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EDITORS

Nataliia Hryshchenko, Associate Professor, National University of Life and Environmental Sciences of Ukraine, Kyiv, Ukraine
Galia Zamaratskaia, Associate Professor, Swedish University of Agricultural Sciences, Uppsala, Sweden

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[a]Swedish University of Agricultural Sciences, Uppsala, Sweden; [b]National University of Life and Environmental Sciences of Ukraine, Kyiv, Ukraine; [c]Poltava State Agrarian University, Poltava, Ukraine; [d]Tavria State Agrotechnological University, Zaporizhzhya, Ukraine [e]Institute of Pig Breeding, Poltava, Ukraine; [f]Odesa State Agrarian University, Odesa, Ukraine; [g]Khazar University, Baku, Azerbaijan. galia.zamaratskaia@slu.se

The LEARNSAVE project ("Learning under attacks - sustainable education at risk in Ukrainian universities"), coordinated by the Swedish University of Agricultural Sciences (SLU), project number 01236/2023, and funded by the Swedish Institute, promotes digital resilience and innovative pedagogical approaches in Ukrainian higher education. The project was established with the aim to strengthen the capacity of Ukrainian universities to sustain high-quality learning under crisis conditions. During the project implementation, its impact extended beyond the Baltic region, attracting universities outside the initial partnership framework. Particularly, Khazar University (Azerbaijan) and S. Seifullin Kazakh Agro-Technical Research University (Kazakhstan) engaged with the project, recognizing the universal relevance of its methodology and outcomes. Protracted military confrontation in Ukraine constitutes a threat to conventional education, risking the future of vital sectors ranging from agriculture security to social development. Involvement of LEARNSAVE in the organization of the 4th International Conference "One Health: Problems & Solutions," together with Khazar University and other actors helped to establish international networks and demonstrated the transferability of digital methodologies to partner institutions. Moreover, co-organization of an online summer school "Innovations in Food Biotechnology & Safety" provided a practical platform for implementing active e-learning strategies in an international setting, and facilitated knowledge exchange among students from Ukraine, Azerbaijan, Kazakhstan, and Sweden. These collaborative initiatives demonstrated how crisis-driven pedagogical innovations can transcend geographical boundaries and serve broader educational communities facing diverse challenges.

Through collaborative activity, LEARNSAVE has established a sustainable network for knowledge sharing and mutual support that extends across Eastern Europe, the Caucasus, and Central Asia. This growing regional collaboration not only addresses immediate educational challenges in Ukraine but also contributes to building a more resilient and innovative higher education landscape capable of adapting to diverse crisis scenarios worldwide.

Keywords: pedagogy; international cooperation; resilient education

BREWERY SPENT GRAINS VALORIZATION IN MEAT PRODUCTS - SAFETY RISKS AND IMPLICATIONS

Malgorzata Korzeniowska

The Wroclaw University of Environmental and Life Sciences, Faculty of Biotechnology and Food Sciences, Department of Functional Food Products Development, Wroclaw, Poland, email: malgorzata.korzeniowska@upwr.edu.pl

Brewery spent grain (BSG) is the most abundant byproduct (~85%) of brewing industry, rich in dietary fiber, protein, arabinoxylan and β-glucan. It can be applied in various food products. In meat products, containing zero or minimal amount of fiber, BSG can be a good source of dietary fiber and bioactive compounds. The incorporation of BSG into foods aligns with circular economy principles by reducing food industry waste and enhancing the nutritional profile of final products. However, ensuring the safety and quality of BSG-enriched meat products is critical for industrial application.

Following the current EU legislation BSG utilization in food must comply with the General Food Law (ECRegulation 178/2002) and Novel Food Regulation (2015/2283). Hygiene requirements are regulated by ECRegulations 852/2004-853/2004, while the meat products microbiological criteria by 2073/2005. Compliance with contaminant limits and allergen labeling (EURegulation 2023/915) is essential. Notably, no EU-wide limits exist for mycotoxins in processed meats, with regional exception for cured and fermented products.

BSG food application challenges are related to high moisture content, that cause microbial spoilage, potential growth of pathogens and mycotoxin formation. These hazards, combined with chemical contaminants and allergens, can affect shelf life, nutritional quality, and safety when incorporated into meat matrices. Prompt stabilization through drying, fermentation, or thermal treatments reduces microbial loads and preserves quality. The implementation of comprehensive food safety management systems, including HACCP, throughout the BSG valorization chain is essential for safe, sustainable, and high-quality meat products.

MEAT ALLERGY – A "NEW" FOOD ALLERGY - THE ALPHA-GAL-SYNDROME

Bo Ekstrand

Kristianstad University, Sweden

Food allergy is defined as an immune reaction, dependent on the presence of IgE antibodies in the blood against specific proteins in our food. Symptoms are generally urticaria, angioedema, throat tightness, rhinitis, conjunctivitis, nausea, diarrhoea, hypotension, and finally a severe anaphylaxis, that might be fatal.
Diagnosis is made through anamnesis – the personal experience, a blood sample showing the presence of IgE-antibodies, a skin prick test, and finally a double blind placebo controlled food challenge (DBPCFC). Normally, a baby, maybe after a period of breast-feeding, becomes tolerant against all common proteins in our food. But when the mechanism of oral tolerance does not work, we develop an allergy.

We have traditionally said that there is no allergy against pure mammalian meat. Some years ago, a new drug against colorectal cancer was found to have severe side effects, with evident hypersensitivity reactions. Research made in US showed that some patients had IgE antibodies gainst a specific carbohydrate determinant present in the drug: galactose - alpha - 1,3 - galactose (alpha-gal), and it was shown that this was caused via tick bites, which transfers the alpha-gal into our blood, and we develop IgE antibodies against it. Because mammalian tissues contain alpha-gal, we react against these foods,
and it mostly occurred after consumption of meat, therefore it was called "meat allergy". First there were only a few reports from Europe, but this is now expanding rapidly.

What can we expect in the future?
- We will discover more cases of alpha-gal-syndrome when we learn to make better diagnosis.
- We will see more cases when certain species of ticks are spreading north (due to climate change).
Some of the tick species commonly found in Ukraine are the same as in Sweden, and some of these transfer alpha-gal.

Keywords: allergy; ticks; IgE-antibodies

OPERATIONALIZING ONE HEALTH IN AZERBAIJAN: ADVANCING ANIMAL MANAGEMENT AND FOOD SAFETY FOR PUBLIC HEALTH SECURITY

Irada Khalilova

Department of Life Sciences, Khazar University, Baku, Azerbaijan

In the wake of global health crises, the necessity of a multisectoral One Health approach - integrating human, animal, and environmental health has never been more critical. We examine and present Azerbaijan's progress in operationalizing One Health, specifically focusing on animal production management and its direct impact on food safety and public health. Azerbaijan's livestock sector, primarily comprised of small-scale subsistence farming, presents unique management challenges and opportunities for zoonotic disease mitigation. While intensive livestock production is localized, specific districts exhibit high livestock densities, posing elevated risks for animal-to-human disease transmission.

Recent advancements include the implementation of the Animal Identification and Registration System (AIRS) and the National Veterinary Information System (NVIS), which are designed to track livestock "from farm to table," thereby strengthening food safety and biosurveillance. Furthermore, Azerbaijan has established a robust national control program for endemic zoonoses such as Brucellosis, utilizing cross-sectional seroprevalence studies and knowledge assessments among high-risk groups like farmers and veterinarians to identify and alter risky farming practices.

Despite these strides, challenges remain in maintaining a qualified veterinary workforce and integrating wildlife and environmental monitoring into existing frameworks. The findings suggest that formally institutionalizing a National One Health Committee and enhancing joint cross-sectoral training for veterinarians and public health professionals are essential steps. By refining animal management and fostering transparent data-sharing between the Azerbaijan Food Safety Agency (AFSA) and health ministries, Azerbaijan can better predict and prevent the spillover of pathogens at the human-animal interface.

Keywords: animal production; livestock; zoonotic disease mitigation

THE ROLE OF ANIMAL-DERIVED FOODS IN SUSTAINABLE AND EQUITABLE FOOD SYSTEMS

Hasitha Priyashantha

Department of Animal Science, Faculty of Agriculture, University of Ruhuna, Mapalana, Kamburupitiya, Sri Lanka. hasithap@agri.ruh.ac.lk

Animal-derived foods play a critical yet often challenged role in contemporary food security debates, particularly in the context of sustainability and climate change. While global narratives frequently emphasize the environmental burdens of livestock and fisheries, such perspectives risk oversimplifying their contribution to nutrition, livelihoods, and resilience, especially in low- and middle-income countries. This paper examines the role of animal-derived foods within sustainable food systems, with a specific focus on the Global South and a case study from Sri Lanka. Animal-source foods provide highly bioavailable proteins and essential micronutrients, including iron, zinc, vitamin B_{12}, and calcium, which are vital for vulnerable population groups such as children, pregnant women, and the elderly. In many regions of the Global South, livestock and fisheries function not only as food sources but also as integral components of rural livelihoods, contributing to income generation, nutrient recycling, and risk management within mixed farming systems. Consequently, the sustainability challenge lies not in the exclusion of animal-derived foods, but in improving production efficiency, resource use, and value chain integration. This highlights key constraints affecting animal-based food systems, including climate variability, feed resource limitations, post-harvest losses, and skills gaps across production and processing stages. It also explores emerging opportunities such as precision livestock management, regenerative and circular farming practices, improved cold chains, and digital traceability systems that can enhance both environmental performance and food security outcomes. Using Sri Lanka as a case study, the analysis illustrates how smallholder-based dairy, poultry, and fisheries systems contribute to national nutrition and rural livelihoods, while facing structural and climatic challenges. The findings emphasize the need for context-specific, evidence-based strategies that balance environmental sustainability, nutritional adequacy, and social equity. Recognising the multifunctional role of animal-derived foods is essential for designing inclusive and resilient food systems in the Global South.

