Annex 12

DRAFT CHAPTER 7.Z.

ICFAW comments are indicated in text boxes below suggested additions, which are highlighted in the text in purple.

ANIMAL WELFARE AND LAYING HEN PRODUCTION SYSTEMS

Article 7.Z.1.

Definitions

For the purposes of this chapter:

Laying hens ~~(hens):~~ means sexually mature female birds of the species *Gallus gallus domesticus* kept for the commercial production of eggs for human consumption. ~~Laying hens kept in village or backyard *flocks* are excluded.~~ Breeding hens are not included~~excluded~~.

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

Layer pullets ~~(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 ~~addresses the~~ animal welfare aspects of commercial laying hen production systems. ~~This chapter~~ It covers the production period from the arrival of *day-old birds* onto the pullet-rearing farm through to the removal of end-of-lay hens from the laying production facilities. Laying hens kept in village or backyard flocks and used to produce eggs for personal consumption are not included ~~excluded~~.

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

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

Commercial layer pullet or laying hen production systems include:

1. ~~Indoor~~ Completely housed systems

   Layer ~~P~~pullets or laying hens are completely confined in a poultry house, with or without mechanical environmental control ~~and with no designated outdoor area~~.

2. ~~Outdoor~~ Partially housed systems

   Layer ~~P~~pullets or laying hens are kept in ~~premises~~ a poultry house with ~~or without mechanical environmental control but have~~ access to ~~that include~~ a designated outdoor area.

3. Completely outdoor systems

Layer ~~P~~pullets or laying hens are given continuous access to a designated outdoor area with shelter also provided ~~are not confined inside a poultry house during the day but are confined in a designated outdoor area~~.

ICFAW comment:

Rationale: Previous wording suggested that birds are not provided shelter or housing in completely outdoor systems. Proposed wording is to make it clear that outdoors is constant access but shelter or housing for protection and laying is still provided. Without this the birds are quickly killed by predators, and so it is uncommon in a commercial system not to provide some kind of shelter.

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.

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Article 7.Z.3.

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

The welfare of layer pullets and or laying hens should be assessed using outcome-based criteria or measurables, specifically preferably animal-based measurables, as described in Article 7.1.4. Consideration should also be given to the resources provided and the design of the system. Outcome-based measurables, specifically animal-based measurables, can be useful indicators of *animal welfare*. 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). 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). There is no one single measurable that addresses all aspects of animal welfare. The use of these measurables indicators and the appropriate thresholds should be adapted to the different situations wherein which layer pullets and laying hens are keptmanaged, also taking into account the genetics used, strain of bird concerned. Consideration should also be given to the resources provided as well as, 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 measured used at in the farm level setting include behaviour, body and plumage condition, egg shell condition, mortality and morbidity rates, bone and foot problems, etc. together with other factors such as genetics and environment. The age at which abnormalities of these criteria are observed can help to determine the origin causation of potential problems. Other conditions such as bone and foot problems, disease, *infection* or *infestation* can also be assessed at depopulation or during routine sampling. It is recommended that values for welfare measurables be determined with reference to appropriate national, sectorial or regional standards for pullets or hens. Cconditions such as bone skeletal and foot problems, disease and *infection* or *infestation* that can be assessed during routine or targeted sampling *monitoring*, or at depopulation. It is recommended that target values or thresholds for animal welfare measurables be determined by taking into account with reference to current scientific knowledge and appropriate national, sectorial or regional standards data and recommendations for layer pullets and or laying hens. Determining the age and stage of production at which problems are detected may help to determine the cause.

> ICFAW Comment:
>
> Farm-level data may be a more objective source of information upon which to set thresholds for animal-based measures, as recommendations can be sound or they can be based on faulty assumptions, depending on the source. Adding the words “data and” here may also encourage record keeping, which is a suggestion throughout the chapter.

The following animal-based and outcome-based criteria and measurablesmeasurables, in alphabetical order, are may can be useful indicators of layer pullet and or laying hen welfare:

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 [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].

12. Behaviour

   The presence or absence of certain chicken behaviours may could indicate either good *animal welfare* or an *animal welfare* problem, such as including fear, pain or sickness. In addition, chickens have evolved behaviours that they are highly motivated to perform and a good understanding of normal chicken behaviour [Nicol, 2015], including their social interactions [Estevez *et al*., 2007; Rodríguez-Aurrekoetxea, A. and Estevez, I., 2014], is required. Some behaviours may not be uniquely indicative of one type of problem; they may be exhibited for a variety of reasons. The domestic fowl*Gallus gallus domesticus* hasve evolved behaviours that they are highly motivated to perform and, a good understanding of their normal behaviour [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].

   a) Dust bathing

Dust bathing is ~~an intricate~~ a complex, highly motivated behaviour providing body maintenance ~~behaviour~~ benefits. During dust bathing, layer pullets and laying hens~~birds~~ ~~remove~~ work ~~work~~ loose substrate material, such as litter, through their feathers. This behaviour helps remove stale lipids ~~dirt~~ [van Liere and Bokma, 1987] ~~and parasites~~; ~~[Martin and Mullen, 2012~~, which contributes to the maintenance of ~~maintaining~~ plumage condition;~~,~~ This ~~which in turn~~ helps to regulate ~~maintain~~ body temperature and protect against skin injury. Reduced dust bathing behaviour in the *flock* may indicate problems with ~~litter~~ substrate or range quality, such as the ~~litter~~ substrate or ground being wet or not friable [Olson and Keeling, 2005; Van Liere and Bokma, 1987]. The demonstration ~~presence~~ of complete sequences of dust bathing may ~~indicate good welfare~~ be associated with positive mental state and therefore welfare ~~affect~~ [Widowski and Duncan, 2000].

ICFAW Comment:

Describe dustbathing as highly motivated

Justification

Dust bathing is a highly motivated behaviour that birds naturally perform when provided the opportunity. In the absence of substrate, birds have been observed to vacuum or sham dust bathe. To remain consistent, dust bathing should also be termed a highly motivated behaviour along with foraging, nesting and perching. While the underlying causes may be different for dustbathing (a complex interaction between internal and external factors) compared to other behaviour, the term "motivated" still applies.

Scientific references supporting the justification

Duncan, I. J.H., Widowski, T.M., Malleau, A.E., Lindberg, A.C., Petherick, J.C. (1998) External factors and causation of dustbathing in domestic hens. Behavioural Processes 43: 219-228.

Louton H, Bergmann S, Reese S et al (2016) Dust-bathing behaviour of laying hens in enriched colony housing systems and an aviary system. Poultry Science 95:1482-1491.

"Under natural unrestricted conditions, hens perform a dust bath about every other day, and a complete dust bath takes 20 to 30 min".

Olsson, I.A.S. and Keeling, L.J. (2005) Why in earth? Dust bathing behaviour in jungle and domestic fowl reviewed from a Tinbergian and animal welfare perspective. Applied Animal Behaviour Science 93: 259-282.

"In the absence of substrate, hens in conventional cages perform the sequence of dust bathing motor patterns on wire, referred to as vacuum or sham dust bathing."

Wichman A, Keeling L (2008) Hens are motivated to dustbathe in peat irrespective of being reared with or without a suitable dustbathing substrate. Animal Behaviour 75:1525-1533.

Keep the term 'work loose substrate' rather than 'remove'.

Justification

During dust bathing it is by the birds' working the litter through their feathers that excess lipids are removed.

Replace the term 'affect' with 'mental state and therefore welfare'

Justification:

In order to avoid misunderstanding and provide clarity that birds undertaking highly motivated natural behaviours is an indicator of a positive affective state.

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b) Fear behaviour

Fearful layer pullets and laying hens show high reactivity to various stimuli [Jones , 1987; Zeltner and Hirt, 2008] ~~. Fearfulness can lead~~ and this may result in traumatic injuriesy ~~,~~ and or suffocation if ~~when~~ the layer pullets ~~and~~ or laying hens~~birds~~ pile on top of~~,~~ ~~and sometimes suffocate,~~ one another. Fearful layer pullets and laying hens~~birds~~ may be less productive [Barnett *et al.*, 1992] and more prone to injurious feather pecking behaviour [~~Hass~~ 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 and level of flightiness to novel objects or when people, including ~~when while~~ *animal handlers,* walk through the ~~poultry house or~~ pullet~~s~~ and hens~~bird~~ area of the poultry house [Jones, 1996; Waiblinger *et al* 2006 ~~Forkman *et al.*, 2007~~].

