

POULTRY NEWS

1/2015

TECHNICAL

Pre-incubation to improve the hatchability of stored eggs

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EVENTS

Franchise Distributor Meeting in Canada



**RESPONSE OF LAYER BREEDING
TO TODAY'S MARKETING AND
WELFARE DEMANDS**



LOHMANN
TIERZUCHT

An outbreak of AI is no longer news in the poultry industry!



Several new outbreaks on different continents in flocks of commercial or backyard birds, are challenging the entire industry and harming the trade of poultry products.

More than 30 countries worldwide have decided to protect their territories from potential cross contamination by closing their borders to other countries officially "touched" by existing international regulations.

We, as LOHMANN TIERZUCHT, the world's largest international supplier of layer parent stocks, have taken on this challenge as our main responsibility.

Thanks to the cooperation of health authorities implied, the unstoppable efforts of our staff in the different positions/locations within Lohmann, as well as the patience and efficient management of our clients/distributors in their own local status, we have, so far, been able to get our genetics to you on time and safely.

We would like to express our special thanks to all of those who made this possible.

Lohmann will continue to serve its customers in response to years of loyalty and make sure that our biosecurity measures, our strategic geographic positions, and internal efforts and dedication, will assure efficient supplies even in the years to come.

Sincerely,

Javier Ramírez Villaescusa



03 Response of layer
breeding to today's marketing
and welfare demands

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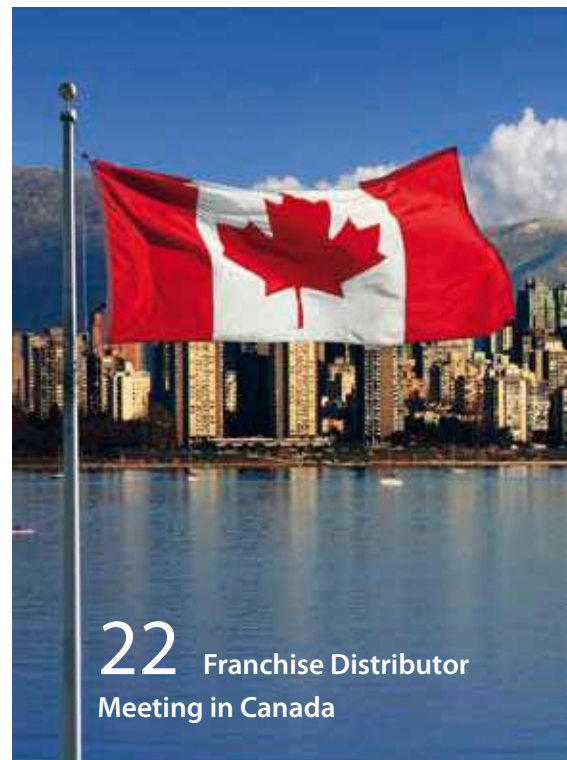
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RESPONSE OF LAYER BREEDING TO TODAY'S MARKETING AND WELFARE DEMANDS

The world population passed the mark of 7 billion last year and continues to increase at a rate of about 80 million people per year; the demand for eggs is increasing at least at the same rate. To meet the increasing demands, a minimum of 50 million hens have to be added each year.

Increased egg production, improved feed efficiency and adaptation of egg quality to consumer preferences have contributed significantly to the success of the poultry industry. While the focus has to remain on maximizing the genetic potential for producing high quality protein at competitive cost, additional requirements of the egg industry, changing consumer habits and the public opinion on animal welfare have to be taken into account.

Close communication

Primary breeders have to look beyond current requirements and anticipate changing needs and opportunities at least five years into the future. Close communication between breeders and distributors is necessary to introduce new varieties at the right time to benefit from growing niche markets. This requires extensive gene pools with large elite lines which can be combined to generate strain crosses with specific attributes to meet market needs as closely as possible. Maintaining and developing new lines, testing, selection and reproduction of primary stocks involves high fixed costs in the operation and requires superior skills in quantitative genetics as well as internal organization to keep track of the availability of different line combinations. Genetic development, marketing and technical support have to communicate closely with local distributors to provide the best possible service for the current market and to benefit from changing requirements.

To supply the best possible combination for each market with specified optimal egg weight, shell colour and the most common housing system, LOHMANN TIERZUCHT is currently offering more than a dozen of different strain crosses, which are all selected with focus on efficient egg production, but with different emphasis on individual selection traits.

Test environments

For line improvement, pure-line and cross-line hens are being tested in different environments: in single, small group and family cages as well as under floor conditions with a new kind of "trap-nesting". The majority of single bird cages are enriched with perches, nests and scratching areas with the aim of creating a testing system which is as close as possible to future housing systems with more floor space and several enrichments. Daily egg production is recorded with the aid of barcode readers, various egg quality traits (mainly egg weight, shell stability, shell colour and internal egg quality) and plumage condition are recorded on a sample basis across the production cycle. Individual feed intake and daily egg mass are determined at peak production, i.e. during the time of maximum performance, so that selection for improved efficiency reflects the capacity for sufficient feed intake at a time of greatest nutrient demand.

Ten years ago, the automatic testing of individual performance in floor systems was developed with the aid of a specially adapted transponder technique and the Weihenstephan Funnel Nest Box to obtain individual information on egg production, nest acceptance and utilization of outdoor facilities (winter garden or free-range). The data are used in family selection for "number of saleable nest eggs", penalizing families with poor nest acceptance which tend to produce floor eggs.

Breeding goals

For the foreseeable future, we can safely assume that general breeding goals such as egg numbers, feed efficiency and egg quality traits will remain priorities. Behaviour patterns and especially behaviour anomalies are included in the selection process for more



than 10 years now. Suitability for floor housing and free-range systems has become more important, and this includes attention to a whole range of traits: acceptance of nests and free-range, persistent plumage cover to the end of lay, resistance to common diseases and minimal tendency to develop feather-pecking or cannibalism.

LOHMANN TIERZUCHT has invested in additional testing capacities which reflect typical field conditions in different markets. At the same time, the genetic basis of the elite lines has been expanded on different continents to accommodate the demand of growing markets, which in turn will minimise the rate of inbreeding and the risk of losing valuable genetic variation. A special program to match selected males and females at the pedigree level assures that inbreeding effects in the pure lines are minimized and genetic progress continues at an even faster rate.

Molecular Biology

Advances in molecular biology have contributed new and more powerful techniques for selection. Using informative genetic markers, we can identify individuals with special characteristics early in life and thereby accelerate improvements in egg production, egg quality, behaviour and liveability. These innovations complement traditional performance testing and evaluation methods based on phenotypic selection indexes of production, efficiency and quality parameters.

Additional information based on DNA analysis is combined with traditional breeding to select males at an earlier age and to differentiate among full brothers, which used to have identical breeding values before DNA information became available. The combination of performance testing as described above and genome wide analysis is a promising tool

for enhancing the genetic progress for line combinations with a performance profile tailored to specific requirements.

