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The responsibility for abstracts from the content and language perspective remains with the authors.

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WORKSHOP

Periparturient medicine workshop - Part 2: Training in calving assistance

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Objective: As for surveillance of the parturition process technical and sensor driven solutions become more common and successful, practical calving assistance needs not only knowledge on the calving process, but also hands-on skills for correct calving assistance. Farm veterinarians are not always available, so training programs for acquiring knowledge and skills in calving assistance are important not only for young veterinarians, but also for farm personnel responsible for the calving unit.

Methods: This workshop will share experiences of subject matter experts in teaching calving assistance across a wide range of settings from small family-run farms to intensively managed large employee-staffed dairy herds. We want to extract the most essential learning goals, the most effective teaching methods for these goals and chances of testing the learning success. We discuss the needs of a calving training devices, either expensive commercial calving simulators or simple self-made model. How effective and user-friendly are Smartphone-based teaching apps or how to organize a on farm workshop are also topics of discussion. The workshop will be organized using the World café method which facilitates open discussion and knowledge sharing in an informal café-like setting.

Results: Training hands on skill for calving assistance is essential to ensure effective and animal friendly obstetrical help. These training programs should include theoretical knowledge and practical, hands-on skills in techniques like fetal re-positioning, extraction, and management of complications. Farm veterinarians play a crucial role in educating and training herd personnel. Most commonly the farm veterinarian teaches the farm personnel on the job, although this teaching methods is not the most effective in terms of learning outcome. Learning apps motivate the user by a game like structure, but cannot teach hands on skills. Calving simulator are very valuable, and although commercial one offer interesting feature, self-made models do a good job.

Conclusion: To ensure effective and animal friendly calving assistance, a well structure training for farm personnel is necessary. Training should include theoretical input on calving process, including the timeline of calving stages. For practical training a calving simulator is very effective.

Periparturient medicine workshop - Topic 1: Prediction of calving/problems using biosensors – physiology, latest devices, pros/cons and other key points

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Objectives: As dairy herd sizes increase and skilled labour becomes less available, alternative approaches to managing calving are required. Recent advances in agri-tech have generated numerous novel devices designed to predict calving time more accurately than traditional methods, like observation of the calving cow. These biosensors promise to bring accurate, real-time prediction not only of the time of calving, but also whether dystocia or stillbirth is likely, within reach. Hence, the objective of this workshop topic is to present and discuss the latest in practitioner experience and research results on this topic.

Methods: While more than a dozen indicators of impending parturition have been tested to develop calving alarms there are four commercial themes; 1) activity monitors (e.g. accelerometers, image analysis), 2) foetal expulsion monitors (e.g. vulval separation, external temperature or light sensors), 3) tail elevation monitors (e.g. accelerometers) and 4) body temperature sensors (e.g. vaginal, ruminal, skin, ear). These four themes will be presented and discussed interactively.

Results: Of activity monitoring devices, a combination of rumination time and posture changes appears to offer the best prediction accuracy but cost may be an issue for some breeders not already using precision livestock farming (PLF) technology. Of foetal expulsion devices, vulval lips separation devices appear to offer the best prediction accuracy but these must be attached by a veterinarian. Of tail elevation devices, tail-mounted accelerometers appear to offer the best prediction accuracy but issues with tail injuries, no/false alerts and 'drops' may occur. Of body thermosensors, intra-vaginal devices appear to offer the best prediction accuracy but the animals must be restrained and the devices inserted hygienically in the vagina.

Conclusions: Currently there are no published studies comparing all available commercially-available devices together so we must rely on studies where one device is compared with breeder observations or where more than one device is compared on the same animal. Major future challenges for all PLF technologies include validation of existing commercial devices, integration of information across different devices and development of economical, real-time, decision support forecasting tools for commercial breeders.

Periparturient medicine workshop - Topic 3: Assessment of perinatal vitality – scoring systems, timing and frequency of use, research vs. practical applications

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Objectives: Despite considerable advancements in animal breeding, the prevalence of stillbirth remains high, particularly in Holstein-Friesian dairy farms. Therefore, our Topic 3 will focus on assessing foetal and neonatal calf vitality to decrease the stillbirth rate in dairy farms.

Methods: Several diagnostic methods are available to evaluate the clinical signs of foetal/neonatal vitality during and after calving and to measure the acid-base balance or L-lactate concentrations (in heparinized blood samples withdrawn anaerobically). On dairy or beef farms, ultrasonography can be used to detect foetal heart rate if the different reflexes cannot be stimulated to find out whether the foetus is still alive or not. Similarly, pulse oximetry can be used to continuously monitor foetal/neonatal oxygen saturation of arterial haemoglobin and heart rate. Implementing these methods may contribute to recognizing and eliminating threats to the foetal/neonatal calf's vitality on time. These methods will be presented and discussed interactively.

Results: If the stillbirth prevalence rate on a given farm is higher than 3 %, then farm management has the critical task of decreasing it. Before starting any obstetrical assistance, it is essential to be 100 % accurate in our diagnosis, whether the foetus is still alive or not, to select the most appropriate method for our obstetrical assistance. We may use ultrasonography and/or measure acid-base balance or lactate concentration to confirm our diagnosis in doubtful cases. In cases of severe asphyxia, it is better to perform a Caesarean section to save the foetal life than performing traction, even when the duration of traction would be less than 60 seconds. After calving, vitality scores may help us evaluate the vigour of a newborn calf. Several attempts have been made to create a practical tool to assess newborn calf vitality. A helpful tool that can be used on farms with ease and high accuracy is still missing. Detecting asphyxia/acidosis [venous blood acid-base balance (pH: <7.0, Base excess: <-13 mmol/L) or lactate concentration (>20 mmol/L)] may increase the accuracy of our diagnosis.

Conclusions: There are several diagnostic methods to evaluate the clinical signs of vitality during and after calving or to measure acid-base balance or L-lactate concentrations, as well as to use ultrasonography to detect heart rate or pulse oximetry to measure continuous foetal/neonatal oxygen saturation of arterial haemoglobin and heart rate. This workshop will discuss the pros and cons of these diagnostic modalities by comparing what is possible in research and what is possible now on farms with recent advances in cow/calf-side diagnostics.

ORAL PRESENTATIONS

Advancing Herd Health Management: Real-Time Biomarkers Analysis for Early Detection of Metabolic Disorders in Dairy Cows

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Introduction: This study evaluates the application of innovative technologies to improve herd health management in dairy farms. The primary focus is on the use of automated monitoring systems for assessing cow health through non-invasive measurements of milk biomarkers, specifically the milk fat-to-protein ratio (F/P). We hypothesized that changes in milk F/P could indicate metabolic health, aiding in the early detection of subclinical ketosis (SCK) and acidosis (SCA).Materials and Methods

The study, conducted between June 1 and September 1, 2023, included 320 lactating dairy cows within 5 to 30 days postpartum. Milk F/P ratios were continuously recorded using in-line analyzers, and cows were categorized based on clinical examinations into groups: SCK, SCA, and healthy controls. Blood samples were analyzed for non-esterified fatty acids (NEFA), glucose, and liver enzymes to correlate with milk data.

Results and Discussion: Cows with SCK exhibited significantly higher milk F/P ratios (1.66 ± 0.29) and NEFA levels compared to healthy cows (1.22 and 0.31 ± 0.25 mmol/L, respectively). In contrast, cows with SCA had lower F/P ratios (0.93 ± 0.10) and elevated AST and GGT activity. A strong positive correlation was identified between milk F/P and NEFA concentrations ($r = 0.499$, $p < 0.01$).This study confirms the utility of milk F/P ratios as a reliable, non-invasive biomarker for identifying cows at risk of SCK and SCA. The integration of real-time monitoring with digital health records offers actionable insights for improving herd health, reducing antibiotic use, and enhancing farm productivity.

Conclusions: Real-time milk biomarker analysis provides a valuable tool for early detection of metabolic disorders in dairy cows. This approach complements traditional health management practices, ensuring improved animal welfare and farm efficiency. Future studies should explore its applications under varying environmental and management conditions.

The European College of Bovine Herd Health Medicine (ECBHM)

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The European Colleges of Specialization are supranational Institutions that standardize the level of knowledge and professional activity in each particular veterinary specialty. Its rules are based on a regulatory framework provided by the EBVS (European Board of Veterinary Specialization; https://ebvs.eu/).
The primary aim of the ECBHM is to advance health oriented bovine production management in the herd context in Europe and to increase the competency of those, who practice in this field, and its concrete objectives are:

- To train specialists in the Bovine Medicine (individual and herd medicine)
- To establish basic standards of knowledge in the Bovine (keeping UpToDate)
- To certify the necessary teaching programs in the Approved Training Centers (updated)
- To accredit and re-accredit (every 5 years) Training Centers to educate ECBHM-diplomats
- To organize and conduct exams
- To periodically recertify (every five years) ECBHM-diplomats
- To promote research developed in the bovine
- To encourage collaboration and transfer of knowledge and results among Bovine Specialists from different countries

What a veterinary professional can harness the diploma in the ECBHM:

- Recognition and international certification of your level of specialization in Bovine Health issues
- Networking with other professionals of the discipline within Europe and the world
- International training and discussion forums
- Improved positioning of your own practice / clinic: greater access to skilled and well-trained professionals, greater loyalty of veterinarians
- Better remuneration (depending on countries; different for practitioners or for academics)
- Access to the Academia (depending on countries: it is getting rapidly more and more relevance)
- Self-interest: intellectual, self-training and dissemination of your training and specialization.

To become a diplomat you have, firstly, to complete a period of specialized training called "residency" of at least 3 years (full time equivalent). We offer two types of residency programs that are the Standard Residency Program (SRP) and Alternative Residency Program (ARP) thought for working veterinarians (practitioners, academic, or workers at private firms). Although both programs follow the same goals, they differ in duration, type of training institution, requirements of external training periods and level of supervision by a Diplomat. After a successful completion of the Residency program the resident has to obtain the accreditation of merits achieved during residency (attendance at training international conferences, writing and presentation of scientific communications, individual and herd clinical case reports, two scientific papers and completion of a short research project. Then, the resident needs to pass the official Diploma exam, which is the same for all residents, independently of type of residency program.

Each resident is permitted up to three attempts to take the exam in a period of 8 years after having finished the residency program.

All deliveries, exams and communication with the colleagues and diplomats is in English. A medium level of English language skills are thus required for successful completion of a residency. Specific Training centers may also require knowledge in the native language in those countries.

Using Noseband Sensor Technology to Measure Rumination Time as an Indicator of Feeding and Locomotion Behavior in Dairy Cows

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Objectives: the aim of this research was to assess rumination time, recorded using innovative technologies, as a parameter for evaluating feeding and locomotion behaviors by measuring chewing rate (chews per minute), eating time, rumination time, drinking gulps, bolus activity, and general activity in dairy cows.

Materials and Methods: the study was conducted in West Lithuania from June 1–30, 2023. A total of 434 multiparous Holstein cows (5–30 days post-calving, average weight: 550 kg ± 45 kg, producing 12,500 kg energy-corrected milk/lactation) were selected from 1,160 clinically assessed cows.

Cows were housed in free-stall barns with natural and mechanical ventilation and fed a TMR twice daily (06:00, 18:00). Milking occurred at 05:00 and 17:00 using a DeLaval parlor system.The RumiWatch System (RWS) monitored behavior: rumination time (RT) min/h, chews per minute (CPM) n/min, eating chews (EC) n/h, eating time (ET) min/h, drinking gulps (DG) n/h, bolus (B) n/h, activity (A) min/h, other activity time (OAT) from June 14–30 after a 2-week acclimation phase (June 1–14).Data collection occurred hourly throughout the study.

Results: We found a significant negative relationship between RT and OAT ($r = -0.435$, $p < 0.001$), as RT increases and OAT decreases.

We detected a significant negative relationship between RT and ET ($r = -0.544$, $p < 0.001$) as RT increases and ET decreases.

A strong, significant negative correlation between RT and EC was also detected ($r = -0.508$, $p < 0.001$). We found a strong, significant negative correlation between RT and DG ($r = 0.535$, $p < 0.001$). We received a strong, significant positive correlation between RT and B ($r = 0.993$, $p < 0.001$). We determined a strong, significant positive correlation between RT and CPM ($r = 0.672$, $p < 0.001$). A strong, significant negative correlation between RT and activity was identified ($r = 0.488$, $p < 0.001$).

Conclusions: overall, this study highlights how new technologies such as the RumiWatch system can enhance our understanding of dairy cow behavior. By studying the relationship between rumination time and different eating and locomotion parameters, we discovered valuable insights into how these behaviors interact. Our results show that as cows spend more time ruminating, they tend to spend less time on other activities, suggesting a clear link between rumination and the cows' daily activities. connect. Furthermore, the high correlation between rumination time, bolus and chewing rate highlights that rumination is closely related to the general physiology and behavior of dairy cows

Impact of heat stress during the first 90 days of age/life on growth and reproductive parameters in Holstein heifers.

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Objective: Effects of the heat stress during the first 90 days of life on growth and reproductive efficiency in Holstein heifers.

Methods: We followed 647 calves from arrival up to leaving a commercial rearing farm. Based on daily, meteorological data from a National Station (AEMET; Chelva, Spain) the temperature-humidity-index (THI) was calculated. A heat stress day (HSd) was when suffering >14h at a time of THI>72. Four groups were built by the HS: 'NO-HS' (no HSd), 'mild-HS' (<3HSd at a time, with THI=72-79), 'moderate-HS' (>3HSd with THI=72-79) and 'severe-HS' (≥1HSd with THI>80). We assessed weight and back-fat (BF) at arrival, weaning, 4.mo., 9mo., and 12mo. old, average-daily-weight-gain (AWDG) and reproductive parameters [age at puberty (AP), at first service (AFS), at pregnancy (AFP) and inseminations per pregnancy (AI/P)]. Results were analysed with Kruskal Wallis, Kaplan Meier and χ^2 tests (SPSSv.29, IBM). Funding: CDTI (IDI-20200936); P. Carulla Universitat Politècnica València (PAID-01-20).

Results: ADWG from arrival to weaning was lower in severely heat-stressed calves (P=0.033), with a compensatory growth in the following interval, with ADWG from weaning to 4.5mo. old being highest in Severe-HA calves (P=0.027). From 4.5mo. to 9 mo. ADWG was significantly lowest in severely and moderately stressed heifers (P<0.001), but these groups showed a compensatory growth from 9mo. to 12 mo. old, with the ADWG being larger than in the others (P<0.001; Severe- HS1.17±0.46 kg/d; Moderate-HS: 0.96±0.13 kg/d; NO--HS:0.90±0.08 kg/d and Mild-HS:0.86±0.13 kg/d). At 12mo. old Severe-HS were the lightest heifers (336.1±20.9 kg; P<0.001) compared to NO-HS: 367.4±32.6 kg; Mild-HS: 377.4±38.6 kg and Moderate-HS 377.3±35.0 kg. The severely-stressed heifers showed larger fat-deposition at arrival than non-stressed heifers (P=0.010). No difference in BF was observed at weaning. At 4.5mo. NO-HS (5.50±0.27 mm), Mild-HS (5.47±0.25 mm), and Moderate-HS (5.54±0.20 mm) maintained lower dorsal fat compared to Severe-HS (5.64±0.16 mm), which showed the highest value (P=0.006) and at 9mo., the Mild-HS (6.37±0.30 mm) recorded the lowest BF (P<0.001), whereas the Moderate-HS (6.52±0.27 mm) displayed the greatest fat accumulation. Therefore, heat stress suffered early in life was linked to a different pattern of fat deposition during growth. Surprisingly, AP, AFS and AFP were shortest in the Severe-HS heifers (P<0.005), with these heifers becoming pregnant at 14.7±1.9 mo. compared to Moderate-HS with 15.0±1.6mo., Mild-HS with 15.2±1.5mo. and non-stressed heifers with the largest AFP of 15.3±1.4mo. All groups required a similar AI/P (P>0.05) and the survival study detected a tendency (P=0.083) for the severely-stressed heifers to reach pregnancy earlier than the others up to 25 mo. old. Heifers suffering heat stress in this early stage were inseminated again in a hot season (9 mo. later, approximately). This may demonstrate a better adaptation to these conditions with an age of 12 mo., through the early exposition in life, with two mo. old.

Conclusions: The heat stressed suffered during the first 90d of life significantly induced a long- term different growth and fattening pattern, which did positively affect the reproductive efficiency of these animals, 10 months after having suffered it. More studies are needed to explore the metabolism differences linked to these differences.

Morbidity and mortality associated of heat stress in Holstein heifers during the first 90 days of age/life.

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Objective: To assess differences in morbidity and mortality in Holstein calves depending on the intensity of heat stress suffered during the first 90 days of life.

Methods: We followed 647 calves from arrival up to leaving a commercial rearing farm. Based on daily, meteorological data from a National Station (AEMET; Chelva, Spain) the temperature-humidity-index (THI) was calculated. A heat stress day (HSd) was when suffering >14h at a time of THI>72. Four groups were built by the HS: 'NO-HS' (no HSd), 'mild-HS' (<3HSd at a time, with THI=72-79), 'moderate-HS' (>3HSd with THI=72-79) and 'severe-HS' (≥1HSd with THI>80). Morbidity of neonatal diarrhoea (ND) up to 30 d-old and bovine respiratory disese (BRD) up to 300 d-old was recorded. Mortality in the farm (FM) preweaning (PW: 2mo), from weaning to puberty (W-P; 2.5-7mo) and the mortality + culled heifers (M-CH) was considered. Results were analysed with Kruskal Wallis, Kaplan Meier and χ^2 test (SPSSv.29, IBM). Funding: CDTI (IDI-20200936); P. Carulla Universitat Politècnica València (PAID-01-20).

Results: The survival analysis on the morbidity of ND and the age at onset of ND revealed a significant effect (P=0.005), indicating a higher incidence of neonatal diarrhoea (ND) at an earlier age in calves exposed to moderate heat stress compared to the NO-HS group, with the moderate-HS group becaming ill earlier (21.90±25.2 d- old) compared to the NO-HS group (24.25±12.1 d-old). The BRD-morbidity did not differ among groups (P=0.23), although the NO--HS group became ill earlier (90.4±81.7 d-old). The FM was 7.6 % with all groups showing similar values (P=0.71). The overall M-CH rate was 13.6 %, with no differences among groups either (P=0.60). However, numerical differences were observed, with the group mild-HS having the highest M-CH (15.1 %), and severe-HS group the lowest (6.3 %).

Conclusions: Heat stress experienced during the first 90 days of life induces significant adverse effects on the health of calves, particularly concerning ND. However, it does not appear to directly impact mortality or the incidence of BRD. Further research is needed to explore the underlying metabolic and physiological mechanisms that may explain these differences.

Do twin calvings affect early puerperal uterine activity more than normal calvings in dairy cows?

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Early postpartum uterine contractility is vital to evacuate uterine content for undisturbed involution, but twinning can negatively influence these processes, mainly when foetal membrane retention (RFM) also develops. The aim of this study was to investigate uterine contractility patterns after twinning and compare these with the puerperal changes after singleton calvings.

Sixteen Holstein-Friesian dairy cows, after twin calvings, and 22 cows, after singleton calvings, were involved in a field study at a Hungarian dairy cattle farm. Intrauterine pressure (IUP) changes were repeatedly recorded and analysed during the first 48 hours. After twinning, 6 animals had RFM by 12 hours after calving in both uterine horns (RFM/RFM), 5 had wholly expelled these (NRFM), and further 5 had RFM in just one of the two horns (RFM/NRFM). After singleton calvings, 15 cows expelled their placenta (NRFM), while 7 did not (RFM).

A non-invasive digital system (4 Hz sampling frequency, LabVIEW® 5.0) with two independent polyethylene open tip catheters was used to record IUP signals from the two uterine horns in cows after twin calving. In contrast, a single system was introduced into the cows after singleton calvings. The internal end of the catheter was fixed to a caruncle in the previously pregnant uterine horn in one or both horns (after twinning). The external end was attached to separate disposable pressure transducers on the shaved skin on the gluteal area.

The initial 4 hours of IUP recordings were started between 14 and 17 hours after parturition, after which the 1st hour recordings were analysed. The recordings were repeated three times for 1 hour each, with 12 hours in between (pp12, pp24, pp36 and pp48, respectively). Contraction frequency (FREQ), amplitude (AMP), duration of curve lengths (DUR), mean and total area under the contraction curves (AUC, TAUC) were calculated. Group and time differences were calculated using t-tests and significant differences were considered if P <0. 05.

Uterine contractility pattern did not show significant differences between NRFM cows after twin and singleton calvings. While AMP and AUC of single calved RFM cows at pp12 were higher than in twin calved cows with RFM in only one horn, if both horns were affected after twinning, these parameters were usually higher after pp24 than after singleton calvings ($P<0.001$ to $P<0.05$). However, the uterus of RFM cows was mechanically more active than that of NRFM cows in some parameters (e.g. AMP, AUC), independently of having twin or singleton calvings. Furthermore, if only one horn had RFM in twinning cows, the results either did not show any differences compared to those after twinning with none or both affected horns, or had occasionally higher values in FREQ, AMP and AUC, when more horns were affected ($P<0.001$ to $P<0.05$).

In conclusion, no significant differences were found between cows after twin and singleton calvings or between the two uterine horns in cows after twinning when the placenta was expelled. However, when RFM developed, it had a more pronounced effect on early postpartum uterine contractility than the number of delivered calves.

Sarcoptic mange in a herd of llama and alpaca mares – a case report

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Background: South American camelids are often affected by dermatological diseases. Typically, skin lesions are diagnosed rather late in the pathogenetic process because the skin surface is hidden by the fleece most times throughout the year. Mange and zinc-responsive dermatitis are frequently diagnosed in affected animals. This case report shows the importance of diagnostic work prior to a systemic and topical treatment. Additionally, the treatment options for sarcoptic mange on a herd health level will be discussed.

Case report: Two adult llama and four adult alpaca mares from the same herd were referred to the Clinical Centre for Ruminant and Camelid Medicine within a period of nine weeks because of skin lesions and blepharospasm after ineffective systemic treatment against mange. At the physical examination, all six camelids showed moderate to severe alopecic, hyperkeratotic and erythematous skin lesions with pruritus. Three animals showed generalised lesions. The most affected body regions included the face, the neck, ventral abdomen, medial and proximal aspects of the limbs and the tail. The skin of one or both eye lids in three animals were also affected and led to blepharospasm. Comprehensive diagnostics were initiated. In two animals, severe *Sarcoptes spp.* infection was detected by deep skin scrapings. Two alpacas were additionally secondary infected by multi-resistant bacteria. Individual topical treatment including clipping and intensive washing procedures were implemented over two to six weeks at the clinic. The systemic treatment included antibiotics, non-steroidal antiphlogistic treatment, oral administration of omeprazole and the substitution of minerals as animal-individually required.

Discussion and Conclusion: This presentation will provide a comprehensive protocol of diagnostic and therapeutic measures in six camelids with different stages of sarcoptic mange. The aim of this presentation is to show the skin healing process that was successful by the combination of the systemic and intensive local treatment over a minimum of two weeks.

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How control and eradication of BVDV at farm level influences the occurrence of calf diseases and antimicrobial usage during the first six months of calf rearing

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Objectives: Bovine viral diarrhoea viruses (BVDVs) cause significant economic losses in dairy cattle farms worldwide. Acute BVD outbreaks are rare across Europe nowadays due to successful control programs, while other manifestations of the virus infection are becoming increasingly common (6,7). In calves BVDV infections have mainly been associated with pneumonia and enteritis (1,5). A significant relationship was found between the BVDV infection status of herds and the incidence of calf mortality and respiratory disorders (3,4). Studies also indicated that BVDV plays an important role in enteric diseases when occurring in conjunction with other enteric pathogens. Nowadays the disease manifests mainly as virus--induced immunosuppression, compare with acute BVD outbreak impacting overall herd performance and contributing to increased antibiotic usage in calf rearing. In our study we investigated the effect of rapid BVDV control measures on calf diseases and antimicrobial usage after weaning on a large industrial dairy farm.

