Enacted No. 5-Chikusan-1067 on July 26, 2023

Technical Guidelines for Management of Broilers

Scope: The guidelines cover the production period of broilers, from the arrival of day-old chicks at farms through to their transportation to the slaughterhouse/abattoir.
The guidelines are also applicable to other meat producing chickens, such as *Jidori*.

The “Technical Guidelines for Management of Broilers” were developed and issued by the Ministry of Agriculture, Forestry and Fisheries of Japan (MAFF-J), based on the standards for animal welfare in the Terrestrial Animal Health Code of the World Organisation for Animal Health. This document is the English version of the guidelines translated by MAFF-J. While every effort has been made to ensure that the translation is as accurate as possible, the accuracy and completeness of the content is not entirely guaranteed. For accurate and up-to-date information, please refer to the original Japanese version.

Ministry of Agriculture, Forestry and Fisheries of Japan
Livestock Industry Bureau

Table of Contents

Section 1. Management method

1. Observation and recording

It is important to keep track of the health of broilers to make sure that they are being reared comfortably. Signs of poor health in broilers include changes in their plumage condition, lethargy, rapid and irregular breathing, persistent coughing or wheezing, trembling, poor appetite, diarrhea, pathological crouching, and abnormal behaviors.

It is important to keep daily records to ensure that the rearing environment is comfortable for the broilers. The items to be recorded include the health status of the broilers, the occurrence of diseases and accidents and their causes, the number of deaths, back scratching, contact dermatitis, breast blisters, ascites, leg deformities, feed rations or intake, adequate water supply, maximum and minimum temperatures, and humidity.

[Actions recommended for implementation]

Broilers should be observed at intervals appropriate to the management practices and the risks to the health and animal welfare, at least once a day. In particular, the frequency of observation should be increased immediately after changes in the rearing environment or during hot or cold seasons to prevent the occurrence of sickness and injuries. Observation should be conducted in such a way that broilers are not unnecessarily disturbed; for example, handlers should move quietly and slowly through the flock.

When observing broilers, their health status should be assessed by observing factors including their body condition, feeding status, presence of injury, and occurrence of feather pecking. The absence of any signs indicating a deterioration in animal welfare should be confirmed by referring to the animal welfare measurables shown in Section 7, and it should also be checked that feed and water are being administered appropriately, ventilation is adequate, lighting is adequate, and litter substrate is clean. When observing body condition, the fact that feather cover can mask actual body condition should be considered.

If broilers show signs of health deterioration or an increase in the number of deaths, clinical examination and lesion observation should be utilized to take appropriate action immediately. Diseased or injured broilers should be given appropriate treatment as soon as possible by the manager (e.g., owner) or handler (person actually involved in the management of the broilers). If the manager or handler is unable to provide adequate care, veterinary treatment should be provided. If treatment is not effective, euthanasia should be conducted. When broilers die, they should be promptly handled and reported, and the cause should be ascertained.

Daily records should be kept on the health status of broilers, the occurrence of diseases and accidents and their causes, the number of deaths, the occurrence of feather pecking, feed rations or intake, adequate water supply, maximum and minimum temperatures, and humidity. Daily, weekly, and cumulative mortality, culling, and morbidity rates and performance should be within expected ranges. Depending on the key husbandry events in the production cycle, mortality, morbidity, and culling rates should be checked and periodically recorded along with the causes of increase or decrease and the details of treatment. Items to be recorded should be added in accordance with the situation, for example, when a behavior that may be causing animal welfare problems is observed (refer to Section 7.6).

[Actions recommended for future implementation]

None

2. Handling of broilers

Broilers are animals that are sensitive to changes in their surrounding environment.

Since broilers are shipped at a younger age than laying hens, they pose fewer problems in the aspects of feather pecking and cannibalism.

To prevent broilers from feeling undue stress, managers and handlers should pay attention to avoid contact with animals other than broilers, and should try to avoid behaviors that cause unnecessary stress to broilers. They should also recognize that broilers have a habit of fighting to secure feed and space for activities as well as to establish social rank, and that fighting behavior can cause injury or death.

Painful interventions, such as beak trimming (removing the tip of the beak), toe trimming, and dubbing should not be routinely practiced on broilers. It is important to note that broilers may be unable to consume feed immediately after beak trimming.

With regard to painful procedures, possible options for improving animal welfare include suspension of the procedure, reducing or eliminating the need for painful procedures through proper husbandry, rearing strains that do not require painful procedures, and changing to less painful or less invasive alternatives.

[Actions recommended for implementation]

When working in the poultry house or approaching broilers, managers and handlers should avoid sudden actions that may cause unnecessary stress or fear, avoid rough handling, and handle the broilers as carefully as possible to avoid causing injuries.

Catching broilers should be scheduled in a way to minimize the time until their slaughter. It should be carried out by skilled animal handlers, under dim or blue light to minimize stress, fear reactions, and injuries, and handlers should avoid picking them up by their necks or wing tips and pay attention to avoid giving them a strong impact. Mechanical catchers, where used, should be designed, operated and maintained to minimize injury, stress and fear to the broilers. Broilers that are injured during catching should be euthanized.

