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H.3. Organic farming

Expert Group for Technical Advice on Organic Production

EGTOP

Report On Poultry

The EGTOP adopted this technical advice at the 5th plenary meeting
of 20-21 June 2012

About the setting up of an independent expert panel for technical advice

With the Communication from the Commission to the Council and to the European Parliament on a European action plan for organic food and farming adopted in June 2004, the Commission intended to assess the situation and to lay down the basis for policy development, thereby providing an overall strategic vision for the contribution of organic farming to the common agricultural policy. In particular, the European action plan for organic food and farming recommends, in action 11, establishing an independent expert panel for technical advice. The Commission may need technical advice to decide on the authorisation of the use of products, substances and technologies in organic farming and processing, to develop or improve organic production rules and, more in general, for any other matter relating to the area of organic production. By Commission Decision 2009/427/EC of 3 June 2009, the Commission established the Expert Group for Technical Advice on Organic Production (EGTOP).

EGTOP

The Group shall provide technical advice on any matter relating to the area of organic production and in particular it must assist the Commission in evaluating products, substances and technologies which can be used in organic production, improving existing rules and developing new production rules and in bringing about an exchange of experience and good practices in the field of organic production.

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The report of the Expert Group presents the views of the independent experts who are members of the Group. They do not necessarily reflect the views of the European Commission. The reports are published by the European Commission in their original language only, at the following webpage:

www.organic-farming.europa.eu

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EXECUTIVE SUMMARY¹

The expert Group for technical advice on organic production (EGTOP; hereafter called "the Group") in addressing the mandate on poultry recommends that:

- The maximum usable area limit for poultry houses for meat production should be deleted;
- The term "usable" area should replace the term "net" area in Commission Regulation (EC) No 889/2008 (hereafter called the organic regulation), and should include verandas where 24h/day access is available;
- Multi-layer systems, currently mainly used for laying hens, pullets and breeding stock, should have no more than 3 levels of usable area including the ground floor;
- One third of usable area in multi-tiered poultry houses should be solid, that is, not of slatted or of grid construction, and covered with a litter material such as straw, wood shavings, sand or turf. In order to be considered as part of the usable area higher tiers should be capable of having manure removed by an automated system;
- In the case of multi-tiered systems a maximum limit per m² (ground) floor area should be applied, set at 50% above the stocking rate per m² usable area;
- The existing number per poultry house limits in the organic regulation should refer to flock size, not numbers per poultry house (houses may contain multiple flocks provided they are separated within the house and have separate open air areas);
- The requirement concerning the minimum period of open air access in Article 14 of the organic regulation should be amended to add: "In particular, continuous daytime open air access should be provided from as early an age as practically possible, whenever physiological and physical (e.g. weather) conditions allow, except in the case of temporary restrictions imposed by veterinary authorities, and should reflect the different life spans of different categories of poultry;
- Management options to prevent flight injuries and escape for some categories of birds such as guinea fowl and quail should be reviewed.
- The provision of pop-holes as defined by the organic regulation (4m/100m² usable area) should apply to the external boundary of the poultry house, including a veranda, provided that continuous (24 hour) access to the veranda is possible;
- If a veranda is present with a fixed dividing barrier to the outside area, then this minimum pop-hole requirement should apply to this barrier. In such a situation, internal pop-holes between the house and the veranda of minimum of 2m/100m² usable area would be acceptable to enable 24h access to the veranda (provided that they are open continuously) recognising the need for smaller openings to regulate internal temperatures, particularly in adverse weather conditions;
- The maximum distance from any point within the house to the nearest external pop-hole should not be more than 10-15m (depending on the category of poultry).
- The open air area for poultry should be designed to encourage its use by the birds (including the behavioural need for perceived shelter from overhead predators) and to provide a contribution to their diet;
- Under conditions where feed availability from the range area is limited, e.g. due to long term snow cover, or where vegetation availability is temporarily limited due to arid climates or excessively dry/wet weather conditions, supplementary feeding of roughage should be included as part of poultry diets;

¹ This summary includes only the main recommendations given by the Group.

- A diverse range of plants (e.g. at least 5 species of at least 3 different plant families) should be present (including for the provision of protective facilities (overhead shelter) throughout the range area in preference to artificial structures). This may be achieved through perennial shrubs, bushes, trees and/or pasture and annual cover crops, but where low densities of trees/shrubs are present, pasture and or annual cover crops should be present. If vegetation cover is degraded (overgrazed or absent or low levels of plant biodiversity), then action must be taken to restore it, for example by reducing stocking rates or prolonged resting. The area close to the house, where health protection and nutrient surplus issues can be more significant, should be managed appropriately, for example by covering with appropriate materials, e.g. that permit controlled drainage/effluent capture, and that can be removed periodically to reduce parasite/disease risks and nutrient accumulation;
- The vegetation cover should also be suitable for the species intended to use it (see Geese below), and water should be available at appropriate points throughout the open air area. Feeding troughs do not need to be provided in the open air area due to a) the need to encourage poultry to source more feed from the range area directly and b) the need to discourage wild birds and rodents and their associated health/biosecurity risks.
- The maintenance of vegetation should include a requirement to harvest and remove at regular intervals material, either as feed utilised by livestock, grass, wood or other organic matter where perennial species dominate, or as crops in the case of rotational systems, in order to reduce the potential for nutrient surpluses leading to pollution risks.
- The phrase in Annex III "m² available in rotation" should be amended to delete the words "in rotation", and that the requirement in Article 23.5 of the organic regulation for Member States to specify the period for which runs should be empty should be reviewed and more precisely specified;
- The definition in Annex III of Commission Regulation (EC) No 2295/2003 defining free range egg production (i.e. 150 m radius extendable to 350m if at least 4 shelters (either natural or artificial) per ha and drinking troughs provided, evenly distributed throughout the whole open-air run) should be used to limit the area of land included in the stocking rate calculation; this condition should apply to all poultry categories, not only laying hens. If the open-air range management recommendations are implemented, and drinking troughs provided, then the 350m limit would apply to organic producers.
- Open-air stocking rates, including assumptions concerning nitrogen excretion and outside deposition, should be simplified and made more consistent across poultry species and Member States, potentially by adopting a single liveweight per m² limit. Further analysis and debate is required to determine the appropriate value.
- The in-house stocking rates, pop-hole and flock size limits for parent poultry (including males) of *Gallus gallus* species should be the same as for laying hens;
- Breeder birds should have outside access whenever physical conditions permit, but if there are statutory restrictions limiting outside access for biosecurity reasons, then a veranda should be a minimum requirement with a wire mesh barrier to keep other birds out;
- Mutilations such as beak trimming, toe clipping and spur removal should not be permitted in organic farming as there are alternative management strategies that can be applied to control feather pecking and cannibalism – if beak-trimming or comb-clipping are considered necessary by relevant authorities under general regulations to control aggression between breeding males, they should be restricted to breeding males and carried out on one day old chicks only;

- The use of restricted feeding should not be permitted in organic poultry production. Alternative solutions should be sought, including increased emphasis on slow growing strains in breeding programmes and the use of roughage as part of the diet;
- The in-house stocking rate for pullets aged from 0-8 weeks of age should be no more than 24 birds/m² usable area subject to maximum of 21 kg/m² usable area. For pullets from 9-18 weeks of age the limits should be 15 birds/m² and a maximum of 21 kg/m²;
- For fattening birds in the starter period (0-21 days) a maximum of 20 birds/ m² and 21 kg/m² usable area should apply. In the fattening period (22-81 days) no more than 10 birds/ m² and 21 kg/ m² should be permitted;
- Access to perches, and multi-layer roosts if pullets are to be supplied to multi-layer systems, should be available from not later than 9 weeks of age;
- Access to open-air runs should be available for all pullets and young fattening birds, although the younger birds may not utilise the opportunity. For this reason, an open-air stocking rate of 1 m² per pullet aged 0-8 weeks or starter fattening chicken aged 0-3 weeks would be acceptable. Health restrictions preventing outside access in some countries should not be used to undermine the principle that range access is necessary;
- For fattening birds a consistent system for identifying appropriate slow-growing strains at EU level should be developed, including at least a database/register of acceptable strains and possibly an additional Annex in the organic regulations restricted feeding practices are not acceptable on welfare grounds;
- In-house stocking rates in terms of birds per unit area should be better related to the 21 kg/m² limit and the 50-60% higher stocking rates in mobile houses should be reviewed, due to lack of technical justification;
- Perch space requirements of 40 cm should be specified for turkeys and muscovy ducks;
- For water fowl such as ducks, access to water should be provided consistent with the organic regulation provided that the water bodies are well managed to meet health/hygiene, species behavioural and environmental requirements;
- For some birds such as geese which eat large quantities of grass, the vegetation requirement for the open-air run should include a specific requirement for pasture;
- For consistency, nitrogen-related open-air stocking rate limits should be defined for other categories of poultry than the layers and fattening birds currently covered in Annex IV of Commission Regulation 889/2008;
- Live plucking of poultry (ducks, geese) should not be permitted;
- The transitional rules for poultry housing and stocking density not compliant with the regulation, which were originally set to expire in 2010 and then extended to 2013, should not be extended further even if some operators will revert to non-organic, free range production;
- Consideration should be given to including welfare outcome protocols into future regulations for organic poultry;
- Permission to use formaldehyde for disinfection under Annex VII of the organic regulation should be reviewed, and that consideration should be given to alternative products;
- The Group was not asked to review standards for hatcheries, so there remains an aspect not covered that would be necessary to address to provide fully organic birds from hatching

The Group also drafted the template for the dossier mentioned in Art. 16(3)(b) of Council Regulation (EC) No 834/2007 in relation to cleaning and disinfection products. The dossier is proposed in Annex 1 of this report.

1. BACKGROUND

The first EC Regulation on organic livestock was adopted in 1999.

