USA COMMENTS

CHAPTER 7.Z.

ANIMAL WELFARE AND LAYING HEN PRODUCTION SYSTEMS

Article 7.Z.1.

Definitions

For the purpose 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.

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 covers the production period from the arrival of *day-old birds* on the pullet-rearing farm to the removal of hens from the laying production facilities.

Commercial production systems involve the confinement of birds, the application of biosecurity and trade in the eggs or pullets. These recommendations cover pullets or hens kept in cage or non-cage systems, whether indoors or outdoors.

Commercial pullet or hen production systems include:

1. **Indoor systems**

   Pullets or hens are completely confined in a poultry house, with or without environmental control.

2. **Outdoor systems**

   Pullets or hens are kept in premises with or without environmental control that include a designated outdoor area, or are kept outdoors but given access as needed to an enclosed area.

   **Rationale:** As worded this definition does not seem to include pasture-based systems, where the hens or pullets are mainly or entirely kept outdoors.

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.

Criteria or measurables for the welfare of pullets or hens

The welfare of pullets or hens should be assessed using outcome-based measurables. 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*. The use of these indicators and the appropriate thresholds should be adapted to the different situations where pullets or hens are managed, also taking into account the strain of bird concerned.
Criteria that can be measured in the farm setting include body and plumage condition, egg shell condition, mortality and morbidity rates, etc. The age at which abnormalities of these criteria are observed can help to determine the origin. 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.

The following outcome-based criteria and measurables are useful indicators of pullet or hen welfare:

1. **Behaviour**

   The presence or absence of certain chicken behaviours could indicate good animal welfare or an animal welfare problem, 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 [Estévez et al., 2007; Rodríguez-Aurrekoetxea, A. and Estévez, I., 2014]. Some behaviours may not be uniquely indicative of one type of problem; they may be exhibited for a variety of reasons. Opportunities for hens to display these behaviours are influenced by the housing system and space provided.

   **Rationale:**
   - Some of the outcome based measures listed here are considered indicators of positive welfare (e.g. dustbathing, social affiliation).
   - Unnecessary words.
   - It is not clear as to why a good understanding of chicken behaviour is required.
   - The last statement was moved from 1f below and placed above. Some of the behaviours in Article 7.Z.3.1., specifically, Dust bathing, Foraging, Nesting, and Perching, may not be possible to be expressed because of the housing system and space provided to the birds.

   a) **Dust bathing**

   Dust bathing is an intricate body maintenance behaviour. During dust bathing, birds work loose material, such as litter, through their feathers. This behaviour helps remove dirt and parasites, which contributes to maintaining plumage condition, which in turn helps to maintain body temperature and protect against skin injury. Reduced dust bathing behaviour in the flock may indicate problems with litter or range quality, such as the litter or ground being wet or not friable [Olsön and Keeling, 2005; Van Liere and Bokma, 1987].

   b) **Fear behaviour**

   Fearful pullets and hens show high reactivity to various stimuli [Jones R. B., 1987; Zeitner and Hirt, 2008]. Fearfulness can lead to injury when the birds pile on top of each other, and sometimes suffocate one another. Fearful birds may be less productive [Barnett J., et al., 1992]. Methods have been developed for evaluating fearfulness while animal handlers walk through the poultry house or bird area [Jones, 1996; Forkman, 2007].

   c) **Feeding and drinking behaviour**

   Reduced feeding or drinking can indicate management problems, including inadequate spaces or inappropriate placement of feeders or drinkers, dietary imbalance, poor water quality, or feed contamination. Feeding and drinking are often depressed when birds are ill, and intake may also be reduced during periods of heat stress and increased during cold stress [Garner et al., 2012; Thogerson et al., 2009a; Thogerson et al., 2009b].

   d) **Foraging activity**

   Foraging is the act of searching for food, typically by walking and pecking or scratching foraging materials such as the litter substrate; reduced foraging activity could suggest problems with substrate or foraging material litter quality or the presence of conditions that decrease bird movement [Appleby et al., 2004; Lay et al., 2011; Weeks and Nicol, 2006].
**Rationale:** Birds on pasture forage on the ground, not in litter, so the changes we are making broaden the definition. In addition, there are other ways to promote foraging activity besides substrate – for example pecking blocks (e.g. Huber-Eicher and Wechsler, 1998; https://doi.org/10.1006/anbe.1997.0715) or scattered feed (e.g. scattering feed on Astroturf in furnished cages).