When transporting broilers, the loading, transport, unloading, and stocking density during transport should be conducted appropriately according to the “Technical Guidelines for Transport of Farm Animals." Plans should be made in a way to minimize the time and distance for transport, and appropriate measures should be taken to reduce climatic stress during catching, transport, and storage.

Animal welfare and health considerations should balance any decisions on productivity and growth rate when choosing the broiler breed and strain to be used for a particular location and management practices.

In cases where feather pecking and cannibalism are a potential problem, management methods, such as selecting the appropriate genetic stock, reducing light intensity, providing foraging materials, nutritional modifications, and reducing stocking density, should be implemented.

Painful interventions, such as beak trimming, toe trimming and dubbing should not be routinely practiced on broilers. Therapeutic beak trimming should be performed as a means of last resort when management practices fail to prevent feather pecking. In such cases, it should be carried out by trained and skilled personnel at as early an age as possible and care should be taken to remove the minimum amount of beak necessary using a method that minimizes pain and controls bleeding. After beak trimming, managers or handlers should make sure that the bleeding has stopped, carefully observe the broilers, and take the appropriate measures such as administering vitamins as necessary.

Surgical caponization should be carried out by an appropriate method that adequately controls pain and infection, and should only be performed by veterinarians or trained and skilled personnel under veterinary supervision.

[Actions recommended for future implementation]

None

3. Control of diseases and accidents

It is most important to prevent the occurrence of diseases and injuries by daily management.

It is necessary for managers and handlers to acquire knowledge to identify and appropriately address broilers affected by chronic diseases or injuries.

Reasons for euthanasia of individual broilers include leg deformity, lameness or abnormal gait, bone fractures or other illnesses, diagnostic purposes, disaster response, emaciation, rapid deterioration of condition for which treatment has been unsuccessful, and severe pain that cannot be alleviated.

[Actions recommended for implementation]

The health management of broilers should be carried out in a way that the health and welfare of broilers concerning the body and behavior are optimized. There should be an effective program for the prevention and treatment of diseases and health problems that is developed in appropriate consultation with veterinarians. The program, including production information, morbidity rates, mortality rates, culling rates, and details of treatment, should be regularly updated by managers or handlers. For parasites, an appropriate program should also be in place for monitoring, control, and treatment.

Managers and handlers should acquire knowledge of dealing with broilers affected by chronic disease or injuries and should consult veterinarians as appropriate. If managers or handlers suspect the presence of a disease, or are unable to correct the causes of disease, ill-health, distress, or stress, they should seek advice from a veterinarian or other qualified advisers.

Vaccinations and treatments should be administered by personnel skilled in the procedures with consideration for the welfare of broilers and under the guidance of veterinarians in accordance with the “Veterinary Act (Act No. 186 of 1949)” and other relevant laws and regulations.

Sick or injured broilers should be moved as carefully as possible, separated, and treated promptly.

The decision of on-farm euthanasia should be undertaken by a competent person for broilers that are injured during catching, not fit for loading or transport, not expected to recover after treatment, or are severely stunted or weak. On-farm euthanasia, except for cases where culling is carried out in accordance with the “Act on Domestic Animal Infectious Diseases Control (Act No. 166 of 1951)”, should be performed as soon as possible following documented procedures and appropriate equipment, with reference to the “Technical Guidelines for On-Farm Euthanasia of Farm Animals."

Records of diseases and accidents should be kept, and if the frequency of occurrence is high, consultation with a veterinarian or relevant experts should be sought for appropriate action, as the presence of disease may be suspected, or the cause of disease, pain, distress or suffering may not have been improved.

[Actions recommended for future implementation]

None

4. Cleaning and disinfection of poultry houses

Providing a comfortable environment for broilers will ensure good hygiene and minimize the risk of disease and injury.

[Actions recommended for implementation]

Floors, substrate, cages, and areas outside poultry houses should be cleaned as necessary to ensure good hygiene and to minimize the risk of disease and injury.

Areas in contact with broilers, including buildings and equipment should be cleaned, washed, and disinfected to keep facilities and equipment clean.

Manure should be removed properly to provide a comfortable environment. When litter is used, the floor surface should be kept dry by adding or replacing litter.

After the shipment of broilers, the poultry houses should be washed, disinfected, and dried as conditions warrant and, at a minimum, after each production cycle.

[Actions recommended for future implementation]

None

5. Biosecurity measures on the farm

In the event of the entry of highly infectious pathogens such as highly pathogenic avian influenza virus into a farm, there is a high risk that the disease will spread simultaneously throughout the entire flocks, posing a significant problem for animal welfare.

In order to prevent the outbreak of infectious diseases and to maintain the health of broilers, it is necessary to implement thorough biosecurity management to prevent the entry of pathogens into the farm. In addition, pest animals such as wild birds, rats, and flies are involved in the transmission of various pathogens, and degrade the rearing environment by causing contamination of feed and damage to facilities and equipment (e.g., electrical wiring).

