BOOK OF ABSTRACTS

EAST CENTRAL/EAST AND SOUTH EUROPE ISAE REGIONAL MEETING 2025

WORKSHOP

Sofia, Bulgaria, 24 – 26 June 2025

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Detailed workshop schedule

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Local organizer:

Assoc. Prof. Ivan Yanchev, Ph.D. Vice Director, Institute of Animal Science 2232 Kostinbrod, Bulgaria www.ias.bg

Preface

Bridging Science and Practice: A Workshop on Farm Animal Welfare Assessment

The welfare of farm animals is a collective responsibility, situated at the crossroads of scientific research, ethical considerations, and agricultural practices. With society's growing concern for animal well-being, the demand for robust welfare assessment methods has significantly increased. To meet these expectations, such methods must not only adhere to scientific rigor but also be practical and adaptable across the diverse range of farming systems.

This three-day workshop, *Bridging Science and Practice: A Workshop on Farm Animal Welfare Assessment*, brings together students, PhD candidates, early-career researchers, and experts from the Balkan, Eastern, and Western European regions. Hosted at the Institute of Animal Science in Kostinbrod, Bulgaria, the programme offers a unique opportunity to examine animal welfare challenges and explore innovative solutions within the context of a lower-budget agricultural economy, reflecting the realities of many Eastern European settings.

Bulgaria, as one of the more economically constrained EU member states, offers a valuable opportunity to explore how welfare principles can be effectively implemented despite financial limitations. Participants will gain insight into the current state of animal welfare in the country, including ongoing research initiatives, policy frameworks, and the practical realities faced by its farming systems.

The workshop weaves together robust theoretical foundations with applied experience. Participants will benefit from plenary talks delivered by leading researchers, engaging group discussions, and immersive field visits to farms and research institutions. The programme covers a diverse range of topics, including species-specific assessment protocols, ethical and legal considerations, cutting-edge digital technologies, and strategies for welfare policy implementation. By bridging scientific knowledge with field-based perspectives, this workshop supports critical thinking, cross-border collaboration, and the development of context-sensitive solutions to advance farm animal welfare across Europe. We warmly invite you to join this enriching and collaborative environment, designed to inspire learning and exchange.

The Organising Committee
Manja Zupan Šemrov, Miroslav Kjosevski, Radka Šárová

The Scientific Committee (Abstract Evaluation)
Barbora Valníčková (Czech Republic), Boris Bilčík (Slovakia), Irene Camerlink (Poland), Martina Komárková (Czech Republic), Radka Šárová (Czech Republic)

Day 1 – Introduction & Theoretical Foundations

Theme: Understanding Farm Animal Welfare – Concepts and Indicators
Venue: Conference Room

09:00 – 09:30 | Registration & Welcome Coffee
09:30 – 10:00 | Opening Remarks & Workshop Objectives (Manja Zupan Šemrov. *University of Ljubljana, Slovenia*)

- Introduction of participants
- Overview of the workshop programme and goals
- ISAE representatives (Oluwaseun Iyasere, *Development Officer for ISAE*, Radka Šárová, *Regional ISAE secretary*)

10:00 – 11:00 | **Plenary Talk 1:** *Scientific Foundations of Animal Welfare – Why Do We Need to Assess Welfare?*
Speaker: Carolina Cardoso Nagib Nascimento, FOUR PAWS, Austria

- Defining animal welfare (physical, mental, and natural behaviors, positive animal welfare)
- Key indicators for welfare assessment
- Ethical and legal perspectives

11:00 – 11:15 | Coffee Break

11:15 – 12:15 | **Plenary Talk 2:** *Welfare Assessment in Cattle and Small Ruminants*
Speaker: Miroslav Kjosevski, Saints Cyril and Methodius University of Skopje, North Macedonia

- Behavioral, physiological, and health indicators
- Practical challenges in field assessments

12:15 – 13:30 | **Discussion Session 1:** *Species-Specific Challenges and Innovations*
Moderators: Ivan Yanchev, Institute of Animal Science, Kostinbrod, Bulgaria,
Katarina Nenadović, Faculty of Veterinary Medicine, University of Belgrade, Serbia

- Small group discussions with case studies
- Interactive Q&A with plenary speaker

13:30 – 14:30 | Lunch Break

14:30 – 15:30 | **Plenary Talk 3:** *Welfare Assessment in Pigs and Poultry*
Speaker: Ivana Sabolek, Department of Animal Hygiene, Behaviour and Welfare, University of Zagreb, Croatia

- Behavioral, physiological, and health indicators
- Practical challenges and solutions

15:30 – 15:45 | Coffee Break

15:45 – 17:00 | **Discussion Session 2:** *Species-Specific Challenges and Innovations*
Moderator: Elie Atallah, University of Milan, Italy

- Group case discussions
- Q&A with plenary speaker

19:00 – Evening Gathering & Dinner with Participants

Day 2 – Practical Implementation

Theme: Application of Welfare Assessment in Farming Systems
Venue: Conference Room

09:00 – 09:30 | Recap of Day 1 & Key Takeaways (Manja Zupan Šemrov)

09:30 – 10:30 | **Plenary Talk 4:** *Policy Implementation in Animal Welfare*
Speaker: Marta Brščić, Department of Animal Medicine, Production and Health, University of Padua, Italy

10:30 – 10:45 | Coffee Break

10:45 – 11:45 | **Plenary Talk 5:** *Research on Transhumant Pastoralism in Sheep over the Past Decade*
Speaker: Ivan Yanchev, Institute of Animal Science, Kostinbrod, Bulgaria

11:45 – 13:00 | **Discussion Session 3:** *Emerging Technologies & Tools*
Moderator: Andrej Mergeduš, Faculty of Agriculture and Life Sciences, University of Maribor, Slovenia and Nikolay Markov, Institute of Mountain Agriculture and Animal Husbandry, Troyan, Bulgaria

