

DRAFT CHAPTER 7.Z.

ANIMAL WELFARE AND LAYING HEN
PRODUCTION SYSTEMS

Article 7.Z.1.

Australian Comments – indicated in blue font

GENERAL COMMENTS:

- Australia notes that there have been changes to the language used throughout the chapter to describe the importance and degree of motivation related to certain laying hen and layer pullet behaviours. Australia is supportive of these changes, and is supportive of the current wording in Articles 7.Z.3.2f, 7.Z.5, 7.Z.7 and 7.Z.9. Australia considers these particular aspects to be of great importance to laying hen and layer pullet welfare and does not support any further changes which would weaken the language in these articles.
- The verbs 'euthanase' and 'euthanise' are used interchangeably throughout the chapter. Australia recommends using one verb consistently throughout the chapter.
- There is inconsistency throughout the chapter of the use of 'pullets' or 'layer pullets' and 'hens' or 'laying hens'. Given the changes to the definitions in the last revision of the chapter, Australia recommends that the consistent terms 'layer pullets' and 'laying hens' are used throughout the chapter, with all instances of 'pullets' changed to 'layer pullets', and all instances of 'hens' changed to 'laying hens'.
- The terms 'criteria' and 'measurables' are used interchangeably throughout the chapter. Australia suggests that only one of these terms is used consistently throughout this chapter and the Code.
- The terms 'can' and 'may' are used throughout the chapter. Examples include "Conjunctivitis can indicate disease or the presence of irritants such as dust and ammonia" and "Reduced foraging activity may suggest problems with substrate quality or the presence of conditions that decrease foraging ability". Australia notes that using these terms interchangeably can lead to confusion over their meaning. Subsequently, Australia seeks clarification on the difference between these two terms.

Definitions

For the purposes of this chapter:

Laying hens means sexually mature female birds of the species *Gallus gallus domesticus* kept for the commercial production of eggs for human consumption. Breeding hens are not included.

End-of-lay hens means laying hens at the end of their productive lives.

Layer pullets means female birds of the species *Gallus gallus domesticus* raised for commercial layer production purposes from hatch until the onset of sexual maturity.

Article 7.Z.2.

Scope

This chapter provides recommendations for the animal welfare aspects of commercial layer pullet and laying hen production systems. It covers the production period from the arrival of *day-old birds* layer pullets onto the pullet-

rearing farm through to the removal of end-of-lay hens from the laying [hen](#) production facilities. Laying hens kept in village or backyard flocks and used to produce eggs for personal consumption are not included.

Rationale: Insertion of 'layer pullet and' is recommended to clarify that the chapter refers to animal welfare aspects of both layer pullet and laying hen production systems, not just laying hen production systems.

The replacement of 'birds' with 'layer pullets' is recommended to ensure consistent terminology throughout the chapter.

The insertion of 'hen' is recommended for consistency throughout the chapter.

Commercial laying hen production systems involve the confinement of layer pullets and laying hens, the application of *biosecurity* and trade in eggs or pullets.

These recommendations address the welfare aspects of layer pullets or laying hens kept in cage or non-cage systems, whether indoors or outdoors.

Commercial layer pullet or laying hen production systems include:

1. Completely housed systems

Layer pullets or laying hens are completely confined in a poultry house, with or without mechanical environmental control.

2. Partially housed systems

Layer pullets or laying hens are kept in a poultry house with access to a designated outdoor area.

3. Completely outdoor systems

Layer pullets or laying hens are not confined inside a poultry house during the day but are confined in a designated outdoor area.

This chapter should be read in conjunction with Chapters 6.5., 7.1., 7.2., 7.3., 7.4., 7.5. and 7.6. ~~Article 7.Z.3.~~

Rationale: Deletion of 'Article 7.Z.3' recommended, as Article 7.Z.3 is contained within this chapter.

Annex 12 (contd)

Article 7.Z.3.

Outcome-based criteria (or measurables) for the welfare of layer pullets and laying hens

The welfare of layer pullets and laying hens should be assessed using outcome-based criteria or measurables, preferably animal-based measurables, as described in Article 7.1.4. Outcome-based criteria or measurables are particularly useful for evaluating compliance and improving animal welfare. Animal-based outcomes are usually the most sensitive measurables (~~e.g. mortality rate~~).

Rationale: Australia recommends deleting the above text in Article 7.Z.3, as mortality rate is not a strong example of a sensitive measurable. Mortality rate is only a general indicator of welfare. It becomes a more useful measurable if the causes of mortality are known.

However, resource and management-based outcomes can also have important applications (e.g. interpretation of mortality rate data may be informed by decisions made to euthanise).

Comment: The meaning of the above sentence is unclear. If it is to be retained, clarification is required.

There is no one single measurable that addresses all aspects of animal welfare. The use of measurables and the appropriate thresholds should be adapted to the different situations in which layer pullets and laying hens are kept, also taking into account the genetics used, resources provided, and the design and management of the system. Animal-based criteria or measurables can be considered as tools to monitor and refine these factors.

Criteria (or measurables) that can be used at farm level include conditions such as skeletal and foot problems, disease and *infection* or *infestation* that can be assessed during routine or targeted *monitoring*, or at depopulation. It is recommended that target values ~~or thresholds~~ for animal welfare measurables be determined by taking into account current scientific knowledge and appropriate national, sectorial or regional data and recommendations for layer pullets ~~or and~~ laying hens. Determining the age and stage of production at which problems are detected may help to determine the cause.

Rationale: Australia suggests choosing between the terms 'target values' or 'thresholds', and defining the chosen term appropriately in the glossary.

Australia notes that farm-level data can be an objective basis for setting thresholds for animal-based measures. Insertion of the words "data and" may also encourage record keeping, which is a suggestion throughout the chapter.

The criteria apply to both layer pullets and laying hens so a wording change from 'or' to 'and' is recommended.

The following animal-based and outcome-based measurables, in alphabetical order, may be useful indicators of layer pullet ~~or and~~ laying hen welfare:

Rationale: The criteria apply to both layer pullets and laying hens so a wording change is recommended.

1. Beak condition

Evaluation of beak condition provides useful information about the extent to which layer pullets and laying hens are able to engage in normal behaviour, such as foraging, feeding, drinking and preening and whether painful husbandry procedures such as beak trimming have been appropriately performed [Dennis and Cheng, 2012; Vezzoli *et al.*, 2015]. Tools for assessing beak condition have been developed and implemented in animal welfare assessment programmes [e.g. Kajlich *et al.*, 2016].

Rationale: Beak condition and bird welfare is affected by whether the beak has been trimmed, and whether this procedure has been properly conducted. For example, beak trimmed birds have a higher mite and lice burden during periods of infestation due to an inability to preen, certain behaviours are compromised in beak trimmed birds, and sensitivity to heat and pressure is increased in the beak of birds that have been trimmed with a hot blade. Australia recommends the insertion of the above text in Article 7.Z.3 point 1 to include this information.

Reference:

- Nicol, C.J., Bouwsema, J., Caplen, G., Davies, A.C., Hockenhull, J., Lambton, S.L., Lines, J.A., Mullan, S., Weeks, C.A. (2017) *Farmed Bird Science Review*, Department of Economic Development, Jobs, Transport and Resources, Melbourne, p. 55.

Available at: http://agriculture.vic.gov.au/__data/assets/pdf_file/0019/370126/Farmed-Bird-Welfare-Science-Review-Oct-2017.pdf.

