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TETRA

NEWSLETTER

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2020 - CHALLENGING YEAR

This time of the year, in December **LOOKING BACK AT 2020**, we can say that despite the fact that the virus that appeared almost a year ago and caused serious economic challenges to the world's economy, our company, Bábolna TETRA Ltd., is closing the year successfully and was able to increase its market shares both on domestic and international markets.

Different coronaviruses can also cause many problems in our poultry flocks, but the COVID-19 human epidemic also claims many lives among our fellow human beings. As I am writing these lines, we are still uncertain about when this problem can be solved, which has significantly upset our daily lives.

Egg consumption is steadily rising in countries around the world, as egg is the easiest and most economical source of complete protein for humans. Presumably, this is the reason why in times of global crises, such as the current economic recession caused by the epidemic, the decline of egg consumption is much smaller than that of poultry meat.

Meanwhile, rules and regulations related to production are constantly changing, especially in Europe. To mention just a few of them: the husbandry practices or measures that are planned to be introduced in some countries to ban beak-trimming or the forthcoming regulations concerning the handling of day-old male chicks.



In order to work effectively, both breeders and egg producers must constantly adapt to new conditions.

We can proudly say that, despite all the difficulties, we are able to continue our genetic research, as a result of which our competitive TETRA hybrids are part of the world's global food production.

We believe that in the forthcoming year of 2021, our life returns back to the old trail enabling us to continue personal meetings again and together we will be able to put higher and higher

quality TETRA-produced eggs on our consumers' tables.

In the hope of this, we wish you good health, Merry Christmas, and a Prosperous Happy New Year! ■

BRIGHT RETROSPECT

AS THE END OF THE YEAR

approaches we look back on our past achievements as usual. This year was especially extraordinary as we had to face unusual circumstances never experienced before. However, despite all the difficulties of the pandemic, Babolna TETRA Ltd. is looking forward to end its 2020 business year with success.

Sales increased compared to previous year, despite the extraordinary circumstances. We have done our utmost to overcome the problems caused by the COVID-19 pandemic, so we have introduced added flexibility, new communication channels and have provided even more efficient tailor-made services for our partners.

We are proud of the fact that the number of our customers worldwide has risen during this challenging period of time. Thanks to our preliminary business activity, we could arrange deliveries to Bangladesh and Kenya for the first time and again to Vietnam after a few years of interruption. We began a long-term cooperation with key customers of the layer breeding market in Bangladesh and Kenya. In Vietnam we managed to make a contract with a new participant of the poultry market.

There were two breeding stock deliveries to Bangladesh, the first was made early this year followed by another shipment during autumn. Ordering for the second time confirms that the customer is extremely satisfied, so we consider it a remarkable success.

We arranged shipment of a large quantity of commercial layers to Kenya and the delivery of parent stocks is scheduled for early next year. It will provide an excellent opportunity to test the TETRA breed locally.



*TETRA'S SALES VOLUME AND MARKET SHARE
HAVE INCREASED AND ITS MARKET POSITION
HAS STRENGTHENED IN MANY COUNTRIES*

After a long business preparation, we could enter the market again in Vietnam. Our customer, located in the southern part of the country, has been breeding colour broilers only. We sincerely hope that the newly established commercial layer and egg production divisions based on TETRA breed will be successful and we will be able to cooperate with them on the long run and receive further orders from the company.

In addition to that, TETRA's sales volume and market share have increased and its market position has strengthened in many countries. Contrary to previous years, we didn't have the opportunity to visit our customers and discuss the performance of TETRA breeds personally. However, our clients shared the main performance data of TETRA hybrids plus sent videos and photos of the flocks. Based on the information received from our customers we believe, that TETRA hybrids perform reliably and to the greatest satisfaction of our partners furthermore, they improved in quality compared to previous periods.

Due to the spread of the coronavirus epidemic, the seasonality of sales observed in previous years has altered. We did not have the usual high demand we used to face in spring. The orders for seasonal products were delayed and it allowed us to utilise the production flocks more efficiently.



Nairobi

Unfortunately, egg consumption declined in many countries due to the coronavirus pandemic, as significant part of the consumption is related to tourism and catering. For this reason, we experience similar decrease in the demand for parent stocks.