e) Injurious feather pecking and cannibalism

Injurious feather pecking can result in significant feather loss and may lead to cannibalism. Cannibalism is the tearing of the flesh of another bird, and can result in severe injury. These behaviours can have multifactorial causes [Hartcher, 2016; Estevez, 2015; Nicol et al., 2013; Rodenburg, 2013; Lambton, 2013].

f) Locomotion and comfort behaviours

Locomotion and comfort behaviours are important for body and plumage maintenance, and may include walking, leaping, turning, stretching legs and wings, wing flapping, feather ruffling and tail wagging [Dawkins and Hardie, 2007]. Opportunities to display these behaviours are influenced by housing system and space [Widowski et al., 2016; Lay, 2011].

**Rationale:** This statement was placed above under Item 1. Some of the outcomes in Item 1, Behaviour, are affected by the housing system and space provided to the birds.

g) Nesting

Nesting is a natural and 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 and egg laying outside the nests may be indicative of problems with environmental or social behavioural factors [Cronin et al., 2012; Cooper and Appleby, 1996; Gunnarsson et al., 1999].

h) Perching

Perching is a natural and highly motivated behaviour. Birds seek elevation during the day; 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, injuries and pullet rearing experience [Janczak and Riber, 2015; Gunnarsson et al., 1999].

i) Social behaviour

Chickens are a highly social species, engaging in synchronised behaviour [Olsson et al., 2002; Olsson and Keeling, 2005]. Benefits include social learning, protection from predators [Newberry et al., 2001], help in thermoregulation and plumage maintenance. Problems in social behaviour can be assessed using scoring systems for measuring the degree of aggression damage and competition for resources [Estevez, 2002].

j) Spatial distribution

Uneven spatial distribution of the birds may indicate thermal discomfort or uneven availability of resources, such as light, food or water, shelter, comfortable resting locations. [Rodriguez-Aurrekoetxea and Estevez, 2016; Cornetto and Estevez, 2001].

k) 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.
I) Vocalisation

Vocalisation can indicate emotional states, both positive and negative. A good understanding of flock vocalisations is useful for good animal care [Zimmerman et al., 2000; Bright, 2008; Koshiba et al., 2013]. Vocalisation, decreased vocalisation or lack of vocalisation can also indicate presence of disease.

**Rationale:** Some outcome-based measures, such as vocalization, are less validated or more speculative than others, and are presently very difficult or impossible to measure on-farm. It would be helpful to clarify which measures are in more of a developmental stage or can/cannot be measured in the farm setting by producers or auditors. We, therefore, recommend adding the statement here to provide context to the statement about this behavior; namely, differences in vocalization by pullets and hens may mean many different things, including presence of disease.

2. Body condition

Poor body condition is reflective of poor welfare outcomes for individual birds. At flock level, uneven body condition may be an indicator of potential 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].

3. Eye conditions

Conjunctivitis can indicate irritants such as dust and ammonia. High ammonia levels can also cause corneal burns and eventual blindness. Abnormal eye development can be associated with low light intensity [Jenkins et al., 1979; Lewis and Gous, 2009; Prescott et al., 2003].

**Rationale:** Currently abnormal eye development has only been measured in an experimental setting and has not been validated on-farm.

4. Foot problems

Hyperkeratosis, and bumblefoot are painful conditions associated with inappropriate flooring [Lay et al., 2001; Abrahamsson and Tauson, 1995; Abrahamsson and Tauson, 1997]. Excessive claw growth, broken claws and toe injuries affect locomotion and may be associated with pain [EFSA, 2005].

Contact dermatitis, also known as pododermatitis, affects skin surfaces that have prolonged contact with wet litter or other wet flooring surfaces [Tauson and Abrahamson, 1996].

