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*AWIN
welfare
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Turkeys



Acknowledgement

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- o The photos and drawings included are examples to illustrate a specific condition; these must not be considered as the only representation of animal or farm conditions.

Safety and welfare are the first priorities. The assessor, the owner, the farm manager and the animals should never be put in danger. If it is not possible to complete all or part of the assessment without compromising the animal welfare through fear, discomfort, pain or excessive restraint, the assessment should be stopped.

This document forms an integral part of the protocol.

No parts of the protocol may be copied without the permission of the authors.

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March 2015

FOREWORD

The European Animal Welfare Indicators Project (AWIN), addressed the development, integration and dissemination of animal-based welfare indicators, with an emphasis on pain assessment and pain recognition.

AWIN research objectives were carried out in four complementary workpackages and focused on sheep, goats, horses, donkeys and turkeys, species that, although commercially relevant world-wide, have so far been overlooked in previous science-based animal welfare assessments.

Workpackage 1 developed practical, science-based, welfare assessment protocols, including pain indicators. AWIN also translated the welfare assessment protocols into interactive apps to facilitate data collection, data storage and data analysis.

Workpackage 2 studied the impact of diseases and pain on animal welfare and developed interactive apps to facilitate data collection, data storage and data analysis.

Workpackage 3 examined the effects of different prenatal social environments, social dynamics and prenatal handling methods on developmental and welfare outcomes of the offspring of sheep, goats and horses.

Workpackage 4 developed interactive learning objects to disseminate the scientific work developed in the AWIN project, and created the Animal Welfare Science Hub, to promote transparency, establishing a global research and education repository in animal welfare science.

The AWIN project remains committed to promote solid science, which could be used in practical settings.

A list of partners of the AWIN project is reported at the end of the document.

Draft protocols were subjected to an extensive consultation process with interested parties, across many European countries, and the wider world. Stakeholders actively contributed to testing the draft protocols and offered useful feedback.

This document includes the AWIN welfare assessment protocol for growing turkeys developed by:

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Valentina Ferrante and Tatiane Terumi Negrao Watanabe (Università degli Studi di Milano, Italy).

This document was edited by Valentina Ferrante, Susanna Lolli and Inma Estevez, with the contribution of Elisabetta Canali, Sara Barbieri (Università degli Studi di Milano, Italy) and Adroaldo J. Zanella (Universidade de São Paulo, Brazil).

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HOW TO USE THIS DOCUMENT

This document presents the practical protocol to assess the welfare of turkeys developed by AWIN and it is divided into four parts:

- **Chapters 1, 2, 3** – preliminary information relevant for applying the protocol.
- **Chapters 4, 5** – flow of welfare assessment; description, assessment and scoring of the welfare indicators (presented according to the four principles and twelve criteria of Welfare Quality®); description of the outcome of the assessment.
- **Chapters 6** – i-WatchTurkey App.
- **Appendix A, B** – recording sheets to collect data.

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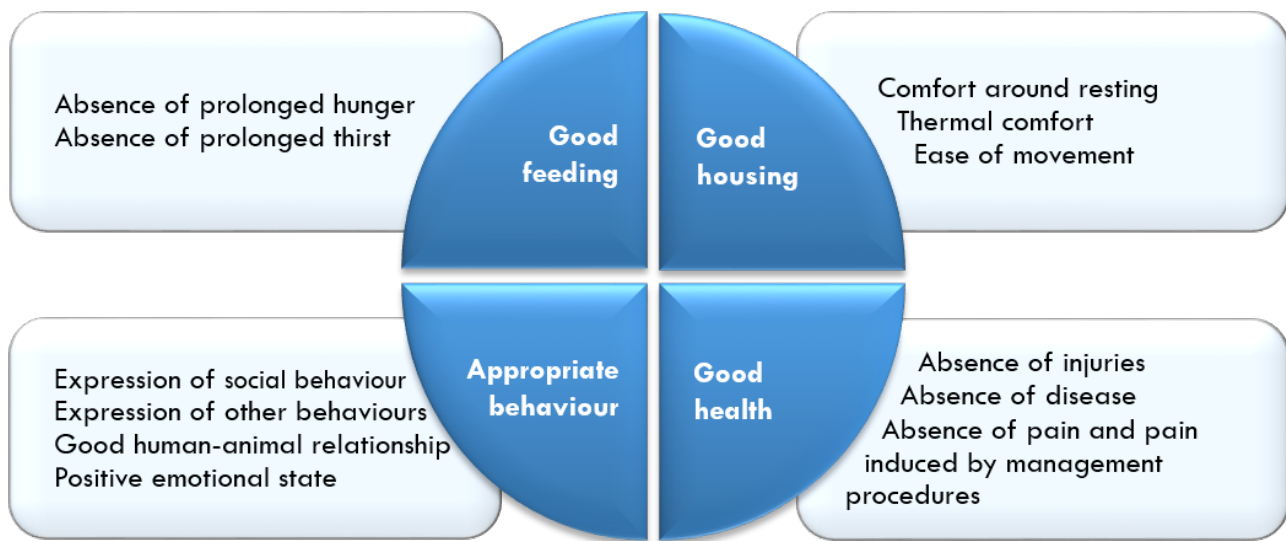
1. INTRODUCTION

Good animal welfare is a prerequisite for high-quality and sound farm animal production. Providing environmental and management conditions that favour animal welfare is not only expected by consumers and the general public, but is also related to achieving system-appropriate levels of performance and profitability. Animal welfare assessment is thus one of the pillars of productive, efficient and sustainable production systems.

In order to develop valid welfare assessment protocols it is important to remember that current, accepted definitions of animal welfare are based on a multidimensional concept, defined as a state of complete mental and physical health where the animal is in harmony with its environment (Hughes, 1976), and as its state as regards its attempts to cope with its environment (Broom, 1986). The physical environment, resources available to the animals and management practices of the farm can affect the welfare of animals, which adjust to these inputs with behavioural, and physiological responses. Since the beginning of the 21st century, on-farm welfare monitoring systems have been developed. Initially monitoring schemes were largely based on environmental assessments, such as design or resource indicators, which assess inputs that could affect animal welfare. These resource-based and management-based measures should be considered as risk factors that might affect welfare; however in order to assess animal welfare at farm level, it is crucial to develop and use animal-based measures. These indicators provide a more accurate welfare assessment as they give direct information about the response of, and the effects on, the animal. Animal-based measures are considered by EFSA to be “the most appropriate indicators of animal welfare and a carefully selected combination of animal-based measures can be used to assess the welfare of a target population in a valid and robust way” (EFSA, 2012). The European Commission emphasizes the use of science-based animal welfare indicators as a possible means to simplify the legal framework and allow flexibility to improve competitiveness of livestock producers (EC, 2012).

