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TETRA NEWSLETTER

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Photo: Ildikó Búza

NEW SERIES OF ARTICLES **FROM THE EXPERTS OF TETRA LABORATORY**

The year 2021, in addition to many ordeals, also **GAVE US A LOT OF EXCITING TASKS**.

Among others, the previously presented accredited laboratory was completed in Uraiújfalu, in which we have now started not only the service activity but also the PCR tests supporting the work of research and development. We are in the fortunate position that the team of the laboratory, which specializes in poultry testing, has active participants in scientific research as well in addition to solving day-to-day challenges, so theory and practice, which are often difficult to "understand" each other, combines in one team. The experience of joint research work in specialised literature has inspired the series of articles that we are just starting with, the aim of which is to summarize the general knowledge about pathogens affecting the daily routine, as well as to provide insight into the latest research results and curiosities. We would like to bring science a little closer to practice, because we can get a lot of ideas and inspiration from these literature summaries, which we would like to share with you afterwards.

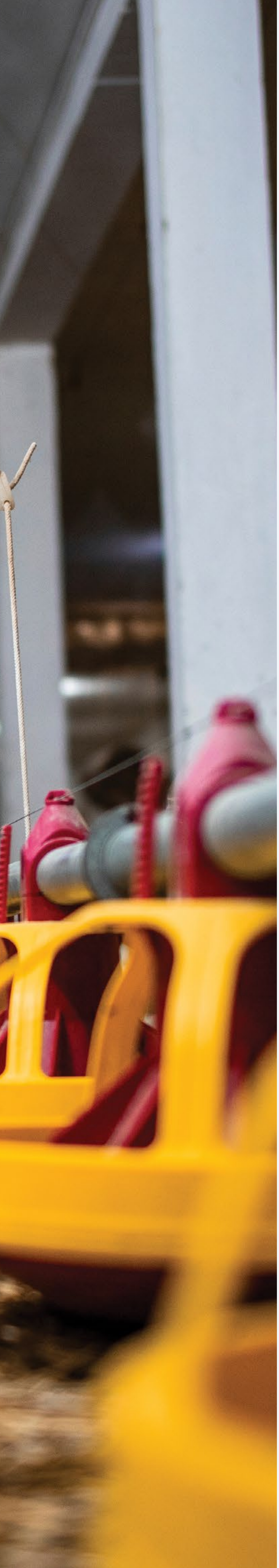
DR ANITA KÖTELES | Veterinarian

TETRA LABORATORY

TETRA Laboratory Team (colleagues from left to right) Ivett Bíró, Anikó Dulicz Koloszárné, Anikó Dovánczi, Sára Karakai, Piroska Ilona Kovács, Dr Anita Köteles

COLIBACILLOSIS

ESCHERICHIA COLI is a well-known bacterium in the poultry-rearing sector that is commonly found living in human and animal intestines. Some are harmless but this bacterium **CAN ALSO CAUSE SERIOUS ECONOMIC AND HEALTH DAMAGE** in both animals and humans.



It is the localized or systemic disease of farmed poultry caused by avian pathogenic Escherichia coli (APEC). This disease can come in various forms, including colisepticaemia, airsacculitis, synovitis, peritonitis or salpingitis. From a former perspective, E. coli was only the secondary pathogen of other predisposing factors such as virus infection, stress, ammonia, etc. The current opinion is that APEC may be the primary pathogen. The transmission of this pathogen can occur both horizontal (from the environment through feed, drinking water, litter or faeces) and vertical (through eggs). The infection through skin injuries (foot pad lesions, pecking) is very significant, as well as the infection of eggs that may be traced back to ovaries containing E. coli bacteria due to an earlier septicaemia, but they can also easily transmitted through freshly laid wet eggshells with faecal contamination.

Colibacillosis in mammals is most often a primary enteric or urinary tract disease, whereas colibacillosis in poultry is typically a localized or systemic disease occurring secondarily when host defences have been impaired or overwhelmed by virulent E. coli strains [(1)]

E. coli strains which can cause extraintestinal infections in any species share common features and are called Extraintestinal Pathogenic Escherichia coli (ExPEC) [(29)]. Most APEC are also ExPEC, and they are also very similar to mammal ExPEC.

