Duck breederfocus

1. Feeding breeder ducks to maximise egg viability

by Robert Wehrlen, Parental Production Manager, Grimaud Frères. www.grimaud.com

Reputed to be excellent laying hens, Pekin ducks are particularly suitable for farming breeder ducks. In order to further improve their performance, high quality nutrition is essential for the optimal production of viable eggs and high quality ducklings.

The diet required by Pekin ducks can be split into several phases during the breeding process. Whilst all are important, the start-up phase is proven to be crucial. The first three days of their lives determine their breeding potential, therefore particular attention must be given to their nutrition at this early stage. As they grow extremely quickly, extra vigilance is required for Pekin ducks.

THE START-UP PHASE

Starter feed, sold as crumbs for better absorption, should contain raw materials that are easy to digest. Experts of Grimaud Frères advise that ducklings should be given a diet composed of highly digestible nutrients and additives, especially chelated minerals which are easier for them to digest.

Chelates combine trace elements with proteins, which provides two key advantages: it increases the rate of absorption to 60% and reduces the amount of waste going back into the environment. This starter feed diet should be provided for between 8-10 days, whilst the duckling is developing its nervous system and starting to grow its bones. Then, it enters the growth phase. One should not hesitate to invest in this feed.

THE GROWTH PHASE

When entering the growth phase the feed changes and takes the form of pellets, a shape suited to the duck's beak, which makes it easier to ingest. The pellets also prevent the segregation of vitamin and trace mineral intakes in the feed in the form of fine particles not consumed by the ducklings.

Nutrition during this phase should meet the primary needs of ducks. It is at this time that they finish building their nervous and skeletal systems, and build their muscular mass.

However, the aim is not to fatten them up excessively as this would have a negative effect on their reproduction. Growth feed should be provided for up to 8-10 weeks, before moving to the breeding phase.

THE BREEDING PHASE

The aim of this new stage in the lifecycle of a Pekin duck is to maintain the capital obtained during the start-up and growth phases, and to prepare the animals for breeding.

The feed provided to ducks is slightly less concentrated as the idea is to further strengthen their skeleton by providing them with the right calcium intake.

Thus, a breeder with good bone reserves will lay eggs with hard shells, which will determine the quality of future ducklings.

It is at the end of this breeding phase that the growth potential of the female duck's ovarian cluster and the male duck's testicles is established, which will inevitably influence how successfully they reproduce in the future.

It is also important not to deviate from growth targets. The aim is to give the right food intake based on growth curves, otherwise the development of the Pekin duck's body composition will not be as expected.

A diet which does not follow this curve could have significant consequences for breeding. This can result in deficiencies, causing ossification problems, which will then affect the quality of the shells at the time of laying.

Conversely, overweight females will have difficulties laying and males that are too fat will have fertility problems. In all events, if the feed given to ducks is not of a high quality, breeders will be faced with poor egg productivity and hatchability issues.

With the right feed, Grimaud Frères experts guarantee that a female has the potential to produce 252 eggs and 206 ducklings over a laying period of 45 weeks.

THE LAYING PHASE

When female ducks enter the laying period, their diet varies. Their needs will not be the same at the beginning and end of laying. At the start, the ducks still need to grow, so provide them with a feed that is richer in protein and with a higher energy intake.

At the end of laying, the amount of protein is reduced and calcium is increased.

Be careful if males and females are kept together as they will eat the same diet. Do not increase the calcium too much as this could be detrimental to sperm production, and the ducks could become less fertile.

FEED FOR HIGH QUALITY FUTURE DUCKLINGS

Although, first and foremost, a specially designed feed meets the physiological needs of breeding ducks, we also aim to try to transfer as many nutrients to the egg as possible to increase the viability and quality of the ducklings before their birth.

As the duckling will feed on the yolk of the egg, it is necessary to maximise the quality of the required nutritional intake and, above all, not to neglect the quality and the quantity of vitamins and amino acids.

Grimaud Frères recommend, in particular, incorporating a vitamin of the type HY-D into feed.

This vitamin is directly absorbed by the liver, which combined with canthaxanthin antioxidants improves hatchability, the quality of embryos and therefore, of ducklings. In this way, the duckling leaves the egg on the right foot right from the start.

Above all, it must not be forgotten that the first food that is essential to the life of all living things, and in particular ducks, is water and that the quality of that water is paramount.

