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

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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 poults 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.

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

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Summary

The European Commission requested from EFSA, in accordance with Article 31 of Regulation (EC) No 178/2002, a Technical Report that reviews the most common husbandry systems and current practices for keeping turkeys (*Meleagris gallopavo gallopavo)* of all ages on farm, focusing on day-old poults, turkey breeders and fattening turkeys. Term of Reference A of the mandate requests a description the types of housing, litter availability, outdoor access (including covered veranda), stocking density, enrichment provided and light scheme of each housing system, the use of cages and the practices of separation of sexes, mutilations and breeding practices, including artificial insemination. The production phases of transport and slaughtering were not part of the request.

To obtain data and information to address the mandate, the following methodologies were used:

1) An extensive literature review in Web of Science of relevant scientific articles published between 1980 and 2024,
2) A survey amongst stakeholders with questions on housing systems and practices at the hatchery, fattening turkey farms, and breeder farms of parents, grandparents, great grandparents and pedigree/pure line birds, and
3) an EFSA public call for evidence.

This call for evidence focused on eight areas including

1) husbandry systems of turkeys kept for meat production, turkey breeders, and hatchery conditions,
2) breeding of turkeys and impact on welfare,
3) stocking density (kg/m^2 and birds/m^2) in different husbandry systems;
4) environmental conditions and environmental enrichment;
5) the practice of mutilations in turkeys;
6) separation of turkey toms and turkey hens in the barn;
7) the practice of thinning in turkeys kept for meat production; and
8) welfare assessment in turkey farming.

In addition to the information obtained from the three above-mentioned methodologies, data from the following sources were also used:

1) EFSA Networks dealing with animal welfare matters on the mutilations performed on turkeys,
2) Reports of the fact-finding studies from the EC to collect information on the national system for the protection of turkey welfare on farm in France, Germany and in Italy, and

3) Production data obtained from Eurostat and a report of the European Union Reference Centre for Animal Welfare for Poultry and other small farmed animals (EURCAW-Poultry-SFA) on the husbandry systems for turkeys (EURCAW, 2023).

EFSA experts' knowledge and information derived from working group discussions were also included in this report.

Available data showed that in 2023, the EU had about 5,000 turkey fattening farms producing over 171 million turkeys, along with 43 turkey hatcheries and 270 turkey breeder parent farms. Turkey breeders of grandparent lines and higher-level generations are located in two countries in Europe: France (14 grandparent farms) and the UK (20 grandparent farms). In the EU, there are mainly two breeding companies providing turkeys, namely Aviagen™ Turkeys and Hendrix Genetics™, that produce a range of heavy and medium lines of turkeys.

The production cycle of fattening turkeys (i.e., turkeys kept for meat production) starts with the fertilised turkey eggs that are transported to the hatchery, where hatching takes place after around 28 days of incubation. After hatching, turkey poults are subjected to a number of procedures, which are collectively named 'servicing' and include sexing and culling of second-grade poults that have malformations like umbilical cord disorders or leg problems; poults are also subjected to mutilations, such as beak trimming, toe trimming and de-snooding. Subsequently, turkey poults are then transported to the fattening farms 24 to 72h after hatching, where the brooding period lasts for about 4-6 weeks, followed by a growing period that lasts between 10 and 13 weeks for turkey females (henceforth called turkey hens) and between 15 and 17 weeks for turkey males (henceforth called turkey toms). In total, the production cycle of turkeys from day-old poult to finishing turkey hens and toms lasts between 15 and 18 weeks and 20 and 22 weeks, respectively. Turkey hens of heavy lines have an average daily weight gain of 97 g/day and reach an average weight of 10.7 kg in 15 weeks; medium line hens have an average daily weight gain of 88 g/day and reach an average weight of 8.2 kg in 13 weeks. Turkey toms of heavy lines have an average daily weight gain of 149 g/day and reach an average weight of 21 kg in 20 weeks; medium-line toms have an average daily weight gain of 136 g/day and reach an average weight of 16 kg in 18 weeks.

The production cycle of turkey breeders lasts between 55 and 58 weeks. During the first 29 weeks, turkeys are immature and housed in rearing farms. Following that, they are transported to production farms to start the production and the laying period. Sexual maturity is controlled through light stimulation and feeding programmes. Breeding in turkeys is conducted by means of artificial insemination. When turkey breeder toms reach 30 weeks, semen is collected twice per week and used to inseminate the turkey hens weekly. During the laying period, lasting about 26 weeks, the average turkey hen lays about 110 fertilised eggs.

The following husbandry systems for poults, fattening turkeys and breeding turkeys were identified and described in this report: (1) hatcheries, where turkey poults are hatched from fertilised eggs, (2) indoor farms for fattening turkeys, (3) indoor farms with access to covered veranda for fattening turkeys, (4) indoor farms with an outdoor range and with or without a covered veranda for fattening turkeys, (5) indoor farms without covered veranda or outdoor range for turkey breeders.

In Europe, turkey poults are hatched from fertilised eggs in industrial hatcheries, which typically run two hatching batches per week. Fertilised eggs are stored for up to 26 days before being placed in the incubators. The eggs are kept in the incubators for 25 days and then placed in

hatching chambers, where hatching starts on day 27 or 28. The hatching window lasts between 12 and 48 h. Following, poults are placed in trays and moved through conveyor belts. The process begins with a drying phase and hatchery procedures that last between 2 and 3 h. After this, the poults are placed into cardboard or plastic boxes to be transported to the farms. There is no water or feed provided to the poults in the hatchery at the time of this report was finalized (end of 2025), on-farm hatching was not practiced in the EU for turkeys.

Fattening turkey toms and hens are raised on the same or on different farms, but sexes are always kept separated. Turkeys are kept indoors in barren buildings of 1,000 to 2,000 m^2 with deep litter that house about 3,500 turkey toms or 7,000 turkey hens. The maximum stocking density applied varies depending on the Member State (MS), ranging from 40 kg/m^2 in Austria to 65 kg/m^2 in Italy. The birds have *ad libitum* access to feed and water from their arrival on farm. During the first 5 to 6 weeks, turkeys can be housed in brooding houses and then moved to growing houses, or they can be placed in a house encompassing both the brooding and growing period. Light schedule changes from light during the first 24h to provide 16 to 18h of light from the end of the first week. Different enrichment materials or structures can be provided, such as elevated platforms, pecking blocks, egg boxes, bottles, ropes and strawbales or hay baskets/nets. In some MSs, the practice of flock thinning, which is the removal of some birds before the end of the production cycle of the whole barn, is applied to allow more birds to be reared than the maximum capacity of the barn at the end of the cycle. In some MSs, because hens have a production cycle shorter than toms, farms that rear both sexes routinely remove the hens earlier.

In turkey breeders, stocking density varies depending on the genotype and the production phase, with a median of 1.5 toms/m^2 and 3 hens/m^2.Lighting programmes differ markedly between breeder toms and hens, and vary with age. For example, breeder hens are typically kept under very short day-lengths (e.g. 7-8h light) for a conditioning period before photostimulation at ~29-30 weeks of age, after which the day length is increased to induce sexual maturity. For breeder toms, once they have completed moult, exposure to a day length of 12 h or more is used to stimulate testicular development and semen production.

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1 Introduction

1.1 Background and terms of reference as provided by the European Commission

1.1.1 Background

In accordance with the Farm to Fork Strategy, published on 20 May 2020, the Commission is working on the revision of the EU animal welfare legislation. This includes the following acts:

1. Council Directive 98/58/EC of 20 July 1998 concerning the protection of animals kept for farming purposes[1];

2. Council Directive 1999/74/EC of 19 July 1999 laying down minimum standards for the protection of laying hens[2];

3. Council Directive 2008/119/EC of 18 December 2008 laying down minimum standards for the protection of calves[3];

4. Council Directive 2008/120/EC of 18 December 2008 laying down minimum standards for the protection of pigs[4];

5. Council Directive 2007/43/EC of 28 June 2007 laying down minimum rules for the protection of chickens kept for meat production[5];

6. Council Regulation (EC) No 1/2005 of 22 December 2004 on the protection of animals during transport and related operations and amending Directives 64/432/EEC and 93/119/EC and Regulation (EC) No 1255/97[6];

7. Council Regulation (EC) No 1099/2009 of 24 September 2009 on the protection of animals at the time of killing[7].

There is currently no specific EU animal welfare legislation covering turkeys, however Council Directive 98/58/EC of 20 July 1998 concerning the protection of animals kept for farming purposes[8] applies for this animal species. In addition, in 2001 the Council of Europe has adopted a specific Recommendation concerning turkeys[9] which is incorporated into the EU animal welfare acquis by Council Decision 78/923/EEC[10].

In 2019, EFSA has published two scientific opinions, one on the welfare of slaughter and the other on on-farm killing of poultry species (including turkeys). In 2022, EFSA has

[1] OJ L 221, 8.8.1998, p. 23
[2] OJ L 203, 3.8.1999, p. 53
[3] OJ L 10, 15.1.2009, p. 7
[4] OJ L 47, 18.2.2009, p. 5
[5] OJ L 182, 12.7.2007, p. 19
[6] OJ L 3, 5.1.2005, p. 1
[7] OJ L 303, 18.11.2009, p. 1
[8] OJ L 221 , 8.8.1998, p. 23
[9] https://www.coe.int/en/web/cdcj/2001-rec-turkeys
[10] OJ L 223, 17.11.1978, p.2

published a scientific opinion on transport of animals in containers including turkeys. However, previously EFSA has not published scientific opinions on the welfare of turkeys on farm.

Against this background, the Commission would like to request the EFSA to review the available scientific publications and other sources to provide an updated and sound scientific basis for possible future EU specific legislation on the welfare of turkeys on farm.

This request is about the protection of turkeys *Meleagris gallopavo gallopavo* on farm, covering turkeys of all ages (breeding turkeys and turkeys kept for meat production) including hatchery conditions.

1.1.2 Terms of reference

The Commission therefore considers opportune to request EFSA to give an independent view on the protection of turkeys.

A. The Commission requests EFSA to deliver a technical report in accordance with Article 31 of Regulation (EC) No 178/2002[11] on the elements below:

   Request 1. A review of the most common husbandry systems and current practices for keeping turkeys *Meleagris gallopavo gallopavo* on farm, covering turkeys of all ages (breeding turkeys and turkeys kept for meat production) including hatchery conditions in the EU.

   This is to include description of the types of housing, litter availability, access to outdoors (including covered veranda), stocking density applied, the enrichment provided (perches, platforms, pecking objects, etc.) and the light scheme. It also includes the practices of thinning in farms of turkeys kept for meat production, the separation of sexes and mutilations. It includes the description of the hatchery conditions and the use of cages and breeding practices (including artificial insemination) in turkey breeders.

B. The Commission requests EFSA to deliver a scientific opinion in accordance with Article 29 of Regulation (EC) No 178/2002 for keeping turkeys *Meleagris gallopavo gallopavo* on farm, covering turkeys of all ages (breeding turkeys and turkeys kept for meat production) focusing in particular on the issues identified below:

   Request 2. Assess

   a. for turkeys kept for meat production, turkey breeders and poults, the risk to welfare posed by the following risk factors and practices: the type and condition of the litter, type and presence of enrichment, availability and condition of outdoor space (including covered veranda), space allowance, environmental (ammonia, CO_2, temperature) and light conditions, group size and mixed keeping of males and females;

   b. for turkeys kept for meat production, the risk to welfare posed by the following risk factors and practices: the final weight, average daily weight gain, the practice of thinning and the practices of feed and water restriction.

[11] OJ L31.1 28.8.2002, p.24

c. for turkey breeders, the risk to welfare posed by the following risk factors and practices: age of onset of breeding, nest conditions, artificial insemination and the practices of feed and water restriction;

d. the risk posed by the hatchery conditions, on the welfare of turkeys of all ages relevant;

e. the risk to welfare associated with beak trimming and other mutilations where performed (e.g. de-toeing and de-snooding);

f. the breeding and genetic traits that improve and/or impair welfare;

Request 3. Identify the relevant welfare consequences of the housing systems and the risk factors and practices described in Request 1 and 2, by using animal-based measures for the assessment of these welfare consequences.

Request 4. Provide qualitative and, where applicable, quantitative recommendations to prevent or mitigate the welfare consequences on farm identified in Request 3;

Request 5. Assess and define suitable animal-based indicators collected at the slaughterhouse to monitor the level of welfare of turkeys on farm.

1.2 Interpretation of the Terms of Reference

This Technical Report aims to address the term of reference (ToR) Part A Request 1 relevant to the scientific and technical assistance in accordance with Article 31 of Regulation (EC) No 178/2002 (see point A in section 1.1.2 Terms of reference). The objective of this report is the description of the most common housing systems and current practices applied in turkey production in the EU. The assessment of the risks related to the most common husbandry systems and practices, Part B of the ToRs, is included in the Scientific Opinion on the welfare of turkeys on farm (EFSA AHAW Panel, 2026).

The animal categories reviewed in this mandate include poults, fattening turkeys, and turkey breeders. In the context of this report, a poult is defined as a newly hatched turkey up to 7 days of life; fattening turkeys are turkeys kept for meat production and breeding turkeys are kept for reproduction. In turkeys, it is conventional to house the females (hens) and males (toms) separately, and both can be reared for breeding or fattening purposes.

This report first describes the abovementioned animal categories and the duration of their production cycle. Subsequently, the husbandry systems and the current practices applied to keeping these animals are described.

In ToR A, the EC listed examples of enrichment in turkey production such as perches, platforms and pecking objects. In the context of this report, enrichment is defined as ''housing elements (either single type or multiple types combined in a complex system) that increase the occurrence and variety of species-specific and motivated behaviours' (Riber et al., 2018). There is a growing trend in the scientific community towards viewing housing elements necessary for meeting basic behavioural motivations as 'mandatory housing requirements' rather than 'enrichment'. Consequently, many elements traditionally seen as enrichment would no longer fit this definition. For instance, perches and platforms are essential for turkeys to perform the highly motivated behaviour of

roosting; therefore, according to the described trend, they would not be considered enrichment, but they are still included and referred to as enrichment to accommodate the request from the EC.

The mandate requests an assessment of the condition of the outdoor space, including covered veranda. Some publications refer to the covered veranda as a 'winter garden'. The name 'winter garden' could be misleading, as it could be interpreted as a space that is only used during the winter months or as a 'garden' (i.e., a complex and natural environment); therefore, in this report, only the term 'covered veranda' will be used and all information on 'winter gardens' has been used to address the request on verandas.

There are no EU-level legislative requirements specific on the protection of turkeys on farm, but Council Directive 98/58/EC concerning the protection of animals kept for farming purposes is applied after being transposed into the national legislations. These include specific legislative acts for keeping turkeys in e.g., Austria[12], The Netherlands[13], the Regions of Flanders[14] and of Wallonia[15] in Belgium, Denmark[16], Poland[17], and Sweden[18]. In Germany, there is a voluntary agreement applied by industry adopted in 2013 (Verband Deutscher Putenerzeuger, 2013). The Recommendation concerning turkeys from the European Convention for the Protection of Animals kept for Farming Purposes adopted on 21 June 2001[19] included a series of recommendations for certain aspects such as (i) stockmanship and inspection; (ii) enclosures, buildings and equipment; (iii) management; (iv) changes of genotype; (v) changes of phenotype. This recommendation defines minimum requirements on aspects such as the prohibition of keeping turkeys in cages, a minimum illumination level of 10 lux at bird eye level, a minimum of two daily inspections by the keeper, the avoidance of barren environments, the availability of a sick pen, the availability of dry and friable litter and the prohibition of mutilations.

2 Data and methodologies

2.1 Data

Data to inform this Technical Report were collected using seven methods: 1) results of an extensive literature review, 2) information obtained from the relevant stakeholders, such as, non-governmental organisations (NGOs), industry, and academic institutions that were contacted through a survey, 3) information submitted by stakeholders through a specific

[12] https://www.ris.bka.gv.at/GeltendeFassung.wxe?Abfrage=Bundesnormen&Gesetzesnummer=20003820

[13] https://wetten.overheid.nl/BWBR0035238/2023-09-01

[14] https://etaamb.openjustice.be/nl/besluit-van-de-vlaamse-regering-van-22-december-2023_n2024000463
This regulation is recently published and will be valid from 1 January 2026.

