



Universidad
Nacional
de Loja

MILK COMPOSITION OF *CHUSCA* GOAT (*Capra aegrus hircus*) IN HUSBANDRY EXTENSIVE ENVIRONMENT IN THE DRY FOREST OF THE SOUTHERN OF ECUADOR

Edgar Lenin Aguirre¹, Ramiro Armijos¹, Miriam Puchaicela², Belén Gahona², Priscila Pineda², Juan Pablo Riofrio².

¹Agricultural Faculty, Veterinary Medicine and Zootechnics School, National University of Loja-Ecuador

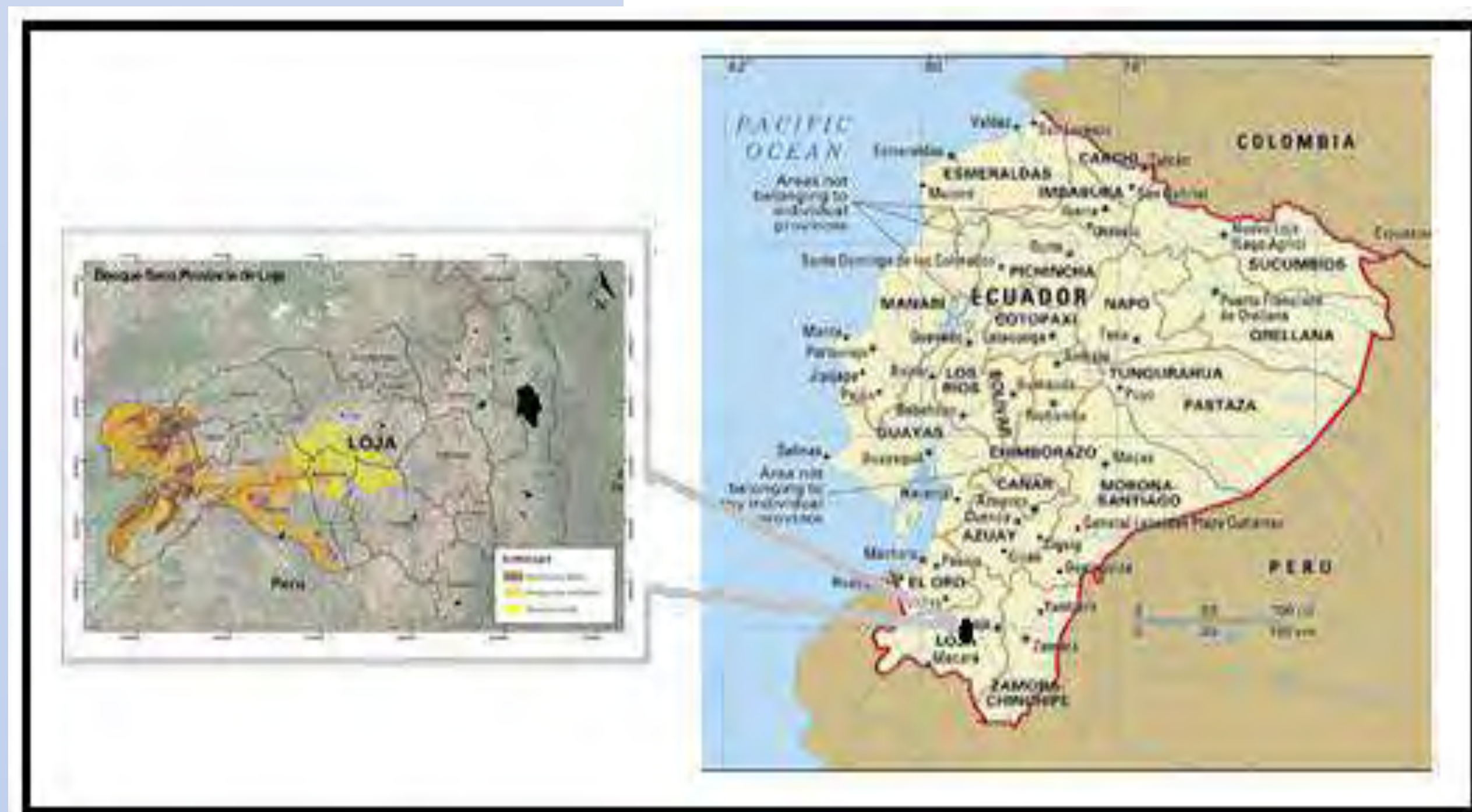
²Graduation Students in Veterinary Medicine and Zootechnics, National University of Loja-Ecuador.

Contact: Av. Pio Jaramillo, Ciudadela "La Argelia", Loja city, Ecuador-South America. Telf. +593-986448562. edgar.aguirre@unl.edu.ec. leninaguirrer@yahoo.es



Introduction

The goat "Chusca Lojana" which is found in the tropical zone of the Dry Forest of the Province of Loja-Ecuador South America, where 73% of the goat population of the nationwide is found in this place (INEC 2013). Is important to study the productive characteristics and the milk quality of this population, because this genetic resource represents a valuable socio-economic element for the habitants of this region.



Study area of the dry forest in the Southern of Ecuador

Objectives

To determinate the quality milk of Chusca goat, through to analyze of 4 biotypes.

Material and Methods

- Production and milk quality of 198 goats managed extensively and from different herds were evaluated.
- Four periodic visits were made where production was recorded at the different stages of lactation and milk samples were taken for analysis using LACTOSCAN Milk Analyzer.
- The factors analyzed were: the place husbandry, calving number, lactation stage and the biotype.

Results

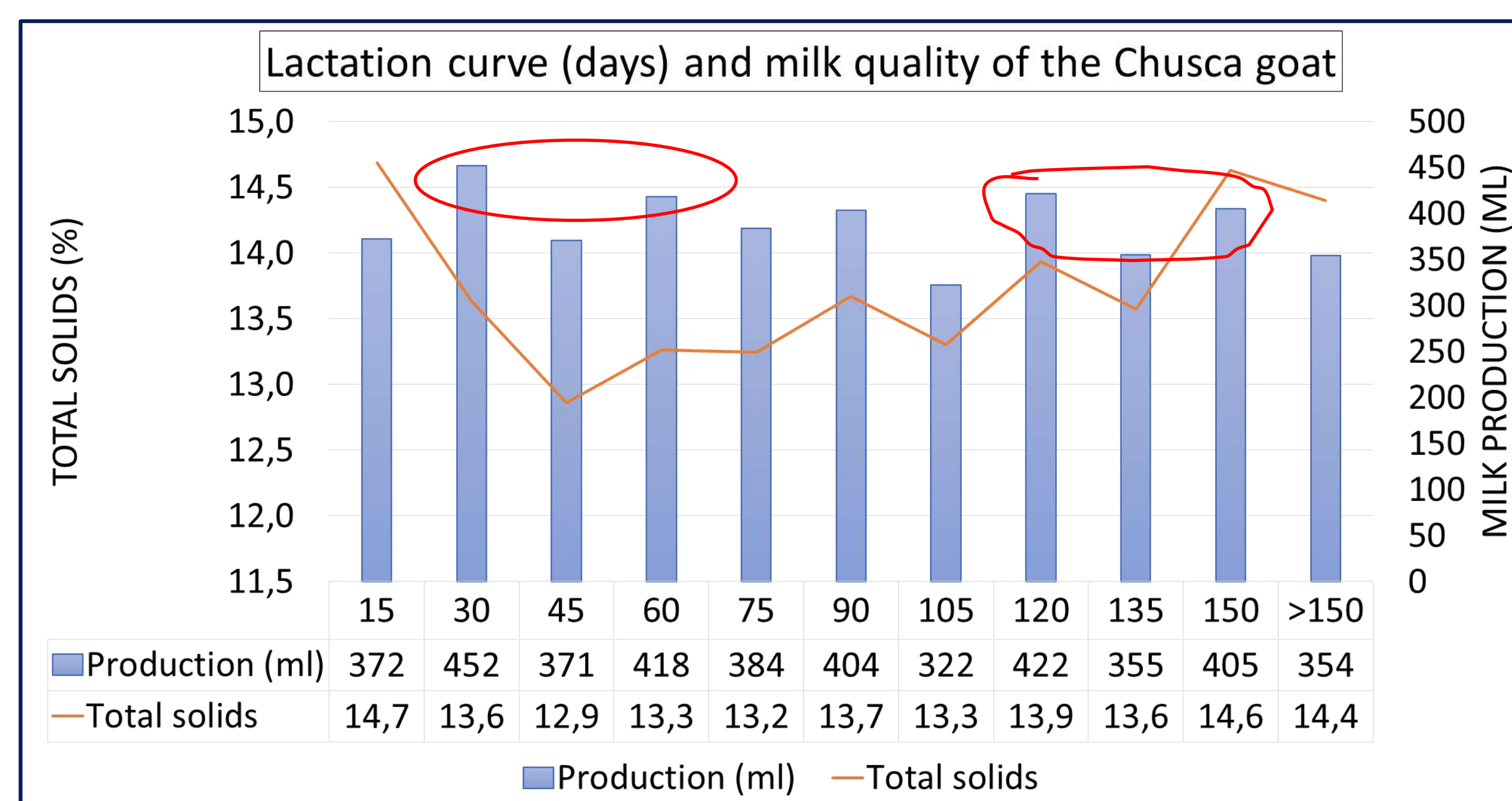
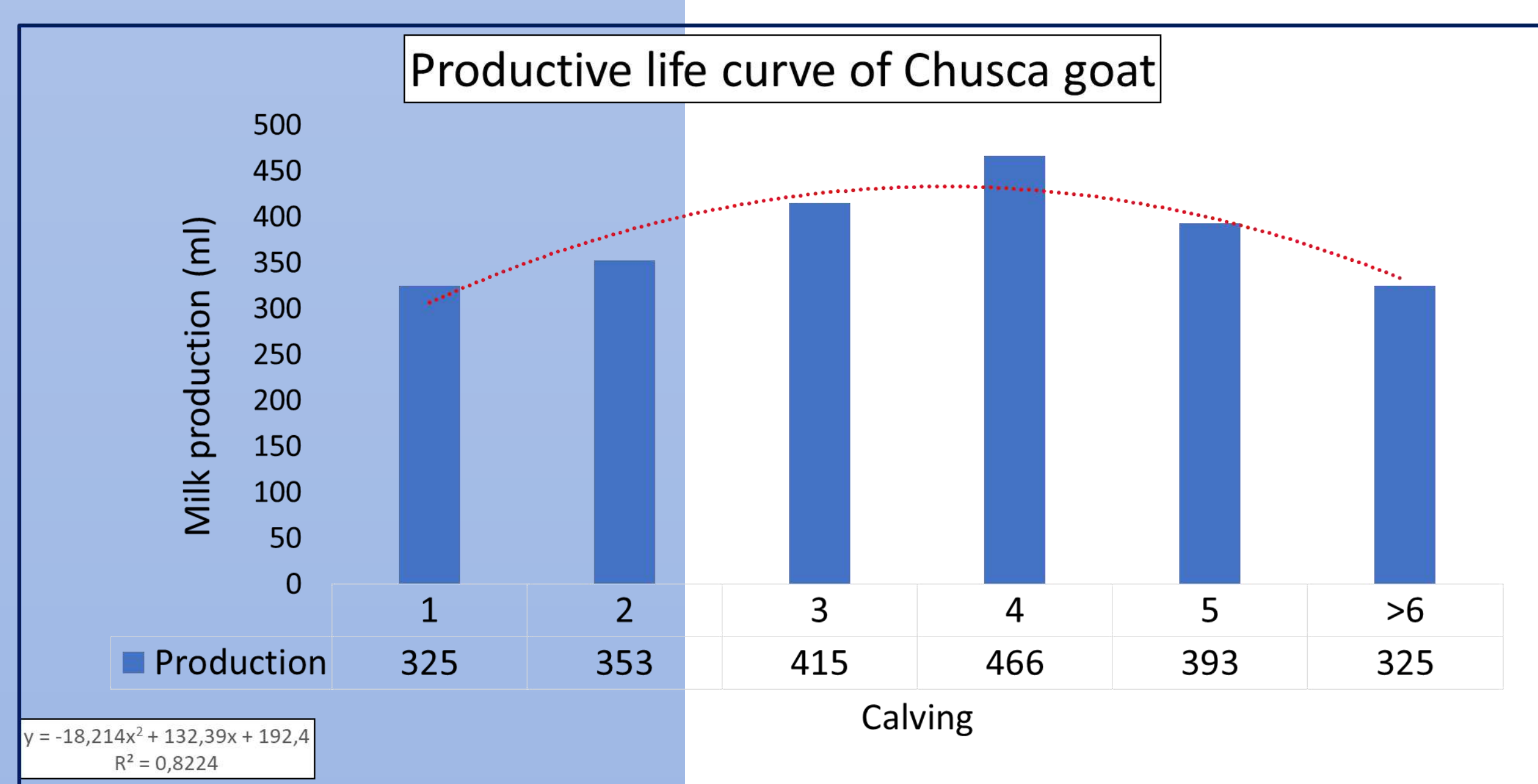


Table 1. Production and quality of milk Chusca goat

Statistician	Produccion ml	Fat %	DE %	TS %	D (kg/m ³)	L (%)	MS %	Protein %	C (mS/cm)	PH
Mean	390	5,49	8,17	13,68	25,68	4,49	0,68	3,0	5,13	6,71
S	231,5	1,9	0,83	2,1	4,6	0,47	0,07	0,3	0,62	0,26
CV	0,59	0,35	0,10	0,15	0,04	0,11	0,10	0,10	0,12	0,04

S : standard deviation; CV: coefficient of variation; DE: dry extract (non-fat solids); TS: total solids; D: density; L: lactose; MS: mineral salts; C: conductivity.

Table 2. Production and quality of milk Chusca goat considering the biotype

Biotype	Statistician	Produccion (ml)	Fat %	DE %	TS %	D (kg/m ³)	L (%)	MS %	Protein %	C (mS/cm)	PH
Oreja de leon	Mean	410	5,52	8,30	13,82 ^{bc}	28,0	4,56	0,69	3,04	5,0	6,7
	S	255	2,2	0,81	2,1	0,41	0,45	0,07	0,3	0,6	0,2
	CV	0,62	0,40	0,10	0,15	0,00	0,10	0,10	0,10	0,12	0,04
OCD	Mean	377	5,38	8,15	13,56 ^c	27,42	4,49	0,68	3,00	5,12	6,7
	S	220,5	1,81	0,82	2,02	0,37	0,47	0,07	0,30	0,62	0,3
	CV	0,59	0,34	0,10	0,15	0,00	0,10	0,10	0,10	0,12	0,04
Muca	Mean	400	5,83	8,14	13,97 ^{ab}	27,22	4,48	0,67	2,99	5,23	6,7
	S	252	1,9	0,97	2,2	0,10	0,53	0,08	0,36	0,57	0,3
	CV	0,63	0,32	0,12	0,16	0,01	0,12	0,12	0,12	0,11	0,04
Torneada	Mean	519 ^a	6,15	8,07	14,22 ^a	28,66	4,4	0,67	3,0	5,38	6,7
	S	250	2,5	0,6	2,5	2,20	0,34	0,05	0,23	0,69	0,21
	CV	0,48	0,40	0,08	0,18	0,22	0,08	0,08	0,08	0,13	0,03

S : standard deviation; CV: coefficient of variation; DE: dry extract (non-fat solids); TS: total solids; D: density; L: lactose; MS: mineral salts; C: conductivity. Different letters in the same column, there is a statistical difference (P<0.05)

Conclusions and implications

- The productive life curve of this goat reaches its peak between 3rd and 4th calving.
- Shows two peaks of lactation, first (30-60 days), second (120-150 days post calving).
- Milk quality declines after calving, then increases as lactation progresses to completion (140±20 days).
- The composition of milk, it is statistically affected by the place husbandry, calving number, lactation stage and the biotype (P<0.05).
- The biotypes Chusca "Torneada" and Chusca "oreja de leon" are statistically the best animals for to production milk in quantity and quality.
- With this information, animals with a tendency to produce quality milk can be standardized for the purposes of selection, management and multiplication.

References:

- Djebly, I., Ameur-Ameur, A., Gaouar, S. (2020). General characteristics of goat milk cheese (*Feta*) in the region of Tlemcen, Algeria. *Genet. Biodiv. J*, 4(2), 60-73. Available at: <http://ojs.univ-tlemcen.dz/index.php/GABJ/article/view/760>
- INEC. (2013). Visualizador de estadísticas agropecuarias en el Ecuador. Ecuador. Available in: <http://www.ecuadorencifras.gob.ec/ecuador-en-cifras>.



Growth response of West African Dwarf sheep fed detoxified neem (*Azadirachta indica*) seed cake diets

David Aderemi Ajayi¹, Micheal Kolawole Adewumi²

¹National Centre for Genetic Resources and Biotechnology, Moor Plantation, Ibadan, Nigeria

²Department of Animal Science, University of Ibadan, Ibadan, Nigeria.



Contact: Department of Animal Genetic Resources, National Centre for Genetic Resources and Biotechnology, PMB 5382 Moor Plantation, Ibadan, Nigeria. rhemiaajayi@gmail.com. +2348034073868

Introduction

Protein is a critical component of balanced ration. High cost of dietary protein has led to continuous search for alternative sources for livestock. Neem seed cake is rich in protein which is comparable to some vegetable proteins and has potential to replace expensive protein ingredients such as soyabean meal and groundnut cake (Aruwayo and Maigandi, 2013). Utilisation of detoxified neem seed cake in ruminant feeding has not been adequately documented, hence, performance of West African Dwarf sheep fed detoxified neem seed cake based diets were assessed.

Material and methods

The neem seed cake was subjected to be either water-washing, sodium hydroxide-soaking, ammoniation or sun-curing. Six diets were formulated: I (20% soyabean meal, control), II (raw neem seed cake), while the detoxified cakes were used to replace soyabean meal in four concentrate diets: III (water-washed), IV (sodium hydroxide-soaked), V (ammoniated) and VI (sun-cured) (Musalia et al., 2000). In a completely randomised design, thirty-six West African Dwarf sheep were randomly allotted to the six treatments with six replicates per treatment and were fed basal Guinea grass and experimental diets in ratio 70:30 for 105 days. Dry matter intake, crude protein intake, feed conversion ratio and daily weight changes were recorded. Data were analysed using ANOVA at $\alpha_{0.05}$.

Result and discussion

The dry matter intake ranged from 218.14 ± 29.23 (II) to 330.69 ± 7.74 g/day (V). The feed conversion ratio in sheep fed treated neem seed cake diets were similar to the control and better than raw neem seed cake diet, while daily weight changes in treatments I (54.95 g/day) and V (51.28 g/day) were higher than others. The crude protein intake were 39.00, 25.46, 37.06, 35.16, 32.27 and 31.39 g/day for treatments I to VI respectively. Detoxification is responsible for the improved intakes and better performance of WAD sheep fed neem seed cake diets (Gowda and Sastry, 2000).

Table 1: Performance of West African Dwarf sheep fed detoxified neem seed cake based diets

Parameters	Diet						SEM
	I	II	III	IV	V	VI	
DMI (g/day)	325.13 ^a	218.14 ^b	286.27 ^{ab}	293.31 ^{ab}	330.69 ^a	295.41 ^{ab}	25.86
FCR	4.04 ^a	-8.12 ^b	7.87 ^a	5.51 ^a	6.52 ^a	7.16 ^a	1.70
DWC (g/day)	54.95 ^a	-16.48 ^b	40.29 ^a	36.63 ^a	51.28 ^a	41.21 ^a	3.71
CP intake (g/d)	39.00 ^a	25.46 ^b	37.06 ^a	35.16 ^{ab}	32.27 ^a	31.39 ^{ab}	3.50

Conclusion

Ammoniated neem seed cake supplemented diet supports best performance in sheep growth response.



Figure 1: Raw neem seed cake



Figure 2: West African Dwarf sheep

Acknowledgement

I appreciate Dr. Ewuola, E. O., Department of Animal Science, University of Ibadan, Nigeria for his editorial assistance and Miss Hassan Titilayo, National Centre for Genetic Resources and Biotechnology, Ibadan, Nigeria for the technical support.

References

- Aruwayo, A. and Maigandi, S. A. (2013). Neem (*Azadirachta indica*) Seed Cake/Kernel as Protein Source in Ruminants Feed. *American Journal of Experimental Agriculture*, 3(3): 482-494.
- Gowda, S. K. and Sastry, V. R. B. (1998). Neem (*Azadirachta indica*), study on the utilization of Neem Kernel Meal as a Protein supplement for growing rabbits. *Industrial Veterinary Journal*, 75: 281-282.
- Musalia, L. M., S. Anandan, V. R. B. Sastry and D. K. Agrawal, (2000) Urea-treated neem (*Azadirachta indica*) Seed kernel cake as a protein supplement for lambs, *Small Ruminant Research*, 35: 107 – 116.



Gender roles in goats production in Ogbomoso region, southwestern Nigeria

David Aderemi Ajayi, Saheed Adeyemi Busari, Comfort Oluwabori Durosini, Sunday Olufemi Osewa, Olusola Jolaiya and Oluwasogo Dammy Abegunrin

National Centre for Genetic Resources and Biotechnology, Moor Plantation, Ibadan, Nigeria



Contact: Department of Animal Genetic Resources, National Centre for Genetic Resources and Biotechnology, PMB 5382 Moor Plantation, Ibadan, Nigeria. rhemiajayi@gmail.com. +2348034073868

Introduction

Livestock production is a dominant agricultural activity in Africa of which goats production is prominently. It is considered a key asset for most rural livelihoods and food security. (Upton, 2004).

According to a report on the state of food and agriculture, women are as likely as men to keep livestock, although the animals they keep tends to be lower and they are more likely to own poultry and small ruminants than large animals, (FAO,2009). This implies that women play important roles in livestock production in developing countries, however information on their roles in goat production activities is however not sufficiently documented in literature, hence this study was conducted to document gender roles in goats production in five local government areas in Ogbomoso region of southwestern Nigeria.

Material and methods

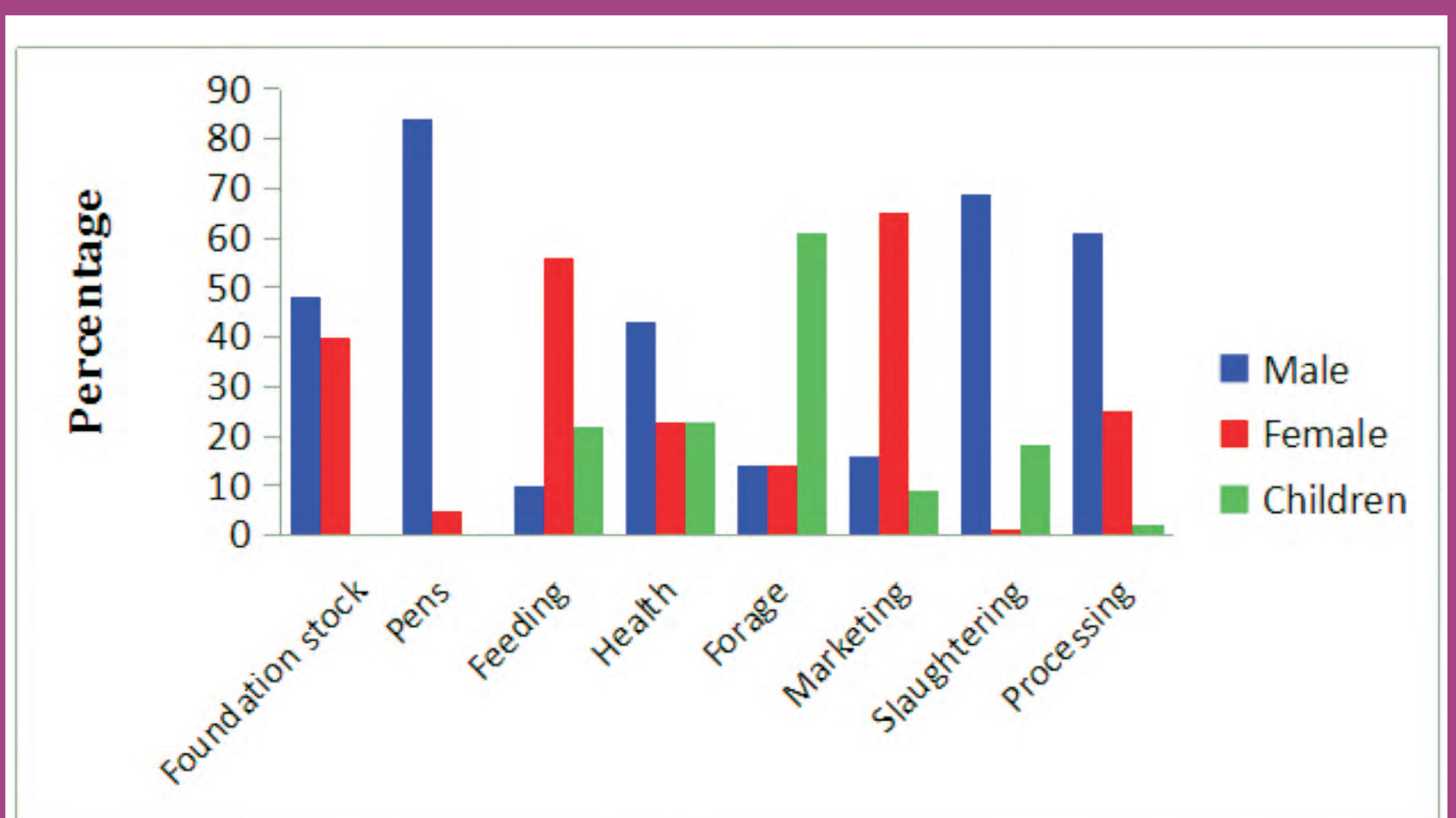
Data was collected by using questionnaire administered to 142 purposively selected farmers who are involved in goats production. Basic information on personal demographics and goat production related activities such as the breeds of goats reared, and who performed some activities in goats production were requested of the respondents. The result was analyzed using descriptive statistics.

Result and discussion

About 51.10 % of the farmers interviewed were aged 41 years and above. The breed reared by 90 % of the respondents was West African Dwarf goats. Furthermore, 60 % of the farmers reared the animals for meat purpose while 36% kept goats to serve as a source of income. The major constraints in goat production enterprises included lack of capital, diseases and thefts of the animals.

Majority of the farmers agreed that the roles of selection of foundation stock, pen construction, caring for sick animals, slaughtering and processing of slaughtered animals are played by men while women played leading roles in feeding, caring for young animals and marketing of goats. This result is in accordance with the findings of Galie et al., (2017).

Fig 1: Gender roles in goat production



Conclusion

Men play more roles than women especially in those activities requiring more energy in goat production in Ogbomoso region of southwestern Nigeria.

Acknowledgement

I appreciate Dr. Ewuola, E. O., Department of Animal Science, University of Ibadan, Nigeria for his editorial assistance and Miss Hassan Titilayo, National Centre for Genetic Resources and Biotechnology, Ibadan, Nigeria for the technical support.

References

- FAO. Rural Income Generating Activities database (2009). Available at www.fao.org/es/ESA/riga/english/index_en.htm assessed on September 30, 2020.
- Galiè, A., Distefano, F., Kangogo, D., Mattioli, R., Wieland, B., & Baltenweck, I. (2017s). Gendered perspectives on smallholder cattle production and health management in three sites in Tanzania. *Journal of Gender, Agriculture and Food Security (Agri-gender)*, 2(3), 43–65.
- Upton, M., 2004. The role of livestock in economic development and poverty reduction. Pro-Poor Livestock Policy Initiative Working Paper No. 10, FAO, Rome. <http://www.fao.org/ag/againfo/programmes/en/pplpi/docarc/wp10.pdf> assessed on September 30, 2020.

Vitamin E in the diet of lactating goats: bioavailability and influence on the passive immunity of kids.

Mercedes Roncero-Díaz¹, Begoña Panea², María de Guía Córdoba³, Anastasio Argüello⁴ and María J. Alcalde^{1*}

¹ University of Seville, Ctra. Utrera km. 1, 41013 Seville, Spain

² Centro de Investigación y Tecnología Agroalimentaria de Aragón (CITA), Zaragoza, Spain.

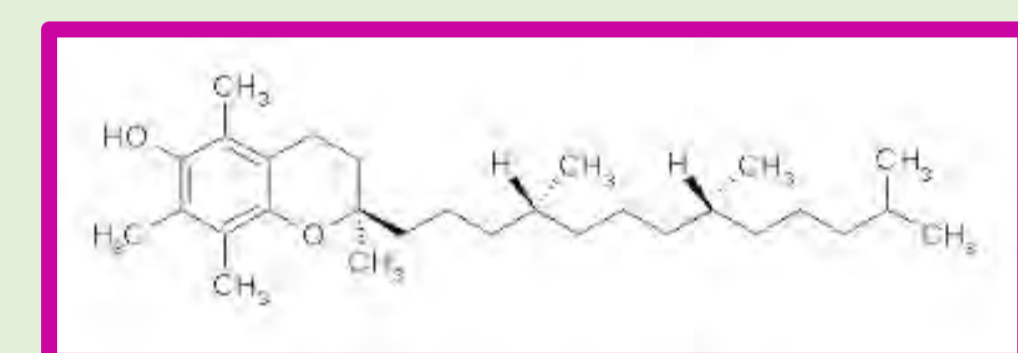
³ University of Extremadura, Badajoz, Spain.

⁴ University of Las Palmas de Gran Canaria. Las Palmas (Canarias). Spain.

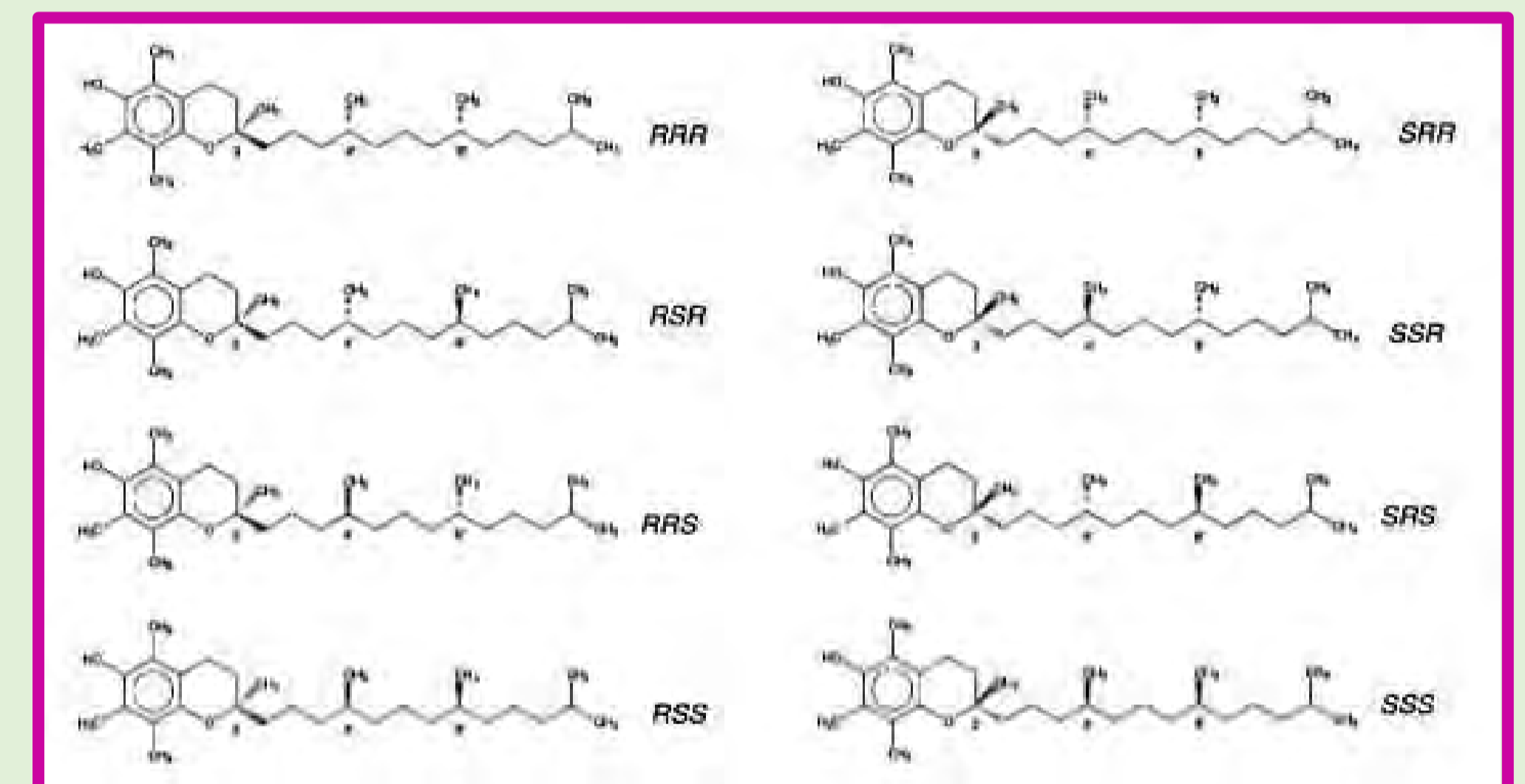
* **Contact:** aldea@us.es

1. MATERIAL AND METHODS

A total of 30 male kids of single-birth from Payoya breed were used. Kids only fed natural milk and remained stabled. Two batches of fifteen animals each were established according to the feeding systems of their dams: cultivated meadow (CM) and total mixed ration (TMR). Different forms of vitamins E (natural / synthetic), provided to the kid through maternal diets (CM and TMR respectively), was evaluated during lactation. α -tocopherol was quantified using HPLC in plasma of goats and their kids. Kidney fat of the kids was weighed. Correlations and ANOVA with the maternal diet as principal effect were performed using SPSS statistical package.



Natural vitamin E: RRR- α -tocopherol



Synthetic vitamin E: all-rac- α -tocopherol

2. RESULTS AND DISCUSSION

There are positive correlations between the plasma concentrations of α -tocopherol in goats and their kids, and between the plasma α -tocopherol in kids and the weight of kidney fat ($r=0.606$, $p<0.001$; $r=0.335$, $p=0.013$ resp.).

The CM kids had higher kidney fat weight ($p<0.001$) and plasma tocopherol concentration ($p<0.001$) than TMR ones. The health of the newborn is influenced by its nutritional level and hence it influences the visceral fat (Gall 1982). Therefore, kidney fat can be a good indicator of a kid's health and immunity.

3. CONCLUSION

Colostrum and milk provide vitamin E that stimulate the immune system and essential for the health of the newborn (Przybylska et al. 2007). The higher bioavailability of natural vitamin E (Debier et al., 2005) from the diet of CM goats influences the health status of their kids.

REFERENCES

- Debier C. and Larondelle Y. 2005. Vitamins A and E: metabolism, roles and transfer to offspring. *British Journal of Nutrition*, 93 (2): 53–174.
Gall, C.F. 1982. "Carcass composition". In *Third International Conference on Goat Production and Disease*. Dairy Goat Journal Publication 472-487.
Przybylska, J., Albera, E. and Kankofer, M. 2007. Antioxidants in bovine colostrum. *Reproduction in Domestic Animals* 42, 402–409.

COMPARATIVE STUDY OF SOME PHYSICOCHEMICAL PROPERTIES IN MILK FROM MURCIANO-GRANADINA GOATS WHICH HAD, OR NOT, BEEN TREATED WITH ANTIBIOTICS

Laura Almela¹, Begoña Peinado¹, Sonia Galián¹, Ángel Poto¹, Elisa Escudero² and Pedro Marín²

¹ Murcian Institute for Agricultural and Food Research and Development (IMIDA). La Alberca-Murcia. Spain. Contact: Laura Almela. IMIDA. La Alberca (Murcia-Spain). E.mail: laura.almela@carm.es. Telephone: +34 968 366 756

² Department of Pharmacology. University of Murcia (Murcia-Spain)

INTRODUCTION AND OBJECTIVE

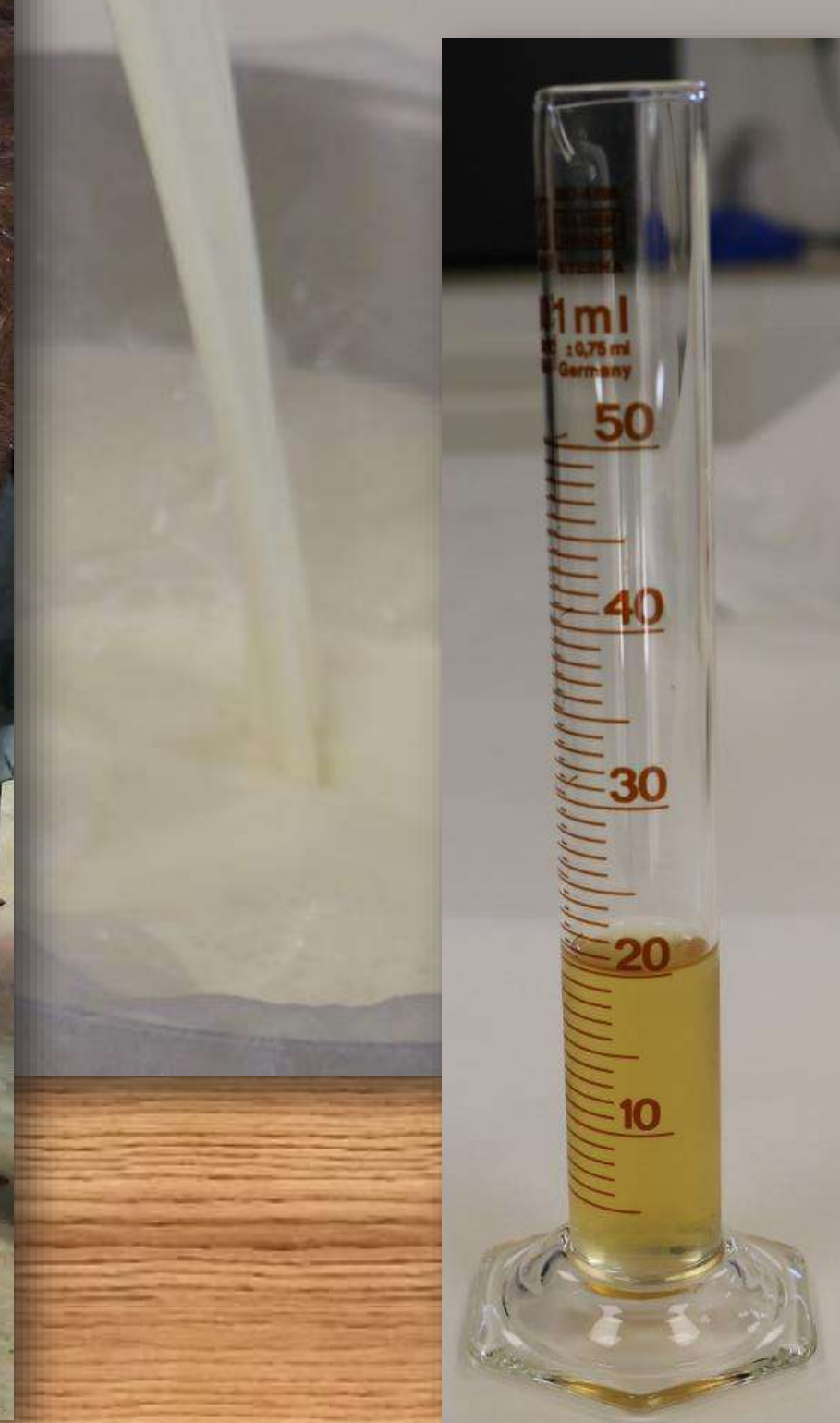
On small ruminant farms it is usual to administer antibiotics to treat the most common problems that occur to these animals. Therefore, there is a risk of finding residues derived from these drugs in the milk they produce, and therefore, a risk of transmitting it to the food chain (thus, to the consumer), so exhaustive testing is necessary to prevent this (Aroca, 2016).

