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Conference proceedings

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Keynote speakers biographies

Prof. Dr. Michał Czopowicz, Dipl. ECSRHM

Warsaw University of Life Sciences

Biography: Michał Czopowicz is a professor of the Faculty of Veterinary Medicine, Warsaw University of Life Sciences-SGGW, from which he graduated in 2007. He has been a practicing veterinarian for 14 years. His scientific interests focus on various aspects of biostatistical and epidemiological analysis of medical data. He also carries out studies regarding infectious diseases of small ruminants, focusing mostly on epidemiology and diagnostics of lentiviral infections. Since 2014, he has been a diplomate of the European College of Small Ruminant Health Management.

Assoc. Prof. Dr. Constantin Cerbu, Dipl. ECVPH (PM)

University of Agricultural Sciences and Veterinary Medicine Cluj-Napoca

Biography: Dr. Constantin Cerbu is an Associate Professor in the Department of Infectious Diseases at the Faculty of Veterinary Medicine, Cluj-Napoca, where he also serves as Vice Dean for Postgraduate Studies and One Health Management. A graduate of the same faculty, he is a diplomate of the European College of Veterinary Public Health (Population Medicine). He has received training and performed research at institutions in the US, UK, and several European universities. His main interests lie in infectious diseases and veterinary public health.

Prof. Dr. Neil Sargison, Dipl. ECSRHM

University of Edinburgh

Biography: Neil Sargison is Professor of Farm Animal Practice at the University of Edinburgh, Royal (Dick) School of Veterinary Studies. He graduated from the Cambridge University Veterinary School in 1984. His interests encompass veterinary parasitology, small ruminant production and veterinary education for international development; reflecting the importance of these topics in global food production, animal welfare and public health. He has worked in Scotland and New Zealand; and collaborates with researchers around the world. He is a former president of the European College of Small Ruminant Health Management and of the Sheep Veterinary Society.

Prof. Dr. Delia Lacasta, Dipl. ECSRHM

University of Zaragoza

Biography: Delia Lacasta is a veterinarian specialised in small ruminants. She began her career in sheep production and spent over 13 years providing veterinary care to more than 20,000 sheep in southern Huesca, Spain. She earned her PhD (Cum Laude) in 2006 on respiratory diseases in lambs. Since 2010, she has been a lecturer at the Veterinary School of Zaragoza, where she leads the Ruminant Clinical Service (SCRUM). She became a Diplomate of the ECSRHM in 2011 and currently serves as its Past President. Her main research focuses on respiratory disorders and ovine anaplasmosis.

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Table of contents

Oral presentations

Poster presentations

ORAL PRESENTATIONS

SESSION 1 – Chair: Jarosław Kaba, Dipl. ECSRHM

Keynote speaker #1

Diagnosis of SRLV infection – can it be both rapid and accurate?

Michał CZOPOWICZ[1], Saulius Petkevičius[2], Laszlo Ózsvári[3], Giuseppe Bertoni[4], Carlos E. Abril[4], Snorre Stuen[5], Agata Moroz-Fik[1], Kinga Biernacka[1], Patricia Klibavičė[2], Krisztina Bárdos[3], Marcin Mickiewicz[1], Zofia Nowek[1], Iwona Markowska-Daniel[1], Emilia Bagnicka[6], Jarosław Kaba[1]*

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Small ruminant lentivirus (SRLV) is a retrovirus responsible for two important diseases of small ruminants – maedi-visna disease (MVD) in sheep and caprine arthritis-encephalitis (CAE) in goats. Diagnosis of these two diseases is based on detection of SRLV infection, rather than on revealing any clinical signs typical of these diseases. This results from the fact that clinical form of the diseases develops only in a part of SRLV-infected animals and almost always long after the infection and clinical presentation is not pathognomonic of the disease. Hence, clinical methods have both low diagnostic sensitivity and specificity.

Therefore, the mainstay of *ante mortem* diagnostics of MVD and CAE are laboratory tests aimed at detection of antibodies to SRLV or detection of genetic material of SRLV in animal's organism. Both approaches have advantages and disadvantages.

Serological diagnostics, based mostly on immunoenzymatic assays, is highly specific since cross-reactions of antibodies to other pathogens with antigens used in ELISAs are rare. An important problem can be, however, detection of maternal antibodies in young animals that have consumed colostrum from infected dams. Consumption of such colostrum does not necessarily result in infection so the false positive rate among lambs and kids aged below 6-12 months may be relatively high. Diagnostic sensitivity of serological tests is usually lower mostly due to delayed seroconversion (sometimes even by several months) of infected animals and to some extent also because of antigenic diversity of SRLV.

Molecular diagnostics, based mostly on various types of in-house PCRs, is even more specific than serology, however its diagnostic sensitivity is substantially lower. Contrary to serology, a decreased diagnostic sensitivity of molecular tests is not associated with the time that has elapsed from infection. It mainly results from a high genetic diversity of SRLV (myriad of genetic subtypes) and low availability of SRLV's genetic material in the blood of infected animals (no free viremia and provirus harbored only by monocytes).

Another problematic issue of field diagnostics of MVD and CAE is the time and costs it takes. Only serological test are available commercially in laboratories, whereas PCRs are usually performed for scientific purposes. Testing requires biological specimen collection (if blood, a veterinarian must be involved in most of countries), sending to laboratory, and a few days of awaiting the result. Given that status of animals is crucial mostly when animals are moved between herds, such a long time and high costs discourage farmers from routine testing. A solution could be a rapid (point-of-care) diagnostic test, similar to those available so far for many companion and farm animal diseases. In recent years, an international consortium of scientists from Poland, Norway, Switzerland, Hungary, and Lithuania has made an attempt to develop such a test for the SRLV infection. The CAE-RAPID project, financed by the ICRAD (Horizon 2020) together with national funding agencies, has led to the emergence of rapid immunochromatographic serological test that can be performed using a drop of blood, serum or milk and yields a result within 20-40 min. Despite being very specific (diagnostic specificity nearly 100%), diagnostic sensitivity ranges from approximately 70% to 85%, depending on biological material used (higher for milk!) and time of reading the result. Interestingly, longer waiting seems to increase sensitivity without losing specificity. However, how long can we wait without turning a rapid test into a slow one – remains a question yet to be answered.

Key words: caprine arthritis-encephalitis, ELISA, immunochromatographic test, maedi-visna disease, PCR

OP #1

Diagnostic performances of three commercial immunoenzymatic assays for small ruminant lentivirus infection in goats and sheep performed on serum samples

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Introduction: Caprine arthritis-encephalitis (CAE) and VISAN-MAEDI caused by small ruminant lentivirus (SRLV) infection are of the most widespread and devastating diseases of goats and sheep. Serological methods, mainly immunoenzymatic assays (ELISA), are the mainstay of SRLVs diagnostics. Several different types of ELISAs for SRLVs are available on the market with different performance.

Materials & Methods: In this study, we tested 736 serum samples, 309 from goats and 427 from sheep, from central Italy, Umbria and Marche region (n=283); from south of Italy (Puglia and Basilicata regions (n=430) and form North Italy, Piemonte region (n=13). All serum samples were tested with three commercially available ELISA Kits: ID-Screen MVV/CAEV Indirect Screening test (ID-Screen), VMRD small Ruminant lentivirus antibody test kit, cELISA (VMRD), INgezim MAEDI Screening (Gold Standard Diagnostics) (INgezim). Statistical analysis was applied on 2,208 records. For the evaluation of the agreement of data from different kits, doubtful results were considered positive, and the Cohen's Kappa (κ) agreement index was calculated. The corresponding 95% confidence intervals (CI 95%) and p-values were calculated, considering $\kappa=0$ as the null hypothesis and considering p-values less than or equal to 0.05 as significant. In addition, the Composite Reference Standard (CRS) This method is particularly useful in absence of a gold standard as the case of serological tests for SRLVs.

Results: The results obtained from the different tests were combined to categorize each subject as positive or negative for the target condition based on three criteria: Criterion 1: A sample is positive if at least one of the three tests is positive, otherwise negative. Criterion 2: A sample is positive if at least two of the three tests are positive, otherwise negative. Criterion 3: A sample is positive if all the tests are positive, otherwise negative. For each criterion and test, the following diagnostic performance measures were calculated: sensitivity, specificity, positive predictive value (PPV), negative predictive value (NPV), and accuracy, comparing the test results with the CRS. The agreement between: ID-Screen and INgezim kits was moderate; between ID-Screen and VMRD kits was good, between INgezim and VMRD kits was moderate. The same levels of agreement were observed when analysing data only from sheep. According to the CRS the higher values of sensitivity (Se) and specificity (Sp) were observed using the second criterion when using the ID-Screen and VMRD kits. Similar, but slightly better results were obtained for the ovine sera when using the same two kits.

Conclusion: Overall, our data showed that the combination of two ELISA tests for serological diagnosis increases both sensitivity and specificity, and in particular, the parallel use (and/and) of the ID-Screen and VMRD kits or the use of ID-Screen for screening and VMRD for confirmation proved to be a robust approach with the applied analysis methods.

Key words: ELSIA, SRLVs.

OP#2

Genetic diversity of Italian SRLVs between 2019 and 2024

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Introduction: Retroviridae family includes Small Ruminant Lentiviruses (SRLVs), which infect sheep and goats, and are distinguished into five genotypes that dictate their considerable genomic heterogeneity. The SRLVs infection is not species-specific and cause different clinical syndromes. SRLVs are spread worldwide, with A and B genotypes detected in all continents. The epidemiology of SRLVs is complex and not fully elucidated, therefore genetic characterisation remains a useful tool for understanding the intricacy of this infection. A previous study investigating the SRLVs genetic landscape in Italy between 1998 and 2019 showed a high genetic variability at national and regional levels and putative novel sub-genotypes.
Aim: The aim of the current study was to update information available regarding the genetic diversity of Italian SRLVs. Positive SRLV samples collected by passive surveillance between 2019 and 2024 from 16/20 Italian regions were genetically characterized, targeting the gag-pol gene.
Materials & methods: During the study period 272 ovi-caprine farms were tested (2019 to 2024), for a total of 474 sampling events.
Results: Four hundred and eighty nine samples were tested, and 90/148 positive samples were successfully sequenced in the gag-pol region. Thirty SRLV were characterized as genotype A and 60 as genotype B. The majority of positive sample was detected in 2019. In the most surveyed regions, the proportion of samples belonging to genotypes A and B was balanced, except in one region, where 15/18 SRLVs belonged to B genotype. The majority of A genotype strains characterized in this study in the A group clustered, with Italian SRLVs collected in previous years. The only exception was one strain SRLV/IT/459/ER/2023 (classified as A2/A3), clustering with Spanish SRLVs. The topology of the phylogenetic tree showed inconsistencies with previous classifications of the A sub-genotypes. In particular, the A24 strain appears to be the progenitor of the A9 and A19 strains, while strains from A3, A9, A19, and A20 form monophyletic groups. Regarding the B genotype, all three sub-genotypes were detected in Italy, showing a less genetic

diversity compared to the A genotype. According to the phylogenetic tree topology, B2 and B3 strains appear well distinguished, while B1 can be potentially classified as a B2 subgroup.
Conclusion: Our findings confirmed the broad genetic heterogeneity of SRLVs throughout Italy, highlighting the necessity to revise the SRLVs current genetic classification. Sequencing of the full gag gene and genome appears pivotal, to properly define the genetic differences between the existing subgenotypes.

Keywords: gag-pol, molecular characterization, phylogeny, SRLVs.

OP#3

Small ruminant lentivirus in Latvian goat population – preliminary results

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Introduction: Caprine arthritis-encephalitis (CAE), an infectious disease caused by the small ruminant lentivirus (SRLV), is widespread in goat populations of many European countries, including Poland and Lithuania. However, information regarding the occurrence of CAE in the goat population of Latvia is lacking.

Aims: To detect SRLV infection in the goat population of Latvia and to identify SRLV genotypes.

Materials and Methods: Blood samples were collected from a total of 359 goats in 15 goat herds located in different regions of Latvia. The herds counted from 2 to 200 goats (median of 19 goats) and from 2 to 61 goats were tested in each herd (median of 15 goats). Serum samples were tested using an indirect ELISA (ID Screen MVV-CAEV Indirect Screening test, ID.vet Innovative Diagnostics, Grabels, France). Buffy coats from seropositive goats (all, if <10 seropositive goats in the herd, otherwise – 10 goats) were tested using the nested real-time PCR (nRT-PCR) capable of distinguishing between A and B genotype of SRLV.

Results: Seropositive goats were found in 5/15 herds (herd-level seroprevalence of 33%; CI 95%: 15%, 53%). All were relatively large counting from 30 to 200 goats. In two herds, virtually all tested goats tested positive (54/61 and 47/47) which corresponded to the within-herd seroprevalence of 89% (CI 95%: 78%, 94%) and 100% (CI 95%: 92%, 100%), respectively. In each of these herds, 9/10 seropositive goats tested positive in the nRT-PCR – only to genotype B in one herd and to both genotypes in the another herd. In the remaining three herds, only 1 (in 2 herds) or 2 goats tested positive in the ELISA and only one of these goats was confirmed to be positive in the nRT-PCR (genotype A). Finally, using both diagnostic tests SRLV infection was detected in 3/15 goat herds (herd-level prevalence of 20%; CI 95%: 7%, 45%) – infection with genotype A in 1 herd, with genotype B in 1 herd, and mixed infection in 1 herd.

Conclusion: SRLV infection with both A and B genotypes is present in the Latvian goat population.

Keywords: CAE, caprine arthritis-encephalitis, genotypes, serology, SRLV

OP#4

Lentivirus Infection in Small Ruminants: A Comparison of Semi-Extensive and Extensive Production Systems

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Introduction: Small ruminant lentiviruses (SRLV) are a group of viruses that infect sheep and goats, leading to progressive and persistent infections that can cause significant economic losses on farms, especially in intensive production systems.
Aims: A study was conducted to assess the seroprevalence of SRLV in randomly selected small ruminant farms in the North region (semi-extensive production system) and the South region (extensive production system) of Portugal.
Materials & Methods: The study involved 50 farms and a total of 890 animals from both regions. Blood samples were analysed to determine the SRLV infection status of the animals. An epidemiological survey was also conducted on each farm.
Results: In the North region, the seroprevalence among animals was 46.94%, with a herd seroprevalence of 80.77%. In contrast, the South region exhibited a seroprevalence of 25.46% in animals and 41.67% in herds.
Conclusion: SRLV has been confirmed in both regions of Portugal, revealing a significant disparity likely due to different management practices. Identifying risk factors for infection transmission in each production system is essential for effective disease control programs.
Keywords: Lentivirus; production systems; Small ruminant.
Acknowledgements: This work was funded by 0687_OVISPID_2_E Interreg España-Portugal (EU) Poctep, UIDP/00772/2020 and LA/P/0059/2020, funded by the Portuguese Foundation for Science and Technology (FCT).

SESSION 2 – Chair: Karim Adjou, Dipl. ECSRHM

OP#5

Neonatal lambs with *Clostridium perfringens* sepsis and pericarditis

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Introduction: *Clostridium perfringens* is an important cause of disease in sheep and yearly vaccination towards clostridial diseases is important for prophylaxis. In Norway, the most common clostridial vaccine Ovivac P (MSD Animal Health) contains several clostridial toxoids including from *C. perfringens* D, but not *C. perfringens* A.

Materials & methods: Over a two-year period, we have received nine neonatal lambs from the same flock with similar and unusual findings. The dams were vaccinated with Ovivac P, and all lambs had received an iron supplement injection in the inguinal region shortly after birth. The lambs were necropsied and bacteriological cultivation from brain, lungs, heart, liver, spleen and kidneys was performed on 5% sheep blood agar plates incubated at 37 °C in 5% CO_2, and for seven of the lambs also in anaerobic atmosphere. Material from several organs were prepared for histopathological evaluation (HE and Gram-stain).

Results: *C. perfringens* was obtained in pure culture from several organs from six of seven lambs where anaerobic cultivation was performed. Six of the lambs were icteric and eight of nine lambs had a severe fibrinous pericarditis. All lambs had macroscopical changes indicating sepsis. Histopathological examination showed necroses and acute inflammation associated to large, gram-positive, clostridial-like rods in myocardium, liver and thigh musculature.

Conclusion: The farmer experienced a higher-than-normal death rate of neonatal lambs appearing normal at birth in two following seasons. This followed an introduction of a subcutaneous iron supplementation since the farmer formerly had many lambs dying because of abomasitis and bloat (1). The described pathological and bacteriological findings to some extent resembles the description of yellow lamb disease, most likely caused by alpha toxin producing *C. perfringens* A (2). We suspect a correlation between the iron injection and proliferation of *C. perfringens* A, not covered in the vaccine that was given to the dams.