2. Behaviour

The presence or absence of certain behaviours may indicate either good *animal welfare* or an *animal welfare* problem, such as fear, pain or sickness. Some behaviours may not be uniquely indicative of one type of problem; they may be exhibited for a variety of reasons. *Gallus gallus domesticus* has evolved, motivated behaviours, ~~that they are motivated to perform and, a~~ good understanding of the animals' their normal behaviours [Nicol, 2015], including their social interactions [Estevez *et al.*, 2007; Rodríguez-Aurrekoetxea A. and Estevez I., 2014], is required for appropriate management and decision-making. Opportunities to display these behaviours are influenced by the physical and social environment [Widowski *et al.*, 2016; Lay *et al.*, 2011; O'Connor *et al.*, 2011].

Rationale: Australia suggests the above edits for grammatical and readability purposes. *Gallus gallus domesticus* refers to the subspecies, which is singular. This is consistent with the use of the word 'has' following *Gallus gallus domesticus*, rather than 'have'. Australia recommends that 'motivated behaviour' is defined and its relevance to animal welfare explained in this chapter.

a) Dust bathing

Dust bathing is a complex behaviour providing body maintenance benefits. During dust bathing, layer pullets and laying hens remove work loose substrate material, such as litter, through their feathers. This behaviour helps remove stale lipids [van Liere and Bokma, 1987], which contributes to the maintenance of plumage condition. ~~This helps to regulate body temperature and protect against skin injury. Good plumage condition helps layer pullets and laying hens to regulate their body temperature and helps protect against skin injury.~~ This helps to regulate body temperature and protect against skin injury. Reduced dust bathing behaviour in the *flock* may indicate problems with substrate or range quality, such as the substrate or ground being wet or not friable [Olson and Keeling, 2005; Van Liere and Bokma, 1987]. The demonstration of complete sequences of dust bathing may be associated with positive mental state and therefore welfare affect [Widowski and Duncan, 2000].

Rationale: Australia recommends using the phrase 'work loose substrate' that was included in previous versions of the chapter in Article 7.Z.3 point 2.a) rather than the phrase 'remove loose substrate'. During dust bathing, excess lipids are removed by birds working the litter through their feathers.

Australia suggests rewording the sentence about regulation of body temperature and skin injury as the current wording is unclear- Is it dust bathing or maintenance of plumage condition which helps to regulate body temperature? Australia suggests that inserting 'Good plumage condition helps layer pullets and laying hens to regulate their body temperature' provides clarification. Good plumage condition is a mechanism that helps to maintain body temperature by minimising heat loss, while overall temperature regulation is performed by the hypothalamus.

Australia suggests replacement of 'affect' with 'mental state and therefore welfare' to avoid misunderstanding, and provide clarity that birds undertaking natural behaviours is an indicator of a positive welfare state.

b) Fear behaviour

Fearful layer pullets and laying hens show high reactivity to various stimuli [Jones, 1987; Zeltner and Hirt, 2008] and this may result in traumatic injuries or suffocation if the layer pullets or laying hens pile on top of one another. Fearful layer pullets and laying hens may be less productive [Barnett *et al.*, 1992] and more prone to injurious feather pecking behaviour [de Haas *et al.*, 2014]. Methods have been developed for evaluating fearfulness [Forkman *et al.*, 2007], for example by observing layer pullet and laying hen behaviour in response to novel objects or when people, including *animal handlers*, walk through the pullet and hen areas of the poultry house [Jones, 1996; Waiblinger *et al.* 2006].

Rationale: Birds' reaction to novel objects or people is commonly used in research to assess fearfulness in birds and could easily be used in an on-farm setting.

The insertion of 's' to make 'area' plural is suggested as there may be separate areas for pullets and hens in a poultry house.

References:

- AssureWel (2013) Laying hens assessment protocol. <http://www.assurewel.org/layinghens.html>.

- Hegelung L, Sorensen J (2007) Measuring fearfulness of hens in commercial organic egg production. *Animal Welfare* 16:169-171.

Annex 12 (contd)

c) Feeding and drinking behaviour

Changes in feeding or drinking behaviour can indicate management problems, including inadequate spaces for, or inappropriate placement of, feeders or drinkers, dietary imbalances, poor feed or water quality, or feed contamination [Garner *et al.*, 2012; Thogerson *et al.*, 2009a; Thogerson *et al.*, 2009b]. Feed and water intake often reduce when pullets or hens are ill. Feed or water intake may also change as a result of heat [Lara L. J. & Rostagno M. H., 2013; Lin H. *et al.*, 2006] or cold [Alves *et al.*, 2012] stress.

d) Foraging behaviour

Foraging is a motivated behaviour [de Jong *et al.*, 2007, Nicol *et al.*, 2011]. Foraging is the act of searching for food, typically by pecking or scratching the substrate.

Reduced foraging activity may suggest problems with substrate quality or the presence of conditions that decrease foraging ability [Appleby *et al.*, 2004; Lay *et al.*, 2011; Weeks and Nicol, 2006]. When in the presence of an adequate substrate, laying hens spend a large amount of time foraging even when food is readily accessible [Weeks and Nicol, 2006].

e) Injurious feather pecking and cannibalism

Injurious feather pecking can result in significant feather loss and lead to cannibalism. Cannibalism is the tearing of the flesh of another layer pullet or lying laying hen, and can result in severe injury, secondary infection or death. These behaviours can have multifactorial causes and be difficult to control [Nicol, 2018; Hartcher, 2016; Estevez, 2015; Nicol *et al.*, 2013; Rodenburg, 2013; Lambton, 2013; Newberry, 2004].

Rationale: Edit made to correct the typological error of 'lying' instead of 'laying'.

Secondary infection can be commonly caused by injurious pecking injuries.

Reference:

- FeatherWel. <http://www.featherwel.org/injuriouspecking.html>

f) Locomotory and comfort behaviours

Layer pullets and laying hens may display a variety of locomotory and comfort behaviours, including walking, running, leaping, turning, stretching legs and wings, wing flapping, feather ruffling, tail wagging, and preening [Bracke and Hopster, 2006; Harthcher and Jones, 2017; Dawkins and Hardie, 1989; Shipov *et al.*, 2010; Norgaard, 1990]. Some of these behaviours have been shown to be important for skeletal, body and plumage development and maintenance. For example, walking and wing movements contribute to improved leg and wing bone strength [Knowles and Broom, 1990], and preening helps remove stale lipids from the skin [Vezzoli *et al.*, 2015] and keeps the feathers flexible and intact [Shawkey *et al.*, 2003].

g) Nesting

Nesting is a motivated behaviour that includes nest site selection, nest formation and egg laying [Cooper and Albentosa, 2003; Weeks and Nicol, 2006; Cronin *et al.*, 2012; Yue and Duncan, 2003].

Uneven nest box utilisation, delayed oviposition, increased pacing and egg laying outside the nest may be indicative of problems with environmental or social behavioural factors such as access to, or suitability of, nesting sites or disturbance by other birds [Cronin *et al.*, 2012; Cooper and Appleby, 1996; Gunnarsson *et al.*, 1999; Yue and Duncan, 2003; Widowski *et al.*, 2013].

Rationale: Australia considers the term 'social behavioural factors' to be unclear and suggests that 'behavioural factors' is clearer. Australia recommends providing examples of environmental and social factors to Article 7.Z.3 point 2.g) to add clarity and improve meaning.

