EXPLANATORY NOTES

Layer hens and pullets

RSPCA APPROVED FARMING SCHEME

RSPCA Australia
PO Box 265
Deakin West ACT 2600

P: 02 6282 8300
E: science@rspca.org.au
W: rspca.org.au

TABLE OF CONTENTS

INTRODUCTION

The RSPCA Approved Farming Scheme aims to improve the lives of as many farm animals as possible, today. The Scheme is underpinned by the RSPCA Approved Farming Scheme Standards (the Standards) which set out species-specific animal welfare requirements designed to meet the animal's behavioural and physiological needs and assist the industry in improving and demonstrating good welfare outcomes. The RSPCA Standards take into account RSPCA policy, current scientific literature, animal welfare legislation, producer advice, and good industry practice.

RSPCA Australia is currently reviewing the *RSPCA Approved Farming Scheme Standard – Layer hens* and the *RSPCA Approved Farming Scheme Standard – Pullets*. To date the review process has sought initial feedback from stakeholders, including Producers, Licensees and the RSPCA Australia Certification Body, on the current 2015 version of the Standards. The current voluntary *RSPCA Approved Farming Scheme Standard – Pullets* has now been included in the revised *RSPCA Approved Farming Scheme Standard – Layer hens* consultation draft as a mandatory section for Producers under the Scheme who own and rear pullets.

Where there have been significant changes proposed to the Standard, information and rationale for the changes and the animal welfare impacts has been provided in these Explanatory Notes.

GLOSSARY SECTION

Change: Inclusion of a new glossary section at the end of the Standard.

Proposed addition: Glossary section.

Certain words and phrases that are bolded throughout the Standard have been defined in the glossary to assist in making the intent of the requirement/s of the relevant standard clause clearer. Having this additional guidance also helps assist the RSPCA Australia Certification Body when assessing conformance with the Standard.

ANTIMICROBIAL STEWARDSHIP PLAN

Change: Inclusion of an Antimicrobial Stewardship Plan where antimicrobials are used.

Proposed addition: Clause 2.08 a – h

2.08 Where antimicrobials are used, an Antimicrobial Stewardship Plan must:

a) be completed and implemented
b) specify current type, quantity and nature (therapeutic or preventative) of antimicrobial use in a format to be agreed with by RSPCA Australia
c) consider available evidence of antimicrobial resistance in the Australian layer hen flock
d) specify a year-on-year strategy which considers the reduction, refinement and/or replacement of preventative antimicrobial use
e) specify husbandry, management strategies and any alternative preventative treatments, where used, to manage disease risk during any planned reduction, refinement and/or replacement of antimicrobials
f) be reviewed on an annual basis in order to inform the following year's strategy
g) be authorised by the designated registered veterinarian
h) be provided to RSPCA Australia as part of the Veterinary Health Plan.

Antimicrobials in farm animal production are agents used to prevent or treat the growth of microorganisms including bacteria, viruses, fungi and parasites. Some of the diseases relevant to layer hens include *Escherichia coli*, *Mycoplasma spp.*, *Salmonella spp.*, *Campylobacter hepaticus*, *Pasteurella multocida* and *Coccidiosis* infections (Trott et al. 2019; Groves et al. 2021).

Prolonged and inappropriate use of antimicrobials can lead to them becoming ineffective over time as the microorganisms they are intended to target develop resistance to the drugs (Hao et al. 2014; APVMA 2017). Due to the development of resistance to antimicrobials, there is growing pressure worldwide to reduce the use of antimicrobials drugs. In addition to this, the risk factors associated with diseases such as coccidiosis include stress, overcrowding, wet litter, poor hygiene, insufficient feed, and changes in diet. Alternative strategies to reduce reliance on antimicrobial use include optimising housing environment, appropriate nutrition, minimising stress to animals, improving diagnostics and implementing vaccines where applicable (Knoblock-Hahn et al. 2016).

The World Health Organisation and the Australian Strategic and Technical Advisory Group provide expert guidance on the use of certain classes of antimicrobials and their relative importance in human medicine. The introduction of an Antimicrobial Stewardship Plan into the Standard for layer hens encourages the judicious use of antimicrobials, considering any evidence of resistance to antimicrobials, management strategies to reduce the need for antimicrobials, and the ultimate aim of reducing the reliance on antimicrobials over time.