Key words: *Clostridium perfringens*, neonatal lambs, pericarditis, sepsis

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OP#6

Differences in the cellular self-defense of ovine and bovine macrophages upon *Coxiella burnetii* infection

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Introduction: *Coxiella burnetii* is an obligate intracellular bacterium with significant implications for both ruminant and human health. Its primary target cells are macrophages, which employ various cellular self-defense mechanisms to eliminate the pathogen.
Aims: To investigate the response of primary bovine and ovine macrophages to *C. burnetii* infection, with the goal of identifying protective mechanisms that could contribute to the development of new control strategies.
Materials & Methods: Primary bovine and ovine macrophages were infected with *C. burnetii* Phase II. The expression of surface receptors, including CD40, CD80, CD86, MHC-I, and MHC-II, was analyzed using flow cytometry. The role of inducible nitric oxide synthase (iNOS) in MHC-II induction was evaluated by measuring NOS2 expression and assessing the effect of the iNOS inhibitor 1400W.
Results & Discussion: Bovine macrophages showed significantly higher MHC-II expression compared to ovine macrophages. This difference appears to be mediated by iNOS, which contributes to MHC-II upregulation in bovine macrophages but not in ovine macrophages. The observed increase in iNOS expression and the inhibitory effect of 1400W on MHC-II induction in bovine macrophages support this hypothesis. These effects were absent in ovine macrophages. The protective role of nitric oxide, possibly through the prevention of CD74 (invariant chain) degradation, may underlie the MHC-II upregulation observed in bovine macrophages.
Conclusion: Primary bovine and ovine macrophages exhibit distinct responses to *C. burnetii* infection, particularly regarding MHC-II induction. This difference may be driven by iNOS activity, which influences bovine but not ovine macrophages. A deeper understanding of these host-specific responses could facilitate the development of targeted intervention strategies.

Keywords: coxiellosis, macrophage, MHC-II, iNOS

Acknowledgement
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OP#7

Pathogens in lymph node-associated abscesses in sheep from southern Germany

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Introduction: Abscesses in sheep can significantly impact animal health. The bacterium *Corynebacterium pseudotuberculosis* (CPS) leads to the abscessation of lymph nodes in sheep, a condition known as Caseous lymphadenitis (CLA). Additionally, Morel´s Disease (MD), caused by *Staphylococcus aureus* subsp. *anaerobius* (SAAN), is emerging in German sheep flocks. However, data on the pathogens responsible for abscesses in sheep remain limited in Germany.
Aims: This study aimed to identify pathogens causing superficial lymph node-associated abscesses in sheep from southern Germany.
Material & Methods: During routine farm visits, abscesses in the area of superficial lymph nodes from sheep were lanced, and swab sample were collected. The samples were analysed using sheep blood agar and a nitrate reductase test. Since CPS was of particular interest, CPS-negative samples were further tested by PCR using the TaqMan PCR system for the detection of the phospholipase D exotoxin (PLD) gene in CPS. Data on abscess location, size, sex, age, and breed were recorded.
Results: A total of 118 sheep (female n=98, male n=20) with abscesses were sampled from 52 sheep flocks. Most abscesses were caused by CPS (n=91), followed by SAAN (n=14), *Staphylococcus aureus* (n=11) and 17 other bacterial species. The parotid lymph node was most frequently affected (n=33), followed by the cervical (n=16) and mandibular (n=13) lymph nodes. The majority of abscesses measured between 2 and 4 cm (n=97). In total, ten different breeds were examined, with adult sheep being the most commonly affected.
Conclusion: CLA is prevalent in sheep flocks in southern Germany. However, MD is also an emerging concern. Increasing awareness of both diseases among sheep farmers is essential for preventing their spread and implementing effective preventive measures.

Key words: Abscess, *Corynebacterium pseudotuberculosis*, Caseous Lymphadenitis, Sheep, Lymph nodes

OP#8

Vaccinaion against Bluetongue virus in Germany

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Introduction: Facing an epidemic outbreak of Bluetongue-Virus serotype 3 (BTV 3) Infections in ruminants in Germany, the federal ministry allowed on 06/06/2024 the use of 3 available commercial vaccines provisionally for 6 months for vaccination of susceptible animals until one of the vaccines are licensed: **a)** Bultavo 3 from Boehringer Ingelheim Vetmedica GmbH**; b)** Bluevac-3 from CZ Vaccines S.A.U.**; c)** Syvazul BTV 3 from Laboratorios Syva S.A.
Lower Saxony (LS) and North Rhine Westphalia (NRW) already had positive BTV 3 cases. The autologous vaccine failed and there was a need for vaccination as the warmer temperatures bring the unlimited spread of the mosquitoes during the main flight period.
Aims: Target of the study is to determine how well the BTV 3 vaccination protects small ruminants from BTV 3.
Materials & Methods: Bultavo 3 was the first vaccine available to our clinic with the amount of vaccine we needed. Sheep and goat in our clinic were vaccinated at the 13th of June. No clinical side effects were seen in the 48 animals (no rise in temperature, no clinical symptoms, no decrease in appetite, and no change in behaviour). Blood samples were taken 3 weeks post vaccination to control the development of antibodies against BTV 3. Blood samples were taken from three other herds of sheep to control the effectiveness of the vaccine.
Results: It was shown that one shot of Bultavo 3® did not induce seroconversion in most of the cases. Serological ELISA tests have shown that two vaccine injections 3 weeks apart induces seroconversion of all tested sera, with a high antibody activity. Antibody activity decreased over the course of six months and we are testing how antibodies develop after a third shot of the vaccination in spring 2025. We could also find antibodies in lambs of vaccinated ewes and are testing how long these maternal antibodies last.
Conclusion: For a complete primary immunization, two shots of the vaccine are needed, even if the producer propagates it as a one shot BTV 3 vaccine. Also the vaccine should be boostered in the following spring to induce higher antibodies before the season of the midges starts. Studies are still ongoing to control how long especially maternal antibody activities last to give recommendations about when to revaccinate small ruminants, and when to vaccinate lambs, depending on the vaccination program of the ewes.
Keywords: bluetongue virus serotype 3 (BTV 3), sheep, vaccination

OP#9

Survey of veterinary practices on antibiotic prescribing into sheep flocks in the Highlands and Islands of Scotland

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Introduction: Eliminating unnecessary antibiotic use is essential to preserve efficacy for humans and animals. Data is limited on how antibiotics are prescribed and used in sheep flocks in HAIS.
Aims: Gather evidence on factors influencing prophylactic antibiotic (PAB) prescribing into sheep flocks by veterinary surgeons in the Highlands and Islands of Scotland (HAIS)**.**
Materials & Methods: An online questionnaire, with input from HAIS veterinarians and relevant literature, was distributed to relevant veterinary practices via email. (MVLS, University of Glasgow ethics approval: 200210173)
Results: Fifty complete responses came from 20 practices. Most vets (71%) thought sheep PAB use had decreased, 2012 to 2022. Forty-five percent remained concerned about antibiotic levels in sheep. Many vets cited client pressure to prescribe (60%) and lack of rapid diagnostics (49%) as barriers to reducing PAB use. Eighty-eight percent of vets thought neonatal infections would decrease with improved management instead of PAB, but many believed veterinary practice profits would decrease (29%) or remain unchanged (56%). Vets thought proactive flock health planning was inhibited by a lack of flock data (75%), farmers only wanting veterinary input in emergency situations (67%) and lack of time (66%).
Conclusion: This is the first study exploring the barriers and facilitators to reducing PAB use in HAIS. Vets' positivity concerning alternative disease control measures present an opportunity, to identify meaningful ways that local vets can engage sheep keepers to improve animal health and reduce PAB use, and a challenge to make these activities profitable for farmers and veterinary practices.

Keywords: Antibiotics, Scotland, stewardship

OP#10

Pathology of natural *Mycobacterium Bovis* infection in alpacas

Sebastian Alessandro Mignacca[1], Benedetta Amato[2], Sara Salgado[1], Colm Brady[1], John Moriarty[1], Micheal Casey[1], Aideen Kennedy[3], Maresa Sheehan[3], Denise Murphy[4], Brian Toland[5], Shane McGettrick[6], Sarah Coffano[7], James O'Shaughnessy[7], Maire McElroy[7], Cosme Sánchez-Miguel[8]*

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Introduction: Farming of new world camelids (NWCs), particularly alpacas, is becoming more popular worldwide. Animal tuberculosis (TB) is a chronic worldwide disease caused by members of the *Mycobacterium tuberculosis* complex, primarily *Mycobacterium bovis* and *Mycobacterium caprae*. TB has a wide host range and can affect domestic and wild mammals as well as people. Although it has been controlled in most countries, its complete eradication is challenging due to the persistence of *M. bovis* infection in certain species.
Anatomo-histopathological features in alpacas naturally infected by *M. bovis* are described here.
Materials & Methods: Alpacas necropsied within the Department of Agriculture, Food and the Marine - State Veterinary Laboratory (Ireland) from January 2010 to December 2024 were selected.
Results: Tuberculosis was diagnosed in 81 alpacas (23 females, 29 males, 29 unrecorded) with a history of sudden death, weight loss, respiratory disease, and/or a positive ELISA test. Ages ranged from 3-month-old to 19-year-old (2 cria, 10 juveniles, 69 adults). BCS was good, moderate, poor or unrecorded in 26, 4, 24, and 27 animals, respectively.
Twenty-five animals (30.9%) had lesions on a single organ (24 lungs, 1 liver). Nineteen animals (23,4%) had lesions localized in both the lungs and liver. Thirty-seven cases (45.7%) also had nodules/ulcers elsewhere (cranial lymph-nodes, kidneys, spleen, mesothelium), including unusual sites (heart, trachea, pharynx, thyroid, uterus, intestine, skin). Pulmonary lesions had multiple presentations (from scattered miliary subpleural foci to caseous-calcified nodules up to 10x6x9cm, often cavitated). Hepatic lesions were usually similar but lacked cavitation. Lymph-nodes were almost always enlarged and frequently had caseous-chalky appearance on the cut surface. Histologically, nodular lesions were composed of multifocal to coalescing granulomas with a coagulative to liquefactive necrotic core, surrounded by variable number of epithelioid macrophages, multinucleated giant cells, fibroblasts, lympho-plasma cells, with scant to large numbers of ZN acid-alcohol fast bacilli.
Conclusion: TB lesions can be extensive despite non-specific symptoms, and the disease in camelids merits further studies. To the authors' knowledge, this is the most extensive case-series TB pathology in alpacas.

Key words: Alpaca; Bovine tuberculosis; Surveillance

SESSION 3 – Chair: Valentina Busin, Dipl. ECSRHM

Keynote speaker #2

Biosecurity meets Population Medicine: Managing Public Health risks in small ruminants' systems in Romania

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In Romania, small ruminant production systems remain a cornerstone of rural livelihoods but also present complex epidemiological interfaces due to their typically extensive management, mixed species grazing, and (very) limited biosecurity infrastructure. This presentation examines the integration of population medicine principles with targeted biosecurity interventions to mitigate public health risks emerging from these systems. Using Biocheck (biocheck .ugent), we identified several weaknesses in current disease control frameworks. We propose a structured approach grounded in risk analysis and One Health principles, aiming to optimize resource allocation for surveillance, enhance intersectoral collaboration, and support evidence-based policy development. The presentation will also discuss strategies for improving farmer engagement and translating scientific knowledge into practical, context-specific interventions.

OP#11

Comparison of four pre-breeding protocols in a flock of Bavarian Alpine Sheep at different times of year

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Introduction: Some hormonal protocols to influence the ovine oestrus cycle such as the combination of progestagens with equine chorionic gonadotropin (eCG) have recently come under scrutiny because of welfare aspects associated with its production.
Aims: The study aimed to compare four pre-breeding protocols at different times of year in a moderately non-seasonal breed (Bavarian Alpine Sheep).
Materials & Methods : This retrospective study covered reproductive data of one sheep flock and included a total of 921 matings of 241 individual ewes between 2009 and 2023.
The following protocols were applied, with ewes remaining with a fertile ram for three days following hormonal treatments, and for the duration of approximately one oestrus cycle in the control group.
I: PGF (n=147): Two intramuscular injections of 0,15mg cloprostenol (Dalmazin SYNCH, Selectavet, Germany) 9 to 10 days apart.
II: FGA (n=194): Intravaginal sponges containing 20mg flugestone acetate (Chronogest®CR, Intervet, UK) for 14 days.
III: FGA + eCG (n=425): As of group II, but followed by intramuscular injection of 300 IU eCG (Intergonan, Intervet, Germany or Pregmagon, CEVA, Germany) at the time of sponge removal.
IV: CON (n=155): control group without any medical treatment.
Mixed-effects logistic regressions were performed in R to assess any potential differences between the groups regarding conception and litter size, taking into account the potential confounders breeding history, season and ewe age, with the individual ewe included as random effect.
Results: Season was the most significant influential factor on conception ($p<0.001$), but the type of synchronization ($p=0.001$), ewe age ($p=0.006$) and the breeding history ($p=0.027$) also showed significance. Matings in spring were least likely to lead to conception, and this seasonal difference was particularly pronounced within the PGF group. The pre-mating protocol was the most significant influential factor on litter size ($p=0.001$), with significantly smaller litters following the PGF protocol. There was no significant difference in litter size between the FGA and FGA + eCG groups.
Conclusion: The PGF treatment was inferior to the other studied pre-breeding protocols, particularly in spring, showing that there is residual seasonality in the breed used. The addition of 300 IE eCG to the progestagen treatment did not improve conception or increase litter size even in out-of season matings. It can thus be concluded that eCG is dispensable in the breed used.

OP#12

Building foundations for a digital clinical diagnosis-support app for small ruminants in Tanzania

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Introduction: Prevalence and clinical presentation data for goat and sheep diseases are incomplete in many parts of the world and often limited to a small number of high-interest diseases. A diagnostic-support app needs to incorporate the common, clinically significant diseases, alongside high impact diseases. We developed a protocol for identifying priority diseases and their associated clinical presentation, using literature search and expert elicitation.
Aims: Determine the priority diseases of goats and sheep in Tanzania and their clinical presentation, to populate a diagnosis-support app for use in areas with limited veterinary support.
Materials & methods: An initial metanalysis was performed based on a structured literature search. The collated data were assessed using a disease prioritisation tool adapted from the One Health Zoonotic Disease Prioritization tool. The results were verified using a modified Delphi expert elicitation, involving an online survey and in-person workshops (MVLS, University of Glasgow ethics approval: 200240029).
Results: The priority lists contained 24 diseases for goats and 22 for sheep. The Delphi method effectively optimised the diseases, varying little from the literature results. Clinical presentation was also determined for each disease. The process highlighted important gaps in small ruminant disease knowledge, especially for sheep.
Conclusion: The disease prioritisation protocol was designed to be repeatable for use in other countries and species as the app is rolled out further. This work under-pinned the Bayesian inference algorithm of the app, but also identified the diseases of importance in sheep and goats in Tanzania, where many rely on livestock.

Keywords: diagnosis, support, Tanzania

OP#13

Generating a prioritised list of diseases for small ruminants in Senegal

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Introduction: Small ruminant disease prevalence and clinical presentation is poorly documented in Senegal. A small number of high-impact diseases are well studied but common production-limiting diseases are neglected, limiting the ability for livestock workers to manage their animals in a way that maximises production. The internet has led to better dissemination of knowledge but lacks validated diagnostic and treatment advice. Diagnostic support apps are a useful way of providing targeted information for better diagnosis and treatment of animals in low-resource areas.
Aims: To populate a diagnosis-support app specific to Senegal, this study aimed to identify priority diseases including common and high-impact diseases and their associated clinical presentation.
Materials & methods: An initial metanalysis based on a structured literature search was performed to produce a list of diseases. The collated data was assessed using a protocol adapted from the One Health Zoonotic Disease Prioritization tool. The selection criteria for relevant publications focused on search terms that would highlight disease prevalence, incidence, and clinical impact in relation to production, trade and animal welfare.
Results: Screening for studies that met the inclusion criteria included an initial 645 publications . Second stage screening resulted in the selection of 159 relevant publications. Priority disease lists were then generated for sheep and goats, including comments on clinical presentation for each disease.
Conclusion: This work identified the diseases of importance in sheep and goats in Senegal based on literature. The next steps will be to verify this list, using a modified Delphi expert elicitation workshop in Senegal. Once populated for Senegal, the app will provide support with clinical decision-making to improve animal health and reduce the impact of disease in Senegalese production systems.

