National Organic Standards Board
Livestock Committee
Proposed Discussion Document

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Guidance for Assessing Animal Welfare on Organic Poultry Operations

The following is provided to aid in assessment of whether or not the requirements of **§ 205.238-241** are being met sufficiently to demonstrate adequate animal welfare conditions on organic poultry operations. In addition, this document provides further guidance to producers for improving poultry welfare. The internationally recognized "five freedoms" (freedom from hunger, thirst and malnutrition; freedom from fear and distress; freedom from physical and thermal discomfort; freedom from pain, injury and disease; and freedom to express normal patterns of behavior) promulgated by the Farm Animal Welfare Council are a useful framework for considering animal welfare.

Nutritional requirements

Poultry must be fed a wholesome diet that meets their nutritional needs and promotes optimal health. Feed should be formulated to meet or exceed the National Research Council's *Nutrient Requirements of Poultry,* and adjusted with bird age and stage of production. Feed and water should be palatable and free from contaminants. Unless using a commercially prepared complete feed, laying hens must have access to a course calcium source, such as ground limestone. Water should be fresh, potable, and clean. Feed and water delivery systems should be checked daily and kept clean and in good working order. Birds must be provided with feed on a daily basis and water should be available continuously, with the rare exception of withholding for medical treatment under the advice of a veterinarian.

There should be enough feed and water space to prevent competition between birds. In double sided liner feed track, there should be at least 2 inches of feed space per bird, and 4 inches per bird for single sided feed track. Circular feeders should provide at least 1.5 inches of feeding space per bird.

Adjust the height of drinkers for easy access at each bird age and so that droppings do not fall into the water supply. There should be at least 1 bell-type drinker for every 100 hens and 1 nipple drinker per 12 hens. In small flocks, there should be a minimum of two drinkers.

Physical alterations

Management methods should be implemented to reduce feather pecking and cannibalism (see "preventing injurious pecking" below). If these management strategies fail, therapeutic beak trimming using the infrared laser method should be considered for subsequent flocks. This amputation must be performed on chicks no later than 10 days of age, and is commonly carried out at the hatchery.

While not pain-free, infrared laser beak trimming is superior to the conventional hot blade trimming in that open wounds are eliminated and the method is more precise, minimizing error and inconsistency. It also leaves a greater proportion of the beak intact.[1]

With the exception of toe trimming of turkey poults at the hatchery using infrared laser, other alterations including de-snooding, caponization, dubbing and toe clipping of birds are not permitted.

Force molting

Forced molting by feed withdrawal is not permitted under the National Organic Program, as it causes hunger and distress. If force molting is practiced, a molt ration should be supplied that is palatable and acceptable to the birds. A molt diet is acceptable to the birds if, on average, the total amount of feed consumed per day does not differ during the molting and non-molting period. Flocks should be carefully monitored during a molt, and individual hens that are not faring well should be separated into a designated sick pen and provided with a non-molt diet. Water should never be withheld for molting purposes.

Poultry health

Poultry should be monitored for signs of stress and disease. Birds should have a healthy body condition, have good feather cover for their stage of life, and no more than 2% should have poor hygiene, lesions or other injuries. Sick or injured birds must be treated without delay or, if suffering and unlikely to recover, euthanized humanely. Producers must not withhold medical treatment from a sick animal in an effort to preserve its organic status.

Animal health plan

All poultry farms should draft and follow an animal health plan that covers the specific circumstances unique to each farm. The plan should include, at a minimum, the disease prevention strategy (such as vaccination schedules and biosecurity protocols), contingency plans for emergency situations (including failure of the power or water supply), predator exclusion steps, veterinary contacts and emergency euthanasia procedures.

Sick pens

A designated area for the treatment of injured or moribund birds should be prepared to aid recovery, by preventing competition between birds and allowing a greater level of individual care. Sick pens should be arranged for the comfort and safety of the birds during convalescence. Feed and water must be provided, with the rare exception of withholding for medical treatment under the advice of a veterinarian.

Lameness

Broiler chickens, turkeys and ducks are prone to leg problems, including angular deformities, tibial dyschondroplasia (TD), and in severe cases, ruptured tendons. These may manifest as lameness or more severe mobility impairment.

Gait scoring is a tool that can be used to assess the degree of lameness in a broiler chicken flock.[2,3,4] Randomly score 100 birds individually by viewing their walking ability using the following scale:

Score 0. No detectable gait impairment
Score 1. Slight gait defect. Wobbling or uneven gait.
Score 2. Gait abnormality. Bird has impairment, but will move away from handler when approached.

Score 3. Gait abnormality that impairs function. Bird has a limp, jerky or unsteady gait and moves away from the observer when approached, but squats again within 15 seconds. Bird prefers to squat when not coerced by handler.
Score 4. Severe gait defect. Bird remains sitting when approached or nudged, but can stand or walk when placed in a standing position by a handler.
Score 5. The bird is completely lame and cannot walk. The bird may shuffle along on its hocks.