ICFAW Comment:

Add 'flightiness' as a way to assess fearfulness within a flock.

Justification

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.

Scientific references supporting the justification

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.

c) Feeding and drinking behaviour

~~Reduced~~ Changes in feeding or drinking behaviour can~~may~~ 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~~ing~~ and water ~~drinking~~ intake is ~~are~~ often ~~depresse~~d reduced when pullets or hens are ill~~.~~, ~~and~~ Feed or water intake may also ~~be reduced~~ change as a result of ~~during periods of~~ heat [Lara L. J. & Rostagno M. H., 2013; Lin H. *et al.*, 2006] ~~stress and increased~~ or ~~during~~ cold [Alves *et al.*, 2012] ~~[Garner et al, 2012; Thogerson et al, 2009a; Thogerson et al, 2009b]~~ stress.

d) Foraging ~~activity~~ behaviour

Foraging is a highly motivated behaviour [de Jong *et al.*, 2007, Nicol *et al.*, 2011]. Foraging is the act of searching for food, typically by ~~walking and~~ pecking or scratching the ~~litter~~ substrate~~;~~. R~~r~~educed foraging activity may~~could~~ suggest problems with ~~litter~~ substrate quality or the absence of suitable ~~presence of conditions that decrease~~ ~~pullets and hens~~bird movement foraging substrate~~activity~~ability [Appleby *et al.*, 2004; Lay *et al.*, 2011; Weeks and Nicol, 2006].

ICFAW Comment:

Add the word “highly” before “motivated”.

Justification

Foraging is a natural and highly motived behaviour that layer pullets and hens perform. When are hens are unable to forage or are provided inadequate substrate to forage in, it can result in frustration and has been shown to increase the prevalence of feather pecking, cannibalism and stereotypies in a flock.

Scientific references supporting the justification

Weeks C, Nicol C (2006) Behavioural needs, priorities and preferences of laying hens. World’s Poultry Science Journal 62:296-307.

Huber-Eicher B, Wechsler B (1997) Feather pecking in domestic chicks: its relation to dustbathing and foraging. Animal Behaviour 54:757-768.
“…housing conditions that promote foraging behaviour are effective in reducing and preventing feather pecking.”

Dixon L, Duncan I, Mason G (2010) The effects of four types of enrichment on feather-pecking behaviour in laying hens housed in barren environments. Animal Welfare 19:429-435.
“The hypothesis that feather pecking stems from re-directed foraging behaviour was supported as feather-pecking levels were lowest when providing foraging substrates. Additionally, it appears that the provision of any or all of the enrichments used in this experiment, not just forages, would benefit laying hens, since all enrichments reduced feather-pecking behaviour and thus may have improved bird welfare.”

European Commission: Scientific Veterinary Committee, Animal Welfare Section. Report on the welfare of laying hens. 30 October 1996. Brussels, Belgium.

European Food Safety Authority (2005) Welfare aspects of various systems for keeping laying hens. Annex to The EFSA Journal 197:1-23.

Gunnarsson, S., Matthews, L.R, Foster, T.M & Temple, W. (2000) The demand for straw and feathers as litter substrates by laying hens. Applied Animal Behaviour Science 65:321-330.

Revise the sentence about the causes of reduced foraging behaivor to add more precise, useful information.

Justification

The wording “Reduced foraging activity may suggest ...the presence of conditions that decrease foraging ability” is circular logic, and too general to be instructive.

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]. ~~Frequent foraging bouts may indicate good welfare [Dawkins, 1989; Duncan and Hughes, 1972] and reduce the incidence of injurious feather pecking [Blokhuis, 1989].~~

e) Injurious feather pecking and cannibalism

Injurious feather pecking often directed at the back, vent and tail area can~~may~~ result in significant feather loss and ~~may~~ lead to cannibalism. Cannibalism is the tearing of the flesh of another layer pullet or lying hen ~~bird~~, 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].

ICFAW Comment:

Add description to assist readers in distinguishing feather pecking from other types of allo pecking behavior.

Justification

Addition of further description of common areas in which injurious feather pecking can occur to provide more clarification. Also addition of secondary infection which can be commonly caused by injurious pecking injuries.

Reference supporting the justification

FeatherWel. www.featherwel.org/injuriouspecking.html

f) Locomotorytion and comfort behaviours

Locomotorytion and comfort behaviours are important for the health of the pullets and hens, allowing allow for skeletal, body and plumage development and their maintenance,. These behaviours and may include walking, running, leaping, turning, stretching legs and wings, wing flapping, feather ruffling and ,tail wagging, and preening [Dawkins and Hardie, 1989; Shipov *et al*., 2010; Norgaard, 1990].

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].

Opportunities to display these behaviours are influenced by housing system and space [Widowski *et al*., 2016; Lay *et al*, 2011].

g) Nesting

Nesting is a ~~natural~~ ~~and~~ ~~highly~~ highly 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].

ICFAW Comments:

Reinsert: "highly motivated natural behaviour" and clarify the causes of nesting problems.

Justification
Although the Code Commission considered the word *highly* to be 'subjective and without a clear metric', in fact, scientific studies demonstrate that nesting is indeed *highly* motivated; it is a *priority behaviour* for laying hens. Removal of the word highly does not accurately reflect the scientific evidence. It is the fact that nesting is such a *highly* motivated behaviour, that makes it important to include in the code. By simply saying it is a motivated behaviour, the importance is lost, which undermines the reason for its inclusion. Hens unable to perform nesting behaviour become frustrated, show more aggression, and may develop stereotypies.

The term "social behavioural factors" is unclear. The cited studies don't conclude that that "social behavioural factors" may be indicative of uneven nest box utilization, laying outside the nest, etc., however Cronin et al. (2012) does report that disturbance by other birds around nesting was stressful (as measured by increased nesting bouts and corticosterone levels). The suggested edit adds clarity and improves meaning with examples. Examples of some environmental or social behaviour factors that contribute to nesting problems should be given to provide clarity. 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.

Scientific references supporting the justification

Opinion of the Scientific Panel on Animal Health and Welfare on a request from the Commission related to the welfare aspects of various systems of keeping laying hens. *The EFSA Journal* (2005) 197, 1-23 stating: "*laying hens have a high behavioural priority to lay their eggs in a nest site that is suitable to them and to perform nest building behaviour*."

LAYWEL, 2006. Welfare implications of changes in production systems for laying hens. Deliverable 7.1: Overall strengths and weaknesses of each defined housing system for laying hens, and detailing the overall welfare impact of each housing system.
The above *LayWel* report, produced for the European Commission states "*normal nesting is a behavioural priority essential for good laying hen welfare*".

Weeks, C.A. and Nicol, C.J., 2006. Behavioural needs, priorities and preferences of laying hens. World's Poultry Science Journal, 62(2), pp.296-307. This review of multiple studies concluded: "*Access to a nest site is a high-ranking priority for laying hens, preferred over food at this time*."

Widowski T, Hemsworth P, Coleman G (2012) Welfare issues and housing for laying hens: international developments and perspectives. "Most hens prefer to lay their eggs in a discrete enclosed nest box."; "Both the degree of seclusion and the substrate lining the nest box are important."; "Social factors such as gregariousness and dominance status can affect pre-laying behaviour and access to a nest site. As the majority of hens will lay their eggs within a window of time in the early part of the day, nest boxes should be able to accommodate multiple hens engaged in pre-laying behaviour."

Widowski, T., Classen, H., Newberry, R., Petrik, M., Schwean-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.