[15] https://bienetreanimal.wallonie.be/home/legislation/legislationlist/liste-de-legislations-bea/bienetre043-W.html

[16] Lov om hold af slagtekalkuner (Lov nr 91 af 09/02/2011) [Keeping of Turkeys for Fattening Act [Act no. 91 of 09/02/2011). https://www.retsinformation.dk/eli/lta/2011/91

[17] Rozporządzenie Ministra Rolnictwa I Rozwoju Wsi z dnia 28 czerwca 2010 r w sprawie minimalnych warunków utrzymywania gatunków zwierząt gospodarskich innych niż te, dla których normy ochrony zostały określone w przepisach Unii Europejskiej.
https://isap.sejm.gov.pl/isap.nsf/DocDetails.xsp?id=WDU20101160778

[18] Statens jordbruksverks föreskrifter och allmänna råd om fjäderfähållning inom lantbruket m.m. https://lagen.nu/sjvfs/2019:23

[19] https://www.coe.int/en/web/cdcj/2001-rec-turkeys

EFSA public call for evidence (see section 2.2.3), 4) field information from the EFSA Networks dealing with animal welfare matters on the mutilations performed on turkeys in their countries (EFSA, 2024), 5) evidence reported from the fact-finding studies performed in 2024 by the EC to collect information on the national system for the protection of turkey welfare on farm in France (EC, 2024a), in Italy (EC, 2024b) and in Germany (EC, 2025) and 6) production data retrieved from Eurostat[20] and a report of the European Union Reference Centre for Animal Welfare for Poultry and other small farmed animals (EURCAW-Poultry-SFA) on the husbandry systems for turkeys (EURCAW, 2023) and 7) information provided during an *ad-hoc* technical hearing with breeding companies on 17th October 2024 (information obtained through this is marked as personal communication).

The EURCAW report used information from a survey conducted amongst the members of the Poultry Veterinary Study Group of the EU in the first half of 2023, and it includes production data from the previous year and the forecast for 2023. The data collected by EUROSTAT were used to identify the number of tonnes of turkey meat produced, and the heads of turkeys slaughtered. The number of turkeys slaughtered in an EU MS may not reflect the accurate number of turkeys raised in that MS, as the birds can be transported to be slaughtered in neighbouring countries. This also occurs in the cases of those EU MSs where there are few or no turkey slaughterhouses; for example, turkeys reared in Denmark and the Netherlands are generally slaughtered in Germany and Belgium (EFSA, 2023).

2.2 Methodologies

An extensive literature review was conducted to gather information on the housing systems used in the EU for turkeys (*Meleagris gallopavo gallopavo*) of all ages kept on farms, including hatcheries and fattening and breeding housing. In addition, a survey of key stakeholders on the keeping of turkeys in the EU was conducted. The specific details of the literature search strategy and the survey are included below. Furthermore, as part of the engagement strategy in animal welfare mandates (EFSA, online a), a stakeholder meeting was held shortly after the reception of the mandate and a public call for evidence was launched by EFSA.

2.2.1 Literature review

An extensive literature review of housing systems and practices for keeping turkeys for breeding and meat production was conducted. The literature review was performed using the Web of Science Core collection (WoS) and restricted to records published between 1980 and 04 March 2024. The search query is included in Appendix A. The language was restricted to publications with English titles and abstracts. The records retrieved from WoS were exported to EndNote libraries/Excel files, including the relevant metadata (e.g., title, authors, abstract). Titles and abstracts were screened for relevance, and duplicates were removed. Full-text publications were screened if the title and abstract did not allow an assessment of the relevance of a paper. For details of the literature review strategy and results, see Appendix A. In addition, relevant articles, review articles, websites and key reports were checked for further relevant articles. EFSA experts were invited to propose any additional publications of which they were aware if relevant to address the mandate.

[20] https://agridata.ec.europa.eu/extensions/DashboardPoultry/PoultryProduction.html

2.2.2 Survey

Six surveys were launched to gather information on the production cycle of turkeys, hatchery conditions, housing systems used for fattening and breeding turkeys (including pedigree, pure lines, great-grandparent, grandparent and parent stock turkey breeders), and management practices relevant in the EU context.

In total, 25 stakeholders were contacted to fill out the surveys. They were identified as key informants with knowledge on the keeping of turkeys in the EU and included researchers, farmers, veterinarians, representatives from genetic companies and NGOs. Some of the stakeholders contacted had attended the Stakeholder meeting on the welfare of turkeys in Brussels[21] (see Section 2.2.3). The online surveys were conducted between 23rd of January 2024 and the 1st of March 2024. To obtain more information, the contacted stakeholders were requested to share the surveys with their networks. In total, 41 answers were received, as detailed in Appendix B. The survey questionnaires are available in supplementary material Annexes A to E.

2.2.3 Stakeholder meeting, public call for evidence and ad hoc technical hearing

In line with its policy on openness and transparency, and as part of its engagement strategy, EFSA organised a meeting with its stakeholders to promote a technical discussion on the available data and data sources that would inform EFSA's scientific advice on the welfare of turkeys on farm (for details of this event, see EFSA (online a).

The meeting took place in Brussels on 8th of November 2023 with the aim of presenting the Terms of Reference of the mandate and the new engagement strategy, which included a Public Call for Evidence that was launched by EFSA shortly afterwards. The call for evidence was open from 7th of December 2023 to 31st of January 2024 to collect information and data to support an assessment of the welfare of turkeys on farm as requested by the EC.

The information sought by EFSA through the Public call for evidence focused on the following topics: 1) husbandry systems of turkeys kept for breeding, turkey poults (hatchery conditions) and turkeys kept for meat production, 2) breeding of turkeys and its impact on welfare, 3) space allowance in different husbandry systems, 4) environmental conditions and environmental enrichment, 5) the practice of mutilations on turkeys, 6) separation of turkey toms and turkey hens in the barn, 7) the practice of thinning in turkeys kept for meat production and 8) welfare assessment in turkey farming.

In total, 24 stakeholders from six EU MSs and two non-EU countries replied to the public call for evidence and provided 89 comments, 99 files attached and 24 references. The contributions deemed relevant for this report were subsequently analysed and integrated into the description of the housing and practices applied in turkey farming.

[21] https://www.efsa.europa.eu/en/events/stakeholder-meeting-welfare-beef-cattle-and-turkeys-farming-practices-and-data

Data provided during the public call for evidence are publicly available in Open EFSA[22]. A list of the stakeholders that engaged with EFSA by attending the stakeholder event and/or submitting information to the public call for evidence is included in Appendix C. When the information was provided in a language other than English, it was translated using the EC Machine Translation System[23].

Out of 28 stakeholders, seven stakeholders provided 10 inputs that were considered relevant for this report and were referenced as 'EFSA Public call for evidence 2024', with 'PC-0741' as the prefix of the public consultation, followed by the specific submission section number (ranging from 1 to 8 as described above) and the name of the stakeholder who submitted the information. For an overview of the submissions that were used in this report, please see Appendix D.

3 Results

3.1 Production of turkeys in the European Union

Turkey meat represents the second major share of poultry meat production in the EU (12.5%) after broiler chickens (DG Agri, 2024). Turkey meat production in the EU is concentrated in five EU MSs, with Germany being the largest producer followed by Poland, France, Italy and Spain (Appendix E, Table E1). Between 2019 and 2023, these countries accounted for 90% of the EU market in terms of tonnes of turkey meat. However, production of turkeys also occurs in other EU MSs. In France, Italy and Germany there was a significant reduction in turkey production between 2021 and 2022 caused by avian influenza outbreaks (Appendix E Table E1). In terms of number of turkeys slaughtered, Poland leads the EU by accounting for 22% of the total number during the last five years (2019-2023), followed by France (20.1%) and Germany (18.7%) (see Appendix E, Table E2).

In 2022, there were more than 5,000 turkey fattening farms, in the EU and EFTA countries that produced over 170 million turkeys (Table 1). France has the largest number of commercial fattening farms (n=1,350) (EC, 2024a), followed by Germany (around 950), Italy (around 850), Poland (around 700) and Spain (around 650) (EURCAW, 2023). Grandparent breeder farms are present in the EU only in France, and, outside the EU, in the UK (see Table 1). Breeding parent stock is present in the EU, in France, Finland, Germany, Hungary, Italy, Norway, Poland, Spain and Sweden (see Table 1).

In the EU, turkey production is part of vertically integrated production systems/chains (so-called integrators). The whole poultry production chain follows a very tight and strict timeline from the moment of hatching and delivery of poults to the farms to the transport of turkeys to the slaughterhouses. This integrated approach ensures maximising the usage of the hatchery facilities, farms, transportation and slaughterhouses. Hungary ranks at the top of the list in terms of the largest number of integrators, while the major turkey meat producing countries (i.e., Poland and France) have been reported to possess only one or two very large integrators (see Table 1).

[22] https://open.efsa.europa.eu/consultations/a0cTk00000024ifIAA.
[23] https://commission.europa.eu/resources-partners/etranslation_en .

Production of turkeys is characterised by housing in large indoor barns. The top five producing EU MSs tend to apply stocking densities at the slaughter age ranging from 45 to 65 kg/m^2. Female turkeys (hereafter turkey hens or hens) are reared in different houses or parts of the barn than male turkeys (hereafter turkey toms or toms).

Table 1: Overview of the turkey industry in the EU MSs, Norway, Switzerland and the United Kingdom in 2023 (adapted from EURCAW, 2023).

Country	N° of integrators	N° of fattening farms	N° of parental breeder farms	N° of grandparent farms	N° of hatcheries	N° of turkeys produced annually
Austria	3	190	0	0	1	1,800,000
Belgium	1	25	0	0	1	1,000,000
Bulgaria	2	2	0	0	3	8,000
Cyprus	4	0[a]	0	0	0	25,000
Denmark	0	13	0	0	0	600,000
Finland	1	32	6	0	1	936,850
France	2	1350[b]	139[b]	14	5	32,000,000
Germany	4	950	30	0	8	24,500,000
Hungary	8-10	215	6	0	6	7,418,000
Italy	4	850	30	0	4	28,000,000
The Netherlands	0	30	0	0	0	1,500,000
Norway	2	46	2	0	2	1,000,000
Poland	1	700	30	0	5	40,000,000
Romania	1	10	0	0	3	2,800,000
Spain	6	650	22	0	5	30,000,000
Sweden	Unknown	10	7	0	1	500,000
Switzerland	2	45	0	0	1	275,000
EU MSs and EFTA countries Total	**43**	**5,118**	**272**	**14**	**46**	**172,362,850**
United Kingdom	**7**	2,500[c]	250[a]	20	5	14,000,000
All countries Total	**50**	**7,618**	**522**	**34**	**51**	**186,362,850**

(a) Reared in broiler farms only during the Christmas period

(b) Data from France extracted from EC (2024a)

(c) Referred to registered flocks, not farms.

3.2 Production cycle of turkeys and respective turkey animal categories

The following sections describe the animal categories in the turkey production cycle and include poults, fattening turkeys and turkey breeders and their main characteristics.

3.2.1 Poults hatched in hatcheries

Typically, poults hatch in hatcheries after 25 days of incubation of the fertilised eggs, followed by approximately 3-4 days in the hatcher. Poults go through several hatchery procedures, which are called servicing, including sexing. Poults of the same sex are grouped and, within 24h to 72h after hatch, transported to the farms. More details on the diverse hatchery procedures of poults are provided in Section 3.3.1.

3.2.2 Fattening turkeys

Turkey poults meant for meat production are transported from the hatchery to the farm, where hens and toms are usually kept in separate barns or separated by a fence within a barn. Poults grow from 61-68 g (Mróz et al., 2019) to about 20 kg (turkey toms) or 11 kg (turkey hens) in 20 or 15 weeks, respectively. The production cycle consists of three phases: the initial one, called brooding phase during the first week, is followed by a rearing phase (until 4-6 weeks of age) and a growing/finishing phase, which lasts between 12 and 16 weeks depending on the sex, genotype and target weight (Mailyan & van Schie, 2019 retrieved from EFSA Public call for evidence 2024 - PC-0741 1 - Fachtierärztliche Praxis für Wirtschaftsgeflügel und Beratung). Depending on the factors listed above, turkey toms are kept until about 20 to 22 weeks of age and turkey hens until 15 to 18 weeks of age.

According to the results of the survey, turkeys are mainly kept in an all-in, all-out systems also known as brood-to-finish systems, meaning they are kept in the same barn until they reach slaughter age (Figure 1). However, depending on the country and housing practices applied, turkey poults can also be placed in a brood and move system, where they are transferred after brooding and rearing (up to 5 to 6 weeks of age) to a different facility to be kept for growing/finishing until the age of slaughter. In some countries, e.g., Austria, Germany, Poland and Sweden, both the brood to finish system and the brood and move system can be applied (see Appendix F, Table F7). For instance, in Germany, according to a submission to the Public call for evidence (EFSA Public call for evidence 2024, PC-0741 1 - Verband Deutscher Putenerzeuger e.V. (VDP)), turkey hens and toms are sometimes housed separately in the same barn during brooding and rearing (about 6 weeks). When growing starts, the turkey toms are moved to another house (growing barn), and the turkey hens are given access to the entire space of the brooder barn until slaughter at around 15-16 weeks of age. In line with country-specific biosecurity requirements, the downtime between flocks generally involves a 2 to 4-weeks cleaning and disinfection phase.

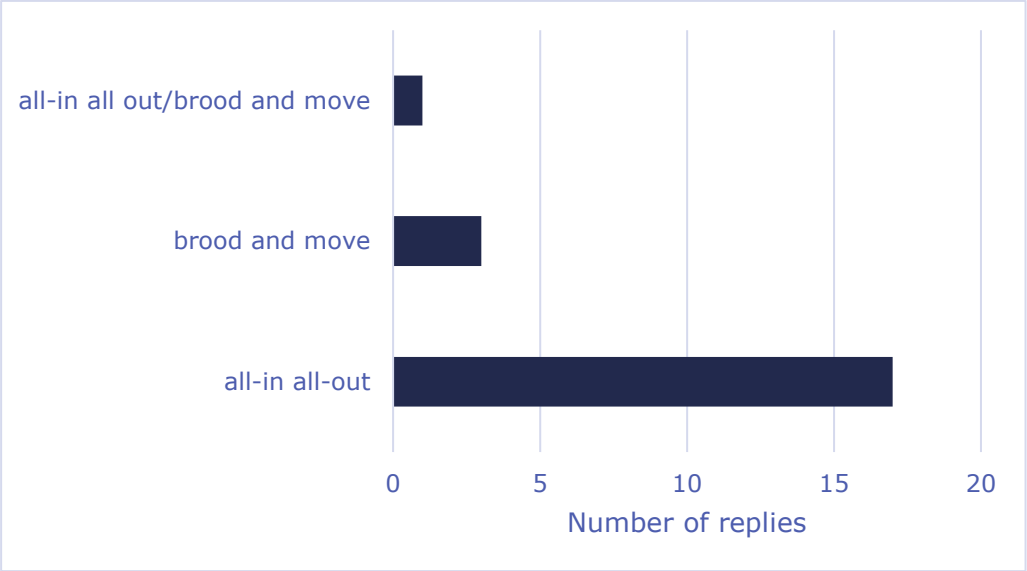

Figure 1: Survey replies with the type of farm management system for fattening turkeys: all-in all out/brood and move, brood and move and all-in all-out (brood to finish).

In the EU there are two main commercial breeding companies, Aviagen™ Turkeys and Hendrix Genetics™, that market heavy and medium/heavy turkey breeders (Glawatz & Kartzfehn, 2024), retrieved from EFSA Public call for evidence 2024, PC-0741 1 - Landwirtschaftskammer Nordrhein-Westfalen).

Management guides provide recommendations about the special needs and performance data from poults and turkeys for meat production (Aviagen Turkeys, 2023b; Hendrix Genetics, online). Heavy or medium genotypes are classified based on the average daily weight gain (ADG). The duration of the production cycle and the target body weight of heavy and medium genotypes vary and depend on sex and genotype of the bird, as well as the market requirements of the different countries. For instance, heavy turkey hens with an ADG of about 97 g/day are reared for 14-18 weeks to achieve 9-15 kg slaughter weight, whereas heavy turkey toms with an ADG of 149 g/day, are fattened for 20-22 weeks at a slaughter weight ranging between 18.5-22.5 kg (Table 2). High variability was observed in relation to weight and age at slaughter for the medium genotypes. Indeed, turkey hens of medium genotypes with an ADG of about 88 g/day may be kept for 10 weeks to achieve 5 kg in some cases; however, in others, they are kept for 16 weeks to achieve 10 kg (Table 3). Similarly, turkey toms of medium genotypes having an ADG of 136 g/day are kept for 18 weeks (range between 17 and 20 weeks) to achieve nearly 17 kg (range 16 -18.75 kg) (Table 3).

Table 2: Survey answers on average daily weight gain (ADG), age and weight at slaughter of heavy genotype turkey toms and hens;

	Heavy genotype toms				Heavy genotype hens			
	N	Mean (SD)	Median	Min - max	N	Mean (SD)	Median	Min - max
ADG (g/day)	11	149 (7.96)	150	129 - 156	11	97 (4.35)	98	89 - 101
Weight at slaughter (kg)	13	21 (1.14)	21	18.5 - 22.5	13	10.7 (1.53)	10.5	8.9 - 15
Age at slaughter (weeks)	12	20 (0.73)	20	20 - 22	12	15 (1.27)	15	14 - 18

N: number of answers received; SD: Standard deviation;

Table 3: Survey answers on average daily weight gain (ADG), age and weight at slaughter of medium genotype turkey toms and hens;

	Medium genotype toms				Medium genotype hens			
	N	Mean (SD)	Median	Min - max	N	Mean (SD)	Median	Min - max
ADG (g/day)	8	136 (8.16)	137.5	125 - 148	8	88 (9.42)	89.5	71- 100
Weight at slaughter (kg)	8	17 (1.11)	17.1	16 - 18.75	8	8.2 (1.58)	8.2	5 -10
Age at slaughter (weeks)	7	18 (1.11)	18	17- 20	7	13 (1.88)	14	10 - 16

N: number of answers received; SD: standard deviation;

3.2.3 Turkey breeders

The term turkey breeders covers the parents and earlier generations (e.g., grandparents, great-grandparents, pedigree breeders) of the turkeys kept for meat production (EURCAW, 2023). The breeders produce the fertilised eggs from which poults destined to become turkeys for meat production are hatched.

