



EURCAW-Poultry-SFA Roadshow 27.05.2026



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Agenda

1

Welcome and introduction to EURCAW

9.30–9.45

2

Introduction to the legal framework

9:45–10:00

3

Ethology and welfare of turkeys

10:00–10:30



4

EURCAW-Poultry-SFA activities related to turkeys: on farm

11:00–11:45

5

EURCAW-Poultry-SFA activities related to turkeys: at the slaughterhouse

11:45–12:30

6

Key points from the EFSA report on turkeys

12:30–13:00



7

Case studies

15:00–17:00

Introduction to EURCAW-Poultry-SFA

Antonio Velarde– EURCAW-Poultry-SFA



EU Reference Centers for Animal Welfare

Art. 95 of **'The Official Controls Regulation'**:
"The Commission shall, by means of implementing acts, designate European Union reference centers for animal welfare that shall support the activities of the Commission and of the Member States"



Since October 2018



Since February 2020



Since June 2021



Since May 2024

Main role:

→ to assist the NCAs in performing better official controls and enforce EU animal welfare rules.

→ to provide scientific information on:

- On-farm welfare: e.g. Directive 95/58/EC
- Animal transport: Council Regulation (EC) No 1/2005
- Protection of animals at the time of killing:
Council Regulation (EC) No 1099/2009



Target groups:

- Competent Authorities, Policy Workers and their 'support bodies': science, training, communication

This means we cannot formally respond to questions from farmers, NGO's or other stakeholders in the livestock production chain.



5 activities (= 5 Work Packages (WP))

1. COORDINATED ASSISTANCE (WP1)
2. ANIMAL WELFARE INDICATORS (WP2)
3. SCIENTIFIC AND TECHNICAL STUDIES (WP3)
4. TRAINING COURSES (WP4)
5. DISSEMINATING RESEARCH AND INNOVATIONS (WP5)



EURCAW-Poultry-SFA has 5 Priority areas

1. Broiler chickens on farm
2. Laying hens in alternative housing systems
3. Consciousness and welfare during stunning and killing process at slaughter and on farm
4. Rabbits on farm, with a focus on alternative housing systems
5. Turkeys on farm



EURCAW-Poultry-SFA team

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What the Centre can/can't do




The Centre is



The Centre is not

 To **assist** EU Commission and MSs

To be questioned by other institutions

 Able to **deliver** scientific and technical advice

To do risk assessment

 To **help implementation** of legislation

To interpret legislation

What we do?

Production of:

- Indicators, Thematic and Good Practices Factsheets,
- Report about experimental/technical studies,
- Reviews,
- Webinars/workshops on dedicated thematics
- Knowledge pills
- Q2E infographics based on Q2E answers
- Newsletters and news items
- Videos
- Translation of Factsheets into 6 languages





The EURCAW-Poultry-SFA LinkedIn account :
<https://www.linkedin.com/company/eurcaw-poultry-sfa>



Newsletters → Sign-up!!

<https://sitesv2.anses.fr/en/minisite/sfawc/subscribe-eurcaw-poultry-sfas-newsletter>

Latest issue: <https://zenodo.org/records/19001874>





Factsheets are translated into 6 languages:
DE, ES, FR, IT, PL, NL (thanks to the Flemish AW NRC)



The **scientific overview** page permits to download a list of all the outputs produced by the Centre since its creation, by topics: slaughter and killing, broiler chicken, laying hen, turkey, rabbit. This page is updated regularly.

EUROPEAN UNION REFERENCE CENTRE FOR ANIMAL WELFARE FOR POULTRY AND OTHER SMALL FARMED ANIMALS



Identify 

HOME SERVICES **OUTPUT** TOPICS TRAINING GOOD PRACTICES TRANSLATION KNOWLEDGE BASE NEWS ABOUT EXTERNAL LINKS ROADSHOWS

Scientific output overview
Factsheets

SCIENTIFIC OUTPUT OVERVIEW


Search a document

Title :



SEARCH

Summary Deliverables - Slaughter and killing

Document Links, Published on 04/01/2025

 **DOWNLOAD**

POULTRY RABBIT



Dissemination:

Our new video is online : *Focus on turkey output on farm, during transport and at the time of killing*

Take a look here: <https://youtu.be/SfOf1J7R9IM>

Slide show with links is available [here](#)



On farm

Reviews Factsheets

- Injurious pecking in turkeys
- On-farm assessment of footpad dermatitis in turkeys
- Environmental enrichment and winter garden in a turkey barn
- Use of sick pens in turkey farming

EURCAW Poultry SFA



Focus on turkey output

On farm, during transport and at the time of killing

EURCAW Poultry SFA



Knowledge pill



<https://www.youtube.com/watch?v=cRzrWv29CcQ>



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REGULATORY FRAMEWORK PROTECTION OF TURKEYS ON FARM IN SPAIN

Animal welfare · European and Spanish legislation · Technical requirements



EUROPEAN REGULATORY FRAMEWORK

DIRECTIVE 98/58/EC*Welfare of farm animals*

- General protection of all animals reared for production.
- Requires that physiological and ethological needs be met.
- Basis for the inspection and control system on farms.

REG. 1/2005*Transport of live animals*

- Minimum space, ventilation and water during transport.
- Time limits
- Certification of authorised drivers and vehicles.
- Mandatory veterinary checks at origin and destination.

REG. 1099/2009*Protection at slaughter*

- Stunning methods and controls
- Standard operating procedures
- Restraint and stunning equipment
- Guides to good practice
- Requirements for slaughterhouses, emergency slaughter and depopulation
- Competent authority

Regulation 2017/625*Official control of the food chain*

- Lays down rules on animal welfare requirements



NATIONAL REGULATORY FRAMEWORK

LAW 32/2007*Care of animals, in their rearing, transport, experimentation and slaughter*

- Classified infringements: Minor infringements (up to €3,000), serious infringements (up to €60,000) or very serious infringements (up to €600,000).

ROYAL DECREE 348/2000*Protection of animals on livestock farms.*

- General requirements for on-farm implementation
- No specific requirements for turkeys

ROYAL DECREE 637/2021*Regulation of poultry farms.*

- Staff training: All persons working with the birds must have a minimum of 20 hours' training

ROYAL DECREE 695/2022*Monitoring of animal welfare through video surveillance systems*

- Requirements applicable to slaughterhouses.
- No specific requirements for turkeys

ROYAL DECREE 37/2014*Protection of animals at the time of slaughter*

- General requirements for on-farm operations.
- No specific requirements for turkeys





Minimum welfare standards applicable to all livestock farms

Staff	A sufficient number of staff with the necessary skills, knowledge and professional competence.
Inspections and checks	At least one daily inspection at farms dependent on human care. Fixed or mobile lighting available. Immediate veterinary care in the event of illness or injury. Isolation of sick animals.
Documentary evidence	Records of medical treatments and animals culled following inspection. Minimum retention period: 3 years. Available to the competent authority of the AC.
Freedom of movement	Restrictions causing unnecessary suffering or harm are prohibited. If tethered or chained: adequate space is mandatory.
Buildings and stables	Non-harmful materials that can be washed and disinfected. No sharp edges or protrusions. Control of air, dust, temperature, humidity and gases. Adequate natural or artificial lighting.
Outdoor animals	Protection against inclement weather, predators and disease risks.
Automatic and mechanical equipment	Mandatory daily inspection. Immediate rectification of faults. Emergency system if ventilation is artificial. Fault alarm with regular testing.
Feed, water and substances	Healthy feed, appropriate for age and species, in sufficient quantities. Access to good-quality water at all times. Equipment designed to prevent contamination. Only authorised therapeutic, prophylactic or zootechnical substances.
Mutilations	General prohibition of procedures causing suffering, with the possibility of authorised exceptions.
Breeding procedures	Natural or artificial procedures causing suffering or serious injury are prohibited. Those causing momentary or minor harm are permitted if authorised. Only animals with a genotype and phenotype suitable for farming.



Minimum welfare conditions during transport.

I. GENERAL CONDITIONS

General principle	No one may transport animals in a manner that may cause them injury or suffering.
Fitness for transport	Only animals fit for the journey may be transported.

II. DOCUMENTATION AND AUTHORISATION

Authorisation of the carrier	Mandatory for all transporters.
Certificate of competence	Drivers and attendants of vehicles transporting poultry must hold a certificate of competence issued by the AC

III. MEANS OF TRANSPORT AND CONTAINERS

Conditions of the means of transport	Vehicles and containers must: be clean and disinfected; be constructed of non-harmful materials, with no sharp edges; have a non-slip floor; display a visible sign indicating live animals; have adequate ventilation systems; allow access to the animals for inspection.
Ventilation and temperature	Ventilation systems must maintain a temperature between 5 °C and 30 °C (± 5 °C tolerance) inside the vehicle. For long journeys: adjustable system, temperature control and an alarm if the temperature exceeds the limits.
Containers for birds	Containers must allow birds to adopt a natural posture. They must be clean, dry and have absorbent material (litter) on the floor. Birds of different sizes must not be mixed in the same container.



Minimum welfare conditions during transport.

IV. LOADING DENSITIES — Minimum floor area per animal in a container

Turkeys (usually >5 kg)	105 cm ² / kg. These figures may vary depending on physical condition, weather conditions and journey duration. The minimum of 105 cm ² /kg applies.
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V. STAFF AND HANDLING

Staff training	All staff handling animals during transport must have received accredited training
Treatment and handling	Prohibited: hitting, kicking, compressing limbs. Birds must not be loaded or unloaded vertically.
Accompanying attendant	One attendant is mandatory per consignment, unless transport is carried out in secured, adequately ventilated containers with water and feed for twice the expected journey time, or if the driver acts as the attendant.

VI. FEED, WATER AND REST

Water and feed	Animals must have access to water and feed at intervals appropriate to their species. For birds, a water supply must be provided in the container if the journey duration so requires. The minimum amount of water may be equivalent to 10% of the animal's live weight.
Journey times and rest periods	For poultry (including turkeys): maximum journey time not expressly set in specific hours by Regulation 1/2005 (unlike for mammals). The duration must be minimised and welfare conditions guaranteed at all times.



Minimum welfare conditions during slaughter.

GENERAL REQUIREMENTS

Scope	Includes turkey production for food + slaughter, fallow period + related operations (NOT scientific experiments, private domestic poultry, etc.)
General principle	During slaughter or related operations, no avoidable pain, distress or suffering shall be caused to the animals.

STUNNING METHODS (ANNEX I) - Examples applicable to turkeys

Mechanical	Penetrating captive bolt pistol, cervical dislocation, blunt force to the head
Electrical	Electric water bath
Controlled atmosphere	Carbon dioxide methods, inert gases, carbon monoxide methods
Others	Lethal injection

RESPONSIBILITIES OF FOOD BUSINESS OPERATORS

Stunning checks	They shall ensure that those responsible for stunning or other designated staff carry out regular checks to ensure that the animals show no signs of consciousness or sensibility in the period between the end of the stunning process and death.
SOPs	They shall plan the slaughter of animals and related operations in advance and carry them out in accordance with standard operating procedures.
Level and certificate of competence	Slaughter and related operations must be carried out only by persons with the appropriate level of competence for that purpose, without causing the animals avoidable pain, distress or suffering.
Restraint and stunning equipment	may only be sold when accompanied by appropriate instructions for use. Their maintenance and verification, in accordance with the manufacturers' instructions, must be carried out by persons specifically trained for that purpose.



Minimum welfare conditions during slaughter.

GUIDELINES FOR GOOD PRACTICE

Member States	They shall promote the development and dissemination
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ADDITIONAL

Additional requirements for slaughterhouses	Design, construction and equipment; restraint and stunning operations; supervision procedures; animal welfare officer
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Culling and emergency slaughter	The keeper of the affected animals shall take all necessary measures to carry out the slaughter as soon as possible, avoiding unnecessary suffering.
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COMPETENT AUTHORITY

Scientific support	Each Member State shall ensure that the competent authorities have access to sufficient and independent scientific assistance, upon request
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Certificate of competence	MS = responsible for designating the competent authority for: training courses, certificates of competence following examination, approving training programmes (delegation)
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THANK YOU





Ethology and welfare in turkeys



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Introduction

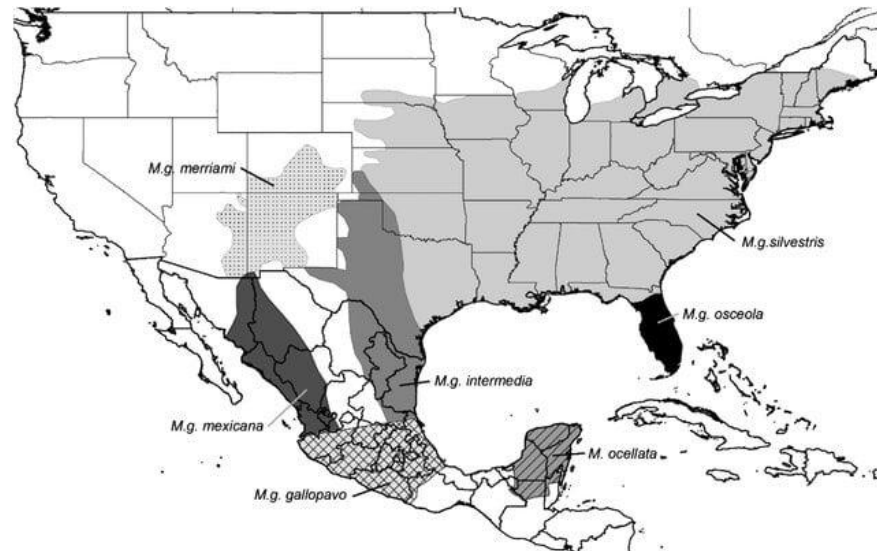




Ancestor: *Meleagris gallopavo gallopavo*

Domestication: ~2,500 years

Sexual dimorphism: weight { Male weight: 5–11 kg (7–8 months)
Female weight: 2.5–5.5 kg



Source: Thornton, EK (2016)



Polygamists

Courtship March–April

Cooperative courtship (leks)

Females still in winter territories

Social groups vary according to the season



Meleagris gallopavo domesticus

Selection for meat quality and quantity

Rapid growth

Commercial breeds, mostly white-feathered





Physiological factors





Light perception

Wide field of view

Partial binocular vision

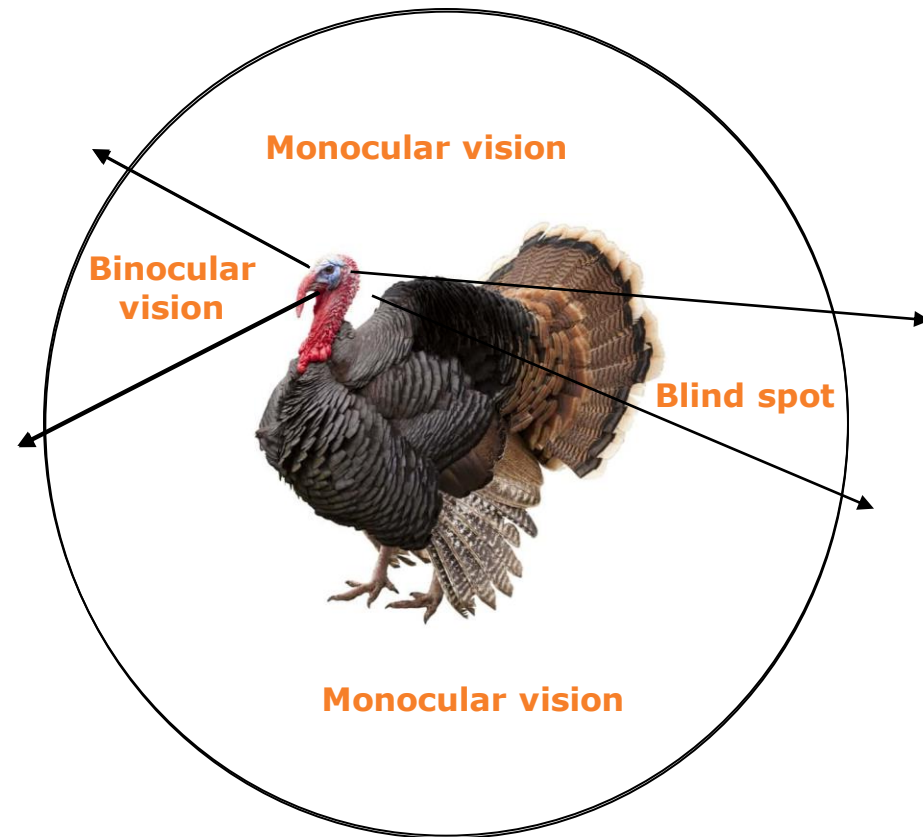
→ Poorer perception of depth and distance (light/dark contrasts)

→ Uniform lighting

Blink fusion frequency

→ stress, aggression, social tension

→ Reduction in certain behaviours



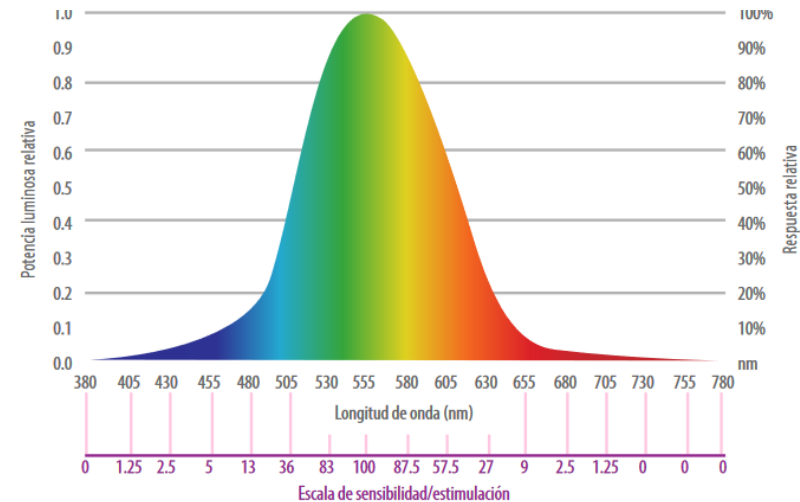
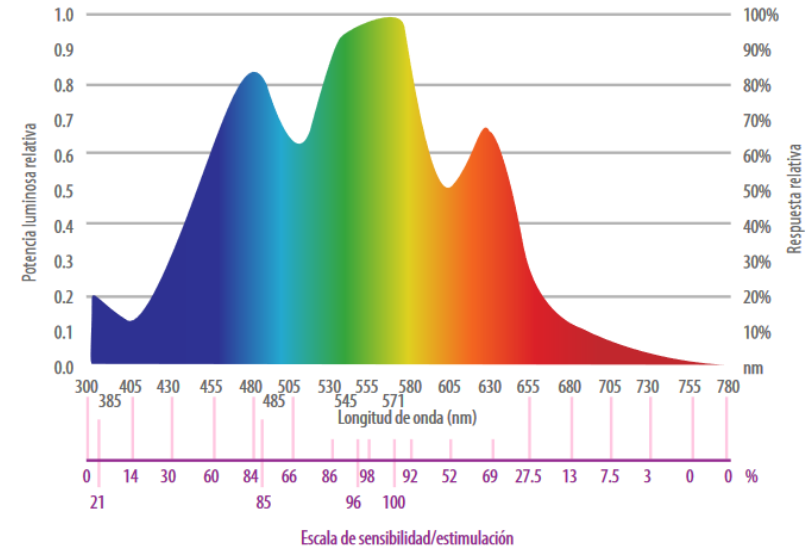


Perception of light

They can see part of the ultraviolet spectrum that is not visible

- > Colour vision
- > Sensitivity to \neq colours
- > Visual acuity

Soothing blue light



Delgado (2016), for hens



Perception of light

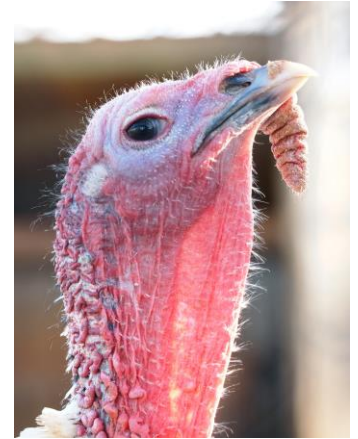
Light intensity – **rearing**

Lux: human perception

>10 lux (CoE) / >20 lux (Denmark)