The first welfare assessment protocols built on animal-based measures were developed by the Welfare Quality® project for pigs, poultry, dairy and beef cattle (Welfare Quality® Protocol, 2009a, Welfare Quality® Protocol, 2009b, Welfare Quality® Protocol, 2009c). This project, funded within the 6th EU Framework Programme, developed a scheme where the needs of animals are related to four principles and twelve criteria, considered necessary to cover all aspects of animal welfare (Fig. 1). This approach was the basis for future research on welfare assessment at farm level.

Figure 1. Welfare principles and criteria according to Welfare Quality®



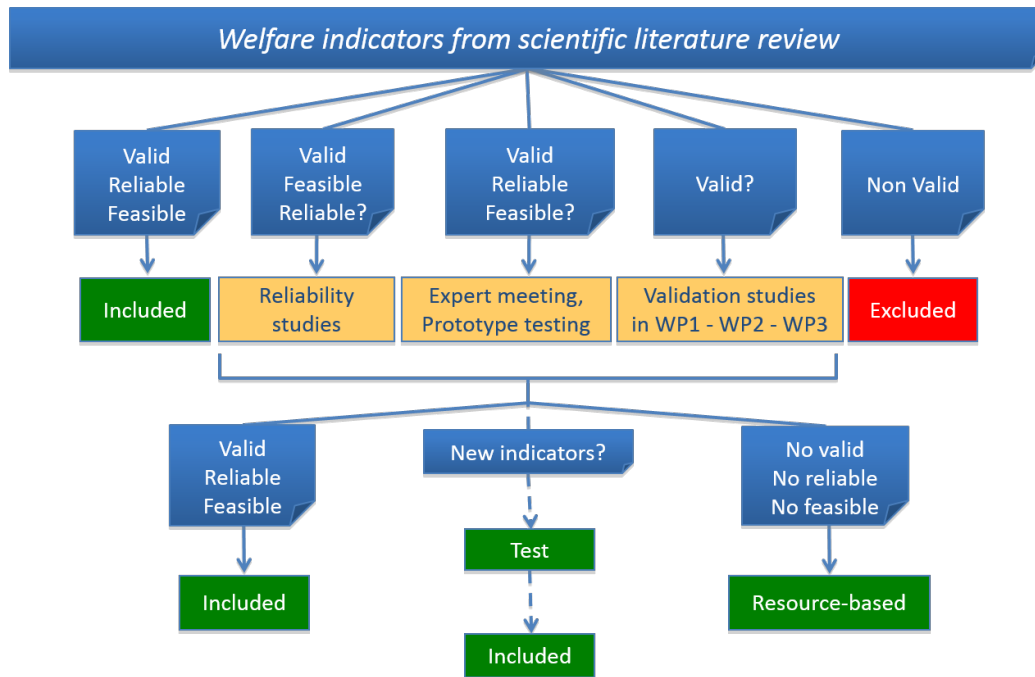
After dealing with welfare assessment of some of the most common farmed species, in the 7th Framework Programme, the European Commission required the development, integration and dissemination of animal-based indicators, including pain, in commercially important husbandry species not yet covered in previous projects. In 2011 the AWIN (Animal Welfare Indicators) project was funded with the overall goal of improving animal welfare of sheep, goats, horses, donkeys and turkeys by developing, integrating and disseminating information about animal welfare indicators. These animal species offer challenges since they have been less studied and thus there is generally less information available on well-validated welfare indicators. In addition, the heterogeneity of the farming systems and environments in which these animals live may make the assessment more difficult. AWIN also puts special emphasis on the recognition and assessment of pain, as pain is an area that is frequently lacking from many animal welfare assessments and yet is often key when animal welfare problems arise.

AWIN workpackage 1 (WP1) aimed to develop and refine welfare assessment protocols using animal-based indicators, including pain, in the above mentioned species. The welfare assessment protocols developed by AWIN are grounded on the four welfare principles and twelve criteria developed by Welfare Quality® and are complete but not complex, so that their application can meet current needs.

This Section briefly summarizes the principles and the rationale of the AWIN welfare assessment protocols for sheep, goats, horse, donkeys and turkeys, to be applied for on-farm welfare assessment; information about the animal based indicators, data processing and outcome will be presented later in the document.

As a starting point WP1 reviewed background scientific information to select promising animal-based indicators to be included in the protocols. Indicators were classified according to the 4 principles and the 12 criteria developed by Welfare Quality® (Fig. 1), and assessed for their validity, reliability and feasibility, identifying gaps in current knowledge (Fig. 2).

Figure 2. Characteristics and process to identify promising animal-based indicators



From this process, at least one indicator for each welfare criterion was selected to be included in the protocols. AWIN scientists developed a research action plan to address the lack of knowledge regarding the validity, repeatability and feasibility of single promising indicators where this was not present in the literature.

The work involved collaboration with workpackage 2 of the AWIN project, which addressed the relationship between disease, pain and animal welfare and with workpackage 3, which examined the effects of prenatal social environments, social dynamics and prenatal handling methods on the development and welfare of the considered species. Workpackage 4 maximised the effective translation of workpackage 1 scientific results into learning objects. New indicators were developed and results were published in peer reviewed journals. Welfare assessment protocols were developed using animal-based indicators, although some resource-based indicators were included when no animal-based indicator were available to assess specific aspects.

To develop the welfare assessment protocols, stakeholders' perception of the selected indicators was taken into consideration. The purpose of involving the stakeholders was to increase the acceptability of the project outcomes through stimulation of a multidisciplinary dialogue, and identify solutions to potential barriers to the application of the protocols in practice. Stakeholders' opinion and farmers' experience were crucial for the successful implementation of the protocols. An on-line questionnaire in five languages was developed with the aim of understanding the current opinion of various stakeholders (farmers, veterinarians, owners) on welfare evaluation of the different species. In addition, the welfare assessment protocols for horses, donkeys, sheep, goats and turkeys were discussed with a network of stakeholders in several meetings, gaining feedback on their acceptability and feasibility, and facilitating the experimental phases of the project through practical support for the on-farm testing of the protocols.

The protocols were refined according to the results of WP1 studies and the feedback from the stakeholders favouring the use of indicators with the highest acceptability.