We have also managed to conclude a strategic cooperation agreement on breeding with the Poultry Association of Luoyang Province, China. Deliveries are scheduled to begin next year.

Due to COVID-19 pandemic restrictions, the demand for supplying basic products and foodstuff self-sufficiently has risen.

Therefore, the government began to support local production in many places. It generated several new investments for TETRA despite the uncertain economic conditions. So, we not only supply TETRA products but also give technical advice and provide technology transfer to new customers.

The toughest challenge of the future is how to develop our business relationships without any personal contact. Though, online communication applications plus the information available and accessed via internet provide great opportunities however, based on our long term experience, personal contact remains absolutely essential in this special part of the industry. We are looking forward to returning to our former business practice gradually next year and relying on the power of personal persuasion. ■

NIKOLETTA FEJK | Area Sales Manager,
Africa



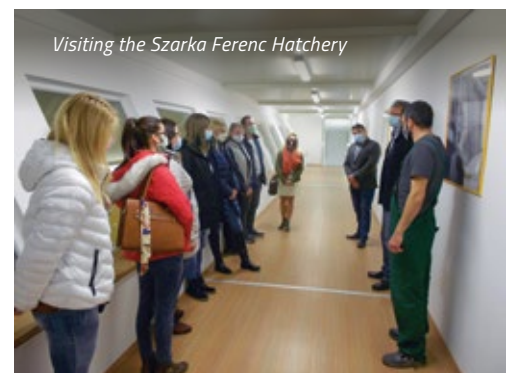
Bangladesh

PROFESSIONAL DAY TO MAINTAIN COOPERATION

With the strict adherence to the **EPIDEMIOLOGICAL PROCEDURES**, but keeping in mind the power of personal meetings, a Professional Day was organized between Aranykorona Zrt., Csabatáj Zrt. and Bábolna TETRA Kft. in our center, in Uraiújfalu on 4th November 2020.

The named, 100% Hungarian-owned agricultural and food industry companies are key players in the Hungarian agricultural sector, while Bábolna TETRA Kft. is the only Central European layer breeding company, which distributes its products in nearly 50 countries. On behalf of the holding, János Kovács, CEO of Aranykorona Zrt., and Éva Czupázné Sánta, CEO of Csabatáj Zrt. and their employees were present.

The aim of the meeting was to gain a deeper knowledge of TETRA's breeding and R&D activities, husbandry technologies adapted to marketed hybrids, and the breeding company's veterinary prevention program. Following the professional presentations, the 9-member delegation had the opportunity to see the company's recently launched microbiology laboratory, genetic research unit and breeder hatchery, which can hatch 32 million eggs a year, from the visitor corridors set up for this purpose. During the visit of the units, György Búza, one of the owners of Bábolna TETRA Kft., and his professional team continued to inform the guests. Discussions on issues related to the presentations and what was seen could continue further during the viewing of the key venues. The day, which was full of programs, ended with a late business lunch, which provided an opportunity for further discussion and acquaintance.



Visiting the Szarka Ferenc Hatchery

As a result of the meeting, we hope that our long-standing business relationship with Aranykorona és Csabatáj Zrt. - by visiting old and new colleagues - has further deepened and increased trust between our companies. Bábolna TETRA Kft. is proud to know this group of companies among its partners, which plays a significant role in the production of table eggs in Hungary. ■



At the end of a meaningful professional day in front of Szarka Ferenc Hatchery

ANITA ALMÁSI, PHD | R&D Analyst
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CHANGES IN THE EGG QUALITY OF TETRA L SUPERB AND TETRA-SL LL LAYING HENS IN DIFFERENT KEEPING SYSTEMS DURING THE FIRST EGG-LAYING PERIOD

While about **50% OF THE WORLD'S EGG CONSUMPTION IS COVERED BY LEGHORN TYPE HYBRIDS** (white egg layers), this type of hybrid has not been bred in Hungary since 1983 and has not been distributed since 1999.

Therefore, Bábolna TETRA Ltd. – continuing poultry breeding traditions in Bábolna – developed a new Leghorn type layer hybrid – called TETRA L SUPERB – for providing an alternative to their existent and prospective partners, preferring the white egg layers against the brown ones.