- Small group discussions on AI and digital tools in animal production
- Interactive Q&A with plenary speaker

13:00 – 14:00 | Lunch Break

14:00 – 17:15 | **Scientific Session:** *Participant Research Presentations*

Elena Gobbo – Scatter feeding as a strategy to reduce aggression and feather pecking in parent layer flocks

Alja Ališah – Farm animal welfare in Bosnia and Herzegovina: A comparative analysis with European Union's practice

Andrej Mergeduš – Animal welfare and the prevalence of technopathy in the context of cattle stable design

Elie Attalah – Seasonality's influence on sheep welfare: insights from farms in marginal areas

Mehmed Halil – Comprehensive Welfare Assessment of Dairy and Meat Sheep Farms in Bulgaria

Katarina Nenadović – Welfare assessment of farm animals in Serbia

Patricia Soster de Carvalho – Behavioral Dynamics and Movement Patterns in Broilers Captured by Multi-Camera Tracking System

Claudia Manfrè - Reliability of Qualitative Behaviour Assessment in a cow-calf contact system

Simon Cirkulan – Parental and alloparental behaviour of the Golden-headed lion tamarin (*Leontopithecus chrysomelas*)

17:15 – 17:30 | Wrap-Up & Preparation for Field Visit (Manja Zupan Šemrov and Ivan Yanchev)

- Overview of field visit agenda
- Key welfare indicators to observe

19:00 – Evening Gathering & Dinner with Participants

Day 3 – Field Visits & Practical Demonstrations

Theme: Real-World Application of Welfare Assessment
Venue: Local Research Institute & Farm

08:00 – 10:15 | Travelling from Hotel Forum - Sofia to Research Institute of Mountain Stockbreeding and Agriculture (RIMSA) - Troyan - about 2 hours by bus along the route - https://maps.app.goo.gl/gVKsmu3s1H7kPQyH6?g_st=im

10:15 – 10:30 | Welcome & Coffee Break

10:30 – 12:00 | Visit to the farms in RIMSA - Troyan

Leads: Ivan Yanchev and Nikolay Markov

- Demonstration of welfare assessment methods
- Overview of ongoing research initiatives

Brief description:
In the Scientific and Experimental Base of the Research Institute of Mountain Stockbreeding and Agriculture - Troyan, an "Intelligent System for Monitoring Microclimate Parameters" is being successfully implemented, which is related to the humane attitude towards animals, the constant change in environmental parameters and public health. Stationary sensors control: atmospheric pressure, humidity, temperature and carbon dioxide level, at certain intervals of time, with the data array being collected in an information cloud. The data is processed with specific software and recorded in a database for analysis, and from there it is sent to the mobile

devices of scientists in various fields. Sensors monitoring humidity and temperature control the ripening process of cow and goat cheese, traditional and established products of the Institute. The illumination, humidity and temperature of experimental raspberry plantations are also monitored. The system is in the process of upgrading and improving and is being implemented according to the idea of a team from the Research Institute of Mountain Stockbreeding and Agriculture - Troyan working on Panel 5 of NNP "Intelligent Animal Husbandry" headed by Prof. Nikolay Markov and the Management of the Institute.

12:00 – 13:00 | Lunch Break (On-Site) will be held in the official hall of the canteen in RIMSA - Troyan

13:00 – 13:45 | **Closing Session:** *Reflections and Key Takeaways* (in the conference hall of RIMSA - Troyan)

Moderators: Manja Zupan Šemrov and Ivan Yanchev

13:45 – 14:00 | Certificate Distribution & Closing Remarks

14:00 – 15:00 | Visiting Troyan monastery - located located 10 km (16 minutes) from RIMSA (brief info at https://en.wikipedia.org/wiki/Troyan_Monastery)

15:00 – 17:30 | Travelling back to Sofia & Farm Visit during the way: On-Site Welfare Evaluation

Abstracts

Plenary Talk 1

SCIENTIFIC FOUNDATIONS OF ANIMAL WELFARE – WHY DO WE NEED TO ASSESS WELFARE?

Carolina Cardoso Nagib Nascimento

Four Paws International, Vienna, Austria carolina.nascimento@vier-pfoten.org

Animal Welfare has been defined as "the state of an animal as it attempts to cope with its environment" (Fraser and Broom, 1990). When animal welfare is brought to discussions, different people tend to emphasise different concerns, such as health aspects or the absence of diseases or injuries. Or the emotions or mental states of animals such as pain, distress and pleasure that are experienced as negative or positive. Or the ability of animals to live reasonably natural lives by carrying out natural behaviour and having natural elements in their environment. These concerns constitute different criteria that people use to assess animal welfare. Indeed, the animal welfare assessment framework became an essential tool to recognise signs of pain, suffering and distress, and to be able to improve the practical care of animals. Historically, animal welfare as a scientific foundation gained prominence after the publication of Animal Machines (1964) by Ruth Harrison and the subsequent Brambell Report (1965), that pointed out that farm animals would be likely to have problems if the conditions provided for them frustrate aspects of natural behaviour and which introduced the "Five Freedoms". A major scientific contribution to welfare has been the development of assessment frameworks and indicators, such as the five-domain assessment approach. So, the concept of welfare refers to the measurable state of the individual on a scale from very good to very poor. Since welfare can be poor, it is not logical to speak of preserving, ensuring or compromising welfare. Welfare measurements should be based on the biology of the species and, in particular, on what is known about the mechanism used by animals to try to adapt to the difficulties, and on their success or failure in achieving this objective. The measurement and interpretation should be objective. According to Broom (1998), good welfare often involves good feelings, and poor welfare involves bad feelings. Indeed, feelings are biological mechanisms, which are an important part of coping methods. Pain, fear, pleasure, rage for example, are adaptive and have evolved as a result of natural selection like other biological mechanisms. Significant protocols like the Welfare Quality, AWIN and Animal Needs Index illustrate a shift toward more animal-based assessment that consider positive welfare as an important indicator, not only the absence of pain and suffering. Indeed, the evaluation of animal welfare entails far more than a mere technical exercise or an added value to a product. The scientific assessment constitutes a fundamental element of both responsible animal stewardship and ethical awareness. By taking this approach, it establishes a foundation for a more compassionate, sustainable, and ethically sound relationship between humans and animals.