Reducing antimicrobial use may be done in many ways, including:

1) Reducing the risk of disease – risk factors for disease include stress, immune suppression, high stocking densities, poor hygiene and biosecurity, litter condition, group size, and air quality. Therefore, optimising the environment and minimising stress through best practice handling and health management practices is essential for minimising the risk of disease within a flock (Knoblock-Hahn et al. 2016).

2) The use of alternative treatments – alternatives to antimicrobial drugs that have shown promise in the poultry industry include probiotics, prebiotics, symbiotics, polyphenols, organic acids, essential oils, enzymes, immunostimulants, and phytogenic (phytobiotic) feed additives (Scicutella et al. 2021; Abd El-Hack et al. 2022).

3) Responsible use of antimicrobials - recording and reporting of use, and antimicrobial stewardship plans are important in encouraging responsible use of antimicrobials while ensuring bird health and welfare.

TYPE OF LIGHTING

Change: Artificial lighting must not consist of only a single or limited wavelength and must provide at least the broad spectrum visible to humans.

Proposed addition: Clause 5.22
5.22 Artificial lighting, unless during catching, must:
a) provide at least the broad spectrum visible to humans
b) not be monochromatic in wavelength.

The type of lighting used can have an impact on hen welfare. Layer hens have a broad colour sensitivity that extends to the UV spectrum (Nicol et al. 2017). This means that, with full spectrum lights, hens that appear uniformly coloured to the human eye may appear to have mixed colouring or markings to other hens. Natural sunlight, which provides full spectrum including UVA and UVB wavelengths, provided through windows or with outdoor range access, has been shown to be beneficial for hens' health and welfare (Janczak and Riber 2015; Wichman et al. 2021). Where natural light is not provided, LED lighting may have welfare advantage in that full-spectrum LED contains UVA and UVB lighting. The provision of UVA and UVB wavelengths have been found to be beneficial for bone growth and health in hens (Rana et al. 2021). The addition of UV lighting may also provide behavioural benefits decreasing measures of fear and stress in hens (Sobotik et al. 2020).

While there is a growing amount of research exploring the effects of the type and colour of lighting on the welfare of hens, there remains a number of gaps. Until further information is available, or evidence suggests otherwise, the intent of the new requirement in the Standard is to provide hens lighting that most closely resembles full spectrum natural light and prevent the use of monochromatic lighting.

PERCHES

Change: Increased perch space requirement and detail on construction and position of perches. Clauses 3.42 and 3.43 in the current Standard.

Proposed amendment: Clauses 5.28 and 5.29

5.28 Perches in the laying facility must be provided at a minimum length of 150m per 1000 birds based on shed placement number.

5.29 Perches must be constructed and positioned to:
a) be evenly distributed throughout the shed
b) have rounded edges and provide a solid flat surface
c) have a minimum width of 3cm and support birds' keel bone and whole foot
d) be raised at least 60cm above the floor
e) have a minimum height of 20cm clearance above.

Perching and resting on elevated structures is a highly motivated and natural behaviour for poultry. Layer hens perch usage varies during daytime, however, almost all hens will use perches to roost at night when provided the opportunity (Nicol et al. 2017). Hens will use perches to rest, monitor the surrounding environment, escape other hens, and facilitate thermoregulation (EFSA, 2015).

Perch design is critical to encourage hens to use and benefit from perches (EFSA, 2015). Hens' physical ability to jump and navigate perches should be considered to minimise the risk of injuries occurring, such as keel bone fractures. Perches that require hens to jump >80cm (horizontally, vertically or diagonally) or at an angle between 45 and 90° (measured at the horizontal plane) have been shown to increase the risk of injury (EFSA, 2015).

Other aspects of perch design which should be considered to minimise the risk of injury include the perch material, shape, width and height. Current research findings suggest the ideal perch design to be wooden, square or rectangular in shape, covered by pliable material at body contact points, and of appropriate width for hens to balance while reducing the force placed on their keel bone and feet (EFSA, 2015). Hens' perch use is reduced when perch width is <1.5cm and hens show a preference for rectangular perches >3cm in width (Chen et al. 2014). Perch heights >60cm from the floor have been shown to encourage perching, and perches above >80cm particularly for night-time roosting (Newberry et al. 2001; Brendler et al. 2014). Additionally, the provision of stepped perches, ramps and other elevated structures should be considered to account for hens' varying physical and navigational ability (EFSA, 2015).