Because Bábolna TETRA Ltd. sells its hybrids to more than 40 countries in the world, the expectations of their customers are very different. Beside egg shell color, productivity of the hybrids in different keeping systems is also very important. Although conventional cage systems have been prohibited in member countries of the European Union since 1st of January 2012, they are still widely used in a lot of other countries of the world. Therefore, Bábolna TETRA Ltd. should provide hybrids for its partners with high productivity in different keeping systems.

For testing productivity of different hybrids and experimental lines in different keeping systems,

Bábolna TETRA Ltd. has a traditional and good co-operation with Kaposvár University. In the Poultry Test House of the university three different keeping systems are available in the same experimental area: old type EU cage (Picture 1), EU conform (equipped) cage (Picture 2) and alternative floor system (Picture 3).

In the framework of the present study changes in the egg quality of TETRA L SUPERB and TETRA-SL LL laying hens were compared during the first egg-laying period in these keeping systems.

The experiment was carried out between the ages of 24 and 68 weeks of life of the hens. Hens were assigned to the different keeping systems randomly. They were fed ad libitum with commercial diet during the whole experimental period. Drinking water was also continuously available from self-drinkers. From the different egg quality parameters the followings were measured every four week: egg weight, shell thickness, Haugh Unit and yolk color.



Picture 1: Old type EU cage
6 hens/cage (630 cm²/hen)



Picture 2: EU conform (equipped) cage
10 hens/cage (756 cm²/hen)



Picture 3: Alternative floor system
53 hens/pen (1040 cm²/hen)

Based on the results it was established that the egg weight of the hens was higher in the alternative floor system than in the two types of cages in both examined genotypes almost at all examined ages (*Graph 1 and 2*).

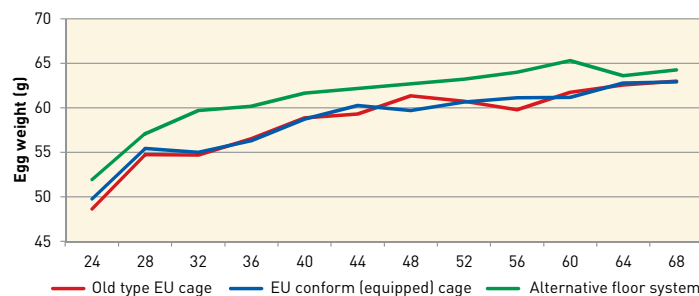
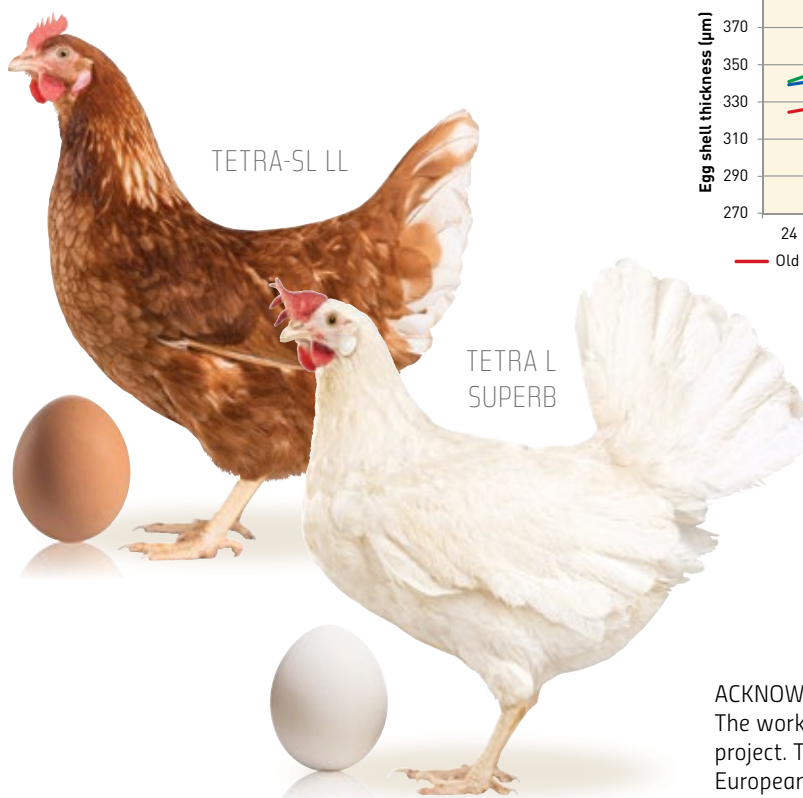
The differences in egg weight varied between 0.9 and 5.0g in the case of TETRA L SUPERB hens and between 0.4 and 4.1g in the case of TETRA-SL LL hens, except for the last examination day in the case of TETRA-SL LL hens, when the eggs originating from EU conform cages were the heaviest ones.