The production cycle of turkey breeders lasts between 55 and 58 weeks depending on the country, and it consists of three phases: the brooding phase, the rearing phase and the production phase (i.e., semen production of toms and egg laying of hens) (Aviagen Turkeys, 2023b). Turkey breeder toms and hens reach sexual maturity at around 29-30 weeks of age. At 30 weeks of age, the collection of semen from toms starts and turkey hens begin to be inseminated (i.e., artificial insemination is practised). The average breeder hen lays 110 eggs in a lay cycle of 26 weeks (Mailyan & van Schie, 2019 retrieved from EFSA Public call for evidence 2024 - PC-0741 1 - Fachtierärztliche Praxis für Wirtschaftsgeflügel und Beratung).

Turkey breeding consists of 1) selecting turkeys of pure lines (i.e., pedigree breeders, which have known pedigree and individual performance records, that allow their individual genetic and/or genomic evaluation) with a blend of various desired traits; 2) mating the selected animals with others selected from another pure line of pedigree breeders; 3) rearing, and crossing the first generation with other first-generation birds; and 4)

continuing until the male and the female turkey parent lines are mated to produce the commercial fattening turkey in the phase of multiplication (see Figure 2).

According to Neeteson et al. (2023), crossbreeding between two different lines starts at the grandparent stock level. The shift from the pure line selection in pedigree breeders to the commercial generation of fattening turkeys takes about four years (Neeteson et al., 2023) (Figure 2). Genetic selection takes place in the pure lines from which it cascades down exponentially through a series of multiplying generations. For instance, one pure line of pedigree hen produces 40 grandparents, 1,600 parents, and 116,500 commercial poults, resulting in the production of 1,750,000 kg of turkeys (at an average weight of 15kg) (Willems, 2018).

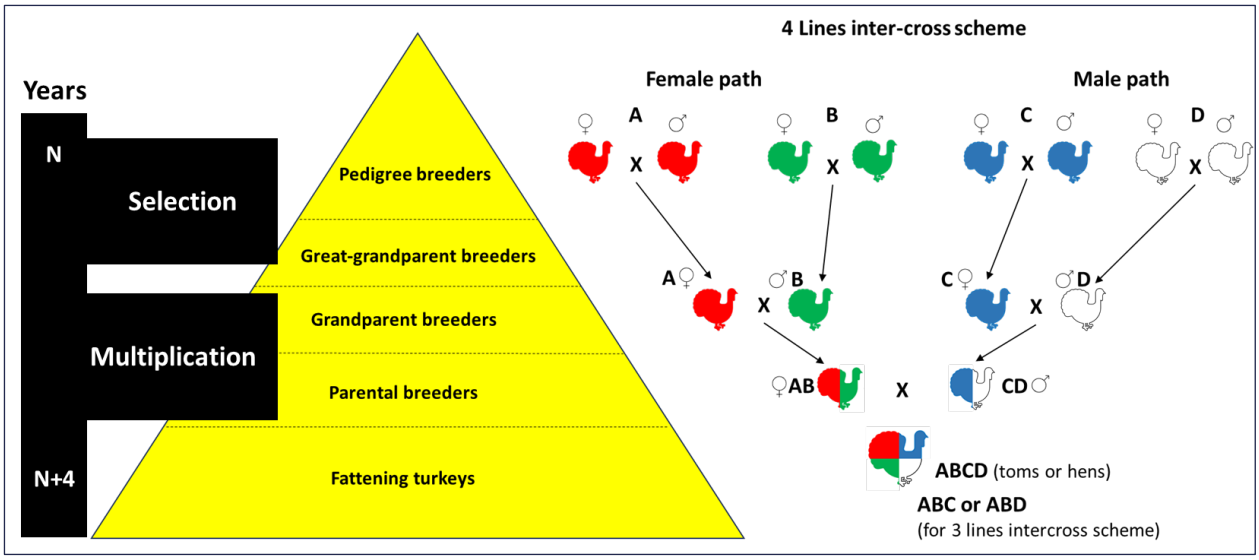

Figure 2: Selection and multiplication phases of the turkey breeders and meat production (adapted from EFSA AHAW Panel, 2023).

3.2.3.1 Parent breeding turkey stock

The turkey parent stock produces fertilised eggs from which the commercial poults for fattening hatch. Both breeding toms and hens are provided as day-old poults to the parent stock farms. Details on the housing and management are provided in Section 3.3.3.

3.2.3.2 Grandparent, great-grandparent and pedigree turkey breeders

In the EU, grandparent, great-grandparent and pedigree breeder stock are kept only in France (see Table 1). In the other EU MSs, only parent breeders are kept (see Table 1). Eggs produced in laying farms of grandparent, great-grandparent and pedigree breeder stocks are transferred to grandparent, great-grandparent and pedigree hatcheries. There is a lack of available data on how these generations are kept and for which specific traits they are selected, as well as on the selection pressure for each trait. In a recent report of the European Forum of Farm Animal Breeders (Granados Chapatte et al., 2023) it was stated that since the 2000s, turkey breeding companies state that 30% of the traits selected in poultry focus on animal welfare and sustainability. In addition, in the fact-finding study from Italy, the fattening turkey industry stated that within the last few years there have been improvements in robustness and skeletal conformation and, as a result, a reduction in mortality and malformations such as dyschondroplasia (EC, 2024b).

3.3 Husbandry systems used in turkey production

According to the survey results, four housing systems are used in the different phases of turkey production in the EU (see Table 4). Turkey breeder toms and hens are kept in **indoor floor systems** during the rearing and laying phases. Poults are hatched in turkey **hatcheries**. Fattening turkeys are kept in indoor floor systems during the brooding/rearing phase. During the growing phase (that can take place in the same barn as the brooding/rearing phase), turkeys are kept in **indoor floor systems**, **indoor floor systems with access to covered veranda** or **indoor floor systems with access to outdoor range or in indoor floor systems with access to covered veranda and outdoor range**. In the following sections, the four different housing systems are described in more detail.

Table 4: Most common husbandry systems per category of turkeys in the EU

Husbandry system	Turkey poults	Turkeys kept for meat production		Turkey breeders	
		Brooding and rearing	Growing	Brooding and rearing	Production or laying
Hatchery	X				
Indoor floor system		X	X	X	X
Indoor floor system with access to covered veranda			X		
Indoor floor system with access to outdoor range			X		

3.3.1 Poults hatched in hatcheries

Turkey poults are hatched from fertilised eggs in hatcheries in the EU. Germany has the largest number of hatcheries (n=8), followed by Hungary (n=6), France, Poland and Spain (n=5 each) (EURCAW, 2023). Survey answers revealed large variability between hatcheries in terms of number and capacity of hatchers and incubators (see Appendix F, Table F1). Indeed, the number of incubators ranged from 5 to 169, while the number of hatchers varied from 2 to 67. The capacity of incubators and hatchers ranged from 852,000 to 12 million eggs per year. On average there were 1.8 hatching events/week per hatchery (range: 1.4 - 2.8) (see Appendix F, Table F2).

Fertilised eggs - before being transported to the hatcheries - are normally identified in the parent breeder farm with a unique code printed on the shell, including farm ID, date of laying, flock ID and flock age. Such information is used later to decide on the storage period for eggs (before incubation).

Egg storage duration differs between countries, ranging from 0 to 26 days (see Appendix F, Table F2). This difference originates on several factors, including the demand for turkey poults. Depending on the storage duration and climate conditions, the eggs are normally stored at temperatures varying from 14 to 18 °C and a relative humidity between 50% and 75%. Depending on the storage duration, eggs are pre-warmed in specific machines before being placed in incubators (The Poultry Site, 2009).

The survey results showed that both single-stage and multi-stage incubators are used. Multi-stage incubators are machines operated continuously, with eggs set and transferred

in the machine once or twice a week. Multi-stage incubation uses the heat generated by the eggs at the end of incubation to warm the eggs at the start of incubation (Aviagen Turkeys, online b). The relative humidity and eggshell temperature are not always measured from days 1 to 25 in the incubator. When measured, eggshell temperature has been reported to vary between 37.5 to 38.9°C, while the relative humidity varies from 65% during the first two weeks to 77.2-78.2% from days 21 to 25. Other survey respondents reported that both temperature and relative humidity settings, as well as levels of CO_2, differ depending on several parameters including flock age, storage duration and season, among other factors. Eggs are turned once or twice per hour and kept at an angle of 45°.

On day 25 of incubation, eggs are transferred to the hatcher chambers. By days 27-28, hatching starts and may be spread across a "hatching window" lasting minimum 8 to 12 h, and maximum 24 to 48 h, depending on the parent flock age and egg storage duration (see Appendix F, Table F4). Incubation and hatching occur in darkness with no feed or water available in the hatcher chambers. In Canada, there is a pilot project called Hatchcare©[24], being developed that enables poults hatched in hatchery to have immediate access to light, feed and water. On-farm hatching of turkey poults is not practised in the EU.

After being pulled from the hatcher, the poults are subjected to a drying period in which humidity is decreased and ventilation is increased in the hatching chamber. Results from the survey revealed that the drying period lasts between 360 and 600 minutes. Subsequently, the poults are taken from the hatching chamber in trays to undergo hatchery procedures. Automated systems are normally used to move the trays involving rollers and high-speed conveyor belts that transport turkey poults through the hatchery. According to the results of the survey, the drop height from belt to belt is about 10-15 cm, whereas the drop height from belt to the crating box is about 10-15 cm in some hatcheries and 25-35 cm in others. The servicing procedures include (i) separating turkey poults from egg shells and debris, (ii) poult grading in first- and second-grade (the latter are the poults that are not saleable), (iii) sexing (mainly vent sexing), (iv) mutilations (see Section 3.3.1.1) and (v) vaccination (e.g., rhinotracheitis, Marek's disease, Newcastle disease, etc.). In some hatcheries, the poults are also sprayed with probiotics. According to the survey results, the hatchery procedures last between 120 and 360 min per hatching batch.

Navels, splayed legs and, in some cases, walking ability as well as body condition are also inspected in the hatchery. Based on the survey results, around 1-2% of turkey poults are usually graded as second-grade and culled. In the fact-finding study in Italy, around 1% of the newly hatched poults were culled mainly for navel disorders within 1h after rejection (EC, 2024b). When the hatchery procedures are finalised, healthy poults are counted and crated according to sex to be transported to the brooding/rearing facilities or breeding farms. In the survey, it was reported that solid plastic or cardboard boxes with a floor covered by either poultry pad, straw wool matting pad, woodwool or pieces of cardboard and honeycomb carton are used for turkey poult transportation. Height, length and width of the boxes were reported to vary among countries (see Table F3, Appendix F).

[24] https://www.canadianpoultrymag.com/hatching-concept-gives-poults-a-wing-up/, https://www.wattagnet.com/broilers-turkeys/breeding-genetics/article/15537708/turkey-hatchery-places-emphasis-on-animal-welfare 2022)

3.3.1.1 The practice of mutilations

As part of procedures in the hatchery, turkey poults may undergo mutilations depending on sex and production type. The most common mutilations performed are beak trimming, toe trimming, and de-snooding (EFSA, 2024).

Beak trimming is forbidden by national legislation in Finland, Norway and Sweden (EFSA, 2024). In some EU MSs, poults are subjected to beak trimming to prevent wounds caused by injurious pecking (EFSA, 2024). Beak trimming is conducted mainly by applying infrared treatment to heat and damage the beak tip, which can be done by a hatchery operator, an automated system or a combination of both. When using an automatic system, the turkeys are placed in an automated carousel that holds their head, and after a few seconds, when the infrared system has trimmed the tip of the beak, the turkey poult is removed by the hatchery operator (EFSA, 2024). EFSA Network members reported that between 20 and 30% of the beaks were trimmed (EFSA, 2024).

According to the fact-finding study carried out in France and Italy, toe trimming (also called claw trimming) is performed on the three frontal digits in turkey hen poults (EC, 2024a, 2024b), usually using microwave claw processing (MCP) at the hatchery. In the report of the fact-finding study conducted in Italy, it was reported that turkey hens were toe trimmed to prevent wounds and scratches to other hens that could be caused by the intact toenails due to turkey hens' higher agility compared to toms (EC, 2024b). Fournier et al. (2012) found less carcass scratching in turkey hens that were toe trimmed. In some countries, toe trimming is also performed on toms (EFSA, 2024). The microwave energy kills the germinal bed tissue from where the claw grows. When conducting toe trimming, poults are restrained by their feet upside down and the microwave energy is applied to their toes for a short time. A short burst of microwave energy is directed at each of the three frontal toes at the same time (Mailyan & van Schie, 2019 retrieved from EFSA Public call for evidence 2024 - PC-0741 1 - Fachtierärztliche Praxis für Wirtschaftsgeflügel und Beratung). Fournier et al. (2014) used MCP set at 1.26 seconds of exposure and a length of the toes trimmed set at 59% trim (59% of the guide light still exposed past the end of the toes). Within two weeks after the mutilation, toe tissue darkens, shrinks and falls off (Mailyan & van Schie, 2019 retrieved from EFSA Public call for evidence 2024 - PC-0741 1 - Fachtierärztliche Praxis für Wirtschaftsgeflügel und Beratung).

Desnooding is the removal of the snood (a caruncle on the top of the beak that drapes down the beak of turkey toms) which is removed to reduce the risk of injury and prevent cannibalism (EFSA, 2024). It is practised in the EU in turkey toms for fattening and breeding (EFSA, 2024). Desnooding typically occurs at the hatchery, though there are exceptions. For example, one integrator in Italy indicated that turkey breeder toms are desnooded at the farm by hand using the nail of the thumb and the index finger or nail clippers (EC, 2024b).

3.3.2 Fattening turkeys

3.3.2.1 Fattening turkeys kept indoors in floor systems

Turkey fattening in Europe is highly standardised and industrialised. Poults are transported (24-72h after hatching) from the hatchery to the brooding/rearing or brooding and growing facilities, which typically consist of buildings of about 2,000 m^2. According to the survey, the majority of conventional commercial fattening turkey farms host a median of 7,000

turkeys ranging from 3,500 to 10,000 birds during one production cycle (see Appendix F, Table F5). In the report of the fact-finding study it was reported that in Italy flock sizes are on average 3,500 toms and 7,000 hens (EC, 2024b).

As turkey poults cannot regulate their body temperature in the first days (Crespo & Grimes, 2024), the house is preheated before the arrival of the poults and during the first weeks of their life. During the first 5-10 days of the production cycle, turkey poults can be confined to a preheated area with heating lamps with feeders and drinkers for easy access to feed and water. This area is called a brooder ring as it has a circular shape. The number of poults varies depending on the diameter of the brooder ring and may differ according to the sex of the birds. However, some companies/farms are adopting an approach called whole house heating, where no brooder rings are used, and all the space is accessible to the poults. During the first days of life, paper or cardboard is usually placed on the floor and feed is spread on top to promote the feeding of turkey poults. When the birds walk over the paper, feed particles move and trigger the poults to peck. The use of paper also facilitates the differentiation of feed from litter.

Fattening turkeys are typically raised in indoor housing systems with litter material on the floor and *ad libitum* access to feed and water. Fattening farms are usually barren environments, except for drinking and feeding lines and sometimes enrichment items. Feed is usually offered in round troughs by automated feeder systems, which can be either pipes or pans. The water lines consist of troughs, nipple or bell drinkers. Sometimes, turkey houses are divided into two halves separated by a net to avoid crowding in the four corners of the house (EC, 2024b). Turkey toms and hens are raised separately, either in separate farms, separate buildings or in separate areas within the same building (e.g., pens or fenced areas).

Light is usually provided permanently (23-24 h of light) in the first 24 h after placement of the poults. The darkness period is then increased to achieve 6-8 h of continuous darkness by the end of the first week, which is maintained for the rest of the production cycle (see Appendix F, Table F6). According to the survey results, light sources used consist of incandescent, fluorescent, LED and natural light (windows) (Figures 3a and 3b). During brooding, the most common light intensity is more than 30 lux (Figure 4a) and during growing it is 10 to 20 lux (Figure 4b). It was reported that in some EU MSs, emergency lighting is provided in the darkness, for example 0.5 lux according to German standard, and 5 lux according to the Austrian standard.