The antibiotic substance administered to the animals in this study was tildipirosin, a macrolide derived from tylosin, the effects of which have already been proven in the treatment of respiratory diseases in pigs and cattle (EMA, 2011) and which is also used in goats (Beltrán, 2016). One of its characteristics is that it is absorbed quickly and stays in the system for a long time.

Taking into account that antibiotics and metabolites are naturally excreted through milk (Llanos, 2002), in addition to regulatory sanitary controls, in this study we have tried to find out if it is possible to detect residues in the collected milk from goats treated with antibiotics after processing, as well as in the products derived from it by measuring some physical-chemical parameters, and comparing them with milk from untreated goats.



Murciano-Granadina goats



METHODOLOGY

A total of 26 Murciano-Granadina goats were studied in a farm located in the district of Guadalupe (Murcia-Spain) registered according to an agreement between IMIDA-UMU*. Twenty goats were not treated at all (NA) and six goats were given antibiotics (A). The milk collection was daily, separating milk A from milk NA. A total of 36 samples (18 A and 18 NA) from different days were analyzed. Milk collection was carried out daily for a period of 2 months, separating the milk from the goats treated with antibiotics from those not treated.

Milk A and milk NA were subjected to a pasteurization process, and once cooled to 40°C commercial rennet was added (enzymatic coagulation). The coagulation point was timed and measured using the "buttonhole technique", checking the coagulation status every 5 seconds. The rennet and whey were separated and the following parameters were measured: whey amount, rennet weight, whey and rennet pH, and rennet colour.

*University of Murcia (Spain).



MAIN FINDINGS

The results showed a milk A curdling time of three minutes and fourteen seconds, compared to a milk NA curdling time of three minutes and four seconds. According to the statistical comparison study, there are no significant differences between them for this variable, nor for the other variables studied.



CONCLUSIONS

The results indicate that after the pasteurisation process there are no significant differences between the milk from those goats treated with antibiotics and those which weren't. Neither are there any observable alterations in the milk processing process.

BIBLIOGRAPHIC REFERENCES

- AROCA, N.E. 2016. Detección cualitativa de residuos de antibióticos en leche cruda comercializada en el Cantón Naranjal, provincia del Guayas. Unidad Académica de Ciencias Agropecuarias. Carrera de Medicina Veterinaria y zootecnia. Trabajo de titulación. Trabajo Experimental. Universidad Técnica de Machala (UTMACH).
- BELTRÁN. 2016. Uso "extra label" de antibióticos macrólidos en ganado caprino lechero. Detección de residuos en la leche y el queso de cabra. Trabajo Fin de Grado en Ingeniería Agroalimentaria y del Medio Rural.
- EMA. 2011. CVMP Assessment Report. Zuprevo® (EMA/V/C/002009). http://www.ema.europa.eu/docs/en_GB/document_library/EPAR_-_Public_assessment_report/veterinary/002009/WC500106577.pdf (accessed 29September2011).
- LLANOS G. 2002. "Determinación de residuos antibióticos en la leche fresca que consume la población de Cajamarca". Revista Amazónica de Investigación Alimentaria. 2: 35-43.



Antibody titer after vaccination as potential phenotype for footrot susceptibility in sheep: first results



Annabell Amend, Olusegun O. Adeniyi and Gesine Lühken

Institute of Animal Breeding and Genetics, Justus Liebig University, Giessen 35390, Germany

Introduction

Footrot is a highly contagious disease causing lameness due to foot lesions and occurs worldwide mainly in sheep and goats. The causal agent is the bacterium *Dichelobacter nodosus* (Beveridge 1967). In some few countries with a well-organized sheep industry, programs for selection against footrot susceptibility based on footrot scores are in progress or already established (Conington et al. 2008). However, footrot scores are difficult to collect as well as to interpret, and heavily influenced by weather and ground conditions.

Aim of this study

was to establish and validate another method for phenotyping footrot susceptibility, which is the reaction of the animal's immune response after contact with antigens of the pathogen (Raadsma et al. 1994).

Material and methods

- Female Merinoland and Rhoen sheep were vaccinated twice with 5-8 months of age and blood samples collected at several time points (fig.1).
- Antibody titers were measured with an enzyme-linked immunosorbent assay (ELISA) including *D. nodosus* antigens extracted from a commercial vaccine.
- Antibody titer data from 202 Merinoland sheep belonging to 7 half-sib groups (S1-S7) were included in the presented preliminary analyses.
- Heritabilities for antibody titers at several time points after vaccination were estimated with animal and sire models.

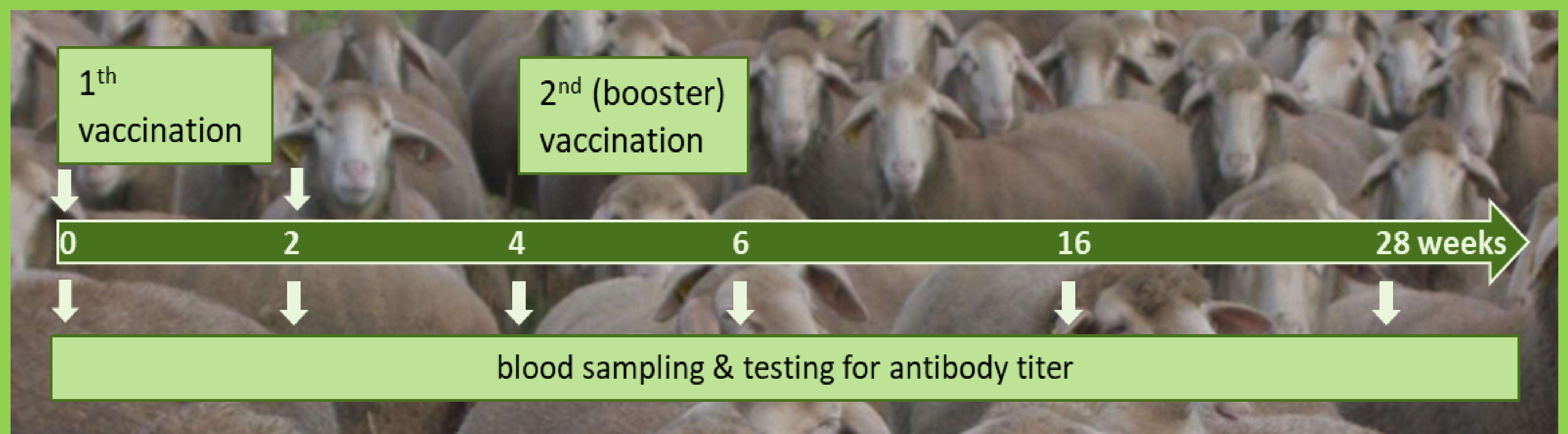


Fig.1: Vaccination and blood sampling strategy.

Results

- In all sheep antibody titers (optical density ratio, ODR) increased after vaccination to a peak at week 6, followed by a slower decrease (fig. 3).
- Between some half-sib groups, mean antibody titers were significantly different for several time points after vaccination, e.g. at 2 and 6 weeks after first vaccination (fig. 2a and 2b).
- Moderate heritabilities were estimated, e.g. 0.22 (animal model) and 0.42 (sire model) for antibody titer at 4 months after vaccination.

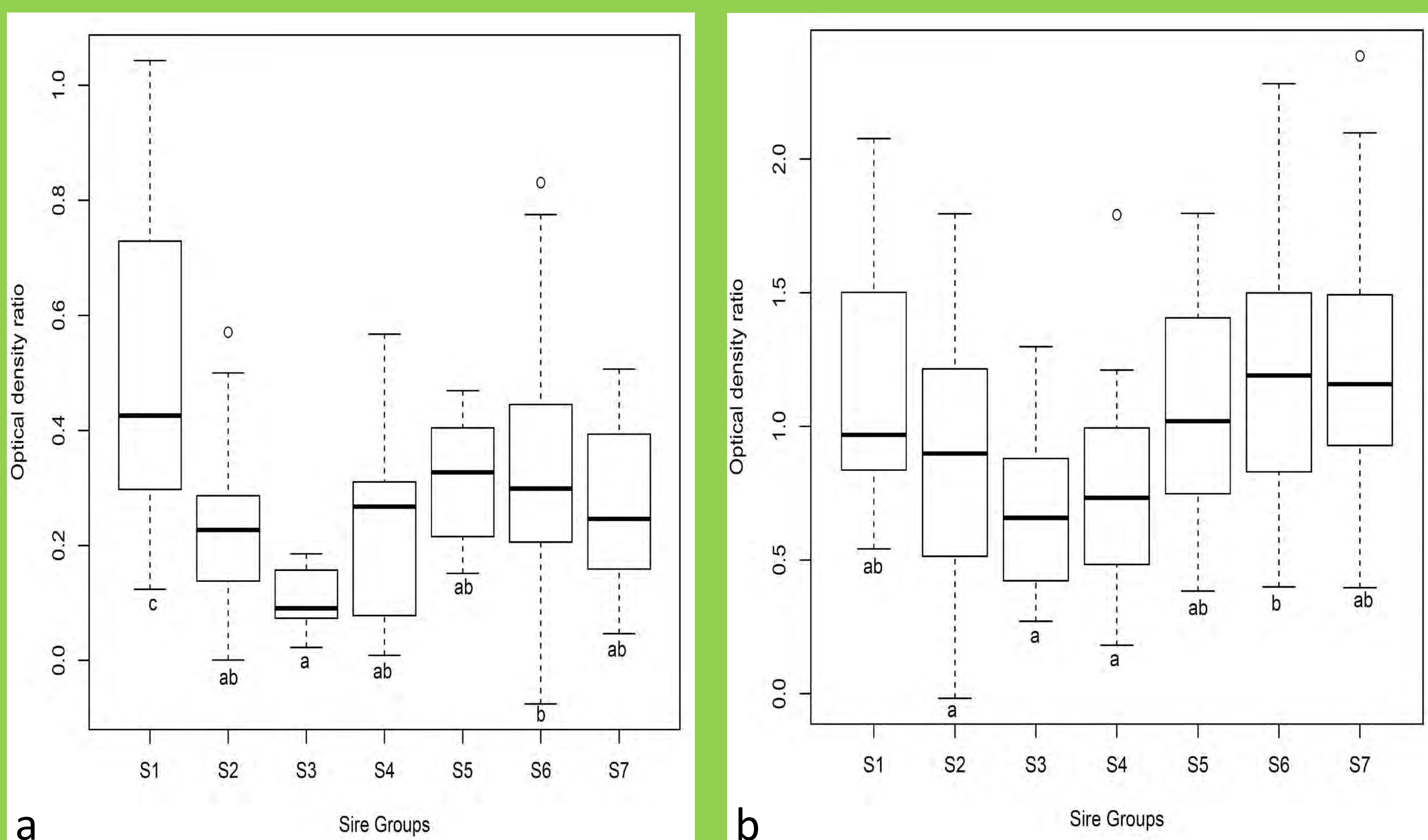


Fig. 2: Mean antibody titers of half-sib groups (S1-S7) 2 weeks (a) and 6 weeks (b) after the first vaccination. Different small letters indicate significant differences.

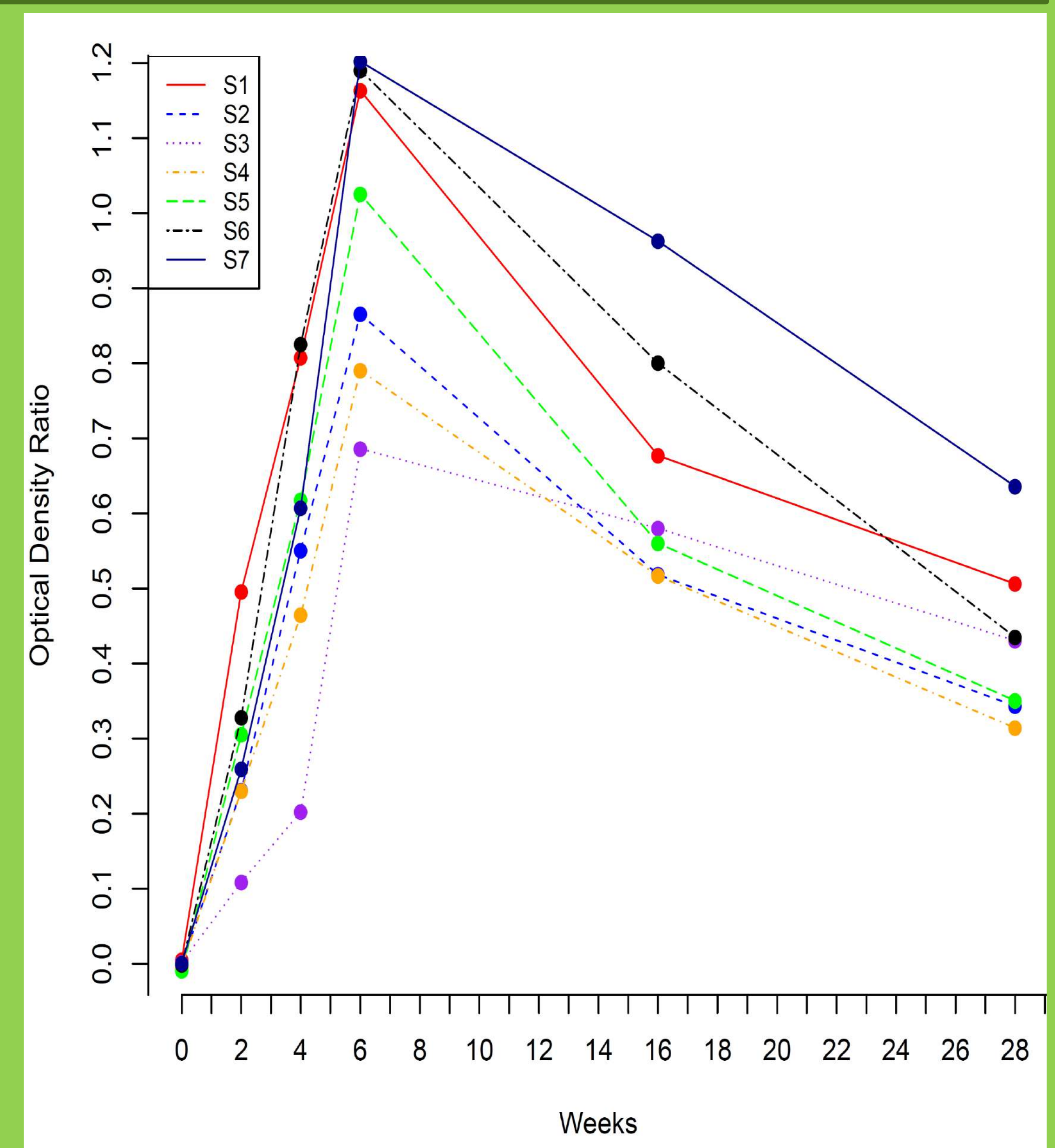


Fig. 3: Development of antibody titers in half-sib groups across time. Half-sib groups (S1-S7) are shown with different colored lines.

Conclusions and Outlook

- The results are promising for a potential use of this phenotype for breeding towards lower footrot susceptibility and/or better effect of vaccination.
- The findings will have to be confirmed in a larger group of animals and breeds.
- The optimal time point for single sampling will have to be defined to obtain a reliable phenotype.

References

- Beveridge, W.I. (1967) Diseases caused by non-sporing anaerobes: Ovine footrot, necrobacillosis. *Bull. Off. Int. Epizoot.* 67, 1597-1601.
- Conington, J., Hosie, B., Nieuwhof, G.J., Bishop, S.C., Bünger, L. (2008) Breeding for resistance to footrot – The use of hoof lesion scoring to quantify footrot in sheep. *Vet. Res. Commun.* 32, 583-589.
- Raadsma H.W., Egerton, J.R., Wood, D., Kristo, C., Nicholas, F.W. (1994) Disease resistance in Merino sheep. III. Genetic variation in resistance following challenge and subsequent vaccination with an homologous rDNA pilus vaccine under both induced and natural conditions. *J Anim. Breed. Genet.* 111, 367-390.



Genetic Resources



Genetic diversity of Algerian and Turkish native sheep breeds



AMEUR AMEUR A¹, YILMAZ O², ATA N², CEMAL I², GAOUAR S.B.S³

¹ Agronomic sciences department, University of Tlemcen, Tlemcen, Algeria
² Department of Animal Science, Adnan Menderes University, Aydın, Turkey
³ Department of Biology, University of Tlemcen, Tlemcen, Algeria

Contact: Dr. Ameer Ameer Abdelkader . University Of Tlemcen, Department of Agronomic sciences, and Faculty life and nature sciences, Email ameurabdelkader@gmail.com ; Tel: +213 657 052 803
ORCID: <https://orcid.org/0000-0002-7450-4311>



*** Introduction ***

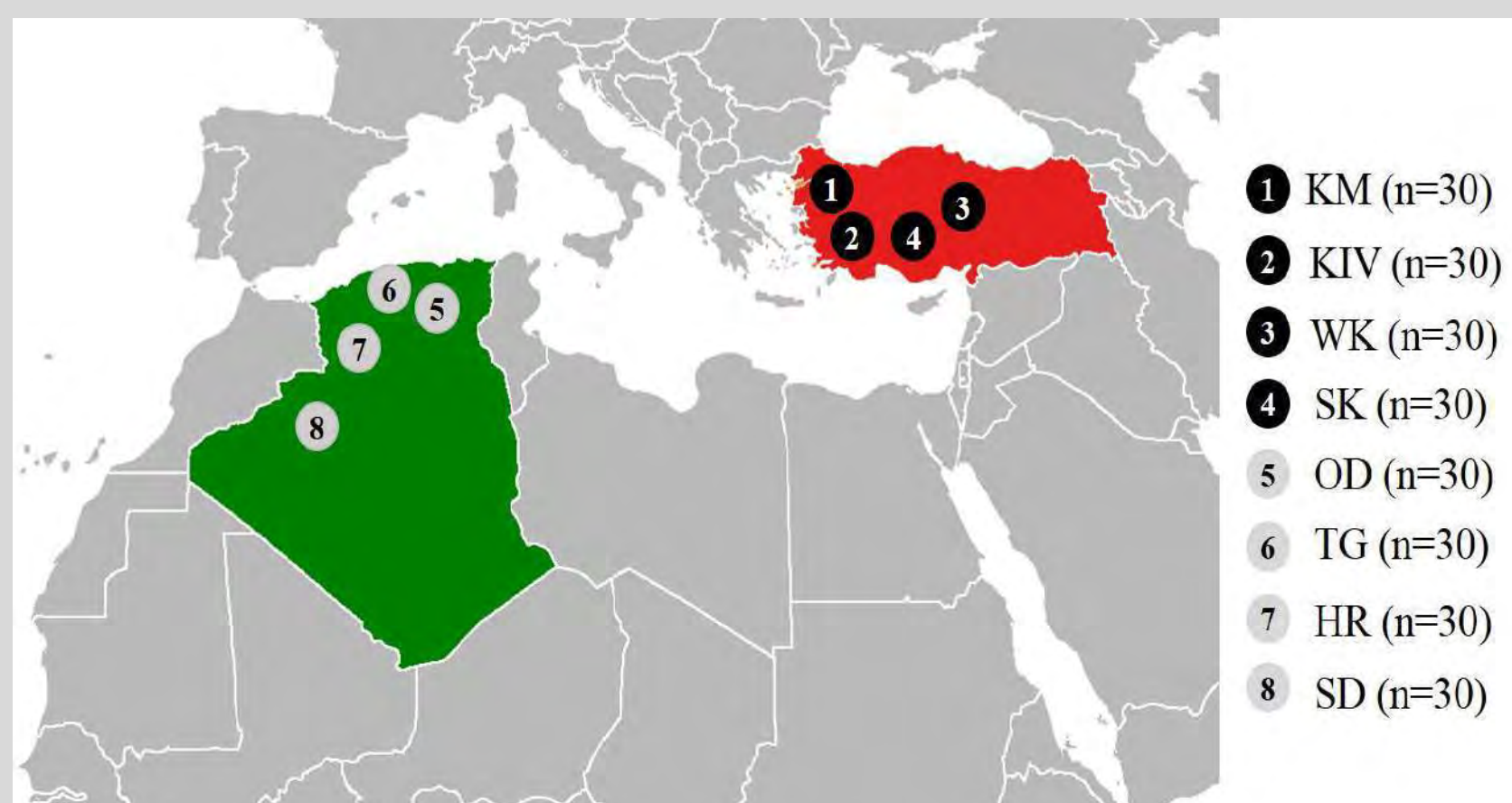
Algeria and Turkey share historical relationship since the Ottoman Empire period, and Turkey by its geographical possession near the Middle East has played a major role in the process of domestication of sheep breeds in this context, The first step for a well-structured and sustainable animal breeding and conservation program is to reveal detailed information on intra and inter-breed genetic diversity. This situation indicates how important it is to reveal the genetic structure of breeds.

The objective of the present study was determine genetic diversity, population structure and genetic relationship of different native sheep breeds raised in two different countries.

*** Materials And Methods ***

a) Samples Origin

Blood samples were obtained from 240 sheep. Blood samples were collected from Vena jugular into tubes containing K3-EDTA as anticoagulant and stored at -20°C until DNA extraction. DNA was extracted using salting-out technique Miller et al. (1988)



NanoDrop 2000 (Thermo Scientific, Waltham, MA) spectrophotometer device was used to determinate quality and quantity of DNA samples.



b) PCR and fragment analysis

Fourteen microsatellite markers with two multiplexes are labeled with fluorescent dye (D2, D3 and D4) were used according to recommendation of FAO (2011).

Loci	Multiplex Group	First Denaturation	Denaturation	Annealing	Extension	Cycle	Final Extension
OarFCB193	1	95 °C (5 min)	95 °C (40sec)	63-54 °C (40 Sec)	72 °C (60 sec)	40	72 °C (10 min)
OarFCB304							
INRA0023							
OarCP34							
INRA0132							
D5S2							
BM1818							
BM8125							
MCM0527	2	95 °C (5 min)	95 °C (40sec)	60-50 °C (40 sec)	72 °C (60 sec)	34	72 °C (10 min)
CSR0247							
OarFCB128							
BM1329							
OarJMP29							
MAF214							
MAF214							

c) Statistical Analysis

Number of alleles per locus (Na), mean number of alleles (MNa), effective number of alleles (Ne), polymorphic information content (PIC), observed heterozygosity (Ho), expected heterozygosity (He), average heterozygosity (H), Hardy-Weinberg equilibrium and null allele frequencies were calculated using GenAlEx (Peakall & Smouse 2006) The genetic distance dendrogram for the breed was drawn with MEGA 6 (Tamura et al. 2013), the bootstrap resampling methodology (1000 replicates) was performed to test the robustness of the dendrogram topology. Wright's F-statistics (FIT, FIS, FST) (Wright, 1931; Weir and Cockerham, 1984) were calculated with POPGENE (Yeh et al.,1997).

*** Results and discussion ***

Genetic variation of microsatellites and genetic structuration between breeds

Locus	N	Na	Ne	PIC	Ho	He	F _{IS} *	F _{IT} *	F _{ST} *	D _{ST}	G _{ST}	H _T	HWE	F(Null)
OarFCB304	237	25	8.22	0.87	0.67	0.88	0.172***	0.252***	0.096***	0.074	0.084	0.88	***	0.134
OarFCB193	239	23	9.17	0.89	0.80	0.89	0.066**	0.105***	0.042**	0.033	0.036	0.89	***	0.053
BM1818	234	28	14.17	0.93	0.83	0.93	0.047*	0.118***	0.075***	0.061	0.065	0.93	***	0.059
INRA0132	240	21	11.92	0.91	0.82	0.92	0.052*	0.113***	0.064**	0.052	0.056	0.92	***	0.057
OarCP34	239	17	7.68	0.86	0.85	0.87	-0.029 ^{ns}	0.027 ^{ns}	0.055***	0.042	0.049	0.87	***	0.008
D5S2	207	17	8.19	0.87	0.73	0.88	0.109**	0.181***	0.080**	0.061	0.069	0.88	***	0.092
CSR0247	230	32	13.21	0.92	0.76	0.92	0.120***	0.186***	0.075***	0.062	0.067	0.93	***	0.103
MCM0527	232	20	9.59	0.89	0.68	0.90	0.207***	0.252***	0.056**	0.044	0.049	0.90	***	0.140
BM8125	240	20	12.70	0.92	0.78	0.92	0.094**	0.169***	0.083**	0.068	0.074	0.92	***	0.083
HSC	231	24	14.48	0.93	0.72	0.93	0.191***	0.230***	0.048**	0.039	0.042	0.93	***	0.122
BM1329	237	31	14.13	0.93	0.70	0.93	0.164***	0.254***	0.107***	0.088	0.094	0.93	***	0.137
OarFCB128	240	22	10.22	0.90	0.76	0.90	0.116**	0.162***	0.052**	0.041	0.046	0.90	***	0.086
OarJMP29	240	31	11.20	0.91	0.81	0.91	0.081**	0.119***	0.041**	0.033	0.036	0.91	***	0.058
MAF214	240	29	8.92	0.88	0.77	0.89	0.071*	0.142***	0.076**	0.060	0.068	0.89	***	0.077
Mean		24.29	10.99	0.90	0.76	0.90	0.104	0.165	0.068	0.054	0.060	0.91		

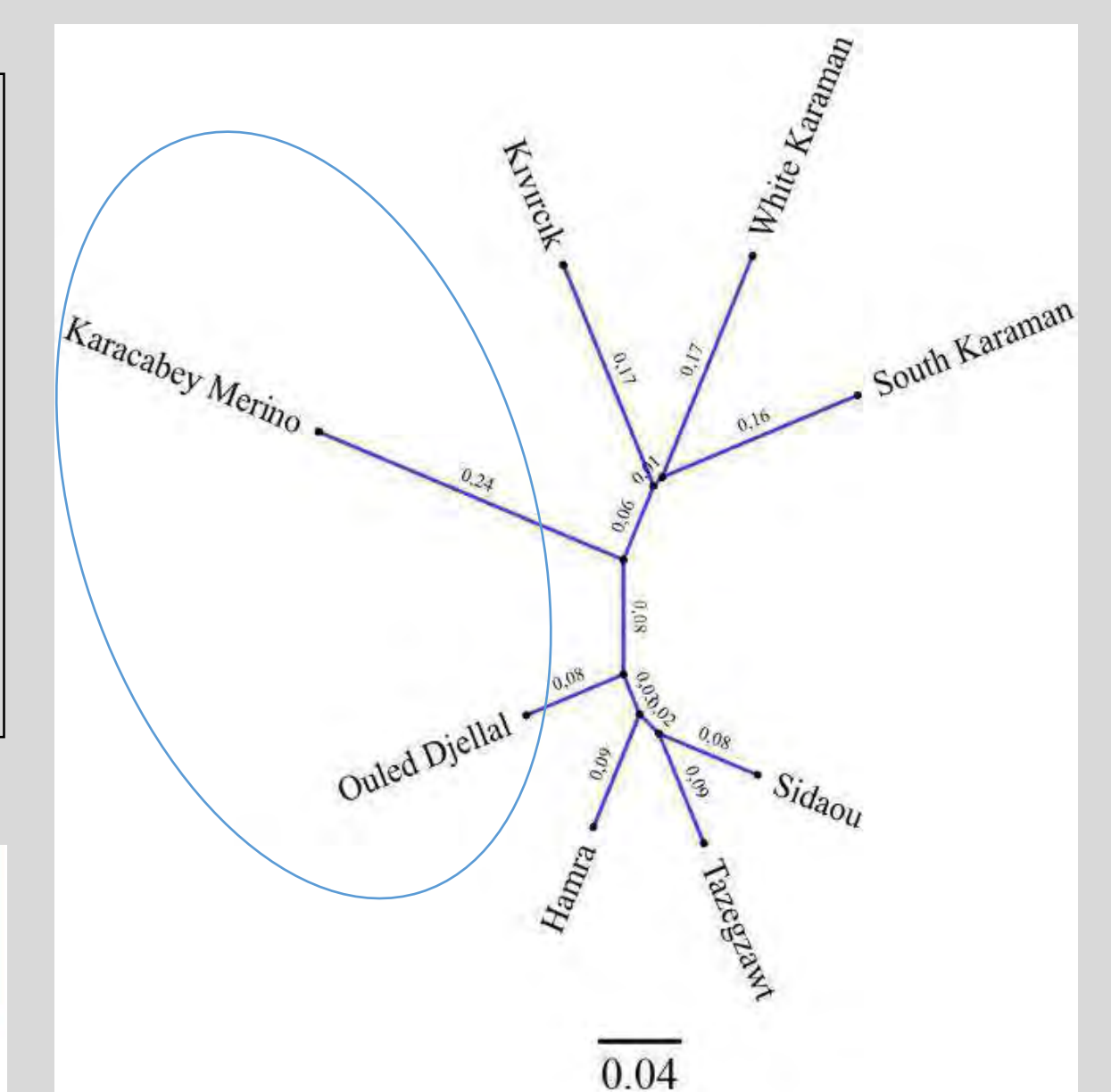
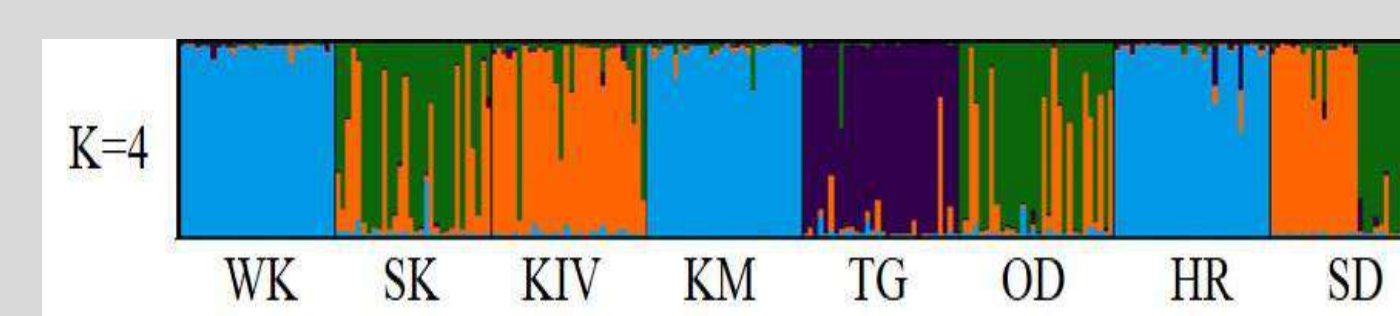
A total of 340 alleles were detected from fourteen markers studied. The genetic diversity parameters such as Na, Ho and He obtained from the studied Algerian sheep breeds were higher than the Turkish native sheep breeds.

It was revealed 84.73% of the total variance was found within individuals while 8.56% among individuals within populations and 6.71% among population.

Breeds	MNA	Mean Heterozygosity		F _{IS}	HW E	NPA		
		Ho (SE)	He (SE)			Freq. ≥5%	Freq. <5%	Total
WK	9.93	0.78 (0.040)	0.80 (0.016)	0.047 ^{ns}	5	5	3	8
KIV	9.57	0.58 (0.056)	0.81 (0.012)	0.326***	9	3	1	4
KM	10.21	0.67 (0.058)	0.76 (0.030)	0.114***	11	1	5	6
SK	9.57	0.72 (0.063)	0.74 (0.059)	0.055**	2	2	3	5
HR	14.71	0.84 (0.023)	0.89 (0.006)	0.055***	8	1	5	6
OD	17.00	0.83 (0.022)	0.90 (0.005)	0.075***	5	-	17	17
SD	13.86	0.82 (0.028)	0.87 (0.010)	0.025 ^{ns}	4	1	7	8
TG	15.07	0.83 (0.028)	0.86 (0.014)	0.038*	7	1	11	12

Variation Sources	DF	SS	VC	PV (%)	FI
Among population	7	204.88	0.3893 Va	6.71	F _{IS} = 0.092
Among individuals within populations	232	1370.53	0.4964 Vb	8.56	F _{ST} = 0.067
Within individuals	240	1179.50	4.9145 Vc	84.73	F _{IT} = 0.153
Total	479	2754.91	5.800		

Four cluster belonging to eight breeds studied was revealed in dendrogram based on Nei's Da distance matrix. The obtained results are similar to the dendrogram drawn according to Nei's Da distance matrix as expected. It is seen that the optimal number of groups was 4 considering the value of ΔK obtained by the method reported by Evanno et al. (2005)



*** Conclusion ***

As a result, the eight sheep breeds studied show a distinction between them. Nevertheless, only the Algerian breed Ouled Djellal which is located near the Turkish ovine breeds in the dendrogram, this breed which introduced by the Tribes of Arabia "Benou HILAL" coming from the Middle East. In addition, such information provides an overview of the effect of conservation activities on breeding farms, suggesting that we should take some measures to avoid further losses of genetic diversity and minimize inbreeding represented by these breeds as soon as possible.

*** REFERENCES ***

- FAO. 2011. Rome: FAO; Peakall R, Smouse PE. 2006. Mol Ecol Notes. 6:288-295; Tamura K, et al. 2013. MEGA6: M. Mol Biol Evol. 30:2725-2729.; Yeh FC, et al. 1997. POPGENE: Edmonton, AB, Canada: University of Alberta, Evanno G et al 2005 Mol Ecol.; 14: 2611-2620

Ultrasound findings of common genital pathologies in small ruminants

Mário Balara¹, Isabel Cosentino¹, Felipe Leal¹, Lucas Barbosa¹, Fernanda Gonçalves¹, Ana Beatriz Carvalho¹, Bruno Vieira¹, Mirella Dias¹, Paula Cortat de Souza¹, Felipe Brandão¹

¹Universidade Federal Fluminense, Niterói, Rio de Janeiro, Brazil

Introduction

This study reports the prevalence and ultrasound appearance of some common reproductive tract pathologies of small ruminants under tropical conditions in Brazil.

Material and Methods

From September 2012 to February 2020 ultrasound data were collected during pregnancy diagnosis and evaluation of the reproductive tract at Rio de Janeiro State. A total of sixteen sheep flock and ten dairy goat flock raised under extensive and intensive management systems, respectively, were evaluated and used in the study. An ultrasound device (Sonoscape S6®, Sonoscape, Yizhe Building, Yuquan Road, Shenzhen, China) coupled to a linear transducer of 7.5 MHz (transrectal) or 5 MHz convex (transabdominal) was used. B-mode and Color Doppler-mode ultrasound tapes were recorded and evaluated. The chi-square test was adopted for frequency comparison among findings ($P < 0.05$).