To ensure hens have adequate room to simultaneously perch, current research suggests a minimum of 15cm of perch space per hen (EFSA, 2015). There also appears to be breed differences in space requirement, with brown strain hens occupying more space than white strains when perching (Riddle et al. 2018; Giersberg et al. 2019). The increased requirement for a minimum of 150m perching length per 1000 birds (i.e., 15cm per bird) and the requirements for perch design in the Standard are intended to ensure that hens are encouraged to use perches and have the opportunity to perch simultaneously.

RAMPS

Change: Inclusion of a new requirement for ramps in tiered systems.

Proposed addition: Clauses 5.30 and 5.31

5.30 For tiered systems, birds must have access to ramps in the laying facility shed, unless during catching or preparation for catching or where temporary removal is required for litter maintenance.

5.31 Ramps must be constructed and positioned to:
a) be of a minimal slope to allow birds to walk up and down the ramp with normal gait
b) provide a continuous surface
c) provide a non-slip surface.

Ramp provision in addition to perching can help reduce the incidence of injuries and keel bone fractures in layer hens. Particularly in complex multi-tiered laying facilities (e.g., aviary housing systems) ramps can help with learning and transitions between tiers (Stratmann et al. 2015; Pettersson et al. 2017a). Hens that are provided ramps, especially if provided during rearing, show improved ability to navigate more complex environments, improved bone and leg health, and a reduced number of falls and collisions during their lifetime (Stratmann et al. 2015). Ramps may also be beneficial for hens' footpad and leg health. Hens with access to ramps have been shown to have lower rates of foot and leg-related disorders, such as footpad hyperkeratosis, footpad dermatitis and bumble foot, compared to hens without ramps (Heerkens et al. 2016a).

As with perches, the design is critical to ensure hens can navigate and benefit from ramps. Continuous gridded ramps (compared to ladder rung ramps) and ramp inclines between 40 and 70° encourage ramp use and allow for easier navigation (Pettersson et al. 2017a; Widowski and Torrey 2017; Norman et al. 2021). Having appropriate inclines and slopes of ramps can also be beneficial for improving muscle and bone strength, which in turn could contribute to decreasing the risk of keel bone fractures later in life.

The requirement for ramp provision in the Standard is intended to improve the welfare of hens in tiered systems while also helping to reduce the risk of injuries and keel bone fractures.

ENVIRONMENTAL ENRICHMENT

Change: Increased number and type of environmental enrichment requirement. Clauses 3.44 and 3.45 in the current Standard.

Proposed amendment: Clause 5.32

5.32 Birds in the laying facility must be provided with:
a) at least two different types of environmental enrichment objects
b) a minimum of two environmental enrichment objects for every 1000 birds based on laying facility shed placement number.

Environmental enrichment improves layer hens' environment by increasing the opportunities for hens to perform highly motivated behaviours. Highly motivated behaviours in hens include nesting in nests, perching, dust bathing and foraging (Hemsworth and Edwards 2021).

Enrichment for hens can include visual stimulation (e.g., colours, patterns and different structural-shaped areas), cognitive enrichment (e.g., problem solving and complex spatial navigation tasks), auditory stimuli (e.g., music and maternal calls), objects (e.g., pecking devices and novel objects), and positive human-animal interaction (Campbell et al. 2019). To ensure hens can benefit from enrichment it should be provided during rearing and within the first 2 weeks of life (Campbell et al. 2019).

Where hens are housed in barren environments with inadequate resources and enrichment provision, it can lead to the development of abnormal and aggressive behaviours suggesting negative welfare outcomes. Feather pecking is a particular behaviour of major concern in layer hens. While the cause of feather pecking is multi-factorial and complex, the provision of enrichment and litter substrate from an early age has been shown to reduce feather pecking and feather damage in hens later in life(Schreiter et al. 2019; van Staaveren et al. 2021). Therefore, the provision of pecking and foraging enrichment may be one effective management strategy for managing and preventing problematic feather pecking behaviour (van Staaveren et al. 2021).

The proposed requirement to increase the amount and type of environmental enrichment in the Standard aims to ensure hens are provided with an adequate number of suitable enrichment objects, which are introduced at an early age to ensure all hens have the opportunity to utilise and experience the benefits of an enriched environment.

OUTDOOR AREA

Change: Change to outdoor stocking density requirement. Increased amount of overhead cover and detail on construction and position. Clauses 5.08, 6.08 and 6.04 in the current Standard.