[Actions recommended for implementation]

In addition to complying with the “Biosecurity Standards” as outlined in the “Act on the Prevention of Infectious Diseases in Livestock”, managers and handlers should design, implement, and periodically review "Biosecurity plans" and acquire the necessary knowledge for the daily prevention of infectious disease outbreaks. In the case of any abnormalities observed in broilers or other necessary situations, managers and handlers should consult with veterinarians or other qualified persons, and when specific symptoms outlined in the “Act on the Prevention of Infectious Diseases in Livestock” are confirmed, they should notify that to the Livestock Hygiene Service Center immediately.

When vehicles enter or leave a farm, or when managers or others enter or leave a poultry house, disinfection and footwear replacement should be carried out appropriately.

The major sources for spread of pathogens, including vectors (e.g., arthropods and rodents), should be prevented from invading, and if they do, prompt extermination measures should be taken.

[Actions recommended for future implementation]

None

6. Promoting understanding of animal welfare

It is necessary to understand that ensuring good animal welfare involves management practices such as designing management systems, maintaining proper rearing environments, responsible rearing, and providing appropriate care, and that serious problems may arise if these factors are compromised.

Good management of broilers plays a crucial role in ensuring good animal welfare. It is also necessary to constantly recognize that the acquisition of correct knowledge, skills, and an aptitude for animal welfare by managers and handlers will contribute to the reduction of the number of culled broilers due to diseases and injuries, and lead to the healthy rearing of broilers.

[Actions recommended for implementation]

Managers and handlers should be competent with relevant experience or training to equip them with the necessary practical skills and knowledge of broiler behavior, handling, health, biosecurity, physiological needs and welfare (early specific signs of disease or distress, such as panting (open-mouth breathing), wing spreading, huddling, feather ruffling, diarrhea, changes in locomotory behaviors, and non-specific signs such as reduced feed and water intake, changes in weight and body condition, changes in behavior or abnormal physical appearance). In particular, they should acquire the knowledge and skills to identify and appropriately manage broilers with lameness or abnormal gait, contact dermatitis, conjunctivitis, and those with suspected chronic diseases or injuries.

There should be a sufficient number of animal handlers to adequately ensure the health and welfare of the broilers.

[Actions recommended for future implementation]

None

Section 2. Nutrition

1. Nutritional and water requirements

In order for broilers to maintain their health and carry out activities such as normal development, it is necessary to provide them with sufficient feed that contains appropriate nutrition according to their developmental stage and other factors, and which satisfies their physiological requirements in quality and quantity in a form that can be eaten, without excess or deficiency.

[Actions recommended for implementation]

Broilers should be fed a diet appropriate to their age and genetics, which contains adequate nutrients to meet their requirements for good health and welfare daily, and management should be practiced to ensure that they do not deviate from the acceptable range of body condition according to the breed, strain, and physiological condition. When feed is changed, it should be carried out in a planned and gradual manner.

Water requirements are influenced by factors such as age, temperature, humidity, body weight, and feed ingredients. Insufficient water intake can cause various diseases; therefore, a sufficient amount of fresh water suitable for drinking should be continuously available except under veterinary advice. Water should be available up to the time of transportation to the slaughterhouse/abattoir. In particular, special provision should be made to enable young chicks access to appropriate feed and water.

The “Japanese Feeding Standards for Poultry,” “Standard Tables of Feed, Composition in Japan," and other sources should be referred to for information on the types and quantities of nutrients required.

[Actions recommended for future implementation]

None

2. Ensuring the quality of feed and water

When feed and water are stored in feeders and drinkers for a long time, problems such as contamination by the growth of mold and bacteria will occur.

Contamination of feed and water with excrement of wild animals such as rats and wild birds can lead to diseases.

[Actions recommended for implementation]

Feeders and drinkers should be easy to clean and properly maintained through regular inspections and cleaning in consideration of the frequency recommended by the equipment manufacturer. Concerning water, attention should be paid to high temperatures in summer and freezing in winter.

Feedstuffs and feed ingredients should be of satisfactory quality to meet nutritional needs, be managed to minimize contamination and degradation, and be tested for the presence of substances that would impact on the health of broilers.

Measures to prevent the entry of wild animals should be taken to avoid contamination of feed and water with excrement from rats, wild birds, and other animals that can cause

diseases in broilers.

When setting up an outdoor area, attention should be given to contaminated puddles, harmful plants, and other potential hazards to broilers.

[Actions recommended for future implementation]

None

3. Feeding and water supply methods

When installing feeders and drinkers, it is necessary to ensure that all broilers have adequate access to feed, water, and nutrition without any problems, and to keep in mind that requirements of feed and water vary according to age, weight, etc.

[Actions recommended for implementation]

In all rearing systems, feeding and watering facilities should ensure that all broilers have adequate access to feed, water and nutrition without problems.

Since feeding and watering conditions required for broilers vary depending on their status such as age and weight, managers or handlers should design feeding and watering systems to prevent excessive fighting among broilers, ensure sufficient space according to the systems, and take appropriate measures such as dispersing the rearing areas, as necessary.