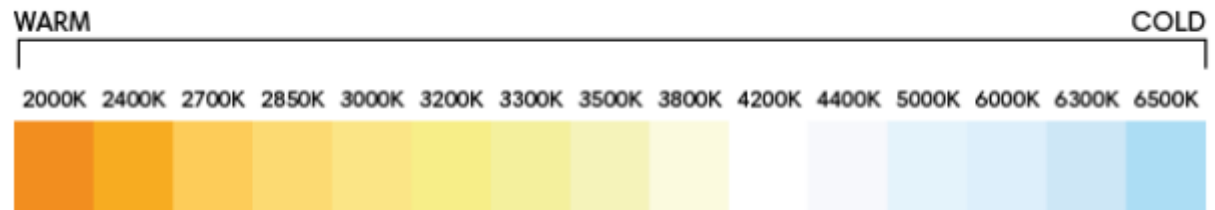
Excessive intensity / Areas of high light intensity

Areas of varying intensity for different activities



6500K (vs 3000K)

8 hours of darkness





Consequences for well-being



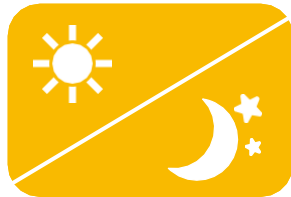
- ❖ Group stress
- ❖ Soft tissue injuries and damage to the integument
- ❖ Resting problems
- ❖ Locomotor disorders (including lameness)
- ❖ Eye disorders
- ❖ Sensory under-stimulation and/or over-stimulation



Identified risks



Light intensity
too low



Photoperiod



Flickering



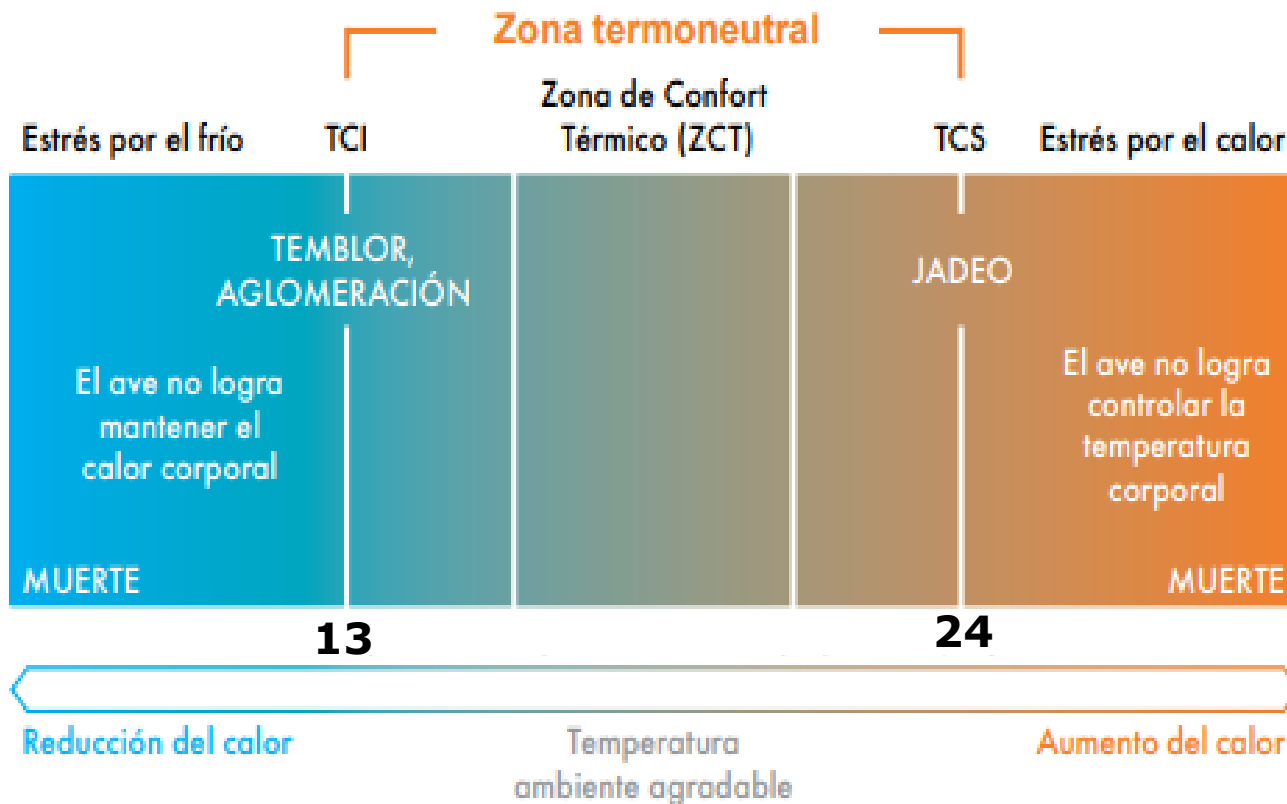
Absence of UV
rays



Light intensity
too high



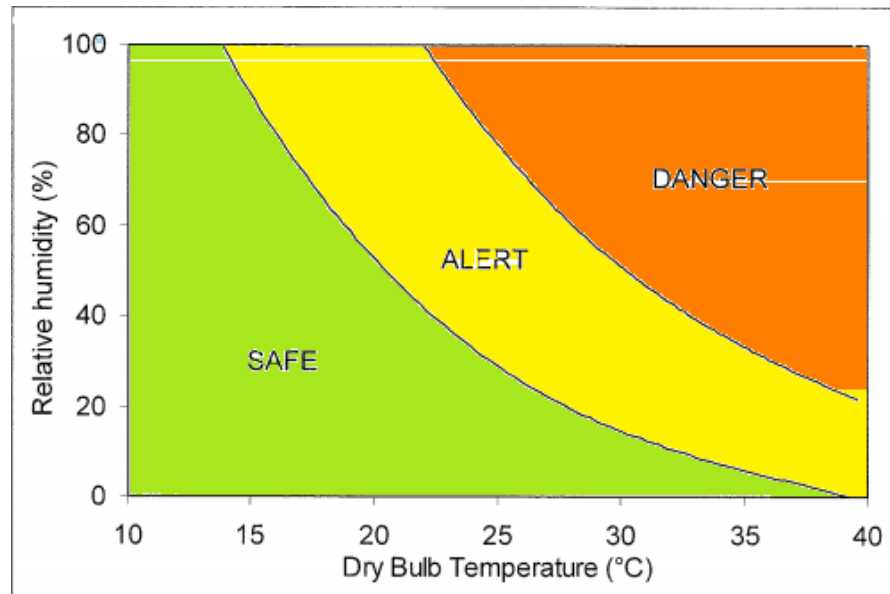
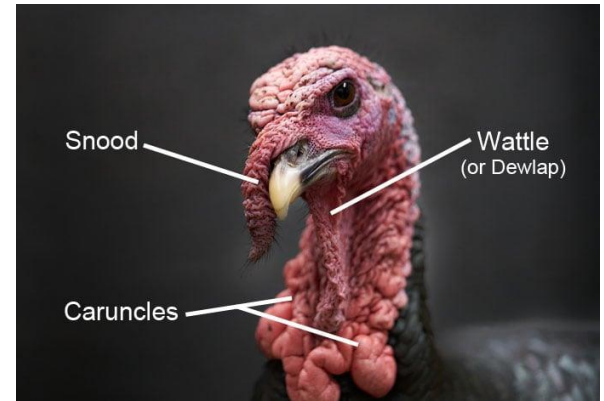
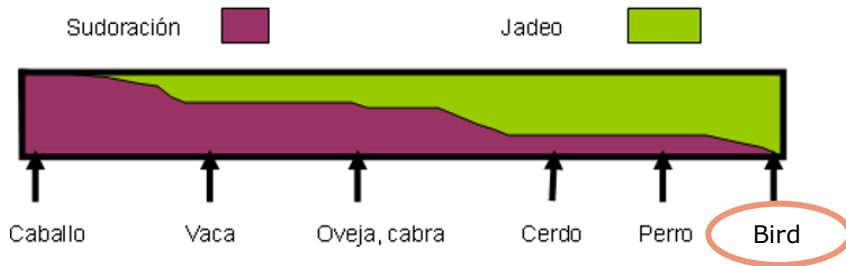
Thermal comfort



Source: Adapted from World Animal Protection, 2015



Thermal comfort

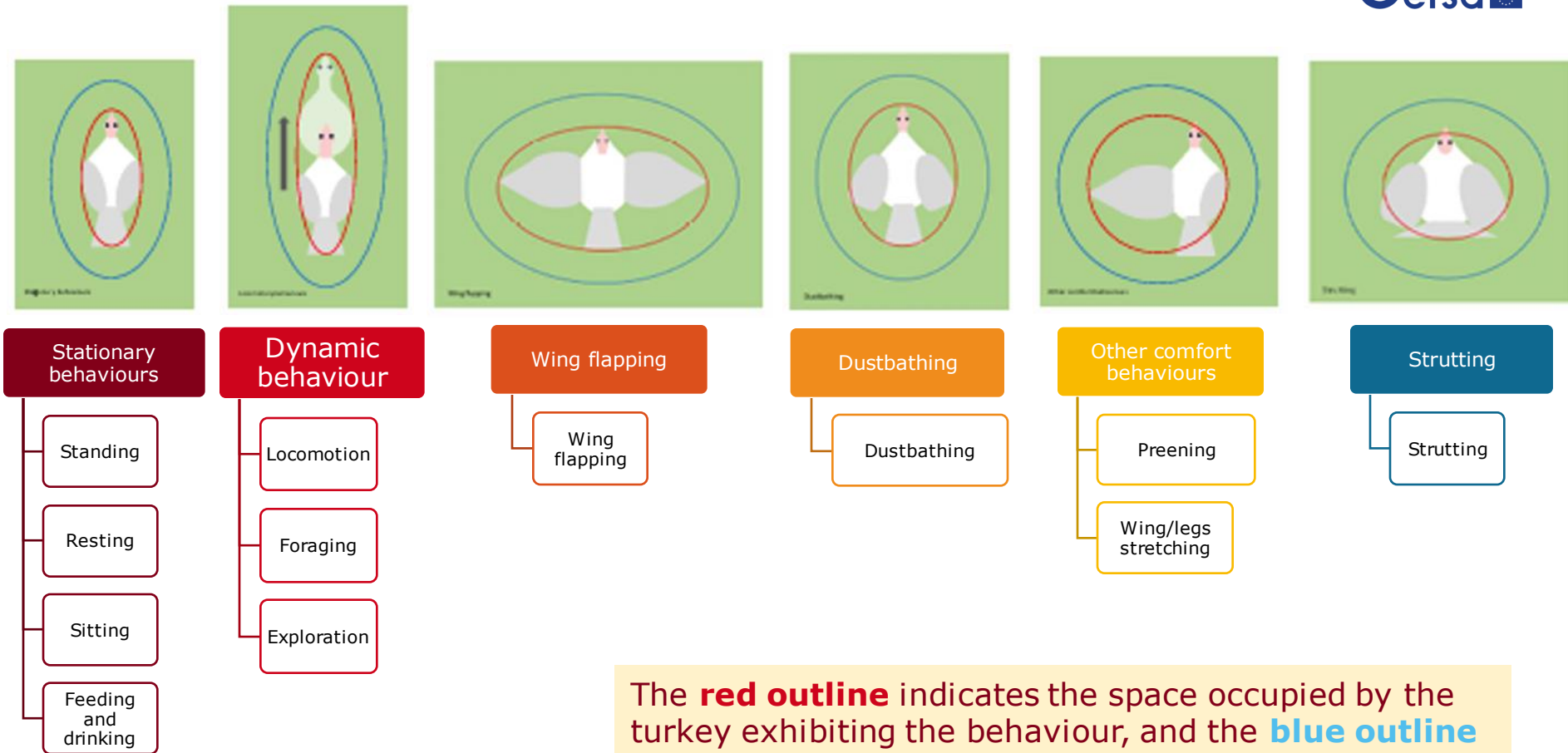




Ethological factors



Typical ethogram



The **red outline** indicates the space occupied by the turkey exhibiting the behaviour, and the **blue outline** indicates the space occupied taking into account the inter-individual distance between the turkeys.



Exploratory behaviour (*foraging*)

Behaviour of **pecking** (and scratching) the ground in search of food.

Wild turkeys: 50% of their waking hours



Comfort behaviours:

- **Feather preening**
- **Dustbathing**



Good plumage condition,
parasite control, removal of
excess lipids



Bedding quality

- Exploratory behaviour
- Dustbathing

Hazards

- ❖ Excessive moisture in the bedding
- ❖ Insufficient bedding
- ❖ Inappropriate type of bedding and flooring
- ❖ Inadequate bedding management



Consequences for welfare

- ❖ Difficulty resting
- ❖ Inability to engage in comfort-seeking behaviours
- ❖ Inability to engage in exploratory and foraging behaviour
- ❖ Cold stress
- ❖ Locomotor disorders (including lameness)
- ❖ Soft tissue injuries and damage to the integument
- ❖ Respiratory disorders





Comfort behaviours:

- **Wing flapping**
- **Stretching of wings/legs**



Wing flapping for other reasons:

Aggression or alertness
Playful behaviour





Other positive behaviours

- **Play**
- **Mutual preening**
- **Slight pecking (social)**



Strutting

- Courtship
- Threats
- Begins at 3–4 weeks of age and increases with sexual maturity



Environmental enrichment





Objectives

- Preventing or reducing abnormal behaviours and improving physical health
- Reduce negative emotional states and increase positive emotional states and use of the environment
- Increase animals' ability to cope with challenges
- Increase the frequency and types of species-specific behaviour



All categories of turkeys are motivated to use foraging and exploration materials, dust baths and visual barriers.

Broiler and breeding turkeys are motivated to use elevated structures and complex enriched environments, with or without a covered veranda or outdoor space.



Exploration materials



Plastic bottle



Ropes

©ANSES



Materials for exploration



Pecking stone



©ANSES

Plastic bottles



Materials for exploration



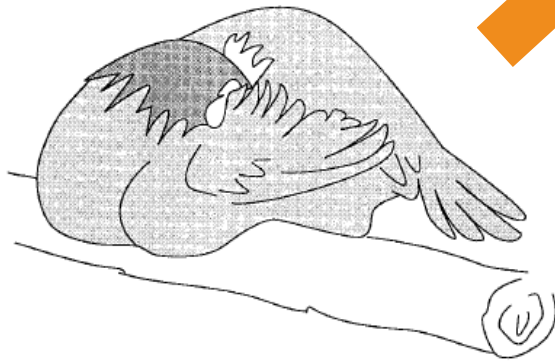
©ANSES



Straw bale

Resting behaviour: perching

- Easily accessible to elevated platforms



Resting behaviour: perching



©ANSES



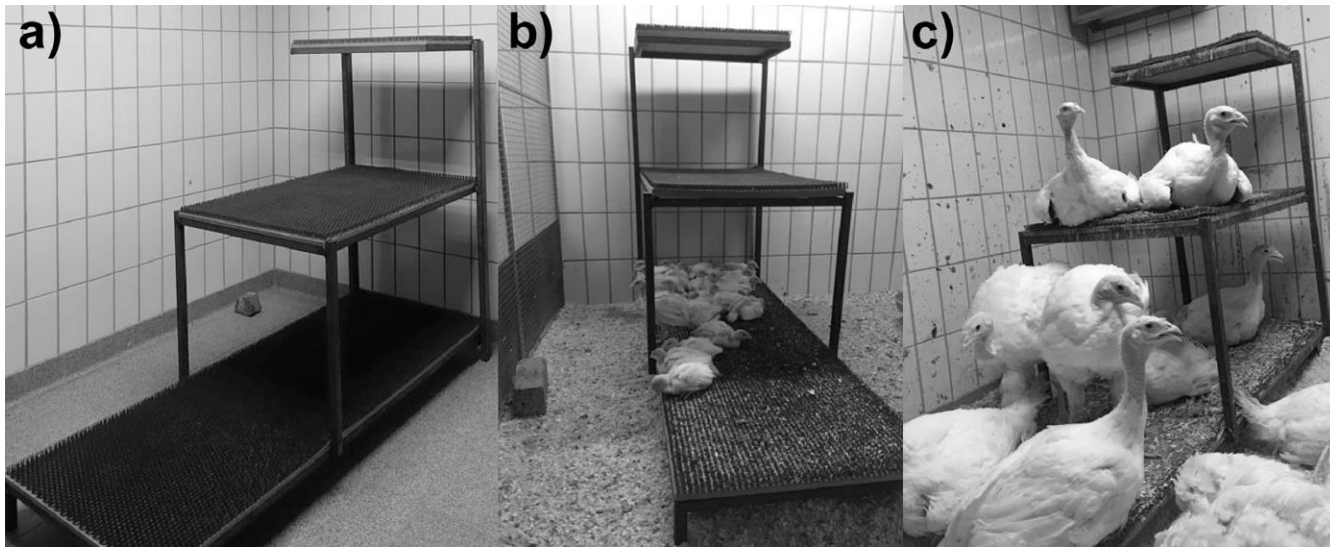
©EFSA

Elevated platform



Visual barriers

- Additional wall space: resting
- Hiding places or shelters



Source: Lindenwald et al, 2021



Covered veranda

- Fresh air / outdoor climate
- Space and enrichment
- Different ground surfaces – exploratory behaviour / dustbathing



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EURCAW-Poultry-SFA activities related to turkeys: on farm



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Reviews

2022

2023

2024

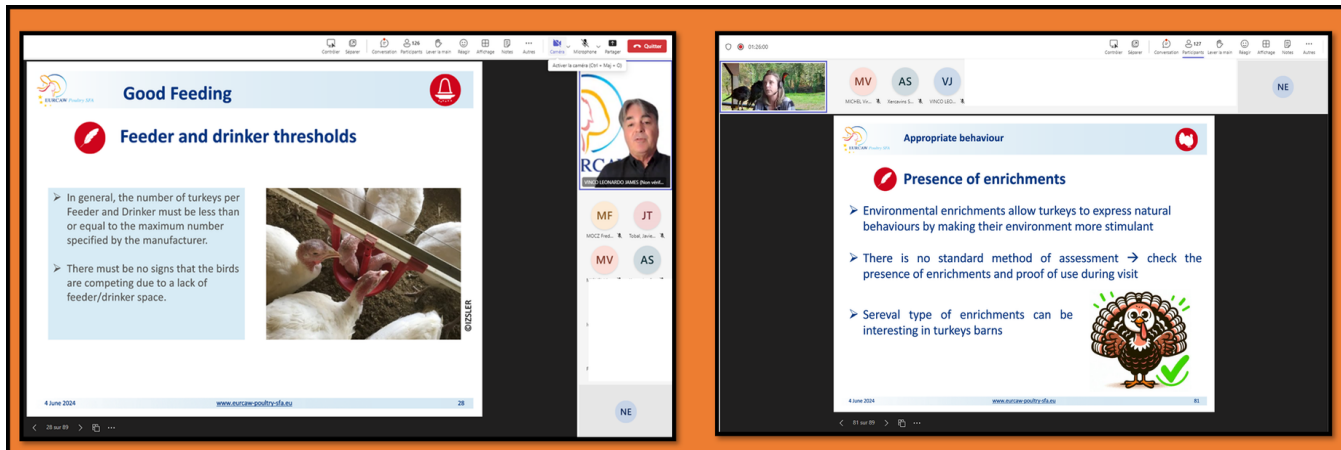
- **List of welfare indicators for assessing the welfare of turkeys on farms**
- **Training report: Review of existing training** for the assessment of turkey welfare on farms
- **Description of the main rearing systems used in turkey production in the EU**
- **Guidelines for assessing the welfare of turkeys on farms using relevant welfare indicators to assess compliance with requirements laid down in Directive 98/58 EC**



Reviews

Training

- **Webinar: Key welfare indicators and assessment methods for turkeys on farms (2024)**



Good Feeding

Feeder and drinker thresholds

- In general, the number of turkeys per Feeder and Drinker must be less than or equal to the maximum number specified by the manufacturer.
- There must be no signs that the birds are competing due to a lack of feeder/drinker space.

Appropriate behaviour

Presence of enrichments

- Environmental enrichments allow turkeys to express natural behaviours by making their environment more stimulant
- There is no standard method of assessment → check the presence of enrichments and proof of use during visit
- Several type of enrichments can be interesting in turkeys barns



- **Aggressive pecking in turkeys**
- **On-farm assessment of pododermatitis in turkeys**
- **Environmental enrichment and covered veranda for turkeys**
- **Use of hospital pens on turkey farms**



Injurious pecking in turkeys

What is injurious pecking?
It is when a turkey pecks another turkey, which is a social and communicative behavior. It is usually related to the general behavior of the turkey and is not a disease. It is caused by the general behavior of the turkey and is not a disease. It is caused by the general behavior of the turkey and is not a disease.