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. Stating "Hens denied a nest site were considerably more frustrated during pre-lay than their counterparts who were provided with nest boxes in their cages."

h) Perching

Perching is a ~~natural~~ ~~and~~ ~~highly~~ highly motivated behaviour. ~~Birds~~ Layer p~~P~~ullets 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 lack of a suitable perch or enough

perch space, injuries or ~~and~~ pullet rearing experience [Janczak and Riber, 2015; Gunnarsson *et al.*, 1999].

ICFAW Comments:

Clarify what is meant by "problems with environmental factors" by providing an example. Suggested text added.

Reinsert: "highly motivated natural behaviour" and as the above nesting comment, some examples of environmental factors should be given to provide clarity.

Justification
Perching is also a highly motivated behaviour for hens, as demonstrated through scientific research. Removal of the word highly does not accurately reflect the scientific evidence. The term 'highly motivated' should remain when referring to perching, because it is a natural behaviour that hens are highly motivated to perform, especially at night. Research has demonstrated that when hens are unable to perch at night they experience frustration and reduced welfare.

Perch material, height, width and amount of perching provided has significant influence as to how birds then utilise perches.

Scientific references supporting the justification

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.

Hester P (2014) The effect of perches installed in cages on laying hens. World's Poultry Science Journal 70:247-264.
"Synchronization of perching behaviour is important to laying hens, so enough space is needed to allow all hens to perch at the same time."

"When cage ceiling is not a limiting factor, hens prefer the highest perch for night time perching for many housing systems. Besides hen preference, perch position is important relative to hen welfare. A welfare benefit was that the humerus of hens was stronger in get-away cages with higher perches as compared to hens in furnished cages with lower perches most likely due to more wing flapping"

"Perches that are too wide may prevent hens from wrapping their toes around the perch in a locked grip."

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.

LAYWEL, 2006. Welfare implications of changes in production systems for laying hens. Deliverable 7.1: Overall strengths and weaknesses of each defined housing system for laying hens, and detailing the overall welfare impact of each housing system
The same *LayWel* report, produced for the European Commission stated that: "*perching, dustbathing and foraging are also very important parts of the normal behavioural repertoire.*"

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*(1), pp.11-19.

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.
"Perch material and diameter revealed significant effects on hens' behaviour. perch grip is not only important with regard to comfortable perching. Perches, which provide a better grip and which are easier to move between, may additionally reduce the risk of injury and bone fracture."

i) Resting and sleeping

~~Sleeping, including slow-wave and fast-wave states, is a natural normal behaviour in pullets and hens, including slow-wave and fast-wave sleep states [Blokhuis, 1983]~~ Sleep is an adaptive state that allows animals to recover from daily stress, conserve energy and consolidate memory [Siegel, 2009]. Layer p~~P~~ullets and laying hens display ~~highly~~ 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].

~~*i)*~~ *j)* Social behaviour

Pullets and hens~~Chickens~~ are ~~a highly~~ social ~~species~~ and~~,~~ engag~~e~~eing in synchronised behaviour [Olsson *et al.*, 2002; Olsson and Keeling, 2005]. ~~Benefits include social learning, protection from predators [Newberry *et al*., 2001], aiding help in thermoregulation and plumage maintenance.~~ 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 ~~damage~~ and competition for resources [Estevez *et al*., 2002; Blatchford *et al.*, 2016].

~~*j)*~~ *k)* Spatial distribution

Uneven spatial distribution of ~~the birds~~ layer pullets and laying hens may indicate fear reactions, thermal discomfort or, uneven availability or use of resources such as light, ~~food~~ feed or water, shelter, nesting ~~and~~ areas or comfortable resting locations [Rodríguez-Aurrekoetxea and Estevez, 2016; ~~Cornetto and Estevez, 2001~~; Bright and Johnson, 2011].

~~*k)*~~ *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 ~~piling on top of each other and~~ distress vocalisations.

~~*l)*~~ *m)* Vocalisation

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

~~2~~3. Body condition

Poor body condition is reflective of ~~poor~~ *animal welfare* ~~outcomes~~ problems for individual ~~birds.~~ layer pullets and laying hens. At *flock* level, uneven body condition may be an indicator of ~~potential~~ poor *animal welfare* ~~problems~~. 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 ~~that~~ can mask actual body condition.

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~~3~~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 ~~may~~ be associated with very low light intensity (<5 lux) [Jenkins *et al.*, 1979; Lewis and Gous, 2009; Prescott *et al.*, 2003].

~~4~~5. Foot problems

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

~~Excessive claw growth, broken claws and toe injuries affect locomotion and may be associated with pain [EFSA, 2005].~~

~~Contact dermatitis affects skin surfaces that have prolonged contact with wet litter~~, ~~manure~~ ~~or other wet flooring surfaces [Tauson and Abrahamson, 1996].~~

~~Foot problems are usually manifested as blackened skin progressing to erosion and fibrosis on the lower surface of the footpads and at the back of the hocks.~~ If severe, the foot and hock ~~lesions~~ problems can may contribute to locomotion problems and lead to secondary *infections.* Scoring systems for foot problems have been developed [Blatchford *et al.*, 2016].

ICFAW Comment:
Provide an example of inadequate maintenance and change from" may" to "can" in the last paragraph.
Justification
Add clarity and better explain. Change from" may" to "can" for wording consistency and because this is more appropriate given that severe foot and hock conditions will cause locomotion problems and can lead to secondary infections.

~~5~~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 layer pullet or laying hen ~~husbandry~~ management.

ICFAW Comment:
Delete "husbandry" and replace with "layer pullet and laying hen".
Justification
Simple wording improvement.

~~6~~7. Injury rate and severity

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

~~7~~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 ~~could~~ 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.

~~8~~9. Performance indicators

Daily, weekly and cumulative performance should be within expected ranges (as described in, for example, the relevant breed management manual). Any unforeseen reduction ~~decreases~~ in these rates ~~could~~ may ~~be reflective of~~ reflect an *animal* *welfare* ~~status~~ problem. Types of measure~~s~~ that can be used include:

ICFAW Comment:

Add a source of information for performance data expectations.

Justification

The term 'expected ranges' is ambiguous and open to interpretation. Include recommendation that the expected ranges should be within the relevant breed management manual to avoid inappropriate interpretations of ranges.

a) ~~P~~pullet growth rate, which measures average daily mass gain per ~~average~~ pullet and *flock* uniformity;

b) ~~P~~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) ~~H~~hen feed conversion, which measures ~~the~~ quantity ~~mass~~ of feed consumed by a *flock* relative to the unit of egg production;

d) ~~E~~egg production, ~~such as when~~ which measure~~d~~s ~~by e.g.~~ the number and size of eggs per hen housed;

Annex 12 (contd)

e) ~~E~~egg quality and downgrades, ~~such as when~~ which can be measured by, for example, grade percentage, shell strength ~~and~~, Haugh units, abnormalities and mis-laid or floor eggs;

~~9~~10. Plumage condition

Evaluation of ~~the~~ plumage condition ~~of pullets and hens~~ provides useful information about aspects of *animal welfare* in terms of feather pecking and cannibalism, ability to thermoregulate, illness, and protection from injury ~~Feather loss and damage can result from injurious feather pecking behaviour, nutritional problems, external parasites and abrasions resulting from faults in the equipment housing system~~ [Rodriguez-Aurrekoetxea and Estevez, 2016; Drake *et al.*, 2010]. Dirty ~~P~~plumage ~~dirtiness~~ may be associated with illness, ~~the~~ environmental conditions ~~and~~ or ~~production~~ the layer pullet and laying hen housing system. Plumage cover and cleanliness scoring systems have been developed for these purposes [Blokhuis, 2007; Blatchford *et al.*, 2016].

~~10~~11. Water and feed consumption

Monitoring and evaluating daily water and feed consumption is a useful tool ~~to~~ which may indicate thermal stress, disease, *infection* or *infestation* and other welfare conditions, taking into consideration ambient temperature, relative humidity and other related factors. ~~Problems with the water or feed quality and supply can result in~~ Changes in intake, crowding at feeders and drinkers and wet ~~litter~~ substrate ~~and diarrhoea, dermatitis, dehydration, changes in egg quality or quantity, production and body condition~~ may be associated with problems with the ~~water or feed~~ quality or supply of water, or feed.