In particular, when broilers are newly introduced into the poultry house, it should be confirmed that they are able to consume feed and water.

All broilers should be fed at least once a day, and feeding should be avoided during the hottest hours of the day if it is difficult to maintain the proper temperature in the poultry house. From a hygiene management perspective, it is necessary to withdraw feed for a certain period prior to slaughter; however, excessive and prolonged withdrawal of feed should be avoided, taking into consideration the time required for transportation and other processes before slaughter.

[Actions recommended for future implementation]

None

Section 3. Poultry house

When newly building or renovating a poultry house, a facility location that is safe from the impact of fires, floods, or other natural disasters should be selected to the extent possible, and the impact of climate and geographical factors should be evaluated and the facility should be designed based on expert knowledge on the health and welfare of broilers, while considering the five freedoms. In order to mitigate the negative effects of these factors, efforts should be made to adapt the breeds to the location of the farm or consider alternative locations. In addition, consideration should be given to the following: (1) ensuring the environment in the poultry house is comfortable for broilers and fresh air can be supplied to the entire house; (2) prevention of the invasion of pathogens and pest animals such as wild animals, rats, and flies; (3) avoiding significant changes in the temperature and humidity in the poultry house due to fluctuations in the weather conditions, such as heat and cold, which may adversely affect the health of broilers; (4) designing the poultry house structure to facilitate daily management and observation of the broilers, equipped with the necessary management facilities; and (5) providing a structure that enables appropriate disposal of manure.

It is necessary to maintain proper management, including repairs, to prevent broilers from being injured by damaged parts of poultry houses and equipment.

Managers or handlers should develop a maintenance program that includes record-keeping for all equipment and contingency plans to address any failures that may compromise the welfare of broilers.

The form of the poultry house includes the open-sided poultry house, the semi-windowless poultry house, and the windowless poultry house, which are selected according to the management techniques of the managers or handlers and the environmental conditions surrounding the rearing place.

[Actions recommended for implementation]

The location of the broiler farm should be chosen to be safe from the effects of fires, floods and other natural disasters to the extent practical. Farms should be located or designed to minimize biosecurity risks, exposure of broilers to chemical and physical contaminations, noise, and adverse climatic conditions.

Poultry houses, outdoor areas, and equipment should be designed and maintained to avoid injury or pain to the broilers, with consideration of broilers' opportunities to perform their motivated behaviors, as well as health, environmental factors, and animal management capability. In addition, poultry houses should be constructed with materials, electrical and fuel installations that minimize the risk of fire and other hazards and are easy to clean and maintain.

All production systems should be designed, maintained and managed to prevent contact with and predation by predators and wild birds.

Managers or handlers should have a maintenance program in place, including record-keeping for all equipment and contingency plans, to address failures that may compromise the welfare of broilers.

1. Poultry house without outdoor areas

(1) Open-sided poultry house

An open-sided poultry house is a poultry house with a structure that allows natural light to enter the house and allows air to flow in and out freely. Broilers are fully confined in the house.

(2) Semi-windowless poultry house

A semi-windowless poultry house is an open-sided poultry house with curtains, etc. that facilitates environmental control through forced ventilation or other systems similar to windowless poultry houses, and broilers are fully confined in the house.

(3) Windowless poultry house

A windowless poultry house is a house where ceilings, walls and floors are covered with insulation, etc., and ventilation and light management are artificially controlled. Broilers are completely confined in the house.

[Actions recommended for implementation]

All establishments for broilers should be designed, constructed, maintained and managed in such a way as to minimize the adverse effects on the health and welfare of broilers which can be caused by drastic changes in temperature and humidity in the poultry house due to fluctuations in weather conditions such as heat and cold.

Attention should be paid to prevent broilers from being injured by damaged parts of the poultry house.

Poultry houses should be designed and managed to prevent contact with and predation by wild animals including predators and wild birds, rats and flies, as well as contact with other broilers, predation, and infestation.

The structure should be designed to facilitate daily management and observation of broilers and be equipped with the necessary management facilities, ensuring appropriate manure disposal.

[Actions recommended for future implementation]

None

2. Poultry house with outdoor areas

There are two types of poultry houses with outdoor areas: a partially housed type in which broilers are kept in a poultry house while having access to a designated outdoor area, and a completely outdoor type in which broilers are not kept in a poultry house for the entire production period but are kept in a designated outdoor area.

Broilers may be given access to outdoor areas only when they have sufficient feather cover and can range safely.

[Actions recommended for implementation]

In the case of the partially housed type, there should be sufficient exit areas to allow broilers to leave and re-enter the poultry house from outdoor areas freely.

Land and pasture should be appropriately managed to reduce the risk of broilers becoming infected by pathogens, infested by parasites, or being injured. For this reason, it should be kept in mind to limit the stocking density and to rotate the use of multiple plots during management.

Outdoor areas should be located on well-drained ground and managed to minimize swampy conditions and mud. In addition, there should be a shelter for broilers, and the areas should be managed to prevent broilers from escaping. They should also be free from toxic plants and contaminants in soil, feed, and drinking water.

