous 3 batches of birds were paired and randomly allocated to either the treatment group or the control group. The 12 treatment farms received the audit document and were asked to complete the recording sheets. The 12 control farms did not receive a copy of the audit document and were asked to continue recording what they normally would have done such as mortalities, culls, feed supplied and body weight.

Growers participated in the study for 3 batches of birds. The treatment farm participants were asked to complete the recording sheets for all three batches. At the end of the third batch, the audit was conducted for the period from 2-5 weeks of age; this time period was chosen to avoid variation due to pick-up schedules. Each grower would have received three visits throughout the duration of the three batches in addition to the initial visit where the study was explained and they were asked to sign a consent form. The audit involved asking the growers a sub-set of 31 audit questions from the documentation (Barnett et al., 2001) that referred to farm activities from weeks 2-5 of production. Questions 1–24 related to routine husbandry procedures, equipment and housing and

questions 25-31 related to staff issues. Data were obtained for 2 sheds at each farm and the results were averaged for the farm. Each audit question was recorded as either a 'yes' or 'no' (or not applicable) on the basis of the recorded evidence that the grower was able to provide via a record sheet (eg the batch card) or a diary entry.
The proportion of farms complying with an audit question was analysed using the Chi-square test and the production data were analysed for treatment effects by analysis of co-variance using the data from the previous 3 batches of birds as the co-variate.

Results
Each booklet is comprised of audit questions, background information on the purpose of the questions and how the questions/practices relate to welfare and the Codes of Practice for welfare for the poultry industry (Standing Committee on Agriculture and Resource Management, 1995; 1998). Examples of recording sheets are also included to help demonstrate compliance with the audit process. The audit questions include both critical questions, which are defined as those where "if something goes wrong the welfare of the birds is irrevocably damaged" and good practice questions which reflect the current state of knowledge and its practical implementation in the industry. Compliance can be at the level of the Code of Practice or at a higher standard that has targets higher than those in the Code of Practice.
The on-farm evaluation showed a number of differences ($P<0.001$) between the treatment and control farms based on improved record keeping by the treatment farmers. There were 6 questions for which the control farms were unable to provide evidence of their actions. At the control farms there were no diary entries or records to confirm the frequency of checking birds or water pressure. At the control farms, culls were not recorded, despite the company batch card requiring culls and mortalities be recorded separately. Instead the growers recorded them all under the category of total mortalities. Similarly, there was no written evidence that the control farms were regularly adjusting feeders and drinkers to the correct height or checking water availability at the drinkers each day, although this was visually evident on the day of the audit.
Analysis of co-variance showed a lower mortality (1.37 vs. 1.74 %; $P < 0.01$) in the first week after placement.

Discussion
The audit documentation has several aims. Most importantly, that of demonstrating high standards of animal welfare by providing documented evidence of quality animal care and by identifying and monitoring equipment, animal problems and human resource issues. Introduction of a welfare audit can result in positive production effects and welfare benefits. There was a significant reduction in mortality in the first week after placement at the treatment farms. While there was no effect on overall mortality, this variable was lower in the treatment farms (5.05 vs. 5.35 %). It is interesting to speculate that the closer attention to detail required by the audit procedure may have been in part responsible for this lower mortality in the first week. For example, it is possible that both more regular checking of birds and adjustment of feeder and drinker height contributed to the reduced mortality.
Other aims include improved awareness by industry personnel of the interactions between production and welfare, a recognition that welfare must be continually improved. Other more intangible benefits include a training aid focussing on welfare and improvements in stockperson characteristics such as job satisfaction by taking a professional approach to the job. A number of lessons have been learned or their importance reinforced during the period of development of the industry package. These include, the need for the Management Group to include wide industry representation, the involvement of non-industry stakeholders such as credible animal welfare groups, terms of reference, a confidentiality agreement for participants, a national rather than a regional focus and ensuring industry ownership and feedback which is considered an essential part of the process. Finally the whole process cannot be rushed as the stakeholders have to learn a degree of trust and this takes time. The challenge remains to implement the welfare audit in industry.

Acknowledgements
Funds were provided by the Department of Natural Resources and Environment, the Rural Research and Development Corporation and the other participating organisations. We acknowledge the significant contributions by the representatives of commercial companies and welfare groups who participated in the Management Group and the growers who participated in the evaluation experiment.