The tendency of changes in egg weight was very similar in both examined genotypes during the whole experimental period.

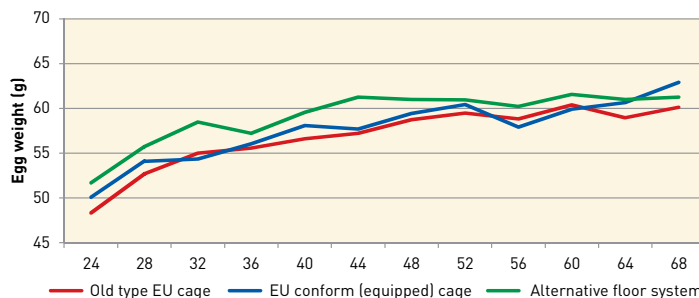
In the changes of egg shell thickness higher variability was observed in the case of TETRA L SUPERB hens than in the case of the TETRA-SL LL ones (*Graph 3 and 4*).

While egg shell thickness varied mainly between 330 and 350 μm in the case of the TETRA-SL LL hens, slightly lower values were often observed in the case of the TETRA L SUPERB hens. However, it was interesting to see that these lower values were found only in the two cage keeping systems. In the case of TETRA L SUPERB hens the best egg shell thickness values were always observed in the alternative floor system.

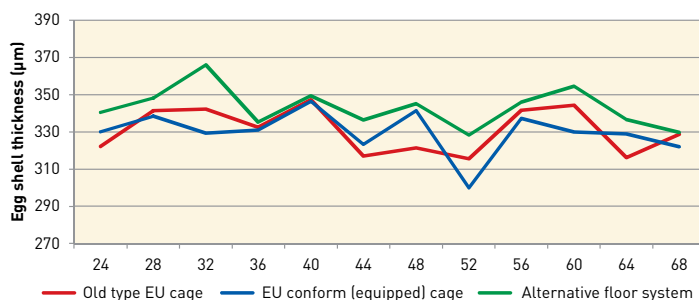
Based on the results, it was established that the egg quality of TETRA L SUPERB hens is not worse than that of the TETRA-SL LL ones. It seems that the egg weight and egg shell thickness is more favourable in the alternative floor system than in the examined cages. ■



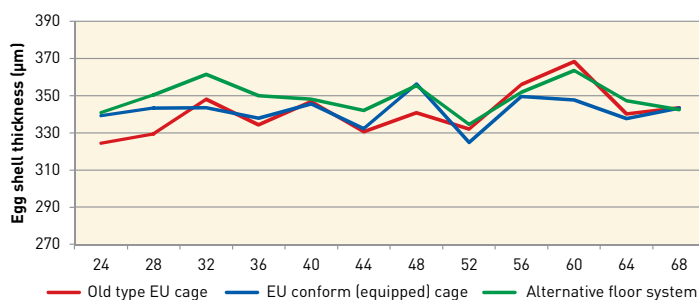
Graph 1: Changes in egg weight of TETRA L SUPERB laying hens in different keeping systems during the first egg-laying period



Graph 2: Changes in egg weight of TETRA-SL LL laying hens in different keeping systems during the first egg-laying period



Graph 3: Changes in egg shell thickness of TETRA L SUPERB laying hens in different keeping systems during the first egg-laying period



Graph 4: Changes in egg shell thickness of TETRA-SL LL laying hens in different keeping systems during the first egg-laying period

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CORONA- AND ORTHOMYXOVIRUSES

The pandemic curve of **COVID-19** flattened temporarily by the end of spring and early summer in 2020 in Europe.