Broilers should be habituated early to the outdoor areas.

Outdoor areas should be designed, maintained and managed to allow broilers to feel safe and to encourage them to utilize the areas optimally while mitigating the contact and predation by predators and wild birds, disease risks, and adverse climatic conditions.

[Actions recommended for future implementation]

None

Section 4. Rearing system, structure, and rearing space

1. Rearing system

The main rearing system used for broilers in Japan is the cage-free system.

[Actions recommended for implementation]

In order to provide and maintain a good rearing environment for broilers, managers and handlers should acquire knowledge and skills in management techniques and methods of using equipment. They should monitor the air environment (temperature, humidity, etc.) in the poultry house and ensure there is appropriate ventilation, especially in winter when the amount of ventilation is reduced.

In cage-free systems, broilers are not separated from their manure, so care should be taken to prevent the occurrence of coccidiosis and other parasitic diseases by properly managing the manure, such as by frequently replacing or adding litter.

[Actions recommended for future implementation]

None

2. Structure, floor, and substrate

The structures of facilities for housing broilers should ensure that broilers will not be injured by protrusions and should be easy to clean, disinfect, and replace.

It is necessary to ensure that the structure and materials of the floor are comfortable and safe for broilers. Poor litter quality can result from a variety of factors, including water spillage, inappropriate feed composition, enteric infections, poor ventilation, and overcrowding.

[Actions recommended for implementation]

Facilities for housing broilers should be free of protrusions that may cause injury, the type of substrate should be chosen carefully, and the floor should preferably be easy to clean and disinfect to maintain a good rearing environment. Litter should be managed to minimize any detrimental effects on animal welfare and health, and appropriate materials such as hygienic and non-toxic materials should be used. Litter should be replaced or adequately treated when required to prevent diseases in the next flock. Additionally, the litter should be maintained so that it is dry, friable, and not dusty, caked, or wet.

If broilers are kept on slatted floors or cages, where a very humid climate precludes the use of other flooring substrates, the floors should be designed, constructed and maintained to adequately support the broilers, prevent injuries, and ensure that manure can fall through or be adequately removed.

Deterioration of the floor surface can cause contact dermatitis on the surface of the foot pad or at the back of the hocks, breast blisters, and other conditions; therefore, the floor should be designed and managed to maintain comfort.

Day-old chicks should be placed on an appropriate type of flooring suitable for their size to prevent injury and keep them warm. Litter for day-old chicks should be uncontaminated substrate, such as wood shavings, straw, rice husk, shredded paper,

or treated used litter, and should be sufficient deep to allow normal behavior and to separate chicks from the floor.

[Actions recommended for future implementation]

The provision of loose and dry bedding material is desirable in order to insulate the chicks from the ground and to encourage dust bathing and foraging.

3. Rearing space

Since the required rearing space varies depending on factors such as the breed, strain and weight of broilers, the structure of the poultry house, ventilation conditions, rearing system, and number of broilers per flock, it is difficult to uniformly prescribe the appropriate level of space required. What is important is that managers or handlers observe the broilers carefully and determine whether the rearing space is appropriate. It is known that panting frequency increases when the temperature near the floor is high.

When the space is overcrowded, it can be stressful for broilers, leading to an increase in back-scratching, abnormal behaviors such as feather pecking, disease, fighting, and injuries.

[Actions recommended for implementation]

Appropriate space should be provided to all broilers for comfort and socialization.

If abnormal behaviors are observed, corrective measures such as increase of rearing space should be taken. Areas that are not suitable for resting, such as those with excessive water and manure accumulation, should not be included in the areas available to broilers.

All broilers should be housed at a stocking density that allows them to rest at the same time and to adopt normal postures. The rearing space should be managed with consideration for various spaces for resting, feeding and drinking, and to avoid the adverse effects on normal behavior and resting due to close confinement. Broilers should be housed at a stocking density that allows them to access feed and water and to move and adjust their posture normally.

When determining the space allowance, the following factors should be considered: age and weight of broilers, ambient conditions, biosecurity strategy, equipment selection, feed and watering systems, flooring substrate, genetic characteristics of breeds and strains, housing design, management capabilities, production system, available space, and ventilation capacity.

[Actions recommended for future implementation]

None

Section 5. Environment of poultry houses

1. Thermal environment

The comfortable temperature range for broilers depends on their developmental stage and other factors.

While broilers need to be kept warm until they are three to four weeks old, the optimum temperature range for broilers after that age is about 15 to 25°C. Since the comfort of broilers is affected not only by temperature but also humidity, wind speed, ventilation method, radiant heat, and stocking density, it is important to observe the broilers carefully and maintain their comfort level.

For the growing stage, the temperature-humidity index can assist in identifying the comfort zones for broilers at varying temperatures and relative humidity levels.

When it is too hot for broilers, they exhibit signs such as a decrease in feed intake, panting, and the action of spreading wings. Conversely, when it is too cold, they exhibit behaviors such as huddling, an increase in feed intake, feather ruffling, rigidity, and shivering. Sudden temperature changes may cause heat and cold stress.