Results from the survey also indicated that light intensity is not always even throughout the barn (see Appendix F, Table F6). Light colour temperatures used include natural white, (warm/cold) white and (warm) yellow (Figures 5a and 5b).

Regarding ventilation, the results of the survey showed that turkey farms can have natural or mechanical ventilation, or both types. In Germany, turkeys can be kept in open houses with natural wind or gravity ventilation, the so-called Louisiana stables. On the long sides of the houses there are either blinds or flaps which can be used to regulate the quantity of natural light as well as the temperature and air requirements (EFSA Public call for evidence 2024, PC-0741 1 - Verband Deutscher Putenerzeuger e.V. (VDP)). It was reported that in Italy, houses with windows on one or two longitudinal sides are also common (EC, 2024b).

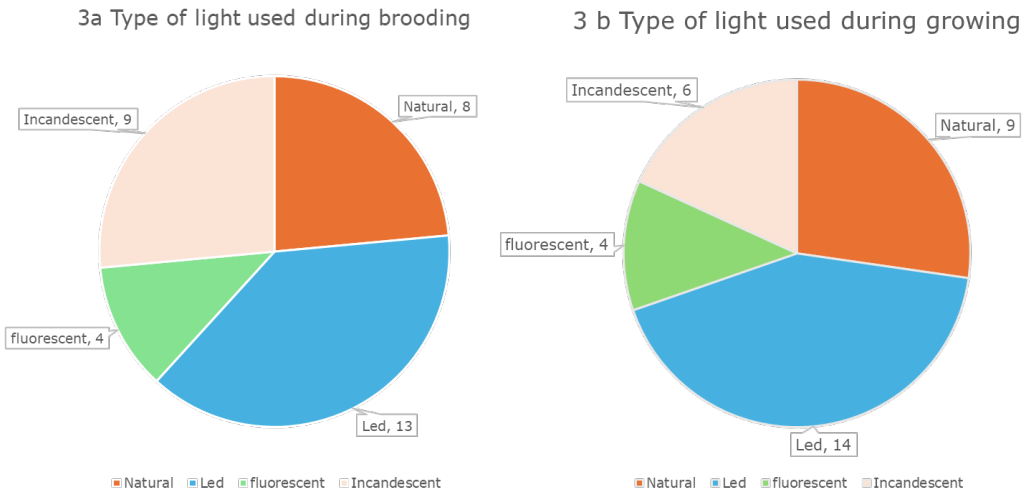

Figure 3: Survey answers on light source used during brooding (4a; n = 20) and growing (4b; n = 20) of turkeys kept for meat production. More than one answer was possible.

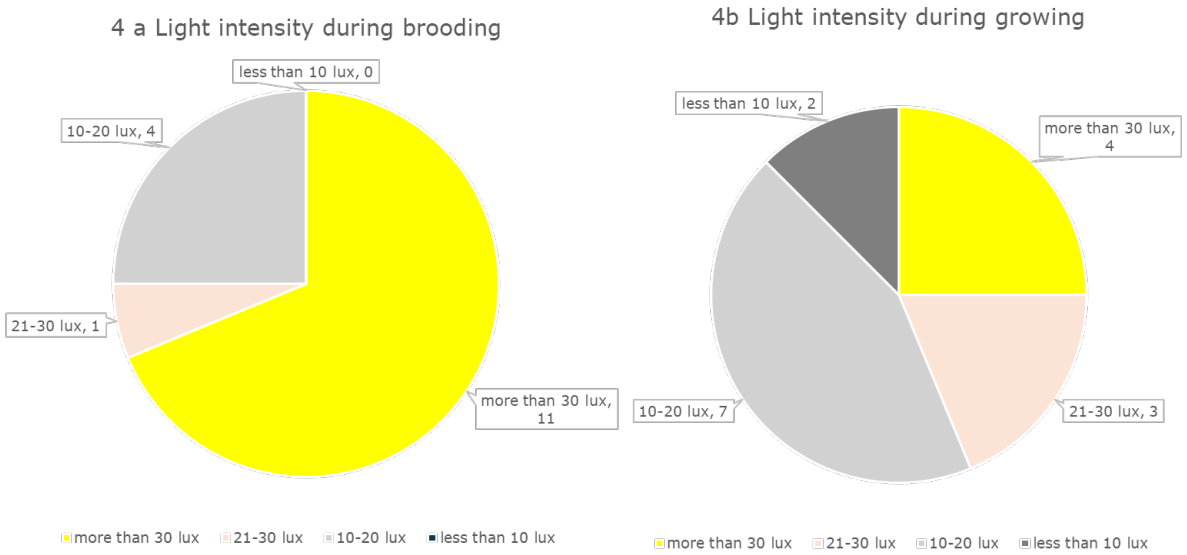

Figure 4: Survey answers on light intensity (lux) during brooding (4a; n = 16) and growing (4b; n = 16) of fattening turkeys.

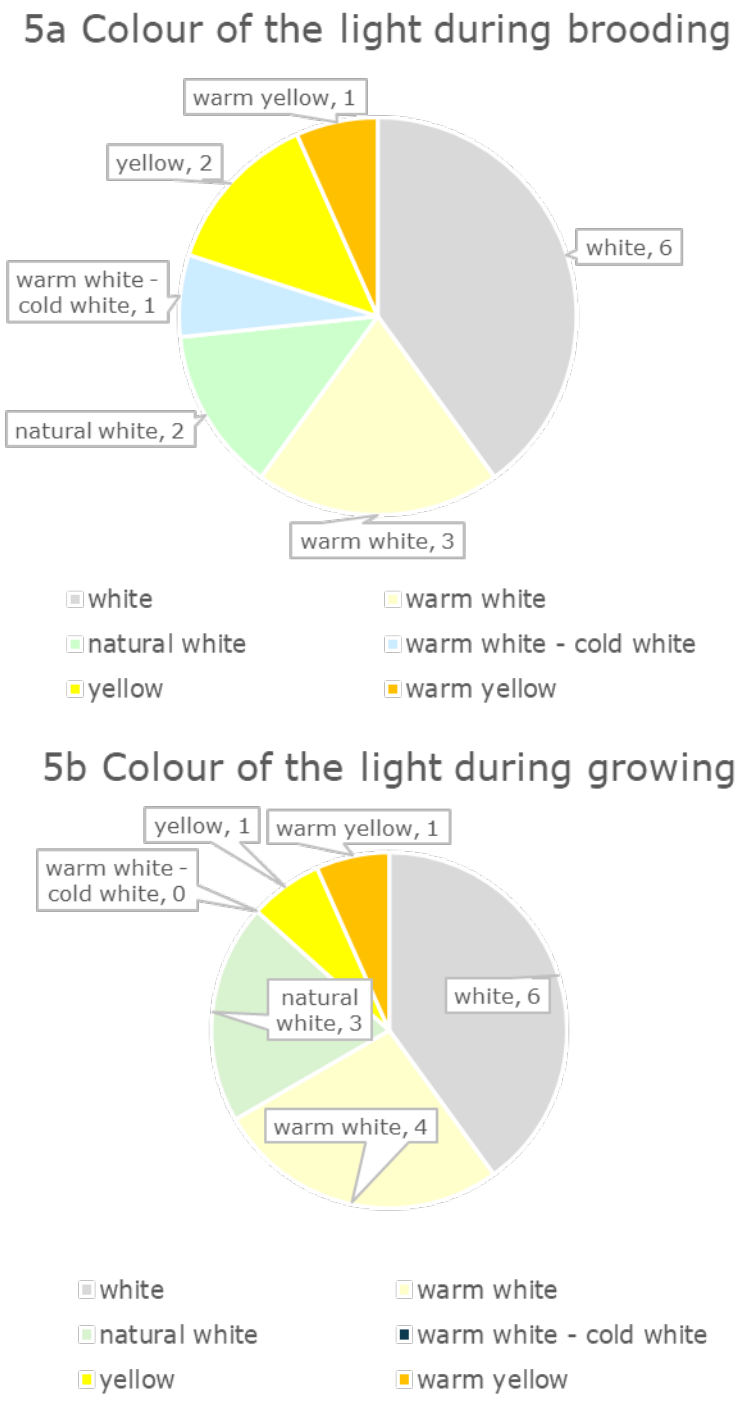

Figure 5: Survey answers on light colour during brooding (5a; n=15) and growing (5b; n=15)

In indoor floor systems, the floor is usually made of concrete and fully covered with litter substrate. Different types of litter substrates are used, with wood shavings and (chopped

or pelleted) straw being the most common, although rice hulls are also used in some EU MSs such as Italy and Spain (EURCAW, 2023).

Litter management differs between EU MSs and farms. For instance, litter depth is higher for winter/autumn poult placements compared with spring/summer placements in some farms/countries (i.e. 10 vs 7 cm in winter and summer, respectively, in Finland; 15-25 vs 10-12 cm in Czechia; and 15 vs 10 cm in Spain), while there is no variation reported in other countries, such as Italy (7 cm) and Sweden (3-5 cm). The heating system also plays a role when determining the litter height (i.e., when floor heating is used, litter depth can be reduced) (Aviagen Turkeys, online c). Turkeys are in direct contact with the litter for their entire lifetime, and there is usually no manure removal during a production cycle (Chepete et al., 2012; Monckton et al., 2020). However, periodical checking of litter condition is reported to be carried out according to the survey results. Several methods, independently or in combination, were reported to be used to check litter conditions, such as visual inspection, assessing the texture by hand or by foot, smelling the litter, etc. According to the results of the survey, a set of corrective measures is applied when needed to maintain the litter quality, among which re-littering, ventilation management and regular tilling seem to be the most important ones (see Figure 6). Adding fresh litter in the entire barn, whenever needed and especially around the water lines, has been reported to be a common practice to maintain good litter quality (see Figure 6).

Humidity levels, concentration of CO_2, ambient temperature and lighting may be monitored periodically or continuously in turkey indoor floor systems, depending on the farm. If the values rise above certain limits, they trigger alarms (EC, 2024a). In some newly built farms, video surveillance allows the stockman to observe the animals in real time and take necessary actions in the case of need (EC, 2024b).

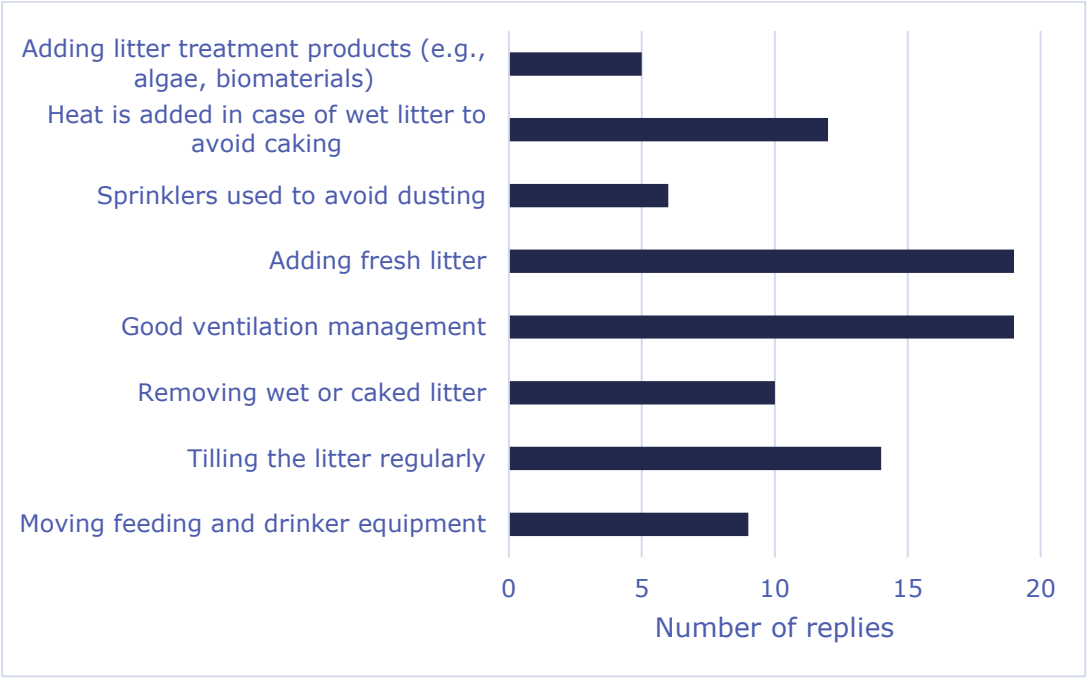

Figure 6: Survey answers on the corrective measures applied to maintain a good litter quality in the barns of turkeys kept for meat production (n = 19)

Regarding the use of enrichment, differences were reported in the survey between the brooding and growing phases. Enrichment was less commonly provided during brooding (8 respondents replied yes and 13 no to the question: 'Is any kind of enrichment provided during the brooding phase?'), while during growing enrichment was more commonly provided (17 respondents replied yes and 5 no to the question: 'is any kind of enrichment provided during the growing phase?'). When enrichment was provided, straw bales, plastic jugs, bottles and pecking blocks seemed the most common enrichment items during the brooding (Figure 7a) and growing (Figure 7b) phases. In addition, elevated platforms are also provided during rearing and growing at a minority of farms (Figure 7a and 7b). In animal welfare labels of turkeys kept for fattening, such as Beter Leven in the Netherlands, other enrichment items such as CDs, ropes, brushes or jerry cans are provided at a minimum of 1 item per 1,000 birds (Beter Leven 1 star, 2016 retrieved from EFSA Public call for evidence 2024 - PC-0741 1 - Dierenbescherming). Regarding the use of strawbales, the same animal welfare label requests the provision of a minimum of one straw/hay/alfalfa bale weighing on average 15 to 20 kg provided in the barn per 1,000 birds (Beter Leven 1 star, 2016 retrieved from EFSA Public call for evidence 2024 - PC-0741 1 - Dierenbescherming). In Italy, in the fact-finding report, 1 straw basket per 1,000 birds that was not replenished during the production cycle was observed (EC, 2024b). In Germany, according to the Initiative Tierwohl welfare label, at least one type of enrichment material, such as hay/straw in racks/baskets/bales or pecking stones, should be constantly offered per 400 m² of barn space from the beginning of the second week of life at the latest (Initiative Tierwohl, 2023).

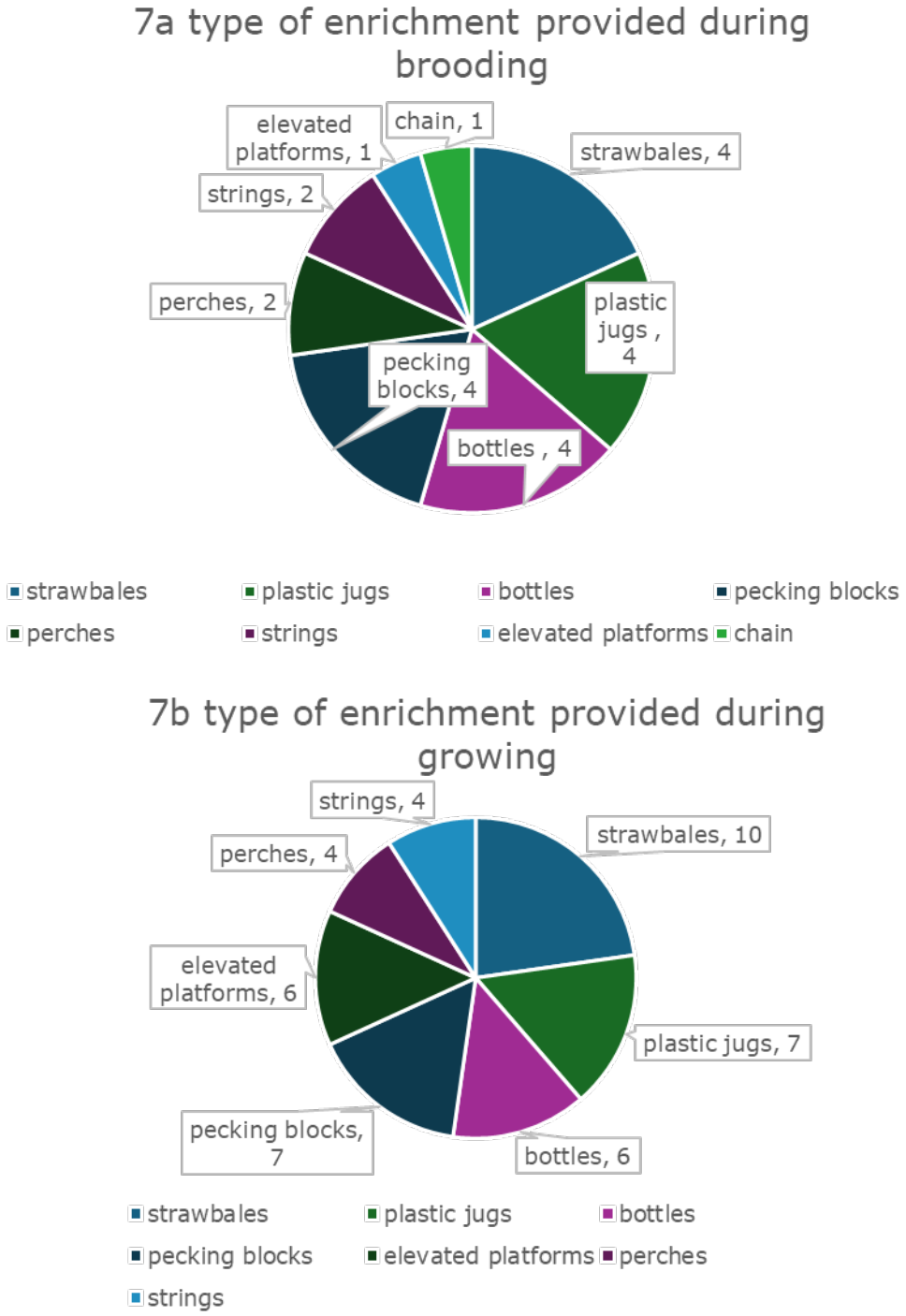

Figure 7: Survey responses on the type of enrichment provided during a) brooding (7a; n=8) and b) growing of fattening turkeys (7b; n=17) (more than one answer was possible).