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EFFECT OF CLAW ABRASIVES ON MORTALITY IN CAGED LAYERS UNDER AUSTRALIAN HOUSING CONDITIONS

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Introduction

One of the criticisms of keeping birds in cages is the excessive length that claws can reach by the end of the laying period. This has been recognised in the European Union with a recommendation that cages be fitted with suitable claw shortening devices. When birds are placed in layers cages at 18-20 weeks the middle claw length of current strains of birds reared on the floor are about 18 mm and by end of lay in cages can measure more than 30 mm. During the laying period the claws of birds can cause abrasions on other birds especially during periods of disturbance. During some of these disturbances birds attempt to escape from the cage and can cause considerable injuries to other birds and to themselves. It is not uncommon for the claw of a bird to get caught on its own wing. Furthermore, even fairly short claws will still get sharp and may also be a potential source of injury to other birds (Hill, 1975 and Ruszler and Quisenberry, 1979). A low-cost, non-invasive method by which the claws of caged layers could be kept short and blunt can be achieved by fitting 8-mm strips of abrasive tape on the egg guard. Bird's claws scrape against this tape while they are feeding. This reduces the effectiveness of the claws in causing injury and feather loss and reduces the risk of birds trapping their claws in the cage. Tauson (1996) suggested that in addition to abrasive strips a mixture of paint and sand might also be an effective abrasive when coated onto the egg guard. Very fine sand is mixed in paint and the thick mixture is applied in a band on the egg baffle. Swedish egg producers have found that abrasive paint is effective as a claw shortener. This trial was conducted to determine the effect of abrasive strips and abrasive paint in layers cages on claw length and claw sharpness, foot condition, feather cover and mortality of hens.

Materials and Methods

A total of 960 laying hens (Hyline Gold) were housed 5 per cage in 192 Harrison 'Welfare' back-to-back, single tier cages (each 500 mm wide by 545 deep; 545 cm^2/bird) in a fan ventilated insulated laying shed with louvred windows. There were three treatments comprising; i) control cages without abrasives, ii) treatment cages with two 8-mm wide abrasive strips (3M-Safety Walk, General Purpose Black) fitted to egg guard, and iii) treatment cages with an abrasive paint (Galaxy Abrasives G4450 Poultry Paint) applied in one 5-cm strip to the egg guard. A randomised design was used for allocation of treatments with 32 replicates per treatment. A single replicate comprised 10 birds in two adjacent cages. At 60 weeks of age birds middle claws were assessed on both feet for claw sharpness (1-4 point scale) and middle claw length of both feet were measured. Mortality was recorded daily and deaths as a result of prolapse and cannibalism were noted as they occurred over the period 20-60 weeks. The experiment was analysed using the General Linear Models procedure (using Base-SAS ® software, 1988).

Results

The birds using the abrasive paint had the lowest claw length and claw sharpness . Mortality from prolapse and cannibalism was significantly higher ($P<0.05$) for birds using the abrasive strips and abrasive paint (Table). Overall mortality approached significance at $P=0.10$ in the birds using the abrasive strips and abrasive paint.

Table 1. Claw length and claw sharpness (1, blunt; 4, sharp) at 60 weeks, total mortality and deaths from prolapse and cannibalism.

Treatment	Claw length (mm)	Claw sharpness	Total mortality %	Prolapse+cannibalism %
Control	31.7a	3.6a	4.7	1.6a
Strip	23.7b	2.2b	10.9	5.9b
Paint	13.8c	1.1c	9.4	6.3b
l.s.d.(P=0.05)	1.0	0.2	ns	4.2