Gait score tends to worsen as birds age.[5] Birds that are suffering or are too crippled to reach feed and water should be humanely euthanized. Birds at gait score 3 and above are probably experiencing pain,[6,7] so ideally no birds should reach this level. However, a reasonable place to set the target for lameness is that 95% of the birds should be gait score 2 or less at seven weeks of age or older.

Broiler chickens, turkeys and ducks are also prone to contact dermatitis. When heavy birds spend excessive time lying down in wet or soiled litter, they are prone to skin lesions on the feet, legs and breast.[8, 9,10] Focal ulcerative dermatitis is small skin lesions (commonly called "breast buttons") that develop on the keel bone of turkeys.[11] A reasonable place to set target levels is that no more than 5% of birds should show hock burn, breast blisters or foot pad dermatitis.

Additional producer guidance on preventing leg problems

While dietary deficiencies are one factor that can lead to skeletal deformities,[12] genetic selection for rapid early growth rate is the major contributing factor. Rapid growth is also implicated in metabolic disorders, including ascites and Sudden Death Syndrome.[13] Some commercial broiler crosses are more susceptible to leg problems than others,[14] but slow growing broiler strains are generally less prone to these weaknesses. They are also less prone to heart and circulatory problems.[15] The use of slow growing breeds is therefore recommended. Broiler growth should be limited to no more than 45g per day and should be achieved without feed restriction.

Other factors that can improve gait score include: increasing the daily period of darkness, lowering the stocking density, and adding whole wheat to an otherwise balanced diet. Increasing the daily period of darkness allows chickens more time to rest and less time to feed. Feeding whole wheat is thought to be effective though slowing the rate of digestion. Both of these interventions work through reducing growth rate.[16] The reason that higher stocking densities can lead to lameness is more complex, involving both lack of room available for exercise and movement, as well as factors such as additional ammonia and litter moisture.[17,18,19]

Additional producer guidance on preventing dermatitis

Dermatitis lesions are painful and create a gateway for bacterial infection. Avoid them by preventing wet, sticky, or compact litter. Use bedding with good moisture holding capacity, such as wood shavings, and keep litter dry (but not dusty), with good ventilation. Drinkers should be monitored to ensure they are not spilling over and causing wet areas in the litter. Water nipples with drip cups can reduce water spillage.[20] Moisture and temperature of the litter increase with stocking density, so if these variables become problematic, it may be

necessary to raise fewer birds in the allotted space.[21] Manually turning the litter can help. Floor heating systems have also been found to improve litter quality.[22]

Conversely, well-managed litter is a soft substrate, while outdoor environments can cause abrasion and foot-pad dermatitis if not carefully managed.[23] Birds should be kept on cushioned, dry, clean surfaces outdoors. Rotate or move birds onto fresh pasture often enough to prevent the build up of droppings and damage to the protective vegetative cover.

Feed composition affects the consistency and composition of bird droppings, and is therefore a factor influencing irritant qualities of litter. Protein, fat and salt content can all affect the levels of contact dermatitis, as can the source and type of raw ingredients. Within the limits of meeting nutritional requirements, adjustments to the diet may help improve litter quality.[24]

For ducks, bell-type drinkers and open water troughs have been correlated with low levels of foot pad dermatitis. Conversely, foot pad dermatitis tends to worsen in houses with nipple drinkers. There is also evidence that increasing relative humidity and ammonia levels are associated with foot pad dermatitis of ducks.[25]

The health status of the flock will also affect the prevalence of contact dermatitis. Intestinal parasites, infectious disease, and poor feed quality can cause diarrhea, which will negatively impact litter friability (looseness and dryness). Prevent coccidiosis and other enteric diseases and feed good quality feed. Also strive to reduce leg problems, as lame birds will sit for longer periods of time in contact with litter.[26]

Varying degrees of foot pad dermatitis on the feet of turkeys

Foot pad dermatitis and hock burns on a broiler chicken

Disease

Disease incidence is a welfare indicator. Respiratory disease may indicate poor air quality. Incidence of internal parasites can indicate management issues such as lack of sanitation and failure to rotate outdoor areas often enough.

Poultry houses must be cleaned out completely between flocks if there have been adverse health issues with the previous flock; in other cases, the addition of a clean layer of litter will help maintain a sanitary environment.

If there is a documented occurrence of a disease outbreak in the region or relevant migratory pathway, or state or federal advisory order to confine birds, then poultry must be kept indoors to reduce the likelihood of pathogen transmission.

Any dead birds must be removed daily and disposed of in accordance with state and local laws.

Additional producer guidance on management of disease risk

Disease risk should be managed by using multiple approaches, including attention to outdoor range area, good litter management indoors, adherence to an effective biosecurity plan and ensuring clean, hygienic facilities.