Clinical symptoms and postmortem lesions indicate the disease that can be confirmed or excluded by classical microbiological growing of E. coli on a selective medium. Then, the further types and subtypes can be determined by molecular biological processes. A PCR protocol aimed at the APEC virulence plasmids has proven to be successful in the routine testing, however, it is not certain that it provides a hundred per cent identification due to the diversity of the strains playing a role in the disease.

Prevention of colibacillosis relies on good hatchery and flock management in particular with regard to air quality, temperature, litter and housing conditions, as well as general hygiene requirements. Vaccines have proved to be effective to combat some strains of E. coli, but due to the diversity of strains related to colibacillosis it can also happen that vaccines do not prove to be effective in the case of all strains. In poultry production the choice of drugs may be restricted by the new restrictions concerning the application of antimicrobials, or it is not so effective if there are strains present which are resistant to the active agents.

It is generally recognised that colibacillosis is the most common infectious bacterial disease affecting poultry, and thus E. coli infections are associated with major economic losses and belong to the most commonly reported diseases in surveys referring to animal health and slaughterhouse confiscations. During processing, the average body weight of poultry flocks suffering from airsacculitis was lower (84 grams/bird) and showed quality deficiencies as well as faecal and Campylobacter contamination [(28)].

A study on the Escherichia coli peritonitis syndrome in Dutch poultry farming found that the total losses were € 0.28 per layers housed in cages and € 1.87 in the meat-type hens [(15)]. Nevertheless, despite its recognised importance no studies appear to have been carried out to define adequately the important economic impact of colibacillosis on poultry production.

PUBLIC HEALTH IMPORTANCE

Although poultry is not a considerable source of shiga toxin producing E. coli (STEC) causing human diseases, we must remain vigilant in this context as STEC including E. coli O157:H7, which is an important enterohemorrhagic bacterial strain in humans, have already been isolated not only from different avian species but also from poultry products [(2, 3, 4, 23)]. Of even more concern is the possibility that chickens infected with APEC and their eggs may be the reservoir of ExPEC food causing human urinary tract infections, meningitis and other extraintestinal diseases [(19, 32)]. This hypothesis is based on the remarkable similarities which are presented in vitro and in vivo models of human diseases in respect of the genomic sequences, serogroups, virulence genotypes, phylogenetic types, plasmid content, antimicrobial resistance patterns and pathogenicity of particular

APEC and human ExPEC strains [5-8, 13, 14, 16, 17, 19-22, 25, 27, 31, 32]. This hypothesis is also supported by the fact that retail poultry meat my contain E. coli which is more similar to APEC and human ExPEC than to commensal E. coli isolated from the faeces of slaughtered animals. These similarities are particularly significant and notable considering the virulence plasmid content of these organisms [8]. Although ExPEC causing human urinary tract infections can contain virulence plasmids [13], APEC and E. coli causing human neonatal meningitis, are mainly defined by their presence [12, 18, 26]. It has been demonstrated that these plasmids contribute to the development of colibacillosis, urinary tract infections and meningitis [6, 31], and that they can be transmitted from APEC to other pathogens dangerous to human health [9]. In the case of poultry, the evidence to suggest such transmission is the appearance of an especially virulent strain called Salmonella enterica serovar Kentucky containing plasmids similar to APEC [10].

Particularly worrying is also the fact that these virulence plasmids can contain islands encoding multi-drug resistance (MDR) in APEC or can attach together with big R-plasmids encoding MDR [9, 11]. Such MDR-islands or R-plasmids can encode resistance to heavy metals, disinfectants and different antimicrobials. The possibility of spread of resistance genes from APEC to pathogens having importance to human health shall be also taken into account. Salmonella enterica subsp. enterica serovar Newport, a bacterium causing human diseases, has easily acquired antibiotic resistance through taking over a big conjugative-resistance plasmid from antibiotic-resistant E. coli. The plasmid has been transmitted to more than 25% of the Salmonella enterica serovar Newport strains after the co-infection [24]. The E. coli antibiotic resistance of faeces was bigger in broilers and turkeys that relatively often received antibiotics in comparison to layers getting only few antibiotics [33]. Similar samples of antibiotic resistance were found in E. coli isolated from poultry slaughterhouse workers and birds, and in some cases specific strains could be detected showing that the transmission of resistance organisms and/or plasmids from poultry to humans is very frequent.

