KARTZFEHN
premium

INFORMATION ON TURKEY GROWING

2017

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CONTENT

1 INTRODUCTION

One of the basic principles and objectives of the Kartzfehn Premium Concept is to provide advice and support at all times during the planning and implementation of turkey rearing projects. Accordingly, this brochure presents in an established form the most important guidelines and indicators for turkey rearing.

Besides providing basic knowledge for newcomers, "Information on Turkey Growing" is designed in such a way that professionals can also refer to it at any time to help their decision-making during their daily work with turkeys. This brochure serves as a practical compendium in addition to the federal benchmark figures concerning turkey rearing and the guidelines of the health-monitoring programme.

However, it is vital to adapt the respective operating conditions when selecting management measures to successfully raise turkeys, and not just blindly follow the pre-defined regime specifications. A basic prerequisite is regular, systematic observation of the birds, so that ultimately it is the birds that decide the regime.

Experience with other poultry species can only be applied to turkeys to a limited extent. The state of health, species-appropriate design of the management methods, feed, as well as the environmental conditions are essential preconditions for developing the full genetic potential of the turkeys.

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2 HYGIENE

Animal health promotion is of utmost importance in successful turkey rearing.

Also the statutory requirements, for example for absence of Salmonella, underline the importance of uncompromising hygiene in turkey rearing.

The emergence and spread of diseases can be counteracted by careful planning and implementation of hygiene measures. The steps to be aimed for must be designed so that all the harmful bacteria, viruses, fungi, parasites and insects are eliminated from the environment of the birds as far as possible.

All hygiene measures must therefore by performed systematically in order to prevent apparently insignificant individual factors causing a chain reaction that can lower the hygiene level of the entire farm.

NOTE:

Hygiene = no compromises!

2.1 SITE

- Isolated location in relation to other housing, especially the poultry housing and sufficient distance to other livestock and their waste products. Take the main wind direction into consideration. Fencing in the farm and easy-to-clean solid building forecourts.
- Generous spatial separation of the rearing and fattening houses to avoid possible pathogen transfer from the birds in the final fattening stages to the newly housed poults.

AIM:

No different age batches held in any one farm!

2.2 HOUSING HYGIENE

- No cross-contact with other poultry stocks and no other poultry on the farm.

- Access to the housing only in protective clothing and overshoes or after a complete change of clothes (applicable to supervising personnel and visitors). Hand disinfection.
- Use of machines, equipment and tools in the housing only after thorough cleaning and disinfection to prevent direct cross-contamination between the houses.
- Sufficient vacant periods between the individual cycles.
- Systematic beetle and pest rodent control.
- Securing of the housing to prevent wild birds entering.
- No pets allowed in the turkey housing.
- Immediate removal of dead birds from the housing, carcasses cooled.
- Disposal vehicles must not enter the immediate vicinity of the housing.

NOTE:

Strict separation of the black and white areas!

A clean housing environment makes it easier to work hygienically!

2.3 CLEANING AND DISINFECTION

- After removing the litter, the next step is dry-cleaning of the house (floor, ceiling, walls must be brushed clean). Subsequently, a pressure washer is used for wet cleaning, and the anterooms and forecourts, as well as the outer shell of the housing and the ventilation shafts must not be overlooked.
- In the case of beetle infestations, immediately initiate counter-measures after emptying the housing.
- Cleaning of the feeding lines and drinkers, as well as the ventilation systems and heat sources. Use of fatdissolving cleaners.
- Remove all dirt residues.

NOTE:

Dirt cannot be disinfected!

2 HYGIENE

- As far as possible, use disinfectants which are listed in the Disinfectant List of the German Veterinary Association (DVG) or carry the quality label of the German Agricultural Society (DLG).
- Observe the suitability and minimum contact time of the disinfectant.

NOTE:

Disinfectants should be fast acting at the highest possible dilution, their efficacy must not decrease through storage, and they must be as non-toxic and harmless as possible. Use biocides with care!

- Observe the active ingredient of the disinfectant, and its spectrum of activity.
- Use disinfectants with organic acid active ingredients at low temperatures (in general, the aim should be to disinfect the housing at a minimum temperature of approx. 15 °C , if necessary the turkey house should be heated to this temperature).

NOTE:

Avoid wet areas and large puddles of water in the housing. Disinfectants can become diluted in the excess water and lose their potency.

- Use specific products against coccidia oocytes, beetles, mites, etc. (Special products are necessary as the majority of disinfectants are ineffective against these).

NOTE:

Insecticides cannot be mixed with disinfectants!

- When using detergents, rinse thoroughly as tensides and disinfectants can partly neutralise each other.
- Before restocking: Thoroughly rinse the drinker system, remove residues.
- Completely dry and ventilate the house.

NOTE:

Plan vacant periods to comply with the "biological resting phases".

2.4 LITTER HYGIENE

- Litter must be of the highest quality. Avoid dusty, mouldy or damp material (fungal spores!).
- Stored litter must be protected against the weather, bird and pest rodents. Covering with a non-woven material has proved ineffective.

2.5 FEED HYGIENE

- Inspect the interior of the silo before the first delivery of feed. Remove crusts and residues of feed and nests of mould from the conveyor and weighing systems.
- Regular silo cleaning during the service period (min.) 1x annually. Important: Ensure the silo is completely dry before use).
- Avoid long storage times of excess feed volumes in the silo. High temperatures encourage the multiplication of micro-organisms and feed spoilage.
- Ideally install a second feed silo. This will make the feeding system more flexible and it is possible to completely empty (if necessary, destroy feed residues) the individual silos regularly.
- A ventilation valve ensures that moisture can escape from the silo.
- The feed lorry drivers are not allowed access to the turkey house. Systematically clean the silo environment to avoid attracting pest rodents and wild birds.
- Allow the feeders to be eaten empty, without allowing the birds to go hungry for longer than 1 hour. Avoid excessive feed amounts in the feeders.
- When the farm's own grain is used as additional feed, ensure only hygienically safe components are used (e.g. avoid mycotoxins) and that the grain is stored properly.

AIM:

Among other things, salmonella-free production.

2.6 WATER HYGIENE

During the service cycle:

- Clean the water lines and drinker systems: Use suitable detergents that are known to remove biofilms (use both acid and basic cleaners one after the other).
- Disinfect the water lines and drinker systems: Afterwards fill the system with disinfectant to kill off algae, bacteria, viruses and fungi.
- Flush the water lines and drinker systems: Flush the drinking system thoroughly with fresh water before housing new poults. Residues can endanger the health of the poults!

NOTE:

Check the water system regularly for deposits and cleanliness. This includes the secondary lines, branches, valves, filter systems, etc. If the effectiveness of the cleaning procedure can no longer be guaranteed, it is recommended to replace the complete system.

While the housing is in use, the microbial load must be reduced by:

- Regularly washing the drinkers.
- Regularly flushing the water systems, particularly at low flow rates and high temperatures. (Cool water holds less risk of microbial growth)
- Use of suitable and approved detergents (e.g. redox potential systems)
- When using the farm well water, regularly monitor the water quality (at least 1x per year).

NOTE:

The greater the care taken with the water hygiene, then the better are the preconditions for healthy birds.

3 FATTENING

The following information is concerned with the rearing of heavy turkey strains. The following fattening periods are generally used in heavy strains:

Male birds:	19 to 22 weeks	approx. 19.0 – 22.5 kg
Female birds:	15 to 17 weeks	approx. 9.5 – 11.5 kg

There are different fattening systems:

3.1 ALL IN – ALL OUT CYCLE

Male and female birds are housed together as day-old poults or as young turkeys (at about 4 to 5 weeks old). At the age of 15 to 16 weeks, the female birds are slaughtered and the males are given the entire housing area until the end of the fattening period.

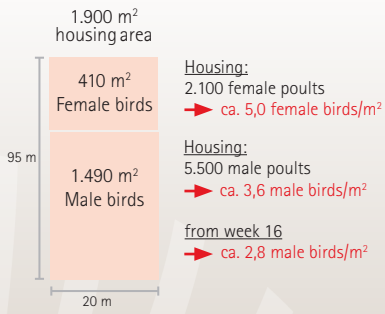
After the male birds are removed at 19 to 21 weeks old, the entire facility is cleaned and disinfected.

Advantage: The chain of infection is interrupted.

Disadvantage: Only 2.2 to 2.4 cycles per year.

EXAMPLE:

23-WEEK CYCLE
(All in-all out method)



3.2 18-WEEK CYCLE

Here, the male and female birds are initially reared together as day-old poults. The rearing takes place, however, in a special house which is then later used to house the female turkeys. Therefore, after 4 to 5 weeks, the male birds are moved to one or more houses for final fattening. The female birds remain in the rearing house for further fattening and are then slaughtered at 15 to17 weeks old so that after cleaning and disinfection in week 18/19. This house can be used to rear poults again. At 19 to 22 weeks old, the male birds are removed from the housing. After two weeks, the male housing(s) is/are prepared again and made ready to receive the young turkeys from the rearing house.

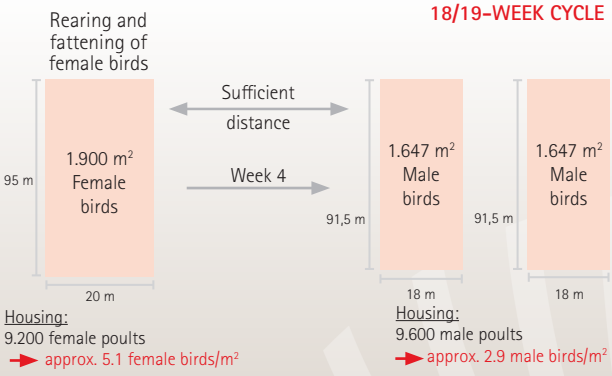
Advantage: 2.7 –2.9 cycles per year and therefore greater capacity utilisation of the housing complex.