Genetic progress

The current rate of genetic progress for total efficiency of egg production appears to be even greater than it was 20 years ago. An improved structure and increased size of breeding populations, the application of new testing and recording technologies and more powerful computer systems for breeding value estimation have contributed to more efficient use of existing genetic variation.

The breeding goals for future layers can be summarised with the following targets and biological parameters which we are on the brink of achieving: vital layers with stable plumage, strong bones as well as performance-based feed consumption. All of these are most significant for cage-free systems.

Today's hen daily lays an egg with a robust shell. The laying sequence is seldom interrupted. In most cases, the pauses are for one day only. Laying sequences of 80 until 100 days without any pauses whatsoever is already the standard with more than 50 % of hens within a flock. A calm behaviour with a high ability to adapt to environmental challenges safeguards the economic success. With the expected ban on beak treatment in Europe, docile behaviour will become the most important factor.

Finally, we should realise that increased genetic potentials need to be "converted" into reality in commercial practice. Disease control, farm management and nutrition have to keep pace with genetic improvements. Together, we can achieve more and we will stay successful also in the future.

Prof. Dr. R. Preisinger

8TH OMMAT SCHOOL, another story of success by Arab Poultry Breeders Co.



From right to left: "Dr. Fahd bin Abdul Rahman Belghunaim" minister of agriculture of Kingdom of Saudi Arabia, "Mr. Hussein Bahri" chairman of Ommat, "Mr. Ron Eek" regional area manager of LOHMANN TIERZUCHT GmbH

Arab poultry breeders Co., "OMMAT", with a market share of more than 75 %, is the market leader in supplying the Kingdom of Saudi Arabia, the Gulf countries and Yemen with day-old layer chickens. The company, which was founded in 1990, is the exclusive partner and distribu-

tor of LOHMANN TIERZUCHT's breeds in the region. The latter is reputed to be one of the largest layer-type breeder complexes in the Middle East. Aside from high quality and excellence in the production and distribution of poultry products, "Arab Poultry Breeders Co." sets a very high value on the training and education in excellent management for both its employees and clients. In this context, a seminar known as the "OMMAT SCHOOL" is held regularly on an annual basis. This year, the 8th OMMAT SCHOOL took place in the Meridien Hotel in Jeddah from 24th to 27th of November 2014. Customers of the company and poultry men from all over Saudi Arabia and other Arabian countries participated in this event. The seminar started with a speech by Mr. Hussein Bahri, the founder and Chairman of the company and his son, Mr. Moyassar Bahri, the General Manager of "OMMAT". The program covered

various recent topics in the poultry business such as veterinary issues, latest technology on poultry equipment and housing, egg marketing, flock management and economics. The speakers were chosen from different local and internationally well known companies all of whom made the "8th OMMAT SCHOOL" very informative. In addition to the lecture program, performing the "Umra" and a sport program were also provided for participants. The school was closed with a speech by the Minister of Agriculture for the Kingdom of Saudi Arabia, Dr. Fahd bin Abdul Rahman Belghunaim. The participants and lectures were honored thereafter and photos were taken of the same. On the whole, the 8th OMMAT SCHOOL was another success story which was perfectly organized by Arab poultry breeders in every respect.

Farhad Mozafar



Participants of the 8th OMMAT School

THE POULTRY INDUSTRY IN SRI LANKA AND Nelfarms



Sri Lanka, formerly called “Ceylon”, has a very special place in the history of poultry domestication with its “Gallus lafayetii” or “Ceylon Jungle fowl” being one of the ancestors for the present day poultry breeds. However, the poultry industry in Sri Lanka only has a brief history as this began just a few decades ago.

During the past 2 decades, the presence of native backyard type poultry breeds have been declining with the availability of present hybrid chicks in the rural areas due to the rapid growth of the poultry industry.

About 70 % of the contribution to the livestock sector in Sri Lanka is made up of chicken meat and eggs. With the current purchasing levels of consumers, the industry is capable of producing a considerable amount to meet the local requirements for chicken meat and eggs. These are relatively cheap as compared to other animal products. Poultry products are now the most

consumed source for animal protein in the diet of the average Sri Lankan as the industry today is in the hands of the private sector

The village chicken contributes to about 15 % of the total egg production in the nation.. They are reared mainly for the production of eggs since they have low growth rates. The village chicken is reared both in the rural and suburban areas, however, they are frequently found in the rural villages of Sri Lanka. The average flock size varies from 5-10 birds. At present, the poultry industry is growing as a lucrative sector despite minor constraints.

The industry is capable of meeting a considerable amount of local requirements for chicken meat and eggs. Being the cheapest source of animal proteins, poultry has contributed largely to the source of animal proteins so much so that the government has even declared chicken meat as an essential food commodity in 2006.

LOHMANN EXCLUSIVE CUSTOMER Nelfarms STORY

The origins of NelFarm (Noorani Estates Limited) began in the coconut estate in Walahapitiya Nattandiya where the company diversified into dealing with livestock due to the seamless demand of poultry products. Today, the core business is poultry which is fondly known as NelFarms.

NelFarms is an integrated poultry business with its own breeder farms and hatcheries. These produce both commercial layers as well as commercial broiler day-old chicks. NelFarms is one of the largest poultry producers in the country.

Brief History.

Noorani Estates Limited was incorporated in 1942 and the main objective of the company was plantation management. Among the many estates that were owned by the company at the time was a 600 acre coconut estate in Walahapitiya, Nattandiya.

In **1974**, the company decided to move its focus into poultry production and dairy farming.

In **1975**, Seven Hills Limited was incorporated as a wholly-owned subsidiary of Noorani estates Limited.

In **2003**, Mangala Eliya, which was a 50-acre coconut land located in the Puttalam District, was purchased for the purpose of

expanding the commercial layer operation.

In **2008**, a state of the art commercial layer farm was established with the most modern technologies in Seven Hills Farm.

In **2009**, the breeder business expanded and became of the leading breeder farms on the island.

In **2012**, first batch of Lohmann Brown Classic was incorporated as a layer breed in the company.

Today, NelFarms is one of the largest producers of ‘day-old chicks’ and the largest, fully-integrated producer of ‘table eggs’ in Sri Lanka.

Noorani Estates Limited or NelFarms, as it is more fondly known, is one of the largest poultry farming operations in Sri Lanka today. NelFarms is one of the pioneers in catering to the protein requirements of the whole nation by supplying clean, safe and high quality table eggs, island wide. The continuous development of NEL is assured due to its committed management team, skillful work force and the usage of cutting edge technology.

NEL is a responsible corporate organization and makes a substantial contribution towards the domestic economy.

Dr. Manoranjan Sharma



SOUTH KOREA-

THE LAND OF THE MORNING CALM

„The Land of the Morning Calm“ or South Korea, officially known as The Republic of Korea, is an East Asian country located at the southern part of the Korean Peninsula bordering North Korea, China and Japan. It is one of the most developed countries in the world and currently the world's 12th largest economy with more than 80 % of it's population living in the cities.