Keywords: Climate-smart livestock, Food value chains, Circular livestock systems, Smallholder livelihoods

THE ROLE OF ANIMAL WELFARE IN ENSURING THE QUALITY AND SAFETY OF ANIMAL-BASED FOOD: THE CASE OF HORSE MEAT

Anel Kostanova

S.Seifullin Kazakh Agro Technical Research University, Astana, Kazakhstan

Animal-based food products play a crucial role in human nutrition, and their quality and safety largely depend on production practices applied throughout the entire production chain. In recent years, increasing attention has been paid to the relationship between animal welfare and food quality, as welfare conditions directly influence animal health, stress levels and physiological stability, which ultimately affect the characteristics of food products.

This study focuses on horse meat as an important animal-based food product in several regions and examines how animal welfare practices in horse production systems impact its quality and safety. Particular emphasis is placed on housing conditions, feeding management and stress reduction during handling, transportation and pre-slaughter procedures. These factors are analyzed in relation to key indicators of food quality, including nutritional value, microbiological safety, technological properties and sensory attributes of meat.

The research highlights that inadequate welfare conditions may result in increased stress, higher susceptibility to diseases and deterioration of meat quality. In contrast, welfare-oriented management practices contribute to improved physiological condition of animals, reduced health risks and more stable production outcomes.

The findings demonstrate that higher welfare standards are associated with enhanced quality of horse meat, lower contamination risks and increased consumer confidence in animal-based food products. Moreover, integrating animal welfare principles into food production strategies supports sustainable development of the agri-food sector by improving food safety and strengthening ethical responsibility in livestock systems.

The study emphasizes that animal welfare should be considered not only as an ethical obligation but also as a fundamental component of quality assurance in modern animal-based food production.

Keywords: animal production; horse meat; welfare standards

ECLAMPSIA IN SMALL DOG BREEDS

Dankevych N.I.[1], *Morozov M. G.*[1], *Deneha V.M.*[2]

[1]Odesa State Agrarian University, Odesa, Ukraine, [2]Veterinary Clinic «Planet of the Animals»

Small dog breeds are well adapted to indoor living; however, many owners involved in breeding underestimate the importance of veterinary knowledge. Despite proper nutrition during pregnancy, the risk of postpartum eclampsia - a dangerous and potentially fatal condition - is often overlooked.

Eclampsia is an acute disease characterized by a sharp decrease in blood calcium levels due to impaired parathyroid gland function. It leads to seizures, muscle contractions, and impaired motor activity and most commonly affects dogs of miniature breeds.

The aim of this study was to assess the prevalence, causes, clinical course, and treatment of postpartum eclampsia in small dog breeds treated at the veterinary clinic «Planet of the Animals» in Kryzhanivka village, Odesa region.

The study was conducted during 2023–2025. Clinical data were analyzed using a review of domestic and international scientific publications. Statistical processing was performed using Microsoft Excel.

A total of 23 cases of eclampsia were recorded in small dog breeds. Eclampsia most often developed during the first 2–3 weeks of lactation. The primary cause was hypocalcemia associated with an unbalanced diet and large litters.

Clinical signs included hyperthermia, seizures, tremors, dyspnea, and loss of coordination. Biochemical blood analysis confirmed the diagnosis. Without timely treatment, the condition could progress to coma and death. Therapy consisted of calcium-containing drugs, infusion therapy, and symptomatic treatment. Puppies were temporarily transferred to artificial feeding.

Postpartum eclampsia occurs predominantly in small dog breeds. Hypocalcemia is the main etiological factor, and prevention depends on proper preparation for breeding and a balanced diet.

Keywords: dogs; Postpartum eclampsia; Hypocalcemia

FEED STRESS AND MILK PRODUCTIVITY OF COWS (A REVIEW)

Stratan A.A., Dankevych N.I., Dankevych A.S.

Odesa State Agrarian University, Odesa,Ukraine

During interaction with the environment, animals are continuously exposed to numerous factors that vary in nature and intensity. In industrial livestock production systems, the impact of these factors is intensified, often resulting in reduced productivity of farm animals.

Researchers identify five main groups of stress factors: climatic conditions, disturbances in feed intake, standard technological procedures, stages of the production cycle, and herd health status. Feed-related stress has a particularly strong effect on high-producing dairy cows and is considered one of the main causes of non-infectious diseases, decreased milk yield, and deterioration of milk quality. This type of stress includes sudden changes in diet composition and energy value, feeding low-quality or moldy feeds, нарушения feeding schedules, and watering cows with cold water.

Excessive stress increases cows' susceptibility to diseases. Protein deficiency leads to reduced secretion of somatotropic and gonadotropic hormones, negatively affecting reproductive function. Excessive concentrate feeding increases histamine levels in the blood, impairing blood circulation in the distal parts of the limbs and promoting the development of hoof diseases such as laminitis and pododermatitis. Carbohydrate deficiency results in rumen digestion disorders, including ruminal acidosis, ketosis, and liver and kidney dysfunction, as well as disturbances in protein, mineral, and vitamin metabolism.

Insufficient intake of macro- and microelements is another important stress factor. Calcium plays a key role, as it constitutes about 99% of bone tissue and is essential for skeletal and skin development. Calcium deficiency, accompanied by reduced serum levels, leads to cellular deformation and impaired membrane permeability.

Stress factors suppress milk let-down and increase the risk of mastitis, ultimately reducing productivity and leading to culling. Therefore, a balanced diet providing essential nutrients in bioavailable forms is crucial for maintaining cow health and high milk productivity.

Keywords: milk; stress factors; risk of mastitis

PRODUCTIVITY AND ECONOMIC EFFICIENCY OF RAISING LIGHTWEIGHT PIGLETS UNDER DIFFERENT FEEDING SYSTEMS

Chumak V. M.

National University of Life and Environmental Sciences of Ukraine,
v.chumak@nubip.edu.ua

There is a need to establish a smooth transition period in piglet feeding technology, which involves continuing to use liquid milk replacer after weaning and gradually introducing dry prestarter mixtures. The aim of the study was to determine the effect of dry and liquid feeding systems with milk replacer on the productivity and economic efficiency of rearing low-weight piglets from prolific sows. The scientific and economic study was conducted at the Globyne Pig Farm using 2,600 hybrid piglets, which were divided into a control group (dry feeding) and an experimental group (liquid feeding through the Megamix system). With an average starting weight of 5.42–5.44 kg, the rearing period lasted 50 days. It was found that the liquid feeding system provided a significantly higher growth rate of animals. The average daily gain in the experimental group was 491 g, which is 23.1 % more than in the control group (399 g), and the final weight of the piglets reached 30.01 kg compared to 25.37 kg in the control group. Survival rates in both groups were high and did not differ significantly – 97.45–97.58 %. Feed cost analysis shows that liquid feeding increased feed consumption by 31.0 %, which raised the cost of feeding one piglet to UAH 1,218.13. However, economic analysis confirmed the high efficiency of the liquid system: the profit per head in the experimental group was 1,660.34 UAH, which is 28.0 % higher than the control indicator (1,297.52 UAH). The profitability level in the experimental group was 6.0 % higher and amounted to 53.9 % with a lower cost of 1 kg of live weight – 102.67 UAH compared to 106.86 UAH in the control group.

Thus, the use of a liquid feeding system with nutritional adaptation on milk replacer is a feasible technological solution for increasing the productivity and profitability of raising low-weight piglets.

Keywords: low-weight piglets, early weaning, liquid feeding system, milk replacer

MONITORING BIOCHEMICAL HOMEOSTASIS OF GILTS UNDER SORPTION-HEPATOPROTECTIVE INFLUENCE

Lenkov L.G.

National University of Life and Environmental Sciences of Ukraine
lenkov.leonid@gmail.com

Intensive industrial pig farming demands optimized rearing of replacement gilts to ensure future productivity. This study evaluated the effect of the feed additive «Gepasorbex» (1500 g/t) on biochemical blood parameters as integral markers of liver function and metabolic intensity. The study involved Large White × Landrace gilts (n=40 per group) kept under industrial conditions. The experimental group received «Gepasorbex» in addition to the standard diet. At 190 days, serum samples (n=5) were analyzed. «Gepasorbex» significantly improved hepatic synthetic function, increasing albumin (24.42 to 27.80 g/l, $p < 0.05$) and total protein (54.24 to 58.49 g/l, $p < 0.05$). Pigment metabolism improved, with total bilirubin decreasing from 7.49 to 2.64 µmol/l ($p < 0.001$) and alkaline phosphatase activity normalizing (173.34 to 115.85 u/l, $p < 0.01$). Stabilization of liver enzymatic activity was confirmed by reduced AST levels and optimization of the de Ritis ratio (1.26 to 0.84). Furthermore, the additive enhanced energy and lipid metabolism, evidenced by increased glucose and a 38.4 % reduction in cholesterol ($p < 0.01$). Creatinine rose to reference values (91.84 to 141.45 µmol/l, $p < 0.01$), indicating metabolic intensification without renal impairment.

Consequently, «Gepasorbex» is an effective tool for metabolic support and hepatic stabilization in intensive pig production.

Keywords: biochemical blood parameters, replacement gilts, feed additive.

EFFECTS OF EVAPORATIVE COOLING SYSTEMS ON PIG WELFARE AND PRODUCTIVITY UNDER HEAT STRESS

Sadovyi A. A.