Disadvantage: 2 age batches in one farm, if there is insufficient distance between the rearing and fattening areas.

NOTE:

- **The stocking density is calculated from the number of birds at the time of slaughter. (cf. 4.8 Stocking density)**

EXAMPLE:



3.3 13-WEEK CYCLE

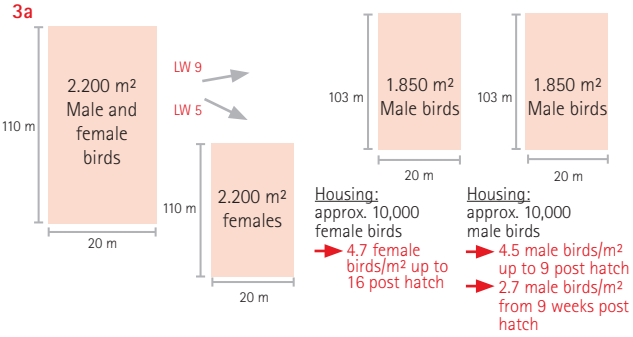
The rearing of male and female birds takes place in the same house. After 5 weeks, the female birds are moved to a separate fattening house and the male birds remain in the rearing housing until 13

weeks old. At 9 weeks, they move into separate male bird fattening houses so that the rearing area can be cleaned and disinfected.
Advantage: Further rise in production by up to 4 cycles per year.

Disadvantages: 2 age batches in one farm, if there is insufficient distance between the rearing and fattening areas.

EXAMPLE:

13-WEEK RHYTHM
(50 % male birds, 50 % female birds)



3.4 OTHER FATTENING CYCLES

Depending on the respective spatial conditions of the individual fattening farms, there are also various different modified forms of the basic systems, even to the 6-week cycle and with it also other housing cycles. The rearing stretches over the first 4-5 weeks.

4 REARING AND FATTENING

The housing of the birds must comply with the highest possible standards, particularly during rearing, so that the poults are allowed an optimal and trouble-free start in life. Prerequisite for this is a dry, heatable, well ventilated, however draught-free and well insulated house with a concrete floor. For year-round turkey rearing, the housing must have an air-conditioning concept for both cold and very warm weather condition and every bird age group.

4.1 HOUSING SYSTEM

Turkey farming mainly differentiates between two types of housing air-conditioning systems:

4.1.1 OPEN HOUSING

Open houses have large open side panels, which can be closed using adjustable curtains or sandwich flaps depending on the need for ventilation and the temperature. The air warms in the house and rises due to thermal lift. The exhaust air is discharged into the atmosphere either through adjustable flaps in the roof ridge or through lifting roof ridges.

4.1.2 CLOSED HOUSING

In closed houses, the fresh air is drawn into the room through ventilation valves the sidewalls. For this, generally extractor ventilators in the roof ridge and/or gable create the necessary negative pressure.

4.2 HOUSING CLIMATE AND AIR QUALITY

The housing climate is one of the most important factors in successful turkey rearing. The aims are provision of oxygen for breathing, removal of excess heat, removal of excess moisture, reduction in the levels of dust particles in the air, as well as reduction of harmful gases such as ammonia, carbon dioxide and carbon monoxide during rearing. As a basic principle, the ventilation system in the turkey house should be designed in such a way that draught-free ventilation is possible during the rearing period.
In the fattening phase, a stream of fresh air over the floor area must be ensured so that the air quality necessary for the wellbeing of the birds is maintained.

NOTE:

Avoid draughts as a matter of principle!

Good air quality requires heating and ventilation systems, which create a well-adjusted environment. The method of ventilation for a house is basically dependent on the architecture (closed or open housing), the type of ventilation selected and the local environmental climate. During installation of ventilation systems, their performance should be over-dimensioned by 20 %, to take into consideration system wear and cleanliness.

4.2.1 PREPARATION FOR VENTILATION MANAGEMENT

- Seal cracks and other areas that could lead to heat loss and draughts. Particularly take into consideration doors, inlets, outlets and shutters.
- Check the ventilation effect between stocks after subsequent disinfection.
- Calibrate all the thermostats to guarantee precise adjustment.
- Adjust the ventilation to guarantee minimum air exchange.
- Under conditions of high ventilation, adjust the ventilation thermostats to the target temperature. Ventilators with thermostats should switch on if the temperature rises above 1 °C of the target temperature.
- Combine several ventilators to reduce the air stratification and increase heating efficiency. They should be hung at ceiling height at a distance of 15 - 18 m.
- Use heat as required to reduce the litter moisture with the increased ventilation.
- Do NOT compromise on air quality if you want to save energy.

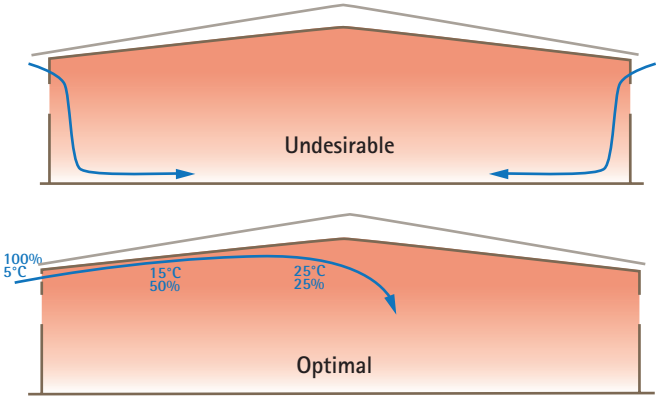
4.2.2 VENTILATION SYSTEMS AND VENTILATION MANAGEMENT

For gravity ventilation systems in open houses:

- The ventilation conditions must be constantly aligned with changes in the environmental conditions (both inside and outside).

- In cold weather, drive fans can be used to circulate the warm air that has collected under the ceiling.

As a general rule, the turkey house should be ventilated at a constant rate of 1 m3/kg live weight/hour. This applies to the entire production cycle and allows sufficient air movement within the house to control the CO2 level (<2500 ppm), humidity, ammonia level and the amount of dust. This rate can be adjusted by monitoring the behaviour of the birds, the housing temperature and the humidity.



In closed housing systems:
To be able to offer the turkeys the best possible environment throughout the entire production cycle, a three-step ventilation regime is recommended:

1. **Minimum ventilation**
2. **Transitional ventilation**
3. **Summer ventilation**

4.2.2.1 MINIMUM VENTILATION

The minimum ventilation rate is the lowest air volume required to ensure that the birds receive sufficient air, that pollutants like dust and ammonia are removed, and that the litter quality remains at the same level through the removal of moisture.
The key to successful minimum ventilation is the creation of a part vacuum (negative pressure), so that the air moves through the ventilation flaps and is drawn along the ceiling. This ensures that the incoming air streams mix with the warm turkey house air above the birds instead of flowing directly down to the birds, chilling them. This type of ventilation is ideally time-controlled.

4.2.2.2 TRANSITIONAL VENTILATION

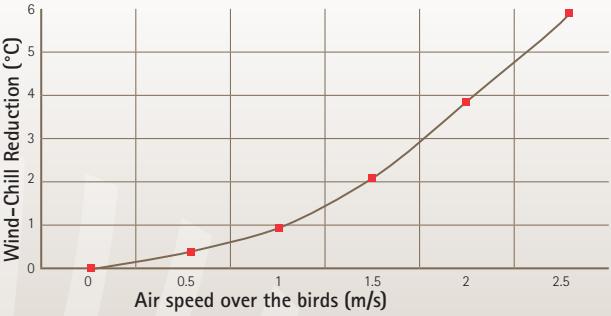
For transitional ventilation, two ventilation principles are used based on the external temperature and the age of the birds. This ventilation is used, when there are both hot and cold weather periods. While minimum ventilation is time-controlled, the transitional ventilation is temperature controlled.

Transitional ventilation begins when there is a higher air exchange rate than the required minimum level. It then starts up as the temperature sensors or thermostats override the minimal ventilation control timer, thereby allowing the fans to continue running.

Transitional ventilation functions like minimum ventilation, however a higher fan performance enables a larger exchange volume. Successful transitional ventilation requires ventilation flaps, which are connected with a pressure regulator for static pressure, so that the heat can be transported away without triggering tunnel ventilation.

4.2.2.3 SUMMER VENTILATION

For summer ventilation at enthalpy values around 67 kJ/kg dry air, both gravity ventilation and negative pressure systems must be designed with the corresponding ventilation capacities. Even better for summer ventilation are systems using the "wind-chill effect" and in part tunnel ventilation and at the same time optimal room throughflow.



For this, additional ventilation measures (as a rule drive fans with approximately 40,000 m³/h at 1.1 KW) are necessary. Drive fans should be hung from the ceiling at a height of 1 m and at an angle of 80° to the floor. The distance between the drive fans should be a maximum of 12 m. Sprinkler systems or Cool Pads help to lower the interior temperature of the turkey house.

NOTE:

The critical upper enthalpy limit is 67 kJ/kg dry air.

The enthalpy indicates the total amount of energy in the air, depending on the temperature and humidity, and serves as an indicator of the thermal load. At high enthalpy values, birds begin beak breathing as a result of their poor ability to transpire, which then turns into panting. After only a few hours, this situation can result in fatal heat stroke. The enthalpy values expected on a particular day can be obtained from the meteorological service.

NOTE:

In extreme situations with greatly elevated enthalpy values in the outside air, the air conditioning system must be able to guarantee sufficient air exchange in the area of the birds (wind-chill effect).