ns=not significant in analyses of variance

Discussion

The abrasive paint used in the current studies was far more effective as a claw shortener probably because the area of abrasive paint provided was far greater than provided by the abrasive strips. Applying the paint in similar strips as the tape might enable the bird to chip the paint off more easily. The reduction in claw length achieved with the abrasive paint, however, was the same reduction achieved by the abrasive strips in the European work. It was much easier and it took less time to apply the paint to the egg guard compared to sticking the abrasive strips to the egg guard. There was more time involved in cutting the 3 strips from the 25-mm roll, then cutting these strips into appropriate lengths, removing the backing of the tape (which can be a time consuming exercise) and then sticking the tape onto the egg guard. It was simpler and quicker to apply the pre-prepared paint and sand mixture onto the egg guard with a spatula. Later on when the abrasive paint wears off it would also take less time to apply a second coat of paint compared to scraping the used abrasive tapes from the egg guard and sticking on the new tape. The key finding in this trial was that abrasive paint was more effective in achieving a reduction in claw length than strips and is recommended for use where farmers are confident abrasives in the cage are not going to result in an increase in mortality (see below).One of the reasons for reducing claw length with claw shorteners was to reduce mortality by minimising abrasions caused by the claws. Surprisingly hen mortality from prolapse and cannibalism was significantly higher in cages fitted with abrasives. There are no other reports in the literature showing an increase in prolapse and cannibalism from hens using abrasives. It is speculated that when birds are frightened or competing for a position at the feed trough they might abrade their vent region on the paint or the strips region encouraging vent pecking. The results of this trial question whether claw shorteners should be installed in layer cages under Australian conditions. If abrasives in cages are responsible for the increase in cannibalism observed in this trial then their use cannot be recommended until further work is undertaken to verify the findings. A further trial is currently being conducted to verify the above findings.

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EFFECT OF DECLAWING ON BEHAVIOUR OF OSTRICH CHICKS

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Introduction

Declawing is a husbandry practice that is commonly practiced in the emu industry to reduce damage to the skin during aggressive behaviours and reduce injuries to handlers. There are not only financial benefits of declawing with improved skin quality but also improved occupational health and safety of workers and reduction in injuries to birds (Glatz, 2001). Recently in Australia there has been an increase in the demand and returns being received for ostrich skins. Currently producers are receiving $225Afor an A-grade skin. While this is a positive outlook for the Industry two-thirds of skins do not achieve the A grade standard because of pinhole defects and also the presence of small scars. These could be caused by fence trauma, barbed wire, thornbushes, sticks or branches and possibly by the claws of ostrich chicks when they clamour over each other when being released from the brooding area in the morning. Alternatively they could occur during other chick interactions while engaged in feeding, drinking and other behavioural activities. The incidence of scars could be reduced substantially by ensuring the birds are properly managed throughout the production cycle. Factors such as stocking rates, feeding and drinking space, type of fencing, yarding, transport, lairage, handling and skinning all contribute to skin quality. To minimise the incidence of scars that may result from claw injuries during the chick stage it has been suggested declawing be introduced. Partial amputation of the two toes of ostriches has welfare implications. It may cause the ostriches chronic pain and to become flatfooted and change their gait. On the other hand the change in gait may reduce their ability to deliver effective kicks to humans and other ostriches during aggressive encounters. In the chick stage, declawing may reduce the incidence of clawing and skin damage to other chicks. Studies with adult emus indicated that declawing did not compromise locomotory ability of emus and had the benefit of improving the social structure in the groups by reducing stereotype behaviour and aggression (Glatz, 2001). The following studies were undertaken to determine the effect of declawing on ostrich chick behaviour over a 12h period on the day of the operation.

Materials and Methods

The study was undertaken at Hazelwood Ostriches, a commercial ostrich farm in Victoria, Australia during November 2000. Ten ostrich chicks were declawed on the day of hatch by removing the distal phalangeal joint using a Lyon beak-trimming machine (Glatz, 2001). Another group of ostriches was not declawed. Behaviour of ostrich chicks was recorded on videotape in brooder boxes for 12h from 8 pm-8 am after declawing. An infra red heat lamp over the brooder boxes (l x b x w = 1.5 x 0.75 x 0.4 m) maintained temperature for birds at 28-30^{0}C. Each bird was monitored for bouts of walking, sitting, standing, stepping on other birds, being stepped on by other birds, eating, drinking, self preening, preening other birds and incidence of pecking at the environment, pecking other birds, being pecked by other birds, kantelling and threatening other birds. A bout was recorded when the ostrich chick sustained the activity for 5 seconds or more. Base SAS software (SAS Institute, 1988) using the General Linear Models procedure was used to determine the significance of the declawing on ostrich chick behaviour.

Results

There was no significant differences between control and declawed chicks in bouts of walking, eating, drinking, preening, preening others or incidences of being pecked or pecking at other birds. There was a non-significant trend (table 1) for control chicks to engage in more ($P=0.11$) stepping on other birds and being stepped on by other birds ($P=0.08$) compared to declawed chicks. Control chicken engaged in a significantly higher ($P<0.05$) bouts of sitting, standing and incidences of pecking at the environment, kantelling and threatening behaviour.