Keywords: animal-based; ethics; farmed animals; indicators; pain

WELFARE ASSESSMENT IN CATTLE AND SMALL RUMINANTS

Miroslav Kjosevski

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The welfare of cattle and small ruminants, particularly sheep and goats, largely depends on housing and management systems. These systems vary across different countries and cultures worldwide, resulting in significant differences in ruminant welfare between regions. For example, in Macedonia and throughout the Western Balkans, cattle and small ruminant production primarily consists of small-scale (individual household) and extensive farming operations. This production type significantly impacts farm animal welfare. The existing variations in production systems underscore the importance of on-farm welfare assessment methods to obtain an objective evaluation of welfare status and identify areas for improvement. The most commonly used welfare assessment protocols are the Welfare Quality® Assessment Protocol for dairy cows and the AWIN Welfare Assessment Protocol for sheep and goats. These protocols follow four welfare principles (Good Feeding, Good Housing, Good Health, and Appropriate Behavior), each comprising multiple welfare criteria that consist of various welfare measures or indicators. These protocols offer a general overview of farm welfare, focusing primarily on herd-level findings based mainly on animal-based indicators. While traditional and small-scale systems are gaining popularity, particularly in high-income countries, they present several welfare challenges that require attention. This is especially relevant in the Western Balkans. For instance, previous on-farm welfare assessments in Macedonia on 11 dairy farms have revealed that tie-stall systems for dairy cows remain prevalent, with high percentages of dirty animals (averaging 95% per farm), a lameness prevalence of 27%, alarming levels of high somatic cell counts in milk (95% of the farms were above the alarm threshold set by Welfare Quality®), and the average scores for all assessed farms of 40.73±14.85, 23.10±15.81, 32.59±10.77, and 21.59±9.84 for the Feeding, Housing, Health, and Appropriate Behavior welfare principles, respectively. Traditional pastoral systems for sheep face similar challenges. This presentation highlights the most critical welfare challenges in small-scale, traditional dairy cattle and small ruminant systems and opens the discussion for potential improvement programs.

Keywords: animal welfare assessment, dairy cows, sheep, goat, Western Balkan

Plenary Talk 3

WELFARE ASSESSMENT IN PIGS AND POULTRY

Ivana Sabolek

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Modern intensive livestock production plays a vital role in ensuring global food security, yet it also presents significant animal welfare challenges. This review aims to provide an overview of current approaches to welfare assessment (WA) in pigs and poultry, drawing from established scientific literature and validated protocols. The primary goal of WA is to evaluate how well animals are coping with their production environment. Over time, the focus has shifted from solely identifying negative welfare indicators, such as pain, injury, and disease, to also including indicators of positive welfare states, such as comfort, social interaction, and exploratory behaviour. Multiple WA frameworks have been developed across Europe and globally, including the widely adopted Welfare Quality® protocols, as well as AWIN, AssureWel, and various national schemes. Each protocol is tailored to specific species and production systems. For poultry, commonly used indicators include lameness, footpad dermatitis, mortality rates, and behavioural responses to humans and environmental stimuli. For pigs, assessments typically involve body condition, skin and tail lesions, respiratory symptoms, and social behaviours. Depending on the production category (e.g., broilers, layers, fattening pigs, sows), welfare assessments may take place on-farm, at the slaughterhouse, or both. Data collection involves direct observation and structured scoring systems, which are carried out by trained assessors to ensure consistency and reliability. Despite notable progress, several challenges remain. Positive welfare states are still difficult to measure reliably. Traditional assessments are time- and labour-intensive, but emerging technologies, such as AI, sensor systems, and automated monitoring offer promising tools for real-time, continuous WA. Furthermore, gaps persist in life-cycle coverage, particularly during transport and in hatcheries. Farmer engagement is also essential, and overcoming resistance requires emphasizing both the ethical and economic benefits of high welfare standards. In conclusion, while intensive pig and poultry farming is essential for feeding a growing human population, it must be balanced with strong, science-based welfare practices. Continued innovation, cross-sector collaboration, and supportive policy frameworks are key to ensuring more sustainable, ethical, and resilient animal production systems.

Keywords: welfare assessment, poultry, pigs, challenges, solutions

POLICY IMPLEMENTATION IN ANIMAL WELFARE

Marta Brščić, Claudia Manfrè, Isil Aytemiz Danyer

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This contribution aims at providing an overview of the current state of art of the level of implementation of measures to guarantee animal welfare in European policy. LEGISLATION: At first a critical analysis of the legislative acts for the protection of animal welfare in different contexts in Europe will be done with specific examples of gaps and inconsistencies. The level of penetration of animal-based measures to assess welfare in these legislative acts will be detailed for some species and animal categories. ANIMAL WELFARE ASSESSMENT: An overview of the animal welfare schemes will be provided and particular attention will be put on the animal-based measures, both positive and negative, that are highly relevant to the public opinion but are not easy to collect directly at farm level and are even more difficult to check for compliance with the current legislation by the legislator. Examples are mutilations such as surgical castration, tail docking and tail clipping in pigs, mulesing in lambs, disbudding in calves, dehorning in cattle. Integration of these animal-based measures in welfare assessment schemes is mainly based on decision trees assessed via questionnaires to the farmers (e.g. Welfare Quality). SOCIETAL EXPECTATIONS: this contribution will analyse another very relevant concern raised by the public opinion, the early cow-calf separation and the quality of the alternative cow-calf contact practices. This latter welfare concern is not legislated yet, despite being part of the mandate from the European Parliament to the European Food Safety Authority (EFSA) and is, thus included in the recent EFSA opinion on welfare of calves. Some of the many research questions to be answered in this context will be listed and the need for validated best welfare friendly practices to be transferred and translated to the policymakers will be pointed out. The integration of positive animal welfare indicators into the on-going assessment schemes to support progress initiatives answering to the societal expectations and policy decisions will be considered as a possible way improve animal welfare, in marginal European regions in particular. Finally, this contribution will overlook the newest policy proposals on pet welfare and the need to elicit the public opinion attention towards other practices harming animal welfare.