**Rationale:** Contact dermatitis is commonly known as pododermatitis, so it seems reasonable to state this here.

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

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

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

6. Injury rate and severity

The rate and severity of injuries can indicate welfare problems in the flock during production. Injuries include those caused by other birds (e.g. scratches, feather loss or wounding), by environmental conditions, (e.g. fractures and keel bone deformation) and by human intervention (e.g. during handling and catching).

7. 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 reflect an animal welfare problem.
8. Performance

Daily, weekly and cumulative performance should be within expected ranges. Any unforeseen decreases in these rates could be reflective of the welfare status of the individual birds or the flocks.

a) Pullet growth rate measures average daily mass gain per average pullet and flock uniformity.

b) Pullet feed conversion measures the quantity of feed consumed by a flock relative to the total live mass produced, expressed as the mass of feed consumed per unit of body mass.

c) Hen feed conversion measures the mass of feed consumed by a flock relative to the unit of egg production.

d) Egg production, such as when measured by the number of eggs per hen housed.

e) Egg quality, such as when measured by shell strength and abnormalities.

9. Plumage condition

Evaluation of the plumage condition of pullets and hens provides useful information about aspects of welfare. Feather loss and damage can result from feather pecking behaviour, nutritional problems and abrasions resulting from faults in the housing system [Rodriguez-Aurrekoetxea and Estevez, 2016; Drake et al., 2010]. Plumage dirtiness may be associated with the environment and production system. Plumage scoring systems have been developed for these purposes [Blokhuis, 2007].

10. Water and feed consumption

Monitoring daily water and feed consumption is a useful tool to indicate 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 wet litter and diarrhoea, dermatitis, dehydration or changes in egg quality, production and body condition.

Article 7.Z.4.

Recommendations

Articles 7.Z.5. to 7.Z.29. provide recommendations for measures applied to pullets and hens. The performance of some of these measures will be limited by the system in which the hens are housed.

Rationale: Numerous scientific studies have documented the benefits of providing for the opportunity to perform behaviours such as dustbathing, foraging, perching, and nesting. Although the draft chapter acknowledges the importance of these specific behaviours, the ability of hens to perform these behaviours will be limited by the system in which the 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, construction and equipment of establishments

The location of pullet and 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, exposure of pullets and hens to chemical and physical contaminants, noise and adverse climatic conditions.

Pullet and layer houses, outdoor areas and equipment to which birds have access should be designed after consideration of bird behaviour and maintained to avoid injury or pain to the birds.

Pullet and layer houses should be constructed with materials and electrical and fuel installations that minimise the risk of fire and other hazards.

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Producers should have a maintenance programme in place for all equipment, the failure of which could jeopardise bird welfare.

Outcome-based measurables: culling and morbidity, fear behaviour, feeding, drinking and foraging, foot problems, incidence of diseases, infections and infestations, injury rates and severity, locomotion and comfort behaviours, mortality, performance, plumage condition, social behaviour and spatial distribution, thermoregulatory behaviour, vocalisations.

**General Comment:** The United States appreciates the outcome-based measurables in 7.Z.5. through 7.Z.25. being listed in alphabetical order. This is different from the other Animal Welfare Production chapters that seems to list the measurables in no particular order. Unless the measurables are listed in order of relative importance or listed according to some other criteria, alphabetical listing is appreciated.

**Article 7.Z.6.**

**Matching the birds and the housing and production system**

Welfare and health considerations should balance any decisions on performance when choosing a layer strain for a particular location, housing and production system. The pullet rearing system should prepare the bird for the layer production system.

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

**Article 7.Z.7.**

**Stocking density**

Pullets and hens should be housed at a stocking density that allows them to have adequate access to resources and to express locomotion and comfort behaviours. The following factors should be taken into account:

- management capabilities,
- ambient conditions,
- housing system,
- production system,
- litter quality,
- ventilation,
- biosecurity strategy,
- genetic strain,
- group size,
- age and bird mass.

**Rationale:** Flock size has effects on behaviour and welfare (e.g. aggression) that can in turn influence optimal stocking densities.
Outcome-based measurables: drinking and foraging, feeding, incidence of diseases *infections* and *infestations*, injury rate and severity, locomotion and comfort behaviours, mortality rate, nesting, perching, performance, plumage condition, social behaviour, spatial distribution.