THE EFFECT OF FEED FROM A HEALTH PERSPECTIVE

In order to secure production at the time of laying, additives can be used to reduce pathogenic flora in the parents' digestive tract and, therefore, improve the bacteriological quality of the eggs and later, the ducklings.

By improving digestive flora, by lowering the pH of the digestive tract with essential oils and/or protected acids, the proliferation of Gram-negative bacteria, such as coliforms, salmonella and other Pseudomonas, is greatly reduced. The risk of vertical transmission or being transmitted through eggs is also greatly decreased.

In addition, to limit the risk of livestock contamination through food, it is possible to use heat-treated food, i.e. food that has been heated to destroy any possible salmonella present in the raw materials. This is a way of ensuring the duck feed is safe and thus ensuring the production of high quality chicks.

Above all, the best way to protect health lies in the selection of the raw materials that are used to make the feed. Good knowledge of nutritional values as well as the fungal quality of the latter are basic elements in producing good feed.

CHANGING DIET ACCORDING TO ENVIRONMENT

The ways of feeding a farm of breeder ducks may differ depending on the country or region you live in and its weather conditions. There is not just one way to do it. There are likely to be differences in their diet due to the climate, the environment, and farming conditions. Therefore, it is necessary to know how to adapt feed to the needs of ducks in a particular environment.

Differences can also come from the raw materials used, which are not strictly the same in one part of the world as another.

At Grimaud Frères, we keep an open mind. It is always interesting to analyse different processes to get the best out of them. We also have an expert nutritionist and all the skills required to help you adapt these dietary recommendations to your needs, regardless of the condition in your region.

In accordance with the different stages described above, Grimaud Frères understand the needs of ducks, which they put at the disposal of their customers in order to guarantee successful breeding. ■

Duck breederfocus

2. Successful duck breeding: Genomics

by Anne Rae, Cherry Valley. www.cherryvalley.co.uk

Cherry Valley Farms Ltd have been involved in breeding Pekin ducks for the duck-meat market for almost 60 years. During this time there have been many changes in the technology available to carry out successful improvements in the elite lines that are used to produce the commercial duck.

The most important recent advance is the use of DNA sequence information and genomic markers to assess genetic diversity, identify birds, track elite line pedigrees and enable genomic selection.

GENETIC DIVERSITY

Commercial ducks are usually produced from four-way crosses. This means that different emphasis can be put on different traits in the elite lines that become the grandparents of the commercial bird, allowing the required traits from the different lines to combine and contribute to the commercial duck performance.

The use of heterosis, or hybrid vigour, is of extreme importance in a four-way cross. This is where the progeny show better performance than either of its parents, and is particularly important for traits such as health and reproduction. For example the Cherry Valley female parent has a higher egg production than either of the two grandparent lines that are crossed together to produce the female parent.

To ensure hybrid vigour, the lines that are crossed together need to be genetically distant. However, it should be noted that the nature of a four-way cross means that the dominant genes (or traits) from each line are passed to the commercial bird producing good uniformity in this generation.

It is a pre-requisite of any breeding programme that there is genetic diversity within each elite line to be able to select the best individuals for the next generation to ensure the continual improvement from the breeding programme; the more genetic variation within a line the more improvement can be made.

Genetic diversity needs to be monitored and maintained within the selection programme to not only avoid a reduction in selection improvement potential, but also prevent inbreeding depression which can lead to loss of reproductive performance and health. DNA markers are important for assessing the amount of genetic diversity within a line to ensure adequate selection potential, and for assessing diversity between lines to utilise hybrid vigour in the commercial lines. A measure of genetic diversity between and within lines also facilitates decisions about developmental strains. Backup genetic resources in the form of developmental lines are maintained so that they can be tapped into when necessary. To ensure this is effective, the optimum number of birds to reflect the genetic diversity available can be forecast using DNA markers. Quantifying the genetic diversity within developmental lines allows prediction of genetic selection potential, indicating the value of these lines for future commercial success.

PEDIGREE TRACKING

A successful genetic breeding programme requires that the ducks that perform best for production traits, including efficient growth, good reproduction, health and liveability, are identified to produce the next generation. It is essential that the traits used for the selection programme are heritable so that they are passed down the breeding pyramid.

Many important production traits are affected by the environment and management practices, so it is imperative to be able to quantify the genetic potential of each duck, i.e. quantify the heritable effects separately from the environmental influence on performance to predict the efficiency of the selection and ensure that the advantages traits are passed on to the next generation.