For turkey it was decided to focus on the development of indicators for intensive systems and to take an innovative approach of on farm evaluation that could be feasible, well accepted by the farmers, less time consuming than previous examples, but at the same time effective and objective as the previous developed protocols for poultry which demand considerable amounts of time to be used. It was decided to develop transect approach for the on farm evaluations of turkeys. The choice of assessing the effectiveness of the transect methodology for on farm application, was based primarily on the potential of this methodology to be a valid, effective, and precise to provide a reliable evaluation of critical welfare issues common in meat poultry such as the incidence of leg problems, immobility and injuries. The transect methodology, used frequently in the area of ecology or population dynamics, has the advantage of being less time consuming as compared to other available methodologies and does not generate stress in the animals as does not imply any bird manipulation, which in the case of turkeys would be extremely problematic. The methodology is basically based on standardized walks through, and, therefore, the protocol seems to be well accepted by farm managers. Furthermore, the parameters used to evaluate welfare are critical for the turkey welfare (such as leg problems) but also have an important economic relevance. The possibility of individual farm data collection by following a relatively simple protocol may facilitate the use of this procedure by industry in order to minimize the incidence of the problem and may facilitate the introduction of corrective actions to maximize welfare.

The outcome of the protocols aims to give a clear and immediate visual feedback to the farmers about the welfare of the animals on the farm, highlighting positive conditions and enabling comparison with a reference population.

AWIN protocols are designed to enable comparisons among similar production and management systems and are intended to assess animal welfare in order to guide its improvement throughout Europe and elsewhere in the world.

It should be underlined that this document presents the first version of the assessment protocol for goats on March 2015 and that scientific research will progress, refining indicators such that AWIN protocols could be updated according to new scientific knowledge. It should also be highlighted that proper training and adequate knowledge are essential to apply the protocols.

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2. AIMS

AWIN aimed to develop welfare assessment protocols that provide a toolbox of sound, feasible and practical animal-based indicators to assess animal welfare in order to promote improvements in animal production systems throughout Europe. The protocols were developed for species with broadly different rearing systems, ranging from very intensive to pasture based systems, and different production settings, ranging from intensive milk production to extensive meat production or working animals.

The Awin welfare assessment protocol for turkeys was focused on intensive systems for growing turkeys, both males and females, assessed 1 to 2 weeks before slaughter. The age of assessment is crucial as the risk of impaired welfare increases at the end of the production cycle, when animals are more prone to show welfare problems.

The decision to use the Transect walks methodology for on-farm application was based primarily on its potential as a valid, effective, and precise method of providing a reliable evaluation of critical welfare issues common in meat poultry. The simplicity of the methodology means it requires simple training and the cost of the assessment is significantly reduced, while potentially allowing a higher degree of homogeneity in the evaluator assessment. This new approach does not involve turkey manipulation and therefore there is minimal impact on the turkeys and less demand on time constraints and personnel.

3. PRELIMINARY INFORMATION

The objective of this section is to ensure that assessors know how to organise a visit, how to behave on a growing turkey farm, how to approach the farm manager and how to present the protocol so that results are reliable and useful to all.

Before contacting the industry or farm manager, assessors should be sure that they have a good knowledge of:

- o how the protocol works;
- o possible constraints in the protocol application;
- o farm practices and husbandry features for turkey;
- o the natural behaviour of turkey;
- o market and production strains, sanitary rules and common diseases.

3.1 Contact the farm manager

It is essential to contact the farm manager and plan an appointment to visit the farm taking into account the timing of the farm routine and the group management, in order to select the house to be assessed.

When talking to the farm manager, assessors should discuss and agree the objectives of the visit, timetable and methods. It should be made clear that special arrangements and changes in routine will be kept to a minimum.

It is important to underline that the welfare assessment is not dangerous for the turkeys nor for the people involved. All procedures conducted as part of the welfare assessment are non-invasive and routine operations that any good farm manager would conduct as part of daily checks. It should be specified how and for how long the farm manager may be involved.

3.2 Equipment required

Useful materials for the welfare assessment are: recording sheets, tablet or smartphone, pens/pencils, camera, measuring tape or laser-distancemeter, safety shoes/boots, disposable overalls and shoe/boot covers and disinfectants.

3.3 Biosecurity

Biosecurity is a crucial issue. Welfare assessors should never be a potential disease-spreading source, or be seen as such.

Disposable overalls and shoe/boot covers are essential even if additional disinfection will be performed on the farm premises. Disposable overalls should be of the same colour as those normally used by the farmers (e.g. dark green or blue). Disposable overalls are usually viewed with suspicion by animals, causing behaviour changes. Using the farm material is also a possibility but this should be confirmed with the farm manager beforehand. Check with the host farm manager as to the correct clothing and footwear preferred.

3.4 Arriving and working

On arrival, assessors should look for the farm manager in charge of the animals and ask to briefly present the farm safety rules. This should include areas to be aware of from a hazard point of view such as vehicle paths, dangerous machinery, or guard dogs.

During this conversation, the welfare protocol should be presented, including the objectives, the approximate assessment duration, the assessor schedules and activities and the indicators collection order. This will provide the farm manager with information on where the assessors will be at any time. Although the flow of the welfare assessment protocol cannot be changed, the plan should be discussed so that the assessment is conducted without interfering with routine work.

When walking around the farm, assessors should be discreet. Any disturbance to people working on the farm or to the animals must be kept to the minimum possible.

Knowing how turkeys behave is crucial when entering the house where animals are kept. This will not only ensure adequate assessment but will also allow the identification of aggressive, threatening or fear signs.

Other advice on how to move around and behave on the farm is:

- o ask permission before entering each house;
- o do not leave the doors open after going through;
- o avoid talking too loud and making sudden movements;
- o do not leave any object within reach of the animals;
- o keep focused on the work at all times.

If records are to be checked, assessors should always ask for permission and, if possible, consult them with the farm manager or whoever is in charge.

3.5 Safety handling

The present welfare assessment protocol is designed for use by trained assessors. Safety and welfare are of prime importance. The assessors, the farmers or the animals should never be put in danger.