Therefore, it is reasonable to consider poultry as a store of virulence and resistance genes bound to ExPEC strains and/or plasmids contributing to the pathogenesis of diseases caused by ExPEC or other human pathogens.

RESEARCH

Within the framework of tender 2018-1.3.1-VKE we were given the opportunity to examine to what extent Escherichia coli serogroup O157 is present among birds reared under different husbandry technologies and stocking densities.

In the course of our investigations, it was established that in addition to an appropriate vaccination program the imposition and compliance with anti-epidemic measures, as well as the maintenance of hygiene and sanitation rules in poultry houses, and the continuation of farm closures affect the microbiological status of the flocks rather than the differences between husbandry technologies. No significant differences were found between the pathogen and facultative pathogen contamination of the different husbandry technologies. Following the analysis with regard to the stocking density, we came to the conclusion again that in addition to a high level disease prevention as well as the hygiene and sanitation rules in poultry houses, deep-litter housing did not mean a greater microbial disease load on the livestock than the battery cage system.

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WE TOOK THE ROAD **AGAIN**

In the spring of 2020, almost the entire world was paralyzed by COVID-19 epidemic. **ALL COUNTRIES RESTRICTED ENTRY IN SOME WAY** for foreigners, but several Asian countries opted for a total ban.

As a result, maintaining personal relationships and creating new ones encountered enormous difficulties, even though the tools of the modern age provide an opportunity to stay in touch online. Professional meetings and exhibitions were also not held or only to a limited extent online, which of course does not provide the same experience as personal meetings. However, from the beginning of 2022, thanks to the high vaccination rates around the world, countries have opened their borders to visitors, allowing business trips and face-to-face meetings to build and maintain relationships.

ASIA

Philippines

"As for the Asian region, one of our first destinations were the Philippines, where I had the opportunity to meet with representatives of several major poultry companies in the country during a very intensive one-week stay. We hope that from this year, TETRA products will also be available in the Philippine market, allowing producers from other countries to have positive experiences with our high-performance hybrids. Fortunately, the international network of Bábolna TETRA Ltd. is very expansive, so we have kind acquaintances in many parts of the world with whom we can always have a nice talk in view of mutually beneficial cooperation opportunities."

TAMÁS SZOBOLEVSZKI
Key Account Manager

AFRICA

"On February 22, 2022, as the starting program of my trip to Ghana, I gave a presentation to local market participants in the showroom of the Hungarian Embassy in Accra. After the introduction of the company and the products - laying hybrids and dual-purpose hybrids - we discussed the possibility of a cooperation.

I especially emphasized that we strive for a close professional relationship with our existing and future business partners. The breeding flocks we sell are accompanied by expert advice in order to achieve better production results. We are also ready to hold trainings and presentations for a wider range of local producers on various online platforms or even locally. We hope that this type of knowledge transfer will make a significant contribution to the development of the poultry sector in Ghana.

Ghana

The event was attended by about 20 potential partners, with whom I was able to discuss their individual needs during B2B discussions. At the same time, an informal conversation developed between the participants, coordinated by Dávid Békési, the first associate of the Hungarian Embassy. Here, Ghanaian guests mainly reported on current problems in the sector. There was a consensus on the need to strengthen the biosecurity of farms in order to control diseases more effectively. Unfortunately, some cases of avian flu have also been registered in the country recently. The issue of more economical production was also discussed in addition to the current high feed prices.

Ghána

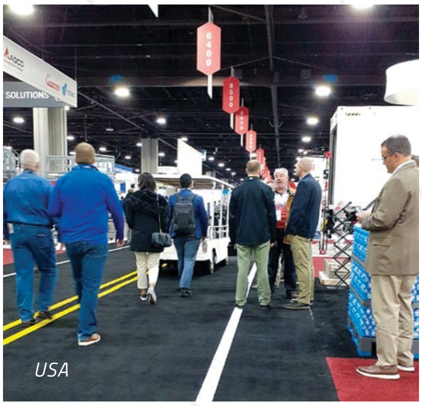
There has been considerable interest in dual-purpose backyard breeds that can be grown with good results in countries with warmer climate.