To do this the family relatedness or pedigree of each duck needs to be known; historically ducks have been divided into small family groups and eggs have been tracked from each duck at the breeder farm through the hatchery so that each duckling is given a unique ID that remains with them throughout their life, denoting their pedigree.

DNA markers can be used to identify individual birds and their parentage so that the pedigree can be tracked. Using DNA to track the pedigree in large open mated pens instead of small family pens greatly facilitates the process, in that it can improve fertility, increase the number of possible crosses, and allows more natural mating behaviour. It also has the advantages of more efficient space usage, extended data collection, improved perceived welfare and a reduction in the risk of errors, all of which improve selection potential. Data suggest that open pen mating, allowing mate choice, can increase the fertility and hatchability of eggs by 15%, resulting in lower chick costs and higher chick numbers leading to improved selection intensity.

Valuable additional reproductive data, such as mating behaviour, mate choice and sexual aggression, is being collected to be used in the genetic breeding programme.

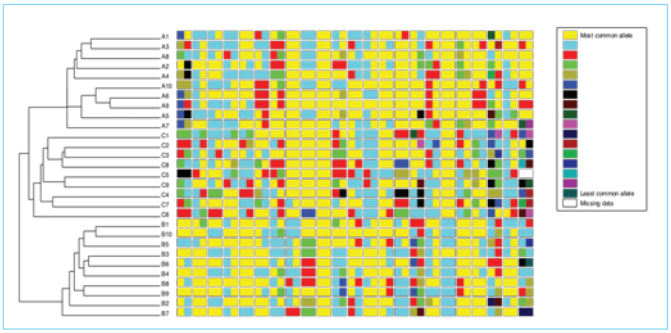
Ducks can be identified by the variation at Single Nucleotide Polymorphisms.

GENOMIC SELECTION

DNA markers may be used to better understand the genetic control and heritability of a trait that is being selected, and allows individuals to be selected early in their lives. Genomic selection is particularly advantageous for 'difficult to measure' traits (behaviour such as aggression), traits that may not be displayed in all individuals (sex specific traits, such as egg production in males) or traits that would prevent an individual reproducing or being used as breeding stock for the next generation i.e. traits that are destructive such as carcase quality, disease tolerance, etc. It has been seen that genomic selection can increase the accuracy of breeding values by 20-40%.

Efficient genomic selection requires tens of thousands of markers to be assessed in each individual. The costs of sequencing and analysing molecular markers are constantly reducing as improved techniques are utilised, and much work is being done to improve the statistical methods to identify useful molecular markers, allowing more efficient analysis. Genomic selection is a rapidly developing influential selection tool, which Cherry Valley are integrating into their breeding programme. ■

The relationship between ducks can be assessed by studying the variation in different DNA markers.



Duck breederfocus

3. The key stages in incubating Pekin duck eggs

by Stéphane Baudon, Hatchery Manager, Grimaud Freres. www.grimaud.com

The Pekin duck is known for how easy it is to breed. At Grimaud Freres, production managers agree that the start-up phase of animals is essential as the first three days of a duckling's life determines its subsequent growth and performance. But what happens before the start-up phase? What practices are used by breeders to incubate eggs and increase the viability of the animals? What precautions are taken?

PLACED IN INCUBATORS

The incubation period varies from one species to another, but for Pekin ducks it lasts 28 days.

An incubator is a machine which automatically and mechanically reproduces the conditions required to hatch the egg and replicates the movement of the female: it maintains the temperature at 37.6°C, humidity at 65% and a 45° incline as standard.

At Grimaud Freres, a breeder of Pekin, Muscovy and mule ducks, we invest in equipment and techniques that reproduce the natural cycles of female ducks.

The eggs must be of impeccable quality, both physically and in terms of health, to ensure proper development of the blood system.

In addition to the criteria previously mentioned, the hatchery manager must pay particular attention to the stability of the incubator to ensure proper consistency and good viability of the ducklings on the day they hatch.

Health aspects, the flow of eggs and people must be fully controlled to guarantee good quality ducklings.

These practices should be adapted according to the equipment and technical resources available and the climatic constraints of the country in which the eggs are incubated.

ENDOTHERMIC EMBRYONIC GROWTH

During the first 14 days of incubation, ventilation management and oxygen requirements are essential indicators to monitor.