Overcrowded and unsanitary outdoor environments are a disease hazard. Providing a rest period in-between flocks reduces the buildup of infectious organisms and allows the regeneration of vegetation and soil. Where stocking density is high, the environmental pathogen load may be correspondingly heavy, and bird-to-bird contact will be more frequent. Providing as much space as possible is therefore important, and the stocking density guidelines set out in the organic rule are minimum space allowances—where conditions permit, the aim should be to lower stocking densities and provide as much space as possible, while balancing freedom of movement with safety of the flock, including protection from predators.

Disease risk can be reduced in barn housing by removing droppings (e.g., via a belt in aviary systems, for example) or by preventing birds from accessing heavily soiled areas (e.g., by placing drinkers on a raised, slatted platform above a manure pit). Contact with droppings—

exacerbated by high stocking density and wet, cool conditions—is a risk factor for enteric disease.[27] Litter that "stops working", leaking drinkers, and an inadequate ventilation system (to remove water vapor) may all increase disease risk.[28,29] Maintain litter in friable condition.[30,31] Introduce only healthy young birds from genetic lines resistant to intestinal parasites.[32]

The build up of parasites around the barn can be avoided with the use of mobile housing,[33] pasture rotation, reduced stocking density, and by using land with good drainage.[34,35] Other methods that are helpful include regularly mowing or grazing to keep vegetation short on pasture, and removing heavily contaminated soil around the barn before introducing a new flock.[36] Gravel around the outside of permanent housing structures, by the exits where birds tend to congregate, can prevent muddy conditions in wet weather and provide additional drainage.

Biosecurity is a strategic plan to prevent the introduction of harmful pathogens. A good biosecurity plan will minimize disease risks and protect flocks. To prevent the spread of disease, limit movement between flocks and outside visitors. Always start with the youngest birds on the farm when doing daily chores and inspections to avoid carrying pathogens from older flocks to younger flocks. Microorganisms, such as coccidiosis for example, can be spread on vehicles and equipment, so designate specific tools and equipment for each poultry house or farm area. Transport crates should be cleaned between uses. Visitors should not enter a poultry farm if they have recently visited other flocks, unless they wear protective, disposable outerwear at both locations and ideally change clothes and shoes and shower between farms.

Mortality rates (deaths, culls)
Mortality rate is a key indicator of poultry welfare. Low mortality is also important for the economic viability of a poultry or egg production enterprise. A reasonable place to set the target for mortality is 3-5%. Birds must be protected from predators.

Additional producer guidance on lowering mortality rates

A low mortality rate is the hallmark of a well-managed poultry farm. Mortality spikes can be caused by a number of different problems, including disease outbreaks, cannibalism, and excessive losses due to predation. It is vital that producers take steps to prevent each of these outcomes, as they are all serious welfare and economic problems.

When poultry are given outdoor access, they become targets for many types of predators including coyotes, opossums, hawks, owls, and domestic dogs, to name a few. Predation is a welfare issue, as birds may suffer when attacked, are not necessarily killed quickly, and flocks can become fearful and reluctant to use outdoor areas if they are threatened by repeated attacks. To protect free-range flocks from nocturnal predators, birds must be secured in a fully enclosed coop, barn, mobile chicken house or other safe facility at night, *without fail*. Depending on the predator pressure at individual farm sites, further steps may be necessary; perimeter fences can be dug deep in the ground to prevent predators from digging underneath, and an overhang at the top of the fence will help prevent animals from climbing over. Electric fencing can further discourage ground predators, and overhead netting may be necessary to protect hens from aerial predators. Do not permit repeated heavy losses.

Preventing injurious pecking

Injurious pecking, including feather pecking and cannibalism should be managed so that severe outbreaks do not occur.

Additional producer guidance on management of injurious pecking

Feather pecking and cannibalism are common behavioral abnormalities of poultry, usually most problematic in large flocks of laying hens, but also sometimes seen in other poultry such as turkeys, ducks and pheasants. Severe feather pecking can lead to denuded plumage and eventually to cannibalism.[37,38] Outbreaks of cannibalism are unpredictable, and once they begin, are very difficult to stop. Prevention is the best approach.

Beak trimming is commonly used as a prophylactic measure to prevent feather pecking and cannibalism. Beak trimming is usually effective in significantly reducing cannibalism and subsequent mortality,[39,40] although occasional outbreaks do occur in beak trimmed flocks. Beak trimming as a solution is not ideal though, as it is a painful procedure. Further, the beak tip is highly innervated and contains abundant sensory receptors;[41,42] cutting off the beak tip thus impairs sensory function. Welfare can be improved by controlling cannibalism using alternative means.

Dietary deficiencies have been linked to increased incidence of pecking damage,[43] especially protein deficiencies,[44,45] so the first step in preventing injurious pecking is to ensure that the feed is nutritionally complete. However, outbreaks of feather pecking still often occur in flocks that are fed to their nutritional requirements. There are a variety of other factors involved.