4. AWIN WELFARE ASSESSMENT PROTOCOL FOR TURKEYS

4.1 Welfare indicators divided by principles and criteria

This Section reports description, assessment and method of scoring of each AWIN welfare indicator for growing turkeys, listed according to WQ® principles and criteria. In order to highlight the association between welfare indicators and principles throughout the document, different colours are used to identify each principle.

| Welfare Principles | Welfare Criteria | Welfare indicators |
|--------------------------------|--------------------------------|-------------------------|
| Good Feeding | Absence of prolonged hunger | Small size |
| | Absence of prolonged thirst | Small size |
| Good Housing | Comfort around resting | Dirtiness |
| | Thermal comfort | Featherless |
| | Ease of movement | Not available |
| Good Health | Absence of injuries | Head wounds |
| | | Back wounds |
| | | Tail wounds |
| | Absence of disease | Immobility |
| | | Lameness |
| Absence of pain | Small size | |
| | Sick | |
| | Terminally ill | |
| | Dead | |
| Appropriate Behaviour | Expression of social behaviour | Lameness |
| | | Aggression towards mate |
| | | Featherless |
| | | Mating |
| | | Head wounds |
| | Back wounds | |
| Expression other behaviours | Tail wounds | |
| Good human-animal relationship | Not available | |
| Positive emotional state | Not available | |

Some indicators provide information on more than one welfare criteria and are therefore associated to more than one colour.

4.2 Flow of the welfare assessment

The data collection is organised in three phases according to the flow showed below.

Phase 1 - Farm Manager Questionnaire

OUTSIDE THE HOUSE

FACILITIES: number of houses, house dimensions (width and length), litter type, temperature, humidity, photoperiod and ventilation, number of turkeys in each house.

TURKEYS: hybrid, sex, age, number of turkeys in the farm, stocking density.

FEEDING: feed type, consumption, regime, type of feeders.

DRINKING: water consumption, type of drinkers.

MORTALITY and CULLING: incidence and main reasons.

Each visit includes an interview with the farm manager and data collection focused on management-based and resource-based indicators.

The answers to this interview will not be included in the final outcome, but they can be used for understanding the underlying reasons for welfare problems that may arise from the protocol.

The number of turkeys in each house is needed to calculate the proportion of animals showing welfare problems.

The Transect walks should be carried out by one assessor.

Phase 2 - Transect Walks

OUTSIDE THE HOUSE

The house width is divided into longitudinal bands (transect) of equal width according to the house width (e. g. if the house is 13 m width, it will be divided in 5 longitudinal bands of around 2,5 m wide). Transect widths in most cases are limited by the location of feeder and drinker lines (for central transects), or the wall and adjacent drinking line (for wall transects), which appeared to create invisible barriers to turkeys' movements, caused by a human moving forward along the transect.



List of transects

The assessor should number the transects from left to right with a progressive number. The first and the last transect will always be wall transects. This may provide additional information on the effect of the walls.

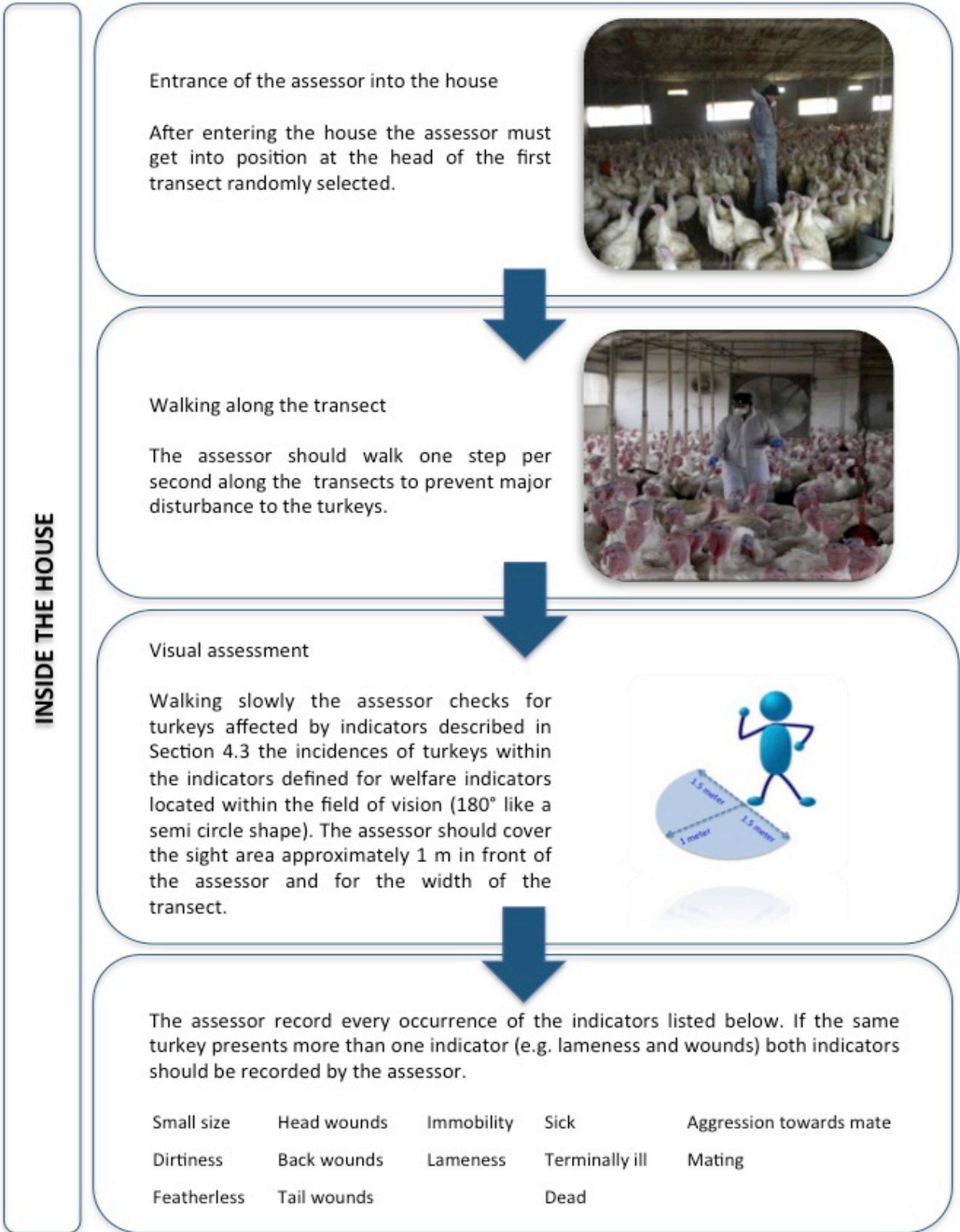


Random order of assessment

The assessor should assess the transects following a random order (like in the picture) and these should be conducted in both directions. Adjacent transects should not be observed sequentially.