Material and Methods: A large industrial dairy farm implemented a BVDV control program in January 2023. Total herd size was 1571 Holstein Friesian cattle. This herd had never been vaccinated against BVDV before the investigation period and no animals are introduced to the farm, they use their own stock for replacement. 1541(cows and heifers) and all 542 newborn calf of blood samples (total 2083) were submitted for RT-qPCR and ab-ELISA tests. Ten animals were investigated by virus neutralization (VN) test. A commercially available qPCR kit was used for screening to identify PI animals as described earlier. The nucleotide sequences of the partial Npro coding genomic region was used for genotyping of the detected viruses as described by Booth et al. (2). Serological investigations were carried out by using the IDEXX BVDV Total Ab ELISA kit (IDEXX, USA) and by virus neutralization (VN) test, the latter to assess vaccine efficacy against the prevailing virus. Herd parameters were collected from the herd-management program between January 2019 and December 2023. Occurrence of calf diseases and cases and antibiotic usage in calves were investigated between calf birth and the age of 6 months.

Results: The rapid BVDV eradication programme began in January 2023 with identifying and eliminating PI animals from the farm. Twenty-one PI animals were found by using RT--qPCR testing of blood sera out of the 1571 animals tested (1.33 %). Subsequent testing (between January and December 2023) identified further 28 PI animals amongst the 542 (5.1 %) calves tested shortly after birth, and all were instantly removed from the farm. The detected 1 b strain confirms previous recent findings on the prevalence of BVDV subgenotypes in the country, i.e. 1 b, 1d, and 1f (4).

Before detecting BVDV on the farm (2019) the calf mortality was 5.68 %. During the next three years when BVDV infection spread among the herd (2020, 2021 and 2022) annual calf mortality rapidly increased to 7.17 %, 7.62 % and 7.45 %, respectively. Before detecting the

BVD virus, 21 out of 43 animals (48 %) were recorded with respiratory problems and 12 out of 43 calves (28 %) with diarrhoea. During the next three years, respiratory cases tripled compared to the previous year. The total number of antibiotic treatments included 1012 cases in 2019 before the first detection of BVDV in the dairy farm. Over the next three years, antimicrobial usage increased dramatically. Antimicrobial treatments totalled at 1194, 1407 and 1422 during these years, respectively. During the BVDV eradication program, antimicrobial usage decreased rapidly. Less than 600 AB treatments were performed, more than fifty percent (57.9 %) less compared to the previous year. Antimicrobial usage decreased for all active ingredients but mostly for the antimicrobials which were associated with calf respiratory diseases (tulathromycin, florfenicol)

Conclusion: Our study clearly demonstrated the positive effects of BVDV eradication: beyond eliminating the virus and reducing its direct impacts, it has evidently improved calf health and more importantly, contributed to the reduction of AB usage, a cornerstone of the One Health perspective of farm animal production.

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Dermatophytosis in South American camelids

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Background: Skin diseases are frequent reasons for treatment in South American camelids (SACs). Various diseases including zinc-responsive dermatosis, mange and additional secondary bacteriological dermatitis can be responsible for an alteration of fleece and skin condition in llamas and alpacas. Dermatophytes as zoonotic pathogens are well known in cattle, in contrast in SAC they are less commonly reported. Literature research was conducted to collect information on prevalences, predisposing factors, diagnostics, treatment and management of affected animals.

Material and methods: For the literature research on dermatophytosis in SACs, the following terms were used in various combinations in the database of „Google Scholar“, „PubMed“, „Scopus“ and „CABI“ in August 2024: „alpaca“, „llama“, „camelid“, „dermatophyte“, „ringworm“, „llama“, „alpaca“, „New World camelids“, „trichophyton“, „aspergillus“, „candida“, „microsporum“ and „alternaria“. Publications in English and German were included. The data, collected for each publication included the title, language, year of publication, first author, first author's country of origin, publication type, species, symptoms, diagnostic procedures, treatment options and prevention. The data was analysed descriptively.

Results: A total of 32 publications were identified. All were published between 1989 and 2024 and over 50 % are of US-American origin. The major pathogens affecting SACs are namely Trichophyton (T.) verrucosum, T. mentagrophytes und Microsporum spp. Dermatophytosis is described as a rare skin disease, mainly affecting juvenile animals. A sex predisposition is not reported. Infection takes place via direct contact or contaminated utensils like troughs. Frequently, only one animal in a herd shows clinical signs but it is unknown how many other animals are infected. The highest incidence of skin lesions due to fungi is in autumn and winter months. Typical clinical symptoms comprise alopecia, brittle hair, exudative dermatitis, and pruritus. For treatment several therapeutic procedures are reported including antimycotic shampoos and antimycotics drugs as ointment or per os. Vaccines, as part of treatment, were described as not available or non-effective.

Discussion and Conclusion: The clinical presentation of skin diseases in SACs are like those in cattle. Nevertheless, treatment in SACs can be very challenging. First, vaccines, which are well known for their effectiveness in cattle and camels, are not licensed and little is known if they are effective in SACs. Second, a variety of antimycotics is used as shampoo. SACs do not tolerate repeated washing very well. Washing in winter season is problematic as well. Oral treatment which is commonly reported does often not comply with drug legislation, as SACs are categorized as food-producing animals in Europe.

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Reticuloruminal motility monitoring in cows during the peripartal period

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Objectives: Hypocalcemia (parturient paresis, milk fever) typically occurs in dairy cows during calving or at the beginning of lactation. A risk prediction on individual cow level would allow customized prophylactic measures and increase the alertness of the farmers.

The objectives of the study were to measure concentrations of total (tCa) and ionized Ca (iCa) around calving, to record rumen motility patterns and to assess the associations between the rumination time (RT) before calving and Ca concentration at calving.

Methods: A total of 46 cows and 20 heifers were included in the study. All cattle were fitted with a reticuloruminal bolus wireless sensor (smaXtec animal care GmbH, 8010 Graz. Austria), which recorded locomotion activity, rumination time, reticuloruminal contraction time and reticular temperature data every 10 minutes from 60 days before calving to 60 days after calving. These sensor-based parameters were averaged every 12 hours from day -21 to +7.

Results: Cows with reduced tCa concentrations (< 1.8 mmol/L) after parturition showed a significantly shorter RT on the days -4, -3.5, -3, -2.5, -1.5, -1, -0.5, 0, 0.5, 1, 2, 2.5 than those with normal tCa concentrations (> 2.2 mmol/L). The rumen motility pattern before parturition was associated to the total and ionized calcium concentrations at parturition.

Conclusion: To summarize, it seems possible that rumination time before parturition might be useful to predict the hypocalcemia risk. However, further studies, including more animals equipped with sensors, are needed to characterize the dynamics of low blood Ca after birth and its association to reticoluruminal motility.

Keywords: reticuloruminal motility, periparturient hypocalcemia, bolus wireless sensor

Predicting fatty liver and hyperketonaemia in dairy cows: prepartum and postpartum biochemical markers and weight loss patterns – a herd example

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Objectives: to identify prepartum and postpartum biochemical markers and weight loss patterns that could differentiate cows that would exhibit ultrasonographic signs of liver fatty infiltration or hyperketonaemia during the latter half of the transition period.

Methods: One dairy cattle herd (n=200) was monitored for a 6 month period. Heifers, primiparous cows and cows requiring pharmacological and/or surgical treatment were excluded from the study. Enrolled animals (n=24) were subjected to weekly body condition score assessments, measurements of backfat thickness (BFT), and blood biochemistry (glucose (GLUC), triglycerides (TG), alanine aminotransferase (ALT), aspartate aminotransferase (AST), alkaline phosphatase (ALP), creatine kinase (CK), lactate dehydrogenase (LDH), non-esterified fatty acids (NEFA), total cholesterol (TC) and β--hydroxybutyrate (BHB)) 10 times from one week prepartum. Fatty liver was diagnosed via ultrasound at 4 weeks postpartum and hyperketonaemia was diagnosed on the basis of BHB serum level during 1 week prepartum and 3 weeks postpartum. Time-dependent metabolite changes were analysed using a repeated measures analysis of variance (MANOVA).

Results: Fatty liver: Mean BFT was significantly higher at all time points in cows exhibiting ultrasonographic signs of fatty liver ($p<0.05$). The AST activity was higher in the healthy cows throughout the monitoring period ($p<0.05$). While ALT and CHOL levels fluctuated over time ($p<0.05$), no significant differences were observed between the two groups. A significant interaction between time and the presence of liver fatty infiltration ($p<0.05$) was found in GLUC levels. NEFA concentrations were consistently higher in cows with fatty liver compared to healthy animals at all time points ($p<0.05$). Both groups exhibited a similar trend in NEFA concentration with an increase until week 2 pp, followed by a decline through the end of the monitoring period. No significant differences were found for CK and LDH activity or BHB levels.

Hyperketonaemia: BHB concentration changed significantly over time between healthy and hyperketonaemic cows ($p<0.05$). In hyperketonaemic cows, high BHB levels were maintained for 5 weeks postpartum, although during the first 3 weeks pp., this difference was statistically significant between the groups ($p<0.05$). The NEFA concentration showed significant differences over time ($P<0.05$), but did not differ significantly between the groups. Postpartum ALT activity decreased in the hyperketonaemic cows, while it increased in the healthy ones. From weeks 6 to 9 pp., these differences were statistically significant ($p<0.05$) In weeks 5 and 6 postpartum, AST activity differed significantly between the groups ($p<0.05$), being lower in the hyperketonaemic group compared to the healthy group. ALP activity showed significant differences over time ($p<0.05$), but did not differ significantly between the groups.

Conclusions: Combining multiple monitoring methods improves the assessment of dairy cows' metabolic status at the herd level. Further research should focus on validating these findings in a larger population of dairy cattle and developing targeted diagnostic protocols for individual herds.

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Health Management in Austrian South American Camelid Herds

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Background: Llamas and alpacas have been kept in Austria for several decades. Still, there is a lack of data regarding the number of llamas and alpacas as well as (health) management measures in Austria. Therefore, a survey study was conducted to collect data on various aspects of South American camelids, including husbandry, work organization, animal movement, utilization and human interaction as well as health management in Austria.

Methods: This thesis specifically focuses on the health management of South American camelids. The study was conducted between January 11th, 2024 and June 8th, 2024 and a total of 450 questionnaires were evaluated. The survey data was analyzed using Microsoft Excel. The first two questions of the survey study were mandatory and served as prerequisites for inclusion in the evaluation. However, since the remaining questions were not compulsory, the number of respondents varied for each question.

Results: The greatest number of farms keeping South American camelids are located in Lower Austria (29.1 %), Styria (19.8 %), and Upper Austria (18.7 %). Approximately one third of the surveyed animal owners (32.7 %) are members of the Austrian Animal Health Service, while the majority of the farms (88.6 %) document health data of their herd, either digitally or analog. Most respondents (66.4 %) spend 1–2 hours per day caring for their animals. Practices regarding animal movement and quarantine measures vary significantly because the majority with 276 votes (72.8 %) only increases their herd as needed. The digestive system was the most commonly mentioned by animal owners as the primary cause of illness (32.9 %) and death (20.3 %). In contrast, death due to old age ranks second, highlighting the importance of these animals to their owners. Proper vaccination management also plays an important role in the prevention of significant diseases within herd care. The majority of vaccines target various clostridia with a total of 212 out of 360 animal owners (96.8 %) reporting vaccination against this spectrum of pathogens.

Conclusions: With the increase in animal numbers of the South American camelids in Austria, veterinarians are now more frequently confronted with questions regarding certain fields like husbandry, feeding and breeding of South American camelids. Topics such as animal health and herd management are also becoming more prominent. The results provide an overview of the current state of South American camelids husbandry in Austria and offer insights for optimizing herd and health management. The survey results identified the most common herd-related issues from the perspective of animal owners, emphasizing the need for future research to focus on health monitoring and preventive measures.

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The Impact of Dystocia on Stress Indicators and Health Outcomes in Beef Calves: A Literature Review

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Objectives: To assess the impact of dystocia in beef calves on the dynamic changes in cortisol, and immunoglobulins levels, contributing to health changes in growing calves through a literature review.

Neonatal survival and development heavily depend on the physiological progression of birth. However, dystocia, or difficulty during calving can result in less vigorous offspring, leading to impaired general health due to exhaustion, pain, and human intervention. One of the primary consequences of dystocia is an elevated neonatal stress response, negatively impacting health through reduced appetite, impaired non-specific immunity, slowed growth, and increased morbidity. Unlike in dairy cattle, in reviewed literature research on the effects of dystocia in beef calves is limited, highlighting the relevance and need for further investigation.

Dystocia is painful and challenging process for both dam and calf. Non-physiological calving induces pain and significantly increases cortisol levels in neonatal blood serum during the first two days of life. High levels of stress lead to exhaustion and generalized weakness, affecting critical neonatal behaviours such as early colostrum intake. Since beef calves typically remain with the dam, their colostrum intake depends on a functioning natural suckling reflex. Weakness from dystocia-induced stress delays suckling, which, when combined with lower intake volumes, often results in a high incidence of passive transfer failure. General weakness of the body requires time of recovery resulting in delayed suckling. Reduced and delayed colostrum intake is linked to reduced serum Immunoglobulin G concentrations and significantly higher rates of morbidity and mortality in growing calves.

In conclusion, findings from the reviewed literature emphasize the need for improved dystocia management strategies to enhance passive immunity transfer and calf health outcomes in beef production systems. A deeper understanding of the dynamic relationship between stress biomarkers, passive immunity, and health outcomes could contribute to better management practices aimed at improving calf survival and growth.

Assessment of Health and Nutritional Status in Sheep Using Selected Blood Parameters and Faecal Egg Count

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Objectives: The most common causes of reduced productivity in sheep flocks are diseases and suboptimal nutrition. This study aimed to evaluate the health and nutritional status of sheep flocks by analysing selected blood parameters, faecal egg count, and other health indicators.

Material and Methods: The study included flocks of Slovenian autochthonous sheep breeds: Bovec sheep (B, n=1), Istrian Pramenka (IP, n=1), and Jezersko-Solčava breed (JS, n=3). Blood and faecal samples were taken for haematological, biochemical, and parasitological analyses. Additionally, all sheep were assessed using the FAMACHA scores, body condition scores (BCS) and body temperature measurements at sampling. All together 280 sheep were examined. Total milk yield in the previous lactation was also recorded for the dairy breeds B and IP. Descriptive statistics were calculated for the collected data, and the percentage of samples deviating from reference values was determined.

Results: Haematological analyses most frequently revealed deviations from reference values in the leucocyte count, which was elevated in 11.6 % of samples, and the platelet count, which was too low in 11.6 % of samples. Biochemical analysis showed the most frequent deviation from reference values in the concentration of inorganic phosphates (iP), with 13.5 % of samples below and 28.67 % above reference values. Low calcium concentration was found in 15.61 % of samples, low urea concentration in 37.13 % and elevated albumin concentration in 30,8 %.

Parasitological examination of the faecal samples detected *Strongylida* eggs in 72.37 % of samples, with an average of 215 eggs per gram (EPG). The average FAMACHA score was 2.45 and the average BCS was 2. 44.

The average milk yield of the dairy sheep breeds was 141.18 kg.

Conclusions: The results of haematological tests and FAMACHA scores indicated that anaemia was not prevalent. Inflammatory processes may be present in a proportion of animals, however an increase in the leukocyte count can also be attributed to stress. The parasitological examination revealed a mild Strongylida infestation in most of the samples, which had no significant negative impact on the animals. In the biochemical analyses, the concentrations of iP, Ca and urea deviated most frequently from the reference values, indicating an inadequate supply of minerals and proteins. Elevated albumin values indicate insufficient hydration of sheep. The findings of this study show that the general health and nutritional status of the sheep were good, although mineral and protein supplementation as well as improved water availability are recommended to optimize flock productivity and welfare.

The effects of a phosphorus binding feed supplement fed prepartum on the Ca and P balance in dairy cows

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Objectives: Subclinical hypocalcemia is a common metabolic disorder of milking cows, possibly leading to clinical milk fever, predisposing to other fresh cow diseases, and having a negative effect on milk production and reproduction. A previous study has shown that the prevalence of hypocalcemia in fresh cows was above 50 % in Hungarian dairy herds. This study aimed to measure the effects of a feed supplement containing a phosphate binder that is supposed to modify the calcium homeostasis in freshly calved dairy cows and thus prevent postpartum hypocalcemia.

Materials and methods: The study was conducted on a large-scale dairy farm in Hungary, housing 600 cows and their offspring. Dry cows were chosen for the study. In total, 17-17 cows were assigned to the Control (CTRL) and experimental (EXP) groups, respectively. Both groups received the same TMR from 3 weeks before the expected calving, except that 400 g/cow experimental material was supplemented to the EXP group daily ration. The supplementation ceased at the time of calving when the cows were moved to the fresh milking group and fed with another TMR. The feeding regime did not differ between control and experimental cows during the post-calving period. Blood samples were taken from the caudal vessels of the focal cows according to the following schedule between 21 days prepartum to 14 days postpartum: 21, 10, 7, 5, 3, and 1 day(s) before expected calving, 6-12 hours after calving, and also 1, 2, 3, 5, 7 and 14 days postpartum.

Total and ionized calcium (tCa, iCa, respectively), phosphorus, magnesium, and BHB concentrations of serum samples were measured. Daily milk yield was also recorded.

Results: The serum tCa levels of control and treated cows differed 12 hours postpartum and days 1 and 2 after calving. On average, the tCa in the blood of supplemented cows was 0.22, 0.18, and 0.14 mmol/L higher than that of control cows. Ionized Ca levels of treated cows were significantly higher from day 10 prepartum until day 3 postpartum. The treatment was associated with significantly lower inorganic phosphate concentrations in EXP before and after calving until d2. Serum Mg concentrations were significantly higher in the CTRL on day 5 before and 12 hours after calving. BHB levels of CTRL and EXP cows differed 14 days after calving. The BHB concentration in the blood of control cows was, on average, 1.42 times higher. Daily milk yield tended to be higher in the EXP during the first 30 days postpartum.

Conclusions: The 400 g/cow/day dose additive yielded the expected results. There was an improvement in serum tCa (at 12h and on d1 and d2) and iCa (throughout the experimental period) concentrations.

Evaluation of the Relationship Between Different Passive Transfer Immunities and Serum Proteomes in Neonatal Calves

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Objectives: The aim of this study was the investigation of potential association between serum proteomes and passive transfer immunity (PTI) levels in neonatal calves for the first time. Specific objectives included the identification of proteomic differences among calves with varying PTI levels (failure, adequate, and excellent PTI) based on IgG concentrations and the evaluation ofe changes in serum proteomes before and after colostrum intake.

Materials and Methods: The study material consisted of serum samples from 40 newborn calves born on the same farm. Blood samples were taken from the calves before colostrum intake (0 h) and 48 h after intake. IgG concentrations of all serum samples were measured using commercially available bovine specific ELISA tests (BIO K420 Biox, Belgium).

The calves were divided into three groups based on their 48-hour IgG concentrations. Calves with IgG < 1000 mg/dL were classified into the Failed Passive Transfer Immunity (FPTI) group, calves with IgG concentrations between 1000 and 2000 mg/dL were classified into the Adequate Passive Transfer Immunity (APTI) groupand calves with IgG > 2000 mg/dL were included into the Excellent Passive Transfer Immunity (EPTI) group.

From each group, five calves representing the group mean were selected, and proteomic analyses were performed separately on the samples collected at 0 and 48 hours. Protein expression differences in samples were analysed by the LC–MS/MS method (WatersM-Class UPLC and Xevo G2-XSQTOF MS). As a result of the proteomic analyses, proteins with a significance of $p< 0.05$ and a fold change of ≥1.2-fold were considered to be significant.

Results: The mean IgG values at the 48th hour for each group were detected as 911.7 mg/dL, 1661.2 mg/dL, and 2499.3 mg/dL for the FPTI, APTI, and EPTI groups, respectively. In the serum samples, a total of 80 proteins were identified. In the FPTI group, 21 proteins showed significant changes at the 48th hour compared to the 0 hour, all of which were upregulated. In the APTI group, a total of 5 proteins showed significant changes, with four proteins upregulated and one protein downregulated. In the EPTI group, 30 proteins were found to be significantly upregulated following colostrum consumption up to the 48th hour.

In the EPTI group, the most upregulated proteins at the 48th hour compared to the 0 hour were Haptoglobin (51.10-fold), Pigment Epithelium-Derived Factor (27.24-fold), Protein Churchill (18.31-fold), and Serpin A3-6 (9.55-fold) ($p < 0.05$).

When evaluating the 48th-hour data of all groups, compared to the FPTI group, 18 proteins were decreased in the APTI group, while in the EPTI group, 10 proteins were decreased and 3 proteins were increased. Compared to the APTI group, 22 proteins were increased in the EPTI group.

Conclusions: As new data on the functions and interactions of proteins showing significant changes at different PTI levels are added to protein databases, more in-depth information about neonatal immune development will be gained.

Keywords: proteomics, passive transfer immunity, calves

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Grade II abomasal ulcer in a Czech Fleckvieh calf – A clinical case

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Objectives: Ulcers are a common problem in intensive cattle breeding systems, with dairy cows and calves being the most affected categories. Ulcers are divided into 4 categories according to the extent of damage to the wall of the abomasum. This abstract discusses a non -perforating bleeding ulcer (type II) in a 1.5-month-old heifer of the Czech Fleckvieh breed originating from intensive cattle breeding with commercial milk production.

Material and methods: 1.5-month-old heifer of the Czech Fleckvieh cattle breed was admitted to the Ruminant and swine clinic, VETUNI Brno with history of worse appetite, general weakness and not thriving for the last few days. The CRT was unmeasurable and the gingival and mule mucosa were anaemic. The sucking reflex was very weak and the feces were pasty and darker in color - melena. Severe anemia, melena and general weakness were identified as the main clinical findings.

Results: Erythropenia (0.65 × 1012/L), very low hemoglobin concentration (21 g/L) and haematocrit values (1.9 %) were indication for blood transfusion. MCV was also reduced (29.3 fL), on the contrary, MCH (32.3 pg) and MCHC (1105 g/L) were higher in the first sampling. Increased RDW (23.5 %) indicated anisocytosis. Biochemical examination revealed hypoproteinemia (44.20 g/L), hypoalbuminemia (20.20 g/L), increased activity of creatine kinase (6.42 μkat/L) and AST (1.04 μkat/L), slightly reduced phosphorus (1.52 mmol/l) and low iron concentration (less than 1 μmol/l). The heifer received 450 ml of whole blood from an adult heifer (blood bag CPDA – citrate, phosphate, dextrose, adenine) on the first day and another 900 ml of whole blood on the second day. As part of the USG examination of abdomen, an edematous mucosa and distended oblique folds within the fundus of abomasum were detected. A hyperechogenic lesion with dimensions of 2 × 2 cm was clearly visible in the abomasal wall – a non-perforating abomasal ulcer. The abomasum contained heteroechogenic material with preserved peristalsis. Famotidine was administered intravenously for 5 days. Furthermore, omeprazole and sucralfate were administered orally for 2 days. Due to the abdomenalgia, the heifer was given metamizole intravenously for the following 3 days. At the same time, the antibiotics amoxicillin - clavulanate were administered. Due to a weak sucking reflex and mild dehydration, infusion therapy was initiated on the 4th day of hospitalization. During the entire course of hospitalization, supportive therapy was given in the form of vitamin B complex and probiotics orally, decoction of chamomile tea and linseed, and at the same time regular feeding with milk substitute was carried out.

Conclusion: Although the slightly anaemic mucous membranes persisted, the patient's condition began to improve after about 11 days of hospitalization in the form of a stronger appetite, i.e. a better sucking reflex and greater interest in the surroundings. More detailed examination results and treatment will be presented at the congress.