Causes
There is an specific for pecking turkey. This is caused by the general behavior of the turkey and is not a disease. It is caused by the general behavior of the turkey and is not a disease.

Prevention
There are several factors that can prevent or reduce the risk of injurious pecking. These include: providing a balanced diet, ensuring adequate space, and providing enrichment.

Management
The number of birds housed in a pen is a key factor in the risk of injurious pecking. The number of birds housed in a pen is a key factor in the risk of injurious pecking.



On-farm assessment of footpad dermatitis in turkeys

Definition and risk factors
Footpad dermatitis (FPD) is a painful condition of the plantar surface of the foot. It is caused by the general behavior of the turkey and is not a disease. It is caused by the general behavior of the turkey and is not a disease.

Prevention
There are several factors that can prevent or reduce the risk of FPD. These include: providing a balanced diet, ensuring adequate space, and providing enrichment.

Management
The number of birds housed in a pen is a key factor in the risk of FPD. The number of birds housed in a pen is a key factor in the risk of FPD.



Environmental enrichment and winter garden in a turkey barn

Introduction
The aim of this fact sheet is to provide information on environmental enrichment and winter gardens in turkey barns. It is caused by the general behavior of the turkey and is not a disease.

Environmental enrichment
Environmental enrichment is a key factor in the risk of FPD. It is caused by the general behavior of the turkey and is not a disease.

Winter garden
A winter garden is a covered veranda that provides a natural environment for turkeys. It is caused by the general behavior of the turkey and is not a disease.



Use of sick pens in turkey farming

Introduction
The aim of this fact sheet is to provide information on the use of sick pens in turkey farming. It is caused by the general behavior of the turkey and is not a disease.

Definition
A sick pen is a small enclosure used for isolating and treating sick turkeys. It is caused by the general behavior of the turkey and is not a disease.

Design
The design of a sick pen is a key factor in its effectiveness. It is caused by the general behavior of the turkey and is not a disease.



Welfare Indicators





- Legal requirements of the directive 98/58/EC that apply to turkeys were identified and allocated to four welfare principles:

- **Good Feeding,**
- **Good Housing,**
- **Good Health**
- **Appropriate Behaviour**

COUNCIL DIRECTIVE 98/58/EC

of 20 July 1998

concerning the protection of animals kept for farming purposes

Article 1

1. This Directive lays down minimum standards for the protection of animals bred or kept for farming purposes.

2. It shall not apply to:

(a) animals living in the wild;

(b) animals intended for use in competitions, shows, cultural or sporting events or activities;

(c) experimental or laboratory animals;

(d) any invertebrate animal.

3. This Directive shall apply without prejudice to specific Community rules laid down elsewhere, and in particular to Directives 88/166/EEC (¹), 91/629/EEC (²) and 91/630/EEC (³), which shall continue to apply.



STANDING COMMITTEE OF THE EUROPEAN CONVENTION FOR THE PROTECTION OF ANIMALS KEPT FOR FARMING PURPOSES (T-AP)


RECOMMENDATION CONCERNING TURKEYS (*Meleagris gallopavo ssp.*)

adopted by the Standing Committee on 21 June 2001
(In accordance with Article 9 of the Convention, the Recommendation
will enter into force on 21 December 2001)

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Welfare Indicators

- Resource Based Indicators:
- Management Based Indicators:
- Animal Based Indicators:
 **Transect method**



The Transect Method (TM)

Definition: Visual observation of birds while slowly walking through a barn along longitudinal predetermined bands (transects) of equal width according to the house width recording welfare indicators of any bird affected in the zone of observation (AWIN, 2015; Marchewka et al., 2015).



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- Small size
- Dirtiness
- Featherless
- Head wounds
- Back wounds
- Tail wounds
- Immobility
- Lameness
- Sick
- Agonizing
- Dead



©IZSLER



The Transect Method (TM)

- The inspector walks slowly (one step per second) to prevent disturbing the birds, and records the indicators visually assessed.
- The number of turkeys observed showing the indicator assessed, is then converted into a percentage of the flock.
- Vigilance is required with contiguous transects to avoid double counting the same birds.



©IZSLER

1. Good Feeding



© IZSLER





Legal requirements

Council Directive 98/58 CE, Annex, point 14 *"Animals must be fed a wholesome diet which is appropriate to their age and species, and which is fed to them in sufficient quantity to maintain them in good health and satisfy their nutritional needs. No animal shall be provided with food or liquid in a manner, nor shall such food or liquid contain any substance, which may cause unnecessary suffering or injury."*

Council Directive 98/58 CE, Annex, point 15 *"All animals must have access to feed at intervals appropriate to their physiological needs."*

Council Directive 98/58 CE, Annex, point 16 *"All animals must have access to a suitable water supply or be able to satisfy their fluid intake needs by other means."*

Council Directive 98/58 CE, Annex, point 17 *"Feeding and watering equipment must be designed, constructed and placed so that contamination of food and water and the harmful effects of competition between the animals are minimised."*



Welfare Indicators

Animal Based Indicators:

- Undersized turkeys



Resource Based Indicators:

- Number of turkeys per drinking and feeding points
- State of feeders and drinkers



Management Based Indicators:

- Diet and feeding programme
- Water quality controls





Welfare Indicators

Animal Based Indicators:

- Undersized turkeys

Description of the indicator and method of assessment:

Undersized turkey: visibly smaller than the average around half the size due to inappropriate nutrition and water consumption or the presence of parasites (AWIN, 2015) or other disorders.

Transect method is generally used to assess this indicator.

In literature, the % of undersized birds in flocks is from 0.01 to 0.99% in males and, from 0.008 to 0.72% in females (Ferrante et al., 2019; Hrzenjak et al., 2021).



Leonardo James Vinco
CreNBA



Welfare Indicators

Resource Based Indicators:

- N° of turkeys per drinker/feeder

Description of the indicator and method of assessment:

Count the number of drinkers and feeders then divide the total number of turkeys, in the barn, by the number of drinkers and feeders counted



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Feeder and drinker models



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Feeder thresholds?

	AVIAGEN		HYBRID	
	TOMS	HENS	TOMS	HENS
N° FEEDERS	1	1	1	1
N° TURKEYS	40-60	60-80	40-50	60-70
MIN. SPACE FEEDER	3 cm	2 cm	3,5 cm	2,8 cm



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Drinker thresholds?

	AVIAGEN	HYBRID
N° BELL DRINKER	1	1
N° TURKEY	80-100	90-110
MIN DRINKER SPACE		1,3-1,5 cm
WATER DEPTH	2-2,5 cm	
CUP DRINKER	*	20 toms/25-30 hens

*For other types of drinkers Aviagen suggests to follow the indications provided by the manufacturer



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Feeder and drinker thresholds

- In general, the number of turkeys per Feeder and Drinker **must be less than or equal to the maximum number specified by the manufacturer.**
- There must be no signs that the birds are competing due to a lack of feeder/drinker space.





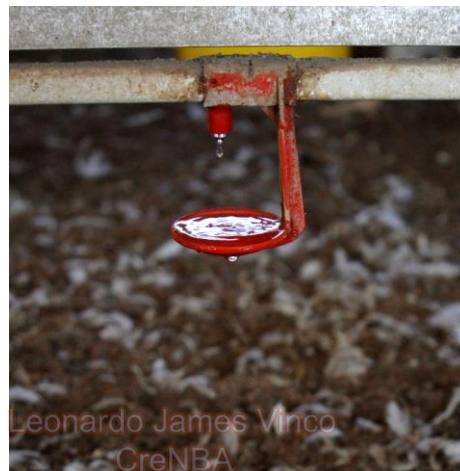
Welfare Indicators

Resource Based Indicators:

- State of feeders and drinkers

Description of the indicator and method of assessment

The state of feeders and drinkers can be checked with 2 parameters: the cleanliness of feeders, and drinkers and the functioning of feeders and drinkers.



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2. Good Housing



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Legal requirements

Council Directive 98/58 CE, Annex, point 4 *"Where necessary sick or injured animals shall be isolated in suitable accommodation with, where appropriate, dry comfortable bedding."*

Recovery pen...

Council Directive 98/58 CE, Annex, point 7 *"The freedom of movement of an animal, having regard to its species and in accordance with established experience and scientific knowledge, must not be restricted in such a way as to cause it unnecessary suffering or injury." Where an animal is continuously or regularly tethered or confined, it must be given the space appropriate to its physiological and ethological needs in accordance with established experience and scientific knowledge.*

Council Directive 98/58 CE, Annex, point 8 *"Materials to be used for the construction of accommodation, and in particular for the construction of pens an equipment with which the animals may come into contact, must not be harmful to the animals and must be capable of being thoroughly cleaned and disinfected."*



Legal requirements

Council Directive 98/58 CE, Annex, point 9 *"Accommodation and fittings for securing animals shall be constructed and maintained so that there are no sharp edges or protrusions likely to cause injury to the animals."*

Council Directive 98/58 CE, Annex, point 10 *"Air circulation, dust levels, temperature, relative air humidity and gas concentrations must be kept within limits which are not harmful to the animals."*

Council Directive 98/58 CE, Annex, point 11 *"Animals kept in buildings must not be kept either in permanent darkness or without an appropriate period of rest from artificial lighting. Where the natural light available is insufficient to meet the physiological and ethological needs of the animals, appropriate artificial lighting must be provided."*

Council Directive 98/58 CE, Annex, point 12 *"Animals not kept in buildings shall where necessary and possible be given protection from adverse weather conditions, predators and risks to their health."*



Welfare Indicators

Animal Based Indicators:

- **Dirtiness of the animals**
- Panting huddling shivering as indicators of thermal stress
- Feather loss



Resource & Management Based Indicators:

- **Stocking density**
- Light intensity and lighting program
- Temperature and humidity
- Noxious gases concentration
- **Litter quality**
- **Dustiness**





On farm assessment of Feather Cleanliness

- The welfare indicator **'feather cleanliness'** involves an **assessment of the plumage** on the breast of chickens, which should be **clean with no patches of dirt**.
- **Feather cleanliness** is mainly linked with **litter quality**.
- **Feather cleanliness** is a good iceberg indicator since it gives a good overview of welfare level (it is correlated with other animal based indicators).
- The **main factors** impacting feather cleanliness is **the quality of the litter (dry and friable)** and possibility to perform **dustbathing** → **good plumage condition**



Welfare Indicators

Animal Based Indicators:

- Dirtiness of the animals



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Welfare Indicators

Animal Based Indicators:

- Dirtiness of the animals



(AWIN, 2015)

Welfare Indicators

Animal Based Indicators:

- Dirtiness of the animals





Welfare Indicators

Resource & Management Based Indicators:

- Stocking density

Stocking density; the amount of space available per animal:

- Kg/m²,
- birds/m²,
- cm²/bird,
- cm²/kg,
- In addition to the kg/m² specifications, it is important to simultaneously regulate the number of animals/m², as the same weight per floor space limitation, results in a greater number of birds in the case of lighter turkeys





Welfare Indicators

Resource Based Indicators:

- Stocking density

Description of the indicator and method of assessment:

The stocking density is assessed by dividing the number of turkeys by the total usable area of the barn, to have the number of birds/m². Then, the kg/m² can be found by multiplying the number of turkeys per square meter by the average weight of turkeys at the moment of the inspection.



2 Good Housing



Country	Farming system	Stocking density (kg/m ²)	Brood and move system	Thinning
Austria	Intensive indoor, organic	40 (intensive indoor), 10 (organic)	Yes	Yes
Belgium	Intensive indoor	40 - 50	Yes	Yes
Bulgaria	Intensive indoor	Unknown	No	No
Cyprus	Intensive indoor	32	No	Yes
Denmark	Intensive indoor	55 (Tom) - 52 (Hen)	Yes	No
Finland	Intensive indoor	57	No	No
France	Intensive indoor, organic	55-60	No	Yes
Germany	Intensive indoor; semi-intensive indoor; covered verandas; organic	58 (Tom) 52 (Hen) - (intensive indoor); 53 (Tom) 48 (Hen) - (semi-intensive); 45 (Tom) 42 (Hen) - (verandas); 25 (organic)	No (in case of 19/24 week cycle) - Yes (in case of 13 week cycle)	No
Great Britain	Intensive indoor; Organic; free range	58 (Tom) 42 (Hen) - (intensive indoor); 25 (organic); 25 (free range)	No	No
Hungary	Intensive indoor	50-60	Yes (65 - 70% of total farms)	No
Italy	Intensive indoor, organic	62 (intensive indoor); 21 (organic)	No	Yes - only in low farm density areas
Netherlands	Intensive indoor, covered verandas, organic	45 (intensive indoor)	No (Hen) - Yes (Tom)	No
Norway	Intensive indoor, organic	44 (Tom), 38 (Hen) - intensive indoor	No	No
Poland	Intensive indoor	55	Yes	Yes
Romania	Intensive indoor	46,5 (Tom); 42,5 (Hen)	Yes	Yes
Spain	Intensive indoor	65	No (mostly) - Yes (2 companies)	Yes (Hen)
Sweden	Intensive indoor	45 (Tom), 40 (Hen)	No (50%) - Yes (50%)	No
Switzerland	Covered verandas	36,5	No (50%) - Yes (50%)	Yes (mostly)



Welfare Indicators

Resource & Management Based Indicators:

- Litter quality



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Welfare Indicators

Resource Based Indicators:

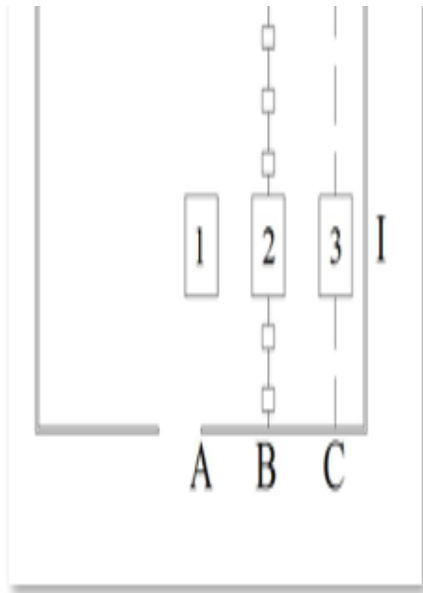
- Litter quality

Description of the indicator and method of assessment

In the Classyfarm protocol, litter is scored for friability and wetness in 3 selected points of approximately 1 m² : one in the middle of the barn, one under the feeder and one under the drinker line. The mean between both values gives the final score



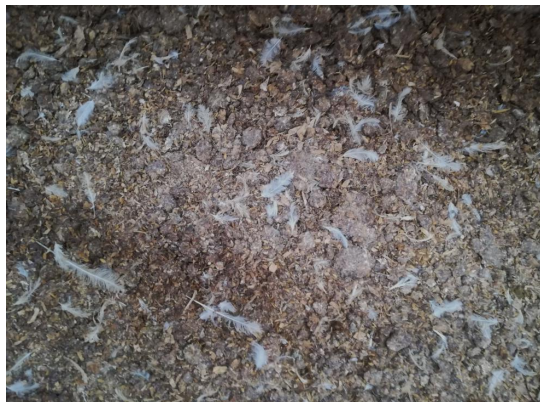
2 Good Housing



Score	Friability description	Wetness description
1	Completely caked	Wet litter, total area, water is appearing by pressure on the litter
2	80–90% area caked	Wet litter, beneath drinking line, water is appearing by pressure on the litter
3	70–80% area caked	Wet litter, beneath drinking line, no water is appearing by pressure on the litter
4	60–70% area caked	Wet litter, dark coloured. Litter can be pressed into ball-shape
5	50–60% area caked	Wet litter, dark coloured. Ridges occur beneath the drinking line
6	40% area caked	Almost dry litter, small ridges beneath drinking line. Litter between drinking line and feeders
7	30% area caked	Almost dry litter, dark coloured beneath drinking line and in other areas light coloured, ridge formation beneath drinking lines just started
8	10% area caked	Almost dry litter, light coloured, no ridges beneath drinking line
9	Friable litter, small caked areas	Dry litter, light coloured
10	Friable litter, no caked areas	Very dry litter (only observed at start)



Litter quality



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Welfare Indicators

Resource Based Indicators:

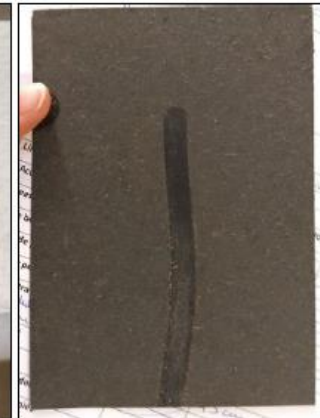
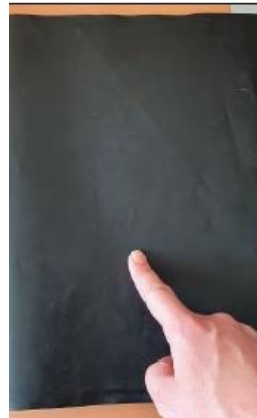
- Dustiness

Description of the indicator and method of assessment:



A black A4 size paper is placed above bird height on a horizontal surface when first entering the barn. The sheet is removed after 2 hours, and the amount of dust accumulated on the sheet is evaluated and classified as follows

- No or minimal evidence of dust
- Isolated dots or a thin layer of dust on sheet is detectable
- Dust covers the sheet



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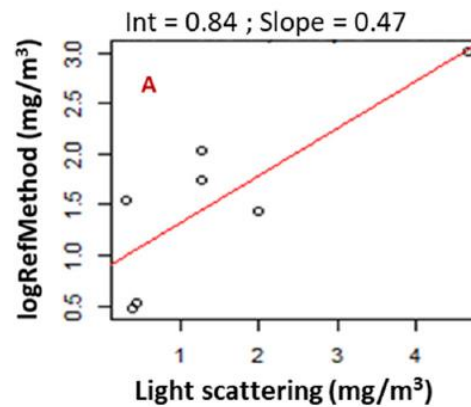
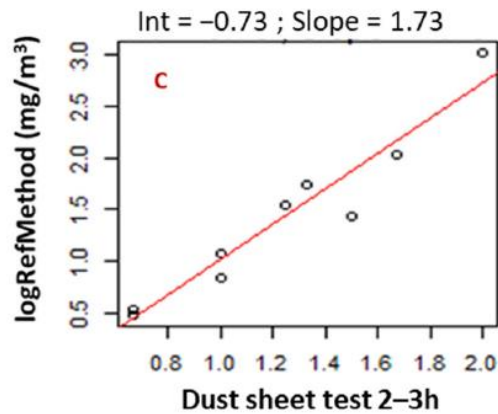
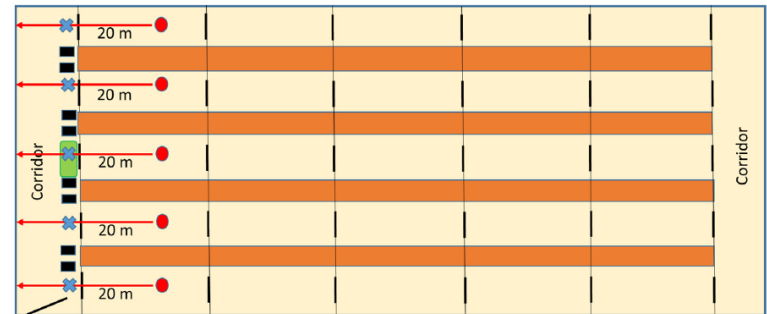


Welfare Indicators

Resource Based Indicators:

- Dustiness

Mousqué et al., 2023





Legal requirements

Council Directive 98/58 CE, Annex, point 4 « ..Where necessary sick or injured animals shall be isolated in suitable accommodation with, where appropriate, dry comfortable bedding.”



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Recovery pen

- Adjustable size, according to the needs (higher demand in specific stages of production cycle)
 - In the brooder rings
 - 4-5 weeks of age for sexual dimorphism
 - 14 weeks hens
 - 17 weeks toms
- Comfortable (low stocking density)
- Correctly equipped ; (drinkers and feeders accessible)
- Correct choice and management of birds



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Recovery pen

Adjustable size, according to the needs (higher demand in specific stages of production cycle)





Recovery pen

Adjustable size, according to the needs (higher demand in specific stages of production cycle)





Recovery pen

Adjustable size, according to the needs (higher demand in specific stages of production cycle)





Recovery pen

- **Comfortable** (low stocking density)
- **Correctly equipped;** (drinkers and feeders accessible)





Recovery pen

To high density...