Proposed amendment and addition: Clauses 7.04, 7.07 and 7.08

7.04 A maximum of 2,500 birds per ha of outdoor area must be available to birds.

7.05 The outdoor area must be designed and actively managed and maintained to:
- *a) encourages birds to dustbathe and forage*
- *b) provide palatable vegetation*
- *c) provide overhead cover*
- *d) be well drained to avoid muddiness and the accumulation of water*
- *e) control disease and parasites*
- *f) avoid injury or mortality*
- *g) minimise the risk of fire.*

7.07 At least 75m^2 of overhead cover per 1000 birds based on the laying facility shed placement number must be provided.

7.08 Overhead cover must be:
- *a) first located <20m from any opening to the outdoor area*
- *b) distributed evenly across the total available outdoor area*
- *c) of sufficient height for birds to stand under it using normal posture*
- *d) constructed, placed and maintained to encourage bird use.*

Having an appropriate outdoor stocking density where hens are provided enough space can help encourage layer hens to use the outdoor area in free-range housing systems. The previous outdoor stocking density requirement was set to be consistent with the *Model Code of Practice for the Welfare of Animals: Domestic Poultry (2002)*. The Australian Consumer Law (Free Range Egg Labelling) Information Standard 2017 allows eggs to be labelled 'free range' if hens are provided 'meaningful and regular access' outdoors with a maximum stocking density of 10,000 hens per ha. Other countries, such as the European Union and New Zealand have a legal maximum outdoor stocking density of 2,500 hens per ha (Office of the European Union 1999; National Animal Welfare Advisory Committee 2012).

Increased space allowance outdoors provides hens' more opportunities to move freely and perform motivated behaviours outdoors, however, there is currently no evidence indicating an ideal outdoor stocking density for hens and large commercial flocks do not appear to simultaneously range together (Campbell et al. 2017). The ideal outdoor stocking density for hens will depend on several factors, including the range quality, weather conditions, flock size, rearing experience, and individual hen differences (Campbell et al. 2017).

Improving the overall attractiveness of the outdoor range is important to ensuring that hens may receive the welfare benefits that can be provided by a free-range system. The overall quality of the range, such as the amount of overhead cover and enrichment, also appears to be of equal importance to space allowance in encouraging hens to use an outdoor area. Outdoor areas with overhead cover (e.g., shade and shelter) and enrichment (e.g., hay bales) have been shown to increase the number and amount of time hens spend ranging outdoors (Nagle and Glatz 2012; Larsen et al. 2017; Thuy Diep et al. 2018; de Koning et al. 2019).

The number of hens that choose to use an outdoor area also varies depending on the time of day and season, with hens during the hot summer months in some areas of Australia preferring to remain inside for most of the time (Nagle and Glatz 2012; Chielo et al. 2016). A minimum of 5% good/dense overhead cover (through tree coverage) has been suggested, however this finding was from research in the UK and therefore may not be fully applicable to Australian climatic conditions (Bright et al. 2011). Rotating range areas is an example of good range management, allowing

vegetation cover and insect availability to be maintained, while controlling disease and parasites, and ensuring the range remains attractive for hens.

The proposed change to the Standard has increased the outdoor stocking density after taking into consideration current constraints of commercial production systems, while still ensuring hens have adequate space outdoors and increasing the requirements for the quality of the outdoor range. The additional requirements on range quality and the amount of overhead cover in the Standard is to ensure hens are encouraged to use the outdoor range and are adequately protected from climatic conditions.

BIRD OBSERVATION

Change: Increased bird observations and monthly flock assessment requirements. Clauses 7.09, 7.10, 8.11 and 8.12 in the current Standard.

Proposed amendment: Clauses 9.03 and 9.05

9.03 Birds must be observed at least three times in every 24-hour period. Where abnormal observations occur, action must be taken and recorded for:
a) appearance, vocalisations and behaviour, including feather cleanliness, wounds and aggression
b) injurious pecking, including feather cover
c) keel bone fractures.

9.05 A sample of birds representative of the flock per shed, must be assessed every four weeks from the day of placement in the laying facility shed for:
a) feather cover
b) feather cleanliness
c) keel bone fractures.