The suitability of nest sites is important to ensure birds use nest sites. Birds have been shown to prefer enclosed boxes, substrate available and nesting sites away from feed areas. There is also the need for adequate numbers and space of sites to avoid aggression or competition between hens.

Cronin et al. (2012) reports that disturbance by other birds around nesting was stressful (as measured by increased nesting bouts and corticosterone levels).

References:

- Yue S, Duncan I (2003) Frustrated nesting behaviour: relation to extra-cuticular shell calcium and bone strength in white leghorn hens. *British Poultry Science* 44(2):175-181.
- Widowski T, Hemsworth P, Coleman G (2012) Welfare issues and housing for laying hens: international developments and perspectives.
- Widowski, T., Classen, H., Newberry, R., Petrik, M., Schwan-lardner, K., Cottee, S. and Cox, B. (2013) Code of practice for the care and handling of pullets, layers and spent fowl: Poultry (layers). Review of scientific research on priority areas.

h) Perching

Perching is a motivated behaviour. Layer pullets and laying hens may seek elevation during the day; however, the motivation to seek elevation is particularly strong at night when pullets and hens select a site for resting or sleeping [EFSA, 2015].

Reduced perching behaviour in the *flock* may indicate problems with environmental factors [such as inadequate perch space or poor perch design](#), injuries or pullet rearing experience [Janczak and Riber, 2015; Gunnarsson *et al.*, 1999].

Rationale: Similar to the above nesting comment, Australia recommends providing examples of environmental factors to Article 7.Z.3 point 2.h) add clarity. The material, height, width and amount of perching provide significant influence on how birds utilise perches.

References:

- Pickel T, Scholz B, Schrader L (2010) Perch material and diameter affects particular perching behaviours in laying hens. *Applied Animal Behaviour Science* 127:37-42.
- Hester P (2014) The effect of perches installed in cages on laying hens. *World's Poultry Science Journal* 70:247-264.
- Fraser, D., Duncan, I.J.H., Edwards, S.A., Grandin, T., Gregory, N.G., Guyonnet, V., Hemsworth, P.H., Huertas, S.M., Huzzey, J.M., Mellor, D.J., Mench, J.A., Spinka, M. and Whay, H.R. (2013) General Principles for the welfare of animals in production systems: The underlying science and its application. *Veterinary Journal* 198: 19-27.
- Lay, D.C., Fulton, R.M., Hester, P.Y., Karcher, D.M., Kjaer, J.B., Mench, J., Ullens, Olsson, I.A.S. and Keeling, L.J. (2002) The push-door for measuring motivation in hens: Laying hens are motivated to perch at night. *Animal Welfare* 11: 11-19.

i) Resting and sleeping

Sleep is an adaptive state that allows animals to recover from daily stress, conserve energy and consolidate memory [Siegel, 2009]. Layer pullets and laying hens display synchronised resting and sleeping behaviours, which can be disrupted by light intensity, photoperiod, environmental or social factors [Malleau *et al.*, 2007; Alvino *et al.*, 2009].

Annex 12 (contd)

j) Social behaviour

Pullets and hens are social and engage in synchronised behaviour [Olsson *et al.*, 2002; Olsson and Keeling, 2005]. Social behaviour may differ according to the characteristics of the social environment [Estevez *et al.*, 2002; 2007]. Problems in social behaviour can be assessed using scoring systems for measuring the degree of damage caused by aggression and competition for resources [Estevez *et al.*, 2002; Blatchford *et al.*, 2016].

k) Spatial distribution

Uneven spatial distribution of layer pullets and laying hens may indicate fear reactions, thermal discomfort or, uneven availability or use of resources such as light, feed or water, shelter, nesting areas or comfortable resting locations [Rodríguez-Aurrekoetxea and Estevez, 2016; Bright and Johnson, 2011].

l) Thermoregulatory behaviour

Prolonged or excessive panting and wing spreading are observed during heat stress [Mack, 2013; Lara and Rostagno, 2013]. Indicators of cold stress include feather ruffling, rigid posture, trembling, huddling and distress vocalisations.

m) Vocalisation

Vocalisation can indicate emotional states, both positive and negative. A good understanding of *flock* vocalisations and their causes is useful for [managing good animal welfare](#) [Zimmerman *et al.*, 2000; Bright, 2008; Koshiba *et al.*, 2013].

Rationale: Australia suggests that the usefulness of the knowledge described relates to how it can be applied in layer pullet and laying hen management. The phrase 'useful for good animal welfare' has limited meaning in this context.

3. Body condition

Poor body condition is reflective of *animal welfare* problems for individual layer pullets and laying hens. At *flock* level, uneven body condition may be an indicator of poor *animal welfare*. Body condition can be evaluated using on-farm sampling methods for body weight or body condition scores [Gregory and Robins, 1998; Craig and Muir, 1996; Elson and Croxall, 2006; Keeling *et al.*, 2003]. The choice of sampling methods should take into account the fact that feather cover can mask actual body condition.

Rationale: Edit to correct typological error.

4. Eye conditions

Conjunctivitis can indicate disease or the presence of irritants such as dust and ammonia. High ammonia levels can also cause corneal burns and eventual blindness. Abnormal eye development can be associated with very low light intensity (<5 lux) [Jenkins *et al.*, 1979; Lewis and Gous, 2009; Prescott *et al.*, 2003].

5. Foot problems

Hyperkeratosis, bumblefoot, contact dermatitis, excessive claw growth, broken claws and toe injuries are painful conditions associated with, amongst other things, inappropriate flooring, poorly designed perches, poorly maintained substrate [EFSA, 2005; Lay *et al.*, 2011; Abrahamsson and Tauson, 1995; Tauson and Abrahamson, 1996; Abrahamsson and Tauson, 1997] and inadequate maintenance of aspects of the production system.

If severe, the foot and hock problems may contribute to locomotion problems and lead to secondary *infections*. Scoring systems for foot problems have been developed [Blatchford *et al.*, 2016].

6. Incidence of diseases, infections, metabolic disorders and infestations

Ill-health, regardless of the cause, is an *animal welfare* concern, and may be exacerbated by poor environmental or husbandry management.

7. Injury rate and severity

Injuries are associated with pain and risk of ~~infection~~ infection. They can be a consequence of the actions of other pullets and hens (e.g. scratches, feather loss or wounding), management (e.g. nutritional deficits leading to skeletal problems), environmental conditions, (e.g. fractures and keel bone deformation), genetics used or human intervention (e.g. during handling and catching). It is important to assess both the rate and severity of injuries.

Rationale: Edit made to italicise 'infection', a term defined in the glossary, for consistency throughout the chapter.

8. Mortality, culling and morbidity rates

Daily, weekly and cumulative mortality, culling and morbidity rates should be within expected ranges. Any unforeseen increase in these rates may reflect an *animal welfare* problem. Recording and evaluating causes of morbidity and mortality can be useful aids in diagnosing and remediating *animal welfare* problems.