Recovery pen

- Correct choice and management of birds (turnover, culling)



3. Good health



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Legal requirements

Council Directive 98/58 CE, Annex, point 4 « *Any animal which appears to be ill or injured must be cared for appropriately without delay and, where an animal does not respond to such care, veterinary advice must be obtained as soon as possible. Where necessary sick or injured animals shall be isolated in suitable accommodation with, where appropriate, dry comfortable bedding.*”

Council Directive 98/58 CE, Annex, point 19 “*Pending the adoption of specific provisions concerning mutilations in accordance with the procedure laid down in Article 5, and without prejudice to Directive 91/630/EEC, relevant national provisions shall apply in accordance with the general rules of the Treaty.*”



Welfare Indicators

Animal Based Indicators:

- Footpad dermatitis (FPD)
- Head, back and tail wounds
- Immobility
- Lameness
- Sick turkeys
- Terminally ill
- Dead turkeys



Resource and Management Based Indicators:

- Presence of dedicated infirmary
- Emergency culling method















Footpad dermatitis (FPD)

- **High validity**
- Common welfare issues in turkeys
- Painful to the birds
- Several factors causing FPD: breed, age, diet, sex, **litter quality**
- Birds handling could be complicated on-farm → assesement could be done on-farm or at slaughter



Type of lesion observed	Surface area affected (% foot)		
	<25 %	[25-50 %]	>50 %
No lesion	 <p>Score 0</p>		
Enlargement of scales and erythema	 <p>Score 1</p>	 <p>Score 2</p>	 <p>Score 3</p>
Hypertrophic and hyperkeratotic scales covered by a yellowish to brownish exudates	 <p>Score 4</p>	 <p>Score 5</p>	 <p>Score 6</p>
Depressed lesion, loss of substance (=ulceration), with or without thick dark, adherent scab	 <p>Score 7</p>	 <p>Score 8</p>	 <p>Score 9</p>



Head, back and tail wounds

- **Indicators of injurious pecking:** one of the main welfare issues in fattening turkeys → tissue damage and mortality
- Includes:
 - Head pecking**
 - Severe feather pecking**
(back and tail area targeted)

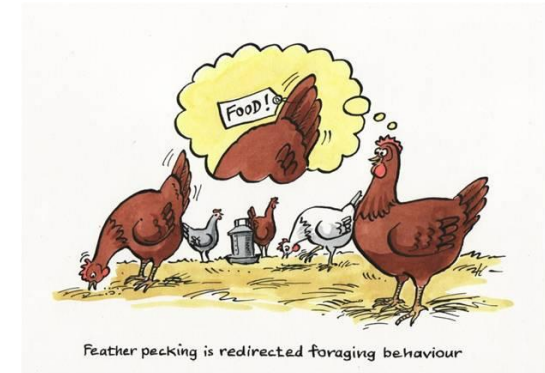


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Head, back and tail wounds

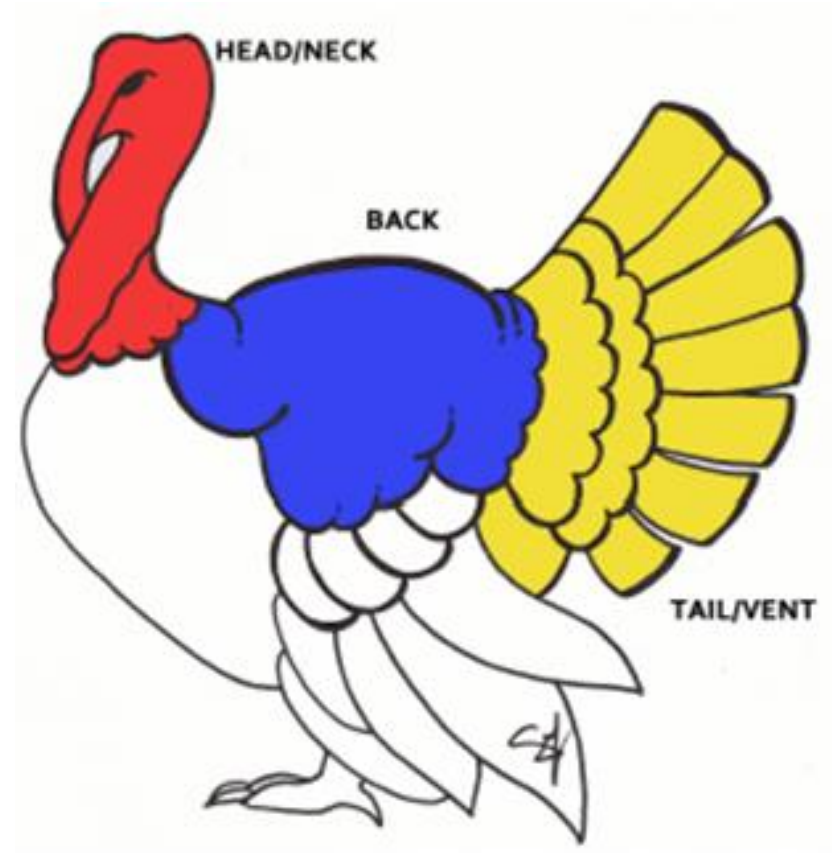
- Head pecking=act of **agression**
- Severe feather pecking is **multifactorial**:
 - ❑ stocking density: lack individual space
 - ❑ group size
 - ❑ inadequate light conditions
 - ❑ diet and watering: dietary deficiencies or insufficient feeding or watering
 - ❑ **re-directed highly motivated ground foraging**
 - ❑ **behaviour** in a **barren environment**: lack of expression of natural behaviours





Head, back and tail wounds

- **Aggressive pecking** will target the **head and neck area**, whereas **severe feather pecking** will target the **back and tail area** (Leishman et al. 2022).



(AWIN, 2015)



Head, back and tail wounds

- Assessment with the **Transect Method**: the number of turkeys observed showing pecking injuries is then converted into a percentage of the flock.
- Prevalence of turkeys suffering injurious pecking=


Number of birds showing one or more lesions described

Total number of birds on the day of the visit


Head, back and tail wounds



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Indicator Factsheet

Injurious pecking in turkeys



What is injurious pecking?

In contrast to gentle feather pecking which is a social and investigatory preening of a turkey to another turkey, typically directed at debris on the plumage (Savory, 1995; Dalton et al. 2018), injurious pecking can cause tissue damage and mortality (e.g. Dalton et al. 2013; Duggan et al. 2014, Dalton et al. 2018). In fattening turkeys, injurious pecking is one of the main welfare and health issues (e.g. Bartels et al. 2020). It includes head pecking - an aggressive act targeted at the head, neck and snood of another turkey (e.g. Savory, 1995) - and severe feather pecking - repeated, forceful pecking and pulling of the plumage and/or skin of another turkey, with or without feather removal. Injurious pecking often results in plumage and tissue damage to the victim (Savory, 1995). Whereas head pecking is considered an act of aggression, the causes of severe feather pecking are multi-factorial (stocking density, group size, light conditions, diet...) although it is mainly re-directed highly motivated ground foraging behaviour in a barren environment lacking appropriate stimuli (e.g. Sharvin et al. 1999; Dixon et al. 2008; Dalton et al. 2018). Depending on the type of pecking, the body area targeted will differ. Aggressive pecking will target the head and neck area, whereas severe feather pecking will target the back and tail area (Leishman et al. 2022).

Legislation

There is no specific law protecting turkeys welfare. Their protection is therefore subject to the general indications dictated by the Council Directive 98/58/EC, which defines the minimum generic requirements for the protection of animals kept for farming purposes. Council Directive 98/58/EC sets down general standards. Article 3 states that:

“Member States shall make provision to ensure that the owners or keepers take all reasonable steps to ensure the welfare of animals under their care and to ensure that those animals are not caused any unnecessary pain, suffering or injury.”

Method of assessment

The number of turkeys victims of injurious pecking in a flock could be assessed with the transect method. The birds are visually observed while the inspector slowly walks through the barn along longitudinal predetermined bands (transects) of equal width according to the house width (AWIN, 2015; Marchewka et al. 2015). The number of turkeys observed showing pecking injuries is then converted into a percentage of the flock. Vigilance is required with contiguous transects to avoid double counting the same birds.

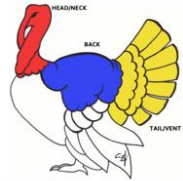



Figure 1. Body areas targeted by conspecifics in case of injurious pecking in turkeys (AWIN, 2015)



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Lameness

- **Lame turkey** walks with difficulty, with one or both legs not placed firmly on the ground, eventually by propping itself up on its wings (AWIN, 2015; EBENE, 2018).



(AWIN, 2015)

- Related to genetic, environment factors or disease



Immobility

- **Immobile turkeys:** Birds only able to move by propping themselves on their wings (Marchewka et al. 2015)
- Indicates **unhealthy turkeys which cannot feed or drink anymore**



(AWIN, 2015)

- Related to genetic, illness, injuries or environment factors (AWIN, 2015)



Sick turkeys

- Birds showing **clear signs of impaired health** as a **small and pale snood** and/or **red and watery eyes**, usually found in a **resting position** (AWIN, 2015)



(AWIN, 2015)



Sick turkeys

- And/or with a **pale/yellowish body colour** and/or with the **pendulous crop** hanging in front of the breast (AWIN, 2015)

(AWIN, 2015)





Terminally ill

- Bird **severely ill** or with **large wounds**, without any possibility of cure and which **will generally die**.
- **Lied on the ground with heads resting on the ground or back**, usually with **half closed eyes** with **feeble breath**.

(AWIN, 2015)



4. Appropriate behaviour





Legal Requirements

Council Directive 98/58 CE, Annex, point 7

"The freedom of movement of an animal, having regard to its species and in accordance with established experience and scientific knowledge, must not be restricted in such a way as to cause it unnecessary suffering or injury.

Where an animal is continuously or regularly tethered or confined, it must be given the space appropriate to its physiological and ethological needs in accordance with established experience and scientific knowledge".



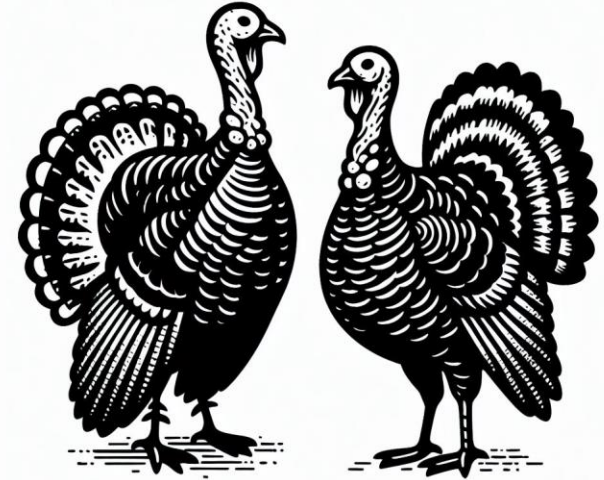
Welfare Indicators

Animal Based Indicators:

- Aggressiveness
- Positive behaviours
- Featherless
- Head, back, tails wounds

Resource and Management based indicators:

- Presence of enrichments
- Stocking density





Presence of enrichments

- Environmental enrichments allow turkeys to express natural behaviours by making their environment more stimulant
- There is no standard method of assessment → **check the presence of enrichments and proof of use during visit**
- Several type of enrichments can be interesting in turkeys barns





Presence of enrichment



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Best Practice Factsheet

Environmental enrichment and winter garden in a turkey barn



Introduction

In October 2022, the EURCAW Poultry-SFA visited a turkey barn with a winter garden and environmental enrichment. These additions allow for the production of turkeys without mutilations (intact beak and toes), improving their welfare. A winter garden and natural light indoors were added in 2018 to this 1000 m² barn dating from the 1960s. Since 2017, a partnership with a farm animal welfare NGO has helped to develop a better living environment for the turkeys. During our visit, birds were 71 days old and, a slower-growing strain was being tested. Previously, a white fast-growing strain was housed in the same conditions.

The winter garden

The winter garden is an extra space of 325 m² which provides fresh air access to the birds. It runs contiguously along one full length of the barn, with west exposure, and a net that separates turkeys from the outside. The entire ground surface is covered with chopped straw and shavings (same litter in the barn) and there is no access to food or water in this area. The addition of clean litter is done by the producer every two weeks in the winter garden (and two to three times per week inside the barn). The winter garden offers a space totally differentiated from the rest of the barn and stimulating for turkeys who have a choice to move in different types of environments.

2600 males and 2600 females are housed separately in this barn. The stocking density is around 5.2 birds/m² excluding the winter garden area (stocking density decreases with the winter garden to less than 4 birds/m²). The birds have access to the winter garden 24/24h, from 35 days of age, except during the first nights when they are kept inside. The females are sent to slaughter at 14 or 15 weeks of age whereas the males stay until 19 or 20 weeks of age.



Figure 2: Turkey on a platform in the winter garden (DANISE)

Environmental enrichment

Several types of environmental enrichment are available in the winter garden and inside the barn. They allow for different types of behaviours such as foraging, pecking, hiding from conspecifics and perching:

- Straw bales (renew when destroyed) (Figures 3 and 4)
- Elevated platforms with and without ramps (and a place to hide underneath) (Figures 5 and 6)
- Plastic jugs and bottles (Figures 7 and 8)
- Strings (Figures 9 and 10)
- Pecking blocks (Figure 11)



Figure 1: View of the winter garden from the outside (DANISE)

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EURCAW-Poultry-SFA activities related to turkeys: at the slaughterhouse and depopulation



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Activities (in slaughterhouses and emergency slaughter)

- Questions for EURCAW (Q2E)
- Scientific reviews
- Scientific studies
- Fact sheets
- Webinars
- Outreach videos





Questions for EURCAW (Q2E) regarding turkeys

Q2E-Poultry-SFA-2021-006 Summary of the various methods of culling on turkey and duck farms in the context of disease control (avian influenza).

Q2E-Poultry-SFA-2022-001 Minimum height of cages for the transport of turkeys.

Q2E-Poultry-SFA-2022-006 Space available for the air transport of day-old chicks, ducklings, goslings, pheasants and turkeys.

Q2E-Poultry-SFA-2023-007 Catching turkeys in a cage-free henhouse.

1 Waterbath stunning - broiler chickens and turkeys

1. Reviews

- ❖ List of the **relevant indicators** for the assessment of consciousness of broilers and turkeys after waterbath stunning.
- ❖ Description of the considered **validated indicators and associated methodology**
- ❖ **Identification of gap of knowledge** regarding indicators.
- ❖ **Review of existing training:** State of consciousness following water-bath stunning of broiler chickens and turkeys
- ❖ Report on **minimum standards for training courses** on the assessment of animal welfare for the official control of water-bath stunning of turkeys



1 Waterbath stunning - broiler chickens and turkeys

1. Reviews

2. Scientific studies

- ❖ Repeatability and feasibility of indicators of consciousness in **broiler chicken** after waterbath stunning and the impact of electrical key parameters on stunning efficiency.
- ❖ Repeatability and feasibility of indicators of consciousness in **turkeys** after waterbath stunning and the impact of electrical key parameters on stunning efficiency.

1 Waterbath stunning - broiler chickens and turkeys

1. Reviews


2. Scientific studies

3. Factsheets

European Union Reference Centre for Animal Welfare Poultry SFA

Indicator Factsheet

How to assess the state of consciousness in broilers (waterbath stunning)



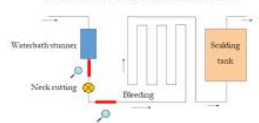
Introduction

- Waterbath stunning (WBS) is intended to induce unconsciousness until death that occurs due to bleeding.
- As WBS is not always effective, it is required to monitor that birds are unconscious at the exit of the WBS and do not regain consciousness before death.
- This factsheet explains the method to check the state of consciousness of birds with the most feasible, repeatable and valid animal-based indicators (ABIs) regardless of line speed and the method for sample size calculation.

Method for the assessment

Place for the assessment: At two different stages.

- Stage 1:** From the exit of the WBS and before bleeding to assess the effective stunning of the birds.
- Stage 2:** During bleeding, to assess that unconscious birds do not recover consciousness before death.



Position: if possible, check the birds in ventral position.

ABIs: use all those listed in Table 1 simultaneously on each bird according to the stage of observation. Commercial videos linked to QR codes.

Any bird showing at least one outcome of consciousness should be considered as conscious or recovering consciousness.

Sampling procedure:

Stage 1:


- Visually follow animals individually during 2-3 s.
- Consciousness occurs if the birds shows at least one outcome of consciousness.

Stage 2:

- Place at a distance from neck cutting where you detect broilers that begin to show outcomes of consciousness (e.g., approx. 10s after carotid section).
- Then, visually follow animals individually during 4-5 s.
- Consciousness occurs if the birds shows at least one outcome of consciousness.

ABIs:

- Wing flapping
- Breathing
- Vocalization
- Head shaking




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Indicator Factsheet

How to assess the state of consciousness in turkeys (waterbath stunning)



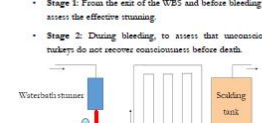
Introduction

- Waterbath Stunning (WBS) is intended to induce unconsciousness until death that occurs due to bleeding.
- It is required to monitor that turkeys are unconscious at the exit of the WBS and do not regain consciousness before death. Hence, turkeys that show indicators of consciousness should be re-stunned using back-up methods to avoid them unnecessary pain, distress and suffering.
- This factsheet contains:
 - The method for the assessment of the state of consciousness after WBS.
 - The most relevant Animal-Based Indicators (ABIs).
 - The method for sample size calculation.

Method for the assessment

Place for the assessment: At two different stages (Figure 1)

- Stage 1:** From the exit of the WBS and before bleeding to assess the effective stunning.
- Stage 2:** During bleeding, to assess that unconscious turkeys do not recover consciousness before death.



Position: if possible, check the birds in ventral position.

Sampling procedure and recommended ABIs:

Stage 1:

- Follow visually individual turkeys during 2-3 s (according to the possibilities in the plant).
- Assess the two ABIs of the state of consciousness listed in Table 1 and shown on videos linked to QR codes in Figure 2.
- Record the outcome of the ABIs for every turkey assessed.

Stage 2:

- Place at a distance from neck cutting where you might detect turkeys that begin to show outcomes of consciousness (e.g., approx. 10s after carotid section).
- Then, visually follow animals individually during 6-8 s.
- Assess the ABIs of the state of consciousness listed in Table 1 and shown on videos linked to QR codes in Figure 2.
- Record the outcome of the ABIs for every turkey assessed.

ABIs:

- Breathing
- Wing flapping
- Head shaking




Figure 2. Relevant ABIs of consciousness: Red arrows indicate where to put the attention on the turkey's body. Videos linked to QR codes.

Although less pertinent and less repeatable between observers, presence of vocalizations in stage 1 and presence of head shaking in stage 2 should not be neglected as ABIs of consciousness (see Table 1).


Any bird showing at least one outcome of consciousness should be considered as conscious or recovering consciousness.

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Best practice Factsheet

Captive bolt as a back-up stunning method during slaughter of turkeys




Introduction


- Stunning methods are not always effective since failure at inducing unconsciousness and recovery of consciousness of turkeys before death might happen.
- Legislative requirements on the protection of animals at the time of killing include assessing the state of consciousness of the animals regularly and ensuring that appropriate back-up equipment is immediately available on the spot to be used in the case of failure of the stunning equipment initially used.
- However, re-stunning turkeys that show outcomes of consciousness after the stunning procedure is a process that remains pending for most of poultry slaughterhouses. In most of the case, turkeys are manually re-stunned out after bleeding when stunning or bleeding is not efficient.

Back-up stunning method


This factsheet shows a good practice related to a back-up stunning method for turkeys.



1. Penetrative captive bolt stunners adapted for turkeys are hung with an extension cord from the ceiling and placed at the business operator's shoulder height.



2. When a turkey is showing at least one sign of consciousness, the business operator in charge takes with one hand a V-shaped, 1-metre-long fork and secures the bird's head while working on the shackle line.



3. With the other hand, the captive bolt is taken and placed perpendicular to the bird's head and it is fired through the skull into the brain causing instant death to the bird.

4. Several captive bolts are placed along the slaughter line allowing for re-stunning of animals at any place from stunning to the scalding tank.