Results

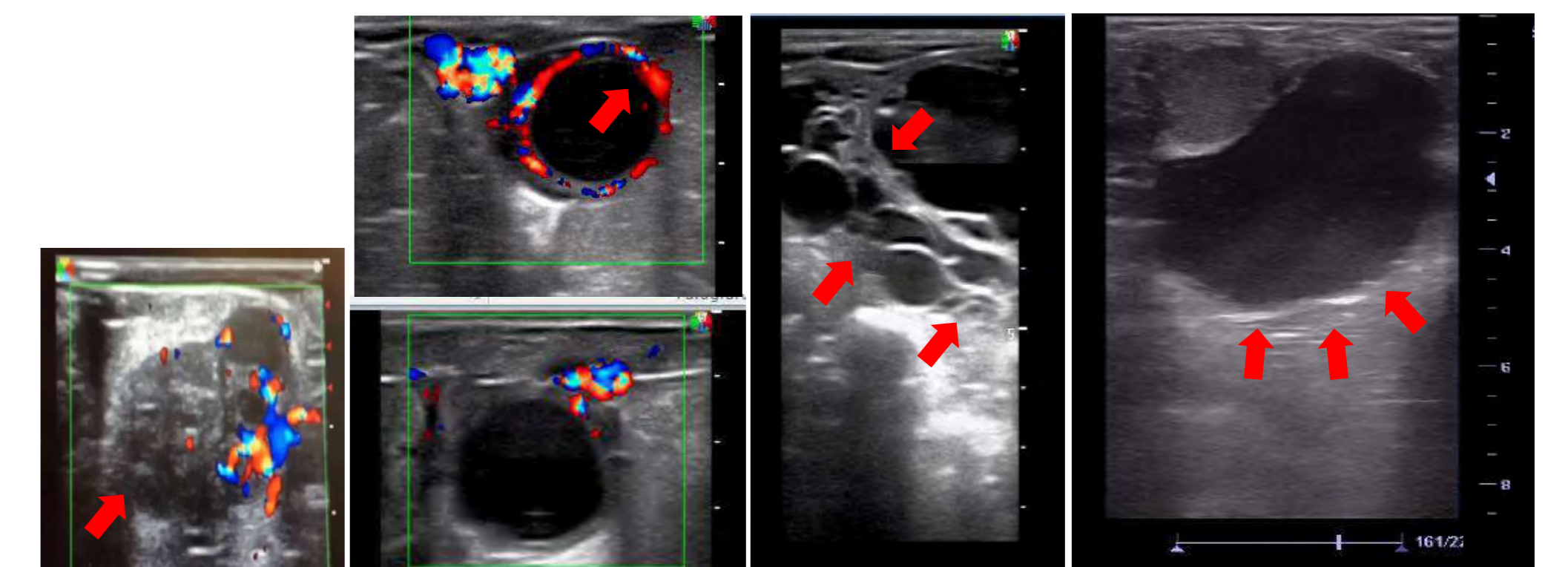
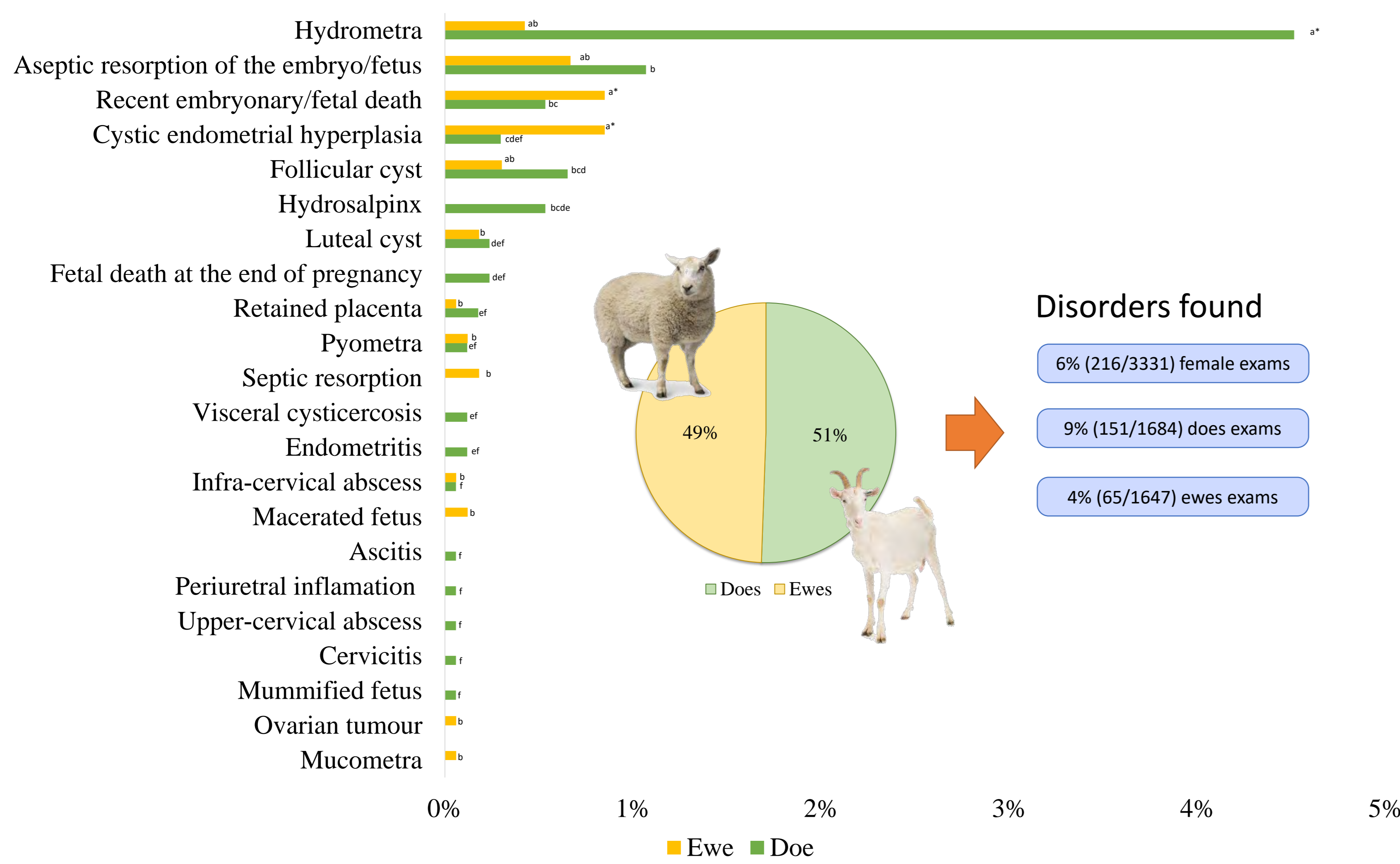


Figure 1. Ovarian tumor (hypoechoic and heterogeneous parenchyma) Figure 2. Luteal cyst above (with blood flow); and follicular cyst down (without blood flow) Figure 3. Cystic endometrial hyperplasia (cystic area with anechoic content inside uterine wall) Figure 4. Hydrosalpinx (anechoic content inside uterine tube, causing diameter enlargement)

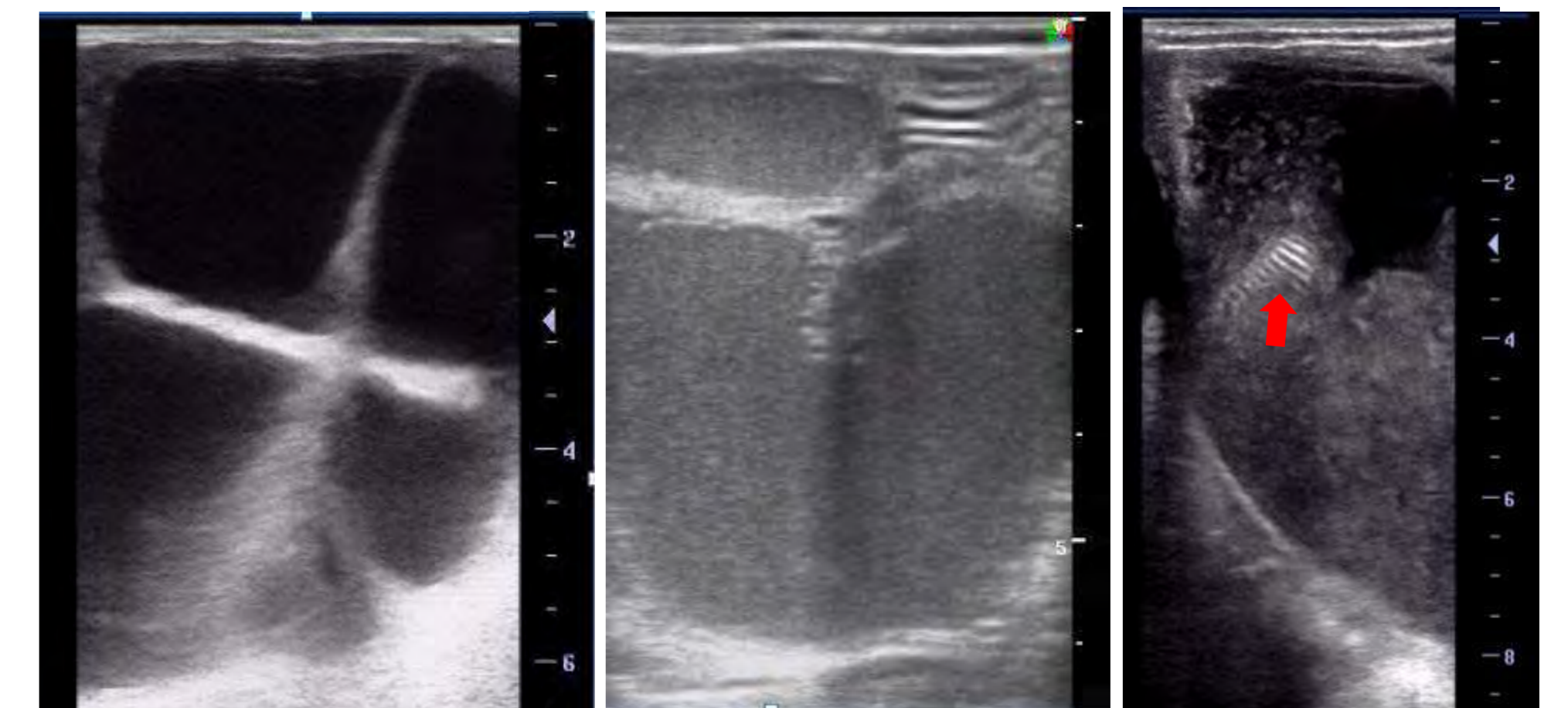


Figure 5. Hydrometra (uterine anechoic content forming trabeculae) Figure 6. Pyometra (uterine hypoechoic trabeculae) Figure 7. Macerated fetus (uterine hypoechoic content, with the presence of the decomposed fetus – well defined ribs – red arrow)

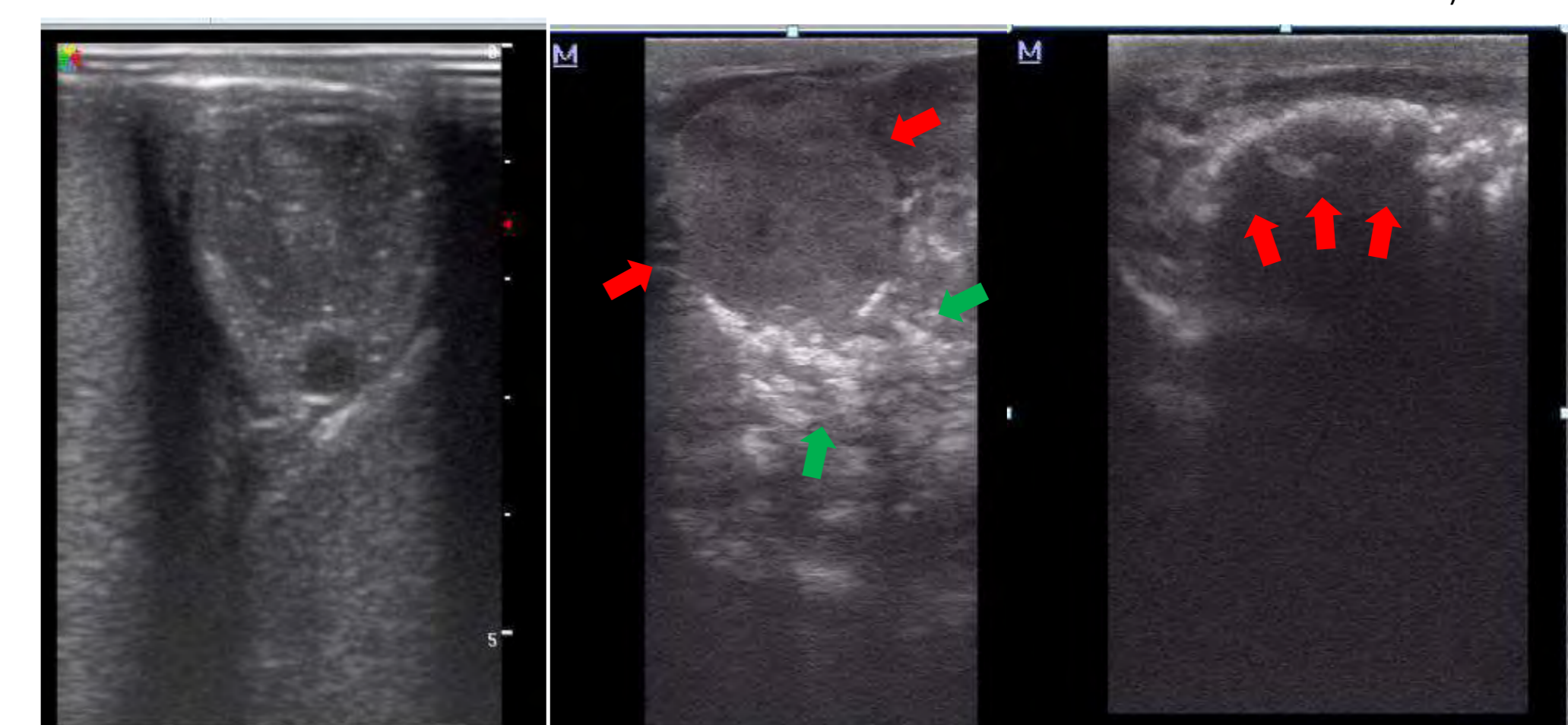
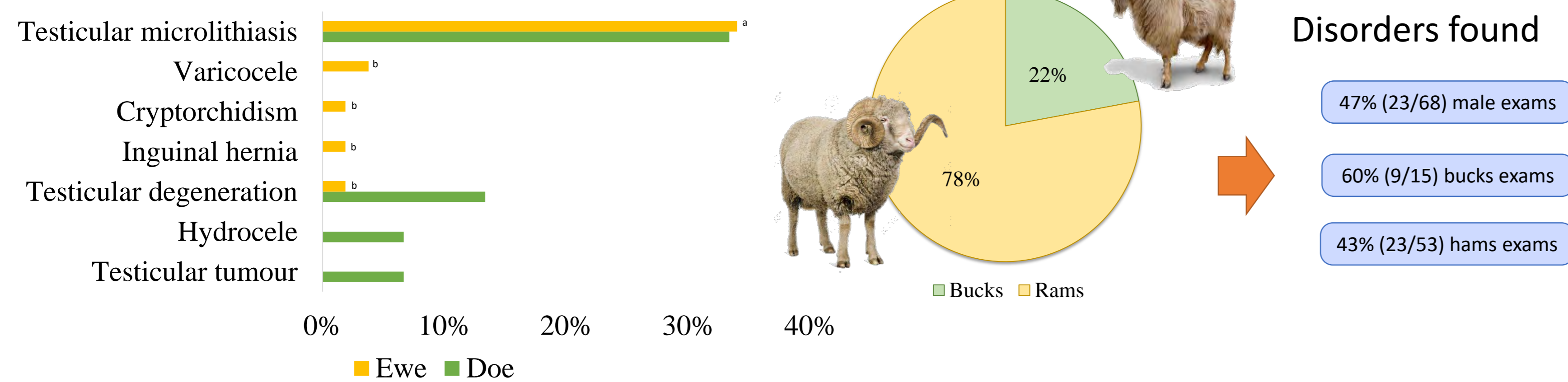


Figure 8. Epididymis tail with spermatic granuloma (hypoechoic parenchyma with hyperechoic dots) Figure 9. Testicular tumor (hypoechoic and heterogeneous circumscribed nodule – red arrow, and hyperechoic and heterogeneous parenchyma – green arrow) Figure 10. Testicular degeneration (acoustic shadow area due to calcification)

Conclusion

In conclusion, does have significantly more reproductive tract disorders than ewes where hydrometra was the major issue. Ultrasonography provides clinically useful information relating to diagnosis, prognosis, and therapeutics.

Teaching vet students on sheep and goat farming: Brazilian experience

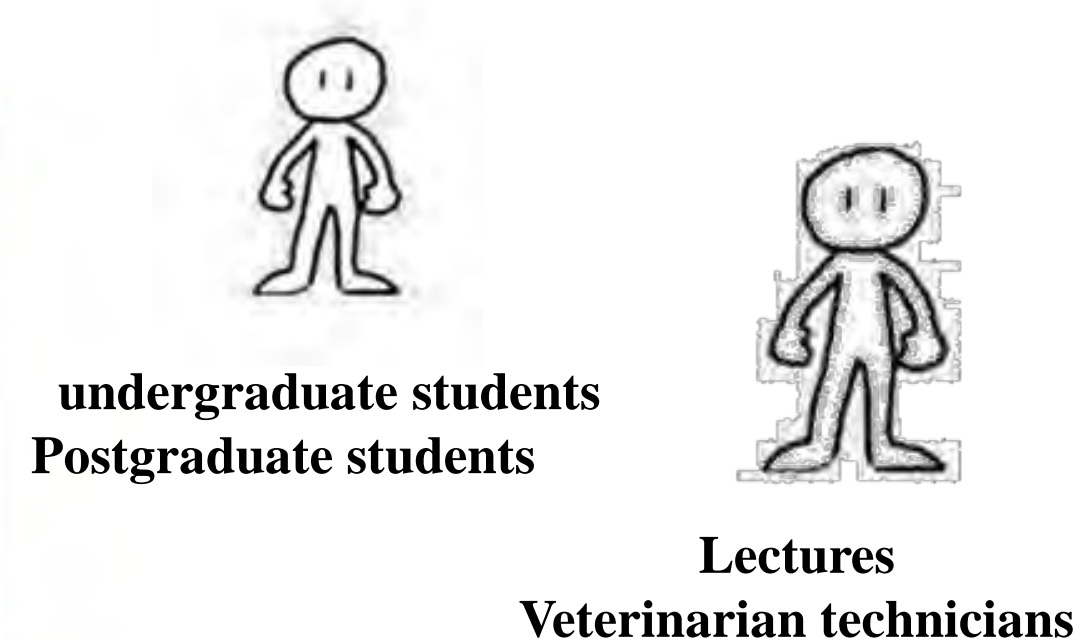
Mário Balaro¹, Isabel Cosentino¹, Lucas Barbosa¹, Fernanda Gonçalves¹, Ana Beatriz Carvalho¹, Bruno Vieira¹, Bruna Figueiredo¹, Mirella Dias¹, Paula Cortat de Souza¹, Felipe Brandão¹

¹ Fluminense Federal University, Niteroi, RJ, Brazil.

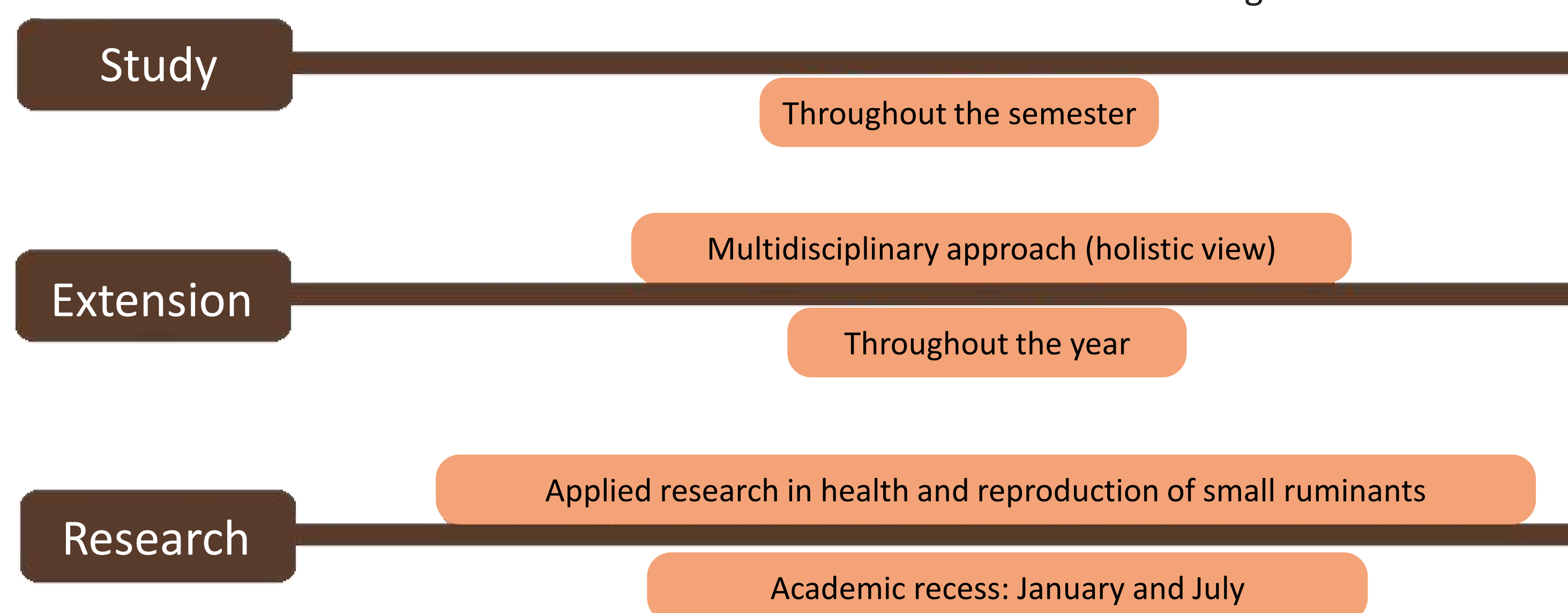


Group of Study, Research and Extension in Goats and Sheep From Universidade Federal Fluminense

THE GROUP:



1. Facilities, ambience and AW
2. Health management
3. Nutritional management
4. Reproductive management
5. Milking and milk quality
6. Peripartum period and lambs/kids care
7. Zootechnical indices and production costs
8. Dairy factories and slaughterhouses




health, reproductive and nutritional management

Clinical and surgical intervention

Diagnostic support

Applied research and rural training

GEPECO collaborates with the skills development and professional insertion of vet students in different productive systems of small ruminants in our State and country. Likewise, it helps to increase the profitability of the sheep and goat farming through the transmission of technology and the fixation of families in the rural zones.

New genomic tools for sheep breeding in Germany

Monia Budnik, Julia Storms, Anna Wirth, Ann-Kathrin Struck and Ottmar Distl
University of Veterinary Medicine Hannover, Institute for Animal Breeding & Genetics, Hannover, Germany

Objectives and Background

- Ovine genome projects enabled the development of high throughput genotyping tools
- Genotyping arrays of **S**ingle **N**ucleotide **P**olymorphisms (SNPs) for sheep available since 10 years
- Ovine GGP 50K genotyping array contains ~45,000 SNPs including SNPs for parentage verification and detection of genetic characteristics
- Testing the suitability of the ovine GGP 50K genotyping array in sheep in Germany
- Screening for genetic characteristics, suitability for studies of genetic diversity, quantitative and Mendelian traits



Materials and Methods

- EDTA-blood samples for approximately 3000 sheep
- Turnaround time between sampling and availability of test results approximately 2-3 weeks
- Genotyping rate > 98%
- All samples were genotyped without the need of repeated sampling

Results

Genetic characteristics

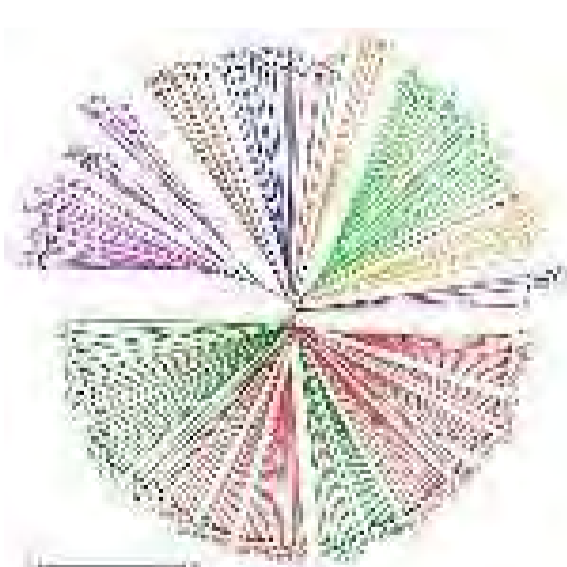
- Scrapie diplotypes: most prevalent ARR/ARR (60%) and ARR/ARQ (25%), but ARR/VRQ (0.25%), VRQ/ARQ (0.12%), VRQ/VRQ (0.09%)
- Microphthalmia allele frequency at 0.19% (11 animals)
- Entropion associated allele located on OAR6 at 118,988,540 bp with a frequency at 4.45%
- Transmembrane protein 154 (*TMEM154*: E35K variant) K/K genotype conferring lower risk to maedi-visna prevalence of 46%
- Myostatin (MSTN:g.6223G>A) A-allele frequency at 16%

Genetic variation

- Estimation of heritabilities for animals without available or uncertain pedigrees
- Multi-breed estimates through genomic relationship matrices
- Improving accuracy of estimates through genomic relationship matrices

Genetic diversity

- Homozygosity islands (runs of homozygosity), genomic inbreeding (F_{ROH}) and F_{IS}
- Diversity measures, effective population size, genetic distances among breeds and relationships among animals within/across breeds



Genomic relationships within and among breeds

Breed	Effective population size	Genomic inbreeding (F_{ROH})	F_{IS}
Forest Sheep	32	0.57%	-0.010
Leine Sheep	41	0.54%	0.017

Conclusions

- Ovine GGP 50K valuable and cost-effective tool for sheep breeding and conserving diversity within and between breeds
- Useful for including new traits to be tested under harsh conditions and non-pedigree animals



Hospital Veterinario Universidad Zaragoza

USE OF THERMOGRAPHY FOR THE DIAGNOSIS OF CHRONIC PROLIFERATIVE RHINITIS IN SHEEP AND ITS APPLICATION IN THE DIFFERENTIAL DIAGNOSIS OF THE FIRST CASE AFFECTING THE DORSAL AND MEDIAL TURBINATE

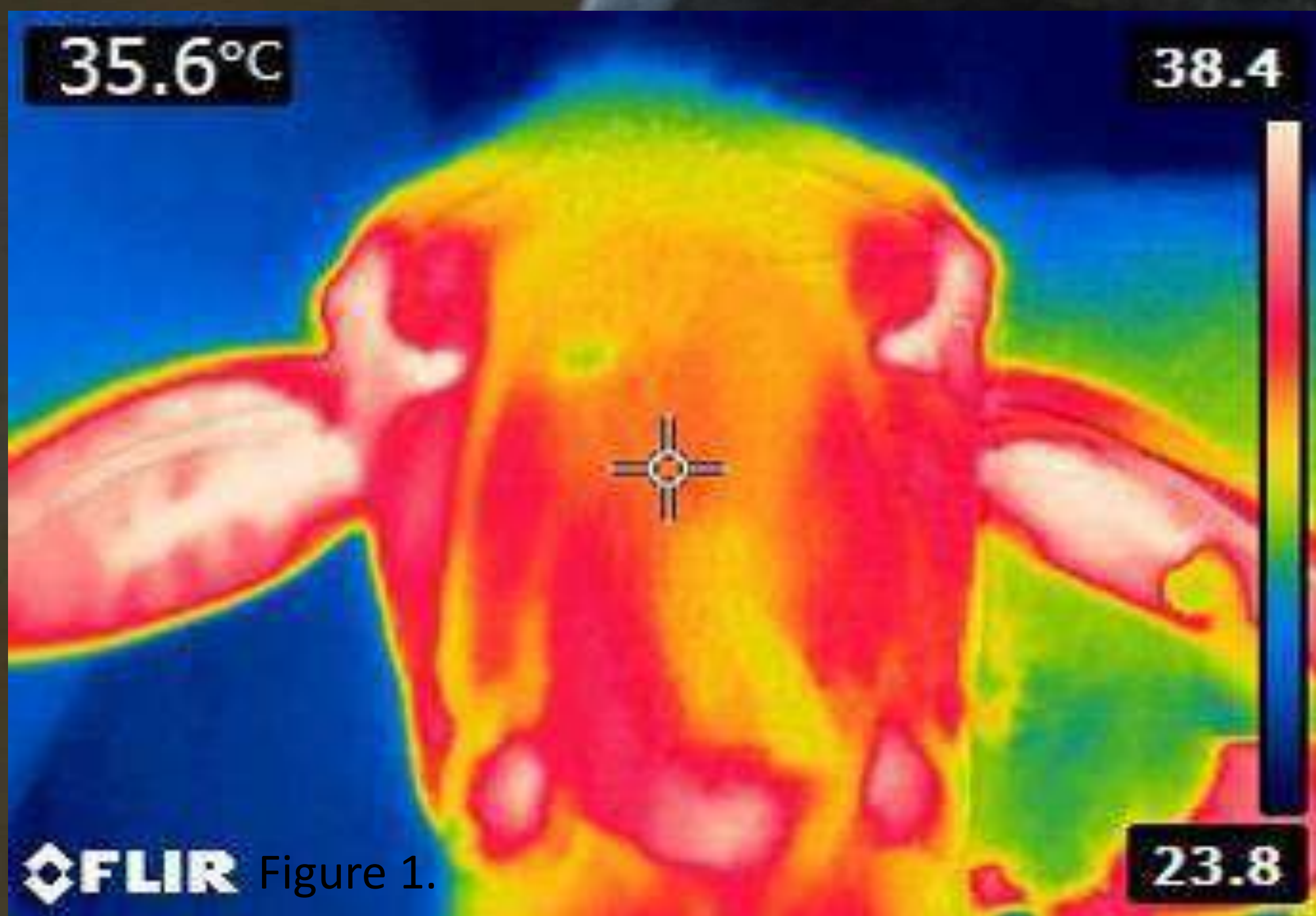


Ceresuela, C.¹; López-Tamayo, S.¹; Bueso, J.P.²; Alzuguren, O.³; Rodríguez, A.¹; Figueras, L.⁴; Ferrer, L.M.¹

¹ Animal Pathology Department. Instituto Agroalimentario de Aragón-IA2 (Universidad de Zaragoza-CITA), Zaragoza, Spain.

² Laboratorio Agroambiental de Aragón, Zaragoza, Spain. ³ Laboratorios Exopol Diagnóstico y Autovacunas S.L., Zaragoza, Spain.

⁴ Gabinete Técnico Veterinario S.L., Zaragoza, Spain.



Introduction

Chronic proliferative rhinitis (CPR) is a fatal prognosis disease of the upper respiratory tract disease that affects sheep and is associated with *Salmonella enterica* subspecies *diarizonae* serotype 61:k:1, 5, (7). It affects the ventral nasal turbinate and sometimes the proliferative tissue can be seen emerging the nostrils.

In the following case the animal affected was a ewe with a severely bilateral inflammatory process of the upper respiratory tract. Thermography, along with other techniques, helped to guide the diagnosis towards the first described case of CPR affecting the dorsal and medial turbinates.

Material, methods and results

A ewe referred to the Ruminants Clinical Service of the University of Zaragoza with upper respiratory symptoms was studied.

Thermography is a very useful technique to locate the affected area in upper respiratory tract disorders. In the present case, the cranial and middle areas of the nasal fossa were affected (Figure 1). The study was complemented with radiographic images, by means of a lateral exposure of the affected area (Figure 2).

CT scan and 3D reconstruction (Figure 3) were performed to determine the extension of the lesion and showed proliferative masses in the ventral turbinate and also in the dorsal and middle turbinates.

Finally, the animal was humanely sacrificed and the pathological (Figure 4) and histological and microbiological study were carried out. All the tests confirmed the affection of the ventral and dorsal turbinates and its etiology.

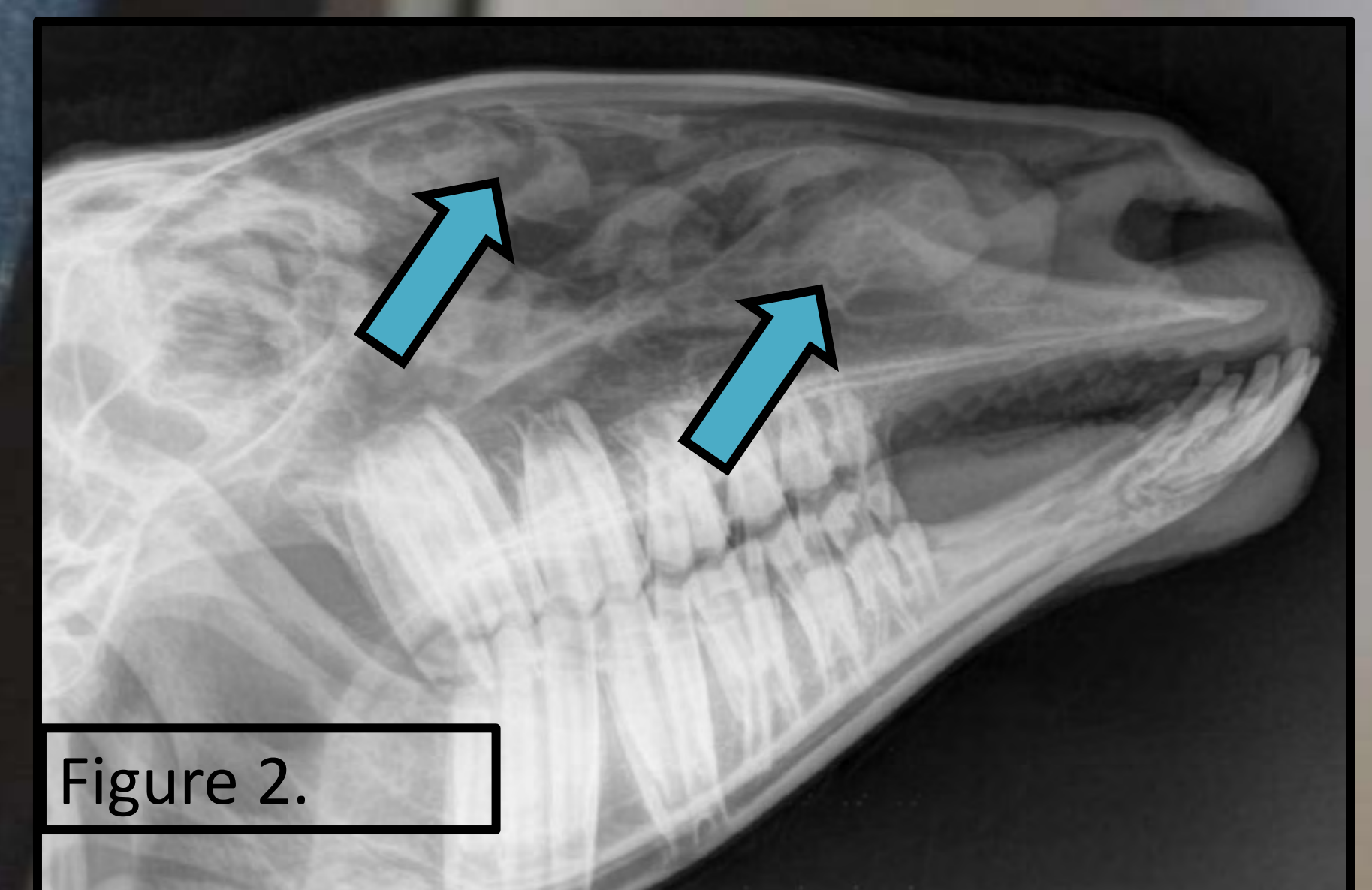


Figure 2.

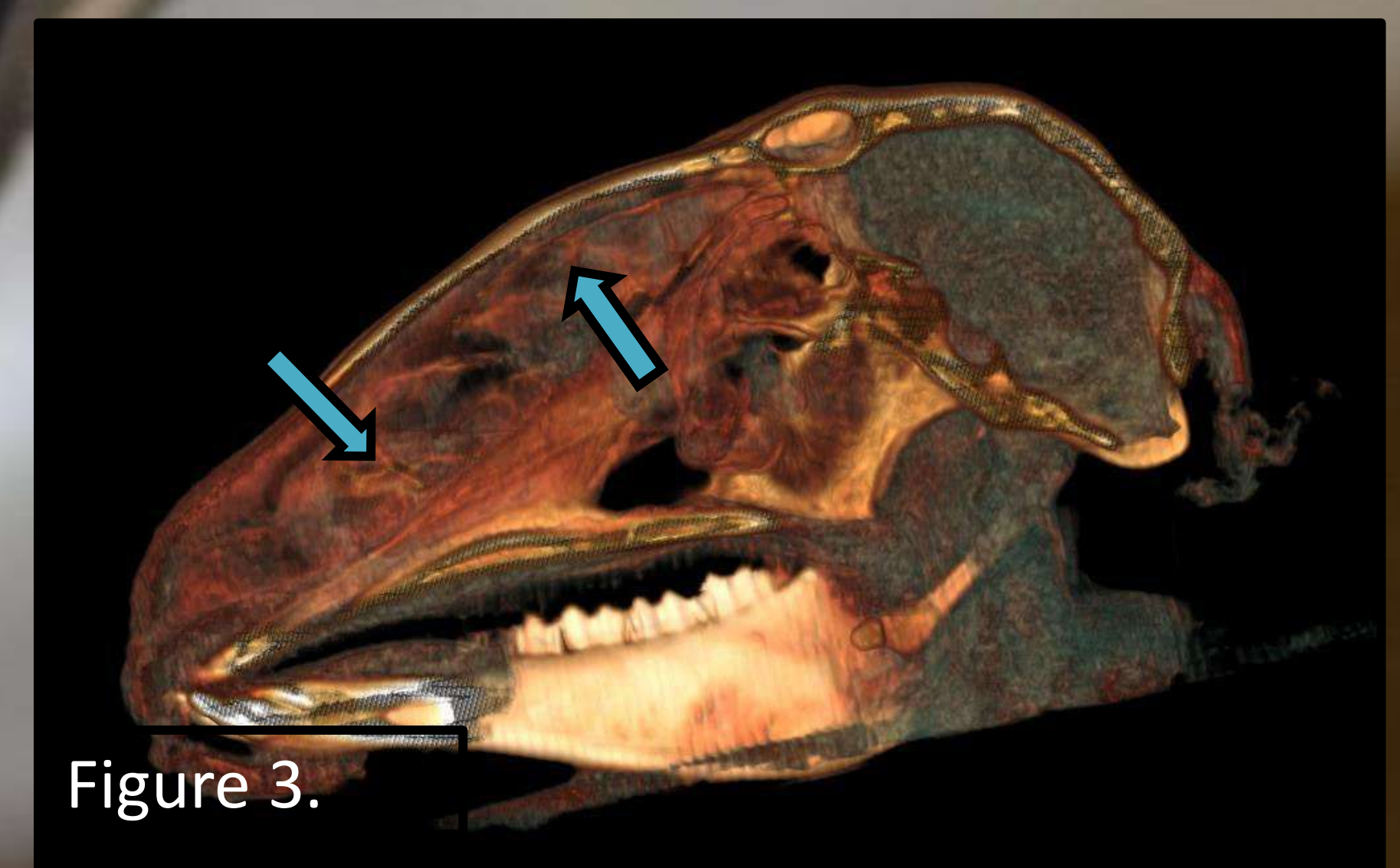


Figure 3.

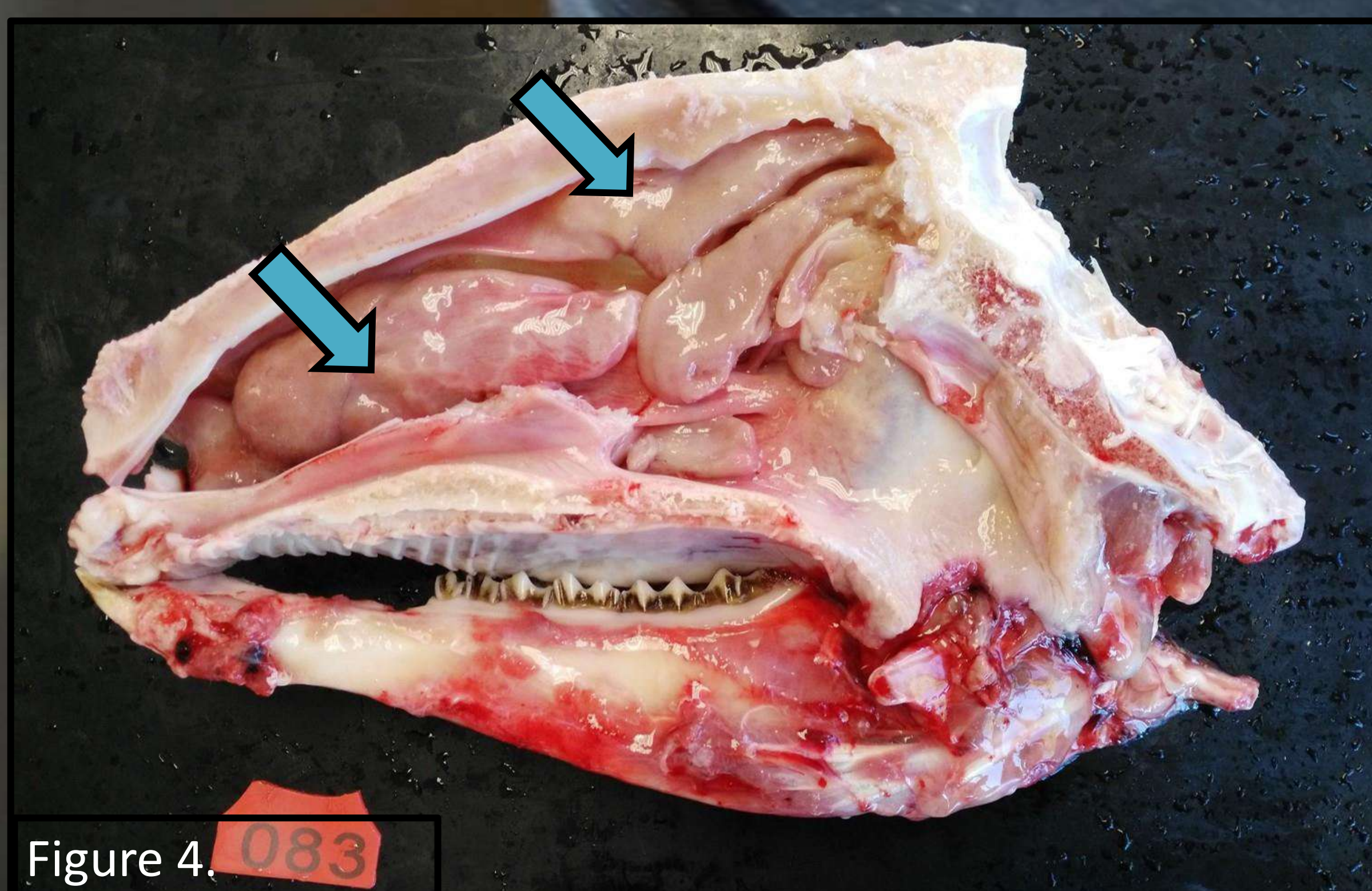


Figure 4. 083

Conclusions

In all the previous descriptions of CPR the ventral turbinate was always affected and only minor changes were observed in dorsal and medial turbinates or ethmoidal area.

The affection of the dorsal and medial turbinates here described shows how this bacterium can deepen and damage more internal structures of the respiratory tract. This was easily observed by thermography, which helped to locate the affection and facilitated the diagnosis, proving to be a useful resource for clinical diagnosis of upper respiratory tract diseases of sheep.



UNIVERSITY OF
THESSALY

Feeding dairy sheep and goats

George Christodoulopoulos*

DVM, PhD, PhD, CertSHP, DipECBHM, DipECSRHM, MRCVS

**Clinical Veterinary Medicine Department, Faculty of Veterinary Science*

P.O. Box 199, Karditsa GR-43100, Greece

Email: gc@vet.uth.gr

Objective

Diet formulation is the math and art of combining feed ingredients to supply nutrients economically for animal function. In small ruminant farms, often the advice given by the practitioners on what quantities they should be fed is empirical; a practice that sometimes either does not cover the animal needs or overpasses them. Here we present our dietetic plan for sheep and goats including our calculations which determined what quantities they should be fed.

