

# POULTRY WELFARE STANDARDS AND GUIDELINES – LITTER MANAGEMENT

## SUPPORTING PAPER PUBLIC CONSULTATION VERSION

Prepared by the Poultry Standards and Guidelines Drafting Group, Oct 2016

### ISSUE

Litter, if provided, should be managed to maximise the welfare benefits to poultry. Issues to be addressed include:

- Access to litter
- Materials used
- Litter quality, quantity and management
- Reuse or built-up litter.

### RATIONALE

If litter is used, litter conditions may influence poultry health and welfare (Lister, 2009). Litter is defined as the combination of bedding material, excreta, feathers, wasted feed and water found on the floor (Ritz et al., 2009). Litter management is an issue for meat chickens, egg laying chickens (layers), turkeys, ducks and quail that are kept under barn conditions.

The litter or bedding material serves a number of important functions. For example it:

- absorbs excess moisture from droppings and drinkers and promotes drying by increasing the surface area of the house floor;
- insulates chicks from cooling effects of the ground and provides a protective cushion between the birds and the floor; and
- allows birds to display behaviours such as dust bathing (Ritz et al., 2009).

An effective bedding material must be absorbent, inexpensive and non-toxic. Ideal materials will have high moisture absorption and release qualities to minimise caking. In addition a bedding material must be compatible as a fertilizer or soil additive after it has served its purpose for poultry production (Ritz et al., 2009). If litter is to be used in energy generation, litter materials may also need to be combustible.

### RECOMMENDATIONS

The drafting group considered current scientific knowledge and practice and agreed that optimum litter management is a complex issue and that standards for litter management were required to underpin poultry welfare.

## **ANIMAL HEALTH AND WELFARE CONSIDERATIONS**

### **Access to litter**

Not all poultry housed in barns have access to litter, and slatted floors are a common alternative. Environments in which hens are exposed to litter and soil, such as non-cage and outdoor systems, provide a greater opportunity for birds to express foraging and dust-bathing behaviours, but also provide an increased opportunity for transmission of disease agents and parasites. The more complex the environment, the more difficult it is to clean, and the larger the group size, the more easily disease agents and parasites are able to spread.

Some studies indicate that hens housed in litter-based systems have a significantly higher occurrence of bacterial and parasitic diseases than hens kept in cages (Fossum et al., 2009; Elson, 2015). Many of the infectious diseases of layers are a result of contact with soil, litter, and fomites (e.g. rodents, beetles, and equipment) known to carry the agents of those diseases.

Air quality has been shown to be poorer in litter-based systems (floor housing and aviary) compared with conventional and furnished cages (Saleh et al., 2003; David et al., 2015a; David et al., 2015b).

Poorly designed and maintained perches used in floor systems have been associated with bumblefoot because of the accumulation of manure and litter on the surface of the perch, especially under wet litter conditions (Tauson and Abrahamsson, 1994b; Wang et al., 1998). Lameness can be a costly problem for birds reared in deep litter.

Hens are strongly motivated to forage even though feed is available ad libitum in the feed trough (Bubier, 1996; Lindqvist et al., 2002). Provision of litter encourages birds to exhibit foraging behaviour. Motivation to access litter for dust bathing is more variable and, despite the provision of litter, some hens sham dust bathe on wire flooring (Olsson and Keeling, 2005). Restricted access to litter in both time and space could be stressful, especially when subordinate hens are excluded from the litter area by dominant hens (Shimmura et al., 2008a).

### **Choice of litter materials**

Many products have been used as bedding. The quality and quantity of bedding materials can vary greatly from one jurisdiction to another in Australia. The most commonly used materials are sawdust, wood shavings, rice hulls, straw, paper products and crop residues. The litter depth can be varied, with a range of approximately 40-75 mm deep, depending on material used (Runge et al., 2007). Litter may be re-used for several flocks, although single flock clean-outs are still very common for Australian meat chicken sheds.