National University of Life and Environmental Sciences of Ukraine,
a.sadovyi@nubip.edu.ua

Heat stress in pig farming has a complex impact on the physiology, behavior, and productivity of sows and their offspring. Developing and implementing effective temperature control methods are critical for maintaining high levels of animal productivity and welfare under conditions of global warming. The study evaluates the comparative effectiveness of different evaporative cooling systems and their impact on the physiological state and productivity of sows under heat stress conditions. Research indicates that the use of «Jet Cool» evaporative panels provides superior microclimate stability compared to high-pressure fogging systems. Specifically, the temperature in the sow's zone was 2.7 °C lower (22.6 °C), aligning with the thermal comfort zone, while humidity remained within optimal limits (65.9 %). The implementation of these panels led to a 3.2-point decrease in the temperature-humidity index, which significantly improved the animals' physiological welfare: respiration rates decreased by 8.7 %, and body mass loss during lactation was reduced by 17.5 % (1.1 kg). Enhanced thermoregulation resulted in higher average daily feed intake and a 5.4 % increase in milk yield, subsequently boosting piglet productivity. Average daily gains of piglets increased by 4.4–6.5 %, litter weight at weaning rose by 3.1 kg, and the survival rate improved by 1.48 %. In conclusion, «Jet Cool» evaporative panels represent a highly effective technological solution for mitigating heat stress, enhancing productivity, and improving the overall economic efficiency of pig farming during the lactation period.

Keywords: sow, housing, microclimate.

IMPACT OF WEANING AGE AND SEASONAL FACTORS ON PIG PRODUCTIVITY AND ADAPTIVE POTENTIAL

Vashchenko Ye. O.

National University of Life and Environmental Sciences of Ukraine,
ye.vaschenko@nubip.edu.ua

The study aimed to substantiate the optimal lactation length in combination with seasonal factors and sow parity to enhance reproductive performance and offspring survival in industrial swine production. The experiment was conducted at the «Agrofirma «Myg-Servis-Agro» agricultural cooperative using crossbred sows (LW×L) inseminated with PIC 337 line boars. The experimental design involved two groups of 50 sows and 3 boars each: a control group (weaning at 28 days of age) and an experimental group (21 days). The total number of piglets at the start of the study was approximately 1,950 heads. The research followed a three-factor model considering weaning age (21/28 days), season of the year, and sow parity (1st–5th cycles, 15 heads per cycle). It was established that reducing lactation length to 21 days, combined with the spring-summer season, enhanced the reproductive efficiency of sows: the weaning-to-estrus interval decreased by an average of 1.8–2.4 days and the conception rate increased by 3.6–5.1 %. The highest performance parameters were recorded in sows from the 2nd to 4th farrowing cycles. During the suckling period, sows in the experimental group exhibited a more stable ethological profile: the proportion of time spent in calm recumbent behavior was 6.2–8.7 % higher, while aggressive reaction levels were 18–22 % lower ($P<0.05$). Maternal behavior assessment using a 5-point scale showed an increase in the average score by 0.4–0.6 in the experimental group, particularly in sows of the 3rd and 4th parities. Piglet vitality at weaning at 21 days was higher: the share of piglets with a Vitality Score increased by 7.9–10.4 %, while the coefficient of variation in live weight decreased from 21.6–23.4 % to 17.8–19.2 %. Piglet survival rate up to 77 days of age in the experimental group exceeded the control by 2.8–3.5%.

Keywords: age of weaning, seasonality, ethological profile.

INFLUENCE OF MANURE PIT MANAGEMENT ON AIR QUALITY AND FATTENING PIG PERFORMANCE

Zinchenko O. V.

National University of Life and Environmental Sciences of Ukraine,
o.zinchenko@nubip.edu.ua

In industrial pig farming, manure management significantly affects indoor air quality. This study evaluated the impact of manure pit drainage frequency (2, 3, and 4-week intervals vs. full filling) on microclimate and gas concentrations (NH_3, CO_2, H_2S, O_2). Results showed that higher manure levels and prolonged drainage intervals increased gas pollution. Conversely, 2-3 week drainage intervals stabilized the air composition and minimized fluctuations in ammonia and carbon dioxide levels. While temperature and relative humidity remained within technologically acceptable limits, higher humidity levels were correlated with increased gas emissions. The improvement of air quality under regulated manure pit drainage directly impacted the performance of young pigs. In buildings with a 2-3 week drainage frequency, the average daily weight gain was 6.8-9.5% higher than in the control. The Feed Conversion Ratio improved, with feed consumption per 1 kg of gain decreasing from 3.05-3.12 kg to 2.78-2.85 kg. Furthermore, the livability rate in the experimental groups exceeded the control by 2.0-2.7 %, correlating with the reduction of harmful gas concentrations.

The results confirm the feasibility of optimizing manure pit drainage regimes as an effective tool for reducing gas load and improving the sanitary and hygienic conditions of pig housing while simultaneously enhancing animal productivity.

Keywords: pigs, performance, microclimate, manure removal.

EFFICIENCY OF POST-CERVICAL ARTIFICIAL INSEMINATION OF SOWS IN INDUSTRIAL PIG FARMING

Kalitaev K. K.

National University of Life and Environmental Sciences of Ukraine
kalitaev.k@nubip.edu.ua

Given the intensification of industrial pig production and the increasing cost of production inputs, improving the economic efficiency of sow reproduction is a priority. One of the most effective approaches to cost optimization and productivity enhancement in breeding herds is the adoption of modern, scientifically validated artificial insemination (AI) technologies. The aim of this study was to evaluate the economic feasibility of using different AI methods in sows under industrial production conditions, with particular emphasis on comparing conventional insemination techniques with the post-cervical artificial insemination (PCAI) method, currently considered one of the most resource-efficient and technologically advanced approaches. Production trials demonstrated that the application of PCAI resulted in a tendency toward a 0.68 % increase in farrowing rate compared with other semen deposition methods, indicating improved conditions for sperm placement in the reproductive tract and more efficient use of genetic material. At the same time, a tendency toward a higher total number of piglets born was observed in sows inseminated using the intravaginal method; however, no statistically significant differences in prolificacy were detected between the experimental groups. The most pronounced benefits of PCAI were identified in the economic analysis. Optimization of insemination techniques led to a 13.0 % reduction in the number of semen doses required per sow per year. The volume of a single semen dose decreased by 44.4 %, while the total quantity of semen used was reduced by 51.7 %. On an annual basis, the number of semen doses per sow decreased by seven units, directly lowering fertilization costs for the entire breeding herd. In addition, expenditures on semen extenders, basic catheters, and disinfectants were reduced proportionally by 13.0 %. More efficient semen utilization also made it possible to decrease the number of boars maintained by 44.0 %, resulting in further savings on housing and management.

Overall, the findings confirm the high economic efficiency of implementing post-cervical artificial insemination in industrial pig farming systems.

Keywords: artificial insemination (AI), post-cervical method (PCAI), economic efficiency.

MONITORING OF THE MUTTON'S QUALITY IN THE SOUTH OF ODESA REGION

Olha Piven, Iryna Monolatiy

Odesa State Agrarian University, Odesa, Ukraine, olhapiven@gmail.com

Sheep breeding is a traditional branch of livestock farming for the south of Odesa region. The main priority of the industry is to obtain high-quality and safe products. The region is a border region, so there is a constant threat of cross-border diseases.

The quality of mutton is significantly affected by the area's well-being from infectious and invasive diseases. The issue of helminth infections in animals remains relevant, with the peak of infestation for most of them occurring in the summer months. Due to climate change this issue requires constant monitoring. Taking into account research data from previous years, a bacterioscopic study of 40 mutton samples was conducted in the periods May-August 2024 and 2025 in order to determine the degree of freshness of the raw mutton. Sampling was carried out randomly.

It was established that no questionable fresh raw materials were found in the deep layers of the smears-imprints. However, in smears-impressions from the surface layers, for two consecutive years, isolated samples of questionable freshness were found. In 2024, the number of samples of questionable freshness was 20%, and in 2025 – 30%. The largest number of samples was detected in July, while in May 2025 no samples of questionable freshness were detected, in contrast to the data of 2024.

The quality of mutton sold in the south of Odesa region requires constant monitoring. All raw materials intended for sale must undergo thorough veterinary-sanitary inspection in order to prevent outbreaks of food infections and toxicosis, especially in the summer.

Keywords: mutton; helminth infections; food infections; toxicosis

ANIMAL WELFARE IN THE CONTEXT OF YOUNG CATTLE FEEDING WITH STRAW AND MIXED FEED

Ivan Stulnik

Odesa State Agrarian University, Odesa, Ukraine i.stulnik@gmail.com

Animal welfare of young cattle fed with straw and mixed feed is a critical factor not only from an ethical point of view but also directly influences gain, feed conversion, morbidity, and economics. Such a feeding system has increased risks and therefore requires targeted management.

Key aspects to consider when ensuring animal welfare:

- *feeding and rumen health (a key welfare factor).* Potential risks include subclinical and clinical ruminal acidosis (SARA) due to high starch levels, resulting in reduced chewing, depression, lameness and liver abscesses. In addition, periods of starvation can lead to rapid consumption of compound feed.

On what should we pay attention to: a minimum of 18-22% NDF in the dry matter of the diet, of which at least 8-10% is physically effective fiber; straw chopped into 4–6 cm pieces, not dusty; gradual introduction of compound feed (minimum 14–21 days of adaptation); buffer substances ($NaHCO_3$ 0.5–1.0% of dry matter). Control of the chewing process: ≥55–60% of animals should chew during the rest.

- *behavior and the ability to fulfill the natural needs of animals.* The risks here are boredom, stereotypical behavior (licking metal, aggression); increased competition for food. Mitigation methods include optimal feeding space (minimum 60–70 cm/head in group housing); free access to straw (as feed or bedding); formation of homogeneous groups by live weight (±10–15%).
- *housing (floor and bedding).* Risks: lameness due to hard/slippery floors, lying on concrete causes stress and reduces weight gain. Optimal: deep straw bedding or a combined system (straw + rubber mats); dry lying areas (humidity <65%); minimum 10–12 hours of lying down/day.
- ***water*** – an underestimated factor in well-being. Problems in case of water shortage: limited access to water may lead to reduced feed intake; contamination of drinking bowls with straw and feed. Optimization of animal watering is based on constant access, at least 2 drinkers per technological group of animals. Drinker capacity ≥10–15 l/min. Water consumption in summer – 50–80 l/day/head.

Thus, feeding with straw and mixed feed is possible with no harm to the animals' welfare but only if potential risks are actively controlled: monitoring rumen condition, constant access to water and feed, comfortable housing, minimization of stress and behavioral restrictions.