After the 12th day, the eggs are taken out of the incubator and placed under a light made up of different variations, in order to check their fertility. Only the fertile eggs are kept.

This stage is known as candling. It is not essential but it makes it possible to save time when hatching and to only keep the viable eggs.

EXOTHERMIC EMBRYONIC GROWTH

During the last days of their incubation period, spraying the eggs with water helps to expel calories and helps to break down the shell of the egg.

Using good quality water is essential to achieve good results during this process. During this phase, oxygen requirements are increasing, therefore it is important to give them more air.

The eggs will lose weight throughout the process, and the closer to the hatching date, the more they will lose.

In total, the eggs will lose about 12% of their weight when compared to their weight on their first day of incubation.

HATCHING

Three days before the end of the production process, the eggs are placed in the hatcher.

The hatching process consists of the ducklings pipping to get out of their shells and establishing the pulmonary respiration required for them to live outside of their shells.

The eggs are no longer sprayed with water and attention now focuses on monitoring the consistency and rate of pipping.

Incubation is an essential stage between the eggs being laid and the start-up phase of the ducklings. Every precaution is taken to ensure optimal health and safety.

Hatchery teams are trained how to use the equipment and are aware of the impact their role has on the success of incubation and the viability of the animals.

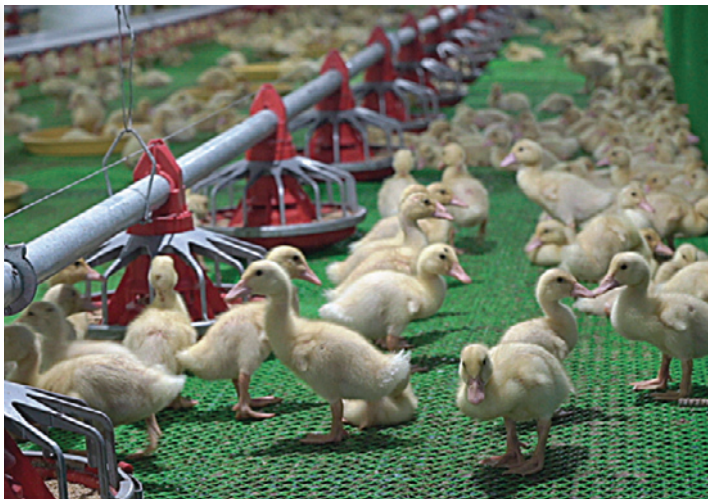
At each stage in the breeding process right up to delivery of the ducklings, Grimaud Freres teams strive to ensure irreproachable quality in terms of health. ■

Duck breederfocus

4. Preparing for the arrival of Pekin ducks on your farm

by Sophie Evesque and Loïc Fruchet, Poultry Managers, Grimaud Freres. www.grimaudfreres.com

We know the first three days of a duck's life determine the rest of its existence. Unlike Muscovy ducks, Pekin ducks are fast growing. It is, therefore, necessary to ensure they can grow properly as soon as they arrive on the farm. All the stages described in this article are essential for the successful rearing of a batch of Pekin ducks.



THOROUGH CLEANING BEFORE ARRIVAL OF THE PEKIN DUCKS

Cleaning is the first essential step in receiving Pekin ducks into a healthy environment. Farmers must decontaminate their buildings and all equipment of any microbes from the previous batch.

DISINFECTION IN COMPLIANCE WITH STANDARDS

After this thorough cleaning, farmers should proceed with the disinfection stage. Using virucidal, bactericidal and fungicidal products, farmers should remove all micro-organisms and undesirable viruses from their buildings.

The final stage of the disinfection process is rat extermination.

These first two stages of cleaning and disinfection take between two and three weeks.

A COMPLETELY DRY BUILDING HEATED TO 28°C

The disinfection downtime serves to dry out the building and establish effective sanitary barriers prior to the reception of the Pekin ducks. A thick layer of good quality straw is essential for the birds' comfort. 28°C is the required temperature for newly arrived ducklings.

They are more energetic than Muscovy ducks and move around more. They therefore need a slightly lower temperature, however it is necessary to begin heating the building well in advance to ensure the appropriate temperature is reached before their arrival.

CUSTOMISED EQUIPMENT

One waterer and one feeder are recommended per 50 ducklings. A heating point, usually radiant, is also necessary for each 250 ducklings, to recreate the sensation of maternal warmth.