Advantage for welfare: it allows re-stunning on the line of heavy birds difficult to unshackle and spares avoidable pain, distress and suffering to inefficiently stunned turkeys. Flaws: in most of slaughterhouse design does not allow to re-stun turkeys between the exit of the waterbath and bleeding because of lack of space and time before neck cutting.

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2 Controlled atmosphere stunning (CAS)

1. Review

- Main welfare aspects of stunning **broilers** by exposure to **controlled atmosphere**:
 - List of CAS methods and legal requirements
 - For each CAS methods:
 - 📄 Description and available equipment
 - 😊 Positive welfare aspects
 - 😞 Negative welfare aspects

2 Controlled atmosphere stunning (CAS)

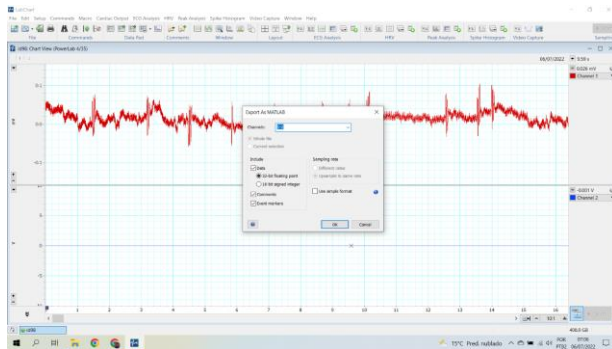
1. Review

2. Scientific studies

- Assessment of welfare during exposure to alternative gas mixtures to carbon dioxide in two phases in **broiler chickens**

Gas mixtures tested:

1. CO₂ in two phases (1st: 40% CO₂ (2 min); 2nd: 90% CO₂ (2 min))
2. 40% CO₂ + 60% N₂ (<2% O₂); 4 min
3. 20% CO₂ + 80% N₂ (<2% O₂); 4 min



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2 Controlled atmosphere stunning (CAS)

1. Review

2. Scientific studies

3. Factsheets

European Union Reference Centre for Animal Welfare Poultry SFA

Main welfare aspects of stunning broilers by exposure to controlled atmosphere

Introduction

- There are two main types of stunning systems commercially used in poultry, electrical waterbath stunning (WBS) and controlled atmosphere stunning (CAS).
- CAS consists in exposing the chickens to modified gas environments or by reducing the atmosphere pressure, which induce a gradual loss of consciousness.
- WBS is used in both small-scale and large-scale abattoirs, while CAS is nearly always used in large-scale abattoirs, likely because CAS systems involve large investments but also increase the slaughter capacity.

Available equipment

Currently, CO₂ in two phases is by far the most common CAS method in use in the European Union.

1. Tinned
2. Closed cabinet
3. Pit

Advantages of CAS

- No uncrating and shackling conscious birds.
- Stunning can be either reversible or irreversible.
- When irreversible, it prevent from recovery before death occurs.

CAS welfare concerns

- Induction of unconsciousness is not instantaneous and involves a transitional period during which negative welfare outcomes may occur.
- CAS systems may incorporate windows or cameras for monitoring the behaviour of the animals. However, it does not allow a clear view of all animals.

CAS methods

- Stunning with carbon dioxide (CO₂) in two phases
- Stunning with inert gases
- Stunning with carbon dioxide associated with inert gases
- Low atmospheric pressure stunning (LAPS)

Percentage of the different CO₂ stunning equipment that are currently in use in European Union. Data extracted from 20 out of 27 European Member States that replied a EURCAW-Poultry-SFA survey in 2021.

Equipment Type	Percentage
Tinned	58%
Pit	10%
Closed cabinet	24%
Unknown	8%

Legend: * Electrical waterbath * Controlled atmosphere * Others

Proportion of slaughterhouses (left) and slaughtered chickens (right) according to the different stunning methods used in the European Union in 2021. Data extracted from 20 out of 27 European Member States that replied a EURCAW-Poultry-SFA survey.

Stunning Method	Slaughterhouses (%)	Slaughtered Chickens (%)
Electrical waterbath	11.0%	83.4%
Controlled atmosphere	89.0%	16.6%
Others	0.0%	0.0%

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Thematic Factsheet

Main welfare aspects of stunning broilers by exposure to controlled atmosphere

1. Stunning with CO₂ in two phases

- Broilers are first exposed to low concentration of CO₂ (up to 40%) until unconsciousness occurs. Thereafter, the CO₂ concentration is increased in the second phase inducing a deeper state of unconsciousness and then death.
- It renders the bird unconscious when using a low level of CO₂ (< 40%) followed by a second phase where broilers are killed painlessly with exposure to a high CO₂ concentrations.
- If birds are conscious, concentrations of CO₂ at above 40% cause unpleasant sensation, pain and respiratory distress when inhaled. This could occur when the exposure time in the first phase is too short leading to animals arriving conscious in the second phase in which CO₂ is above 40%.

2. Stunning with inert gases

- Broilers are exposed to inert gas mixtures with a maximum of 2% residual oxygen, leading to loss of consciousness. Inert gases displace oxygen from the atmospheric air and this ensures that the birds are stunned by anoxia (i.e., lack of oxygen) and dead if the duration of the process is prolonged enough.
- Inhalation of inert gases do not cause aversive reactions after initial exposure, as they are imperceptible to birds.
- After loss of consciousness, birds can perform severe convulsion which may produce wing fractures as well as injuries and distress to other birds that have not yet lost consciousness.
- The duration of induction to unconsciousness is longer than with CO₂ in two phases. If birds are not exposed enough time, they can recover consciousness rapidly if breathing atmospheric air at the exit of the stunning system.

3. Stunning with CO₂ associated with inert gases

- Broilers are induced to unconsciousness by direct or progressive exposure to a gas mixture containing CO₂ up to 40% associated and inert gases.
- Broilers tolerate the inhalation of concentrations below 40% CO₂ inert gases are imperceptible to birds and the reduction of available oxygen is not perceived either.
- The duration of induction to unconsciousness is shorter than with inert gases.
- The occurrence of vigorous convulsions expressed as wing flapping in unconscious birds are less pronounced than the other CAS methods and thus, the likelihood of unconscious animal while convulsing to harm neighbouring birds that are still conscious is lowered.

4. LAPS

- Broilers are induced to a non-recovery state of unconsciousness through progressive hypobaric anoxia (i.e., lack of oxygen due to lowered atmospheric pressure).
- It produces a non-recovery state of birds and thus, it does not compromise the welfare of the bird during the following slaughtering procedures.
- Pain may happen since defecation and prolapses of cloaca were observed during LAPS, suggesting expansion of gas trapped in gut and probably also in other body cavities.
- Only approved for the stunning of broilers of less than 4 kg of body weight according to a prescribed pressure curve carefully described in the implementing regulation.

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Thematic Factsheet

Related to controlled atmosphere stunning methods

Carbon dioxide in two phases, inert gases or in carbon dioxide in association with inert gases:

COUNCIL REGULATION (EC) No 1099/2009 [Annex I, Chapter II]

- "8. Under no circumstances shall gases enter into the chamber or the location where animals are to be stunned and killed in a way that it could create burns or excitement by freezing or lack of humidity"

Specific requirements

COUNCIL REGULATION (EC) No 1099/2009 [Annex II]

- "6.1. Gas stunners, including conveyor belts, shall be designed and built to:
 - optimise the application of stunning by gas;
 - prevent injury or contusions to the animals;
 - minimise struggle and vocalisation when animals are restrained."

Carbon dioxide in two phases, inert gases or in carbon dioxide in association with inert gases:

Gas stunning equipment

- "6.2. Gas stunners shall be equipped to measure continuously, display and record the gas concentration and the time of exposure, and to give a clearly visible and audible warning if the concentration of gas falls below the required level. The device shall be placed so as to be clearly visible to the personnel. These records shall be kept for at least one year. Gas stunners shall be designed in a manner that, even at the maximum permitted throughput, the animals are able to lie down without being stacked on each other."

COMMISSION IMPLEMENTING REGULATION (EU) 2018/723 of 16 May 2018 amending Annexes I and II to Council Regulation (EC) No 1099/2009 [Annex I, Chapter 2, point 10]

- "10.1. During the first phase, the decompression rate shall not be greater than equivalent to a reduction in pressure from standard sea level atmospheric pressure 760 to 250 Torr for a period of not less than 50 seconds."
- "10.2. During a second phase, a minimum standard sea level atmospheric pressure of 160 Torr shall be reached within the following 210 seconds."
- "10.3. The pressure time curve shall be adjusted to ensure that all birds are irreversibly stunned within the cycle time."
- "10.4. The chamber shall be leak tested and pressure gauges calibrated before each operational session and not less than daily."
- "10.5. Records of absolute vacuum pressure, time of exposure, temperature and humidity shall be kept for at least one year."

LAPS:

General requirements

- "10.1. Low atmospheric pressure stunning equipment shall be designed and built to ensure a vacuum of the chamber enabling slow gradual decompression with reduction in available oxygen and holding at minimal pressure."
- "7.2. The system shall be equipped to measure continuously, display and record the absolute vacuum pressure, the time of exposure, the temperature, the humidity and to give a clearly visible and audible warning if the pressure deviates from the required levels. The device shall be clearly visible to the personnel."

LAPS:

Layout, construction and equipment of slaughterhouses

European Union Reference Centre for Animal Welfare Poultry SFA

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For any questions or suggestions regarding this factsheet, please contact info@eurcaw-poultry-sfa.eu



Factsheet: Slaughterhouse and Transport

1. Review

2. Scientific studies

3. Factsheets

- Technical sheet: How to assess the level of consciousness in turkeys (electrical stunning)
- Good practice factsheet: The captive bolt as a backup stunning method during turkey slaughter
- Good practice factsheet: Automated assessment of foot pad dermatitis
- Good practice factsheet: Example of an inspection for compliance with the transport regulation (COUNCIL REGULATION (EC) No 1/2005)

1 Waterbath stunning - broiler chickens and turkeys

1. Review

2. Scientific studies

3. Factsheets

4. Dissemination

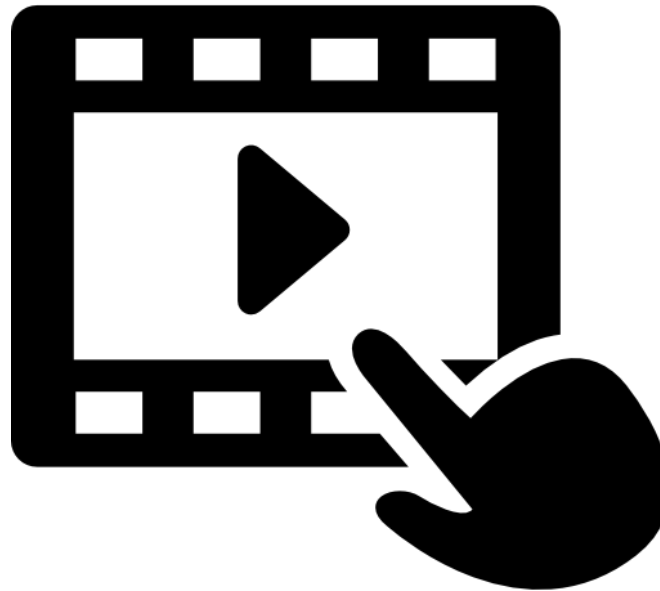
Webinars:

Repeatability and feasibility of indicators of consciousness in **broiler chicken** after waterbath stunning and the impact of electrical key parameters on stunning efficiency.

Repeatability and feasibility of indicators of consciousness in **turkeys** after waterbath stunning and the impact of electrical key parameters on stunning efficiency.

Motion video:

Method and relevant indicators of the state of consciousness in **broiler chickens** and **turkeys**



VIDEO



Technical study: Assessment of indicators of consciousness in waterbath stunned turkeys



Introduction

- Waterbath stunning is intended to induce unconsciousness until death occurs, but it is not always effective (Shields and Raj, 2010)
- Regulation 1099/2009: The state of consciousness must be monitored at the exit of the WB and the animals do not regain consciousness before death.
- Recommended ABIs according to validity and feasibility (EFSA, 2013).
- Monitoring the state of consciousness is not always performed and when it is, there is no uniformity in the applied criteria (Devos et al., 2018)



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General:

Identify refined and validated ABIs with good level of repeatability that can be used for the assessment of the state of consciousness in turkeys to **ensure consistency of controls.**

Specific:

1. Assess the **inter-observer repeatability** of the most valid and feasible ABIs.
2. Elucidate the **correlation** among the outcomes of consciousness of the ABIs.
3. Compare the **effectiveness of stunning** according to different combinations of waterbath electrical key parameters used in different commercial slaughterhouses.



Materials and methods

1. Eight commercial abattoirs were visited (turkeys stunned using a water bath)
2. The countries visited were France and Spain
3. The assessments were carried out by four trained individuals
4. Observations were made during the slaughter process (before and during bleeding)
5. Indicators: level of consciousness



Methods and recommendations



1 Where and how should we do the assessment?

- ❖ Best visibility toward the animals → recommended ventral position.



Animals in ventral position

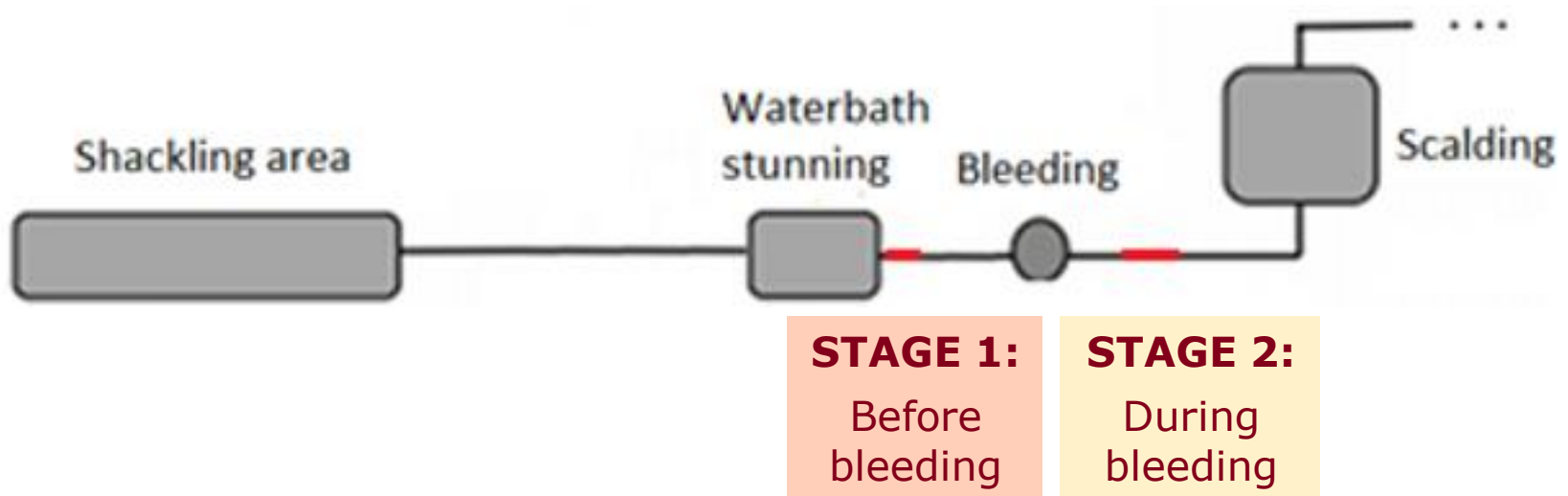


Animals in dorsal position

1 Where and how should we do the assessment?



- **Stage 1:** from the exit of the waterbath until bleeding.
- **Stage 2:** during bleeding at approximately 10s after severing the carotids.



2 How many time should we assess the animals?

- Visually follow animals individually for a few seconds.



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3 Which ABIs should we assess?

- **Stage 1:** from the exit of the waterbath and before bleeding.
 - Breathing
 - Wing flapping*
 - Vocalizations
- **Stage 2:** during bleeding
 - Breathing
 - Wing flapping



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If the animal shows any of these ABIs, the bird is conscious or regaining consciousness

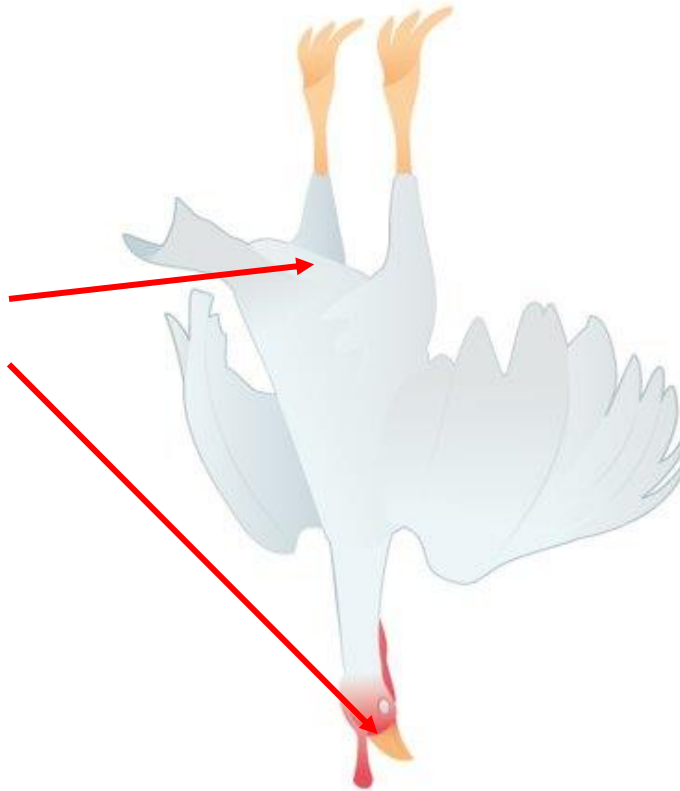
3 Which ABIs should we assess?