As a result of the seminar, a delegation from Ghana will visit Hungary in May to get acquainted with the production and breeding background of Bábolna TETRA Ltd. They would like to use the experience gained here during the investment of the planned parent stock farms."

NIKOLETTA FEJK
Head of Key Account Department

AMERICA

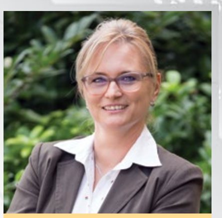
„At the end of January, we travelled with great anticipation to the IPPE 2022 exhibition in Atlanta, which is one of the world's largest animal husbandry exhibitions. In the shadow of restrictions, there were less visitors than in previous years, but more than we expected based on preliminary indications.



USA

Bábolna TETRA Ltd. attended the exhibition together with its American distributor company, TETRA Americana (Centurion Poultry), in order to meet its old and new partners. TETRA Americana, from state of Georgia has been supplying North, Central and South America with TETRA day-old chicks for many years. Thanks to the developments in previous years, and the result of a long licensing process, we will soon be able to sell parents stock day-old chicks to Latin America. Therefore, it was extremely important to be able to meet, introduce ourselves to or renegotiate with as many Latin American customers as possible at this exhibition.

During the personal meetings, it turned out that during the online discussions, not all important details had been included on the agenda, but during the short time spent abroad, several promising preliminary agreements were reached after all this had been clarified. We hope we can start transporting parent stock day-old chicks to yet another continent in the near future."



ORSOLYA LUKÁTS
Key Account Manager

USA

EXAMINATION OF THE POSSIBILITY OF SELECTION FOR THE REDUCTION OF **MORTALITY CAUSED BY THE AGGRESSIVE BEHAVIOUR** IN NON-BEAK-TRIMMED LAYING HENS

One of the most important results of animal protection, which has been politicised in recent decades, **IS THE DIRECTIVE 1999/74/EC ON THE MINIMUM STANDARDS FOR THE PROTECTION OF LAYING HENS BANNIN CONVENTIONAL BATTERY CAGES IN THE EU** from 1 January 2012.

According to the provisions of the Annex to the directive, all mutilation is also prohibited, but in order to prevent feather pecking and cannibalism, each Member State may allow beak trimming if it is carried out by qualified staff on chickens that are less than 10 days old. Nevertheless, some Member States (Denmark, Finland, Sweden, Germany and The Netherlands) have already banned beak trimming of chickens (Gallus gallus domesticus), while other Member States are now considering the introduction of banning.

The introduction and spread of different alternative rearing methods, as well as the increasing rejection of beak trimming in Europe raise new serious animal welfare problems. Several decades of selection for cage tolerance have favoured the highly productive but – despite the original intention of the breeders – also more naturally aggressive laying hens, which – due to the bigger group sizes – may create continuous conflict situations in systems providing more space for behavioural freedom. This kind of social stress was not significant in the case of hens kept in small group systems (4-5 hens/cage), and its occurrence could be effectively prevented by beak trimming of the birds with thermo-cautery, laser or infra-red light. According to surveys, in the current genetic constructions, neglecting beak trimming may result in a 2 to 4-fold increase of mortality in laying houses. This animal protection concern forces breeding companies to produce hybrids that can be successfully maintained without the need for beak trimming that meets the new animal welfare requirements and new housing systems as well. Since the cause of this phenomenon is due to breeding, the most effective prevention method may be to find the resolution of the problem also from the side of breeding. For this reason, the main goal of our study was to support the hypothesis by evaluable data that heritability of behaviour makes the selection of aggressive individuals and families also in the case of non-beak-trimmed laying hens possible.

The examination of the frequency of mortality caused by aggression was started with 26 non-beak-trimmed half sibling hen offspring of 63 Rhode Island Red and 70 Rhode Island White pedigree cocks. During the rearing period of 18 weeks of age, our results indicated that there was no mortality caused by pecking in the Rhode Island Red pullet population, while aggressive behaviour was responsible for 51% of mortality in the Rhode Island White pullets. During the egg-laying period up to 72 weeks of age, pecking and cannibalism were the most frequent cause of mortality in both types.