In particular, it is important to prevent heat stress in summer as broilers do not have sweat glands and thermoregulatory functions through sweating, and they have a high body temperature of 40°C or more and their whole body is covered with feathers. In husbandry guidelines published by breeding hen companies, heat index or other information that is useful for understanding the appropriate thermal environment for the concerned breed may be provided.

[Actions recommended for implementation]

Since broilers do not have sweat glands and a thermoregulatory function through sweating, and they have a high body temperature of 40°C or more and their entire body is covered with feathers, managers and handlers should understand the risks posed by heat stress in summer and the temperature and humidity for which measures are required. They should observe broilers carefully to maintain their comfort; for example, when the temperature is abnormally high, measures should be taken to control the temperature rise in the poultry house. At this time, the thermal conditions should be maintained within a range that is appropriate for their stage of development and the genetic characteristics of their breed and strain, by taking appropriate measures such as using insulation materials, opening and closing of windows, ventilation, aeration, and adjustment of stocking density, so as to maintain an optimal temperature as far as possible.

When the environment is too hot for broilers and there is a decrease in feed intake, panting, or the action of spreading wings, appropriate measures should be taken, such as spraying water around the poultry house, installing cooling pads (heat protection equipment using water evaporation), and introducing a fine-mist system. When introducing a fine-mist system, care should be taken to maintain appropriate humidity and floor surface conditions.

When the environment is too cold for broilers and behaviors such as feather ruffling appear, appropriate measures should be taken, such as preventing drafts, installing cold-proof curtains around the poultry house, and providing auxiliary heat sources including mobile hot air heaters.

Management of the thermal environment should be checked frequently enough so

that failure of the system would be noticed and corrected before it cause a welfare problem, in consideration of the frequency recommended by the equipment manufacturer.

[Actions recommended for future implementation]

None

2. Ventilation

Maintaining good air quality in the poultry house and providing adequate ventilation are important for the health and welfare of broilers. Since broilers have a high oxygen demand for their body size, ventilation is effective in reducing discomfort and the risk of disease among broilers.

The air composition is influenced by stocking density, flooring, substrate, manure management, poultry house design, and ventilation systems.

In order to provide a constant supply of fresh air and keep the comfortable environment for broilers, adequate ventilation should be provided to remove ammonia, hydrogen sulfide, carbon dioxide, dust and moisture generated in the poultry house to the outdoors. It should also be noted that ventilation during hot weather has the effect of discharging heat from the poultry house and helping the body heat dissipate by using the wind from ventilation fans, and it is not solely intended to blow air directly to the bodies of the broilers.

In particular, inadequate ventilation leading to the retention of ammonia and other substances in the poultry house poses risks not only to the broilers but also to human health by causing damage to the respiratory and other organs of the handler. Since ammonia is generated from the manure of broilers, the amount and concentration of ammonia generated vary greatly depending on the ventilation system and the manure treatment conditions.

[Actions recommended for implementation]

The ventilation system should be designed to provide a constant supply of fresh air throughout the poultry house.

Ammonia concentration should not routinely exceed 25 ppm at broiler level, at which managers and others working in the poultry house experience unpleasant odors at the height of the broiler head, and the dust level should be kept to a minimum through constant supply of fresh air and thorough ventilation and improving floor surfaces.

If an automatic ventilation system is used, an appropriate backup power source (emergency generator) and an alarm system should be provided.

[Actions recommended for future implementation]

None

3. Lighting

The poultry house should be provided with appropriate lighting equipment as necessary to ensure that the light is bright enough for broilers to perform natural

behaviors such as feed and water intake. It is also necessary to ensure that the brightness is even enough for managers and handlers to observe and manage the condition of broilers and check the operation of management equipment.

In light management, it is necessary to ensure that the light irradiates evenly. Setting dark periods are beneficial for preventing panic in the event of sudden power outages, and is also effective in improving feed efficiency and growth rates.

[Actions recommended for implementation]

Appropriate lighting equipment should be installed to enable broilers to perform natural behaviors such as intake of feed and water, and managers or handlers to perform daily work without hindrance.

In light management, there should be an adequate period of continuous light in the poultry house. The light intensity during the light period should be sufficient and homogeneously distributed to allow broilers to find feed and water, promote normal development, and to stimulate activity, as well as to enable managers and handlers to perform adequate inspections. When there are light and dark areas in the poultry house due to lighting or natural light, it may cause crowding of broilers in one place or feather pecking. Therefore, attention should be paid to the location and intensity of the lighting.

When light management is performed, there should be a period for gradual adjustment to lighting changes so that broilers do not become startled when lights are turned off and on suddenly.

There should also be an adequate period of continuous darkness during each 24-hour period to reduce stress, allow the broilers to rest and sleep, and to promote normal behaviors, gait and good leg health.

[Actions recommended for future implementation]

None

4. Noise

Excessive or sudden noise may surprise broilers, causing accidents such as bone fractures and piling deaths. Furthermore, broilers may feel anxious or fearful and may not be able to rest or sleep normally, resulting in stress. Where possible, poultry houses should be placed taking into account the surrounding noise sources.