Our dietetic plan

We initially formulate a mixture of concentrates taking care to have crude proteins (CP) 15-17% and digestive fibers (DF) 20-25%. Consequently, we formulate a “total mixed ration”, as the mixture is meant to feed each head over 0.5 kg per day. In the resulting mixture, we add 1.0% calcium carbonate, 1.5% tricalcium phosphate and 0.5-1.0 % salt. In addition, for sheep we add a commercial vitamins/trace elements mixture for supplement of vitamin E, vitamin D3 and the trace elements Se, Zn, Co, J and Mn; while for goats, we add a commercial mixture with the vitamins and elements that we add in sheep with the addition of Cu.

Afterwards, we calculate the daily amounts that should be feed per head so for the mixture of concentrates that we formulated so for the roughage used in the farm.

Our calculations

As example, we calculate below the daily amounts of dry matter that should be feed in a dairy ewe farm that use two kind of feeds: A mixture of concentrates “Cm” with “a” MJ metabolisable energy (ME) and k% neutral detergent fiber (NDF) and a roughage “Rg” with “b” MJ ME and q% neutral detergent fiber (NDF).

We start calculating the Dry Matter Intake (DI) if the animal would consume only the “Cm”; this is given by the formula:

$\frac{120}{k}$ % of the animal life weight (W). So, in kg the DI will be $1.2 \frac{W}{k}$

Same wise, in case that the animal was consuming only the “Rg”, the DI is $1.2 \frac{W}{q}$

Consequently, in a Cartesian diagram, the combinations of the possible amounts “Cm” and “Rg” belong to a line that is determined by the points $(0, 1.2 \frac{W}{k})$ and $(1.2 \frac{W}{q}, 0)$ (see Diagram 1).

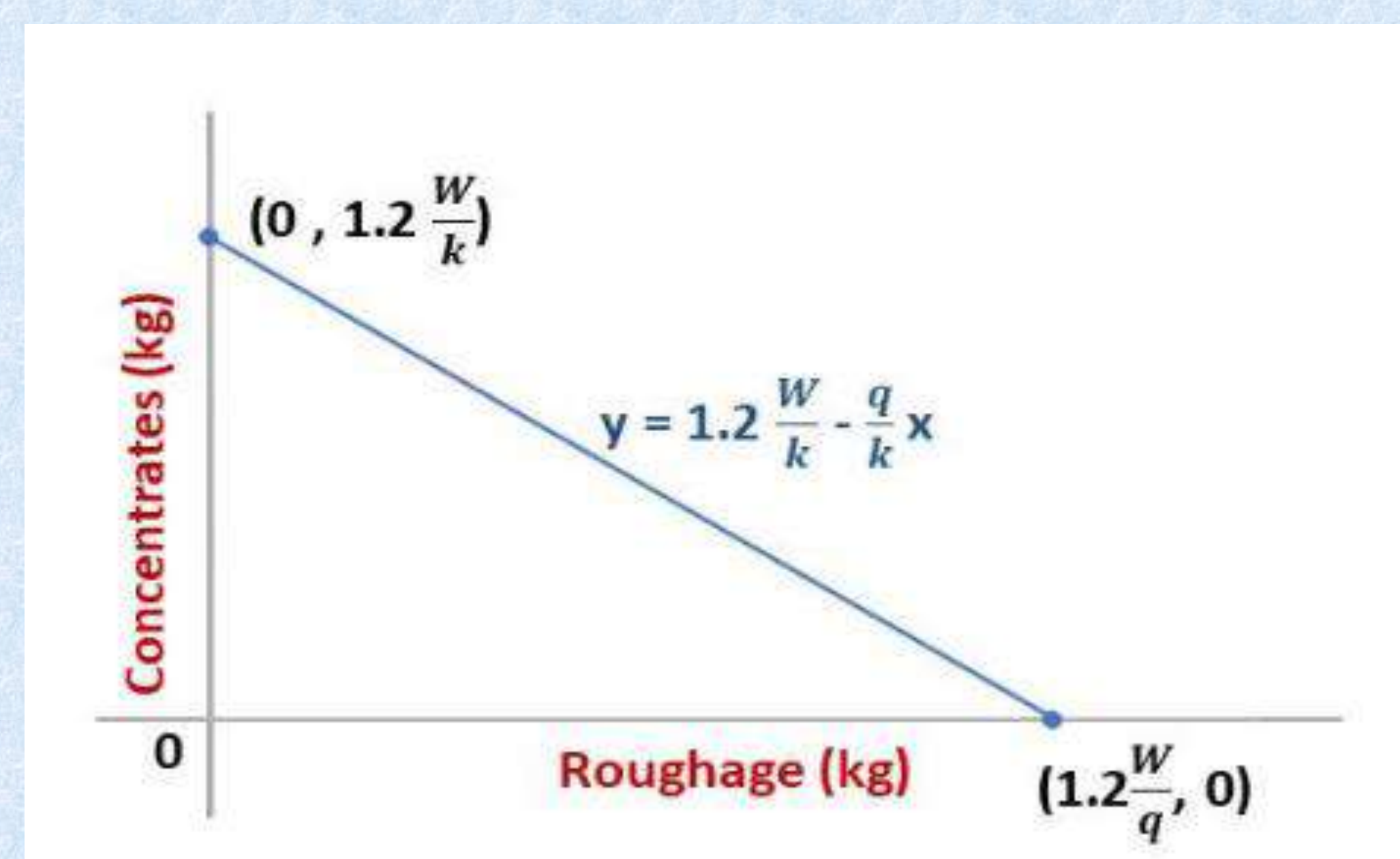


Diagram 1

By doing the mathematical calculations we find that the equation of the line requested is: $y = 1.2 \frac{W}{k} - \frac{q}{k} x$ (1), with y the dry matter of “Cm” in kg and x the dry matter of “Rg” in kg.

For calculation of ME requirements, in the case of ewe we prefer to use the formula: $ME = 7.1L + 0.085W + 2.85$ (2)

[In the case of doe: $ME = 3.25L + 0.085W + 2.85$], where L the daily milk yield in kg, and W the live weight of ewe or doe in kg.

While in the example of the above farm, the ME is also given by the equation: $ME = ax + by$ (3), with y the kg of “Cm” and x the kg of “Rg”.

From (2) and (3), we have: $ax + by = 7.1L + 0.085W + 2.85$ (4)

Subsequently we solve the system of equations (1) and (4) and find out that: $x = \frac{7.1L + 0.085W - 1.2 \frac{bW}{k} + 2.85}{a - \frac{bq}{k}}$

Finally, we calculate the y value by the equation (1).



Chronic mycotoxicosis in a dairy goat farm in Brazil

Paula Renata Cortat¹, Felipe Seabra Cardoso Leal¹, Helena Gomes Ferreira Pinto¹, Caroline Brito Dos Santos², Mirela Balistrieri Dias¹, Bruno Ribeiro Vieira¹, Felipe Zandonadi Brandão¹, Cláudia Del Fava², Luiz Antonio Moura Keller¹, Mário Felipe Alvarez Balara¹

¹ Fluminense Federal University, Niteroi, RJ, Brazil.
² Pathological Anatomy Laboratory, Biological Institute, São Paulo, SP, Brazil.

INTRODUCTION

Goat farming is a growing sector in Brazil, in which farmers faces several production challenges to reach a productivity able to turn the investments in breeding profitable. In this sense, disorders that leads to a decrease in the production, such as mycotoxicosis, are extremely significant, reflecting the challenges to keep a proper breeding.

In this scenario, the most evident signs of mycotoxicosis are the decrease in animal production in association with the greater susceptibility to opportunistic diseases. Therefore, this study aimed to describe a case of chronic mycotoxicosis in a dairy goat flock kept under an intensive system located at Minas Gerais State, Brazil (Fig. 1).



Figure 1. Minas Gerais State, Brazil.

CASE REPORT

Lactating goats presented history of decrease in milk production and weight loss in the past six months with some cases of abortions and premature births in the kidding season. Twelve goats showed thinness (BCS = 2; Fig. 2), pale mucous membranes and mild dehydration at the clinical examination.



Figure 2. (A) Lactating does show thinness (BCS = 2); (B) Close view.



Blood samples and feces were collected to the whole blood count, biochemistry and coproparasitological exams. Due to the poor quality of cornmeal storage, samples were also collected for mycotoxicological analysis (Fig.3).

Figure 3. Poor cornmeal storage.

Whole blood count and biochemistry findings were summarized in Table 1. In short, mild anemia, platelet aggregate, thrombocytosis, reversal of the neutrophil/lymphocyte ratio, hyperproteinemia with hypoalbuminemia and hyperglobulinemia were found.

Table 1. Overall whole blood count and biochemistry findings.

Blood analysis	Average results
Anemia	Hb 22%
Thrombocytosis	1.2x10 ⁵ /μL
Reversal of the neutrophil/lymphocyte	1.2 ratio
Hyperproteinemia	7.5 g/dL
Hypoalbuminemia	2.7 g/dL
Hyperglobulinemia	4.8 g/dL

The egg per gram of feces count average was low (~ 625 e.p.g.). Hemoparasites were not detected. In cornmeal samples were detected average of 354.5 μg/Kg of Aflatoxins, 2300 μg/Kg of Fumonins, 2165 μg/Kg of zearalenone and 3325 μg/Kg of Deoxynivalenol.

From a euthanized goat, it was found anemia, generalized anasarca, severe ascites, and decreased liver size in the necropsy exam (Fig 4).

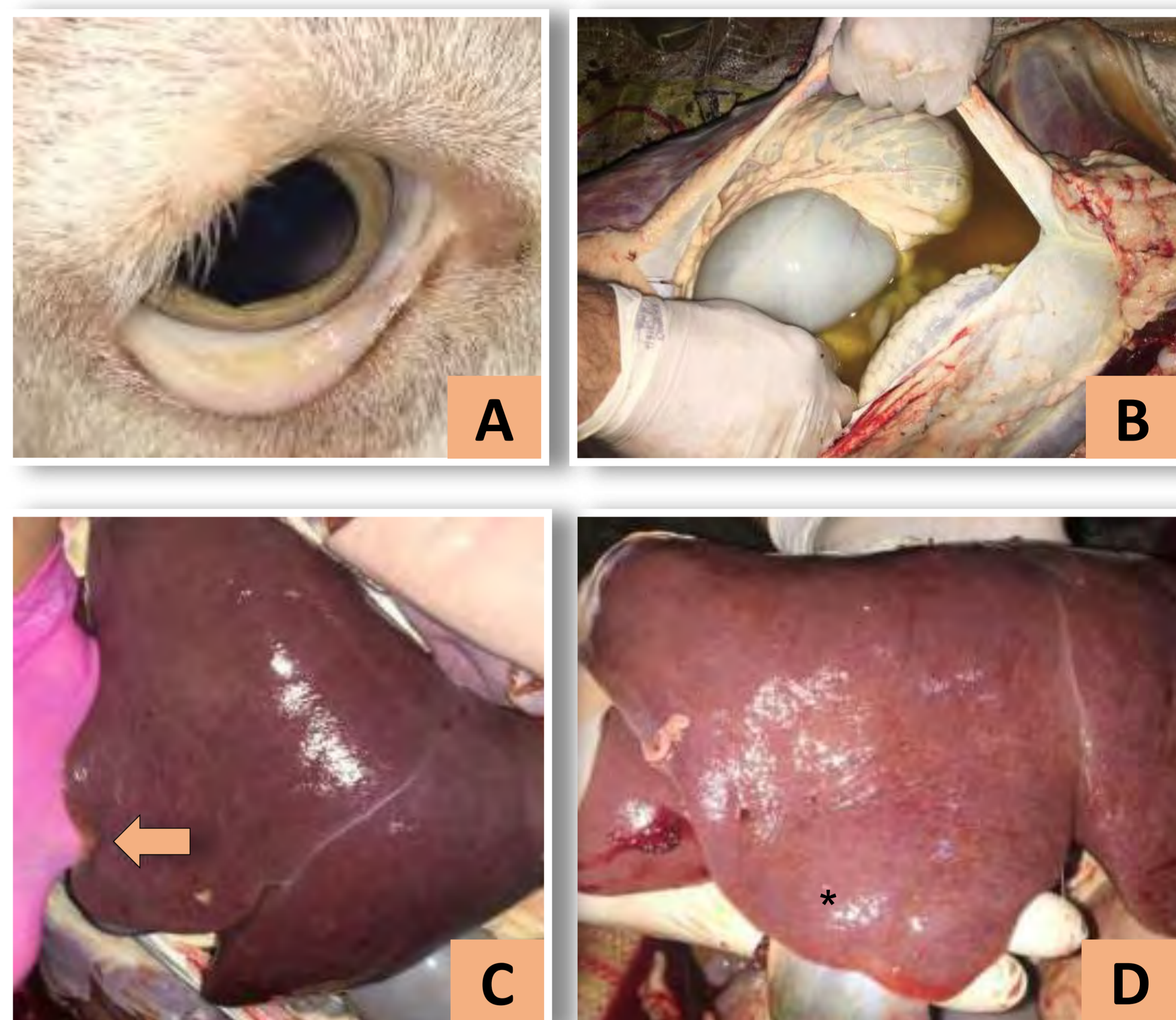


Figure 4. Necropsy findings. (A) Pale eye membrane; (B) Severe ascites within the abdominal cavity; (C) Detail in the liver lobe with a retracted focal segment and a whitish border (orange arrow); (D) Liver with notable lobular pattern, diffuse whitish areas and gallbladder repletion (*).

Histopathological findings revealed lobular center degeneration and liver necrosis, nephrosis and mild cerebral cortical spongiosis (Fig. 5). Such microscopic lesions were suggestive of fumonisin action.

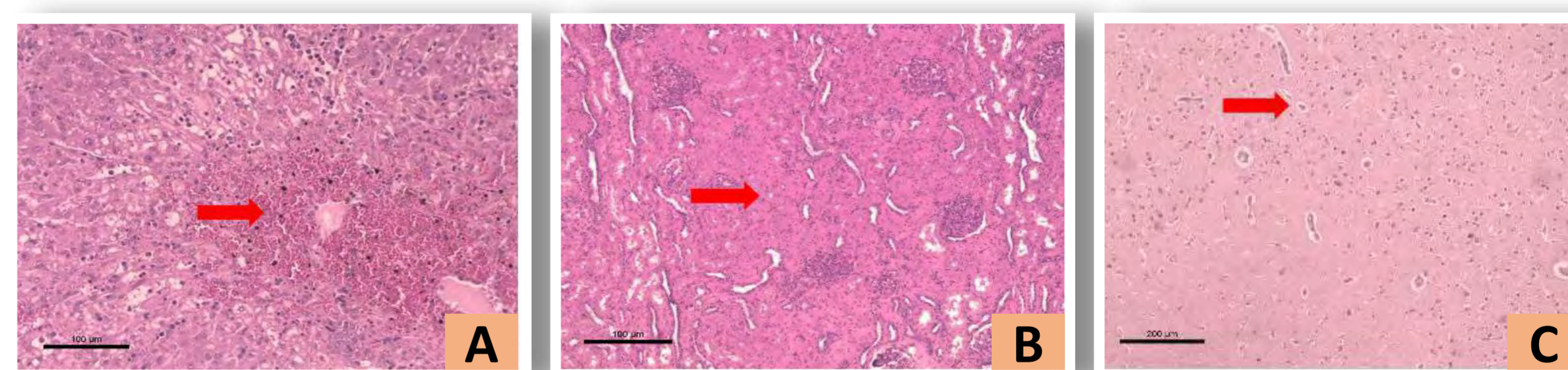


Figure 5. Histopathological findings. (A) Liver's histological section presenting mild hemosiderosis, intense central-lobular congestion; coagulation necrosis of center-lobular hepatocytes; hydropic degeneration of hepatocytes; center-lobular hemorrhage; vacuolization of hepatocytes (edematous degeneration); lobular center hemorrhage; (B) Kidney's histological section presenting large areas of nephrosis and glomerular hyperplasia; (C) Brain's histological section presenting mild cerebral cortical spongiosis.

DISCUSSION AND CONCLUSION

In conclusion, the chronic mycotoxicosis diagnosis was based in clinical, pathological, and toxicological findings. Therefore, the importance of purchase ingredients from reputable suppliers with quality assurance for the feed formulation is emphasized to avoid mycotoxicosis and other disorders.

E-mail: paulacortat@id.uff.br

Valvular endocarditis in small ruminants: case reports

Ana Beatriz da Silva Carvalho¹, Paula Renata Cortat de Souza¹, Bruno Ribeiro Vieira¹, Felipe Seabra Cardoso Leal¹; Isabel Oliveira Cosentino¹, Caroline Brito Dos Santos², Fernanda Martins Gonçalves¹, Mirela Balistrieri Dias¹, Claudia Del Fava², Mário Felipe Alvarez Balara¹

¹ Fluminense Federal University, Niteroi, RJ, Brazil

² Pathological Anatomy Laboratory, Biological Institute, São Paulo, SP, Brazil

INTRODUCTION

Endocarditis is the inflammation of the endocardium, which might be located on the heart wall and/or on the valve. This study aimed to describe two cases of valvular endocarditis in small ruminants located in Rio de Janeiro, Brazil.

CASE REPORTS

The first case occurred in a Saanen lactating goat (five-years-old), kept under intensive system. At the ultrasound scan for pregnancy diagnosis, a large amount of free anechoic fluid was found around uterus and ovaries (Figure 1). The animal underwent a daily treatment with furosemide (2.5 mg/kg) but died two weeks later due to an acute respiratory distress. Postmortem examination revealed yellowish friable masses adhered to leaflets that compound the tricuspid valve, as well as intense ascites, hepatomegaly, congestion and pulmonary edema (Figure 2). Histopathological report revealed in the mass adhered to the valve, there was a focus of neutrophilic infiltration and Splendore-Hoeppli phenomenon (Figure 3), compatible with bacterial and mycotic valvular endocarditis.

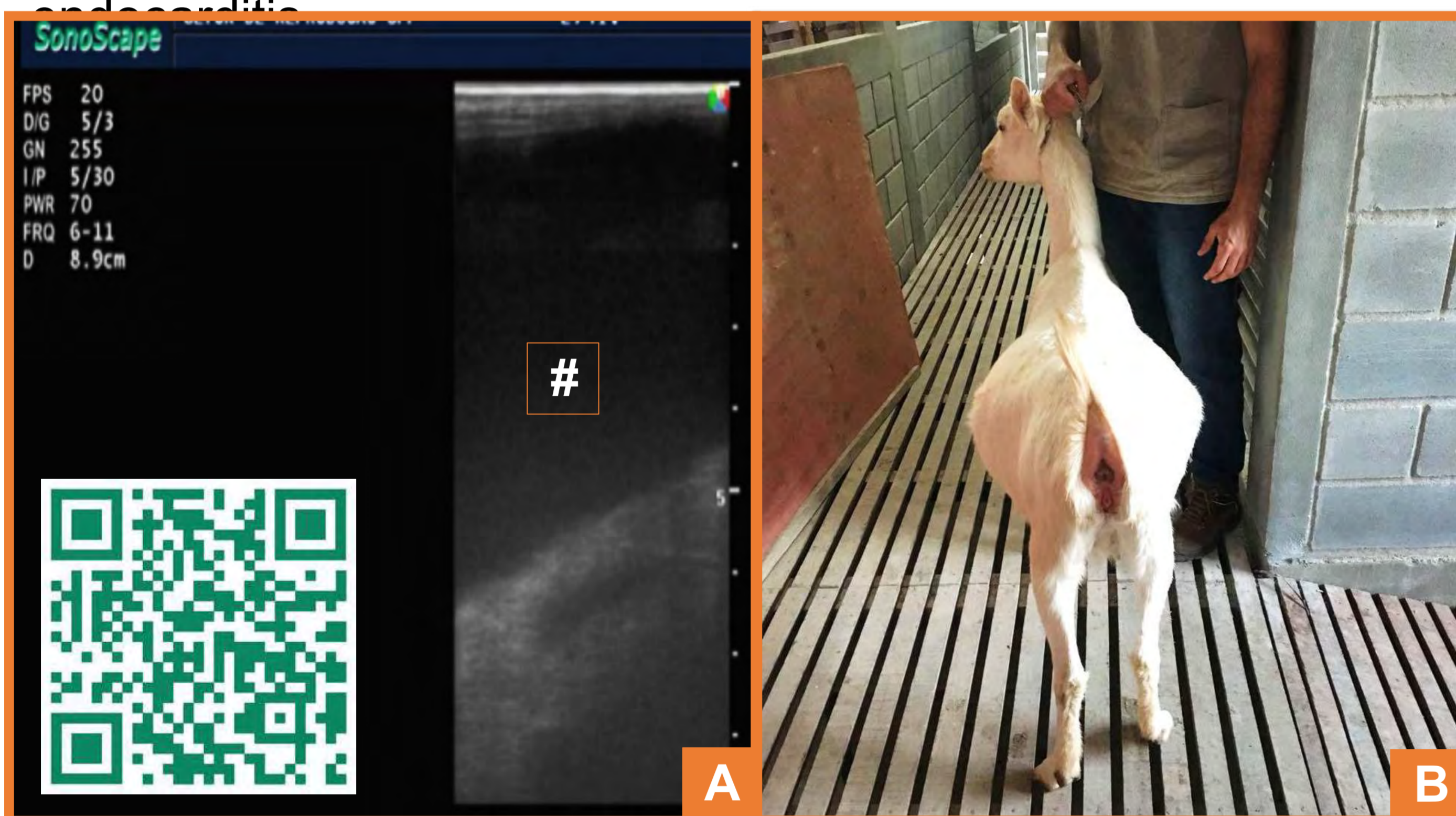


Figure 1. (A) Abdominal ultrasound scan revealed large amount of anechoic content (#) compatible with free fluid with in the abdominal cavity. QR code for video access. (B) Five-years-old Saanen lactating goat showing bulging of the abdominal silhouette.

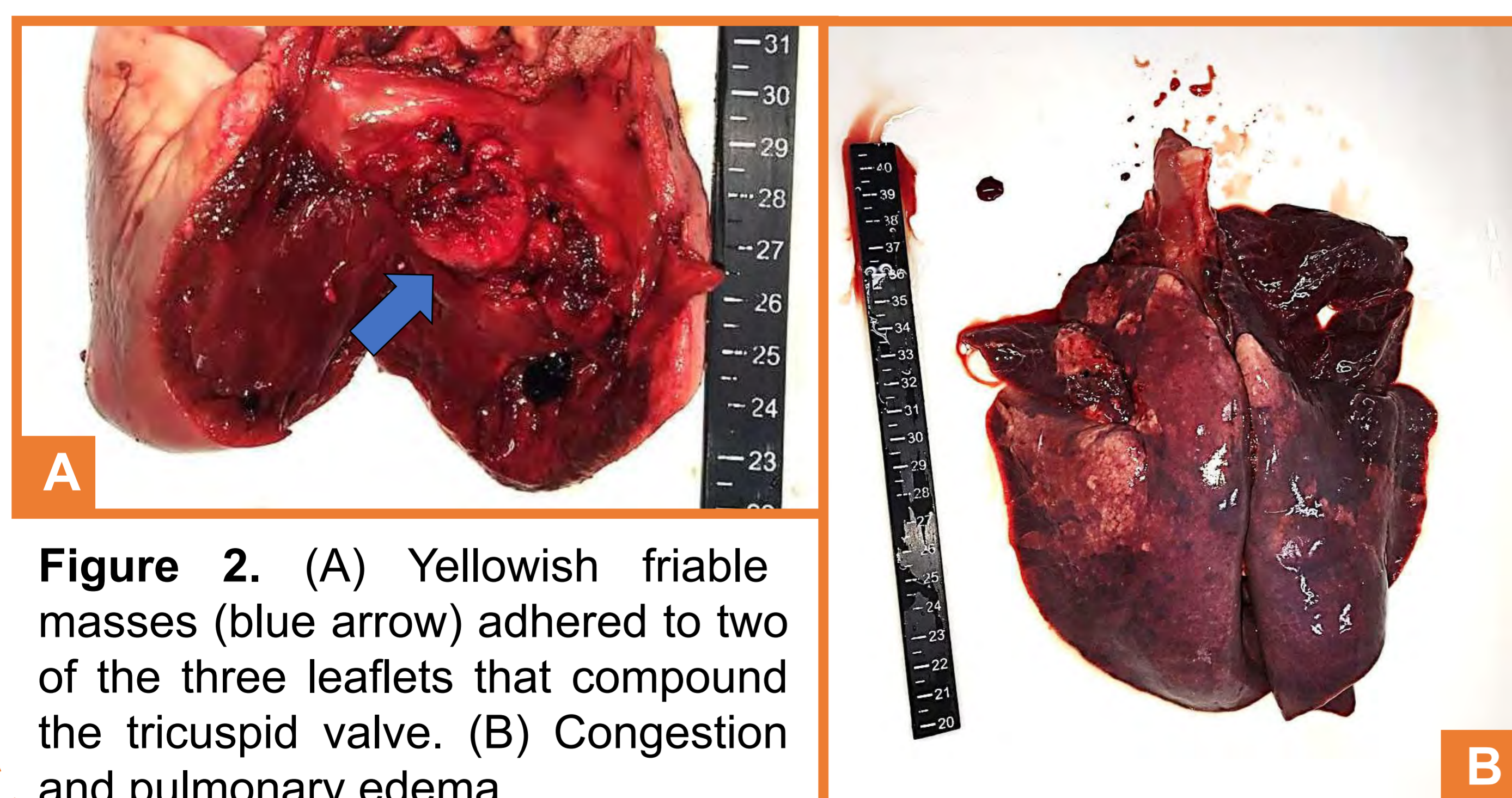


Figure 2. (A) Yellowish friable masses (blue arrow) adhered to two of the three leaflets that compound the tricuspid valve. (B) Congestion and pulmonary edema.

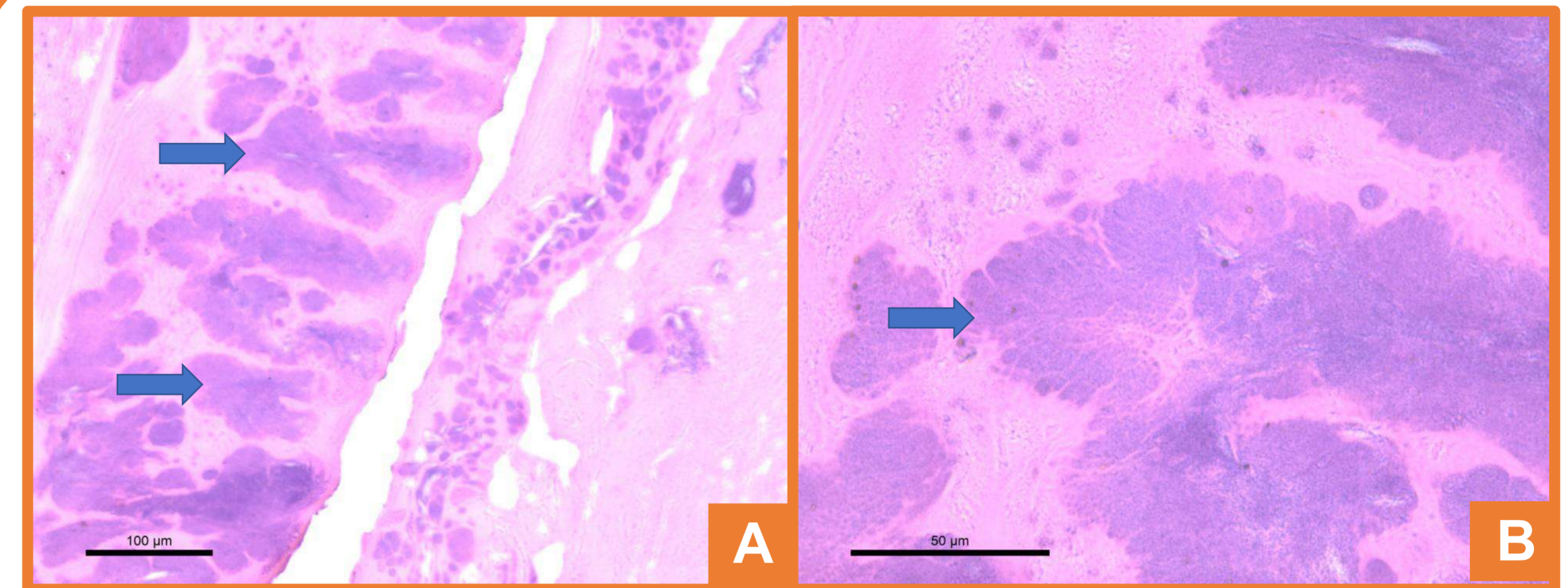


Figure 3. (A) Vegetative tissue in cardiac valve in histological section showing Splendore-Hoeppli phenomenon in mass. 200X magnification HE staining (blue arrow). (B) Vegetative tissue in cardiac valve in histological section showing Splendore-Hoeppli phenomenon in mass. 630X magnification HE staining (blue arrow).

The second case occurred in a crossbred hair sheep (three-years-old) kept under semi-intensive system that died under suspicion of previous fight and cervical trauma. At necropsy, a friable mass was found in the tricuspid valve, diffuse whitish lesions on the epicardium and myocardium, pale ocular conjunctiva, great amount of *Haemonchus* sp. within the abomasum, enlarged lung with diffuse congestion and whitish multifocal lesions on kidneys (Figure 4).

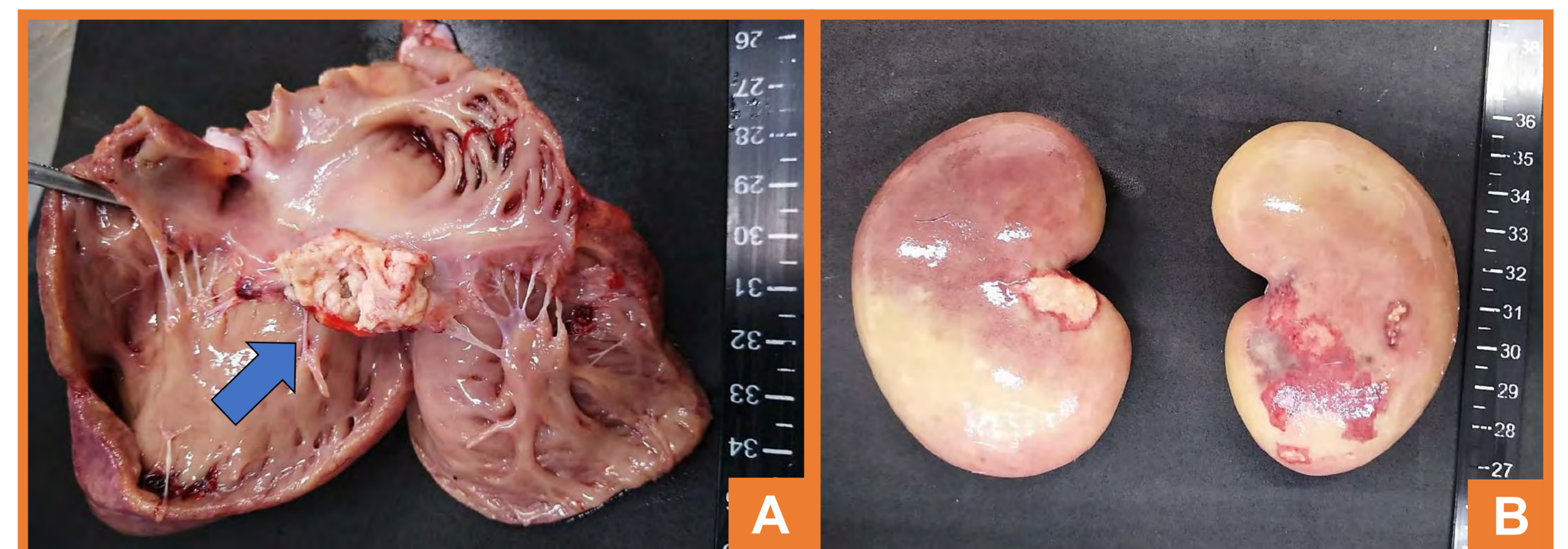


Figure 4. (A) Yellowish friable masses (blue arrow) adhered to two of the three leaflets that compound the tricuspid valve. (B) whitish multifocal lesions on kidneys.

DISCUSSION AND CONCLUSION

In both cases, endocarditis may have been secondary to chronic bacteremia, such as pneumonia, subacute ruminal acidosis (SARA), periodontitis and others.

Therefore, the diagnosis of valvular endocarditis is important to relate to other primary causes that can affect flock productivity and establish prophylactic measures.

REFERENCES

- Buczinski, S., Tsuka, T., Tharwat, M. (2012). The diagnostic criteria used in bovine bacterial endocarditis: a meta-analysis of 460 published cases from 1973 to 2011. *Veterinary Journal*, 193, 349–357. doi: 10.1016/j.tvjl.2012.02.012
- Radostitis, O.M., Gay, C.C., Hinchcliff, K.W., Constable, P.D. (2016). *Veterinary Medicine — A Textbook of the Diseases of Cattle, Horses, Sheep, Pigs and Goats*. (London: Saunders Ltd.). 2278 p.