During the implementation of the Regulation Member States identified several fields for further development in the organic poultry sector, such as space allowances, the definition of a poultry house, or detailed rules for organic pullets. Some of these questions were clarified during the discussion process and are already integrated in the new Regulation, for example the obligation to publish either the criteria for or a list of slow growing poultry, in cases where the minimum slaughter age cannot be applied.

It became clear that for other questions, such as space allowances, more time was needed for further investigation and to arrive at a comprehensive and acceptable solution for all Member States. Some Member States insisted on setting up a specific expert group in order to prepare technical expertise.

The Commission therefore announced in a statement made at a meeting of the Standing Committee on Organic Farming (SCOF) on 2 July 2008 that it would handle the complex issue of "poultry" separately.

In order to further develop the high organic standards and further harmonise the rules so as to avoid distortions of competition, the Commission has decided to issue this mandate to the Expert Group for Technical Advice on Organic Production (EGTOP).

This mandate includes the comments received from Belgium, Denmark, France, The Netherlands, Sweden and United Kingdom.

In addition, in 2004 Germany submitted a dossier for the inclusion of p-chloro-m-cresol in Part E of Annex II of Council Regulation (EEC) No 2092/91, which corresponds to Annex VII ("Products for cleaning and disinfection") to Commission Regulation (EC) No 889/2008. The relevant request for assessment set out in the terms of reference also forms part of this mandate.

2. TERMS OF REFERENCE

a) In the light of the most recent technical and scientific information available to the experts, the Group is requested to answer the following questions/to elaborate the following issues:

1. Parent Poultry

- Housing requirements and husbandry rules for breeding stock (parent poultry), taking into account experiences of certified practices gained in some of the member states, considering general legislation and restrictions on hatching egg production
- Definition of "house", "building" and "veranda".

2. Rules for young poultry

- Housing requirements, stocking densities for young poultry, access to and use of outdoor areas and need for pasture for young poultry, considering the system as a whole and taking into account experiences of certified practices in some member states. As regards to access to outdoor areas and need for pasture for young poultry, the behavioural and production difficulties and the conditions of the outdoor area should also be considered in the reply (animal welfare);
- Stocking densities for young poultry (fattening/layers);
- Definition of "house", "building" and "veranda".

3. Rules for laying hens or fattening poultry

- Specific requirements to improve the welfare of laying hens, in respect to feather pecking and cannibalism;
- Additional housing requirements, including outdoors areas (e.g. vegetation), conditions of the poultry house and relevant definition;
- Additional requirements for laying hens, including differentiation of stocking density according to the housing (on-ground floor or multi-layer);
- Multilayer system – definition, (number of layers, maximum number);
- Access to outdoor areas, including additional conditions for the outdoor and pasture;
- Definition of “house”, “building” and “veranda.

4. Other

- How far are Member states with the implementation of the poultry rules including Annex III (National versus Community rules). What are the weak areas, if any?
- Is it necessary to set a maximum stocking density expressed in number of birds per square meter floor area regardless of housing system?
- Is there a need for additional rules for ducks, geese or turkeys? For instance a definition on how much bathing water is necessary for ducks;
- Housing requirements for quails;
- Can the concept of number of birds “per flock” be used to replace the definitions above mentioned under the points 1, 2 and 3 of this mandate?
- Alternative management practices to avoid practices like beak trimming and the removing of roosters spurs.

In preparing its final report the Group may identify the stage of preparation for the expiry of the transitional rules (2013) concerning housing conditions and husbandry practices and provide the relevant suggestions and recommendations.

In preparing its final report the Group may examine technical documents delivered from MS and made available by the Commission. The Group may also explain and suggest further issues.

b) Is the use of p-chloro-m-cresol in line with the objectives, criteria and principles as well as the general rules laid down in Council Regulation (EC) No 834/2007 and can it therefore be authorised in organic production under the EU legislation?

c) In preparing its final report, the Group may also suggest amendments to the current list in point 1 of Annex VII to Commission Regulation (EC) No 889/2008 and consider possible alternatives to the substances in question. Any such proposal(s) should be accompanied by a brief explanation of the reasons.

d) The Group is also requested to draft the template for the dossier mentioned in Article 16(3)(b) of Council Regulation (EC) No 834/2007 in relation to products for cleaning and disinfection of livestock buildings installations and utensils.

3. CONSIDERATIONS AND RECOMMENDATIONS²

3.1. Definitions and cross-cutting issues

The Group was asked to provide definitions of "house", "building" and "veranda" at various points in the mandate. During the discussions, it was clear that there were a number of cross-cutting issues and additional definitions required that have been addressed in this chapter. The following definitions and recommendations can be considered to be applicable to all poultry categories unless stated otherwise.

3.1.1 Poultry house

A poultry house or shed (=building) includes all surfaces covered by roofs (fixed or mobile), including a veranda. The house may be subdivided to accommodate separate flocks (see below). Commission Regulation (EC) No 889/2008 (EC, 2008), hereafter called the organic regulation, states that the total usable area of poultry houses for meat production on any single unit, shall not exceed 1600 m²³. The Group considers that under current conditions it is not appropriate to impose a maximum unit size for one category of poultry only.

Recommendation

The Group recommends that the maximum usable area limit for poultry houses for meat production should be deleted.

3.1.2 Veranda

A veranda is an additional (optional) roofed (height of 2m on average, but at no point less than 1.5m), uninsulated, outdoor part of the house, the longest side usually equipped with wire fencing or netting, with outdoor climate, natural and artificial illumination and a littered floor. In practice, two types of veranda can be found where:

- i) the open side is permanently open, and the exit from the house into the veranda is also the exit to the open air area, or
- ii) the existence of a wire mesh or other barrier on the external side of the veranda means pop-holes are required both between the house and the veranda and between the veranda and the open air area (see pop-holes chapter). However, the veranda is not a substitute for and should not count towards requirements for open air access.

3.1.3 Usable area

The term usable area is defined in Council Directive EC (No) 1999/74/EC of 19 July 1999 (EC, 1999) laying down minimum standards for the protection of laying hens, Article 2.2 (d) as: *an area at least 30cm wide with a floor slope not exceeding 14%, with headroom of at least 45cm.*

² The text of the report, containing considerations and recommendations, explains the opinion of the Group and should therefore be considered as a whole. All the observations made have been derived from the experience of the Group except where differently indicated.

³ This is similar to the Label Rouge requirement for a maximum of 4 x 400 m² houses.

Nesting areas shall not be regarded as usable areas. The Group considers that usable area so defined is a more appropriate and clear term than "net area" and should include all covered areas where the animals have full access to 24 hours a day, meeting standard requirements for littered areas, including verandas if available 24h/day.

In multi-layer systems, for raised areas to be included in the usable area they should be equipped with a manure collecting/removal system. Raised perches should not be part of the usable area.

Recommendation

The Group recommends that the term "usable" area should replace the term "net" area in Commission Regulation (EC) No 889/2008, and should include verandas where 24h/day access is available.

3.1.4 Ground floor area

This is the lowest level in the poultry house including any base slatted area. Under the organic regulation, at least one third of the floor area shall be solid, that is, not of slatted or of grid construction, and covered with a litter material such as straw, wood shavings, sand or turf.

The organic regulation also specifies that poultry houses shall be constructed in a manner allowing all birds easy access to open air area.

The Group considers that "easy access" should be interpreted as a maximum distance of 10-15m to reach the nearest pop-hole (see chapter 3.1.8) giving access to the open air area from within the house.

3.1.5 Multi-layer (multi-tier) systems

A multi-layer system is a poultry house where the usable area is not all at ground level. In proposing a definition of multi-layer system in terms of number of layers (=tiers, level), the Group took into account the Council Directive No 1999/74/EC of 19 July 1999 laying down minimum standards for the protection of laying hens⁴ (EC, 1999). While this Directive permits a maximum of 4 layers, the Group is concerned that a fourth layer, although permitted by the Council Directive above mentioned, presents real difficulties for inspection by farmers, and for their working conditions, and therefore increases health and welfare risks.

Recommendations

The Group recommends that:

- Multi-layer systems, currently mainly used for laying hens, pullets and breeding stock, should have no more than 3 levels of usable area including the ground floor. Consistent with the Council Directive, the vertical distance between each level should be at least 45cm. The Group also considers that there should be no more than 1m between levels or intermediate (e.g. nesting) areas to ensure freedom of movement;

⁴ Art. 2.2 (d) of Council Directive No 1999/74/EC states:

(a) if systems of rearing are used where the laying hens can move freely between different levels,

(i) there shall be no more than four levels;

(ii) the headroom between the levels must be at least 45 cm;

(iii) the drinking and feeding facilities must be distributed in such a way as to provide equal access for all hens;

(iv) the levels must be so arranged as to prevent droppings falling on the levels below.

- Consistent with the current organic regulation, one third of usable area in multi-tiered poultry houses should be solid, that is, not of slatted or of grid construction, and covered with a litter material such as straw, wood shavings, sand or turf. In order to be considered as part of the usable area (see chapter 3.1.3) higher tiers should be capable of having manure removed by an automated system.

3.1.6 Flock

A flock can be defined as a group of birds that are kept together, originating from the same batch, not mixing with others of the same species, and with their own dedicated external area. Houses may be subdivided to contain more than one flock, as is already practiced in some countries. The Group considers that in houses that are sub-divided to house multiple flocks, there should be restricted visibility to other flocks using solid partitions within the house.. , . If flocks of different ages and/or origins are being housed in the same building, then, for biosecurity reasons, there should be separate access and separate feed, water and manure removal systems for each flock.

Recommendation

The Group recommends that, if this definition is applied, then the existing number per poultry house limits in the organic regulation should refer to flock size, not numbers per poultry house.