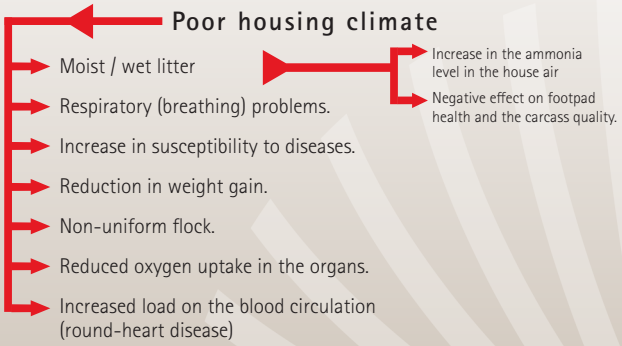
4.2.2.4 ANIMAL MANAGEMENT DURING HIGH TEMPERATURES

IMPORTANT:

Animal management during hot weather conditions also involves removing feeding opportunities during the hot hours, providing fresh litter, as well as regular monitoring of the flock movement and ventilation of the area of the birds. Administration of vitamin C or electrolytes can also provide relief.

4.2.3 POOR HOUSING CLIMATE

CO_2 (carbon dioxide): max. 3.000 ppm



The following reference values apply in turkey fattening:

CO2 (carbon dioxide):	max. 3,000 ppm
CO (carbon monoxide):	0 ppm is aimed for, above 30 ppm should not be tolerated in the long term
NH3 (ammonia):	not permanently above 20 ppm
Rel. humidity:	50-70 %

4.3 LITTER MANAGEMENT

The turkey house climate and therefore the health of the birds is significantly influenced by the properties and handling of the litter. The aim is a dry, dust-free environment at all times, to reduce the breeding ground for bacteria. This can counteract footpad and skin alterations as well as respiratory complaints. Cellulose materials such as straw, wood shavings or grain husks in their original or processed form are in standard use as litter for turkeys.

The following criteria should be taken into consideration when selecting the material:

- Select an absorbent base material; a reduction in the particle size increases the absorbency.
- Keep the proportion of dust as low as possible, even after possible disintegration of the compressed material.
- Again, hygiene is top priority here: The material must be free of dirt, harmful substances, pathogens and mould.

- **The handling of the litter requires special attention.**

- Where underfloor heating is used, the first layer of litter is spread more thinly (approx.3 cm) than when the heat is only given from above (8-10 cm), so that the heat from below reaches the poults. This also means that the litter material can dry more easily at the start.
- Turning the litter is recommended as long as clean, dry litter can be brought to the top from below.

- Later, regular and sufficient addition of new litter to the surface is recommended to help drying.
- Very wet and compacted areas, e.g. after the drinker has overflowed, should be removed from the house and replaced by dry litter.
- Pelleted litter is distributed thinly (2-4 cm, 8-10 kg per m2). It requires a slightly raised heat input (approx. 1-1.5 °C heat loss through the material). After the pellets have disintegrated and moisture has been absorbed, the litter mat grows to up to 10-14 cm.

NOTE:

In the case of illness, a generous top layer of fresh litter material is always recommended.

4.4 PREPARATION FOR REARING

Basically, there are two different rearing systems:

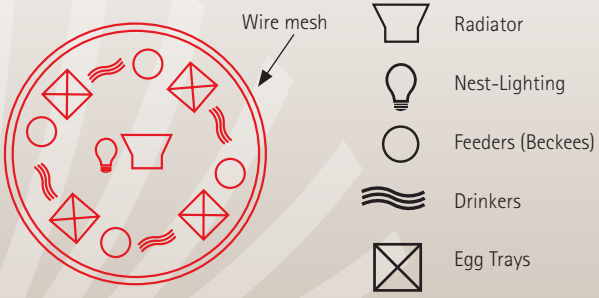
4.4.1 REARING IN POULT RINGS

The poults are reared in the first few days in special poult rings. To avoid initial losses, it is imperative that the birds find their housing and rings well prepared when they arrive. Any retrospective work must be avoided at all costs. The floor of the poult ring is covered with a 7- 10 cm (with floor heating about 3 cm) deep layer of softwood shavings.
The surface should be flat and compact (risk of suffocation of those lying on their backs and sides). After litter compaction and housing, the drinkers heights must be adjusted to the size of the birds. The poults are held in the ring for 3-6 days depending on the housing conditions.
Weak poults are watered and placed in a separate ring. This ring is preferentially lined with wood wool so that the poults have better grip. Furthermore, easily accessible feed and water must be guaranteed.

POULT RING LAYOUT (EXAMPLE)

Diameter:	3.50 – 4.50 m for 240 – 400 poults.
Ring material:	Wire mesh or similar perforated material for optimal air exchange (approx. 30-50 cm high).
Radioators:	For natural gas and propane, a heat output of 3.0 – 5.5 kW, depending on the size of the ring and number of poults. This should be controllable if possible, for adjustment to the external climatic conditions. The heater should be hung at a height of approx. 70-90 cm, depending on the type and season (in summer lower than in winter).
Temperatures:	In the resting area of the birds: 36- 37 °C. Room temperature (at the ring edge): 23-26 °C
Drinkers:	Different drinker systems are possible depending on the number of poults per ring, e.g. 2-4 automatic round drinkers or combinations of round, ancillary and line troughs. Important: correct height adjustment and sufficient water in the drinker (3 days 90 % filled).
Feeders:	One height-adjustable round feeder (so-called Beckees) for 80-100 poults, and also 4 egg trays or "fruit bowls" (plastic packaging material) during the first few days.
Lighting:	Good housing illumination and additionally one dimmable lamp per ring as nesting light so that the total light intensity can reach around 80 lux.

Diagramm, Poult Ring for 400 poults



4.4.2 REARING WITHOUT RINGS

(Heat rearing with or without heat spots)

Ring-free rearing without spot heat sources is characterised to begin with by a constant room temperature of 36-37 °C, and the poults are reared together in groups of 2,000 – 10,000 birds. The most important precondition for ring-free rearing is a house with forced air circulation and a well functioning air conditioning concept.

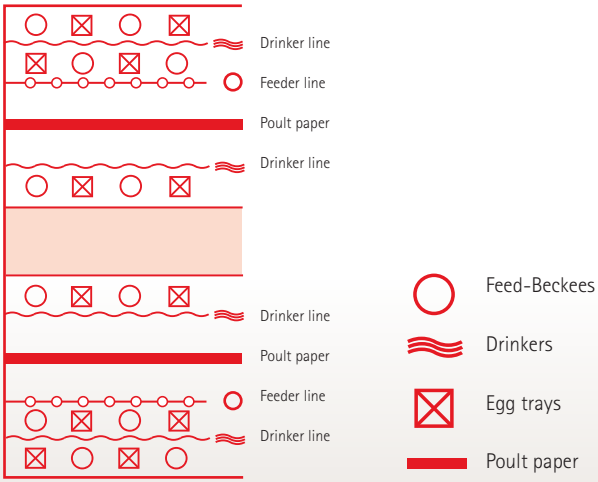
RING FREE REARING CONCEPT

(EXAMPLE WITHOUT HEAT SPOTS)

Compartment:	Separation of the large groups by corrugated cardboard mounted on the floor and stabilised using a support at approx. every 2-3 m.
Heat sources:	Ideally, warm-water heating with convectors, ceiling radiation panels and floor heating, optionally with gas guns.
Temperatures:	Warming phase 2-4 days: 38-40 °C Concrete floor temperature: approx. 28 °C Litter temperature: 34 °C Housing temperature: 36-37 °C. After 7 days: approx. 33 °C After 14 days: approx. 28 °C After 21 days: approx. 24 °C After 28 days: approx. 22 °C A uniform temperature (max. +/- 1 °C) must be guaranteed throughout the turkey house. **Note: With spot heat sources, the room temperature is between 21 and 31 °C. Below the heat source the temperature can be up to 45 °C**
Drinkers:	Various drinker systems and combinations are possible: Line troughs, round drinkers and ancillary bowls. It is important that a uniform water supply is available over the entire area. **Important: Pay particular attention to the water hygiene at high temperatures.**

Feeders:	Height adjustable round feeders, Beckees and egg trays/fruit bowls; for feeding, the use of poult paper or e.g. corrugated cardboard is possible, however it must be regularly replaced due to contamination. It is also important here that a uniform feed supply is available over the entire area. **Note: Keep the feed amount in the house low at high temperatures.**
Lighting:	As in the poult rings. A chain of dimmable lamps in the centre of the compartment is also useful for orientation of the poults.

Representation of ring-free rearing



Under extreme weather conditions (e.g. external temperatures above the desired inner temperature, or poult rearing in high summer), it is sometimes necessary to adjust the temperatures given in the recommendation to ensure functioning and age-appropriate ventilation.

NOTE:

Large quantities of harmful gases develop when heating systems with naked flames are used. Ventilation of the turkey house begins on day one. Poults and radiators compete for oxygen.

4.5 HOUSING AND FIRST WEEK

Depending on the weather, heat the turkey house 2-4 days before placing the poults. Additional temperature monitoring of the litter using hand-held infrared thermometers ensures the correct procedure.

NOTE:

Cold floors draw the body heat out of the poults.

- Feed and water should not be provided too early before housing the poults: High temperatures can compromise the feed and water quality.
- The poult boxes are arranged in the prepared rings or compartments.

NOTE:

Do not place the boxes on the cold floor, and do not stack them or place them too close together for longer periods (risk of suffocation!).

- Vaccination against TRT or other pathogens can be administered in the box if this has not already taken place at the hatchery.
- The lighting of the facility is dimmed so that the poults can become slowly accustomed to the turkey house environment.
- Place the poult calmly but quickly into the ring or compartment. On no account throw the birds.
- Do not make noise or undertake retrospective construction and maintenance work: The poults will be disturbed and press themselves against the edge of the ring or compartment boundaries.
- Perform a quick inspection, after which the poults should be left alone to become accustomed to their new environment for at least an hour.
- Regularly refill the feeders with fresh feed, to encourage the poults to eat.
- The drinkers are cleaned daily; the entire water system is flushed several times a day.