**Article 7.Z.8. Nutrition**

Pullets and hens should always be fed a diet appropriate to their age and genetic strain, which contains adequate nutrients to meet their requirements for good health and welfare.

The form and quality of feed and water should be acceptable to the birds and free from contaminants 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.

**Rationale:** Closed systems (for example nipple drinkers) do not need to be cleaned regularly, but should be inspected and cleaned if water/feed quality problems are detected.

Birds should be provided with adequate access to feed on a daily basis. Water should be continuously available except under veterinary advice. Special provision should be made to enable chicks to access appropriate feed and water.


**Rationale:** This section is about nutrition, and body condition is one of the best ways to measure adequate nutrition.

**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 of the floor should allow birds to express normal locomotion and comfort behaviours. The floors should support the birds adequately, prevent injuries and ensure that manure does not contaminate other birds. Changes of flooring types from pullet to layer housing should be avoided.

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


**Article 7.Z.10. Dust bathing areas**

When dust bathing areas are offered, they should 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 clean [Lentfer et al., 2011].

Outcome-based measurables: dust bathing, injury rate and severity, plumage condition, spatial distribution.

**Article 7.Z.11.**
Foraging areas

When foraging areas are offered, they should provide suitable materials, designed and positioned to encourage foraging, allow synchronised behaviour, prevent undue competition and not cause damage or injuries. Foraging areas should be easy to inspect and clean.

Outcome-based measurables: foraging, injurious feather pecking and cannibalism, injury rate and severity, spatial distribution.

Article 7.Z.12.

Nesting areas

When nesting areas are offered, they should be built of suitable materials, designed and positioned to encourage nesting, prevent undue competition and not cause damage or injuries. Nesting areas should be easy to inspect, clean and disinfect.

Outcome-based measurables: injurious feather pecking and cannibalism, injury rate and severity, nesting, performance, spatial distribution.

Article 7.Z.13.

When perches are offered, they should be easily accessible, built of suitable materials, designed and positioned to encourage perching, to prevent keel bone deformation or foot problems and to maintain stability of the birds during perching. In the absence of designated perches, platforms, grids and slats that are perceived by the birds as elevated and that do not cause damage or injuries, may be a suitable alternative. Perches or their alternatives should be easy to clean and disinfect sanitize [Hester, 2014; EFSA, 2015].

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

Rationale: The perches also have to be positioned so that hens can use them easily (e.g. there has to be sufficient access, perches cannot be blocked by feeders, etc.) Many producers use unsealed wooden perches. These are preferred by hens, and although they cannot be disinfected, they can be sanitized.

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

Article 7.Z.14.

Outdoor areas

Pullets can be given access to outdoor areas as soon as they have sufficient feather cover and are old enough to range safely. There should be sufficient appropriately designed exit areas 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 becoming infected by pathogenic agents, infested by parasites or being injured. This 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 and mud. Outdoor areas should allow pullets and hens to feel safe outdoors and be encouraged to optimise utilisation of the range, while mitigating predation and disease risks [Gilani et al, 2014]. Hens should be habituated early to the outdoor area [Rodriguez–Aurrekoetxea and Estevez, 2016]. Outdoor areas should provide shelter for the birds and be free from poisonous plants and contaminants.

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

Article 7.Z.15.
Thermal environment

Thermal conditions for pullets and hens should be appropriate for their stage of life, and extremes of heat, humidity and cold should be avoided. A thermal comfort index can assist in identifying the comfort zones for the pullets and hens at varying temperature, air velocity, and relative humidity levels.

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

Control of the thermal environment should be monitored frequently enough so that failure of the system will be noticed and repaired promptly, to avoid compromising bird welfare before it causes a welfare problem.

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

Rationale: Thermal comfort refers to cold temperatures as well.

Article 7.Z.16.

Air quality

Ventilation, housing system, and manure management can affect air quality. Actions are required to maintain air quality at all times, including the removal of waste and/or mitigation of noxious or respiratory gases such as carbon dioxide and ammonia, dust and excess moisture content from the environment.