9. Performance indicators

Daily, weekly and cumulative performance should be within expected ranges

Any unforeseen reduction in these rates may reflect an *animal welfare* problem. Types of measures that can be used include:

- a) pullet growth rate, which measures average daily mass gain per pullet and *flock* uniformity;
- b) pullet feed conversion, which measures the quantity of feed consumed by a *flock* relative to the total live mass produced, expressed as the mass of feed consumed per unit of body mass;
- c) hen feed conversion, which measures quantity of feed consumed by a *flock* relative to the unit of egg production;
- d) egg production, which measures the number and size of eggs per hen housed;
- e) egg quality and downgrades, which can be measured by, for example, grade percentage, shell strength, Haugh units, abnormalities and mis-laid or floor eggs;

10. Plumage condition

Evaluation of plumage condition provides useful information about aspects of *animal welfare* in terms of feather pecking and cannibalism, ability to thermoregulate, illness, and protection from injury [Rodriguez-Aurrekoetxea and Estevez, 2016; Drake *et al.*, 2010]. Dirty plumage may be associated with illness, environmental conditions or the layer pullet and laying hen housing system.-Plumage cover and cleanliness scoring systems have been developed for these purposes [Blokhuys, 2007; Blatchford *et al.*, 2016].

11. Water and feed consumption

Monitoring and evaluating daily water and feed consumption is a useful tool which may indicate thermal stress, disease, *infection* or *infestation* and other welfare-impacting conditions, taking into consideration ambient temperature, relative humidity and other related factors. Changes in intake, crowding at feeders and drinkers and wet substrate may be associated with problems with the quality or supply of water, or feed.

Rationale: 'Welfare' is a characteristic of an animal. In order to use the concept of welfare in a scientific way it is necessary to specify the level or impact on an animal's welfare and not simply to reserve the word to indicate that the animal has, or does not have, problems. Australia suggests insertion of 'impacting' to improve the use of the term welfare in this sentence.

Article 7.2.4.

Recommendations for layer pullets and laying hens

Ensuring good welfare of layer pullets and laying hens is contingent upon several management factors, such as system design, environmental management practices, and animal management practices including responsible husbandry and provision of appropriate care, and the genetics used. Serious problems can arise in any [production](#) system if one or more of these elements are lacking.

Rationale: 'Production' added for readability and consistency throughout the chapter.

~~Although pullets and hens can adapt to a range of thermal environments, particularly if appropriate breeds and housing are used for the anticipated conditions, sudden fluctuations in temperature can cause heat or cold stress.~~

Rationale: Australia suggests moving this sentence in Article 7.Z.4 to Article 7.Z.15 'Thermal Environment', as that article specifically refers to thermal environments.

Articles 7.Z.5. to 7.Z.29. provide [welfare](#) recommendations for layer pullets and laying hens.

Rationale: Australia suggests the insertion of 'welfare' to clarify that the recommendations are about welfare.

Each recommendation includes a list of relevant outcome-based criteria or measurables derived from Article 7.Z.3. and when appropriate other criteria or measurables. The suitability of some of these criteria or measurables should be determined in accordance with the [production](#) system in which the pullets and hens are housed.

Rationale: Australia suggests the insertion of 'production' for consistency throughout the chapter.

Annex 12 (contd)

Article 7.Z.5.

Location, design, construction and equipment of establishments

The location of layer pullet and laying hen *establishments* should be safe from the effects of fires and floods and other natural disasters to the extent practicable. In addition, *establishments* should be located or designed to avoid or minimise disease risks and exposure of layer pullets and laying hens to chemical and physical contaminants, noise and adverse climatic conditions.

Good welfare outcomes for layer pullets and laying hens can be achieved in a range of housing systems. Houses, outdoor areas and accessible equipment should be designed after considering the opportunities for layer pullets and laying hens to perform motivated behaviours as well as health, environmental factors, and animal management capability.

They should also be maintained to avoid injury or discomfort. Pullet and hen houses should be constructed with materials, electrical and fuel installations that minimise the risk of fire and other hazards, and are [easy practical](#) to clean and maintain. Producers should have a maintenance programme in place, including record-keeping for all equipment and contingency plans to address failures that could jeopardise [the welfare of](#) layer pullets and laying hens [welfare](#).

Rationale

Australia recommends replacing 'easy' with 'practical', as sheds are generally not easy to clean, however they should be practical to clean.

Edits made to the last sentence to improve readability.

Outcome-based measurables include: body condition, culling and morbidity rates, fear behaviour, feeding and drinking behaviour, foot problems, [frequency of](#) foraging behaviour, incidence of diseases, *infections* and *infestations*, injury rates and severity, [frequency of](#) locomotory and comfort behaviours, mortality rates, performance indicators, plumage condition, resting and sleeping [patterns](#), social behaviour and spatial distribution, thermoregulatory behaviour and vocalisations.

Rationale: Australia notes that the factors listed above are measurable, but several behaviours are listed without indication of what is to be measured e.g. presence, absence or frequency.

References to culling, morbidity, mortality, disease and mortality above include mention of rates or incidences, suggesting these factors should be quantified. Similarly, Australia recommends that behaviours are also quantified throughout the chapter. The insertion of 'frequency of' and 'patterns' above in Article 7.Z.5 supports quantification of behaviours.

Article 7.Z.6.

Matching the layer pullets and laying hens with the housing and production system

Animal welfare and health considerations should balance any decisions on performance when choosing the genetics to be used for a particular location, housing and production system. The pullet rearing system should pre-adapt the [bird layer pullets](#) for the intended production system [Aerni *et al.*, 2005].

Rationale: 'Birds' replaced with 'layer pullets' for consistency throughout the chapter.

Outcome-based measurables include: dust bathing, feeding, and drinking behaviours, foraging behaviour, incidence of diseases, *infections* and *infestations*, injurious feather pecking and cannibalism, injury rate and severity, locomotory and comfort behaviours, mortality rate, nesting, perching, performance indicators, plumage condition, resting and sleeping, social behaviour, and spatial distribution.

Article 7.Z.7.

Space allowance

Layer pullets and laying hens should be housed with a space allowance that allows them to have adequate access to resources and to adopt normal postures. Providing sufficient space for the expression of locomotory and comfort behaviours that [satisfy motivational needs and](#) contribute to good musculoskeletal health and plumage condition is desirable. Problems with space allowance may increase stress and the occurrence of injuries.

Rationale: The original sentence refers to the importance of locomotory and comfort behaviours for physical health only. Australia recommends the insertion of 'satisfy motivational needs and' to Article 7.Z.7 to acknowledge that expression of behaviours provides positive affects.

The following factors, in alphabetical order, should be considered when determining space allowance:

- age and mass of layer pullets and laying hens,
- ambient conditions,
- *biosecurity* strategy,
- equipment selection,
- feed and watering systems,

- flooring substrate,
- genetics,
- housing design,
- management capabilities,
- production system,
- usable space,
- ventilation.

Outcome-based measurables include: dust bathing, feeding and drinking behaviour, foraging behaviour, incidence of diseases, *infections* and *infestations*, injury rate and severity, locomotory and comfort behaviours, mortality rate, nesting, perching, performance indicators, plumage condition, resting and sleeping, social behaviour, and spatial distribution.

Article 7.Z.8.

Nutrition

Layer pullets and laying hens should **always** be fed a diet appropriate to their age, production stage and genetics. The form of the feed should be acceptable to the layer pullets and laying hens and contain adequate nutrients to meet requirements for good *animal welfare and health*. Feed and water should be free from contaminants, debris and microorganisms or other potential *hazards*.

Rationale: Australia suggests deletion of the word 'always' for consistency, as 'should' is used without this addition elsewhere throughout the chapter.

The term 'should always' suggests 'must'. If 'should always' is used in this article, then Australia recommends that for consistency, other areas such as behavioural needs, space requirements and lighting also use the term 'should always', as they are all needs of layer pullets and laying hens that must be met to ensure good welfare.