Keywords: animal rights advocacy; animal welfare assessment; animal protection legislation; cow-calf contact

RESEARCH ON TRANSHUMANT PASTORALISM IN SHEEP OVER THE PAST DECADE

Ivan Yanchev

Institute of Animal Science, Kostinbrod, Bulgaria

Five scientific publications related to transhumant pastoralism in sheep have been presented. The first study focused on differences in ALT, AST, ALP, serum iron, and glucose levels in two herds of Karakachan sheep, distinguished by their body condition score (BCS) and hematocrit (HCT) levels. Overall, the biochemical values were significantly higher in sheep from higher altitudes, both across the herds and within the group with low HCT, where all parameters were elevated. The second study examined the association between hematocrit, erythropoiesis, and cortisol dynamics during acclimatization to high altitude and return to lowland in Ile de France ewes, with a focus on variations in hematocrit levels. The results suggest that hematocrit is linked to the type of hemoglobin and the dominant metabolic pathway for energy production. These factors, in turn, influence the pattern of hematological changes during high-altitude exposure and determine the animal's sensitivity to transport stress. The third study investigated blood cortisol, thyroid hormones, growth hormone, reticulocyte count, and lactate levels. The fourth focused on leukocyte subsets (basophils, eosinophils, neutrophils, lymphocytes, monocytes, large immature cells) and cytokines (IL-2, IL-4, IL-6, IL-10, IL-17A, IFN-γ, TNF-α) in the same group of pregnant Ile de France sheep. The findings indicate that adaptation of shorn pregnant ewes to moderate altitude hypoxia is associated with a slight decrease in basal metabolism and a mild increase in lactate levels. Moreover, exposure of pregnant ewes to ambient temperatures below the lower critical temperature at moderate altitude appears to suppress the increase in cytokine levels. The fifth publication evaluated ALT, AST, ALP, serum iron, and glucose levels in two herds of Bulgarian native sheep breeds raised at different altitudes. The study considered the effects of season, BCS, and the presence of gastrointestinal parasites. Significant differences were observed between the two breeds: in summer, for BCS, ALT, and glucose; in winter, for serum iron; and in both seasons, for HCT, AST, and ALP.

Keywords: Transhumant pastoralism, High-altitude adaptation, Sheep hematology and biochemistry, Stress and metabolic response, Cytokine and hormone dynamics

List of participants' abstracts

arranged alphabetically

Abstract 1

FARM ANIMAL WELFARE IN BOSNIA AND HERZEGOVINA: A COMPARATIVE ANALYSIS WITH EUROPEAN UNION'S PRACTICE

AjlaAlišah[1], Nadža Kapo[1], Andrei-Sebastian Csiplo[2], Abdulah Gagić[1]

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Animal welfare, defined as the physical, physiological, and psychological well-being of animals in relation to their environment, has become an increasingly important concern in veterinary medicine, public policy, and civil society. While the European Union (EU) enforces animal welfare through a well-established legal framework, Bosnia and Herzegovina (BiH) struggles with partial legislative implementation, weak oversight, and limited public engagement. This paper provides a comparative analysis of the current state of farm animal welfare in BiH relative to the standards and regulations upheld within the EU, drawing upon scientific literature, official reports (Eurobarometer, EFSA, European Commission, Veterinary Office of BiH, Federal Statistical Office of BiH), surveys, and the legal framework of BiH. The analysis focuses on several critical pillars: veterinary attitudes towards pain recognition and management, statistical data on animal transportation, and the use of animals for experiments. Findings reveal a significant gap between practices in BiH and those in the EU. A recent survey (Spahija N. et al., Animal Welfare, Vol. 32, 2023) showed that out of 535 veterinarians, 73 responded to a questionnaire regarding pain management. Among them, 50% found pain recognition difficult, 89% did not utilise any pain assessment scales, and 45% held the misconception that pain might be somewhat beneficial to patients. Economic considerations heavily influenced clinical decision-making, with over half citing treatment costs as a key factor. In contrast, EU citizens exhibit a strong ethical stance: 84% advocate for enhanced protection of farm animals, 83% support limiting transport duration, and nearly all insist on more ethical farming practices (Eurobarometer, 2023). Regarding animal transport, the EU's 2022 statistical report estimates an annual movement of approximately 243 million poultry, 28 million pigs, 4 million cattle, and hundreds of thousands of other live animals among member states. Conversely, BiH lacks comparable and transparent data. Similarly, while the EU reported the use of 8.18 million animals in research in 2022, no official figures are available for BiH. This paper highlights key systemic challenges facing farm and other animal welfare in BiH, including limited financial resources, insufficient enforcement of existing regulations, and the absence of a centralised data collection and monitoring system. These challenges represent critical areas for reform rather than mere obstacles. The EU's experience demonstrates that meaningful and sustainable improvements in animal welfare are attainable. Accordingly, practical recommendations are proposed: strengthening legal enforcement with adequate financial support, implementing continuous education for stakeholders, establishing a national animal welfare monitoring platform, and progressively aligning domestic standards with EU regulations.