Evaluation of factors affecting double ovulation in dairy cows and determination of its effect on fertility (retrospective study)

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Objectives: Double ovulation rate (DO) varies between 5-20 % in dairy cows. Although twinning after DO is desirable in some species, it is undesirable in cows due to the problems following dystocia and their infertility. In this study, it was aimed to determine the DO rate after timed artificial insemination protocol, the factors affecting this rate and the effects of DO on pregnancy in dairy cows.

Materials and Methods: The data of a total of 1904 Holstein Friesian (HF, n=1510) and Swedish Red (SR, n=394) cows that underwent Ovsynch protocol were evaluated retrospectively. Ultrasonographic examinations of the ovary were performed to determine the number of follicles at the time of artificial insemination (AI) and to control ovulation on the 7th day after AI. The disappearance of the follicle(s) detected on the ovary at the time of ST on the 7th day after ST was considered as ovulation (+). Statistical analysis of the data was performed using SAS 9.4 (TS1M8) statistical program.

Results: In the analyses, DO was found to be 9.4 % (179/1904) in all cows included in the study, while there was no difference in DO between HF (9.9 %; 150/1510) and SR cows (7.3 %; 29/394). However, DO rate was higher (P<0.0001) in multiparous cows (11.2 %; 124/1098) than primiparous cows (4.4 %; 25/557). While the DO rate was 10.0 % (128/1290) in cows with BCS ≤ 2.75, it was 8.4 % (45/535) in cows with BCS >2.75 and there was no difference between the two groups. When the DO rate was analyzed according to milk yield; the DO rate was 7.0 % (43/614) in cows with milk ≤38.6 kg/day and 11.1 % (66/593) in cows with milk >38.6 kg/day (P<0.01). When the effect of season on the DO rate was evaluated; while the DO rate was 8.9 % (140/1572) in the cold season (September-May), this rate tended to be 11.8 % (39/328) higher in the hot season (June- August) (P=0.09). While the pregnancy rate of all animals was 41.8 % (797/1904), there was no difference between breeds in terms of pregnancy rate (HF 41.5 % vs SR 43.1 %). When pregnancy was evaluated according to the number of ovulations, pregnancy rate was 41.5 % (717/1725) in single ovulations and 44.6 % (80/179) in DOs.

Conclusions: It was determined that the hot season increased the DO rate with increasing lactation number and milk yield in cows, but DO have no effect on conception rate in lactating dairy cows.

Keywords: double ovulation, cow, pregnancy

Epidemic outbreaks of malignant catarrhal fever in cattle, case report and literature review

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Objectives: OvHV-2 (Ovine Herpesvirus-2), a gammaherpesvirus, is part of the group of viruses responsible for causing malignant catarrhal fever (MCF). OvHV-2 is endemic in most sheep populations worldwide and can be transmitted via ocular and nasal secretions from asymptomatic sheep, the primary host, to susceptible species such as cattle and bison, leading to MCF. After an incubation period of two weeks to nine months, MCF manifests with a core body temperature exceeding 41 °C, apathy, and anorexia. In the course of the disease, several overlapping forms can be distinguished. The most common presentation is the head--and-eye form, characterized by oculonasal lesions and ulceration of the nasal and oral mucosa. Additionally, the disease may present with an intestinal form, involving bloody diarrhea, with neurological symptoms or with a mild course and higher recovery rates. Typically, MCF occurs as isolated cases, with a few reports of outbreaks having an epidemic character only.

Material and Methods: Such an untypical outbreak of MCF is described and results of a literature review, concerning possible causes for epidemic outbreaks of MCF are presented.

Results: The MCF outbreak occurred on a dairy farm in Tyrol, Austria, holding 14 cows, resulting in a mortality rate of 57 %. Ten cattle died or were euthanized within nine days after the onset of symptoms or were culled due to long-term complications. The affected animals exhibited sudden agalactia and the clinical signs of the head-and-eye form of MCF, with poor response to symptomatic treatment. OvHV-2 was detected in all 10 cattle through PCR testing, two animals were additionally subjected to pathological examination. The source of the virus was identified as a flock of sheep that had been housed in the same barn for over 30 years. Discussions with the farmer explored factors such as animal movements, housing conditions, and climate to identify potential triggers for the outbreak. The most likely cause appeared to be the purchase of two ewes with their lambs approximately two months before the first case of MCF was observed. Although head stress, genetic variations both in cattle and the virus as well as other factors have been discussed as possible cause for epidemic outbreaks of MCF, the factors leading to such events remain unclear.

Conclusions: Epidemic outbreaks of MCF are rare events, reported in many different regions worldwide. The causes for these outbreaks remain unclear, demanding further research concerning MCF in cattle.

Wound healing and health status of German Holstein heifer calves undergoing hot iron disbudding with special consideration of perioperative pain management

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Hot iron disbudding is a stressful and painful procedure. Various studies dealt with pain management protocols and their effect on behavioural, physiological and biochemical processes. The aim of this study was to investigate the effects of pain management, age of the calves and the disbudding procedure per se on the wound healing and the health status of calves.

Materials and Methods: 327 German Holstein heifer calves were used for this study. The calves were disbudded at 4 to 10 days or at 15 to 28 days of age. Each calf was randomly assigned to one of nine treatment groups, which differed with respect to pain management (sedation, local anesthesia, nonsteroidal antiinflammatory drugs, placebo). All but the sham--disbudded calves underwent hot iron disbudding and all calves were monitored clinically before and until 4 weeks after the procedure. The findings were analyzed using valuation scores and a threshold model.

Results: Wounds showed a typical course during the 4 weeks of observation. Pain management did not affect the wound healing regarding the complete trial, in a small timeframe animals undergoing a multimodal pain management showed lower incidence of wound swelling. Disbudding had adverse effects on respiratory health. Calves undergoing sham disbudding had the lowest incidence of respiratory disease and calves that did not receive any anaesthesia or pain medication had the highest. All treatments had mitigating effects on the incidence of respiratory tract diseases but the effects varied with the type of pain management. Calves disbudded under the regime of a multimodal pain management had almost the same risk for respiratory diseases than the calves who were not disbudded at all. Considering wound healing and health status no differences were observed between the age-groups.

Conclusions: Pain management had no adverse effects on the wound healing, in a smaller time frame animals benefited from a multimodal pain management. If other methods than hot iron disbudding showed faster and less complicated wound healing should be investigated in further studies – in the present study wound healing showed a typical four weeks course. Disbudding calves poses a risk to respiratory health. If breeding of polled offspring is not possible or when farming of horned cattle is not feasible, the risk of respiratory disease induced by disbudding can be minimised through adequate pain management. Disbudding of very young calves is feasible.

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Reducing Methane Emissions in Dairy Farming: A Literature Review on Feed Additives for Sustainable Livestock Management

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Methane (CH_4) emissions from livestock, particularly ruminants, remain a significant environmental concern and a focal point of research in the dairy cattle industry.

The agricultural sector, primarily large ruminants, is responsible for more than half of CH_4 emissions in Europe. Given the rapid rise in global temperatures, mitigating enteric methane emissions through dietary interventions is a promising and animal-friendly approach. Several in vivo studies have investigated the impact of specific feed additives and dietary modifications on CH_4 reduction. Among these, brown algae (Ascophyllum nodosum), red algae (Asparagopsis armata), and 3-nitrooxypropanol have shown potential in mitigating methane emissions.

However, the effectiveness and safety of these additives require further evaluation. While red algae supplements have demonstrated an impressive 98 % reduction in CH_4 emissions in in vitro studies, in vivo trials indicate a substantial increase in halogenated hydrocarbon production due to their active compound, bromoform. In contrast, brown algae supplementation, through its production of phlorotannins combined with polyethylene glycol, inhibits methanogens by reducing the growth of certain ciliates, resulting in a 17 % reduction in emitted CH_4. Additionally, 3-nitrooxypropanol supplementation has shown a 16–20 % decrease in CH_4 emissions by blocking the final step of methanogenesis. However, concerns remain regarding the potential development of methanogen resistance to this additive.

In conclusion, reducing enteric methane emissions in dairy farming is essential for sustainable livestock management and climate change mitigation. While feed additives such as brown algae, red algae, and 3-nitrooxypropanol show promise, their long-term efficacy, safety, and potential environmental impacts require further investigation. Continued research is crucial to ensure the development of effective, sustainable, and safe methane mitigation strategies in the dairy industry.

Keywords: methane emissions, dairy cattle, feed additives, red algae, brown algae, 3-nitrooxypropanol, sustainable livestock management

Effect of heat stress on the proportion of polymorphonuclear neutrophils and the microbial growth in the uterus of postpartum dairy cows

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Objective: Heat stress (HS) has become a significant concern in livestock 1 farming as it a;ects animal health, welfare, and productivity. Studies on the impact of HS on the uterine environment, however, is still limited. Therefore, the objective of this study was to assess the e;ect of HS exposure on the proportion of polymorphonuclear neutrophils (PMN %) and the microbial growth density (MGD) in the postpartum uterus.

Material and Methods: Uterine cytobrush samples were taken from 52 dairy cows on days 7, 14, 28, 42 and 56 postpartum (pp). Samples were used for cytology to determine the PMN % and for bacteriology to assess the MGD on the agar plates after aerobic cultivation. Ambient temperature and relative humidity were recorded at 30-minute intervals with dataloggers installed in the barn and the temperature-humidity index (THI) was calculated. The accumulated HS exposure was calculated as the area under the curve between the THI and the threshold of 68 (Riemann sum).

Results: Positive correlations ($r = 0.3– 0.4$, $P < 0.05$) were observed between short-term HS (48 hours prior to sampling) and the PMN % on days 7, 14 and 42 pp. The MGD correlated negatively with HS 12 hours prior to sampling on day 14 and 42 pp (both $r = –0.4$, $P <$

0.05). Long-term HS (7, 14, 21 and 28 days prior to sampling) significantly correlated with the PMN % and on day 42 ($r = 0.3–0.4$, $P < 0.05$) but not on day 28 or 56 pp. Conclusion

Our results demonstrate that the e;ect of HS on PMN % and MGD depends on the duration and intensity of HS exposure and the day postpartum. Further research is needed to explore underlying mechanisms contributing to impaired uterine health and fertility under HS.

Holistic Applications of Beta-Carotene for Enhancing Reproductive Health in Cattle

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Objectives: This study aimed to assess the effects of different beta-carotene administration methods on blood concentration dynamics and reproductive performance in dairy cows, and explore its potential as a holistic reproductive health therapy. the dynamics of beta-carotene concentration in the bloodstream through different administration methods, assess its impact on reproductive performance in dairy cows, and explore its potential as a holistic therapy for reproductive health improvement.

Materials and Methods: Seventy-one dairy cows diagnosed with the absence of a corpus luteum (CL) were randomly assigned to three groups: intramuscular beta-carotene administration, intrauterine application, and a control group without supplementation. All cows received 2.5 ml of GnRH on days 1 and 13. Blood samples were collected on day 6 to measure beta-carotene levels, and ultrasound evaluations were performed on day 13 to check for CL presence. Reproductive performance metrics were analyzed statistically on day 28 to assess treatment efficacy.

Results: Intramuscular beta-carotene administration significantly increased blood levels, showing a peak rise of 53 % by day 6, followed by a gradual decline ($p<0.05$). In contrast, intrauterine administration led to minimal changes, with levels returning to baseline by day 28. The control group exhibited minor fluctuations.

Regarding reproductive outcomes, corpus luteum formation was highest in the intramuscular group (72 %), followed by the intrauterine group (70.3 %), and lowest in the control group (10 %). Insemination success was greatest in the intramuscular group (88.88 %), followed by the intrauterine group (47.36 %), with no pregnancies in the control group. Intramuscular injection increased beta-carotene levels by 53 % within five days, with a subsequent 4 % decline by day 13 and a 16 % reduction by day 28 ($p<0.05$). Intrauterine administration resulted in an 11 % decrease by day 6, a 7 % increase by day 13, and a return to baseline by day 28 ($p<0.05$). The control group experienced minor fluctuations, with increases of 4.5 % by day 13 and 6.57 % by day 28 ($p<0.05$).

Regarding reproductive outcomes, 72 % of cows in the intramuscular group developed a CL by day 13, compared to 70.3 % in the intrauterine group and only 10 % in the control group. Insemination success was highest in the intramuscular group (88.88 %), followed by the intrauterine group (47.36 %), with no pregnancies in the control group.

Conclusions: Intramuscular beta-carotene supplementation effectively increased blood levels and improved reproductive outcomes, showing the highest synchronization and pregnancy rates. Intrauterine administration had minimal impact. These findings support intramuscular delivery as a valuable strategy to enhance reproductive health in dairy cows.

Blood 25-hydroxyvitamin D status in Slovenian dairy cattle

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Objectives: The connection between vitamin D and normal growth and development of cattle has long been recognized. More recently, studies have highlighted its crucial role in immune system function. Sufficient levels of vitamin D are naturally synthesized in the skin upon exposure to UVB radiation from sunlight. However, this natural production is significantly affected by the confinement of animals.

Dietary supplementation remains standard practice in cattle nutrition to ensure adequate vitamin D levels. Vitamin D status in cattle is assessed by measuring the concentration of 25-hydroxyvitamin D (25(OH)D). By analysing 25(OH)D levels in dairy cows at different stages of lactation and in neonatal calves, we assessed whether the current guidelines remain sufficient to meet optimal blood levels in cattle in Slovenia, while still adhering to EU regulations.

Materials and methods: In two ongoing studies, blood samples were collected from commercial dairy farms with different management practices. A total of 128 calves (aged 2–7 days) from 12 farms and 185 dairy cows in the dry period (N=55) and the first 100 days in milk (N=130) from 9 farms were included. Serum 25(OH)D concentrations were measured using ELFA (Enzyme-Linked Fluorescence Assay) on immunological analyser MiniVidas (BioMerieux, France). Statistical analysis was conducted using R software (version 4. 2. 2) to evaluate the effects of production system type, farm variability, season, and lactation stage on 25(OH)D levels.

Results: Our results show that 91 (71 %) calves had serum 25(OH)D concentrations below 20 ng/mL and 21 (16 %) below 8.1 ng/mL, which is the lower limit of detection for the test used. In dairy cows, 78 (42 %) cows had serum 25(OH)D concentrations below 20 ng/mL, 102 (55 %) cows between 20 and 30 ng/mL and only 5 cows (3 %) over 30 ng/mL (preferred level indicating adequate vitamin D supply).

Conclusions: Vitamin D deficiency is well-documented in calves raised on a milk-based diet, as milk naturally contains relatively low levels of vitamin D. A significant proportion of calves had serum 25(OH)D concentrations below 8.1 ng/mL. Studies have shown that such levels can already result in clinical signs of deficiency.

In most farms average 25(OH)D concentrations in the serum of dry cows ranged between 20 and 30 ng/mL, with only two farms showing notable negative deviations. Concentrations were below 20 ng/mL on one farm that did not supplement any mineral-vitamin mixtures, while the other exhibited a large variation in vitamin D levels among animals within the same group and on the same feed ration. Lactating cows had slightly lower vitamin D concentrations than dry cows; however, it is important to note that cows were sampled during the postpartum period and at the peak of lactation, when the demand for vitamin D is highest.

All calves were fed milk, as is common in Slovenia, while the cows were provided with vitamin D levels based on the NASEM 2021 guidelines, except for the farm where mineral--vitamin mixtures were not added. Additional research is needed to determine whether the

provided values are sufficient for cows under current production levels and to identify optimal values where health and productivity are positively impacted.

Investigation of the effects of abomasum ulcers on gastrointestinal hormones motilin, ghrelin and gastrin levels in beef cattle

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Objectives: Abomasal ulcer is a disease that can be seen in cattle and has many similarities with peptic ulcers in monogastric species. The incidence of abomasum ulcers, which occur as a result of stress, poor quality roughage and sometimes viral diseases, can be 5 % and above in a herd. The gastrointestinal hormones ghrelin and motilin share some common features. These hormones are synthesized in the upper gastrointestinal tract and have a prokinetic effect on gastrointestinal motility. Gastrin is another hormone responsible for hydrochloric acid secretion and parietal cell multiplication in the abomasum. The aim of the presented study was to determine the motilin, ghrelin and gastrin concentrations in animals with abomasum ulcers, to compare them with healthy animals and to investigate the relationship between the severity of abomasum ulcers and the mentioned hormones.

Materials and Methods: The study material consisted of 41 Holstein beef cattle belonging to the same herd, with the same management and feeding conditions. Before the animals were sent for slaughter, general examinations were performed at the farm and blood samples were taken from the coccygeal vein into tubes without anticoagulant. Blood samples were centrifuged at 3000 rpm for 10 minutes, serum samples were stored frozen at -80 °C until ELISA analyses were performed. The animals from which blood samples were collected were sent to the slaughterhouse on the same day and slaughtered. At the time of slaughter, each abomasum of the animals was washed and evaluated in terms of possible lesions, lesion numbers and lesion characters. Accordingly, animals with no lesions in the abomasum were included in the healthy control group (group C, n=20), animals with ≤ 3 lesions were included in the mild-moderate abomasum ulcer group (group M, n=14), and animals with > 3 lesions were included in the severe abomasum ulcer group (Group S, n=7). Blood serum samples were thawed and Motilin (BT-Lab; E2101Bo), Ghrelin (BT-lab;E0262Bo) and Gastrin (BT-lab; E2006Bo) concentrations were measured by species specific ELISA kits. Sigma Plot 15 (Systat Software Inc., San Jose, CA) program was used for the analysis of data and One-way ANOVA test was applied for comparison between groups. P value of <0.05 among the results was considered statistically significant.

Results: Motilin level was determined as 91.42± 6.98, 117.23± 8.35 and 278.23± 56.27 ng/L in C, M and S groups, respectively. Gastrin levels were 98.98± 9.19, 145.27 ± 18.28, 375.48± 87.67 ng/L and ghrelin levels were measured as 45.71± 3.49, 58.61± 4.17 and 139.11± 28.13 ng/L in C, M and S groups respectively. It was determined that there was a significant difference between the groups in terms of all measurements.

Conclusions: Based on the study results, it was determined that the gastrointestinal hormones motilin ghrelin and gastrin were increased in animals with abomasum ulcers and that this was related to the numbers of abomasum ulcers. This data provides a step for future studies related to the etiopathogenesis of abomasum ulcers and other abomasal diseases.

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Field study on routine procedures for navel care in neonatal calves on dairy farms in Eastern Germany

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Objective: Evaluation of the impact of different ways of navel care on the occurrence of omphalitis in neonatal dairy calves in a field study in Eastern Germany.

Material and methods: From December 2016 to July 2019, 196 dairy farms in Eastern Germany were visited on a single occasion. Overall, 1,967 calves aged between five and 21 days were clinically examined, including a thorough examination of the external umbilicus for signs of omphalitis (enlargement with or without heat, reddening or a pain response). In addition, information on animal health and farm management including the execution of navel care was obtained by interviewing the farm or herd manager. Causal diagrams were drawn, containing variables considering navel care (practice of navel care, preparation used, way of application, instillation of the preparation into the umbilical cord, first time of navel care, frequency of navel care, wearing gloves during navel care) as influence variables, „omphalitis“ as target variable and all potential confounder variables. Based on those causal diagrams multivariable statistical analyses were performed on animal level.

Results: One-fourth of all calves examined showed signs of omphalitis (n = 525 calves, 26.7 %,). The risk for omphalitis increased 2.29 times if no navel care was performed compared to routine navel care after calving (in more than 90.0 % of the calvings). Instilling the preparation into the umbilical cord reduced the omphalitis risk 0.38 times compared to no navel care at all. Furthermore, wearing gloves during navel care increased the risk for omphalitis 1.34 times compared to not wearing gloves. A repeated application, however, decreased the omphalitis risk by 0.56 times compared to a single application. In the present study, neither the preparation administered, nor the way of administration or the time between birth and navel care had an impact on the occurrence of omphalitis.

Conclusions: Considering these results, routine navel care has a positive impact on the occurrence of omphalitis in neonatal dairy calves. Furthermore, different ways of navel care influence the omphalitis risk, as well. The application instructions (frequency, instillation into the umbilical cord), however, differ for varying iodine formulations. As the specific iodine formulations were not evaluated, the conclusion if positive effects are caused by the way of application or the formulation itself is difficult. Therefore, further investigations accompanying the actual formulation used and execution of navel care during the daily farm routine are necessary.

Identification of pathogens involved in umbilical infections in dairy calves and their susceptibility to antibiotics commonly used

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Objective: Determination of pathogens involved in umbilical infections (UIs) in dairy calves and their susceptibility to antibiotics commonly used.

Material and methods: Between September 2022 and April 2024, five dairy farms in Brandenburg (Germany) were visited twice a week for twelve weeks. Interviews with farm or herd managers were conducted concerning the care of the neonate, and calves' health, feeding, and housing. Each calf aged up to four weeks was clinically examined weekly including examination of the umbilicus for signs of inflammation (enlargement, heat, rough consistency, pain, discharge). Calves born during visits or calves with UIs accessible for sampling (e.g., discharge, fistula) were sampled using swabs. All samples were processed within 24 hours. Species identification of the cultivated bacteria was carried out using MALDI--TOF. Susceptibility testing of relevant bacteria *(Escherichia (E.) coli, Trueperella pyogenes, Staphylococcus aureus, Streptococcus uberis, Streptococcus dysgalactiae, Klebsiella spp.*) to commonly used antibiotics was performed by broth microdilution to determine minimal inhibitory concentrations (MIC).

Results: Out of 1,248 calves clinically examined, 144 calves (11.5 %) had an UI, with little variation between farms (9.4 % to 14.2 %). Overall, 105 and 100 different bacterial species were isolated after birth and from calves with UIs, respectively. The bacteria most frequently isolated in 47 postnatal samples were *E. coli, Mammaliicoccus sciuri and Aerococcus viridians.* In contrast, in the 106 samples from UIs T*rueperella pyogenes, Staphylococcus aureus, Streptococcus dysgalactiae* and *Streptococcus uberis* were isolated in addition to *E. coli* and *Mammaliicoccus sciuri.* Anaerobic bacteria (e.g., B*acteroides spp., Clostridium perfringens*) were almost exclusively found in UIs.

More than two thirds of all Staphylococcus aureus isolates tested were methicillin-resistant and, therefore, resistant to beta-lactam-antibiotics. The susceptibility to penicillin/ benzylpenicillin, mainly used in the treatment of UIs, was high for *Streptococcus spp.* [MIC_{90}: ≤ 0.0625 µg/ml (*Streptococcus dysgalactiae*), 0.25 µg/ml (*Streptococcus uberis*)] and Trueperella pyogenes (MIC_{90}: ≤ 0.015 µg/ml). The same was observed for amoxicillin/clavulanic acid and all pathogens investigated. All bacteria tested, however, showed low susceptibilities to tetracycline (MIC_{90}: ≥ 16 µg/ml).

Since *E. coli* isolates from calves with UIs from farms using chlortetracycline spray had significantly higher MICs for ampicillin, enrofloxacin, tetracycline, and trimethoprim/ sulfamethoxazole compared to farms using iodine for navel care, an association with the respective product used can be assumed. Comparing MICs for *E. coli* isolated from calves

sampled after birth and calves with UIs, the latter showed lower susceptibilities to almost all antibiotics tested.

Conclusions: The diversity of bacterial species isolated from UIs highlights the complexity of their bacterial spectrum and the difficulty in distinguishing between microbiota, infecting, or contaminating bacteria. Besides considering the prudent and off-label-use of antibiotics, the overall low susceptibility to tetracycline shows the unsuitability of tetracycline for navel care, but rather a possible promotion of antimicrobial resistance. The high susceptibility of streptococci and *T. pyogenes* to first-line antibiotics (penicillin, aminopenicillin) promises successful treatments if timely administered. The high percentage of *E. coli* isolates in both sampling groups indicates the need for further investigations to determine the role of different *E. coli* strains in UI.

LPS in dairy cows

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Objectives: This study aimed to compare the lipopolysaccharide (LPS) blood concentrations and metabolic status in the peripartum period and the late lactation phase in dairy cows. In addition, LPS concentrations in animals with subclinical laminitis were compared with those without claw lesions.