However, seasonal agricultural activity, insufficient conditions of slaughterhouses and their guest workers, less tight restrictions and increasing tourism led to the rapid spread of infection. The US has become the hardest hit country by coronavirus and the number of people diagnosed with COVID-19 has grown in Asia, Australia, Africa and even in Europe compared to the first wave in spring. Countries are facing either the second or the third wave of pandemic, trying to control the disease by imposing measures that often vary on national or even regional level. While the population is not always ready to comply with the health regulations, people are still full of hope regarding the effect of the vaccines that are being developed. The German media summarised the most important health regulations as follows: keep distance, wash your hands and wear a mask.

Viruses, similar to coronavirus (SARS-CoV-2) infecting humans and causing the current pandemic, can be found in domestic and farm animals, pets and wild animals as well and can make them sick. However, the coronaviruses of domestic hen and turkey are more closely related than that of the mammals.

Chickens can be contracted with **infectious bronchitis virus (IBV)** that causes respiratory, gastrointestinal and genital diseases, reduces egg production in laying hens, lowers eggshell and internal egg quality. **Turkey coronaviral enteritis (TCE)** develops severe infection in the intestine and high mortality in young turkeys.

Transmissible gastroenteritis (TGE) causes high mortality in piglets and gastroenteritis in pigs of all ages. The effects of **porcine epidemic diarrhea (PED)** are coughing and diarrhoea and

can lead to 50% mortality in piglets. The symptoms of **porcine hemagglutinating encephalomyelitis (PHE)** are vomiting, wasting, and encephalomyelitis syndrome. For **porcine respiratory coronavirus (PRCV)** pigs may get positive often without symptoms. It is a deletion mutant of **transmissible gastroenteritis virus (TGEV)** and is closely related to **feline enteric coronavirus (FECV)** and **canine coronavirus (CCV)**. When infected by **bovine coronavirus (BCV)**, calves have diarrhoea and cattle suffer from winter diarrhoea. **Canine coronavirus (CCV)** causes diarrhoea in dogs, especially puppies. Though rarely, but older dogs are at risk as well. **Feline infectious peritonitis (FIP)** is a disease of cats. Signs of FIP include fever, inflammation of the serosa that is often characterized by accumulation of fluid inflammatory exudate in the abdominal cavity which shows a progressive, immunopathological disease that results in mortality. The above listed pathogens do not pose any direct threat to humans.

SARS-CoV-2 variant strain was identified in minks in Denmark. Therefore, Danish authorities decided to terminate all the minks (i.e. 17 millions) in the country for the protection of humans. If people are exposed to the virus mutated in minks it could create unforeseen difficulties and even question the effectiveness of human coronavirus vaccines that are under development and authorisation. Due to the rapid spread of disease among minks millions of animals were eliminated in the Netherlands, Spain, Sweden and the US.

COVID-19 pandemic had a dramatic impact on the world's economy. Travelling, accommodation and food services, air transportation were especially hard hit. Employment

rates dropped and restrictions made people to protest. Furthermore, the Hungarian poultry industry had to face another wave of **avian influenza (AI)** in 2020 after the epidemic in 2016-17. This devastating and dangerous AI virus seriously challenged the poultry sector.

It was in January 2020 when **avian influenza** broke out on a turkey factory farm in north-west Hungary and soon after that was diagnosed on a large duck farm in east Hungary. After taking the necessary veterinary health measures, restrictions were lifted and due to those actions neither of the farms are under surveillance anymore.

Unfortunately, in a short time, in March another duck farm in central Hungary confirmed the outbreak of H5N8 bird flu. Many more similar AI cases were reported later on which affected free range waterfowl flocks in the south-east region of the country.

Veterinary authorities responded to the outbreak by terminating the infected birds, declared a 3 km Protection Zone and a 10 km Surveillance Zone around the farms to stop the spread of the virus. The National Food Chain Safety Office (NFCSO) advised poultry farmers to keep their flocks in houses so that their birds do not contact with migrating birds. The authority began inspecting farms more thoroughly to see if they meet biosecurity regulations. NFCSO also checked on minimum disease prevention, i.e. birds are kept, fed, watered in houses, feed and bedding are stored in a well-maintained covered building. The AI epidemic was stopped by early July, so Protection and Surveillance Zones regulations were lifted.