Keywords: diagnosis, support, Senegal, prioritisation, tools

OP#14

Orphan Lambs: how are they being reared in the UK?

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Introduction: Orphan lamb management in the UK is an area with limited research. Erichsen et al. (2024) found that >20% of respondents would choose to artificially rear one of a triplet litter. A GB wide project found a median lamb mortality of 8.2% within the first 21 days (AHDB, 2020), but there are limited reports specifically on artificially reared lambs (ARL) versus naturally reared lambs (NRL) survival rates.
Aims: This project aimed to establish current orphan lamb rearing practices on UK farms and if birth-weaning survival is the same as NRL.
Materials & Methods: An online survey was released in May 2024 for six weeks. A total of 143 respondents answered. Sixty-eight respondents were included in the lamb survival to weaning and antibiotic usage analysis.
Results: ARL were present on 95.7% (133/139) of holdings in 2023. ARL had access to heat lamps on 48.6% of holdings. The most common feeding practices for ARL was with artificial milk replacer (96.4%, 132/137). The most frequent method of administration was bottles (67.6%, 96/142); a third used automatic feeders (31.7%).
Set volumes were fed by 43.4%, with volumes fed per lamb/day provided by 45 respondents. The median milk volume fed was 1.5L/lamb/day (0.5L- 2L/lamb/day). The median weaning age of ARL was 6 weeks old (4-20 weeks), compared to 14.3 weeks old (8-24 weeks) for NRL.
Flocks included in the survival to weaning analysis had a median orphan rate of 5.1% (IQR: 2.1-10.2%). Median survival to weaning was 99.2% (IQR: 95.7-100%) for NRL and were similar to ARL 100% (90.4-100%). Antibiotic usage was higher in ARL (25.5%) than NRL (7.6%) in the pre-weaning period. Lower antibiotic use was seen in ARL (6.3%) and NRL (3.2%) post weaning.
Conclusion: This projects highlights the variability of both rearing practices and survival rates of orphan lambs in UK flocks.

References:

AHDB, 2020. Development of an Integrated Neonatal Survival and Sustainable Antibiotic Plan.
Erichsen, C., Coombs, T., Sargison, N., McCoard, S., Keady, T., Dwyer, C., 2024. Improving triplet lamb survival: management practices used by commercial farmers. Frontiers in Veterinary Science 11. https://doi.org/10.3389/fvets.2024.1394484

SESSION 4 – Chair: Neil Sargison, Dipl. ECSRHM

Keynote speaker #3

Better understanding of genetic diversity in gastrointestinal nematode populations to ensure efficient small ruminant production

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The global efficiency of small ruminant production is inadequate to meet fundamental 'one health' needs. In response to this challenge, each of the interlinked genetic, environmental, infectious disease, nutrition and public health constraints must be addressed. Among the infectious disease challenges, gastrointestinal nematodes (GINs) are foremost causes of production loss. GIN control depends on the integration of pasture management to evade infective larval challenge, and the use of anthelmintic drugs to suppress contamination. These methods are failing, not least due to the emergence of anthelmintic resistance and parasite adaptations to climatic and management changes. The development of innovative solutions is hindered by a lack of knowledge of the parasites' biology and inadequate understanding of GIN population genetics. Step-change advances have been made in molecular methodologies and platforms that allow us to explore the genetics of complex populations. This presentation will summarise our development and application of metabarcoding resequencing to explore genetic diversity in GIN populations. Our results describe GIN species compositions and mitochondrial gene flow in a range of co-grazed pastoral livestock management systems. The work highlights the greater potential of the next generation approaches to explore diversity surrounding loci of interest in GIN parasitic stages, such as those conferring resistance to anthelmintic drugs. In conjunction with publicly available chromosomal level genome assemblies for *Haemonchus contortus* and *Teladorsagia circumcincta*, the approaches could be used to characterise genetic adaptations in GIN environmental stages; or to identify potential targets for chemical control.

OP#15

First identification of Cryptosporidium parvum virus 1 (CSpV1) in various subtypes of *Cryptosporidium parvum* from diarrheic small ruminants and calves

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Introduction: Cryptosporidium spp. remain a major cause of waterborne diarrhea and illness in developing countries and represent a significant burden to farmers worldwide. Cryptosporidium parvum virus 1 (CSpV1), of the genus Cryspovirus, was first reported to be present in the cytoplasm of C. parvum in 1997. Full-length genome sequences have been obtained from C. parvum from Iowa (Iowa), Kansas (KSU) and China.
Aims: We aimed at characterizing the genome of CSpV1 from France and used sequence analysis from Cryptosporidium isolates to explore whether CSpV1 genome diversity varies over time, with geographical sampling location, with C. parvum genetic diversity, or with ruminant host species.
Materials & methods: A total of 123 fecal samples of cattle, sheep and goats were collected from 17 different French departments (57 diseased animal fecal samples and 66 healthy animal fecal samples).
Results: Subtyping analysis of the C. parvum isolates revealed the presence of two zoonotic subtypes families IIa and IId. Sequence analysis of CSpV1 revealed that all CSpV1 from France, regardless of the subtype of C. parvum (IIaA15G2R1, IIaA17G2R1 and IIdA18G1R1) are more closely related to CSpV1 from Turkey, and cluster on a distinct branch from CSpV1 collected from C. parvum subtype IIaA15G2R1 from Asia and North America. We also found that samples collected on a given year or successive years in given location are more likely to host the same subtype of C. parvum and the same CSpV1 strain. Yet, there is no distinct clustering of CSpV1 per French department or ruminants, probably due to trade, and transmission of C. parvum among host species.
Conclusion: All together, these results provide insightful information regarding CSpV1 evolution and suggest the virus might be used as an epidemiological tracer for C. parvum. Future studies need to investigate CSpV1 role in C. parvum virulence and on subtype ability to infect different subtypes of Cryptosporidium.

OP#16

Evaluating the use of salivary anti-CarLA IgA testing to reduce gastrointestinal parasitism in Canadian pastured sheep

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Introduction: Identifying sheep with superior immunity to gastrointestinal nematodes (GIN) is of great interest for Canadian sheep producers. Measuring the concentration of salivary IgA against carbohydrate larval antigen (CarLA) found on all third-stage GIN larvae has shown promise in New Zealand sheep, where salivary anti-CarLA IgA exceeding 1.0 U/ml has been associated with 20–30 % lower fecal egg counts (FEC). However, it remains unclear whether these findings translate to other sheep-producing regions, especially northern climates where GIN epidemiology and flock management differ from New Zealand. The aim of this study was to investigate salivary anti-CarLA IgA testing in sheep under Canadian conditions.
Materials & methods: In 2022, an average of 25 ewe lambs per farm were randomly selected on 18 farms in Ontario, Canada, after grazing pasture for a minimum of 60 consecutive days. Body condition, fecal consistency, FAMACHA© score, liveweight, hematocrit, FEC, and salivary anti-CarLA IgA concentration were recorded for each study animal after the grazing season. Study animals returned to pasture in 2023 and were re-sampled 4 weeks after turnout.
Results: Multivariable linear regression demonstrated that the salivary anti-CarLA IgA response in 2022 predicted the salivary anti-CarLA IgA response in 2023 ($\beta = 0.213$; $p < 0.001$). In addition, salivary anti-CarLA IgA in 2022 was negatively associated with FEC in 2023 ($\beta = -0.167$; $p = 0.025$).
Conclusion: Data indicate that salivary anti-CarLA IgA measurements appear to be helpful for identifying sheep with superior immune responses to GIN. Considering the problem that GIN pose for sheep producers in Canada, measuring salivary anti-CarLA IgA to select sheep for superior immunity to GIN could be a promising tool for GIN management on Canadian farms. In order for this selection tool to be widely adopted by Canadian sheep producers, it is essential that the salivary anti-CarLA IgA ELISA is offered by regional veterinary diagnostic laboratories.

Keywords: Canada, gastrointestinal parasitism, salivary-IgA

OP#17

The impact of overdispersion on Nemabiome uncertainty

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Introduction: Managing gastrointestinal nematode (GIN) infections is difficult due to widespread anthelmintic resistance (AR) and complex epidemiology involving multiple co-infecting species. The Nemabiome technique enables high-throughput quantification of GIN species, offering insights into geographic, seasonal, and host-related variations in infection intensities, as well as identifying AR that might be missed by unspeciated Faecal Egg Count Reduction Tests (FECRTs). Most studies have used the Nemabiome on pooled faecal samples and combined the results with individual faecal egg counts (FECs) to generate 'interpolated' species-specific FECs. However, unspeciated FECs are highly overdispersed, which reduces the precision of pooled FECs.
Aims: Species-specific FECs are even more overdispersed and tend to covary, but the impact of this on the accuracy of interpolated FECs or FECRTs has not been assessed.
Materials & methods: Covarying distributions for multiple GIN species were simulated using parameters from individual-level Nemabiome data collected from lambs in an unmanaged sheep population in Scotland. Point estimates, uncertainty intervals (UIs), and UI coverage probabilities were compared between interpolated species-specific FECs and individual species-specific FECs. Random independent anthelmintic efficacies were then drawn from a uniform distribution (ranging from 0 to 1), and hypothetical post-treatment FECs were simulated. Comparisons were then made between interpolated and individual FECRTs.
Results: FEC point estimates were similar between methods, but the interpolation method consistently underestimated UIs compared to the individual method, leading to lower coverage probabilities for interpolated UIs (85% vs. 95%). This effect was more pronounced at lower FECs, for more overdispersed species, and in GIN communities where co-infecting species were less overdispersed. Despite these differences, FECRTs remained robust as long as WAAVP recommendations for starting FECs were followed.
Conclusion: This simulation demonstrates the risks of not propagating uncertainty but reassures that FECRTs are robust when using pooled Nemabiome samples within the examined parameter range. These findings warrant field validation and confirmation that the parameters used are representative across different farming systems.

OP#18

Accidental closantel toxicity in a group of 70 ewe lambs treated orally with an unlicensed topical product

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Introduction: Closantel is a halogenated salicylanide drug that is useful in the treatment of parasitic infections in sheep. It has efficacy against the late immature stages and mature *Fasciola hepatica*, as well as other parasites including *Haemonchus contortus* and *Oestrus ovis*. Orally, the recommended dose in sheep is 10 mg/kg, and compared to many other anthelmintics, its safety threshold is much narrower with toxic effects described at doses of 14.5-80mg/kg.
Materials & methods: Seventy crossbred ewe lambs were administered a product containing ivermectin and closantel. The product used was only licensed as a pour on topical preparation for cattle and was administered to the sheep in error at a dose rate consistent with 1.2mg/kg ivermectin and 48mg/kg closantel. The short, and longer term clinical effects are described.
Results and discussion: Forty-eight hours after administration four sheep were found dead at pasture with the rest of the group appearing subdued. Clinical examination revealed 18 to have a variety of clinical signs including: unilateral or bilateral mydriasis, blindness, lethargy, reluctance to move, and facial oedema (group 1). A further 20 had milder clinical signs but were grazing and chewing their cud (group 2). The remainder of the group appeared in general clinically normal except that they appeared less active than expected (group 3). Closantel toxicity was considered the most likely cause of the clinical signs based on the history.
Treatment of the sheep was attempted: Group 1: housed to assist with the provision of food/water, administration of 60ml of activated charcoal, and 0.06mg/kg dexamethasone by intramuscular injection; Group 2: managed outside at pasture together with the sheep in Group 3, administration of activated charcoal and dexamethasone as for those in group 1; Group 3: managed outside at pasture together with group 2. As a precaution they were all treated with activated charcoal. All the sheep in all three groups were re-treated with activated charcoal 24 hours later, and all the sheep that had been treated with dexamethasone (groups 1 and 2) were re-treated with this after 48 hours.

Sheep variably remained stable or deteriorated. A further 8 animals were eventually euthanised on welfare grounds, some of the sheep from group 3 developed ocular symptoms and joined group 1. The remaining 58 animals remained generally unchanged with those with clinical signs remaining stable with no improvement or worsening of the clinical signs. Those with an absence of clinical signs continued to behave and grow as expected with no deterioration.

Conclusion: Closantel toxicity is well described in sheep. The sheep in this case displayed classic clinical signs and the severe morbidity and mortality seen was likely related to the high dose received. Despite this, about 35 sheep remained clinically unaffected.

Keywords: Closantel toxicity; sheep; morbidity; retinopathy

SESSION 5 – Chair: Delia Lacasta, Dipl. ECSRHM

Keynote speaker #4

Differential diagnosis of viral oral lesions in adult sheep and goats

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The oral cavity is vital for prehension and mastication, although is a common site of lesions caused by several significant viral diseases affecting sheep and goats. Clinical assessment of small ruminants requires rigorous oral examination and this may require the use of a mouth gag in addition to routine yet essential reflection of the lips to assess the gums and tongue. As several viral diseases currently of concern in Europe and elsewhere manifest with oral lesions, their early detection by careful oral examination is critical for timely notification of authorities to enable control of further transmission. Characterize the macroscopic oral lesions associated with viral diseases in sheep enabling differential diagnosis in clinical practice.

Images from clinical cases of foot-and-mouth disease, sheep and goat pox, peste des petits ruminants, bluetongue, and contagious ecthyma as managed directly by the authors, will be presented. The clinical and gross pathological differences of these diseases will be outlined, reinforcing key diagnostic criteria and raising awareness of the potential emergence or re-emergence of these notifiable viral diseases in Europe.

Recently, and regrettably, cases of foot-and-mouth disease, sheep pox, and peste des petits ruminants have been reported in Europe after several decades without confirmed outbreaks. These viral diseases are highly contagious and pose a serious threat to the economies of European countries, as they are notifiable, subject to strict control measures, including movement restrictions, and may cause significant disruption to the small ruminant industries in affected regions.

This communication advises the prompt recognition of virus-associated oral lesions in sheep and goats to enable earlier detection and reporting, with improved outbreak responses.

Keywords: Oral lesions; FMD; Sheep and goat pox; PPR; Bluetongue; Contagious ecthyma.

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OP#19

Epidermolysis bullosa in a goat kid

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Introduction: Epidermolysis bullosa, a gene defect in humans and several animal species, is characterized by vesicular detachment of the epidermis. In German Black Headed Moutons an autosomal recessive gene defect is known (1). In goats, the causative mutation was previously unknown.

Materials & Methods: Soon after birth a goat kid showed increasing skin lesions on the limbs (blistering, lameness). In recent years, sporadically lambs with identical symptoms were born in the same flock. Most of these lambs died. Occasionally, the lesions healed spontaneously. Despite intensive treatment the lamb had to be euthanized and was referred to necropsy.

Results & Discussion: The skin on the ears, ventral chest and limbs showed crusty-scaly changes, the coronet rim and ankle showed a massive serous to purulent blistering. Similar changes were seen on the mucosa of the palate, tongue, gums and esophagus. Microbiology indicated an unspecific secondary bacterial infection. Histopathology revealed pustular-purulent dermatitis with orthokeratotic hyperkeratosis. Visually intact mucosa could be detached by manipulation. Histology showed multifocal to confluent, severe erosive-ulcerative dermatitis with associated purulent inflammation, serocellular crusts, intracorneal pustules and superficial bacteria and fungi. The macroscopically less affected areas showed multifical subepidermal clefting, partly with accumulation of protein-rich exsudate. PAS reaction showed the basal membrane above the cleft formation.

Subepidermal clefting below the basal membrane provides the suspicion of epidermolysis bullosa dystrophica (EBD). In goats, EBD was described as an autosomal recessive gene defect by breeding studies (2).

Investigations on the causative gene defect are ongoing at present. In the flock of origin of the affected goat kid, ten heterozygous carriers were identified. None of these animals showed clinical

signs of EBD. Homozygous animals were not found. With the help of parentage tests, it was possible to determine that the father of the goat kid was also its grandfather. Both the dam and the buck were heterozygous carriers. Due to the high degree of inbreeding of the affected goat kid, homozygous expression of the trait with clinical symptoms occurred. The underlying genetic defect was identified by molecular tests. As there is no commercial genetic test for the detection or exclusion of EBD in goats, a human test was used on a trial basis. Surprisingly it was shown that the human EBD test can also detect EBD in goats.
No other carriers could be identified in other populations of the same breed.