Table 1. Effect of declawing on ostrich behaviour averaged over 1h intervals from 2000h-0800h on the day of the operation

Variable	Sit (bouts)	Stand (bouts)	Step on	Stepped on	Peck environment	Kantelling	Threats
Control	68.7a	69.1a	6.6a	6.4a	23.6a	7.3a	15.2a
Declaw	57.5b	57.8b	4.7a	4.0a	13.7b	2.8b	3.5b
LSD (P=0.05)	8.9	9.1	2.4 (P=0.11)	2.7 (P=0.08)	6.6	2.5	5.8

Discussion

The evidence from this preliminary study would indicate that declawed ostrich chicks are less active than control ostriches. While declawed chicks engaged in fewer bouts of standing indicating they may have been suffering pain from the operation, it might have been expected that there would have been an increase in the number of sitting bouts. Time spent sitting and standing was not measured. It could be speculated however that declawed chicks spent longer periods both sitting and standing based on the reduction in other activities such as pecking at the environment, kantelling and giving threats. Further behaviour data on declawed ostriches is being obtained at 2 weeks of age and at 12 months of age to provide an indication of whether ostriches do suffer chronic pain. There was a trend for the control ostrich chicks to engage in more bouts of stepping on and being stepped on by other birds compared to the declawed chicks. This may have implications for skin quality and partly explain the high incidence of chick scar damage observed on tanned hides in the Australian Ostrich Industry. The reduction in threats given by the declawed chicks provides evidence that declawing reduces aggressive behaviour in ostriches, which might persist throughout the life of the bird, reducing harmful bird to bird interactions which could be beneficial to hide quality. Further studies are required to determine the long-term consequences of declawing on ostrich behaviour. The behavioural evidence in this preliminary study would indicate declawing modifies ostrich behaviour and perhaps reduces the potential for skin damage in ostriches by reducing behaviours that might affect skin quality.

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ECO SHELTER HOUSING OF FREE RANGE POULTRY INTEGRATED INTO A PASTURE/CROP ROTATION SYSTEM IN THE WHEAT BELT OF AUSTRALIA

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Introduction

In Australia there is a great threat from the spread of weeds and diseases and a reduction in soil fertility in cropping areas, costing the grain industry over $1.5 billion per year. To control weeds, pest and diseases and improve soil fertility, farmers are using chemicals heavily, resulting in the resistance of weeds, pests and diseases, and the chemical contamination of farm products which is a genuine concern for consumers. The industry needs a clean green cost-effective weed, pest and disease control program to improve farming profitability to meet the developing markets for chemical free produce. The incorporation of free range poultry into a cropping system will be expected to assist in weed, pest and disease control in the crop phase, stabilise income (multiple enterprises); reduce chemical input; improve soil fertility and crop yield and change consumer perceptions. Consumers are demanding products from poultry in free-range production systems. Free range is given the highest rating by consumers as a production system. Under natural conditions in free-range the bird's diet comprises seeds, herbage and invertebrates and should achieve reductions in insects and weed seeds. Free-range egg production is an emerging niche market in Australia. Incorporation of free-range poultry into a cropping system housing birds in eco shelters will have considerable public appeal as it will allow the birds to express their natural behaviours both in the shelter and in the large paddocks where there are a wide variety of food resources for the bird to forage. The objective of this paper is to provide the production performance and adaptation of the birds to the system.

Materials and Methods

Medic pastures were established in a 4 hectare paddock in late April 2000. An eco shelter was constructed in the centre of the paddock and was made up of light steel framework covered by a high ultra violet protective shade cloth. Curtains were included on the 4 sides of the shelter to enable manual manipulation of the ventilation. The 4 hectare paddock was divided into 8 smaller paddocks; four plots grazed by poultry and the other four by sheep to provide the comparison with traditional agriculture. Pasture production, foraging behaviour by poultry and sheep, soil fertility and structure, weed population and the production of poultry and sheep are currently being monitored during the season. The feasibility of applying this sustainable system on a niche scale in the wheat belt will be evaluated. Birds were provided nest boxes, perches, feeders and drinkers in the shelter. No artificial light was provided. Birds were fed 110g/b/day of a standard layer ration and were provided access to the paddocks from 0800h-1700h daily. Data reported in this paper relates to the production performance of beak trimmed birds over the period 18-40 weeks of age in the first year of the trial and general observations on birds in the environment.