Keywords: feeding; housing; behavior; animal welfare

ALTERNATIVE COMPONENTS OF FEED RATIONS FOR YOUNG PIGS IN CONDITIONS OF PROTEIN DEFICIENCY

Serhii Arapaki

Odesa State Agrarian University, Odesa, Ukraine, s.arapaki87@gmail.com

Pork remains one of the most valuable, high-energy, strategically important and traditional foods for Ukrainians. Pig farming production technology involves a set of measures for breeding, feeding and keeping animals, which ensure the minimum cost of production per unit at optimal production volumes. The impact of feeding on pig productivity is the most significant, accounting for 60%, compared to 25% for breeding and selection and 15% for housing conditions.

From the point of view of animal welfare, feeding again plays a leading role. In addition, protein nutrition is key in terms of animal satiety, feed conversion, and production costs. Optimisation of the balance of diets in terms of protein nutrition was often characterised by imbalances in pig farms of various capacities and forms of ownership.

In industrial production, typical pig feed rations involve the use of the most popular and affordable cereal (barley, wheat, corn), protein (sunflower meal, soybean meal/cake) ingredients and biologically active substances (vitamins, minerals, enzymes, etc.). At the same time, protein ingredients are in short supply in feed rations due to low crop yields in certain years, high purchase prices, and, with the onset of full-scale incursion, due to logistical collapse, occupation of territories suitable for soybean cultivation, etc.

Therefore, in case of a deficiency of protein components in the feed ration for young pigs for one reason or another, alternative ingredients that can be used are field peas and other legumes, which contain 22–25% crude protein and can significantly supplement or partially replace soybean meal in pig rations and is a good source of lysine but need to be balanced with methionine or threonine; rapeseed meal, which has a sufficient amino acid profile for growing and fattening pigs (also suitable for sows); distillers grains – a side product of corn ethanol production, with a crude protein content of 25–30% and a good supplement to energy feed; meat and bone flour and blood flour – contain a complete set of amino acids, but require quality control due to the risk of microbial contamination; synthetic crystalline amino acids (lysine, methionine, threonine) to avoid deficiencies and ensure animal growth with so-called ‘ideal protein’.

Keywords: young pigs; protein nutrition; protein deficiency

COMPARATIVE ASSESSMENT OF THE EFFECTIVENESS OF LIQUID AND DRY FEEDING SYSTEMS FOR SUCKLING PIGLETS IN THE EARLY POSTNATAL PERIOD

Kovalenko O. A.

National University of Life and Environmental Sciences of Ukraine,
o.a.kovalenko@nubip.edu.ua

This study provides a comparative analysis of the effects of early supplementation with 2–14 Lonolac Piglet dry superprestarter versus liquid feeding using the Piggy Mill milk replacer, administered from the second day of life, on sow productivity, growth, survival rates, and the economic efficiency of piglet rearing during the suckling period. It was established that liquid feeding increased piglet survival by 4.1 %, average daily and absolute weight gains by 12.1 %, and average individual body weight by 9.2 %. At weaning, the number of piglets per litter was 5.2 % higher and the total litter weight was 14.9 % greater compared to the group receiving dry superprestarter feed. The different feeding systems led to significant variations in feed consumption, with the experimental group showing a 91.5 % reduction in dry superprestarter usage; however, total prestarter product consumption was 62.2 % higher per head and 44.7 % higher per kg of gain. Liquid feeding reduced the incidence of diarrhea by 49.1 %, resulting in a 22.8 % reduction in treatment costs per head and 31.1% per kilogram of gain, while preventive costs increased by 21.7 % per animal. Total veterinary expenses rose by 18.8 % per weaned piglet and 6.0 % per kg of gain. Combined costs for feed and veterinary care in the liquid feeding group exceeded the control by 189.6 % per weaned piglet and 62.0 % per kg of gain. The cost structure showed a 2.06 % decrease in the share of sow maintenance costs and increases in shares for veterinary measures (0.87 %), prestarter feed (3.43 %), and equipment depreciation (0.18 %).

Economic analysis demonstrated that due to a 1.4 % reduction in the production cost per weaned piglet and a 12.1 % increase in market value, income in the liquid feeding group was 41.8 % higher, ensuring a 19.85% increase in profitability.

Keywords: suckling piglets, liquid feeding, economic efficiency

BUFFALOES AS A SUCCESSFUL ANIMAL SPECIES THE BIODIVERSITY OF AGROECOSYSTEMS IN UKRAINE

Igor Goncharenko, Petro Korol

National University of Life and Environmental Sciences of Ukraine, Kyiv
igorgoncharenko2711@gmail.com

Climate change on planet Earth has been identified as the most catastrophic phenomenon affecting all forms of life in the 21st century. These changes impact all ecosystems and are perceived as a threat to livelihoods, food security, and sustainable development. The real prospects for development are for those livestock species characterized by the following properties: good health, long productive life, stable fertility, high quality of raw materials. Buffaloes meet all these requirements.

The domestic water buffalo (*Bubalus bubalis*) provides a significant share of global milk production and is the primary dairy animal in many countries. Buffalo milk contains higher levels of fat, protein, lactose, total solids, as well as minerals and vitamins. These components enhance the nutritional value of buffalo milk.

According to FAO statistical data, global buffalo meat production shows a steady growth trend. Buffalo meat is gaining increasing popularity due to its low fat and cholesterol content. It is rich in protein (20–25%, making it an excellent source of dietary protein), macro- and microelements, and B-group vitamins. It has been proven that buffalo meat retains its high nutritional and physiological qualities after culinary processing. Additionally, buffalo meat is not subject to any religious restrictions on consumption. Buffalo meat is gradually gaining popularity in Europe. In Italy, France, and Germany, buffalo steaks, dried sausages, bresaola, and other products have become widely appreciated.

In the recent past, buffalo breeding in Ukraine was a traditional branch of animal husbandry among the Crimean Tatars and the Rusyns in the Transcarpathian region. However, during the period of economic restructuring and commercialization of all sectors of the national economy, this industry also experienced a decline. Since 2007, the introduction of buffaloes from Transcarpathia to the Kyiv region has begun. These animals have demonstrated excellent acclimatization abilities, which have stimulated their comprehensive scientific study. In Ukraine, buffaloes are bred for both milk and meat production. A model enterprise in buffalo breeding is the exclusive buffalo farm LLC “TASbio,” which specializes in buffalo husbandry and the production of food products from buffalo milk.

Thus, the water buffalo represents a promising animal species worldwide and can make a significant contribution to the development of more sustainable and secure food production in the long term.

Keywords: buffalo, milk, meat, buffalo breeding

ASSESSMENT OF THE IMPACT OF THE GENETIC POTENTIAL OF DIFFERENT CROSSBREEDS ON EGG PRODUCTIVITY

Ilchenko M., Shaferivskyi B.

Poltava State Agrarian University, Ukraine, mariia1984poltava@gmail.com

This paper presents the results of an analysis of prospects for the further development of poultry farms, taking into account the existing potential and challenges of the modern poultry industry. Productivity indicators of the Lohmann crossbreeds were studied at “Poltava Poultry Farm” PJSC. The productivity of laying hens and the efficiency of using two lines – Lohmann LSL Light and Lohmann Brown – were assessed.

During the laying period, Lohmann Brown hens demonstrated high adaptive capacity and stable productivity. Although Lohmann LSL Light hens adapted well to intensive housing systems, their survival rate was 2% lower than that of Lohmann Brown birds. At the same time, Lohmann LSL Light hens reached peak egg production more rapidly (91.4%) and maintained high productivity throughout the production cycle. By the end of the productive period, egg production in this cross remained at 69.1%, which was 3.6% higher than in Lohmann Brown hens.

However, the average egg weight of Lohmann LSL Light hens was lower than that of Lohmann Brown hens. Lohmann Brown birds exhibited more intensive growth and reached the standard live weight for the cross by the end of the laying period. Specifically, at the end of production, the live weight of Lohmann Brown hens was 1880.9 g, compared to 1629 g in Lohmann LSL Light hens.

It was also established that feed costs, and consequently production costs, were significantly lower for the Lohmann LSL Light cross than for the Lohmann Brown cross. These findings indicate that the use of Lohmann LSL Light laying hens at Poltava Poultry Farm PJSC is more economically efficient than the use of Lohmann Brown hens.

Keywords: poultry; feed costs; production costs

ENSURING THE PRINCIPLES OF WELFARE IN UKRAINIAN POULTRY FARMING

Prokopenko N.P.
National University of Life and Environmental Sciences of Ukraine

Poultry farming in Ukraine is based on the use of various systems and methods of keeping farm poultry in compliance with existing standards and requirements for the technological process. The intensive farming system, which mainly involves keeping laying hens in battery cages and raising broiler chickens on deep litter floors, is combined with examples of alternative poultry farming methods. There are farms with enriched cages for keeping industrial flocks of chickens, with free-range laying hens, extended rearing periods for meat poultry, etc.

Animal welfare has become an important issue in poultry farming around the world. In Ukraine, along with a number of laws regulating state control over the production of livestock products, transportation of animals, and their slaughter, a series of regulatory documents were adopted in 2021 that directly define the requirements for ensuring welfare in the process of poultry production. Among them are the "General requirements for the welfare of farm animals during their keeping," which establish minimum requirements for the welfare of farm animals during their keeping. The "Requirements for the welfare of laying hens during their keeping" and the "Requirements for the welfare of broilers during their keeping" define the conditions for keeping poultry in cages and alternative systems. With the introduction of these requirements on January 1, 2026, the country is currently actively working to prepare producers for inspections and audits.