Appropriate care of the ducklings ensures they get off to a good, healthy start and can grow to their full potential.

GOOD QUALITY WATER

At this stage, it is important to flush out the water channels regularly while the ducklings are present. Farmers should check water quality by carrying out tests every year.

Chlorination or other treatment is necessary if the results are not satisfactory. Also, since the building is kept at a temperature of 28°C, it is important to regularly replace the water and food.

MONITORING DURING THE FIRST FEW DAYS

The first 72 hours are crucial. As soon as the ducklings arrive, the farmer should spend as much time as possible with them, in order to observe their habits and ensure that they move around.

As ossification takes place very quickly in Pekin ducks, it is important to monitor them and to supplement their feed with the correct vitamins to strengthen their bones.

Visit the ducks every two hours on the first day and then gradually space out visits over the following days.

Experts also stress the importance of spraying ducklings with water to rehydrate them quickly in an emergency.

AN APPROPRIATE DIET

Food must be appropriate for their young age and farmers should ensure that crumbles are stirred so that they remain palatable. The visual appearance of this food is crucial.

You are now ready to receive your ducklings. Grimaud Freres offer a technical support line and a preparatory guide to ensure that you can raise your ducklings in the best possible conditions. ■

Duck breederfocus

5. Exploring new selection technologies

by Sophie Evesque and Loïc Fruchet, Poultry Managers, Grimaud Freres. www.grimaudfreres.com

For many years, Grimaud Frères has been using innovative technologies to serve its breeding programmes for waterfowl and pigeons. The installation of several hundred RFID fitted feeders on selection sites, which detect the animal every time it visits the feeder, has already enabled significant genetic progress in animal feed efficiency, thereby paving the way for the exploration of individual eating behaviour in field conditions.

The acquisition and development of the routine use of a medical scanner also required a lot of work. Each animal has by now been through the scanner, and the images obtained allow for the reconstruction of the bird in 3D, including all its tissues, muscles, bones, and internal organs.

With such precision, the genetic improvement in meat yield is hugely increased.

INNOVATIVE APPROACHES

Even more innovative approaches are also currently in development at Grimaud Frères; for example, the development of sensors allowing the geolocation of each animal at any moment.

This highly advanced technology allows for animals to be distinguished from one another based on general behavioural criteria, such as distances covered or movement speed. The idea is to provide the means to select the animals which are the most docile and best suited to their environment.

ANIMAL WELFARE

Animal welfare is one of the essential components of Grimaud Frères' selection programme, and the use of new technologies not only makes the non-invasive measurement of animal performance possible, but also allows the selection of the animals best suited to the breeding conditions of their clients.

This is why the development of advanced technologies is part of Grimaud Frères' R&D programmes, and they combine all of these methods in order to enhance the effectiveness of the programmes, while maintaining animal welfare and the genetic diversity of livestock.

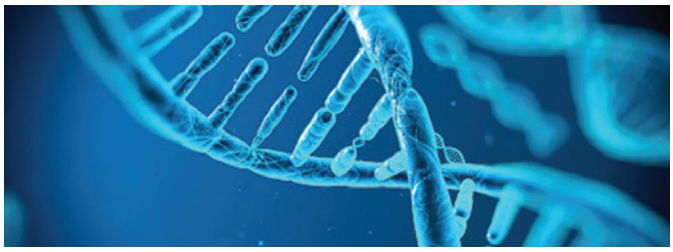
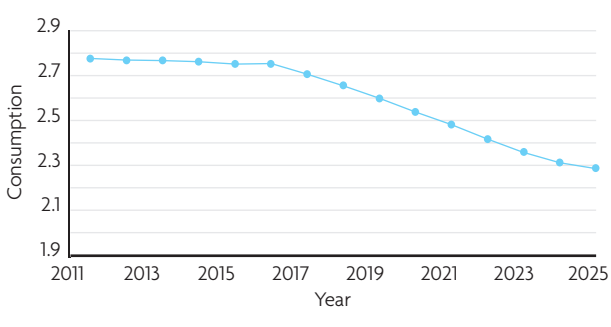
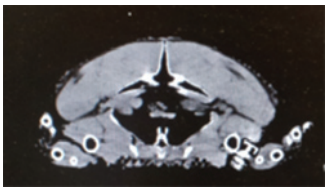


Fig. 1. Male consumption index R71M 84d.