Results

The production performance of layers (Hyline Brown) in the free range system was compared with the production specifications published by the Hyline company for the strain housed under cage systems. The free range birds showed a higher level of mortality (mainly from culling of bullied birds) and lower rates of lay, egg weight and body weight over the period 18-40 weeks (Table 1).

Table 1. Production performance of free range birds compared to strain specifications over 18-40 weeks

Treatment	Mortality and Culls (%)	Rate of Lay (%) (22 weeks)	Rate of Lay (%) (30 weeks)	Rate of Lay (%) (40 weeks)	Egg Weight (g) (40 weeks)	Body Weight (kg) (40 weeks)
Free Range	9.1	72	89	79	57.2	1.93
Standard	1.2	75	94	93	63.9	2.17

Discussion

During the summer of 2000/2001, South Australia experienced its hottest summer in a century. Maximum temperature recorded in the shelter was 47^0C. Overall, there were 17 days when the temperature exceeded 37^0C in the shelter. The shelter was sited on a small hill in the paddock and there was always a breeze that ventilated the birds in the shelter. During the hot weather hens remained within the shelter or within the immediate surrounds and were able to keep cool by dust bathing in the litter or in the soil, where water had been sprayed. The reduction in performance of birds relative to the benchmark was expected considering the heat wave conditions experienced and the reduction in the natural daylight hours after the summer solstice. However, the production performance by free-range birds in this study are similar to the data reported by Barnett (1999) on the experience with free range egg production in Europe.

Birds were very active in the paddock during overcast conditions and also when light drizzly rain was falling. It was apparent that birds were attracted to the insects which were more active during this period. Birds foraged mainly within 30-40 m of the shelter but would also forage further out into the paddock especially when attendants were present. As the birds moved further out into the paddock they tended to leave clumps of pasture. Level of floor laying were less than 1% of egg production, but dirty (20%) and broken eggs were initially a problem, which was overcome by collecting eggs twice daily. Birds favoured nest boxes lowest to the ground. Egg weight and body weight were lower than the benchmark but this was expected given that birds were very active in the free range environment. There were a number of birds low on the pecking order which were bullied by other birds. In most cases these birds had to be culled from the flock. Birds were contained in the shelter overnight and there were no bird losses from foxes, despite a large population of foxes in the region. Work is continuing on the agronomic aspects of the project.

Acknowledgements

We acknowledge the financial support for the project by the Resilient Farming System Program of the Rural Industries Research and Development Corporation and the support of staff from the Pig and Poultry Production Institute.

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DEVELOPING AN ACCREDITATION SYSTEM FOR BEAK TRIMMING IN AUSTRALIA

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Introduction

In April 2001, the Egg Program of the Rural Industries Research and Development Corporation (RIRDC) in Australia provided funds for a project to develop accreditation and training manuals for beak trimmers. The impetus was a recommendation by State and Territory Agriculture Ministers that beak trimmers in Australia be accredited. Beak trimming has considerable welfare problems and in Sweden the procedure is banned. In the Australian Egg Industry, however, where light intensity within many poultry sheds cannot be controlled, beak trimming is regarded as an essential practice to control cannibalism, bullying, and feather and vent pecking (Glatz, 2000). The outcome of the beak trimming accreditation project is Quality Assurance (QA) and training documentation for use in the Australian Egg Industry to support the industry's commitment to maintaining high standards of beak trimming. The documentation covers biosecurity, equipment set up, equipment maintenance, catching birds, holding birds, cutting and retrimming beak, handling after trimming, quality of trimming, beak trimming assessment and occupational, health, safety and welfare. Development by the Egg Industry of documentation that recommends best practice procedures and training courses to accredit beak trimmers will raise the beak trimming standards in Industry and help to improve the profitability of egg farming. Documentation to improve beak trimming covers critical and best practice procedures in all aspects of the beak trimming process. Utilisation of the QA documentation and training manuals will give confidence to operators when undertaking beak trimming and result in improved standards of beak trimming.