Keywords: poultry; animal welfare; regulatory documents

WINTERING MICROCLIMATE AND BEE WELFARE: THE CASE FOR PREVENTING OVERWINTER LOSSES

Igor Goncharenko, Vitalii Ocheredko

National University of Life and Environmental Sciences of Ukraine, Kyiv

igorgoncharenko2711@gmail.com

Overwinter colony losses remain a serious risk for beekeeping and, consequently, for food systems. To quantify how wintering conditions shape in-hive microclimate and affect colony welfare, we conducted comprehensive monitoring on colonies of the Ukrainian steppe bee at the NUBiP teaching-research apiary (Kyiv) over winter 2024–2025. Temperature and relative humidity were logged every 30 minutes using remote monitoring sensors. Results show that indoor wintering reduced environmental volatility and provided more stable in-hive conditions than outdoor wintering. Using monthly means derived from our dataset, brood-area relative humidity (RH) in the wintering room was 62.7% (December), 62.4% (January), 63.2% (February), averaging 62.8% across the period; outdoors it was 60.0% (December), 59.8% (January), 59.8% (February), averaging 59.9%. Temperature was also more stable in the wintering room: 15.93 °C (Dec), 10.72 °C (Jan), 7.56 °C (Feb), mean 11.40 °C; outdoors: 23.92 °C, 9.52 °C, 3.63 °C, mean 12.36 °C. Given biological set-points for colony homeostasis (brood-nest temperature 34–36 °C; mean RH 50–60%, locally 90–95% near eggs; moderate CO_2 ~0.1–0.3%), enhanced stability during indoor wintering plausibly reduces thermoregulatory workload and stress. Building on these results, we propose a prevention-oriented research agenda to lower overwinter mortality: (i) extend monitoring year-round to capture carry-over from summer weather; (ii) link microclimate dynamics to survival outcomes to calibrate actionable thresholds for minimally invasive interventions (insulation, entrance geometry, shielding, ventilation discipline). This results-first, decision-support approach can help beekeepers stabilize winter microclimate while minimizing colony effort.

Keywords: Apis mellifera; wintering; microclimate; temperature; relative humidity; welfare; prevention of winter losses

THE FREEZING POINT OF MILK AS A CRITERION FOR DETERMINING ITS ADULTERATION

Antoniuk T.

National University of Life and Environmental Sciences of Ukraine, Kyiv
antoniuk_t@nubip.edu.ua

Milk counterfeiting involves diluting and/or adding inexpensive, low-quality, and sometimes dangerous products in order to increase volume, mask lower quality, or replace natural substances in milk. The naturalness of milk is controlled by determining individual indicators such as density, dry matter content, its components, and freezing point. In most EU countries, the base freezing point of natural milk is minus 0.518 °C, while in Ukraine this value is standardized at no higher than minus 0.520 °C.

The aim of the study is to investigate changes in the freezing point of milk depending on the amount of added water and skimmed milk. 5 and 10% water (samples 1-2) and 5 and 10% skimmed milk (samples 3-4) were added to whole cow's milk. The freezing point and percentage of added water were determined using a CryoSpecial 1 cryoscope.

The problem in determining the naturalness of milk when it is adulterated with water is that the degree of adulteration largely depends on the freezing point of natural milk. According to the data obtained, the freezing point of whole milk was -0.531^0C. This indicator increased in proportion to the amount of water added: when 5% water was added, it increased to -0.478, and when 10% was added, it increased to -0.433. The freezing point of milk remained virtually unchanged when skimmed milk was added, which makes it difficult to detect this type of adulteration.

In conclusion, milk adulteration is a serious problem that negatively affects the quality and safety of the product and causes economic losses to producers and consumers.

Keywords: freezing point, milk, adulteration

BIOENERGETIC CHARACTERISTICS OF HOLSTEIN COWS UNDER DIFFERENT OPTIONS FOR FEEDING CONCENTRATED FEED

Gotsuliak Viacheslav
Borshch Oleksandr

Bila Tserkva National Agrarian University, borshcha@outlook.com

Milk production should be as economical and profitable as possible. At the same time, high productivity should be achieved not at any cost, but thanks to well-organized rational feeding and the creation of comfortable conditions for keeping animals, which allow for the effective use of feed and the maximum return from it. Therefore, the purpose of this work was to assess the biological properties of animals and the ability of their bodies to produce products under different options for feeding concentrated feed: from a feed table and from a feed table and partially from feed stations. It was found that the option of feeding concentrated feed affected the average daily milk yield adjusted for 4% fat. Under the option of feeding concentrated feed from a feed table and at feed stations, this indicator was 1.41 kg higher compared to the option of feeding concentrated feed only from a feed table. This is explained by slightly higher average daily milk yields with this option of feeding feed – by 1.46 kg ($P \geq 0.95$). At the same time, the indicator of net energy expenditure per 1 kg of 4% milk was slightly higher than with the option of feeding concentrates from the feed table – by 0.05 MJ. Slightly better values of energy (by 0.876%) and productive (by 0.05 kg/MJ) indices were observed in the variant of feeding concentrated feed from the feed table and at feeding stations. Also higher values of net maintenance energy expenditure, net milk energy and, accordingly, total net energy expenditure were observed in this variant of feeding concentrated feed.

Keywords: dairy cows; concentrated feed; productive indices

RATIONAL ROTATIONAL SPEED MODES OF A DISC KNIFE BLADE IN POULTRY CARCASS CUTTING

Bandura V.

National University of Life and Environmental Sciences of Ukraine

In modern industrial production, the relevance of research aimed at increasing efficiency and accelerating processes related to the separation of food raw materials is steadily growing.

The purpose of this study is to determine the cutting forces of poultry meat depending on the rotational speed of a disc knife blade.

During meat cutting with a blade, local temperature increases occur in the zone of structural failure of the meat, ranging from 10 °C at a cutting speed of 10 m/s to 135 °C at a speed of 70 m/s. The occurrence of numerous localized temperature rise zones leads to partial protein denaturation in areas adjacent to the cut surface. Therefore, excessive increases in cutting speed, in addition to higher energy consumption, result in a deterioration of product quality. Based on previous studies and taking into account the operation of industrial equipment, a cutting speed range for sliding cutting from 3 to 9 m/s was selected.

By studying the dependence of cutting force on the blade rotational speed, optimal parameters were determined. The recommended rotational speed range of the disc knife is 6.5 to 9 m/s. Within this range, a reduction in the overall cutting force is observed, which leads to lower energy consumption of the entire production process and provides the possibility to predict energy costs.

Keywords: poultry; meat; energy costs

CREATION OF POPULAR SCIENCE AND EDUCATIONAL VIDEO CONTENT WITHIN THE ONE HEALTH CONCEPT

Inna Zhunko

Odesa State Agrarian University, Odesa, Ukraine, zhunkinn@gmail.com

The One Health concept emphasizes the close relationship between human and animal health, environmental sustainability and biological systems. It has become increasingly relevant in the context of global health challenges, including pandemics, antimicrobial resistance and environmental degradation. In the digital era, social media platforms are powerful, effective tools for disseminating scientific knowledge and increasing public awareness, engaging students in health-related topics. This abstract is based on personal experience in creating popular science and educational video content for social media platforms, particularly TikTok, YouTube, Instagram, Facebook. Such content helps translate complex scientific information into short, accessible, visually appealing formats and promotes health literacy, preventive thinking and responsible behavior among diverse audiences by combining education and entertainment.

The creation of such content relies heavily on the use of modern digital tools and software such as video editing programs (InShot, CapCut, ScreenPal, etc.), graphic design applications (e. g. Canva), animation software, sound-editing and generative AI tools (ChatGPT, Gemini, etc.). Additionally, mobile applications and social media platforms enable rapid dissemination of content and facilitate interaction with broad audiences.

A key element of this approach was the introduction of fictional bacterial characters for explanation scientific facts related to microbiology, hygiene, environmental safety and disease prevention. An important feature of the content is its positive tone and playful, game-like format. Presenting scientific information through humor, visual metaphors, storytelling, accessible language, infographics and friendly tiny characters reduces psychological barriers to learning, facilitates better comprehension and retention of information. Positivity in content creation is particularly effective for students because it lowers anxiety associated with complex scientific topics and encourages curiosity rather than fear. Analysis of user feedback and engagement metrics on social media has revealed a growing interest in microbiology and health-related topics among viewers. This approach also supports informal education and complements traditional methods.

In conclusion, the creation of popular science video content using modern digital tools can serve as an effective educational strategy. Social media platforms provide accessible spaces for promoting health literacy, engaging students and general public attention to current One Health and welfare issues, thereby supporting both interdisciplinary education and public health communication.

Keywords: video; social media; education

ANIMAL WELFARE IN INDUSTRIAL LIVESTOCK PRODUCTION

Susol R.[1], *Zhunko I.*[2], *Zhunko Y.*[2]

[1]The Institute of Pig Breeding and Agro-Industrial Production of NAAS, Poltava, Ukraine r.susol@ukr.net; [2]Odesa State Agrarian University, Odesa, Ukraine, zhunkinn@gmail.com, elezovetazunko@gmail.com

Animal welfare in industrial livestock production remains an important factor in present conditions with given current legislation and directly affects milk yield, weight gain, feed conversion, rumen health and the economics of production. Feeding rations that ensure high animal productivity in industrial production are characterized by an increased amount of concentrated feed and are associated with higher risks to animal welfare compared to low-concentrate feeding. Therefore, systematic control is necessary to achieve optimal production results.

Key aspects of animal welfare and practical indicators:

- Feed Welfare. Main risks: subclinical and clinical ruminal acidosis; effective fiber deficiency; fluctuations in feed intake; hunger or competition for feed; drinking water deficiency.
- Behavioral Welfare. Main risks: stress due to overcrowding; aggression during feeding; restriction of natural behavior (absence or reduction of the frequency and duration of rumination, lying down).
- Physical comfort and microclimate. Main risks: heat stress; cold stress (in winter with wet bedding); limb problems (laminitis);
- Health Welfare. Main risks related to the prevention of laminitis, liver abscesses, respiratory diseases, diarrhea, etc.
- Management and human factor. Main risks associated with causing pain, irregular feeding, disruption of farm operations, shortage of qualified or trained farm staff, etc.