NOTE:

Poults can only eat if they drink!

NOTE:

The water can become microbially contaminated very quickly at high temperatures.

- Mealy, clumpy, damp and excrement-contaminated feed residues must be removed from the feeders and egg trays/fruit bowls, or the egg trays/fruit bowls must be replaced.
- Adjust the radiator temperature or room temperature to the needs of the poults.
- The litter compacts after distribution, so regular checking and adjustment of the drinker heights must be guaranteed!
- The temperature can be reduced after the third day.
- The egg trays/fruit bowls can be gradually removed after the fourth day.
- The poults can be removed from the rings after day 5, depending on the condition of the poults and the weather conditions (the same applies to the movement to the fattening house at 4-5 weeks old).
- Avoid every form of stress for the poults!

NOTE:

Make any changes as fluently as possible!

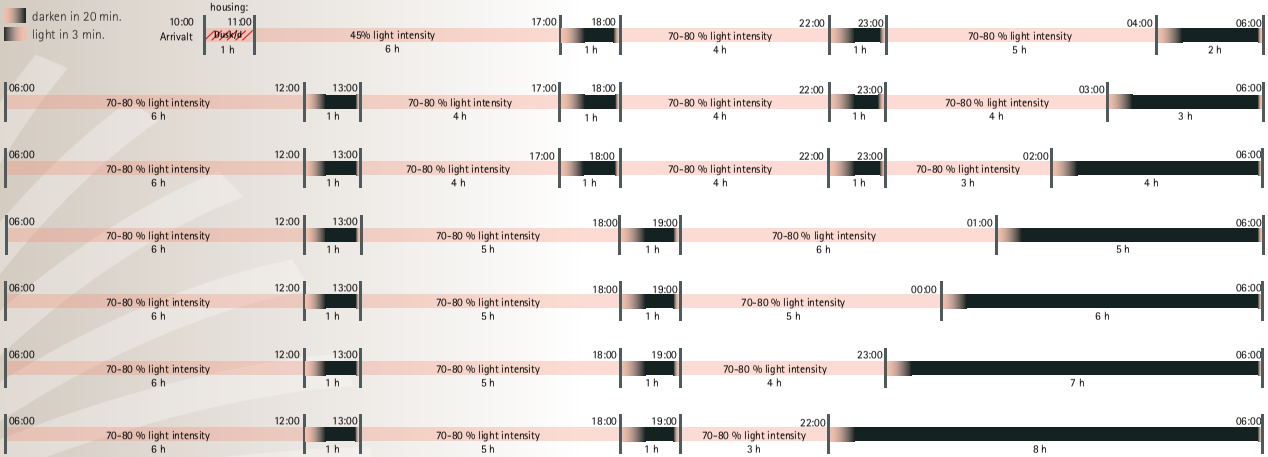
To create a housing climate appropriate for the needs of the birds in the male bird house or after re-housing, the use of radiant heat is recommended to improve the air conditioning in these turkey houses (i.e. heat with concurrent ventilation). During heat and still air, additional ventilation systems must be provided to ensure sufficient air movement at the birds

NOTE:

Keep the temperature differences as low as possible after transfer from the rearing to fattening houses.

4.6 LIGHTING

Especially in the rearing phase, and here predominantly in the first few days, the lighting regime must be aligned to the behaviour and activity of the poults. The following chart shows an example:



The photoperiod and the light intensity in open houses are very strongly dependent on the climatic conditions and season, so that the regime given below must only be taken as a general guideline. The use of intermittent lighting regimes (e.g. alternating 4 hours light, 2 hours dark), however, helps to regulate the resting and feeding times of the poults and in this way to uniformly manage the flock.

ADVANTAGE: The poults rest or sleep at the same time. The behaviour of the poults is synchronised.

Direct sunlight should be avoided whenever possible. Artificial sources should be dimmable, in order to react to the behaviour of the poults.

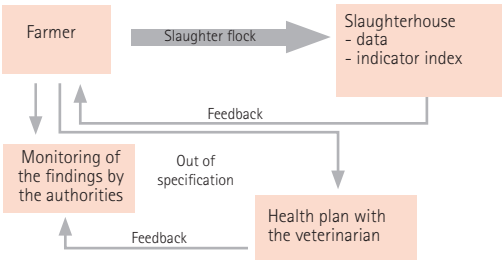
IMPORTANT:

- Uniform lighting of the poult rings or compartments is essential.
- In total, at least 20 lux should be reached.
- Allow successional dark resting phases for the turkeys to sleep. An emergency light with an intensity of 0.5 lux is permissible.
- Artificial light must not flicker.
- Temporary darkening is tolerated if feather pecking or cannibalism occurs.

4.7. HEALTH-MONITORING PROGRAMME

In the scope of the federal parameters for a voluntary agreement on holding fattening turkeys, the turkey farmer is obliged to participate in the health-monitoring programme.

In this way it is possible for him to plan the maximum stocking density of 52 kg/m^2 (female birds) and 58 kg/m^2 (male birds per m^2 usable turkey house area) to the end of fattening. Furthermore, stock-related indicators are determined from rearing and fattening, as well as slaughter (e.g. footpad lesions).



4.8 STOCKING DENSITY

Age, type and sex of the birds, as well as the extent of other environmental factors (particularly the ventilation conditions and litter care) are closely related to the stocking density. Provided the essential environmental factors are optimally adjusted to the birds' requirements. Female turkey with a live weight of up to 58 kg and male turkeys with a live weight of up to 52 kg can be kept per square metre of usable housing area until the end of fattening.
When planning the various rearing and fattening phases, with regard to the numbers of animal per square metre, the following figures can be used for orientation (relating to the fattening performance of BUT 6).

Rearing up to 5 weeks old (Male and female birds)	8-10 birds/m^2
Female birds Up to 16 weeks old (max. stocking density 52 kg/m^2)	4.7 birds/m^2
Male bird fattening a) up to 21 weeks old (max. stocking density 58 kg/m^2)	2.6 birds/m^2
b) using the 13-week cycle up to 10 weeks old	6.2 birds/m^2
c) using the 23-week cycle up to 16 weeks old	3.6 birds/m^2

The data relate in each case to the animal numbers at the time of removal from the turkey house. The stocking densities in the care areas must not exceed 45 kg/m^2.

4.9 MATERIALS TO OCCUPY THE BIRDS

The turkeys must constantly be offered suitable materials to occupy them. Newly introduced litter material as well as worked litter (wood shavings) are classed as material to occupy the birds.

Additionally, a 'changeable' manipulable material must offered, e.g. hay racks, hay baskets, straw bales, peck stones, washed old material. Further occupation materials should be offered if feather pecking and cannibalism occur.

4.9.1 FEEDER AND DRINKER REQUIREMENTS

In both rearing and fattening, the top priority is the design of the facility: Create easy access to feed and water places.

When distributing the feeding and drinking facilities in the turkey house, it should be ensured that the birds are no more than 6 m away from a feeding point, wherever they are. The individual drinkers should, in turn, not be further than 4 m from the next feeding point.

When designing and planning the feeding and drinking facilities, the following **reference values** should be taken into consideration:

Round feeders	live weight per feeder
Rearing feeders (ca. 30-50 cm Ø)	250 kg
Fattening feeders (ca. 30-50 cm Ø)	1.000 kg
Individual feeders (ca. 60 cm Ø)	1.500 kg
Round drinkers (ca. 25-50 cm Ø)	kg live weight per drinker
Rearing	350 kg
Fattening	2.000 kg
Nipple/cup drinkers	
Rearing	150 kg
Fattening	500 kg

4 REARING AND FATTENING

It is practical to use the following figures when planning the number of birds per feeder or drinker:

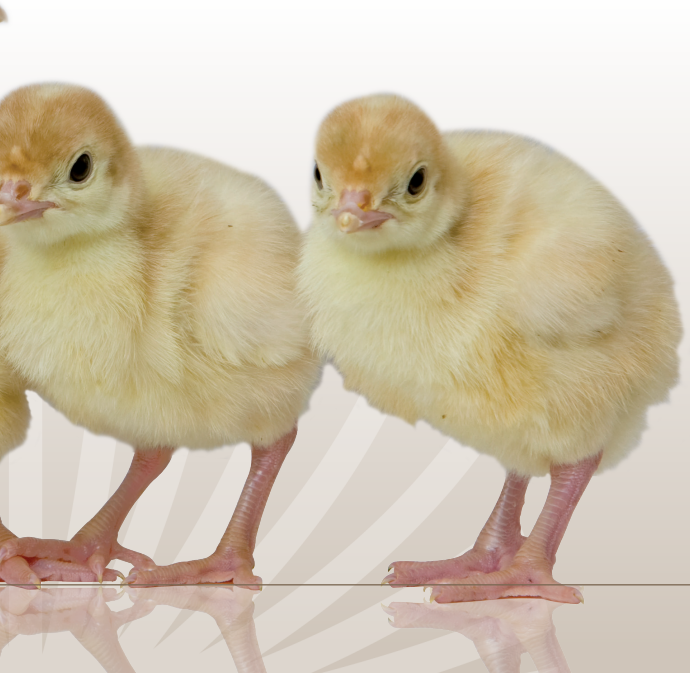
Fattening turkeys - Standard feeder: ca. 50-80 birds/ feeder

Fattening turkeys - Standard round drinker: ca. 80-100 birds/ drinker

5 FLOCK MANAGEMENT

The daily flock and facility inspection ensures the farm runs without problems. At least two inspections should be made per day, as set out in the federal benchmark figures, as this ensures early recognition of anomalies. The following points serve as a checklist for flock management:

- Bird behaviour (noises, plumage, distribution)
- Litter condition
- Consistency of the faeces
- Air quality in the area of the birds
- Dust production
- Temperature
- Feed consumption, water consumption
- Feed level and system height
- Feed quality
- Drinker height
- Drinker cleanliness



6 PREVENTATIVE HEALTHCARE

The basis for successful turkey holding is healthy animals. Farm-specific health care concepts agreed with the veterinarian play a central role in this.