- **Stage 1:** from the exit of the waterbath and before bleeding

BREATHING

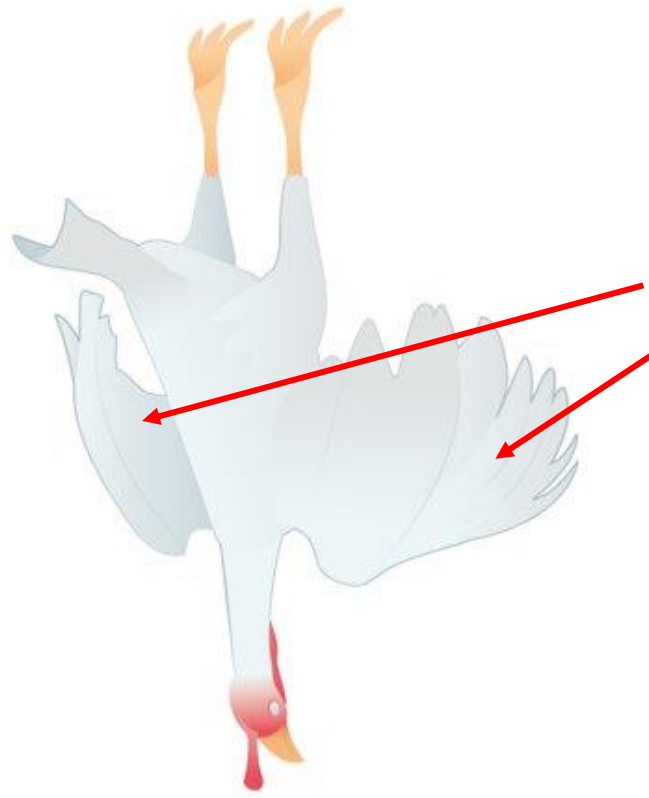
Presence of either a minimum of two movements of the beak or abdominal muscles around the cloaca associated to breathing



3 Which ABIs should we assess?



- **Stage 1:** from the exit of the waterbath and before bleeding



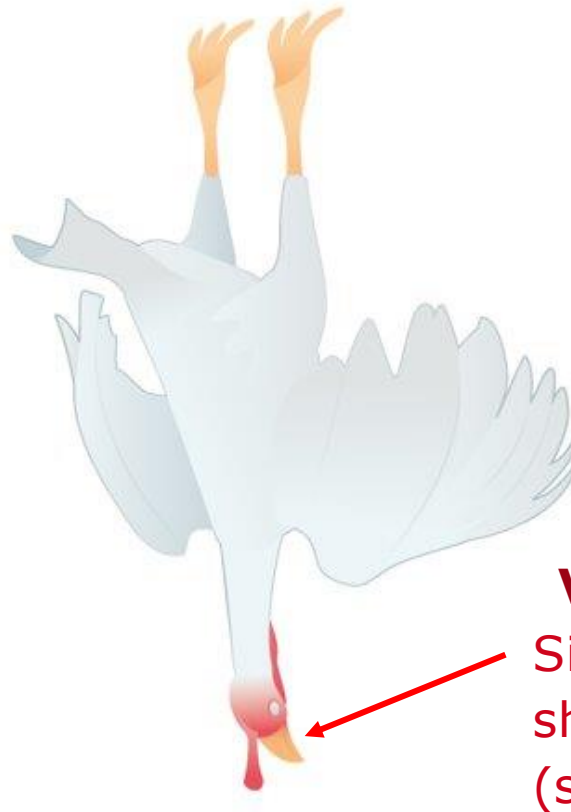
WING FLAPPING

Flapping with both wings and should not be confused with rapid trembling of the entire body of the bird

3 Which ABIs should we assess?



- **Stage 1:** from the exit of the waterbath and before bleeding



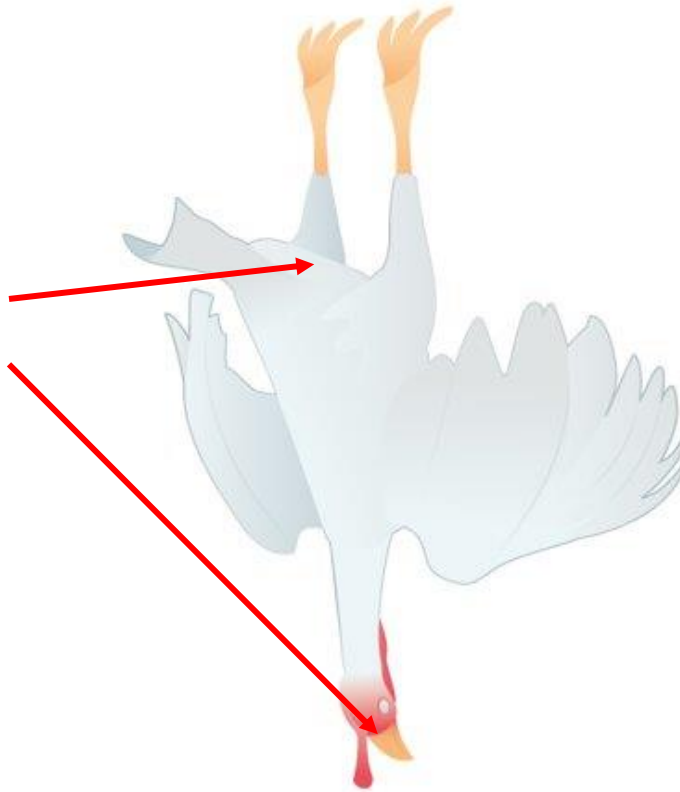
VOCALIZATION

Single or repeated shrieking (screaming)

➤ **Stage 2:** during bleeding

BREATHING

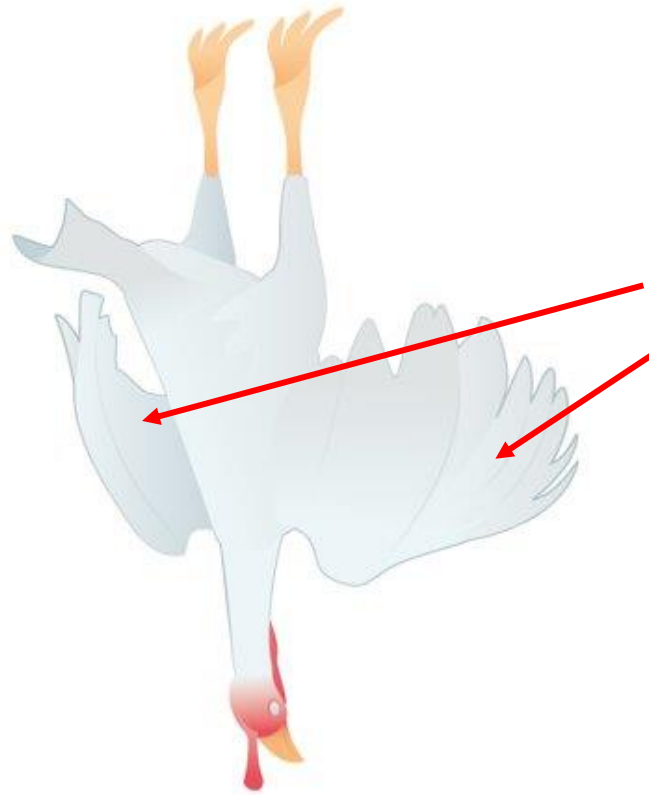
Presence of either a minimum of two movements of the beak or abdominal muscles around the cloaca associated to breathing



3 Which ABIs should we assess?

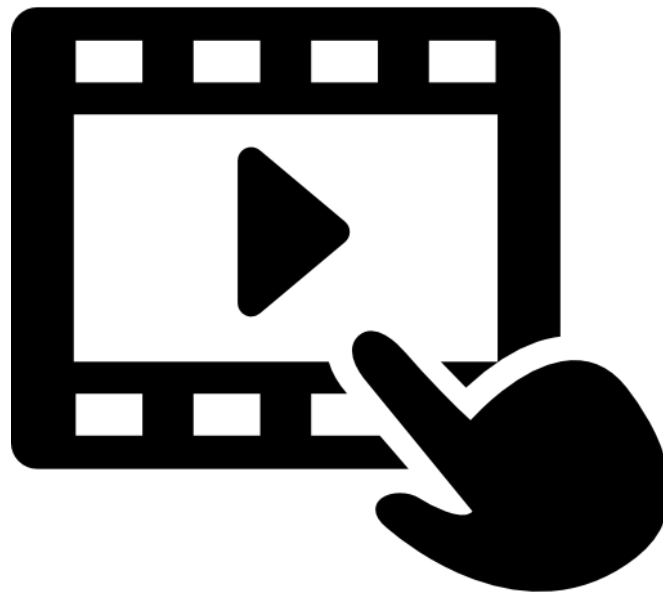


➤ Stage 2: during bleeding



WING FLAPPING

Flapping with both wings and should not be confused with rapid trembling of the entire body of the bird



VIDEOS

Regulation 1099/2009



Article 5.1. Those checks shall be carried out on a sufficiently representative sample of animals and their frequency shall be established taking into account the outcome of previous checks and any factors which may affect the efficiency of the stunning process.

4. How should we do the sampling?

- To decide the frequency of the sampling: every flock? Some flocks?

At least 2 flocks a day, at different period of the day (*Anses, 2021*)

- Random sampling in the flock will ensure representativity
- Sample of the flock according to «factors which may affect the efficiency of the stunning process”
- Sample size: depends on your objective: assess a prevalence of birds showing indicators of consciousness? Monitor consciousness through time? both? Consecutively (*Anses, 2021*)



Captive bolt as a back-up stunning method during slaughter of turkeys

- Re-stunning turkeys that show outcomes of consciousness pending process.
- Factsheet shows a good practice related to a back-up stunning method for turkeys.
- Penetrative captive bolt stunners adapted for turkeys.
- Best practice: it allows re-stunning on the line of heavy birds difficult to unshackle.



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Depopulation



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UNIVERSITY





Joint initiative since 2023

Collaboration between EURCAW-Poultry-SFA and the French Reference Centre for Animal Welfare



In response to a European need

At the request of the competent authorities of several Member States



To promote more ethical emergency culling practices in the event of avian influenza

Recommendation on the most appropriate emergency slaughter method, taking into account the characteristics of the farm and the species concerned



1. Data

10 Questionnaires
3 Workshop



Depopulation methods
used in the US

To produce three reports:

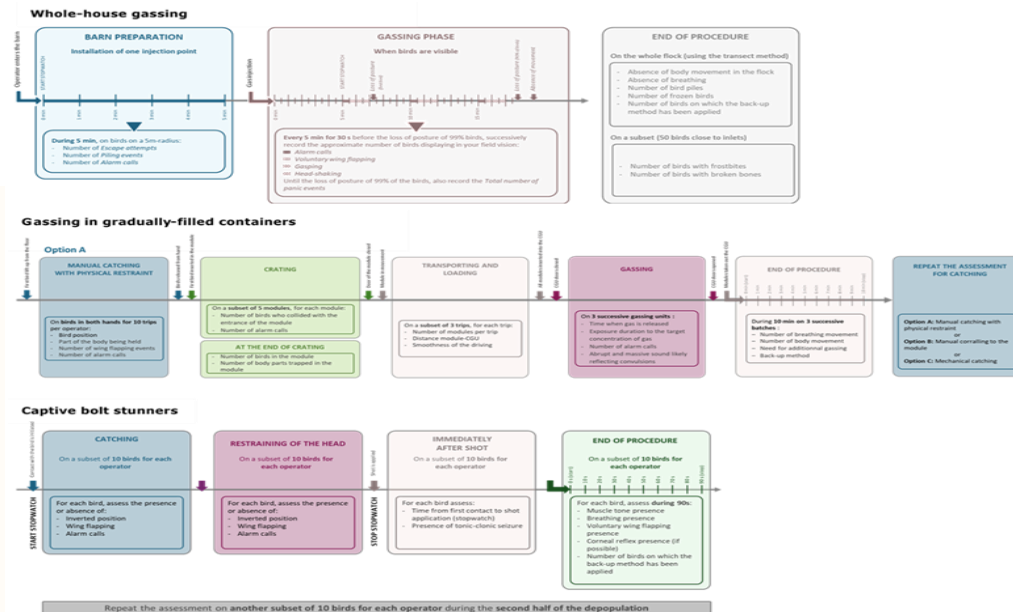
- ❖ the effects on welfare
- ❖ the effectiveness and implications for welfare
- ❖ the selection of the most appropriate depopulation methods





Guidelines for assessing animal welfare

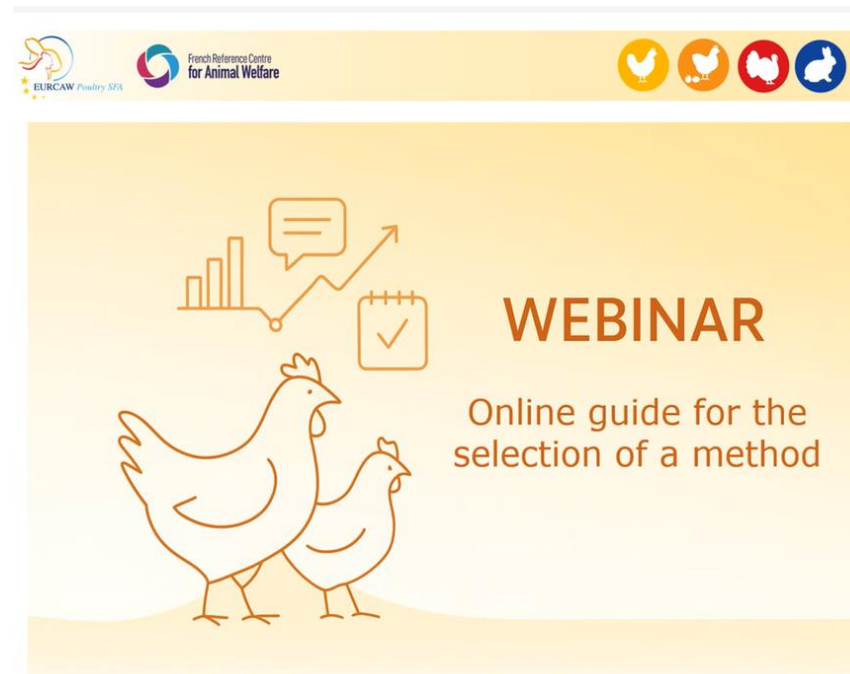
Decision tree



Selection of the most appropriate depopulation method for the welfare of poultry



Webinar: Online guide to choosing a method



Methods at the group level

Containerized gassing (N=17)

Pre-filling

Containers are pre-filled with gas ($\text{CO}_2 > 70\%$) and **poultry is added in layers**

Gradual filling

Poultry is inserted in **modules placed into a gas-tight metal container**

Gas (CO_2 , CO_2 -Inert, CO) is then added

House-gassing (N=14)

Whole-house gassing (N=13)

Administration of CO_2 ($> 40\% \text{CO}_2$) or N_2 ($< 2\text{-}3\% \text{O}_2$) in the house

Partial-house gassing (N=1)

Gassing in litter-based system with CO_2 pellets in a dedicated subpen

Electrical waterbath (N=4)*

Birds are **shackled on a line** that passes over a **water-filled trough**, which is **electrically charged**

The exposure to the electrical current causes an **epileptic seizure** and a **cardiac arrest**

Methods at the group level

Containerized gassing (N=17)

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Methods at the group level



House-gassing (N=14)

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Administration of CO₂
(> 40 % CO₂) or N₂
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Partial-house gassing (N=1)

Gassing in litter-based
system with CO₂ pellets
in a dedicated subpen



From Maria Correia

Methods at the group level



House-gassing (N=14)

Partial-house gassing (N=1)

Gassing in litter-based system with CO₂ pellets in a dedicated subpen



CO₂ pellets **should not be used to kill birds in bags** due to sublimation inefficiencies



From Maria Correia

Methods at the group level



Adapted from TTC group

Electrical waterbath (N=4)*

Birds are shackled on a line that passes over a water-filled trough, which is electrically charged

The exposure to the electrical current causes an **epileptic seizure** and a **cardiac arrest**

Methods at the individual level

Manual blunt-force trauma (N= 3)

Firm and accurate blow to the head of a bird, reportedly using a **hard tool** (e.g., metal pipe)



The blow has to be delivered with a hard tool of **sufficient mass** and **with enough velocity**

Electrical methods

Head-to-body killing (N=2)

Exposure of the body to an electric current delivered via **different equipment, whose efficacy varies**

Head-only stunning (N=2)

Exposure of the brain to an electrical current, reportedly using tongs

Cervical dislocation (N= 15)

Manual or mechanical stretching and twisting of the neck causing skull–spine separation and carotid severance



Neck-crushing equipment should **not** be used

Methods at the individual level

Lethal injection (N=14)

Administration of **pentobarbital** or **T61** most often intraperitoneally



Injections in **the vein and occipital sinus** should be preferred.

T61 should only be used on **unconscious poultry**



From Virginie Michel



Adapted from HSA

Captive bolt stunning (N=5)

Administration of a blow to the head using a penetrative or a **non-penetrative bolt stunners**



Commercially-available penetrative bolt stunners are less effective on heavy poultry than non-penetrative ones

Methods at the individual level

Example of H2H euthanizer



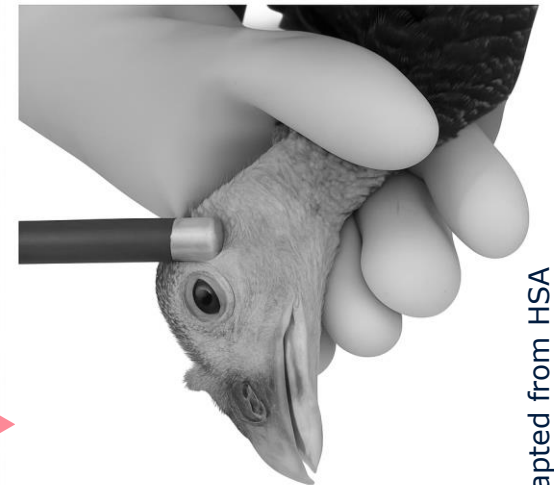
Electrical methods

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Head-only stunning (N=2)

Exposure of **the brain** to an electrical current, reportedly using tongs



Adapted from HSA

Methods at the individual level

Adapted from HSA



Livetec Nex



Cervical dislocation (N= 15)

Manual or mechanical stretching and twisting of the neck causing skull-spine separation and carotid severance



Neck-crushing equipment should **not be used**



French Reference Centre
for Animal Welfare



Selection of the most appropriate depopulation method for
the welfare of poultry

START HERE

General considerations



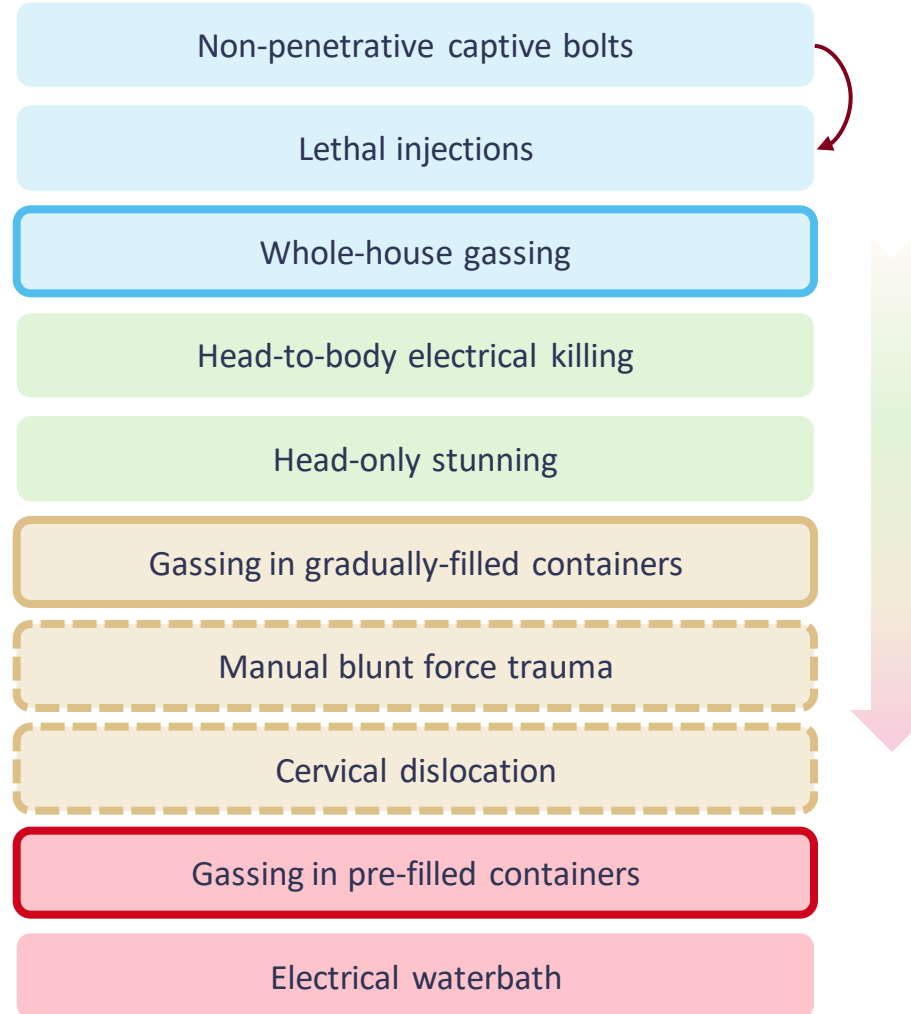
Ranking based on poultry welfare under the assumption that **all methods are « correctly » performed**



Exclusion of factors indirectly related to poultry welfare (e.g., operator safety)



A **living document** subject to updates based on scientific and technological developments



A dynamic ranking

TWO KEY CRITERIA



Flock size

Small (hundreds of individuals)

Medium (few thousands of individuals)

Large (tens of thousands of individuals)