3.1.7 Period of open air access

In the organic regulation, Article 14⁵ defines the minimum period of open air access as 1/3 of the life of the bird. The Group is concerned that this requirement does not place sufficient emphasis on open air access and can lead to significant variation in treatment between categories of poultry.

Recommendation

The Group recommends that the requirement concerning the minimum period of open air access should be amended to add: "In particular, continuous daytime open air access should be provided from as early an age as practically possible, whenever physiological and physical (e.g. weather) conditions allow, except in the case of temporary restrictions imposed by veterinary authorities."

3.1.8 Pop-holes

Pop-holes are openings in the walls of the poultry house, giving the birds access to the veranda and/or the open air area.

⁵ Article 14 (Access to open air areas) of Commission Regulation 889/2008 states:

1. Open air areas may be partially covered.
2. In accordance with Article 14(1)(b)(iii) of Regulation (EC) No 834/2007 herbivores shall have access to pasturage for grazing whenever conditions allow.
3. In cases where herbivores have access to pasturage during the grazing period and where the winter-housing system gives freedom of movement to the animals, the obligation to provide open air areas during the winter months may be waived.
4. Notwithstanding paragraph 2, bulls over one year old shall have access to pasturage or an open air area.
5. Poultry shall have access to an open air area for at least one third of their life.
6. Open air areas for poultry shall be mainly covered with vegetation and be provided with protective facilities and permit fowl to have easy access to adequate numbers of drinking and feeding troughs.
7. Where poultry are kept indoors due to restrictions or obligations imposed on the basis of Community legislation, they shall permanently have access to sufficient quantities of roughage and suitable material in order to meet their ethological needs.

The organic regulation specifies that the ground floor shall have exit/entry pop-holes of a size adequate for the birds, and these pop-holes shall have a combined length of at least 4 m per 100 m² usable area of the house available to the birds.

Recommendation

The Group recommends that:

- The provision of pop-holes as defined by the organic regulation (4m/100m² usable area) should apply to the external boundary of the poultry house (i.e. including veranda if applicable);
- If a veranda is present with a fixed dividing barrier to the outside area, then this minimum pop-hole requirement should apply to this barrier. In such a situation, the Group considers that internal pop-holes between the house and the veranda of minimum of 2m/100m² usable area would be acceptable to enable 24h access to the veranda (provided that they are open continuously) recognising the need for smaller openings to regulate internal temperatures, particularly in adverse weather conditions. The external pop-holes can be closed outside daylight hours and when physical conditions are not appropriate for outside access;
- The maximum distance from any point within the house to the nearest external pop-hole should not be more than 10-15m (depending on the category of poultry).

3.1.9 Open air area and ground cover

In the organic regulation, Article 14⁵ specifies that open air areas for poultry shall be mainly covered with vegetation and be provided with protective facilities and permit fowl to have easy access to adequate numbers of drinking and feeding troughs.

Recommendations

The Group recommends that:

- The open air area for poultry should be designed to encourage its use by the birds (including the behavioural need for perceived shelter from overhead predators) and to provide a contribution to their diet;
- Under conditions where feed availability from the range area is limited, e.g. due to long term snow cover, or where vegetation availability is temporarily limited due to arid climates or excessively dry/wet weather conditions, supplementary feeding of roughage should be included as part of poultry diets;
- A diverse range of plants (e.g. at least 5 species of at least 3 different plant families) should therefore be present (including for the provision of protective facilities (overhead shelter) throughout the range area in preference to artificial structures). This may be achieved through perennial shrubs, bushes, trees and/or pasture and annual cover crops, but where low densities of trees/shrubs are present, pasture and or annual cover crops should be present. If vegetation cover is degraded (overgrazed or absent or low levels of plant biodiversity), then action must be taken to restore it, for example by reducing stocking rates or prolonged resting⁶. The area close to the house, where health protection and nutrient surplus issues can be more significant, should be managed appropriately, for example by covering with appropriate materials, e.g. that permit controlled

⁶ For example, during the restoration process, up to one third of the outdoor area could be temporarily shut-off for a period of max. 12 weeks, in order to allow new vegetation to be established.

drainage/effluent capture, and that can be removed periodically to reduce parasite/disease risks and nutrient accumulation;

- The vegetation cover should also be suitable for the species intended to use it (see Geese below), and water should be available at appropriate points throughout the open air area. The Group does not consider that feeding troughs need to be provided in the open air area due to a) the need to encourage poultry to source more feed from the range area directly and b) the need to discourage wild birds and rodents and their associated health/biosecurity risks.
- The maintenance of vegetation should include a requirement to harvest and remove at regular intervals material, either as feed utilised by livestock, grass, wood or other organic matter where perennial species dominate, or as crops in the case of rotational systems, in order to reduce the potential for nutrient surpluses leading to pollution risks.

3.1.9.1 Rotational requirement

In some Member States, rotation of pastures for poultry is compulsory (consistent with the preamble to Commission Regulation 889/2008⁷), to assist with parasite control, avoidance of nutrient leaching/environmental pollution and vegetation regeneration. However, the Group considers that these aims may be achieved in other ways, including breaks between batches, harvesting/removing vegetation and in some circumstances reducing stocking density, either absolutely or through making fuller use of the open air area supported by a diverse range of plant species, so that rotation does not need to be compulsory.

Recommendation

The Group recommends that the phrase in Annex III to the organic regulation "m² available in rotation" should be amended to delete the words "in rotation", and that the requirement in Article 23.5 of the organic regulation for Member States to specify the period for which runs should be empty should be reviewed and more precisely specified⁸.

3.1.9.2 Maximum ranging distance

The organic regulation does not currently specify the maximum ranging distance that should be used to calculate the open air area to be used as a basis for stocking rate calculations. This is in contrast to the current requirements for free range production, which reflects concern that land may be included in the calculation that is too far away from the house to be used by the birds. The impact of imposing a limit of 150 m is evaluated in Annex 2 and indicates that in most situations there would not be a conflict with other stocking limits, except where a high rate (30%) of N excretion on pasture is assumed in combination with 50% of land resting in rotation.

Recommendation

The Group recommends that the definition in Annex III Article 1 a 4 of Commission Regulation (EC) No 2295/2003⁹ (EC, 2003) defining free range egg production (i.e. 150 m radius extendable

⁷ Whereas (11): In most cases, livestock should have permanent access to open air areas for grazing, weather conditions permitting, and such open air areas should in principle be organised under an appropriate system of rotation.

⁸ The Label Rouge requirement is a minimum of seven weeks for open air runs, but periods up to three months may be appropriate depending on specific circumstances.

⁹ ANNEX III

Minimum requirements to be met by poultry establishments for the various egg farming methods

1. (a) 'Free-range eggs' must be produced in establishments which satisfy at least the conditions specified in Article 4 of Council Directive 1999/74/EC (1) with effect from the dates referred to in that Article, and in which:

to 350m if at least 4 shelters (either natural or artificial) per ha and drinking troughs provided, evenly distributed throughout the whole open-air run) should be used, and that this condition should apply to all poultry categories, not only laying hens. If the open-air range management conditions described above are implemented, and drinking troughs provided, then the 350m limit would apply to organic producers.

3.1.9.2 Open-air stocking rates

Stocking rates are currently defined in terms of m^2 /bird. There are inconsistencies between different species in the regulation, as well as inconsistencies between the nitrogen excretion assumptions utilised to implement the regulation in different Member States, which need to be harmonised.

As background, a spread sheet has been prepared (Annex 2) that analyses the interaction between different specified in-house and open-air stocking requirements for all categories of poultry.

In the current organic regulation, in-house stocking rates are defined in terms of maximum numbers per m^2 as well as a limit of 21 kg liveweight (LW)/ m^2 , although the two are not consistently related for different species. The open-air stocking rates are defined in terms of numbers of birds per m^2 in the organic regulation, but there is no link to kg LW/ m^2 defined. At the same time, a nitrogen limit is defined designed to restrict nitrogen deposition on pasture to a maximum of 170kg N/ha. According to IPCC (2006), most poultry types excrete similar levels of N per kg liveweight (ca. 0.8 g/kgLW/day). However, only a proportion of this is excreted on range land – according to new French research (Juin, 2012, pers. comm.), while 25% is normally assumed, ca. 30%-40% can be excreted on range land by fattening birds depending on strain and season. In Denmark (Johanssen, 2012, pers.comm.), it is assumed in implementing the organic regulation that for laying hens only 10% is excreted on range land. The remainder is collected within the house and distributed on land elsewhere.

In theory, it may be possible to define open-air stocking rates in terms of kg/ha in such a way that only one limit needs to be defined that meets all criteria. If the current organic regulation open air stocking limit for laying hens is used (4 m^2 /bird), this implies ca. 0.5 kg LW/ m^2 . However, according to the theoretical analysis in Annex 2, if it is assumed that 30% of N is excreted on the range land, a lower limit of 0.2-0.3 kg LW/ m^2 would apply (see Row 27 of Table in Annex 2), if all the land available is used (no resting period). However, an assumption of only 10% excretion with all land used would permit 0.6-0.9 kg LW/ m^2 (3 times the values in Row 27 of Table in Annex 2). If the conditions of the range are improved as the Group recommends, this could lead to even greater N depositions outside than the 30% assumed. It is clear that there is already a potential conflict between the generally permitted open-air stocking rates and the N deposition limit of 170kg/ha, and that for example the current limit of 4 m^2 /laying hen may be

1. Hens have continuous daytime access to open-air runs, except in the case of temporary restrictions imposed by veterinary authorities,
2. The open-air runs to which hens have access are mainly covered with vegetation and not used for other purposes except for orchards, woodland and livestock grazing if the latter is authorised by the competent authorities,
3. The open-air runs must satisfy at least the conditions specified in Article 4(1)(3)b(ii) of Council Directive 1999/74/EC whereby the maximum stocking density is not greater than 2 500 hens per hectare of ground available to the hens or one hen per 4 m^2 at all times; however, where at least 10 m^2 per hen is available and where rotation is practised and hens are given even access to the whole area over the flock's life, each paddock used must at any time assure at least 2.5 m^2 per hen,
4. The open-air runs do not extend beyond a radius of 150 m from the nearest pop-hole of the building; however an extension of up to 350 m from the nearest pop-hole of the building is permissible provided that a sufficient number of shelters and drinking troughs within the meaning of that provision are evenly distributed throughout the whole open-air run with at least four shelters per hectare.

inadequate. There is therefore a need for further analysis (including literature review) about excretion rate and percentages deposited outdoors, and for debate about where an appropriate stocking rate limit based on kg liveweight per m² should be set, which should also reflect the potential for the open-air area to provide nutrition for poultry with appropriate vegetative cover, and not only focus on potential pollution risks.