Keywords: Animal welfare; Bosnia and Herzegovina; European Union; Veterinary practice; Legislation and regulation

Abstract 2

SEASONALITY'S INFLUENCE ON SHEEP WELFARE: INSIGHTS FROM FARMS IN MARGINAL AREAS

Elie Atallah[1], Francesco Cerasoli[2], Marta Comin[1], Giorgio Saluti[2], Federica Castellani[2], Vanessa Di Simone[2], Gabriella Centorotola[2], Michele Podaliri[2], Luigi Iannetti[2] and Emanuela Dalla Costa[1]

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Sheep are a species commonly considered well adapted to be farmed in marginal areas. From an environmental perspective, extensive farming in these rural areas can lead to a more sustainable farming system, increasingly valued by consumers. However, pasture productivity, the primary resource for animal feeding in this context, as well as the availability of resources such as shade and water, is dependent on climatic condition, significantly impacting animal welfare, production, and the quality of derived food products. The aim of this study was to describe how seasonal climatic changes affect the welfare of sheep farmed in marginal areas, defined in the experimental design as land with limited agricultural potential, characterised by economic infeasibility or physical constraints (e.g., poor soil fertility, steep slopes, rocky terrain) that preclude conventional crop cultivation. The welfare of six flocks of sheep raised in marginal areas was monitored using the AWIN welfare assessment protocol adapted for extensive systems. A total of 72 sheep (12 for each flock) were individually monitored by trained evaluators using 24 animal-based measures for two consecutive years (2023-2025) during summer and winter seasons. The proportion of each score of animal-based indicators was calculated, and generalized linear models with a binomial distribution were used to analyze the seasonal effects, and pairwise comparisons were conducted with Sidak correction to adjust for multiple comparisons. Good feeding showed moderate seasonal variation, with 50% of animals scoring BCS=3 in both summer 2023 and winter 2024, slightly decreasing to 47.4% in summer 2024, and increasing to 63% in winter 2025, although differences were not statistically significant ($p = 0.413$). In winter, sheep more frequently showed dirty and wet fleece and hoof overgrowth compared to summer. Hoof overgrowth was especially high in summer 2023 (62.8%) and winter 2025 (91.3%) compared to other seasons ($p < 0.001$), with significant differences between summer 2024 and winter 2025 ($p = 0.024$). Fleece cleanliness was poorer in summer 2023 (71.1%) compared to winter 2024 and 2025 ($p < 0.001$ and $p = 0.022$), suggesting that climatic conditions and seasonal management (e.g. trimming, shearing) can affect sheep welfare. Faecal soiling was also more prevalent in winter seasons (2024: 57.1%, 2025: 78.3%) compared to summer seasons (2023: 41.7%, 2024: 43.9%) ($p = 0.002$), possibly influenced by reduced pasture quality or dietary changes during winter, which may negatively affect gut health. Respiratory problems were also more frequent in winter 2025 compared to previous seasons ($p = 0.002$), further highlighting the impact of colder conditions on sheep health in extensive systems. Interestingly, eye lesions were observed in 25% and 12.3% of animals during summer 2023 and 2024, respectively, compared to 5.7% and 6.5% in winter 2024 and 2025 ($p = 0.028$), likely due to increased insect activity and other environmental irritants during warmer months. These results reveal differences in the welfare condition of sheep raised in marginal areas, highlighting the importance of identifying possible risk factors associated with climatic and environmental conditions. This project is funded by the Italian Ministry of Health (GR-2021-12374382).

Keywords: Animal-based indicators; Climatic stressors; Extensive farming; Small ruminants

PARENTAL AND ALLOPARENTAL BEHAVIOUR OF THE GOLDEN-HEADED LION TAMARIN (*LEONTOPITHECUS CHRYSOMELAS*) IN ARTIFICIAL ENVIRONMENT

Simon Cirkulan[1] and Manja Zupan Šemrov[2]

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The golden-headed lion tamarin (*Leontopithecus chrysomelas*) is an endangered species of tamarin, endemic to the Brazilian Atlantic forests. Protection of the population through in-situ and ex-situ conservation programs is essential. To better understand the species and protect it, it is necessary to study the behavior of this species. To ensure adequate care and welfare of animals in an artificial environment, including enrichment, it is necessary to lay the foundation with behavioral inventories of this species. This study aims to develop a detailed ethogram and quantify the frequency of specific behaviors within a family group of golden-headed lion tamarin housed at the Tropska hiša in Celje. The main objective is to identify behavioral indicators of parental and alloparental care, with particular attention to cooperative rearing behaviors exhibited by older offspring toward neonates. Additionally, developmental milestones in neonates, specifically the transition from nursing to solid food consumption, will be systematically monitored. The research group will consist of 11 individuals: a reproductive pair and their offsprings of different ages. Cameras will be strategically installed to ensure comprehensive coverage of the entire living space, allowing continuous observation of the group. Behavioral data will be collected between 9 a.m. and 1 p.m., before the start of the first meal and until the start of the second meal. Samples will be collected over a 10-week period, beginning at parturition and concluding when the newborns completely switch to solid food. Video recordings will be coded and analyzed using BORIS software, with the behavior of each individual systematically registered and evaluated separately. Based on other marmoset and tamarin species, we hypothesize, that in the goldenheaded lion tamarin, group cooperation is important for the survival of the newborns, and that the male offsprings are more effective at raising young. We also hypothesize that newborns use different behaviors to signal to family members that they are hungry or need more attention, for example by shaking their tails and making intense shrieks, with the tail with the lighter spot acting as a targeting system. The results are expected to show a comprehensive behavioral inventory and highlight patterns of social interaction within the family group. The research plan is still in the developing stages, so data, observations, and results are not yet available.