Methods: Blood sampling was carried out on five farms in Central and Eastern Slovakia on Holstein-Friesian dairy cows. Samples were taken from 79 animals. On four farms, clinically healthy animals were sampled and divided into three groups of 5-6 dairy cows each: dairy cows between 10-20 days before calving (Group I), dairy cows 10-20 days after calving (Group II), and dairy cows 4 months after calving (Group III). Within these groups, LPS, BHB, and NEFA concentrations were determined. Five dairy cows with subclinical laminitis and five healthy cows were sampled to determine serum LPS concentrations. LPS were determined using commercial 96-well ELISA kits. BHB and NEFA concentrations (mmol/l) were determined using an automated biochemical analyzer Alizé (Lisabio, Pouilly-en-Aixois, France. Statistical analysis was carried out by a one-way analysis of variance (ANOVA) with the post hoc Bonferroni test.

Results: One-way ANOVA did not show a significant effect of the lactation period on serum lipopolysaccharides in the study. In addition, the mean LPS concentration in the control dairy cows and cows with subclinical laminitis was 0.048 mg/ml and 0.065 mg/ml, respectively. However, the differences among the groups were not significant. BHB concentrations were within the physiological range in all the groups. In contrast, the cows of the early lactation group showed the highest concentrations of non-esterified fatty acids.

Conclusions: In conclusion, elevated NEFA in the post-calving period was not associated with a significant shift in serum LPS concentrations, nor did as well the cows with subclinical laminitis show a strong increase in LPS. The detection of higher LPS concentrations in dairy cows is probably only expected in animals suffering from severe inflammatory diseases, such as ruminitis, enteritis, mastitis, metritis, etc.

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Metabolic adaptations and associated consequences for animal productivity and the emission mitigation potential in cattle supplemented with willow leaves (Salix spp.)

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Objectives: The objective of the present study was to elucidate the nutritional and emission mitigation potential of willow leaves (*Salix spp.*) supplemented to cattle on pasture.

Materials and Methods: Eight German Holstein bull calves were reared under comparable conditions. After weaning at 12 weeks of age, the calves had free access to pasture or grass clippings and received two isocaloric (9.7 MJ metabolizable energy/kg dry matter (DM)) and isonitrogenous (134 g crude protein/kg DM) supplements with willow leaves (SAL) or alfalfa hay (CON) in a crossover design. Calves were weighed every three days and DM intake was assumed to account for 2.4 % of the body weight. The supplementation was adjusted to 45.8 % of DM intake. On each supplement, calves were adapted for two weeks on pasture, followed by a four-day collection period in tie stalls. The latter included the monitoring of feed intake, the collection of urine and feces for four days, and the sampling of feed, urine, and feces every 24 h. On days 3 and 4, a ^{13}C urea bolus was administered intravenously, followed by the collection of a series of blood samples to assess the ruminohepatic nitrogen cycling. Urinary and fecal nitrogen (Kjeldahl), and feed nutrients were analyzed in pooled samples by LUFA GmbH (Rostock, Germany). Urinary nitrogen metabolites were determined by HPLC. Urinary nitrous oxide (N_2O) and ammonia (NH_3) emissions were determined from pooled urine samples (SAL; CON) applied on experimental soils. Statistical analysis was performed using the MIXED model procedure in SAS (9.4, SAS Institute Inc., Cary, NC, USA) with the fixed effects diet (SAL; CON), block of sampling (1-4), and their interactions. Data from the urine incubation experiments were statistically analyzed using the TTEST procedure in SAS. Statistical significance was considered at $P < 0.05$ and tendencies at $0.05 < P < 0.1$.

Results: Dry matter intake, body weight, and average daily gain were comparable between the experimental groups. The 13C urea turnover rate was 12 % lower in SAL-fed than in CON--fed calves ($P < 0.05$). Fecal nitrogen excretion tended to be 22 % higher in SAL-fed calves compared to CON-fed calves ($P < 0.1$), which was paralleled by an 8.7 % reduction in apparent digestibility of nitrogen ($P < 0.01$). Urinary nitrogen excretions and urinary concentrations of purine derivatives did not differ between experimental groups. However, the SAL-fed calves revealed more than twice the urinary concentration of hippuric acid ($P < 0.01$) and tended to have 20 % lower urinary urea concentrations ($P < 0.1$) than CON-fed calves. The incubation experiments showed a mitigation of N_2O and NH_3 emissions by 81 and 14 %, respectively, from soil incubated with urine from SAL-fed calves compared to soil incubated with urine from CON-fed calves ($P < 0.01$).

Conclusions: The present study revealed no differences in animal productivity and a mitigation of urine-derived N_2O and NH_3 emissions in calves supplemented with willow leaves. Therefore, our results suggest a promising nutritional potential and emission mitigation potential of willow leaves as a supplement in cattle nutrition.

A Complex Case of Abomasum Displacement in a Pregnant Dairy Cow: Postmortem Findings of Liver Abscess and Traumatic Reticuloperitonitis

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Background and Clinical Significance: Liver abscesses are prevalent in feedlot cattle but are infrequently documented in pregnant dairy cows, especially during the dry period. This case report illustrates a unique occurrence of a significant liver abscess occurring concurrently with abomasum displacement and traumatic reticulitis, emphasizing the diagnostic difficulties arising from overlapping physiological alterations during late gestation. The research highlights the need for diligent observation and sophisticated diagnostics in identifying abnormal situations in pregnant cows.

Case Presentation: A six-year-old Holstein cow in her fourth lactation was presented during the late dry phase, at 276 days of gestation and 21 days before anticipated calving. The cow had lethargy, diarrhea, and reduced feed consumption. The clinical examination identified a left-sided abomasum displacement, corroborated by auscultation, percussion, and fluctuation assessments. Blood biochemistry revealed high gamma-glutamyl transferase (GGT) (before surgery-52.9 TV/L; after surgery- 169.5 TV/L) and aspartate transferase (AST) values (before surgery- 120.4 TV/L; after surgery- 77.9 TV/L, indicative of hepatic impairment. A right-sided omentopexy was executed to rectify the abomasum displacement; nevertheless, the cow's condition worsened postoperatively, necessitating a caesarean operation to deliver the calf. Notwithstanding the intervention, the cow's condition deteriorated further, resulting in euthanasia. The necropsy disclosed a substantial liver abscess (50 cm in diameter), fibrinous peritonitis and pleuritis, fibrotic adhesion of the liver to the diaphragm, pulmonary fibrotic adhesion to the diaphragm and costal pleura, acute abomasitis, in the abomasum, the feed is mixed with sand and gravel impurities, acute hemorrhagic enteritis, a foreign body (metal nail, about 4 centimeters in length) found in the reticulum.

Conclusions: This instance underscores the intricacy of detecting and controlling dual metabolic and infectious illnesses in pregnant cattle. Essential insights encompass the significance of comprehensive clinical and necropsy assessments, proactive health surveillance, and the rectification of dietary and management variables to reduce hazards. These findings offer essential insights for enhancing health outcomes during the susceptible dry period.

Keywords: pregnancy; abscess; abomasum displacement; traumatic reticuloperitonitis

The assesment of reproductive success for dairy cattle by the use of recorded blood biochemical biomarkers and innovative technologies

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Purpose: Effective reproduction is essential dairy production, impacting milk yield, production, sustainability, and the general health of animals. Recent technological advancements allow veterinarians to keep track of the herd by measuring activity, milk composition, rumination and estrus. The main goal of the study is to assess the reproductive success in dairy cattle by integrating innovative technologies combined with blood biochemical biomarkers.

Material and methods: The study included 100 dairy cows, categorized into five groups of 20, according to their reproductive period. During the study, blood samples were collected and analyzed to assess metabolic readings. The data of animals was retrieved from the herd management program „Lely“ (Netherlands), while disease histories were documented using „DelPro“ (Sweden).

Results: The study found that milk yield was 13 % higher in the second group of fresh cows (31–60 days after calving) than in both the first group of recently calved cows (1–30 days after calving) and expecting cows at 99 days ($P<0.01$). Also a positive correlation was found between the duration of rumination and the amount of milk, noticed by a 40 % increase of rumination among the first group and pregnant cows. ($P<0.001$). Non-pregnant cows had the most active aminotransferase enzyme, while dry cows had the lowest, representing a 91 % difference ($P<0.001$). The highest concentrations of β-hydroxybutyric acid were recorded in both fresh cow groups, whereas the lowest levels were observed in pregnant and dry cows, with a 376 % difference among the second group of fresh dairy cows and cows in the dry period.

Conclusion: Main results, including the correlation with milk yield and rumination, highlight opportunities to improve productivity and advance the sustainability of a dairy farm. The collected data provides important strategies for optimizing dairy herd management, contributing to more efficient and sustainable milk production.

Keywords: innovative technologies, reproduction, blood biomarkers.

Case report: type-3 ulcer in the abomasum of a fresh dairy cow

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Objectives: Ulcers in cattle are often overlooked and cause economic losses. Their vague clinical symptoms and infrequent occurrences make it difficult to diagnose and properly treat ulcers. Early diagnostic tools and effective management can significantly improve the well--being of animals on the farm.

Material and Method: This report examines a fresh dairy cow, which had entered its third lactation fourteen days prior to an elevated fat-protein ratio in the milk and was diagnosed with a displaced abomasum. The cow was transported from a dairy farm to the Veterinary academy in Kaunas, where she suddenly died only ten minutes after the transportation. An autopsy concluded that death was caused by hypovolemic shock due to the perforation and internal bleeding of an ulcer in the abomasum. The cadaver lived on a farm, located in the central region of Lithuania, with a free-stall setup keeping 1,200 milking cows with Lely Astronaut milking robots (Lely, Maassluis, The Netherlands) for automated milking.

Results: Pre-death findings: On the 9th day of milking the automatic milking system identified that cow had an elevated fat-to-protein ratio in the milk and was treated with IV liquids. Her condition seemed stable, but on the 14th DIM, based on the clinical signs, veterinary staff diagnosed her with an abomasum displacement to the left. It was scheduled for surgery the next day.

Autopsy findings: The autopsy confirmed the type 3 perforated ulcer caused fibrinous peritonitis and anemia. Fibrin and green feed deposits were observed on the outer surfaces of the abdominal organs. The perforated ulcer had caused internal bleeding, which had coagulated and mixed with feed inside the abomasum and intestinal tract.

Conclusion: Abomasal ulcers are challenging to diagnose, requiring specialized equipment or surgical procedures. Unfortunately, ulcers are often only identified during post-mortem examinations because their symptoms are similar to those of other abdominal diseases. This condition requires deeper observation of the animal's clinical signs and a fast response.

Keywords: Type-3 perforated ulcer; abomasum; fresh dairy cattle; autopsy.

Costs of production diseases in dairy farms in Germany

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Every day in milk production, decisions have to be made in the area of animal health economics, e.g. on the treatment or culling of an individual animal. However, there is often a lack of data on which to base well-founded decisions. The objective of the present study was to estimate under practical circumstances the costs of diseases on single animal level.

Materials and Methods: A three-week data acquisition was carried out in each of ten project farms located in Brandenburg (average herd size: 538 (229-1,221) German Holstein cows) in the period from May 2020 to June 2021. Using a standardised procedure, project veterinarians identified sick animals, clinically examined them and documented the diagnoses, products used and labour invested. After excluding incomplete data records, the costs and lost revenue for the recorded components: labour, products, veterinary services, orthopaedic services, discarded milk, reduced performance, culling costs (disposal/transport for slaughter), book loss (incl. slaughter revenue and depreciation of heifer raising costs) and lost slaughter revenue could be broken down individually for 1,272 cases/animals.

Results: In 68 % of cases, the animals were affected at one single organ system with a disease occurring stand-alone. In 11 % of cases, several diagnoses were made within one organ system (e.g. various claw diseases). In 21 % of cases, several organ systems were affected by different diseases. The totalised costs and lost revenue in each case showed that the different diseases within one animal often do not simply add up, but rather potentiate each other. The literature comparison showed similar orders of magnitude in respect to costs and lost revenues of the various components for many disease complexes. However, in many cases the cost for labour was estimated to be higher than previously described. It was confirmed that the costs and lost revenue for loss of production and reduced performance, as well as for culling, in many cases amount to a multiple of the diagnosis and treatment costs. The detailed analysis of the different cases indicated that costs and lost revenues caused by the described diseases depend on the quality of the diagnosis and the treatment.

Conclusions: The dataset illustrates the great economic potential of prevention and treatment. Future studies are warranted investigating the economic potential of specialised veterinary staff and workplace and treatment area design.

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Udder health in ewes: Role of the dry period in staphylococcal mastitis

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Objectives: The aim of this study was to determine the persistence or spontaneous cure and new intramammary infection (IMI) rate with Non-aureus staphylococci (NAS) during the dry period. At the same time the benefit of selective treatment at drying-off in dairy sheep was evaluated.

Methods: All investigations were performed in a dairy sheep farm with a total of 420 Lacaune sheep in the region of Salzburg. During farm visits before drying-off and after lambing, milk samples were collected aseptically from all lactating sheep. Bacteriological examination (BE) was performed in the Diagnostic Laboratory of the Clinical Centre for Ruminant and Camelid Medicine and all staphylococci were confirmed and differentiated to the species level with the use of MALDI TOF MS on the Clinical Centre for Population Medicine in Fish, Pig and Poultry. Somatic cell count (SCC) was measured in the milk of all bacteriologically positive udder halves with the De Laval Cell Counter® (Tumba, S). Udder halves infected with NAS species that caused a SCC ≥ 500 000 cells/ml, as well as udder halves infected with *S. aureus* or *Streptococcus spp.* were treated with a commercial intramammary antibacterial suspension containing Benzylpenicillin procaine, Dihydrostreptomycin and Nafcillin (Nafpenzal®, Merck, Rahway, US). Milk samples after lambing were collected approximately two weeks after the lambing date and as the sheep lambed over an extended period some samples were stored at -20 °C before BE.

Results: Two consecutive milk samples were obtained from 385 udder halves. Before drying-off, 18,4 % (n= 71) of the milk samples were tested positive in bacteriological examination (BE), with NAS isolated from 64 udder halves (90,1 % of cases of all IMIs) After lambing, an increase in new infection rates was observed. While infections with *S. borealis* often (n= 9) cured spontaneously, IMIs with *S. epidermidis*, *S. simulans* and *S. chromogenes* tended to persist. A total of 66 previously bacteriologically negative udder halves became infected during the dry period or the first days after lambing with *S. simulans* (n= 24) and *S. epidermidis* (n= 14) being the most frequently detected species. Of the 32 treated udder halves, 93.7 % achieved bacteriological cure. However, the cell count remained elevated in 34.3 % of these cases.

Conclusions: The study confirms that NAS species vary in pathogenicity. While some species exhibited spontaneous cure, others persisted throughout the dry period. Selective drying-off proved to be an effective measure for reducing subclinical mastitis. however, in some cases somatic cell count remained elevated. Since the dry period is a critical phase for new infections, strict hygiene measures are essential. Additionally, this study provides the first documented cases of S. borealis infections in dairy sheep in Austria.

Evaluation of the Effects of Alpha-Amylase and Beta-Glucanase (Optipartum C+ 200) on the Health and Metabolic Profile of Lactating Dairy Cows

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Objectives: This study seeks to examine the effects of feed supplements containing alpha--amylase and beta-glucanase (Optipartum C+ 200) on the health and metabolic profile of lactating dairy cows, both during the lactation period and under conditions of heat stress.

Methods: This study was conducted with two groups of lactating dairy cows. The control group (n=20) received only a standard total mixed ration (TMR), while the treatment group (n=20) was supplemented with 200 g/day/cow of Optipartum-C+. Heat stress was assessed using the Temperature-Humidity Index (THI) at four distinct time points: August 14, 2024 (THI = 76.96), September 11, 2024 (THI = 70.4), October 9, 2024 (THI = 63.24), and November 6, 2024 (THI = 54.86). Blood samples were collected at each time point for biochemical analysis, and cows were categorized according to their lactation stage. The following blood parameters were measured: urea (UREA), glucose (GLU), aspartate aminotransferase (AST), potassium (K), calcium (Ca), magnesium (Mg), phosphorus (P), gamma-glutamyltransferase (GGT), and beta--hydroxybutyrate (BHB). The data from both groups were compared for these parameters over the duration of the study.

Results: Throughout the study, blood urea and glucose levels remained within normal ranges, with the treatment group showing lower urea and glucose levels than the control group in August (THI – 76,96), September (THI – 70,4), and October (THI – 63,24). Liver enzyme activity (AST) was lower in the treatment group, indicating positive effects on liver function under heat stress. GGT levels were elevated in both groups, but the treatment group showed a decrease, suggesting improved metabolic health. The treatment group had lower BHB levels, indicating better energy metabolism and reduced ketone production, particularly during heat stress. Additionally, the treatment group showed higher milk yield and a more favorable milk fat-to-protein ratio, reflecting better rumen function and energy metabolism. Milk protein levels in the treatment group were closer to the normal range and remained stable, while the control group had lower protein levels. Milk lactose levels in the treatment group stayed within normal limits, while the control group's lactose levels decreased, likely due to reduced glucose availability. No differences were observed in blood potassium, calcium, magnesium, or phosphorus levels, suggesting no effect of the feed supplement on these parameters.

Conclusions: Cows in the treatment group showed improved energy metabolism, with lower AST and GGT activity, indicating reduced liver strain and metabolic stress. Lower blood urea levels suggested better protein digestion and optimized rumen fermentation. Blood glucose was slightly lower but efficient, supporting milk lactose synthesis and reducing metabolic stress. BHB levels were lower, indicating reduced fat mobilization and ketosis risk. The treatment group had more stable metabolic parameters during and after heat stress, including lower AST, GGT, and BHB levels, highlighting improved metabolism and reduced liver damage. Milk production, fat, protein, and lactose levels were stabilized, and body fat mobilization was reduced. Overall, Optipartum-C+ (200 g/day) effectively mitigated heat stress and improved cow health and productivity.

Digital provision of hoof health data – the basis for improving hoof health

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Introduction and objectives: Modern software applications enable the digital documentation of hoof health data as part of routine hoof trimming at herd level. With the agreement of livestock farmers and hoof trimmers, this data can be stored centrally, managed, analyzed and made available to all stakeholders for health management at farm level and as a benchmarking tool. The data can also be used for scientific purposes and for breeding value estimation. The objective of this presentation is to describe how digital claw health data have been used within the frame of the Swiss hoof health project.

Methods: Since January 2019, hoof health data have been digitally collected by 60 specifically trained hoof trimmers in Switzerland. They used the ICAR diagnosis code and trimmed according to a standardized technique. During the 6-year project period (until end of 2024), the project provided tablets with software (Klaue; dsp-agrosoft), free training of hoof trimmers and a reimbursement for each complete dataset collected during or at the end of each four-feet trim and consequently stored in the central data base. Participating farmers signed an informed consent letter, allowing for central data storage and use of data in pseudo -anonymized form for analyses later.

Results: To date, more than 1400 farms have made more than 200,000 claw health data sets of individual trims available. Relevant research questions were successfully processed and results thereof published in the scientific literature. Specific risk factors for Bovine digital dermatitis (BDD) were identified and a biosafety handbook for hoof trimmers was developed. For claw horn lesions, a health program was developed and introduced. The benchmarking tool „Klauennet“ for farm hoof health was coded by Qualitas®, the company providing, among others, software applications for the Swiss cattle breeding organizations. The incidence of alarm lesions has improved significantly and to a relevant extent over the project years. Currently, a BDD control program is developed, and Qualitas® and the breeding organizations are calculating breeding values for hoof health traits in cattle for the first time in Switzerland. Some of the study results and many other project information can be found on the website of the project: www.gesundeklauen.ch.

Conclusions: Standardized digital provision and central storage of hoof health data collected during hoof trimming by appropriately trained hoof trimmers allows for long-term improvement of hoof health on a national level, if data are made accessible to all involved stakeholders such as breeding organizations, veterinarians, researchers, hoof trimmers and livestock farmers.

Alterations in Biological Markers Monitored by Advanced Technologies in Dairy Cattle with Subacute Ruminal Acidosis

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Objectives: Advanced technologies were used to identify alterations in biological markers including reticulorumen pH and temperature, cattle activity, water consumption, and milk fat-protein ratio among dairy cows with subacute ruminal acidosis (SARA) versus healthy cow group.

Methods: A total of 59 dairy cows were chosen based on the criteria of two or more lactations and 31 (±5) days in milk. These cattle were divided into two groups according to the clinical examination findings: Sub-acute acidosis group and healthy control group. Subacute acidosis group (SCA, n=23) exhibited signs of this disease (rumen motility rates of 5 to 6 times every 3 minutes, diarrhea, presence of undigested feed in feces). The control group (HC, n=36) showed no signal of SARA.

„Brolis Sensor Technology“ (Vilnius, Lietuva) system was used to document every day milk production (kg/day), milk fat (%), milk protein (%) and their ratio. Meanwhile, „Smaxtec technology“ (Graz, Austria) was used to track reticulorumen parameters involving rumination time (minutes a day), pH, temperature (°C), water consumption (hours per day) and cattle activity.

Results: The findings indicated that the biological markers captured by innovative technologies we used could help identify subclinical acidosis of cattle. Animals with SARA had reticulorumen pH that's lower by 18.8 % ($p < 0.0001$), they also had a 10.49 % decreased production of milk ($p < 0.001$) and milk fat/protein ratio by 11.88 % ($p < 0.01$), a 6.59 % lower rumination time ($p < 0.01$). Additionally, the activity of SCA group cows was higher by 57.19 % ($p < 0.001$) compared to HC.

Conclusions: Significant differences between the groups in reticulorumen pH, milk yield, milk fat- to-protein ratio, rumination time, and animal activity have been found. Therefore tracking these parameters for the identification of subclinical acidosis is a practical and reliable method for farmers and veterinarians.

The effect of alternative methods of lameness prevention in dairy cattle on the health status and rearing parameters of calves

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Lameness in dairy cattle is a significant health and economic problem in all regions of the world. In almost 4000 dairy herds over the last 30 years, the average percentage of lameness > 3o (on scale 1- 5) ranged 5.1 % - 45 %, reaching as high as 88 % in selected regions of the world. The presence of stress factors in lame cows during pregnancy, has a significant influence on development of fetus. The effect is an increase in number of stillborn calves, calves with low birth weight, failure passive transfer, increase in disease and problems with sexual maturity in heifers.

Objective: The aim of the study was to evaluation the effectiveness of using a natural preparation with bacteriophages based on oils and plant extracts as an element supporting the prevention of lameness in dairy cattle on the health and production indicators of calves.

Material and methods: The research was conducted on 45 Holstein-Fresian pregnant dairy cows exposed to the experimental preparate with phages and plant extracts. The phages E. coli and Staphylococcus spp. 10-9-10-12PFU/mL with essential oil from black peppermint leaves and Bergamot, extracts Mentha piperita L. var. officinalis Sole f. rubescens Camus and Mentha piperita L. var. citrata Ehrh., Briq, cinnamon (Patent No. 245405). The cows passed through preparate >30 days (3 times/day). The birth body weight and average weight gain during the first month of rearing were determined in calves. We also verified the results of passive immunoglobulin transfer (total IgG level), acute phase response parameters i.e. haptoglobin/ SAA and infammatory response by evaluation chosen cytokines.

Results: In cows exposed to the experimental phage-herbal preparation for 30 days, no major difficulties in parturition in the form of dystocia were observed. Calves born to them had a birth weight ranging 41 – 43.5 kg. Calves born to cows with lameness > 3 degrees showed an average birth weight of 38.8 kg. The average daily weight gain of calves born to cows exposed to the preparation was 0.7 kg, while in calves born to cows with lameness these average values were approximately 0.6 kg.

The FPT 48 hours after birth was observed in about 16 % of calves from lame cows exposed to the preparation and was over 10 % lower compared to calves born to cows with lameness >3o, not treated with the phage-herbal preparation. No statistically significant differences were observed in the concentration of Ig immunoglobulins in colostrum, which may indicate impaired absorption by newborn calves.