Phase 2 - Transect Walks



4.3 AWIN welfare indicators for turkeys

SMALL SIZE

GOOD FEEDING

ABSENCE OF PROLONGED HUNGER
ABSENCE OF PROLONGED THIRST

GOOD HEALTH

ABSENCE OF DISEASE

Description

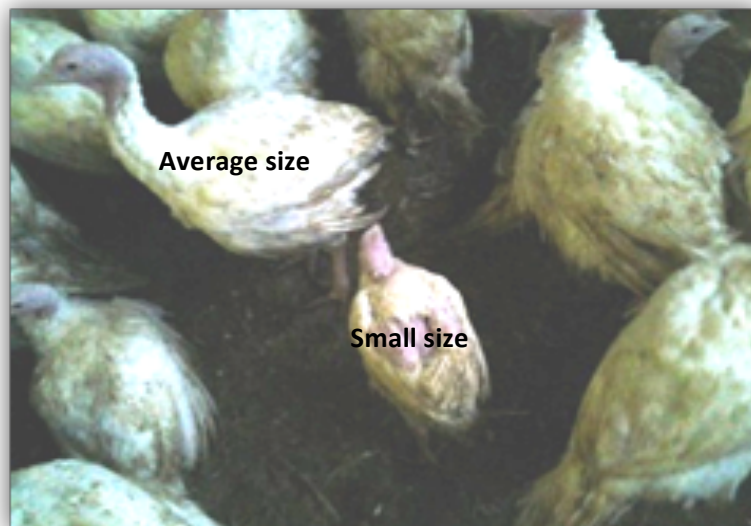
Turkey is visibly smaller than the average of the flock.

There are several factors causing small size in turkey intensive production, such as not appropriate nutrition and water consumption or the presence of parasites.

How to assess

A small turkey is approximately $\frac{1}{2}$ the size of an average turkey in the flock.

During the Transect walks each small turkey is noted on the recording sheet or by using the i-WatchTurkey App on a smartphone or tablet.



DIRTINESS

GOOD HOUSING COMFORT AROUND RESTING

Description

Plumage dirtiness may be correlated with hock burn, contact dermatitis and lameness for individual turkeys or may be associated with the environment and production system. Plumage dirtiness can be assessed as part of on-farm inspections.

How to assess

Dirtiness is a very clear and dark staining of the back, wing and or tail feathers, not including light discoloration of feathers from dust, covering at least 50% of the body area.

During the Transect walks each dirty turkey is noted on the recording sheet or by using the i-WatchTurkey App on a smartphone or tablet.



FEATHERLESS

GOOD HOUSING
THERMAL COMFORT

APPROPRIATE
BEHAVIOUR

EXPRESSION OF SOCIAL BEHAVIOUR

Description

Turkey has one or more visible areas of missing feathers on the body. An increasing number of turkeys with missing feathers may reflect inadequate housing conditions and/or behavioural problems. In turkeys featherless is often combined with back wounds.

How to assess

A turkey is considered featherless when has missing feathers on an extended area on the back, or back and wings.

During the Transect walks each featherless turkey is noted on the recording sheet or by using the i-WatchTurkey App on a smartphone or tablet.



HEAD WOUNDS

GOOD HEALTH
ABSENCE OF INJURIES

APPROPRIATE BEHAVIOUR
EXPRESSION OF SOCIAL BEHAVIOUR

Description

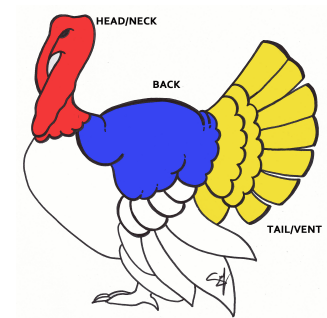
Head wounds refer to all types of fresh or older injuries on the head area. These lesions, especially for snood, could be explained mainly as a result of aggressive pecking by conspecifics. One or more stress factors such as crowding, bright light, dietary deficiencies, insufficient feeding or watering, lack of space or boredom can cause cannibalism.

How to assess

Head wounds are visible signs of injuries on the head area related to fresh or older wounds.

Head area includes head, beak, snood and neck (red area in the picture).

During the Transect walks each turkey with head wounds is noted on the recording sheet or by using the i-WatchTurkey App on a smartphone or tablet.



BACK WOUNDS

GOOD HEALTH
ABSENCE OF INJURIES

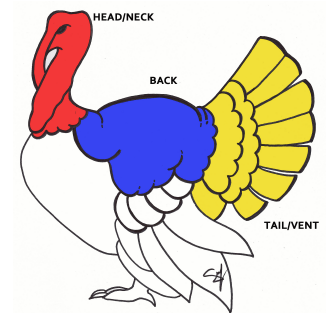
APPROPRIATE BEHAVIOUR
EXPRESSION OF SOCIAL BEHAVIOUR

Description

Back Wounds refer to all types of fresh or older injuries on back area. These lesions could be explained mainly as a result of pecking by conspecifics as behavioral aggressiveness. One or more stressors including crowding, bright light, dietary deficiencies (esp. salt), insufficient feeding or watering, lack of space or boredom can cause cannibalism.

How to assess

Back wounds are visible fresh or older, including bleeding, wounds on the back area.
Back area is between the end of the neck and the beginning of the tail (blue area in the picture).



During the Transect walks each turkey with back wounds is noted on the recording sheet or by using the i-WatchTurkey App on a smartphone or tablet.



TAIL WOUNDS

GOOD HEALTH
ABSENCE OF INJURIES

APPROPRIATE BEHAVIOUR
EXPRESSION OF SOCIAL BEHAVIOUR

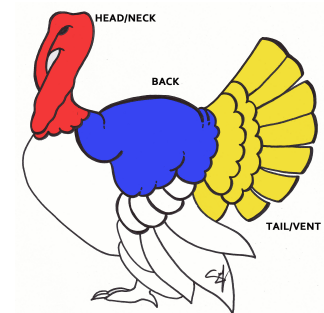
Description

Tail Wounds refer to all types of fresh or older injuries on tail area. These lesions could be explained mainly as a result of pecking by conspecifics as behavioral aggressiveness. One or more stressors including crowding, bright light, dietary deficiencies (esp. salt), insufficient feeding or watering, lack of space or boredom can cause cannibalism.