Hard fibre litter materials (wood shavings) are thought to stimulate gut development, improve nutrient digestibility and alter the composition of the gut microflora of chickens ingesting it. Providing litter encourages pecking, scratching and dust bathing behaviours.

### **Managing the in-shed environment**

It is important to manage the in-shed environment to ensure good bird welfare. This goes beyond litter management and litter moisture management. It includes ventilation, cooling, heating, lighting, sounds, feed and water presentation, managing flock migration and interactions between the grower and the birds. Managing all of these requires a balanced approach, and priorities may need to shift occasionally due to the stage of production, time of day, weather and other influencing factors.

Litter management is a key part of managing the welfare of hens so that problems such as dust, fungal proliferation, and conditions such as bumblefoot or respiratory disease are minimised.

Managing the moisture in the litter is important because having litter that is too dry can result in excessive dust (David et al., 2015a), while having litter that is excessively wet may contribute to ammonia production (David et al., 2015b), cake formation/surface crusting, contact dermatitis (Elson, 2015) and may slow the die-off of pathogenic microbes. Because of the dynamics of water movement in and out of the litter due to routine ventilation, excretion and drinking spillage, litter moisture content varies within the shed and down through the litter profile. Poultry growers should actively manage the entire shed environment to avoid prolonged periods of extensive wet or dry litter.

Litter that is too dry and dusty can also lead to problems such as dehydration of new chicks and respiratory disease. Ideally litter moisture should be maintained at an average of between 20-25% (Ritz et al., 2015).

### **Litter depth**

The optimum depth of litter depends on the choice of litter material and also on weather patterns. Litter needs to be carefully managed in winter when low temperatures lead to low ventilation rates, and consequently the higher humidity may result in the litter becoming wet. This is more likely if hens also have access outdoors. In areas with dry winters, 50 mm is considered adequate to provide sufficient moisture absorption for chickens to start on and avoid litter caking (Runge et al., 2007). In areas of Australia with cold wet winters, a depth of 75 mm is required to absorb the extra moisture (Runge et al., 2007). Stock persons should be aware of the factors that affect litter condition and the welfare problems associated with poor litter management.

### **Management practices to improve litter quality**

Many factors affect litter moisture. For instance, if new litter is not stored properly and becomes damp before it is spread in the poultry house, it should be dried before placement of birds. Nutrition also influences litter quality. Certain dietary ingredients (especially salt), when fed in excess, cause meat chickens to consume and excrete large amounts of water and result in wet litter conditions. Some drugs also stimulate excess water consumption and excretion (Ritz et al., 2009).

Environmental conditions such as wet and humid weather, condensation or very cold temperatures can cause wet litter if the poultry house ventilation system is not able to remove moisture effectively.

Drinker lines, foggers and evaporative cooling pads, if not managed and maintained carefully, can contribute greatly to wet litter problems.

### **Reuse or built-up litter management**

As a result of the reduced availability and the expense of pine shavings and sawdust, and the difficulty of handling and disposing of used litter, many poultry companies and meat chicken producers have adopted the practice of reusing litter.

De-caking the house of crusted litter, preheating and ventilating the house prior to each flock is necessary to help purge the house of ammonia before chick placement. Field experience shows that good performance can be achieved by leaving the litter in the house through several flocks. This good performance may be facilitated when the old litter serves as a reservoir for 'good bacteria' that act by competitive exclusion to suppress pathogens. Additionally, old litter typically keeps the floors warmer during brooding. Some growers do not top-dress between

flocks and have found birds do as well on used litter as when top-dressed. Machines are available that can rework the litter, pick up the cake, stir the litter pack, and apply top-dress bedding, but are not commonly used in Australia.

The practice of growing meat chickens on built-up litter provides considerable management challenges. The potential for problems with ammonia, disease and condemnations increases each time another flock is grown on the same litter and intensifies the challenge of maintaining an optimal in-house environment. Mouldy litter should not be used. There should be frequent checks to ensure that litter does not become infested with harmful organisms parasitic to birds.