A sick pen is usually present, where diseased or injured turkeys (e.g. lame birds or those with injuries caused by pecking) are placed to recover (EURCAW, 2025). If recovered, they are returned to the flock; if not, they stay in the sick pen until the end of the rearing period or are euthanised.

Stocking density is usually expressed as kg of live turkeys per square metre of usable area (kg/m²) and is an important production parameter in turkey farming. Stocking density

continuously increases after placement as the turkeys grow until they reach their maximum weight (and consequently maximum stocking density) at the time they are sent to the slaughterhouse. There is no EU legislation that regulates stocking density or space allowance in fattening turkeys (Directorate General for Internal Policies - Policy department - Citizens' rights and constitutional affairs C, 2017). However, national legislations regulating the maximum stocking density exist in several EU MSs (see Table 5). As turkey toms and hens are raised separately in some MSs such as Germany, and in the Netherlands, the maximum stocking density is different for turkey toms and turkey hens. Table 5 includes a description of the different maximum applied stocking densities in several EU MSs and EFTA countries, together with the sources of information or the reference to the legislative requirement. According to EU legislation, stocking density in organic farming is 21 kg/m^2 and a space allowance of 10 m^2/bird (Regulation (EC) 2018/848)[25].

Table 5: Stocking density in fattening turkey housing systems: national requirements in some EU MSs and Norway

Country	Applied stocking densities in turkeys	Source/Legislation
Austria	The maximum stocking density is 40 kg/m^2 at any time of the life cycle (60% of the turkey meat production derives from farms with this stocking density), regulated in the 1. Tierhaltungsverordnung (1st Animal Husbandry Act)[26]. In welfare programs: 38.5 kg/m^2 with 20% of covered veranda.	EFSA Public call for evidence 2024, PC-0741 1 – AVEC ELPHA Tierhaltungsverordnung (1st Animal Husbandry Act)[26].
Denmark	A maximum stocking density of 58 kg/m^2 for toms and 52 kg/m^2 for hens is set, although, calculated over the current and the two previous flocks in the same house, it may not exceed 55 kg/m^2 for toms or 48 kg/m^2 for hens.	BEK nr 1748 af 30/11/2020[27]
Finland	In the Finnish legislation there is no maximum stocking density for turkeys (breeding or fattening). According to a submission to the EFSA public call for evidence, the maximum stocking density before slaughter is of 46 kg/m^2 for hens and 57 kg/m^2 for toms. Hens and toms are reared in the same barn, but in separate sections. After the removal of the hens, the toms are given access to the entire barn and the stocking density for the toms in this final phase before slaughter is therefore reduced to an average of 43 kg/m^2.	EFSA call for evidence on the welfare of turkeys 2024, PC-0741 3 - Länsi-Kalkkuna Ltd
France	There is no regulation in France on the maximum stocking density for keeping turkeys. The maximum stocking density applied is 60 kg/m^2. The fact-finding study in France observed densities ranging from 45 to 59 kg/m^2. The density in private labels such as Label Rouge is 35 kg/m^2.	EC (2024a) EFSA Public call for evidence 2024, PC-0741 1 – AVEC ELPHA
Germany	In Germany, the keeping of fattening turkeys is not specifically regulated by law apart from the general requirements in the Animal Welfare Act and the Animal Welfare- Farm Animal Husbandry Ordinance. In the voluntary commitment by the turkey industry, the stocking	EFSA Public call for evidence 2024, PC - 0741-3, Landwirtschaftkamm

[25] Regulation (EU) 2018/848 of the European Parliament and of the Council of 30 May 2018 on organic production and labelling of organic products and repealing Council Regulation (EC) No 834/2007. OJ L 150, 14/06/2018, p. 1–92.

[26] 1. Tierhaltungsverordnung (1st Animal Husbandry Act in Austria) https://www.ris.bka.gv.at/GeltendeFassung.wxe?Abfrage=Bundesnormen&Gesetzesnummer=20003820

[27] https://www.retsinformation.dk/eli/lta/2020/1748

	density must not exceed 45 kg/m^2 of usable barn area (hens) or 50 kg/m^2 of usable barn area (toms) if the farmer does not participate in the health control program (EFSA Public call for evidence 2024, 0741-3, Landwirtschaftkammer Nordrhein-Westfalen). If the farmer participates in the health program, the maximum stocking density for hens is 52 kg/m^2 of usable barn area and 58 kg/m^2 for toms[28].	er Nordrhein-Westfalen Verband Deutscher Putenerzeuger (2013)
Hungary	In Hungary it is reported to be 45 kg/m^2 for hens and 50 kg/m^2 for toms	EFSA Public call for evidence 2024, PC-0741 1 – AVEC ELPHA
Italy	There is no national regulation establishing a maximum stocking density for keeping turkeys (EC, 2024b). The standard stocking density is 65 kg/m^2 with reported stocking density for standard production of 53-58 kg/m ^{2}.	EFSA Public call for evidence 2024, PC-0741 1 – AVEC ELPHA
Norway	The Norwegian regulation establishes that the maximum applied stocking density is 38 kg/m² if the average weight of the turkey is less than 7 kg and 44 kg/m^2 if the average weight is more than 7 kg.	Norwegian Regulation 12. December 2001 no. 1494 on keeping of chickens and turkeys[29]
The Netherlands	The stocking density for keeping turkeys is set by a corresponding regulation for the keeping of animals[30]. A maximum of 58 kg/m^2 is allowed for turkey toms and 48 kg/m^2 for turkey hens. When enrichment material is present with which at least 10% of the animals can be occupied at the same time, these values may increase to 59 kg/m^2 for toms or 49 kg/m^2 for hens. Beter Leven one star recommends a maximum of 7 birds/m^2 and 36 kg/m^2 for hens and 40 kg/m^2 for toms. Beter Leven two stars recommends a maximum of 6.25 birds/m^2 from 49 days of age (10 birds until 7 weeks old) corresponding to 35 kg/m^2.	Wettenbank (2022)[28]
Poland	The maximum stocking density of turkeys is established in a ministerial decree. The stocking density is limited to 57 kg/m² for turkeys for meat production regardless of sex and 40 kg/m^2 for all other turkeys such as parent breeding stock.	Decree of the Minister for Agriculture and Rural Development of 28 June 2010 on minimum conditions for the keeping of farm animal species other than those for which protection standards are laid down in European Union legislation[31]
Portugal	In Portugal there is no regulation that establishes the maximum stocking density of keeping turkeys. The reported applied stocking density for hens is 50 kg/m^2 and for toms 54 kg/m^2.	EFSA Public call for evidence, 2024, PC-0741 1 – AVEC ELPHA.
Spain	In Spain there is no regulation that establishes the maximum stocking density of keeping turkeys. The	EFSA Public call for evidence 2024, PC-

[28] Voluntary agreement on keeping turkeys for fattening http://www.lkclp.de/uploads/files/bundeseinheitliche_eckwerte_mastputen.pdf
[29] https://lovdata.no/dokument/SF/forskrift/2001-12-12-1494/KAPITTEL_9#KAPITTEL_9
[30] https://wetten.overheid.nl/BWBR0035217/2024-01-01
[31] https://isap.sejm.gov.pl/isap.nsf/DocDetails.xsp?id=WDU20101160778

	reported applied stocking density for hens is 56 kg/m^2 and for toms 60 kg/m^2.	0741 1 – AVEC ELPHA.
Sweden	In Sweden there is a legislation that sets the maximum stocking density of 40 kg/m² for animals under 7 kg and a maximum of 45 kg/m² for animals over 7 kg (with control program), without a control program the maximum stocking density is 30 kg/m^2.	Provisions of the Swedish Board of Agriculture Statens Jordbruksverk, 2019[32]

In terms of industry guidelines, in the Turkey Management Best Practices by the Association of Poultry Processors and Poultry trade in the EU (AVEC) recommends, a maximum of 60 kg/m^2 (AVEC, 2024). However, it is possible to increase the maximum stocking density up to 63 kg/m^2 regardless of the sex of the birds at the time of slaughter, if certain criteria are met. These criteria are, for example, the participation of stockmen in specialised training and more than two years of experience working with turkeys, providing welfare and health assessment plans and records, and the availability of a sick pen (AVEC, 2024).

3.3.2.2 The practices of flock thinning and removal of hens in turkey fattening farms

The mandate requests EFSA to describe the practice of **flock thinning** in turkeys kept for meat production; the implication of this practice on the welfare of turkeys will be assessed in the Scientific Opinion (see Section 1.1.2).

Flock thinning is commonly used in broiler chickens (van Emous et al., 2024), but the procedure is the same for turkeys. The flock thinning consists of: 1) placing initially a higher number of birds than the total barn capacity if all birds would reach the slaughter weight at the same time at the end of the production cycle and 2) identifying birds and removing them at planned times to go to slaughter before the end of the production cycle at the all-out phase (see figure 8). This allows the remaining birds to have an increased space allowance while they gain more weight before slaughter. Figure 8 illustrates how flock thinning influences stocking density throughout the production period of turkeys.

[32] https://lagen.nu/sjvfs/2019:23

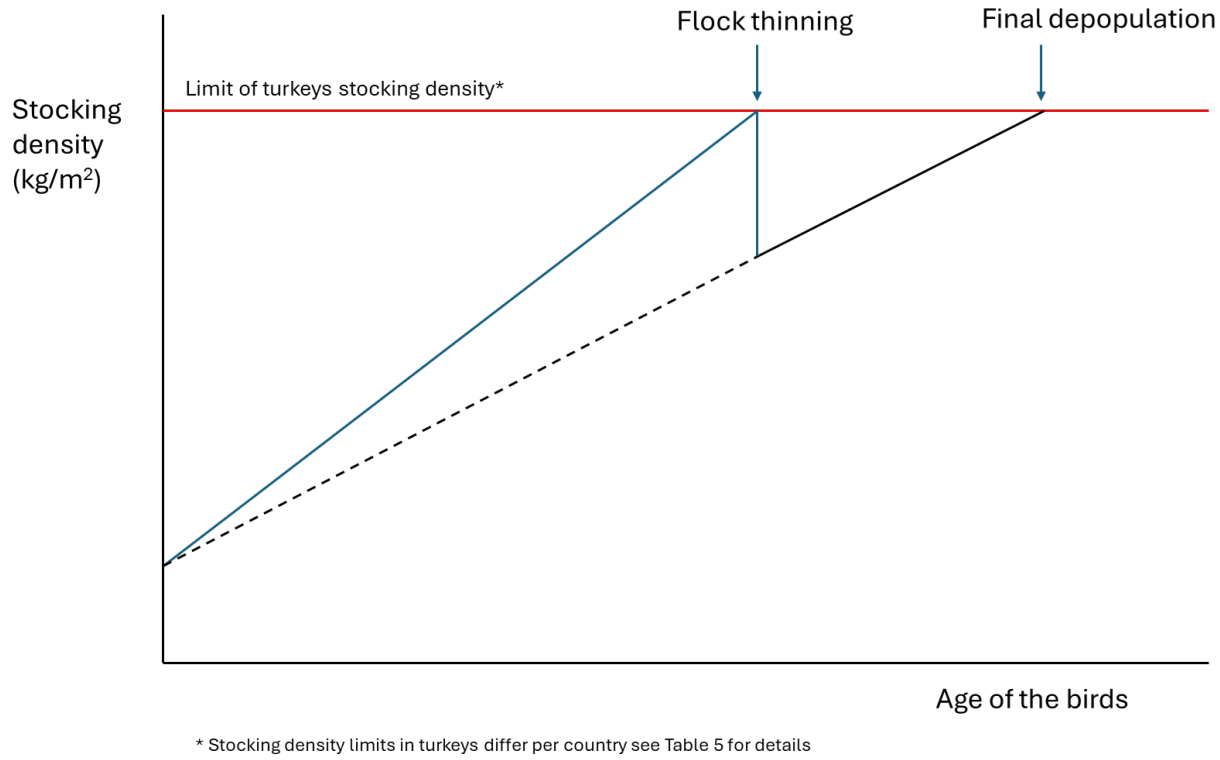

Figure 8. Scheme of flock thinning influencing stocking density in turkey farms. The red line shows the limit of stocking density. The blue line shows a flock where a portion of birds is removed earlier than the final depopulation, and the dashed black line shows the trajectory of the stocking density if flock thinning is not planned.

According to the survey, flock thinning in turkeys was reported to be practised in Austria, Czechia, France and Spain, also in farms raising only turkey hens (see Appendix F, Table F8). Between 10 and 50% of the turkeys are slaughtered at an age ranging between 10 and 18 weeks. The maximum stocking density the day before thinning is about 60 kg/m^2 for all-tom flocks and 42 kg/m^2 for all-hen flocks based on results from the survey (see Appendix F, Table F8).

The practice of removal of hens consists of removing them for slaughter about 6 weeks earlier than toms to optimise production of turkey meat per m^2. In this type of production, toms and hens are separated through a fence or housed in different barns on the same farm, and when hens are sent to slaughter, toms gain access to the space previously occupied by hens. In such production systems, the stocking density of toms peaks twice during the production cycle, i.e. once when the hens are about to be sent to slaughter, and secondly when toms are about to be slaughtered.

3.3.2.3 Fattening turkeys kept indoors in floor systems with access to a covered veranda

The covered veranda area (also called covered run or winter garden by some sources) is a covered area usually attached to one side of the barn. In Austria and Germany, 30% and 3%, respectively, of the farms have covered verandas (EFSA Public Call for evidence 2024, PC-0741 1 – AVEC ELPHA). In the welfare label Beter Leven, covered verandas are used

as well (Beter Leven 1 star, 2016 retrieved from EFSA Public call for evidence 2024 - PC-0741 1 - Dierenbescherming).

With the use of protections (e.g. windbreaks, insulated surfaces), the veranda can be used in different weather conditions and protects turkeys against predators, wild birds and other animals (e.g., with meshes). This area is accessible to the turkeys by pop-holes for at least 12h/day. However, as the covered veranda is not heated, the age at which turkeys gain first access to it depends on the outside weather conditions and may differ between the EU MSs and different welfare labels. Results from the survey showed that age at first access can vary from at least 4 to 10 weeks of age. For instance, for Beter Leven one star, turkeys access the covered veranda from the age of 35 days (Beter Leven 1 star, 2016 retrieved from EFSA Public call for evidence 2024 - PC-0741 1 - Dierenbescherming).

The applied stocking densities in this housing system in different countries are the ones reported in Table 5, although no indication of the dimensions of covered verandas is provided. There are no legislative requirements regulating the dimensions of covered verandas; however, some private labelling schemes provide guidelines on them. For instance, in the French Label Rouge scheme, it is foreseen that the pop-holes are 4m/100m^2 of the surface area of the house (EFSA Public call for evidence 2024, PC-0741 1 - Coopérative Agricole des Fermiers de Loué). The Dutch Beter Leven label requires 1 m of pop-holes per 1,000 turkey toms and 1 m of pop-holes per 1,500 turkey hens with ramps to access the covered veranda. The area of the covered veranda varies, e.g. Beter Leven 1 star requires an area that is between 20 and 30% of the area of the indoor stable (Beter Leven 1 star, 2016 retrieved from EFSA Public call for evidence 2024 - PC-0741 1 - Dierenbescherming). The floor of the covered veranda is bedded, and the litter is cleaned after the end of the production cycle.

3.3.2.4 Fattening turkeys kept indoors with access to an outdoor range

In this type of housing system, turkeys are kept indoors in a barn and have access to an outdoor range during the daytime with or without a covered veranda from 6 to 8 weeks onwards. The outdoor range has a vegetation cover that could be ground vegetation (grass), trees, hedges and bushes. In Austria and Germany, approximately 10% and 2% of turkeys are kept in systems with an outdoor range, respectively (EFSA Public call for evidence 2024, PC-0741 1 – AVEC ELPHA). The applied stocking densities in this housing type in the different countries are reported in Table 5.