Keywords: behavior, tamarins, parental care, alloparental care

Abstract 4

SCATTER FEEDING AS A STRATEGY TO REDUCE AGGRESSION AND FEATHER PECKING IN PARENT LAYER FLOCKS

Elena Gobbo, Manja Zupan Šemrov

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Severe feather pecking, cannibalism, and related injuries remain major welfare and productivity concerns in modern poultry farming, including in parent flocks of light-type hens. As the industry moves away from beak trimming, identifying alternative methods to reduce injurious behavior while supporting natural behaviors has become increasingly important. One such method is dispersing feed on litter to stimulate foraging, a practice known as scatter feeding. It has shown promise in broiler systems, however, its effects on layer parent stock remain largely unexplored. This study aims to evaluate the impact of scatter feeding with oats on animal-based welfare indicators and production parameters in a parent flock of Prelux-Č hens.

The study will be conducted at the Educational and Research Centre for Poultry in Krumperk, Slovenia, involving approximately 1,000 hens housed in two floor-rearing sections under standardized conditions. One group will receive feed exclusively via conventional feeders. The scatter-fed group will receive the same base feed ration, with a portion of the daily caloric intake substituted by whole oats dispensed three times daily via an automated scatter feeder. Data will be collected at four time points: once before the start of the intervention and then at approximately monthly intervals. At each time point, physical assessments will be conducted on the same 100 individually marked hens per group. Animal-based welfare indicators, from the Welfare Quality® Assessment protocol for poultry, will include head and body feather condition, body weight, comb pecking injuries, keel bone status, and footpad health. In addition, production-related parameters such as egg production, nest usage (assessed by recording the number of floor versus nest-laid eggs), and egg quality will also be monitored.

We hypothesize that scatter feeding will reduce feather and comb pecking by stimulating natural foraging behavior, thereby lowering social tension and enhancing overall welfare. The increased movement and litter interaction associated with this feeding method are expected to contribute to improved footpad health and keel bone condition. Additionally, we anticipate better egg quality and production outcomes, driven by more uniform feed access and elevated physical activity levels.

Findings from this study are expected to contribute practical evidence on the feasibility and benefits of scatter feeding in layer parent stock, supporting the development of science-based recommendations for commercial implementation.

Abstract 5

COMPREHENSIVE WELFARE ASSESSMENT OF DAIRY AND MEAT SHEEP FARMS IN BULGARIA

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A comprehensive welfare assessment was conducted on 150 sheep aged 16 to 60 months, selected from 15 farms located in various regions of Bulgaria. The evaluation employed a multi-method approach, integrating the AWIN welfare assessment protocol, the mathematical welfare assessment model developed by Prof. Bozakova, visual inspections, behavioral analysis, and productivity indicators. Animals were randomly selected from each flock. Welfare indicators included body condition scoring (BCS), lameness assessment, fleece cleanliness, human-animal interaction tests, and blood sampling for the analysis of cortisol and selected biochemical parameters (e.g., calcium, phosphorus, total protein). Behavioral observations were recorded using a Sony FDR-AX55 video camera and analyzed with Observer XT software. At the herd level, farm performance data such as mortality, fertility, milk yield, and morbidity rates were also collected. The average milk production per ewe was estimated at 110– 120 liters per lactation. A majority (85%) of the farms were classified as traditional/low-input systems. Body condition scores showed that 62% of sheep had a BCS of 3, 23% had a BCS of 2, 2% scored 1, 10% scored 4, and 5% had a BCS of 5. Laboratory analysis of blood samples is currently pending. Lameness was observed in approximately 23% of the animals, with 95% of these cases associated with overgrown hooves. Lamb mortality was consistently low across all flocks, remaining below 2%. The mathematical welfare assessment yielded an average welfare score of approximately 66%, indicating moderate welfare status across the surveyed farms. The results demonstrated significant inter-farm variability in welfare outcomes, which were closely associated with differences in husbandry practices, environmental conditions, and levels of production intensity.

Keywords: sheep, welfare, Bulgaria, AWIN, behavior

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RELIABILITY OF QUALITATIVE BEHAVIOUR ASSESSMENT IN A COW-CALF CONTACT SYSTEM

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In recent years cow-calf contact (CCC) systems gained increasing attention as alternatives to the conventional early separation thanks to their potential positive effect on the welfare of both cows and calves. This study aimed to evaluate the implementation and inter-observer reliability (IOR) of Qualitative Behavior Assessment (QBA) in assessing dairy cows' attitudes and emotions during the CCC phase. Five observers underwent comprehensive online training to ensure consistent QBA. They were a team with different backgrounds and levels of study. The meetings were held between May and June 2024 through videoconferencing tools. The first session aimed at familiarizing with the fixed list of terms and assessment method to reach consensus among the observers on the precise meaning of each term. A fixed list of 14 terms published in a previous study on maternal protective behaviour (Ceballos et al., Appl. Anim. Behav. Sci, 0168:1591, 2021) was used. After in-depth discussion and precise description of the terms, the assessors started QBA application on 18 short videos recorded in CCC contexts, using a 125 mm visual analogue scale (VAS). Before starting the observations, observers agreed on the focal animal. In case of disagreement on the assigned scores, a discussion was started aimed at understanding the reasons for the divergences, thus encouraging a new reflection on the terms whose meaning was not yet perceived in a uniform way. The scores of QBA attributed by observers during each session were summarized through Principal Component (PC) analysis and the first two principal components (PC1 representing activity and PC2 mood and caring) were used for the IOR. After the training sessions were completed, the assessors conducted joint on-farm observations of 10 Italian Friesian cows at approximately 7 days post-partum while with their calf. Results showed that IOR, calculated through intraclass correlation coefficient (ICC, 95% CI) was reached after 3 training sessions. It improved from moderate to high agreement for PC1 during training (ICC=0.55, 0.14-0.81) and after training at on-farm assessments (ICC=0.85, 0.60-0.96). For PC2 the agreement reached during training was high (ICC=0.84, 0.68-0.93) but moderate during on-farm assessments (ICC=0.60, 0.05-0.89). The online training allowed consensus among observers and improved for the component dealing with activity whereas the reached agreement did not stay high during on-farm assessment for the component representing mood and caring. It would be important therefore to have continuous peer feedback to keep high agreement and initial on-farm trainings in these specific contexts.