As the economic status of the Korean households improved and personal income increased, the intake of meat and eggs also increased steadily. The players in the poultry industry of South Korea, both in broiler and egg production, consist of large integrators and some small independent farmers.

In the past 4 decades, the South Korean egg industry has grown from backyard farming to full scale intensive farming with emphasis on modern technology. The per capita egg consump-

tion for South Korea is about 11.2 kg or 180 eggs per person per year. The Korean consumers are quality conscious, with preference for table eggs produced under good sanitary conditions, high Haugh Units and a dark brown egg shell colour.

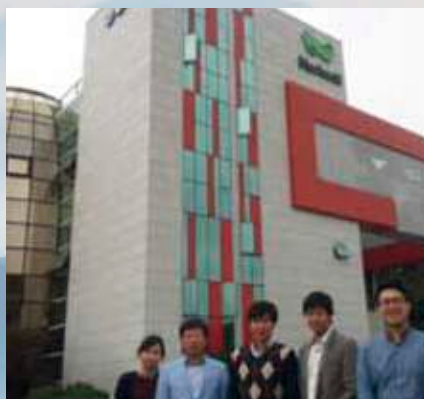
LOHMANN TIERZUCHT is a proud partner of Join Co Ltd in South Korea especially since we introduced one of our popular breeds, Lohmann Brown-Lite more than a decade ago. It is popular amongst the South Korean commercial layer farmers for its good performance, high laying rate, good laying persistency and for its other traits like its high Haugh Units.



*Mr Han Jae-Kwon,
Chairman of Join Co Ltd*



Front View: New R&D Complex



Dedicated Sales Team in front of the HQ



*Egg Shaped Business Complex,
Join Co Headquarter in Gyeonggi-Do*

Join Co Ltd is one the market leaders in the South Korean poultry industry. It first started in 1979 as Kang Nam Hatchery by Mr. Han Jae-

Kwon. By 1985, the company owned a total of 16 farms and did not stop growing in its capacity ever since.

In 1993, Mr Han converted the traditional farming system within his company into to a modern poultry systemization and in 1998, he had already built a modern Egg Distribution Warehouse System. His company is among the first to do so in South Korea.

By 2002, the company was incorporated and in 2004, it was certified with ISO 9001 for its good production practices.

The year 2006 marked another milestone for Join Co Ltd as the company introduced a system called the Grade Egg Information Service. This is a very significant achievement with regard to food safety as their customers can trace and check the information about antibiotic residual status, grade packing centre where the eggs are packed, grade information and the packing date of the eggs



that were bought by the customers simply by entering the serial number in the web-site <http://www.apgs.co.kr/etrace/etrace.asp>.

This further enhanced their traceability system and increased the customer's confidence in the quality of the eggs produced in their facilities.

In 2007, a new egg processing plant was established and a year later in 2007 „Nuriwell“ a brainchild and a new brand name for Join Co products, was launched by Mr Han.

Since the launch of „Nuriwell“, Mr Han has dedicated all his passion and time to further expand his business to the other parts of the world. He has a strong idea and a clear vision to make Join Co into a global company that is proud to introduce Korean food to the world. He is confident in the expansion plans as he has a team of motivated employees that fully support him, and we at LTZ are even prouder to be able to share his success story.

Dr. Ling Ling Chuah



Range of Join Co Ltd Bestseller Products: **01.** Ready to Eat Seasoned Hard Boiled Eggs **02.** Pasteurized Liquid Eggs **03.** Fresh Table Eggs Pack of 15, Donate as you buy campaign **04.** Organic Eggs, Pack of 15. **05.** Fresh Table Eggs, Pack of 30



*Dr. Kim and Dr. Eun, Veterinarians of Join Co Ltd
Mr. Jung Sales Manager and Mr. Choi*



From left: Ms. Lee, Mr Kim TH, Mr Kim, CEO of Join Co

LOHMANN TIERZUCHT, MARKET LEADER IN PERU

THE PERUVIAN MARKET

POPULATION: 30.8 MILLION

EGG CONSUMPTION: 180

LAYERS: 20 MILLION

ALMOST 100 % BROWN

With 22 Million DOCs placed in 2014, the Peruvian layer industry is growing at an even faster rate than the country's economy. In former times, egg producers were competing with the fish industry and only when fish prices were too high, Peruvians tended to consume more eggs. In 2005, egg consumption was at only 110 per person. Due to the impressive economic growth in the last decade, driven mainly but not only, by the mining industry (GDP 5,8 % growth in 2013, according to the World Bank), egg consumption has been increasing steadily and independent from fish prices.

Peru is a market for middle-sized brown eggs, although lately, white eggs are also demanded by consumers with increasing purchasing power and by foreigners coming to work from countries where white eggs are usually consumed.

In the past, all layer farms had a very simple structure consisting of open houses built with wooden poles, wire, and in some areas where it never rains, not even a hard roof; they used canvas soaked in asphalt or straw. Labour was cheap and available but the booming economy has made it expensive and scarce.

Nowadays, the layer industry is undergoing a rapid modernization process where automation plays a significant role and LOHMANN TIERZUCHT is supporting this process not only with its products, but also with recommendations and advice.

Agropecuaria Vallecito introduced Lohmann Brown to the country in 1993

At that time, 10 egg producers started a company destined to deliver Lohmann Brown DOCs only to its shareholders. The breeders were housed in very simple barns on floor ma-

nagement and achieved very good results. In order to improve even those outstanding results, at the end of 1997, the production on floor was abandoned and the breeders were housed in cages from day 1 on and production was continued with males and females in separate cages performing artificial insemination. Indeed, all production parameters were improved as observed in the following chart:

	Floor	Cages
Body weight (week 18)	1.519,90 g	1.564,08 g
Livability in Rearing	94.83 %	96.85 %
Livability in Production	88.89 %	93.53 %
Life cycle	68 weeks	74 weeks
Feed consumption	112.12 g	103.58 g
Hatching eggs until W. 67.	226	235
Egg weight	58-59 g	60-61 g
Fertility	91-92 %	95-97 %
DOC Body weight	36-38 g	38-40 g

Until today, Vallecito has continuously improved its own results and is selling around 4 Million DOCs every year, only to third parties.

Most recently, the vaccination team of Vallecito's hatchery won the 1st prize for the year 2014. This prize was awarded by Invetsa, the company providing the vaccines and evaluating the efficiency of the vaccination process at all hatcheries in the country.

Reproductoras Roma

Of the 10 original shareholders, only five are still owners of Vallecito and two of them started their own integration process creating Reproductoras Roma SAC, to produce the growing amount of DOCs demanded by their new automatic barns with 100,000-120,000 layers each. Since 2011, this integration is operating in a separate breeding farm fitted with cages and A.I., hatching LB Classic DOCs at their brand new hatchery with single stage machines, only for themselves. We were really astonished when the average production results of the last 3 flocks were presented to us, outperforming those of Vallecito and even our own standards: until 68 weeks of age, 42,51% hatchability and **134!!!** DOCs.