Management Committee

A beak trimming management committee comprising researchers, RIRDC, beak trimmers, egg producers and welfare groups is involved in developing the beak trimming audit documentation. The approach used in this beak trimming audit was modelled on a RIRDC project on a chicken meat industry welfare audit (Barnett et al., 2001). The role of the management group is to develop audit questions relating to all aspects of beak trimming that can be completed by a yes/no answer and the required record keeping and oversee the production of training materials. The project is utilising the seven principles of the 'HACCP-based quality assurance systems approach in that it is, i) identifying potential risks that contribute to poor beak trimming ii) identifying the critical risks iii) establishing appropriate targets for the risk area iv) establishing a monitoring system v) establishing contingencies to be used in association with deviations observed during monitoring vi) establishing a verification program and vii) developing documentation that accurately depicts risk, critical limits and corrective action.

HACCP Protocol

The documentation will be set out as follows for each aspect of the beak trimming process using the HACCP protocol:

1. Audit questions and implications relating to each part of the beak trimming process that can be completed by a yes/no answer. Critical issues are identified and defined as processes in the beak trimming protocol that if they go wrong will cause permanent damage to the beak resulting in poor bird health, production and welfare.
2. Record keeping checklists.
3. List of targets to be achieved.
4. Score sheets for auditors to monitor, evaluate and verify beak trim standards.
5. Fact sheets that provide more detail on the questions and the implications.
6. Training manuals for use in accrediting beak trimmers.

Major issues and objectives associated with beak trimming addressed in the accreditation documentation

Each stage of the beak trimming process, commencing with the responsibilities of the beak trimmer concerning biosecurity through to an assessment of the quality of the beak trimming operation will be addressed with the following specific objectives;

Biosecurity
1. Prevent the introduction and spread of infectious agents to a flock.
2. Implement routine high standard operational and personnel standards to achieve high levels of biosecurity.

Equipment Set Up
1. Establish stable position for beak trimming machine.
2. Ensure timing of automatic cam is correct.
3. Ensure blade is correct temperature, type and sharpness for age of bird being trimmed.
4. Availability of back up equipment.

Occupational Health and Safety
1. A short break for the beak-trimming operator every hour.
2. Clothing to cover arms and legs to protect against injuries and scratches from birds.
3. Finger guard to protect against burns whilst beak trimming.
4. Fully adjustable ergonomic chair with back and foot support to avoid back injuries.
5. Bench of suitable working height with adequate working space.
6. Adequate ventilation of dust and fumes away from the operator and comfortable air temperature.
7. Full-face mask with fresh air supply to prevent ill health from poor air quality.
8. Retractable extension cords conforming to electrical safety standards.
9. Beak trimming apparatus confirmed to be electrically safe.
10. Cool water and first aid kit for treating burns and scratches.

Penning Birds
1. Minimise the stress on birds during penning or catching.
2. Provide adequate ventilation.
3. Ensure birds are kept in appropriate containers prior to beak trimming.

Holding Birds
1. Ensure birds are held correctly according to the age group of birds being trimmed.
2. Angle the beak at 15-30^0 from the horizontal onto the cutting bar or into the holes in the gauge plate.

Cutting and cauterising beak
1. Determine beak hardness.
2. Use directed light source to identify tip of quick or position halfway along upper beak.
3. Cut both beaks simultaneously in chickens up to 6 weeks of age at the tip of the quick or half way along the upper beak.
4. Cauterise hard beaks for 2 seconds, soft beaks for 1.5 seconds.
5. Cut beaks to achieve an inward V slant.
6. For birds aged 8-14 weeks of age cut at the tip of the quick or half way along the upper beak. Lower beak should be 2-3 mm longer.
7. Retrim beaks if necessary at 12-14 weeks. Maintain upper beak length at 12-14 mm and lower beak at 14-16 mm.
8. Round sharp edges on beaks.
9. For pullets and adult layers not previously trimmed cut no more than 5 mm of upper and lower beaks.
10. To reduce persistent cannibalism trim beaks such that at maturity 8 mm of upper beak and 11 mm of lower beak remains.

Equipment maintenance during the day
1. Regular cleaning of blades and change blades if necessary.
2. Checking blade temperature and timing of automatic cam.
3. Ensure trimming equipment is level after being moved.
4. Check water-cooling of cutting bar.

Handling and care after trimming
1. Gentle handling of birds after beak trimming.
2. Ensure birds can eat and drink after trimming, particularly from nipple lines.
3. Dip beak in ice water after trimming on hot days.