6.1 VACCINATIONS

The poultry plague regulation in Germany legally prescribes vaccination against Newcastle Disease (ND), i.e. pseudo fowl pest, to be performed by a veterinarian.

Depending on the regulations in the respective countries, the ND vaccination programme can be performed according to, for example, the following scheme: 3, 6, 10, 14, 18 weeks of age.

Approved vaccine strains are La Sota, Hitchner and Clone 30. Administration is generally via the drinking water. Spraying or misting is also possible in consultation with the veterinarian.

NOTE:

Only vaccinate healthy birds! Switch the water hygiene system off in good time. There must be no disinfection solution anywhere in the water system at the time of vaccination, otherwise the vaccination will not be effective. Restrict access to water before vaccination to ensure the birds are thirsty. Administer a water volume that can be drunk by the flock within approx. two hours.

Depending on the respective location and situation of the farm, in addition to the mandatory vaccination, further vaccinations are recommended, for example against TRT (turkey rhinotracheitis: a cold virus affecting turkeys) or HE (haemorrhagic enteritis: an acute intestinal inflammation affecting turkeys).

Disease prophylaxes, which are administered by injection, have also proved effective in some farms, in addition to the drinking water and/or misting vaccinations.

The vaccination programme is adapted to the conditions of the respective farm.

6.2 FLOCK OBSERVATION

An important prerequisite for early disease recognition is precise observation of the flock.

Already 1-2 days before the disease emerges, an observant farm hand recognises the deterioration of the health of the flock through the behaviour of individual birds, which can be seen as:

- Changes in feed and water consumption.
- Need for warmth and non-uniform distribution.
- Crouching in corners and separation from the flock.
- Changes in colour or consistency of the faeces.
- Changes in the smell in the turkey house.
- Sudden behavioural changes in the flock.
- Drawing in of the neck.
- Ruffled plumage.
- Increased beak panting.
- Plaintive cheeping sounds.
- Sounds when breathing.
- Eating litter.
- Pale head colour.

The precise description of the changes gives the attending veterinarian the first clues for the diagnosis. Laboratory tests confirm the diagnosis and therapy measures.

NOTE:

Birds that will obviously not survive must be anaesthetised and killed in accordance with animal welfare laws! This also applies to animals in the care area, if they do not show improvement within a reasonable time frame!

7 FEEDING

The results of our own fattening trials, literature, breeder recommendations and experience in the field formed the basis for the recommendations for energy and nutrient provision in heavy fattening turkeys.

Therefore, the recommendations presented here should promote healthier rearing of the birds, using their genetic potential while ensuring that the farm is economically viable.

7.1 FEEDING REGIME

The feeding regimes should not be seen as rigid specifications in terms of the time and content, but rather as "dynamic systems". This means that the nutrient input in a respective phase is decided depending on the health and performance status of the turkeys, the weather (e.g. heat), the price situation of the feed components, etc. An energy-dense feed leads, for example, to more efficient feed conversion rate.

A 6-phase feeding regime is recommended as a framework guideline. Intermediate phases allow flexible adjustment of the supply to the needs of the birds. Therefore, also a 7-phase or multi-phase feeding regime may be appropriate.

NOTE:

Observe the bird weights and adjust the feeding according to development. In this way, also more than 6-phases are possible.

Male birds						
Feeding phases	Phase 1	Phase 2	Phase 3	Phase 4	Phase 5	Phase 6
Fattening week	1-2	3-5	6-9	10-13	14-17	18-22
Crude protein %	27,5	26,0	22,0 - 23,5	20,0 - 21,0	17,0 - 18,0	15,0 -16,0
ME, MJ / kg	11,4 - 11,6	11,6 - 11,8	12,0 - 12,2	12,4 - 12,6	12,7 - 2,9	13,1 - 13,3
Methionine, %	0,63	0,60	0,55	0,50	0,40	0,35
Methionine+ Cystine, %	1,10	1,00	0,95	0,85	0,70	0,60
Lysine, %	1,75	1,60	1,45	1,25	1,15	1,00
Threnonine, %	1,05	1,00	0,90	0,80	0,65	0,60
Tryptophan, %	0,29	0,27	0,24	0,21	0,19	0,17
Methionine (digestible.), %	0,58	0,55	0,50	0,46	0,40	0,35
Methionine+ Cystine (digestible.), %	0,98	0,93	0,84	0,75	0,67	0,60
Lysine (digestible.), %	1,58	1,46	1,31	1,14	1,05	0,91
Threnonine (digestible.), %	0,89	0,82	0,75	0,68	0,58	0,53
Tryptophan (digestible.), %	0,25	0,23	0,21	0,19	0,17	0,15
Calcium %	1,35 - 1,40	1,35 - 1,40	1,10 - 1,20	0,95 - 1,05	0,85 - 0,95	0,75 - 0,85
Phosphor %	1,00	1,00	0,70 - 0,80	0,60 - 0,70	0,55 - 0,60	0,50 - 0,55
Sodium %	0,14	0,14	0,14	0,14	0,14	0,14
Linoleic acid % max.			max. 2,30	max. 2,30	max. 2,30	max. 2,30
Linolenic acid % max.			max. 0,23	max. 0,23	max. 0,23	max. 0,23
Feed requirement						
Male (kg/phase)**	0,49	2,38	7,87	12,58	15,91	23,07
Male cum. (kg)**	0,49	2,87	10,74	23,32	39,23	62,30
	Fine/coarse granulate, incl.					
Pellet size	2 mm	2mm	3 mm	3 mm	3 mm	3 mm

* 1.) The listed specifications represent the minimum requirements and can be increased as required.* 2.) The Ca/P ratio must be considerd during optimisation.* 3.) Phytase is generally required.
** BUT6

Female birds						
Feeding phases	Phase 1	Phase 2	Phase 3	Phase 4	Phase 5	Phase 6
Fattening week	1-2	3-5	6-9	10-13	14-15	16
Crude protein %	27,5	26,0	22,0 - 23,5	20,0 - 21,0	17,0 - 18,0	15,0 -16,0
ME, MJ / kg	11,4 - 11,6	11,6 - 11,8	12,0 - 12,2	12,4 - 12,6	12,7 - 2,9	13,1 - 13,3
Methionine, %	0,63	0,60	0,55	0,50	0,40	0,35
Methionine+ Cystine, %	1,10	1,00	0,95	0,85	0,70	0,60
Lysine, %	1,75	1,60	1,45	1,25	1,15	1,00
Threnonine, %	1,05	1,00	0,90	0,80	0,65	0,65
Tryptophan, %	0,29	0,27	0,24	0,21	0,19	0,17
Methionine (digestible.), %	0,58	0,55	0,50	0,46	0,40	0,35
Methionine+ Cystine (digestible.), %	0,98	0,93	0,84	0,75	0,67	0,60
Lysine (digestible.), %	1,58	1,46	1,31	1,14	1,05	0,91
Threnonine (digestible.), %	0,89	0,82	0,75	0,68	0,58	0,53
Tryptophan (digestible.), %	0,25	0,23	0,21	0,19	0,17	0,15
Calcium %	1,35 - 1,40	1,35 - 1,40	1,10 - 1,20	0,95 - 1,05	0,85 - 0,95	0,75 - 0,85
Phosphor %	1,00	1,00	0,70 - 0,80	0,60 - 0,70	0,55 - 0,60	0,50 - 0,55
Sodium %	0,14	0,14	0,14	0,14	0,14	0,14
Linoleic acid % max.			max. 2,30	max. 2,30	max. 2,30	max. 2,30
Linolenic acid % max.			max. 0,23	max. 0,23	max. 0,23	max. 0,23
Feed requirement						
Female (kg/phase)**	0,44	2,02	6,22	9,86	5,83	3,07
Female cum. (kg)**	0,44	2,46	8,68	18,54	24,37	27,44
	Fine/coarse granulate, then					
Pellet size	2 mm	2mm	3 mm	3 mm	3 mm	3 mm

* 1.) The listed specifications represent the minimum requirements and can be increased as required.* 2.) The Ca/P ratio must be considerd during optimisation.* 3.) Phytase additive is generally required.
** BUT6

7.1.3 APPLICATIONS

EXAMPLE OF A COMMONLY USED "DIET RATION"

PROBLEM:
„Over-stressing" of the intestine (e.g. diarrhoea)

POSSIBLE SOLUTION:
Use of a nutrient-poorer diet ("diet feed")

Feed type/ Week	ME, MJ/kg	Crude protein %	Methionine %	Meth. + Cys., %	Lysine %	Threonine %
P3 (6-9)	11,8-11,9	22,0	0,54	0,95	1,45	0,88
P4 (10-13)	12,2-12,3	19,5	0,47	0,83	1,25	0,76

ATTENTION:

Do not use for too long so that growth compensation is still possible!

EXAMPLE OF A COMMONLY USED "ENERGY RATION"

PROBLEM:
Weight specifications are not reached, for example during high temperatures

POSSIBLE SOLUTION:
Use of a nutrient-rich diet

Feed type/ Week	ME, MJ/kg	Crude protein %	Methionine %	Meth. + Cys., %	Lysine %	Threonine %
P5 (14-17)	13,2	18,5	0,44	0,77	1,15	0,70
P6 (18-end)	13,3	16,0	0,42	0,74	1,10	0,68

7.2 FEED TYPE AND COMPOSITION

Feed structure

The feed in Phase 1 (P1) can be offered in two forms to improve the initial conditions for the poults:

a. Coarsely ground fine material and

b. Coarsely structure solid material (granulate and 2 mm pellets)

HELPFUL:

Finely structured material in sacks can be used to make individual combinations for a "fine-coarse menu" and for adjustment to the respective requirements of the poults.