Now, the future lies in the genomic selection of ducks, which began this year and will help bolster all of the progress achieved so far. The principle consists of identifying the markers present in the genome for each individual, following DNA sampling, and to link these to expected performance; this will once again avoid performing numerous procedures on the animals and will improve the accuracy of the information.



Finally, in ovo sexing, which consists of the early determination of each bird's sex in the egg, will prevent the destruction of unsold chicks. ■

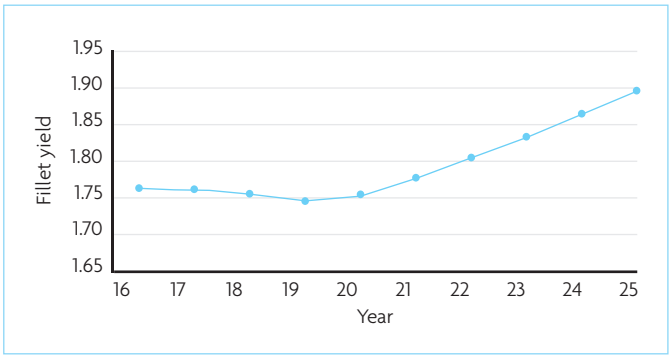
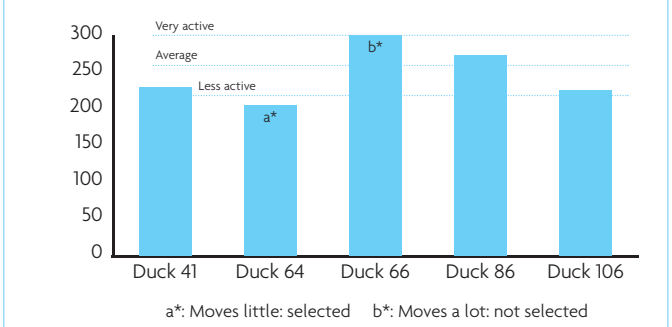


Fig. 2. Male fillet yields S53 49d.

Fig. 3. Measuring duck activity.



Duck breederfocus

6. Biosecurity in duck buildings

by Sophie Evesque, Export Technical Engineer, Grimaud Freres. www.grimaudfreres.com

Biosecurity in duck buildings depends on four essential pillars – from the cleaning of the empty building to respecting hygiene instructions while the ducks are in. The whole preparation period before receiving the animals should follow precise sanitary rules regarding equipment, water, and the buildings. The place where the ducks will grow should be free of all types of contamination and controls should be maintained throughout the breeding period.

1. AN EMPTY AND CLEAN BUILDING

- Remove all movable equipment, empty the silo and store documents of the flock.
- Spray insecticide and remove the litter.
- Cleaning of the building, the vestibule and the egg storage room: remove all the organic matter with a detergent. Pay attention to the water quality.
- Management of washing water and manure.
- Cleaning and disinfection of all the equipment.
- Cleaning the water distribution system.
- Schedule maintenance in the building.

The aim is to start a new flock in a good environment.

2. A DISINFECTED BUILDING

- Disinfect inside and outside the building with a liquid disinfection (caustic soda or lime).
  This is the beginning of the sanitary 'stop'.
- Set up the building with all the equipment already clean and disinfected.
- Check that everything is working (feeding chain, light, water system, ventilation).
- Set up the sanitary barriers (airlock three zones, livestock keeping, flow plan).
- Maintenance of the surroundings (no storage, verification of bait for rodents, straw shed tightness).
- Building dry and preheated.
- Check the breeding instructions for the incoming flock.
- Re-install litter.
- Disinfect with fumigation, 24-48 hours before the ducklings arrive.

3. A CONTROLLED HEALTH AREA

- Organise a circulation circuit around the building: fencing, gates, traffic signs, disinfection area at the entrance.
- Establish or verify flows within the farm:
  – For livestock staff.
  – For external workers (food, gas, rendering).
  Such flow control avoids cross-contamination.
- Straw storage in a closed and rodent/bird-free shed.
- No food under the silo and close.
- Rodent control plan for the entire farm.

Closed, screened site. The food and gas supplier do not enter the site. Staff must take a shower to enter on site. The flows do not cross each other.

Clear access, direction of traffic and signs.