Australia suggests the removal of 'and health', as health is an aspect of animal welfare, not separate to it.

The feeding and watering systems should be inspected regularly and cleaned as needed, to prevent the growth of hazardous microorganisms.

Layer pullets and laying hens should be provided with adequate access to feed on a daily basis. Water should be continuously available except under veterinary advice. Special provisions should be made to enable newly hatched pullets to access appropriate feed and water.

Outcome-based measurables include: body condition, foraging behaviour, incidence of disease, *infections* and *infestations*, injurious feather pecking, injury rate and severity, metabolic disorders, mortality rate, performance, plumage condition, vocalisations and water and feed consumption.

Article 7.Z.9.

Flooring

The slope, design and construction of the floors should provide adequate support for the locomotion of layer pullets and laying hens, prevent injuries, and entrapments, ensure good health and allow the performance of normal behaviour.

Changes of flooring types from pullet to hen housing should be avoided. Manure contamination from other layer pullets and laying hens within the house should be minimised through appropriate floor design and other elements of system design. The flooring should be easy to clean and disinfect.

When [litter/substrate](#) is provided, it should be managed to remain dry and friable, and adequately treated or replaced when required to prevent *diseases* and minimise any detrimental effects on *animal welfare*.

Rationale: Australia suggests replacing 'litter' with 'substrate' for consistency with the rest of the chapter.

Outcome-based measurables include: dust bathing, foot problems, foraging behaviour, incidence of diseases, *infections* and *infestations*, [injurious feather pecking](#), injury rate and severity, locomotory and comfort behaviours, performance, plumage condition and; resting and sleeping.

Rationale: Australia suggests the insertion of 'injurious feather pecking' as an outcome to Article 7.Z.9, as per the 'Nutrition' section above. The reasoning for the insertion is that feather pecking can be a result of redirected foraging behaviour, in which birds will peck at other birds when no litter/substrate is provided.

References:

- FeatherWel (2013) Improving feather cover: a guide to reducing the risk of injurious pecking occurring in non-cage laying hens.
- Hartcher KM, Wilkinson SJ, Hemsworth PH, & Cronin GM. (2016) Severe feather-pecking in non-cage laying hens and some associated and predisposing factors: a review. *World's Poultry Science Journal* 72:103-114.

Annex 12 (contd)

Article 7.Z.10.

Dust bathing areas

Access to friable, dry substrate to encourage dust bathing is desirable. When provided, dust bathing areas should be designed and positioned to encourage dust bathing, allow synchronised behaviour, prevent undue competition and not cause damage or injuries. Dust bathing areas should be easy to inspect and maintain [Weeks and Nicol, 2006].

Outcome-based measurables include: dust bathing, incidence of diseases, *infections* and *infestations*, injury rate and severity, plumage condition and spatial distribution.

Article 7.Z.11.

Foraging areas

Access to substrate that encourages foraging behaviour activity is desirable. When provided, foraging areas should be designed and positioned to encourage synchronised behaviour, prevent undue competition and not cause damage or injuries. Foraging areas should be easy to inspect and maintain.

Outcome-based measurables include: foraging behaviour, incidence of diseases, *infections* and *infestations*, [injurious feather pecking](#), injurious feather pecking and cannibalism, injury rate and severity and spatial distribution.

Rationale: Australia suggests the insertion of 'injurious feather pecking' as an outcome in Article 7.Z.11, as per the 'Flooring' article rationale. The reasoning for the insertion is that feather pecking can occur as a redirected behaviour in which birds will peck at other birds when no litter/substrate is provided.

Reference:

- FeatherWel (2013) Improving feather cover: a guide to reducing the risk of injurious pecking occurring in non-cage laying hens.

Article 7.Z.12.

Nesting areas

[Access to](#) nesting areas is desirable. When provided, nesting areas should be built of suitable materials, and designed and positioned to encourage nesting, prevent undue competition and not cause damage or injuries. Nesting areas should be easy to inspect, clean and maintain.

Outcome-based measurables include: incidence of diseases, *infections* and *infestations*, injurious feather pecking and cannibalism, injury rate and severity, nesting, performance (mis-laid or floor eggs), and spatial distribution.

Rationale: 'Access to' inserted to correct editing error. The clean version of the chapter that was circulated for comment does not contain the words 'Access to', although the track changed version does.

Article 7.Z.13.

Perches

Access to perches is desirable. When provided perches should be built of suitable materials, designed, elevated and positioned to encourage perching by all layer pullets and laying hens, prevent undue competition, minimise keel bone deformation, foot problems or other injuries, and to ensure stability during perching. In the absence of designated perches, other structures such as platforms, grids or slats that are perceived by the pullets and hens as elevated and that do not cause damage or injuries, may be a suitable alternative. When provided, perches or their alternatives should be made available from an early age, be easy to clean and maintain, and be positioned to minimise faecal fouling [Hester, 2014; EFSA, 2015].

Outcome-based measurables include: foot problems, injurious feather pecking and cannibalism, injury rate and severity, perching, plumage condition, resting and sleeping and spatial distribution.

Article 7.Z.14.

Outdoor areas

Layer pullets and laying hens may be given access to outdoor areas when they have sufficient feather cover and can range safely. Where pullets and hens are partially housed, there should be sufficient appropriately designed openings to allow them to leave and re-enter the poultry house freely.

Management of outdoor areas is important. Land and pasture management measures should be taken to reduce the risk of layer pullets and laying hens becoming infected by pathogenic agents or infested by parasites or being injured. This may include limiting the stocking density or using several pieces of land consecutively in rotation.

Annex 12 (contd)

Outdoor areas should be located on well-drained ground and managed to minimise stagnant water and mud. The outdoor area should be able to contain the layer pullets and laying hens and prevent them from escaping. Outdoor areas should be designed, built and maintained to allow layer pullets and laying hens to feel safe outdoors and to encourage them to utilise the range optimally, while mitigating predation, disease risks, and adverse climatic conditions [Gilani *et al.*, 2014; Hegelund *et al.*, 2005; Nagle and Glatz, 2012]. Pullets and hens should be habituated early to the outdoor area [Rodríguez–Aurrekoetxea and Estevez, 2016].

Outdoor areas [that provide shelter and shade for birds are desirable. Outdoor areas](#) should be free from harmful plants and contaminants.

Rationale: Shade and shelter have been shown to be important factors contributing to range utilisation and allowing birds to feel safe outdoors. Australia recommends the insertion of the above statement to Article 7.Z.14 to acknowledge the importance of shelter and shade for birds and encourage their provision.

References:

- Hegelund L, Sorensen J, Kjaer J et al (2005) Use of the range area in organic egg production systems: effect of climatic factors, flock size, age and artificial cover. *British Poultry Science* 46(1):1-8.
- Nagle T, Glatz P (2012) Free range hens use the range more when the outdoor environment is enriched. *Asian-Australian Journal of Animal Science* 25(4):584-591.

Outcome-based measurables include: fear behaviour, foot problems, foraging behaviour, incidence of diseases, *infections* and *infestations*, injury rate and severity, locomotory and comfort behaviours, morbidity and mortality rates, performance, plumage condition, social behaviour, spatial distribution, thermoregulatory behaviour, and vocalisation.

Article 7.Z.15.