*THE CAUSATIVE AGENT OF AVIAN INFLUENZA **BELONGS TO THE ORTHOMYXOVIRIDAE FAMILY**, IS A CAPSIZED VIRUS, CONTAINS EIGHT SEGMENTS OF LINEAR NEGATIVE-SENSE SINGLE STRANDED RNA.*

Fotó: ID 182787448 © Akesin | Dreamstime.com

In order to prevent the transmission of the infection it is advisable to learn more about the pathogenic agent, its epidemiological characteristics and the possible protective measures.

Avian influenza refers to the disease caused by infection with bird flu Type A viruses which can lead to high almost 100% mortality in breeding stocks. Sometimes these viruses occur naturally in wild and pet birds and there are times when birds show symptoms of high fever, malaise, respiratory and gastrointestinal, nervous system infections. The signs of bird flu vary, sometimes we cannot identify all of its symptoms.

THE PATHOGENIC AGENT OF AVIAN INFLUENZA

Bird flu is a highly contagious disease caused by a virus that can make large number of birds sick at one time. These capsized viruses belong to the *Orthomyxoviridae* family, contain eight segments of linear negative-sense single stranded RNA. There are influenza A, B and C virus genomes. It is influenza A that infects birds.

Two large glycoproteins, hemagglutinin (HA) and neuraminidase (NA) can be found on the outside of the viral particles. Today, scientists know about 16 subtypes of hemagglutinin and 9 subtypes of neuraminidase. The immune system of animals recognizes the virus through the spike glycoproteins of the capsid. However, the frequent modifications of these glycoproteins challenge the immune system, i.e. it is unable to recognize the pathogenic agent and it results in the outbreak of an epidemic from time to time. There are two ways influenza viruses change. One is called “antigenic drift” when one of the amino acids of the glycoprotein changes. The other one is called “antigenic shift” it is a process by which two or more different strains of a virus, or strains of two or more different viruses, combine to form a new subtype having a mixture of the surface antigens of the two or more original strains.

On the basis of their specific characteristics, scientists differentiate two subtypes (H and N) of glycoproteins emerging from the virus’ capsid. These protein particles play crucial role in affecting the host cell and developing the infection. Antibodies produced in the body to fight HA protein particles are able to neutralize the virus. When hemagglutinin and neuraminidase glycoproteins combine they produce several subtypes of influenza virus. The genetic material of viruses can alter constantly and it can lead to new outbreaks of epidemics.

Antibodies produced in the body can protect birds against HA protein particles. A new situation emerges when the surface antigens of the virus change, the birds do not have protecting antibodies against the challenge and that leads to outbreaks of epidemics. Wild birds, especially wild ducks have a main role in maintaining A-type influenza viruses and in developing new variants. They play a great role in disease transmission as well.

The most severe symptoms, diseases and mortality rates are caused by H5 and H7 subtype influenza viruses however, the pathogenicity of similar subtypes can also differ significantly. The former is called highly pathogenic avian influenza (HPAI) virus and there are low pathogenic avian influenza (LPAI) viruses. The latter ones do not cause acute symptoms, but they can persist in flocks and they may mutate into HPAI viruses. The following virus strains were responsible for the most severe AI epidemics in the past few years: H5N1, H7N7, H5N8, H9N2.

Viruses have low resistance, they can survive only for a few days in secretion-droplets, and for a few weeks in water contaminated with faeces. They become very sensitive to dehydration and to most disinfectants.

On the other hand, frosty weather enhances the survival of the viruses.

EPIDEMIOLOGY OF THE DISEASE

Avian influenza viruses (AIV) exist all over the world. The cause of the European epidemic is said to be due the transmission of migrating wild birds.

There are no age or season related infections. Viruses persist in migrating birds without any symptoms but these birds, especially wild ducks, can spread the virus easily. The excrement of wild birds proved to be a particularly hazardous source of the virus.