The origin of the hens played a significant role in the occurrence and harm of aggression in both of the examined types. Both in the Rhode Island Red and the Rhode Island White type, we have found cocks whose offspring did not show any loss because of aggression, but at the same time also cocks whose offspring died exclusively by aggression (Figure 1 and 2).

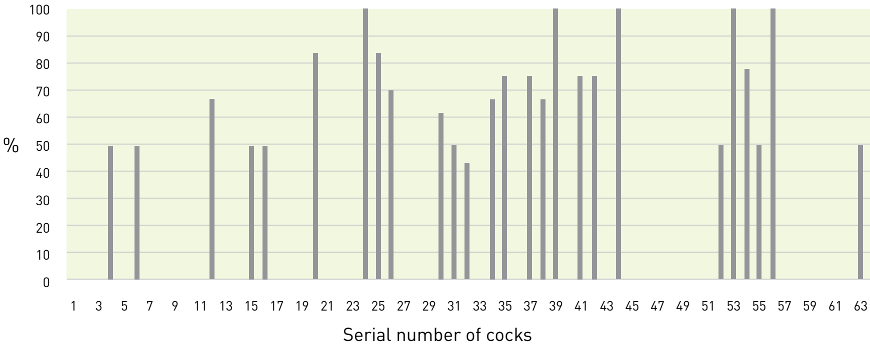


Figure 1: Ratio of mortality caused by aggression in the per cent of total mortality in non-beak-trimmed Rhode Island Red laying hens

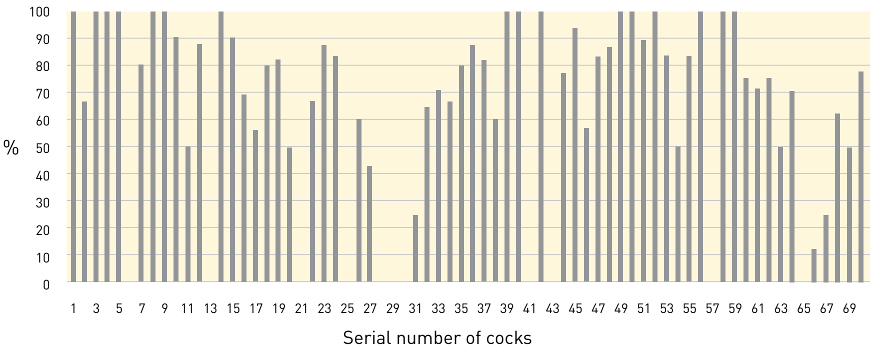


Figure 2: Ratio of mortality caused by aggression in the per cent of total mortality in non-beak-trimmed Rhode Island White laying hens

It can be clearly seen that there are significantly less cocks in the Rhode Island Red type (n=5) whose offspring died exclusively by aggression, while there were three times more Rhode Island White cocks (n=16) whose offspring showed loss due to injuries caused by aggression.

We have found 37 Rhode Island Red cocks and 11 Rhode Island White cocks whose offspring apparently did not inherit the susceptibility to aggression.

Based on these results it was established, that selection is suggested in both of the examined types, but especially in the Rhode Island White, where significantly more cocks had mortality due to aggression in their offspring population. It is hoped that mortality caused by pecking and cannibalism in hybrid laying hens can be significantly reduced by this conscious selection. Our company has already started this selection, as a result of which we will shortly introduce TETRA COUNTRY into the market, our calm, viable, highly productive and very persistent brown feathered layer hybrid with brown eggshell. These laying hens are particularly suitable for alternative keeping systems without beak trimming.

DR GÁBOR MILISITS, DR ANITA ALMÁSI
Bábolna TETRA Kft.

DR ZOLTÁN ZOMBORSZKY, PROFESSOR DR ZOLTÁN SÜTŐ
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LET 'S GET TOGETHER

5-7 MAY, 2022

XXIX. ANIMAL HUSBANDRY AND AGRICULTURAL DAYS

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TETRA
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