Thermal environment

[Although layer pullets and laying hens can adapt to a range of thermal environments, particularly if appropriate breeds and housing are used for the anticipated conditions, sudden fluctuations in temperature can cause heat or cold stress.](#)

Rationale: Australia suggests that the above sentence is moved to Article 7.Z.15, from its previous location in the introduction of Article 7.Z.4 'Recommendations for layer pullets and laying hens'. The sentence is relevant to thermal environments and therefore fits better within the 'Thermal environment' article.

Thermal conditions for layer pullets and laying hens should be maintained within a range that is appropriate for their stage of life and the genetics used; extremes heat, humidity and cold should be avoided. A heat index can assist in identifying the thermal comfort zones for layer pullets and laying hens at varying temperatures, air velocities and relative humidity levels [Xin and Harmon, 1998], and can be found in management guidelines provided by laying hen genetics companies.

Rationale: Typological error corrected.

When environmental conditions move outside of these zones, strategies should be used to mitigate the adverse effects on the layer pullets and laying hens. These may include adjusting air speed, provision of heat or evaporative cooling [Yahav, 2009].

The thermal environment should be monitored regularly so that ~~failure of the system~~ extreme conditions can be detected and corrected before they cause an animal welfare problem.

Rationale: Australia considers the current wording to be unclear, does 'the system' refer to the production system, or a system for temperature regulation? Australia suggests replacing 'failure of the system' with 'extreme conditions' to improve clarity of meaning.

Outcome-based measurables include: morbidity rate, mortality rate, performance, spatial distribution, temperature and humidity, thermoregulatory behaviours and water and feed consumption.

Article 7.Z.16.

Air quality

Ventilation, housing, space allowance and manure management can affect air quality. Actions are required to maintain air quality at levels required for good *animal welfare*, including the removal or mitigation of noxious gases such as carbon dioxide and ammonia, dust and excess moisture in the environment.

Ammonia concentrations should not routinely exceed 25 ppm at layer pullet and laying hen level [David *et al.*, 2015; Miles *et al.*, 2006; Olanrewai, 2007].

Dust levels should be kept to a minimum [David *et al.*, 2015].

Outcome-based measurables include: ammonia level, carbon dioxide level, dust level, eye conditions, incidence of diseases, *infections*, metabolic disorders and *infestations*, morbidity and mortality rates, plumage condition, performance indicators, temperature and humidity and thermoregulatory behaviours.

Article 7.Z.17.

Lighting

There should be an adequate period of continuous light. The light intensity during the light period should be sufficient and homogeneously distributed to promote normal development, allow layer pullets and laying hens to find feed and water, to stimulate activity, to stimulate onset of lay, minimise the likelihood of feather pecking and cannibalism, and to allow adequate inspection [Prescott *et al.*, 2003; Prescott and Wathes, 1999; Green *et al.*, 2000].

Annex 12 (contd)

There should also be an adequate period of darkness during each 24-hour cycle to allow layer pullets and laying hens to rest and sleep, to reduce stress and promote circadian rhythms [Malleau *et al.*, 2007].

Changes in lighting should occur gradually or in a step-wise fashion, as needed, except if during induced moulting is practised, during which ~~when~~ rapid adjustments to lighting should be considered [Tanaka and Hurnik, 1990; Kristenson, 2008].

Rationale: Australia recommends inserting the term 'if practised' into Article 7.Z.17, as otherwise the sentence implies that induced moulting is recommended as a practice. Induced moulting in hens can cause significant suffering to birds and has negative welfare implications. See the below rationale in Article 7.Z.20 for not recommending induced moulting.

References:

- Shimmura T, Eguchi Y, Uetake U et al (2008) Comparison of behavior, physical condition and performance of laying hens in four molting methods. *Animal Science Journal* 79:129-138.
- McCowan B, Schrader J, DiLorenzo AM et al (2006) Effects of Induced Molting on the Well-Being of Egg-Laying Hens. *Journal of Applied Animal Welfare Science* 9:9-23.

Outcome-based measurables include: eye conditions, injurious feather pecking and cannibalism, injury rate and severity, locomotory behaviour, nesting, perching, performance, plumage condition, resting and sleeping and spatial distribution.

Article 7.Z.18.

Noise

Although layer pullets and laying hens can adapt to different levels and types of noise, exposure of layer pullets and laying hens to unfamiliar noises, particularly those that are sudden or loud, should be minimised to prevent stress and fear reactions, such as piling up [Bright and Johnson, 2001]. Ventilation fans, machinery and other indoor or outdoor equipment should be constructed, placed, operated and maintained in such a way as to cause the least possible amount of noise [Chloupek *et al.*, 2009].

Rationale: Edit to correct typological error.

Location of *establishments* should, where possible, consider existing local sources of noise. Strategies should be implemented to acclimatise the layer pullets and laying hens to the conditions [Candland *et al.*, 1963; Morris, 2009].

Outcome-based measurables include: fear behaviours, injury rate and severity, mortality rate, performance indicators, resting and sleeping, and vocalisation.

Article 7.Z.19.

Prevention and control of injurious feather pecking and cannibalism

Injurious feather pecking and cannibalism are challenges in pullet and hen production systems.

Management methods that may reduce the risk of occurrence include:

- adapting the diet and form of feed during rearing and lay [Lambton *et al.*, 2010],
- choosing genetics [associated](#) with a low propensity [for](#) injurious feather pecking [Craig and Muir, 1996; Kjaer and Hocking, 2004],

Rationale: Australia suggests the insertion of 'associated' and 'for' to increase the accuracy of the statement in Article 7.Z.19 point 2. The genetics themselves do not feather pick, they are associated with the behavioural phenotype of a low propensity to feather pick.

- increasing age at onset of lay [Pöttsch, 2001],
- increasing space allowance during rearing [Jung and Knierim, 2018],
- managing light during rearing and lay [Nicol *et al.*, 2013; van Niekerk *et al.*, 2013],
- minimising fear-related stimuli [Uitdehaag K. A. *et al.*, 2009],
- providing elevated perches during rearing and lay [Green *et al.*, 2000],
- providing foraging or other manipulable materials during rearing and lay [Huber-Eicher and Wechsler, 1998; de Jong *et al.*, 2010; Daigle *et al.*, 2014; Dixon *et al.*, 2010; Nicol, 2018],
- reducing group size during rearing and lay [Bilcik and Keeling, 1999].
- [Matching layer pullet rearing environment with the intended laying hen environment.](#)
- [Providing nesting areas during lay.](#)
-
- [Providing outdoor or partial outdoor access during rearing and lay.](#)
-
- [Managing air quality during rearing and lay.](#)
-
- [Undertaking regular inspections of flocks for signs of injurious feather pecking.](#)

Rationale: Australia recommends the insertion of additional important management methods that reduce the occurrence of injurious pecking.

Reference:

- FeatherWel (2013) Improving feather cover: a guide to reducing the risk of injurious pecking occurring in non-cage laying hens.

Management methods should be implemented, where applicable, and in the event of injury affected layer pullets and laying hens should be promptly removed and treated or euthanased.

If these management methods are unsuccessful, partial beak removal [Gentle *et al.*, 1997], may be considered as a final course of action.

Outcome-based measurables include: injurious feather pecking and cannibalism, injury rate and severity, mortality and culling rate, plumage condition, and vocalisation.

Article 7.Z.20.