## CONCLUSIONS

Litter serves to absorb moisture and provide insulation and cushion between the birds and the floor. Because birds are in constant contact with litter, litter conditions will significantly influence bird welfare.

The practice of built-up litter requires a greater degree of management to be successful. Growers need to be alert to changes in litter quality and take actions to maintain an appropriate in-house environment for optimal bird performance. Controlling litter moisture can help growers manage litter quality. Proper litter management helps to improve in-house air quality. Poor litter management may lead to litter that is caked, wet or excessively dusty, and attempts must be made to prevent these conditions and rectify them should they occur (Bureau of Animal Health, 2003).

## REVIEW OF NATIONAL POLICIES AND POSITIONS

The current Australian **Model Code of Practice for Poultry** 4th edition (2001) states:

*2.4.2.2 Where litter floors are used, the management of the litter is critical for the welfare of the birds. In deciding what depth of litter to use consideration must be given to the stocking density of the birds and length of time in the shed. Poor litter management may lead to litter that is caked, wet or excessively dusty, and attempts must be made to prevent these conditions and rectify them should they occur.*

The **RSPCA Australia** Approved Farming Scheme standards place a strong emphasis on the need to maintain litter in a dry and friable condition for layers, meat chickens and turkeys. Litter must be of an appropriate material and of sufficient depth to allow birds to maintain body temperature, scratch, forage and dust bathe. Managing shed conditions and ongoing maintenance of facilities (including drinker lines) combined with nutrition management and appropriate space allowance will affect litter quality.

If litter quality is managed well, conditions including lameness, footpad burn and breast blisters can be minimised. Every effort should be made to ensure shed managers are aware of the principles and methods of removing moisture from the litter under varying environmental conditions.

### **Litter (Layers)**

*3.21 Where the laying facility does not allow provision of litter indoors, birds must have access to a veranda or an outdoor area to allow birds to dust bathe and forage.*

*3.22 Where the laying facility allows provision of litter indoors, litter must completely and evenly cover the usable area of the laying facility floor at ground level.*

*3.23 For tiered systems, the litter area must provide sufficient space to allow at least one third of the flock (calculated as per stocking density requirements under 6.01) to forage and dust bathe at any one time.*

3.24 *Birds must be given continuous access to litter as soon as possible but no later than three weeks following placement allowing for a period in which to train birds to use the nests.*

3.25 *From 1 January 2018, where a period in which to train birds to use the nests is used, birds must at least have daily access to litter immediately after the egg-laying period.*

3.26 *Litter must be maintained to a minimum average depth of:*

*a. 50mm during the first two months of use*

*b. 100mm after the first two months of use.*

3.27 *Litter must be of good quality, water-absorbing material and provide for the bird's behavioural need to dust bathe, scratch and forage.*

3.28 *Litter supplies must be accompanied by documentation specifying source, type and volume.*

3.29 *Litter must be actively maintained in a dry and friable condition.*

3.30 *Litter condition must be monitored daily and prompt action taken where crusts and/or wet areas are identified.*

5 *Usable area, as defined in these Standards, may include any horizontal floor surface (including litter, slats or wire mesh surfaces), verandas (where accessible at all times) and any area occupied by feeding and watering equipment and nest boxes (where accessible at all times), on one or more levels within the laying facility provided that each area is accessible to the birds. Usable area can only be included where there is sufficient headroom between levels to allow birds to stand normally and where the area is accessible to stock-persons to observe and reach birds.*

3.31 *Litter management equipment must be available on-farm.*

3.32 *Irreparably wet or fouled litter must be removed promptly and replaced with dry, friable litter.*

#### **Litter (meat chickens)**

3.14 *Litter material must be of good quality, water-absorbing material and provide for the bird's behavioural need to dust bathe, scratch and forage.*