How to assess

Tail wounds are visible wounds on the tail area, including fresh, older or bleeding wounds.
Tail area includes vent where vent is visible (yellow area in the picture).

During the Transect walks each turkey with tail wounds is noted on the recording sheet or by using the i-WatchTurkey App on a smartphone or tablet.



IMMOBILITY

GOOD HEALTH

ABSENCE OF DISEASE

Description

Turkeys are immobile when they do not attempt to move. Immobile turkeys may rest in an unnatural position with the legs extended to the front or sideways.

Immobility causes severe economic loss on the global market mainly at the end of the production cycle and is a major welfare problem. Walking ability can be affected by a variety of factors such as genetic background and environment.

How to assess

A turkey is considered immobile when do not move when approached, or after slight encouragement with a stick.

During the Transect walks each immobile turkey is noted on the recording sheet or by using the i-WatchTurkey App on a smartphone or tablet.



LAMENESS

GOOD HEALTH

ABSENCE OF DISEASE
ABSENCE OF PAIN

Description

Lame turkeys walk with obvious difficulty. One or both legs are not placed firmly on the ground. Walking ability can be affected by a variety of factors such as genetic background, environment and diseases. Lamed turkeys are often able to move only by propping themselves up on their wings. Locomotory problems cause severe economic loss on the global market mainly at the end of the production cycle and are considered a major welfare issue.

How to assess

A lame turkey moves away from the assessor but stops to rest after 2-3 steps.

During the Transect walks each lame turkey (regardless to severity) is noted on the recording sheet or by using the i-WatchTurkey App on a smartphone or tablet.



SICK

GOOD HEALTH

ABSENCE OF DISEASE

Description

The sick turkeys are usually found in a resting position, with the pendulous crop hanging in front of the breast or with missing body parts. Usually sick turkeys show clear signs of impaired health.

How to assess

Sick turkey showing clear signs of impaired health like small and pale snood, red and watery eyes and occasionally unarranged feathering.

During the Transect walks each sick turkey is noted on the recording sheet or by using the i-WatchTurkey App on a smartphone or tablet.



TERMINALLY ILL

GOOD HEALTH

ABSENCE OF DISEASE

Description

A terminally ill turkeys cannot be cured and generally die; the situation of a terminally ill turkey is so severe that no treatment with help.

How to assess

A terminally ill turkey lies on the ground with head resting on the ground or back, usually with half closed eyes with feeble breath.

During the Transect walks each terminally ill turkey is noted on the recording sheet or by using the i-WatchTurkey App on a smartphone or tablet.



DEAD

GOOD HEALTH

ABSENCE OF DISEASE

Description

There are several factors causing death in intensive turkey production. Mortality surely affects the industry and farm income, but it is also an important animal welfare concern.

How to assess

During the Transect walks each dead turkey is noted on the recording sheet or by using the i-WatchTurkey App on a smartphone or tablet.

AGGRESSION TOWARDS MATE

APPROPRIATE BEHAVIOUR

EXPRESSION OF SOCIAL BEHAVIOUR

Description

The pecking behaviour is normally used by turkey to establish a hierarchical organisation. The so called “peck order” starts at an early age and will be established at different times according to the flock size and complexity.

Once established the turkeys live in a harmonious state with no obvious dominant/subordinate relationship until the flock structure is altered. The farm manager must give consideration to the multiple aspects of the social organisation in order to minimise the disturbance of established relationships.

Among the causes of aggression towards mate are: high densities, insufficient space availability for feeding and drinking, group size.

How to assess

Aggression towards mate is a clear aggressive attack towards the head of another turkeys or chasing or pecking, including fights and leaps.

During the Transect walks each turkey exhibiting this behaviour is noted on the recording sheet or by using the i-WatchTurkey App on a smartphone or tablet.



MATING

APPROPRIATE BEHAVIOUR

EXPRESSION OF SOCIAL BEHAVIOUR

Description

Sometimes, due to the mistake in the turkeys sexing at hatching, males and females are reared together and some toms can show mating behaviour. This normal behaviour can lead to lesions on the back of females due to the sexual dimorphism.

How to assess

The tom makes an attempt or “sit” on top of a female.

During the Transect walks the number of turkeys exhibiting this behaviour is noted on the recording sheet or by using the i-WatchTurkey App on a smartphone or tablet.



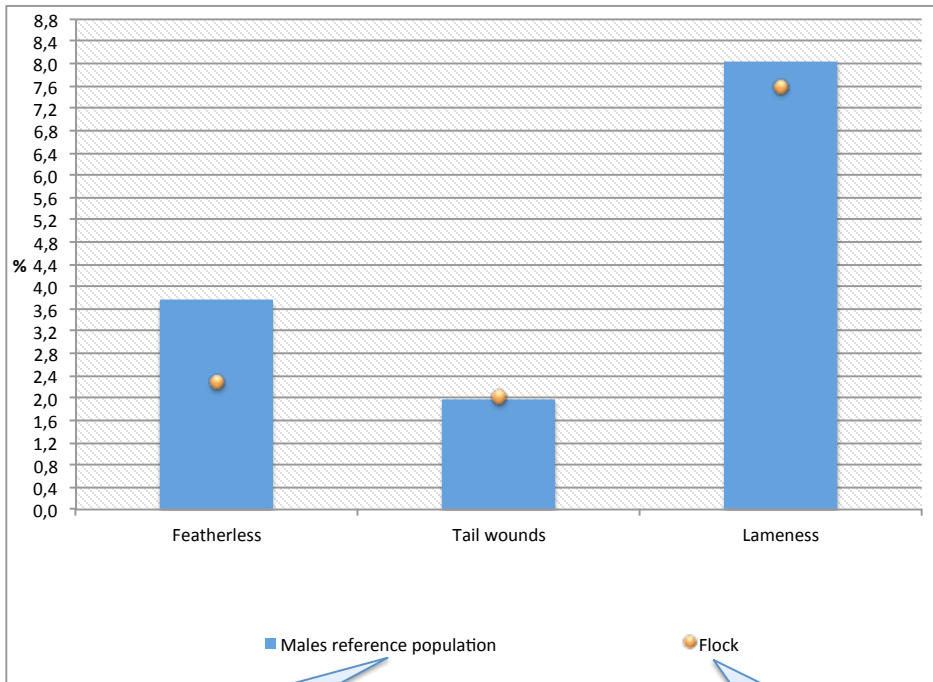
5. OUTCOME OF WELFARE ASSESSMENT

After the assessment, welfare data for each flock should be entered into a data set and an objective descriptive output should be generated. The aim of the output is to give a visual feedback on the welfare of the animals on the farm, to highlight positive conditions and enable comparison with a reference population. Currently, the reference population displayed in the output refers to data collected during the AWIN project on 26 farms, with a total of 44 flocks (17 males and 27 females).