Keywords: Qualitative Behaviour Assessment; Inter-observer reliability; Cow-calf contact; Dairy cows

INTELLIGENT SYSTEM FOR TRACKING MICROCLIMATE PARAMETERS

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Since May 2024, in the premises for raising animals in the Scientific and Experimental Base of the Research Institute of Mountain Stockbreeding and Agriculture - Troyan, an "Intelligent system for tracking microclimate parameters" has been successfully implemented, which is related to the humane attitude towards the raised groups of animals, the constant change in environmental parameters and public health. Stationary sensors control: atmospheric pressure, humidity, temperature and carbon dioxide level, at certain intervals of time, with the data array being collected in an information cloud. The data is processed with specific software and recorded in a database for analysis, and from there it is sent to the mobile devices of scientists dealing with various areas and categories of animals. Sensors monitoring humidity and temperature control the ripening process of cow, goat cheese and yellow cheese - traditional and well-established, delicatessen products of Institute. The illumination, humidity and temperature of raspberries grown in experimental raspberry plantations are also monitored. The system is in the process of upgrading and improving and was implemented based on the idea of a team from the Institute of Animal Husbandry - Troyan working on Panel 5 - Cyber-physical systems from the National Research Institute "Intelligent Animal Husbandry" headed by Prof. Dr. Nikolay Markov and the Director of the Institute, Prof. Dr. Diyan Georgiev. In parallel, a team of three scientists from the Institute of Animal Husbandry - Troyan measure once a month with an "Air Environment Analyzer" device, kindly provided to us by our colleagues from the Cherasakta Scientific Station - Ukraine, at five equal points of the surveyed premises the following parameters: t° of the air, % relative humidity of the air, P (atm), Ev luk,A mg/ m³, CO, CO_2, NH_3, H_2S, NO, CH_2O, CH_4, Db. Keywords: intelligent system, microclimate, temperature, data, farm animals.

Keywords: Environmental monitoring, Cyber-physical systems, Animal welfare technology, Cloud-based sensor networks, Air quality analysis

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ANIMAL WELFARE AND THE PREVALENCE OF TECHNOPATHY IN THE CONTEXT OF CATTLE STABLE DESIGN

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The health of dairy cows is crucial for animal welfare. The higher prevalence and incidence of health problems are the cause of lower production efficiency, higher costs and a greater environmental impact per unit of product produced. The welfare of the animals in the herd should be described, and a useful welfare assessment system should enable the farmer to monitor changes over time and take necessary action. To determine risk factors and the actual status of animal welfare on farms, a combination of resource-based and animal-based indicators must be used. One of these indicators, that also the breeder can significantly influence and prevent, are technopathies. Technopathies refer to injuries or pathological changes resulting directly or indirectly from housing conditions, facilities and stable equipment. In farm animals, these typically manifest as body injuries. Common technopathies include skin injuries, abrasions, swellings, open wounds, lacerations and cuts, and injuries to teats and claws. Technopathies are frequently observed on the skin covering body prominences and joints. There are many causes of technopathies. One common cause of technopathy in cattle is inadequate cubicles and inadequate flooring. Causes of technopathy can also include inadequate corridors (floor quality, dimensions), unsuitable or poorly maintained equipment (e.g. sharp objects or incorrectly fitted brushes) and other parts of the barn. It is therefore essential to take the above facts into account when planning the construction or adaptation of new stables. Stables or barns must be designed in such a way that technopathies are avoided. Technopathies can be recorded and assessed however, standardized protocols are required for their correct recording. At the Faculty of Agricultural and Life Sciences of the University of Maribor, our research has focused on assessing the welfare of various farm animals, including the prevalence and incidence of technopathies by milking cows. Recent research, including several studies in which we used both established protocols to assess welfare and newly developed protocols to assess technopathies. The results show that technopathies are prevalent on most dairy farms, albeit to varying extents and severity. By identifying and accurately assessing potential causes, farmers can be provided with valuable feedback specific to their operations. This feedback enables them to implement targeted improvements in housing and care practices, ultimately eliminating deficiencies, leading to enhanced health and welfare of dairy cows and contributing to sustainable and profitable farming.

Keywords: stables, milking cows, animal welfare, technopathies

WELFARE ASSESSMENT OF FARM ANIMALS IN SERBIA

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In 2009, Animal Welfare Act has been passed in Serbia. Since then, people who raise animals have become more aware of the importance of animal welfare and the need to meet their mental and physical welfare. However, field research shows that many factors still influence the welfare of farm animals. The aim of this study was retrospective analysis of welfare assessment of farm animals in recent years in Serbia. Farm animal welfare was evaluated using the Welfare Quality® protocol for poultry and cows, and AWIN protocol for sheep, goats and donkeys.

In the research conducted during the winter season 2019/2020, on four rearing systems of 400 Lohman Brown laying hens was determined that hens in cage systems had the significantly ($p<0.001$) higher prevalence of poor plumage condition, and skin lesions than hens in other systems. Keel bone deformation was the most present in the aviary system. Laying hens in cage systems have a higher expression of negative emotions in relation to the aviary and free-range system.