Recommendation

The Group recommends that open-air stocking rates, including assumptions concerning nitrogen excretion and outside deposition, should be simplified and made more consistent across poultry species and Member States, potentially by adopting a single liveweight per m² limit. Further analysis and debate is required to determine the appropriate value.

3.1.10 Thermal comfort

Thermal comfort is an important welfare consideration. The Group considers that the housing and open air area recommendations should not be implemented in such a way as to cause negative impacts on thermal comfort.

3.2. Parent Poultry (breeding stock)

3.2.1 Housing requirements¹⁰

3.2.1.1 Stocking densities for parent poultry

The Group could not identify specific reasons why stocking densities and other requirements for parent poultry should differ from that for other adult birds of the same species.

Recommendation

The Group recommends that:

- The in-house stocking rate for parent poultry of *Gallus gallus* species should be no more than 6 birds (including males)/m² usable area (the same number as for laying hens) in both fixed and mobile housing;
- In the case of multi-layer systems, the in-house stocking rate of parent poultry should be no more than 9 birds (including males)/m² ground floor area including veranda if 24h access is provided;
- The maximum flock size should be 3000 birds including males, as for laying hens.

3.2.1.2 Open air access

The Group recognised that there is a potential problem of hygiene and risk of infections from outside, although it considered that the extent of this risk is not well quantified and may be overstated.

Recommendation

The Group recommends that breeder birds should have outside access whenever physical conditions permit, but if there are statutory restrictions limiting outside access for biosecurity reasons, then a veranda should be a minimum requirement with a wire mesh barrier to keep other birds out.

3.2.1.3 Pop-hole size

The organic regulation specifies that exit/entry pop-holes should be of a size adequate for the birds. In the case of parent poultry for *Gallus gallus* and similar sized birds, the Group considers that the size defined in the Council Directive 1999/74/EC (EC, 1999) for laying hens (at least 35 cm high and 40 cm wide) is appropriate. Turkeys and other larger birds will need larger pop-holes.

3.2.2 Husbandry rules

3.2.2.1 Mutilations

With respect to breeder males, potential problems with relation to injuries may occur as a result of fighting between them. Beak-trimming and comb-clipping are advocated by some experts as potential solutions. However, reports by EFSA (2010) and the UK FAWC (1997) have questioned the evidence on the extent of the problem and do not support the need for these mutilations.

¹⁰ For definitions, see chapter 3.1.

Recommendation

The Group does not support the need for mutilations for general application in organic farming. If such interventions are considered necessary by the relevant authorities under general regulations, they should be restricted to breeding males and carried out on one day old chicks only.

3.2.2.2 *Restricted feeding*

A problem identified in the EFSA (2010) and other reports is the potential for restricted feeding of broiler males to increase aggression and hence potential for welfare problems. The organic regulation requires that the nutritional needs of poultry are covered.

Recommendation

The Group does not support the use of restricted feeding in organic poultry production. Alternative solutions should therefore be sought, which may include increased emphasis on slow growing strains in breeding programmes as well as the use of roughage as part of the diet.

3.2.2.3 *Other issues*

The Group was not asked to review standards for hatcheries, so there remains an aspect not covered that would be necessary to address to provide fully organic birds from hatching. If this is addressed, the issue of minimum slaughter ages will need to be reviewed as the 70 day conversion period will no longer act as a de facto minimum age for slaughter of slow growing strains.

3.3. Rules for young poultry

3.3.1 Housing requirements¹¹

3.3.1.2 Stocking densities for young poultry (fattening/layers).

Given the wide range in size of birds from day-old to point-of-lay pullets or finishing birds ready for slaughter, and the differences in ranging behaviour applicable to very young birds, the Group considered that different requirements should be applied to different age groups.

Recommendations

The Group recommends that, with respect to *Gallus gallus*:

- The in-house stocking rate for pullets aged from 0-8 weeks of age should be no more than 24 birds/m² usable area subject to maximum of 21 kg/m² usable area. For pullets from 9-18 weeks of age the limits should be 15 birds/m² and a maximum of 21 kg/m². This takes into account that at 18 weeks of age the average weight of pullets is ca. 1.5 kg;
- For fattening birds in the starter period (0-21 days) a maximum of 20 birds/m² and 21 kg/m² usable area should apply. At about 3 weeks of age, the average weight may reach 1 kg. In the fattening period (22 to 81 days) the Group recommends that no more than 10 birds/m² and 21 kg/m² should be permitted;
- Access to perches, and multi-layer roosts if pullets are to be supplied to multi-layer systems, should be available from not later than 9 weeks of age .

3.3.2 Access to and use of outdoor areas and need for pasture

The Group considered that the sooner that young birds have access to outside areas, the better they adapt to these conditions and the more they are able to exploit them in later life. In some countries, the issue of health restrictions preventing outside access has been raised. Such restrictions should not be used to undermine the principle that range access is necessary.

Recommendations:

The Group recommends that access to open-air runs should be available for all pullets and young fattening birds, although the youngest birds may not utilise the opportunity. For this reason, an open-air stocking rate of 1 m² per pullet aged 0-8 weeks or starter fattening chicken aged 0-3 weeks would be acceptable (see discussion in Chapter 3.5, overview tables in Chapter 3.9 and detailed analysis Annex 2 for further details).

¹¹ For definitions, see chapter 3.1.

3.4. Rules for laying hens or fattening poultry

3.4.1 Welfare

The Group considers that with respect to fattening birds (as for breeders), the use of restricted feeding as a standard management practice is not acceptable on welfare grounds. There is therefore a need for clarification of the requirement in the current organic regulation for slow-growing strains and 81-day finishing for (semi-) intensive strains.

Recommendation:

The Group recommends that a consistent system for identifying appropriate slow-growing strains at EU level should be developed, including at least a database/register of acceptable strains and possibly an additional Annex in the organic regulation.

As regards to specific requirements to improve the welfare of laying hens in respect to feather pecking and cannibalism see Chapter 3.5 below.

3.4.2 Housing¹²

The Group did not consider that there was a need to change the stocking rates specified in the organic regulations for laying hens and fattening birds apart from the additional rates specified for multilayer systems and the question of mobile houses.

Recommendation

The stocking rate of laying hens (aged from 19 weeks) should remain limited to 6 birds/m² usable area.

3.4.3 Outdoor access

Access to outdoor areas, including additional conditions (e.g. vegetation), for the outdoor and pasture. Refer to Chapters 3.1, 3.5, 3.9 and Annex 2.

¹² See definitions, including multi-layer systems, in Chapter 3.1.

3.5. Other issues

Introduction

As part of the mandate the Commission asked the Group to address some additional questions. These are listed hereunder together with the relevant opinion of the Group.

How far are Member states with the implementation of the poultry rules including Annex III (National versus Community rules). What are the weak areas, if any?

The Group could not reach an overall conclusion about progress in all Member States with respect to implementation of the poultry rules including Annex III. However, some considerations were made. Comparison of rules implemented in some member states (Jespersen, 2012; Schmid and Kilchsberger, 2010) indicate significant variations between some member states, with requirements additional to those in the current organic regulations being imposed. There are a number of aspects of the organic regulation that are left to member states to determine contributing to variations in implementation. The Group considers that it would be desirable to achieve greater harmonization on these issues.

Is it necessary to set a maximum stocking density expressed in number of birds per square meter floor area regardless of housing system?

The Group considers that in the case of multi-tiered systems a maximum limit per m² (ground) floor area should be applied, set at 50% above the stocking rate per m² usable area. This takes account of the potential inclusion of verandas in the usable area definition, if accessible 24 hours per day. This is considered further in Chapter 3.1 and in the overview table in Chapter 3.9.

Is there a need for additional rules for ducks, geese or turkeys? For instance a definition on how much bathing water is necessary for ducks

The specific requirements for ducks, geese, turkeys and other poultry species are less well defined in the organic regulation than for *Gallus gallus* birds. The Group considers that some specific additional requirements should be implemented to put them on an equivalent basis.

Recommendations

The Group recommends that:

- Open-air stocking rates should be simplified and made more consistent across poultry species, potentially by adopting a single liveweight per m² limit (see Chapter 3.1.9.2);
- In-house stocking rates in terms of birds per unit area should be better related to the 21 kg/m² limit – see Chapter 3.9 for specific proposals;
- Perch space requirements of 40 cm should be specified for turkeys and muscovy ducks;
- for water fowl such as ducks, access to water should be provided consistent with the organic regulation provided that the water bodies are well managed to meet health/hygiene, species behavioural and environmental requirements;
- For some birds such as geese which eat large quantities of grass, the vegetation requirement for the open-air run should include a specific requirement for pasture (see chapter 3.1);
- For consistency, nitrogen-related open-air stocking rate limits should be defined for other categories of poultry than the layers and fattening birds currently covered in Annex IV of Commission Regulation 889/2008;
- Live plucking of poultry (ducks, geese) should not be permitted;

- An alternative to the "open-air access for 1/3rd of life" requirement in the current organic regulation (see chapter 3.1) be considered, reflecting the different life spans of different categories of poultry;
- Account should be taken of the inability of white turkeys to mate naturally and the consequent requirement for artificial insemination, which are in conflict with the organic principle of permitting animals and birds to fulfil natural behaviour patterns;
- Management options to prevent flight injuries and escape for some categories of birds such as guinea fowl and quail should be reviewed.