4. MAINTAIN AND RESPECT THE INSTRUCTIONS

- Respect the 'clean' or 'dirty' areas throughout breeding.
- Provide the equipment necessary to respect the rules: clothing, soap, towel, masks, hat and shoes.
- Note the interventions, flows or any other event that may affect the health security of the site.

At the end of the day, each individual farmer is responsible for biosecurity on their site and must lead by example.

Once cleaned and disinfected, the equipment is put back in a clean building.

Duck breederfocus

7. Genetic development

by Nicolas Guillaume, Export Director, Orvia. www.orvia.fr

Established over 40 years ago, Orvia Group has become a major operator fully and actively dedicated to duck and geese breeders through an innovative and strict genetic selection programme. Last year Orvia reached a total turnover of €117 million, 20% of which is from its substantial growth and presence in international markets throughout more than 40 countries.

GENETIC DEVELOPMENT

Thanks to its many years of research into the genetic development of waterfowl, Orvia has gained a solid reputation and well recognised competitiveness for its holistic approach.

For the last five years, Orvia has gained more and more consideration for its Pekin duck genetics globally and within western, central and eastern Europe; it is fully dedicated to excellence and to providing the best for its customers.

The research and development department of Orvia is dedicated to the improvement of all pure lines. Every new generation of its gene pool is therefore better than the previous.

DATA COLLECTION

To reach this goal, the research and development team is collecting millions of individual data on its Pekin ducks on a yearly basis.

By using high throughput phenotyping and state-of-the art measurement devices, those recorded data are bringing detailed information on different traits, such as bodyweight, feed efficiency, reproductive traits like the number of DOD per female and also livability.

Data are not only collected on pure line birds, but a large part is also collected on progeny via slaughtering tests where detailed information on meat yield/quality are collected.

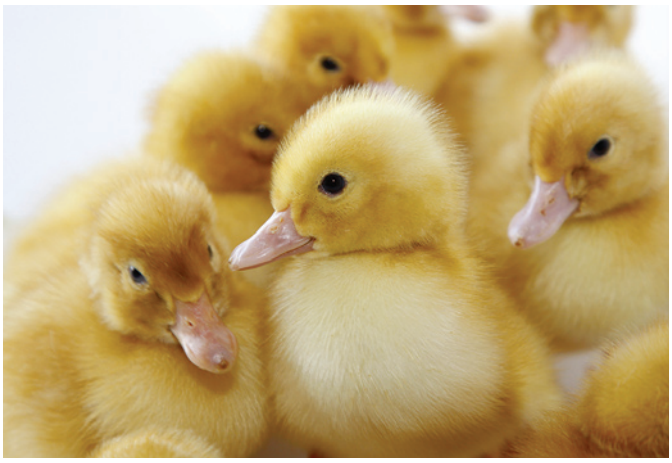
GENOMIC INFORMATION

To be even more accurate in its selection process, Orvia is now using genomic information.

All this information combined gives Orvia the opportunity to select the best animals with the right balance between all traits to meet the expectation of its customers.

Its Pekin breeding lines have shown great laying and fertility persistency in the field for female and male lines respectively, with optimal FCR to potentiate the best way feed is given.

Robustness and viability are also strong distinguished features of its breed.



Robust and healthy ducklings.

ANIMAL WELFARE

Orvia is placing animal welfare at the heart of its corporate culture. Indeed, the needs of animals, evolving with age, are considered and looked after with a magnifying glass within the group.

Employees and breeder farmers are thus trained in house to fully respect the fundamental freedoms and integrity of the birds. Reliable, repeatable and animal welfare indexes are also measured in each farm and hatchery regularly.

Innovation in animal welfare equipment, such as the mule duck ovo-sexing (granted 'Favourite of the Year award' at Space 2020), is a real priority and is inducing significant investments allocation.

ORVIA EXPERIENCE

The Orvia experience is the commitment to work closely and efficiently with its customers through a team of experts dedicated to perform and make the ST5H Pekin duck, which has one of the best combinations of an optimal feed conversion ratio and meat yield, excelling in the field and always performing at its best.

Orvia is growing synergistically with its customers to conjugate expertise on site for farms, hatcheries and laboratories. Next year they are proposing a new digital solution to better reinforce its customer relationships.

Orvia's strain is the promise of excellence. ■

Orvia has a presence in international markets throughout more than 40 countries.

Orvia's research and development has resulted in optimal FCR and improved meat yield, ensuring high quality meat.