Records
1. Maintain qualitative and quantitative records of the beak trimming process.

Quality of beak trimming

1. Correct length of upper and lower beaks depending on age.
2. Correct gap between upper and lower beak depending on age.
3. Beaks sealed and rounded at edges.
4. Less than 1% mortality in first week of beak trimming.
5. Normal feeding, drinking and social behaviour.
6. Less than 1% of birds with bleeding after beak trimming.

Assessment of beak trimming

1. Appropriate beak length.
2. Minimal imperfections.
3. Normal feeding, drinking and social behaviour.
4. 95% grade A standard for beak trimmed birds.

Training Model

The Australian Egg Industry has a choice regarding the implementation of beak trimming training – whether or not to use the Australian vocational education and training system? The training system in place across Australia provides a quality system consisting of Registered Training Organisations (RTOs), national competencies, accredited training and competency-based assessment. It is set up to ensure that industry can access people with the skills it requires. If this system is not used, the Egg Industry will need to set up its own system to accredit people and maintain records.

A beak trimming training course will be developed whichever system is used. The course will be competency-based and designed to be delivered as a short course or as workplace training. Initially, industry experts will deliver short courses to experienced beak trimmers from major enterprises. These train-the-trainer short courses will provide best practice skills and knowledge and assess participants in an off-the-job setting. The courses will also help prepare participants to deliver and assess the course to others in the workplace. Workplace training is flexible, cheap to deliver, minimises time spent off the job and can be customised to suit each enterprise. For example, some beak trimmers may need minimal time to reach the standards required while others will need more intensive training.

To complement the train-the-trainer short course it is proposed that those who become workplace instructors/assessors must have satisfactorily completed appropriate trainer/assessor qualifications before they can deliver training to other beak trimmers. Workplace trainer/assessor qualifications will be specified and can be obtained locally throughout Australia from a range of training providers. Alternatively this training could be incorporated into the beak trimming train-the-trainer short course.

The majority of beak trimmers will be trained and assessed in the workplace to ensure they have reached the required standard. This requires the availability of workplace assessors who will determine which staff are competent and those who are not yet competent. It is essential that a thorough assessment be carried out if the beak trimming qualification is to be of value. Participants will be assessed against the learning outcomes and assessment criteria specified for the course.

It will be recommended that industry only allow accredited beak trimmers to trim birds. A person will need to be deemed competent by a workplace assessor to become accredited. An initial assessment will be carried out after the completion of training and remain valid for a period to be decided by industry. Beak trimmers will need to be re-assessed after this period. The assessor will focus on the skills and underpinning knowledge for beak trimming as well as activities relating to a flock recently beak trimmed and a flock that had been trimmed at least 10 and 30 weeks previously. The assessor will require access to records and to visually inspect and take measurements of the beaks of birds. The assessor will use an audit score sheet to evaluate beak trimming quality and if there are areas of concern the assessor will discuss with the beak trimmer the time lines to evaluate and rectify beak trimming procedures.

The course will be accredited through the New South Wales Vocational Education Training and Accreditation Board if it is delivered as part of the vocational education and training system. Accredited training is nationally recognised and increases the opportunities for gaining funding for course delivery. With this system workplace instructors will deliver the beak trim course through a Registered Training Organisation (RTO). In some cases the RTO may be the company the trimmers work for or it might be an educational institution. All RTOs

throughout Australia submit training records to a central database that can be interrogated to provide industry with a profile of the training that has occurred.

Training Materials

A resource manual for students and an instructor/assessor handbook will be developed to support the beak trim course. The materials will assist those delivering workplace training and help to ensure these standards are maintained. The resource manual will be written in plain English and kept simple to meet the needs of those with low literacy skills. Case studies, exercises, photographs and graphics will enhance the learning process. The instructor/assessor handbook will describe options instructors have for delivery and assessment of the course. This will contain more detailed technical information, suggested delivery strategies and assessment tools. It will provide guidelines that will assist instructors to provide relevant training that meets the needs of the local enterprise. The resource manual and instructor/assessor handbook will be used as resources for the train-the-trainer short courses.

Summary

The Australian Egg Industry is developing a QA program and beak trimming accreditation which is likely to lead to improved standards of bird management and welfare.

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