The significant differences ($p \leq 0.05$) in IL-1, IL-6 and acute phase proteins Hp were observed in calves born by cows with lameness exposed to phage-herbal preparation in comparison to the calves born by cows not treated born by preparate.

The maturity of the heifers allowed them to be inseminated between 13 and 15 months of age.

Conclusions: We confirmed significant influence of lameness in cows on immunological parameters in calves. The exposition of cows during pregnancy on experimental phage-herbal preparate allowed for improvement in calf birth rates, inflammatory and immunological parameters, and production rates (ADG, reaching maturity).

Calf Welfare and Management Protocol

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Calf diarrhoea, other infectious diseases and in general failure to thrive are ubiquitous challenges in livestock farming, leading to significant economic losses and health concerns.

Despite these conditions being common and their causative agents known, the response to disease occurrence is most often solely curative rather than preventative, resulting in excessive antibiotic use and consequent resistance to antimicrobials. Real-time recording of events is key to effective action.

To address this issue, we created a Monthly Calf Welfare and Management Protocol, which aims to encourage farmers and veterinarians to keep track of crucial points in calf management.

As not to become another chore, it is simple in design, only covering a single A4 sheet of paper – the front to be filled out by a veterinarian, which mostly addresses cleanliness of the individual boxes and group pens and details water and feed supply in a checkbox format, which can be quickly completed at each visit. There is also a table dedicated to recording individual or group treatments and health concerns.

The back of the page is for the farmer to monitor each calf from birth, documenting colostrum quality, quantity consumed, and time of first feeding.

There is a table for each age group or group pen (as needed), to monitor milk and solid feed intake as well as note other observations or interventions (e.g. oral applications), providing a comprehensive overview of calf health and management.

The protocol is reviewed by the veterinarian at the end of each month, the information discussed with the farmer, comparing data to previous months to identify trends, areas for improvement, and the impact of management changes. The protocol is adaptable to individual farm needs.

By encouraging systematic data collection and regular reviews we aim to motivate farmers to be more proactive, especially when it comes to colostrum quality and delivery monitoring. The protocol fosters better record keeping shifting farmers behaviour to establish more positive practices while evidencing the consequences of poor management.

Such intervention has the potential to improve calf welfare, enhance farm productivity and mitigate the risks of resistance to antimicrobials.

Factors affecting pregnancy success in the use of sexed semen in lactating dairy cows: A retrospective study

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Objectives: The use of sexed semen has become increasingly common in the dairy cattle industry, especially in recent years. Various factors can affect fertility outcomes when using sexed semen in cows. Success rates with sexed semen can be improved by carefully considering these factors, while neglecting them may lead to reduced fertility rates. The objective of this study, was evaluation of a group of cows, uniform in terms of factors known to affect fertility such as lactation number (second lactation), high milk yield (average 51 liters/day), and type of Timed Artificial Insemination (TAI) protocol with sexed semen from one bull, to identify and emphasize the prominent factors affecting pregnancy with the use of sex-sorted semen in lactating dairy cows.

Methods: The material of the study includes the cows (n=457) were received the same TAI protocol (G6G) and inseminated with sexed semen from a single bull. Data from these cows, including postpartum health, BCS (Body Condition Score), cyclic activity, response to the TAI protocol, estrus detection rate and follicle size at TAI, pregnancy/AI, and pregnancy loss rates, were evaluated, retrospectively. Mann-Whitney U and Chi-square tests were used to compare continuous and categorical data, respectively. Factors affecting pregnancy/AI were analyzed by logistic regression analysis.

Results: No effect was determined for the parameters related to the physiological condition of the cow such as BCS (p=0.160) and milk yield (p=0.103) on pregnancy success. Likewise, no effect was determined for parameters related to cyclic activity, such as showing signs of estrus during the voluntary waiting period (p=0.279), cyclic activity at the beginning of presynchronization (p=0.637), follicle size (p=0.713), and estrus detection rate at TAI (p=0.160). It was observed that being cyclic at the start of TAI protocol (p=0.089) tends to increase the chance of pregnancy/AI, and responding to the first GnRH application of the protocol (p=0.036) significantly increases the chance of pregnancy/AI. Moreover, cows without a history of retentio secundinarum/metritis in the postpartum period had a 1.5 times higher pregnancy success rate compared to those with such a history (OR = 1.53; 95 % CI 1.01-2.32; P=0.046).

Conclusions: It has been confirmed that the cyclic activity status at the beginning of the protocol affect fertility in lactating dairy cows, and the response to the TAI protocol also influence pregnancy success following insemination with sex-sorted semen in these cows. However, no effect was identified regarding the reproductive physiological activities of the animals, such as cyclic activity and showing signs of estrus. Nonetheless, when using sexed semen in lactating dairy cows, it is need to be considered that pregnancy success may be lower in cows that have experienced uterus-related problems during the postpartum period.

POSTERS

Phosphorus Deficiency in Cattle and Erythrocyte Parameters

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The aim of the study was to determine the effect of clinical and subclinical phosphorus deficiency in dairy cows on erythrocyte parameters.

Materials and Methods: The study was conducted on 37 Holstein-Friesian cows aged 3 to 6 years, with an average milk yield of over 9000 liters per lactation and a body condition score of 3/5. The cows were in their first month of lactation. The farms used the Total Mixed Ration feeding system. Only animals without parasitic or infectious diseases, injuries, bleeding, dystocia, or periparturient metabolic disorders were included in the study. Preventive treatments were regularly performed on the animals.

In 8 cows, between days 20 and 30 after calving, apathy, weakness, pale mucous membranes, and dark red to brown urine discoloration were observed. Farmers also reported a decrease in milk production compared to the previous lactation. A preliminary diagnosis of postpartum hemoglobinuria was made based on clinical examination, which was confirmed by laboratory blood tests (all cows had an inorganic phosphorus concentration of 0.3 mmol/l). Additionally, after centrifugation, the urine remained dark red in color and showed moderate proteinuria.

In 29 cows, varying degrees of mucous membrane pallor and a decrease in milk production were observed, with an average (inorganic phosphorus) Pi concentration of 1.02 mmol/l.

Blood samples were collected from the external jugular vein of cows with phosphorus deficiency before treatment initiation. Hematological parameters were measured, including red blood cell count (RBC), hemoglobin (Hgb), hematocrit (Htc), mean corpuscular volume (MCV), mean corpuscular hemoglobin (MCH), mean corpuscular hemoglobin concentration (MCHC), as well as white blood cell count and platelet count, using the automatic analyzer.

In serum, the concentrations of total calcium, Pi, and magnesium were determined using the automatic analyzer. The concentrations of copper and iron in serum samples were determined using flame atomic absorption spectrometry.

The results of hematological tests and biochemical parameters were subjected to statistical analysis using Student's t-test and Mann-Whitney rank test. Calculations were performed at a significance level of $p < 0.05$ and 0. 01.

Results: In both groups of animals, anemia was observed (decreased RBC count, Hgb concentration, and Htc index). In cows with postpartum hemoglobinuria, intermediate parameters (MCV, MCH, MCHC) remained within the reference range. However, in animals with subclinical hypophosphatemia, anemia and a decrease in the MCH index were observed.

Biochemical blood tests showed a decrease in Pi concentration in both groups, while the remaining parameters were within the reference range.

Conclusions: In cows with phosphorus deficiency, a decrease in erythrocyte parameters and anemia are observed.

In cows with postpartum hemoglobinuria, normocytic normochromic anemia was diagnosed.

In cows with subclinical phosphorus deficiency, normocytic hypochromic anemia was observed.

Determining erythrocyte parameters in subclinical phosphorus deficiency has prognostic significance in cows.

Monitoring erythrocyte parameters in different forms of phosphorus deficiency facilitates diagnosis, treatment, and prevents late complications and milk production decline.

Length of inter-estrus intervals and clinical findings in repeat-breeding cows

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Objectives: The aim of this study was to evaluate the length of inter-estrus intervals and the clinical status of the reproductive tract in cows failing to become pregnant after three artificial inseminations (AI).

Methods: The study was carried out on 942 Polish Holstein Frisian cows from 5 dairy herds under a herd-health program in North-East Poland. The average milk yield was 9000 L. Two hundred eighteen cows (23.1 %) had been inseminated three times and were still not pregnant. The intervals between the two last estrus events were calculated and classified as normal (18-24 days), shortened (< 18 days), regular prolonged (multiples of a normal interval) or irregular prolonged (> 24 days but not multiples of a normal interval). The cows were examined 35-40 days after AI by vaginoscopy, rectal palpation and ultrasonography.

Results: On average, 42.6 % of repeat-breeding cows exhibited a normal inter-estrus interval, shortened in 3.3 % of cows, irregularly prolonged in 22.9 % and regularly prolonged 31.2 % of cows. On average, 67.4 % of repeat-breeding cows showed no clinical abnormalities of the reproductive tract. Mild clinical endometritis was found in 21.8 % of cows, ovarian cysts in 6.4 % of cows and ovarian afunction in 4.6 % of cows. Clinically healthy cows exhibited mainly normal or regular prolonged inter-estrus intervals, cows with mild clinical endometritis had mostly irregular prolonged intervals and those with ovarian cysts shortened or irregular prolonged intervals.

Conclusions: The study showed that the majority of the cows that did not get pregnant after three AI did not have an evident cause for reproductive failure and exhibited mainly normal or regular prolonged inter-estrus intervals. This suggests fertilisation failure or early embryo death by day 14th of gestation as the causes of infertility. Moreover, the high proportion of cows with a regular prolonged inter-estrus interval indicates the occurrence of silent heat or inadequate estrus detection.

Mechanical Ileus in a German Fleckvieh cow two weeks before expected calving – a case report

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Objectives: To present a case report of an ileus caused by intestinal obstruction in a cow two weeks before expected parturition.

Methods: A 47 month old German Fleckvieh cow weighing approximately 650 kg was presented off feed. The cow was housed in a tie stall without access to pasture in a herd of 16 cows. Feeding consisted of corn and hay silage, hay and concentrates. The owner noted a decreased skin temperature and reported that the cow was expected to calve in 14 days.

Results: The cow was slightly depressed and showed no interest in various feed offered. Physical examination revealed decreased ruminal and intestinal motility. Rectal temperature was 38.2 °C and skin temperature was lower than in the other cows. Respiratory rate was normal, but heart rate was greater than 100 beats per minute. Abdominal distension appeared slightly increased. No ping or splashings sounds were noted during simultaneous auscultation and ballottement of body walls. On rectal examination moderate amounts of faeces of olive-brown colour were present. Palpation of the uterus confirmed late term pregnancy. Udder and vulva were not enlarged and no signs of mammary infection or impending parturition were present. A solution containing calcium, magnesium and phosphorus was administered subcutaneously for correction of suspected hypocalcaemia. The next day the cow was completely anorectic and severely depressed. Rumen motility was absent. Abdominal dilatation was increased in size and eyes were moderately sunken. Rectal temperature was normal and faecal output was almost completely absent. Faecal contents were dark brown with some blood clots and mucus. Due to the deteriorated clinical condition and suspected intestinal obstruction, parturition was induced with Prostaglandin F2alpha. Pain medication was administered in combination with fluid therapy containing calcium, phosphorus and magnesium and a 40 percent glucose solution. Standing right flank was performed for sectio caesarea and correction of suspected intestinal obstruction 24 hours after parturition was induced and 48 hours after first presentation. An internal obstruction of the jejunum with firm masses of intestinal contents approximately 30 cm in size were found during exploration of intestines and a final diagnosis of obstruction ileus was made. The intestinal contents (clots) were completely broken down manually without applying strong manual pressure and milked in both directions inside the jejunum. After routine closure of the abdominal wall and further therapy with fluids, antibiotics and pain medications the cow passed large amounts of loose faeces within 3 hours after surgery. The calf exhibited a decreased APGAR score, appeared premature and did not survive. The cow recovered completely after surgery and further treatment for retained foetal membranes and regained a productive status in the herd.

Conclusions: Exploratory laparotomy for caesarean section and manual reduction of clotted intestinal contents inside the jejunum was successful for correction of an obstruction ileus in a cow close to parturition. The nature of the intestinal masses causing the intestinal obstruction could not be determined.

Assessment of different extenders effect on bull sperm viability

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Objectives: To assess a selected diluents effect on sperm viability within 5 days in cold and the evaluation of suitability of used form off egg yolk emulsion for extenders preparation and storage of sperm.

Materials and Methods: The ejaculate from a three-year-old crossbreed bull was collected with artificial vagina. Same volume (30 µl) of ejaculate were pipetted into 57 sterile Eppendorf tubes and subsequently were diluted at a concentration of 2 × 108/ ml with different extenders. The groups were defined according used extenders as: group A (control group – undiluted), group B (AndroMed), group C (Tris), group D (Natrium citrate), group E (Tris + egg yolk) and group F (Natrium citrate + egg yolk). The sperm viability was determined by the flow cytometry using specific fluorescent dyes in group A at time 0h and all samples were stored at a 4 °C. Next analyses were conducted at times: 1st, 3rd and 5th day after semen collection. All analysis were performed in triplets. Caused by very poor quality of the bull's ejaculate (viability only 25 %), the evaluation was focused on comparing the results at 1st, 3rd and 5th day after sampling.

Results: Statistically the highest concentration of live spermatozoa ($p < 0.001$) was found in group B against other groups, but only in day 1. Significantly the most stable increased values ($p < 0.01$; $p < 0.001$) of sperm viability compared with other groups were detected in group C until the 5th day. A very significant decline ($p < 0.001$) in sperm viability was detected in groups E and F compared with each one experimental group (B, C, D) 1st day after semen collection. Only dead spermatozoa were detected 3 and 5 days after sampling, what was significant decrease compared with group B and C ($p < 0.05$; $p < 0.001$) at 3rd day and only with group C at 5th day after ejaculate collection. In terms of time dynamics, the significant decrease ($p < 0.05$; $p < 0.001$) of sperm viability was recorded in group B between chosen days and also in group D ($p < 0.01$) between 1st and 3rd day.

Conclusions: Based on our results, we can state that the commercial diluent AndroMed is not suitable for several days sperm storing. The best protection for maintaining of sperm viability, even for several days, in temperature 4 °C was provided by the Tris dilution solution. Chosen egg yolk emulsion is not suitable for extenders preparation for storage of spermatozoa in cold.

Keywords: viability, diluents, bull sperm, flow cytometry

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Respiratory disease in dairy calves: a cross-sectional study of housing, management and environmental factors

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Objectives: Calf housing environment is commonly referenced as one of the major contributing factors to the prevalence of bovine respiratory disease (BRD). However, the evidence base for this relationships is weak. Hence, the objective of this cross-sectional study was to assess the association of calf housing design, environment and management with BRD.

Methods: In total, 83 Irish dairy farms were each visited twice in total in autumn and in spring over three years. The calf housing was surveyed, data loggers (temperature and humidity) were installed inside the calf housing and a survey of calf management practices was conducted with the farmer. Calves were examined to diagnose BRD and environmental and calf samples were collected. In total 1,640 calves (20 per farm) between 4 and 6 weeks were examined using thoracic ultrasound (TUS) and the Wisconsin clinical score (WCS). Bacterial air load was quantified within the calf housing using an impaction air sampler. Nesting scores (scale of 1 to 3) were assigned. Two linear regression models were constructed with prevalence of TUS lesions (score >3; at least a single patch of lobar consolidation) and positive WCS (aggregate score ≥5 or two or more scores ≥2) as the outcome variables, respectively.

Results: The calf house survey revealed that vented sheeting was the most commonly observed inlet design (20.5 % farms), while central ridge outlet and no outlet present were the joint most common outlet designs (35 % each). The environmental data loggers indicated that in the week prior to calf examination in the spring the median within-calf house air temperature was 8.8oC and relative humidity 76.7 %. The most frequently observed nesting score was 1 (on 33 farms). In total, 173 (10.5 %) calves were classified as having complete consolidation of at least one lung lobe by TUS and 155 (9.5 %) calves were diagnosed with BRD using the Wisconsin clinical score. The ratio of bacterial air load (BA:VRGBA) in the middle of the calf pen was positively associated with BRD prevalence in both models ($p < 0.05$). Housing temperature exceeding 20oC in the week prior to examination was also positively associated with BRD prevalence in both models ($p < 0.05$). In the WCS model, inlet design, feeding method (automatic feeder vs bucket vs teat feeder), milk type (milk replacer vs whole milk vs whole milk & milk replacer vs other), nesting score (score 2 & 3 protective), mechanical ventilation and calf occupied area (positively associated) were all significant predictor variables for BRD ($p < 0.05$). In the TUS lesion model, the minimum temperature humidity index in the week prior to examination (negatively associated), number of calves in the housing (positively associated), outlet design, colostrum feeding method and colostrum source were significant predictors of BRD ($p < 0.05$).

Conclusions: The modeling carried out in this work highlighted several design and environmental factors in calf housing that play a role in determining the prevalence of BRD in preweaning dairy calves. Some of these may be modified to reduce the prevalence of BRD.

Effects of Lameness on Milk Yield, Milk Quality Indicators, and Rumination Behaviour in Dairy Cows Before, During, and After 7 Days of Diagnosis

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Objectives: Lameness in dairy cows is a well-documented issue in scientific literature, with significant implications for both animal welfare and farm economics. However, less attention has been given to its temporal progression—before, during, and after diagnosis. There is a notable gap in research exploring how productivity and health metrics evolve across these stages of lameness. This perspective is critical for understanding both the onset and recovery phases of lameness, which can inform better management and treatment strategies for aYected cows. This study aimed to leverage data from existing sensors to identify clinical lameness through behavioural patterns and milk performance metrics. Specifically, the aim of this study was to evaluate the eYects of lameness on milk yield, milk quality indicators, and rumination over three key time points: 7 days before diagnosis, on the day of diagnosis, and 7 days after diagnosis.

Methods: The study monitored 24 multiparous Holstein dairy cows during early lactation (up to 100 days postpartum) using a 1-to-5 scoring system to assess lameness. Lameness was found to significantly aYect rumination and milk production. Daily data were collected using Lely Astronaut® A3 milking robots, recording parameters such as rumination time (minutes/day), body weight (kg), milk yield (kg/day), milk protein content (%), milk fat content (%), milk lactose concentration (%), and somatic cell count (SCC, thousand/mL). These metrics were analysed for 7 days pre-diagnosis, on the day of diagnosis, and 7 days post-diagnosis.

Results: On the day of diagnosis, rumination time dropped by 26.64 % compared to the pre-diagnosis period ($p < 0.01$) and by 26.06 % relative to healthy cows, highlighting its potential as an early health indicator. Milk yield decreased by 28.10 % compared to pre--diagnosis levels ($p < 0.01$) and by 40.46 % compared to healthy cows ($p < 0.05$). These results suggest that lameness aYects productivity and welfare even before clinical signs become apparent. Milk composition also changed significantly, with lame cows showing increased fat (+0.68 %, $p < 0.05$) and reduced lactose (-2.15 %, $p < 0.05$) content compared to healthy cows. Positive correlations were observed between rumination time and milk yield ($r=0.491$, $p < 0.001$), while negative correlations were identified between milk yield and milk fat, protein, and the fat- to-protein ratio ($p < 0.001$).

Conclusions: This study underscores the value of sensor-based monitoring for early and accurate detection of lameness in dairy cows. Significant reductions in rumination time and milk yield were observed on the day of diagnosis, along with a decrease in milk lactose concentration. These findings suggest that changes in rumination, milk yield, and lactose content could serve as early warning indicators of lameness. Incorporating real-time milk quality monitoring with gait analysis could support more informed management decisions, improving animal welfare and minimizing economic losses.

The Role of Injectable Mineral Treatment in Dairy Cow Health: Impact on Metritis, Milk Production, and Composition

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Objectives: Mineral supplementation plays a crucial role in dairy farming, significantly impacting the health, reproductive efficiency, and milk production of dairy cows. Essential trace minerals, such as zinc, copper, manganese, and selenium, are vital for enzymatic functions, immune response, and overall metabolic balance. Deficiencies in these minerals can lead to compromised immune function, increased disease susceptibility, impaired reproductive performance, and reduced milk yield and quality. Reproductive challenges, including retained placenta, metritis, and poor conception rates, have been linked to mineral imbalances, emphasizing the necessity of adequate supplementation. This study investigates the impact of MULTIMIN injectable trace mineral supplementation on dairy cow health, reproductive performance, and milk production and composition, aiming to determine its efficacy in improving overall herd productivity.

Methods: According to breed and production, all cows (from 30 days before the calving and finish 30 days after calving) were split into two groups: the treatment group (TG), which was receiving Multimin (n=78), and the control group (CG), which did not receive Multimin (n=74). Cows were grouped based on analogies. All cows in the study were vaccinated against bovine rotavirus, coronavirus, and Escherichia coli at the same time (30 days before expected calving). The supplementation protocol for the TG group involved administering Multimin at a dose of 1 mL/100 kg subcutaneously once 30 days before the expected calving date. The investigation divided these two groups of cows into first lactation cows and second plus lactation cows. Daily data were collected using Lely Astronaut® A3 milking robots, recording parameters such as rumination time (minutes/day), body weight (kg), milk yield (kg/day), milk protein content (%), milk fat content (%), milk lactose concentration (%), and somatic cell count (SCC, thousand/mL).

Results: The study revealed statistically significant differences between the test group (TG) and control group (CG) across several parameters. Milk production was significantly improved in the TG, with an 8.5 % higher milk yield (37.57 kg vs. 34.63 kg, $p < 0.001$) and 2.7 % greater milk protein content (3.75 % vs. 3.65 %, $p < 0.001$). A slight but significant reduction in the milk fat-to-protein ratio was observed in the TG (1.26 vs. 1.29, $p = 0.04$), alongside a 0.43 % lower lactose concentration (4.62 % vs. 4.64 %, $p < 0.001$). Feeding behaviour also differed, with the TG exhibiting 7.3 % less total eating time (161.43 min vs. 174.17 min, $p < 0.001$) but consuming 6.8 % more concentrated feed (5.33 kg vs. 4.99 kg, $p < 0.001$). Additionally, the incidence of retained placentas was twice as high in the CG, and metritis was seven times more frequent in the CG, suggesting a strong protective effect of MULTIMIN on reproductive health.

Conclusions: The findings of this study demonstrate that injectable mineral supplementation (MULTIMIN) positively influences dairy cow productivity, reproductive health, and milk composition. Cows receiving MULTIMIN had higher milk yield (+8.5 %) and milk protein content (+2.7 %), along with improved feed efficiency and a reduction in retained placentas (50 %) and metritis cases (7-fold decrease). These results suggest that the strategic

use of injectable mineral supplementation can enhance herd health, optimize milk production, and improve overall farm efficiency.

Occurrence of mastitis and microbiological contamination on dairy sheep farms with different milking methods

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Objectives: This study aimed to investigate the occurrence of mastitis and microbiological contamination in dairy sheep herds on farms using different milking technologies. The focus was on the assessment of biofilm production and antibiotic resistance with the detection of the methicillin resistance gene *mecA* in staphylococci.

Methods: A total of 3172 samples of raw sheep milk, 44 milk filters, and 360 udder skin swabs were collected during two milking seasons from 2022 to 2023 on two sheep farms; the farms utilized either hand or machine milking. The collected milk samples and the vortexed solution from the swab samples were inoculated onto blood agar with 5 % sheep blood. The colonies were identified based on the cell morphology, Gram staining, haemolysis, catalase activity, esculin hydrolysis, and cytochrome oxidase. The samples were analysed using MALDI--TOF to identify the udder pathogens and to assess the risk of environmental contamination during the milking process. The formation of biofilm from isolated NAS and *S. aureus* was determined according to the growth on Congo Red agar (CRA). The antimicrobial susceptibility of the isolated staphylococci was determined using a disc diffusion method on Mueller–Hinton agar according to the CLSI methodology. Based on the antimicrobial resistance to β--lactams, the phenotypically positive S. aureus and NAS isolates were subjected by PCR to test for methicillin resistance. The chi-square test was used to evaluate the relationship between environmental contamination, the occurrence of pathogens on the monitored surfaces, and the incidence of mastitis caused by these pathogens in ewes from both monitored farms.