Outdoor range systems are associated with labelled production in the EU MSs. For instance, in the Netherlands, under the label Beter Leven 2 stars, turkeys have access to the outdoor range from no later than 50 days of age (Beter Leven 2 star, 2016 retrieved from EFSA Public call for evidence 2024 - PC-0741 1 - Dierenbescherming) and in Label Rouge, turkeys have access to the outdoor range from at least 8 weeks of age (EFSA Public call for evidence, 2024 – PC-0741 1 - Coopérative Agricole des Fermiers de Loué). Access to the outdoor range is only provided during the daytime. For Beter Leven 2 stars, a type of shelter should be reachable within 30 m of any place in the outdoor range (Beter Leven 2 star, 2016 retrieved from EFSA Public call for evidence 2024 - PC-0741 1 - Dierenbescherming). In addition, a minimum of 16 m^2 shelter, consisting of trees, bushes, shrubs and/or shelter tables, spread over the outdoor range, is required. The stocking density in Beter Leven 2 stars and Label Rouge is one turkey for every 6 m^2 of the outdoor range (Beter Leven 2 star, 2016 retrieved from EFSA Public call for evidence 2024 - PC-

0741 1 - Dierenbescherming) EFSA Public call for evidence 2024, PC-0741 1 - Coopérative Agricole des Fermiers de Loué). Pop-holes that provide access to the outdoor range must be at least 1.5 m wide and 0.65 m high, so turkeys can enter and exit walking upright, and at least 4 m of pop-holes is provided for every 100 m^2 of the barn (Beter Leven 2 star, 2016 retrieved from EFSA Public call for evidence 2024 - PC-0741 1 - Dierenbescherming).

In Label Rouge, medium genotypes are fattened with a longer growing period (i.e. 21 weeks for GB191 and GB308 genotypes used for the Christmas turkey) than in the conventional indoor fattening systems (EFSA, online a).

3.3.3 Turkey breeders

3.3.3.1 Parental breeder turkeys

When newly hatched breeder poults arrive from the parental breeder hatchery to the rearing facilities, poults are confined to a heated area littered with wood shavings or other kinds of substrate material where feed and water are available.

Brooder rings are typically used during the first 5-7 days of life (see Appendix F, Table F8), as previously described for fattening turkeys. The weight of turkeys when released from the brooder rings is about 150-160g for toms and 140-160g for hens. For both sexes, a maximum of 300 poults is placed per brooder ring (see Appendix F, Table F8). The birds are kept at the rearing facilities for approximately 29 weeks before entering the laying facilities, where they remain in production until weeks 55 to 58 of age.

Usually, breeding farms are located in remote areas, such as mountainous areas, for biosecurity reasons (EC, 2024b). The housing conditions and management are very similar to those of fattening turkeys, but with higher levels of biosecurity and management care, due to the higher value of these animals.

During the semen production and laying phases (hereafter called 'production'), turkey toms and hens are reared in separate rooms within the same house, and females account for 90% of the total animals (EC, 2024b).

Results from the survey indicate that pan feeders and bell-drinkers are the most commonly used feeder and drinker types in turkey parent stock farms. The number of birds per feeder varies between farms, sexes and phases (brooding/rearing and production).

According to the survey results, enrichment is reported to be provided in some breeder farms, including pecking blocks, strings, plastic jugs, bottles, bales of shavings or hanging objects. In parent breeder farms in Italy, enrichment items were not provided to turkey hens or toms, because, according to the sector, there was no need for enrichment due to the lower stocking densities (EC, 2024b).

The management of the litter in breeding farms is quite similar to that described for turkeys kept for meat production (see Section 3.3.2). The ventilation is either mechanical (fans) or mixed (mechanical and natural). The maximum reported threshold applied is 2500 ppm for CO_2 and up to 20 ppm for NH_3, based on industry guidelines and common practice.

According to the public call for evidence (EFSA call for evidence 2024, PC-0741 1 – AVEC ELPHA) and the fact-finding study in Italy (EC, 2024b), cages are not used in parental breeding of turkeys. Also, the main farm assurance scheme for UK turkeys (Red Tractor)

does not allow turkeys to be kept in cages, and this includes turkeys kept for breeding (EFSA call for evidence PC-0741 1 - RSPCA). Next-generation feeding stations can record individual feed consumption and, therefore, the use of individual cages can be avoided. In fact, genetic selection of turkey individuals is carried out by using radiofrequency identification (RFID) technology in which each turkey has a tag, first attached to the leg and later to a wing (Willems, 2018).

3.3.3.2 Parent breeder turkey toms

Immature toms are kept in light-controlled rearing facilities. During the first week of life, toms are provided continuous light with an intensity of 80-100 lux. The duration of darkness is then increased daily until 10h of continuous darkness are achieved by 4-7 days of age. From the second to the 22nd week of age, toms are provided 14h of light at 50 lux and 10h of darkness. Around 23-24 weeks of age, sexual maturity of the toms is stimulated by gradually increasing day length to at least 14 hours of light at 100 lux and 10h of darkness (Aviagen Turkeys, 2023b; Hybrid, online). This results in the development of secondary sex characteristics and sexual behaviour at around 29 weeks of age.

According to the survey results, the stocking density of toms (heavy genotypes) is around 2 to 3 birds/m^2 (up to 7 kg/m^2) during brooding, 1 to 2 birds/m^2 (about 30 kg/m^2) during rearing and 0.75 to 1.5 birds/m^2 (about 23 kg/m^2) during production (see Appendix F, Table F9). However, in the fact-finding study in Italy, a stocking density of a heavy genotype of 3 toms/m^2 during rearing was observed (EC, 2024b). Toms from medium genotypes are kept under a stocking density of 2 birds/m^2 during brooding and rearing, and of 1-1.5 birds/m^2 during production (see Appendix D, Table 10). In several cases, toms are subdivided into smaller groups within the building. In Italy, turkey breeder toms in production are kept in pens of 16 m^2 accommodating 10 to 12 toms (EC, 2024b).

Survey results (see Appendix F, Table F13) showed a group size ranging between 180 and 650 toms during brooding, between 30 and 650 toms during rearing, and between 15 and 600 toms during production of heavy toms. Results of the survey (see Appendix F, table F14) showed a group size for toms of medium lines ranging between 150 and 500 during brooding, between 80 and 500 during rearing and between 20 and 400 during production.

Parent breeder toms are subjected to selection to identify strong, healthy toms for the reproductive period. The selection age differs according to the breeding company and may take place between 14-18 weeks of age for some strains (Aviagen Turkeys, 2023b) or between 16-18 or 18-21 weeks of age for others (Willems, 2018). Birds presenting issues (e.g., smaller than the target, poor posture, leg issues, inappropriate shape and conformation of the breast) are removed and culled. The selection of candidate breeders starts at placement as day-old poults and continues throughout life with a special focus on conformation, leg strength and walking ability, and later on semen quality (Aviagen Turkeys, 2023b).

According to the survey, the body weight of the parent stock is reported to be checked weekly, most often manually. Monitoring the growth performance of turkey breeders is different between the EU MSs with *ad libitum* feeding or quantitative or qualitative feed restriction. Replies from Italy and Poland reported that feed is provided *ad libitum*. In some countries, a quantitative feed restriction is applied, which consists of allocating a defined feed quantity to control breeder toms' weight (e.g., in Finland one meal per day is

provided). However, other countries are using qualitative feed restriction whereby toms are fed lower-energy diets to manage body-weight gain. In both cases, a special interest is given to ensure a representative average body weight that is in line with the growth curve for the entire flock. Feed restriction starts in some cases with selection at around 16-21 weeks of age, and in other cases when toms are transferred to the production facilities, and it continues for the rest of the toms' lives.

3.3.3.3 Parent breeder turkey hens

Immature breeder hens (0-29 weeks) are kept in closed-sided barns to guarantee absolute darkness, allowing the management of a light programme. They are provided continuous light during the first 5 days with an intensity of 80 lux. From the 5th day to 12-13 weeks of age, the light period is decreased progressively to achieve 14 hours of light with an intensity of 25-50 lux, and 10 hours of darkness. Afterwards, a step-down program is applied to reach 7-8 hours of light, allowing the conditioning of females around 17-19 weeks of age. This conditioning period aims to physiologically prime the hens for egg production by avoiding the establishment of post-juvenile photo refractoriness. This is defined as "a physiological state in which there is a lack of responsiveness to photoperiods that previously induced or maintained egg production and that is characterised by a spontaneous cessation of lay, usually followed by moult, as well as an absence of nesting behaviour" (Siopes, 2001). Therefore, if established, the photo refractoriness would lead to a lack of sexual response to light and a failure to commence laying eggs (Siopes, 2001). This lighting programme remains stable until around 29 weeks of age and a body weight of about 12 kg has been reached, after which hens are transferred to the production farms. Hens' sexual maturity is stimulated at week 29 by increasing the light period length from 7-8 h to 14-16 h. In response to the increased light, hens start producing eggs around 31 to 32 weeks of age (12-13 days after starting the increase in day length). Barns for breeder turkey hens that are in the production phase can be either closed-sided in some countries (such as Finland where the light intensity is reported to be 100-120 lux) or open (e.g. Italy, Poland), letting natural light in where the light intensity is around 300 lux.

Results from the survey showed that in almost all the EU MSs (except for Sweden), a qualitative feed restriction is applied to control the weight of breeder turkey hens. In the fact-finding study carried out in turkey farms in Italy, farmers reported that breeder turkey hens are fed *ad libitum* (EC, 2024b).

The reproductive (i.e. laying) phase of the females typically lasts for around 28 weeks, with a few weeks of variation depending on the genotype and management applied. The cumulative settable eggs produced per breeder turkey hen is between 100 and 120 eggs for the whole production period, from which around 90-100 poults are hatched. Overall hatchability is around 82 to 84% for Aviagen™ Turkeys (genotype B.U.T. 6 performance objectives and Nicholas Select performance objectives). Usually, the peak of egg production occurs at the fourth to fifth week of lay (Aviagen Turkeys, online c).

After the 29th week of life, turkey hens are reared in barns with nests. There are different designs of nests that may or not have access ramps, a mat and some straw or wood shavings. Nests have a trap mechanism that prevents entrance of more than one hen at a time. Breeding companies select turkey hens that have a reduced tendency to become broody; however, some breeder hens have retained their natural reproductive behaviour to sit on a clutch of eggs to incubate them. This behaviour, known as broodiness is

generally associated with persistent nesting behaviour, reduced feed and water intake, cessation of egg laying and ovarian regression (Emamgholi Begli et al., 2019). Turkey breeder farmers apply measures to limit floor eggs to avoid the development of broodiness in turkey hens; for example, they manually remove eggs laid on the floor and install automatic nests that are closed during a period of the day.

The types of nest boxes used in commercial facilities of turkey breeders can be manual or automatic, depending on the type of push-off and egg collection mechanisms (Aviagen Turkeys, online d). This technical advice sheet from Aviagen also indicates that manual nest boxes are constructed from wood, plastic or metal, and usually built in blocks of 4, 5 or 6 to facilitate the clean-out process. Manual nest boxes can be constructed either with or without floors (called bottomless boxes). Bottomless boxes fit directly onto the concrete floor, and the nesting material is placed directly onto the floor. Nest boxes with floors have a built-in base, and nesting material is placed directly on the box floor. At the end of the production period, when the bottomless box is moved for cleaning, the used nesting material remains are removed along with the floor litter. Both types of nest boxes are supplied without nesting material, which must be added manually. Different nesting materials can be used, including wood shavings, straw, rice hulls, and coconut shells (Aviagen Turkeys (online d).

Commonly used automatic nest systems for turkey breeders (Hybrid, 2023b) are those manufactured by MGH™ and Vencomatic™, two systems that work differently in the trap mechanism (preventing a nesting hen from other hens entering an occupied nest box), bird push-off from the nest (preventing the hen from staying too long in the nest and becoming broody) and egg collection.

Nest box dimensions in the AviagenTM Turkeys guidelines are 50 cm wide x 60 cm deep and 60 cm high, or bigger if turkey hens are of larger-sized genotypes (Aviagen Turkeys, online d). In some management guidance, a maximum of 5 hens per nest is recommended. According to the results of the fact-finding study in turkey farms, there is one nest available for every 5 turkey hens (EC, 2024b). In Finland, there is approximately one nest available for every 4 hens (EFSA Public call for evidence 2024, PC-0741 1 - Länsi-Kalkkuna Ltd).

According to the survey results, the stocking density for heavy hens is around 3 up to 7.2 birds/m^2 (up to 13 kg/m^2) during brooding, between 3 and 3.6 birds/m^2 (up to 49 kg/m^2) during rearing and between 2 and 3 birds/m^2 (up to 41 kg/m^2) during production (see Appendix F, Table F10). The fact-finding study in Italy found a stocking density of 4.5 hens/m^2 of a heavy genotype during production (EC, 2024b). Medium-weight hens are kept at a stocking density of 3 birds/m^2 during brooding and rearing, and between 2.6 and 3 birds/m^2 during production (see Appendix F, Table F11).

For heavy hens, group size ranges from 1,000 to 10,000 birds during brooding, from 1,000 to 5,000 birds during rearing, and from 1,000 to 2,500 birds during production (see Appendix F, Table F12). In medium hens, group size varies from 1000 to 10,000 birds during brooding, from 1000 to 5000 birds during rearing, and from 1000 to 2500 birds during production (see Appendix F, Table F15).

3.3.3.4 The practice of artificial insemination

At 29 weeks of age, turkey toms are placed in the production farms (Aviagen Turkeys, 2023b) where turkey toms are manually ejaculated twice per week. Even if semen is not

needed, all toms will still be ejaculated at least once a week to maintain good semen quality.

Semen collected from breeder toms is used within 30 min. A minimum of 0.025ml of semen is deposited by blowing it through a pipette into the hen's everted vagina, allowing spermatozoa to be deposited close to the sperm host (or sperm storage) glands. Artificial insemination of hens is performed three times during the first week, followed by one insemination per week thereafter (Aviagen Turkeys, 2023b).

The first artificial insemination of turkey breeder hens takes place between 14 –16 days after the increase in day length for medium lines and 18–19 days, or more, for heavy lines (Aviagen Turkeys, 2023b). Squatting behaviour is considered a manifestation of sexual maturity and an indicator of readiness for the first artificial insemination. Turkey breeder hens are housed in a barn with an elevated area for insemination accessible by a ramp or a pit for staff to stand in.

3.3.3.5 Grandparents, great-grandparents and pedigree breeders

As reported above, farms of grandparent and above generations of breeders are present only in France and the UK (EC, 2024a; EURCAW, 2023). Thus, in the EU, the selection of turkeys only takes place in France. In these farms, turkey hens and toms are housed separately in rooms with about 350 to 500 individuals (John Ralph and Tim Burnside, Aviagen™ Turkeys, EFSA *ad hoc* technical hearing with Aviagen™ Turkeys, 17 th October 2024). Like parent breeders (see Section 3.3.3.1), grandparents, great-grandparents and pedigree breeders are not housed in cages (Willems, 2018) but on the floor with litter (John Ralph and Tim Burnside, Aviagen™ Turkeys, EFSA *ad hoc* technical hearing with Aviagen™ Turkeys, 17th October 2024). No elevated platforms or perches are provided, but sometimes pecking blocks and bales of shavings are available (John Ralph and Tim Burnside, Aviagen™ Turkeys, EFSA *ad hoc* technical hearing with Aviagen™ Turkeys, 17th October 2024). After the initial beak trimming at the hatchery (see Section 3.3.1.1), sometimes a second beak trimming is conducted at around 16 weeks of age (EC, 2024a), if the turkeys are pecking and the veterinarian deems it necessary. Turkey hens can be housed in compartments with automatic nests, with trap mechanisms to keep the hen in the nest for a set laying cycle. The identity of the hen in the nest is tracked through a RFID tag and stamped on the egg. All the data are then stored in the breeding database (Hybrid, 2023a).

4 Conclusions

This report reviews most common housing systems and practices of keeping turkeys (*Meleagris gallopavo gallopavo*) in the EU. The assessment of the welfare of turkeys on farm is discussed in a separate EFSA publication (EFSA AHAW Panel, 2026).