[Actions recommended for implementation]

Ventilation fans, feeding machinery, and other indoor or outdoor equipment should be constructed, placed, operated, and maintained in such a way as to cause the least possible amount of noise.

Exposure of broilers to unfamiliar, sudden, and unexpected loud noises, including those made by humans, should, where possible, be minimized to prevent stress and fear reactions such as piling.

The location of farms should, where possible, take into account existing local sources of noise.

Strategies should be implemented to acclimatize broilers to the conditions.

[Actions recommended for future implementation]

None

Section 6. Confirmation of the situation related to animal welfare

1. Confirmation of animal welfare status

It is important to confirm and record the current management status of broilers in order to address the concept of animal welfare appropriately.

Checking broilers for injuries (bruises, fractured or damaged wings, etc.), contact dermatitis, breast blisters, or other conditions at poultry slaughterhouses, etc. is also useful for confirming the animal welfare status.

2. Inspection and management of equipment

If automated equipment for feeding, watering, ventilation, etc. is installed, its failure could negatively affect the health of broilers and the rearing environment. Therefore, such equipment should be appropriately maintained and managed.

[Actions recommended for implementation]

All facilities should be constructed, maintained, and managed to minimize the risk to the welfare of broilers.

The equipment should also be inspected at least once a day to ensure proper operation, considering the frequency recommended by the equipment manufacturers. If a fault is found, it should be repaired promptly.

[Actions recommended for future implementation]

None

3. Emergency response

Outages of the electricity, water, and feed supply systems may compromise animal welfare. Therefore, to respond to emergencies such as fires on the farm and natural disasters accompanied by flooding, power outages, water outages, and feed supply disruptions due to road conditions, as well as to prevent adverse effects on the health of broilers and their rearing environment, each farm should take measures such as obtaining contact information of main service providers, considering stockpile of feed and fuel as well as water intake methods, and installing their own power generators and alternative systems to operate ventilation, feeding and other equipment.

[Actions recommended for implementation]

To address the failure of electricity, water, and feed supply systems, as well as to minimize and mitigate the consequences of natural disasters (e.g., earthquakes, fires, droughts, floods, blizzards, typhoons, and high temperature stress), managers and handlers should have emergency plans or crisis management manuals, including evacuation plans, as a preventive measure to prepare for hypothetical scenarios, rather than to deal with the consequences of the disaster. In addition to familiarizing themselves with these documents, they should also share them with all the relevant parties. The emergency plan, crisis management manual or other document should be consistent with farm animal hygiene measures of national and prefectural Veterinary Services, and include matters related to the following: euthanasia procedures for sick

or injured broilers; evacuation procedures; installation, maintenance and testing of backup generators and fail-safe alarm devices to detect malfunctions; access to maintenance providers; alternative heating or cooling arrangements; ability to store water on farm; access to water cartage services; adequate on-farm storage of feed and alternative feed supplies; a plan for managing ventilation emergencies; and farm-wide management in the event of emergency disease outbreaks.

In case of feed shortage due to drought or other reasons, managers and handlers should take measures to minimize the reduction period of feed supply and to mitigate the risk of damage to the health and welfare of broilers. The measures, including consideration of reducing the number of broilers, should be carried out as soon as possible.

When reducing the number of broilers to prevent starvation, methods such as relocation, sale, slaughter and euthanasia should be taken.

Backup systems such as alarms and generators should be inspected periodically, considering the frequency recommended by the equipment manufacturers.

If there is a risk of damage to broilers or poultry houses as a result of natural disasters, preventive measures should be taken in advance whenever possible. Among the advance measures, the evacuation plans should include feasible actions, such as moving broilers to lower-risk areas on the farm site. In addition, measures to prevent the spread of damage should be implemented after the weather conditions have recovered.

[Actions recommended for future implementation]

None

Section 7. Criteria or measurables of the welfare of broilers

The welfare of broilers should be assessed using outcome-based criteria or measurables, preferably animal-based measurables. Outcome-based criteria or measurables are particularly useful for evaluating compliance and improving animal welfare. Animal-based outcomes are usually the most sensitive measurables.

Some criteria can be measured in the farm setting, such as gait, mortality and morbidity rates, while others are best measured at the slaughterhouse. For example, at slaughter flocks can be assessed for the presence of bruising, broken limbs, visceral diseases, and other injuries. The age of these lesions can help to determine the source. Back scratching, contact dermatitis, and breast blisters are also easily observed at the slaughterhouse. Other conditions such as ascites, leg deformities, dehydration and disease conditions can also be assessed at slaughter. It is recommended that values for welfare measurables be determined with reference to appropriate national, sectoral or regional norms for commercial broiler production.

The following outcome-based criteria or measurables can be useful indicators of the welfare of broilers.

[Actions recommended for implementation]

The welfare of broilers should be assessed using outcome-based measurables, preferably animal-based measurables.