Article 7.Z.4.

Recommendations for layer pullets and laying hens

Ensuring good welfare of layer pullets and laying hens is contingent upon several management factors, ~~including~~ 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 system if one or more of these elements are lacking. ~~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.~~

ICFAW Comment:

Move the statement on thermal ranges.

Justification

The sentence fits better under Article 7.Z.15, the section on 'Thermal Environment'.

Articles 7.Z.5. to 7.Z.29. provide recommendations for ~~measures applied to~~ layer pullets and laying hens.

Each recommendation ~~in Article 7.Z.5. to 7.Z.29.~~ includes a list of relevant ~~animal~~outcome-based criteria ~~and~~ or measurables derived from Article 7.Z.3. and when appropriate ~~. This does not exclude~~ other criteria ~~and~~ or measurables ~~being used where or when appropriate~~. The suitability of some of these criteria ~~and~~ or measurables ~~will~~ should be determined ~~by~~ in accordance with the system in which the pullets and hens are housed.

~~Each recommendation includes a list of relevant outcome-based measurables derived from Article 7.Z.3. This does not exclude other measures being used when appropriate.~~

Article 7.Z.5.

Location, design, construction and equipment of establishments

The location of layer pullet~~s~~ and laying hen *establishments* should ~~be chosen to~~ 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 pullet laying hens can be achieved in a range of housing systems.~~

ICFAW comment:

Delete: "Good welfare outcomes for layer pullets and laying hens can be achieved in a range of housing systems."

Justification:
This is a vague statement that does not offer any detail on which systems can achieve good welfare outcomes. It is therefore at best unhelpful, and at worst misleading.

For example, it could readily be taken to imply that good welfare can be achieved in barren cages, yet these systems cannot deliver several welfare outcomes that are acknowledged in this Chapter as being important (eg locomotory and comfort behaviours, dustbathing, nesting, foraging and perching). Cages have inherent limits. They restrict behaviour to such a degree that good outcomes are not possible.

Scientific references supporting the justification

Baxter, M. (1994) The welfare problems of laying hens in battery cages. The Veterinary Record 134(24):614-619.

ESFA (2005) Opinion of the Scientific Panel on Animal Health and Welfare on a request from the Commission related to the welfare aspects of various systems of keeping laying hens. The EFSA Journal 197:1-23.

Hartcher KM and Jones B 2017 The welfare of layer hens in cage and cage-free housing systems. World's Poultry Science Journal, Vol. 73:767-782.

LAYWEL (2006) Welfare implications of changes in production systems for laying hens. Deliverable 7.1: Overall strengths and weaknesses of each defined housing system for laying hens, and detailing the overall welfare impact of each housing system.

~~Pullet and layer h~~Houses, outdoor areas and accessible equipment should be designed~~,~~ after ~~consideration of~~ considering ~~bird~~ the opportunities for layer pullets and laying hens ~~for pullets and hens~~ to perform ~~highly~~ motivated behaviours ~~(e.g. perching and nesting)~~, ~~and~~ as well as health, environmental factors, and animal management capability. ~~to promote good *animal welfare* and~~ They should also be maintained to avoid injury or discomfort ~~pain to the birds~~. Pullet and ~~layer~~ hen houses should be constructed with materials ~~and,~~electrical and fuel installations that minimise the risk of fire and other hazards, and are easy to clean and maintain. Producers should have a maintenance programme in place, including record-keeping for all equipment and contingency plans to address~~.~~ ~~the~~ failures ~~of~~ that could jeopardise ~~bird~~ layer pullets and ~~hen~~ laying hens welfare

~~Producers should have a maintenance programme in place for all equipment and contingency plans in place to deal with, the failures of which could jeopardise bird pullet and hen welfare.~~

~~Outcome~~~~Animal~~Outcome-based measurables include: body condition ~~weight~~, culling and morbidity rates, fear behaviour, feeding~~,~~ and drinking behaviour, foot problems, ~~and~~ foraging behaviour ~~activity~~, ~~foot problems,~~ incidence of diseases, *infections* and *infestations*, injury rates and severity, locomotory~~ion~~ and comfort behaviours, mortality rates, performance indicators, plumage condition, ~~body condition weight,~~ , resting and sleeping, dustbathing behavior, perching behaviour, nesting behaviour, social behaviour and spatial distribution, thermoregulatory behaviour~~,~~ and vocalisations.

ICFAW comment:

Add: "Dustbathing, Nesting and Perching" to this list of outcome-based measurables.

Justification:

These behaviours are rightly included in the list of outcome-based measurables in Article 7.Z.3.2, and are described as motivated behaviours, which are referred to as considerations in the second para of 7.Z.5. They are therefore highly relevant for inclusion here and it is strange to omit them.

Article 7.Z.6.

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

Animal ~~w~~*Welfare* and health considerations should balance any decisions on performance when choosing the genetics to be used ~~a layer strain~~ for a particular location, housing and production system. The pullet rearing system should pre-adapt ~~prepare~~ the bird for the intended ~~layer~~ production system and encourage highly motivated behaviour [Aerni *et al.*, 2005]. The pullet rearing system should replicate the intended layer housing system as much as possible, and provide appropriate perches, environmental enrichment and appropriate substrate.

ICFAW Comments:

Add the words "and encourage highly motivated behaviour".

Justification

There is significant amounts of research demonstrating the importance of rearing systems in regards to training pullets for layer hen housing, as well as the benefits in adult life when pullets are provided the ability to carry out highly motivated behaviour such as perching, dust bathing and foraging.

Scientific references supporting the justification

Regmi P, Deland T, Steibel J et al (2015) Effect of rearing environment on bone growth of pullets. Poultry Science 00:1-10.
"Providing greater access to activities including flying, perching, and running during pullet phase can be crucial to the increased bone quantity that might help prevent fractures due to osteoporosis in cage birds, and impact injuries during the production phase in the extensive systems."

Colson S, Arnould C, Michel V (2008) Influence of rearing conditions of pullets on space use and performance of hens placed in aviaries at the beginning of the laying period. Applied Animal Behaviour Science 111:286-300.
"The adaptation to laying aviaries was mainly influenced by the design of the rearing pens. Hens coming from furnished floor pens jumped and flew less accurately and had a preference for staying on litter and lower levels, compared with hens coming from rearing aviaries. This led to difficulties reaching upper levels (including higher nest level) and finding the feed, and had a negative impact on laying and mortality rates."

Widowski T, Hemsworth P, Coleman G (2012) Welfare issues and housing for laying hens: international developments and perspectives.
"Rearing experience may also affect use of nest boxes. For example, Sherwin and Nicol (1993) found that hens reared on litter laid more floor eggs in furnished cages than hens reared on wire. In non-cage systems where hens have to negotiate perches or more complex environments in order to access nest boxes, rearing in systems that encourage use of 3-dimensional space reduces floor eggs."

"…there is considerable evidence to suggest that rearing and/or housing hens in the absence of foraging substrate either contributes to or exacerbates the development of feather pecking."

"There is a learning component to perching behaviour; hens without perching experience during rearing are less adept at using perches and have poorer spatial skills as adults."

ICFAW Comments:

Add a statement explaining that the "pullet rearing system should replicate the intended layer housing system as much as possible, and provide appropriate perches, environmental enrichment and appropriate substrate."

Justification

Providing appropriate rearing conditions and matching the rearing and laying environments has been shown to be critical in influencing the welfare and behaviour of adult hens. The provision of perches, environmental enrichment and appropriate substrate is also crucial in the rearing environment to ensure good welfare. Inappropriate rearing conditions has been shown to be directly linked to injurious feather pecking and aggression.

Scientific references supporting the justification

Johnsen PF, Vestergaard KS, Nørgaard-Nielsen G. (1998) Influence of early rearing conditions on the development of feather pecking and cannibalism in domestic fowl. Applied Animal Behaviour Science 60:25-41.