Successful control of feather pecking and cannibalism requires an integrated approach that includes consideration of three main factors: early-life experiences, the environment and genetics.[46]

Feather pecking and cannibalism are not aggressive acts—rather, science demonstrates that these are foraging pecks that have been re-directed toward feathers.[47,48,49] In natural conditions, domestic fowl spend over 50% of their active time in foraging related activity.[50,51] Studies have shown that hens will choose to forage for feed on the ground in loose substrate rather than eat identical food freely available from a feeder.[52,53] Thus, the natural urge to forage remains strong, even when full feed is provided. The acquisition process itself—including seeking, investigating, and manipulating feed items—is nearly as important as the act of consuming the feed itself.[54]

Pecking preferences are formed early in life, and these are learned through experience.[55] Therefore, providing appropriate pecking and foraging substrate from day one[56,57] is a critical factor shaping adult pecking preferences. Scientific research has demonstrated that early access to loose litter—such as wood shavings, sand and straw—is an important first step in reducing feather pecking, cannibalism and subsequent mortality.[58,59,60, 61,62,63] Conversely, studies also show that the absence of loose-litter[64] and poor litter quality are risk factors for plumage deterioration due to feather pecking.[65] Scattering grain or feed into loose litter for young chicks can also be beneficial.[66]

Lack of perches during early rearing is another important risk factor for feather pecking on organic farms.[67] Early access to perches can decrease cloacal cannibalism by giving potential victims a safe place to avoid hens who would peck them from the floor.[68,69,70] Young birds must learn how to successfully navigate perches by gaining experience with them from a young age, which shapes their cognitive spatial abilities.[71] Pullets should have access to perches elevated above 35 centimeters at no later than four weeks of age.[72,73] Higher perches are generally better, [74] although they must be constructed and arranged in a way that allows easy access, or else hens can miss a landing, fall and become injured (see section on providing perches for laying hens in indoor housing below).

Feather pecking often begins to appear in affected flocks shortly after moving pullets from the rearing to the laying house. When transferring pullets, there are many potential stressors including changes in light intensity, diet, house layout and access to the outdoors. Stress can be partially alleviated by matching the rearing and laying environments as closely as possible.[75] Do not change the feed or lighting program at the same time pullets are moved into the laying house.

Since cannibalism is thought to have a hormonal basis, the risk of cannibalism may be reduced by using lighting programs that delay the age at which hens first begin to lay eggs to after 20 weeks of age.[76] Flocks that begin laying eggs before 20 weeks of age have approximately four times the risk for vent pecking as compared with flocks that begin laying at a later age.[77]

When feather pecking outbreaks occur in adult hens, lowering the light level is a commonly used intervention. While somewhat effective, the problem with dimming the light is that, like beak trimming, the underlying cause of the problem is not addressed. To truly attend to the welfare issue, the natural early motivation of a hen to forage and peck should be channeled appropriately into desirable adult pecking behavior, as discussed above.

Feed form is also important for attracting and sustaining foraging related pecks and regulating appetite. Studies show that a mash diet is better than pelleted feed for reducing feather pecking and cannibalism.[78,79] The small particle form takes longer to consume, sustaining foraging related pecking behavior for a longer period of time as birds pick out individual feed particles.[80] A diet high in insoluble fiber has also been shown to help to reduce and control cannibalism,[81] and millrun, oat hulls, rice hulls, and lucerne meal are effective sources.[82] Additional foraging enrichments such as maize, barley-pea silage, carrots,[83] straw[84,85] seeds in suet, and cabbage leaves[86] have been shown to attract interest and reduce the tendency to perform injurious pecking.

Most importantly, it has been repeatedly demonstrated in scientific studies that flocks making good use of an outdoor range area (where more foraging and exploring opportunities are provided for them) are significantly less likely to feather peck and cannibalize flock mates.[87,88,89,90,91,92,93] One study found that when at least half the flock was observed outdoors during good weather, there was a five-fold decrease in the risk of feather pecking. On these farms, it is likely that hens are directing their pecking behavior at appropriate foraging substrate, rather than at each other.[94] Therefore it is essential to provide attractive outdoor areas and encourage hens to go outside (see section on outdoor access below).

If possible, time the introduction of pullets into the laying house so that they will have good weather when the doors are first opened to permit outdoor access. If inclement weather prevents them from using the range area when they are young, it may be difficult to encourage them out when they grow older.[95]

Other risk factors that have been associated with injurious pecking include:
- Restricting access to portions of the indoor litter area;[96]
- Restricting access to the outside range area;[97]
- Changing the diet three or more times during the laying period;[98,99]
- Using lights inside the nest boxes;[100]
- Use of bell drinkers;[101,102]
- Inadequate number of drinking places;[103]
- Reduced indoor temperature (below 68º F);[104]
- Not keeping cockerels with the hen flock;[105] and
- Dietary deficiencies.[106]

Feather pecking, cannibalism, and the associated mortality have genetic components, which means that these traits can be selected against in breeding programs.[107,108,109,110] Different hen strains vary in their propensity to exhibit injurious pecking behavior.[111] It is therefore critical to source hens that exhibit low levels of feather pecking behavior. Because breeding efforts to control cannibalism are ongoing, it is difficult to pinpoint lasting recommendations on specific genetic lines. If a severe outbreak occurs, consider using a different supplier, switch to a different hen strain, or use a different breed or hybrid altogether.