Moulting

Induced moulting can lead to *animal welfare* problems if not well managed [Nicol *et al.*, 2017; Sariozkan *et al.*, 2016; Holt, 2003, Ricke, 2003, Webster, 2003]. It is preferable for other management strategies to be used instead to extend the first productive laying phase (genetics, provision of extra space and furnishings for exercise, or other techniques). When induced moulting is practised, methods that do not involve withdrawal of feed and are consistent with Article 7.Z.8. should be used. Laying hens should have access to light and access to water at all times [Anderson, 2015]. Only laying hens in good body condition and health should be moulted. During the moulting period, loss of body mass should not compromise the welfare of laying hens welfare, including their welfare during the subsequent laying periods. Total mortality and culling rates during the moulting period should not exceed normal variations in *flock* mortality and culling rates.

Rationale:

Australia recommends stating that it is preferable for other management strategies to be considered in the first instance over induced moulting, as there is substantial evidence demonstrating that induced moulting is detrimental to many aspects of hen welfare.

Welfare concerns outweigh the productivity benefit of extending the laying phase of laying hens. The induction of moulting requires an extended period of total or partial withdrawal of food which causes hunger and stress – freedom from hunger is a key animal welfare domain. Hunger occurs even when food of similar quantity (but reduced nutritional value) is provided, and is demonstrated by increased pecking behaviour and aggression, among other behaviours. The practice of forced moulting also has a substantial negative impact on bone mineral density and content.

Working towards furnished cages or non-cage systems that allow hens to exercise and/or the use of new strains of laying hens with longer first laying cycles can make induced moulting redundant. The literature review referenced below further explains the welfare concerns associated with induced moulting.

Some text edits have also been made to improve readability. Australia's suggestion to insert 'access' adds clarity to the sentence about access to light and water. In its current form, the sentence implies that both light and water should be available all the time. Australia's suggestion clarifies the sentence to ensure the intention of the sentence is clear, which is that water is available at all times.

Reference:

- Nicol, C.J., Bouwsema, J., Caplen, G., Davies, A.C., Hockenhull, J., Lambton, S.L., Lines, J.A., Mullan, S., Weeks, C.A. (2017) *Farmed Bird Science Review*, Department of Economic Development, Jobs, Transport and Resources, Melbourne. Pp. 33, 56-58, 60.

Available at: http://agriculture.vic.gov.au/__data/assets/pdf_file/0019/370126/Farmed-Bird-Welfare-Science-Review-Oct-2017.pdf.

Outcome-based measurables include: body condition, feeding and drinking, foraging behaviour [Biggs *et al.*, 2004; Sariozkan *et al.*, 2016; Petek and Alpay, 2008], injurious feather pecking and cannibalism, injury rate and severity, morbidity rate, mortality and culling rate, performance, plumage condition, and social behaviour.

Article 7.Z.21.

Painful procedures

Painful procedures should not be practised unless necessary and should be performed in such a way as to minimise any pain, distress and suffering. [Dubbing, toe trimming and other mutilations should not be performed in layer pullets and laying hens.](#)

[It is desirable to control injurious feather pecking and cannibalism using pain-free management strategies such as provision of pecking substrates, rather than partial beak removal. If used, partial beak removal should be carried out at the earliest age possible and care should be taken to remove the minimum amount of beak necessary using a method that minimises pain and controls bleeding.](#) If management methods to control injurious feather pecking and cannibalism are not successful, therapeutic partial beak removal may be considered as a final course of action [Gentle *et al.*, 1991; Marchand-Forde *et al.*, 2008; Marchand-Forde *et al.*, 2010; McKeegan and Philbey, 2012; Freire *et al.*, 2011; Glatz *et al.*, 1998]. [If used, partial beak removal should be carried out at the earliest age possible and care should be taken to remove the minimum amount of beak necessary using a method that minimises pain and controls bleeding. Partial beak removal at a mature age can cause chronic pain. Dubbing, toe trimming and other mutilations should not be performed in layer pullets and laying hens.](#)

Rationale: Australia suggests that the sentences in Article 7.Z.21 are moved as per the edits above to improve readability and flow.

Australia recommends the insertion of 'It is desirable to control injurious feather pecking and cannibalism using pain-free management strategies such as provision of pecking substrates, rather than partial beak removal', as welfare guidelines should always recommend attempting to find pain-free alternatives to any aversive routine procedure currently practiced in a commercial setting.

Reference:

- Nicol C, Bouwsema J, Caplen G et al (2017) Farmed bird welfare science review.

Potential options for improving *animal welfare* in relation to these procedures include: ceasing the procedure, reducing or eliminating the need for the painful procedures through management strategies, using genetics that do not require the painful procedures, or replacing the current procedures with less painful or invasive alternatives.

Outcome-based measurables include: beak condition, body condition, feeding and drinking behaviour, foraging behaviour, injurious feather pecking and cannibalism, locomotory and comfort behaviours, mortality rate, morbidity rate, performance, plumage condition, and vocalisations.

Article 7.Z.22.

Animal health management, preventive medicine and veterinary treatment

Animal handlers responsible for the care of pullets and hens should have knowledge of normal layer pullet and laying hen behaviour, and be able to detect signs of ill-health or distress, such as a change in feed or water intake, reduced production, changes in behaviour and abnormalities in plumage condition, faeces or other physical features.

Rationale: Comma inserted to correct the meaning of the sentence.

If *animal handlers* are unable to identify the cause of disease, ill-health or distress, or are unable to correct these, or if they suspect the presence of a *notifiable disease*, they should seek advice from a *veterinarian* or other qualified advisers. Veterinary treatments should be prescribed by a *veterinarian*.

There should be an effective programme for the prevention of diseases that is consistent with the programmes established by *Veterinary Services* as appropriate, and which includes record-keeping.

Vaccinations and treatments should be administered by personnel skilled in the procedures and with consideration for the welfare of the layer pullets and laying hens.

Sick or injured pullets and hens should be placed in a hospital area for observation and treatment, or euthanised in accordance with Chapter 7.6. as soon as possible.

Annex 12 (contd)

Outcome-based measurables include: body condition, incidence of diseases, *infections*, metabolic disorders and *infestations*, injury rate and severity, morbidity rate, mortality rate and performance.

Article 7.Z.23.

Biosecurity plans

Biosecurity plans should be designed, implemented, and reviewed regularly, commensurate with the best possible layer pullet and laying hen health status. The *biosecurity plan* should be sufficiently robust to be effective in addressing the current disease *risks* that are specific to each epidemiological group of layer pullets and laying hens and in accordance with relevant recommendations in the *Terrestrial Code*.

These programmes should address the control of the major routes for *infection* and *infestation* such as:

- aerosols,
- direct transmission from other *poultry*, *domestic animals* and *wildlife* and humans,
- feed,
- fomites, such as equipment, facilities and vehicles,
- *vectors* (e.g. arthropods and rodents),
- water supply.

Partially restocking (back filling), in a response to catastrophe or incomplete flock placement, should only be practised with due consideration to biosecurity and in a manner that prevents co-mingling of flocks.

Outcome-based measurables include: culling and morbidity rates, incidence of diseases, mortality rate and performance.

Article 7.Z.24.

Euthanasia of individual layer pullets or laying hens

Individual layer pullets or laying hens may be euthanised. Techniques used should be performed, in accordance with Chapter 7.6.

Reasons for euthanasia may include:

- [disease or illness](#)
- disaster management,
- diagnostic purposes,
- rapid deterioration of a medical condition for which treatment has been unsuccessful,
- bone fractures or other injuries,
- emaciation,
- severe pain that cannot be alleviated.

The decision to euthanise ~~an animal~~ [a layer pullet or laying hen](#) and the procedure itself should be undertaken by a competent person. The *establishment* should have documented procedures and appropriate equipment.