Keywords: Epidermolysis, Genetic, Goat, Inbreeding

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OP#20

Severe respiratory distress caused by multicentric small lymphocytic B-Cell Lymphoma

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Introduction: Neoplastic diseases in sheep are rarely reported in the veterinary literature, mainly due to their low incidence and non-specific clinical presentation. However, tumours in sheep can significantly impact animal welfare. Lymphomas, although uncommon, represent a clinically relevant neoplastic condition in small ruminants. Recently, a 6-year-old Lacaune ewe from an experimental dairy flock, which developed severe respiratory distress, reduced milk production, and mammary nodules, was referred to the SCRUM. Her condition deteriorated rapidly, ultimately leading to death, and a multicentric lymphoma was diagnosed.
Aims: To describe the clinicopathological features and origin of the case, and highlight the challenges in diagnosing rare neoplastic diseases in sheep.
Materials and Methods: Clinical, haematological, and imaging examinations were performed, including nasal swabs for molecular testing. A thermographic study and *post-mortem* examination were conducted. Histopathological and immunohistochemical analyses were carried out on tissues from the nasal cavity, lungs, lymph nodes, and liver.
Results: The ewe showed severe inspiratory dyspnoea, mucous discharge, and generalised lymphadenomegaly. Thermography suggested chronic proliferative rhinitis, and PCR ruled out *Salmonella enterica* serovar *diarizonae*. Warm nodules in the udder suggested mastitis. Despite temporary improvement with anti-inflammatories, the ewe worsened and died. *Post-mortem* examination revealed tumour masses in the nasal turbinates, lungs, and several lymph nodes, including the mammary gland. Histopathology identified small lymphocytic lymphoma with concurrent pulmonary adenocarcinoma. Immunohistochemistry confirmed B-cell lymphoma with Pax5 positivity and minimal T-cell involvement.
Conclusion: This case highlights the challenge of diagnosing rare neoplastic conditions in sheep, as clinical signs can mimic more common diseases. It describes an unusual case of two neoplastic conditions occurring simultaneously.
Keywords: B-cell lymphoma; Multicentric lymphoma; Neoplastic disease; Respiratory distress.

OP#21

Diagnosis and prevalence of pregnancy disorders using transrectal ultrasound scanning (TRUS) during the reproductive season in Sardinia, Italy

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Introduction In the Mediterranean area, the mating of ewes typically begins at the end of the seasonal anestrus period, and pathologies which lead to poor reproductive performances (infertility and pregnancy losses) are often underestimated and generally classified as unexplained infertility (1). Poor reproductive performance leads to delayed lambing and reduced numbers of lambs (2), resulting in lower income for farmers.

Infertility and pregnancy losses are often caused by pathologies such as Late Embryonic Death (LED) between 18 and 40 days, Early Fetal Death (EFD) between 40 and 60 days, Abortion (ABT) after 60 days of pregnancy, Pseudopregnancies (PP), Pyometras (PY) and Endometritis (EM). These pregnancy disorders are often undetected during regular pregnancy diagnosis, usually performed by transabdominal ultrasound scanning (TAUS) (1).

Aims: This study aimed to determine the diagnosis and prevalence of pregnancy disorders using transrectal ultrasound scanning (TRUS) performed during reproductive season (3).

Materials and Methods: A total of five dairy commercial farms located in northern Sardinia, Italy, were included in this study for a total of 7083 TRUS performed using a SonoScape S8 ultrasound scanner fitted with a transrectal linear probe for human use (10 MHZ). Data from each ewe on physiological state, pregnancy diagnosis or pregnancy disorders were individually recorded on a Excel spreadsheet.

Results: The study showed an overall prevalence of pregnancy disorders of 4.6% (326/7083). The most common diagnosis was EM.

Conclusion: This study highlights EM as the most diagnosed pregnancy disorder detected in the examined flocks. EM is an underdiagnosed condition in sheep, contributing to repeat breeder syndrome. TRUS enables earlier pregnancy diagnosis compared to TAUS and facilitates the rapid identification of pregnancy disorders. This, in turn,allows for the timely application of targeted therapies, leading to improved reproductive performance and reduced economic losses.

Keywords: endometritis, reproductive efficiency, transrectal ultrasonography

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OP#22

Rare case of mammary gland squamous cell carcinoma with multiple metastases in a young ewe

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Introduction & aim: Data on mammary tumours in sheep are scant. A metastatic squamous cell carcinoma (SCC) arising from the mammary parenchyma in an ewe is described here for the first time.
Materials & methods: A 3,5-year-old ewe with history of chronic bacterial mastitis was investigated.
Results: The udder had intact ski, was severely swollen, not painful and firm. Ultrasound showed multifocal to coalescing fluid-filled cysts and granulomatous-like areas within the parenchyma, mixed with multifocal mineralized foci. Two branch-like cord extensions originating from the udder also extended into the subcutis of the right hindlimb and the pelvic cavity.
The udder, the cord within the limb, and the proximal portion of the pelvic extension were surgically removed. The udder (14 kg) showed diffuse, severe parenchymal necrosis, and large areas were disrupted and replaced by firm, pale and disorganized tissue delimitating large irregular cavitations filled with abundant thick, brown-pink liquid.The animal was euthanised 6 weeks after the surgery. Macroscopically, a severe multifocal neoplastic infiltration and suture dehiscence within the right hindlimb was observed. The non-resected lesion of the branch-like cord in the pelvis was oval, large, smooth, firm-hard, well encapsulated and multifocally adherent to the surrounding tissues, and, on cross-section, resembled the lesions affecting the udder. Scattered multifocal to coalescing, firm, pale metastatic foci within the mammary lymph-nodes, caudal mesentery, large intestine, caudal parietal peritoneum, diaphragm, heart, and pulmonary parenchyma also were observed. Histologically, the mammary gland was largely replaced by an infiltrative mass consisting of neoplastic squamous epithelial cells organized in small to large clusters, which showed abundant eosinophilic cytoplasm, a centrally located nucleus with irregularly clumped chromatin, and large central nucleoli. Often, the squamous component had a multilayered arrangement, similar to the SCC of the skin, with variable keratin covering the surface sometimes organized in concentric layers (keratin pearls). Cords of squamous cells or single squamous cells infiltrated into the dermis covering the mammary glands with variable keratosis were also seen. The metastases had similar histological findings.
Conclusion: This case will add to the knowledge of mammary gland SCC in ovine and other animal species.
Key words: Mammary tumors; Mastectomy; Sheep; Squamous cell carcinoma

SESSION 6 – Chair: Paula Menzies, Dipl. ECSRHM

OP#23

Progressing pain management for husbandry interventions and epidermal infectious diseases in livestock

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Introduction: As routine pain management for improved welfare of farmed animals is relatively new and a vast diversity of approaches, opinion, policy, adoption and availability exists between countries, a review of progress of this intervention is appropriate.
Aims: Examine practices and literature on using topical anaesthesia wound therapeutic formulations (TA), with or without non-steroidal anti-inflammatory dugs (NSAIDs), to manage pain during husbandry interventions, tissue debridement, and infectious epidermal viral diseases.
Materials & Methods: Analysis of literature and clinical reports of over 20 years duration**.**
Results: Studies on the use of TA with and without NSAIDs, indicates efficacious blockage of nociception is a preferred first step in pain relief approaches as TA ablates hyperalgesia and allodynia. A multimodal approach with an NSAID to reduce sensitisation is advocated, despite lower recognition of therapeutic impact. Pain relief demonstrates superiority to routine antimicrobial use (AMU), for disturbed surface tissue integrity. Farmer acceptance of pain relief for aversive husbandry procedures has led to 'mandatory' regulations in some locations. Further, pain management is increasingly applied for foot-and-mouth disease and orf infections, particularly in developing countries, although pain is still largely ignored in the majority of global farming systems.
Conclusion: Promotion of routine pain relief use by producers may assist in replacement of AMU with a 'management of pain' strategy to advance welfare in global livestock populations.
Keywords: anti-microbial resistance, multi-modal analgesia, topical anaesthesia
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OP#24

A pain in the leg: A randomised controlled trial of an autogenous joint-ill vaccine in sheep

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Introduction: Joint ill (neonatal infectious arthritis (NIA)), is primarily associated with *Streptococcus dysgalactiae* subsp. *dysgalactiae* (SDD) and is a major driver of antibiotic use for prevention and treatment.
Aim: The aim of this study was to investigate the clinical and immunological efficacy of an autogenous killed vaccine on a single farm in Wales, using a blind randomised controlled trial.
Materials & methods: A single flock of 990 ewes in Wales was enrolled. Sterile joint aspirates were obtained with two isolates of SDD selected for inclusion in the vaccine. Half of the flock was randomly allocated as controls and were untreated; half were vaccinated. After vaccination, the farmer and researchers were blind to the allocated trial arm. A random sample of 396 ewes were selected to be blood sampled prior to and after vaccination, together with collection of colostrum samples from ewes, and blood samples from lambs. These samples were then analysed using a SDD specific antibody ELISA.
Results: Only ten lambs developed NIA: 5 from vaccinated ewes and 5 from controls. Overall, there was more serum IGG to SDD in vaccinated ewes and in lambs born to vaccinated ewes (P=0.02). There was no difference in IGG in colostrum from the control and vaccinated ewes (P=0.8).
Conclusion: Compared to previous years there were fewer NIA cases (n=10). There was no difference in the number of clinical cases between vaccinated and control ewes, but there were significant differences in the SDD IGG concentration in both ewes and.

Keywords: Infectious arthritis; Joint-ill; Sheep; *Streptococcus dysgalactiae* subspp. *dysgalactiae*; Vaccine

OP#25

Dairy goat claw health in The Netherlands – pilot study results

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Introduction: In The Netherlands, dairy goat lameness is considered an issue that could be improved upon but little is known about the prevalence, risk factors, impact or the main causes of lameness.

Aims: This study aimed to establish both prevalence and lesions found in dairy goats in order to create a starting point for improving dairy goat claw health in The Netherlands.

Materials & Methods: The prevalence study was carried out during July-September 2024. Twenty farms were visited once during milking time. Seventy five goats per farm were randomly selected and scored while exiting the milking parlor. The inclusion criteria of the farm ensured they all had a straight exit from the parlor with space to walk at least 5 steps on concrete. A 4 point scoring system (1-4) was used as described by Anzuino et al. 2010.

The lesion scoring study was carried out by one researcher during March-May 2024. Fourteen farms were visited during their routine trimming, carried out by lay contractors. Only extended lactation milking goats were included and an average of 45 goats per farm were scored. Each goat was scored for overgrowth before trimming and for lesions, severity and location after trimming. All four feet were scored on each goat.

Besides the scoring, questionnaires were filled in by each farmer in each study.

Results: The overall prevalence of lame goats on the 20 farms visited was 20.1% (score >1). The range varied between 2.9 and 37.1%. The overall prevalence of severely lame goats was considerably lower at 4.7% (range 0 -12.9%).

Overgrowth was found on 95% of goats and 79% of individual claws scored. The overgrowth was scored as mild overgrowth in 20% of cases and moderate in 74% of cases. The most prevalent lesions that were found were white line lesions (6.4% of claws and 44% of goats) and solar hemorrhaging (5% of goats and 29% of claws). Solar bleeding due to trimming was found in 3% of goats.

Interestingly, a longer walkway to the parlor was associated with a higher prevalence of lameness but a lower prevalence of claw overgrowth and solar hemorrhaging. The presence of a separate waiting area on a hard surface was also associated with a lower prevalence of both overgrowth and

hemorrhaging. Access to climbing opportunities, grazing and optimizing bedding dryness were associated with a lower lameness prevalence.
Additionally, the frequency of routine trimmings (>2x a year) was associated with a lower prevalence of overgrowth. Farms that trimmed lame goats themselves in between routine trimming events had a lower prevalence of white line lesions.
Conclusion: This study indicates that lameness prevalence in Dutch dairy goat herds leaves room for improvement. Although overgrowth was reported in 95% of goats and white line lesions in 44% of goats, an association with lameness was not part of this study. Some risk factors have been identified in both studies that need to be researched in order to find out their relevance in claw health, such as underfoot conditions and trimming frequencies. The wide range of prevalence also indicates that some farms perform considerably better than others and these farms could be used to look for success factors rather than risk factors.

Keywords: dairy goats, lameness, lesions, prevalence.

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OP#26

An Investigation into the Sources and Routes of Transmission of *Streptococcus dysgalactiae* subspecies *dysgalactiae* on UK Sheep Farms

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Introduction: Joint ill is a bacterial polyarthritis of lambs, commonly caused by SDSD. Low SDSD isolation rates from mixed microbial samples by culture methods have hampered epidemiology research aimed at identifying the sources and routes of transmission of the infection to the lamb.
Aims: Identify the sources and routes of transmission of *Streptococcus dysgalactiae* subspecies *dysgalactiae* (SDSD) on UK sheep farms
Materials & methods: Swab samples were collected by convenience sampling from ewes, lambs, and the environment from 16 UK farms with a history of SDSD joint ill. Samples were tested for presence of SDSD DNA by a novel, validated, qualitative real-time PCR
Results: 1992 samples were collected from 656 ewes. 8.0% of samples were positive for SDSD DNA, including vaginal, rectal, udder skin, and saliva swabs. 430 samples were collected from 123 lambs. Overall, 23.7% of samples were positive for SDSD DNA. These included wounds (navel, tail docking and ear tag); and skin, saliva and rectal swabs. 299 samples were collected from the farm environment. 14.4% were positive for SDSD, including straw bedding, soil, faeces birth products, and environmental book sock samples.
Conclusion: SDSD DNA was found in the reproductive, digestive tracts, and udder skin of a proportion of ewes and a range of environmental samples. This suggests ewes act as a direct or indirect source of SDSD infection. The lamb digestive tract, navel, and management wounds are potential routes of SDSD entry. The study provides underpinning evidence for ensuring high environmental and lamb wound management hygiene at lambing time.

OP#27

Investigation of prevalence of subclinical mastitis and its dynamics between lactations in meat producing sheep

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Introduction: Clinical mastitis peaks early in lactation and again at 3-4 weeks. Early-lactation mastitis may result from unresolved subclinical infections or new infections acquired during the dry period. Subclinical mastitis prevalence in meat sheep flocks is underexplored, yet it has significant implications for health and welfare.
Aims: This study hypothesizes that clinical mastitis in the first week of lactation originates from infection acquired during the previous lactation or the dry period rather than a new infection in the current lactation. Therefore, the aims of this study are to investigate whether ewes without gross lesions to the udder are subclinically infected at weaning, whether these infections self-cure or become chronic and whether new infections are acquired during the dry period.
Materials & Methods: In a Scottish lowland indoor lambing flock, aseptically udder half milk samples (n=780) were collected from breeding ewes at weaning and lambing (n=190 and n=213, respectively). Milk samples were analysed for somatic cell counts (SCC) and bacterial culture with isolate identification via MALDI-TOF. Data on ewe condition, age, litter size, and udder defects were also recorded (Veterinary Ethical Review Committee reference 137.23).
Results: At weaning (SCC average of 644,000 cells/ml), 39.5% of ewes had SCC above the 500,000 cells/ml cut off used for interpretation, rising to 39.9% at lambing (SCC average of 1295,000 cells/ml). Of ewes sampled at both times (n=107), 23.4% had persistent high SCC, while 16.8% acquired new infections. Of all 372 cultured milk samples, 36.8 % (137/372) were cultured positive (either pure or mixed) and 63.2% (235/372) were cultured negative. From the isolates sent to speciation, *Coagulase negative Staphylococcus* were the predominant species (*Staphylococcus equorum*: 38.10%; *Staphylococcus simulans*: 8.73%; *Staphylococcus warneri*: 7.94%; *Staphylococcus chromogenes*: 6.35% and others).
Conclusion: These findings indicates that subclinical mastitis is prevalent in meat producing sheep flocks and may persist or emerge during the dry period.

Keywords: subclinical mastitis, somatic cell counts, Coagulase negative Staphylococcus

OP#28

Urachal remnants in sheep – Anatomo-Histopathological findings at slaughterhouse

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Introduction: At birth, the umbilical cord breaks and the umbilical arteries and urachus retract into the abdomen. There they undergo progressive atrophy leading to a persistent scar at the apex of the urinary bladder. Failure of this involution leads to different types of urachal anomalies (UAs), also named urachal remnants.
Congenital UAs seem unusual in small ruminants, and a paucity of literature on abattoir survey exists.
Materials & Methods: In total, 1206 urinary bladders from slaughtered adult sheep were grossly examined.
Results: Sixty-seven bladders (5.5%) had UAs. Forty-five had irregular spheric, sessile or pedunculated, firm-elastic, pink-grey remnants of mild to moderate size. On cross section, 42 had a homogeneous appearance and, rarely, scattered mild brown-black pigmentation or a fluid-filled cavitation. Histologically, they showed a variable number of cystic formations delimitated by an inner transitional epithelium, sometimes irregularly hyperplastic-metaplastic, and surrounded by abundant connective also containing scattered mild mononuclear infiltrate. Often the lumen of such cysts was filled with eosinophilic material. These lesions were consistent with urachal cysts. Nineteen specimens were represented by elongated, filiform (Ø 3mm), fibrotic extensions up to 11 cm long, almost always with a lacerated free end, and, on cross section, did not show any macroscopic lumen. Histologically, cross sections proximal to the apex showed a central narrow lumen lined by a multi-layered/pseudostratified epithelium surrounded by abundant fibrovascular and collagenous stroma containing few lymphocytes. Consecutive, slightly more distal sections showed replacement of this epithelium by mineralized areas in which few cells were embedded (interpreted as bony metaplasia); eventually, these were substituted by irregularly arranged bundles of smooth musculature and a variable number of blood vessels of different caliber. Distal segments were also surrounded by adipocytes and displayed the previously described stroma. These structures were interpreted as urachal cordae.