Rodenburg TB, Van Krimpen MM, De Jong IC, De Haas EN, Kops MS, Riedstra BJ, Nordquist RE, Wagenaar JP, & Bestman M, Nicol CJ. (2013) The prevention and control of feather pecking in laying hens: identifying the underlying principles. World's Poultry Science Journal 69:361-374.

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.

Brantsaeter, M., Nordgreen, J., Rodenburg, B.T., Tahamtani, F.M., Popova, A. & Janczak, A.M. 2016. Exposure to increased environmental complexity during rearing reduces fearfulness and increases use of three-dimensional space in laying hens (Gallus gallus domesticus). Frontiers in Veterinary Science 3:14.

Colson, S,. Arnould, C., & Michel, V. (2008) Influence of rearing conditions of pullets on space use and performance of hens placed in aviaries at the beginning of the laying period. Applied Animal Behaviour Science 111:286-300.

Gunnarsson, S., Keeling, L. and Svedberg, J. (1999) Effect of rearing factors on the prevalence of floor eggs, cloacal cannibalism and feather pecking in commercial flocks of loose housed laying hens. British Poultry Science 40: 12-18.

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

Article 7.Z.7.

~~**Stocking density**~~ **Space allowance**

Layer p~~P~~ullets and laying hens should be housed with ~~at~~ a space allowance ~~stocking density~~ that allows them to have adequate access to resources and to adopt normal postures. Providing sufficient space for the expression of locomotory~~ion~~ and comfort behaviours that contribute to good musculoskeletal health and plumage condition is desirable. Problems with space allowance may increase stress and the occurrence of injuries and feather pecking behaviour.

The following factors, in alphabetical order, should be ~~taken into account~~ considered when determining space allowance:

– age and average live bodyweight ~~mass~~ of layer pullets and laying hens,

ICFAW comment:

Add: "average live bodyweight" in place of "mass".

Justification:

The more precise language will help avoid confusion and misunderstanding.

– ambient conditions,

– ~~housing design system,~~

– *biosecurity* strategy,

– equipment selection,

– feed and watering systems,

– ~~litter~~ flooring substrate,

– genetics;~~.~~

– housing design,

– management capabilities,

– production system,

– usable space,

ICFAW Comment:

Clarification is needed as to what 'usable space' is referring to. Is it referring to the space within the shed or shelter available to the birds?

– ventilation.

– ~~genetics strain,~~

– ~~age and bird mass.~~

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

ICFAW Comment:

Under crowded conditions and insufficient space allowance for the single animals respectively, the risk for feather pecking can increase. Thus, it should be mentioned in this chapter and added to the outcome-based measurables.

E.g.: Temple, D, van Niekerk, T, Weeks, C & Manteca, X (2017) GUIDELINES FEATHER PECKING HENNOVATION, Ref. Ares(2017)3465242 - 10/07/2017

Article 7.Z.8.

Nutrition

Layer p~~P~~ullets and laying hens should always be fed a diet appropriate to their age, production stage~~,~~ and genetics~~strain, which contains adequate nutrients to meet their requirements for good health and welfare~~. 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*.

~~The form and quality of feed and water should be acceptable to the birds and free from contaminants, debris and microorganisms hazardous to bird health.~~

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

~~Birds~~ Layer p~~P~~ullets 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 ~~chicks~~ to access appropriate feed and water.

~~Outcome~~~~Animal~~Outcome-based measurables include: ~~aggression~~, body condition, ~~performance (egg quality), water and feed consumption~~ foraging ~~activity~~ 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 flooring for the birds should be easy to clean and disinfect and not cause harm or damage to them.~~

~~The slope, and design and construction of the floor should allow birds pullets and hens to express normal locomotoryion and comfort behaviours.~~ The slope, design and construction of the floors should provide adequate support for the locomotion of ~~for the~~ layer pullets and laying hens~~the birds~~ ~~adequately~~, prevent injuries~~,~~ and entrapments, ~~and~~ ensure good health and allow the performance of normal behaviour~~that manure does not contaminate other birds pullets and hens~~. Changes of flooring types from pullet to ~~layer~~ 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 ~~and should not cause harm~~.

Annex 12 (contd)

~~The provision of loose and dry litter material is desirable to encourage dust bathing and foraging by pullets and hens. When litter is provided it should be managed to minimise any detrimental effects on welfare and health.~~ When ~~litter~~ substrate is provided, ~~Litter~~it should be managed to remain dry and friable, ~~replaced or~~ and adequately treated or replaced when required to prevent *diseases* and minimise any detrimental effects on *animal welfare*~~, *infections* and *infestations*~~.

ICFAW Comment: Change litter to 'substrate' **Justification** For consistency with the rest of the draft.

~~Outcome~~Animal~~Outcome~~-based measurables include: ~~comfort behaviour,~~ dust bathing, foot problems, foraging behaviour ~~activity~~, incidence of diseases, *infections* and *infestations*, injurious feather pecking, injury rate~~s~~ and severity, locomotor~~y~~~~ion~~ and comfort behaviours, performance, plumage condition and~~,~~ resting and sleeping.

ICFAW Comment: Add "injurious feather pecking" to the list of measurables. **Justification** Inclusion of incidences of injurious pecking as an outcome as per the 'Nutrition' section above and given it can be a result of redirected foraging behaviour in which birds will peck at other birds when no litter/substrate is provided. **Scientific support for the justification** 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.

Article 7.Z.10.

Dust bathing areas

Access to ~~The provision of~~ friable, dry ~~litter~~ substrate ~~material is desirable~~ to encourage dust bathing is desirable ~~by pullets and hens. When d~~D~~When provided, d~~ust bathing areas ~~are offered, they~~ should be ~~provide suitable friable materials,~~ 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 ~~clean [Lentfer *et al.*, 2011]~~ [Weeks and Nicol, 2006].

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

ICFAW Comment:

Add "injurious feather pecking" to the list of measurables.

Justification

Inclusion of incidences of injurious pecking as an outcome as per the 'Flooring' section rationale, it can occur as a redirected behaviour in which birds will peck at other birds when no litter/substrate is provided.

Scientific support for the justification

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

Article 7.Z.11.

Foraging areas

~~The provision of~~ Access to substrate that ~~friable, dry litter material is desirable to~~ encourages foraging behaviour activity is desirable. When provided, ~~When F~~foraging areas ~~are offered, they~~ should ~~provide suitable materials, and~~ be designed and positioned to encourage ~~foraging activity, allow~~ synchronised behaviour, prevent undue competition and not cause damage or injuries. Foraging areas should be easy to inspect and maintain ~~clean~~.

~~Outcome~~~~Animal~~Outcome-based measurables include: foraging behaviour ~~activity~~, incidence of diseases, *infections* and *infestations,* injurious feather pecking and cannibalism, injury rate and severity~~,~~ and spatial distribution.

Article 7.Z.12.

Nesting areas

Access to ~~When n~~Nesting areas is desirable and should be provided. When ~~should be provided are offered,~~ nesting areas~~they and should~~ 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~~disinfect~~.

ICFAW Comment:

Reinstate: "Nesting areas should be provided".

Justification:

As commented in Article 7.Z.3.2g, this change is inconsistent with scientific evidence, which demonstrates that access to nests are essential in order to achieve good laying hen welfare. Nests are not simply 'desirable' but are essential resources in order to enable important motivated behaviour, which is necessary for good welfare, and therefore they *should* be provided. The removal of this term is a weakening of this clause, which is contrary to the research.

Further, the change to 'desirable' is inconsistent with other guidance in the Chapter:
Article 7.Z.5 recognises that "*Houses, outdoor areas and accessible equipment **should be** designed after considering the opportunities for layer pullets and laying hens to **perform motivated behaviours.***" This wording in Article 7.Z.5 is consistent with housing standards for animal welfare for other chapters, such as Article 7.13.12. of ANIMAL WELFARE AND PIG PRODUCTION SYSTEMS.

Nesting is recognised as a motivated behaviour. It is therefore appropriate that the Chapter maintains the wording that they should be provided.

Scientific references supporting the justification

Opinion of the Scientific Panel on Animal Health and Welfare on a request from the Commission related to the welfare aspects of various systems of keeping laying hens. *The EFSA Journal* (2005) 197, 1-23, The welfare aspects of various systems of keeping laying hens.