In conclusion, in the context of animal welfare, Cattle production in industrial farming depends not so much on the type of feed as on the balance and stability of feeding rations, the availability of optimal levels of physically effective fiber, free access to high-quality drinking water, optimization of the microclimate, farm management and staff behavior.

Keywords: animal welfare; feed; behaviour; physical comfort; human factor

THE CONCEPT OF ONE HEALTH THROUGH THE LENS OF ANIMAL WELFARE

Hryshchenko N. P.

National University of Life and Environmental Sciences of Ukraine
nat.hryshchenko@nubip.edu.ua

Globalization processes in the agricultural sector in recent years have required intensive methods of animal husbandry. Market saturation is often accompanied by technological pressure on animals, causing stress, which must be compensated for with broad-spectrum veterinary drugs. This situation has an indirect impact on the final link in the livestock production process – the consumer. The concept of One Health is a generalized form of sustainable development for sustainable human health through the creation of welfare for farm animals.

From 2026, the organisation of livestock production in Ukraine will be based on welfare principles. To this end, a number of organisational and educational measures are being taken at the state level to explain the requirements of European Union legislation in the field of welfare to market operators. For Ukrainian farmers in times of full-scale war, ensuring full compliance with requirements that involve increasing production areas and changing the design of animal housing facilities is financially costly for existing enterprises, while new enterprises are being built today in accordance with modern requirements. The implementation of preventive measures to ensure the health and comfort of animals on Ukrainian farms is an acceptable and routine matter, as the issues of full-ration feeding of animals, creation of an optimal microclimate, provision of optimal stall space, and the possibility of natural animal behavior are traditional components of livestock production technology in Ukraine.

Keywords: One Health; welfare; livestock production

OPTIMIZATION OF REARING AND FATTENING OF YOUNG PIGS UNDER DIFFERENT TECHNOLOGICAL SOLUTIONS

Zhdanov D.

National University of Life and Environmental Sciences of Ukraine,
Presbeton28@gmail.com

The material for the scientific and economic experiments will consist of three-breed hybrid pigs raised on the same farm.

All scientific and economic experiments will be conducted using the group method. The research will be carried out in two directions - groups of pigs during the rearing and fattening periods, which will be kept on slatted floors with different percentages of solid flooring. During the experiments, the following will be recorded: livestock preservation, determination of weight and linear growth, calculation of absolute, average daily, and relative live weight gains, as well as feed consumption per 1 kg of live weight gain. When balancing the pigs' diets, the total, protein, fat, carbohydrate, vitamin, and mineral nutritional values will be taken into account. The microclimate parameters of the premises where the pigs will be kept will be maintained by ventilation so that they meet the established hygienic standards: air temperature - within 18–22°C, relative humidity – 65-70%, concentration of carbon dioxide in the air - not exceeding 0.2%, ammonia - 20 mg/m³, hydrogen sulfide - 10 mg/m³. Lighting intensity in the facilities should be within 30–75 lx.

The growth of the experimental pigs will be evaluated based on the weighing results. Weighing will be carried out individually at the beginning and end of the experiment, as well as on the 45th and 60th day during the rearing period, and monthly during the fattening period, using special scales with an accuracy of 0.1 kg. Body length measurements will be taken during weighing using a measuring tape from the middle of the occipital crest along the top line to the base of the tail.

Based on the live weight data, the intensity of pig growth will be determined by calculating absolute, average daily, and relative gains using the corresponding formulas.

Keywords: pigs; growth performance

INNOVATIVE APPROACHES TO MEAT DEHYDRATION TO IMPROVE SAFETY AND NUTRITIONAL QUALITY OF DRIED MEAT PRODUCTS

Semenov M, Kiurcheva L.

Dmytro Motornyi Tavria State Agrotechnological University, Ukraine

Within the One Health framework, ensuring the safety and nutritional quality of animal-based foods is a key challenge linking human health, food technology, and sustainable production. Dried meat products represent a promising category of low-moisture, high-protein foods; however, inappropriate dehydration regimes may lead to protein denaturation, oxidative deterioration, and quality losses during processing.

The aim of this study is to substantiate innovative dehydration approaches that enhance the safety and nutritional value of dried meat products through controlled moisture removal. Particular attention is given to the optimization of technological parameters governing heat and mass transfer during dehydration.

Model-based analysis and literature data indicate that moderate-temperature convective dehydration combined with precise control of air velocity and processing time enables effective moisture reduction while preserving protein structure and sensory attributes. Achieving target water activity levels ($aw \leq 0.85$) is identified as a critical safety factor, as water activity is a primary determinant of microbial growth and shelf stability in low-moisture meat products.

From a One Health perspective, optimized meat dehydration contributes to human health by delivering safe, nutrient-dense foods with extended shelf life, while simultaneously supporting sustainable animal-based food systems. The proposed approaches are applicable to small and medium-scale production and provide a technological basis for improving food safety and quality in dried meat products.

Keywords: meat dehydration; dried meat products; food safety; nutritional quality; water activity; One Health

ON THE TRAIL OF LEPTOSPIROSIS: RESERVOIRS AND ROUTES OF SPREAD IN NATURE

Pyvovar Y., Zhunko I.

Odesa State Agrarian University, Odesa, Ukraine, liza.pivovar2000@gmail.com, zhunkinn@gmail.com

Leptospirosis is an acute infectious disease caused by pathogenic bacteria of the genus *Leptospira*. It remains one of the most widespread zoonotic infections affecting both animals and humans. Therefore, understanding the transmission mechanisms of the pathogen in the environment is crucial for the implementation of effective preventive strategies and disease control measures.

Environmental factors contribute substantially to the formation of endemic leptospirosis areas by influencing the pathogen itself, as well as the spread and population density of hosts and reservoirs. These factors create favorable conditions for the reproduction and transmission of *Leptospira*.

The primary sources of leptospirosis distribution include:

- Animals, especially rodents, serve as reservoirs for *Leptospira* and shed the pathogen into the environment through biological fluids, including urine.
- Stagnant water bodies contaminated with the biological fluids of infected animals.
- Moist soil, where *Leptospira* can persist and maintain their viability for up to 270 days.

To date, several transmission pathways of leptospirosis infection have been identified:

- *Leptospira* can penetrate the body through mucous membranes or damaged skin upon contact with contaminated water or soil, or in case of contact with biological fluids of infected animals.
- Infection can occur via the alimentary route through the consumption of food or water contaminated with *Leptospira*.
- There is a high risk of infection transmission for personnel handling infected animals or conducting post-mortem examinations, especially in cases when personal hygiene protocols are not strictly followed.

Given these factors, it is extremely important to raise public awareness about leptospirosis, particularly in rural and agricultural areas where the interaction between humans, livestock and wildlife is the most prominent.

Keywords: leptospirosis; livestock; *Leptospira*

PHYTOBIOTIC PRODUCT FOR THE PREVENTION AND TREATMENT OF MASTITIS IN DAIRY ANIMALS

Alyonova M.E.[1,2], *Mustafina R.Kh.* [1,2], *Sultanayeva L.Z.*[2], *Gaidukevich V.V.* [1,2], *Zamaratskaia G.*[3], *Balji Yu.A* [1,2]

[1]Kazakh Agro-Technical Research University named after S. Seifullin, Astana, Kazakhstan, [2]"NFT-KATU" LLP, Astana, Kazakhstan, [3]Swedish University of Agricultural Sciences, Uppsala, Sweden. meruertalenova64@gmail.com

Inflammatory mammary gland diseases, such as mastitis, reduce productivity and milk quality in dairy farming. With rising antimicrobial resistance, natural-based remedies offer safe, effective alternatives. This study developed a phytobiotic product from medicinal plant extracts *Salvia officinalis* (sage), *Plantago major* (plantain), *Achillea millefolium* (yarrow), *Calendula officinalis* (calendula), and *Artemisia absinthium* (wormwood) combined with BioFeed-P, glycerin, xanthan gum, and distilled water. Plant extracts has anti-inflammatory, antibacterial, and regenerative effects. BioFeed-P enhances immunity and metabolism; glycerin hydrates tissues; and xanthan gum forms a protective teat-skin biofilm. Experiments were conducted at LLP "NFT-KATU" and at S. Seifullin Kazakh Agro Technical Research University's Food Safety Laboratory. Efficacy was tested on a Kazakh dairy farm with cows showing clinical mastitis (experimental group, n=10; control, n=10). Application of the phytobiotic product increased milk fat content by 8.5%, reduced microbial contamination of teat skin by 54%, and decreased somatic cell count by 48%. This phytobiotic approach improves milk quality, herd health, and mastitis prevention/treatment, supporting sustainable dairy practices.

Keywords: mastitis; phytobiotic; medicinal plants; dairy cows; milk quality

QUALITY OF BROILER MEAT DEPENDING ON THE INTENSITY OF REARING

Karasyk M. D.

Poltava State Agrarian University, Poltava, Ukraine

At present, the demand for affordable poultry meat is increasing, provided that high quality and safety of products are maintained. At the same time, the issue of ensuring stable quality of chicken meat under intensive production systems remains unresolved. Public concerns regarding meat quality persist despite the declared compliance with technological standards, including the HACCP system.

The quality of poultry meat is formed under the influence of a complex of factors, the main ones being genotype, stocking density, duration of fattening, and housing conditions. The combined effect of these factors determines the main physicochemical characteristics of meat, including protein and fat content, pH level.

Under intensive broiler rearing conditions, poultry enterprises often face the occurrence of breast muscle myopathies, such as white striping and wooden breast, which are associated with reduced juiciness, impaired texture, and deterioration of overall meat quality.

As previously reported, supplementation of minerals and trace elements in the diet improved all aspects of meat quality, including sensory, physical, and chemical characteristics.

However, studies on the physicochemical properties of meat have shown that they were not significantly affected by access to pasture. Fast-growing commercial broiler chickens can be reared with access to pasture without changes in meat yield or quality parameters.