Finally, 3 specimens had an evident communication (1-2 x 5 mm) with the bladder's lumen. Histology in these cases was not performed, however the macroscopical appearance allowed to classify them as vesicourachal diverticulum.

Conclusion: The authors underline the importance of these findings also considering its relevance in comparative pathology.

Key words: Abattoir survey; Sheep, Urachal remnants

OP#29

Long-term Evaluation of Growth Performance and Feed Efficiency in Iberian Lambs: A 25-Year Analysis

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Introduction: Sheep production plays a key role in Mediterranean agriculture, with lamb fattening efficiency being a major determinant of economic sustainability (Geenty & Brien, 2010). Understanding growth performance, feed conversion efficiency, and the impact of nutritional strategies is essential for improving lamb production. This study evaluates growth and feed efficiency in Iberian lambs over 25 years.

Aims: The study aims to assess growth performance and feed efficiency across 717 trials, focusing on: a) Establishing key benchmarks for initial and final weights, average daily gain (ADG), and feed conversion ratio (FCR); b) Evaluating the impact of nutritional factors, particularly energy utilization (UFC2007x100); c) Comparing weight groups (n=10), farms (n=85), and feed companies (n=29); d) Developing regression models to predict technical outcomes for continuous monitoring.

Material & Methods: The research includes 717 trials conducted over 25 years within the Iberian Peninsula, covering extensive and intensive feeding systems. Data were obtained from commercial farms, ensuring representativeness (Freer et al., 2007).

Collected metrics included: - Initial and final weights; - ADG and FCR; - Energy input (UFC2007x100); -Weight groups, farm-specific data, and feed company information; - Gender and seasonal variations. ANOVA and regression models were used to determine relationships between nutritional inputs and growth performance, considering environmental factors.

Results: Growth Performance - Lambs had an average initial weight of 19.57 kg and final weight of 22.51 kg, with ADG averaging 0.28 kg/day. Seasonal differences influenced growth rates, with better outcomes in spring (Atti et al., 2006). Feed Efficiency - The mean FCR was 3.27 kg of feed per kg of gain, improving with energy-dense diets and precision feeding strategies.

Predictive Equations - a) ADG Prediction: ADG (Kg/day) = 0.003 ×(UFC × 100) × KgGained (R^2 = 0.959); b) FCR Prediction: FCR = 0.052 × avBW + 1.746 × FI − 4.121 × ADG -0.078 × (UFC × 100)(R^2 = 0.978); c) FCR prediction : FCR = 0.092 x avBW + 9.88 – 3.199 x ADG - 0.078 x (UFC x 100) (R^2 = 0.496)

(ADG = Average daily gain; UFC = Energy (INRA); FCR = Feed Conversion Index; FI = Feed Intake , kg/day; avBW = average body weight; KgGained = Kg body weight gained)

Conclusion: Predictive models allow real-time adjustments in feeding strategies, improving productivity and sustainability. Seasonal management plays a crucial role in optimising lamb growth. Data were collected from commercial farms, introducing potential variability. Future studies should explore genetic and management influences.

This study establishes critical benchmarks for lamb growth and feed efficiency, reinforcing the value of precision nutrition and predictive modelling. Implementing these findings can significantly enhance production efficiency and sustainability.

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OP#30

Lamb D-lactic acidosis: an update on aetiology, pathophysiology, and treatment

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Introduction: Lamb D-lactic acidosis, also known as Drunken Lamb Syndrome or Lamb Nephrosis Syndrome, is a disease of lambs which until recently had been poorly understood, untreatable, and invariably fatal.
Aim: The aim of this paper is to summarise recent investigations that have furthered our understanding of the aetiology, pathophysiology, and treatment of this disease.
Materials & methods: A prospective study of lambs from a single farm in North Wales, UK, was carried out, with all clinical cases investigated (Angell et al., 2013a). Clinical, biochemical, and histopathological investigations were carried out and patterns in the data investigated. A subsequent study then utilised these data to investigate the success of a novel intervention, which was successful in treating 18/18 clinical cases (Angell et al., 2013b). Biochemical analyses were conducted to explore the underpinning treatment hypothesis. The diagnostic test used to confirm clinical disease was then investigated to refine a laboratory reference range to assist in the diagnosis of Lamb D-lactic acidosis syndrome, and other disorders associated with D-lactic acid anomalies. Brain histopathology was also carried out on euthanised clinical cases to investigate cellular neurological changes.
Results: Clinical cases were shown to have elevated blood D-lactate, compared to laboratory reference data. They were also shown to have bicarbonate concentrations below laboratory reference ranges. Based on these data, an oral sodium bicarbonate treatment was developed. Investigations in treated clinical cases revealed blood D-lactate and bicarbonate biochemical data returned to expected reference ranges after treatment. Additionally, 18/18 treated clinical cases survived following treatment.
Conclusion: Drunken lamb syndrome/Lamb Nephrosis syndrome is associated with an increased blood concentration of D-lactate and should be more correctly referred to as Lamb D-lactic acidosis syndrome. Elevations in blood D-lactate are hypothesised to occur as a result of a disordered bacterial fermentation of carbohydrate in the large intestine, following a more proximal gastrointestinal insult resulting in a reduced intestinal transit time. Reversal of the metabolic acidosis produced, using an oral sodium bicarbonate solution is successful, with treated lambs

surviving and making a good recovery. The histopathological data demonstrates non-fatal pathology which should allow lambs to make a good long-term recovery.

Keywords: Bicarbonate; drunken lamb syndrome; histopathology; Lamb D-lactic acidosis; lamb nephrosis

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OP#31

Selenium triglycerides in neonatal goats: predicted effects on haematopoiesis, blood morphology and biochemistry – a residency project overview

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Introduction: Selenium deficiency is a major health concern for neonatal small ruminants, affecting growth and immunity. Selenium triglycerides, a novel organic form of Se, offer advantages over traditional injectable preparations. However, their efficacy has only been studied in cattle, pigs, and sheep. Investigating their effects in neonatal goats may support a more effective, less invasive supplementation strategy, improving animal welfare and health.
Aims: To evaluate the effects of selenium triglycerides on bone marrow cytology, blood morphology and biochemistry, and daily weight gain in Alpine goat kids.
Materials & methods: The study involves 24 Alpine goat kids randomly assigned to two groups: an experimental group (n=12) receiving an oral selenium triglyceride preparation in the first week of life and a control group (n=12) receiving no selenium supplementation. The following procedures are used to assess the supplement's impact on bone marrow haematopoiesis (bone marrow smears for cytological evaluation, stained with the MGG method), blood morphology, and biochemistry (GSH-Px, SOD, ALT, AST, AP, GGTP, LDH, UREA, CREA, GLUC, CAT): blood collection for morphological and biochemical analysis on 1, 7, 14, 21, and 28 day of life, bone marrow biopsy on days 3, 14, and 28, and daily monitoring of body weight and health status through clinical examinations. Obtained data will be analysed using descriptive statistics (mean ± SD) and normality tests (Shapiro-Wilk). Between-group comparisons at each time point will be performed using a Student's t-test or Mann-Whitney U test, depending on data distribution. Time-dependent changes within groups will be assessed using repeated-measures ANOVA or Friedman test, with post-hoc analyses as needed. Correlations between biochemical, haematological, and growth parameters will be evaluated using Spearman's correlation coefficients.
Results: Expected findings include a positive impact of selenium triglycerides on caprine bone marrow haematopoiesis, with higher proportions of erythrocytic, granulocytic, and thrombocytic cell lines, increased GSH-Px and SOD activity, and improved daily weight gain.

Conclusion: Selenium triglycerides appear to be a promising alternative for selenium supplementation in neonatal kids. Their low toxicity and oral administration make them a safer and less invasive option than injectable selenium preparations.

Keywords bone marrow, caprine haematopoiesis, selenium supplementation

POSTER PRESENTATIONS

PP#1

Extensive unilateral facial mass in a 3-year old sheep

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Introduction: Neoplastic lesions in farm animals are not uncommon. In a relatively recent review of tumors in domestic ruminants and swine, cattle were the most affected species with 68.8% of the reviewed cases, followed by goats with 10.52% and sheep with 10.46% (Vasconcelos et al 2023).

Case presentation: In the present case, a 3 year old sheep was presented with a 5x6cm facial mass extending from the left inner canthus of the eye and involving the left frontal, maxillar and nasal areas. The owner had reported a very quick progression, claiming the facial mass had reached this size within 10 days. At the time of presentation, the patient showed massive stridor and bloody purulent nasal discharge a reduced body condition, the clinical examination revealed no further abnormalities. Utrasonographic examination of the affected area revealed hyperechoic well-organized tissue within the mass, surrounded by clear hypoechoic fluid. Osteolysis was present in some areas of the nasal bone. Based on the clinical findings, Enzootic Nasal Adenocarcinoma was suspected.

Outcome: Due to the poor prognosis and the severe clinical signs, the patient was euthanized for welfare reasons. Histopathological examination of the tissue revealed a malignant bone neoplasia, compatible with a chondrosarcoma.

Conclusion: This is a rare tumor in small ruminants. In patients with neoplastic lesions of the nasal area, this needs to be considered as a differential diagnosis to Enzootic Nasal Adenocarcinoma.

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PP#2

Lack of efficacy of Avermectin in Psoroptes ovis control : two observations in meat sheep farms in Pyrenean foothills

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Introduction: Psoroptic mange is an endemic parasitic disease in France, and is a major concern for sheep welfare, causing illthrift in clinically affected animals in clinically affected animals and intense pruritus. Sheep scab control constitutes a challenge mainly because of the parasitic cycle's characteristics, a poor understanding or a misapplication of the treatment recommendations that can lead to failure in eradicating the parasite. Yet another issue arises: emerging scab mite resistance to avermectins, injectable molecules largely used in France.
Aims: This report of two cases of suspected lack of efficacy of avermectins on sheep scab control aims at raising awareness about challenges we face to treat sheep scab.
Materials & methods: Skin scraping of infected animals and microscopic observation.
Results: Observation of live parasites ten days after the second injection of Doramectin intramuscular 0,3mg/kg and 0,2mg/kg respectively in the two farms.
Conclusion: being aware of the limitations of allopathic treatment and understanding the parasitic cycle of Psoroptic mange is key to eradicating sheep scab.

Keywords: sheep scab/ resistance / eradication/ treatment

References: Lack of Efficacy of Avermectins in *Psoroptes ovis* Control : Two Observations in Meat Sheep Farms in Pyrenean Foothills. Le Nouveau Praticien Vét élevages & santé. 2024. 56(16) :20-25

PP#3

Vaccination against ovine toxoplasmosis: effect on lesions and parasite load and distribution

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Introduction: *Toxoplasma gondii* represents a health and economic concern for the ovine industry, as it is responsible for abortions in sheep.
Aims: This study evaluates the impact of vaccination with Toxovax® (MSD Animal Health) on the pathogenesis of the experimental ovine toxoplasmosis.
Materials & methods: Thirty-eight pregnant ewes were distributed into different groups: vaccinated and infected (V-I, *n*=13), vaccinated and not infected (V-NI, *n*=6), not vaccinated and infected (NV-I, *n*=13) and not vaccinated nor infected (NV-NI, *n*=6). Half of each group was culled 28 days post-infection (dpi) and tissue samples from foetuses, lambs and sheep were collected for histological and molecular studies.
Results: Fever was observed in all NV-I animals. Foetal and perinatal loss occurred in >85% of NV-I. Placental vascular lesions, necrosis and non-purulent multifocal inflammation at foetal samples were more frequently found in NV-I than in V-I. Although NV-I animals harboured higher quantities of *T. gondii* DNA, parasite burden in placentomes was paradoxically higher in V-I than in NV-I. No lesions or parasite DNA were detected in the control groups (V-NI and NV-NI).
Cconclusion: Vaccination significantly reduces clinical signs, histopathological lesions and abortion rates in infected ewes. However, vertical transmission is not completely prevented. Further research is needed to clarify the underlying immune mechanisms of vaccine-induced protection.
Keywords: Sheep; toxoplasmosis; vaccination
Acknowledgments: This study was financed by the Spanish Ministry of Economy and Competitiveness (PID2019-104713RB-C22). The funding for these actions comes from the EU's Recovery and Resilience Facility-Next Generation, in the framework of the General Invitation of the Spanish Government's public business entity Red.es to participate in talent attraction and retention programmes within Investment 4 of Component 19 of the Recovery, Transformation and Resilience Plan.

PP#4

Functional Activation of Neutrophils by Commercial Vaccine in Ovine Paratuberculosis

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Introduction: Paratuberculosis, caused by *Mycobacterium avium* subsp. *paratuberculosis* (Map), leads to major economic losses in small ruminants. Although vaccination is considered the most effective control strategy, its protective mechanisms remain unclear. Trained innate immunity, particularly involving neutrophils, may contribute to the vaccine's protective effects. This study investigates the impact of the inactivated commercial vaccine on neutrophil function in sheep.
Materials & methods: Ten Assaf lambs were randomly assigned to vaccinated (n=5) and unvaccinated (n=5) groups. The vaccinated group received the commercial vaccine at two weeks of age. Blood samples were collected at 30, 60, and 90 days post-vaccination (dpv). Phagocytosis and ROS production were assessed in whole blood by flow cytometry after *in vitro* stimulation with Map. At 90 dpv, neutrophils were isolated to evaluate phagocytic activity (by flow cytometry, immunofluorescence, qPCR), Map viability (culture), and NETs formation (immunofluorescence and fluorimetry). Statistical significance was set at $p<0.05$.
Results: Vaccinated animals showed significantly higher neutrophil phagocytosis from 60 dpv and increased ROS production at 90 dpv in whole blood. Isolated neutrophils from vaccinated sheep exhibited greater internalisation of Map, as indicated by higher fluorescence intensity and percentage of infected cells. However, no differences were found between groups in Map viability, NETs formation, or qPCR analysis. The enhanced functionality may be due to trained immunity mechanisms influenced by vaccination.
Conclusion: The commercial vaccine enhances the phagocytic and microbicidal capacities of neutrophils in sheep, potentially contributing to improved control of Map infection. These findings support the role of trained innate immunity post-vaccination and encourage further mechanistic studies.

Keywords: Innate immunity, neutrophils, paratuberculosis, sheep, vaccination
Acknowledgments: This study was financed by the Spanish Ministry of Economy and Competitiveness (PID2021-125807OB-C21

PP#5

Evaluation of body temperatures of Murciano-Granadina goats on warm season

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Introduction: Recent studies have shown in some species that the correlation between rectal and body temperatures vary with the body region assessed and environmental conditions. While environmental temperatures strongly correlate with surface temperatures, the correlation with core body temperatures is weaker, underscoring the challenges in using IRT for accurate core temperature estimation (1).
Aims: The objective of this study was to analyze the influence of ambient temperature on superficial and rectal temperatures of goats.
Materials & methods: The experiment took place in July at the Polytechnic School of Orihuela. The temperature inside the facilities ranged from 26.7 to 34 C. Over a six-day period, 9 goats were taken to the milking room every four hours, where rectal temperatures were measured, and thermographic images from the udder and the lachrymal area were captured using a FLIR SYSTEMS Flyr ThermaCAM TM SC 660 camera. Ambient temperature was recorded with a Testo 174 h datalogger. The PROC CORR procedure in SAS (version 9.4) was used to examine the relationships among udder, ambient (AT), rectal (RT), and lacrimal temperatures (LT).
Results: AT showed a notable influence on udder T ° and LT, with moderate to high positive correlations (0.66 to 0.74), while its correlation with RT was lower (r = 0.48). This lower correlation suggests that goats effectively regulate their internal body temperature despite significant variations in ambient temperature, highlighting their physiological capacity for thermoregulation. Further analysis revealed that the relationship between AT and RT is not constant but varies, particularly under higher ambient temperature conditions.
Conclusion: The findings underscore the strong influence of ambient temperature on superficial body temperatures and a variation of this influence according to the variations of the values of AT.
Keywords: IRT, GOATS, UDDER.
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PP#6

Use of FAMACHA scoring as a tool in assessing haemonchosis in ewes in England

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Introduction: FAMACHA (Faffa Malan Chart) scoring was developed in South Africa as a semi-quantitative way of assessing pallor of the ocular mucous membranes, caused by anaemia due to haemonchosis. The inside of the lower eyelid is compared to a chart and scored from 1-5 (1 being most red, 5 palest). It can thus be used to guide a targeted selective treatment approach to the control of haemonchosis.