Two shareholders of Vallecito:

Raúl Velit Fernández and Atilio Giribaldi Mansilla owners of **AVIVEL** and **DIANO MARINA**.

AVIVEL: tradition and innovation hand in hand

More than 35 years ago, Raúl Velit Fernández started his activities as egg producer at his small farm Santa Anita in Quilmaná, Cañete, with 1,200 layers and 5 employees. In 1998, his son Raúl Velit Madueño founded his own company in the same region, Granjerito Don Antonio SAC and in 2013, both companies merged to create AVIVEL, which they proudly promote as a Peruvian Family Holding today. Currently AVIVEL is fully integrated with 1.5 million layers in production in 4 farms undergoing a rapid automation process, with an own feed mill, a modern packing station worth US\$ 2.5 Million and 400 employees. They also produce cages and share the ownership together with DIANO MARINA and another partner of ALIOVO. The egg processing plant will start operating in February 2015.

Avivel is the first company to be granted tax exemptions by the Government, after the project to improve the production process through innovation was evaluated by CONCYTEC (National Council for Science, Technology and Innovation).

AVIVEL is a good example of a forefront egg producing company where the second generation in charge is as efficient and passionate as the first one.

DIANO MARINA: a good example of modern egg production

In 1955, Atilio Giribaldi Mansilla, the patriarch of the extense Giribaldi family and founder of DIANO MARINA, started his egg producing business with 1,000 layers. In 1970, he bought the Fundo Diano Marina in Chincha establishing the company that not only continued with the expansion of the layer operation, but also since 1992, bets on the development of the agroindustry of this region and started to produce non-traditional products like fruits and vegetables. Nowadays, DIANO MARINA is a huge enterprise co-owner of Reproductoras Roma and Aliovo, with 600,000 layers in production and 230,000 in rearing and housed in own farms, also embarked in



a fast automation process and exporting fresh fruits and vegetables produced in their 300 hectares at the Chincha Valley and 700 hectares at the Nasca Valley.

The management of the different companies is spread among the several young descendants and in-laws of Atilio who is now enjoying life and supervising the whole modernized business. A special chapter deserves the barbecue and dining room of the main farm and family house where visitors and friends are entertained like royalty with excellent dishes of Peruvian cuisine and the best wines from all over the world.

More Lohmann Integrators

Other integration which follow the same modernization process, are housing our breeders to produce DOCs for their own farms, but are not allowed to sell the Lohmann products to the market.

La Calera, the biggest Peruvian egg producer, with 5 million layers is one of them, breeding Lohmann Brown Lite and a small amount of LSL Lite. Recently, the newest Lohmann customer, Prodmil SAC in Arequipa, housed its first Lohmann Brown Lite breeder flock.

Alltogether, these customers have helped us to achieve more than 50 % market share in a market that is extremely exigent regarding egg shell colour and feed efficiency and where the spent hen has an unbelievable value when finished with more than 2,100 g and good feather cover: currently 3.75 US\$.

Dr. Luciano Cousinet



OPENING OF A NEW HATCHERY – THE SUCCESS STORY OF EL MAZRAA LOUNIS SARL

With about 2.3 million square meters and a population of 32 million inhabitants, Algeria is one of the biggest countries in Africa. About 32 million layers are produced in this country every year. Algeria is therefore one of the most important poultry markets in the region, next to Nigeria and South Africa. Up until some years ago, it was the responsibility of the three governmental farms Oravio, Oravie and Orac to produce day-old layer chicks. After the liberalization of the Algerian market, it became possible for many privately-owned hatcheries to be established which in turn resulted in a largely fragmented market. The majority of the Algerian hatcheries are located in the North of the country where the climate is more moderate thereby providing ideal conditions for animal production.

The head office of El Mazraa Lounis as well as the company's own feed mill and some commercial layer houses are also settled in this area. The parent stock flocks and the new hatchery are situated in Ain Oussera, a sparsely populated area about 200 km South of Algiers, the capital of the country. In addition to the production of layers and eggs, the company is also active in the business of producing broiler day-old chicks. El Mazraa Lounis was founded by Abdelkader Lounis in 1979. Today, the company is led by his sons, Ali and Khaled Lounis, who split the responsibilities of the operative business into two sections, i.e. purchasing raw materials and production. El Mazraa Lounis is one of three companies in Algeria who produces and sells LOHMANN day-old chicks.

Business relations between LOHMANN TIERZUCHT and El Mazraa Lounis first began in January 2012 with the first PS shipment of LOHMANN TRADITION birds. Since then, the company has been constantly developing and as a consequence the construction of a second hatchery became necessary. The day-old layer chicks, which are produced by El Mazraa Lounis, perfectly meet the demand of the Algerian market for XL-eggs. With the new hatchery, which is in production since January 2015, the company continues its constant growth. The hatchery is state of the art and contains 18 setters and 9 hatchers manufactured by Petersime.

LOHMANN TIERZUCHT is pleased about the continuing growth of El Mazraa Lounis and truly appreciates the successful collaboration over the years. We wish family Lounis all the best with their new hatchery and a good hatch, always!

*Djanet Ould-Ali
Viola Holik*



Mr. Ali Lounis, General Manager of El Mazraa Lounis SARL analyzing chick quality



Mr. Khaled Lounis, General Manager of El Mazraa Lounis SARL is proud of his brand new hatchery



Egg store of the new hatchery.



Setter corridor of the new hatchery.



PRE-INCUBATION TO IMPROVE THE HATCHABILITY OF STORED EGGS

WHY SHOULD I READ THIS?

THE PROBLEM ...

Beyond one week of storage, even under optimal conditions, the hatchability will drop 0.5 - 1.5 % per day with the percentage increasing as storage extends further. After two weeks of storage, the chick quality will also be impaired. LSL is usually more negatively affected by long storage than is Lohmann Brown.

Pre-Incubation is one tool to reduce the negative effect of long egg storage. It cannot improve hatchability, but helps to maintain it. Therefore, it starts making sense using this technique, if eggs are scheduled for a storage period which leads to a noticeable decline in hatchability. This depends on the local conditions of the flock and the storage.

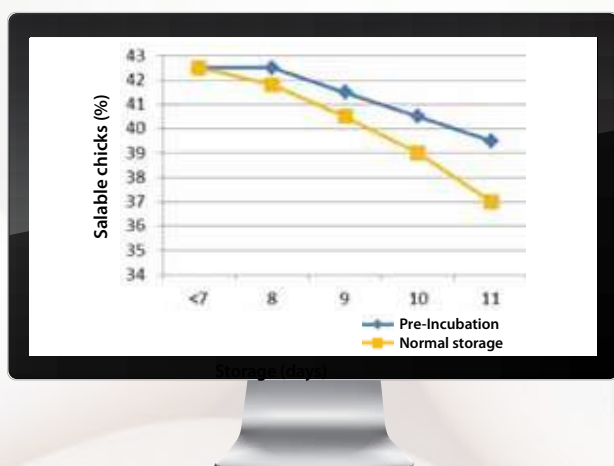


Figure 1: Hatchability of stored LSL eggs under field condition (Japan)

Under conditions causing an improper cooling of the eggs the effect of pre-storage incubation might be negligible or even negative, because the eggs are already containing an embryo at an advanced stage of development.