INTRODUCTION

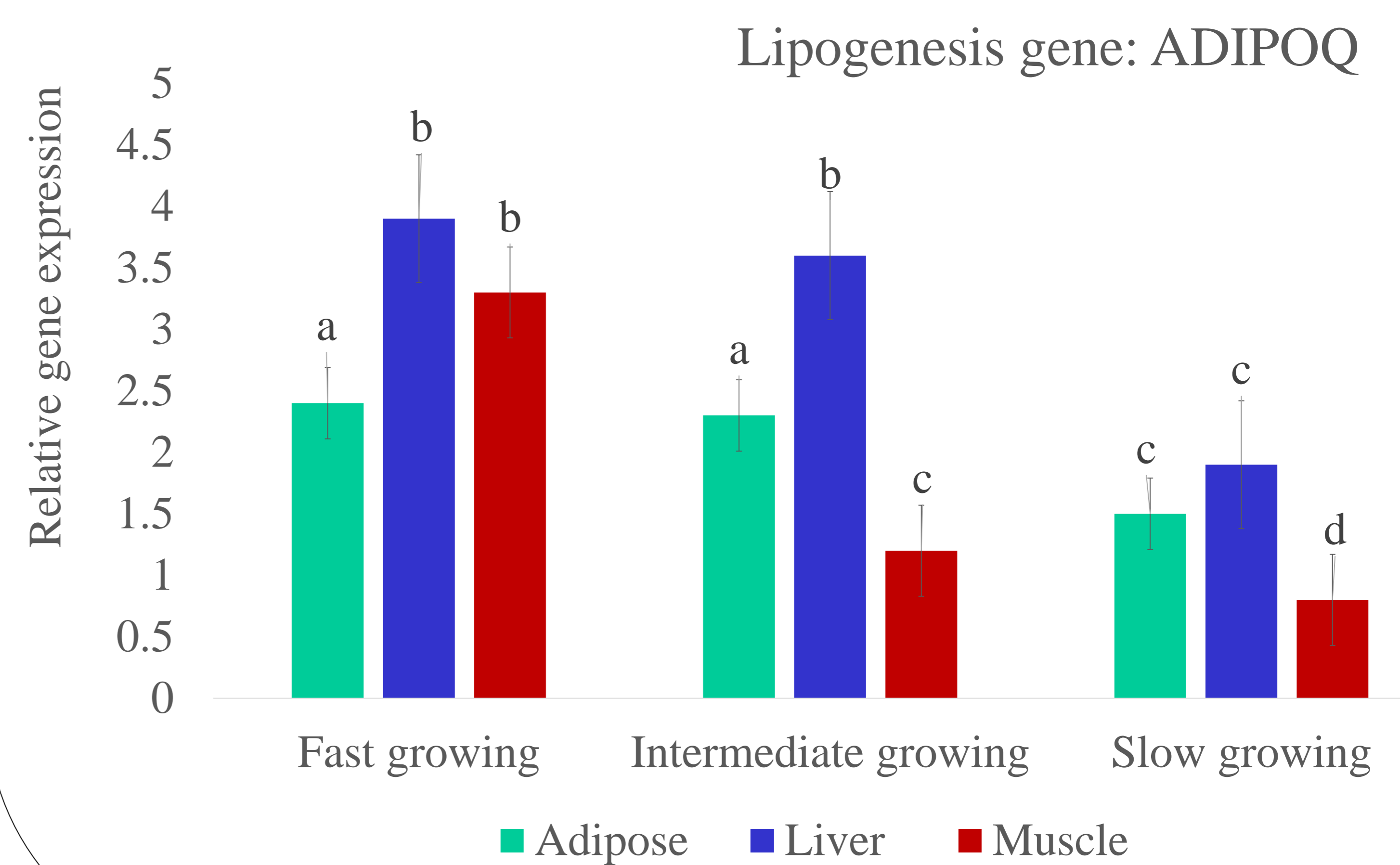
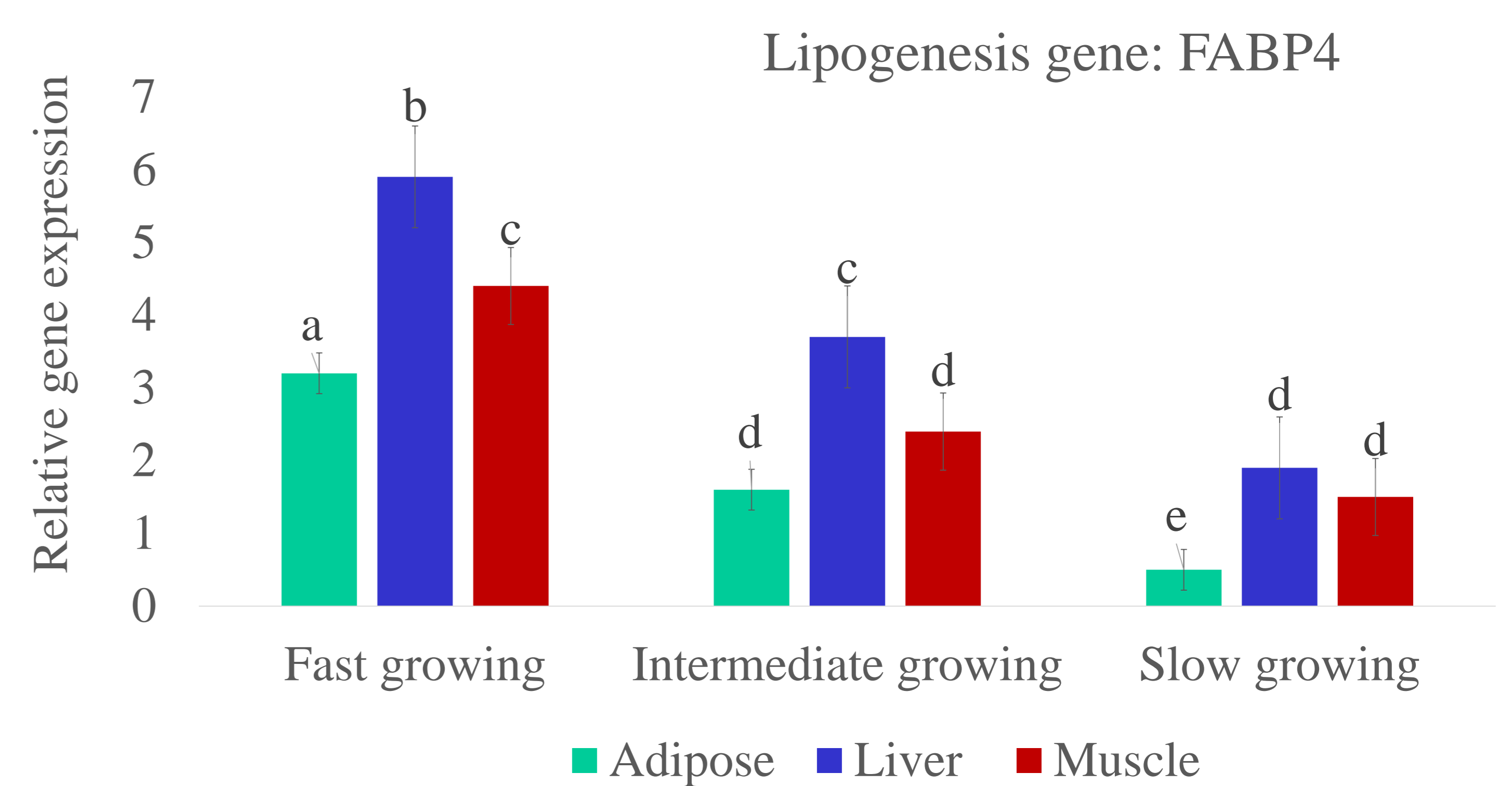
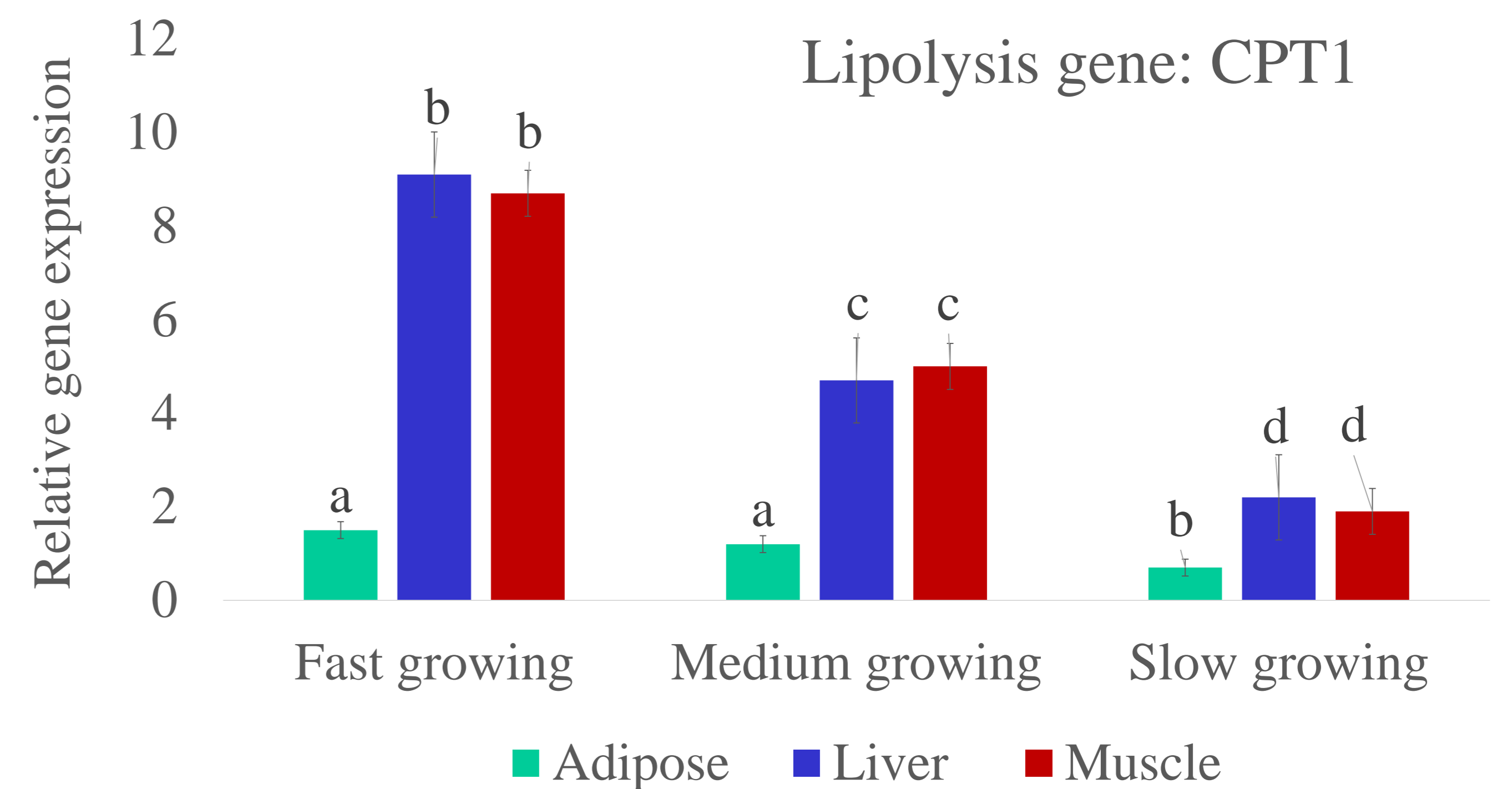
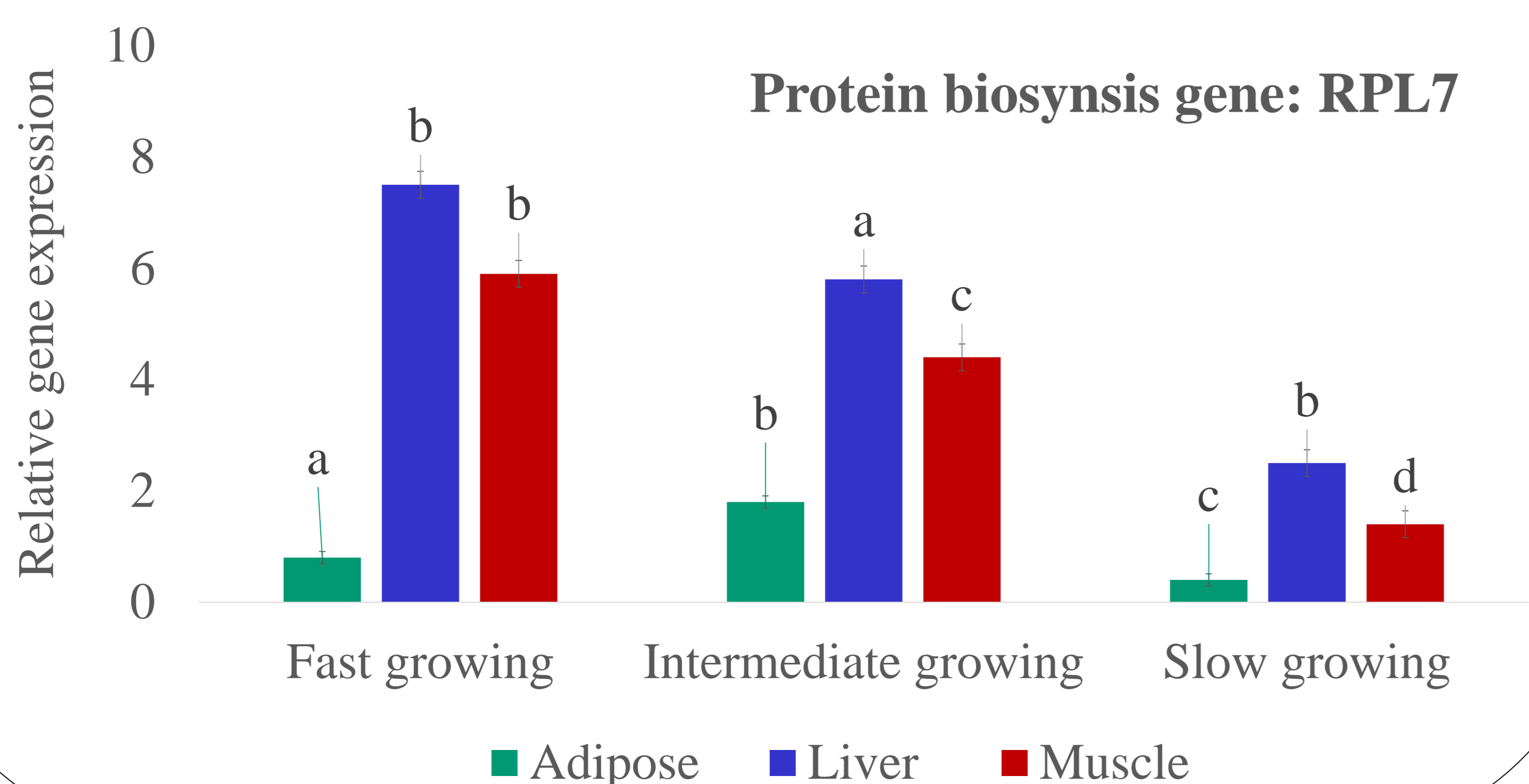
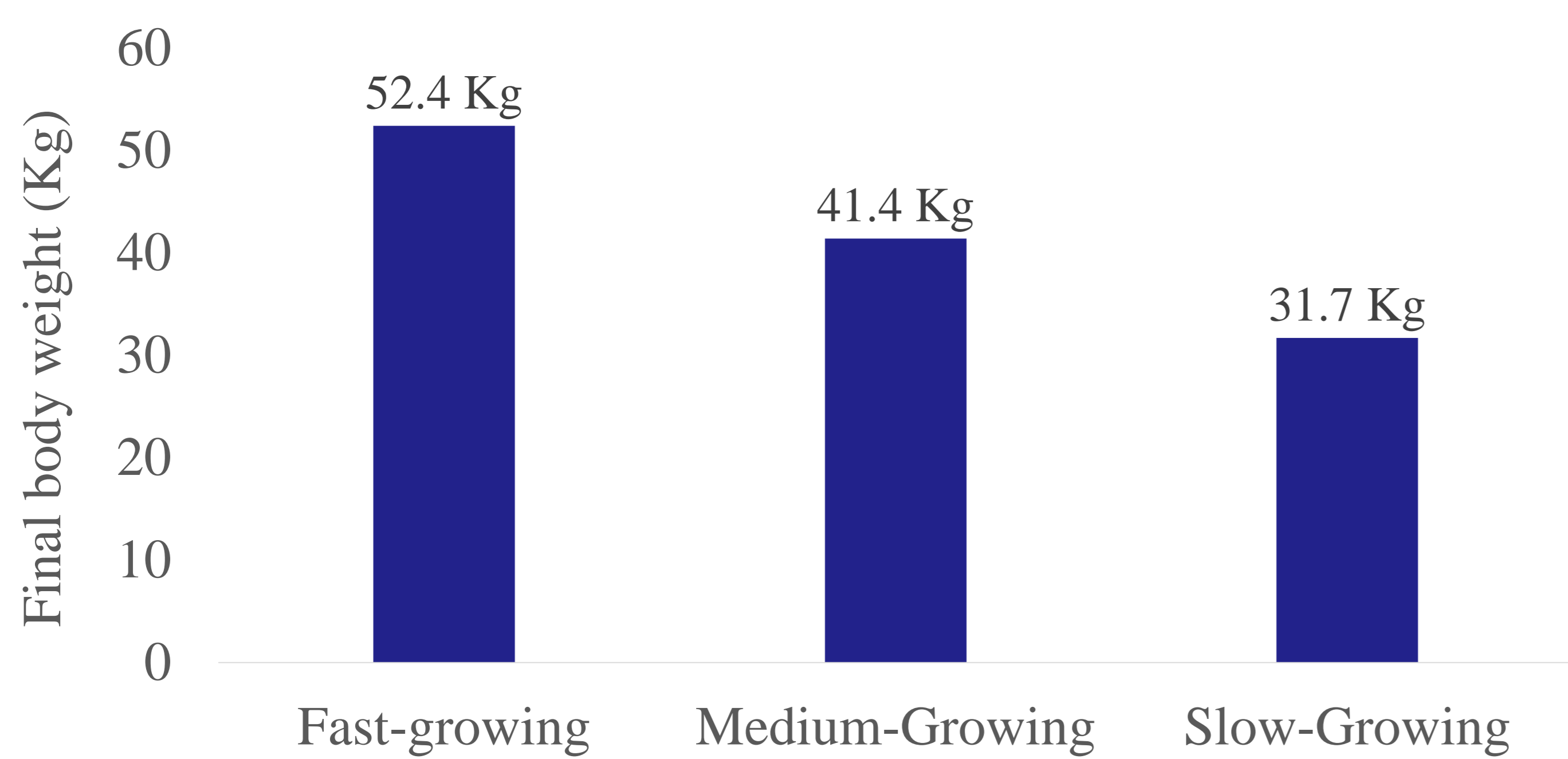
Sheep is considered one of the main animal genetic resources in Egypt as contributing in meat production while surviving harsh desert conditions and consuming low quality of forage.

The aim of this study was to link the expression profile of selected candidate genes with growth performance of Egyptian Barki sheep.

MATERIAL AND METHODS



RESULTS



CONCLUSION

This study clearly indicated a specific spatiotemporal gene expression profile in sheep tissues reflecting their biological roles.

Moreover, transcriptional profile of CPT1, FABP4 RPL7 is linked with growth performance of sheep lambs, providing an evidence for the importance in regulating sheep growth.

Ozonized oil can be used for topical treatment of sheep affected by Contagious Ecthyma

Helena Gomes Ferreira Pinto¹, Lucas de Figueiredo Cardoso Barbosa¹, Mariana Santos Ribeiro¹, Bruna Ramalho Rigaud de Figueiredo¹, Marta Maria Campos Pereira da Costa¹, Caroline Brito dos Santos¹, Claudia Del Fava², Mário Felipe Alvarez Balaro¹

¹ Fluminense Federal University, Niteroi, RJ, Brazil
² Pathological Anatomy Laboratory, Biological Institute, São Paulo, SP, Brazil

Introduction

This study aimed to test the ozonized oil on wound healing of hair sheep affected by Contagious Ecthyma and compare with the topical treatment based on 1% iodine.

Material and Methods



Figure 1. Oral lesions in a sheep caused by Contagious Ecthyma.



Figure 2: Sunflower oil being ozonized.

Sunflower oil is ozonized directly by the flow of the gas (ozone), which reacts with the linoleic acid present forming hydrogen peroxide (antimicrobial, anti-inflammatory action). From a meat sheep flock (located in Rio de Janeiro – Brazil) affected by Contagious Ecthyma, a total of four adults Santa Ines ewes (2.9 ± 0.5 years old, BCS: 3.0 ± 0.2) with similar pattern of lesion were organized in two groups to compare different topical treatments: G1 - treated with 1% iodine; and G2 - treated with ozonated sunflower oil, daily, for 2 consecutive weeks. From each ewe, direct impressions of the skin lesion were made for cytological evaluation before treatments, as well as clinical evaluation and skin biopsies were collected for histopathology evaluation and bacteriological/fungal culture, before, during (1 week after) and after treatments (2 weeks after).

Results

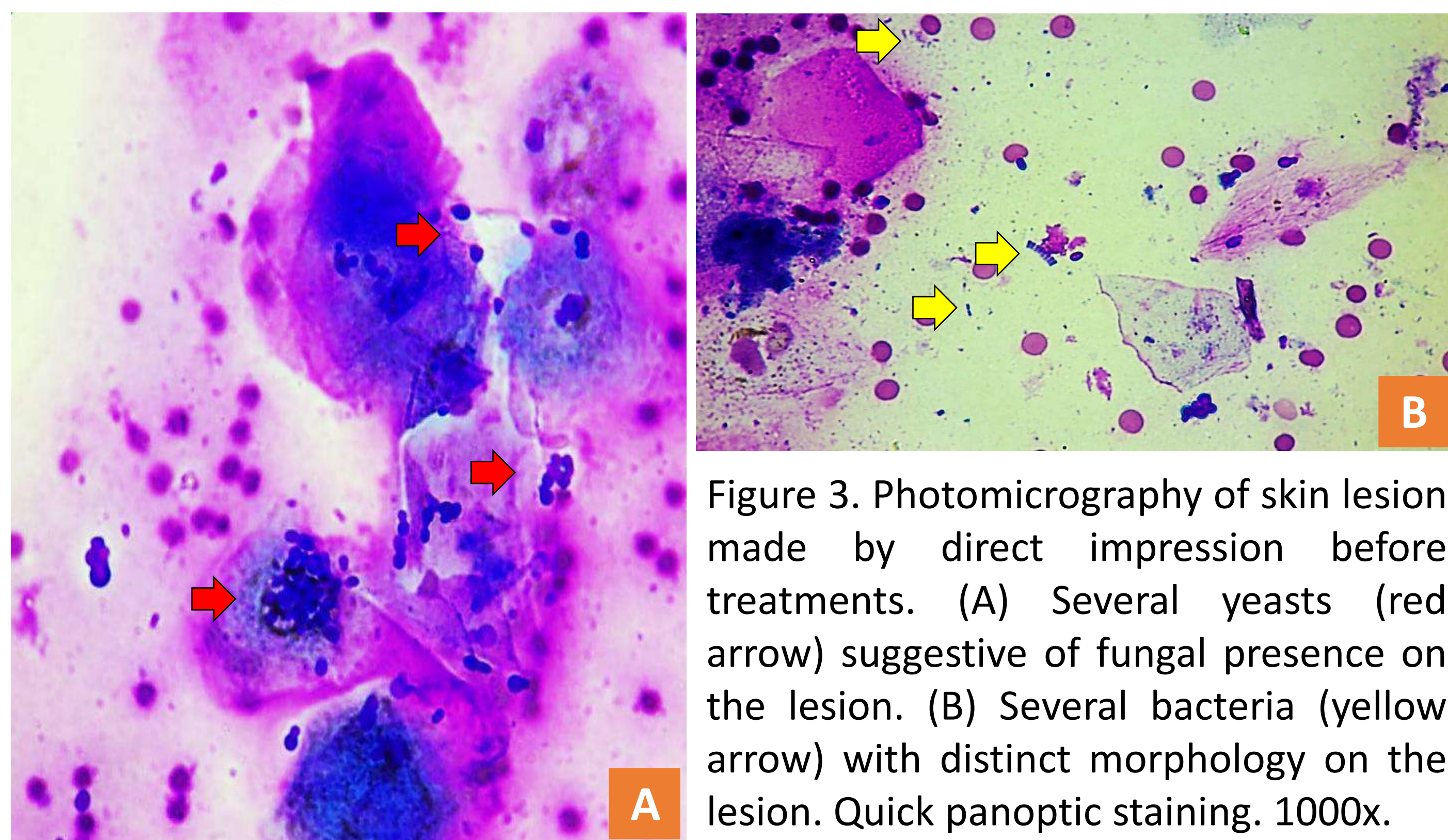


Figure 3. Photomicrography of skin lesion made by direct impression before treatments. (A) Several yeasts (red arrow) suggestive of fungal presence on the lesion. (B) Several bacteria (yellow arrow) with distinct morphology on the lesion. Quick panoptic staining. 1000x.



Figure 4. Sheep affected by Contagious Ecthyma in the first day of treatment before (A) and after (B) crust removals.

The first clinical evaluation and cytology findings before topical treatments are demonstrated in fig. 3 and 4. First cultures performed showed the presence of opportunist infection by *Candida* sp., *Staphylococcus coagulase* negative and *Yersinia* sp., not shown in the subsequent collections. In the first biopsy, all tissues had ulcers and inflammation. In the second one, both groups presented half of animals with complete tissue reepithelialization and the other half in an intermediate process. In the third biopsy, all animals had tissues totally reepithelialized as seen macroscopically in fig. 5. In the clinical analysis, the G1 still had crusts after one week of treatment, differently from G2, which no longer formed crusts at this moment.



Figure 5. Sheep affected by Contagious Ecthyma in the last week of treatment with healed wounds. (A) ewe treated with ozonized oil; and (B) ewe treated with 1% iodine.

Conclusion

In conclusion, both treatments were effective for the wound healing. Nevertheless, ozonized oil facilitated the employee's work by the lower formation of crusts throughout the healing period, as well as avoiding tissue dryness (different from iodine action), promoting greater safety for ocular and oral regions.

The larval exsheathment inhibition of extracts of *Pleurotus djamor* against *Haemonchus contortus*

Liliana Aguilar-Marcelino, Jaime Cristóbal Hernández-Rodríguez, Jetzabelt Ambrosio-Bautista, Iván Flores-Pérez, Gloria Sarahí Castañeda-Ramírez, Claudia Hallal-Calleros, Juan Felipe de Jesús Torres-Acosta

Introduction

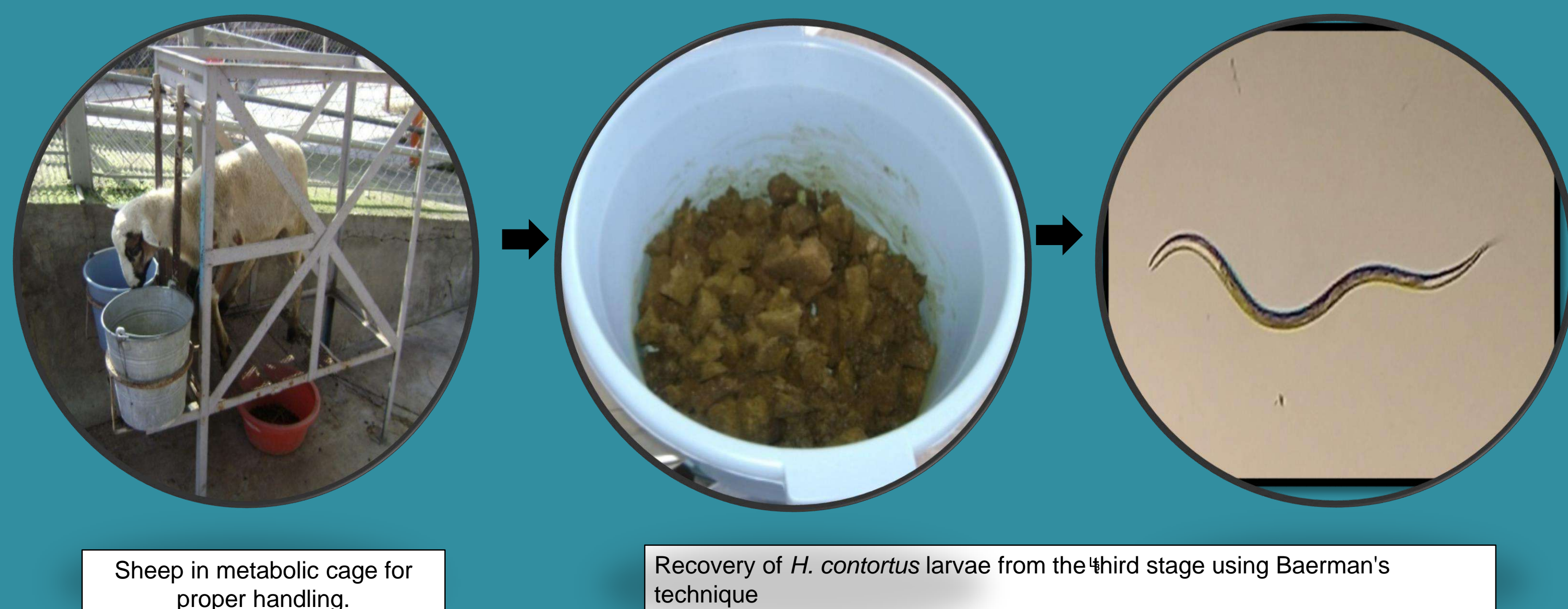
Currently the problem of gastrointestinal nematodes (GI) in small ruminants has a global impact that is reflected in large economic losses. In addition, the problem of anthelmintic resistance must also be addressed urgently. Like the problem presented to the environment by anthelmintic residues (Quintero-Elena, 2018). Among the sustainable control alternatives are edible mushrooms that have medicinal and nutritional properties and are known for their action as: antiparasitaria (Aguilar-Marcelino et al., 2017).

Results

Percentage of inhibition of larval unsheathing

Concentration (µg/mL)	<i>P. djamor</i> (%)
PBS	1.3
150	2.6
312.5	8.2
625	60.4
1250	99.2
2500	100.0

Methodology



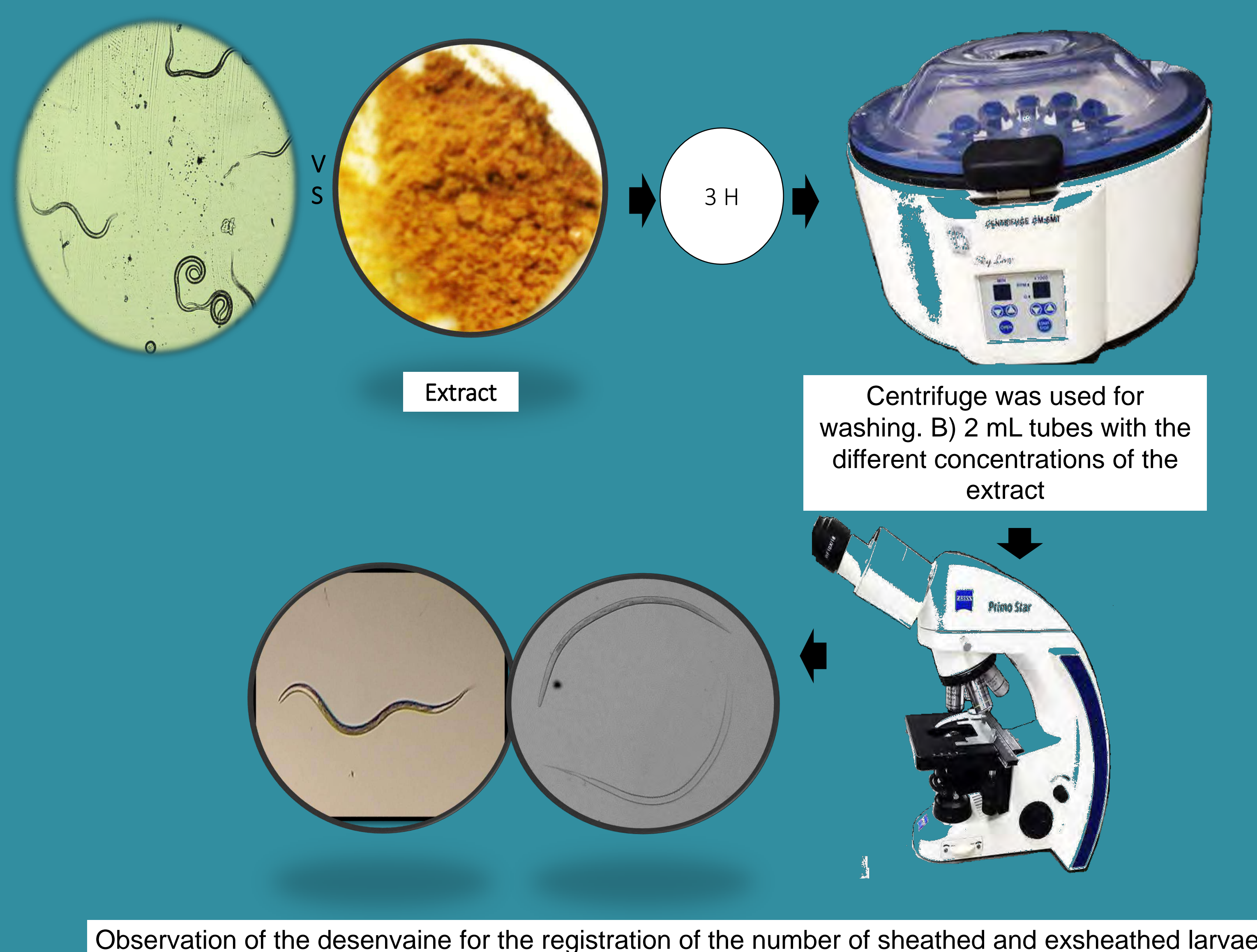
Effective concentration EC50 and EC90

Extracts	CE ₅₀	Interval trust	CE ₉₀	Interval trust
<i>P. djamor</i>	533.3	441.4-652.9	949.8	755.7- 1412.8

Conclusions

- 1.-Derived from the *in vitro* evaluation of the draw test of the edible fungus extracts *P. djamor* against *H. contortus* (L₃), the highest percentage of inhibition of the larval draw was obtained with the concentration 2500 µg / mL and the lower percentage of inhibition of larval unsheathing with a concentration of 150 µg / mL
- 2.-The CL50 and CL90 of the extract of the edible fungus *P. djamor* against *H. contortus* (L₃) was 533.3 and 949.8 respectively

Larval exsheathment inhibition

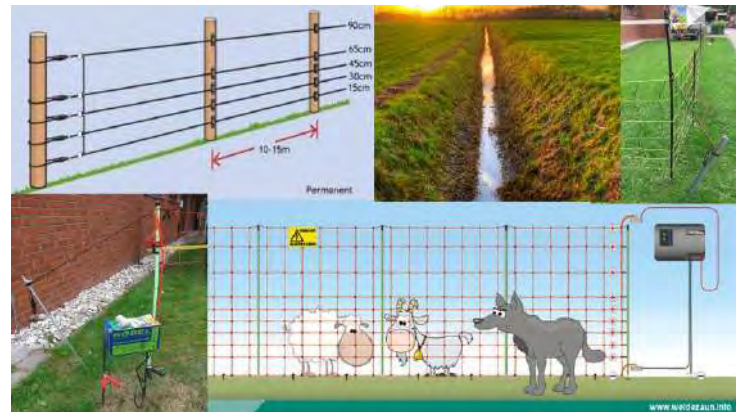


References

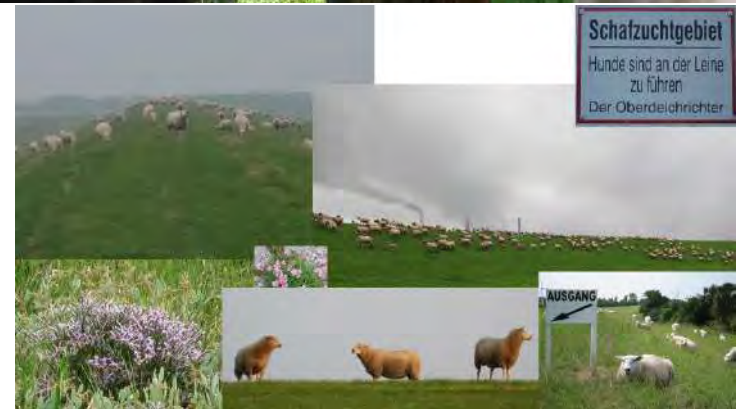
- 1 Aguilar-Marcelino L. ; Sánchez, J.E. ; Mendoza-Gives, P. 2017. Biotechnological use of Products Obtained from *Pleurotus* spp. In: The biology, cultivation and nutritional and medicinal properties of *Pleurotus* spp. José E. Sánchez and Daniel J. Royse, Eds. San Cristóbal de las Casas, Chiapas, Mexico: ECOSUR. pp 297-309.
- 2.- Quintero-Elena, Z.J. 2018. In vitro and microplot evaluation of the nematophage mite *Caloglyphus mycophagus* with potential use against three nematodes of agricultural importance. Thesis to obtain the title of forestry engineer.

Acknowledgements

This study was financed by National Problems, CONACYT, project number 9342634372



Schutz der Schaffaltung schützt alle-sheep farming protection protects them all



eine Gesellschaft, die sich Klimaschutz und Artenschutz leisten kann und will und tunichtst muss, darf sich nicht leisten, auf Weidetiere zu verzichten

Biodiversitätsstrategie?
Tierwohldiskussion?
Nutztierethik?
Schutz ist nicht teilbar

alle Seiten des Biodiversitätswürfels müssen im Blick bleiben



a society that can/wants/needs to afford climate protection and species conservation cannot do without grazing animals

Biodiversity Strategy?
Animal Welfare Discussion?
Farm Animal Ethics?
Protection ist indivisible

all sides of the biodiversity cube must be kept in view

15-16 October 2020, WCCB Bonn, Germany

EFFECT OF A TOPICAL ANAESTHETIC FORMULATION ON VIRAL LOAD IN LAMBS NATURALLY INFECTED WITH ORF VIRUS



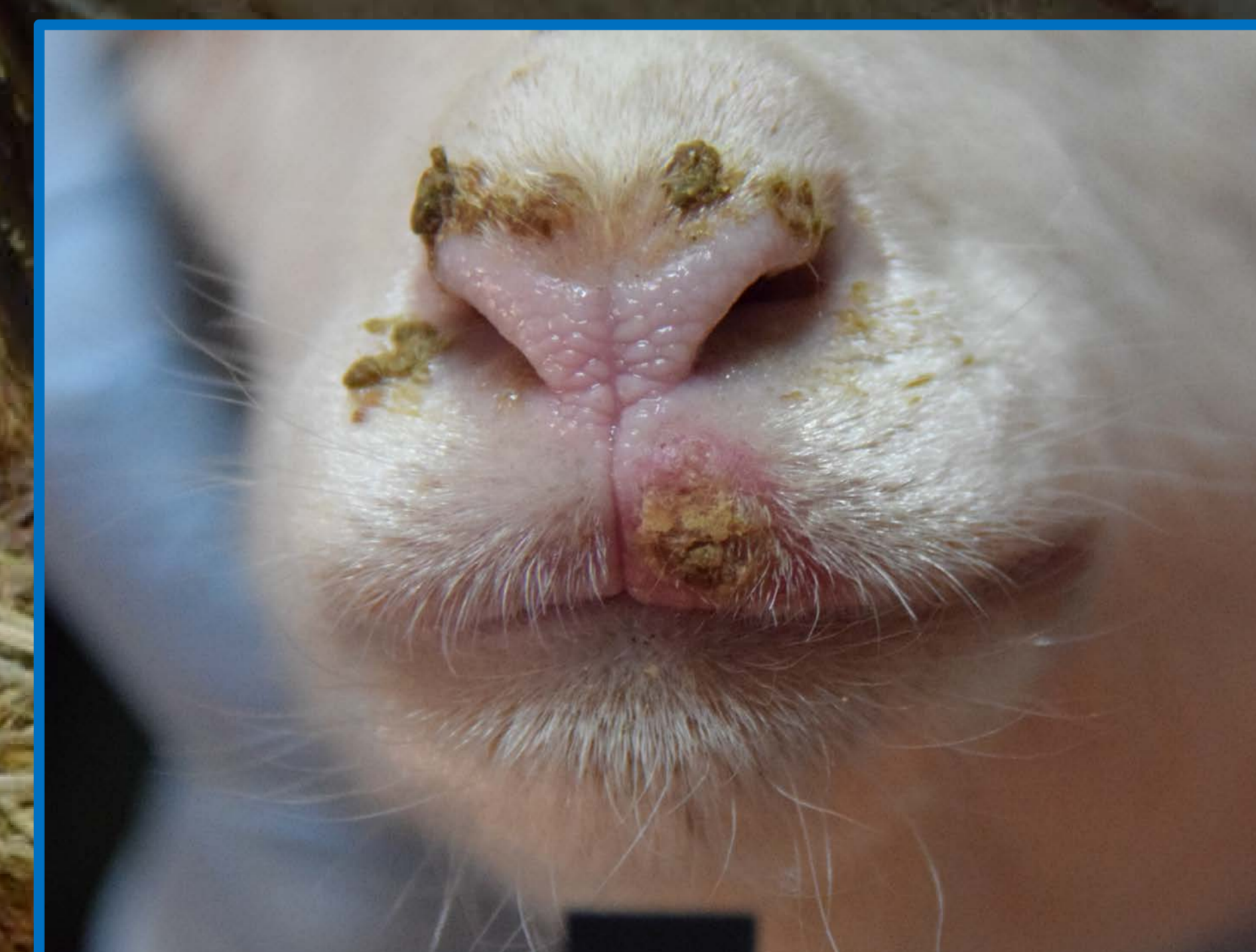
Lacasta, D.¹; Reina, R.²; Ramos, J.J.¹; Ferrer, L.M.¹; Benito, A.A.³; Tejedor, M.T.⁴; Martínez, S.¹; Ruiz, H.¹; Echeverria, I.²; Windsor, P.A.⁵

¹ Animal Pathology Department. Instituto Agroalimentario de Aragón-IA2 (Universidad de Zaragoza-CITA). Veterinary Faculty of Zaragoza. C/Miguel Servet 177. 50013 Zaragoza. Spain. ² Instituto de Agrobiotecnología (CSIC-Gobierno de Navarra). Av. Pamplona, 123, 31192 Mutilva Baja, Navarra. Spain. ³ Laboratorios Exopol Diagnóstico y Autovacunas. Polígono San Mateo de Gállego. Spain.

⁴ Anatomy, Embryology and Animal Genetics Department. CIBER CV (Universidad de Zaragoza-IIS). C/Miguel Servet 177. 50013 Zaragoza. Spain. ⁵ Sydney School of Veterinary Science, The University of Sydney. Camden, NSW | 2570 Australia.

Introduction

- Orf is a highly contagious eruptive skin condition of sheep and goats.
- Vaccination with live orf virus is the preferred option for disease control.
- However, the vaccine is unavailable in many countries.
- Treatment of orf lesions involves hygiene & management of presumptive secondary infections with antibiotics.
- The wound dressing formulation, Tri-Solfen® (Animal Ethics Pty Ltd, Australia) offers advantages over current therapies, providing pain relief & potentially, more rapid healing of lesions.
- The formulation contains 2 local anaesthetics lignocaine and bupivacaine, adrenalin & an antiseptic (cetramide) in a gel formulation.
- The pH of ~2.7 that is potentially viricidal.



Material and methods

Fourteen one-month-old lambs, naturally infected with orf, were recruited from a farm during an outbreak of orf disease.

Lambs were selected in early stages of disease & divided into two cohorts:

- Group A (n=11): treated with Tri-Solfen®
- Group B (n=3): control group without treatment

Lesions sampled before (T0) & on days 1 (T1), 3 (T2) and 5 (T3) post-treatment,

Swabs submitted to:

- direct DNA extraction & real-time PCR quantification (Exopol) or
- incubation with primary tissue cultures from ovine skin fibroblasts (OSF) & T-immortalized goat embryonic fibroblasts (TIGEF).

Results

In the study using qPCR, no significant differences were found ($p=0.722$). However, when orf viral load was assessed in OSF cell cultures, there was a significant difference ($p<0.05$) in reduction between both groups between T0 and T3.

Conclusions

The findings suggest treatment of orf lesions with Tri-Solfen® reduces the viral load in lesions.



SPONSORS

FUNDING

This research was supported by provision product from the Australian company Animal Ethics Pty Ltd.

Aortic connective tissue abnormalities resembling Marfan syndrome in goats

Karianne Lievaart-Peterson^{1*}, Liesbeth Harkema¹, René van den Brom¹, Reinie Dijkman¹, Eveline Dijkstra¹, Mark van der Heijden², and Piet Vellema¹

¹Royal GD, Arnsbergstraat 7, 7418 EZ Deventer, the Netherlands *Presenting author

²Universitaire Landbouwhuisdierenpraktijk, Harmelen, the Netherlands

Case presentation

Recently, three cases of sudden death in seemingly healthy adult dairy goats revealed a hemoabdomen due to rupture of the cranial abdominal aorta or cranial mesenteric artery at post mortem examination.

M&M

Routine post mortem examination. Histopathological examination of cranial abdominal aorta wall tissue using Lawson van Gieson stain for elastic fibers.

Results

At gross post mortem hemoabdomen due to rupture of the cranial abdominal aorta or cranial mesenteric artery was observed. Histologically, there was evidence of impaired vessel wall architecture with loss and fragmentation of elastin fibres, proliferation of the lamina intima and fibrosis.