Aims: Given increasing reports of haemonchosis as a problem affecting sheep flocks in the UK (Taylor 2009), especially in southern England, the use of FAMACHA scoring has been proposed. However, before its use can be responsibly widely promoted to the English sheep industry, the robustness of the predictive power of the FAMACHA scoring system must be estimated for English conditions.

Materials & methods: Ewes on 6 farms in England with a previous diagnosis of haemonchosis were examined during the period July-September. 100 ewes on each farm were scored for FAMACHA score, body condition score and dag score. In addition, faecal samples were taken from the first 10 animals within the FAMACHA score categories 1 & 2, 3 and 4 & 5. These faecal samples were submitted to an external veterinary laboratory (APHA Carmarthen) for individual worm egg count (by the modified McMaster technique) and pooled *H.contortus* egg differentiation using the fluorescent peanut agglutinin assay (Jurasek et al. 2010). The correlation between scoring categories (FAMACHA, body condition score and dag score) was assessed using Spearman's rank correlation . The relationship between the FWEC and FAMACHA score was assessed using an ANOVA test.

Results: On all farms the greatest frequency of FAMACHA scores were in the 1 & 2 group, the least in the 4 & 5 group. A negative statistical correlation (ranging from -0.615 to -0.279) was found between body condition scores and FAMACHA scores on all six farms. The p value was equal to or below 0.005 on all farms. There was no correlation between dag score and FAMACHA score. There was also a positive correlation between mean FWEC and FAMACHA scores on 5/6 farms. When analysing farm and FAMACHA score as predictors of FWEC using a two way ANOVA test, the predictive value of both farm and FAMACHA score was high, having combined

and individually a p <0.001. All of these findings correspond with the typical clinical picture of haemonchosis. Fluorescent peanut agglutinin assay confirmed that all flocks had *H. contortus*, however the proportions varied a lot from farm to farm. There was a trend on most farms to the % eggs fluorescing increasing as the FAMACHA score increased, however the regression was not significant.

Discussions: Unlike previous studies, this study did not directly examine FAMACHA score as a predictor of haematocrit, but this has been reasonably well established in previous studies. Its focus was on FAMACHA score as a predictor of animals that required anthelmintic treatment. Given the significant positive correlation between FAMACHA score and FWEC it may be said that in agreement with previous studies the scoring system does correctly identify the ewes with the greater worm burden. Also, again in agreement with some previous studies, the FAMACHA score is negatively correlated with body condition score, so it is identifying ewes that are suffering negative effects from their parasite burden, and in turn will have reduced productivity (given the well-established correlation between body condition and ewe fecundity, milk yield etc).

One farm had an a worm population that was almost exclusively *H. contortus*. This may be due to anthelmintic resistant *H. contortus* being present on farm and surviving treatment that removed all the other, susceptible, worm species. This would have an effect in the short-term aftermath of treatment, but if sheep were put onto pasture with limited in refugia population that pasture may end up contaminated with with an almost pure population of H. contortus, which would in turn infect sheep grazing that pasture. The other farms showed a more mixed population of parasites. Interestingly for farms with a recent history of haemonchosis, only in half of the flocks were *H. contortus* eggs greater than 50% of the eggs isolated from faeces.

Such an indirect measure as this will always suffer from imprecision, in that there are other causes of pallor. In investigating only on farms where haemonchosis has been diagnosed the study did not examine the predictive power of the scoring system for detecting haemonchosis. Furthermore, the absence of grazing history for the ewes adds another limitation. Without this, it is challenging to determine whether infections were chronic or acute, which may affect FAMACHA scores. In sheep, a regenerative response can be seen in as little as 1-2 days and peaking 6-8 days post anaemic event . If ewes with a low tolerance to *H. contortus* were moved recently to a highly contaminated pasture, a large pre-patent burden could be acquired, resulting in no change in FWEC despite anaemia. Another limitation was the lack of information regarding the animals' anthelmintic treatment history. According to previous studies, lambs infected with *H. contortus* did not show a normal PCV until about two weeks following successful anthelmintic treatment. Recent treatments may reduce *H. contortus* populations and FWECs but may not allow sufficient time for red blood cell regeneration, leading to level of pallor, reducing the correlation between FAMACHA score and FWEC.

Conclusion: Overall, however, when combined with evaluations of body condition score, FAMACHA scores show promise as a tool to detect which ewes are more affected by haemonchosis on sheep farms in England where *H.contortus* is known to be present.

Keywords: sheep, haemonchosis, FAMACHA, targeted selective treatment

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PP#7

Internal Parasitic Burden and Anthelmintic Resistance in Household Goat Herds in Northwestern Romania

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Introduction: The extensive use of anthelmintics (AHs) for the management of endoparasitic infections, particularly gastrointestinal strongyles (GIS), has contributed to the emergence of anthelmintic resistance (AR). Identifying the spatial distribution and reporting on endoparasite populations and their resistance levels is critical for effective monitoring, control, and education of farmers.
Aims: This study assessed the internal parasitic burden and the occurrence of AR in goat herds raised under household management systems in Northwestern Romania.
Materials and Methods: Between 2020 and 2021, five herds (n=300) were dewormed with eprinomectin in the autumn (H1, H2) and albendazole in the spring (H3–H5). Fecal samples (n=67) were collected before and 14 days post-AH administration. Coprological examinations, coprocultures, and polymerase chain reaction (PCR) analysis were performed. AR was evaluated in herds that met the WAAP guideline requirements (H1, H2, and H5) using the fecal egg count reduction (FECR) test.
Results: Before AH administration, *Eimeria* spp. was the most prevalent parasite (95.5%), followed by GIS (91.0%), *Protostrongylus rufescens*/*Muellerius capillaris* (77.6%), *Dictyocaulus filaria* (56.7%), and *Moniezia* spp. (43.3%). *Teladorsagia circumcincta*, *Trichostrongylus colubriformis* (4/5 herds), *Oesophagostomum venulosum* (3/5), *Haemonchus placei* (3/5), *H. contortus* (2/5), and *Cooperia oncophora* (2/5) were detected by PCR. Total mean oocyst/egg counts for *Eimeria* spp. and GIS were ≤1000 per gram feces at both timepoints, with values that tended to be higher in young compared to adult goats (except for GIS at day 14) and during spring compared to autumn (except for Eimeria spp. before AH administration). Post-AH administration, FECR (90% confidence interval) values were 38.42 (23.4–71.8) for H1 and 54.71 (–4.1–75.1) for H2 following eprinomectin administration, and 9.78 (–1.7–64.8) for H5 following albendazole.

Conclusion: High rates of GIS and other internal parasitic infections (*Eimeria* spp., lungworms, *Moniezia* spp.) were observed. The suboptimal efficacy of both albendazole and eprinomectin, along with the presence of AR, highlights the need for tailored AH management strategies and integrated parasite control programs in small ruminant production systems. Parasite control should rely on copro-parasitological examination and egg count testing. Uncontrolled, excessive use, or underdosing of anthelmintics should be avoided.

Keywords: goats; internal parasites, strongyles; anthelmintics; resistance

PP#8

Development of an Innovative Management System for Sheep Farming Enterprises in the Ionian Islands

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Introduction*:* In the Ionian Islands (Corfu, Kefalonia, Ithaca, Lefkada, Zakynthos), livestock farming is semi-extensive and relies on farmers who follow traditional breeding methods without specific planning regarding hygiene conditions, grazing, and reproduction. The viability of small farms is undermined by factors such as insufficient information, lack of education and expertise among professionals, low productivity, high production costs, variations in product quality, difficulties in market access, social isolation, and the undervaluation of livestock farming as a profession.

Aims: This study focuses on the integration of an innovative management system to improve the sustainability, productivity, and overall viability of sheep and goat farming enterprises in the Ionian Islands.

Materials and Methods: Stage 1: Genetic and Disease Assessment

A total of thirteen sheep farms raising local breeds from Kefalonia and Zakynthos were selected for analysis. The study focused on: a) The distribution of genetic resistance to scrapie among the sheep population; b) The prevalence of maedi-visna, a chronic viral disease affecting sheep.

Stage 2: Pilot Implementation of a Management System

A pilot livestock management system was introduced to achieve the following objectives: a) Increase the number of animals with genetic resistance to scrapie; b) Reduce the prevalence of maedi-visna through targeted breeding and improved farm management practices.

Stage 3: Development of Policy Recommendations

Based on the findings, a set of recommendations was developed and presented to farmers and policymakers to encourage informed decision-making and long-term improvements in livestock farming.

Results: *Zakynthos Breed* - The genetic resistance rates of the Zakynthos sheep breed were notably high: - 15.6% of sheep carried the ARR/ARR genotype (fully resistant); - 42.2% carried the ARR/ARQ genotype (partially resistant). A total of 57.8% of the population exhibited full or partial resistance to scrapie.

Serological tests for maedi-visna showed an average positivity rate of 28.9%, which is relatively low compared to other regions where rates can reach up to 80%.

Kefalonia Breed

Sheep of the Kefalonia breed demonstrated: - 40.7% genetic resistance to scrapie, making them suitable for the development of disease-resistant breeding programs. However, 3.8% of the population carried genotypes highly susceptible to scrapie (valine alleles), requiring strategic breeding programs for gradual elimination. Encouragingly, maedi-visna prevalence in Kefalonia farms was only 4%, one of the lowest rates recorded in Greece.

Conclusion: The incorporation of Selective breeding programs to enhance genetic resistance to diseases. The gradual elimination of susceptible genotypes through a mild herd transformation plan that minimizes economic and management disruptions. Broader adoption of new technologies and sustainable practices to improve productivity, animal welfare, and farm sustainability. It is evident that integrating modern livestock management techniques, alongside policy support and farmer education, is crucial for ensuring a more resilient and productive livestock sector in the Ionian Islands.

Keywords: selective breeding programs

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PP#9

Systematic review and meta-analysis of *Eimeria* spp. infection in small ruminants from Romania

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Introduction: Coccidiosis is a protozoan disease caused by *Eimeria* species that infects the epithelial cells of the gastrointestinal tract. It leads to significant economic losses in young farm animals due to decreased weight gain, increased morbidity and mortality, and high costs related to treatment and prevention. While sheep and goats each host approximately 13 distinct *Eimeria* species, these are not shared between the two. Despite its impact, the prevalence and consequences of coccidiosis in small ruminants, particularly lambs and kids, remain underestimated in Romania.
Aims: To address this, we conducted a systematic review and meta-analysis of the prevalence and associated risk factors for *Eimeria* infections in Romanian sheep and goats. Literature searches were performed in international and Romanian databases for studies published from 2007 to 2024. Ten studies met the inclusion criteria, including seven on sheep and three on goats. Notably, six of these studies were conducted after 2016, and only one focused on *Eimeria* infection.
Results: The reviewed studies included 26 flocks, of which 12 were reported as *Eimeria*-positive, one as *Eimeria*-negative, and 13 for which infection status was not specified. The overall prevalence of *Eimeria* spp. infection in small ruminants was estimated at 37.1% (95% CI: 34.5–39.8), with a mean oocysts per gram (OPG) count of 1,489.
Subgroup analyses revealed significantly higher prevalence rates in lambs and kids (65.8%; 95% CI: 57.0–73.7) compared to adults (46.9%; 95% CI: 42.7–51.2), and in goats (53.0%; 95% CI: 44.0–61.8) compared to sheep (35.6%; 95% CI: 32.9–38.3). Likewise, mean OPG was markedly higher in lambs/kids (6,392) than in adult animals (320). Geographical differences were also evident: the prevalence was significantly greater than 50% in the western, central, and northern regions of Romania, compared to only 16.7% in the southern region.
Species-level identification was performed in only one study on sheep, reporting the presence of E. ovinoidalis (42%), E. crandallis (28%), E. parva (17%), E. faurei (10%), and E. pallida (3%).
Conclusion: The present study underscores the need for further research on the epidemiology of coccidiosis in small ruminants in Romania, with particular emphasis on goat-specific investigations, longitudinal studies, farm-level risk factor analyses, and detailed species

identification. Additionally, comprehensive assessments of the economic impact, especially regarding health and production parameters, are essential to fully understand the disease's burden in our country.

Keywords: *Eimeria,* goats, review, Romania, sheep.

PP#10

A rare case of cutaneous non epitheliotropic B cell lymphoma in a sheep

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Introduction: Skin diseases in sheep are common, but determining their cause based on clinical appearance can be challenging. This case report describes a rare instance of cutaneous lymphoma in a sheep, clinically indistinguishable from sheep and goat pox (SGP). It highlights the importance of recognizing atypical disease manifestations, disease surveillance, and the role of histopathological examination in determining the cause of skin diseases.

Materials and Methods: A six-year-old Welsh Hill Speckled Face ewe from a flock of 600 sheep presented with multiple cutaneous nodules. The practitioner consulted the GD Veekijker, a passive surveillance consultancy. Due to the similarity of the lesions to SGP and recent SGP outbreaks in Europe, the case was referred to official authorities under the suspicion of an OIE-listed disease. A capripoxvirus PCR on EDTA blood and an ELISA on a serum sample were performed. The ewe was later euthanized for post-mortem examination. Samples from the skin nodules were collected for bacteriological culture and DNA/RNA nanopore sequencing. Samples from the skin, caecum, liver, kidney, and mammary lymph node were collected for histopathology, fixed in 10% neutral-buffered formalin, processed, paraffin-embedded, and stained with HE. Immunohistochemical staining with CD3 and CD79a antibodies was performed on the skin lesions.

Results: PCR and ELISA tests for Capripoxvirus were negative, ruling out SGP. Macroscopic examination revealed nodular and ulcerated cutaneous lesions over the entire body, pale nodules in the kidneys, and prominent Peyer's patches in the caecum. Histopathological examination and immunohistochemical phenotyping with CD3 and CD79a antibodies confirmed a multicentric non-epitheliotropic cutaneous B-cell lymphoma. Bacterial culture identified *Staphylococcus chromogenes* as a secondary skin infection. Nanopore sequencing of the lesional tissue for viral and bacterial complexes was negative.

Conclusion: This report documents the first case of cutaneous non-epitheliotropic B-cell lymphoma in sheep in the Netherlands, initially suspected to be SGP. It underscores the critical role of veterinary practitioners and pathological examination in disease identification and surveillance. Early and accurate diagnosis is essential for managing atypical disease presentations and ensuring effective disease control and prevention.

Keywords: lymphoma, ovine, surveillance

PP#11

Multimodal Diagnostic Assessment of Concurrent Lung Pathologies in flocks with Ovine Pulmonary Adenocarcinoma: Insights from a Pilot Study

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Introduction: Ovine respiratory diseases significantly affect animal welfare and farm productivity. Diagnosis of Ovine Pulmonary Adenocarcinoma (OPA), a retroviral-induced neoplasia, is often challenging due to common clinical and pathological features that it shares with non-neoplastic conditions. This study aimed to assess a multimodal approach for diagnosing lung pathology in sheep using rapid transthoracic ultrasonography (TTUS) alongside post-mortem examination (PME) by a standardized protocol of sampling 10 lung sites for histopathology, and immunohistochemistry (IHC).

Material and methods: Twenty-one adult sheep from flocks in central Scotland were selected, consisting of 16 animals with a range of lung pathologies detected by TTUS and 5 negative control animals. For each sheep TTUS examination was recorded, followed by euthanasia and PME of the whole lung with samples taken from 10 predefined sites. Gross and histopathological lesions were defined and categorized using the most common changes in sheep, as previously described in the literature. Only those aspects that could be assessed by visual inspection were considered for gross lesions. To confirm OPA, IHC was performed using an antibody specific for the Jaagsiekte Sheep Retrovirus (JSRV) SU envelope protein.

Results: Of the 21 sheep selected for study 16 sheep had lung lesions identified by TTUS, of which 11 were classified as suspected OPA. Discoloration was the most common gross lesion (18/21), followed by macroscopic suspected OPA (14/21), nodular lesions (4/21), and other lesions. Interstitial pneumonia (IP) was not identified by gross appearance at PME. OPA was confirmed by histopathology and immunohistochemistry in 13 cases, with consistent localization of the tumor in the right and left cardiac lobes and the left apical lobe.