Routine on-farm animal welfare assessments can be used to complement daily shed inspections, strengthen self-responsibility of the farm manager, improve transparency and be used as a basis for benchmarking within and between farms (EFSA, 2012; Zapf et al. 2017). Routine assessment also supports continuous improvement to animal welfare and allows for early intervention before issues becomes unmanageable or adversely impact hens (EFSA, 2012). Outcome-based measures (OBMs) are increasingly being used to assess poultry welfare on farm in place of or in combination with resource-based measures (RBMs). RBMs such as access to food and water, litter condition and air quality, have traditionally been the main indicators used to assess animal welfare as they are easy to record and highly repeatable (Blatchford 2017). However, there are significant limitations to relying only on an assessment of the environment or system, as opposed to including characteristics of the hens' physical health and behaviour (Butterworth 2018). OBMs that have been validated and are repeatable and practical to assess on farm should be used where possible (Butterworth 2018).

For layer hens, critical outcome-based measures include feather coverage, feather cleanliness and the incidence of keel bone fractures. Feather cover assessments and signs of injuries can be used as early warning signs or as evidence of feather pecking and aggressive behaviours in hens. The cause of feather pecking is complex and multifactorial however it is generally considered to indicate poor welfare from inappropriate management or environmental conditions. The Standard glossary definition for feather coverage is based on the FeatherWel feather scoring system for signs of injurious pecking (FeatherWel 2022). When feather scoring, including observations for feather loss on the head or signs of head/comb trauma could be useful for indicating the level of aggressive behaviours occurring within a flock.

Feather cleanliness can be used to assess the effectiveness of litter management, perch and nest maintenance, and the prevention of manure build-up or drop-through in a shed. Based on a visual assessment of hens, it can be assumed that if there is a significant number of hens with extremely dirty feathers then litter and shed cleanliness is not being managed appropriately. The Standard glossary definition for feather cleanliness has been based on AssureWel's 3-point scoring system for feather cleanliness (AssureWel 2022).

Keel bone fractures cause pain and can affect hens' ability to move and perform normal behaviours, such as nesting and perching (Rufener and Makagon 2020; Campbell 2020). Keel bone injuries and fractures are considered a serious welfare concern for hens due to the high incidence rate in commercial housing systems. Different methods have been used to assess keel bone fractures, such as palpation, dissection, radiography, and computed tomography (Rufener and Makagon 2020). Palpation remains the most practical on-farm method and focusing on the bottom 1/3 of the keel bone during palpation can help improve the accuracy, as well as increased training and experience (Petrik et al. 2013). The Standard glossary definition for keel bone fractures is based on the scoring systems developed by Petrik et al. (2013) with the focus of assessment on the bottom 1/3 of the keel bone.

EUTHANASIA

Change: Inclusion of new requirements when performing one of the permitted methods for euthanasia, which include captive bolt device, carbon dioxide controlled atmosphere killing, and manual cervical dislocation.

Proposed addition: Clauses 11.07, 11.08, 11.09, 11.10, 11.11 and 11.12

When euthanasia is performed in a manner that does not result in rapid loss of consciousness followed by death, hens are at risk of experiencing prolonged pain, discomfort, stress or injury (Farm Animal Welfare Council 2017). Some of the risks associated with euthanasia include the suitability of the technique or method used, the amount of restraint required, maintenance and function of equipment, training and competency of the operator, health status of the hen and timely confirmation of death.

Manual cervical dislocation has traditionally been the most common euthanasia method for poultry on farm, however there are growing concerns that the method does not result in immediate loss of consciousness (Humane Slaughter Association 2013; Sparrey et al. 2014; Farm Animal Welfare Council 2017). Some countries, including the European Union and Canada, and other animal welfare certification schemes, now only permit manual cervical dislocation for birds <3kg liveweight and where more humane methods are unavailable (Office of the European Union 2009; National Farm Animal Care Council 2016). Performing the correct cervical dislocation procedure is difficult, especially for very small pullets or larger hens, so consideration should always be given to the size of the bird (Linares et al. 2018; Martin et al. 2018). Cervical dislocation using a hard edge or sharp object is not considered humane because there is a high risk of the spinal cord being crushed causing death by asphyxia rather than death by cerebral ischemia (Farm Animal Welfare Council 2017).

Non-penetrating captive bolt guns are a suitable alternative euthanasia method to cervical dislocation. The use of non-penetrating captive bolt devices has been demonstrated effectively in a number of poultry species, including chickens, turkeys and ducks (Erasmus et al. 2010; Woolcott et al. 2018; Bandara et al. 2019; Jacobs et al. 2019; Baker-Cook et al. 2021; Stiewert and Archer 2021). The correct positioning and angle, bolt diameter, velocity, and airline pressure (or cartridge strength) are all critical factors to ensure captive bolt devices are effective at causing death (EFSA 2004).