Housing requirements for quails

The Group did not have the specialist expertise to discuss specific requirement for quails.

Can the concept of number of birds "per flock" be used to replace the definitions above mentioned under the points 1, 2 and 3 of this mandate?

As discussed in Chapter 3.1 and summarised in the overview table in Chapter 3.9, the Group considers that larger houses can be feasible, provided that they are subdivided to keep individual flocks separate.

Recommendation:

The Group recommends that birds per flock limits are used instead of birds per poultry house.

Alternative management practices to avoid practices like beak trimming and the removing of roosters spurs.

Feather pecking and cannibalism are common welfare problems in organic as in other poultry systems. While these problems may be controlled by beak trimming and other mutilations, there are significant reports from EFSA (2010) and the UK Farm Animal Welfare Council (FAWC, 1997) that question the need for these practices.

Detailed description of the nature of the feather-pecking and cannibalism problem, together with potential alternative management/control approaches suitable for organic production and extensive references, can be found in Annex 3 and at:

<http://www.organicvet.co.uk/Poultryweb/disease/feath/feath1.htm>

The Group considers that there is now sufficient knowledge and experience available in some Member States that, with an appropriate knowledge transfer effort, in particular with respect to (i) the use of appropriate strains and selective breeding to further reduce the hens' propensity to feather peck, (ii) appropriate nutrition and (iii) good design of pasture and housing systems and implementation of a range of preventive management practices, it should be possible to minimize feather pecking and cannibalism problems in organic poultry so that beak trimming and other mutilations can be prohibited.

Recommendation

The Group recommends that beak trimming, toe clipping and spur removal should not be permitted in organic farming (see also Chapter 3.2.2.1).

In preparing its final report the Group may identify the stage of preparation for the expiry of the transitional rules (2013) concerning housing conditions and husbandry practices and provide the relevant suggestions and recommendations.

The Group considers that the transitional rules for poultry housing and stocking density not compliant with the regulation, which were originally set to expire in 2010 and then extended to

2013, should not be extended further even if some operators will revert to non-organic, free range production.

In preparing its final report the Group may examine technical documents delivered from MS and made available by the Commission. The Group may also explain and suggest further issues.

Welfare outcome protocols (such as those developed by the Assurewel, Laywel and Welfare Quality projects) have the potential to encourage producers to improve animal welfare and to be more aware at an earlier stage of shortcomings in management systems and to take action to remedy them before welfare problems become serious.

Recommendation

The Group recommends that consideration be given to including welfare outcome protocols into future regulations for organic poultry.

3.6. Chlorocresol (*p*-chloro-*m*-cresol)

Introduction

As part of the mandate, the Group was required to consider whether the use of *p*-chloro-*m*-cresol is in line with the objectives, criteria and principles as well as the general rules laid down in Council Regulation (EC) No 834/2007, and whether it could therefore be authorised in organic production under the EU legislation.

Authorization in general agriculture or food processing

Under the denomination "chlorocresol" (CAS no 59-50-7), *p*-chloro-*m*-cresol is subject to the EU's biocide re-evaluation programme, but its evaluation is not yet completed. It was classified as an "existing active substance" under Council Regulation (EC) No. 834/2007, and national authorizations remain valid until the re-evaluation at EU level is completed.

Reflections and conclusions

The Group was advised by the Commission that consideration could not be given to the approval of chlorocresol for inclusion in Annex VII, before its re-evaluation as a biocide is completed.

3.7. Amendments to Annex VII: Formaldehyde

Concerns have been raised by various sources about the use of formaldehyde for disinfection of poultry houses, due to its potential health impacts on humans working with the product. Glutaraldehyde and other products have been suggested as potential alternatives.

Recommendation:

The Group recommends that the permission to use formaldehyde for this purpose should be reviewed, and that consideration should be given to alternative products. Dossiers for the withdrawal of formaldehyde as well as for inclusion of alternative substances would need to be prepared for consideration by the Group.

3.8. Draft Dossier Template

The Group drafted a template for the dossier mentioned in Article 16(3)(b) of Council Regulation (EC) No 834/2007 in relation to products for cleaning and disinfection of buildings and installations for livestock production. The Group considered that it would be helpful to develop some interpretative guidelines to support the dossier template. The document presented in Annex 1 to this report includes in part A a questionnaire and in part B a section incorporating the criteria for assessment of consistency with the EU organic regulation.

3.9. Overview – in house and open air run stocking rates and flock sizes.

Table 1: Recommended limits for birds of species <i>Gallus gallus</i>	Breeders/ parents	Young stock		Fattening birds		Capons	Layers
Age	Breeding birds	Pullets 0-8 weeks	Pullets 9-18 weeks	Starter 0-21 days	Finisher 22 to 81 days	22-150 days	Laying hens from 19 weeks
In house stocking rate (birds or kg per m ² of usable area)	6 birds	24 birds max 21kg	15 birds max 21kg	20 birds max 21kg	10 birds max 21 kg	10 birds max 21 kg	6 birds
Multi-layer systems additional limits/m ² ground floor area (including veranda if 24h access)	9 birds	36 birds excluding veranda area	22 birds	Not normally applicable			9 birds
Flock size limits	3000 inc males	10,000*	3300**	10000*	4800	2500	3000
Open-air access required	Yes, but may be health/ biosecurity issues in some countries	Yes, but may be health/ biosecurity issues in some countries (see Chapter 3.3.2)		Not essential	Yes	Yes	Yes
Open-air run stocking rates (m ² /bird)***	4	1	4	1	4	4+	4

*sub-dividable to produce 3x3000 or 2x4800 batches with (**) allowance for mortality and surplus sold to smaller producers

***the open air stocking rates shown here are based on the current organic regulation, except in the case of young pullets and fattening bird categories. In Chapter 3.1.9.2 the group recommends that a limit based on a more consistent kg liveweight per m² is investigated further with a view to implementation, which might lead to different and possibly lower stocking rates for all categories of poultry.

Table 2: Recommended limits for poultry birds of other species than *Gallus gallus*

Type	<i>Turkeys</i>		<i>Geese</i>	<i>Ducks</i>			<i>Guinea fowl</i>	
	Male	Female	All	Peking	Male Muscovy	Female Muscovy	Mallard	All
Minimum slaughter age	140	100	140	49	84	70	92	94
Flock size	2500	2500	2500	4000F 3200M	3200	4000	3200	5200
In house* stocking rate (max 21 kg)/m ²	10 (4 at 5 kg/bird)	10 (4 at 5 kg/bird)	10 (4 at 5 kg/bird)	10	10	10	10	10
Open air stocking rate (m ² /bird)**	10	10	15	4.5	4.5	4.5	4.5	4
Perch space (cm)	40	40	n/a	n/a	40	40	n/a	20

* In all cases, higher stocking rates may be applicable for younger or lower slaughter weight birds linked to 21 kg/m² usable area maximum limit. In-house stocking rates are increased by 50-60% for mobile houses not exceeding 150m² in current organic regulation. The Group sees no technical justification for permitting a higher stocking rate in such cases.

** The open air stocking rates shown here are based on the current organic regulation. The group recommends that a limit based on a more consistent kg liveweight per m² is investigated further with a view to implementation.

4. LIST OF ABBREVIATIONS/GLOSSARY

See also Chapter 3.1 for more detailed definitions of some terms (poultry house, veranda, usable area, ground floor area, multi-layer/multi-tier, flock, open air access, pop-hole)

EC	European Communities
EEC	European Economic Community
EFSA	European Food Safety Agency
EGTOP	Expert Group for Technical advice on Organic Production
FAWC	Farm Animal Welfare Council (UK)
GPS	Group productivity and survivability
IPCC	Intergovernmental Panel on Climate Change
LW	Liveweight
SCOF	Standing Committee of Organic Farming

5. REFERENCES

Assurewel project (2012) – see www.assurewel.org

EC, 1999. Council Directive EC (No) 1999/74/EC of 19 July 1999 laying down minimum standards for the protection of laying hens. OJ L 203, 53-57.

EC, 2003. Commission Regulation (EC) No 2295/2003 of 23 December 2003 introducing detailed rules for implementing Council Regulation (EEC) No 1907/90 on certain marketing standards for eggs. OJ L 340, 16-34.

EC, 2007a. Commission Regulation (EC) No 1451/2007 of 4 December 2007 on the second phase of the 10-year work programme referred to in Article 16(2) of Directive 98/8/EC of the European Parliament and of the Council concerning the placing of biocidal products on the market. OJ 325, 3-65.

EC, 2007b. Council Regulation (EC) No 834/2007 of 28 June 2007 on organic production and labelling of organic products and repealing Regulation (EEC) No 2092/91 OJ L 189, 1-23.

EC, 2008. Commission regulation (EC) No 889/2008 of 5th September 2008 laying down detailed rules for the implementation of Council Regulation (EC) No 834/2007 on organic production and labelling of organic products with regard to organic production, labelling and control O J L 250, 1-84.

EFSA (2010) Scientific Opinion on welfare aspects of the management and housing of the grand-parent and parent stocks raised and kept for breeding purposes. European Food Safety Authority Panel on Animal Health and Welfare. EFSA Journal 8(7):1667

FAWC (1997) Report on the welfare of laying hens. Farm Animal Welfare Council, UK. <http://www.fawc.org.uk/reports/layhens/lhgretoc.htm>

IPCC (2006) Guidelines for national greenhouse gas inventories. Intergovernmental Panel on Climate Change. Chapter 10 p 59

Jespersen L (2012) Comparison of organic standards on poultry production in selected EU countries. Publication in preparation, ICROFS, Arhus University, Denmark.