All data used to calculate the proportion of each indicator is weighted according to the number of turkeys on the flock.

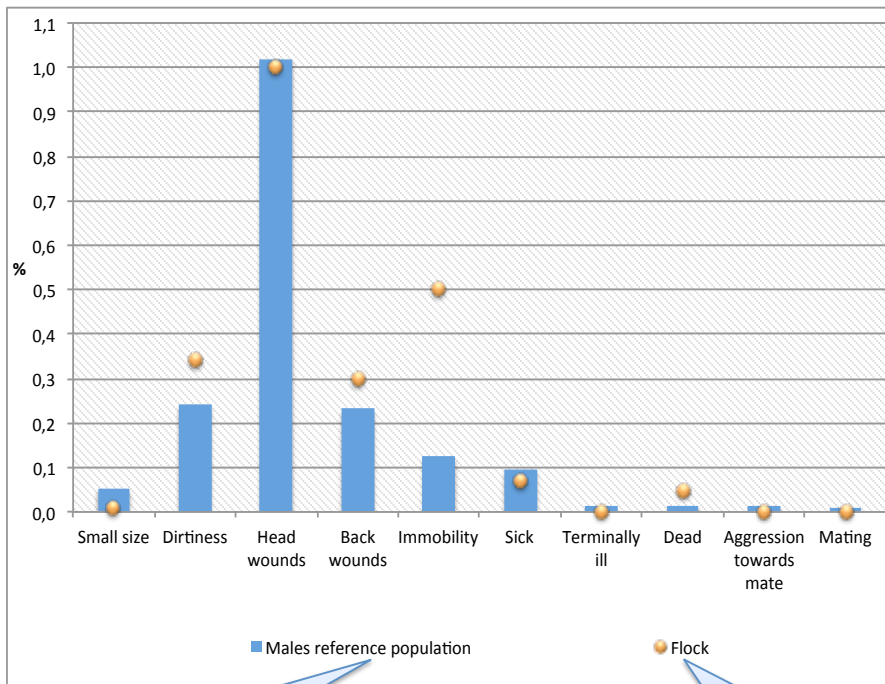
All the indicators are displayed in the output and the position of the assessed flock is highlighted in comparison with the median value of the reference population.

MALES



Reference population refers to data collected during the AWIN project, weighed depending on the number of animals per flock

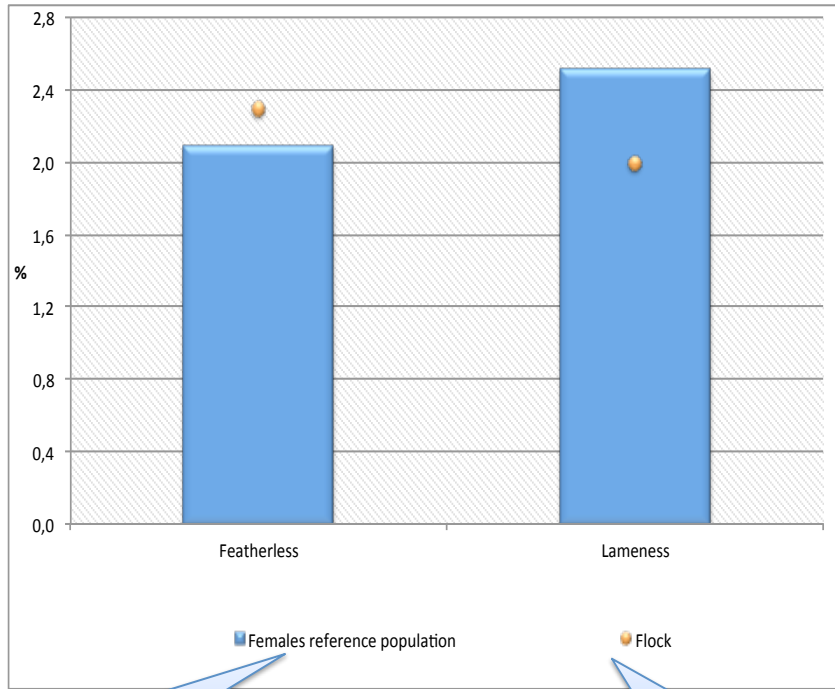
Data refers to the flock assessed



Reference population refers to data collected during the AWIN project, weighed depending on the number of animals per flock

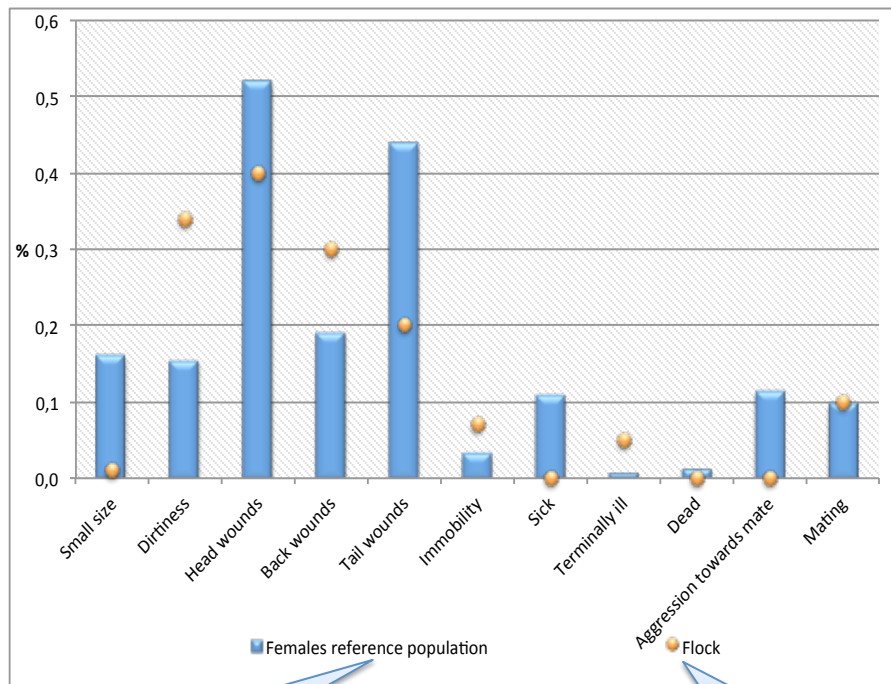
Data refers to the flock assessed

FEMALES



Reference population refers to data collected during the AWIN project, weighed depending on the number of animals per flock