Carbon dioxide controlled atmosphere killing on farm may also be a suitable alternative to cervical dislocation, where appropriate equipment and non-aversive gas concentrations are used (EFSA 2019a). Producers looking to install controlled atmosphere killing systems should be guided by a suitably qualified practitioner to ensure the system is fit for purpose and appropriate safeguards are included in the design such as gas concentration alarms and monitoring equipment, opportunity for visual observation, as well as regular calibration to ensure only suitable gas mixtures are used.

To minimise suffering and distress, any bird identified as needing to be euthanased must be done so promptly. In addition to this, regardless of the euthanasia method birds must be checked to confirm the procedure has been effective in causing death and it is essential that operators are trained and competent in identifying signs to confirm death (Farm Animal Welfare Council 2017; Linares et al. 2018). The proposed additional requirements for euthanasia methods in the Standard aims to ensure that the euthanasia of birds can be performed promptly when required and that any prolonged and unnecessary suffering is prevented.

CATCHING AND TRANSPORT SECTION

Change: The catching and transport section of the Standard will now be routinely assessed. Section 10 and 11 in the current Standard.

Proposed amendment: Section 12, 12.01 to 12.20

There are a number of animal welfare concerns and unavoidable stressors associated with the catching and transport of layer hens. Hens likely experience increased levels of stress and fear during catching, due to unfamiliar people and equipment in the shed, handling, unfamiliar noises, removal of feed and water, and the removal of perches/ramps and environmental enrichment (Nicol et al. 2017; Gerpe et al. 2021). Hens are also at an increased risk of experiencing injuries and fractures when being handled, as well as during catching and transportation. Catching hens by two legs and carrying them upright, rather than by one leg and upside down may minimise the likelihood of injuries and fractures (Gerpe et al. 2021).

During transport, thermal conditions and transport distances are the two main factors that impact hen welfare. Mortalities during transport increase with increasing transport time and distance, with research suggesting dead on arrivals increase with transport times >2 hours and distances >50km (Weeks et al. 2016; di Martino et al. 2017; Vecerkova et al. 2019; Çavuşoğlu and Petek 2021; Frerichs et al. 2021). Risk factors including poor feather cover, lower body weight, and higher flock morality numbers have all been associated with increased mortality during transport (Weeks et al. 2016; Beaulac et al. 2020). Cold temperatures have also been shown to increase transport mortalities (Weeks et al. 2012; Çavuşoğlu and Petek 2021).

The catching and transport section in the Standard will now be subject to routine assessment with the intent to minimise the negative welfare impacts that may occur during catching and transportation of layer hens.

SLAUGHTER SECTION

Change: The slaughter section of the Standard will now be routinely assessed. Section 12 in the current Standard.

Proposed amendment: Section 13, 13.01 to 13.40

When layer hens are no longer considered commercially viable, they are either transported to an abattoir for slaughter or killed on farm.

Electrical waterbath stunning is one of the stunning methods used for poultry at slaughter in Australia. This stunning system requires poultry to be shackled and inverted while conscious. Inversion during shackling is a physiologically abnormal position for poultry, and they likely experience pain and distress due to the compression of the metal shackle on their legs (Gentle and Tilston 2000). The experience of pain and suffering during shackling is amplified for poultry with poor leg health and those suffering injuries as a result of the catching or transport process (Gentle and Tilston 2000; Humane Slaughter Association 2015; EFSA 2019b). Shackling lines, surrounding structures and equipment must be fit for the purpose of processing layer hens. Poor contact between the shackles and the legs is a welfare concern as it results in increased electrical resistance in the system and may result in hens receiving an ineffective stun (EFSA 2019b). To help overcome this, shackles should be well maintained and wet at the leg-shackle contact area prior to the shackling of the hens (Humane Slaughter Association 2015).