- **Manual blunt for trauma and cervical dislocation for small flocks only**

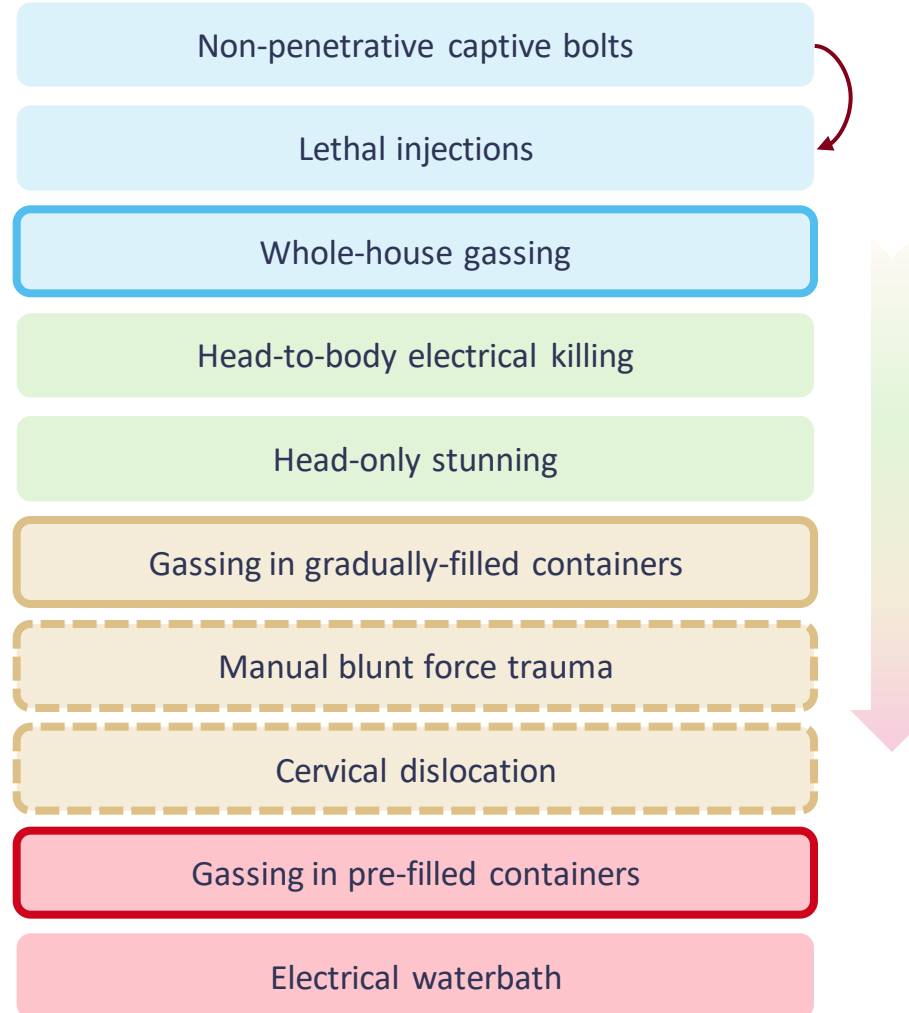


Presence of clinical symptoms

Whole house gassing

Gassing in gradually filled containers

- **Preference for group-based methods to avoid prolonged suffering**



A dynamic ranking

TWO KEY CRITERIA



Flock size

Small (hundreds of individuals)

Medium (few thousands of individuals)

Large (tens of thousands of individuals)

- ***Manual blunt for trauma and cervical dislocation for small flocks only***



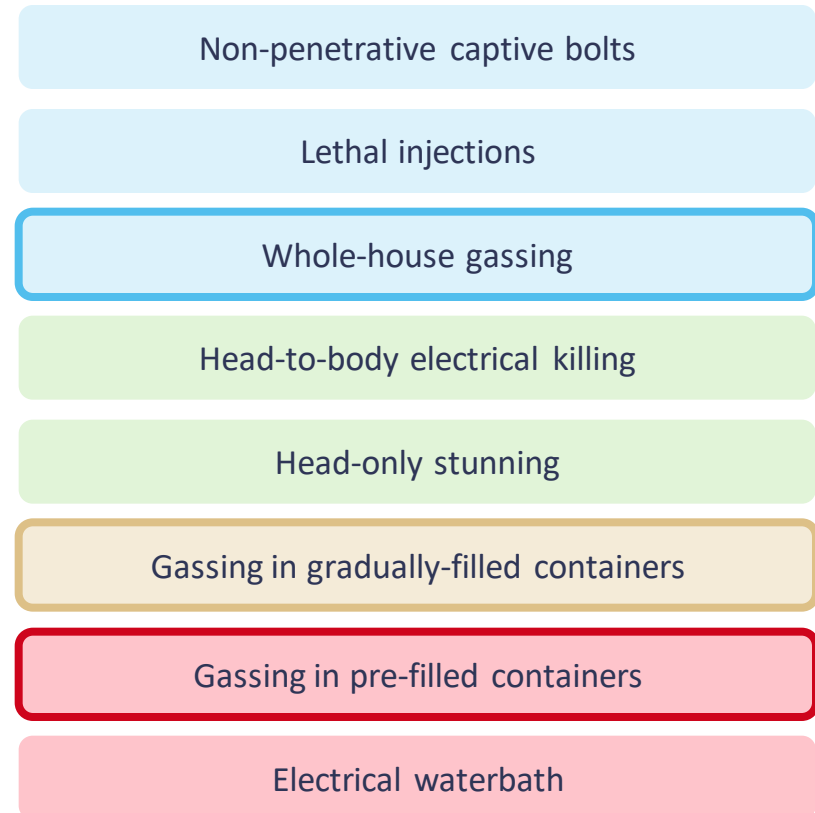
Presence of clinical symptoms

Whole house gassing

Gassing in gradually filled containers

- ***Preference for group-based methods to avoid prolonged suffering***

Example for a flock of **medium size** without clinical symptoms



A dynamic ranking

TWO KEY CRITERIA



Flock size

Small (hundreds of individuals)

Medium (few thousands of individuals)

Large (tens of thousands of individuals)

- ***Manual blunt for trauma and cervical dislocation for small flocks only***



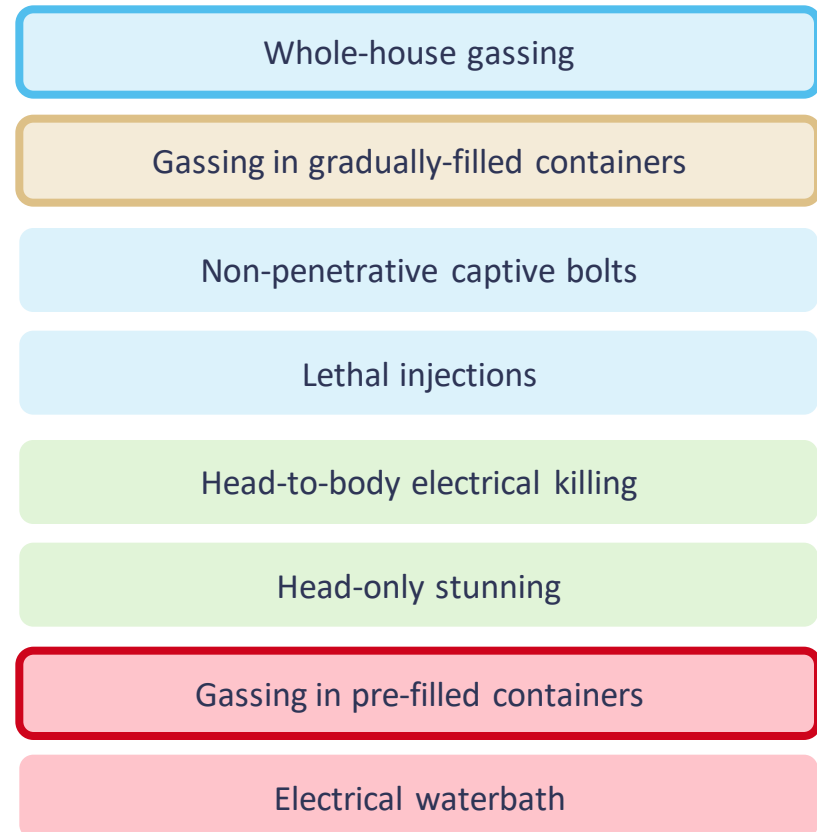
Presence of clinical symptoms

Whole house gassing

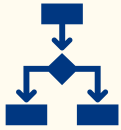
Gassing in gradually filled containers

- ***Preference for group-based methods to avoid prolonged suffering***

Example for a flock of medium size with clinical symptoms



A collection of decision trees



One decision tree per method, for a total of **11** trees



Each tree is based on **3** categories of questions that relate to human, technical and environmental resources



A method is recommended for use only if **all conditions are met to ensure poultry welfare**. Otherwise, the possibility of implementing the next best method is examined, etc.



**Do you have any
questions?**



Thank you for your attention



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Advances in scientific knowledge regarding the welfare of turkeys on farms

Conclusions of the EFSA scientific opinion



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This presentation uses the data presented and published in this EFSA session:

Info session | Advancing Scientific Knowledge on the Welfare of Turkeys on farm: Insights from the EFSA Scientific Opinion

📅 25 February 2026, 14:00 - 16:05 (CET)

📍 Online

All original information is available here:

<https://www.efsa.europa.eu/en/events/info-session-advancing-scientific-knowledge-welfare-turkeys-farm-insights-efsa-scientific>

Translation into Spanish by EURCAW-Poultry-SFA

Background to the EFSA's scientific opinion on the welfare of turkeys





Turkeys in current EU legislation

- There is no specific legislation
- Council Directive 98/58/EC of 20 July 1998
- Council of Europe Recommendation of 2001 on turkeys (*Meleagris gallopavo* spp.)

NEW

EFSA's first
opinion on the
welfare of
turkeys on
farms



Terms of Reference (ToR)

Terms of Reference 1:

- ❖ **Request 1:** Review of the most common rearing systems and current practices for rearing turkeys on farms.

Terms of Reference 2:

- ❖ **Request 2:** Assessment of factors and practices.
 - a) Welfare implications of housing conditions.
 - b) Welfare risks associated with thinning practices.
 - c) Factors related to genetic selection practices.
 - d) Incubator conditions.
 - e) Mutilations.
 - f) Breeding and genetic traits.



Terms of Reference (ToR)

ToR 2:

❖ Request 3:

- Identify the relevant welfare implications of housing systems, risk factors and practices from Requests 1 and 2 using animal-based measures.

❖ Request 4:

- Provide qualitative and quantitative recommendations.

❖ Request 5:

- Assess and define animal-based indicators collected at the slaughterhouse.



The tender specifies: 'Turkeys of all ages' and lists 'turkeys for meat production, breeding turkeys and turkey chicks'



TURKEY CHICK

A newly hatched turkey up to 7 days old, during which time the bird is unable to regulate its body temperature.



TURKEYS INTENDED FOR MEAT PRODUCTION

Raised until slaughter. Weight and age at slaughter depend on sex, country and genotype.



BREEDING TURKEYS

They are reared for the reproduction of new generations of broiler and breeding turkeys.



Female turkeys = turkey hens



Male turkeys = turkeys

Interpretation of the ToR: Mutilations



The **mandate** asked EFSA to assess the animal welfare implications associated with mutilations, such as **beak trimming** and other practices (e.g. toe removal and neck feather removal)

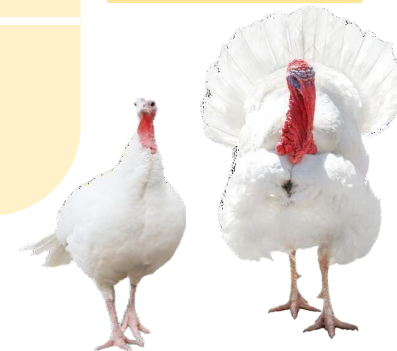


Toe removal is not practised in turkeys in EU Member States (EFSA, 2024; European Commission, 2024a,b); instead, **claw trimming** is practised, which was assessed.

Mutilations are typically performed on **newly hatched** chicks, but are associated with welfare consequences in **turkeys reared for meat production** and in **breeding turkeys**.

Negative affective states

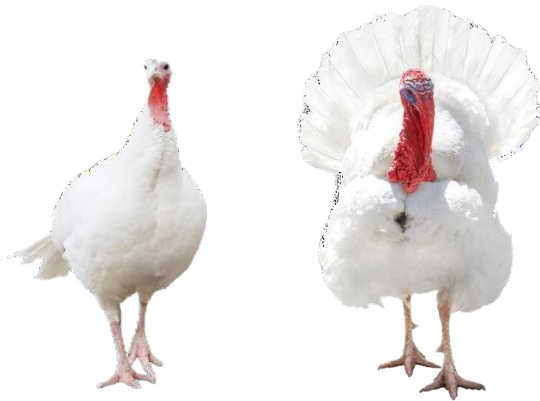
The **biological functions** of the **removed body parts** were assessed in relation to the relevant **welfare implications**; the ethical dimension of animal integrity was outside the scope of this assessment.





A request was made to evaluate the MBAs that can be collected at the slaughterhouse to assess on-farm welfare.

The MBAs identified were considered relevant for **turkeys intended for meat production and breeding stock.**



EFSA's approach, methodology and engagement strategy

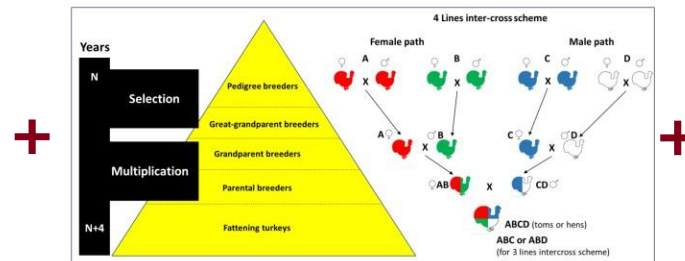




Description of turkey categories



Description of the production cycle and its duration



Housing systems and practices currently used in the EU



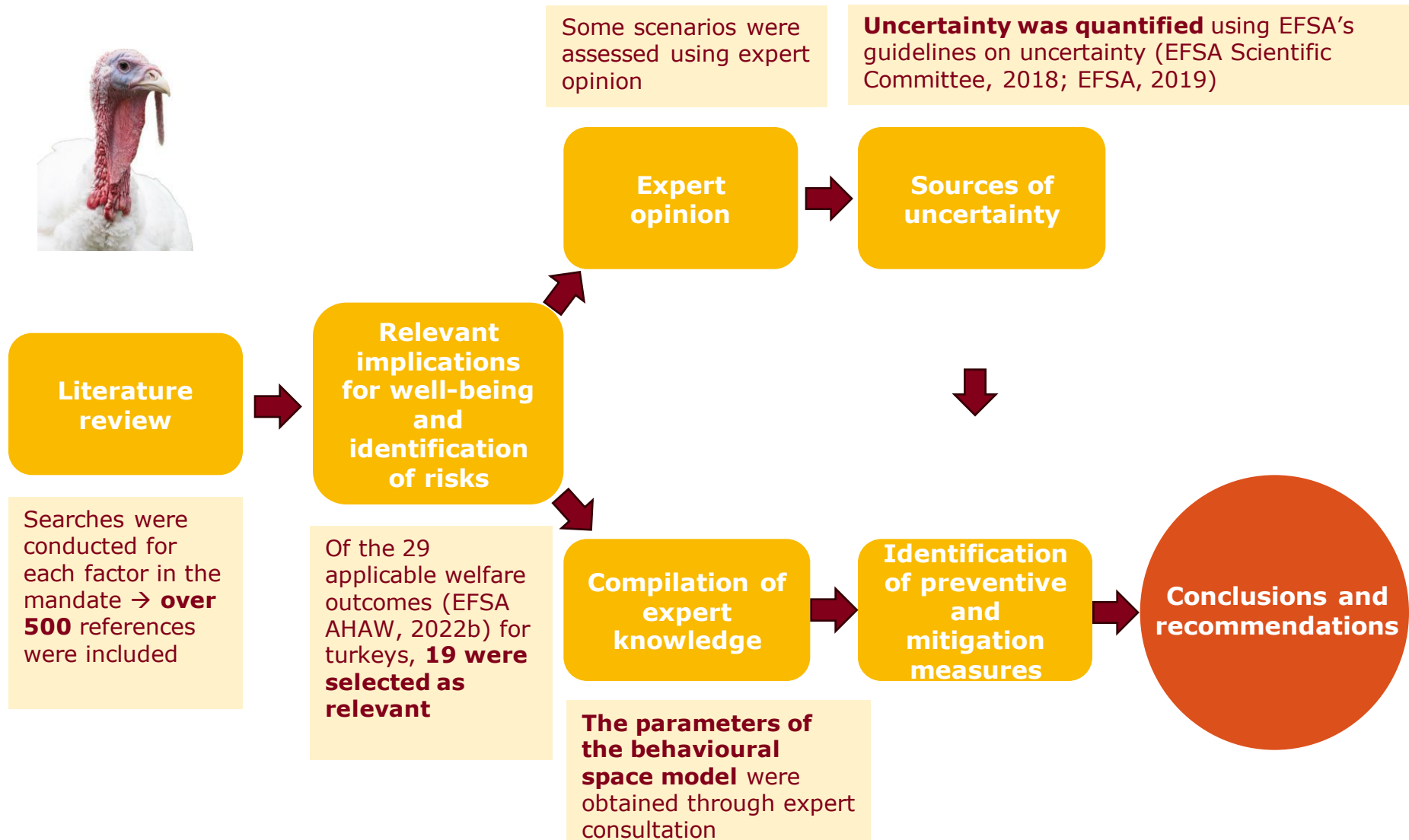
Most common housing systems and practices for keeping turkeys (*Meleagris gallopavo gallopavo*) in the EU

<https://doi.org/10.2903/sp.efsa.2026.EN-9864>



Some scenarios were assessed using expert opinion

Uncertainty was quantified using EFSA's guidelines on uncertainty (EFSA Scientific Committee, 2018; EFSA, 2019)



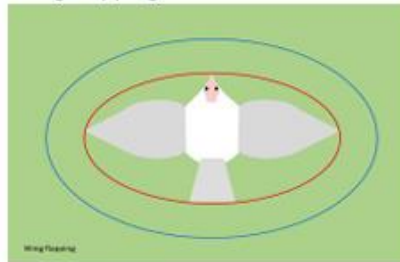


Six types of natural behaviour

Dynamic behaviours



Wing flapping



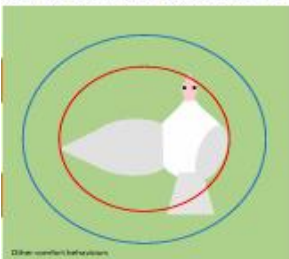
Stationary behaviours



Dustbathing



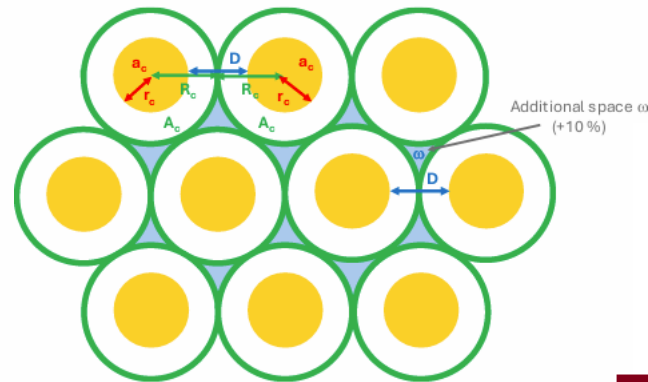
Other comfort behaviours



Strutting



Semi-formal expert judgement
(EFSA Scientific Committee, 2018)
for the behavioural model
parameters



$$A_c = \omega \cdot \pi \cdot \left(\sqrt{\frac{a \cdot F_c}{\pi}} + \frac{D}{2} \right)^2$$

a	Bird's area
b	Interindividual distance
P_c	Proportion of birds exhibiting the behaviour



Turkey welfare: conclusions of the scientific opinion



Co-funded by
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Mutilations

Ammonia concentration

Lighting conditions

Carbon dioxide concentration

Available space

Effective ambient temperature

Type and condition of the litter

Group size

Type and availability of enrichment

Flock reduction and removal of females

Nest conditions

Artificial insemination

Genetic selection and breeding strategies

Food restriction

Housing conditions

The three types of mutilation practised in the EU



Beak trimming

Removal of *the snood* (caruncle)

Claw trimming



Common to all mutilations

- Soft tissue injuries and damage to the integument
- Handling stress

Beak and nail trimming

- Inability to engage in exploratory and foraging behaviours
- Inability to engage in comfort-seeking behaviour
- Prolonged starvation
- Prolonged thirst

Trimming of claws

- Locomotor disorders (including lameness)

Mucus removal

- Heat stress



Acute and chronic pain



When kept under **current standard** housing conditions:

- ❖ Beak trimming effectively reduces damage caused by aggressive pecking.
- ❖ Intact toes increase the risk of injury in female turkeys, but not in males.

For all forms of self-mutilation, soft tissue injuries and damage to the skin inflicted by turkeys with intact toes can **be prevented** by implementing appropriate housing conditions and management practices, including:

- ❖ Environmental enrichment
- ❖ Strategic genetic selection
- ❖ Appropriate lighting conditions
- ❖ Sufficient space
- ❖ Natural wear or smoothing of the beak or claws





To phase out **beak trimming, mucus removal and nail clipping**

Strategies to **prevent pecking and scratching** must be implemented before these practices are phased out and maintained after their elimination.