The ammonia concentration should not routinely exceed 25 ppm at bird level [David et al., 2015; Milles et al., 2006; Olanrewaju, 2007].

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

Outcome-based measurables: eye conditions, incidence of respiratory diseases, performance.

Rationale: Rewording suggested to improve for clarity and completeness. Also, important to include that there are mitigation strategies for noxious gases (such as litter amendments) that can be used to actually minimize gas generation. Removing gasses is not the only effective control strategy.

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 for the normal development and behaviour of the birds, for finding feed and water, to stimulate activity, minimise 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 the birds to rest, to reduce stress and to promote circadian rhythms [Malleau et al., 2007].

When changes in lighting are needed, they should be performed in a step-wise fashion, except during induced moulting (if practised) when rapid adjustments to lighting are desired.

Outcome-based measurables: eye conditions, feather condition, injurious feather pecking, injury rate and severity, locomotion, nesting perching, performance, spatial distribution.
**Rationale:** Light should not be homogenously distributed. It is usually recommended that the nest area be darkened to encourage nesting behavior and minimize problems with cannibalism, whereas the litter area can be lighter than in the remainder of the housing system to encourage foraging and dustbathing and to discourage floor laying. Feather condition should be added to the list of outcome measures as an indicator of feather pecking.

**Article 7.Z.18.**

**Noise**

Pullets and hens are adaptable to different levels and types of noise. However, exposure of birds 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 other indoor or outdoor equipment should be constructed, placed, operated and maintained in such a way that it causes the least possible amount of noise [Chloupek et al., 2009].

Location of establishments should, where possible, take into account existing local sources of noise. Strategies should be implemented to habituate the birds to the conditions [Candland et al., 1963; Morris, 2009].

Outcome-based measurables: fear behaviours, injury rate and severity, performance.

**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.

Management methods that may reduce the risk of occurrence include:

- managing light in rearing and lay [Nicol et al., 2013],
- choosing a genetic strain [Craig and Muir, 1996; Kjaer and Hocking, 2004],
- influencing age of onset of lay [Green et al., 2010],
- providing foraging materials in rearing and lay [Huber-Eicher and Wechsler, 1998],
- adapting diet and form of feed in rearing and lay [Lambton et al., 2010],
- reducing stocking density [Zimmerman et al., 2006],
- reducing group size in rearing and lay [Bilcik and Keeling, 1999],
- providing elevated perches in rearing and lay [Green et al., 2010],
- treating beaks in chicks [Gentle and Hughes, 1997],
- minimising fear-related stimuli,

Management methods to control the occurrence include the above list, where applicable, and prompt removal of affected birds to a hospital area or euthanasia.

If these management strategies fail, therapeutic beak trimming is the last resort.
Outcome-based measurables: injurious feather peaking and cannibalism, injury rate and severity, mortality rate, plumage condition, vocalisation.

Article 7.Z.20.

Moulting

When induced moulting is practised, techniques that do not involve withdrawal of feed should be used. Hens should have access to water at all times. Only hens in good body condition and health should be moulted. During the moulting period, body mass loss should not compromise hen welfare, including welfare during the subsequent laying period. Total mortality during the moulting period should not exceed normal variations in flock mortality.

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

Article 7.Z.21.

Painful interventions

Painful interventions, such as beak trimming, should not be practised unless absolutely necessary and pain mitigation interventions should be used. Other mutilations (e.g. dubbing and toe trimming) should not be performed in pullets and hens. Pain-free alternatives are preferred. If preventive beak trimming is required, it should be carried out by trained and skilled personnel at the earliest age possible and care should be taken to remove using a method, which minimises pain and controls bleeding. Current methods include infrared treatment or hot blade cutting. [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]; 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-based measurables: drinking and foraging, feeding, injurious feather pecking and cannibalism, locomotion and comfort behaviours, mortality rate, morbidity rate, performance, plumage condition, vocalisations.

Article 7.Z.22.

Animal health management, preventive medicine and veterinary treatment

Animal handlers responsible for the care of pullets and hens should be aware of the signs of ill-health or distress, such as a change in feed and water intake, reduced production, changes in behaviour, abnormal appearance of feathers, faeces, or other physical features.