For electrical waterbath stunning systems to effectively render poultry unconscious for the duration of bleed out prior to death, the use of appropriate electrical parameters (e.g., frequency and current applied per hen) is critical (Humane Slaughter Association 2015; EFSA 2019b). There are a number of variables which influence an effective current being delivered to each hen, including the number of hens in the water bath, individual size, body muscle and fat content, plumage condition, shackle condition and tightness, and water composition (Humane Slaughter Association 2015). It is therefore critical to maintain, monitor and routinely assess stunning effectiveness and make timely adjustments when needed to safeguard animal welfare and prevent hens from suffering (Humane Slaughter Association 2015).

Controlled atmosphere stunning (CAS) systems have several advantages over electrical waterbath stunning, one of which is that poultry can be stunned without the need for physical handling or shackling while conscious (EFSA 2004; Berg and Raj 2015). In CAS systems, poultry are moved into the stunning module in their transport crates or transferred onto a conveyer belt which moves them into the stunner, the former being preferred as there may be welfare issues associated with emptying hens onto the conveyer (Berg and Raj 2015). Unlike electrical stunning, CAS systems do not cause immediate loss of consciousness, instead unconsciousness is achieved gradually as a result of exposure to carbon dioxide or various gas combinations (Berg and Raj 2015). Non-aversive gas mixtures and concentrations should be used to minimise stress, gasping and the sense of breathlessness prior to loss of consciousness. Where carbon dioxide gas is used, hens should first be exposed to low concentrations and only exposed to higher concentrations (≥40%) once they have lost consciousness (Berg and Raj 2015; EFSA 2019b).

The slaughter section in the Standard will now be subject to routine assessment with the intent to minimise the negative welfare impacts to layer hens at slaughter.

ON-FARM KILLING SECTION

Change: Inclusion of a new section for on-farm killing of layer hens at depopulation.

Proposed addition: Section 14, 14.01 to 14.06

When layer hens are no longer considered commercially viable, they are either transported to an abattoir for slaughter or killed and disposed of on farm. For on-farm killing, if the chosen method does not result in rapid loss of consciousness followed by death, birds may experience prolonged pain, discomfort, stress or injury (Farm Animal Welfare Council 2017). The chosen method also needs to consider that on-farm killing usually involves the killing of a large number of hens or the entire flock at one time.

Where non-penetrating captive bolt devices are used for on-farm killing, the correct positioning and angle, bolt diameter, velocity, and airline pressure (or cartridge strength) are all critical factors to ensure they are effective at causing death (EFSA 2004). When killing a large number of birds, staff capacity, competency and risk of operator fatigue must also be considered.

Controlled atmosphere killing systems currently use carbon dioxide gas for on-farm killing (EFSA 2019a). However, with advances in research, there is the possibility in the future of these systems using less aversive gases, such as inert gases (e.g., argon and nitrogen gas), which could provide welfare advantages. Where carbon dioxide gas is used, the system must be fit for purpose with appropriate safeguards in place and use non-aversive gas concentrations while hens are conscious.

Due to the large number of hens being killed during on-farm killing at depopulation, it is critical that the method's effectiveness is confirmed by confirming death in hens. In the event any hen is found to be ineffectively killed, an appropriate back-up killing method must be applied immediately to ensure death. The new on-farm killing section in the Standard is intended to minimise the negative welfare impacts to layer hens that may occur during on-farm killing at depopulation.

PULLET REARING SECTION

Change: Inclusion of a new section with mandatory requirements for rearing pullets where Producers own and rear pullets. Previous requirements for pullets were covered the voluntary RSPCA Approved Farming Scheme Standard – Pullets (2015).

Proposed addition: Section 15, 15.01 to 15.12

Environment and housing
Housing pullets in rearing systems that are the same or similar to their intended laying facility has been shown to improve pullets' adaptability following transfer (Colson et al. 2008; Janczak and Riber 2015).

Chicks begin using litter for foraging and dust bathing behaviours in the first few weeks of life. Providing good quality friable litter within the first 4 weeks of life has been demonstrated to reduce the development of feather pecking behaviour in pullets (Janczak and Riber 2015; Campbell et al. 2019; Schreiter et al. 2019). Additionally, reducing litter provision during rearing even if only briefly, can have negative effects on feather condition and contribute to increased incidence of feather pecking behaviours (Schreiter et al. 2019).