Why does Pre-Incubation work? Learning from mother hen ...

A hen needs approximately 24 hours to produce an egg. Around 30 minutes after an egg is laid the next follicle is ovulated. The follicle falls into the infundibulum where the fertilisation takes place. After that, the albumen is added, the egg membranes are formed and the egg shell is composed.

Therefore, the eggs arriving at the hatchery are containing an embryo representing already 23.5 hours development in the hen's body. However, this developmental stage at point of lay is not optimal for long storage. In nature it would be altered by periodical warming of the eggs during the time the hen sits on the nest to produce the next egg of the clutch. In the hatchery it is possible to achieve similar results by incubating the eggs for 3 to 6 hours during the first storage days. This leads to further development of the germinal disk to a stage containing 60,000 - 80,000 cells. At this stage the embryo is less susceptible to cell death occurring during the storage period.

How does Pre-Incubation work? The procedure ...

We aim to apply 3 to 6 hours of incubation during the first days of storage. These hours mean the time the eggs spend on 100° F/37.8° C incubation temperature. In order to bring the eggs to this temperature, the eggs need to be heated-up and they also need to cool down afterwards. The different steps of the total Pre-Incubation procedure are shown by figure 2.



Figure 2: Egg temperature during the Pre-Incubation steps



1. Egg storage

The optimal day to pre-incubate the eggs depends on the pick-up frequency and the transport conditions. While treating the eggs soon after lay gives best results one should not forget to give hatching eggs a rest after long transport and/or traying (to do the treatment eggs need to be placed on setter trays).

Hatcheries receiving eggs twice a week would usually treat the eggs one or two days after egg reception. This means the egg age during the treatment is 2-5 days. Also in hatcheries receiving the eggs just one time per week, pre-incubation can be applied successfully.

2. Pre-warming

While pre-warming of the eggs is not necessary when single-stage incubators are used for the treatment, it can facilitate the process. Many hatcheries use the pre-warming or delayed-start function of the incubator to set the eggs at a time which suits the staff.

3. Heat-up time + Pre-incubation

The heat-up time depends on the heating capacity of the incubator and the number of eggs set. If it takes longer than 9 hours to heat-up the eggs the number of eggs should be reduced for the next treatment. The shorter the heat-up time the longer is the recommended pre-incubation time, because the effective time for embryo development during the heating-up phase is shorter. Most hatcheries work successfully with 3-4 hours on incubation temperature.

Heat-up time plus pre-incubation time should not exceed 12 hours.

4. Cool-down

Ideally eggs are cooled down below 25°C before they are moved back in the egg room in order to avoid warming of remaining eggs in the storage room. This cooling can be done in the incubator or in the setter room.

5. Egg storage

Pre-incubation will do no harm to eggs which are set soon after the treatment. If eggs are scheduled for more than 10 days storage after the treatment it can be beneficial to do a second pre-incubation one week after the first one.

If pre-incubated eggs are going to be set, the necessary incubation time is shorter than normal. The usual incubation time can be reduced by approx. 6-8 hours (compared to figure 2: time of egg temperature >32°C).

Rule of thumb: If a hatchery treats all eggs scheduled for long egg storage, it can use the same setting time for all eggs! This makes life easier as usually long stored eggs would need an earlier setting time.

Robert Schulte-Drüggelte

Review of different day-old chick quality parameters in layer type breeds - Part 2

Quantitative Traits

Activity

Chicks of premium quality must be lively and have a good body tension. This can be checked by placing a day-old chick on its back. A good chick does not struggle to get back directly on his feet. One can say that it should not take more than 3 seconds for the chick to get back in an upright position.



Investigating chick activity

Navel

An essential element in investigating chick quality is examining the quality of the navel. A good navel is closed, dry and free of egg shell and membrane residues. The chick needs to be handled manually to control the quality of its navel.

Of course, it is not possible to check every chick in a commercial hatchery prior to delivery.

Investigation of beak and joints

Investigating the conditions of the beak and joints of the chicks can give several hints on incubation conditions. Both must have a normal appearance which means they have to be free of damages and wounds. Wounded beaks and joints are hints of non-optimal conditions in the hatchery.

Red dots on the beak indicate that the temperature in the hatcher was too high. Either the chicks wanted to break out of the egg shell too fast and damaged their beak by working too hard on the egg shell or they tried to regulate their body temperature by breathing through the openings of the hatch basket. By doing so, they damage the upper part of their beaks. Injured joints can be in accordance to MAULDIN and BUHR (1996ww), signs for a very high humidity level during incubation. Chicks which are hatched under these high humidity conditions must put in more efforts to break out of the shell which harms their joints.



Investigating Belly Quality

The belly of day old chicks must be soft and smooth. Bloated, stiff and hard bellies are signs of a badly absorbed yolk. This often leads to problems during brooding and results in a higher first week mortality rate. Causes for big and hard bellies in layer type chicks might be due to both insufficient water loss and too high temperatures during the incubation process. A hard belly is also a sign for a yolk sack infection.

Evaluation of Data

The collection of data can be done by means of written forms and/or can be directly entered into a computer programme. A good practice is to collect the data based on breeder flock and hatch day. This aids an overview on performance fluctuations related to breeder flocks and/or to hatch day or even season of the year. Of course, data collection only makes sense if one is able and willing to search for the causes for obvious differences in chick quality. Only this can help to improve the production process.

Summary

The aim of every hatchery is to achieve the highest possible number of premium quality chicks. To get an idea on the quality of produced and ready to sell chicks, it makes sense to collect data of chick quality using clearly defined parameters. These parameters can be both quantitative and qualitative traits. Quantitative traits are namely chick weight, chick yield, chick- and feather length. Qualitative traits are more subjective and include the investigation of chick activity and the quality of the navel, beak and joints. There are methods which can help to measure the qualitative traits as objective as possible to achieve a reliable overview about the produced chick quality.

*Djanet Ould-Ali
Robert Schulte-Drüggelte*



Navel of bad quality



Navel of good quality



Red dot beak



Wounded Joints



Badly absorbed yolk - big and stiff belly



Well absorbed yolk – soft and smooth belly

OPTIMAL CALCIUM SUPPLY OF LAYING HENS

H.-H. Thiele (LOHMANN TIERZUCHT GmbH),
G. Díaz (Biomix S.A.) and
L. Armel Ramirez (Pronavicola S.A.)



During their lifetime, modern laying hens produce a lot of eggs, hopefully “well packed” for handling as hatching eggs or shell eggs for human consumption. Only eggs harvested „well-packed” from the nests (or cages) will add to farm income and meet the demands of hatcheries, processing plants, egg traders and consumers, whereas eggs with insufficient shell quality seldom recover the production cost and may be a complete loss.