If they are not able to identify the causes of disease, ill-health or distress, or to correct these, or if they suspect the presence of a notifiable disease, they should seek advice from veterinarians or other qualified advisers. Veterinary treatments should be prescribed by a veterinarian.

There should be an effective programme for the prevention and treatment of diseases consistent with the programmes established by Veterinary Services as appropriate.

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

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

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

Article 7.Z.23.

Biosecurity

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Biosecurity plans should be designed and implemented, commensurate with the best possible bird health status and current disease risk (endemic and exotic or transboundary) that is specific to each epidemiological group of pullets and 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,
- fomites, such as equipment, facilities and vehicles,
- vectors (e.g. arthropods and rodents),
- aerosols,
- water supply,
- feed,
- the practice of partially restocking the house (back filling), due to catastrophe or incomplete flock placement, which should only be performed with due consideration to biosecurity and in a manner that prevents commingling of flocks.

Outcome-based measurables: incidence of diseases, infestations, morbidity rate, mortality rate, performance.

**Article 7.Z.24.**

**Humane killing of individual birds or flocks**

When individual or groups of birds are killed for diagnostic purposes, depopulation of end-of-lay flocks or for purposes of disease control, techniques used should be performed in a humane manner in accordance with Chapter 7.6.

**Article 7.Z.25.**

**Depopulation of pullet and layer facilities**

Birds should not be subjected to an excessive period of feed withdrawal prior to the expected depopulation time [Webster, 2003].

Water should be available up to the time of depopulation.

Birds that are not fit for loading or transport because they are sick or injured should be humanely killed.

Catching should be carried out by competent animal handlers and every attempt should be made to minimise stress, fear reactions and injury. If a bird is injured during catching, it should be humanely killed.

Birds should be handled and placed into the transport container according to Article 7.Z.14.

Catching should preferably be carried out under dim or blue light to calm the birds.

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

Stocking density in transport containers should comply with Chapters 7.2., 7.3. and 7.4.

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

**Rationale:** Killing of animals for disease control purposes is already addressed in Chapter 7.6, and not necessary to have here (this is not done for the other welfare chapters).
Emergency plans

Pullet and hen producers should have emergency plans to minimise and mitigate the consequences of natural disasters, disease outbreaks and the failure of mechanical equipment. Planning may include the provision of 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 alternative feed supply and a plan for managing ventilation emergencies.

The emergency plans should be consistent with national programmes established or recommended by Veterinary Services. Humane emergency killing procedures should be a part of the plan.

Outcome-based measurables: culling, morbidity and mortality rates.

Personnel competency

All animal handlers responsible for the pullets and hens should have received appropriate training or be able to demonstrate that they are competent to carry out their responsibilities and should have sufficient knowledge of bird behaviour, handling techniques, emergency killing procedures, biosecurity, general signs of diseases, and indicators of poor animal welfare and procedures for their alleviation.

Outcome-based measurables: fear behaviour, incidence of diseases, locomotion and comfort behaviours, performance, morbidity rate, mortality rate, spatial distribution, vocalisation.

Inspection and handling

Pullets and hens, and the facilities in which they are kept, should be inspected at least daily. Inspection should have 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, and to identify facility problems, such as feed outages, which could affect bird welfare.

Rationale: Editorial changes made to include the need for facility as well as bird inspection to ensure welfare.

Inspection should be done in such a way that birds are not unnecessarily disturbed, for example animal handlers should move quietly and slowly through the flock.

When pullets and hens are handled, particularly when birds are placed into or removed from the house, they should not be injured, unnecessarily frightened or stressed (e.g. should be restrained in an upright posture) [Gregory & Wilkins, 1989; Gross & Siegel, 2007; Kannan & Mench, 1996].

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

Protection from predators

Pullets and hens should be protected from predators in indoor and outdoor areas.

Outcome-based measurables: fear behaviour, mortality, injury rate and severity, locomotion and comfort behaviours, performance, spatial distribution, vocalisation.
References


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Van Liere & Bokma, (1987). Dust bathing is a maintenance behaviour that contributes to feather condition by fluffing up the downy feathers and removing stale lipids prior to replacement with fresh lipids through oiling behaviour.


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