Results: From 1911 raw milk samples, milk filters, and swabs from udder skin on Farm 1, which used machine milking, the most prevalent mastitis pathogens were non-Aureus staphylococci (NAS; 9.8 %) and *S. aureus* (4.4 %). Other isolated species included *Enterococcus faecalis* (2.7 %), *E. coli* (2.9 %), and streptococci (2.5 %), primarily from subclinical mastitis cases (14.6 %). On Farm 2, where hand milking was practiced, subclinical mastitis was detected in 1665 samples; the frequency was higher (26.1 %), with the most frequently detected udder pathogens being staphylococci (8.8 %), followed by *Escherichia coli* (7.9 %), *Enterococcus faecalis* (6.9 %), and streptococci (5.9 %). A statistically significant relationship ($p < 0.05$) between the occurrence of mastitis and environmental contamination by staphylococci was identified on both monitored farms. Additionally, on Farm 2, this correlation was also observed for *E. coli* and *Enterococcus faecalis*. Biofilm formation was detected in 44.7 % vs. 33.3 % of the *S. aureus* isolates, and 32.4 % vs. 28.9 % of the NAS isolates on Farm 1 and Farm 2, respectively. Notably, staphylococcal isolates with biofilm-forming ability showed greater resistance compared to non-biofilm-producing isolates on both farms.

Conclusions: The results indicate a concerning trend related to pathogens with increasing antimicrobial resistance to β-lactams and aminoglycosides, particularly on Farm 1, where multidrug resistance was confirmed along with the detection of the *mecA* gene in two MRSA (methicillin-resistant *S. aureus*) isolates. This finding suggests a potential risk of resistant pathogens with the ability to form biofilm spreading through the food chain.

Keywords: ewes, hand milking, mastitis, Staphylococcus aureus, biofilm, environment
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Subclinical mastitis causative agents and evaluation of treatment effectiveness with garlic extract (Allicin) in dairy cattle

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Objectives: In dairy cattle herds, subclinical mastitis is much more common than clinical mastitis. Farms frequently aren't aware that some of their milking cows have subclinical mastitis since there aren't any obvious changes in the milk. Mastitis can be caused by over 140 different types of pathogens that can be found in the cow's environment. The treatment of subclinical mastitis can often be managed without antibiotics, using non-steroidal anti--inflammatory drugs and supportive measures. The aim of the study was to evaluate the treatment effectiveness of subclinical mastitis caused by various pathogens using non--steroidal anti-inflammatory drugs and allicin boluses.

Methods: The study was conducted on a farm in Lithuania that holds 550 dairy cows. Ten cows with subclinical mastitis were selected for the study. Increased electrical conductivity of the milk, decreased milk production, an increase in the number of somatic cells in the milk, and a positive California Mastitis Test (CMT) result were all used to diagnose subclinical mastitis. Milk samples were taken on the day of diagnosis of subclinical mastitis to identify the causative agent. All cows diagnosed with subclinical mastitis were treated once on the day of diagnosis with Allicin (SCC-Bolus) 1 unit orally and with karprofen (Rimadyl Cattle 50 mg/ml) at a dosage of 1 ml per 35 kg subcutaneously. After 7 days, microbiological testing of milk was repeated on the same 10 cows to determine if they had recovered.

Results: After conducting microbiological tests on the milk, it was found that 5 cows were suffering from mastitis caused by *Staphylococcus aureus*, 3 by *Streptococcus spp.*, 1 by *E. coli*, and 1 by *Bacillus spp*. After re-evaluating the CMT after 7 days, a positive result was obtained for 3 cows. On the same day, milk samples were taken from all the cows in the study for microbiological testing. Mastitis pathogens were still found in the milk of the 3 cows that tested positive for CMT: one cow had *Staphylococcus aureus,* and two had *Streptococcus spp.* pathogens. The treatment was effective for 7 out of the 10 cows.

Conclusions: The study used too few cows, so the results were not statistically reliable. It would be beneficial to include more cows in similar studies in the future. However, this study showed that the most common causative agents of subclinical mastitis on one farm in Lithuania are *Staphylococcus spp.* and *Streptococcus spp.* The study demonstrated that subclinical mastitis in dairy cows can be effectively treated using non-steroidal anti--inflammatory drugs and allicin boluses. With a treatment success rate of 70 %, the combination therapy proved to be beneficial, as evidenced by the resolution of infection in 7 out of the 10 cows assessed.

Adaptation of Scottish Highland cattle to wet and swampy lowland areas in Poland as an example of welfare

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Objectives: Scottish Highland cattle is one of the most distinctive and resistant to unfavorable environmental conditions cattle breeds. This breed is characterized by very good fertility and easy calving. Cows calve in pastures without any assistance, and births are not hindered even by winter conditions and temperatures below -20 °C. Cow's milk contains a lot of fat, which ensures good viability of the calves and regular growth during the rearing period.

In 2010, about 500 cattle of this breed were bred in the country, and over the last 15 years this breed has gained significantly in popularity - currently it is estimated that the population is over 3,000 animals. Most representatives of the Scottish Highland cattle breed are found in the Masovian, Lublin, Pomeranian, as well as Greater Poland and Podlaskie voivodeships. One of the largest herds is located in the Świętokrzyskie Voivodeship - it has over 170 animals. In mentioned voivodeships there are many large areas of wetlands and meadows, which allows these animals to move freely and have an unlimited amount of food.

Unfortunately, due to the fact that Scottish Highland cattle was originally kept in different conditions, a change in the living environment may significantly limit the possibility of expressing natural behavior, which is associated with a negative impact on their well-being. The aim of the study was to statistically assess the adaptation of Scottish Highland cattle to marshy living conditions in the swampy areas of the Bug basin (SE Poland) and the vicinity of the Vistula Żuławy, as well as Warmia and Mazury.

Methods: In studied herds, we assessed some of the animal welfare parameters, including behavior during grazing, willingness to move and lie down, and the occurrence of maternal instinct disorders in cows after calving. Additionally, some parameters determining the reproduction of the cattle herd were assessed, i.e. length of pregnancy, percentage of calving, number of stillborn and live-born calves, birth weight of calves and their growth in the first days of life, and the percentage of culled females in the herd. We also obtained information on the average milk yield of cows and the quality of produced colostrum.

Results: The analysis of adaptation indicators of Scottish Highland cattle showed no differences in the length of time spent grazing, the willingness to use the pasture, the length of time spent lying down, as well as the animals' willingness to move throughout their daily activity. Moreover, in the case of cows with calves, no disturbances in the expression of maternal behavior were observed. Additionally, births did not require any veterinary intervention, because calves were born without any major problems.

Conclusions: The obtained indicators confirm the adaptability of animals to wet conditions in the moderate climate zone in Poland. The measurable result of the very rapid adaptation of animals is the increase of the population of Scottish cattle in the country, which has been observed since 2010.

Comparative analysis of four methods for somatic cell counting in cow's milk with Fossomatic FC

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Objectives: To determine the agreement of four commercial methods (three on-farm: California Mastitis Test, Eimü Cell Check 3S Test, DeLaval Cell Counter, and one laboratory method: LactoScan SCC) used for somatic cell counting in cow's milk, compared to the analysis using Fossomatic FC in an accredited laboratory.

Methods: Our study was conducted on a dairy herd from southeastern Slovakia. Of the total number of dairy cows, 50 were randomly selected for inclusion in the experiment. Somatic cell count (SCC) was determined in mixed, unaltered milk samples taken during the afternoon milking directly from the milking machine sample box. A threshold of 200,000 cells/mL was used to define subclinical mastitis in fresh milk. The number of somatic cells was determined using on-farm methods (CMT, EMCT, and DCC) immediately after collection and by LactoScan SCC within 12 hours after collection. Analysis using Fossomatic FC was performed within 24 hours after collection. The somatic cell count measured by the Fossomatic FC was considered the gold standard. Agreement between the methods (%) was assessed as follows: CMT vs. FSCC, EMCT vs. FSCC, DCC vs. FSCC, and LactoScan SCC vs. FSCC. An analysis of Sensitivity and Specificity of these methods was also carried out. Additionally, correlations with the FSCC (Pearson's coefficient) were calculated for the DCC and LactoScan SCC.

Results: The mean somatic cell count (SCC) of all milk samples was highest for FSCC (476.5 $\times 10^3$ SC/mL), followed by DCC (352.0 $\times 10^3$ SC/mL), and LSc SCC (270.0 $\times 10^3$ SC/mL). Of the total number of dairy cows (n = 50), subclinical mastitis (SCC over 200,000 SC/mL) was detected in 17 cows (34.0 %) by FSCC, with a mean SCC of 1279.4 $\times 10^3$ SC/mL; in 19 cows (38.0 %) by DCC, it was 974.9 $\times 10^3$ SC/mL; in 17 cows (34.0 %) by LSc SCC, it was 1078.3 $\times 10^3$ SC/mL, in 22 cows (40 %) by CMT and EMCT. The overall agreement of CMT and EMCT with FSCC was 90 %, with DCC showing 96.0 % agreement and LSc SCC showing 94.0 %. The sensitivity and specificity for CMT and EMCT were 100.0 % and 86.4 %, for DCC 91.1 % and 92.1 %, respectively. For LSc SCC they were 79.5 % and 94.3 %, respectively. The correlation between FSCC and DCC was 0.867 ($P < 0.001$) and between FSCC and LSc SCC 0.92 ($P < 0.001$).

Conclusions: When all methods used for somatic cell counting were examined, the agreement with the certified laboratory device Fossomatic FC was found to be 90 % or more. These promising results suggest that these methods can be applied in a wide range of areas, not only in veterinary practice but also in the dairy industry worldwide.

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Metabolic profile of Cows During the Transition Period

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Objectives: To determine the metabolic profile of Holstein cows during the transition period and peak lactation.

Methods: In a dairy herd with an average milk yield of 13,863 kg per standardized lactation, the metabolic profile was evaluated in cows during the following periods: dry period (Group A), prepartum (Group B), early lactation (Group C), peak lactation (Group D), A total of 30 cows were included in the study. Blood was collected from the coccygeal vein and serum concentrations of BHB, NEFA, Ca, P, haptoglobin, and the activities of AST, GMT, and CK were measured using the Konelab 20XT analyzer.

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Results: Dry Period (Group A): all measured parameters were within reference ranges.

Prepartum (Group B): a slight increase in BHB concentration (0.87 ± 0.13 mmol/l) was observed. Early Lactation (Group C): further increase in BHB concentration (1.02 ± 0.2 mmol/l), decrease in glucose, Ca (2.13 ± 0.10 mmol/l), and P (1.67 ± 0.27 mmol/l), increase in AST (1.58 ± 0.22 µkat/l) and CK (2.63 ± 0.48 µkat/l) activities. Peak Lactation (Group D): persistently elevated BHB concentration (0.99 ± 0.10 mmol/l), increased AST (1.65 ± 0.62 µkat/l) and CK (2.62 ± 0.68 µkat/l) activities, suboptimal glucose concentration.

Conclusion: The study demonstrated that the adaptation process of cows during the transition period is highly demanding. Dry cows showed metabolic values within the reference range. During the prepartum period, an increase in BHB and NEFA concentrations was observed.

In the early lactation period, NEB (negative energy balance) and hepatic steatosis were diagnosed, characterized by elevated NEFA, BHB, and AST. Changes in the metabolic profile persisted even during peak lactation.

Postmortem analysis of the causes of perinatal calf mortality on dairy farms in Poland

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Objectives: The purpose of this study was to analyze the causes of death in calves, which died in the perinatal period (bovine perinatal mortality; BPM) on Polish dairy farms, using the clinico-pathological model of investigation.

Materials and Methods: The study material consisted of 121 cases of BPM and 110 of their dams in 29 dairy herds, from the areas of southwestern and central Poland. Selected herds were within < 2.5h one-way distance-travel time from Wroclaw University of Life Sciences. The inclusion criteria were all calves born after a gestation of 260 days that died before, during, or within 6 h after birth (a case definition of death within 24 h was planned, but none of the collected calves died between 6 and 24 h after birth). Anamnestic information collected (by questionnaire) included: dam information (cow age, cow calving number, date of last insemination, BCS scale 1-5); calving-related information (the course of calving, including the time of noticing the appearance of amniotic sac and the appearance of fetal expulsion), administration of resuscitation, calf vitality scale and calving difficulty scale. The carcasses were transported to the university necropsy laboratory where the necropsies were carried out by one of 5 members of the research team. The time from when the calf was born to the beginning of the necropsy was recorded in each case. Necropsy was performed following a standard protocol. The cause of death (COD) in each case of BPM was determined by a clinico-pathological examination consisting of analysis of: 1) the postmortem findings, 2) the questionnaire information and 3) the results of the clinical examination of the dam. Each case was then assigned to one of eight COD categories: dystocia, eutoxia, lethal malformations and IUGR, infection, premature placenta separation, anemia, multifactorial cause of death and unexplained - diagnosis not reached. Dystocia, defined here as abnormal calving, had four subgroups: traumotocia, dystoxia, bradytocia and maldisposition.

Results: In descending rank order the COD were: dystocia (47.1 %), unexplained (31.4 %), multifactorial (6.6 %), lethal malformations and IUGR (5.8 %), eutoxia (5.0), premature placenta separation (1.7 %) anemia (1.7 %) and infection (0.8 %). Amongst dystocia cases, traumotocia was the most common subcategory with 21.5 % of cases.

Conclusions: Dystocia/abnormal calving was the predominant cause of perinatal calf mortality. A high incidence of calves with traumatic birth injuries suggests inadequate obstetrical skills among farm personnel. The primary impediment to determining the cause of death was advanced autolysis, which obscured postmortem findings. Other causes of mortality were less frequently diagnosed.

Small ruminant rearing practices – identifying potential critical points for animal health and welfare

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Small ruminants are reared in various farming systems, ranging from intensive to extensive. The husbandry practises and conditions have a significant impact on the health and productivity of the animals. The aim of the study was to obtain data on rearing practices for small ruminants in Slovenia and to identify potential critical points that pose a risk to animal health and welfare.

225 sheep and goat breeders from different Slovenian regions participated in the study. Data on rearing practices were collected using questionnaires. The questionnaire contained general questions about the farm, animal husbandry, the grazing system, parasite control and biosecurity measures.

Almost half (49.8 %) of the farmers surveyed kept sheep, 29.8 % kept goats and 20.4 % kept both species. In the flocks surveyed, an average of 132 sheep, 53 goats and 31 animals of both species were kept. On all farms, the animals were given hay, 60 % of the farmers added mineral-vitamin mixtures and 40 % fed them additional concentrated feed. 36 % of the farmers mucked out the stall only once a year, while most of the others did this every 3 to 6 months. On most farms, the animals are grazed from April to November. On 14.6 % of farms, animals are kept outside all year round, and only 2.7 % of farms keep them constantly indoors. Farmers use different grazing systems: 68.4 % of farmers rotate pastures, 33.8 % combine grazing and mowing, and in 16 % of farms the animals are constantly on the same pasture. In terms of biosecurity measures, half of the respondents control flies and rodents. More than 40 % of farmers treat newly acquired animals for parasites and only a fifth of farmers keep them in a separate barn. Most farmers surveyed (57 %) treat their animals against parasites twice a year, and more than half of the farmers (69 %) treat all animals in the flock. Farmers mostly decide on treatment based on previous experience (68 %), a third (30 %) treat animals if they are underweight or not growing well. 28 % treat based on the results of a parasitological examination. Anthelmintics are mostly (71.5 %) dosed according to the body weight of the individual animal, which is most often (88.8 %) assessed visually.

The results show that on several farms the animals do not receive mineral-vitamin mixtures and concentrates, which harbours the risk of nutrient deficiencies, especially for animals with higher requirements (growing or lactating animals). On almost all farms, the animals have access to pasture, which has a positive effect on their welfare, but carries a higher risk of parasite infestation, especially on farms where the animals are constantly on the same pasture. Treatment practices against parasites are often inadequate and pose a risk of developing resistance to anthelmintics. Farmers' responses show that biosecurity measures are lacking. The survey results highlight key issues that require more attention in the future, emphasizing the need for better farmer education to improve their rearing practices.

Selected biochemical profile parameters in dairy cows with left displacement abomasum

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Background: Efficient dairy production requires healthy and functional cows. In most industrialised countries, maintaining herd health becomes more important and challenging than milk yields and herd size increase. Left displaced abomasum (LDA) is a common problem in dairy cows. There have been numerous studies focused on LDA prediction. Blood profiles and changes in body condition score have been used to monitor metabolic imbalances around parturition and, in early lactation, to investigate herd 's problem as well as to predict the risk of diseases such as displaced abomasum. The aim of the study was to determine the dynamics of metabolic parameters of energy profile- non-esterified fatty acids (NEFA), beta-hydroxybutyrate (BHB), glucose (GLU), total lipids (TL), total cholesterol (TCH), triglycerides (TG) and total bilirubin (CBi) in dairy cows with left displaced abomasum before and after surgery.

Methods: Seven Holstein dairy cows with LDA were included in study. All cows underwent omentopexy. Postoperation therapy included Cefriofur 11-22 mg/ kg subcutaneously for 10 days and Ketoprofen 3 mg/ kg intramusculary for 4 days. Blood samples were collected from v. jugularis before the surgery and after the surgery and on the 1s^{t}, ^{4th}, 7th and 14th day after surgery. Analysis was carried out in laboratory of Clinic of Ruminants at University of Veterinary Medicine and Pharmacy in Košice.

Results: The mean concentration of energy metabolism in cows with LDA were above physiological range: BHB (1,60 mmol/l; SD 1,31), NEFA (1,52 mmol/l; SD 0,30) and GLU (5,60 mmol/l; SD 3,03) and TL (5,47 mmol/l; SD 0,21). After the surgery, the parameters of energy metabolism had a decreasing tendency. The lowest concentration of metabolic parameters were recorded 14 days after surgery: BHB (0,52 mmol/l; SD 0,14), NEFA (0,46, SD 0,15), GLU (3,90 mmol/l; SD 0,35), and TL (4,19 mmol/l; 0,21). Statistically significant differences (P< 0,001) between individual periods were recorded for the NEFA parameter.

Conclusion: Our study confirmed an increase in the parameters of energy metabolism before operation with decreasing tendency after surgery. LDA is best diagnosed at an early stage and the necessary therapy should be performed before extensive biochemical changes occur.

Keywords: biochemical parameters, left displacement abomasum, dairy cows

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Linking Methane Emissions with Health Indicators in Dairy Cows Across the Peripartum Period

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Objectives: The dairy industry confronts difficulties in improving productivity while reducing environmental impacts, particularly enteric methane emissions, a major greenhouse gas that could intensify global warming. We must recognise the calving period due to its potential influence on methane emissions due to physiological alterations. This study utilises innovative technologies to monitor bovine behaviour and associate methane emissions with physiological metrics to improve our comprehension of their relationship. Blood metabolites indicate metabolic health, suggesting that metabolic status may affect methane emissions. This approach clarifies the biological factors influencing methane production by combining behavioural and physiological data, thereby enabling focused emission reduction strategies in the dairy industry.

Materials and Methods: The research, carried out in Lithuania from November 2023 to April 2024, observed 13 healthy dry Holstein cows beginning 40 days prior to calving and lasted for 7 weeks. RumiWatch sensors (RumiWatch System, Itin+Hoch GmbH, Liestal, Switzerland) were utilised to monitor feeding and activity behaviours, while methane emissions were assessed daily using the HESAI HS4000 (Hesai, Building L2-B, Hongqiao World Centre, Shanghai) laser methane detector. Methane concentrations were measured as CH_4 column density (ppm) at a specified time, two hours after feeding to account for diurnal fluctuations. Critical peripartum phases (prepartum, parturition, and postpartum) were chosen for observation to document notable physiological alterations. Weekly blood samples from the coccygeal vein were obtained for metabolic analysis, yielding extensive data on bovine health, behaviour, and methane emissions during this transitional phase.

Results: The result of our study reveals a trend of increased methane emissions in cows on the day of calving, although variations across the transition periods were not statistically significant. Methane concentrations increased by 30.890 ppm on calving day relative to three weeks prior and by 13.597 ppm three weeks post-calving ($p > 0.05$). In the pre-calving period, methane emissions exhibited a mild positive correlation with Other Chews time ($r = 0.410$, $p < 0.01$) and a negative correlation with Chews per Bolus ($r = -0.306$, $p < 0.05$). Methane emissions exhibited significant correlations with blood morphology over time: a positive correlation with monocytes prior to calving ($r = 0.501$, $p < 0.01$), a negative correlation with platelet counts on the day of calving ($r = -0.641$, $p < 0.05$), and post-calving, negative correlations with platelets ($r = -0.413$, $p < 0.01$), alongside a positive correlation with haematocrit ($r = 0.413$, $p < 0.01$).

Conclusions: This study indicates a propensity for increased methane emissions in dairy cows during the calving period, despite the absence of statistically significant differences across transition periods. Significant correlations with physiological and behavioural indicators, such as monocyte and platelet levels, underscore the metabolic changes that cows experience during this period, which may influence methane emissions. However, the limited sample size requires further investigation with a larger cohort to validate these results. Observing cows during the peripartum period may facilitate methane reduction efforts and improve animal welfare by reducing metabolic stress, potentially leading to a decrease in greenhouse gas emissions in dairy farming.

Effect of Different Forms of Hypomagnesemia at Peak Lactation on Macronutrient Concentrations During the Periparturient Period in Dairy Cows

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Objective: The study aimed to assess whether acute, subacute, and chronic hypomagnesemia in dairy cows at peak lactation affects calcium, phosphorus, magnesium, and potassium concentrations during the periparturient period.

Materials and Methods: The study was conducted on 70 Holstein-Friesian cows (2–6 years old) from monitored herds in the Lublin region, with an average milk yield exceeding 9000 liters per lactation. The cows were housed in tethering barns (≤200 animals) and fed using the TMR system.

The cows were divided into four groups. The first group was cows with typical symptoms of acute hypomagnesemia: eye exophthalmos, pupil dilation, restlessness, lack of appetite, diarrhea, muscle tremors, skin hypersensitivity, motor awkwardness, clonic-tonic spasms, the second group with symptoms of subacute hypomagnesemia : stiff, wobbly movement, stiff auricles, fibrillary muscle tremors or appetite disorders, and a third with chronic hypomagnesemia in which there were atypical symptoms such as lameness, paresis or milk production disorders. The fourth or control group included animals from the same farms that were clinically healthy, and blood tests showed no reduction in magnesium concentration in any monitoring test. Blood from the animals was collected between 6 and 12 weeks of lactation. Cows in group I had an average magnesium concentration of 0.25 mmol/l, in the second group 0.45 mmol/l, and in the third group 0.66 mmol/l. Cows in the control group received an average concentration of 0.99 mmol/l. Subsequently, blood was drawn from the animals three weeks and one week before birth and one week and three weeks after parturition.Subsequent blood draws were performed at three weeks and one week before calving, and one week and three weeks after parturition. Serum concentrations of calcium (Ca), inorganic phosphorus (Pi), magnesium (Mg), and potassium (K) were measured using an automatic analyzer. Statistical analysis was conducted using Student's t-test and Mann-Whitney rank test ($p < 0.05$ and 0.01).

Results: Mg concentrations were significantly lower in all hypomagnesemic groups compared to controls but remained within the lower limits of normal.

Ca concentrations were lowest in Group III, especially postpartum, with significant differences compared to other groups.

Pi concentrations remained within normal limits in all groups but were lowest postpartum in Group III.

K concentrations were lowest postpartum in Group I and highest in Group III.

Conclusions: Chronic hypomagnesemia has a greater impact on perinatal calcium concentrations than acute or subacute deficiency.

Hypomagnesemic cows during lactation exhibit significantly lower magnesium levels in the perinatal period compared to healthy cows.