Schmid O, Kilchsberger R (2010) Overview of animal welfare standards and initiatives in selected EU and third countries. Final report, deliverable 1.2 Econwelfare project (www.econwelfare.eu). FiBL, Frick.

Welfare Quality project (2011) see www.welfarequality.net

Annex 1: Template for dossiers concerning products for cleaning and disinfection**Part A****DOSSIER CONCERNING THE REQUEST TO AMEND ANNEX VII
Products for cleaning and disinfection referred to in Article 23(4) of
Commission Regulation (EC) No 889/2008**

Article 16(3)(b) of Council Regulation (EC) No 834/2007.

"Where a Member State considers that a product or substance should be added to, or withdrawn from the list referred to in paragraph 1, or that the specifications of use mentioned in subparagraph (a) should be amended, the Member State shall ensure that a dossier giving the reasons for the inclusion, withdrawal or amendments is sent officially to the Commission and to the Member States."

General information on the request

Nature of the request	<input type="checkbox"/> Inclusion <input type="checkbox"/> Deletion <input type="checkbox"/> Change of disposition
Request introduced by	[Member State]: Contact e-mail:
Date	

Please indicate if the material provided is confidential.

Requested inclusion / change in Annex VII

Name	Description, compositional requirement, conditions for use

1. Identification

Identification of substance, terminology, synonyms

Chemical name(s)
Other names
Trade names
CAS code (Chemical Abstracts Systematic Names)
Other code(s)

2. Characterisation

Raw materials, methods of manufacture

Composition
Active ingredients
Relevant physical/chemical properties including solubility
Origin of raw materials (including aspects of mining/harvesting them), production methods

3. Specification of use

Equipment treated and/or parasites/diseases controlled
Formulation
Application method
Dosage and number of applications
Timing of application, e.g. in relation to animal age, management practices and veterinary treatments
Physiological effect, mode of action
Side-effects on farm animals

4. Status

Authorization under general legislation

Historic use
Regulatory status (EU, national, others)

5. Reasons for the inclusion, withdrawal or amendments

Explain the need for the proposed substance
What alternative solutions are currently authorised or possible?
Is there any traditional use or precedents in organic production?

6. Consistency with objectives and principles of organic production

Please use the checklist in part B of this Annex to indicate consistency with objectives and principles of organic production, as well as criteria and general rules, laid down in Council Regulation (EC) 834/2007 Title II and Title III as applicable.

7. Other aspects

Environmental issues relating to production and use
Animal health and welfare issues relating to production and use
Human health issues relating to production and use
Food quality and authenticity, residues
Ethical issues relating to production and use
Socio-economic issues relating to production and use
Various aspects, further remarks

8. References**9. Annexes**

CHECKLIST FOR CONSISTENCY

with objectives and principles of organic production with reference to specific articles in the organic regulation

Part B

Criteria	Specific articles in Reg. 834/2007	Fulfilled? Yes / no / not applicable	Brief qualification
Exclude the use of GMOs and products produced from or by GMOs	Art.4(a)(iii); Art. 9(1)		
Enhances the health of soil, water, plants and animals	Art. 3(a)(i)		
Makes responsible use of energy and the natural resources, such as water, soil, organic matter and air	Art. 3(a)(iii)		
High level of animal welfare, respecting species-specific needs	Art.3(a)(iv); Art. 5(h)		
Aim at producing products of high quality	Art. 3(b)		
Use living organisms and mechanical production methods	Art. 4(a)(i)		
Limited to natural or naturally-derived substances	Art. 4(b)(ii)		
For chemically synthesized inputs: appropriate management practices do not exist	Art. 4(c)(i)		
For chemically synthesized inputs: organic, natural or naturally-derived alternative substances are not available on the market	Art. 4(c)(ii)		
For chemically synthesized inputs: use of organic, natural or naturally-derived alternative substances contributes to unacceptable environmental impacts	Art. 4(c)(iii)		
Maintenance of animal health by encouraging the natural immunological defence of the animal, as well as the selection of appropriate breeds and management practices	Art. 5(e)		

Criteria	Specific articles in Reg. 834/2007	Fulfilled? Yes / no / not applicable	Brief qualification
Animal husbandry practices which enhance the immune system and strengthen the natural defence against diseases ...	Art. 5(l)		
Disease prevention shall be based on breed and strain selection, husbandry management practices, high quality feed and exercise, appropriate stocking density and adequate and appropriate housing maintained in hygienic conditions	Art. 14(e)(i)		
Disease prevention shall be based on keeping the animals in optimal conditions, by appropriate siting, optimal design of the holdings, the application of good husbandry and management practices, including regular cleaning and disinfection of premises, high quality feed, appropriate stocking density, and breed and strain selection.	Art. 15(f)(i)		
The corresponding use is authorised in general agriculture [...]	Art. 16 (1)		
Their use is necessary for sustained production and essential for its intended use	Art. 16(2)(a)		
All products and substances shall be of plant, animal, microbial or mineral origin ...	Art. 16 (2)(b)		
... except where products or substances from such sources are not available in sufficient quantities or qualities or if alternatives are not available	Art. 16 (2)(b)		
Products and substances to be withdrawn or their use amended/ limited	Art. 16(3)(b)		
Others: please specify			

Annex 2: Analysis of in-house and external stocking rate constraints for different categories of poultry

The purpose of this Annex is to illustrate for the different categories of poultry how the different stocking rate and flock size constraints in the regulation and proposed in this report interact. An explanation of individual rows and their calculation is provided in the following table (see also additional notes).

Row	Heading	Explanation
1	Flock size	Flock size as defined in the EU organic regulation
2	Analysis of in-house stocking constraints	Currently 6 laying hens or 21kg per m ² or
3	Period in house (min.)	Equals period laying or period to transfer/ slaughter
4	Typical AVERAGE weight	Expert definition based on typical age and species
5	Internal stocking usable area	As defined in EU organic regulation
6	Min in-house usable area for max numbers	Usable area required to accommodate maximum flock size – equals flock size (row 1) divided by internal stocking usable area (row 5)
7	Min in-house area for max 21kg/ m ²	Usable area required to accommodate maximum kg limit – equals flock size (row 1) times typical average weight (row 4) divided by internal stocking usable area (row 5)
8	Batches per year	Number of batches based on production cycle (laying period, period to transfer/slaughter) plus 2 weeks for building sterilisations between batches
9	Birds per year	Equals flock size (row 1) time batches per year (row 8)
10	Analysis of max 170kgN/ha constraint, assuming manure from within house spread elsewhere	EU organic regulation specifies maximum stocking rates for different categories of livestock related to nitrate directive limit of 170 kg N/ha. As birds are housed, with manure from houses usually spread on other land, assumptions concerning nitrogen excretion rates from birds and proportion excreted outside are critical.
12	N excretion rates	Based on IPCC data
13	Equivalent to annual stocking	Maximum number of birds per ha to comply with nitrogen constraint – equals annual nitrogen limit (170 kgN/ha) divided by average weight times N excretion per kg times period in house divided by 1000 to convert g to kg
14	Min % deposited on range	10 % assumed value based on current practice in DK (Johannsen, pers. comm.)
15	Theoretical max stocking per batch	To comply with nitrogen constraint assuming 10% deposited on land (lower deposition assumption)
16	Range area required for flock	Area required if used continuously to meet nitrogen constraint – equals annual stocking at 100% N deposition (row 13) divided by N deposition assumption (row 14) divided by number of batches per year (row 8)
17	Resting period 25%	Area required as row 16 if rested (or rotated) one year in four
18	Resting period 50%	Area required as row 16 if rested (or rotated) one year in two
19	Max % deposited on range	30 % assumed value based on current FR research results (Juin, pers. comm.)
20	Theoretical max stocking per batch	To comply with nitrogen constraint assuming 30% deposited on land (higher deposition assumption)
21	Range area required for flock	Area required if used continuously to meet nitrogen constraint – equals annual stocking at 100% N deposition (row 13) divided by N deposition assumption (row 19) divided by number of batches per year (row 8)
22	Resting period 25%	Area required as row 21 if rested (or rotated) one year in four
23	Resting period 50%	Area required as row 21 if rested (or rotated) one year in two
24	Analysis of range stocking constraint	To take account of 4 m ² per laying hen and similar constraints for other poultry categories

25	External stocking max numbers	Stocking rate m ² /bird as specified in regulation or proposed in report (Chapter 3.9)
26	External stocking max N (30%)	Stocking rate needed to meet Nitrogen constraint if higher (30%) N deposition level assumed – equals range area (ha) required for flock (row 21) times 10000 (to convert to m ²) divided by flock size (row 1).
27	Average weight per unit area (30% N)	Equals typical average weight per bird (row 4) divided by stocking rate (m ² per bird) under high N (30%) deposition assumption (row 26)
28	External stocking hen 0.5kg/ m ² equiv.	Stocking rate if standardised 0.5 kg/ m ² based on current 4 m ² per laying hen (approx. 2 kg) applied
29	Range area required for flock 0.5kg/ m ²	Area required if used continuously to meet hen equivalent (0.5kg/ m ²) stocking constraint – equals typical average weight (row 4) divided by 0.5
30	Resting period 25%	Area required as row 29 if rested (or rotated) one year in four
31	Resting period 50%	Area required as row 29 if rested (or rotated) one year in two
32	Analysis of proposed 150m max ranging distance constraint	Proposed to be consistent with free-range regulation.
34	Single flock, single tier house, centre of field	Based on 150m radius circle around building including adjustment for building itself
35	Width (max 10m from centre)	20 m assumed allowing for max 10m from centre of house to exit
36	Length m incl. 5m service entrance	Calculated to accommodate flock based on internal stocking rate constraints – equals minimum in-house floor area (row 6) divided by width of house (row 35) plus 5 for service entrance
37	Max range area (ha)	Open air area based on 150m distance from external boundary of house (rectangles on each side of house and quarter circles at each corner)
38	Single flock, single tier house, corner of field or multi-flock (x4), single tier house in centre of field	More restrictive assumption that only 25% of land around house is available
41	Width (max 10m from centre)	10 m assumed as exit restricted on one side.
42	Length incl. 5m service entrance	Calculated to accommodate flock based on internal stocking rate constraints – equals minimum in-house floor area (row 6) divided by width of house (row 41) plus 5 for service entrance
43	Max range area (ha)	Open air area based on 150m distance from external boundary of house (rectangles on two sides of house and quarter circle at one corner)