Data refers to the flock assessed



Reference population refers to data collected during the AWIN project, weighed depending on the number of animals per flock

Data refers to the flock assessed

6. I-WATCHTURKEY APP



An android App, the i-WatchTurkey has been developed in order to facilitate assessment and evaluation of results. The i-WatchTurkey App developed within the frame of the AWIN FP7 EU project (www.animal-welfare-indicators.net), by scientists at Ikerbasque and Neiker-Tecnalia (Spain) and the University of Milan (Italy) is a tool specifically developed for turkey health and welfare assessment. The i-WatchTurkey allows the assessment of critical health and welfare indicators in turkey flocks in a simple and standardized manner. It does not require changes in the routine farm evaluation. The method of assessment is based on the transect methodology. The i-WatchTurkey App enables turkey producers to easily collect the incidence of the most relevant health and welfare indicators in a simple manner at the time of a regular health inspection. This app includes the possibility to record the frequency of turkeys with relevant welfare and health deficiencies, such as the incidence of immobility, severe lameness, injuries, unwanted behaviours or other serious health issues in the flocks without catching or disturbing the turkeys. The App allows the user to customize the scoring to include additional parameters of interest or to score turkeys with multiple problems. Data collection is done in a comfortable touchscreen mode, while the assessors are slowly walking along the house and observing turkeys, as it is usually conducted in routine walks through the production house. The incidence of the health and welfare issues collected is automatically standardized by the number of turkeys in the flock at the time of assessment and the number of transects conducted.

i-WatchTurkey App allows entering relevant information, such as turkey strain, age, housing and management conditions, expanding the applications of the app and potential for further data analysis significantly (for example to compare results in management changes, diets, lighting programs etc.). Date, time, geographic location, and weather conditions at the time of inspection are automatically collected if working in the on-line mode. The app generates a report and warning message if mean incidences of the indicator for such inspection is significantly above the historical mean (calculated from previous flock evaluations). These outputs are available immediately after finishing data collection. A full database consisting of all the collected over time information is saved in CSV format (.XLS compatible) and can be further analysed. Continuous, easy access to reliable, past and current information on the health and welfare status of turkeys in relation to management and environmental factors is an important asset for the decision-making process of the companies, helping to improve turkeys' health and welfare based on a methodological and standardized data collection.

Free download: <https://play.google.com/store/apps/details?id=com.daia.iwatchturkey&hl>

TERMS AND DEFINITIONS

Animal-based indicator

Indicator that is taken directly from the animal.

Assessor

Person in charge of collecting data using the welfare assessment protocol developed by AWIN on a flock of animals.

Farm

The whole area of land and its buildings used for growing crops and rearing animals, typically under the control of one owner or manager. The farm is divided into houses.

Farm manager

Person in charge of the planning and daily management of the farm.

Flock

A group of turkeys.

Growing turkey

Domesticated fowl (*Meleagris Gallopavo*) of genotypes suitable for meat production.

House

A building in which turkeys are reared. Each house can be divided into rooms.

Management-based indicator

Indicator which refers to what the farm manager does on the animal flock and what management processes are used.

Production cycle

A turkey cycle starts when the one-day old chicks are placed and ends when the flock is transported to the slaughterhouse.

Reference population

Reference population is defined by the geographic area where the assessment occurred and/or the time period when the assessment occurred and/or the type of animals covered by the assessment. Throughout this document, the term “reference population” refers to data collected during the AWIN project.

Resource-based indicator

Indicator that is taken regarding the environment in which the animals are kept.

Room

Partition of the house.

Tom

Male turkey (*Meleagris Gallopavo*).

Transect walks

For turkey welfare assessment consist of standardized walks divided into randomly set paths covering the full area of the house (Marchewka et al., 2013 Poultry Science, 92, 2588-2599). Transect walks are divided into transects.

Welfare assessment protocol

A welfare assessment protocol is a description of the procedures and requirements for the overall assessment of welfare.

Welfare criterion

A welfare criterion represents a specific area of welfare, which indicates an area of welfare concern (WQ®).

Welfare indicator

An observation, a record or a measurement used to obtain information on animal welfare.

Welfare principle

A welfare principle is a collection of criteria associated with one of the following areas: feeding, housing, health and behaviour (WQ®).

Units of measure are abbreviated according to standard International System of Units usage.

APPENDIX A - FARM MANAGER RECORDING SHEET

Questionnaire

| | |
|------------------------------------------------------|-------------------------------------------------|
| Facilities | Date |
| | Location |
| | Farm name |
| | Farm manager |
| | Number of houses |
| | House Width (m) |
| | House Length (m) |
| | Litter Type |
| | Temperature (T) |
| | Humidity (%) |
| | Photoperiod (h) _____ L (light): _____ D (dark) |
| | Ventilation (m ³ /h) |
| | Number of turkeys in the house |
| | Turkeys |
| Sex | |
| Age (d) | |
| Number of turkeys in the farm | |
| Stocking density (number of turkeys/m ²) | |
| Feeding | Feed type |
| | Feed consumption (kg/d/turkey) |
| | Regime |
| | Type of feeders |
| Drinking | Water consumption (l/d/turkey) |
| | Type of drinkers |
| Mortality and Culling | Mortality (%) |
| | Culling (%) |
| | Main cull reason |

AWIN CONSORTIUM

| | AWIN partners | Country |
|----------------------------------------------------------------------------------------------------------------------------|----------------------------------------------|---------------|
|  | Scotland's Rural College, Edinburgh | Great Britain |
|  | Norwegian University of Life Sciences, Ås | Norway |
|  UNIVERSITÀ DEGLI STUDI DI MILANO | Università degli Studi di Milano, Milan | Italy |
|  | Neiker-Tecnalia, Vitoria-Gasteiz | Spain |
|  | Universidade Positivo, Curitiba | Brazil |



University of Cambridge,
Cambridge

Great Britain



Universidade de Lisboa,
Lisbon

Portugal



Indiana University,
Bloomington

USA



Institute of Animal Science,
Prague

Czech Republic



Pferdeklunik Havelland, Equine Clinic,
Beetzsee-Brielow

Germany



Universidade de São Paulo,
Pirassununga

Brazil

Colophon

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