NOTE:

Only the best feed quality for the poults.

NOTE:

The poults should take up as much feed as possible in the first few days for optimum development. It helps to make more feed available!

Selection of ingredients

Excessive use of ingredients with large amounts of antinutritive substances can lead to permanent disturbance of the digestive system. The selection of different components can reduce the risk. Do not use final fattening fat blends for poults.

Phytases

When using phytases to improve P availability, reduction of the Ca and P amounts by 0.1 to 0.2 (from P3) is recommended.
Important prerequisite: Readily available Ca and P sources (e.g. monocalcium phosphate, especially for poults).

NSP enzymes

These help the breakdown of non-starch polysaccharides for energy generation from crude fibre that would otherwise be difficult for the turkeys to digest. They have proven to be effective and are widely found in feeding formulations.

7.3 GRAIN SUPPLEMENTS AND CRUDE FIBRE REQUIREMENT

The crude fibre requirement of turkeys is generally covered by the contents of the feed. The farm's own grain as a supplement can improve the ration, and other crude fibre sources such as hay, alfalfa, etc. given as material to occupy the birds can also be consumed.

When adding cereals (e.g. wheat), the general formulation or the supplement formulation is adjusted to the specified quantity of grain according to the feeding regime. So that, for example, the recommended amino acid uptake remains unchanged, the concentration of the supplement must be increased correspondingly.

IMPORTANT:

Gradual transition from the standard feeding programme to supplementary grain feeding must not take place too early on (from approx. week 6) and only in small amounts (start with approx. 5 %, and slowly increase).

ATTENTION:

Grain qualities and contents are subject to natural fluctuations, which cannot be entirely taken into consideration by the manufacturers of the supplementary feed. Here, laboratory analyses can help.

HELPFUL:

Offer grit, or crush or crack the cereal to improve digestion.

7.4 ADDITION OF GRIT

The addition of grit not only supports the digestion of crude fibre but has also been shown to help the general digestion and training of the gizzard. At the same time, it must be ensured that only little stones are used, e.g. from quartz grit. While shell grit can also be

used as an additional Ca source, it dissolves in the stomach and therefore loses its grinding effect.

The following sizes and amounts of additional grit stones are recommended:

2.-4. week	1-2 mm	1-2x per week
5.-13. week	2-4 mm	1-3x per week
males: 14.-17. week	4-6 mm	1-3x per week

IMPORTANT:

Grit must be discontinued at least 3 weeks before slaughter to ensure the stomach has no stones in it during the slaughter process.

8.1 FEED CONSUMPTION

Following feed consumption figures to be considered as guiding values:

		Males		Females	
Phase	Pellet size	kg/phase	cum. (kg)	kg/phase	cum. (kg)
1	2mm	0,49	0,49	0,44	0,44
2	2mm	2,38	2,87	2,02	2,46
3	3mm	7,87	10,74	6,22	8,68
4	3mm	12,58	23,32	9,86	18,54
5	3mm	15,91	39,23	5,83	24,37
6	3mm	23,07	62,30	3,07	27,44

8.2 WATER CONSUMPTION

Good water quality is absolutely essential for rearing and fattening. Well water can only be used if the drinking water quality is regularly tested. The birds should always have access to fresh water.

Water consumption can fluctuate considerably, e.g.

- Environmental temperature
- Humidity
- Health status
- Feed mixture
- Performance level (age) of the birds

This similarly applies to feed consumption. The water consumption of turkeys is about 2.5 times higher than the feed consumption at the start of the fattening period. It is double the feed consumption in the middle phase, decreasing towards the end of fattening. A shift in the feed-water relationship over several days can be an alarm signal.

		Males Water consumption		Females Water consumption	
Week	Day	l/day	l/week	l/day	l/week
1	7	0,05	0,24	0,04	0,20
2	14	0,09	0,51	0,08	0,44
3	21	0,16	0,90	0,13	0,75
4	28	0,24	1,43	0,20	1,17
5	35	0,35	2,10	0,28	1,69
6	42	0,45	2,85	0,36	2,27
7	49	0,55	3,57	0,44	2,86
8	56	0,63	4,19	0,52	3,40
9	63	0,69	4,66	0,58	3,86
10	70	0,73	5,00	0,62	4,24
11	77	0,76	5,25	0,66	4,52
12	84	0,79	5,44	0,69	4,74
13	91	0,81	5,60	0,71	4,91
14	98	0,83	5,77	0,73	5,05
15	105	0,86	5,96	0,74	5,16
16	112	0,90	6,19	0,76	5,26
17	119	0,94	6,46	0,77	5,33
18	126	0,98	6,75	0,77	5,38
19	133	1,01	7,01	0,78	5,42
20	140	1,04	7,20	0,78	5,44
21	147	1,05	7,30	-	-
22	154	1,04	7,32	-	-
23	161	1,04	7,29	-	-
24	168	1,02	7,21	-	-

9 PERFORMANCE DATA

9.1 BUT 6

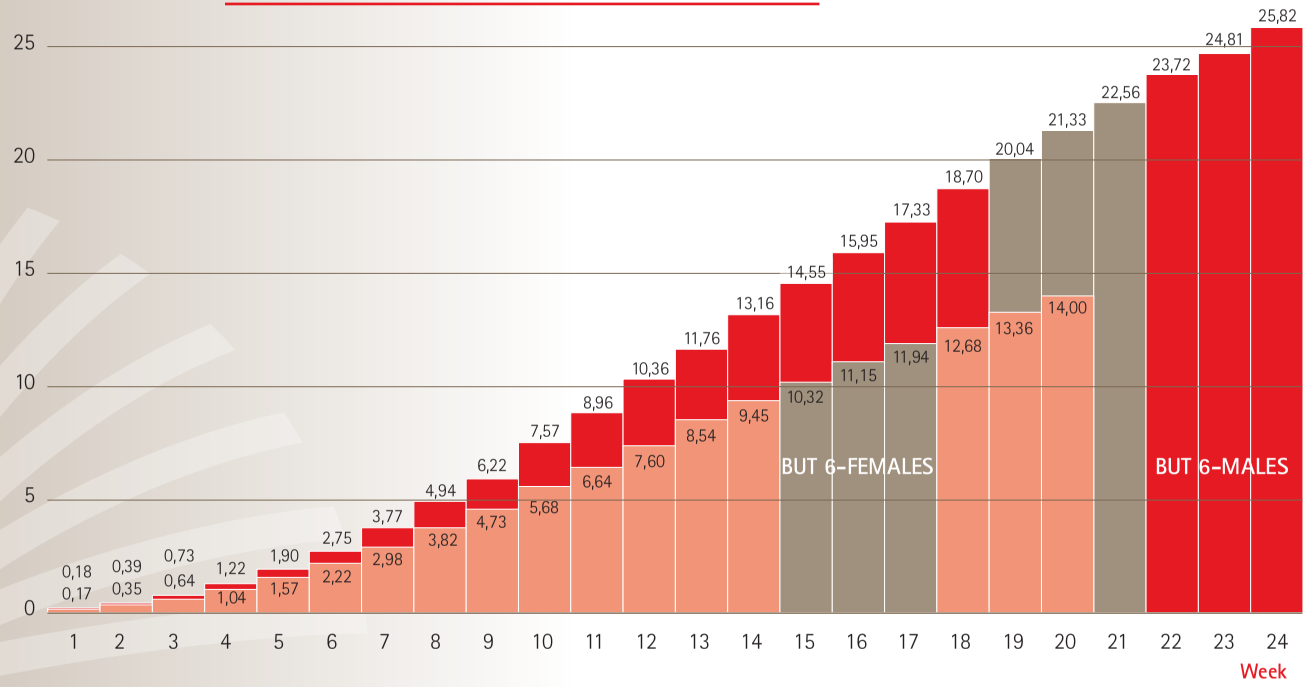
9.1.1 GROWING PERFORMANCE BUT 6 MALES

Week	Days	Weight (kg)	Com. daily weight gain (g/d)	Daily weight gain/week (g)	Feed conversion cum. (kg/kg)	Feed/day (kg)
1	7	0,18	25,7	25,70	0,93	0,024
2	14	0,39	27,9	30,03	1,26	0,046
3	21	0,73	34,7	48,38	1,40	0,075
4	28	1,22	43,7	70,87	1,46	0,111
5	35	1,90	54,2	96,00	1,52	0,154
6	42	2,75	65,5	121,77	1,56	0,204
7	49	3,77	77,0	146,02	1,62	0,256
8	56	4,94	88,2	166,77	1,67	0,308
9	63	6,22	98,7	182,62	1,73	0,356
10	70	7,57	108,1	193,05	1,79	0,399
11	77	8,96	116,3	198,52	1,85	0,436
12	84	10,36	123,3	200,34	1,92	0,467
13	91	11,76	129,2	200,20	1,98	0,496
14	98	13,16	134,3	199,59	2,05	0,524
15	105	14,55	138,6	199,27	2,12	0,554
16	112	15,95	142,4	199,09	2,19	0,583
17	119	17,33	145,7	198,21	2,26	0,611
18	126	18,70	148,4	195,65	2,33	0,635
19	133	20,04	150,7	190,86	2,41	0,653
20	140	21,33	152,3	183,91	2,48	0,665
21	147	22,56	153,4	175,32	2,55	0,671
22	154	23,72	154,0	165,74	2,63	0,672
23	161	24,81	154,1	155,73	2,70	0,670
24	168	25,82	153,7	145,64	2,77	0,666