References

AVEC. (2024). *Turkey management best practices. European Guidelines developed by AVEC representing the European poultry producers and processors in Europe.* Available online: https://avec-poultry.eu/wp-content/uploads/2024/06/AVEC-turkey-farm-management-guide-2024-1.pdf

Aviagen Turkeys. (2023b). *Management guidelines. Turkey breeders*. Retrieved 04 September 2024 from https://www.aviagenturkeys.com/uploads/2023/09/05/BR28_V4.1_Management%20Guidelines%20for%20Breeding%20Turkeys_UK.pdf

Aviagen Turkeys. (online b). *Management article HA20.version 3. Multi Stage Incubation procedure.* . Retrieved 24 July 2024 from https://www.aviagenturkeys.com/uploads/2020/02/24/HA20%20Multi%20Stage%20Incubation%20Procedure%20EN%20V3.pdf

Aviagen Turkeys. (online c). *Targeted approaches to achieving good litter quality*. Retrieved 22 November 2024 from https://www.aviagenturkeys.com/uploads/2019/12/11/CL12%20Targeted%20Approaches%20to%20Achieving%20Good%20Litter%20Quality%20EN%20V1.pdfbak

Aviagen Turkeys. (online d). *Nest Box Type and management*. Retrieved 08 November 2024 from https://www.aviagenturkeys.com/uploads/2020/02/24/BR12%20Nest%20box%20type%20and%20Management%20EN%20V4.pdf

Beter Leven 1 star. (2016). *Turkeys 1 star version 1.1, dated 01.09.2016*. Retrieved 25 July 2024 from https://beterleven.dierenbescherming.nl/zakelijk/wp-content/uploads/sites/2/2022/09/Turkeys-1-star-version-1.1-d.d.-01-09-2016.pdf retrieved from EFSA Public call for evidence 2024 - PC-0741 1 submitted by Dierenbescherming

Beter Leven 2 star. (2016). *Turkeys 2 star version 1.1, dated 01.09.2016*. Retrieved 18 July 2025 from https://beterleven.dierenbescherming.nl/zakelijk/wp-content/uploads/sites/2/2021/07/Turkeys-2-stars-version-1.1-d.d.-01-09-2016.pdf retrieved from EFSA Public call for evidence 2024 - PC-0741 1 submitted by Dierenbescherming

Chepete, H. J., Xin, H., & Li, H., (2012). Effect of partially covering the turkey litter surface on ammonia emission. *Journal of Applied Poultry Research*, *21*(3), pp. 513–521. https://doi.org/10.3382/japr.2011-00419

Crespo, R., & Grimes, J., (2024). Effect of brooding conditions on the blood chemistry and performance of turkey poults. *Journal of Applied Poultry Research*, *33*(2), Article 100408. https://doi.org/10.1016/j.japr.2024.100408

DG Agri. (2024). *DG Agri Dashboard: Poultry Meat*. Retrieved 05 September 2024 from https://agriculture.ec.europa.eu/document/download/0ce25b9f-1571-4310-8531-3fe3346c49e0_en?filename=poultry-meat-dashboard_en.pdf

Directorate General for Internal Policies - Policy department - Citizens' rights and constitutional affairs C. (2017). *Animal Welfare in the European Union*. Retrieved 24 July 2024 from https://www.europarl.europa.eu/RegData/etudes/STUD/2017/583114/IPOL_STU(2017)583114_EN.pdf

EC. (2024a). *MR-2024 -8008. Final report of a fact-finding study of France carried out from 24 to 25 January and 21 and 24 Mat 2024 in order to collect information on the national system for the protection of turkey welfare on farm.* Retrieved 28 November 2024 from https://ec.europa.eu/food/audits-analysis/audit-report/details/4814

EC. (2024b). *MR-2024, 7990, Final Report of a fact-finding mission of Italy carried out from 28 February to 13 March 2024 in order to collect information on the national system for the protection of turkey welfare on farm.* Retrieved 24 July 2024 from https://ec.europa.eu/food/audits-analysis/audit-report/details/4755

EC. (2025). *MR-2024, 7989, Final Report of a fact-finding study of Germany carried out from 22 May to 31 May 2024 in order to collect information on the national system for the protection of turkey welfare on farm*. Retrieved 20 Novemeber 2025 from

EFSA, Vitali, M, Aboagye, G, Candiani, D., Rojo Gimeno, C., Van der Stede, Y., Fabris, C. (2023). The use of animal-based measures at slaughter for assessing the welfare of turkeys on farm: EFSA scientific NCPs Network exercise. *EFSA Supporting Publications*, *20*(10), 28 pp., Article EN-8383. https://doi.org/10.2903/sp.efsa.2023.EN-8383

EFSA, Rojo Gimeno, C., Balmos, O. M., Candiani, D., Van der Stede, Y., Fabris, C. (2024). The practice of mutilations in turkeys (Meleagris gallopavo gallopavo) – exercise of the EFSA Networks on Animal Welfare. *EFSA Supporting Publications*, 30 pp. https://doi.org/10.2903/sp.efsa.2024.EN-9138

EFSA. (online a). *Stakeholder meeting on the welfare of beef cattle and turkeys: farming practices and data*. Retrieved 20 January 2025 from https://www.efsa.europa.eu/en/events/stakeholder-meeting-welfare-beef-cattle-and-turkeys-farming-practices-and-data

EFSA AHAW Panel, Nielsen S. S., Alvarez J., Bicout D. J., Calistri P., Canali E., Drewe J. A., Garin-Bastuji B., Gonzales Rojas J. L., Schmidt C. G., Herskin M., Michel V., Miranda Chueca M. Á., Padalino B., Roberts H. C., Spoolder H., Stahl K., Viltrop A., Winckler C., Berg C., Edwards S., Knierim U., Riber A., Salamon A., Tiemann I., Fabris C., Manakidou A., Mosbach-Schulz O., Van der Stede Y., Vitali M., Velarde A. . (2023). Welfare of ducks, geese and quail on farm. *EFSA Journal*, *21*(5), 157 pp., Article 7992. https://doi.org/10.2903/j.efsa.2023.7992

EFSA AHAW Panel, Nielsen, S. S., Alvarez, J., Boklund, A., Dippel, S., Dorea, F., Figuerola, J., Herskin, M. S., Michel, V. Miranda Chueca, M. A.,

Nannoni, E., Nonno, R., Riber, A. B., Stahl, K., Berk, J., Marchewka, J., van Staaveren, N., Balmos, O. M., Fabris, C., Van der Stede, Y., Rojo Gimeno, C., Velarde, A. (2026). Welfare assessment of turkeys on farm. *EFSA Journal*. https://doi.org/10.2903/j.efsa.2026.9851

Emamgholi Begli, H., Wood, B. J., Abdalla, E. A., Balzani, A., Willems, O., Schenkel, F., Harlander-Matauschek, A., & Baes, C. F., (2019). Genetic parameters for clutch and broodiness traits in turkeys (Meleagris Gallopavo) and their relationship with body weight and egg production. *Poultry Science*, *98*(12), pp. 6263–6269. https://doi.org/10.3382/ps/pez446

EURCAW. (2023). *Deliverable 2023-DL.3.1.2: Description of the main husbandry systems used for turkey farming in the EU*. Retrieved 23 August 2024 from https://zenodo.org/records/10625290

EURCAW. (2025). *Use of sick pens in turkey farming*. Retrieved 21 November 2025 from https://zenodo.org/records/15358077

Fournier, J., Schwean-Lardner, K., Knezacek, T., Gomis, S., & Classen, H. (2012). Impact of toe trimming on productivity, carcass grading, and

welfare of turkey hens raised to 15 weeks of age. Proceedings of the 24th World's Poultry Congress,

Fournier, J., Schwean-Lardner, K., Knezacek, T. D., Gomis, S., & Classen, H. L., (2014). The effect of toe trimming on production characteristics of heavy turkey toms. *Poultry Science*, *93*(9), pp. 2370–2374. https://doi.org/10.3382/ps.2014-04044

Glawatz, H., & Kartzfehn, M. (2024). Entwicklungen in der Putenzucht. In *Geflügeljahrbuch 2024. Zentralverband der Deutschen Geflügelwirtschaft e.V.* (pp. pp. 76–88).

Granados Chapatte, A., Lévêque, G., & Burnside, T., (2023). EU turkey breeders: main features, animal welfare challenges and opportunities. https://www.efsa.europa.eu/en/events/stakeholder-meeting-welfare-beef-cattle-and-turkeys-farming-practices-and-data in the presentations tab at the end of the website / day 2: turkeys / presentation 05. EU turkey breeders,

Hendrix Genetics. (online). *Brooder house set up*. Retrieved 04 September 2024 from https://www.hybridturkeys.com/en/resources/commercial-management/brooding/brooder-house-set/

Hybrid. (2023a). *Hybrid Turkeys trials the use of automatic nests in pedigree facility.* Retrieved 08 November 2024 from https://www.hybridturkeys.com/en/news/hybrid-turkeys-trials-the-use-of-automatic-nests-in-pedigree-facility/

Hybrid. (2023b). *Hybrid Turkeys trials the use of automatic nests in pedigree facility*. Retrieved 20 November 2025 from https://www.hybridturkeys.com/en/news/hybrid-turkeys-trials-the-use-of-automatic-nests-in-pedigree-facility/

Hybrid. (online). *Male Parent stock lighting guidelines, housed on lay farm.* Retrieved 04 September 2024 from https://www.hybridturkeys.com/documents/437/Lighting_Guidelines_PS_Male_layfarm_Aug2015.pdf

Initiative Tierwohl. (2023). *Handbuch Landwirtschaft Kriterienkatalog Geflügelmast*. Retrieved 29 November 2024 from https://initiative-tierwohl.de/wp-content/uploads/2023/07/20230731_Handbuch-Kriterienkatalog-ITW-Gefluegel.pdf

Mailyan, E., & van Schie, T. (2019). *Turkey Signals: A Practical Guide to Turkey Focused Management*. Roodbont Agricultural Publishers. retrieved from EFSA Public call for evidence 2024 - PC-0741 1 submitted by Fachtierärztliche Praxis für Wirtschaftsgeflügel und Beratung

Monckton, V., van Staaveren, N., Baes, C. F., Balzani, A., Kwon, I. Y., McBride, P., & Harlander-Matauschek, A., (2020). Are Turkeys (Meleagris gallopavo) Motivated to Avoid Excreta-Soiled Substrate? *Animals*, *10*(11), Article 2015. https://doi.org/10.3390/ani10112015

Mróz, E., Murawska, D., Jankowski, J., Stępińska, M., Przywitowski, M., & Otowski, K., (2019). The effects of hen's age and egg storage time on the frequency of occurrence of physical defects in turkey poults. *Poultry Science*, *98*(12), pp. 7097–7100. https://doi.org/10.3382/ps/pez481

Neeteson, A.-M., Avendaño, S., Koerhuis, A., Duggan, B., Souza, E., Mason, J., Ralph, J., Rohlf, P., Burnside, T., Kranis, A., & Bailey, R., (2023). Evolutions in Commercial Meat Poultry Breeding. *Animals*, *13*(19), Article 3150. https://doi.org/10.3390/ani13193150

Riber, A. B., van de Weerd, H. A., de Jong, I. C., & Steenfeldt, S., (2018). Review of environmental enrichment for broiler chickens. *Poult Sci*, *97*(2), 378-396. https://doi.org/10.3382/ps/pex344

Siopes, T. D., (2001). Temporal characteristics and incidence of photorefractoriness in turkey hens. *Poultry Science*, *80*(1), pp. 95–100. https://doi.org/10.1093/ps/80.1.95

The Poultry Site. (2009). *Turkey egg storage: effects on embryo and poult viability*. Retrieved 22 November 2024 from https://www.thepoultrysite.com/articles/turkey-egg-storage-effects-on-embryo-and-poult-viability

van Emous, R. A., van Harn, J., & van Riel, J. W., (2024). Effects of season, catching method, and thinning on carcass quality and production parameters in 4 different broiler production systems in the Netherlands. *Poultry Science*, *103*(6), Article 103688. https://doi.org/10.1016/j.psj.2024.103688

Verband Deutscher Putenerzeuger. (2013). *Bundeseinheitliche Eckwerte für eine freiwillige Vereinbarung zur Haltung von Mastputen*. Retrieved 5 September 2024 from www.ml.niedersachsen.de

Willems, O. (2018, 23 September 2024). *Webinar: Turkey genetics 101*. Hybrid Turkeys. Retrieved September 2024 from https://www.hybridturkeys.com/en/resources/video-resources/webinars/turkey-genetics-101/

Abbreviations and Acronyms

ADG	Average daily weight gain
CIWF	Compassion in World Farming
CO_2	Carbon dioxide
EC	European Commission
EFFAB	European Forum of Farm Animal Breeders
EFSA	European Food Safety Authority
EFTA	European Free Trade Association
EU	European Union
MCP	Microwave claw processing
MS	Member State
NGO	Non-governmental organisation
NH_3	Ammonia
RFID	Radiofrequency identification
RSPCA	Royal Society for the Protection of Cruelty to Animals
SD	Standard deviation
ToR	Term of Reference
UK	United Kingdom
VDP	Verband Deutscher Putenerzeurger
WoS	Web of Science

Appendix A Extensive literature review

The query search was as follow: ((((TS=(Turkeys OR "Meleagris gallopavo") AND TS=(*farm* OR "housing" OR husbandry OR cage OR "covered veranda" OR "free range" OR "outdoor range")) AND TS=("animal welfare" OR stress* OR pain* OR comfort* OR behav* OR protection)))) NOT TS= (domestication).

The link allowing the access to the search in Web of Science is the following: https://www.webofscience.com/wos/woscc/summary/67e8ca87-0b7d-4fe6-b360-863e355f5c71-b4f9ba4f/relevance/1 (Date: 04/03/2024)

The search string yielded 794 articles, out of which 1 was duplicated. Non relevant articles were removed for the following reasons: 307 articles were related to the country Türkiye, 297 were related to species other than turkeys and 67 were not related to the effect of housing on turkeys' welfare. In total, 122 articles were included from the web of science search and an additional 41 relevant articles were found based on manual assessment of cited references. Table 1 summarizes the search strategy leading to the abovementioned results.

Table A1. Initial count of obtained articles, number and reasons for excluding articles, and total number of included articles from Web of Science and other references

Initial search	Databa-se	Initial count	Post de-duplication	Total excluded per reason	Total included from web of science	Included from the references	Total included
04/03/2024	Web of science core collection	794	793	-Related to Turkey country: 307 -Not related to the effect of housing on turkeys' welfare: 67 -Related to species other than turkeys 297	122	41	163

Appendix B Answers received from the survey

Table B1. Number of answers received for each part of turkey production cycle

Type of turkey production	Number of answers
Turkey hatcheries	11
Fattening turkeys	22
Parental turkey breeders	5
Grandparent turkey breeders	1
Great-grandparent turkey breeders	1
Pedigree turkey breeders	1

Appendix C List of the stakeholders that engaged with EFSA by attending the stakeholder meeting in Brussels and/or submitting information on the Public call for data

A list of the stakeholders that engaged with EFSA by attending the Turkeys farming practices event and/or by submitting information in the Public call for data is provided in Table C1.

Table C1. Stakeholders that engaged with EFSA and attended the stakeholder meeting in Brussels and/or submitted information on the Public call for data. Stakeholders marked with* submitted data to the Public call for evidence

Name of stakeholder	Country
AVEC ELPHA*	Belgium
Caillé*	France
Chamber of Agriculture Lower Saxony*	Germany
Clinic for Birds and Reptiles, University Leipzig*	Germany
Compassion in World Farming Brussels (CIWF EU)*	Belgium
Coopérative Agricole des Fermiers de Loué*	France
Deutscher Tierschutzbund e.V.*	Germany
Dierenbescherming*	The Netherlands
Djurens Rätt*	Sweden
EFFAB*	Belgium
Eurogroup for animals*	Belgium
Fachtierärztliche Praxis für Wirtschaftsgeflügel und Beratung*	Germany
FOUR PAWS*	Germany
FVE- Federation of Veterinarians of Europe	
GAIA, Global Action in the Interest of Animals*	Belgium
General Directorate for Food and Veterinary	Portugal
German Farmers Association	Germany
Heidemark GmbH und Co KG	Germany
Hubel*	Germany
Ikerbasque, Basque foundation for Science (at NEIKER)	Spain
Institut de l'Elevage (French Livestock Institute)	France
Institute for Animal Hygiene, Animal Welfare and Farm Animal Behaviour (ITTN), University of Veterinary Medicine Hannover, Foundation*	Germany
Irish Department of Agriculture, Food and the Marine	Ireland
Irish Farmers Association	Ireland
Istituto Zooprofilattico Sperimentale del Mezzogiorno	Italy
IZSLER – Istituto Zooprofilattico Sperimentale della Lombardia e dell'Emilia Romagna	Italy

Landwirtschaftskammer Nordrhein-Westfalen*	Germany
Länsi-Kalkkuna Ltd*	Finland
Lower Saxony State Office for Consumer Protection and Food Safety, Germany*	Germany
Mendel University in Brno	Czechia
Mission of Brazil to the EU	Brazil
Netherlands Food and Product Safety Authority	The Netherlands
Putenzucht Miko GmbH	Austria
RSPCA*	UK
SAFE – Safe Food Advocacy Europe	Belgium
Sciensano, the Belgian Institute for Health	Belgium
Societe Sommac*	Democratic Republic of the Congo
Terrena – BODIN*	France
TERRENA LES FERMIERS D'ANCENIS*	France
USDA – US Mission to the EU	Belgium
Utrecht University	The Netherlands
Verband Deutscher Putenerzeuger e.V. (VDP)*	Germany
Vinces Consulting	

Appendix D Instructions for accessing submissions from the Public call for evidence

The submissions referenced in this technical report are identified under the label 'EFSA Public call for evidence 2024', followed by the prefix 'PC-0741' which denotes the unique identifier of the Public call for evidence on the welfare of turkeys on farm. This prefix is further followed by a number indicating the specific topic of the call the submission refers, alongside the name of the organisation that provided each submission.