The use of measurables and the appropriate thresholds should be adapted to the different production systems and situations in which broilers are kept, also taking into account the genetics of the breed and strain of the broilers concerned, resources provided, and the design and management of the system.

1. Mortality, culling, and morbidity rates

Daily, weekly, and cumulative mortality, culling, and morbidity rates should be within expected ranges. Any unforeseen increase in these rates may reflect an animal welfare problem.

2. Gait

Broilers are susceptible to developing a variety of infectious and non-infectious musculoskeletal disorders. These disorders may lead to lameness and gait abnormalities. Broilers that are lame or have gait abnormalities may have difficulty reaching the food and water, may be trampled by other broilers, and may experience pain. Musculoskeletal problems have many causes, including genetics, nutrition, sanitation, lighting, litter quality, and other environmental and management factors. There are several gait scoring systems available.

3. Contact dermatitis

Contact dermatitis affects skin surfaces that have prolonged contact with wet litter or other wet flooring surfaces. The condition is manifested as blackened skin progressing to erosions and fibrosis on the lower surface of the foot pad, at the back of the hocks, and sometimes in the breast area. If severe, the foot and hock lesions may contribute

to lameness and lead to secondary infections. Validated scoring systems for contact dermatitis have been developed for use in poultry slaughterhouses.

4. Feather condition

Evaluation of feather condition provides useful information about aspects of animal welfare. Plumage dirtiness is correlated with contact dermatitis and lameness for individual broilers or may be associated with the environment and production system. Plumage dirtiness can be assessed as part of on-farm inspections, at the time of catching or prior to plucking. A scoring system has been developed for this purpose.

5. Incidence of diseases, including infectious, parasitic infestations, and metabolic disorders

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

6. Behavior

(1) Fear behavior

Fearful broilers show avoidance of humans, and this behavior is seen in flocks where managers or handlers walk through the poultry house quickly when performing their tasks rather than moving more slowly while interacting with the broilers. Fearfulness (e.g., of sudden loud noises) can also lead to the broilers piling on top of, and even suffocating, one another. Fearful broilers may be less productive. Validated methods have been developed for evaluating fearfulness.

(2) Spatial distribution

Changes in the spatial distribution (e.g. huddling) of broilers may indicate thermal discomfort or the existence of areas of wet litter or uneven provision of light, food or water.

(3) Panting and wings spreading

Excessive panting and wings spreading indicates heat stress or poor air quality, such as high levels of ammonia.

(4) Dust bathing

Dust bathing is an intricate body maintenance behavior. During dust bathing, broilers work loose material, such as litter, through their feathers. Dust bathing helps remove stale lipids, which contributes to the maintenance of plumage. Good plumage condition helps to maintain body temperature and protect against skin injury. Reduced dust bathing behavior may indicate problems with litter or range quality, such as litter or ground being wet or not friable.

(5) Feeding, drinking, and foraging

Reduced feeding or drinking behavior can indicate management problems, including inadequate feeder or drinker spaces or placement, dietary imbalance, poor

feed and water quality, or feed contamination. Feeding and drinking behavior are often depressed when broilers are ill, and intake may also reduce during periods of heat stress and increased during cold stress. Foraging is the act of searching for food, typically by walking and pecking or scratching the litter substrate. Reduced foraging activity could suggest problems with litter quality or presence of conditions that decrease movement of broilers.

(6) Feather pecking and cannibalism

Feather pecking can result in significant feather loss and may lead to cannibalism. Cannibalism is the tearing of the flesh of another bird and can result in severe injury. These abnormal behaviors have multi-factorial causes.

7. Water and feed consumption

Monitoring daily water consumption is a useful tool to indicate disease and other welfare conditions, taking into consideration ambient temperature, relative humidity, feed consumption, and other relevant factors. Problems with the water supply can result in wet litter, diarrhea, dermatitis or dehydration.

Changes in feed consumption can indicate unsuitability of feed, the presence of disease or other welfare problems.

8. Performance

(1) Growth rate

An index that indicates the average daily gain of weight per average broiler of a flock.

(2) Feed conversion

An index that measures the quantity of feed consumed by a flock relative to the total live weight shipped, expressed as the weight of feed required to produce one kilogram of broiler body weight.

(3) Liveability

An index that indicates the percentage of broilers present at the end of the production period. This indicator is more commonly measured as its opposite, mortality.

9. Injury rate

The rate of these injuries can indicate welfare problems in the flock during rearing or catching. Injuries include those due to other broilers (scratches, feather loss or wounding due to feather pecking and cannibalism), and those due to environmental conditions, such as skin lesions (e.g. contact dermatitis) and those due to human intervention, such as catching. The most prevalent injuries seen during catching are bruises, broken limbs, dislocated hips, and damaged wings.

10. Eye condition

Conjunctivitis can indicate disease or the presence of irritants such as dust and ammonia. High ammonia levels can also cause corneal burns and eventual blindness. Abnormal eye development can be associated with low light intensity (< 5 lux).

11. Vocalization

Vocalization can indicate emotional states, both positive and negative.
Interpretation of flock vocalizations is possible by experienced manager and handlers.