Outcome-based measurables include: ~~injury rate and severity~~ [effectiveness of killing method, signs of death](#).

Rationale:

Australia suggests insertion of 'disease or illness' in Article 7.Z.24, as a disease or illness that has not yet deteriorated or been associated with a disaster, may be a reason for euthanasia. An example of this would be an outbreak of an exotic but low severity disease.

Australia suggests replacing 'an animal' with 'a layer pullet or laying hen' for consistency throughout the chapter.

Australia suggests the above edits to the outcome-based measurables, as effective euthanasia should produce immediate insensibility of an animal and then death. Euthanasia should never result in a bird being injured. Therefore, measuring the outcome of euthanasia should include the effectiveness of killing method and signs to confirm death. Injury rates and severity may be measured to understand why euthanasia was required, however they are not the most appropriate measure of the outcome of euthanasia.

Article 7.Z.25.

Depopulation of pullet and hen facilities

This article refers to the removal of flocks of layer pullets and laying hens from facilities ~~for whatever reason~~ and should be read in conjunction with Article 7.Z.24 [and Chapter 7.6](#).

Rationale: Australia suggests deletion of 'for whatever reason' from Article 7.Z.25 as this phrase is considered unnecessary.

Australia suggests inserting a reference to Chapter 7.6 'Killing of animals for disease control purposes', as this chapter is also relevant to depopulation procedures of hens.

The period of feed withdrawal prior to depopulation of layer pullets and laying hens should be minimised.

Water should be available up to the time of depopulation.

Layer pullets and laying hens that are not fit for *loading* or transport should be euthanised. Hens with poor plumage condition are at risk of thermal stress and injury during transport [Broom, 1990; Fleming *et al.*, 2006; Gregory and Wilkins 1989; Newberry *et al.*, 1999; Webster, 2004; Whitehead and Fleming, 2000]. On-farm killing should be performed in accordance with Chapter 7.6.

Catching should be carried out by competent *animal handlers* in accordance with Article 7.Z.28. and every attempt should be made to minimise stress, fear reactions and injuries. If a layer pullet or laying hen is injured during catching, it should be euthanised.

Layer pullets and laying hens should be handled and placed into the transport *container* in accordance with Chapter 7.3.

Catching should preferably be carried out under dim or blue light to calm the layer pullets and laying hens.

Catching should be scheduled to minimise the transport time as well as climatic stress during catching, transport and holding.

The stocking density in transport *containers* should be in accordance with Chapters 7.2., 7.3. and 7.4.

Outcome-based measurables include: fear behaviour, injury rate and severity, mortality rate, spatial distribution, and vocalisation.

Article 7.Z.26.

Contingency plans

Layer pullet and laying hen producers should have contingency plans to minimise and mitigate the consequences of natural disasters, disease *outbreaks* and the failure of mechanical equipment. Planning should include a fire safety plan and, where relevant, include the provision, maintenance and testing of backup generators and fail-safe alarm devices to detect malfunctions, access to maintenance providers, alternative heating or cooling arrangements, ability to store water on farm, access to water cartage services, adequate on-farm storage of feed ~~and~~ an alternative feed supply and a plan for managing ventilation emergencies.

The contingency plans should be consistent with national programmes established or recommended by *Veterinary Services*. Humane emergency *killing* procedures should be a part of the plan and be in accordance with the methods recommended in Chapter 7.6.

Outcome-based measurables include: culling, morbidity, [injury rate and severity, incidence of diseases, thermal comfort](#) and mortality rates.

Rationale: Australia suggests inserting additional outcome-based measurables in Article 7.Z.26 that are also relevant to contingency plans.

Article 7.Z.27.

Competencies of personnel

Animal handlers should have the ability, knowledge and competencies necessary to maintain the welfare and health of the layer pullets and laying hens.

All people responsible for layer pullets and laying hens should have received appropriate training and be able to demonstrate that they are competent to carry out their responsibilities, which should include the assessment of pullet and hen behaviour, handling techniques, *euthanasia* and humane killing procedures, implementation of *biosecurity*, and the detection of general signs of diseases, and indicators of poor *animal welfare* and procedures for their alleviation.

Rationale: Australia suggests the insertion of the term 'humane' to Article 7.Z.27 to be consistent with Chapter 7.6 'Killing of animals for disease control purposes'.

Outcome-based measurables include: body condition, culling and morbidity rate, fear behaviour, incidence of diseases, locomotory and comfort behaviours, performance, mortality rate, spatial distribution and vocalisation.

Article 7.Z.28.

Inspection and handling

Layer pullets and laying hens, and the facilities and equipment within their poultry house should be inspected at least daily. Inspection should have the following objectives

Annex 12 (contd)

- to collect and remove dead layer pullets and laying hens, and dispose of them in accordance with Chapter 4.12.;
- to identify sick or injured layer pullets and laying hens, and treat or ethanised euthanise them in accordance with Article 7.Z.24.;

Rationale: Edit made to correct the tense of the word 'ethanised'.

- to detect and correct any *animal welfare* or health problems in the *flock*; and
- to detect and correct malfunctioning equipment and other problems with the facility.

Inspections should be done in such a way that layer pullets and laying hens are not unnecessarily disturbed, for example *animal handlers* should move quietly and slowly through the *flock*.

When layer pullets and laying hens are handled, particularly when placed into or removed from the poultry house, they should not be injured, and should be held in a manner that minimises fear and stress [Gregory & Wilkins, 1989; Gross & Siegel, 2007; Kannan & Mench, 1996]. The distance over which layer pullets and laying hens are carried should be minimised. Laying hens are prone to bone fractures when not handled properly.

Outcome based measurables include: culling and morbidity rates, fear behaviour, injury rate and severity, mortality, incidence of disease, plumage condition, body score condition, performance, spatial distribution; and vocalisation.

Rationale: Australia suggests the insertion of additional outcome-based measurables that are relevant and easy measures to assess during bird handling/inspection. Plumage condition and overall body condition are important indicators of animal health and behaviour. Plumage can indicate feed deficiencies and feather pecking behaviours in a flock. Body condition scoring is used routinely across other animal production systems (cattle and pig) and in birds provides important information on body fat to muscle ratio, and poor conformation.

References:

- Tauson R, Kjaer J, Maria G et al (2006) Applied Scoring of Integument and Health in Laying Hens.
- Gregory N, Robins J (1998) A body condition scoring system for layer hens. New Zealand Journal of Agricultural Research 41(4):555-559.
- Campe A, Hoes C, Koesters S et al (2018) Analysis of the influences on plumage condition in laying hens: how suitable is a whole body plumage score as an outcome? Poultry Science 97:358-367.
- Welfare Quality® (2009) Welfare Quality® assessment protocol for poultry.
- LayWel (2006) LAYWEL – Welfare implications of changes in production systems for laying hens.

Article 7.2.29.

Protection from predators

Layer pullets and laying hens should be protected from predators in indoor and outdoor areas. All production systems should be designed and maintained to prevent access by predators and wild *birds*.

Comment: Australia considers free range birds to be at greater risk of being accessed by predators and wild birds than birds in indoor only systems. Australia recommends that further details are added to this Article to provide guidance about how to protect free range birds from predators and wild birds.

Outcome based measurables include: culling and morbidity rates, fear behaviour, injury rate and severity, locomotory and comfort behaviours, mortality rate, performance, spatial distribution and vocalisation.

References

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