For more information on managing feather pecking without beak trimming see:

"A guide to the practical management of feather pecking & cannibalism in free range laying hens" at:
www.defra.gov.uk/publications/files/pb10596-feather-pecking-050309.pdf

Newberry RC. 2003. Cannibalism. In: Perry GC (ed.), Welfare of the Laying Hen, Poultry Science Symposium Series, 27 (Wallingford, U.K.: CABI Publishing, pp. 239-58).

Indoor living conditions

Housing must protect birds from the elements, maintain a comfortable temperature, provide ventilation and allow birds to exercise and conduct natural behavior. Cages are not permitted. Bedding indoors provides comfort, insulation, and pecking and scratching opportunity. However, it must be maintained in clean, dry condition. Slatted-floor systems are useful under watering areas to prevent wet litter.

The indoor climate must be modulated for light, temperature, and air quality to provide a comfortable environment for the birds. Lighting should provide for an 8 hour rest period daily. Indoor temperatures must not be so warm that birds pant or so cold that they huddle together. Ventilation must be adequate to prevent the buildup of ammonia. Ammonia levels should generally be less than 10 ppm. Ammonia level testing must be documented and ammonia levels must be at or below 25ppm. General levels can be tested using ammonia test strips and if excessive ammonia is noted a second test using passive dosimeter or gas detection tubes should be conducted. Dust should also be kept to a minimum.

Layers should be provided with nest boxes—at least one box per 5 birds is recommended. If community nest boxes are provided, there should be at least 9 square feet of nesting space for every 100 hens.

Laying hens must also be provided with perches—at least 6 inches of elevated perch space per hen is suggested. There must be enough perch and/or flat roost space for all hens to simultaneously rest off of the floor at night. Turkeys can be provided with elevated platforms and ramps in addition to or instead of perches.[112]

Poultry must be provided with dustbathing areas. Preferred substrates include sand, wood shavings and peat. On outdoor range areas, chickens usually create their own preferred dustbathing locations in loose, dry dirt. Dustbathing balances oil levels in the feathers,[113,114,115] and helps keep the plumage in good condition.

Ducks should have access to water for bathing and head dunking in addition to water for drinking. Water related activity is part of the natural behavior of waterfowl. At a minimum, ducks should be able to dip their heads and splash their feathers with water. This behavior will help keep their nostrils, eyes and feathers clean.[116,117] Troughs are often used to provide an open water source and these can be situated on grids or slats over a drainage channel to prevent adjacent litter from becoming wet. Nipple drinkers do not permit ducks to wet their eyes or feathers, and can lead to poor eye and plumage cleanliness.[118] Open water sources should be cleaned daily.

Additional producer guidance on providing perches for laying hens in indoor housing

Perches are an important enrichment in indoor housing for laying hens. The foot of a hen is anatomically adapted to close around a perch,[119,120] and this is the natural resting position for chickens. Perch use maintains bone volume and bone strength,[121,122,123] and can serve as a refuge for subordinate hens to avoid aggressive interactions with more dominant hens.[124] Research demonstrates that hens are highly motivated to perch at night.[125,126,127] When given a choice, hens often prefer to roost on higher perches as opposed to those that are closer to the floor.[128,129]

Bumblefoot is a bulbous swelling of the footpad caused by a localized infection.[130] Some hen breeds are more susceptible than others, and the condition is associated with poor hygiene and poor perch design.[131,132] The use of plastic perches or the commonly used soft wooden perches measuring 25 mm (0.98 in) in width are thought to contribute to poor foot health, as manure and moisture are able to accumulate on the structure's top where the birds' feet rest.[133] Incidence of bumblefoot can be reduced by providing hens with hardwood perches that are approximately 1.5 inches in diameter with a flattened top[134,135] and by limiting walking exposure to mud and manure.[136]

Hens selected for egg production are prone to osteoporosis and subsequent bone fractures.[137,138,139] These often go undetected unless hens are palpated by an experienced veterinarian. The way perches are arranged inside the poultry house can have an effect on the incidence of bone fractures. Research suggests that the upper limit on a hen's ability to jump from one perch to another is about three feet,[140] and angles greater than approximately 45º can be difficult to navigate.[141] At a minimum, hens need approximately 6 inches of perch

space to take-off, and 6-9 inches to land.[142] Perches should be large enough for hens to maintain stable footing, about 1.5 inches in diameter.[143,144] These general requirements may differ depending on the size and previous experience of the hen, so adjustments may be necessary for individual flocks. Injuries are more likely to occur if perch design and layout require hens to jump beyond their natural capabilities.[145]

Providing perches at a young age can also help reduce the risk of floor eggs,[146] as pullets must be skilled at flying up and down in order to access elevated nest boxes.[147]

Outdoor access and living conditions

Outdoor access must be provided to all poultry, with the following exceptions:

- Pullets younger than 12 weeks of age.
- Broiler chickens younger than 4 weeks of age.
- Outdoor temperatures below 50ºF.
- Other inclement weather such as heavy snow, sleet, rain, wind or extreme heat that would endanger the health or welfare of the animals.