> The EFSA report states: "*laying hens have a high behavioural priority to lay their eggs in* a nest site that is suitable to them and to perform nest building behaviour."
>
> The report's recommendations reflect the importance they attach to certain key behaviours. The recommendations include:
> "*Housing systems should provide the possibility for hens to carry out activities which are behavioural priorities.*
>
> *An adequate number of discrete enclosed individual or group nests should be provided.*
>
> *They should be placed so that birds can easily gain access to them.*

LAYWEL, 2006. Welfare implications of changes in production systems for laying hens. Deliverable 7.1: Overall strengths and weaknesses of each defined housing system for laying hens, and detailing the overall welfare impact of each housing system

> The above *LayWel* report, produced for the European Commission states "*normal nesting is a behavioural priority essential for good laying hen welfare*".

Weeks, C.A. and Nicol, C.J., 2006. Behavioural needs, priorities and preferences of laying hens. World's Poultry Science Journal, 62(2), pp.296-307. This review of multiple studies concluded: "*Access to a nest site is a high-ranking priority for laying hens, preferred over food at this time*."

~~Outcome~~~~Animal~~Outcome-based measurables include: ~~injurious feather pecking and cannibalism,~~ 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.

Article 7.Z.13.

Perches

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

Annex 12 (contd)

ICFAW Comment:

Reinstate "Perches should be provided".

Justification:

As commented in Article 7.Z.3.2h, and above in the section on nesting, this change is inconsistent with scientific evidence, which demonstrates that access to perches is essential in order to achieve good laying hen welfare. Perches are not simply 'desirable' but are essential resources in order to enable important motivated behaviour, which is necessary for good welfare, and therefore they should be provided. The term 'should be' should be included when referring to perches. The removal of this term weakens the clause which goes against the research which has clearly demonstrated perching is a natural and highly motivated behaviour of hens. The provision of perches is critical to ensuring good welfare.

Further, the change to 'desirable' is inconsistent with other guidance in the Chapter:
Art 7.Z.5 recognises that "*Houses, outdoor areas and accessible equipment* ***should be*** *designed after considering the opportunities for layer pullets and laying hens to* ***perform motivated behaviours***"

Perching is recognised as motivated behaviours. It is therefore appropriate that the Chapter maintains the wording that they should be provided.

Scientific references supporting the justification

Opinion of the Scientific Panel on Animal Health and Welfare on a request from the Commission related to the welfare aspects of various systems of keeping laying hens. *The EFSA Journal* (2005) 197, 1-23, The welfare aspects of various systems of keeping laying hens.

> The report's recommendations reflect the importance they attach to certain key behaviours. The recommendations include:
> "*Housing systems should provide the possibility for hens to carry out activities which are behavioural priorities..*
>
> *Perch material, design and position should be an important consideration when selecting a housing system for laying hens. Perches should be raised above the level of the floor*."

LAYWEL, 2006. Welfare implications of changes in production systems for laying hens. Deliverable 7.1: Overall strengths and weaknesses of each defined housing system for laying hens, and detailing the overall welfare impact of each housing system.

> The *LayWel* report, produced for the European Commission states that: "*perching, dustbathing and foraging are also very important parts of the normal behavioural repertoire.*"

~~Perch elevation should be carefully considered to minimise injurious feather pecking, cannibalism, keel deformities and fractures.~~

~~Outcome~~Animal~~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 p~~P~~ullets and laying hens may~~can~~ be given access to outdoor areas ~~as soon as~~ when they have sufficient feather cover and ~~are old enough to~~ can range safely. Where pullets and hens are partially housed, ~~T~~there should be sufficient appropriately designed ~~exit areas~~ 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 ~~birds~~ layer pullets and laying hens becoming infected by pathogenic agents~~,~~ or infested by parasites or being injured. This may~~might~~ include limiting the stocking density or using several pieces of land consecutively in rotation.

Outdoor areas should be located on well-drained ground and managed to minimise ~~swampy conditions~~ standing stagnant water and mud. The outdoor area should be able to contain the ~~P~~layer-pullets and laying hens ~~birds~~ 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 ~~be~~ encouraged ~~d~~ them to ~~optimise~~ optimally ~~utilisation~~ utilise ~~of~~ the range optimally, while mitigating predation, ~~and~~ disease risks, and adverse climatic conditions [Gilani *et al.*, 2014; Hegelund *et al.*, 2005; Nagle and Glatz, 2012]. Pullets and ~~H~~hens should be habituated early to the outdoor area [Rodriguez–Aurrekoetxea and Estevez, 2016]. Outdoor areas should provide shelter and shade for birds, ~~provide shelter for the birds and~~ be free from ~~poisonous~~ harmful plants and contaminants.

ICFAW Comment:

Reject the deletion of "provide shelter and shade for birds"

Justification

Shade and shelter are critical in commercial systems, as they help ensure safety and comfort of the flock and contribute to range utilisation. A good welfare standard must include shade and shelter in outdoor systems, and this is consistent with other welfare chapters. Nowhere else is provision of shade mentioned in the chapter.

Scientific support for the justification

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.

"…studies of both hens and chickens have shown positive correlation between the presence of cover and number and dispersion of poultry on the range (Gordon and Forbes, personal communication; Mirabito and Lubac, 2001; Bestman et al., 2002; Zeltner and Hirt, 2003)."

"…results show that the presence of cover had a significant influence on both number and distribution of hens on the range."

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.

"…it was clear that enriching the free range environment attracted more birds into the range. For example shaded areas were used by hens with a tendency for outdoor shade to attract more birds into other areas of the paddock."

~~Outcome~~~~Animal~~Outcome-based measurables include: fear behaviour, foot problems, foraging behaviour ~~activity~~, incidence of diseases, *infections* and *infestations*, injury rate and severity, locomotory~~ion~~ and comfort behaviours, morbidity and ~~rate,~~ mortality rates, ~~*infestations,*~~ 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. 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~~,~~; ~~and~~ extremes ~~of~~ heat, humidity and cold should be avoided. A heat index can assist in identifying the thermal comfort zones for ~~the~~ layer pullets and laying hens at varying temperatures, air velocity~~ies~~ and relative humidity levels [Xin and Harmon, 1998], and can be found in management guidelines provided by laying hen genetics companies ~~and can be found in management guidelines provided by primary laying hen genetics companies [Xin and Harmon, 1998]~~.

ICFAW Comment:
Move the sentence from Introduction of Article 7.Z.4 'Recommendations for layer pullets and laying hens'. **Justification** As relevant to thermal environment and therefore fits better within the Thermal environment section.

When environmental conditions move outside of these zones, strategies should be used to mitigate ~~against~~ the adverse effects on the layer pullets and laying hens ~~birds~~. These may include adjusting air speed, provision of heat, water-based cooling (misters/foggers) or evaporative cooling [Yahav, 2009].

ICFAW Comment:
Include water-based cooling systems. **Justification** This is an important example to highlight.

~~Control of t~~The thermal environment should be monitored ~~frequently~~ regularly ~~enough~~ so that failure of the system can be ~~noticed~~ detected and corrected before they ~~it~~ cause~~s~~ ~~an~~ *animal welfare* problem~~s~~.

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

Annex 12 (contd)

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* ~~at all times~~, including the removal or mitigation of noxious ~~of waste~~ gases such as carbon dioxide and ammonia, dust and excess moisture ~~content from~~ in the environment.

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

Dust levels should be kept to a minimum [David *et al.*, 2015]. ~~Where the health and welfare of birds depend on an artificial ventilation system, provision should be made for an appropriate back-up power and alarm system.~~

~~Outcome~~~~Animal~~Outcome-based measurables include: ammonia level, carbon dioxide level, dust level, eye conditions, incidence of ~~respiratory~~ 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 ~~for~~ normal development ~~of the birds~~, allow layer pullets and laying hens to ~~for~~ find~~ing~~ 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].