Notes to Annex 2 table (numbers refer to numbers in Notes column (3) of table):

1. As defined in organic regulation except breeders, pullets and young fattening birds as proposed by EGTOP
2. With 2 weeks resting between batches
3. Values based on IPCC 2006, own estimates in italics
4. Organic regulation limits layers to 230 birds/ha due to N
5. Reduced assumption for young birds due to limited ranging
6. If this constraint only operational
7. Assuming whole area used by birds
8. Assuming area rested for full year (1 year in 4 (25%) or 1 year in 2 (50%))
9. Min/max range illustrative based on current DK practice (min., Johanssen (2012) pers comm.) and FR research (max., Juin (2012) pers comm.)
10. Based on 30% deposition on range
11. 0.25 kg/m² applicable in most cases, exception youngest birds not ranging
12. Organic regulation specifies 4m²/hen = 0.5kg/m²
13. Based on hen kg equivalence

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Row	Notes	Unit	Layers	Breeders	Pullets		Fattening birds		Turkeys		Geese	Capons	Peking ducks		Muscovy ducks		Mallards	Guinea F
			hens	all	0-8 wk	9-18 wk	0-21 d	22-81d	Male	Female	All	All	Male	Female	Male	Female	All	All
1	Flock size	birds	3000	3000	10000	3300	10000	4800	2500	2500	2500	2500	3200	4000	3200	4000	3200	5200
2 Analysis of in-house stocking constraints																		
3	Period in house (min.)	days	350	350	55	70	20	60	140	100	140	150	49	49	84	70	92	94
4	Typical AVERAGE weight	kg/bird	1.9	1.9	0.4	1.1	0.5	1.5	2.5	2.5	2.5	1.5	1.5	1	1	1.5	1.5	
5	Internal stocking usable area	birds/m2	6	6	24	15	20	10	10	10	10	10	10	10	10	10	10	10
6	Min in-house floor area for max numbers	m2	500	500	417	220	500	480	250	250	250	250	320	400	320	400	320	520
7	Min in-house area for max 21kg/m2	m2	500	500	190	173	238	343	298	298	298	179	229	286	152	190	229	371
8	Batches per year	batch	1	1	5	4	10	4	2.3	3	2.5	2.5	5	5	4	4	3	3
9	Birds per year	birds	3000	3000	50000	13200	100000	19200	5750	7500	6250	6250	16000	20000	12800	16000	9600	15600
10 Analysis of max 170kgN/ha constraint, assuming manure from within house spread elsewhere																		
11	Annual N limit	kg/ha	170	170	170	170	170	170	170	170	170	170	170	170	170	170	170	170
12	N excretion rates	g/kg LW/d	0.82	0.82	0.5	0.6	0.5	1.1	0.74	0.74	0.8	0.8	0.83	0.83	0.83	0.83	0.83	0.83
13	Equivalent to annual stocking	birds/ha	312	312	15455	3680	34000	1717	656	919	607	944	2787	2787	2438	2926	1484	1453
14	Min % deposited on range	5,9	10%	10%	1%	10%	1%	10%	10%	10%	10%	10%	10%	10%	10%	10%	10%	10%
15	Theoretical max stocking per batch	6	birds/ha	3118	3118	309091	9199	340000	4293	2854	3063	2429	3778	5573	5573	6096	7315	4947
16	Range area required for flock	7	ha	0.96	0.96	0.03	0.36	0.03	1.12	0.88	0.82	1.03	0.66	0.57	0.72	0.52	0.55	0.65
17	Resting period 25%	8	ha	1.28	1.28	0.04	0.48	0.04	1.49	1.17	1.09	1.37	0.88	0.77	0.96	0.70	0.73	0.86
18	Resting period 50%	8	ha	1.92	1.92	0.06	0.72	0.06	2.24	1.75	1.63	2.06	1.32	1.15	1.44	1.05	1.09	1.29
19	Max % deposited on range	5,9	30%	30%	3%	30%	3%	30%	30%	30%	30%	30%	30%	30%	30%	30%	30%	30%
20	Theoretical max stocking per batch	6	birds/ha	1039	1039	103030	3066	113333	1431	951	1021	810	1259	1858	1858	2032	2438	1649
21	Range area required for flock	7	ha	2.89	2.89	0.10	1.08	0.09	3.35	2.63	2.45	3.09	1.99	1.72	2.15	1.57	1.64	1.94
22	Resting period 25%	8	ha	3.85	3.85	0.13	1.43	0.12	4.47	3.50	3.26	4.12	2.65	2.30	2.87	2.10	2.19	2.59
23	Resting period 50%	8	ha	5.77	5.77	0.19	2.15	0.18	6.71	5.26	4.90	6.18	3.97	3.44	4.31	3.15	3.28	3.88
24 Analysis of range stocking constraint																		
25	External stocking max numbers	1	m2/bird	4	4	1	4	1	4	10	10	15	15	4.5	4.5	4.5	4.5	4
26	External stocking max N (30%)	10	m2/bird	9.6	9.6	0.1	3.3	0.1	7.0	10.5	9.8	12.4	7.9	5.4	5.4	4.9	4.1	6.1
27	Average weight per unit area (30% N)	11	kg/m2	0.20	0.20	4.12	0.34	5.67	0.21	0.24	0.26	0.20	0.19	0.28	0.28	0.20	0.24	0.25
28	External stocking hen 0.5kg/m2 equiv.	12	m2/bird	3.8	3.8	0.8	2.2	1.0	3.0	5.0	5.0	5.0	3.0	3.0	2.0	2.0	3.0	3.0
29	Range area required for flock 0.5kg/m2	7,13	ha	1.14	1.14	0.80	0.73	1.00	1.44	1.25	1.25	1.25	0.75	0.96	1.20	0.64	0.80	0.96
30	Resting period 25%	8	ha	1.52	1.52	1.07	0.97	1.33	1.92	1.67	1.67	1.67	1.00	1.28	1.60	0.85	1.07	1.28
31	Resting period 50%	8	ha	2.28	2.28	1.60	1.45	2.00	2.88	2.50	2.50	2.50	1.50	1.92	2.40	1.28	1.60	1.92
32 Analysis of proposed 150m max ranging distance constraint																		
<i>34 Single flock, single tier house, centre of field</i>																		
35	Width (max 10m from centre)	m	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20
36	Length m incl. 5m service entrance	m	30	30	26	16	30	29	17.5	17.5	17.5	17.5	21	25	21	25	21	31
37	Max range area (ha)	ha	23.7	23.7	23.6	23.3	23.7	23.7	23.3	23.3	23.3	23.3	23.4	23.6	23.4	23.6	23.4	23.7
<i>38 Single flock, single tier house, corner of field or multi-flock (x4), single tier house in centre of field</i>																		
41	Width (max 10m from centre)	m	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10
42	Length incl. 5m service entrance	m	55	55	47	27	55	53	130	130	130	30	37	45	37	45	37	57
43	Max range area (ha)	ha	5.8	5.8	5.8	5.7	5.8	5.8	6.1	6.1	6.1	5.7	5.7	5.8	5.7	5.8	5.7	5.8

Annex 3: Feather pecking and cannibalism

This literature review was prepared to support the work of the group. A further detailed description of the nature of the feather-pecking and cannibalism problem, together with potential control approaches relevant to organic farming and extensive references, can be found at:

<http://www.organicvet.co.uk/Poultryweb/disease/feath/feath1.htm>

Feather pecking and cannibalism are among the most common welfare problems in organic laying hens (Kjær, 1996; Sandøe, 1996). Conventionally, the problem can be controlled by beak trimming but this is not considered desirable from the perspectives of animal welfare and organic principles. It is known from research based on conventional egg production that these problems can be triggered by a number of different factors such as breed, feed composition, rearing environment, external parasites and other management factors (Gunnarsson, 1999). The same factors can lead to outbreaks of feather pecking or cannibalism in organic poultry. FAWC (1997) concluded that if injurious pecking could be eliminated by other means, for example through genetic selection, the use of controlled light for housed birds or other management practices, then the need for beak trimming would disappear.

Housing factors

Cannibalism and severe feather pecking is more common in loose housing and free range systems than caged systems due to the increased numbers of birds that may have access to injured birds. Loose housing of hens will, on the other hand, lead to improvements regarding other aspects of animal health, such as improved bone strength in loose-housed laying hens compared to caged birds (Appleby, 1993).