Pullets must be provided outdoor access by 12 weeks of age, when weather permits. As a guide, doors for outdoor access should be at least 14 inches high, spaced uniformly and provide direct access to the outdoors. Total door opening should be at least 6 feet/1000 birds.[148] Once layers are accustomed to going outdoors, a brief confinement period of no more than 5 weeks to allow for nest box training is permitted. Broiler chickens must be provided outdoor access by 4 weeks of age, provided that they are fully feathered and weather permits.

Enclosed spaces that have a solid roof overhead (sometimes called “porches” or “winter gardens”) do not meet the definition of outdoor access and cannot be included in the space calculation of outdoor access.

Additional producer guidance on outdoor access

Outdoor areas for poultry should be fully vegetated, where possible. Grasses, legumes, and other forage provide interest and enrichment to poultry, who consume not only greens, but also insects, grubs, and seeds. However, high traffic areas tend to become denuded of vegetation, so steps must be taken to keep outdoor areas in good condition. Rotate the use of range areas by taking flocks off of pasture to prevent the buildup of infectious organisms and allow the re-growth of vegetation. Fields can also be rotated between species with different parasite spectrums, such as cattle and poultry. Harvested crop fields also make good poultry runs.

Layout is important for attracting hens to use outdoor space. There should be plenty of exits from the hen house, and they should be easily accessible and large enough for several hens to pass through simultaneously. Since hens are prey animals, they are naturally wary of

overhead predators, and will sometimes avoid open range if some sort of cover is not provided. Cover, either artificial or natural structures, should therefore be provided.[149] Natural cover can take many forms, including tall plantings of vegetation, bushes, and trees,[150] however, large swaths of thick undergrowth can actually attract ground predators if fences don't exclude them. Maize plantings and low pollard willows (*Salix*), for example, have worked on organic farms to attract hens outdoors.[151] In "tree-range" production, the outdoor area is planted with short trees, such as orchard varieties. Flocks with canopy cover from trees are more likely to have better plumage condition at the end of lay than those without canopy cover.[152]

Artificial structures that provide shelter, shade, and security can also be constructed.[153,154] Cover made from a wide variety of wood, plastic or recycled materials, in designs both low to the ground and high enough to include perches, have been innovated by producers with success. Camouflage nets are another option.[155] If artificial cover is portable, it can be moved to different range areas to encourage more even distribution of the flock, preventing buildup of contamination over highly frequented areas.

For more information see: Fanatico, A. 2006. Alternative poultry production systems and outdoor access. Available through the National Sustainable Agriculture Information Service at: www.attra.ncat.org

Space allowances

Poultry housing must be sufficiently spacious to allow all birds to move freely, stretch their wings and engage in natural behavior. Perching areas and nest boxes may not be used in the calculation of floor space. Slatted/grated floors may be considered floor space. Mobile poultry units require the same amount of indoor space per bird but allow the house to be moved so birds always have access to fresh vegetation.

Livestock Species	**Indoor Space**	**Outdoor Runs and Pens**
Chickens		
Laying hens and breeders	1.5 sq ft / bird	2.0 sq ft / bird
Pullets	5 lbs / sq ft	5 lbs / sq ft
Broilers	5 lbs / sq ft	5 lbs / sq ft
Other poultry		
Turkeys and Geese—breeding,	7.5 lbs / sq ft	2 lbs / sq ft

laying, or meat birds (pounds)		
Ducks-meat	5 lbs / sq ft	2 lbs / sq ft
Ducks-laying hen	2 lbs / sq ft	1 lbs / sq ft
Ducks—breeder	3.3 lbs / sq ft	1 lbs / sq ft

Humane handling of poultry

Poultry should be handled quietly and firmly, with care taken to avoid unnecessary distress and dislocated or broken bones during catching and loading for transport. Poultry catching should be scheduled to minimize the time to slaughter as well as climatic stress during catching, transport and holding. Birds should not be picked up by the neck or wings.

Transport is a stressful experience,[156,157] as birds are subjected to noise, vibration, motion, overcrowding, feed and water deprivation, social disruption, and potential temperature extremes.[158,159,160] Aim to reduce these stressors and comfort the birds wherever possible. Transportation units should provide space enough that all birds can lie down at the same time and none are on top of each other. Birds must be protected from heat and cold. Delivery of poultry for slaughter should be scheduled such that they are not deprived of water for longer than 12 hours.

Birds must be fit for transport before being loaded for slaughter. Due to the stress involved, animals must be healthy enough to withstand the rigors of the journey. Birds exhibiting obvious signs of poor health, weakness or injury are not fit for transport. These birds should be euthanized using the most humane method available.