The data provided by each stakeholder through the Public call for evidence is publicly available at the following webpage: https://open.efsa.europa.eu/consultations/a0cTk00000024ifIAA?search=turkey

The submissions specifically referenced in this technical report are listed in Table D1.

- For submissions in the form of comments, open the webpage linked above and use the "Download all comments" button to download all comments in a single file. Once downloaded, the relevant comment can be identified by searching for the corresponding Comment Number listed in the table.
- For submissions in the form of attachments, open the webpage linked above and use the Public Consultation ID and the organisation's name as listed in Table D1 to locate the relevant submission. Additional details on where to find the attached file are provided in the "Submission Location Details" column. These details can be retrieved on a page view displaying 20 results per page. If this column is left empty, it means that no file was attached to the submission.

TABLE D1: Summary of submissions received in response to the EFSA Public call for evidence, 2024 and cited in the present document (Technical Report). Each submission is identified by a unique Public Consultation ID and the corresponding organisation. Additional details on where to locate attached files to the submissions (if provided) are provided in the last column.

Public call for evidence ID	Section	Stakeholders submitting information on turkeys farming practices	Comment number (in comment document)	Attached file location on Open EFSA link, if provided* ('20/page' view)
PC 0471	1 Husbandry systems of turkeys kept for turkey breeders, hatchery conditions, turkey poults and turkeys kept for meat production	Verband Deutscher Putenerzeuger e.V. (VDP)	74	Page 4
PC 0741	3 space allowance in different husbandry systems	Länsi-Kalkkuna Ltd	82	Page 5
PC 0741	1 Husbandry systems of turkeys kept for turkey breeders, hatchery conditions, turkey poults and turkeys kept for meat production	AVEC ELPHA	20	Page 1
PC 0741	1 Husbandry systems of turkeys kept for turkey breeders, hatchery conditions, turkey poults and turkeys kept for meat production	Coopérative Agricole des Fermiers de Loué	60	Page 4
PC 0741	1 Husbandry systems of turkeys kept for turkey breeders, hatchery conditions, turkey poults	RSPCA	38	Page 2

	and turkeys kept for meat production			
PC 0741	1 Husbandry systems of turkeys kept for turkey breeders, hatchery conditions, turkey poults and turkeys kept for meat production	Länsi-Kalkkuna Ltd	80	Page 5
PC 0741	1 Husbandry systems of turkeys kept for turkey breeders, hatchery conditions, turkey poults and turkeys kept for meat production	Landwirtschaftskammer Nordrhein-Westfalen	21	Page 2
PC 0741	3 space allowance in different husbandry systems	Landwirtschaftskammer Nordrhein-Westfalen	22	Page 2
PC 0741	1 Husbandry systems of turkeys kept for turkey breeders, hatchery conditions, turkey poults and turkeys kept for meat production	*Fachtierärztliche Praxis für Wirtschaftsgeflügel und Beratung*	28	Page 2
PC 0741	1 Husbandry systems of turkeys kept for turkey breeders, hatchery conditions, turkey poults and turkeys kept for meat production	Dierenbescherming	3	Page 1

Appendix E Turkey production in the EU from European Commission

Table E1. Turkey production in the EU (thousands of tonnes) during 2019-2023 in the main 12 producing Member States

	2019	2020	2021	2022	2023
Germany	471	476	441	406	419
Poland	386	407	363	409	367
France	317	321	295	245	240
Italy	301	313	298	211	243
Spain	213	226	225	232	229
Hungary	78	81	73	64	56
Portugal	44	47	49	46	45
Ireland	13	14	15	15	16
Finland	8	8	9	9	9
Belgium	7	6	5	6	7
Sweden	5	5	5	5	5
Czechia	1	2	2	2	2

Source: European Commission
https://agridata.ec.europa.eu/extensions/DashboardPoultry/PoultryProduction.html

Table E2. Turkeys slaughtered during 2019-2023 in the main 12 producing EU Member States (thousands of heads)

	2019	2020	2021	2022	2023
Poland	39664	40905	35433	40974	35678
France	39333	39087	35717	30173	28709
Germany	34227	34901	33170	30526	30127
Spain	27482	27413	26639	27391	25932
Italy	28536	29431	27474	20455	23828
Hungary	7054	7032	6493	5840	5214
Portugal	3585	3901	4202	3915	3825
Ireland	1299	1375	1535	1493	1663
Finland	852	862	878	893	882
Belgium	728	575	507	657	679
Sweden	497	512	520	526	520
Czechia	138	158	175	169	173

Source: European Commission
https://agridata.ec.europa.eu/extensions/DashboardPoultry/PoultryProduction.html

Appendix F Survey results

Table F1. Survey answers about number and capacity of hatcheries and incubators (eggs/year)

n	Country and affiliation of respondent		Number of incubators	Number of hatchers	Capacity per year of the hatchery (eggs/year)
10	Finland (1: Industry), Poland (1: Industry), Slovakia (Industry), Spain (1: Industry), Sweden (1: Industry), Anonymous (5)	Average	46.6	17.7	4,604,080
		Min	5	2	852,000
		Max	169	67	12,000,000
		Median	48	14	3,944,800
		SD	50.72	20.08	3,818,455.17

Table F2. Survey answers on the minimum, average and maximum frequency of hatching per week and storage duration of eggs (days)

N	Country		Frequency of hatching/week	Storage duration of eggs (days)
			Average (min, max)	Average (min, max)
5	Finland (1: Industry), Spain (1: Industry), Sweden (1: Industry), Anonymous (2)	Average	1.8 (1.4, 2.8)	7.9 (3, 14.8)
5	Poland (1: Industry), Anonymous (4)	Min	1 (1, 2)	3 (0, 4)
5	Poland (1: Industry), Anonymous (4)	Max	2 (2, 4)	13 (10, 26)

Table F3. Descriptive analysis of survey answers (n=6*) on dimensions of crates (height, length, and width in mm) used to transport turkey poults from the hatchery to the brooding facilities.

	Mean (SD)	Min, max
Height (mm)	180 (26.33)	135, 200
Length (mm)	632 (104.20)	510, 800
Width (mm)	502 (104.20)	360, 610

*N=6, Finland (1, industry), Sweden (1, industry), Poland (1, industry), Anonymous (3 no affiliation mentioned)

Table F4. Descriptive analysis of the survey answers on the duration of hatching window (h), servicing (min), waiting time (min) before transport, and duration between the beginning of hatching window and placement on the destination farm (h)

	N	Country	Average (SD)	Median	Min	Max
Minimum duration of the hatching window (h)	8	Finland (1: industry), Spain (1: Industry), Anonymous (6)	15 (7.56)	12	8	24
Average duration of the hatching window (h)	5	Finland (1: Industry), Slovakia (1: Industry), Sweden (1: Industry), Poland (1: Industry), Anonymous (1)	22 (7.16)	23	12	32
Maximum duration of the hatching window (h)	8	Finland (1: industry), Spain (1: Industry), Anonymous (6)	25 (14.04)	24	12	48
Minimum duration of servicing (min)	5	Anonymous (5)	444 (222.89)	600	120	600
Average duration of servicing (min)	4	Poland (1: Industry), Anonymous (3)	405 (307.41)	420	60	720
Maximum duration of servicing (min)	4	Anonymous (4)	765 (270)	900	360	900
Minimum duration of waiting time (min)	3	Anonymous (3)	22 (33.29)	5	0	60
Average duration of waiting time (min)	4	Poland (1: Industry), Anonymous (3)	107 (313.69)	150	20	720
Maximum duration of waiting time (min)	3	Anonymous (3)	460 (544.43)	240	60	1,080
Minimum duration between the beginning of the hatching window and placement on the destination farm (h)	8	Finland (1: industry), Spain (1: Industry), Slovakia (1: Industry), Anonymous (5)	29 (10.89)	29	18	46
Average duration between the beginning of the hatching window and placement on the destination farm (h)	9	Spain (1: Industry), Sweden (1: Industry), Poland (1: Industry), Anonymous (6)	36 (24.92)	30	5	84
Maximum duration between the beginning of the hatching window and placement on the destination farm (h)	8	Finland (1: industry), Spain (1: Industry), Slovakia (1: Industry), Anonymous (5)	71 (22.67)	0	48	120

Table F5. Survey answers on the group size and farm size for fattening turkeys

	N	Mean (SD)	Min	Max
Min group size	11	4,318.2 (3,530.4)	1,000	13,000
Average	3	7,666.7 (2,081.7)	6,000	10,000
Median		7,000	3,500	10,000
Max group size	12	13,125 (9,890.6)	2,500	39,000
Min farm size (m2)	5	750 (418.99)	250	1,400
Average farm size (m2)	9	2,007.8 (1276.6)	480	4,700
Median		2,000	710	2,000
Max farm size (m2)	5	3,352.2 (3384.7)	1,650	9,400

SD= standard deviation

Table F6. Survey answers on light distribution, provision of dark period and intermittent light for turkeys kept for meat production.

Lighting evenness		**Provision of dark period during brooding**			**Provision of dark period during growing**		
N	Answer	N	Answer	Duration of the dark period (h)	N	Answer	Answers per duration (h)
20	Even (7)	22	No (1)		22	No (0)	
	Somewhat even (10)		Yes (21)	1 (1) 6 (2) 6-8 (2) 8 (13)		Yes (22)	6 (2) 6-8 (3) 8 (14) 7-10 (1) Not defined (2)
	Uneven (3)			Not defined (3)			

Table F7. Survey results on the growing system used for turkeys kept for meat production in the member states of the EU; the information between parenthesis inform the affiliation of the respondent;

Growing system used	**Number of replies**	**Country**
All in-all out	17	Austria (1: NGO), Czechia (1: Industry), Finland (1: Industry), France (1: Academic; 3: Industry), Germany (1: NGO), Italy (1: Academic; 1: NGO), Spain (1: Industry; 1*)
Brood and move	3	Austria (1: Industry), Poland (1: Industry), Sweden (1*), Germany (1: Industry)
All in all out /Brood and move	1	Germany (1: NGO)

*Not mentioned; NGO: non-governmental organization

Table F8. Survey answers on thinning practices, age of thinning, percentage of removed animals and stocking density the day before thinning for flocks of only toms, only hens, and for flocks as hatched (50 % of both toms and hens)

Thinning practiced	Number of replies	Age at thinning (weeks)	% of removed animals	Stocking density the day before thinning in flocks with only toms.		Stocking density the day before thinning in flocks with only hens.		Stocking density the day before thinning in flocks as hatched (50% of both sexes).	
				Kg/m²	Animals/m²	Kg/m²	Animals/m²	Kg/m²	Animals/m²
No	15[a]								
Yes	7[b]								
	Average	13	34.2	46.7	2.2	41.0	4.3	52.0	5.2
	Min	10	10	40	2	40	4	40	3
	Max	18	50	60	2.3	42	4.5	60	6.5
	Median	12	37.5	40	2.15	41	4.25	56	6
	SD	2.76	18	11.55	0.21	1.41	0.35	10.58	1.89

SD = Standard deviation

(a) Austria (1: NGO), Finland (1: Industry), France (1: Industry), Italy (1: NGO; 1: Research), Poland (1: Industry), Germany (2: NGO; 1: Industry), Sweden (1*), Anonymous (4*);

(b) Austria (1: Industry), Czechia (1: Industry), France (1: Research; 2: Industry), Spain (1: Industry; 1: Anonymous), Anonymous (1*)

Table F9. Survey answers on the use of brooder rings for parental breeder stocks

	Weight at release (g)		Age at release from brooder rings (days)		Diameter of the brooder rings (m)			Brooder power (Kw)		Number of males per ring			Number of females per ring		
	toms	hens	min	max	min	average	max	min	max	min	average	max	min	average	max
Average	157	150	5.6	7	3.5	3.5	4	3.85	5.03	*	287.5	*	200	283	300
Min	150	140	5	6	3.5	3.5	4	3.8	4.7	0	250	0	200	250	300
Max	160	160	7	8	3.5	3.5	4	4	6	0	300	0	200	300	300
Median	160	150	5	7	3.5	3.5	4	3.8	4.7	*	300	*	200	300	300
SD	5.77	10	0.89	0.71	0	*	0	0.1	0.65	*	25	*		28.9	*

**Could not be calculated due to insufficient data*

Table F10. Survey answers on stocking density in kg/m^2 and animals/m^2 of heavy genotypes of parental breeder stock during brooding, rearing and production.

		Stocking density	Average (SD)	Median	Min, max
Heavy toms	Brooding	Kg/m^2 Animals/m^2	7 (*) 2.5 (0.5)	7 2.5	7, 7 2, 3
	Rearing	Kg/m^2 Animals/m^2	30 (*) 1.57 (0.40)	30 1.5	30,30 1.2, 2
	Semen Production	Kg/m^2 Animals/m^2	23 (*) 1.25 (0.43)	23 1.5	23, 23 0.75, 1.5
Heavy hens	Brooding	Kg/m^2 Animals/m^2	13 (*) 5.73 (2.73)	13 7	13, 13 3, 7.2
	Rearing	Kg/m^2 Animals/m^2	49 (*) 3	49 3	49 3, 3.6
	Laying	Kg/m^2 Animals/m^2	40 (*) 2.67 (0.58)	40 3	40, 40 2, 3

**Could not be calculated due to insufficient data*

Table F11. Survey answers regarding stocking density in kg/m^2 and animals/m^2 of medium genotypes of parental breeder stock during brooding, rearing and production.

		Stocking density			
			Average (SD)	Median	Min, max
Medium genotype toms	Brooding	Kg/m^2 Animals/m^2	25 (*) 2 (0)	25 2	25, 25 2, 2
	Rearing	Kg/m^2 Animals/m^2	25 (*) 3 (0)	30 3	30,30 3, 3
	Sperm production	Kg/m^2 Animals/m^2	25 (*) 1.25 (0.35)	25 1.5	25, 25 1, 1.5
Medium genotype hens	Brooding	Kg/m^2 Animals/m^2	25 (*) 3 (0)	25 3	25, 25 3, 3
	Rearing	Kg/m^2 Animals/m^2	25 (*) 3 (0)	25 3	25, 25 3, 3
	Laying	Kg/m^2 Animals/m^2	25 (*) 2.8 (0.28)	25 2.8	25, 25 2.6, 3

**Could not be calculated due to insufficient data*

Table F12. Survey answers on group size of heavy parental breeder hens

	Turkey hens								
	Brooding			Rearing			Production		
	Min group size	Mean	Max group size	Min group size	Mean	Max group size	Min group size	Mean	Max group size
Mean	1,000	2,500	10,000	1,000	2,500	5,000	1,150	*	2,150
Min	1,000	2,500	10,000	1,000	2,500	5,000	1,000	0	1,800
Max	1,000	2,500	10,000	1,000	2,500	5,000	1,300	0	2,500
Median	1,000	2,500	10,000	1,000	2,500	5,000	1,150	*	2,150
SD	*	*	*	*	*	*	212.1	*	494.9

**Could not be calculated due to insufficient data*

Table F13. Survey answers on group size of heavy parental breeder toms

	Turkey toms								
	Brooding			Rearing			Production		
	Min group size	Mean	Max group size	Min group size	Mean	Max group size	Min group size	Mean	Max group size
Average	190	650	350	115	650	280	17.5	600	215
Min	180	650	200	30	650	60	15	600	30
Max	200	650	500	200	650	500	20	600	400
Median	190	650	350	115	650	280	17.5	600	215
SD	14.1	*	212.1	120.2	*	311.1	3.5	*	261.6

**Could not be calculated due to insufficient data*

Table F14. Survey answers on group size of medium parental breeder toms

	Turkey toms								
	Brooding			Rearing			Production		
	Min group size	Mean	Max group size	Min group size	Mean	Max group size	Min group size	Mean	Max group size
Average	175	150	410	175	80	410	70	80	325
Min	150	150	320	150	80	320	20	80	250
Max	200	150	500	200	80	500	120	80	400
Median	175	150	410	175	80	410	70	80	325
SD	35.4	*	127.3	35.4	*	127.3	70.7	*	106.1

*Could not be calculated due to insufficient data

Table F15. Survey answers on group size of medium parental breeder hens

	Turkey hens								
	Brooding			Rearing			Production		
	Min group size	Mean	Max group size	Min group size	Mean	Max group size	Min group size	Mean	Max group size
Average	1,250	1,600	6,500	1,250	1,400	3,500	875	1,400	1,950
Min	1,000	1,600	3,000	1,000	1,400	2,000	750	1,400	1,400
Max	1,500	1,600	10,000	1,500	1,400	5,000	1,000	1,400	2,500
Median	1,250	1,600	6,500	1,250	1,400	3,500	875	1,400	1,950
SD	353.6	*	4,949.8	353.6	*	2121.3	176.8	*	777.8

*Could not be calculated due to insufficient data