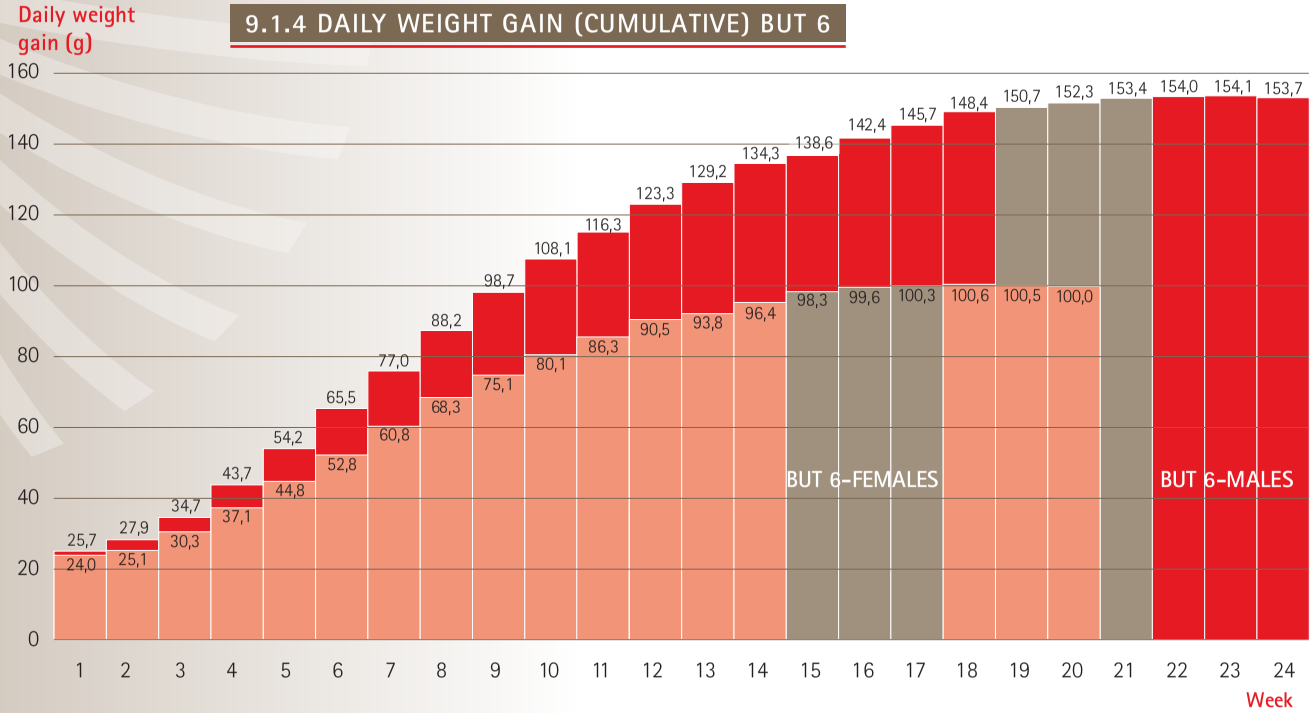
9.1.2 GROWING PERFORMANCE BUT 6 FEMALES

Week	Days	Weight (kg)	Com. daily weight gain (g/d)	Daily weight gain/week (g)	Feed conversion cum. (kg/kg)	Feed/day (kg)
1	7	0,17	24,0	24,0	0,89	0,021
2	14	0,35	25,1	26,2	1,26	0,042
3	21	0,64	30,3	40,7	1,42	0,066
4	28	1,04	37,1	57,7	1,50	0,094
5	35	1,57	44,8	75,6	1,57	0,128
6	42	2,22	52,8	92,9	1,63	0,165
7	49	2,98	60,8	108,3	1,69	0,203
8	56	3,82	68,3	120,9	1,76	0,242
9	63	4,73	75,1	129,9	1,83	0,278
10	70	5,68	81,1	135,3	1,91	0,312
11	77	6,64	86,3	137,4	1,99	0,341
12	84	7,60	90,5	136,8	2,08	0,367
13	91	8,54	93,8	134,1	2,17	0,389
14	98	9,45	96,4	129,9	2,26	0,408
15	105	10,32	98,3	124,8	2,36	0,425
16	112	11,15	99,6	118,9	2,46	0,438
17	119	11,94	100,3	112,4	2,56	0,449
18	126	12,68	100,6	105,4	2,67	0,458
19	133	13,36	100,5	98,0	2,77	0,463
20	140	14,00	100,0	90,5	2,88	0,466