In cows with hypomagnesemia during lactation, it is advisable to test the concentration of magnesium in the blood already in the period before parturition

Evaluating the Impact of Clinical Mastitis on Ovarian Morphometry and Synchronization Protocol Efficiency in Dairy Cows

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Objectives: To evaluate the impact of mastitis on ovarian morphometry and its derivatives, and to determine the effectiveness of different synchronization protocols in the presence of mastitis in dairy cows.

Methods: A total of 110 Holstein Friesian cows, ranging from second to fifth lactation, were selected and monitored for clinical mastitis starting from the first day after parturition (pp). All cows in the study had uncomplicated calvings and were divided into two groups: Group 1 – cows with no clinical mastitis between 0 and 30 days after calving, and Group 2 – cows that developed clinical mastitis during the same period. The onset date of mastitis was recorded. Prior to initiating the synchronization protocols, the cows underwent an ultrasound to assess the ovaries. On day 60 pp, all cows were synchronized using one of three protocols: Ovsynch, G7G, or Presynch, irrespective of mastitis status. Following the completion of the synchronization protocols, pregnancy was assessed via ultrasound.

Results: Mastitis influences ovarian morphometry. In healthy cows, the left ovary is 10.51 % larger than the right ($p < 0.05$), while in cows with mastitis, the right ovary is 6.52 % larger ($p < 0.05$). Both groups had more functional structures in the left ovary, but larger structures were found in the right ovary of cows with mastitis and in the left ovary of healthy cows. Mastitis affects insemination efficiency based on the synchronization protocol. Healthy cows had 28.53 % higher conception rates after the first insemination ($p < 0.05$). Mastitic cows had better success with Ovsynch (39.3 %) compared to G7G and Presynch, while healthy cows had better outcomes with G7G or Presynch. Mastitis affects conception efficiency regardless of its onset postpartum. Cows that developed mastitis within 30 days postpartum had higher conception rates compared to those that developed it later.

Conclusions: Mastitis affects ovarian morphometry and reproductive performance. In cows with mastitis, the right ovary is larger than the left, whereas the opposite is true for healthy cows. Mastitic cows synchronized with the Ovsynch protocol had higher conception rates when mastitis occurred within 30 days postpartum, compared to those affected later. Healthy cows showed better outcomes with G7G or Presynch protocols. Further research is needed to understand the mechanisms behind these effects and optimize synchronization strategies for mastitic cows.

Nutritional causes of ruminal fermentation disorders in dairy cows

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Objectives: Evaluation of the effect of nutritional composition and structure of TMR on rumen fermentation activity and assessment of the incidence of rumen acidification in herds of dairy cows in the 1st phase of lactation.

Methods: In breeding conditions in a total of 131 farms with a production of 7-9 thousand liters, rumen contents were collected from 6-8 clinically healthy animals in the 1st phase of lactation by a stomach tube for the assessment of rumen fermentation at a time of 4-6 hours after morning feeding. The nutrient content was determined by conventional methods (Commission Regulation EC No. 152/2009) on the official control of feed. The structure of TMR were determined by determining the physical efficiency factor feF>8.0 resp. feF>1.18 from the proportion on the Penn State Particle Separator. The amount of physically effective NDF (feNDF) in TMR was determined by multiplying the analyzed amount of NDF by the factor feF>8.0 resp. feF>1.18.

Results: In breeding conditions, with a large number of examined dairy cows (790) in the 1st phase of lactation, a decrease in pH values below the physiological level was confirmed in a total of 33.6 % of dairy cows, of which pH values below 5.9 at the level of subacute rumen acidosis with an average pH value of 5.67 ± 0.15 were confirmed in 13.3 % of farms. Values at the level of acidification (pH 5.9 - 6.2) were confirmed in 20.3 % of farms with an average of 6.07 ± 0. 8. When dividing the farms according to the rumen pH into groups with SABA manifestation (pH <5.9), acidification (5.9-6.2), physiological pH 6.2-6.8, alkalization pH>6.8 of the rumen, a statistically significant difference (P<0.001) was confirmed between the content of carbohydrates in the TMR and rumen fermentation. For maintaining of the rumen pH (6.2-6.8), the recommended values of feNDF1.18 at the level of 31.2 % and feNDF8 at the level of 18.5 % in the dry matter of the TMR are recommended. In the monitored farms with SABA manifestation, reduced values of feNDF8 (17.8±1.9 %) and feNDV1.18 (29.9 ± 1.8 %) were confirmed. Physically effective NDF (feNDF8 resp. feNDF1.18) to starch content used to estimate rumen ph. Thus, estimated rumen pH level for evaluated TMR in relation to analyzed rumen pH values confirm linear regression dependence (R2 = 0.809, resp. R2 = 0.705).

Conclusion: Residual analysis as the difference between the estimated and analyzed pH values for the farms gives an acceptable dispersion of estimated (according to feNDF>8 or feNDF>1.18: starch) and directly analyzed pH values, especially at the limit values of rumen acidification. The results of assessments of the nutritional composition and structure of TMR on the farms by analyzing feNDF and rumen fermentation indicate the suitability of feNDF for estimating fermentation load by the rumen pH calculation system at the formation feed ration and evaluation of TMR.

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Mycoplasma bovis serostatus in dairy youngstock: a longitudinal, herd-level risk factor study

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Objectives: Mycoplasma bovis is a globally significant pathogen of cattle associated with a wide range of clinical syndromes, including respiratory disease, mastitis, arthritis, otitis, and reproductive failure. Since its detection in Ireland in 1994, M. bovis has become a significant contributor to morbidity and mortality in Irish cattle. This study aimed to investigate herd--level risk factors associated with M. bovis seropositivity in replacement dairy heifers.

Methods: In each of 105 Irish dairy herds ten randomly selected heifers were sampled on three occasions: spring 2018, spring 2019, and autumn 2019. Serum samples were analysed by a commercial accredited laboratory (FarmLab Diagnostics, Roscommon, Ireland) using the M. bovis ID Screen® Mycoplasma bovis antibody ELISA (IDVet, Montpellier, France). The ID Screen® Mycoplasma bovis antibody ELISA has a reported a sensitivity of 95.7 % and a specificity of 100 %. The cut offcut-off for a positive sample was an S/N value of < 0. 6. Inconclusive test re-sults were classified as negative in the data analysis. There is no M. bovis vaccine available in Ireland. Seropositivity was evaluated using two thresholds: ≥ 1 positive heifer (Model ≥ 1POS) and ≥ 3 positive heifers (Model ≥ 3POS) per herd per sampling visit. To assess the possible risk factors for herd-level seropositivity, all participating farmers completed a questionnaire relating to biosecurity and management practices on their farms. The questionnaire covered various aspects of farm management, including herd characteristics, bioexclusion practices, calving and newborn calf management, unweaned heifer management and weaned heifer management. The survey consisted of a combination of open- and closed-ended, multiple choice and Likert scale questions.

Results: M. bovis seropositivity varied over time, with at least one positive heifer in 50.4 % (95 % confidence interval (CI): 40.5–60.3) of herds in spring 2018, 35.2 % (95 % CI: 26.2–45.1) in spring 2019, and 45.7 % (95 % CI: 36.0–55.7) in autumn 2019. Herds with three or more positive heifers increased from 31.4 % (95 %CI: 22.7–41.2) in spring 2018 to 42.9 % (95 % CI: 33.2–52.9) by autumn 2019. Risk factors for M. bovis seropositivity included the purchase of cattle, which significantly raised the odds of seropositivity across multiple visit periods (Model ≥ 1POS: Odds ratio (OR) 3.84, p = 0.02; Model ≥ 3POS: OR 3.69, p = 0.02). Managing more than three land parcels, housing heifer calves separately from bull calves, and sharing airspace between calves and older animals also increased seropositivity risks. Conversely, more colostrum feeds reduced the risk of seropositivity (Model ≥ 1POS: OR 0.81, p = 0.05), while colostrum quality assessment and feeding waste milk showed a trend toward increased risk.

Conclusions: These findings suggest the importance of robust biosecurity measures, including limiting cattle purchases, improving calf management, and enhancing colostrum feeding practices, to control the spread of M. bovis. This study provides valuable insights into the epidemiology of M. bovis in dairy youngstock, emphasising the need for targeted biosecurity and surveillance to safeguard herd productivity.

A national survey of bovine congenital defects recorded in dairy and beef herds over ten years (2014-2023).

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Objectives: Congenital abnormalities are those that are present at birth. These may be structural and/or functional anomalies. Congenital defects are often reported as cases or case series in retrospective studies from university clinics or from veterinary pathology laboratories. Studies at national level are rare internationally and none had been conducted in Ireland. Hence the objective of this study was to report on the typology of bovine congenital defects in dairy and beef herds in Ireland.

Methods: A survey was conducted by ICBF (Irish Cattle Breeding Federation; www.icbf.com) over a ten-year period (2014-2023). A questionnaire survey, consisting of 33 questions was designed and formatted using an on-line platform (www.surveymonkey.com) and accessible via the ICBF website. The questions were a mix of both open-ended and close--ended questions. The survey was promoted via web posts, social media and agricultural news platforms. Each of the responses on the type/s of congenital defect reported were reviewed independently by both authors then a consensus was reached to categorise each case into one of 16 congenital defect categories.

Results: Between 2014 and 2023 inclusive, 575 cattle with congenital defects were reported by respondents. Following the removal of duplicate reports, reports relating to non--congenital defects and reports where the defect could not be determined based on the information provided, 522 reports remained. Of the 522 unique reports, 369 cattle were officially registered with the Department of Agriculture, Food and the Marine (DAFM). Where a calf was officially registered, additional information could be retrieved from the ICBF database. These data (birth, breed and herd location details) were available for 369 animals born in 251 unique herds.

Results: The three most commonly recorded defect categories were intestinal atresia alone (22.9 %), multiple defects (18.7 %) and tail defects alone (12.6 %); these accounted for over half of all congenital defects recorded (54.2 %). The majority of atresia cases (66 %) were male and the predominant breed type was dairy x dairy (64 %). The majority of atretic calves were born unassisted (71 %). The majority of dams of these calves were served by AI (73 %) and most dams of affected calves were pluriparous (92 %). The three most common defect categories (each case of which had a co-defect) within the multiple defect category were tail defects (27.5 % of all multiple defect cases), ankyloses (19.6 %) and intestinal atresia (19.6 %). Of calves with tail defects alone, the majority were female (58 %) and the result of dairy x dairy mating (73 %), and of an AI service (73 %) and were born unassisted (85 %). The majority of dams were pluriparous (93 %).

Conclusions: This is the first national survey of bovine congenital defects in Ireland. It shows that while farmer-reported cases generally lack a veterinary clinical or necropsy examination, farmers are in the unique position of being able to report phenotypic abnormalities first hand, and provide an unbiased perspective of the true typology and epidemiology of congenital defects on-farm. This study also describes a novel model of farm--based congenital defect recording, with use of accessory data from a national breeding organization.

Why are the prevalences of umbilical infections/ inflammations/disorders/omphalitis in European dairy calves so variable?

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Objectives: To explain why the published prevalences of umbilical infections in dairy calves in Europe are so variable.

Materials and methods: A literature search for umbilical health in calves was performed using three databases (PubMed, Google Scholar, Web of Science) including only publications from Europe. Only articles in English or German with full articles available were included. In order to investigate the prevalence of umbilical infections, articles including only calves with *inflammatory diseases of the umbilicus* (100 % prevalence) were excluded. But studies recording *umbilical diseases in general,* e.g. umbilical infections and hernia, were included. All studies included were performed in Europe and used both male and female dairy calves of the species Bos taurus.

Results: Overall, 34 articles were considered. Most studies used „inflammation, infection or omphalitis/omphalophlebitis" (n = 18), followed by „infection" alone (n = 8), „disorder/ disease" (n = 6) and „inflammation" alone (n = 2) for nomenclature. The preparation used for navel care was mentioned in six studies, while only two studies reported the care method (e.g., dip, spray), as well. Most studies reported disease prevalences at calf-level (n = 27), while herd prevalences were not mentioned in 20 studies at all.

While 29 articles were based on random farm surveys, five studies, however, included only calves with umbilical diseases (e.g., umbilical infection and hernia). Most studies used calves aged under one month (n = 10), followed by up to six months (n = 7). In six studies no age was recorded. The predominant diagnostic technique was clinical examination (n = 32), sometimes supported by ultrasound (n = 7). Out of all studies, 10 studies, however, described no case definition of umbilical infections. Most diagnoses were made by veterinary staff (n = 21), partly assisted by farmers (n = 4). Almost one-third of all studies included diagnosis from farmers alone (n = 9).

In almost all categories analysed, many studies lacked necessary information (e.g., number of calf examinations, number of herds included, herd and calf prevalence, observer type). Higher prevalences of umbilical infections were found in large studies (> 1,000 calves examined), studies including only calves with umbilical diseases, using ultrasound or necropsy as diagnostic technique, focusing on calves aged less than one month or using diagnosis made by veterinary staff.

Conclusions: This literature analysis showed that there is no consistent nomenclature of umbilical infections. The reason the published prevalences differed so widely is that study designs vary widely as well and, in many cases, the prevalences recorded are not comparable with dissimilar study designs. Key factors are study population (size, age, sick or randomly chosen calves), diagnostic technique and observer type. This underlines the importance of a precise description of study characteristics. Unfortunately, many studies lack important information needed for sufficient comparisons (e.g., method of navel care). Moreover, even though umbilical infections are diseases to be evaluated at herd-level, many studies did not

mention herd prevalences at all. Further analyses are needed to quantify the qualitative results presented here.

Neoplasm (fibroma molle) on the upper eyelid in a young bull: surgical excision with blepharoplasty

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Background: Fibromas are found in all species, being more common in adult or older animals. The incidence does not appear to be associated with the animal's breed or sex. *Fibroma molle* is well-defined, white-gray in color, with an elastic-soft consistency, wet, and slightly sticky upon sectioning. Fibromas frequently appear in the dermis or subcutaneously and can be found at any site with connective tissue. Macroscopically, they present as well--defined, ovoid or round, hard or soft formations.

Methods: A young bull of the Holstein-Friesian breed, approximately 6 months of age, was referred to the Clinic of ruminants with a mass on the left upper eyelid that had been growing over time, with an unknown etiology. A general clinical examination was performed, and blood samples were taken for hematological and biochemical analysis.

The mass was palpable, with an elastic-soft consistency, without involvement of the subcutaneous tissue or marginal involvement. The skin neoplasm was regular in shape, with a smooth surface, measuring 2,5 × 4,5 cm. Surgical excision of the neoplasm was performed under general anesthesia, with the bull in right lateral recumbency. Regional anesthesia was achieved through auriculopalpebral and supraorbital nerve blocks. The cut surface was homogenous. Blepharoplasty was performed using an intradermal buried vertical mattress suture. The excised mass was sent for histopathological examination.

Results: The general clinical examination of the animal, including heart rate, respiratory rate, and rectal temperature, revealed values within the normal range. The CBC and WBC count were normal. Based on the histopathological findings, the final diagnosis of *fibroma molle* (soft fibroma) was made. The animal made an uneventful recovery within 10 days after surgery with the preservation of function and aesthetic of the eyelid. During postoperative monitoring for nine months, there was no recurrence or other complications.

Conclusions: Fibromas are benign skin tumors that occur wherever there is fibrous connective tissue, in this case, on the upper eyelid. Soft fibromas (*fibroma molle*), or fibromas with a shaft, consist of many loosely connected fibroblastic cells and less fibrous tissue. Fibromas occur in all domestic animals but are most common in horses, where they are often seen as equine sarcoids. In all cases, a thorough clinical and histopathological examination should be performed. In our case, the final diagnosis of fibroma was confirmed after histopathological examination, and curative excision of the neoplasm was recommended with a favorable prognosis. The cosmetic result of the procedure was also satisfactory. Although this surgical approach is not commonly used in cattle, it appears to be successful when applied early, while preserving full eye functionality.

Keywords: young bull, fibroma molle, histopathology, blepharoplasty

Eco-Friendly Synthesis of Silver Nanoparticles Using Lavender Leaves and Their Antimicrobial Potential Against Resistant Udder Pathogens

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Objectives: The study aimed to investigate the bactericidal efficacy of silver nanoparticles (Lav-AgNPs) prepared by green synthesis against resistant pathogens affecting the mammary glands of dairy cows and compare it with the effectiveness of conventional antibiotics. Green methods use natural reducing and stabilizing agents to synthesize nanoparticles, which makes them environmentally friendly. In this case, dried lavender leaf extract was used to synthesize and stabilize Lav-AgNPs. Given the increasing resistance to conventional antibiotics and the economic losses caused by mastitis, this alternative treatment method presents a promising approach to improving veterinary care.

Methods: The synthesized AgNPs were confirmed using different analytical methods, Fourier Transform Infrared Spectroscopy (FTIR), Transmission Electron Microscopy (TEM), and Scanning Electron Microscopy (SEM). A total of 480 dairy cows were included in the study, with samples collected using the California Mastitis Test (CMT) which is a rapid test to identify infected mammary quarters. Based on CMT results, samples with positive findings were cultured, and bacterial antibiotic susceptibility was determined. The antimicrobial activity of Lav-AgNPs was evaluated using the disk diffusion method, testing different concentrations (25, 50, 100, 150, and 200 ppm) on Petri dishes. After 24 hours of incubation, inhibition zones were measured to quantify antibacterial efficacy.

Results: The most frequently identified pathogens included non-aureus staphylococci (46.7 %), *Staphylococcus aureus* (19.1 %), and *Streptococcus uberis* (10.7 %). Antibiotic susceptibility testing demonstrated a high resistance of Staphylococcus spp. and Streptococcus uberis to β-lactams and aminoglycosides, particularly penicillin and gentamicin. Of the 480 cows examined, 402 (83.8 %) had negative tests for CMT, while 78 (16.2 %) showed positive results, indicating 5.6 % of affected mammary quarters. Bacterial pathogens were confirmed in 94 quarters (4.9 %).

Using the biological approach uniform spherical Lav-AgNPs with a mean diameter of 20 nm were successfully synthesized. When Lav-AgNPs at 200 ppm were applied, inhibition zones were recorded as follows: 13±0.73 mm for S. aureus, 16±1.15 mm for *Staphylococcus chromogenes,* 14±0.52 mm for *Staphylococcus haemolyticus*, and 14±0.56 mm for *Streptococcus uberis.* Increasing the concentration of Lav-AgNPs correlated with larger inhibition zones,

confirming a direct relationship between nanoparticle concentration and antibacterial efficacy.

Conclusions: Silver nanoparticles synthesized using an extract from dried lavender leaves represent a promising alternative to traditional antibiotics for treating resistant mastitis pathogens. Their application could improve mastitis control in dairy cows and reduce dependence on conventional antimicrobial drugs, contributing to more sustainable and eco--friendly veterinary practices. The study confirmed that Lav-AgNPs exhibit significant antibacterial activity even against antibiotic-resistant bacteria. These findings support the potential of green synthesized AgNPs in veterinary medicine and open possibilities for implementing environmentally friendly approaches in mastitis treatment. The results proved, that more extensive clinical testing of AgNPs could significantly contribute to their implementation in standard veterinary practice, improving the effectiveness of mastitis treatment and the overall health of dairy cattle.

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New insights on congenital defects in dairy and beef cattle submitted to veterinary diagnostic laboratories.

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Objectives: A congenital defect is a structural or functional anomaly present at birth The objective of this study was to identify the most common lethal congenital defects diagnosed in cattle submitted to the six Irish Regional Veterinary Laboratories (RVLs) and to describe their associated epidemiology.

Methods: Data covering a five year period (2020-2024), from the RVLs and the national cattle breeding organisation (ICBF), were extracted and merged. If a congenital defect was recorded it indicated that this was the primary (majority of cases) or joint cause of death. Epidemiological information about the calf, dam and sire [breed, sex, age-at-death, and breeding method (AI, natural service)] was extracted from the ICBF database. In total, 197 cattle with congenital defects were recorded of which 180 had associated data in the ICBF database.

Results: The majority of cattle diagnosed with a congenital defect were beef (75 %) which is surprising given that there are almost twice as many dairy (1.6 m) as suckler cows (79 k) nationally; this may reflect animal value. The three most common sire and dam breeds were Charolais, Holstein-Friesian, Limousin and their crosses. A similar percentage of deformed cattle were derived from AI (53 %) and natural service (47 %) and the same percentage were male (50 %) and female. The majority (87 %) of affected cattle were born to pluriparae and the majority (84 %) had unassisted calvings. The majority (55 %) of deformed cattle died within 7 days of birth but one lived up to 1,374 days (over 3 years). The 3 most commonly affected body systems, the cardiovascular (60 %), gastrointestinal (21 %) and musculoskeletal (8 %), accounted for 89 % of all cattle. The majority (69 %) of cardiac defects were either ASDs or VSDs alone. The majority (98 %) of gastrointestinal defects were atresias and there was no predominant musculoskeletal defect. The three most common individual defects (ASD 22.3 %, atresia 20.3 % and VSD 19.3 %) accounted for 62 % of all deformed cattle. The epidemiological profiles of these three defects were similar for some variables but quite different for others. Thus for all three defects the majority of affected cattle were born from pluriparae at unassisted calvings. However, while the majority of atresia and VSD cattle were conceived by AI, the majority of ASD cattle were conceived by natural service. While the majority of ASD and atresia cattle were male, the majority of VSD cattle were female. The majority of ASD dams were sucklers but the majority of atresia dams were dairy; VSD were 50:50. The majority of both ASD and VSD sires were beef; atresia sires were 50:50 dairy:beef. The majority of ASD and atresia cattle died within 7 days of birth but the majority of VSD cattle died between 8 days and 180 days.

Conclusions: This study identified the hitherto undocumented common lethal congenital defects in cattle submitted to veterinary laboratories in Ireland as cardiovascular defects and of the associated information identified beef cattle as over-represented. These findings have implications for targeting of potential genetic testing for these lethal defects in this cohort of the national cattle population.

Can the number of sunshine hours and the amount of precipitation affect the occurrence of estrus in cattle in temperate climates?

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Objectives: It was observed that veterinary practitioners have more requests for artificial insemination of cattle after rain, i.e. during sunny days with certain variations during the year. This study aimed to determine whether sunshine hours and/or precipitation amount can affect the daily number of cattle in estrus.

Materials and Methods: During three consecutive years (2019-2021) in northwestern Croatia, a total of 21,043 cows and heifers (various breeds and crossbreds) were artificially inseminated (AI). Meteorological data (number of sunshine hours and amount of daily precipitation) were obtained from the Croatian Meteorological and Hydrological Service (CMHS), Zagreb, Croatia, measured at the nearest meteorological station located within a radius of 0.5 to 25 km from all farms in the study. Experienced inseminators performed AI after vaginal examination, transrectal uterine palpation and/or transrectal ultrasound control, with frozen-thawed semen, at the owner's request after external signs of estrus were detected according to established protocols. Statistical analysis was descriptive correlation analysis and analysis of variance (ANOVA) performed using Minitab® statistical software version 15 (2007).

Results: The average number of cows and heifers AI per day did not differ significantly between seasons ($p>0.05$), but significant differences were observed in the number of cows and heifers AI per day in relation to rainfall (1, 2, 3, 4 or more days after rainfall) and in relation to the amount of precipitation (dry, light rain, rain, heavy rain, extreme rain), as well as based on cloud cover-overcast (cloudy, partly cloudy, sunny, very sunny and extremely sunny days). For example, during rainy days (regardless of intensity), there were an average of 12.56 cattle for AI, while 2 days after the rain there were 21. 51. Likewise, during extreme rain there were only 7.44; during moderate rain 10.87, and light rain 15.18, while during dry weather there were an average 21.45 cows and heifers for AI.

Conclusions: In the temperate climate region of northwestern Croatia, there were significantly more breeding female cattle in natural estrus (determined by the daily number of artificial inseminations at the owner's request) during dry days after rain (with more hours of sunshine), regardless of the season, while there were significantly fewer during rainy or cloudy days.

Keywords: artificial insemination, cattle, cloud cover, hours of sunshine, rain precipitation.