Selection for improved shell stability is an integral part of continuing efforts to enable modern laying hens to produce more eggs with good shell quality over a longer period of time. Egg producers and feed manufacturers should enable the birds to express their genetic potential, providing an adequate nutrient supply with all necessary raw minerals for proper shell formation. Attention to optimal nutrition is recommended throughout the laying period and is becoming even more significant since as the laying period of flocks is being extended. With increasing age and cumulative number of eggs produced, the ability of hens to produce eggshells of good quality tends to decline. This is partly due to the exhaustion of calcium metabolism of the bone, but can also occur as a result of liver damage. Acute fatty liver syndrome or chronic congestion of the liver will accelerate the loss of shell stability with age.

The shell of a hen's egg consists up to 90-95 % of calcium carbonate which is embedded in a protein matrix that determines the strength of the egg. The eggshell is made essentially from

lime, which is made available either from the daily feed supplied or from the long bones, especially the medullary bone marrow. The calcium reservoir of this bone is formed with the onset of sexual maturity until shortly before the onset of egg production. The calcium in the bone is bound to phosphate. How much of the lime actually used to form an eggshell comes from the recent dietary intake and how much from the bone varies and depends on the availability of the latter at the time of shell formation. Since the hens have only limited reserves of calcium in their bones, this must be supplemented with the daily dietary intake. Today's commercial laying hens lay an egg almost every day and therefore require about 4-5 grams of calcium per day. In order to support the complex process of eggshell formation, the hens should also be supplied with sufficient phosphorus and vitamin D3.



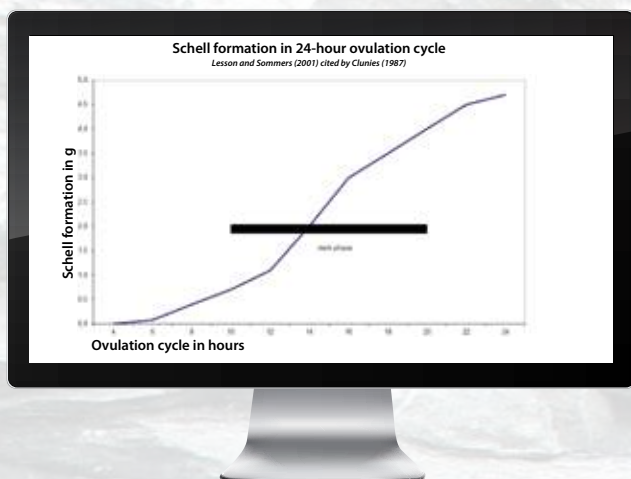


Figure 1: shell formation in a 24-hour ovulation cycle (Clunies (1987) cited by Leeson and Summers (2001))

The process of eggshell formation takes place mainly during the hours of the night. The most intense period of shell formation is about 12-18 hours following the laying of an egg. The intensity reaches its peak at 18 hours after an egg is laid and starts to decline again before the next egg is laid. During this time, enough lime should be available from the gastrointestinal tract. Since the retention period of ingested feed in a chicken's digestive system is relatively short, i.e. about 3-4 hours, it is important to feed the bird with lime at the right time. Scientific studies have shown that laying hens with ad libitum access to lime have a particularly high appetite for lime in the last 5-6 hours of daylight. Apparently, these birds instinctively know when they need more supply.

At night, there is a cyclical increase in the female sex hormone oestrogen which increases the solubility and transportability of calcium. If no lime is available in the gastrointestinal tract during this time, the reserves in the bone would be mobilized. To prevent this, the structure of the lime supplied should not be too fine so that it cannot be dissolved quickly and then excreted by the hen during the day, before being needed and used.

The benefits of feeding coarse lime (1.5 to max. 4 mm particle size) in the afternoon or evening hours have been demonstrated repeatedly. By doing so, the amount of the calcium derived from the feed is maximized and the calcium metabolism of the bone is minimized. Without adding to feed cost, this feeding program combines three advantages: reduced phosphorous level in the feed (saving limited resources), less metabolic work for the hens (and maintenance of bone strength), and significant reduction of phosphorus excretion. The reduced daily mobilization of calcium reservoir in the bones would reduce the phosphorus excretion.



lime fine < 0,5 mm



Diaz, 2008

lime coarse 1,5-2,5 mm



Armél, 2011

lime very coarse ≥ 4 mm

Armél, 2011

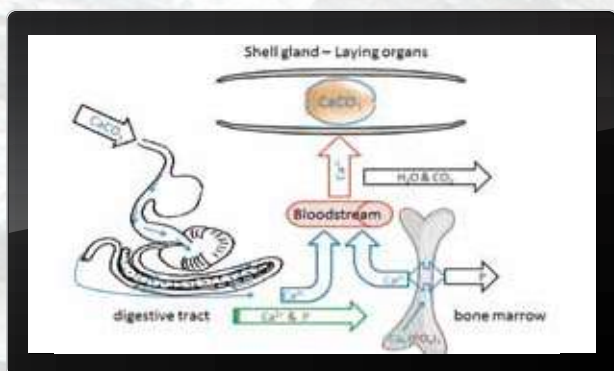


It is obvious that an optimally timed supply of lime is important for the maintenance of bone strength. If a laying hen extracts calcium from the reservoir of her bones during the night, the lime will not only be mobilized from the medullary bone, but also from the marrow of the structural bones. This reservoir cannot be restored during very long laying sequences, unlike the reservoir in the medullary bone marrow. The laying hen can only "repair the damage" during laying pauses or moulting, which allows the lime to be stored in the marrow of the structural bones and practically rebuild the reservoir. A modern laying hen producing eggs in long "clutches", has to utilize the reservoir of the bones almost daily, compromising the long-term bone stability and increasing the well-known risk of bone frac-

tures. For optimal implementation of these findings, it would be necessary to provide two different feed mixtures: feed with lower calcium content and finer particles offered in the morning hours, feed with a higher lime content and coarse particle size during the afternoon and evening hours. Where it is impossible or too difficult to implement this recommendation in practice, a significant effect can be achieved by supplementing the single ration with coarse lime in the afternoon and evening feedings. Experience in practice has shown that this not only improves shell stability, but also bone stability and the general health of laying hens. Mini silos to supplement the feed and provide the right dosage of lime at the right time are becoming increasingly popular worldwide.

Mini silos for top dressing of lime:

Figure 2:
Simplified representation of the egg - shell formation



As a general rule, we must assure that all essential components of the feed will become available for each hen, i.e. we must avoid segregation of feed components between feed mill and the hens. This applies to all nutrient-relevant raw materials as well as minerals and vitamins. A homogeneous good mash feed structure is the feed for the modern laying hen. With good feed quality, the use of fine or coarse lime is unproblematic. In case of pelleted or crumbled layer feed raw material components were mostly milled through a hammer mill which makes it difficult to add coarse lime. In this case lime must be added after pelleting; otherwise the lime content will have little value for the laying hen.