A comparative analysis according to the OPA status of the analyzed lung areas revealed that in sheep with OPA, the most common observation in the OPA-unaffected apical and cardiac lobes was no significant finding showing that, at least in the pre-clinical stages, OPA is usually confined

to individual lobes. Fibrinous pneumonia/bronchopneumonia, verminous pneumonia (VP), and other types of lesions were also identified. Among the OPA-negative cases, the most common lesion was lymphoplasmacytic interstitial pneumonia (LIP), except in the caudal region of the diaphragmatic lobe where VP was common. Other types of lesions were also identified. LIP, often undetectable grossly but commonly identified microscopically, especially in OPA-negative cases, holds a particular significance in sheep due to its association with Maedi-Visna infection, or with other conditions such as *Mycoplasma ovipneumoniae* infection, Peste des petits ruminants, and chronic exposures to parasitic infections.

Conclusion: A ten-site histopathologic sampling analysis, supported by IHC, enhanced the diagnostic accuracy of lung pathologies identified during TTUS screening and revealed lesions that might be missed by TTUS or PME.

Keywords: lung, pathology, sheep

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PP#12

Anticoccidial activity of intraruminal bolus containing *Tanacetum vulgare L.* extract against *Eimeria spp.* in lambs under field conditions

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Introduction: Eimeriosis is common parasitosis in sheep. This infection mainly affects lambs, but adult animals on the farm can be carriers. Considering the current problem of drug resistance, it is necessary to look for various alternatives to drugs.
Aims: To evaluate the anticoccidial efficacy of *Tanacetum vulgare* extract in lambs under field conditions.
Materials and Methods: The study was conducted in four different sheep farms (A-D). In each farm, 20 lambs tested positive for Eimeria spp. infection were randomly selected and two groups were formed – bolus group and control group 10 lambs in each. On day 0 intraruminal boluses containing lyophilizate of *T. vulgare* extract was administered for bolus group. Feacal oocyst counts were performed on day 0, 21, 42, 63 and 84 and was calculated feacal oocyst count reduction (FOCR).
Results: The strongest anticoccidial effect and the higher FOCR on 84 days were in two farms – B (96%) and D (90%). The other two farms had lower FORC on 84 days – A (69%) and C (47%) but in these farms the higher reduction was on 63 days – A (83%) and C (76%).
Conclusion: The obtained results indicate that the anticoccidial effect of *T. vulgare* extract varies across different farms. Additionally, its efficacy is time-dependent.
Keywords: anticoccidial, tansy, sheep

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PP#13

Anthelmintic activity of *Cucurbita pepo* and *Satureja hortensis* alcoholic extract against sheep gastrointestinal strongyles

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Introduction: The increasing prevalence of anthelmintic resistance in sheep gastrointestinal strongyles highlights the need to explore alternative control strategies. In this context, plant-based extracts represent promising alternatives due to their rich content of bioactive compounds with potential antiparasitic effects.

Aims: The aim of this study was to evaluate the *in vitro* anthelmintic efficacy of alcoholic extracts derived from *Cucurbita pepo* and *Satureja hortensis* against sheep gastrointestinal srongyles.

Materials and Methods: The research was conducted during 2022, in a sheep herd located in Cluj County, Romania. Ten individual fecal samples were randomly collected from the sheep rectum. Strongyle eggs were recovered from a pooled fecal sample using the sieving method. The effectiveness of alcoholic extracts from *C. pepo* and *S. hortensis* against gastrointestinal strongyles was evaluated using three distinct *in vitro* assays: the egg hatch assay (EHA), the larval development test (LDT), and the larval paralysis test (LPT). Six concentrations (50, 25, 12.5, 6.25, 3.125, and 1.562 mg/ml) were tested, each concentration was replicated five times.

Results: Statistical analysis revealed significant differences between both plant extracts and the alcoholic control ($p < 0.05$), confirming their specific antiparasitic activity. *C. pepo* showed the highest anthelmintic efficacy, with lower DL_{50} values (1.63 mg/ml in EHA, undeterminable in LDT and 1.64 mg/ml in LPT), whereas *S. hortensis* demonstrated moderate effectiveness (DL_{50} values of 2.85 mg/ml in EHA, 2.62 mg/ml in LDT and 4.09 mg/ml in LPT). Therefore, both extracts may serve as viable natural alternatives for controlling gastrointestinal strongyle infections in sheep.

Conclusion: *Both C. pepo* and *S. hortensis* extracts showed antihelmintic activity but the higher effectiveness was observed for the pumpkin seeds extract.

Keywords: *Cucurbita pepo, digestive strongyles, Satureja hortensis*, sheep

PP#14

Characterization of the fecal microbiome of sheep after administration of Tanacetum vulgare L. extract.

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Introduction: Tanacetum vulgare extract has shown some antiparasitic effects, but its potential effects on the gastrointestinal microbiome (GIM) need further clarification.
Aims: To determine the effect of *Tanacetum vulgare* extract on the sheep GIM.
Materials and Methods: Thirty Latvian Dark-Headed sheep (4-5 months old) were randomly assigned to groups A to E in a controlled experiment. On day 0, groups A and B received 3D-printed intraruminal boluses of tansy extract in different concentration, group C received tansy pellets for 40 days. Group D served as a negative control, group E as a positive control treated with levamisole (5 mg/kg). Fecal samples collected before treatment and on day 56, then frozen and sent for DNA isolation, microbiome profiling by targeting bacterial 16S rDNA using next-generation sequencing (NGS).
Results: Ten most frequent detected genera were Ruminococcaceae UCG-005, Rikenellaceae RC9 gut group, Lachnospiraceae Family, Ruminococcaceae UCG-010, Ruminococcaceae Family, Clostridiales Order, Christensenellaceae R-7 group, Treponema 2, Bacteroidales Order, p-251-o5 Family, Bacteroides. There was no difference between the groups in the beta diversity score before the study, ($p<0,05$). At the end of the study, differences were observed between groups C and A ($p=0.015$), E and A, B, C, D ($p=0.001$). Difference before and at the end of study were observed for group A ($p=0.011$) and E ($p=0.004$).
Conclusion: The GIM is modulated using tannin-containing preparations. Further studies using larger numbers of animals should be conducted.
Keywords: Tannins, microbiome, antiparasitic resistance
Acknowledgments: The project is supported by the Ministry of Agriculture of Latvia and the Rural Advisory Service of Latvia, project no. 22-00-A01612-000007. " Production of medication form of extract from tansy leaves, Latvian traditional medicinal herb, and its impact on microbiot of sheep digestive tract and antiparasitic control"

PP#15

ENVIRANT - Environmental impact of anthelmintics in livestock and alternatives to minimize their use (COST ACTION)

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Introduction: Pasture-based animal production systems play a vital role in promoting sustainable farming practices in Europe. These systems rely on grass grazing as an affordable feed source on the farm. However, these systems have certain disadvantages, particularly concerning animal health since grazing livestock are very susceptible to infections caused by helminth parasites. These infections can impose a substantial economic burden on the food production system and the most commonly used method for their control is the administration of anthelmintic drugs. However, these drugs have been considered recently emerging contaminants because their presence in both terrestrial and aquatic ecosystems poses significant environmental risks.

Aims: Under this context, the objective of ENVIRNAT is to advance, consolidate and disseminate research and knowledge on the environmental occurrence and ecological impact of anthelmintics administered to livestock and to propose more sustainable practices and methods to minimize their use in the control of helminth infections. This Action aims to (i) to monitor the sale, use and

efficacy of anthelmintics in European livestock farming; (ii) to investigate factors related to farming practices, the environment and climatic conditions that favour the persistence of anthelmintics in the environment; (iii) to assess the impact of anthelmintic residues on ecosystems; (iv) to develop sustainable methods to reduce the use of anthelmintics in a variety of European settings; (v) to conduct socio-psychological research on barriers that may arise in the implementation of sustainable methods; (vi) to model the impact of anthelmintic use, considering both animal health benefits and ecosystem risks through benefit-risk assessment.

ENVIRANT is structured into six work groups (WG), which work in synergy to ensure the achievement of the objectives. The first four WGs (WG1-WG4) are dedicated to cultivating and disseminating knowledge in various promising scientific areas essential for facilitating the transition to a more sustainable use of anthelmintics. Their initial task is to generate scientific content that will serve as a benchmark for progress in their respective scientific areas. This material will facilitate the dissemination of knowledge to researchers, especially young researcher and innovator (YRI). WG5 is a cross-sectional WG that integrates the outcomes of the first four WGs to establish predictive models to determine the benefit-risk of the use of anthelmintic drugs. Finally, WG6 will focus on community building, dissemination and communication to researchers and stakeholders, supporting other activities led by the other WGs. The supervision and coordination of the Action will be carried out by the Management Committee (MC) .

Express your interest in joining any working group by applying on:

www.e-services.cost.eu/action/CA23154/working-groups/apply

Key words: Anthelmintics, Ecotoxicity, Livestock, Sustainable methods

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PP#16

An application of metabolomics to the detection of anthelmintic resistance of gastrointestinal nematodes in goats (METABOL-AR)

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Introduction: Anthelmintic resistance is one of the major global threats for welfare of small ruminants. While the genetic background of resistance to benzimidazoles has been well clarified, little is known about the consequences of anthelmintic resistance for metabolism of gastrointestinal nematodes.

Aims: The objective of METABOL-AR project is to quantify the metabolome of the larval stages of gastrointestinal nematodes susceptible and resistant to benzimidazoles. Therefore, in the METABOL-AR project we aim to employ currently the most advanced and sophisticated tool for investigating gastrointestinal nematodes metabolome. Larvae will be collected from various geographical and climatic regions of Europe so that an influence of various potential confounders (such as gastrointestinal nematodes species composition, temperature, and rainfall) on gastrointestinal nematodes metabolome can be precisely studied. A main goal will be to identify a set of metabolites significantly and independently linked to the presence of resistance to benzimidazoles. In the future quantification of these metabolites could serve as a simple, rapid and accurate method for diagnosing resistance to benzimidazoles in larvae isolated from fecal samples. This would provide an alternative for traditional *in vitro* and *in vivo* tests for resistance to benzimidazoles. To achieve this objective METABOL-AR team brings together 7 partners (research institutions) from 6 different countries representing different regions of Europe with different climate from humid subtropical and maritime to temperate continental. Since the larvae

will come from different countries the METABOL-AR will also provide a highly complex view of gastrointestinal nematodes species composition, resistance to benzimidazoles prevalence in various geographical and climatic regions of Europe.

Research objectives: a) Determination of the influence of geographical and climatic factors on larvae metabolism, b) Identification of trace differences in metabolomic profile associated with variations in gastrointestinal nematode species composition, c) Identification of a set of metabolites accurately distinguishing between benzimidazole-susceptible and benzimidazole-resistant larvae. d) Obtaining proof-of-concept for metabolomics as a rapid and practical test for resistance to benzimidazoles, e) Spread of know-how, implementation of new methods and provision of training in anthelmintic resistance diagnostic methods in countries where they have not been used before, f) Collection of data on prevalence of benzimidazole resistance in goat herds from areas where they have not been available until now (Estonia and Latvia) or are scarce (Turkey), g) Collection of detailed data on the species and community composition in goats in different climatic regions of Europe.

Key words: Anthelmintic Resistance, Benzimidazoles, Goats, Metabolome, Nemabiome

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PP#17

Prevalence of the resistance of gastrointestinal nematodes to levamisole in the Polish goat herds based on the faecal egg count reduction test

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Introduction: Parasitic infections, especially caused by gastrointestinal nematodes (GIN), are important causes of economic losses in goat farming worldwide. The widespread use of anthelmintic products has led to the emergence of drug-resistant parasite strains. The faecal egg count (FEC) reduction (FECR) test (FECRT) is the only tests for the detection of anthelmintic resistance (AR) that can be done *in vivo*. In this study we aimed to determine the prevalence of resistance to levamisole (LEV) in the Polish goat herds by using FECRT.

Materials & Methods: This cross-sectional study was conducted from April 2021 to November 2023 and enrolled 16 dairy goat herds (217 goats in total) located in various regions of Poland. FECRT was performed according to the most up-to-date recommendations. Goats were treated with recommended doses of LEV (12 mg/kg, orally). The number of animals enrolled in the treatment group in each herd varied from 10 to 21 animals depending on the herd size. Percentage FECR (%FECR) was calculated according to the following formula: %FECR = 100 × (1 - [T1/T0]) where T0 and T1 were the mean FEC in the treated group before and after treatment, respectively. The parasite population was considered (suspected) resistant if %FECR was <95%. Larval cultures were prepared for each group and identified to the species level based on morphological features of the third-stage larvae (L3).

Results: The resistance to LEV was detected in 2 out of 16 goat herds examined in the study (13%; 95% confidence interval: 4% – 36%). The %FECR in the two herds with resistance to LEV was 82% and 91%. In herds, the %FECR ranged from 96% to 100%. The main GIN genus detected in all post-treatment faecal samples was *Trichostrongylus* spp.

Conclusion: Our study showed that resistance to LEV was low in goat population in Poland and *Trichostrongylus* spp. was the main GIN genus responsible for AR. The prevalence of AR to LEV assessed by the *in vivo* FECRT is consistent with results obtained from our previous studies based on *in vitro* larval development test, in which the prevalence of resistance to LEV was 12%.

Key words: Anthelmintic Resistance, Goats, Nematodes, Levamisole
Acknowledgements and funding: The study was financed by the grant from the National Science Centre (UMO-2020/37/B/NZ6/00457).

PP#18

SPARC (Sustainable Parasite Control in Grazing Ruminants) - a new HORIZON EUROPE thematic network to promote sustainable worm control in grazing ruminants

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Introduction: Ruminant farming is critically important in maintaining the viability of rural communities and ensuring food security. All grazing ruminants are exposed to parasitic worm (helminth) infections, that negatively impact ruminant health/welfare and productivity. Infection with parasitic worms is estimated to cost the livestock sector upwards of €1.8 billion a year in Europe, with 80% of this due to production losses and 20% due to treatment costs. Efficient worm control is a requirement to guarantee the health, welfare and production efficiency of grazing ruminants. Worm control is largely based on preventive use of anthelmintic drugs, but excessive use of anthelmintics has led to anthelmintic resistance, which has become a global threat for effective parasite control.The only way to mitigate anthelmintic resistance in ruminants, is to adopt sustainable worm control strategies.

Aims: SPARC aims to build a European Community of Practice involving all interested stakeholders and build a European vision and practices on sustainable worm control. The final goal is to increase the performance and the resilience of ruminant livestock farms by widely disseminating best practices, tools and solutions on sustainable worm control that improve (1) animal health and welfare on the farms; (2) economic performance, and (3) the environmental sustainability of the sector. National and international stakeholder networks will share sustainable worm control practices among farmers, across borders and production systems (beef and dairy cattle, meet and milk sheep and goats). Dissemination of experiences and results will be facilitated by a Knowledge Exchange Platform on the SPARC website, hosting testimonies, case studies, videos, practice abstracts and decision support tools, available in local languages. SPARC activities and results will be communicated on social media and in professional journals.

Europe wide collaboration: SPARC is a cooperation between 15 partners in 10 countries coordinated by Flanders Research Institute for Agriculture, Fisheries and Food (ILVO) and Kreavet in Belgium. The partners involved are Ghent University (BE), Universitá Degli Studi di Napoli Federico II (IT), Hellenic Agricultural Organisation (ELGO)-DIMITRA (GR), Zuidelijke Land- En Tuinbouworganisatie Vereniging (NL), Institut de l'Elevage (FR), Animal Health Ireland (IE), Bioresearch Laboratories (GR), Agencia Estatal Consejo Superior de Investigaciones Cientificas (ES), Toinen Pro Art Fundacja (PL), Centre Interregional d'information et de Recherche en Production Ovinele Mourier (FR), Boehringer Ingelheim (DE), The Queen's University of Belfast (UK) and Moredun Research Institute (UK).

For more information about the project and how to join the SPARC network, visit the project website: www.wormsparc.com.