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Occurrence of Central Nervous System (CNS) Diseases in Cattle, Small Ruminants, and South American Camelids: A Retrospective Study

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Introduction: Diseases affecting the central nervous system (CNS) in ruminants and South American camelids (SACs) are common and often showing various clinical symptoms. Advanced diagnostics like CT, MRI or histopathological analysis are crucial, but challenging due to economic and, in case of cattle, logistical constraints. This retrospective study evaluates the occurrence, diagnosis and outcomes of CNS diseases in cattle, sheep, goats, alpacas and llamas presented at the Clinical Centre for Ruminant and Camelid Medicine, Vienna, during the years 2012 to 2021.

Materials and Methods: Patient data were collected from the clinic's information system focusing on cases with neurological symptoms or confirmed CNS disease. Parameters such as age, breed, gender, seasonal occurrence, diagnosis and treatment outcomes were analysed. Diagnoses were categorized as degenerative, inflammatory, metabolic-toxic, traumatic or congenital disease or malformations and other. Statistical analyses were performed using IBM SPSS v28 with significance set at $p<0.05$.

Results: A total of 170 animals were identified: 69 cattle, 32 sheep, 34 goats, 28 alpacas and 7 llamas. The most common CNS diseases included listeriosis, tetanus, cerebrocortical necrosis and otitis-associated syndromes. Seasonal trends were observed with higher incidences in spring and winter.

Discussion and Conclusion: CNS diseases made up a relatively small proportion of illnesses in this study but showed species-specific and seasonal patterns. Advanced diagnostics and timely treatment remain crucial, particularly for diseases like listeriosis and CCN, which are treatable if they were diagnosed early. Improved management strategies including preventive measures and owner education could reduce CNS disease prevalence and improve animal welfare.

Severe chronic osteomyelitis of the os ileum in an alpaca- diagnostic and pathological findings

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Objectives: The objectives of this case report were to describe the diagnostic process and pathological findings in a case of severe chronic osteomyelitis of the iliac bone in a 5.5-year--old alpaca mare and to emphasize the importance of clinical as well as orthopedic examinations and advanced diagnostic imaging in detecting severe pathological changes with minimal clinical symptoms.

Materials and Methods: A 5.5-year-old alpaca mare was presented with intermittent lameness in the right hind limb. Clinical examination revealed a non-painful swelling near the right tuber coxae and mild mixed lameness. Diagnostic procedures included ultrasound, radiography, and computed tomography to evaluate bone and soft tissue structures. Postmortem pathological, histological, and microbiological analyses were performed.

Results: Imaging revealed a long-standing infected fracture of the right iliac bone with irregular calcified callus formation and associated osteomyelitis. Fusobacterium spp. was isolated from abscess material. Advanced bone destruction and reactive bone growth were confirmed postmortem, with extensive muscular atrophy and chronic purulent osteomyelitis. Given the poor prognosis, the animal was euthanized.

Conclusions: The presented case shows the importance of clinical as well as orthopaedic examinations, as the individual animal frequently only exhibits minimal clinical signs despite the presence of severe changes.

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Comparison of Four-Day and Eight-Day Treatments for Streptococcus uberis Mastitis in Dairy Cows Under Real Farm Conditions

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Objectives: The aim of this study was to evaluate the effectiveness of prolonged therapy for *Streptococcus uberis* mastitis and determine whether an eight-day treatment provides better outcomes than a four-day regimen. In the Czech Republic, a 5–7 day treatment is commonly used, but data on its efficacy under real farm conditions remain limited.

Materials and Methods: The study was conducted on a Holstein dairy farm (800 cows) with free-stall housing, where mattresses served as lying surfaces. Observations took place in June and July, a period of increased S. uberis mastitis incidence and reduced treatment success due to heat stress.

A total of 42 mastitis cases were included (21 treated for eight days, 21 for four days). Only cows with a positive S. uberis culture using the ClearMilk on-farm system were selected. Treatment consisted of intramammary suspension containing amoxicillin and clavulanic acid and an injectable long-acting amoxicillin (administered 4× every 48 hours in group A and 2× every 48 hours in group B). Control samples were collected two days after the last injection.

A case was considered cured if no *S. uberis* was cultured within four weeks post-treatment.

Recurrent mastitis cases were treated with three intramammary penicillin applications every 24 hours and a seven-day injectable therapy combining penicillin and streptomycin.

Results: In group A (8 days), 16 out of 21 cows (76.2 %) were cured, while in group B (4 days), 15 out of 21 cows (71.4 %) were cured. The difference was not statistically significant ($p>0.05$).

The cure rate for recurrent mastitis was lower: 20 % (1/5) in group A and 50 % (3/6) in group B.

Conclusions: The results indicate that prolonged eight-day treatment does not provide a significantly better therapeutic outcome compared to the four-day regimen. Shorter treatment may be a viable strategy to reduce antibiotic usage.

Author's program of prevention and health management of the dairy cattle herd

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Objectives: The aim of study was to evaluate the efficacy of own developed prophylaxis program among the dairy calves, heifers and high production cows.

Material and methods: The research was conducted on a dairy farm of about 1,400 cattle. 700 cows, 500-600 heifers and about 120 calves. The original program, implemented for over 5 years, is divided into cows, calves, heifers.

Cows during dry period are vaccinated with the MSD Bovilis® Rotavec® Corona vaccine Additionally, cows are vaccinated against Q fever every 9 months with the Coxevac Ceva vaccine, for IBR prophylaxis cattle are vaccinated every 6 months with the Bovilis IBR marker inac vaccine.

Calves: Vaccination of all newborn calves aged 7-14 days intranasally with a live vaccine against BRSV and PI3 -Bovilis Intranasal Rsp Live. Another vaccination between 21-28 days of age s.c., with a combined vaccine BRSV, PI-3 and the bacterial component Mannheim haemolytica - Msd Bovilis Bovipast Rsp. Second dose of vaccine after 4 weeks.

Calves during the transition from milk feeding (approx. 5 days of age) to a milk replacer receive metaphylactically, or in the case of infection therapeutically, the antibiotic Paromomycin directly into the milk or milk replacer. Calves aged 2-3 months, when changing rooms and grouping, receive s.c. Tulathromycin as metaphylaxis treatement.

Heifers: Heifers after age of 3 months are immunized i.m. against IBR with live vaccine Bovilis IBR Live. At the age of 9 months they are vaccinated s.c. against Q fever (Coxevac), and at 11 months against BVD (Mucosiffa). At 2-4 months age, 7 days after grouping, heifers receive Toltrazuril p. os. against coccidiosis At 11-12 months, heifers are dewormed with Ivermectin. Pregnant heifers during the 7-8 month of pregnancy are dewormed with Ivermectin.

Results: The introduced prophylaxis program significantly contributed to increasing the natural immunity in the herd, which resulted in reduction of the percentage calf deaths in rearing up to 3 months of age to 7 %. The mortality rate of calves from birth to 6 months can range from 5 to 30 % depending on the herd size (Hordofa et al. 2021). The frequency of umbilical inflammation was at 0.5 % and was lower by approx. 1.5 % than shown in literature. The neonatal diarrhea during 5-14 days after birth was 15 % and was approx. 49 % lower than in the literature. The incidence of BRD 14–30 days after birth was approx. 2 % and was 13 % lower than in currently literature (Hordofa et akl. 2021).

The first insemination of heifers occurred at 12-13 months of age in over 98.5 % of animals. The implemented program has impact on significant reduction in the occurrence of health disorders in high-production dairy cows. The percentage of lameness was about 10 %, the frequency of mastitis- 5 %, metritis 1 %, and ketosis-0.2 % of animals. Left-sided displacement of abomasum (LDA) occurred in about 0.1 % cows.

Conclusions: The prophylactic program implemented for over 5 years in dairy herd has significantly increase natural immunity in all groups of animals. The effect was observed in reduction of disease incidence and % of calf deaths.

Effect of Dietary Plant Tannins on Rumen Fermentation and Protozoa Genera Abundance in Cattle

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Objectives: Evaluate the effects of dietary supplementation with chestnut, quebracho, and seaweed tannins on rumen fermentation parameters and protozoan populations in Simmental cows and investigates how tannin supplementation influences the distribution and abundance of rumen protozoan populations and its potential role in modulating the rumen microbial community.

Methods: Four Simmental cows fitted with ruminal cannulas were used in a 4 × 4 Latin square design. Cows were fed a total mixed ration with increasing tannin levels (0, 150, 200, 250 g/cow/day). Rumen fluid samples were analysed to pH, volatile fatty acids (VFA), nitrogenous compounds, ammonia and protozoa. Statistical analysis was performed using ANOVA, and Pearson's correlation coefficient was used to examine associations between fermentation parameters and protozoan communities.

Results: Tannin supplementation significantly impacted rumen fermentation and protozoan populations ($P < 0.05$). The 150TAN group showed higher total VFA. However, propionate levels decreased in the 200TAN and 250TAN groups. Nitrogen compounds were elevated in the 150TAN group ($P < 0.001$), but ammonia concentrations remained unaffected. Tannins reduced protozoan populations, especially Entodiniomorphids, while increasing Holotrichs were increased ($P < 0.001$). Pearson's correlation analysis revealed significant positive correlations between various protozoan genera, including Isotricha spp. and Diplodinium spp. ($r = 0.81$; $P = 0.02$), Isotricha spp. and Epidinium spp. ($r = 0.82$; $P = 0.02$), and between Dasytricha spp. and Ophryoscolex spp. ($r = 0.83$; $P = 0.001$). Conversely, negative correlations were observed between Ophryoscolex, Ostracodinium, and Diplodinium ($r = −0.89$ and $r = −0.93$; $P < 0.001$), as well as between Isotricha spp. and Charonina spp. ($r = −0.95$; $P < 0.001$).

Conclusion: Dietary supplementation with plant tannins significantly modulated rumen fermentation and protozoan populations, contributing to reduced methane production, although optimal dosage for methane reduction and productivity remains to be determined.

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Evaluating Automated Body Condition Scoring as a Predictor of Health and Reproductive Success in Dairy Cows

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Objectives: The study aims to investigate the associations between automatically recorded Body Condition Score (BCS) and key metrics related to production, health, and reproduction, including milk yield, BHB levels, LDH, and progesterone.

Methods: The research was conducted on a dairy farm in Lithuania, where cows were housed in a loose environment and fed a total mixed ration (TMR) tailored to their physiological needs. The diet consisted of corn silage, grass silage, grass hay, grain concentrate, and a mineral mixture, specifically formulated for a 550 kg Holstein cow producing 35 kg of milk daily. The study involved 597 cows, categorized into primiparous and multiparous groups. Key metrics such as β-hydroxybutyrate (BHB), lactate dehydrogenase (LDH), progesterone (mP4), and milk yield (MY) were collected using the Herd Navigator system during milking, while health status was assessed by categorizing cows into four groups: healthy, subclinical ketosis, subclinical mastitis, and metritis.

Results: The results indicated clear relationships between BCS, milk biomarkers, and productivity. A substantial 67.3 % of cows produced less than 31 kg of milk daily, with 80.7 % showing BHB levels below 0.06 mmol/L. LDH activity was below 27 μmol/min in 69.5 % of the cows, while milk progesterone levels were under 15.5 ng/mL in 28.8 % of cows. BCS was categorized as follows: 2.5–3.0 (21.4 %), >3.0–3.5 (50.8 %), and >3.5–4.0 (27.8 %).Pregnant cows had higher BCS (+0.29) and mP4 levels compared to non-pregnant cows, who had lower milk yields (–5.26 kg/day). Cows with a BCS greater than 3.5–4.0 required 42.41 % more inseminations compared to those with a BCS of 2.5–3. 0. The group with the lowest BCS produced 29.55 % more milk than the group with the highest BCS, while mastitis was linked to a 4.96 % increase in BCS when compared to healthy cows.

Conclusions: We discovered that a higher BCS is linked to increased pregnancy success, as pregnant cows demonstrated a BCS increase of 0.29 points, with mP4 levels being 10.93 ng/mL higher than those in non-pregnant cows during insemination. Cows with a BCS higher than 3.5–4.0 required 42.41 % more inseminations compared to those with a BCS of 2.5–3. 0. Furthermore, cows with subclinical mastitis exhibited a BCS that was 4.96 % higher than that of healthy cows. Significant differences in BCS (9.04 %) were also noted between the mastitis and metritis groups.

Metabolic changes during the periparturient period in healthy dairy cows and cows with puerperal metritis

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Objectives: To determine the changes in rectal temperature, vaginal pH, haptoglobin and several metabolic parameters during the periparturient period in healthy dairy cows and cows showing symptoms of puerperal metritis.

Methods: 3 hungarian large-scale dairy cattle farms were involved in this study. 19 different parameters were measured 7-14 days before and after parturition. 35 cows were included pre-calving and 48 cows post-calving. Examinations included physical examination, vaginal pH measurement and blood sampling. Fresh cows were divided into groups based on their metritis score on a scale of 0 to 3.

Results: In the pre-calving group, rectal temperature (38,74±0,28 °C) was significantly (p=0,0015) lower than in the post-calving group (39,1±0,67 °C). Vaginal pH did not differ significantly, it was on average 7,12±0,21 before and 7,22±0,26 after calving. During the first two weeks of lactation, the level of the following metabolic parameters decrease significantly: calcium (from 2,53±0,21 to 2,31±0,21 mmol/l, p<0,01), magnesium (from 0,97±0,13 to 0,87±0,12 mmol/l, p<0,01), zinc (from 12,45±2,31 to 10,14±2,02 µmol/l, p<0,01), phosphorus (from 2,27±0,35 to 2,03±0,44 mmol/l, p<0,01) and potassium (from 4,8±0,68 to 4,26±0,38 mmol/l, p<0,01). During the first two weeks of lactation, the level of the following metabolic parameters increase significantly: beta-hydroxybutyrate (from 0,53±0,66 to 0,83±0,47 mmol/l, p=0,0267), copper (from 12,92±2,79 to 15,27±1,93 µmol/l, p<0,01), non-esterified fatty acid (NEFA) (from 0,4±0,44 to 0,87±0,63 mmol/l, p<0,01) and aspartate aminotransferase (from 47,32±10,07 to 68,54±31,23 U/l, p<0,01). The levels of urea (4,41±1,01 mmol/l pre-calving and 4,42±1,29 mmol/l post-calving), albumin (39,65±5,81 g/l pre-calving and 40,65±2,92 post--calving), total protein (83,17±8,95 g/l pre-calving and 84,68±7,66 g/l post-calving) and sodium (138,54±9,78 mmol/l pre-calving and 135,58±7,77 mmol/l post-calving) did not differ significantly. Inflammatory marker haptoglobin's level was significantly (p<0,01) higher in fresh cows (2,67±0,97 g/l pre-calving and 3,77±1,82 g/l post-calving). Between healthy cows and cows with puerperal metritis, only 2 of the measured parameters differed significantly: NEFA was lower in metritis 0 compared to metritis 1-3 (0,56±0,43 mmol/l in healthy versus 1,13±0,67 mmol/l in sick, p<0,01) and zinc was higher in metritis 0 compared to metritis 1-3 (10,87±2,08 µmol/l in healthy versus 9,53±1,79 µmol/l in sick, p=0,0217).

Conclusions: Several metabolic parameters change significantly around calving, regardless of whether the cow is about to develop puerperal metritis or not. Only two parameters differed significantly between healthy cows and cows with metritis: NEFA and zinc. Further investigations are required to determine if certain blood parameters could be used to predict potential metritis cases.

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The effects of a probiotic intravaginal treatment on the occurrence of uterine diseases in dairy cows – preliminary results

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Objectives: The objective of this study was to test the effect of an intravaginal probiotic product on the health of dairy cows in the postparturient period. The product is intended to prevent postparturient uterine diseases by ensuring healthy vaginal microflora.

Methods: In total, 162 cows were allocated to experimental (n=72; lact. no.: 2.2±1.1) and control (n=90; lact. no.: 2.3±1.1) groups during their dry period on a Hungarian large-scale dairy farm. The experimental cows were treated with a probiotic preparation containing *Brevibacillus* and *Lactobacillus* strains in a carboxymethylcellulose-based carrier applied to the vagina approximately 20 days before the expected calving. The treatment was repeated 3 and 7 days postpartum (pp), while the control cows were untreated. The following data were collected from both groups after calving. Retained placenta (yes or no), quality of vaginal discharge at days 3, 7, 14, and 21 pp (score 0 = clear or translucent mucus; score 1 = mucus containing flecks of white or off-white pus; score 2 = discharge containing ≤ 50 % white or off--white mucopurulent material; and score 3 = discharge containing ≥ 50 % purulent material, usually white or yellow, but occasionally sanguineous), rectal temperature (days 3 and 7 pp), blood BHB level (day 7 pp), number of days until the first AI and until pregnancy, number of services/pregnancy, ratio of pregnancy. The cows were kept in straw-bedded barns before and after calving. A total mixed ratio was offered twice daily; drinking water was available ad libitum. The study was conducted from November to March to avoid heat stress. The two groups during the study were identical regarding housing and feeding conditions, regular veterinary checkups, necessary treatment, and oestrus synchronization protocols.

Results: Retained placenta occurred in 9,7 % of experimental and 12,4 % of control animals (p>0,05). Based on the quality of vaginal discharge, the distribution of cows in each category (VD0-3) did not differ significantly between experimental and control group. There was no significant difference between experimental and control group regarding the average severity of disease – however, on days 3 (p=0,05) and 21 (p=0,103) the difference was almost significant in favour of the experimental group. There was no statistical difference in the rectal temperature between experimental and control cows on day 3 (38,8±0,3 versus 38,9±0,4) however on day 7 experimental group showed significantly lower rectal temperature (38,9±0,4 versus 39,1±0,5, p=0,047). BHB level did not differ (1,0±0,5 in experimental versus 1,0±0,4 in control) and the proportion of ketosis (BHB≥1,1) was not significantly different. 94,4 % of experimental cows received AI and 75,0 % of those animals became pregnant, while 88,9 % of control animals received AI and 70,0 % of those animals became pregnant (p>0,05). Average number of days until the first AI was 66,9±4,7 in experimental and 66,6±3,7 in control group (p>0,05). Average number of days until pregnancy was 112,8±60,7 in experimental and 104,9±59,2 in control group (p>0,05). Number of services/pregnancy was 2,8±2,0 in experimental and 3,0±2,2 in control group (p>0,05).

Conclusions: Treatment with an intravaginal probiotic product showed promising results regarding reducing the severity of vaginal discharge on days 3 and 21 post-calving. A larger number of participating cows is required to further investigate this effect. After treatment, rectal temperature was significantly lower on day 7 postpartum compared to non-treatment group.

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Short-term reduction in feed intake by dairy cows in the postpartum period leads to subclinical ketosis development

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Objectives: Subclinical ketosis is widespread in highly productive dairy cows after calving and often remains undiagnosed, leading to reduced productivity. Physiologically controlled feeding in the first weeks after calving and during the intensive lactation period can reduce the incidence of ketosis. The study aimed to determine how a short-term reduction of feed after calving affects the formation of ketone bodies in blood, urine and milk of dairy cows.

Methods: The group of ten Ukrainian black-spotted dairy breed cows after calving aged from 4 to 6 years was involved in the experiment lasted for 72 h. In 24 h the amount of compound feed, haylage, and silage received by cows was gradually reduced until complete exclusion in the diet. Blood, urine, and milk samples were collected three times a day. The content of ketone bodies, β-hydroxybutyrate and glucose was estimated with the corresponding sets of indicator strips. The content of total bilirubin, cholesterol, albumin and enzymes activity in the blood serum were determined on biochemical analyzer.

Results: It was found that in 24 h after the beginning of feed reduction the level of blood glucose decreased, persistent hypoglycemia within 48 and 72 h was developed, the concentration of β-hydroxybutyrate in blood and milk and of ketone bodies in urine was elevated. The increase in total bilirubin concentration and liver enzymes activity in the blood serum with a simultaneous decrease in albumin level and delayed sodium propionate conversion into glucose were observed.

Conclusions: Short-term reduction in feed intake by dairy cows after calving causes ketosis development and violation of liver functions.

Treatment of cows with liver pathology using a liposomal drug based on extract from the fruits of Silybum marianum

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Objectives: After labor, dairy cows are often diagnosed with fatty liver disease. The objective of our study was to identify the efficacy of a liposomal drug based on extract from seeds of *Silybum marianum(L.) Gaertn.,* including tocopheryl acetate, lecithine, squalene, and Twin-80, which was intramuscularly administered to dairy cows to recover the functional state and structure of the liver from the disorder.

Methods: The experiment involved clinically healthy cows (15) and cows suffering disorders in the main functions and the structure of the liver (15). The liposomal drug based on *S. marianum,* with addition of alphatocopherol acetate, squalene lecithin, and Tween-80 intramuscularly injected in the cows with fatty liver disease three times each two days for six days in the doses of 25 and 30 mL per animal.

Results: Three-time administration of the liposomal drug, with two days interval between each dose, improved the functional condition and the structure of the damaged liver. Biochemical assays of blood of the cows after treatment revealed improvement of the bile--forming and bile-removing functions of the liver, and also removal of cholestasis, as evidenced by decreased concentrations of uric acids, total and conjugated bilirubin, and lower activity of gamma-glutamyl transpeptidase in serum. Intramuscular injections of the drug in the sick animals reduced the activities of the hepatospecific mitochondrial enzyme glutamate dehydrogenase in the blood serum, and also the indicatory enzymes aspartate aminotransferase and alanine aminotransferase, indicating recovery of the structure of hepatocytes and cessation of cytolysis. After treatment, the sick cows were observed to have upward tendencies in albumin and glucose, which may be interpreted as recovery of the protein-synthesizing and carbohydrate functions of the liver.

Conclusions: The liposomal drug based on *S. marianum*, with addition of alpha-tocopherol acetate, squalene lecithin, and Tween-80 intramuscularly injected in the cows with fatty liver disease three times each two days for six days in the doses of 25 mL and 30 mL per animal normalized the functions and structure of the liver, which manifested in decrease in the concentrations of bilirubin, bile acid, and also the activities of GLDH, AST, ALT, and GGT in blood serum. However, complete restoration of hepatocyte function and structure in sick cows did not occur, so further studies with longer and more complex therapeutic approaches are necessary.

Antibiotic resistance of staphylococci isolated from mastitic cows under the conditions of Slovak and Czech dairy farms

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Objectives: The aim of our study was to determine the prevalence of the most common mastitis pathogens in dairy cows and their antibiotic resistance under the conditions of Slovak and Czech dairy farms.

Methods: A total of 960 dairy cows from four farms in eastern Slovakia and Czechia were examined through clinical assessment, including sensory evaluation and palpation of the udder. Milk from the fore-stripping of each udder quarter underwent sensory analysis and was evaluated using the California Mastitis Test (CMT). For laboratory diagnostics of bacterial pathogens and their virulence factors, composite raw milk samples were collected from cows with a CMT score of 1 to 3.

Results: The most frequently isolated mastitis-causing pathogens in dairy cows were staphylococci (59.1 %), streptococci (17.8 %), *E. coli* (11.9 %), and enterococci (11.2 %). In addition to major udder pathogens such as *S. aureus, S. uberis*, and *S. agalactiae,* coagulase--negative staphylococci (CNS) were identified as a significant concern for dairy animals. The majority of virulence factors, including hemolysin production, gelatinase activity, biofilm formation, DNA hydrolysis, and antibiotic resistance, were found in *S. chromogenes, S. warneri, and S. xylosus,* which were isolated from animals with clinical and chronic mastitis. Antimicrobial susceptibility testing using the disk diffusion method revealed that 77.0 % of *S. aureus* and CNS strains from mastitic milk samples were resistant to one or more antimicrobial classes. Based on phenotypic resistance profiles to β-lactam antibiotics, the methicillin-resistant mecA gene was detected in two isolates of *S. aureus* (2.9 %) and two isolates of CNS (*S. chromogenes* and *S. warneri*).

Conclusions: Our findings confirm that S. aureus remains one of the dominant staphylococcal species responsible for clinical and persistent mastitis, exhibiting a high level of pathogenicity. However, some CNS species may display a comparable aggressive potential due to their virulence factors.

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