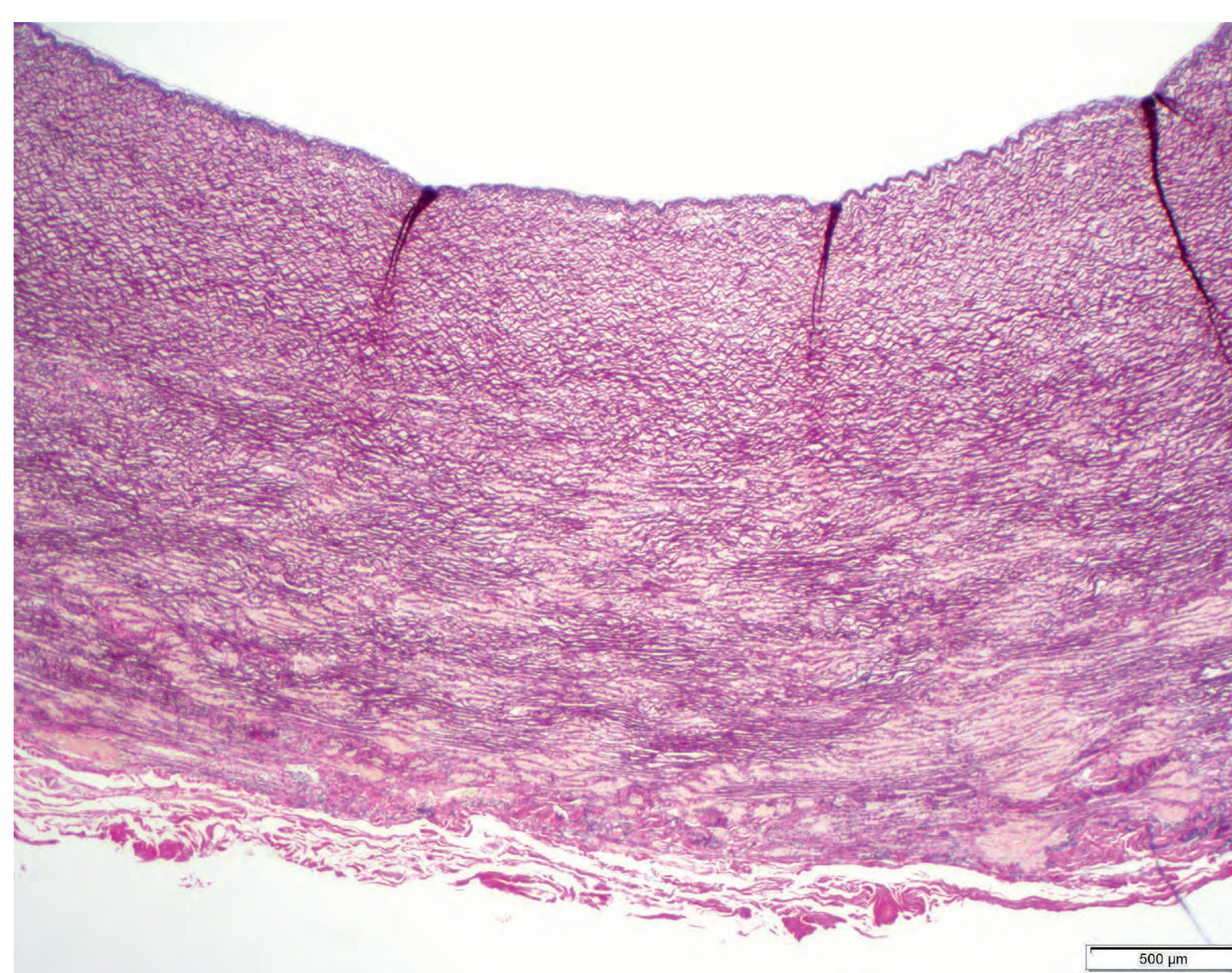
Discussion

Similar microscopic lesions have been described in Marfan syndrome. Marfan syndrome is a genetic (autosomal dominant) disorder that affects the connective tissue, named after French paediatrician Antoine Marfan, who first described it in 1896 in children. Clinical manifestations involve the cardiovascular, ocular and skeletal system. It is caused by mutations in the gene encoding fibrillin 1, the major component of extracellular microfibrils that support elastin fibre deposition [1]. Marfan-like syndrome has since been suggested or described in dogs, cattle [2], sheep, and horses. Multiple connective tissue disorders in man and animals are caused by heritable genetic defects and may share similar features.

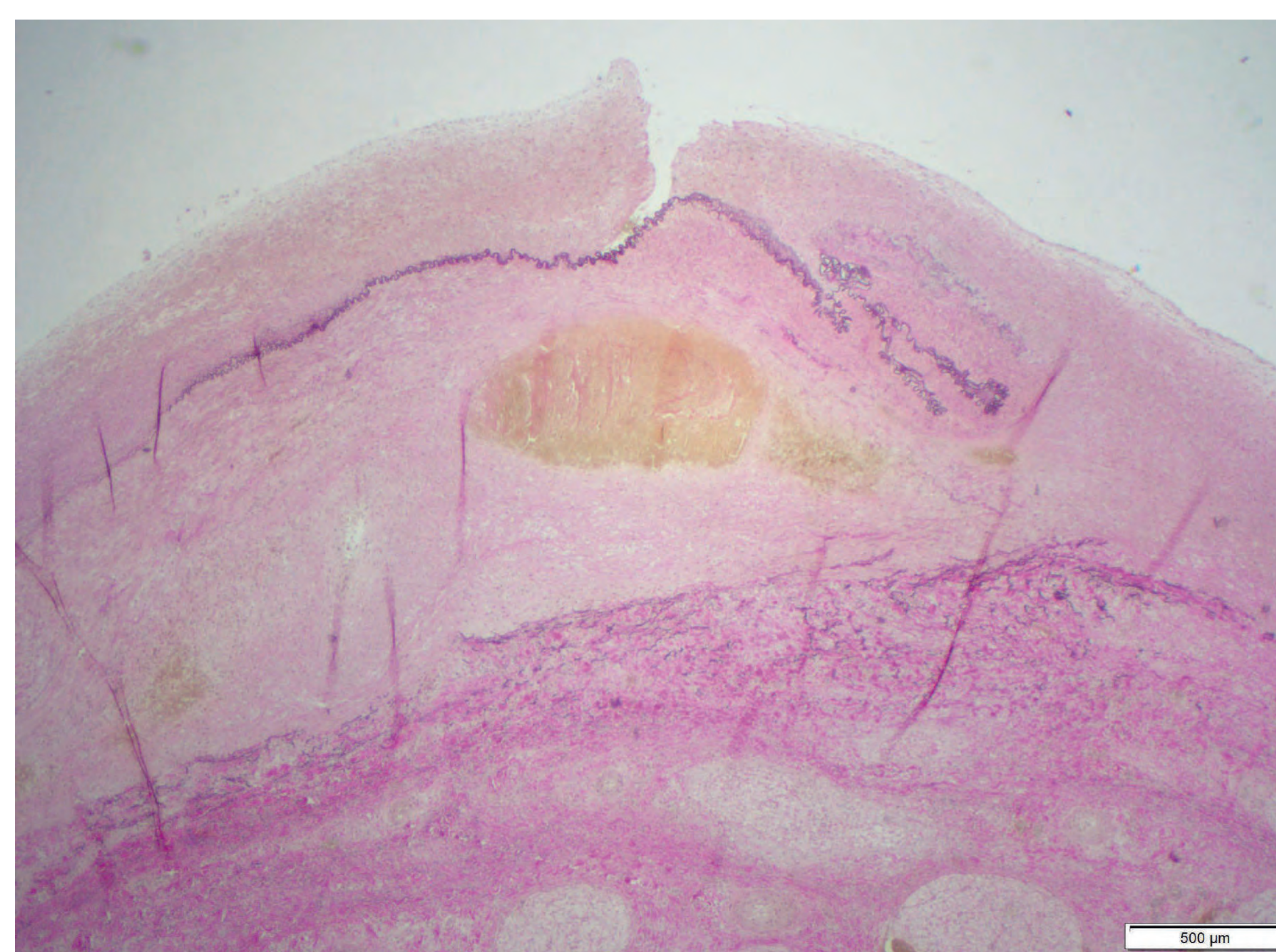
Conclusion

It cannot be ruled out that a genetic defect plays a role in the development of the vascular wall lesions in these dairy goats. The dairy goat population in the Netherlands share a small genetic background. Annually, dairy goats with the anamnesis of sudden death are submitted for post-mortem examination, a small number of these cases present with vascular wall rupture. Occasionally, rupture of the uterine artery is observed in gravid goats, these cases did not show similar vessel wall lesions in these cases. There is a need for further research including larger numbers of cases, further typing of vessel wall lesions as well as genetic typing. To the best of our knowledge, this is the first description of morphologic connective tissue abnormalities resembling features of Marfan syndrome in goats.

Figure 1a+b Histopathology of normal aorta wall tissue and aortic wall tissue from an adult dairy goat with hemoabdomen due to rupture of the cranial abdominal aorta



Normal aorta with numerous elastic fibers (black stained fine fibers) and a continuous internal elastic lamina (superficial black line). Lawson van Gieson stain, 20x magnification.



Cranial abdominal aorta from a goat with aortic rupture and vessel wall abnormalities. There's proliferation of the intima, the internal elastic lamina (black) is disrupted and coiled and the amount of fine elastic fibers is reduced. Lawson van Gieson stain, 20x magnification.



k.lievaart-peterson@gdanimalhealth.com
l.harkema@gdanimalhealth.com
www.gdanimalhealth.com

References

Coelho, S. G., Almeida, A. G. (2020). Marfan syndrome revisited: From genetics to the clinic. *Rev Port Cardiol*, 39(4), 215-226. doi:10.1016/j.repc.2019.09.008
Hirano, T., Matsuhashi, T., Kobayashi, N., Watanabe, T., Sugimoto, Y. (2012). Identification of an FBN1 mutation in bovine Marfan syndrome-like disease. *Anim Genet*, 43(1), 11-17. doi:10.1111/j.1365-2052.2011.02209.x



Usefulness of the genetic variant TMEM154 E35K for breeding against maedi visna susceptibility in the German sheep population



Gesine Lühken

Institute of Animal Breeding and Genetics, Justus Liebig University, Giessen 35390, Germany

Introduction

Maedi visna (MV), a disease caused by small ruminant lentiviruses, is present in sheep populations of many countries. The disease ends always fatal and cannot be prevented by vaccination. Developed eradication programs including testing and culling may be helpful but are neither cost-effective nor sustainable. Breeding against maedi-visna susceptibility could solve or at least reduce these problems. At first in North American sheep populations, an amino acid substitution (E>K) at position 35 of the transmembrane protein 154 (TMEM154) was observed to be associated with susceptibility to maedi visna (Heaton et al. 2012).

Aims of this study

- to test the association of the TMEM154 E35K variation with serological MV status of sheep in MV-affected German flocks with different sheep background.
- to determine the E35K allele and genotype frequencies in sheep breeds kept in Germany in order to estimate their genetic MV susceptibility status.

Material and methods

- Blood samples were collected in 21 MV affected sheep flocks with in different German regions. Samples were tested for MV antibody titer by ELISA and genotyped for TMEM154 E35K. Sheep with ELISA S/P values under/over 110%/120% were considered to be serologically MV negative/positive, respectively. Data from flocks with same breed background was combined. Association of MV status with TMEM154 E35K was tested using chi square/fisher's exact test.
- TMEM154 E35K was genotyped in 320 samples from unrelated sheep of 12 sheep breeds (in average 27 sheep per breed). TMEM154 E35K allele and genotype frequencies were calculated.

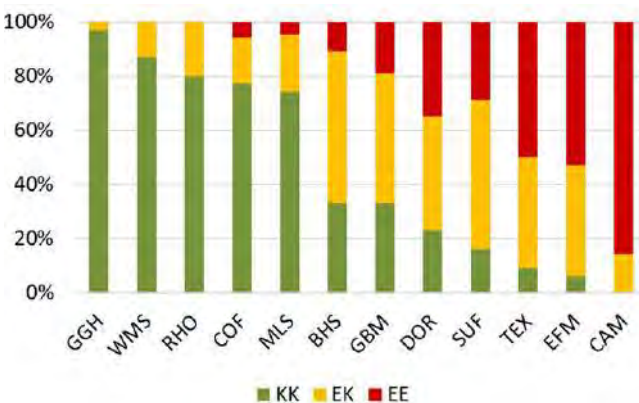


Fig. 2: Frequencies (%) of TMEM154 genotypes in 12 sheep breeds kept in Germany.

Abbreviation of breed names: GGH = German Grey Heath; WMS = White Mountain sheep; RHO = Rhoen sheep; COF = Coburg Fox; MLS = Merinoland sheep; BHS = Brown Hair sheep; GBM = German Blackheaded Mutton; DOR = Dorper; SUF = Suffolk; TEX = Texel sheep; EFM = East Friesian Milk; CAM = Cameroonian sheep.

Results

- In most of the analyzed maedi visna-affected flocks, the MV positive sheep had higher EK and EE frequencies than MV negative sheep. However, in flocks with Merinoland sheep background (MLS-X), an unexpected high proportion of MV positive sheep carried the genotype KK (fig 1).
- E allele frequencies ranged among the 12 analyzed breeds from 2% (German Grey Heath) to 93% (Cameroonian sheep). Genotype frequencies are shown in Fig. 2.

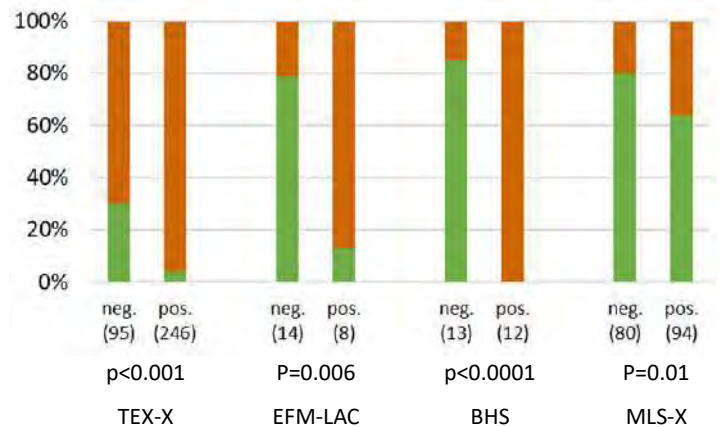


Fig. 1: Frequencies (%) of TMEM154 KK and EK or EE genotypes within groups of serologically MV negative and positive sheep. Numbers of sheep are given in brackets. Significances for differences are given by p-values.

Breed background of flocks: TEX-X = Texel and TEX crossbreds; EFM-LAC = East Friesian Milk, Lacaune and their crosses; BHS = Brown Hair sheep; MLS-X = Merinoland sheep and MLS crossbreds.

Discussion

- The association of the TMEM154 E allele with MV susceptibility was also shown with other statistical tests and in additional populations, including Iranian breeds (Molaei et al. 2018, 2019).
- The results for Merinoland sheep may be explained by other, maybe breed-specific factors with additional influence on MV susceptibility.
- KK frequency was lowest in Texel, East Friesian Milk and Cameroonian sheep, which are known for high MV susceptibility (Fig. 2).

References

Heaton, M.P., Clawson, M.L., Chitko-Mckown, C.G., Leymaster, K.A., Smith, T.P., Harhay, G.P., White, S.N., Herrmann-Hoesing, L.M., Mousel, M.R., Lewis, G.S., Kalbfleisch, T.S., Keen, J.E., Laegreid, W.W. (2012) Reduced lentivirus susceptibility in sheep with TMEM154 mutations. *PLoS Genet.* 8:e1002467.
 Molaei, V., Eltanany, M. and Lühken, G. (2018). First survey on association of TMEM154 and CCR5 variants with serological maedi-visna status of sheep in German flocks. *Vet. Res.* 49, 36.
 Molaei, V., Otarod, V., Abdollahi, D., Lühken, G. (2019) Lentivirus susceptibility in Iranian and German sheep assessed by determination of TMEM154 E35K. *Animals.* 9, 685.

Conclusions

- TMEM154 E35K is a promising tool for lowering the MV prevalence in susceptible sheep populations.
- However, other (genetic) and maybe breed-specific factors influencing MV susceptibility have to be taken into account and should be searched for.
- The frequencies of TMEM154 E and K alleles reflect the MV susceptibility of breeds and different starting situations for potential breeding programs.

15-16 October 2020, WCCB Bonn, Germany



Hospital
Veterinario
Universidad Zaragoza

Study of the use of bronchoalveolar lavage as a *in vivo* diagnostic method to detect clinical pulmonary Maedi-Visna disease



MAGDALENA, A.¹, MENJÓN, A.¹, DE LAS HERAS M.¹, BOROBIA, M.¹, ARNAL, J.L.², ELORZA, J.¹, LACASTA, D.¹

¹Animal Pathology Department. Instituto Agroalimentario de Aragón-IA2 (Universidad de Zaragoza-CITA). Veterinary Faculty of Zaragoza. Zaragoza, Spain.

²Exopol diagnóstico y autovacunas, S.L. Polígono San Mateo de Gállego. Zaragoza, Spain.

Introduction

Maedi-Visna virus (MVV) is a lentivirus that infects sheep causing a multi-systemic and slow progressive syndrome, inducing a chronic inflammation of the lung, mammary gland, central nervous system and joints. It causes relevant economic losses worldwide, and due to the lack of vaccines and treatments, a suitable diagnosis is decisive to develop control programs.

Objectives

Evaluate the usefulness of the molecular study of bronchoalveolar lavages using PCR techniques to improve the *in vivo* diagnosis of clinical pulmonary Maedi Visna disease (MV). In order to investigate the efficacy of this diagnostic method, the lung lesions compatible with MV found after the necropsy of the 155 studied animals were analyzed, and lung tissue samples were also collected to perform a molecular diagnosis of the MVV.

Methodology

For this study 155 culled sheep were analyzed at the Ruminant Clinic Service at the University of Zaragoza during the academic course 2018-2019. These animals were part of a project of rural development of the Aragon Government whose aim was to investigate the main diseases affecting sheep in different farms and the causes of the early culling of these animals.

For the bronchoalveolar lavage all the animals were sedated. Once the sample was obtained, it was sent refrigerated to the laboratory for the molecular diagnosis (PCR).

RESULTS

Nineteen of the lungs presented MV compatible lesions (12.25%). These lesions were lung enlargement, general greyish discoloration, increased size of mediastinal lymph nodes and grey subpleural dots.

Regarding bronchoalveolar lavages, fifteen of the nineteen lungs with compatible MV lesions (78.94%) were MVV-positive by PCR.

CONCLUSION

Bronchoalveolar lavages are revealed as a suitable, little invasive and innovative *in vivo* diagnostic method of MV with a positive predictive value of 82.40% and a negative predictive value of 96.00%, both related to the presence of macroscopic compatible lesions.



References

- Blacklaws, B. A., 2012. Small ruminant lentiviruses: immunopathogenesis of visna-maedi and caprine arthritis and encephalitis virus. *Comparative immunology, microbiology and infectious diseases*, 35(3), 259-269. DOI: 10.1016/j.cimid.2011.12.003.
- Herrmann-Hoesing, L. M. (2010). Diagnostic assays used to control small ruminant lentiviruses. *Journal of veterinary diagnostic investigation*, 22(6), 843-855. DOI: 10.1177/104063871002200602.
- Luján, L., Pérez, M., de Andrés, D., and Reina, R. (2019). Pulmonary lentivirus infection in sheep. *Small Ruminant Research*, 181, 87-90. DOI: 10.1016/j.smallrumres.2019.05.006.

ABDOMINAL PERFORATION IN TWO EWES DUE TO FETAL MACERATION

Sebastian Alessandro Mignacca¹, Benedetta Amato², Vincenzo Di Marco Lo Presti²,
Gaetano Guarneri³, and Maria Costa¹

¹Veterinary practitioner, Enna, Italy

²Istituto Zooprofilattico Sperimentale della Sicilia "A.Mirri", Barcellona P.G., Italy

³Azienda Sanitaria Provinciale, Palermo, Italy

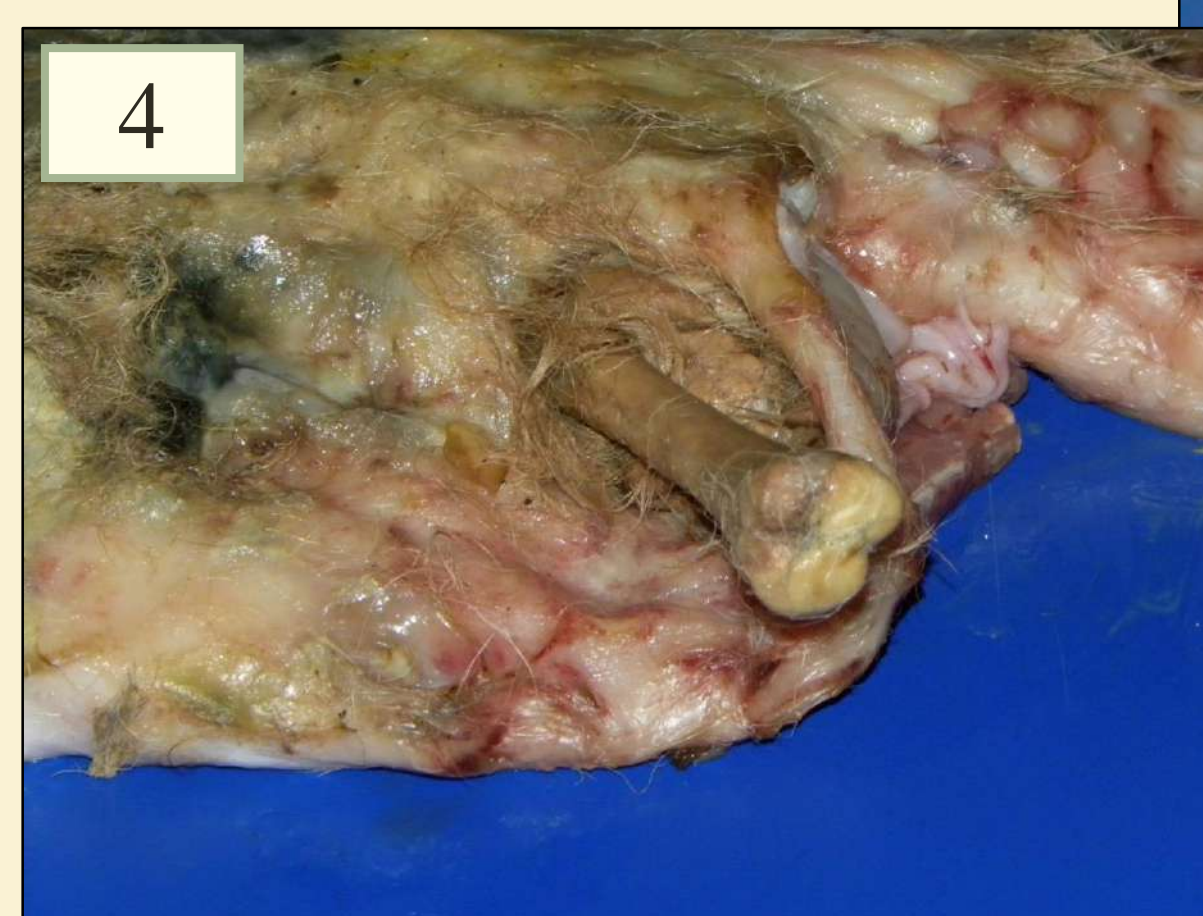
Fetus retention is considered a complication of pregnancy and has been described both in domestic animals and in human. Mummification and maceration of the fetus are the two typical conditions of this pathology which can lead to death of the dam. When the mother remains alive for a longer period, the macerated fetal bones can perforate the uterus generating also peritonitis and fistulas with other organs.

The authors describe the clinical symptoms and pathological findings in two ewes with fetal retention that caused uterine fistula with perforation of the abdominal wall.

Both animals were cross-breed and were reared in two different small farms. Ewes were judged pregnant by owners and had a pregnancy extension of several months without showing any apparent previous signs of dystocia. They appeared in good general condition but with progressive weight loss. The bottom part of the abdomen was swollen and with some small holes that let out necrotic fragments of macerated fetus (Figs. 1 and 2). No vaginal discharges were observed and palpation confirmed the presence of a hard and cold mass in the abdomen. Due to the poor prognosis, ewes were euthanized.



Fistulous channels from the uterus were opened to the outside, perimetrium adhered to the surrounding organs through extended fibrous connections (Fig. 3), and severe chronic endometritis (Fig. 4) with two retained macerated fetuses were observed in each sheep (Fig. 5).



This paper increases the clinical records in this species, and the authors add that Veterinary Practitioners should take into account that these conditions, although exceptional, can occur.

References:

Drost M. (2007) Complication during gestation in the cow. *Theriogenology*. 68, 487-491.

Lefebvre R.C. (2015) Fetal mummification in the major domestic species: current perspectives on causes and management. *Veterinary Medicine: Research and Reports*. 6 233-244.

MALIGNANT NEOPLASMS IN SHEEP AND GOATS IN SICILY (ITALY)

Sebastian Alessandro Mignacca¹, Sandro Bevacqua², Flavia Stassi², Benedetta Amato³, Colombino Elena⁴, Vincenzo Di Marco Lo Presti³, and Maria Teresa Capucchio⁴

¹ Veterinary practitioner, Enna, Italy; ² Veterinary practitioner, Palermo, Italy; ³ Istituto Zooprofilattico Sperimentale della Sicilia "A. Mirri", Barcellona P.G., Italy; ⁴ Department of Veterinary Sciences, University of Torino, Turin, Italy

Tumors in small ruminants are generally rare, even if their incidence is quite different in literature. Viruses (Papillomavirus and Jaagsiekte Sheep Retrovirus), chemical and physical agents are considered potential etiological agents. The authors reported the tumors observed during their diagnostic activity in Sicily (Italy) from January 2009 to May 2020.

Neoplasms were collected at the slaughterhouse, during necropsies or under surgeries from adult animals of both sexes, mainly belonged to local breeds. Gross and histological investigations were performed.

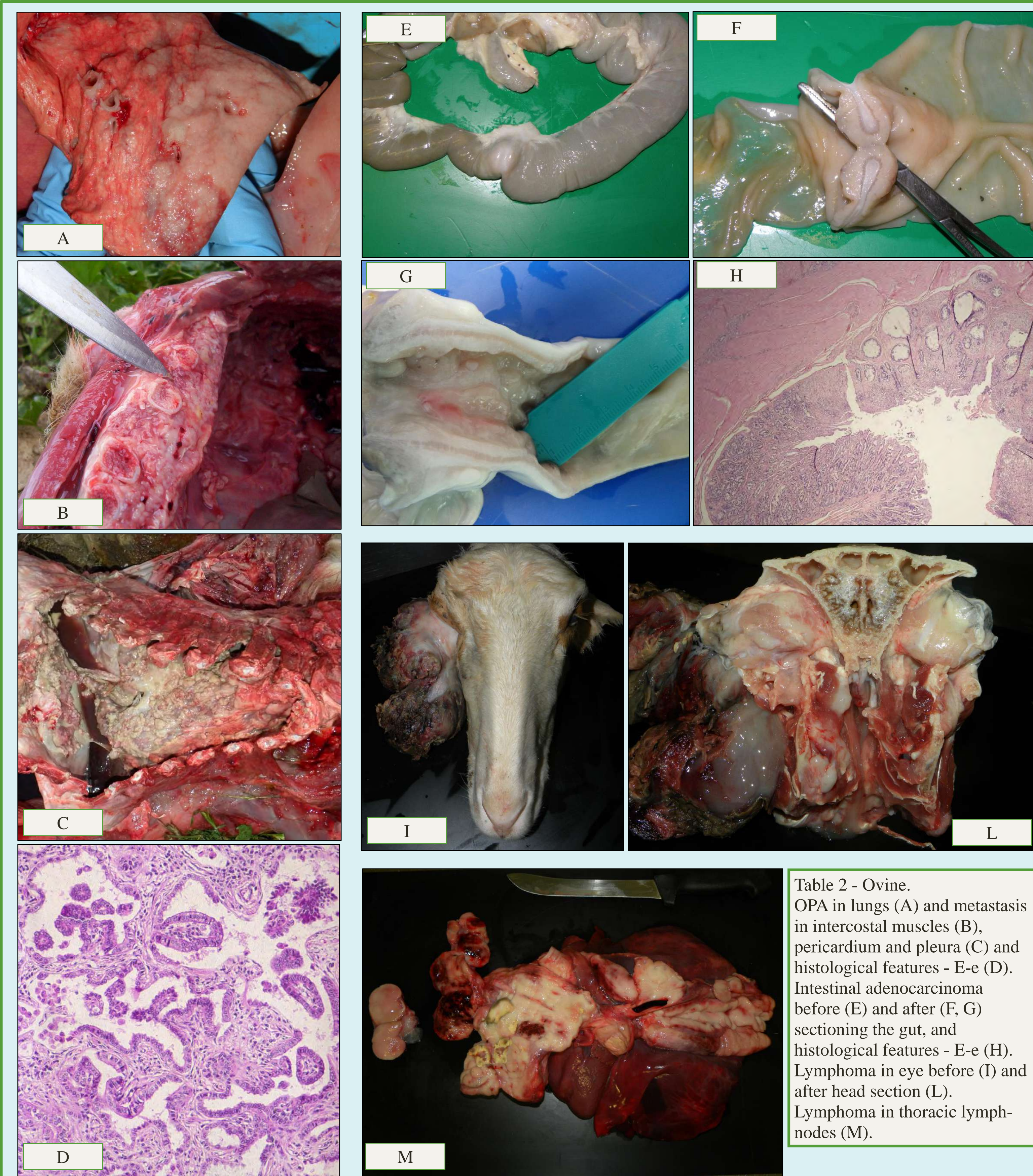


Table 2 - Ovine. OPA in lungs (A) and metastasis in intercostal muscles (B), pericardium and pleura (C) and histological features - E-e (D). Intestinal adenocarcinoma before (E) and after (F, G) sectioning the gut, and histological features - E-e (H). Lymphoma in eye before (I) and after head section (L). Lymphoma in thoracic lymph-nodes (M).



Table 1 - Ovine. SCC in the mouth (A), udder (B), flank, (C), shoulder (D), eyes (E, F, G) and its metastasis (H), and histological features - E-e (I)

A total of 226 malignant neoplasms were detected (sheep: 159; goats: 67). Particularly, in sheep 122 squamous cell carcinomas (SCC), 27 ovine pulmonary carcinomas (OPA), 4 intestinal adenocarcinomas, 2 lymphomas, 1 melanoma, 1 mesothelioma, 1 cholangiocarcinoma and 1 anaplastic carcinoma were observed. In goats 59 SCC, 6 melanomas, and 2 sarcomas were reported (Tabs. 1, 2, 3, 4 and 5).

SCC were most frequently reported followed by OPA. The high incidence of SCC permits to hypothesize that Papillomavirus could play a role in the carcinogenesis. However, its role remains to be clarified as its presence is inconstant. In authors' opinion small ruminants tumors are underestimated and an increased surveillance is recommended because these species could represent interesting animal models in comparative medicine and valid environmental bio-indicators.

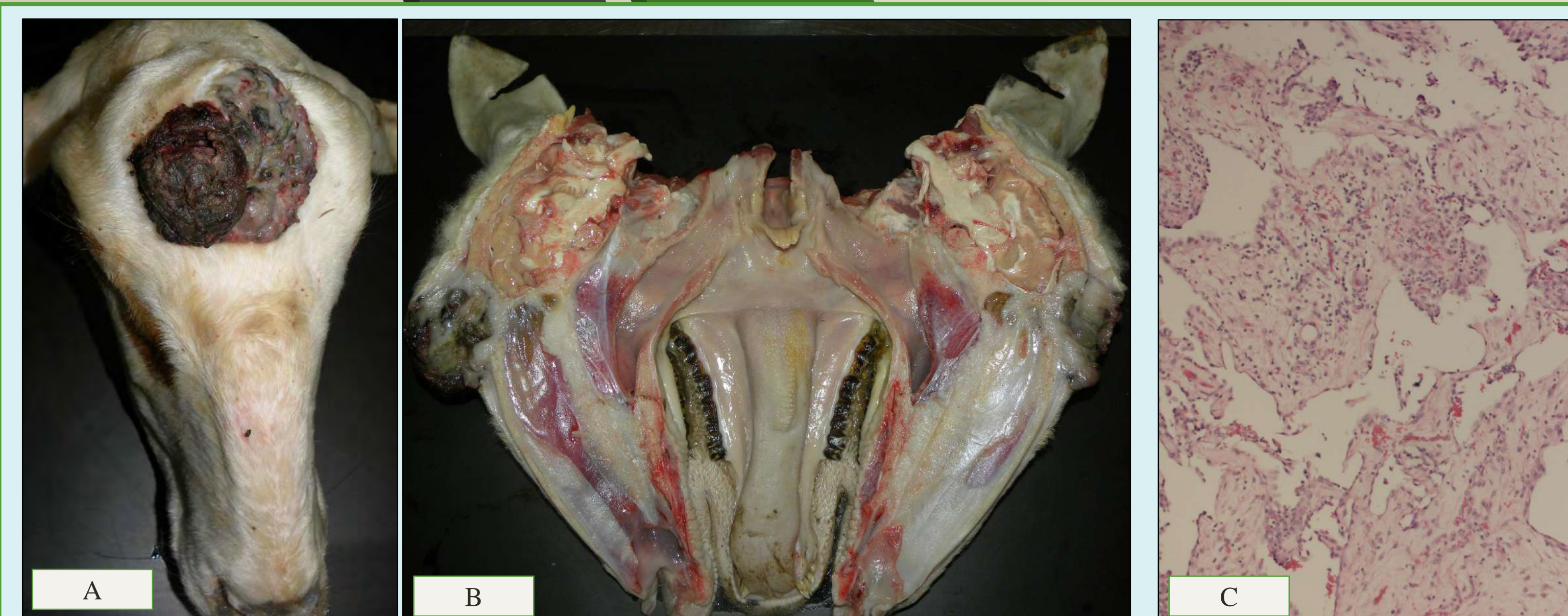


Table 3 - Ovine. Anaplastic carcinoma in the head before (A) and after (B) its section. Mesothelioma; histological image - E-e (C).

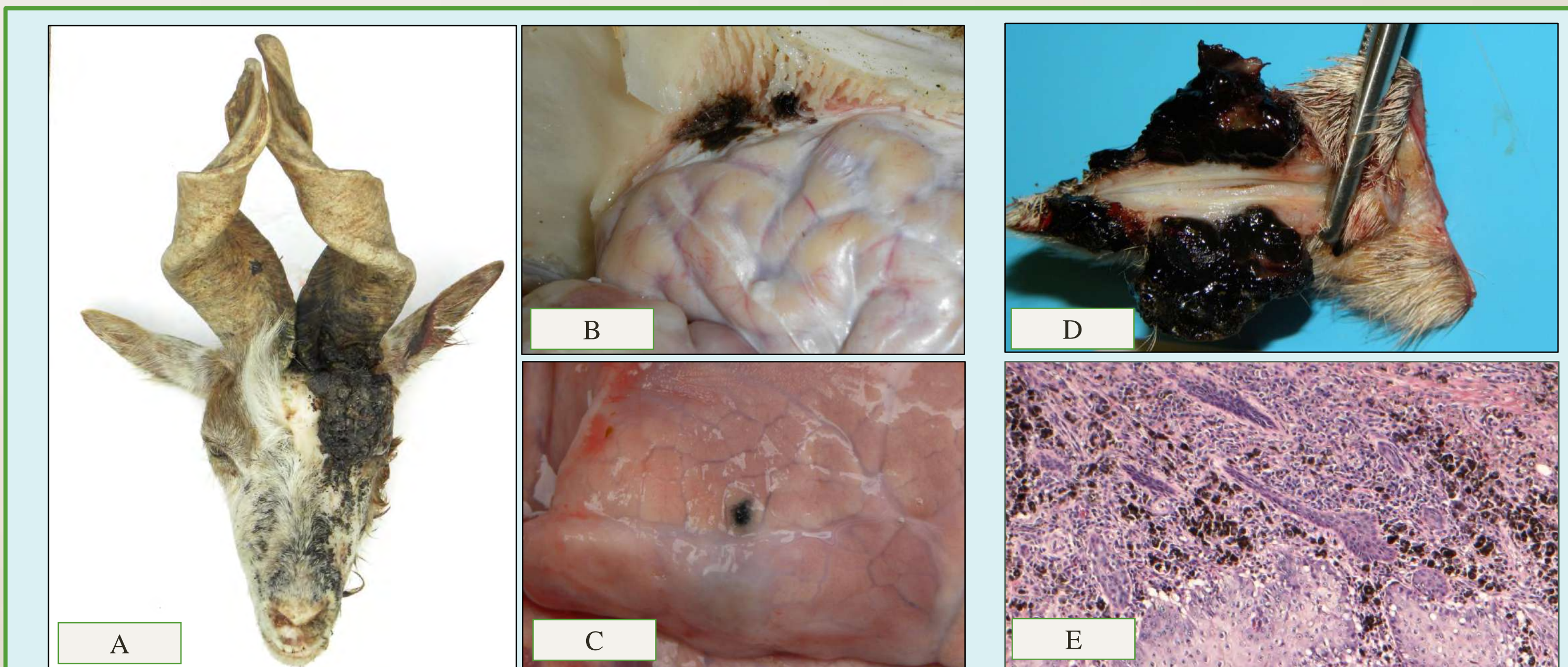


Table 4 - Caprine. Melanoma at the base of the horn (A) and its metastasis in bone, meninges (B), and lungs (C). Melanoma in the ear (D) and histological features - E-e (E).

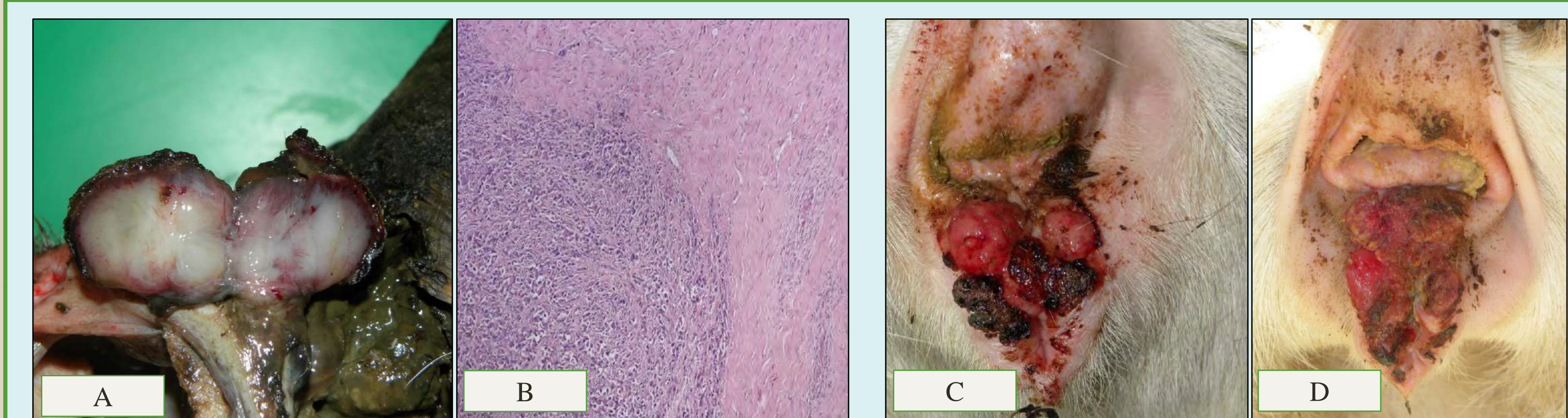


Table 5 - Caprine. Sarcoma at the base of the horn (A) and histological features - E-e (B). CSC in the perineum (C, D).