The virus spreads through the respiratory system and the cloaca mucous membrane or orally. The faeces or nasal secretion of an asymptomatic or infected bird can be a source of infection. The disease can also spread through contaminated natural water. Flocks kept outside are highly at risk because of the possible infection with the virus through faeces of wild birds. The pathogenesis of the disease depends on the virulence of the virus, the species, the age and the resistance of the bird.

HOW TO SPOT AVIAN INFLUENZA?

After a 1-3 day incubation period you can confirm sickness or face mortality ranging from a few to 100%. The first symptoms are sudden high mortality, a significant drop in layers' egg production, inactive, depressed behaviour, loss of appetite, ruffled feathers, fever.

- Respiratory symptoms: conjunctivitis, rales, sneezing, coughing, sinusitis, lacrimation.
- Drop in egg production, soft, misshaped eggs, egg shell whitens, low hatching rate.
- Diarrhoea.
- Neurologic disorders: paresis, paralysis, torticollis, nystagmus and general behaviour aberrations.

POST-MORTEM SYMPTOMS OF AVIAN INFLUENZA

Poor pathological findings, except for a few petechial haemorrhages may arouse suspicion for an infection. At per-acute death no gross lesions may be seen. In acute cases oedematous, haemorrhagic, necrotic lesions in the inner organs and in the skin may be observed, further swollen head, face, upper neck and feet due to subcutaneous oedema, accompanied by haemorrhages. Periorbital oedema, cyanosis, necrotic foci, haemorrhages of the wattles and the comb. Haemorrhages on the serosal or mucosal surfaces of the visceral organs, especially on the pericardium

and the pectoral muscles, further in the mucosa of the proventriculus and the gizzard. Necrotic foci are often in the pancreas, spleen and heart and occasionally in the liver and the kidney. Lung may be congested or haemorrhagic. Air sacculitis, egg yolk peritonitis, inflammatory exudates in the oviducts of laying hens. Regression of the ovaries, haemorrhages or colliquation in the large follicles. Thymus and cloacal bursa are usually atrophic.

CONFIRMATION OF THE DISEASE

Laboratory tests are needed to confirm the infection. If bird flu is suspected the competent veterinary authority must be informed. This is a notifiable disease, it is subject to mandatory reporting.

If the outbreak of avian influenza is confirmed veterinary authorities order to eliminate the sick or infected flocks against national compensation. The veterinary authority declares a 3 km Protection Zone and a 10 km Surveillance Zone around the farm and restricts transport.

PREVENTION

It is believed that the most hazardous sources of infection are the contacts with wild birds and their excrement. So keeping the breeding flocks inside and storing feed and bedding in well maintained covered buildings, changing clothes and footwear, wearing protective clothing and footwear, disinfecting vehicles entering the farm premises are necessary to protect the birds. Infected animals and their products and bedding are also highly contagious. There is no vertical infection, transmission appears only horizontally and that can be and should be stopped. If birds are kept in closed houses horizontal infection transmission is less likely to occur.

Make sure:

- Wild birds are kept off the farm.
- Healthy birds do not have contact with animal products, objects, people (temporary workers), vehicles originating or coming from farm sites of infected or sick flocks.
- Of having controlled place of bird's origin, strict quarantine and regular veterinary inspections.

PROTECTION

Despite the fact that there are vaccines available and in use around the world, they are prohibited in the EU and thus in Hungary. However, captive birds in zoos can be vaccinated with the permission of the veterinary authorities.

HUMAN HEALTH ISSUES OF AVIAN INFLUENZA

Avian influenza virus can be transmitted to bird species directly to a varying degree. However, it does not affect humans directly.

Bábolna TETRA group takes professional, organized, strict veterinary measures to face the challenge of infections mentioned above. Though, there are certain restrictions on export, the company maintains business continuity and keeps its position on the poultry market. Breeding, genetic development and professional background are guaranteed. Biosecurity is provided by the fact that certain activities of the company are at different geographical locations. ■

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| on Poultry Medicine



*Wishing You Happy Holidays
and a Prosperous New Year!*



TETRA NEWSLETTER by Bábolna TETRA Kft.

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