Key words: anthelmintic resistance, helminths, implementation, integrated control, network, ruminants

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PP#19

Preliminary study on lung ultrasound as a diagnostic tool for lower respiratory tract diseases in sheep

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Introduction: Pulmonary ultrasound is a useful, simple, and safe tool for diagnosing respiratory diseases in sheep. It allows assessment of the lungs and detection of lesions. Healthy lungs show A-lines, while pleural irregularities, consolidations, or pleural effusion may indicate disease. This study analyzes the agreement between ultrasound, clinical examination, and post-mortem findings.
Materials & Methods: The study was conducted on 52 sheep. Each animal first underwent a clinical examination focused on the respiratory system, followed by pulmonary ultrasonography. Ultrasound was performed using an Esaote MyLab™ Omega scanner and a microconvex transduce. Both techniques were used to assess the presence of lower respiratory tract disease. All animals underwent post-mortem examination. For each case, clinical, ultrasonographic, and pathological scores were recorded to enable comparative statistical analysis.
Results: Statistical analysis showed that clinical evaluation had a low agreement with post-mortem findings (κ = 0.291, p=0.031). Ultrasonography performed better (κ = 0.47X, p=<0.001), indicating greater reliability, although some diagnostic limitations remained. The combination of clinical and ultrasonographic assessment yielded the highest diagnostic accuracy (κ = 0.833, p=<0.001), demonstrating strong agreement with the definitive diagnosis and supporting the complementary use of both methods.
Ultrasound can misidentify healthy animals as sick due to non-specific findings. Therefore, it is essential to interpret the results along with clinical signs.
Conclusion: Although clinical examination is useful, it has limitations. Lung ultrasound improves diagnosis and, together with clinical evaluation, is the best option for detecting respiratory diseases in small ruminants.

Keywords: sheep, respiratory diseases, ultrasound diagnosis, clinical exam, pulmonary pathology.

PP#20

Prevalence of Zoonotic Resistant Bacteria in Small Ruminants from Centre Region of Portugal – Preliminary Results

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Introduction: The emergence of potentially zoonotic antibiotic-resistant bacteria that can be transferred from animals to humans is a significant concern, particularly regarding extended-spectrum β-lactamase (ESBL)-producing strains of *E. coli* and methicillin-resistant *Staphylococcus aureus* (MRSA).

Aims: The current study aimed to investigate the fecal carriage of presumed ESBL–producing *E. coli* strains and the nasal carriage of presumed MRSA by small ruminants in the Centre region of Portugal.

Materials and methods: A total of 106 farms—comprising 72 sheep farms and 34 goat farms—were selected based on convenience sampling. From each farm, six animals were randomly chosen for sampling. Fecal samples were collected per rectum, and nasal swab samples were taken from all selected animals. Bacteria were isolated following the standard EURL-AR protocols and identified using MALDI-TOF mass spectrometry. A farm was considered positive for bacteria if at least one animal tested positive. Additionally, a questionnaire was created and validated to gather information about the farm type, farming system, and antimicrobial usage.

Results: Most farmers stated the use (96.2%) and stock of antibiotics on the farm (85.8%), mainly oxytetracycline (78.3%), penicillin+di-hidroestreptomicin (6.6%), and ampicillin/amoxicillin (4.7%), which are used to treat mastitis (39.6%), foot trot (39.6%) and diarrhea (33.0%). The overall prevalence of presumably ESBLs–producing strains of *E. coli* was 18.9%, slightly higher in goat (23.5%) than in sheep farms (16.7%). Prevalence of isolation was significantly higher in conventional (90.0%) than biological (10.0%) farms, and in semi-extensive (55.0%) than extensive (30.0%) or intensive/semi-intensive systems (15.0%) (p=0.027). Presumably MRSA was isolated from 14.7% and 8.3% of goat and sheep farms, respectively. The prevalence of isolation was significantly higher in semi-extensive and intensive/semi-intensive (both 36.4%) than in extensive (27.3%) production systems (p<0.001).

Conclusion: The prevalence of ESBL-producing stains of *E. coli* and MRSA highlight the importance of small ruminants as reservoirs of antibiotic-resistant genes which poses a significant zoonotic risk. These zoonotic bacteria and associated resistant genes can be transferred to humans by direct contact with healthy carrier animals, contaminated environments and chain food. These findings underscore the need to implement strict biosecurity measures to contain the spread of bacteria and antibiotic resistance genes and raise awareness among small ruminant producers about the responsible use of antibiotics.

Keywords: ESBL-producing stains of *E. coli*, methicillin-resistant *Staphylococcus aureus*, sheep, goat

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PP#21

Knowledge, attitudes and practices regarding antimicrobial use among small ruminant farmers from Portugal

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Introduction: The use of antibiotics in farm animals is considered one of the factors contributing to the emergence of antibiotic-resistant bacteria (ARB). Evaluating the Knowledge (K), Attitude (A), and Practices (P) of farmers helps design effective educational initiatives for responsible antimicrobial use (AMU).
Aims: The current study aimed to assess the knowledge, attitudes, and practices (KAP) of small ruminant farmers in Portugal regarding antimicrobial use (AMU), antimicrobial resistance, and residues in animal-based products.
Materials and methods: A questionnaire consisting of four sections was developed and validated to assess sociodemographic information and the knowledge, attitudes, and practices (KAP) of

farmers. Each KAP section contained seven questions designed to create measurement scales, where correct answers were scored as "1" and incorrect answers as "0." KAP levels were categorized as "bad" (0-2), "good" (3-5), and "very good" (6-7) based on the scoring scale. The questionnaire was distributed via email by farming associations and completed in person by researchers.

Results: Based on 267 responses, the KAP levels of producers were classified as “very good” in the following proportions: 42.7% for knowledge, 70.8% for attitudes, and 40.4% for practices. The KAP levels were positively influenced by the academic qualifications of the farmers. Among those with higher education, a significant majority demonstrated “very good” levels: 75.9% for knowledge, 82.8% for attitudes, and 60.9% for practices. In contrast, only 13.9%, 53.2%, and 21.5% of farmers with only an elementary school education reached the same levels of performance, respectively ($p<0.001$). Furthermore, over half (63.4%) of farmers engaged in organic production exhibited a “very good” level of knowledge, compared to only 38.9% of those practicing conventional production ($p=0.013$). Additionally, farmers operating in intensive or semi-intensive systems showed “very good” levels of knowledge (68.4%), whereas those in extensive systems had 55.8%, and those in semi-extensive systems reported only 31.4% ($p<0.001$).

Conclusion: Academic qualifications had a positive impact on farmers' knowledge, attitudes, and practices. Farmers who used organic production methods demonstrated higher levels of knowledge, likely due to mandatory training related to organic production standards. The intensification of production systems requires the implementation of appropriate biosecurity measures, which likely explains the higher knowledge scores among these farmers. Notably, the results showed that attitudes were more favorable than actual practices, reinforcing the saying, “Do as I say, not as I do.” These findings highlight the need for educational initiatives aimed at improving the knowledge, attitudes, and practices (KAP) of small ruminant farmers.

Keywords: Antibiotic resistance: Knowledge, attitudes, and practices; small ruminants.

Funding: This work was supported by the RumiRes project - "Vigilância epidemiológica de resistências antimicrobianas e resíduos medicamentosos em Pequenos ruminantes da Região Centro" (Ref. PRR-C05-i03-I-000190); Fundação para a Ciência e Tecnologia através de fundos para GHTM-UID/04413/2020 e LA-REAL—LA/P/0117/2020; CITAB UIDB/04033/2020, https://doi.org/10.54499 e CERNAS UIDB/00681/2020.

PP#22

Left displaced abomasum in a late-pregnant goat

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Introduction: Abomasal displacement in small ruminants seems to be a rare condition. To the authors knowledge, only two cases have been reported in goats so far.
Case presentation: A female boer goat (68 kg) in late gestation was presented to a veterinary hospital due to sudden onset of abdominal distention and signs of cardiovascular depression. The owner had noticed a reduced general condition and inappetence with normal rectal temperature since the previous day.
Upon submission, the doe exhibited a severely distended abdomen, hyperaemia of the mucous membranes and marked enophthalmos. The acra were cold, the heart tachycardic and the back was hunched. The rumen appeared overloaded with fluid content. On the left, it seemed noticeably distant from the abdominal wall with a vital foetus palpable cranioventrally to it. Swinging auscultation resulted in prominent and extensive splashing sounds at the cranioventral abdomen on the left-hand side. The rumen fluid had a pH of 7 with no protozoal motility. Ultrasonographic examination of the abdomen revealed no indication of increased abdominal fluid or an abnormal diameter of intestinal loops. However, the abomasum and the pylorus were unambiguously identified in the lower half of the left abdomen between abdominal wall and rumen.
Treatment: The goat was placed on the left side and was slowly rotated on the back while the abdomen was swung by rhythmic fist pressure. Ultrasonographic control was performed. Additional therapeutic measures included fluid therapy, pain management, rumen fluid transfaunation and administration of vitamins (vitamin E, B1, B12). An improved general condition and visible reduction of the abdominal distention was observed within one hour after rolling.
Outcome: The goat showed no recurrence of the disease and gave birth to a normal sized and vital kid 10 days later.
Conclusion: Although there seems to be a low incidence of displaced abomasum in small ruminants, the condition can occur and should be considered as a differential diagnosis in cases of abdominal distention and abnormalities of the anterior digestive tract.
Keywords: abdominal distention; displaced abomasum; goat

PP#23

Presence of *Erodium* spp. seeds in lamb carcasses and skins as a cause of condemnation

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Introduction: On May 2024, a massive condemnation of lamb carcasses and skins was reported in a slaughterhouse due to the presence of numerous sharp foreign bodies. A total of 80 carcasses and 120 skins from lambs originating from an extensive sheep farming system in South of Spain were affected. The foreign bodies, later identified as plant seeds, were embedded in the dermis and subcutaneous connective tissue.
Aims: To determine the nature and origin of the foreign bodies causing carcass condemnation, as well as the associated tissue lesions.
Materials and Methods: Samples of skin and subcutaneous tissue, as well as images of condemned carcasses and skins were referred to the Ruminant Clinical Service of the Veterinary Faculty of Zaragoza (SCRUM). A complete pathological examination of the skin was performed. Additionally, plant fragments were analysed by botanical specialists at the Centre for Agri-Food Research and Technology of Aragón to identify the foreign material.
Results: Pathological study revealed multifocal acute dermatitis with marked inflammatory foci surrounding foreign bodies. These consisted of plant fragments causing acute, severe inflammation with macrophages, multinucleated giant cells, neutrophils, and lymphocytes. Cells closest to the fragments showed necrosis. Inflammation was also
observed in the superficial dermis, with sweat gland adenitis, epidermal microabscesses, and hyperkeratosis. The plant material was identified as seeds from the genus *Erodium* spp., common in the region of origin. Their physical structure enabled them to penetrate and embed in the skin and subcutaneous tissue, triggering an intense inflammatory reaction.
Conclusion: The lesions observed in lamb carcasses and skins were caused by the penetration of *Erodium* spp. seeds, which induced severe subcutaneous inflammatory responses and led to carcass and skin condemnation, causing severe economic losses. Awareness of this issue is essential in extensive systems during peak seed dispersal periods.
Keywords: Carcass condemnation; *Erodium* spp.; Foreign body dermatitis.

PP#24

Ovine ichthyosis congenita: clinicopathological progression and evidence of inherited origin

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Introduction: A progressive dermatological disorder affecting skin integrity and health was identified in a Rasa Aragonesa sheep flock. Around 2.5% of lambs developed hyperkeratotic and scaly skin in non-wooled areas at 3–5 months of age, with lesions worsening upon sun exposure and leading to high mortality. Skin disorders in livestock can severely impact animal welfare and productivity. Congenital ichthyoses are a group of inherited autosomal syndromes that impair terminal keratinocyte differentiation, resulting in abnormal skin keratinisation. Although described in several animal species, this condition has not been previously reported in sheep.
Aims: To describe the clinical and pathological evolution of congenital ichthyosis in lambs and confirm its inherited nature.
Materials and Methods: One clinically affected ewe and four of its lambs were monitored over 2.5 years. Periodic physical examinations, haematological tests, biochemistry, serum zinc analyses and serial skin biopsies were conducted. Macroscopic and microscopic evaluations of lesions were performed, and genealogical data were analysed to assess inheritance patterns.
Results: Only the ewe and two lambs from a consanguineous mating showed lesions. Clinical signs progressed from focal hyperkeratosis in non-wooled regions and dark seborrhoeic wool to generalised thickened skin with fissures and crusts. All haematological values and zinc levels were within reference ranges, and no improvement was observed with supplementation. Histopathology revealed orthokeratotic hyperkeratosis, sebaceous glands atrophy, acanthosis, and eosinophilic perivascular dermatitis. These findings resembled bovine ichthyosis congenita.
Conclusion: This is the first description of ichthyosis congenita in sheep. The progression of clinical and histological lesions, along with the exclusion of differential diagnoses and evidence of autosomal recessive inheritance, supports the characterisation of this condition in Rasa Aragonesa lambs.
Keywords : Congenital ichthyosis; Inherited skin disorder; Rasa Aragonesa sheep

PP#25

Field-based antiparasitic activity of an intraruminal bolus containing tansy (Tanacetum vulgare L.) extract against Trichostrongylidae in sheep

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Introduction: Small ruminants are susceptible to a variety of parasite infections, especially gastrointestinal nematodes (GIN). It is crucial to assess the use of natural remedies, in the prevention of parasitic infections in sheep, as anthelmintic resistance is relevant nowadays.
Aims: evaluate the anthelmintic activity of tansy extract under field condition against GIN in sheep.
Materials and Methods: The study was conducted on four sheep farms (A–D). Each farm had two groups: a study group, which received intraruminal boluses containing tansy, and a control group. Each group consisted of 10 sheep. A clinical examination and coprological analysis were performed on day 0, followed by four examinations every three weeks.
Results: In the middle of the study farm B was excluded and sheep were dewormed. The highest efficiency was observed in the C farm – FECRT in study group was 64%, control group 48%. In D farm – FECRT in study group was 9%, control group - 31%, and in A farm – 0%.
Conclusions: Tansy extract demonstrated a positive effect in reducing parasitic infection in only one farm, while no anthelmintic effect was observed in the other farms. Further research is needed, as tansy extract has potential for use in parasite control in sheep.

Keywords: sheep, natural remedies
References: Castagna F., Palma E., Cringoli G., Bosco A., Nisticò N., Caligiuri G., Britti, D., Musella V. Use of Complementary Natural Feed for Gastrointestinal Nematodes Control in Sheep: Effectiveness and Benefits for Animals. *Animals* **2019**, *9*, 1037
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PP#26

Blood gas, ionic and biochemical parameters in neonatal kids and postpartum goats: correlations and comparisons between singleton and twin births

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Introduction: Physiological responses in goats during and after pregnancy may vary depending on the type of pregnancy (singleton vs. twin), influencing the health of both the mother and her offspring. The purpose of this study was to evaluate blood gas, ionic, and biochemical parameters in goats with singleton and twin pregnancies and to assess how these parameters correlate within and between goats and their neonatal kids.
Materials and Methods: A total of 19 clinically healthy goats (Saanen and Alpine breeds), all of which had normal deliveries, and their 29 neonates were included in the study. Blood samples were collected within a few hours after parturition. Nine goats had singleton births, and ten had twin births. The parameters analyzed included Na^+, K^+, Cl^-, glucose, BUN, TCO_2, haematocrit, pH, pCO_2, HCO_3^-, base excess, anion gap, lactate, β-hydroxybutyrate (BHBA), total protein, body temperature, heart rate, respiratory rate, rumen activity, and body condition score. Blood analyses were performed using the i-STAT portable analyser. Statistical analysis was conducted using PROC MIXED by SAS to assess intra-group correlations and inter-group differences. **Results and Discussion**: Significant differences ($p<0.05$) were observed between does with singleton and twin pregnancies in several parameters. Glucose levels were higher in does with singleton (221.6 ± 18.72 mg/dL) compared to those with twin pregnancies (165.8 ± 17.76 mg/dL; $p=0.045$). Blood pH was lower in singleton-bearing does (7.33 ± 0.015) compared to twin-bearing does (7.38 ± 0.014; $p=0.049$), while pCO_2 was also higher in does with singleton births (35.7 ± 0.969 mmHg) compared to twin-bearing does (32.8 ± 0.92 mmHg; $p=0.047$). Kids from twin pregnancies had higher plasma chloride (103.9 ± 0.74 mmol/L) than those from singleton births (100.8 ± 1.10 mmol/L; $p=0.029$). The plasmatic chloride (Cl) in the twin kids further showed a negative correlation with maternal anion gap ($r = -0.56$, $p = 0.007$). Multiple other significant correlations

were found between kid and doe parameters, highlighting the influence of maternal metabolic and physiological status on the neonatal biochemical profile.

Conclusions: This study provides valuable insights into the physiological differences between singleton and twin pregnancies in goats, particularly in terms of blood biochemical and gas parameters. The observed differences and correlations suggest distinct metabolic adjustments in response to the number of fetuses.

Keywords: Biochemical parameters, Blood gas analysis, Goat kids, Maternal parameters, Twin births