In the research of 131 native goat breads in 2019 was determined that the main welfare issues identified were poor hair coat condition, dirty and light soiling hindquarters, thin body condition score (BCS), abscesses, and udder asymmetry. In addition, an important and prevalent welfare problem identified across all farms was parasite infection and weak significant ($p<0.001$) correlation between Strongylidae, *Moniezia* spp., *Buxtonella sulcate*, and Protostrongylidae, and poor hair coat condition and nasal discharge.

Results from assessed welfare of 82 native sheep breed Vlašićka zackel in 2022 showed that the main welfare issues identified were fleece cleanliness, nasal discharge, ocular discharge, respiratory problems, thin BCS, fleece quality, borderline anemia, and parasitological infections. Weakly significant ($p<0.05$) correlation were found between *Buxtonella sulcata*, Protostrongylidae, and nasal discharge and borderline anemia.

In the research conducted in 2024 on 45 Holstein-Friesian cows was determined that cows in the pasture-based system had significantly higher scores for dirtiness ($p<0.001$), while those in tie stalls showed more integument alterations and lameness ($p<0.001$, $p<0.05$). Loose-housed cows had higher nasal discharge scores ($p<0.001$). Significant correlations ($p<0.001$) were found between certain welfare indicators and parasite infections, such as a low body condition score with *Eimeria* oocysts and nasal discharge and hairless patches with *Buxtonella sulcata* and *Dicrocoelium dendriticum*.

Research from assessed welfare of 160 Balkan donkeys in 2025 showed that main welfare problems were thin BCS, hair loss, skin lesions, poor hair coat condition, ocular and nasal discharge, respiratory problems and fecal soiling. A significant correlation ($p<0.001$) was found between the presence of *Parascaris equorum* and fecal soiling, and strongylids and thin body condition score, nasal discharge, and hair loss.

It is clear from these results that in Serbia, farm animal welfare is still compromised, especially for animals kept in conventional cages or tie-stall systems. Animal welfare should be an important aspect of farming, and veterinarians need to disseminate knowledge to animal handlers and farmers to minimize the occurrence of impaired welfare and infections.

Key words: farm animals, welfare, protocols, parasite infections, Serbia

BEHAVIORAL DYNAMICS AND MOVEMENT PATTERNS IN BROILERS CAPTURED BY MULTI-CAMERA TRACKING SYSTEM

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Understanding broiler chicken behavior is critical for advancing precision livestock farming and improving animal welfare, especially under environmental challenges such as heat stress (HS). This study aimed to monitor and quantify three key behaviors in broiler chickens (active, feeding, and drinking) using a multi-view automated tracking system developed by our group. A total of 1,120 male Ross 308 broilers were raised across four production rounds under controlled thermoneutral (TN) and cyclic HS conditions. The experiment employed a custom-built multi-camera system coupled with object detection and tracking algorithms to generate ground-plane tracklets (short segments of a moving object's trajectory) for individual birds. These tracklets were post-processed to classify behaviors based on movement thresholds and spatial proximity to feeders and drinkers, allowing for a continuous and high-resolution assessment of behavioral dynamics over time. The analysis revealed a progressive decline in general activity levels over time, and of high-intensity movements in particular. In contrast, drinking behavior increased steadily in HS birds. Feeding behavior declined with age and was significantly reduced under HS conditions. Time-of-day effects were also evident: activity peaked in the morning and midday. Additionally, the study tested different radius thresholds to define feeding and drinking zones, finding minimal differences in behavioral outcomes across all radius levels, which supports the robustness of the ethogram. The tracking system achieved high accuracy (Multiple Object Tracking Accuracy: 0.81; ID F1 Score: 0.89), validating its suitability for behavior analysis in group-housed broilers. Few studies have tracked broiler behavior continuously throughout the production cycle, particularly under varying environmental conditions. Our findings help bridge this gap by revealing more information regarding age-related patterns in activity, feeding, and drinking behaviors, including periods of HS. Unlike short-term, event-based studies, our scalable, automated multi-view tracking system enabled long-term behavioral analysis and highlighted the influence of age, HS, and time of day on broiler behavior. With this knowledge of expected behavioral patterns, deviations caused by challenges such as heat stress or disease could be continuously monitored in broilers, enabling 24/7 surveillance and early detection to trigger alerts and support timely interventions. The system's limitations include the inability to detect complex social behaviors and the constraints of an experimental setting compared to commercial environments.

Keywords: Precision livestock farming, poultry, patterns, tracking system, heat stress

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STRUCTURE OF LINKED SUPPORT WITH EUROPEAN FUNDS IN THE LIVESTOCK SECTOR IN BULGARIA TAKING INTO ACCOUNT GREEN PAYMENTS AND ASSESSMENT OF ITS EFFECTIVENESS IN THE PREVIOUS PROGRAM PERIOD

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An assessment has been made of the distribution of payments from the Rural Development Program 2023-2027 by measures for 2023 compared to the total budget of the program. The general requirements for farmers for all measures are presented, as well as the requirements for them separately for applying for the measures for coupled support for dairy and beef cows (in general and for those included in breeding programs), as well as for buffaloes and cows of endangered breeds. A similar presentation is also given for the requirements for farmers for the measures regarding sheep and goats. All eco-schemes are outlined, with a detailed emphasis on the use of three eco-schemes concerning livestock farming. Special attention is paid to the Eco-scheme for the humane treatment of animals (poultry, pigs, cattle, sheep and goats) with the budget and requirements for them for 2025. An analysis was made of change in farm structure: the number of dairy cows and sheep, the number of dairy farms for cows and sheep and the milk produced from cows and sheep for the period 2010-2023. A similar analysis was also made of change in farm structure: the number of beef cows and sheep and the number of beef farms for cows and sheep. The report concludes with an assessment of the economic efficiency of the implementation of the measures for this period.

Keywords: Interventions, Unlinked Direct Payments, Linked Direct Payments, Eco-schemes, Animal welfare, Farming trends