References:

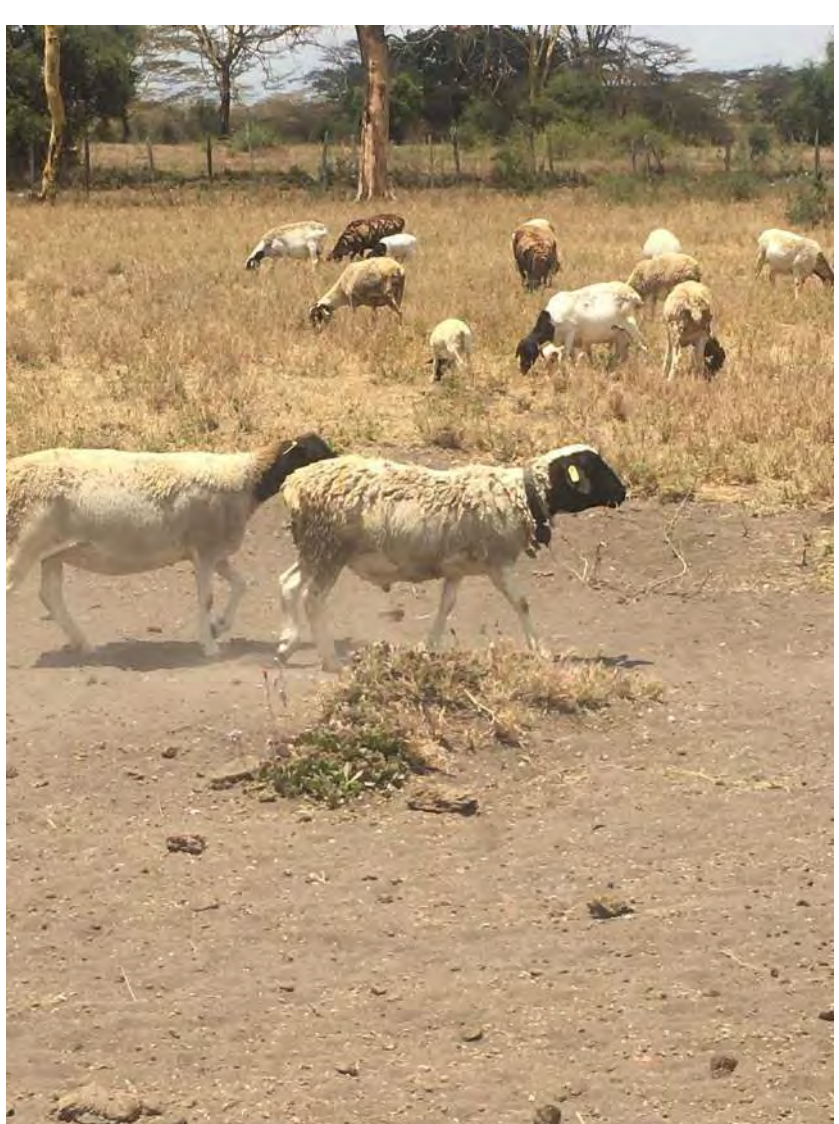
- Mignacca S.A., Zoccola R., Monnier M., Costa M., Colombino E., Gorla M., Capucchio M.T. (2018) Papillomavirus (OAPV3) in tumori cutanei ovini in Sicilia: Lesioni anato-patologiche e indagine biomolecolare. In Proceedings of XVIII National Congress S.I.Di.L.V., Perugia (Italy). 115-116
- Mignacca S.A., Biasibetti E., Spuria L., Amato B., Di Marco Lo Presti V., and Capucchio M.T. (2016). Cutaneous tumors in small ruminants: UV ray exposure and Papillomavirus infection as potential risk factors. In Proceedings of IX World Cancer Congress, Shanghai (China). 366
- Mignacca S.A., Capucchio M.T., Biasibetti E., Guarneri G., Milone S., Marchisotta A., Amato B., and Di Marco Lo Presti V. (2015). Three cases of melanoma in small ruminants: clinical symptoms and pathological results. Small Rumin Res. 126, 25-27

PRECISION IN SHOATS SELECTION USING TELOMERES.

Mercy Mulandi, Dr. Rawlynce Bett ; University Of Nairobi

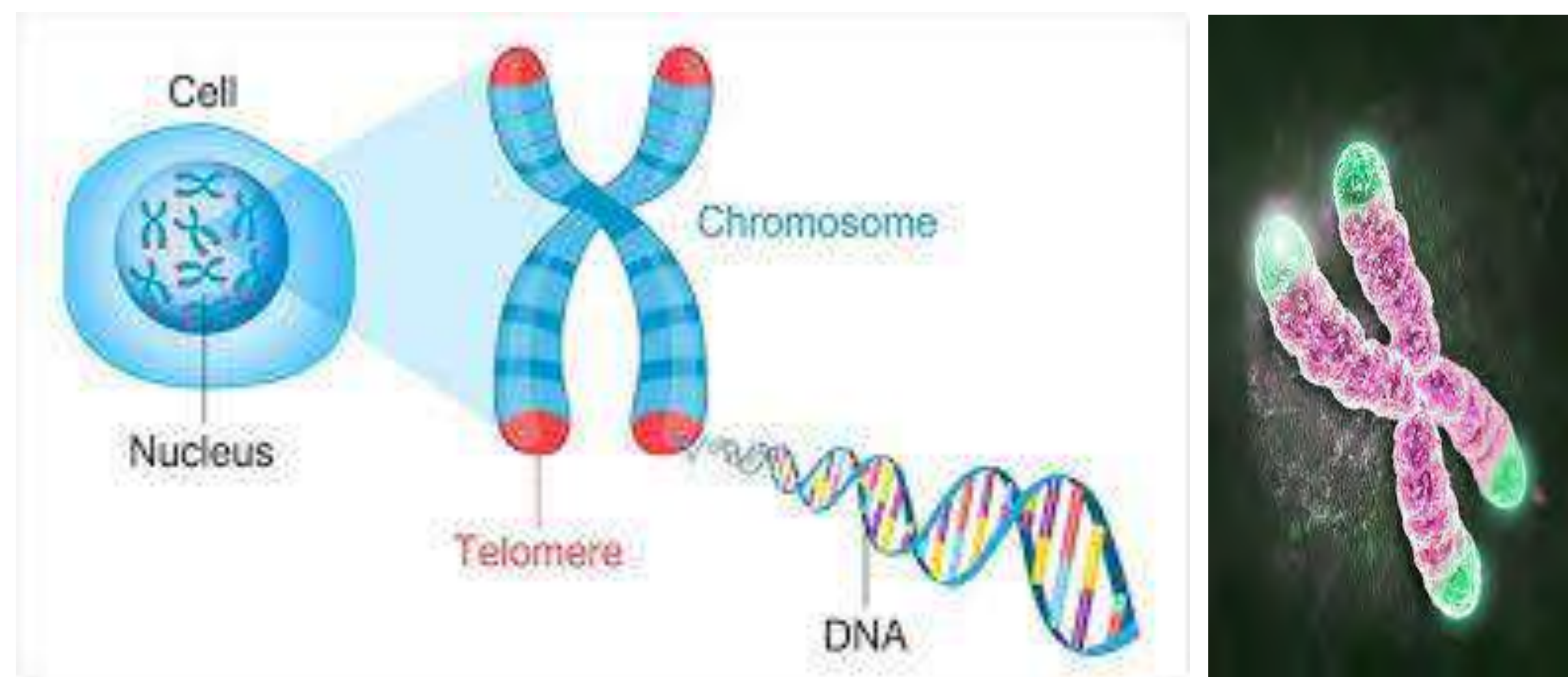
SHEEP AT FARM

- Time wastage in the farm due to 'unseen' genetic disorders
- large population sizes contributes to economic losses
- Thus high levels of methane that we would have otherwise foregone is a widely discussed topic in the livestock world. -
- This can be solved through **precision selection** → **better production** → **less animals kept** → **less methane** → **Less contribution of GHG from shoats**



TELOMERE

- Telomeres are protective structures at the end of chromosomes that maintain the integrity of the genome by ensuring that chromosomes are not recognised as sites of DNA damage
- The heritable nature, correlation between lifespan, genetic diseases to **telomere length** is of great impact to the selection of suitable sheep in early life stages..



Acknowledgement

The work in this poster would not have been possible without the help of Dr.R.Bett a lecturer at the University of Nairobi for including me in a world bank funded project,KCSAP .



UNIVERSITY OF NAIROBI



Kenya Climate Smart Agriculture Project

TELOMERE MEASUREMENTS

- Measurement of telomere length done through QPCR on 120 shoats (60 goats and 60 sheep)
- Samples from randomly selected farms in Laikipia and Kajiado counties, Kenya.

This study followed the telomere measurement guidelines as described by Seeker et.al 2018 and by Cawthon,2002. We conducted two separate PCRs simultaneously, a Telomere PCR and a Single copy gene (beta-2-microglobulin (B2M) PCR for all samples. This was as such in order to get the ratio between the two as the average telomere length is usually presented as the amount of single copy gene which is a constant to the amount of telomeric DNA. B2M was used as it has been previously used in soay sheep and freshian cattle telomere dynamics experiments and has shown stable qPCR results.

The fluorescence thresholds were different across all samples. The single gene copy had an average of 2.081 while the TEL gene had an average of 2.123. The study is ongoing, hence more information will be released. In the meantime, the below consistency has been achieved

RESULTS

- The lengths are shorter for animals with lower growth rates, lower milk production, more disease manifestations and more reproductive disorders like abortions .
- The telomeres are longer for animals described to have a better quality life(longer and more productive).

FUTURE OF SELECTION

The future of animal selection lies on the use of telomere lengths as parameters contributing to precision agriculture, reducing methane footprint as well as reducing the amount of money dedicated to these problems.

References

- Blackburn EH (2005) Telomeres and telomerase:their mechanisms of action and the effects of altering their functions.
- Blackburn, E. & Gall, J. A (1978).Tandemly Repeated Sequence at the Termini of Extrachromosomal Ribbosomal RNA Genes in Tetrahymena.
- Blackburn, E. H. (1991). Structure and function of telomeres.
- F. Douhard ,N. B. Jopson, N. C. Friggens and P. R. Amer. (2016).Effects of the level of early productivity on the lifespan of ewes in contrasting flock environmen



Mercy Mulandi
University of Nairobi

mercykabondo@gmail.com

Goat production systems characteristics and management practices in Zambia

Idowu Kolawole Odubote

c/o Department of Biomedical Sciences, University of Zambia, Lusaka, Zambia

Introduction

- Study to provide information on goat production system characteristics and management practices

Data Collection

- Data collected during the Zambia 2017/2018 livestock and aquaculture census.

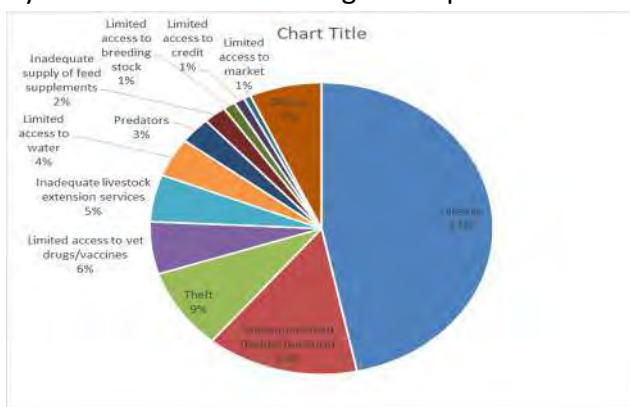
Data Analysis

- PUMS (Public User Microdata Sample) dataset were analyzed using both qualitative and quantitative methods.



Results and Discussions

- Main production system was essentially traditional and extensive with free range being the dominant feeding practices.
- The management practices were minimal although the main purpose of keeping goats were for sale and income.
- The constraints to goat production bordered mostly on the inadequacies of the production systems and limited management practices



- Study revealed a wide array of genetic resources of local breeds, exotic breeds and crosses between and among local and exotic breeds
- Main local breeds were Plateau, Gwembe and Sinazongwe.

Acknowledgements

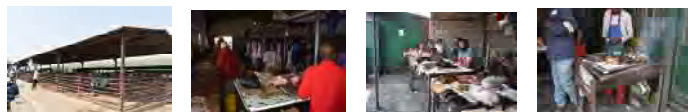
Central Statistics Office and the Ministry of Fisheries and Livestock for the conduct of the 2017 Livestock and Aquaculture and providing the 10 percent sample dataset for this study.

- Main exotic breeds include Bantu, Boer and Nubian, Red Kalahari, Saanen, Toggenburg, Anglo-Nubian and Swaka-Lala.
- Various crosses were reported among and between local and exotic breeds.
- Local-exotic crosses represented the largest single genetic group at 20.9%
- The above was a reflection of government and development organizations programmes and the farmers' desire to improve productivity through crossbreeding although indiscriminately carried out.
- This may threaten local genetic resource development and also lead to erosion of local genetic resources over time if not controlled.



Conclusion

- It is therefore imperative that a holistic system approach is designed to develop the goat sector in Zambia.
- A community goat breeding programme to optimally utilize available genetic resources is recommended
- Livestock extension services to reach farmers with husbandry skills are critical.
- Such extension services should include crop livestock integration, improved feeding practices, promotion of pasture production with high yielding fodders, management of communal grazing lands, good housing, hygienic practices and disease control.
- Value addition and market development would be another key step to improve production and productivity leading to higher youth and women engagement



Outbreak of abomasal bloat in kid goats due to *Clostridium ventriculi* and *Clostridium perfringens* type A

Fernanda Martins Gonçalves¹, Felipe Seabra Cardoso Leal¹, Isabel Oliveira Cosentino¹, Júlia Alves Vignoli¹, Nathalia Xavier da Silva¹, Alessandra Figueiredo de Castro Nassar², Simone Miyashiro², Nathalie Costa da Cunha¹, Claudia Del Fava³, Mario Felipe Alvarez Balara¹

¹ Universidade Federal Fluminense, Niterói, RJ, Brazil.

² General Bacteriology Laboratory, Instituto Biológico, São Paulo, SP, Brazil.

³ Pathological Anatomy Laboratory, Instituto Biológico, São Paulo, SP, Brazil.

Introduction

Disorders related to abomasal emptying in small ruminants are mostly associated with errors in their nutritional management. *Clostridium perfringens* and *Clostridium Ventriculi* are mandatory, opportunistic, gram-positive bacteria that take advantage of the fermentative environment, absent from oxygen and low pH, found in the abomasum of ruminants for their proliferation and colonization, causing final disease.

Case Report

The outbreak occurred in a Saanen dairy goat flock located in Sapucaia, RJ - Brazil. The owner reported a 30% of mortality in suckling kids. The animals were between 20 and 30 days old and had abdominal tympanism followed by prostration, anorexia and death (Fig. 1). The clinical course ranged from 6 to 12 hours until death. At necropsy, emphysematous abomasitis, rupture of the abomasum, peritonitis and intestinal meteorism were observed (Fig. 2). Samples of gastrointestinal tissues, abomasal and intestinal contents were collected for molecular (PCR), cytological (direct imprint; GIEMSA and GRAM) histopathological (H&E and GRAM) and microbiological (anaerobic culture) diagnosis. From the animals sampled (n = 11) six were positive for the target gene of *C. ventriculi* (formerly *Sarcina ventriculi*; Fig. 3). Likewise, the isolation and molecular identification of *C. perfringens* type A was performed. Histopathological evaluation revealed hyaline necrosis of the mucosa and emphysema of the mucosa and abomasal submucosa (Fig. 4). Likewise, *C. ventriculi* was visualized in optical microscopy in five animals, both in the histopathological slides stained with Gram, and those stained by H&E. In the imprint technique, both bacteria were identified, the morphology of *C. ventriculi* was characterized by basophilic staining (Gram +), cuboid shape and tetrad arrangement (Fig. 5). *C. perfringens*, on the other hand, as bacilli by basophilic staining (Gram +), forming spores oval-subterminal (Fig. 5). The risk factors related to the disease and the suggested management corrections were described in Table 1.



Figure 1. QR Code for a video of one of the affected goats, showing tympanism in the inspection and percussion of the abdominal region.



Figure 2. A) Kid goat of Saanen breed (45 days old) found dead with intense abdominal bloating and subcutaneous emphysema; B) Advanced state of autolysis, free abomasal contents in the abdominal cavity and peritonitis; C) Abomasal congestion and diffuse emphysema in the abomasal wall.

Table 1. Risk factors found in the management of goat suckling goats together with the suggestion of correction or reduction of risk.

Risk factor	Correction suggestion or risk minimization
Milk substitute prepared and offered at 40°C	Milk substitute prepared and offered at 25°C
Large volume of milk per meal (Almost 25% live weight/day)	Supply 15% of live weight/day divided three times a day
Heterogeneous mobs with older kid goats that can drink faster than younger ones.	Segregate lots of kid goats by weight and size, for the purpose of calculating the necessary volume of milk to feed the kid goats and to reduce unequal competition.
Young goats were only given one to two minutes to drink from the feeding bottle. After that, they were not full, so they went and ate the concentrate.	Restrict access to the concentrate until 2 hours after giving the milk bottle.
Overcrowding	Recalculate by available area for each mob (kids) or organize the farrowing station to respect the capacity of goats.
Possible failure of the immunization program and absence of a colostrum quality plan	Vaccination plan containing <i>C. perfringens</i> alpha toxoid and establish a good colostrum quality plan

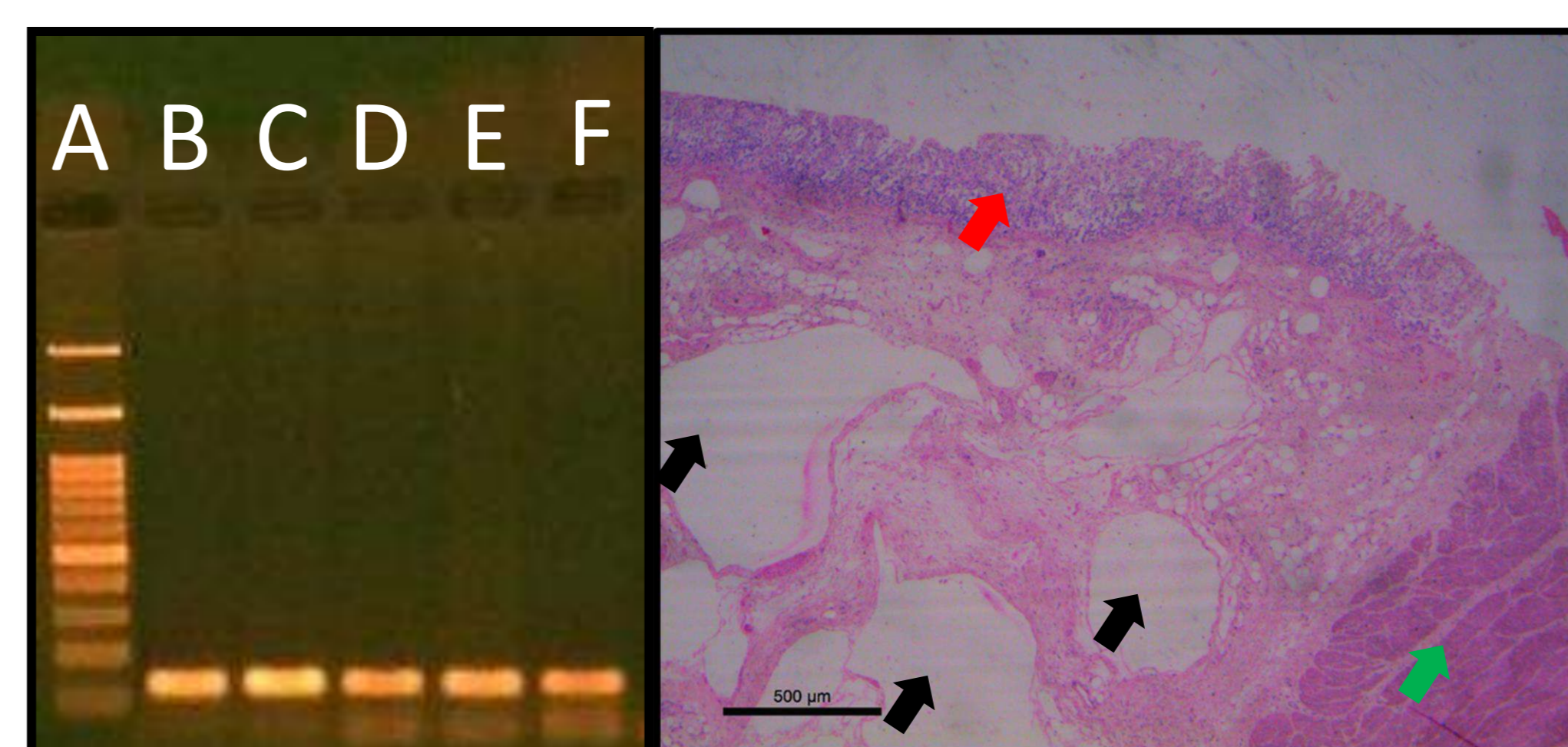


Figure 3. Analysis of the PCR product on 1.5% agarose gel stained with GelRedTM. A) Molecular weight standard (100bp). B-F) Positive samples for detection of the PDC gene (pyruvate decarboxylase), with 149 bp.

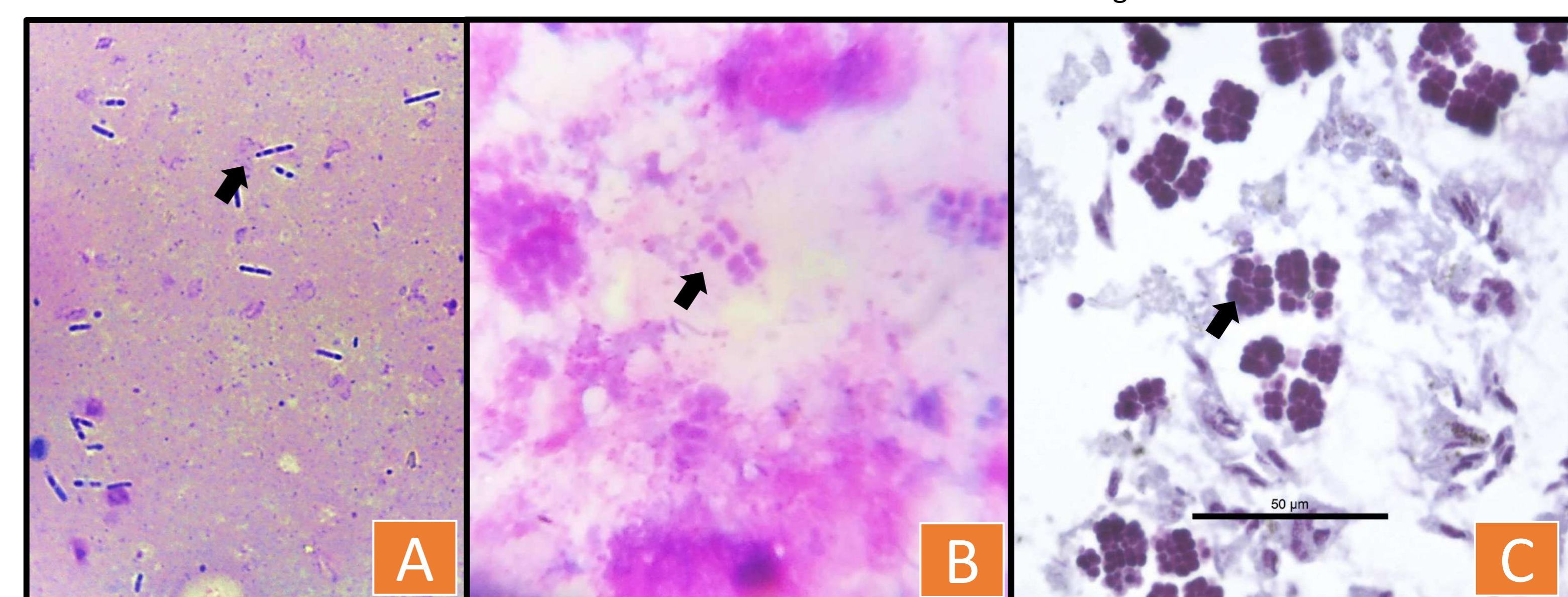


Figure 4. Photomicrography of abomasal tissue. Emphysematous abomasitis – gas accumulated at the submucosa of the abomasum (black arrow). Mucosa (red arrow). Muscle tunics (green arrow). HE staining. Magnification of 40X.

Figure 5. Photomicrography of abomasal tissue. A) *C. perfringens* characterized as basophilic bacilli (Gram +), forming oval-subterminal spores (black arrow). GRAM staining. 1000X. Direct imprint of the abomasal mucosa - *C. ventriculi* characterized by basophilic staining (Gram +), cuboid shape and tetrad arrangement (black arrow). Fast Panotic coloring. 800X. C) *C. ventriculi* in the abomasal mucosa (black arrow). Histopathological GRAM staining. 630X magnification.

Discussion and Conclusion

The final diagnosis was acute bacterial emphysematous abomasitis. The origin of the problem was a multifactorial issue composed of the described risk factors that led to abomasal dysbiosis and the development of the disease. After correcting milk-feeding management, the outbreak was resolved. Thus, the importance of adopting appropriate technologies for the management of suckling goats is considered in order to meet animal welfare and avoid economic losses in the establishment.

EFFECT OF A TOPICAL WOUND ANAESTHESIA FORMULATION ON THE CORTISOL AND THE ACUTE PHASE RESPONSES OF LAMBS UNDERGOING TAIL DOCKING

Ortín, A. ¹; Borobia, M. ¹; Ramos, J.J. ¹; Lacasta, D. ¹; Ferrer, L.M. ¹; Tejedor, M.T. ²; Ruiz, H. ¹; Jimenez, C. ³; Windsor, P.A. ⁴

1: Animal Pathology Department. Instituto Agroalimentario de Aragón-IA2 (Universidad de Zaragoza-CITA). Veterinary Faculty of Zaragoza. Miguel Servet 177. 50013 Zaragoza. Spain
 2: Anatomy, Embryology and Animal Genetics Department. CIBER CV (Universidad de Zaragoza-IIS). Veterinary Faculty of Zaragoza. C/Miguel Servet 177. 50013 Zaragoza. Spain.
 3: Gabinete Técnico Veterinario S.L. Isla Conejera sn. 50013 Zaragoza. Spain
 4: Sydney School of Veterinary Science, The University of Sydney. Sydney. Australia.

OBJECTIVE

Evaluation of the effect of a topical wound gel formulation containing local anaesthetics lignocaine and bupivacaine, with cetrimide and adrenalin (Tri-Solfen®; TS) on the concentrations of serum cortisol (SC) and the acute phase protein serum amyloid A (SAA) in tail-docked lambs.

METHOD



44 Rasa Aragonesa female lambs:

- Group A (n=11), tail excised with a scalpel without anaesthesia
- Group B (n=11), tail surgically excised and stitched under general anaesthesia (GA)
- Group C (n=11), tail excised with a scalpel without anaesthesia and sprayed with TS
- Group D (n=11), tail surgically excised and stitched under GA and sprayed with TS



Groups A & C



Groups B & D

Blood samples collected before tail docking and at different time intervals post-tail excision

- Concentration of SC: Salivary Cortisol ELISA SLV-2930 (DRG Diagnostics, Marburg, Germany)
- Concentration of SAA: PHASE TM Serum amyloid A ELISA Assay (Tridelata Development Ltd., Maynooth, Ireland)

Statistical analysis: IBM SPSS statistics version 26 (2019) software (IBM, Armonk, NY, USA)

RESULTS AND DISCUSSION

Concentration of SC did not change significantly over time in cohorts tail-docked under GA (B & D), but peaked at 30 min post tail removing without anaesthesia (A & C), and treatment with TS (C) appeared to reduce this cortisol response (Figure 1).

In cohorts B & D, SAA concentration increased significantly 48 hours after tail docking, as it is expected after a noxious stimulus, but treatment with TS avoided the elevation of SAA at this time point in lambs where the tail was excised without anaesthesia (Figure 2).

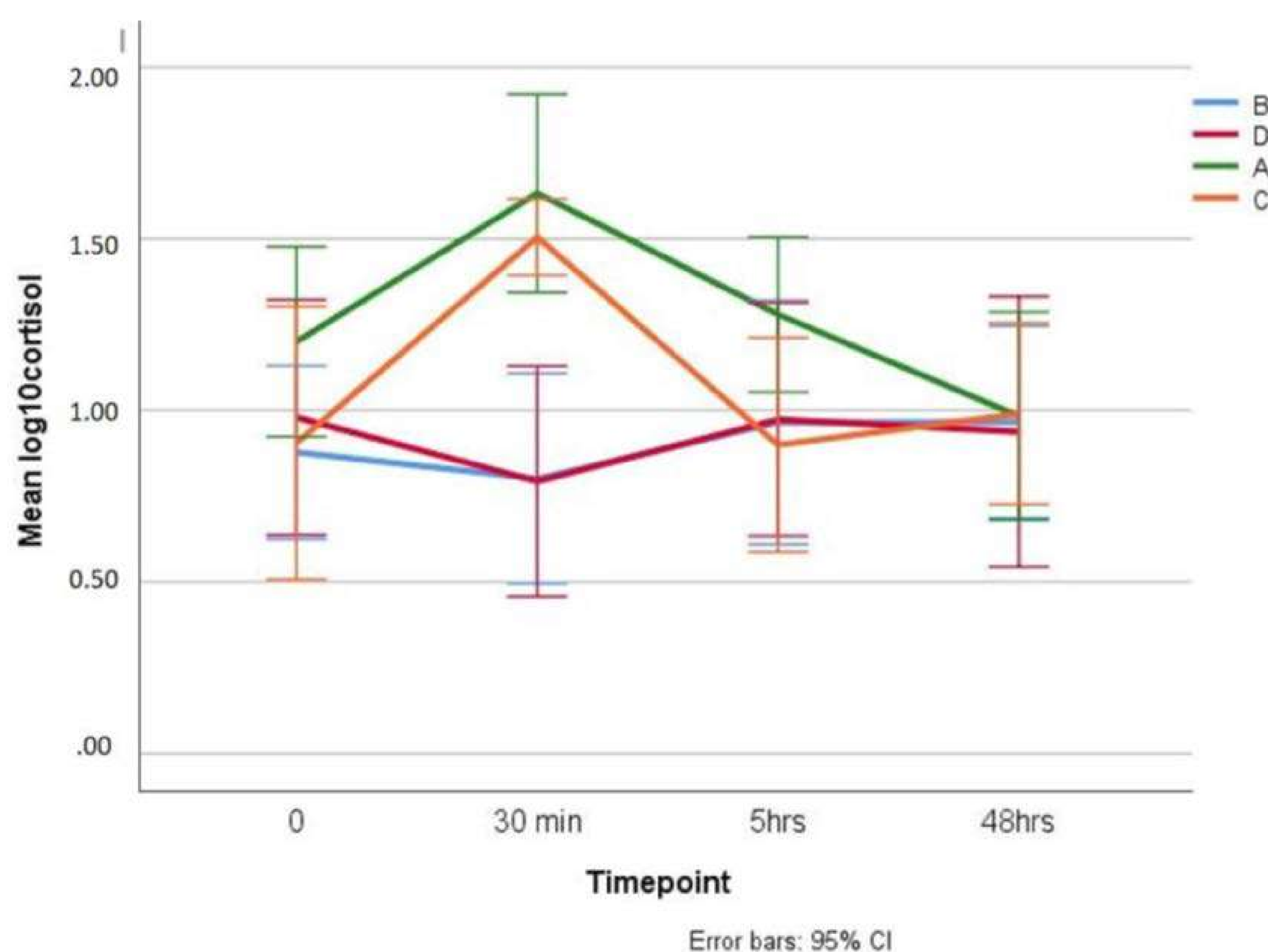


Figure 1. Mean of log10 cortisol in the four groups A, B, C and D, prior to tail docking (0), and at 30 min, 5hrs and 48hrs intervals post-tail excision (Error bar: 95% CI).

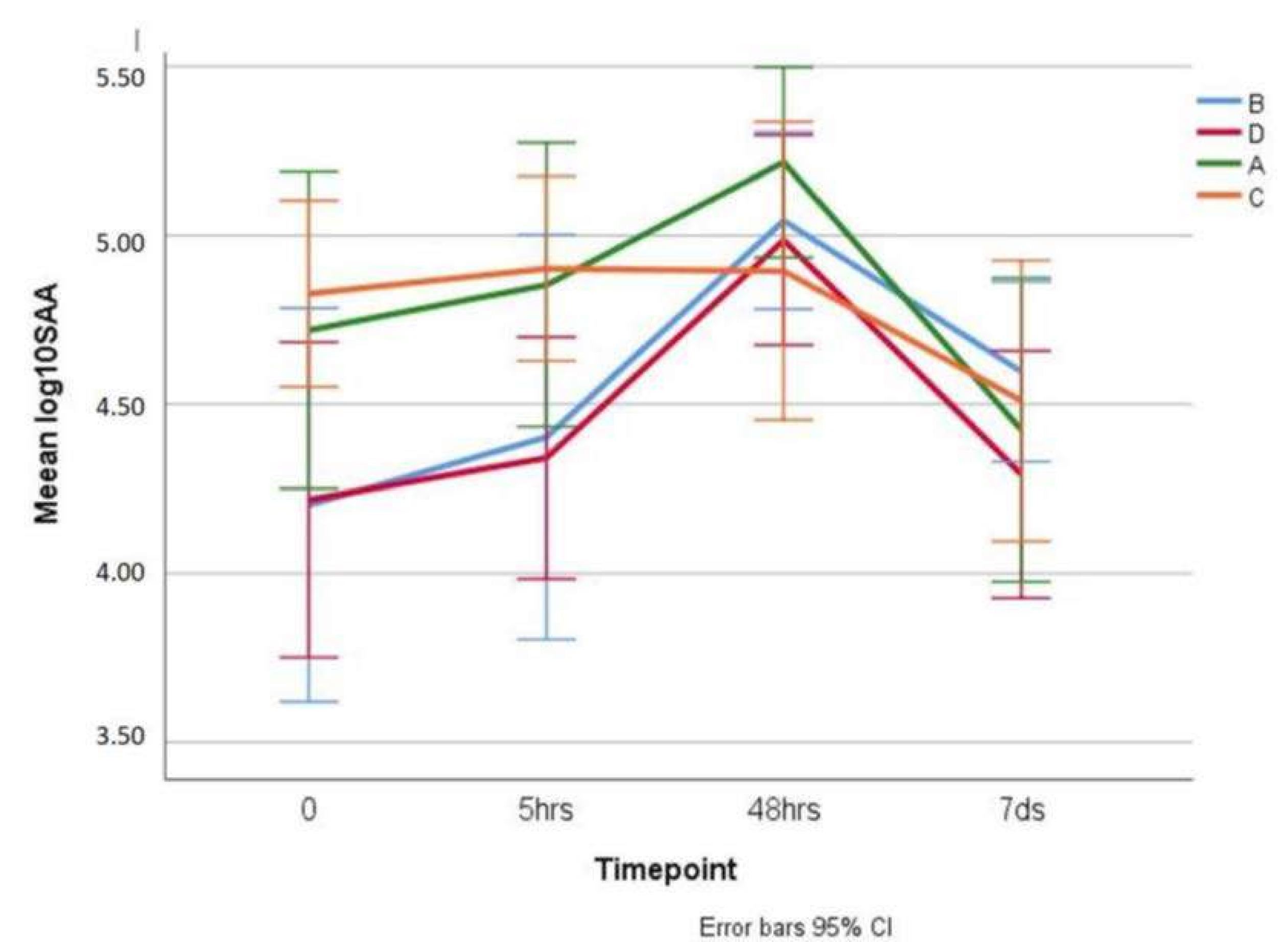


Figure 2. Mean of log10 SAA in the four groups A, B, C and D, prior to tail docking (0), and at 5hrs and 48hr intervals, plus seven days later (Error bar: 95% CI).

CONCLUSIONS

These results appear to indicate that treatment with TS reduces cortisol and SAA responses in lambs tail docked without anaesthesia, although further research is needed to corroborate these findings.

REFERENCE

Ferrer LM, Lacasta D, Ortín A, Ramos JJ, Tejedor MT, Borobia M, Pérez M, Castells E, Ruiz de Arcaute M, Ruiz H, Windsor PA. Impact of a topical anaesthesia wound management formulation on pain, inflammation and reduction of secondary infections after tail docking in lambs (2020). *Animals*, Jul 24;10(8):1255. doi: 10.3390/ani10081255.

FUNDING

This research was supported by provision product from the Australian company Animal Ethics Pty Ltd with financial support for the travel of the senior co-author (PA Windsor) to attend the trial and financial compensation of some of the costs incurred. The work was also supported by the Aragón Government and the European Social Fund (A15_17R, Construyendo Aragón 2016-20).

Goat semen collection with two different sexual stimulations

Begoña Peinado¹, Ángel Poto¹, Laura Almela¹ and Sonia Galián¹.

¹ Murcian Institute for Agricultural and Food Research and Development (IMIDA). La Alberca-Murcia, Spain. Contact: Begoña Peinado. IMIDA. La Alberca-Murcia (Spain). E-mail: begona.peinado@carm.es

Introduction

Goat semen collection is usually performed using a female goat stimulated with injectable estrogen as a sexual stimulus (Poto *et al.*, 1995; Peinado *et al.*, 1998). This system requires the animal to receive repeated hormone injections, compromising animal welfare, or even these hormones can get into the food chain (mapa.gob.es). The use of mannequins or other males is employed in other species to solve these problems (Poto *et al.*, 2000; Arieta *et al.*, 2014).

Objective

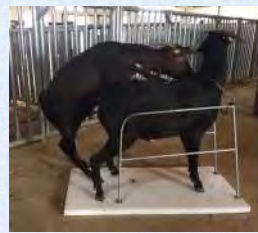
In this work we wanted to check if it is possible to collect semen in the Murciano-Granadina goat breed, in young bucks previously trained in the seminal collection with the use of a female goat, using as a lure another buck, and to compare the sexual behaviour and the quality of the ejaculate with that presented when the stimulus is a female goat.

Material and Methods

Eight bucks under one year of age, previously trained for 3 months in seminal collection with the use of an immobilized female goat, were used. Each buck was timed for reaction time (time it takes from the moment they make contact with the stimulus until ejaculation occurs), and the volume of ejaculate, total sperm concentration was measured using a spectrophotometer, individual motility (each sample was subjectively scored between 0-5) and the percentage of motile sperm in each ejaculate (Galián *et al.*, 2020). To observe differences in the libido, the number of services that each buck was capable of performing on the same morning was counted, both when the stimulus was a female goat and when it was another buck.

We differentiated the results obtained for each parameter during the time the donor bucks were trained (training) from those observed once the same bucks had been trained, knew the system and were stimulated with a female goat (female) or another buck (male).

The results were statistically analyzed with the Statgraphics centurion program, to know if there were significant differences between them ($P < 0.05$)



Results

Tables I, II, III, IV and V show that there are significant differences between the averages of the training period and those obtained once the bucks had been trained, decreasing reaction time and increasing seminal quality due to the older age of the donor bucks. When the donor bucks knew the seminal collection system, there were no significant differences when they were presented with a female goat or another male goat as a sexual stimulus. The variations found were due to differences among specimens, those that had greater reaction times and worse seminal quality when the lure was a female goat, repeated behavior when presented with a male goat. The number of services in the same morning was the same for both stimulations, some bucks even jumping up to 7 times, whether the stimulus was a female goat or another buck.