Sparks (2003) recommends the following practices to reduce feather-pecking risks:

- Care should be taken to prevent shafts of light entering the poultry house (eg via ventilation ducts). While complete control of light would be desirable it can be difficult to achieve in practice. Diffuse low level light is less of a stimulus to feather peck than bright shafts of light.
- When buying in point-of-lay pullets, birds should be obtained from a reputable source as the way the birds have been reared can affect their behaviour (e.g. birds that have been reared in a stressful environment may be more flighty when in production phase). Also recommended are access to range (and exposure to daylight) for organic pullet rearing, enriched indoor environments to provide alternative pecking objects (to other chickens) and similarities in housing systems at point of transfer.
- The birds should not be disturbed more frequently or to a greater extent than is absolutely necessary (acknowledging the need for routine interaction between humans and birds). This includes reviewing procedures for egg collection, allowing visitors onto the unit and preventing disturbance from other sources such as vermin and other animals.
- The health and welfare of the flock should be monitored carefully and, should any bird show signs of injurious feather pecking, the wound should be treated so as to minimise infection and to cover the red colouration of the damaged area.
- Depending on the layout of the house, it may be feasible to place injured birds in "hospital pens" for a limited period. Care should be taken however to ensure that birds within the hospital pen have access to food, water and adequate space.
- If an outbreak occurs or is repeated over several flocks, control options and management practices should be reviewed with a veterinarian and/or a qualified advisor.
- Thermal comfort should be maintained.

Nutritional factors and foraging behaviour

Feather pecking and cannibalism behaviour can be moderated by providing appropriate feeding and opportunities for foraging. Evidence suggests that feather pecking is redirected ground pecking behaviour associated with foraging (Blokhuis, 1986; Huber-Eicher and Wechsler, 1997; Ramadan and von Borell, 2008). Recent research indicates that severe feather pecking in particular derives from frustrated motivation to forage (Dixon et al, 2008). Appropriate feeding and design and management of systems to provide opportunities for hens to forage, with the aim of increasing the length of time birds spend engaged in foraging and feeding, is likely to reduce the incidence of feather pecking.

Increasing protein level in the diet can have a positive effect on plumage and lowered feather pecking and cannibalism. Low levels of protein may increase risks because feathers serve as compensatory source of nutrients deficient in the food provided (Ambrosen and Petersen 1997). However, high dietary protein levels associated with sub-deficiency in lysine might also favour cannibalism in meat label chickens during the finishing stage more than low dietary protein levels (Quentin et al., 2005).

A deficiency of certain amino-acids (methionine, arginine), minerals (NaCl, Ca, Mg), protein and fibre is a factor known to decrease incidence of feather pecking (see Hughes and Duncan 1972 and Hughes 1982 for reviews). Savory (1995) and van Hierden et al. (2002) found reduced feather pecking damage after L-tryptophan dietary supplementation, and Sossidou et al. (2009) found that phytase supplementation also had a positive effect on feather plumage of laying hens. Moreover, there are indications that diets high in insoluble fibre may reduce cannibalism outbreaks in laying hens (Hetland *et al* 2004). Feeding high-fibre, low-energy diets or roughage reduces feather pecking (Van Krimpen et al, 2005). Insoluble fibre (non-starch polysaccharides and lignin) affects gut functions and modulates nutrient digestion and there are indications that diets high in insoluble fibre are preventive of cannibalism outbreaks in laying hens (Hetland et al , 2004).

Genetic factors

There is also scientific evidence that feather pecking is a heritable trait, which may be reduced by genetic selection. Research studies showed that cannibalism was much more common in a certain commercially available brown hybrid than in the other, non-commercial breeds, studied under organic conditions (Sørensen & Kjaer, 1999). McAdie and Keeling (2000) point out: “It has been repeatedly documented that feather pecking differs between strains of hens... It has also been demonstrated that feather pecking traits can be selected for or against.” FAWC (1997) states that genetic selection can reduce feather pecking and cannibalism “significantly and substantially”. The Laywel project (www.laywel.eu, WP7, 2006) concluded that “*much greater emphasis should be placed on selecting genotypes with reduced damaging feather pecking tendencies for use in alternative housing systems for laying hens*”.

Hocking et al (2004) concluded that there is a strong genetic basis for feather pecking and cannibalism and that these behaviours are not strongly related genetically to other behavioural traits. Therefore, it should be possible to select birds that exhibit the normal range of behaviours but that do not have a propensity for feather pecking and cannibalism. However, it should be remembered that due to intense breeding efforts the commercial hybrids are continuously changing, both in terms of production capacity and temperament, and that it is therefore difficult to give any lasting advice regarding the choice of hybrid.

Various layer strains differ in their propensity to feather pecking (Kjaer, 2000; Klein et al., 2000). Higher incidence of feather pecking in brown versus white lines was attributed to contrast between feathers and skin in brown (dark) feathered lines of hens that may attract more attention (Savory and Mann 1997). Besides the strain differences there are also individual differences in pecking rates. It has been shown that only a small proportion of birds in the flock are responsible for the most feather damage. Divergent selection for high and low group productivity and survivability (GPS) affected also the frequency of aggressive pecking (pecks on the head) and damaging pecking (pecks on other regions of the body), which were both higher in low GPS hens as compared to high GPS ones (Cheng et al. 2001).

References

- Ambrosen T, Petersen VE (1997) The influence of protein level in the diet on cannibalism and quality of plumage of layers. *Poultry Science* 76:559-563.
- Appleby MC (1993) Modified cages for laying hens. In: Savory, Hughes (eds.) Proc. 4th Eur. Symp. on poultry welfare, Edinburgh, 1993. Universities Federation on Animal Welfare (UFAW), Potters Bar, 237-239.
- Blokhuis, H. J. (1986) Feather-pecking in poultry: its relation with ground pecking. *Applied Animal Behaviour Science* 16:63-67
- Cheng HW, Dillworth G, Singleton P, Chen Y, Muir WM (2001) Effect of genetic selection for productivity and longevity on blood concentrations of serotonin, catecholamine and corticosterone of chickens. *Poultry Science* 80:1278-1285.
- Dixon, LM, Duncan, IJH and Mason, G (2008) What's in a peck? Using fixed action pattern morphology to identify the motivational basis of abnormal feather-pecking behaviour. *Animal Behaviour* 76:1035-1042.
- FAWC (1997) Report on the welfare of laying hens. Farm Animal Welfare Council, UK. <http://www.fawc.org.uk/reports/layhens/lhgretoc.htm>
- Gunnarsson, S., Keeling, L. J. 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
- Hetland, H., Choct, M. and Svihus, B (2004) Role of insoluble non-starch polysaccharides in poultry. *World's Poultry Science Journal* (2004), 60:415-422
- Hierden YM van, Korte SM, Ruesink EW, Reenen CG van, Engel B, Koolhaas JM, Blokhuis HJ (2002) The development of feather pecking behaviour and targeting of pecking in chicks from a high and low feather pecking line of laying hens. *Applied Animal Behavioural Science* 77:183-196.
- Hocking, P. M., Channing, C. E., Robertson, G. W., Edmond, A. and Jones, R. B. (2004) Between breed genetic variation for welfare-related behavioural traits in domestic fowl. *Applied Animal Behaviour Science* 89:85-105
- Huber-Eicher, B. and Wechsler, B. (1997) Feather pecking in domestic chicks: its relation to dustbathing and foraging. *Animal Behaviour* 54:757-768
- Hughes BO, Duncan IJH (1972) The influence of strain and environmental factors upon feather pecking and cannibalism in fowls. *British Poultry Science* 13:525-547.
- Hughes BO (1982) Feather pecking and cannibalism in domestic fowls. In: Bessei, W (Ed): *Disturbed behaviour in farm animals*. Verlag Eugen Ulmer, Stuttgart, pp. 138-146

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- Kjaer J (1996) Velfærd hos økologiske høner – ikke en selvfølge! (Welfare in organic hens – it doesn't go without saying!) *Forskningsnytt om økologisk landbrug i Norden*, 1996, 4, 6-8.
- Kjaer JB (2000) Diurnal rhythm of feather pecking behaviour and condition of integument in four strains of loose housed laying hens. *Applied Animal Behaviour Science* 65:331-347.
- Klein T, Zeltner E, Huber - Eicher B (2000) Are genetic differences in foraging behaviour of laying hen chicks paralleled by hybrid specific differences in feather pecking? *Applied Animal Behaviour Science* 70:143-155.
- Krimpen, M. M. van, Kwakkel, R. P., Reuvekamp, B. F. J., Van der Peet-Schwering, C. M. C., Den Hartog, L.A. and Verstegen, M. W. A. (2005) Impact of feeding management on feather pecking in laying hens. *Worlds Poultry Science Journal* 61:663-685
- Laywel project (2006) - see www.laywel.eu
- McAdie, T. M. and Keeling, L. J. (2000) Effect of manipulating feathers of laying hens on the incidence of feather pecking and cannibalism. *Applied Animal Behaviour Science* 68:215-229
- Quentin M, Bouvarel I, Picard M (2005) Effects of crude protein and lysine contents of the diet on growth and body composition of slow-growing commercial broilers from 42 to 77 days of age *Animal Research* 54 (2): 113-122
- Ramadan, SGA and von Borell, E. (2008) Role of loose feather on the development of feather pecking in laying hens. *British Poultry Science* 49:250-256
- Sandøe P (1996) Dyreetiske Råd kræver bedre forhold for de økologiske høner (The Animal Ethics Council demands better conditions for organic hens). *Forskningsnytt om økologisk landbrug i Norden*, 1996, 4, 4.
- Savory CJ (1995) Feather pecking and cannibalism. *World Poultry Science Journal* 51: 215-219.
- Savory CJ, Mann JS (1997) Behavioral development in groups of pen-housed pullets in relation to genetic strain, age and food form. *British Poultry Science* 38:8-47.
- Sørensen P, Kjaer JB (1999) Comparison of high yielding and medium yielding hens in an organic system. *Proc. Poultry Genetics Symposium*, October 6-8 1999, Mariensee, Germany, p 145.
- Sossidou EN, Sandilands V, Sparks NHC, Acamovic T (2009) Effects of phytase supplementation on plumage damage in caged laying hens. In : *Book of Proceedings and Abstracts, 17th European Symposium on Poultry Nutrition*, 23-27 August 2009, Edinburgh: p. 209
- Sparks N (2003) *Organic Farming Technical Summary*, OFTS No 35, Scottish Agricultural College.