Dr. Hans-Heinrich Thiele

Photos: Armel (2011), Luykx (2012),
Thiele (2014), Kruger (2014)





52nd

Franchise Distributor Meeting in Canada

Inauguration of the brand new pedigree farm in YORK





From September 22nd - September 24th, LOHMANN TIERZUCHT'S 52nd Franchise Distributor Meeting was held in York, Canada. The official opening of the brand new pedigree farm was the primary reason for the meeting. More than 150 participants from all around the world took advantage of this unique opportunity to have a glance into the daily breeding business of LOHMANN TIERZUCHT and accepted the invitation to North America.

On September 23rd, the event at the world-famous Niagara Falls began with a day of interesting presentations by renowned speakers who covered current topics related to the poultry industry. Mr. Javier Ramirez, Managing Director of LOHMANN TIERZUCHT, opened the event and took the chance to speak proudly about the developing success of the company. There are only 20 remaining countries on the world map where LOHMANN TIERZUCHT has not entered the market, just yet. It is becoming very obvious that there is no doubt in the outstanding quality of LOHMANN TIERZUCHT's layers. Clever marketing tactics can open up new opportunities for a successful business by the respective distributors.

The company is always ready to take on new challenges and is prepared to develop itself and its products further to adapt to new situations in the market. This was emphasized in the interesting presentation held by Prof. Dr. Rudolf Preisinger, Managing Di-

rector and Chief Geneticist at LOHMANN TIERZUCHT. With its sophisticated breeding program, the company is able to improve on classic traits like egg number, egg weight and livability to a very high level. These also include traits like beak shape, beak length and nesting behavior, all of which have gained importance in recent years. New breeding methods like genomic selection which has already been well-integrated into the breeding programme at LOHMANN TIERZUCHT for two years now, enable the company to enjoy a much faster breeding progress than ever before.

The presentation held by Mr. Jørgen Kjaer, Scientist at Friedrich Löffler Institute, gave an interesting overview on feather-pecking and cannibalism in layers. The scientist has been involved in investigations for a better understanding of the appearance of misbehavior in birds for many years now. He mentioned that through different studies, it is now widely known that feather-pecking and cannibalism are caused by several factors. The focus of prevention should therefore be placed on optimizing layer management. He also mentioned that with a well-organized breeding program, it is possible to select birds with a weaker tendency towards feather-pecking. After a series of investigations, he could conclude that hens with a higher drive to feather-pecking and cannibalism are more active and show a higher content of stress hormones, e.g. Corticosterone, in the blood.

Dr. Hans-Heinrich Thiele and Mr. Farhad Mozafar, both responsible for Technical Service at LOHMANN TIERZUCHT, held a lively debate on the pros and cons of moulting in layers. Throughout the whole discussion, Dr. Thiele emphasized his opinion that moulting in modern layer type hens does not make any sense. With an optimized management Lohmann hens show outstanding persistency which makes moulting unnecessary. With examples from the field, he did some calculations showing that moulting does not necessarily improve the economic situation of a layer operation. With opposing views, Mr. Mozafar stated that it is widely known that moulting can improve the egg shell stability at the end of the laying cycle and that this improves the number of saleable eggs. Besides that, moulting reduces the number of male chicks which is, from an animal welfare point of view, a very valuable argument. The discussion showed very clearly that there are no real pros and cons for or against moulting. It is always a question of the situation of every poultry operation and the market it is operating in.

The "Challenges of today's layer nutrition" was the theme of Mr. Robert Pottgüter's presentation, nutritionist at LOHMANN TIERZUCHT. Today, the high demands of soya in the nutrition of animals is being more and more criticized as the cultivation of the same, sometimes result in the deforestation of natural forests in the region of Central and South America. Moreover, in Europe, the use of soya in layer diets is controversial in terms of ongoing GMO discussions. In order to escape this dispute and to counter the high soya prices, questions are constantly being posed about soya-free and/or soya reduced diets. In his presentation, the experienced nutritionist expressed that there are indeed alternatives to soya in layer rations, e.g. rape and sunflower. It is, however, of great importance to take the quality of these raw materials into account so as to avoid having a negative impact on the performance of the birds. Investigations in practical trials have to be performed in order to determine to which extent soya can be excluded in layer feed. If soya would be reduced, then the application of synthetic amino acids in the feed is of main significance.

"The use of organic acids in the layer husbandry" was the subject presented by Selko Feed Additives' Mr. Christian Lienesch. It is becoming more and more important to reduce the application of medication in layer husbandry or better still, to do away with it completely. Applying organic acids in the feed or drinking water can help to improve gut health in layers, thereby improving their resistibility towards pathogenic agents. Mr. Lienesch mentioned that although there are many different acids that can be used, one has to take into account that they each have a different effect on various pathogenic agents. Some are useful against E.Coli and Salmonella whereas others are effective in treating mold and yeast. It is therefore necessary to investigate the situation at every farm very closely before choosing a suitable acid.

The last presentation of Prof. Paul Siegel, Virginia Tech Univer-

sity, covered the development of the poultry industry. In his lively presentation, he illustrated how humans managed to domesticate the original Red Jungle-fowl (Bankiva) to the modern laying hen. The experienced scientist stated that aside from the chickens themselves, which are the base of a poultry breeding company, it is actually the people who are working within a company which are of great importance to guaranteeing the success of any breeding company.

On Wednesday, the 24th of September, the grand opening of the pedigree farm was celebrated. With an official ribbon-cutting ceremony, both managing directors, Prof. Dr. Rudolf Preisinger and Mr. Javier Ramírez, opened the doors of the farm for a well-organized tour. Divided into groups, the visitors were allowed to explore the farm by visiting different stations within the building. This gave a very good overview about the quality of the building and familiarized the visitors with the breeding programme at LOHMANN TIERZUCHT. At eight different stations, each visitor was given a detailed explanation on how different traits are measured at farm level, i.e. before the values of the same are entered into a database. This allows the geneticist to derive conclusions on the breeding values of every chick. Demonstrations on how artificial insemination is done in pure line hens were carried out at one station. The visitors got an idea of how accurate the laying performance and the egg weight of each single hen are determined. Much attention was drawn by the egg quality station. Here, there was a demonstration on how the breaking strength of eggs is recorded. Not only is the "output" of the hens (the eggs and their quality) of main interest for the respective geneticist, but also the "input" is of crucial importance. Of course, it is relevant how much feed the hens need to produce eggs; this is precisely recorded for every hen in different phases of their lives. The results have an influence on the breeding value of every hen. The guided tour of the breeding farm and the well-organized explanations at the different stations made the visitors aware of the complexity of LOHMANN TIERZUCHT's breeding program.

The program was enhanced by diversified leisure activities. A boat trip going literally into the Niagara Falls and an excursion to a historic village of native Indians at "Crawford Lake" enabled the visitors to get in touch with the incredible nature of Canada and its native culture. During a trip to the vineyard "Jackson Triggs", guests could taste the quality of the regionally produced wines. The leisure program offered the perfect opportunity for visitors to interact with each other and share valuable information and experiences in relation to their businesses.