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

~~When c~~Changes in lighting should occur gradually or ~~are needed, they should be performed~~ in a step-wise fashion, as needed, except during induced moulting if practiced ~~(if practised)~~ when rapid adjustments to lighting should be considered ~~are desired~~ [Tanaka and Hurnik, 1990; Kristenson, 2008].

ICFAW Comment:

Justification

The term 'if practised' should still be included otherwise it implies that induced moulting is recommended. Induced moulting in hens causes significant suffering to birds and has negative welfare implications. See below rationale for not recommending induced molting for further rationale.

Scientific support for the justification

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

Article 7.Z.18.

Noise

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

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

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

Annex 12 (contd)

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:

- ~~managing light in rearing and lay [Nicol *et al.*, 2013; van Niekerk *et al.*, 2013],~~
- adapting the diet and form of feed during rearing and lay [Lambton *et al.*, 2010],
- choosing genetics ~~strain~~ with a low propensity ~~to~~ for injurious feather pecking [Craig and Muir, 1996; Kjaer and Hocking, 2004],
- ~~influencing~~ increasing age ~~of~~ at onset of lay [~~Green *et al.*,~~ ~~2010~~ Pötzsch, 2001],
- ~~reducing stocking density [Zimmerman et al., 2006];~~ increasing space allowance during rearing [Jung and Knierim, 2018],
- managing light ~~in~~ during rearing and lay [Nicol *et al.*, 2013; van Niekerk *et al.*, 2013],
- minimising fear-related stimuli [Uitdehaag K. A. *et al.*, 2009]

- E.g. enhancing a good human-animal relationship could lead to less fear and stress among the pullets and hens in case of human interaction [Temple, D, et al.,2017]

ICFAW Comment:

Add a key example

Justification

Human-animal relationship can be an example for causing fear and stress among the birds, both increase in turn the risk for feather pecking. Thus, promoting a good relationship between the workers/farmers and the birds could be one additional factor to keep in mind for preventing feather pecking occurrence.

Scientific support for the justification

E.g.: Temple, D, van Niekerk, T, Weeks, C & Manteca, X (2017) Guidelines Feather Pecking Hennovation, Ref. Ares(2017)3465242 - 10/07/2017

- ~~treating beaks in chicks [Gentle and Hughes, 1997], especially by using new non-invasive beak treatments that are being developed.~~
- providing elevated perches during~~in~~ rearing and lay [Green *et al.*, 2000],
- ~~adapting diet and form of feed in rearing and lay [Lambton *et al.*, 2010],~~
- providing foraging or other manipulable materials ~~in~~ 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 ~~in~~ during rearing and lay [Bilcik and Keeling, 1999].
- ~~introducing males [Bestman and Wagenaar, 2003].~~

- Matching pullet rearing environment with the intended laying environment

- Providing good quality substrate for foraging and dust bathing during rearing and lay

- Providing nesting areas during lay

- Providing outdoor or partial outdoor access during rearing and lay

- Managing air quality during rearing and lay

- Undertaking regular inspection of flock for signs of injurious pecking

ICFAW Comment:

Add other important management methods to reduce the occurrence of injurious pecking.

Justification

While the list is not meant to be exhaustive, the list of key factors that should be included should be expanded to aid understanding and provide useful guidance.

Scientific support for the justification

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

~~These mM~~anagement methods should be ~~to control the occurrence include the above list~~implemented, where applicable, and in the event of injury ~~prompt removal of~~ affected layer pullets and laying hens~~birds~~ should be promptly removed and treated ~~to a hospital area~~ or euthanased~~ia~~.

If these management ~~strategies~~ methods are unsuccessful~~fail~~, ~~therapeutic~~ partial beak removal ~~treatment~~ [Gentle et al., 1997], ~~trimming~~ ~~is the last resort.~~ may be considered as a final course of action.

ICFAW note

There is inconsistency throughout the draft of the use of euthanased or euthanised. Need to choose one spelling and ensure consistent throughout the draft.

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

Article 7.Z.20.

ICFAW comment:

Add: “foraging behaviour” to the outcome-based measurables.

Justification:

As this article is on the prevention and control of injurious feather pecking, it is logical to include monitoring of foraging behaviour as it is such a key prevention strategy (and is listed as one of the management strategies).

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]. The practice of induced moulting is not recommended. When induced moulting is practised, ~~techniques~~ methods that do not involve withdrawal of feed ~~should be used~~ and are consistent with Article 7.Z.8. should be used. Laying h~~H~~ens should have access to lights 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, ~~body mass~~ loss of body mass should not compromise the laying hen welfare, including welfare during the subsequent laying period. Total mortality and culling rates during the moult period should not exceed normal variations in *flock* mortality and culling rate.

~~Outcome~~~~Animal~~Outcome-based measurables include: body condition, feeding and drinking, foraging behaviour ~~activity~~ [Biggs *et al.*, 2004; Saiozkan *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.

ICFAW comment:

Clearly state that induced moulting is not recommended

Justification:

Induced moulting should not be recommended as a practice. The practice of induced moulting involves total or partial feed and water deprivation as well as lighting program manipulation. It results in significant losses of body weight, stress and suffering in hens. The practice of induced moulting goes directly against the OIE recommendation in 7.Z.8 which states that feed should "contain adequate nutrients to meet requirements for good animal welfare and health."

Scientific support for the justification

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

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.

Annex 12 (contd)

Article 7.Z.21.

Painful procedures ~~interventions~~

Painful procedures ~~interventions, such as beak treatmenttrimming,~~ should not be practised unless ~~absolutely~~ necessary and should be ~~pain mitigation interventions should be used~~ performed in such a way as to minimise any pain, distress and suffering. Beak trimming at a mature age can cause chronic pain. Other mutilations (e.g. dubbing and toe trimming) should not be performed in pullets and hens. Pain-free alternatives are preferred. ~~Beak trimming at a mature age can cause chronic pain. Other mutilations (e.g. dubbing and toe trimming) should not be performed in pullets and hens. Pain-free alternatives should be favoured are preferred~~. If used, partial ~~preventive~~ beak removal ~~treatment trimming~~ should be carried out ~~by trained and skilled personnel~~ at the earliest age possible and care should be taken to remove the minimum amount of beak necessary using a method~~, which~~ that minimises pain and controls bleeding. ~~Current methods include infrared treatment or hot blade cutting. Beak trimming at a mature age can cause chronic pain~~ If management ~~strategies~~ methods to control injurious feather pecking and cannibalism are not successful ~~fail~~, therapeutic partial beak ~~treatment~~ 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]. Partial beak removal at a mature age can cause chronic pain. ~~Other mutilations (e.g. dubbing and toe trimming) should not be performed in pullets and hens.~~ Dubbing, toe trimming and other mutilations should not be performed in layer pullets and laying hens.

ICFAW comment:

Add a statement on the problem with beak trimming at a mature age.

Justification:

Beak trimming at mature age can cause chronic pain and has significant welfare implications. It should also be stated that other mutilations are not recommended as they can also lead to negative welfare and unnecessary suffering of birds. Good welfare should always involve attempting to find pain-free alternatives to any aversive routine procedure currently practiced in a commercial setting.

Scientific support for the justification

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.

~~Beak trimming at a mature age can cause chronic pain. If therapeutic beak trimming is required, at whatever age, it should be carried out by trained and skilled personnel and care should be taken to remove the minimum amount of beak necessary using a method which minimises pain and controls bleeding.~~

~~Outcome~~Animal~~Outcome~~-based measurables include: beak condition, body condition, feeding and drinking behaviour, ~~and~~ foraging behaviour ~~activity~~, ~~feeding~~, 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 ~~be~~ knowledge ~~aware~~ of normal layer pullet and laying hen behaviour, ~~the~~ and be able to detect signs of ill-health or distress, such as a change in feed ~~and~~ or water intake, reduced production, changes in behaviour~~,~~ and abnormalities in plumage condition ~~appearance of feathers~~, faeces~~,~~ or other physical features.

If *animal handlers* are ~~not~~ 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 ~~humanely killed~~ euthanised in accordance with Chapter 7.6. as soon as possible.

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

Article 7.Z.23.