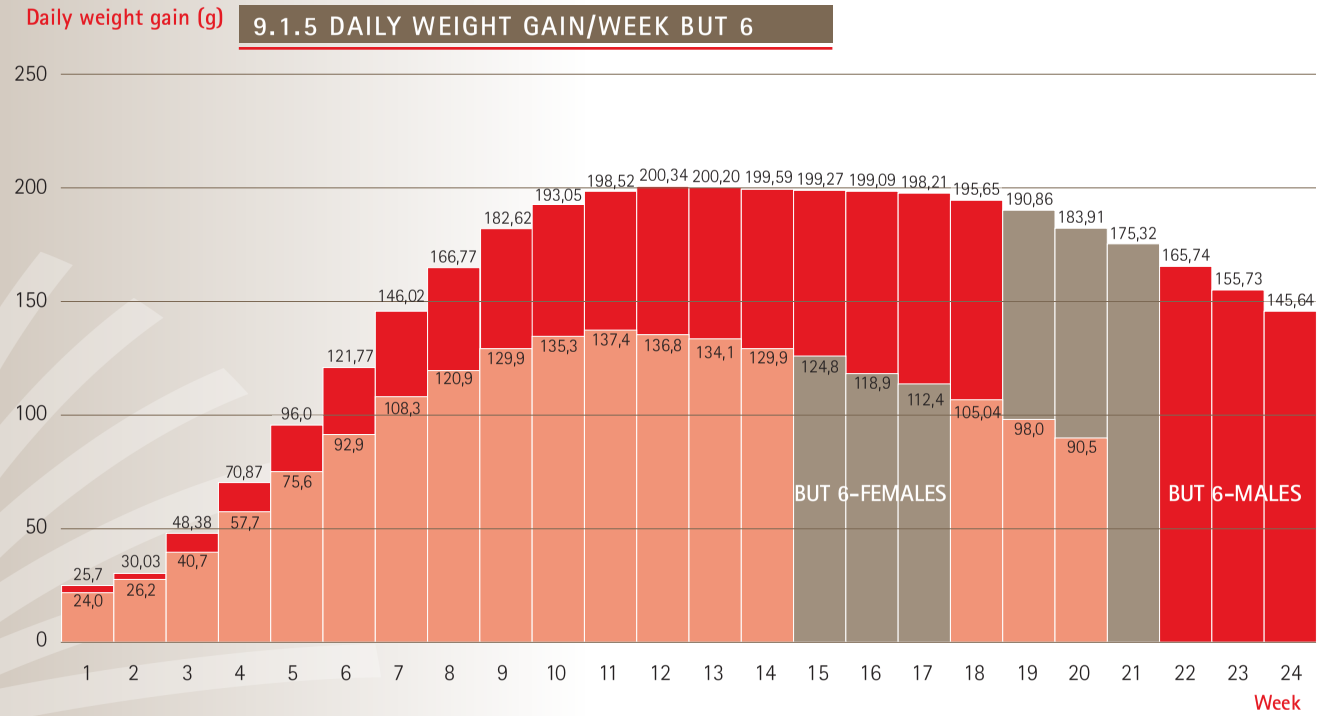
9.1.3 WEIGHT DEVELOPMENT BUT 6



9.1.4 DAILY WEIGHT GAIN (CUMULATIVE) BUT 6



9.1.5 DAILY WEIGHT GAIN/WEEK BUT 6



9.2 TP 7

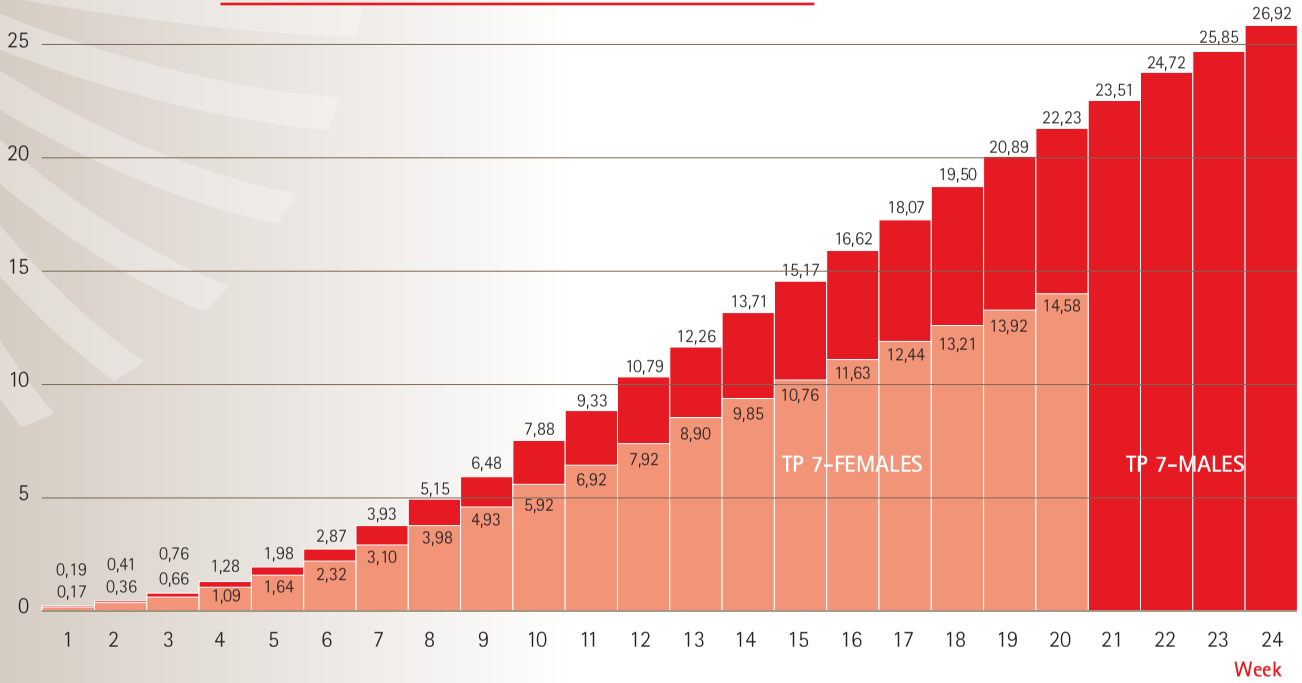
9.2.1 GROWING PERFORMANCE TP 7 MALES

Week	Days	Weight (kg)	Com. daily weight gain (g/d)	Daily weight gain/week (g)	Feed conversion cum. (kg/kg)	Feed/day (kg)
1	7	0,19	26,5	26,5	0,93	25
2	14	0,41	28,9	31,4	1,26	48
3	21	0,76	36,2	50,6	1,39	78
4	28	1,28	45,6	74,1	1,46	115
5	35	1,98	56,6	100,2	1,51	161
6	42	2,87	68,3	126,9	1,56	212
7	49	3,93	80,3	152,1	1,61	266
8	56	5,15	91,9	173,6	1,67	320
9	63	6,48	102,8	190,0	1,72	370
10	70	7,88	112,6	201,0	1,78	415
11	77	9,33	121,2	206,8	1,85	453
12	84	10,79	128,5	208,9	1,91	486
13	91	12,26	134,7	208,8	1,98	516
14	98	13,71	139,9	208,3	2,05	545
15	105	15,17	144,5	207,9	2,12	575
16	112	16,62	148,4	207,6	2,19	606
17	119	18,07	151,8	206,6	2,26	635
18	126	19,50	154,7	203,8	2,33	660
19	133	20,89	157,0	198,8	2,40	679
20	140	22,23	158,8	191,6	2,47	691
21	147	23,51	159,9	182,7	2,55	697
22	154	24,72	160,5	172,8	2,62	699
23	161	25,85	160,6	162,5	2,69	697
24	168	26,92	160,2	152,1	2,77	692

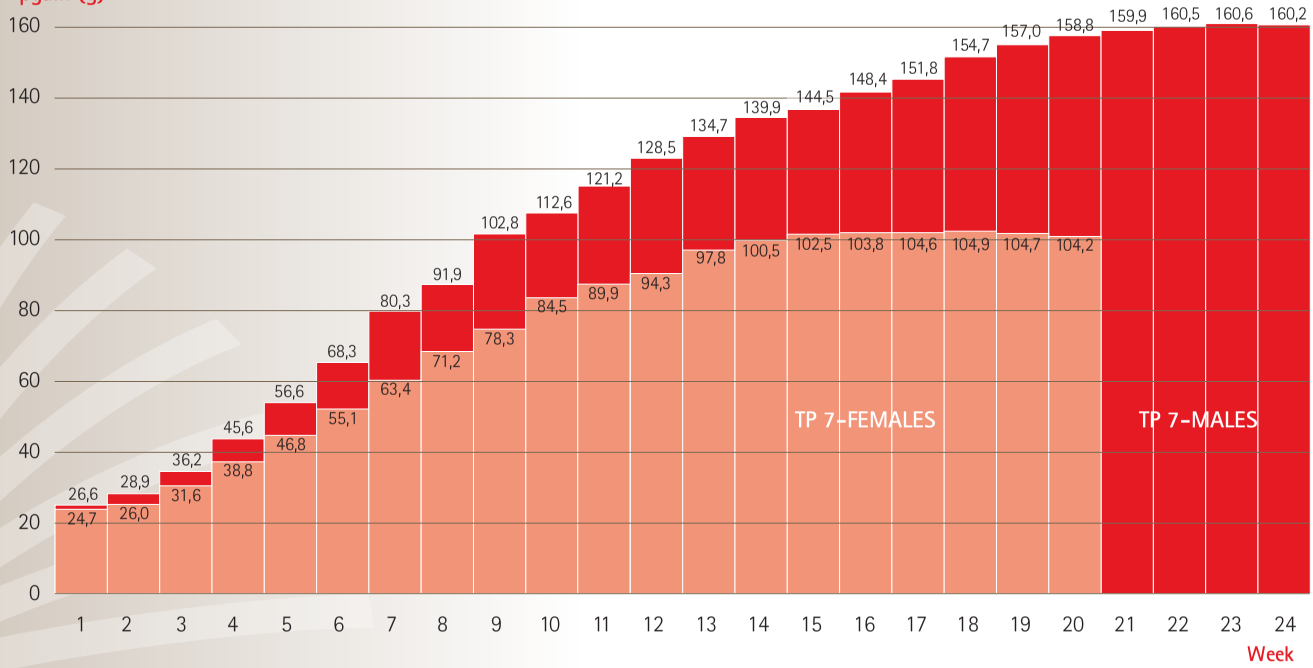
9.2.2 GROWING PERFORMANCE TP 7 FEMALES

Week	Days	Weight (kg)	Com. daily weight gain (g/d)	Daily weight gain/week (g)	Feed conversion cum. (kg/kg)	Feed/day (kg)
1	7	0,17	24,7	24,7	0,89	22
2	14	0,36	26,0	27,4	1,25	44
3	21	0,66	31,6	42,7	1,41	68
4	28	1,09	38,8	60,3	1,50	98
5	35	1,64	46,8	78,9	1,57	133
6	42	2,32	55,1	96,8	1,63	171
7	49	3,10	63,4	112,8	1,69	211
8	56	3,98	71,2	125,7	1,76	251
9	63	4,93	78,3	135,1	1,83	289
10	70	5,92	84,5	140,9	1,91	324
11	77	6,92	89,9	143,2	1,99	355
12	84	7,92	94,3	142,7	2,07	381
13	91	8,90	97,8	139,9	2,16	404
14	98	9,85	100,5	135,6	2,26	424
15	105	10,76	102,5	130,2	2,36	441
16	112	11,63	103,8	123,9	2,45	456
17	119	12,44	104,6	117,0	2,56	467
18	126	13,21	104,9	109,6	2,66	476
19	133	13,92	104,7	101,8	2,76	481
20	140	14,58	104,2	93,9	2,87	484

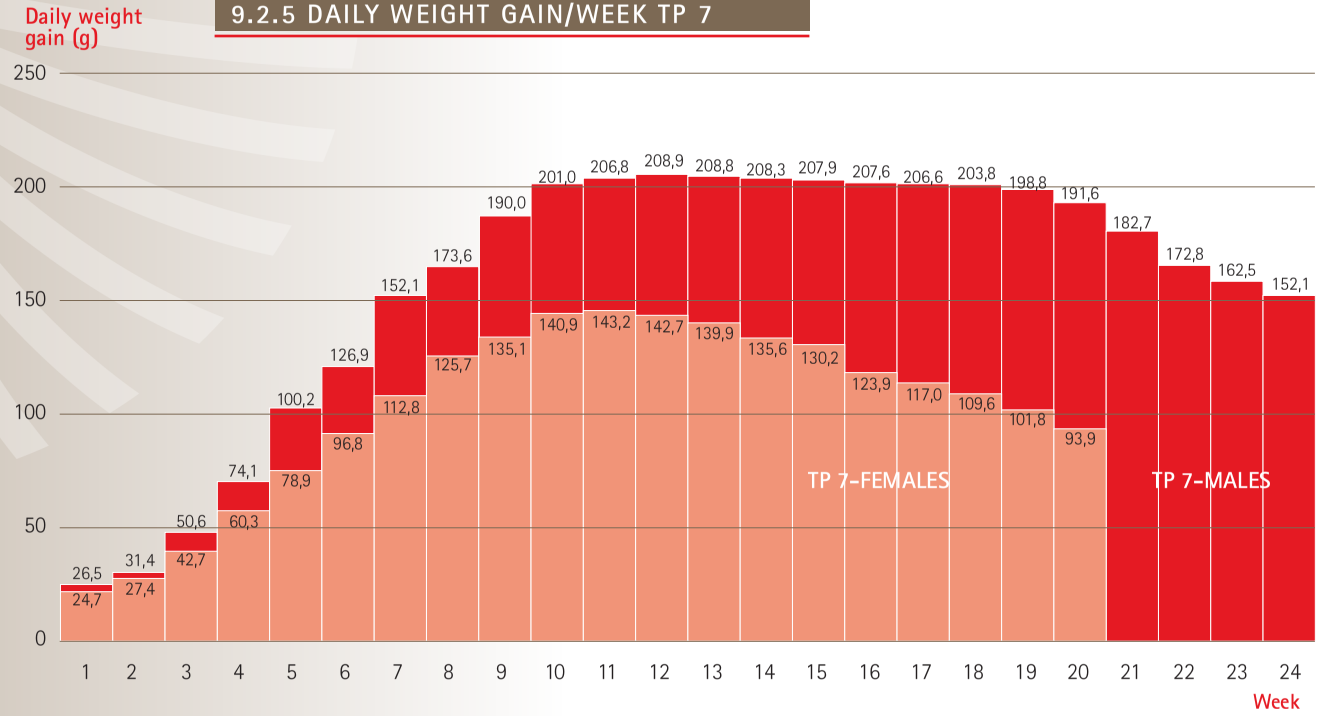
9.2.3 WEIGHT DEVELOPMENT TP 7



9.2.4 DAILY WEIGHT GAIN (CUMULATIVE) TP 7



9.2.5 DAILY WEIGHT GAIN/WEEK TP 7



NOTES

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