Article: Djanet Ould-Ali

Photos: Stella Schnor



CANADA 2014

Great event at the falls.







VIV Asia

11th - 13th March 2015, Bangkok, Thailand

From 11th to 13th March 2015, the VIV Asia will take place in Bangkok, Thailand. The team from LOHMANN TIERZUCHT GmbH will once again participate in 2015 with a new innovative booth in hall 106, stand B61. We are looking forward to interesting talks, an international exchange with the highly qualified trade audience and overall, to a promising and successful time in Bangkok.

Lohmann School

18th - 22nd May 2015, Cuxhaven, Germany

Lohmann Hatchery Course

7th - 11th September 2015, Cuxhaven, Germany



53rd Franchise Distributor Meeting

28th - 30th September 2015, Istanbul, Turkey

INTERNATIONAL POULTRY EXPO (IPEX)

REPORT BY: DR SOHAIL HABIB SYED, AREA SALES & SERVICE MANAGER LOHMANN TIERZUCHT GMBH

Commercial or modern poultry in Pakistan is one of the largest agro-based segment of Pakistan

that was established in 1962, having an investment of more than 732 billion rupees (7.32 Billion USD). The poultry industry of Pakistan is making a tremendous contribution in bridging the gap between the supply and demand of animal protein. About 25,000 poultry farms have been established in Pakistan. Moreover, the annual growth rate of poultry production is about 10 to 12 % whilst 40 % of the total meat production is being procured from poultry products. Furthermore, other poultry products that are annually in Pakistan are followed by table eggs: 9410 million; chicken meat: 953.600 metric tons.



The International Poultry Expo (IPEX) was held from 25th to 27th September, 2014 at The Expo Center, Lahore. On this occasion, different local and international poultry companies, poultry feed manufacturers, poultry farm consultants and poultry equipment manufacturing companies exhibited their products at this expo. The Federal Minister for Food

Security and Research, Sikandar Hayyat Bosan, inaugurated the International Poultry Expo. He elucidated his remarks on the topic of "Avian Health". "He said that Pakistan was the 11th largest producer of broiler chickens in the world as its poultry sector was growing at a pace of 10 % annually, adding that this sector had 6.1 % share in agriculture and 10.8 % in the livestock sector. „Brazil is the largest exporter of halal chicken to Saudi Arabia, and Pakistan has all the potential to make inroads to this market", he said, adding that the country's poultry industry could also exploit the need of Gulf countries for halal chicken". After the address of the Federal Minister, the event was started.

Different booths were arranged in two halls and the exhibitors included Altinibek Makina (Turkey), Beijing Yuet International Exhibition Co. Ltd., Cherry Pharma Itn'l, Ghazi Brothers, Orient Animal Health, Fine Fabricator, Lohmann Animal Health, Sb Pharma, Hilton Pharma, Biocure Pharma, Soypak, A & K Pharma, Kps Company, Descon Chemicals Limited, Vetmune Pharma, Euro Feed Technology, Pepco Pakistan, Big Bird Group (Pvt) Ltd, K & N's Poultry, Um Enterprises, Agro Tech, Zagro Singapore Pte, Kausar Feeds, Jadeed GP Frams Pvt Ltd.

The most interesting part of the IPEX were talks by inspiring great personalities which were held on 25th September, 2014. The Chief Organizer, Chaudhry Shaukat Hussain, started the inaugural

session of the conference and enlightened the participants on aims and objectives of IPEX. Other delegates, e.g. Mr. Raza Mehmood Khursand, Chairman of PPA (Northern Zone), Dr. Muhammad Aslam and Mr. Khalil, Sattar also addressed the importance of poultry farming.

The 1st technical session was co-chaired by Dr. Muhammad Sadiq and Dr. Naeem Tariq. In this session, different speakers like Dr. Mustafa Kamal, Dr Hanif Nazir and Dr. Muhammad Riaz elaborated on modern broiler management, spray & other vaccination techniques, respectively. The 2nd technical session was co-chaired by Mr. Khalil Sattar and Dr. Khurram Shafi Qazi. In this session, Dr. Khalid Naeem Khawaja presented a recent update of Newcastle disease. Eng. Tariq Nazir closed this session with an informative talk on farm ventilation.

The event finally ended on 27th September with lots of informative ideas regarding poultry farming. By these innovative ideas we can flourish Pakistan's poultry industry.

Dr. Sohail Habib Syed



Chiel Ter Heerdt, the new Marketing Director at LTZ



On January 1st 2015, Mr. Chiel ter Heerdt M.Sc. was appointed the new Marketing Director at LOHMANN TIERZUCHT GmbH (LTZ). Mr. ter Heerdt is responsible for the global Marketing activities both at LTZ and H&N International GmbH (H&N).

Mr. Ter Heerdt (39), has gained a broad experience within the layer sector of the poultry industry over the years. After completing his masters in International Business, he started his career in 2002 as a Sales Manager at Hatchery ter Heerdt in the Netherlands. For the last seven years, he has been active in this family-owned company as a Commercial Director and he is still one of the main shareholders of the company.

Hatchery Ter Heerdt is a market leader in selling pullets and day-old-chickens in the Netherlands and is also a successful distributor for LTZ. Ter Heerdt: "I am very pleased to work for one of the world's lea-

ding companies in the layer industry specializing in the genetics of layers and with colleagues who are fully dedicated to working on very high standards. Owing to my experience of working with the breeds of the company, I have been able to witness outstanding results and great laying performance of the birds.

Javier Ramírez adds: "We are delighted to welcome Chiel as our new Marketing Director of LTZ. We are sure that his profound knowledge of the international egg layer industry together with his entrepreneurship and marketing skills will enable him to further develop the continuous success of our companies".

Lohmann Information 1/2015

Tradition has been given a brand new facelift!

Lohmann Information will make a debut with a fresh new look in April 2015! Make sure you check this out and be kept abreast with the latest in the wonderful scientific world of agriculture!



CUSTOMER PRESENTATION

Our long-term customer HasTavuk comprehensively described their businesses and the corporate philosophies behind the same in their respective corporate video.



HasTAVUK
lezzetlin hasını bilenlere



Our new data recording and flock management tool **Flockman4U**



Our new data recording and flock management tool Flockman4U - you might recall the article in our last issue of PN 2/14 - is rapidly gaining popularity. More and more customers are subscribing to this service, recording their data and controlling the performance of their own flocks. Furthermore, ranking tables and graphs depicting their own flocks in comparison to our standards and/or the average of comparable flocks are being analysed to improve the performances of the user's own flocks. Of course, all data are handled in an anonymous and confidential manner.

Our database is growing and so comparisons are becoming more precise and informative. Have you already registered? It's easy:

just fill in the form on our website www.ltz.de or directly on the tool's site <http://ltz.flockman4u.com>. We're looking forward to your input!



Imprint

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