In our study, broilers were fed the compound feed “TOP KORM” and kept under conditions ensuring maximum compliance with poultry welfare requirements. It was found that the mass fraction of crude ash in the tibiotarsal bone of birds from the experimental group, whose diet was supplemented with the experimental products INPh L, INGut WS and INHealth L, amounted to 42.04%, whereas in the control group this value was significantly lower, at 39.73%. A higher level of bone mineralization indicates better absorption and deposition of calcium and phosphorus from the diet, which consequently contributes to improved meat quality and texture.

It is essential to maintain all technological and environmental parameters at optimal levels in an integrated manner, as this provides the basis for animal welfare and a stable microclimate, enabling consistently high meat quality, reduced mortality, and improved overall poultry welfare.

Keywords: meat quality; meat texture; technological and environmental parameters

BEEF SPLEEN IN SAUSAGE PRODUCTION TECHNOLOGY

Rys M., Agunova L.

Odesa National University of Technology, Odesa, Ukraine

The rational utilization of meat by-products is an important direction in the sustainable development of the meat-processing industry and a means of improving production efficiency. Beef spleen attracts increasing scientific interest due to its exceptionally high content of haem iron and its potential use as a functional ingredient in meat products.

Fried sausages are traditionally popular in Ukraine and are commonly manufactured without the addition of sodium nitrite, which enhances consumer demand for products with a more “natural” composition.

The aim of this study was to assess the effect of incorporating blanched beef spleen into the formulation of «Ukrainian fried» sausages on their organoleptic characteristics. Prior to use, the spleen was blanched, the denatured collagen shell was manually removed, and the tissue was cut into pieces. Processing resulted in a weight loss of 2.0 – 2.5 %. The prepared spleen was incorporated into a standard sausage formulation at different inclusion levels. The sausage mince was stuffed into casings and cooked until ready in accordance with established technological procedures.

A total of eleven sausage samples were subjected to sensory evaluation using a 9-point scale. The results showed that sausages containing up to 14 % beef spleen exhibited a pleasant taste characteristic of high-quality raw materials and an acceptable colour. Increasing the spleen content intensified the colour of the product, producing evenly distributed dark red or black inclusions. Samples containing 16–20 % spleen were characterized by a slightly metallic aftertaste, which negatively affected sensory acceptability.

It has been established that, to ensure balanced organoleptic characteristics, the proportion of blanched beef spleen in fried sausage formulations should not exceed 14 %.

Keywords: beef; sausage; blanched beef spleen

BIOLOGICALLY ACTIVE COMPOUNDS OF OATS IN THE DIET OF GEESE AS A MEANS OF IMPROVING THE QUALITY OF GOOSE FARMING PRODUCTS

Danchenko O., Maiboroda D., Danchenko M.

Dmytro Motornyi Tavriya State Agrotechnological University, Zaporizhzhia, Ukraine, olena.danchenko@tsatu.edu.ua

The composition of oat (*Avena sativa*) has been found to contain biologically active compounds (BACs) of phenolic nature, avenanthramides, which exhibit extremely high antioxidant activity. The content of these compounds varies significantly depending on the varietal characteristics and growing conditions of oats. A high content of these compounds has been proven in the green mass of oats of milk-wax ripeness. The aim of this work was to improve the technology of obtaining and storing goose meat by enriching their diet with BACs of oats. A comparative analysis of the effect of feed additives of aqueous extract of oats and an equivalent amount of green mass of oats of milk-wax ripeness on the quality of the resulting meat was carried out. The addition of oats to the diet of geese occurred in the pre-slaughter period for three weeks (from the 49th to the 63rd day). The quality of the resulting meat was determined after slaughter of the bird and during its low-temperature storage (-18^{0}C) for 90 days by the content of end products of peroxide oxidation (TBKAP), fatty acid composition, content of fat-soluble vitamins and organoleptic indicators. The results of the conducted studies proved that the addition of both oat extract and its green mass to the diet of geese contributed to a significant decrease in the content of TBKAP in the meat of both experimental groups compared to the control during the experiment. A significant increase in the content of polyunsaturated linoleic, linolenic and docosahexaenoic acids was recorded, which led to an increase in the total content of ω3- and ω6-polyunsaturated fatty acids in the meat of geese of both experimental groups. The meat of these groups of geese was characterized by a significantly higher content of vitamin E and β-carotene at the end of the experiment. However, a more stable positive antioxidant effect during low-temperature storage of meat was observed when oat extract was added to the diet of geese. However, the economic component, taking into account the additional costs of extracting BAS from the green mass of oats, proves the feasibility of using its green mass.

Keywords: *Avena sativa*, avenanthramides, goose meat quality, oxidation products, fatty acid composition, fat-soluble vitamins

EFFECT OF OVEN AND MICROWAVE DRYING ON THE ANTIOXIDANT ACTIVITY OF STRAWBERRY FRUITS

Kucheriavyi V., Kiurcheva L.

Dmytro Motornyi Tavriya State Agrotechnological University,
Zaporizhzhia, Ukraine, kucheravy_vlad@ukr.net,
liudmyla.kiurcheva@tsatu.edu.ua

Dried fruits are characterized by higher nutritional value compared to other types of processed products; however, different drying methods affect the retention of their biologically active compounds differently. In this context, the aim of the study was to determine the effect of oven and microwave drying on the antioxidant activity of dried strawberry fruits.

The antioxidant activity of strawberry fruits was determined using a colorimetric method with the stable radical DPPH (2,2-diphenyl-1-picrylhydrazyl). The results of antioxidant activity were expressed as a percentage of DPPH radical inhibition.

Statistical analysis of the results was performed based on three independent experiments. Mean values and the statistical significance of differences were determined using analysis of variance (ANOVA).

The study examined the effect of drying methods (oven and microwave drying) on the antioxidant activity of strawberry fruits (Fragaria × ananassa, cultivar «Senga Sengana»). The analyzed fruits were characterized by high antioxidant activity, with the ability to scavenge free radicals ranging from 54.5% to 78.6%.

The results of the study indicated that the antioxidant activity of strawberry fruits decreased after drying, with a more pronounced reduction observed in samples dried in a microwave oven compared to oven drying. The data suggest that microwave drying under optimal temperature conditions is a more effective method for preserving strawberry fruits with maximal retention of antioxidant compounds.

The differences observed between samples dried by different methods may be attributed to factors such as the temperature regime, harvest period, drying parameters, cultivar characteristics, plant nutritional status, and other factors influencing the drying process.

Keywords: garden strawberry, drying, DPPH activity

PROSPECTS FOR THE USE OF ALTERNATIVE TYPES OF FRUIT AND BERRY RAW MATERIALS IN THE PRODUCTION OF PASTA PRODUCTS WITH ANTIOXIDANT PROPERTIES

Kolisnychenko T., Zvonenko B.

Dmytro Motornyi Tavria State Agrotechnological University, Zaporizhzhia, Ukraine

Today, humanity faces an important problem related to the quality of food consumed. The chemical composition of food products at the beginning of the third millennium largely depends on the deterioration of the planet's ecological condition caused by massive emissions into the environment, which is a consequence of active human technological activity.

One effective way to counteract the negative impact of harmful dietary factors on human health is to include components in the diet that can protect the body from their effects. Recently, foods designed for health improvement and prevention, enriched with vitamins, essential amino acids, micro- and microelements, as well as other biologically active substances, have been gaining popularity. Thanks to such products, people have the opportunity to maintain their health and fully satisfy their physiological needs for energy and nutrients that are necessary for the body to build cells, tissues and organs.

In today's world, the fast pace of life increasingly dictates its own terms, forcing many people to focus primarily on work, education or other important responsibilities. As a result, the cultural aspect of cooking is often overlooked. Pasta remains consistently popular among the population due to its affordability, ease of preparation, and the possibility of creating a wide range of flavour combinations based on it.

As an alternative, we suggest adding fruit and berry puree bases to the composition of moulded flour products, as they contain a significant amount of nutrients valuable for human nutrition, thus giving them antioxidant properties.

This fruit and berry stuff has a bunch of biologically active stuff in it, like vitamins A, C, E, B vitamins, dietary fibre, micro- and macroelements, cellulose, and polyphenolic compounds.

Thus, it is relevant to create functional flour-based products using fruit and berry purees as sources of natural antioxidants, which will contribute to increasing the nutritional and biological value of the products.

Keywords: functional flour-based products; fruit; berry

BEHAVIOURAL INDICATORS OF DAIRY COW WELFARE AS INFLUENCED BY STOCKING DENSITY AND HOUSING CUBICLE DESIGN PARAMETERS

Nosevych D. K.

National University of Life and Environmental Sciences of Ukraine,
dknosevich@nubip.edu.ua

Comfort facilitates the expression of the productive potential of dairy cows. On farms, emphasis is generally placed on compliance of housing area parameters with regulatory standards; however, the level of housing comfort can be objectively assessed through the analysis of cows' behavioural responses.

By observing cows' resting behaviour at dawn, prior to the morning feed delivery, stall comfort and the effect of pen stocking density on resting availability were evaluated. It was established that the application of up to 20 cm of bedding not only enables the formation of a comfortable lying surface but also compensates for the disadvantages of a low position of the lower rail of the stall divider, thereby reducing the risk of limb injuries. On the other hand, the bedding layer reduces the distance to the neck rail; consequently, taller cows may be injured when rising. An indicator of a low neck rail position is a substantial proportion of cows resting in the stall while standing with only the forelegs inside. The overall proportion of cows standing in stalls ranged from 2 to 18%, indicating a potential effect of stall design on behaviour.

Stocking density of pens is of considerable importance. It is generally accepted to leave several stalls unoccupied within a pen to facilitate cows' search for a free resting place. In pens with a capacity of up to 50 cows, correlation analysis did not confirm a positive effect of group unloading on the number of cows lying in stalls. A weak positive relationship was observed between pen occupancy and the number of lying cows ($r = 0.32$). Although in pens stocked at 100% occupancy 59% of cows were lying, which is below the herd average, at 62% occupancy only 45% of cows were lying in stalls. A reduction in the number of cows per pen had a negative effect. The proportion of animals standing in stalls with only the forelimbs increased ($r = -0.58$). The causes of this behavioural response require further investigation.