Inspectors should discuss procedures for poultry catching and loading with the producer and must observe poultry being caught and loaded for slaughter at the annual inspection and note percentage of birds with broken/dislocated legs/wings.

Additional producer guidance on humane handling of poultry

Low-stress handling is as important for poultry as it is for livestock. Although commonly carried this way, research shows that birds react with a significant stress response when picked up and held upside-down by the legs, as this is a physiologically abnormal posture for chickens.[161] Handling, crating and loading for transportation, have been identified by researchers as major sources of stress and trauma.[162] Bruising and injuries are well-documented, and these are not only welfare problems, but can also result in carcass downgrading and economic loss to producers.[163, 164,165,166,167] Ideally, all poultry should be handled individually, upright, and carried gently using two hands.

Catching and carrying turkeys can also cause bruises and injuries. Turkeys can be driven or herded into transport crates instead, which reduces stress levels.[168]

Euthanasia and depopulation
Individual birds who are ill or injured, are suffering, and are unlikely to recover, should be euthanized without delay. All euthanized and depopulated birds must be confirmed dead before disposal. No live birds should be found on dead piles.

Permitted methods include:
- Hand held electrical or percussive stunning using an instrument designed for the specific size/age of the species, followed by neck cutting;
- Cervical dislocation by stretching the neck to sever the spinal cord and cause extensive damage to the major blood vessels.
- Barbiturate overdose administered by a licensed veterinarian (with special considerations noted below)
- Decapitation
- Carbon dioxide or a mixture of nitrogen and argon gases, delivered in an appropriate container at acceptable concentrations.

Acceptable gas mixtures include:
- a minimum of 2 minutes exposure to any mixture of argon, nitrogen or other inert gases with atmospheric air and carbon dioxide, provided that the carbon dioxide concentration does not exceed 30 percent by volume and the residual oxygen concentration does not exceed 2 percent by volume; or
- a minimum of 2 minutes exposure to argon, nitrogen, other inert gases or any mixture of these gases in atmospheric air with a maximum of 2 percent residual oxygen by volume.

Methods that are not permitted include, but are not limited to:
- Suffocation
- Blow to the head by blunt instrument
- Equipment that crushes the neck including killing pliers or burdizzo clamps
- Carbon monoxide
- Neck wringing (holding the head while swinging the body in a circular motion)
- Maceration in a wood chipper

Additional producer guidance on euthanasia and depopulation

The term euthanasia is derived from Greek words meaning “good death” and is applied to the killing of an animal with minimal pain and distress.[169] Animals that are suffering must be euthanized in a timely manner, and should not be left for extensive periods, over a weekend, for example.

Barbiturate injection or inhalant anesthetics administered by a veterinarian are the ideal methods for a limited numbers of hens, as they most closely meet the goals of killing with minimal pain and distress. However, these methods have not been widely used on farm settings due to cost and convince issues associated with culling large numbers of birds. Producers should also be aware that drug residues associated with the use of barbiturate injections will prevent the use of carcasses for human consumption, and dead birds must be disposed of carefully, because residues could also be unwittingly consumed by other animals eating the carcass or could become an environmental pollutant. Dead poultry should be disposed of in a way that does not attract wildlife.

Research demonstrates that inhalation of an inert gas (including argon and nitrogen) is probably painless, as they are colorless, odorless gases and birds do not demonstrate aversive reactions with initial exposure. In carefully controlled behavior experiments, turkeys and chickens are willing to enter a chamber filled with inert gas in order to access food.[170,171] Argon and nitrogen can be used to kill chickens on the farm. Containerized gas killing systems have been developed for culling large numbers of birds,[172] and these can be built on either a large or small scale, depending on the needs of individual producers. Such a system is the most humane method for killing large numbers of chickens on the farm that researchers have identified to date.

The use of CO_2 is problematic as there are both physiological and behavioral lines of scientific evidence suggesting that CO_2 may be unpleasant and possibly very distressing to inhale, as it is an acidic gas, pungent at high concentrations.[173,174]

Exhaust fumes from an idling car engine are an unacceptable source of carbon monoxide, due to problems with production of other gases, inadequate gas concentration, and gas temperature.

While purpose-build macerators are sometimes used to kill unwanted chicks at hatcheries, using a wood chipper to dispose of a spent laying-hen flock is never acceptable.

It is extremely important to confirm that all animals are dead before disposal. When depopulation is performed on large flocks, depending on the methods used, it can be difficult to ensure that birds are actually dead and not simply lying still or unconscious. There is a very high potential for birds that are not dead, but are severely injured, to suffer greatly. Each bird must be methodically checked, and dead piles must be examined carefully for any sign of movement. A backup method of euthanasia must be in place to kill any birds that recover. Careful attention to this step in the euthanasia process is essential to ensuring a humane end for farmed poultry.

Slaughter of poultry

All slaughter facilities must be audited yearly. Organic certifiers can use documentation from other third-party animal welfare audits that have been performed and should do additional auditing as necessary.