For lighting, chicks are routinely housed at higher light intensities (>20lux) and near-continuous photoperiods the first few days after placement to help them find food and water. However, daily periods of darkness (i.e., dark brooding), like the light/dark pattern they would naturally experience, may be beneficial for chicks (Widowski BS et al. 2013). Dark brooding has been shown to improve feather condition, decrease fearfulness, and reduce the incidence of severe feather pecking and cannibalism (Widowski BS et al. 2013; Janczak and Riber 2015; Riber and Guzman 2017; Jongman and Jongman 2021). Light intensities of >10 lux during the light period appears important to ensure pullets can successfully navigate their environment and avoid the risk of injuries and fractures (Chew et al. 2021).

Pullets first begin perching between 7-10 days of age during the day and begin nighttime roosting at around 3-6 weeks of age. The height and simultaneous use of perches continues to increase as pullets age from 3-18 weeks of age, resulting in an increased perch space requirement. Providing pullets with perches before 8 weeks of age can increase bone mineralisation and strength; improve adaptability and spatial navigation; and decrease the incidence of keel bone injuries and fractures after transfer to laying facilities (Janczak and Riber 2015; Regmi et al. 2015; Heerkens et al. 2016b; Casey-Trott et al. 2017; Pufall et al. 2021). Pullets with perches during rearing can also be expected to have higher perch usage in laying facilities compared to pullets without previous perch experience. In free-range systems, perches during rearing can help encourage greater outdoor range use following transfer to the laying facility (Campbell et al. 2018, 2021a, b; Bari et al. 2020).

In addition to perches, ramp provision for pullets has been shown to decrease hesitancy behaviours and incidences of keel bone injuries and fractures after transfer to the laying facility (Heerkens et al. 2016a; Pettersson et al. 2017b, a; Norman et al. 2018, 2021). Pullets between 2-5 weeks of age have been shown to climb and perch on inclined surfaces, such as platforms and ramps. Provision of ramps at 3 weeks of age has also been shown to increase pullets' use of ramps when they are older at 12-14 weeks of age (Norman et al. 2018).

Environmental enrichment during rearing in addition to litter, perches and ramps can be beneficial for the behavioural and physical development of pullets (Campbell et al. 2019). Enrichment should ideally be provided at placement or within the first 2 weeks of life due to this being a critical period of pullet brain development (Campbell et al. 2019). Enrichment strategies can include visual stimulation (e.g., colours, patterns and different structural-shaped areas), cognitive enrichment (e.g., problem solving and complex spatial navigation tasks), auditory stimuli (e.g., music and maternal calls), objects (e.g., pecking devices and novel objects), positive human-animal interaction(Campbell et al. 2019). Pecking devices and/or objects in addition to litter seem particularly beneficial in preventing the development of feather pecking and cannibalism behaviours later in life (Schreiter et al. 2019; van Staaveren et al. 2021).

Stocking density
Although there is limited research comparing pullet stocking densities, it is critical that pullets are provided adequate room to move and walk around freely and escape other pullets. Higher stocking densities at rearing have been associated with higher rates of feather pecking and feather damage(Jongman and Jongman 2021). Based on floor space and body mass calculation, as well as breed guidelines, the maximum stocking density recommendations vary from 9-15 birds/m^2 depending on the breed and strain of hen (Widowski BS et al. 2013; Jongman and Jongman 2021).

Animal husbandry and management
Beak trimming is associated with several major welfare concerns including acute and chronic pain, risk of infection, loss of sensory receptors in the beak, and impairment of function for eating and body maintenance behaviours(Glatz and Underwood 2021). However, it remains routine practice in layer hens because it is considered the only reliable method for preventing feather pecking and cannibalism outbreaks within flocks. Infrared beak trimming in day-old chicks is associated with less welfare concerns compared to hot blade trimming methods, and therefore preferable (Glatz and Underwood 2021). Where beak trimming occurs, it must be accurate to prevent malformation or neuroma formation, as well as remove the smallest amount of beak necessary to ensure retrimming is not required(Glatz and Underwood 2021). Producers should also continue to implement alternative management strategies to prevent feather pecking with the ultimate aim of eventually phasing out the need for beak trimming.

GUIDELINES

Change: Inclusion of new guidelines in the Standard.

Proposed addition: Guidelines have been included in Section 9 (animal husbandry and management, Section 11 (euthanasia), Section 13 (slaughter) and Section 15 (rearing of pullets).

Guidelines have been included throughout the Standard to highlight alternative practices which will continue to be monitored in the animal welfare literature and considered for inclusion in future revisions of the Standard. While the guidelines are not mandatory, they indicate the potential direction of change that may be made in future revisions to the Standard to continue improving animal welfare outcomes.

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