3.15 *Litter supplies must be accompanied by documentation specifying source, type and volume.*

3.16 *The floor of the shed must be completely and evenly covered in litter to a minimum average depth of 50mm.*

3.17 *Litter must be actively maintained in a dry and friable condition.*

3.18 *Litter condition must be monitored daily and prompt action taken where crusts and/or wet areas are identified.*

3.19 *Litter management equipment must be available on-farm.*

3.20 *Irreparably wet or fouled litter must be removed and replaced with dry, friable litter.*

3.21 *Where litter is re-used at the end of a batch, it must be treated to address pathogen loads and ammonia concentrations and be dry and friable at bird placement.*

3.22 *Where used litter is placed in the brooding area, it must have 50mm of fresh litter placed on top.*

#### **Litter (turkeys)**

3.14 *Litter material must be of good quality, water-absorbing material and provide for the bird's behavioural need to dust bathe, scratch and forage.*

3.15 *Litter supplies must be accompanied by documentation specifying source, type and volume.*

3.16 The floor of the shed must be completely and evenly covered in litter to a minimum average depth of 100mm at brooding and 75mm during the grower phase.

3.17 Litter must be actively maintained in a dry and friable condition.

3.18 Litter condition must be monitored daily and prompt action taken where crusts and/or wet areas are identified.

3.19 Litter management equipment must be available on-farm.

3.20 Irreparably wet or fouled litter must be removed and replaced with dry, friable litter.

3.21 Where litter is re-used at the end of a batch, it must be treated to address pathogen loads and ammonia concentrations and be dry and friable at bird placement.

3.22 Where used litter is placed in the brooding area, it must have 100mm of fresh litter placed on top.

The **Australian Veterinary Association** has no published policy regarding litter management of poultry.

## REVIEW OF INTERNATIONAL POLICIES AND POSITIONS

This section is included to provide a brief international context, while acknowledging that Australia's poultry production systems may vary from production systems, poultry breeds and climatic conditions in other countries.

The New Zealand Layer Hens code of welfare has minimum standards for litter which include; Litter material must be of good quality, friable and free from toxic contaminants. Litter condition must be managed to avoid levels of dustiness or dampness that could cause leg, respiratory, or other health problems such as the build-up of parasites or diseases.

The New Zealand Meat Chickens code of welfare has minimum standards for litter which include; (a) Litter must be of good quality material, friable, and with minimal risk of toxic agent contamination. Meat chicken shed floors must be completely covered with litter. Litter must be managed to avoid levels of dustiness or dampness sufficient to cause leg, respiratory or other health problems.

During the last 15 years, some countries, including France, Ireland, England, Denmark, Canada and the United States have adopted the policy of using materials only from sources that can guarantee freedom of their product from harmful chemicals.

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## **APPENDIX 1 – DEFINITIONS**

**Litter** is defined as the combination of bedding material, excreta, feathers, wasted feed and wasted water. This includes litter from meat chickens (broilers), egg laying chickens (layers) kept under barn conditions, turkeys, ducks and quail.

Bedding materials are absorbent, fast drying, insulating and non-toxic that may be used at the start of a grow-out to provide a cushioning and insulating surface for the birds and to absorb fresh excreta. Materials commonly include wood products and crop residues but may be any organic or inorganic material that has appropriate properties.

**Deep litter:** The system of housing where a suitable material called litter is provided on the poultry house floor for the birds to live on.

### **2.1.1.2 Barn Systems (Non-cage Systems)**

Birds in barn systems are free to roam within a shed which may have more than one level. The floor may be based on litter and/or other material such as slats or wire mesh.

#### **2.1.2.1 Meat Chicken Shed Systems (Deep Litter System)**

Meat chickens in free-range systems have access to an outdoor range and to indoor shelter.

**Caking:** Undesirable compaction of the surface of litter.