Thus, the use of bedding improves stall comfort; however, its presence affects the effective stall dimensions available to the animals, which must be taken into account during housing design. Reducing the number of cows in pens designed for 50 head does not have a significant effect on resting availability but induces behavioural responses, the causes of which require additional research.

Keywords: cows; dairy farming; animal welfare

INFLUENCE OF ANIMAL WELFARE ON FUNCTIONAL AND TECHNOLOGICAL PROPERTIES OF MEAT

Kravchenko O.I.

Poltava State Agrarian University

Animal welfare is a determining factor influencing the formation of the functional and technological properties of meat. The physiological state of the animal directly affects biochemical processes in muscle tissue during life, the rate of post-mortem pH decline, water-binding capacity, color, and texture. Among the factors that can significantly impair these properties, even when high welfare standards are maintained on livestock farms, are the conditions of animal transportation to meat processing plants.

Ukraine has developed a draft order on animal welfare during transportation, but the currently enforced requirements remain outdated. Several key problems persist, including the widespread use of obsolete transport vehicles without regulated ventilation, the absence of approved stocking density standards, lack of access to water, the lack of mandatory personnel training and certification and etc.

Transport stress does not simply “spoil” meat - it alters its functional and technological properties through profound biochemical shifts in muscle tissue. One of the primary consequences is an increased proportion of carcasses exhibiting PSE and DFD defects. Meat with PSE characteristics demonstrates the most pronounced deterioration: reduced water-holding and water-binding capacities, increased exudate losses, paler coloration, diminished emulsifying capacity, and lower yields of processed meat products.

Within the One Health framework, these outcomes must be viewed holistically. Ensuring appropriate transportation conditions and minimizing stress not only enhance animal welfare but also improve the quality and safety of food products, reduce food losses, support the economic resilience of production systems, contribute to the health of humans, animals and ecosystems.

Keywords: animal welfare; meat quality; animal production

USE OF SEA BUCKTHORN PUREE TO IMPROVE THE NUTRITION AND BIOLOGICAL VALUE OF PATE PRODUCTS

Serdiuk D., Priss, O.

Dmytro Motornyi Tavria State Agrotechnological University, Zaporizhzhia, Ukraine

Sea buckthorn fruits are characterized by a high content of vitamin C (120-250 mg/100 g), carotenoids (up to 30 mg/100 g), tocopherols and soluble dietary fiber. Despite these properties, the use of sea buckthorn in emulsified meat-based products, such as pâtés, remains limited.

The aim of this study was to investigate the effect of sea buckthorn puree on the technological characteristics and nutritional value of pâté products. The puree was introduced in amounts of 5, 10 and 15% with partial replacement of the fat phase. The processing parameters included short-term heat treatment of the fruits (85 – 90 °C for 5 min), homogenization to a fine puree and its addition during comminution, which ensured a uniform distribution of organic acids and pectin substances in the meat system.

The results showed that the addition of 10-15% sea buckthorn puree increased the water-binding capacity by 12-18%, reduced the fat content by 8-12% and reduced the energy value by 6-9%. The content of vitamin C in the finished products increased by 2.5-3.2 times, and the content of carotenoids by 3.8-4.5 times compared to the control. Structural stability improved, and a slightly acidic taste profile was formed without a negative impact on sensory qualities.

Keywords: Sea buckthorn; pate quality; sensory

APPLICATION OF A COMPOSITE PLANT-BASED ADDITIVE BASED ON CARROT PUREE AND MUSHROOM POWDER IN THE PRODUCTION OF COOKED SAUSAGES

Serdyuk M.

National University of Life and Environmental Sciences of Ukraine, Ukraine

Carrot and oyster mushroom are accessible sources of dietary fiber, carotenoids, protein, and mineral compounds, making them suitable for targeted incorporation into meat products. Particular interest lies in combining carrot puree and mushroom powder into a single composite additive with controlled technological properties.

The aim of the study was to evaluate the effect of a composite plant-based additive on the quality characteristics of cooked sausages. The additive was formulated using 75% carrot puree and 25% oyster mushroom powder. Its nutritional composition was as follows: moisture – 56.68%, protein – 8.56%, fat – 2.35%, carbohydrates – 36.45%, ash – 6.12%, energy value – 192 kcal/100 g. In cooked sausage formulations, 10 – 30% of meat ingredients was replaced with the plant-based additive.

It was found that the incorporation of 25% of the additive improved water-binding capacity, promoted the formation of a uniform and stable sausage structure, and reduced the overall energy value compared to the control samples. Sensory evaluation confirmed the preservation of characteristic quality profiles without the development of off-flavors. The results demonstrate that the composite additive based on carrot puree and mushroom powder can be effectively used to adjust recipe composition and nutritional characteristics of cooked sausage products.

Keywords: sausage; carrot; oyster mushroom

GROWTH PECULIARITIES OF THE LARGE WHITE AND LANDRACE GILTS WEANED AT DIFFERENT AGE

Shostia A.M., Shpyrna I.H.

Poltava State Agrarian University, Poltava, Ukraine

During the suckling period and at completion of growing, younger and lighter piglets are able to accelerate their growth having favorable conditions of keeping after weaning. To implement this potential, it is necessary to provide the animals with high quality starter feeds having higher nutritive value, which will allow weaker piglets to overtake quicker the animals of the same age.

The aim of the study was to determine the impact of the weaning age on the growth intensity, adaptive capabilities and feed consumption in the Large White and Landrace breed gilts. Four groups of piglets, distributed according to their weaning age: 21 and 28 days were used in the experiment.

The obtained results show that the shortening of the piglets' suckling period lead to their temporal growth inhibition, the decrease in average daily weight gain in the period from the 22nd to the 35th day (in the animals of Landrace breed – up to 34-144 grams and up to 86-136 grams in their analogs of the Large White breed, and the lowering of the absolute weight gains (0.24-1.01 kg and --+0.60-0.95 kg, respectively). At the same time, early weaned piglets demonstrated compensatory growth after the adaptation period, especially in the gilts of Landrace breed, which showed partial growth recovery. It was found that the piglets weaned at the age of 28 days were characterized by uniform weight growth dynamics, stable feed consumption, which ensured more effective adaptation to solid feed and better feed conversion. Breed characteristics also affected the adaptation: the gilts of Landrace breed demonstrated more expressed compensatory growth, while the animals of the Large White breed were distinguished by weight growth and feed consumption stability. It was determined that the shortening of the suckling period to 21 days considerably influenced the piglets' adaptation: not uniform feed consumption reduced growth effectiveness in the first weeks after weaning. At the same time, the optimization of the weaning age to 28 days ensured more stable growth dynamics, uniform feed consumption and economic efficiency of growing.

Keywords: piglets; weaning; growth dynamics

SILENT PAIN: WHY FISH WELFARE MATTERS FOR SCIENCE, INDUSTRY AND ETHICS

Kononenko I.

National University of Life and Environmental Sciences of Ukraine
iryna_kononenko@nubip.edu.ua

Fishes are used in a variety of contexts and in incredibly large numbers. Trillions of fish are caught or farmed each year to provide a foodstuff for humans or other animals. Millions are employed as models for experimental studies. Fishes are also used for recreational purposes in sport or as a hobby. Numerous species are held in public aquaria and fishes are the most numerous pet held in home aquaria or ponds. Considering their popularity, do they deserve humane treatment and welfare?

The previously held view that fish are not capable of feeling pain, stress, emotions, etc., has now been contradicted by numerous studies that prove the opposite. Their perception, consciousness, and sensitivity are different from ours, and it's not primitive; fish are highly sensitive creatures. Fish have the same neuroanatomical structures for perceiving pain as mammals, and the formation of stress responses in fish follows the same principles as in mammals. Fish are highly intelligent, capable of associative learning, which is more effective than in some mammals, as well as learning based on the experience of similar individuals. Fishes form complex hierarchies within their groups and are social animals that also form mutually beneficial relationships between different species, which is not very common among mammals. Fishes actively use tools, which is evidence of consciousness. Fish are “the most exploited group of vertebrates on the planet with the least legal protection.” Our constant abuse of fish, or overfishing, demonstrates our human tendency to underestimate what we do not fully understand. Humane treatment to fish is not a fad. It is a sign of a civilized world and smart business.

Keywords: welfare; fish; sensitivity; pain; intelligence

AREAS OF ACTIVITY OF THE KYIV ZOOLOGICAL PARK

Temchenko D. V.
student pursuing a Master's degree,
Faculty of Animal Husbandry and Aquatic Bioresources,
National University of Life and Environmental Sciences of Ukraine
dasha.temch@gmail.com

Kyiv Zoological Park is one of the oldest in Ukraine, dating back to 1909. It is a nature conservation, research, and cultural and educational institution, which is an artificially created object of the nature reserve fund of national importance. It covers an area of approximately 34.22 hectares, of which 21.85 hectares are allocated for exhibition areas. The zoo collection includes more than 300 species of animals, with a total of over 2,000 individuals. Among them are a significant number of fauna species listed in the Red Book of Ukraine: black stork, eagle owl, golden eagle, Montagu's harrier, Dalmatian pelican, bison, Eurasian lynx, brown bear, forest cat, and others. Since 2016, the zoo has switched to international animal registration in the ISIS International Species Information System, research work has been resumed, and the work of specialists is published in international rating publications. The zoo's scientists are involved in IUCN rare species conservation projects. An ambitious program to release black storks into the wild has been launched. In Ukraine in 2018, black storks were kept in three zoos in different cities, including Kyiv. Three pairs of storks bred at the Kyiv Zoo and seven chicks were hatched. Three chicks hatched in 2017 were first sent to the Galician National Nature Park for acclimatization and then released near the Dniester River, where there is a natural population of black storks. The birds and their migration routes were monitored for several years.

Key words: Kyiv Zoological Park, animal accounting, research activities.

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