Biosecurity plans

Biosecurity plans should be designed, ~~and~~ implemented, and reviewed regularly, commensurate with the best possible layer pullet and laying hen~~birds~~ health status ~~and~~ . The *biosecurity plan* should be sufficiently robust to be effective in addressing the current disease *risks* ~~(endemic and exotic)~~ that ~~is~~ 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:

~~–~~ ~~direct transmission from other *poultry*, domestic *animals* and *wildlife* and humans,~~

~~–~~ ~~*vectors* (e.g. arthropods and rodents),~~

– aerosols,

~~–~~ direct transmission from other *poultry*, domestic *animals* and *wildlife* and humans,

– feed,

– fomites, such as equipment, facilities and vehicles,

~~–~~ ~~feed,~~

~~–~~ ~~the practice of partially restocking the house (back filling), due to catastrophe or incomplete *flock* placement, which should only be performed practiced with due consideration to *biosecurity* and in a manner that prevents commingling of *flocks*.~~

~~–~~ *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~~~~Animal~~Outcome-based measurables include: culling and morbidity rates, incidence of diseases, ~~*infestations*, morbidity rate~~ mortality rate~~, culling and morbidity rates,~~ ~~mortality rate,~~ and performance indicators.

Article 7.Z.24.

~~Humane killing~~ Euthanasia of individual ~~birds or flocks~~ layer pullets or laying hens

When required, i~~I~~ndividual ~~sick or injured~~ layer pullets or laying hens ~~requiring euthanasia~~ may be ~~should be humanely killed as soon as possible. When an individual or groups of pullets or hens birds are killed for~~ euthana~~sed~~sia ~~or humanely killed for diagnostic purposes, depopulation of end-of-lay *flocks* or for purposes of disease control~~,. T~~the~~echniques used should be performed, ~~in a humane manner~~ in accordance with Chapter 7.6.

Reasons for euthanasia may include:

- disaster management,
- diagnostic purposes,
- rapid deterioration of a medical condition for which treatment has been unsuccessful,
- bone fractures or other injuries,
- emaciation,

- disease or medical condition for which there is no treatment or treatment is not possible ,

ICFAW comment:

Add one more key reason.

Justification:

Disease or medical condition for which there is no treatment or for which treatment is not feasible should be included in the list as it is a welfare concern if these birds are not euthanased

- severe pain that cannot be alleviated.

The decision to euthanise an animal 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, mortality.

ICFAW comment:

The obvious indicator is missing

Justification:

Euthanasia when effective should produce immediate insensibility of an animal and then death. Therefore, the outcome of euthanasia should include the effectiveness of killing method and signs to confirm death and not injury rate and severity, as determined by death of the bird.

Article 7.Z.25.

Depopulation of pullet and ~~layer~~ 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..

ICFAW comment:

Delete "for whatever reason" and add the other key reference.

Justification:

The language "for whatever reason" is too colloquial and Chapter 7.6 is also relevant to depopulation procedures of hens.

~~Pullets and hens should not be subjected to an excessive~~ The period of feed withdrawal prior to ~~the expected~~ depopulation ~~time~~ of layer pullets and laying hens should be minimised.

Water should be available up to the time of depopulation.

~~Birds~~ lLayer p~~P~~ullets and laying hens that are not fit for *loading* or transport ~~because they are sick or injured~~ should be euthanised ~~humanely killed~~. 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 ~~the conditions of~~ Article 7.Z.28. and every attempt should be made to minimise stress, fear reactions and injuries~~y~~. If a layer pullet or laying hen~~bird~~ is injured during catching, it should be euthanised ~~humanely killed~~.

~~Birds~~ Layer p~~P~~ullets and laying hens should be handled and placed into the transport *container* in accord~~ing~~ance ~~to~~ with Chapter 7.3. ~~Article 7.Z.14.~~

Catching should preferably be carried out under dim or blue light to calm the ~~birds~~ 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 ~~S~~stocking density in transport *containers* should be in accordance ~~comply~~ with Chapters 7.2., 7.3. and 7.4.

~~Outcome~~~~Animal~~Outcome-based measurables include: fear behaviour, injury rate and severity, mortality rate ~~at depopulation and on arrival at the destination~~, spatial distribution, and vocalisation.

Article 7.Z.26.

~~Emergency~~ Contingency plans

Layer p~~P~~ullet and laying hen producers should have ~~emergency~~ 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, ~~may~~ include the provision, maintenance and testing of backup generators and fail-safe alarm devices to detect malfunctions, ~~backup generators,~~ 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~~, a fire safety plan~~ and a plan for managing ventilation emergencies.

The ~~emergency~~ 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 ~~ing to~~ with the methods recommended in Chapter 7.6.

~~Outcome~~~~Animal~~Outcome-based measurables include: culling, morbidity and mortality rates, injury rate and severity, incidence of diseases, thermal comfort..

Article 7.Z.27.

Competencies of p~~P~~ersonnel ~~competency~~

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

ICFAW comment:

Add further measurables.

Justification:

Addition to outcome-based measurable to include injury rate and severity, incidence of diseases and thermal comfort as all are relevant to contingency plans and should be considered.

ICFAW comment:

Add "attitude".

Justification:

The attitude of the individual towards an animal has been shown to directly impact their behaviour and handling technique and therefore the welfare of that animal.

Scientific support for the justification

Hemsworth P (2007) Ethical stockmanship. Australian Veterinary Journal 85:194-200.
"The attitude of the stockperson can affect animal welfare by the stockperson's behaviour and in turn the animal's fear of humans."

"The stockperson's attitude may also affect his or her willingness to inspect the animals and promptly intervene when welfare problems arise."

"This research indicates sequential relationships between the attitudes of stockpeople towards interacting with their animals, the behaviour of the stockpeople towards their animals, the behavioural response of animals to humans (fear of humans) and the welfare and productivity of farm animals."

Annex 12 (contd)

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

ICFAW comment:

Add the word "humane".

Justification:

It is important to remind that killing must be performed in a humane manner.

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

Article 7.Z.28.

Inspection and handling

Layer p~~P~~ullets and laying hens, and the facilities and equipment within their poultry house~~premises~~ should be inspected at least daily. Inspection should have the following ~~three~~ ~~main~~ objectives: ~~to identify sick or injured birds to treat or cull them, to detect and correct any welfare or health problem in the *flock* and to pick up dead birds.~~

~~–~~ ~~to identify sick or injured pullets and hens and to treat or cull kill them in accordance with Article 7.Z.24.;~~

– to ~~pick up~~ 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 euthanased them in accordance with Article 7.Z.24.;

– to detect and correct any *animal welfare* or health problems in the *flock*; and

– to detect and correct malfunctioning equipment and other ~~facility~~ problems with the facility.

~~–~~ ~~to identify sick or injured pullets and hens and to treat or cull kill them in accordance with Article 7.Z.24.;~~

Inspections should be done in such a way that ~~birds~~ 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 ~~birds are~~ placed into or removed from the poultry house, they should not be injured, and should be held in ~~postures~~ a manner that minimises fear and stress ~~unnecessarily frightened or stressed~~ ~~(e.g. should be restrained in an upright posture)~~ [Gregory & Wilkins, 1989; Gross & Siegel, 2007; Kannan & Mench, 1996]. The distance ~~that~~ over which layer pullets and laying hens are carried should be minimised. Laying hens are prone to bone fractures when not handled properly.

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

ICFAW comment:

Add further measurables.

Justification:

Add to outcome-based measurable to include incidence of diseases, plumage condition and body score condition. All 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.

Scientific support for the justification

Tauson R, Kjaer J, Maria G et al (2006) Applied Scoring of Integument and Health in Laying Hens.
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Welfare Quality® (2009) Welfare Quality® assessment protocol for poultry.
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Article 7.Z.29.

Protection from predators

Layer p~~P~~ullets 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*.

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

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Blatchford, R. A., Fulton, R. M. & Mench, J. A. (2016). The utilization of the Welfare Quality® assessment for determining laying hen condition across three housing systems. Poultry Science, 95, 154-163. 10.3382/ps/pev227.

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