Slaughter establishments must also perform self-audits on a weekly basis. Self-audits ensure that animal welfare standards are being upheld, identify problems that may arise within the facility or with individual staff members, and identify specific farms that may be shipping problematic animals to the slaughter plant. These problems may be due to animals' genetics or handling; slaughter facilities are encouraged to contact the producers of problematic animals so that these problems can be addressed in the future.

In electrical water-bath stunning systems, birds must be shackled by both legs. Birds with broken or dislocated wings should be humanely killed before being shackled.

Stunning

Poultry must be rendered unconscious by stunning, or killed before being bled by simultaneous severance of both carotid arteries or by decapitation. Bleeding without

stunning requires a high level of operator competency to avoid causing pain and missing cutting of both carotid arteries. A very sharp blade or knife of sufficient length is needed so that the point of the knife remains outside the incision during the cut; the point of the knife should not be used to make the incision. The incision should not close over the knife during the throat cut. Decapitation may be achieved by manual or automatic means.

Decapitation must be performed using a sharp instrument which achieves the complete severance of the head from the body by cutting all the major vessels of the neck and the spinal cord with a sharp instrument. All mechanical and automatic instruments used in this method shall be sharp and inspected frequently for sharpness. The poultry slaughter establishment shall ensure that all instruments and equipment are maintained so that they function effectively. All birds (100%) should be dead before they enter the scald tank.

For inspector assessment, 99% of the birds must be rendered insensible by the stunning method chosen. Arched neck and wings tucked in are visible signs of effective stunning.

Additional producer/processor guidance on stunning for slaughter

Electric stunning: The disadvantage of electric stunning for poultry is that birds must be shackled and hung upside-down before they enter the stunner. Care must be taken to avoid pre-stun electrical shocks. Amperage must be high enough that birds lose consciousness and are not merely paralyzed. The electric current shall be administered so as to produce effective surgical anesthesia or death with a minimum of excitement and discomfort. The current necessary to produce an effective stun changes depending the species and electrical frequency. These are outlined in the World Organization for Animal Health, Terrestrial Animal Health Guide, Chapter 7.5, Slaughter of animals (available at: www.oie.int/index.php?id=169&L=0&htmfile=chapitre_1.7.5.htm), and the minimum currents are as follows:

- Broiler chickens and spent laying hens, 100 milliamperes per bird
- Turkeys, 150 milliamperes per bird
- Ducks and geese, 130 milliamperes per bird

For high frequency settings of 200-400 Hz, the minimum current needed to stun chickens is 150 milliamperes. For frequency settings of 400-1500 Hz, the minimum current is 200 milliamperes. For turkeys, frequency settings of 200-1500 Hz require a 400 milliampere currency setting.

These are minimal settings, and higher current levels better ensure that more birds will be effectively rendered unconscious.[175]

Gas stunning: Acceptable gas mixtures include argon, nitrogen, and low initial levels of CO_2 in one of the following combinations, as described by the World Organization for Animal Health:

- a minimum of 2 minutes exposure to 40 percent carbon dioxide, 30 percent oxygen and 30 percent nitrogen, followed by a minimum of one minute exposure to 80 percent carbon dioxide in air; or

- a minimum of 2 minutes exposure to any mixture of argon, nitrogen or other inert gases with atmospheric air and carbon dioxide, provided that the carbon dioxide concentration does not exceed 30 percent by volume and the residual oxygen concentration does not exceed 2 percent by volume; or
- a minimum of 2 minutes exposure to argon, nitrogen, other inert gases or any mixture of these gases in atmospheric air with a maximum of 2 percent residual oxygen by volume.

To avoid unnecessary stress and trauma due to handling, chickens should remain in their transport crates while being conveyed through the gas tunnels. Gas concentrations must be monitored for precision at all times. An alarm system is necessary to indicate malfunctions.

Bleeding

Once stunned, birds should be bled without delay to ensure that consciousness is not regained. Bleeding shall be accomplished by severing both carotid arteries or by decapitation. Sufficient bleeding time (at lest 30 seconds, 60 seconds for gas stunning, and approximately 2 to 3 minutes for electric stunning resulting in cardiac arrest) shall be allowed to prevent the unacceptable condition known as “red skins” or “cadavers” which may occur with insufficient bleeding. For inspector assessment, 99% must be effectively cut by hand or by the bleed machine. Remaining birds must be cut by a backup person.

The inspector will monitor condition of carcasses exiting the scald tank. Birds exiting the scald tank should not show signs that they entered it alive. “Red skins” with uncut throats indicate that they entered the scalding water alive, and those with cut throats could possibly have entered before becoming unconscious.

For poultry, the percentage of chickens with broken or dislocated wings should not exceed 2%, with zero being the goal. No broken legs should be noted.

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Committee vote:
Motion: Wendy Second: Colehour
Yes: 8 No: 0 Absent: 0 Abstain: 0 Recuse: 0