Compilation of knowledge on **good husbandry practices** from EU Member States where mutilation has been omitted for decades.

Until mutilation is phased out, it is recommended that practical measures and effective methods be developed to alleviate pain during and after mutilation.



Lighting conditions: Recommendations



A **minimum light intensity of 10 lux** must be provided during the light phase at the birds' eye level.

A stable light-dark cycle must be maintained, with dark phases adjusted to the birds' age to support **circadian rhythms**.

Lighting programmes characterised by **schedules of increasing and decreasing light intensity** must be gradual and predictable.

Exposure to daylight or artificial lighting that includes **UV-A wavelengths** must be provided.

Avoid light flickering that is perceptible to turkeys.

Continuous monitoring of feather pecking, plumage condition and resting behaviour is recommended.





Direct

- ❖ Restriction of movement
- ❖ Resting problems
- ❖ Group stress
- ❖ Inability to engage in comfort-seeking behaviours
- ❖ Inability to engage in exploratory and foraging behaviours

Indirect

- ❖ Heat stress
- ❖ Soft tissue injuries and damage to the integument
- ❖ Gastrointestinal disorders
- ❖ Respiratory disorders
- ❖ Musculoskeletal disorders (including lameness)



Identified risks: Insufficient space



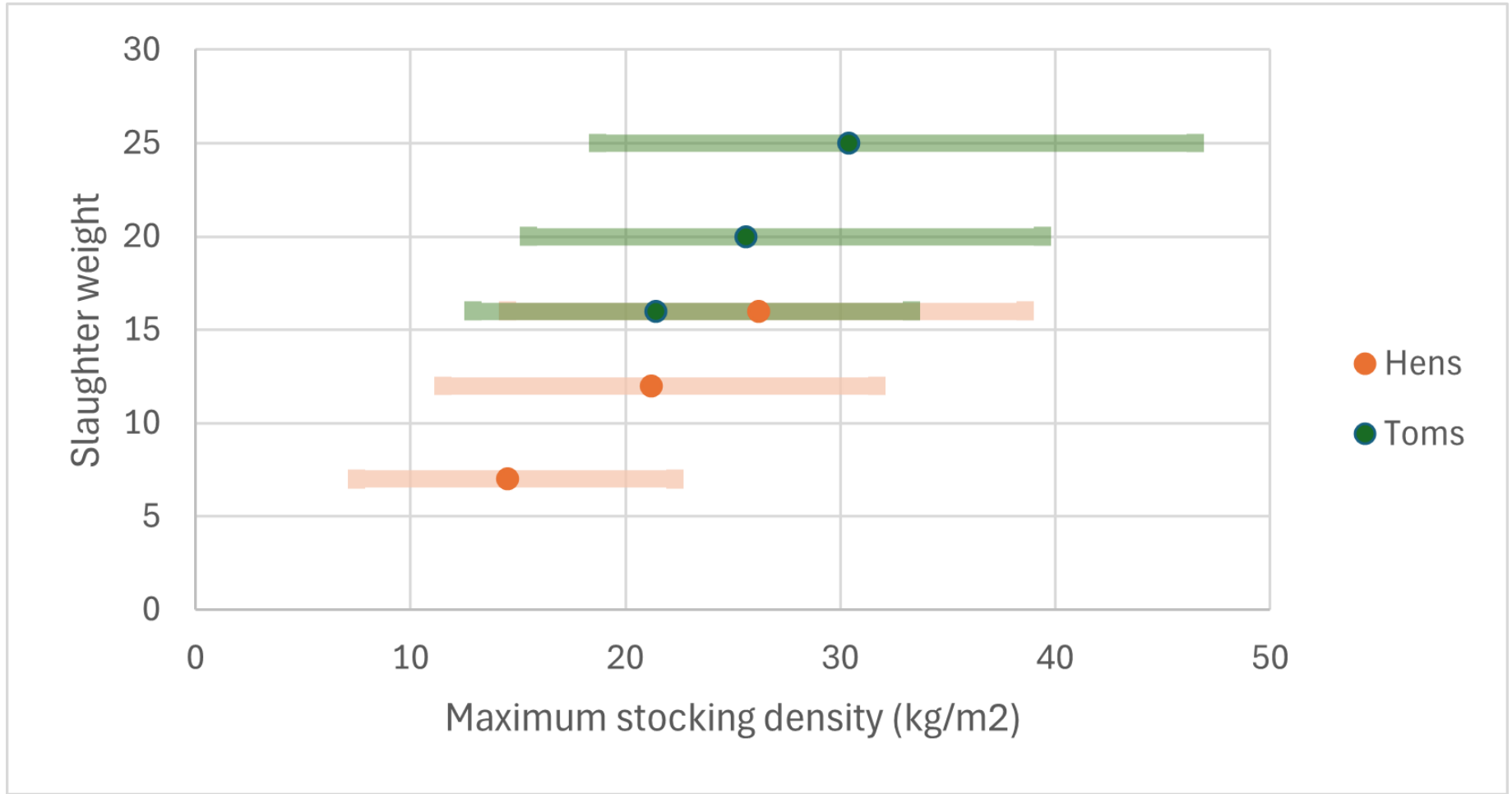


The minimum space required for turkeys to **express their full range of behaviours without restriction**, whilst **preventing or mitigating the associated welfare consequences**:

- ❖ Female turkeys: ranges from 0.49 m² per female with a target body weight of 7 kg to 0.61 m² per female with a target body weight of 16 kg.
- ❖ Male turkeys: ranges from 0.74 m² per male with a target body weight of 16 kg to 0.82 m² per male with a target body weight of 25 kg or more.



Minimum spaces translated into maximum densities: Recommendations



Type and condition of litter: Recommendations



The litter should be spread out **before the chicks arrive**, covering the entire floor.

Keep the **litter dry** (**below 35–40% moisture content**).

Use **shredded straw** and **straw pellets** due to their high absorption and cushioning capacity.

Avoid using unchopped straw.

Adjust the ventilation.

Visually check (at least once a day) the condition of the litter.

Turn the litter and partially replace damp litter with fresh litter.





Hazards

Inadequate, insufficient or non-existent

- ❖ Elevated structures
- ❖ Equipment for foraging and exploration
- ❖ Visual barriers
- ❖ Sand baths
- ❖ Complex enriched environments with or without a covered veranda
- ❖ Complex enriched environments with outdoor space

Consequences for welfare

- ❖ Cold stress
- ❖ Heat stress
- ❖ Group stress
- ❖ Inability to engage in comfort-seeking behaviours
- ❖ Inability to engage in exploratory and foraging behaviours
- ❖ Locomotor disorders (including lameness)
- ❖ Difficulty resting
- ❖ Sensory under-stimulation
- ❖ Soft tissue injuries and damage to the integument



Type and availability of enrichment: Recommendations



Turkeys should be housed in a **complex and enriched environment**, including enrichment elements **designed to appeal to different motivations**.

- ❖ Preferably, this should be combined with access to a covered veranda (minimum 20% of additional space) and/or access to an outdoor run.

Elevated structures (preferably platforms, 0.12 m² per 12 kg of female body weight), edible materials for exploration and foraging, visible barriers and sand baths must be available continuously in **multiple locations within the house**.

Ramps to the elevated structures must be provided so that all turkeys have **easy access**.

First access to:

- ❖ Covered veranda: 5 weeks of age
- ❖ The outdoor run: between 6 and 9 weeks of age

Ensure there are **easy transitions** between the covered veranda and the indoor area.





Health and well-being

Vitality
Resistance to disease
Paw health (pad injuries, hock burns, angular deformities)
Gait/ability to walk

Cardiovascular capacity and function
Cannibalism
Feather pecking Behaviour
Intestinal health
Avian physiology Genetic defects

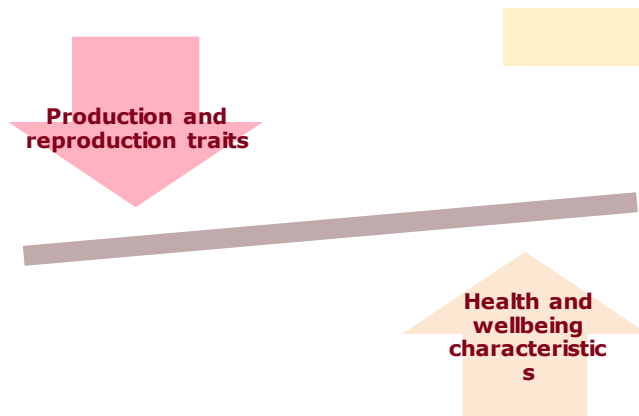
Reproduction

Egg production Fertility
Hatchability
Egg quality

Production

Body weight
Carcass yield, including breast yield
Feed conversion ratio
Residual feed intake Average daily weight gain
Carcass and meat quality

EFSA Stakeholder Meeting (2023); EFSA (2023); Neeteson et al. (2023); EFSA AHAW Panel (2010)



Genetic selection for behavioural traits is limited



Dangers:

Overemphasising increased productivity without considering relationships with other traits

Genetic selection for welfare: Recommendations

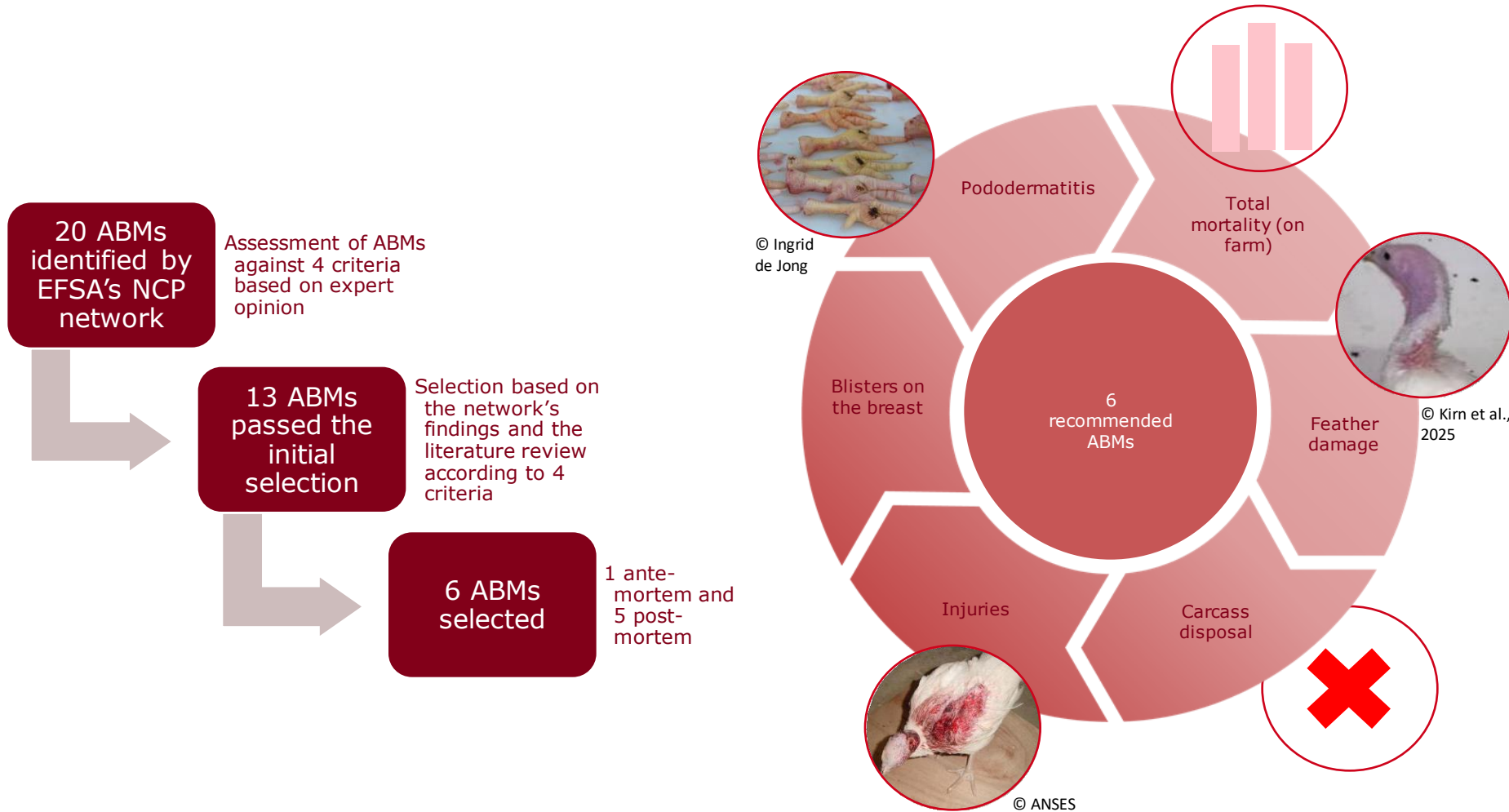


The risk of 'overemphasising productivity gains' should be mitigated **by increasing the number of welfare traits and their relative weighting**, whilst reducing the relative weighting of production traits in the breeding objective.

Greater attention should be paid **to traits related to leg health**.

Genetic selection and breeding strategies to improve turkey welfare should always be considered **in conjunction with** improvements in **housing and management**.







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SCIENTIFIC OPINION

efsa JOURNAL

Welfare assessment of turkeys (*Meleagris gallopavo gallopavo*) on farm

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Correspondence: [Ask a Question](#)

The declarations of interest of all scientific experts active in EFSA's work are available at <https://open.efsa.europa.eu/experts>.

Abstract
This Scientific Opinion assesses the welfare of turkeys of all ages (*Meleagris gallopavo gallopavo*) on farm in relation to the type and condition of the litter, type and availability of enrichment (including covered veranda and outdoor range), space allowance, concentrations of ammonia and carbon dioxide, effective environmental temperature, group size, nest conditions, lighting conditions and hatchery conditions, by using 19 welfare consequences and associated animal-based measures (ABMs) for their assessment. In addition, the data used by the experts of the



Technical Report

efsa SUPPORTING PUBLICATIONS

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Most common housing systems and practices of keeping turkeys (*Meleagris gallopavo gallopavo*) in the EU

European Food Safety Authority (EFSA),
Jutta Berk, Joanna Marchewka, Virginie Michel, Nienke van Staaveren,
Oana Maria Balmos, Chiara Fabris, Yves Van der Stede, Cristina Rojo
Gimeno, Antonio Velarde, Anja Brinch Riber

Abstract
This Technical Report addresses a mandate from the European Commission according to Article 31 of Regulation (European Commission) No 178/2002, which requests a review of the most common husbandry systems and current practices for keeping turkeys (*Meleagris gallopavo gallopavo*) of all ages on farm. The mandate requests a description of litter availability, access to outdoors (including covered veranda), stocking density, the enrichment provided and the light scheme of each housing system, the use of cages and the practices of separation of sexes, mutilations and breeding practices, including artificial insemination. An extensive literature review, a survey amongst stakeholders, a public call for evidence addressed to stakeholders, data from EFSA Networks, reports from the European Commission (fact-finding studies), Eurostat and input from experts in the EFSA working group on the welfare of turkeys were considered. This report provides an overview of the turkey production process and the duration of its various stages. In the European Union the most common housing systems for keeping fattening turkeys are indoor floor systems with and without outdoor access and/or a covered veranda. Turkey breeders are kept in indoor systems. These systems, including hatcheries, are described in this report considering the availability of litter and enrichment, the stocking density and the light scheme applied. In addition, the practices of processing poult in hatcheries, including mutilations, and the practices of flock thinning and separation of sexes in fattening turkey farms, and artificial insemination in turkey breeders are described.

© European Food Safety Authority, 2026

Keywords: artificial insemination, hatcheries, housing systems, poult, turkeys, turkey breeders, stocking density

www.efsa.europa.eu/publications EFSA Supporting publication 2026: EN-9864





EFSA's scientific opinion on

Welfare of turkeys on farm



Turkeys are raised for meat production in large flocks across the EU, mainly in indoor housing. Systems with covered veranda and outdoor range are also used.

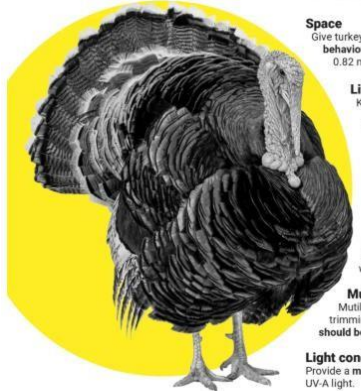
EFSA's experts reviewed the latest scientific evidence to assess the living conditions of turkeys on farm and provided recommendations to improve their welfare, focusing on housing, management and breeding.

What kind of turkeys?



POULTS	TURKEYS KEPT FOR FATTENING	BREEDING TURKEYS
Hatched turkeys up to 7 days of age	Turkeys kept between 15 and 22 weeks raised for their meat ranging from 7 kg to 25 kg respectively	Turkeys that are raised and selected to become the parents and older generations of turkeys kept for fattening

A focus on welfare



Space

Give turkeys enough room to perform motivated behaviours, at least 0.49 m² for 7 kg birds and 0.82 m² for 25 kg birds.

Litter quality

Keep litter dry, clean and friable.

Environmental enrichment

Provide foraging materials to explore and elevated platforms for perching.

Air quality

Ensure good ventilation keeping ammonia below 10 ppm and CO₂ below 2000 ppm.

Breeding

Breeding should focus on improving welfare such as strengthening leg health.

Mutilations

Mutilation practices such as beak trimming, de-snooding and toe-trimming should be avoided.

Light conditions

Provide a minimum light intensity of 10 lux and UV-A light.

Appropriate housing, management and breeding are key to improve turkey welfare and health.



PLAIN LANGUAGE SUMMARY

efsa JOURNAL

Check for updates

February 2026

Welfare assessment of turkeys on farm

Background

- Turkeys (*Meleagris gallopavo gallopavo*) are raised on farms across the EU for meat production and breeding. They are usually kept indoors.
- Inappropriate housing conditions, management or breeding practices can negatively affect the welfare of turkeys. Indicators of welfare problems are, for example, lameness, foot pad dermatitis, pecking injuries and unfulfilled behavioural needs.
- There is currently no EU legislation specifically for the protection of turkeys on farm, so the general animal welfare provisions laid down in Council Directive 98/58/EC apply.
- This is EFSA's first scientific opinion on the on-farm welfare of turkeys.

What was EFSA asked to do?

The European Commission requested EFSA to provide a scientific opinion to support possible future EU legislation on the protection of turkeys kept on farm, focusing on:

- Reviewing the most common housing systems and practices for meat and breeder turkeys in the EU (covered in a separate [EFSA technical report](#)).
- Identifying and assessing relevant negative welfare consequences by using animal-based measures (ABMs) associated with on-farm conditions such as litter type, provision of enrichment, outdoor access, required space, group size, and environmental and light conditions.
- Proposing suitable ABMs to be collected at slaughter to assess on-farm turkey welfare.
- Providing recommendations to prevent or mitigate the identified welfare consequences.

How did EFSA carry out this work (and what data were used)?

- EFSA reviewed the scientific literature from 1954 to 2025, grey literature and evidence provided by stakeholders during a public call for evidence. Additionally, EFSA used expert group discussion to identify and assess relevant welfare consequences, propose suitable ABMs for welfare monitoring, and provide recommendations for improving turkey welfare on farm.
- Based on experts' input, EFSA developed a behavioural space model to estimate the minimum space for turkeys. This model is based on the space required for turkeys to perform different natural behaviours, including stationary behaviours, dynamic behaviours, other comfort behaviours, wing flapping, dustbathing and strutting.

What were the outcomes and their implications?

Outcomes

- Nineteen key welfare consequences were identified for turkeys, including restriction of movement, locomotory disorders, soft tissue lesions and integument damage, inability to perform exploratory or foraging behaviours, cold/heat stress and inability to express nesting behaviour.
- Key factors that increase the risk of poor welfare in turkeys included overcrowding, mutilations, wet litter, lack of environmental enrichment, poor air quality, too low/high temperatures, high hen-to-nest ratios, flock thinning, and feed and water deprivation.
- The behavioural space model indicated that turkeys need at least 0.49 m² for 7 kg birds and 0.82 m² for 25 kg birds to perform naturally motivated behaviours; this is more space than what is currently provided on farms.



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This is the opinion of EFSA. The statements regarding food and feed safety, if done in consultation with national authorities and other stakeholders, are the responsibility of the competent authorities. EFSA does not accept any liability for the consequences of any actions taken on the basis of this opinion.

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