TABLE I AVERAGE REACTION TIME (SEC.) ± STANDARD ERROR	
TRAINING	81,4 ^a ± 6,7
FEMALE	19,2 ^b ± 10,2
MALE	22,1 ^b ± 7,6

TABLE II AVERAGE VOLUME OF EJACULATE (mL) ± STANDARD ERROR	
TRAINING	0,55 ^a ± 0,04
FEMALE	0,77 ^b ± 0,07
MALE	0,66 ^{ab} ± 0,06

TABLE III AVERAGE TOTAL SPERMATOZOA CONCENTRATION (x10 ⁹) ± STANDARD ERROR	
TRAINING	2404 ^a ± 165
FEMALE	3604 ^b ± 273
MALE	2966 ^b ± 193

TABLE IV AVERAGE INDIVIDUAL MOTILITY ± STANDARD ERROR	
TRAINING	4,08 ^a ± 0,04
FEMALE	4,18 ^a ± 0,07
MALE	4,20 ^a ± 0,06

TABLE V AVERAGE % MOBILE SPERMATOZOA ± STANDARD ERROR	
TRAINING	69,1 ^a ± 1,4
FEMALE	76,2 ^b ± 2,3
MALE	73,4 ^{ab} ± 1,9

(Different letters in the same table indicate significant differences)

Conclusions

Sperm collection from goats is possible by using another male goat as a sexual stimulus, once the donor males have been trained.

No differences in sexual behavior, libido, or sperm quality are found by the fact that the donor is stimulated by a female goat or a buck.

Another male goat can be used instead of an oestrogenized female goat for the collection of goat semen, alleviating the animal welfare and food safety problems that can result from the repeated application of oestrogen to the animals.

References

- Arieta, R.D.J., Fernández, J., & Menchaca, J. (2014). Métodos de extracción de semen bovino. RedVet, 15(6). http://produccion-animal.com.ar/informacion_tecnica/inseminacion_artificial/225-extraccion_semen.pdf.
- Galián, S., Peinado, B., Poto, A., Almela, L. 2020. Effect of Seminal Centrifugation with Iodixanol on the Sperm Quality of Goat Semen. J Anim Sci Res 4(1): dx.doi.org/10.16966/2576-6457.135. ISSN 2576-6457.
- Peinado, B., Sánchez, M.C. 1998. Eficacia de la inseminación artificial caprina. Comparación con la monta natural, influencia del macho de raza Murciano Granadina. VII Congreso Nacional y IV Latinoamericano de Etología. Organizado por la Sociedad Española de Etología. Pontevedra (España), 7-10 octubre 1998.
- Poto, A., Peinado, B., Lorenzo, M.C., Domínguez, E., Gergatz, E., Göker, E., Bali, A. 1995. Inseminación artificial en caprino. Aportaciones en ganado de raza Murciano-Granadina. Mundo Ganadero. Año 6. Número 12. Diciembre 1995, pp. 46-50. ISSN: 0214-9192.
- Poto, A., Peinado, B., Rosique, M., Martínez, M., & Barba, C. (2000). Comportamiento del cerdo chato murciano frente maniquí en la sala de extracción de semen. Estudio preliminar de la libido. Archivos de zootecnia, 49(186), 87-93.
- https://www.mapa.gob.es/desarrollo-rural/temas/programas-ue/cap_hormonas_tcm30-57825.pdf.

BLOOD LEVELS OF PROGESTERONE AND CORTISOL IN MURCIANO GRANADINA GOATS AFTER ARTIFICIAL INSEMINATION

Authors: Begoña Peinado, Laura Almela, Ángel Poto, Sonia Galián

Murcian Institute for Agricultural and Food Research and Development (IMIDA). La Alberca-Murcia. SPAIN.

Contact: Begoña Peinado. IMIDA. La Alberca-Murcia. SPAIN. Email: begona.peinado@carm.es. Telephone: +34 968 366 756

INTRODUCTION AND OBJECTIVE

Goat farming in the Region of Murcia is based on the use of the Murciano-Granadina, a breed with recognized dairy qualities, whose milk is used mainly for making cheese. Artificial insemination is one of the most frequently used techniques for obtaining livestock production, and is an indispensable tool which offers distinct advantages for animal reproduction (Poto *et al.*, 1995).

Early pregnancy diagnosis is a very important practice in the reproductive management of females to ensure that the production process is efficient (Ibrahim *et al.* 2017). There are two particularly efficient techniques for diagnosis gestation in goats: real-time ultrasound and blood progesterone measurement, the latter being used for early pregnancy diagnosis between 19-23 days post-service in ruminants. The progesterone test is considered highly accurate to diagnose the absence of pregnancy, thus allowing an early new service (Ortega-Pacheco *et al.*, 1999).

Stress has been used as an indicator of animal welfare. Cortisol is one of the most used biomarkers to evaluate stress in animals, high levels of which can explain losses in production and susceptibility to diseases (Romero *et al.*, 2011). Furthermore, the goat is a species which is prone to abortion, and in various studies in goats high levels of maternal cortisol have been associated with abortion (López *et al.*, 2012).

The aim of this work was to study the relationship between early detection of the blood levels of two hormones (progesterone and cortisol) and the gestation results obtained through artificial insemination in goats of the Murciano-Granada breed.

METHODOLOGY

The study was carried out in a group of 11 adult, multiparous goats of the Murciano-Granadina (MG) breed. They were artificially inseminated with semen from two MG males, the semen being collected using the artificial vagina method. Previously, the females received heat synchronization treatment with a progestin sponge and injection of prostaglandin F2 alpha and equine chorionic gonadotropin (eCG) (Poto *et al.*, 1995; Galián *et al.*, 2020).

Three measurements were taken to determine blood progesterone levels and two for cortisol. The frequency of sampling was 21 days, with one measurement coinciding with the day of the artificial insemination. An automatic immunofluorescence analyzer was used to measure both parameters (Finicare-Vet veterinary immunoanalyzer). For the pregnancy diagnosis, the Voluson 730 expert ultrasound machine was used, with a 5.0 MHz endovaginal probe. Ultrasound scans were performed at 30 and 45 days post-insemination (Poto *et al.* 1995). The Statgraphics Centurion program was used for the statistical analysis



Murciano-Granadina goats

RESULTS

Of the total of eleven inseminated goats, 7 were found empty by ultrasound diagnosis and 4 were pregnant. Tables I and II reflect the progesterone and cortisol values based on these results.

TABLE I. PROGESTERONE VALUES OF MURCIANO GRANADINA GOATS SUBJECTED TO ARTIFICIAL INSEMINATION

Dates analytics	14/01/20	03/02/20 IA day	24/02/20
IA total (N=11)	10,74 ± 2,13*	10,08 ± 2,55	12,38 ± 3,27*
Left empty (n=7)	10,50 ± 2,06	8,63 ± 1,66++	10,74 ± 2,55 **
Pregnant (n=4)	11,17 ± 2,72	12,63 ± 1,59++	15,26 ± 2,3**

Values expressed as mean ± standard deviation. PG = progesterone. Values expressed in ng / ml. IA total= total number of goats wich underwent artificial insemination. IA day: artificial insemination day. *, **, ++, indicate significant differences with p < 0.05

TABLE II. CORTISOL VALUES OF MURCIANO GRANADINA ADULT GOATS SUBJECTED TO ARTIFICIAL INSEMINATION

Dates analytics	14/01/20	03/02/20 IA day
IA total (N=11)	76,52 ± 42,15	78,69 ± 41,5
Left empty (n=7)	90,4 ± 64,88	90,08 ± 44,40
Pregnant (n=4)	52,12 ± 15,73	58,74 ± 31,06

Values expressed as mean ± standard deviation. Values expressed in nmol / L. IA total= total number of goats wich underwent artificial insemination IA day: artificial insemination day

CONCLUSIONS

*The differences found in blood levels of progesterone show they are of interest both in predicting the expected fertility on the day of insemination, as well as in being able to make an early pregnancy diagnosis, starting at 21 days post insemination. Therefore, the progesterone test is considered a fairly accurate test for the early diagnosis of absence of pregnancy, with the added advantage of its ease of use.

* The cortisol values found also make us think that its elevated levels, especially on the day of insemination, negatively affect the fertility obtained. Therefore, the measurement of cortisol levels in blood could also be used as an early indicator of the existence or not of gestation in goats.

BIBLIOGRAPHIC REFERENCES

- Galián S, Peinado B, Poto A, Almela L. 2020. Effect of Seminal Centrifugation with Iodixanol on the Sperm Quality of Goat Semen. *J Anim Sci Res* 4(1): dx.doi.org/10.16966/2576-6457.135
- Ibrahim, S. S., El-Anwar, A.H., Fadel, M.S., Abd Elkarim, A. M. 2017. Color Doppler ultrasound as an accurate and rapid tool for early pregnancy diagnosis in buffaloes. *JOURNAL OF VETERINARY MEDICAL RESEARCH* 2017, 24 (2): 286 - 302. Online ISSN: 2357-0520 Print ISSN: 2357-0512
- López, G., Díaz, V.L., Serrano, B.A, Muñoz, M.L., Morato, T., Romero, CM. 2012. Niveles sanguíneos de cortisol y receptores a glucocorticoides en hígado y placenta de cabras en diferentes etapas de la gestación. *Vet. Méx.*, 43 (3). Pp: 213-223.
- Ortega-Pacheco, A., Montes-Pérez, R., Torres-Acosta, J.F., Aguilar-Caballero, A., Avalos-Borges, E. 1999. Diagnóstico de gestación en cabras criollas (*Capra hircus*) mediante determinación de los niveles sanguíneos de progesterona y ultrasonografía de tiempo real. *Rev Biomed* 1999; 10:229-234.
- Poto, A., Peinado, B., Lorenzo, M.C., Domínguez, E., Gergatz, E., Göker, E., Bali, A. 1995. Inseminación artificial en caprino. Aportaciones en ganado de raza Murciano-Granadina. *Mundo Ganadero*. Año 6. Número 12. Diciembre 1995. pp. 46-50. ISSN: 0214-9192.
- Romero, M.H., Uribe-Velázquez, L.F., Sánchez, J.A. 2011. Biomarcadores de estrés como indicadores de bienestar animal en ganado de carne. *Biosalud Vol.10 N.1 Manizales Jan./June 2011*. ISSN 1657-9550.



Prion Protein gene (*PRNP*) Polymorphism in Latvian Local Breed Goats

Kristine Piliena¹, Lasma Zelča², Daina Jonkus²

¹ Latvian Goat Breeding Association, Talsi region, Latvia

² Latvia University of Life Sciences and Technologies, Jelgava, Latvia

piliena@inbox.lv



Introduction. Latvian local breed goats (LVK) was developed in the 19th century by crossbreeding local goats with Russian and Megrel breed bucks. During the last decade the number of local goat is decreasing. The most relevant feature of LVK breed goats is the high reproduction capacity – fertility ~300% and kid rearing till the weaning age. The average live weight of a grown goat is 45 – 55 kg. The average milk yield of a LVK goat depending on feeding and keeping conditions varies from 450 – 650 kg with fat content 3.80 – 5.00%, and protein content 3.00 – 3.50%. Goats are disease resistant and have a longevity.

Scrapie is a lethal, neurodegenerative disease that is affecting sheep and goats. It is a disease that belongs to the group of transmissible spongiform encephalopathies (TSEs). This disease cause economic loss to herds, where animals are affected by it. The classical scrapie in sheep and goats has been affected by prion protein (*PRNP*) gene polymorphisms (Goldmann et al., 2011). The disease is hereditary and can be limited or eliminated by a thoughtful animal breeding by the selection of scrapie-resistant animals.

The aim of the study was to explain the polymorphism of the Latvian local goat breed population according to codons 146 and 222 of the *PRNP* gene.

Material and methods. In September and October 2019, farms with LVK goats (in total 7 farms) were selected and a total of 397 samples of goat biological material were collected, including 391 females and 6 male goats. The goats were 1 to 7 years old. Genetic analyzes were performed in Germany, in the laboratory Eurofins Medigenomix GmbH.

Results

In the Latvian local breed goat population analyze two codons of *PRNP* gene, were found low resistant allele frequency (Fig.1.).

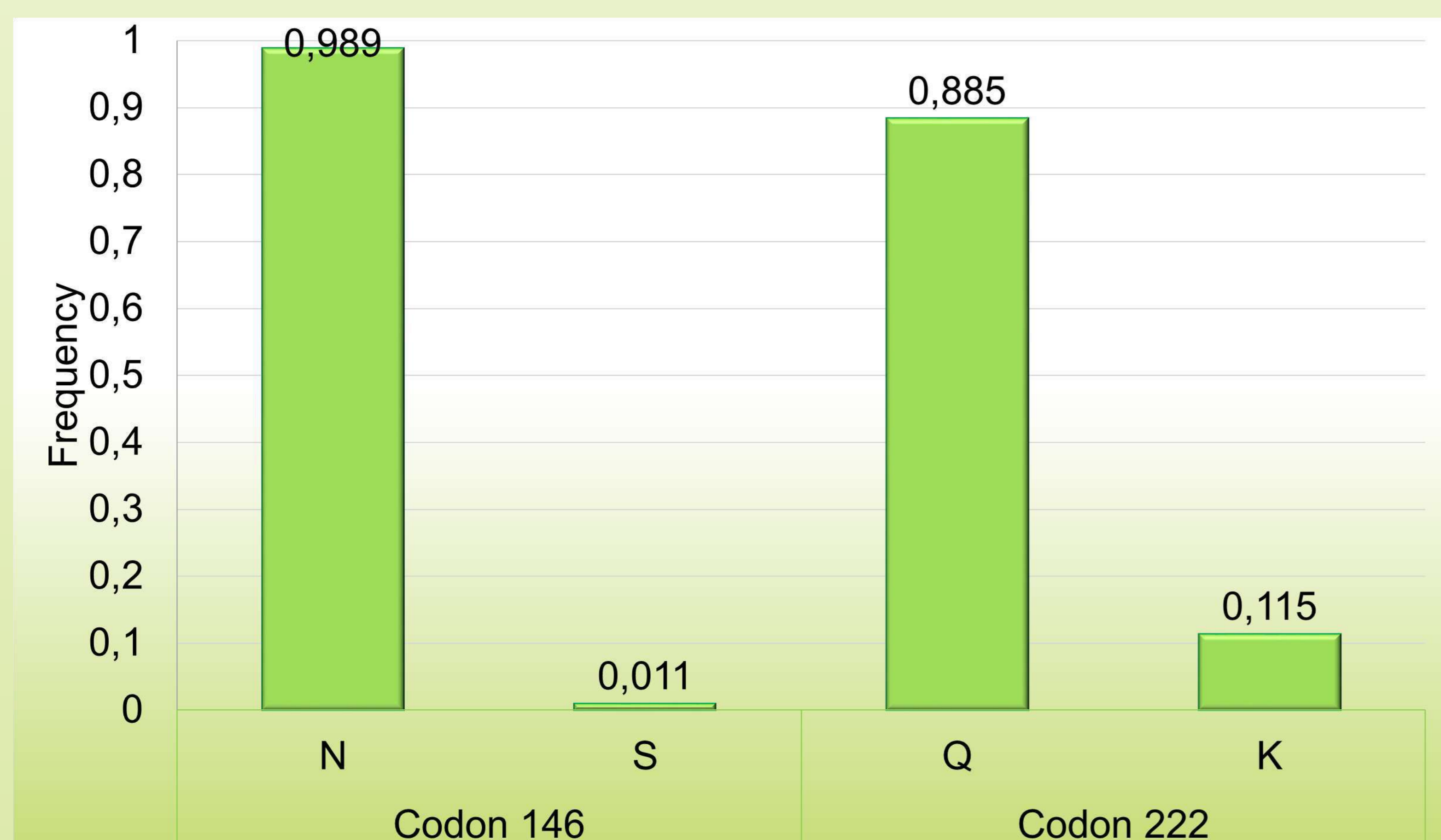


Fig. 1. The allelic frequencies of *PRNP* gene of Latvian local goat breed.

Analyzing two codons of the *PRNP* gene in the LVK breed goats, it was found that codon 146 are practically monomorphic according to the N allele, the frequency of which was 0.989. Of the analyzed LVK breed goats, only 9 animals, or 1.1%, had the S allele. No males goat had a heterozygous genotype.

A higher polymorphism was observed in codon 222 of the *PRNP* gene. 88 goats, or 11.5%, had a resistant K allele. The frequency of the Q allele was 88.5%. However. Only one male goat had the K allele.

LVK genotypic frequencies at codons 146 and 222 of the *PRNP* gene locus are displayed in the table.

The results show, that 97.7% of LVK goats had homozygous genotypes NN on codon 146. Only 2.3% of goats had heterozygous genotypes NS. Within goats, that were analyzed, none of them had SS genotype. Also, within the LVK goats, in the codon 146 the second resistant allele D was not found.

The second codon 222 analysis shows, that 77.8% of the goats had homozygous QQ genotype. Heterozygous QK genotype was seen in 21.4% of the goats. Homozygous KK genotype had almost 1% of the goats. Resistant KK genotype was found only in the female goats. Within the analyzed LVK breed goats, none had boths codon resistant alleles.

Table. Genotypic frequencies at codons 146 and 222 of the *PRNP* gene locus

<i>PRNP</i> codon 146		<i>PRNP</i> codon 222	
Genotypes	Frequencies	Genotypes	Frequencies
NN	0.977	QQ	0.778
NS	0.023	QK	0.214
SS	0	KK	0.008

Genotype analysis shows, that a small number of goats had resistant *PRNP* gene allele, but on the other hand, it were not observed, that LVK goats had been sick with Scrapie, basically, they are resistant to diseases and to them are good longevity.

Conclusions

- Within the analyzed 397 LVK breed goats, 1.1% of the goats had codon 146 resistant S allele and 11.5% of the goats had codon 222 resistant allele K.
- Selection work to increase the frequency of the resistant alleles and genotypes in the LVK breed in the future is problematic, because only 3 goats had a homozygous KK genotype and one male of the 6 goats had a K allele.



Fig. 2. LVK goats hair have different colors (Author's photos)

Acknowledgment: This paper was supported by the Rural Support Service Republic of Latvia, project Nr. 20-100-20-1.8.-000011.

Wool fiber density and other characteristics from birth to weaning in Junin lambs

Quispe EC^{1,2@}; Grabiell, W.H.³ Aliaga, J.¹ Quispe, M.D.⁴ y Quispe, R.³

¹ Animal Production Department, Universidad Nacional Agraria La Molina, Lima, Perú. jaliaga@lamolina.edu.pe

² Laboratory of Animal Fibers, Natural Fiber's Tech SAC. Lima, Perú. edgarquispe62@gmail.com

³ Animal Production Department, Universidad Nacional del Centro del Perú, Huancayo, Perú. rolando-quispe@outlook.com

⁴ Engineering Department, Maxcorp Technologies SAC. Lima, Perú. maxdavid22@gmail.com

INTRODUCTION

The number of fibers or hairs per area unit, called fiber density, is important due to its marked effect and relationship with the quantity and quality of animal fleeces (Hardy y Wolf 1946; D'arcy, 1990). However, there are few studies, probably due to the difficulty of its measurement. Currently, a novel methodology called "Fiber Den" (Quispe y Quispe, 2019) allows evaluating the fiber and duct density on the skin of animals in a direct, non-invasive and fast way. This research had to objectives to evaluate monthly the body weight and some characteristics of the skin and wool fibers from birth to weaning (120 days) and to analyze relationships between them to order assessing the potential of fiber and duct density as a new selection criterion for improving wool quality, of Junín lambs.

MATERIAL AND METHODS

Location: This research was carried out in the Junin Department, in the Casaracra Production Unit, belonging to the SAIS "Túpac Amaru".

Animals: Twenty lambs (10 male, and 10 female) of the Junin breed, were monitored since birth to 120 days old, assessed every 30 days.

Measurement of variables:

Live weight (LW), skin surface (SS), monthly fiber growth (MFG), fiber density (FibDen), ducts density (DuctDen), FibDen/initially tattooed area (ITA), DuctDen/ITA were considered. Additionally, the percentage of ducts with one, two, three, or four fibers (PD1F, PD2F, PD3F or PD4F, respectively), and average fiber diameter (AFD) were considered also.

Live weight and surface skin were recorded with weight scale and graduated ruler, respectively. FibDen and DuctDen were objectively determined using the device and methodology called FIBER DEN. AFD was measured with FIBER EC instrument.

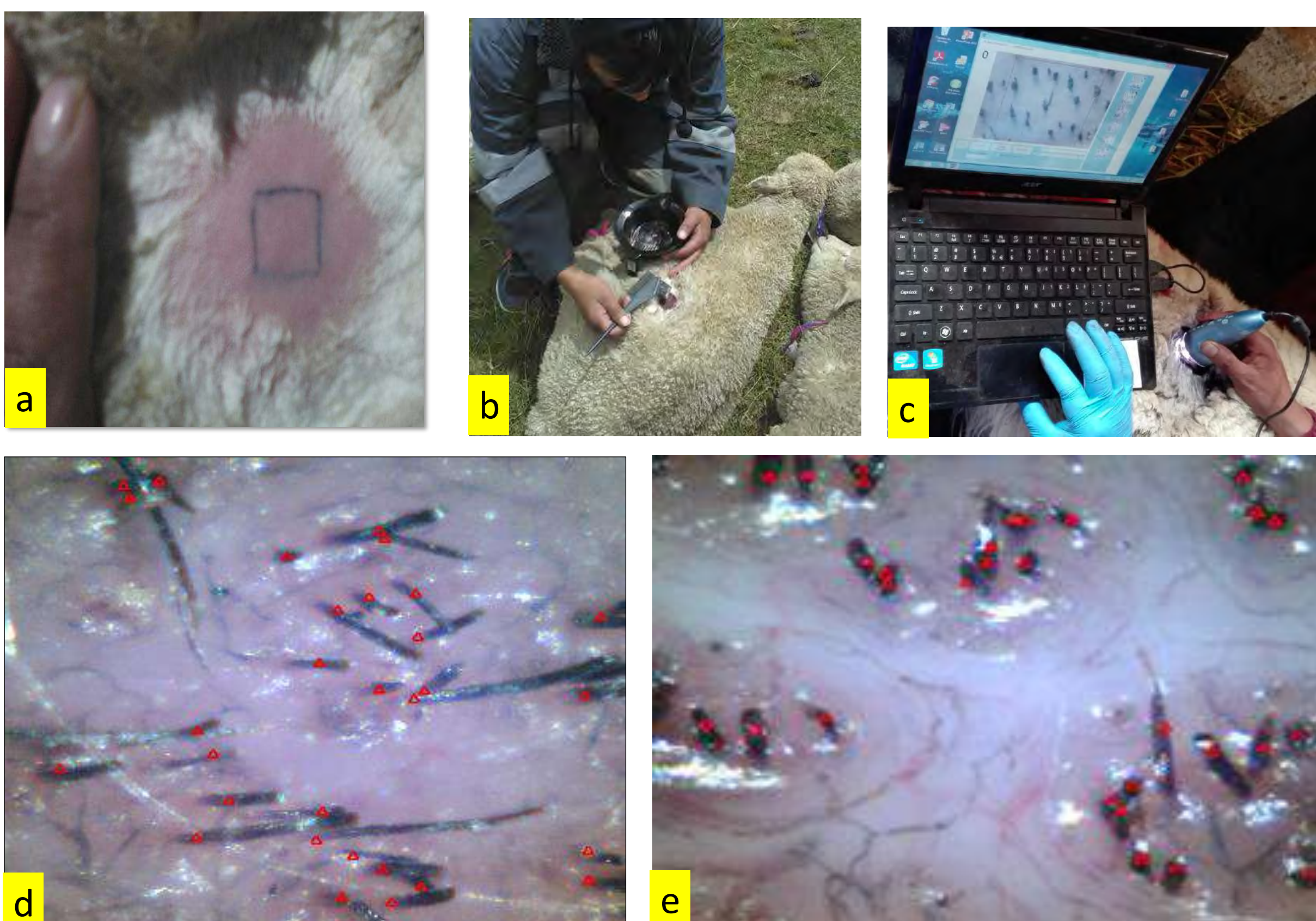


Figure 1. Fiber Den methodology, step by step. **a:** Skin area tattoo (1cm²); **b:** Dyeing of the skin to highlight the fibers; **c:** Evaluating the fiber density with the FIBER DEN equipment; **d:** Image of 1mm² at birth, where the fiber density was obtained; **e:** Fiber density at 120 days. Note the expansion of the skin.

REFERENCES:

1. D'arcy, JB, 1990, *Sheep management and wool technology*. 3rd eds, New South Wales University Press Ltd, Australia.
2. Hardy, JI & Wolf, HW, 1946. A comparison of the wira type density calliper with the electric density clipper, *Journal of Animal Science*, vol. 5, no. 4, pp. 378–81.
3. Quispe, EC & Quispe, MD, 2019, Non-invasive method for measurement fiber density and fiber bundles in the skin of animals, *Archivos de Zootecnia*, vol. 68, no. 261, pp. 74–81.

RESULTS AND DISCUSSION

Table 1. Descriptive statistics of Junin lamb skin since birthday to 120 old days, assessed every 30 days.

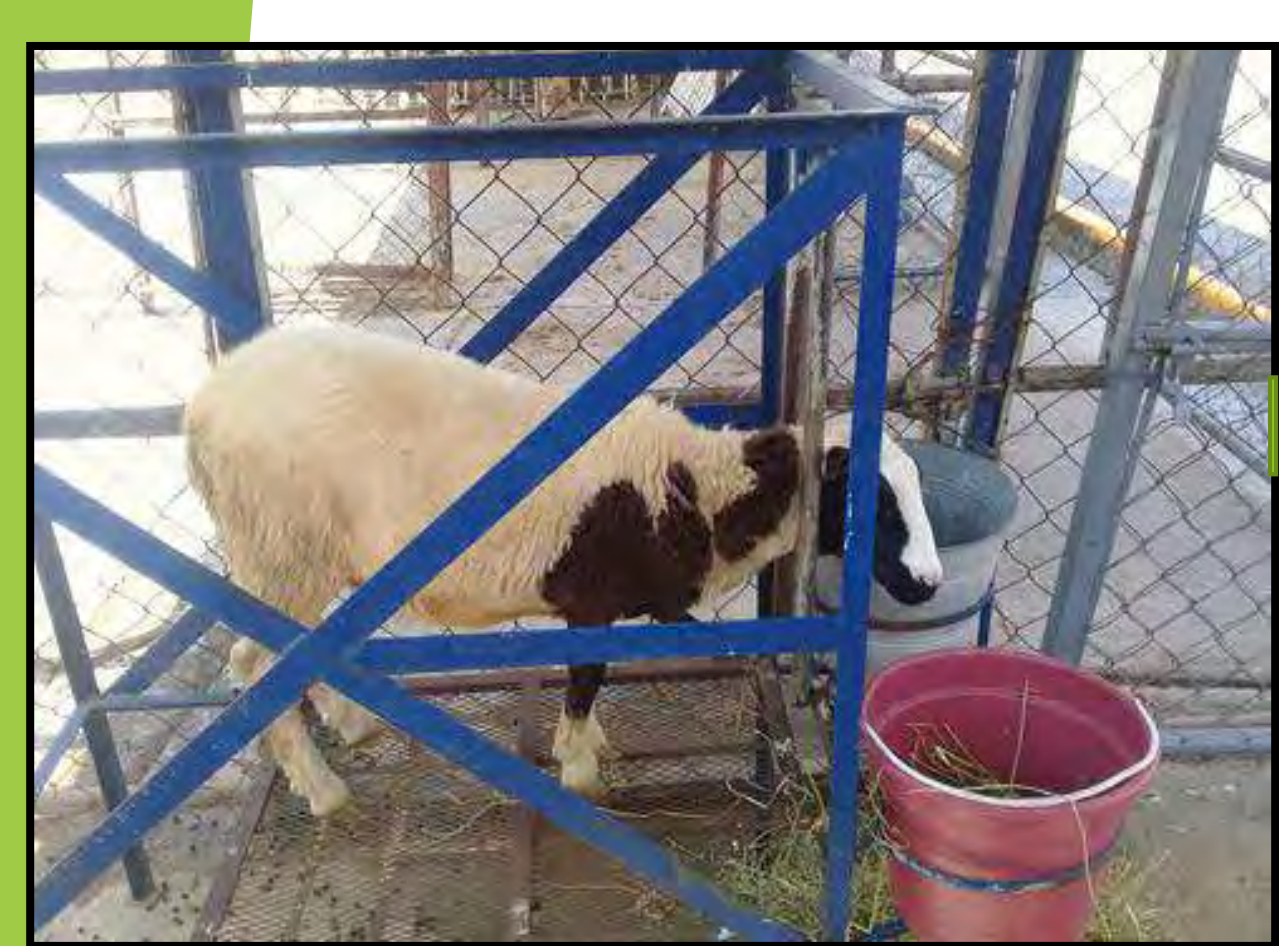
Factor	LW (kg)	AFD (μm)	MFG (cm)	FibDen (N°fibers/mm ²)	DuctDen (N°Duct/mm ²)	SS (mm ²)
Sex	N.S.	N.S.	N.S.	N.S.	N.S.	N.S.
- Female	12.4 ^a 0.306	22.0 ^a 0.193	0.796 ^a 0.02	33.1 ^a 0.82	29.7 ^a 0.69	2.05 ^a 0.07
- Male	12.1 ^a 0.290	21.8 ^a 0.183	0.818 ^a 0.02	31.8 ^a 0.78	32.1 ^a 0.65	1.90 ^a 0.07
Day	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
- At birth	3.62 ^e 0.14	18.1 ^e 0.21	0.557 ^e 0.02	32.2 ^{ab} 1.15	31.5 ^{ab} 1.16	1.00 ^e 0.00
- 30th	7.66 ^d 0.28	21.2 ^d 0.22	0.812 ^{bc} 0.02	33.2 ^a 1.24	30.1 ^{ab} 1.05	1.60 ^{cd} 0.04
- 60th	11.32 ^c 0.43	22.5 ^{bc} 0.31	0.757 ^{cd} 0.02	37.9 ^a 1.72	31.9 ^a 1.24	1.97 ^c 0.07
- 90th	17.32 ^b 0.56	23.3 ^b 0.33	0.867 ^b 0.02	36.5 ^a 0.84	33.5 ^a 0.75	2.46 ^b 0.15
- 120th	21.43 ^a 0.71	24.4 ^a 0.37	0.967 ^a 0.04	32.4 ^{ab} 1.37	27.8 ^b 1.19	2.86 ^a 0.18
Factor	FibDen/ITA (N°Fib/ITA)	DuctDen/ITA (N°Duct/ITA)	PD1F (%)	PD2F (%)	PD3F (%)	PD4F (%)
Sex	N.S.	N.S.	N.S.	N.S.	N.S.	N.S.
- Female	67.80 ^a 2.80	60.20 ^a 2.32	89.70 ^a 0.69	9.85 ^a 0.69	0.59 ^a 0.13	0.04 ^a 0.02
- Male	68.40 ^a 2.66	60.70 ^a 2.20	90.40 ^a 0.67	9.15 ^a 0.60	0.60 ^a 0.12	0.01 ^a 0.02
Day	<0.001	<0.001	<0.001	<0.001	<0.01	<0.05
- At birth	32.20 ^d 1.15	31.50 ^d 1.16	97.60 ^a 0.41	2.45 ^d 0.41	0.00 ^{bc} 0.00	0.00 ^b 0.00
- 30th	53.10 ^c 2.70	48.10 ^c 2.33	92.50 ^b 1.44	7.06 ^{bc} 1.07	0.54 ^{ab} 0.45	0.00 ^b 0.00
- 60th	74.90 ^b 4.90	63.00 ^b 3.67	84.40 ^{de} 1.82	14.73 ^a 1.44	0.79 ^a 0.48	0.00 ^b 0.00
- 90th	89.20 ^{ba} 5.34	81.80 ^a 4.72	91.20 ^{bc} 1.36	9.23 ^b 1.24	0.39 ^{ab} 5.34	0.00 ^b 0.00
- 120th	91.30 ^a 5.56	78.00 ^a 4.55	84.60 ^d 1.00	14.03 ^a 0.88	1.23 ^a 0.29	0.13 ^a 0.07

In addition to the results showed in Table 1, the direct relationship between AFD and the number of cuts (shearing) of the fiber, and FibDen with MFG into the period of study were found. Besides, the indirect relationship between AFD and FibDen and DuctDen was also found, with sufficient statistical evidence. It is concluded that FibDen and DuctDen could be considered as novel selection criteria for simultaneous improvement of wool quality and quantity because FibDen and DuctDen have a direct relationship with quality and quantity characteristics.

Tania María Rodríguez-Barrera, Jetzabelt Ambrosio-Bautista, Maura Téllez-Téllez, José E. Sánchez, Gloria Sarahí Castañeda-Ramírez, María de Lourdes Acosta-Urdapilleta, Liliana Aguilar-Marcelino

Introduction: Livestock is one of the most important economic activities in Mexico, is a profitable sector that guarantees the production and supply of food. This sector is affected by parasites such as gastrointestinal nematodes. One of the main ones is the nematode *H. contortus*. An alternative to this problem is the edible mushroom *L. edodes* which is a natural antagonist of parasitic nematodes of sheep.

Methology:



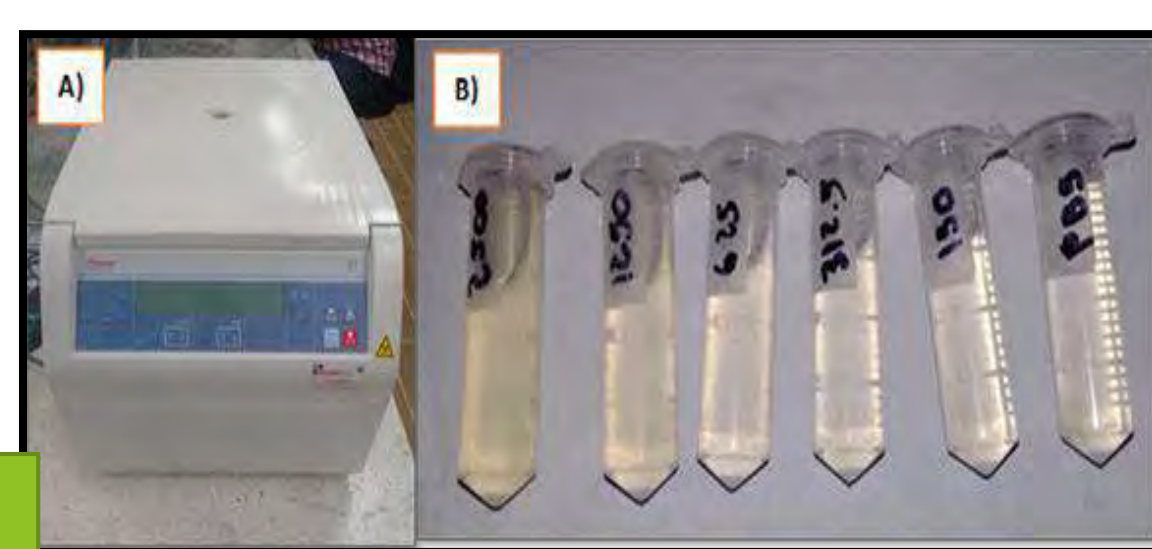
Infection of the donor animal with *H. contortus*



Production of infective larvae



Extract of *L.edodes*



larval unsheath inhibition test.



Evaluation of the larval unsheath test.



Statistic analysis

Results and conclusión:

L. edodes obtained a 100% inhibition percentage of the larvae sheath at a concentration of 2500 µg / ml. In conclusion, the extract of *L. edodes* can be used as a sustainable integral control method in the livestock area.

Concentration (µg/mL)	<i>L. edodes</i>
PBS	2.1 ^A
150	7.1 ^A
312.5	5.9 ^A
625	56.2 ^B
1250	100.0 ^C
2500	100.0 ^C

Groups	infective larval appearance
Control (PBS)	
Aqueous extract of <i>L.edodes</i>	

References:

Al-ani, L. Khalil, T., Aguilar-Marcelino, L., Fiorotti, J., Sharma, S., Sharif M., Furtado E.L., Wijayawardene N.N., Herrera-Estrella A. (2020). Biological Control Agents and Their Importance for Plant Health. *In: Microbial Services in Restoration Ecology*. (Eds) Singh J.S., Raj Vimal S. Elsevier. U.S.A. p 42. doi.org/10.1016/B978-0-12-819978-7.00002-6

Pineda-Alegría, J.A., Sánchez, J.E., González-Cortázar, M., Von Son-de Fernex, E., González-Garduño, R., Mendoza-de Gives, P., Zamilpa A., Aguilar-Marcelino, L. (2020). *In vitro* nematocidal activity of commercial fatty acids and β-sitosterol against *Haemonchus contortus*. *Journal of Helminthology*, 94(135): 1-4. doi.org/10.1017/S0022149X20000152

Aguilar-Marcelino L.; Sánchez, J.E.; Mendoza-Gives, P. 2017. Uso biotecnológico de Productos Obtenidos a Partir de *Pleurotus spp.* En el Control de Nematodos Parásitos de Importancia Pecuaria. En: La biología, el cultivo y las propiedades nutricionales y medicinales de las setas *Pleurotus spp.* José E. Sánchez y Daniel J. Royse, Eds. San Cristóbal de las Casas, Chiapas, México: ECOSUR. pp 297-309.

The present study was financed by the National Problems, CONACYT, project number 9342634372.

Caseous Lymphadenitis – control program for goat flocks in Hesse

Rohde M¹, Wagner H¹, Volmer R², Zschöck M¹

¹ Landesbetrieb Hessisches Landeslabor, 35392 Gießen

²Klinikum Veterinärmedizin, Klinik für Geburtshilfe, Gynäkologie und Andrologie der Groß- und Kleintiere mit Tierärztlicher Ambulanz, Justus-Liebig-Universität, Gießen

Introduction

In March 2017 representatives of animal health-services for small ruminants of the German states and of some states-laboratories met under the direction of the German Veterinary Society (DVG, section „small ruminant diseases“), to establish a guideline for the control of caseous lymphadenitis (CL) in goat flocks. The agreement between the different German states on basic and mandatory measures allows them to cross-approve the state-specific control programs. This harmonisation of policies improves the prevention of epidemic diseases regarding cross-regional or nationwide shows and auctions and the replacement of breeding animals. In the following the control program for CL of the state Hesse is presented.

Approximately 19 800 goats are existing in Hesse and about 3100 goat keepers are registered (<https://llh.hessen.de/tier/schafe-und-ziegen>). As CL is mainly seen in goats, the control program has been developed in cooperation of the Landesbetrieb Hessisches Landeslabor (state laboratory of Hesse), the Justus-Liebig-University of Gießen and the hessian society of goat breeders (HZZV). The latter resumes the administration of the program. Today (April 2020) 56 goat owners are taking part at the control program.

Intents of the control program

The objectives of the control program are to obtain physical and serological unsuspectiveness of the flocks of the HZZV. Regarding animal welfare, animal health, production of healthy foods and not at least economic efficiency (decreased milk yield or weight gain, culling), the control of CL is reasonable and worthwhile. Even more so, as an effective therapy or a vaccine for this disease are not available.

In Germany CL is not state-controlled or officially registered, currently. Therefore the participation in the control program is voluntary.

The control program

The disease eradication and continuous monitoring of the participating goat flocks are performed by physical examination of individual herd members, serological blood testing and culling of either physically or serologically positive animals.

The protocol runs in two stages. In the first stage (approval period) the herd has to achieve the status „caseous lymphadenitis – unsuspectuous“. In the second stage, measures have to be taken to sustain this status.

In the approval period each herd member at the age of at least 12 months will be examined physically and serologically, according to the schema besides.

Clinical examination means manual palpation of the main superficial lymph nodes. A herd or animal is considered as infected if either *Corynebacterium pseudotuberculosis* was detected in abscess material or a serological blood test was repeatedly positive (given a sensitivity of 85-91% and a specificity of 93-100% of the ELISA (Sting R et al., 2017), false positive results have to be considered). Animals detected as infected have to be separated and culled as soon as possible.

After three negative herd examinations the flock is regarded as „caseous lymphadenitis – unsuspectuous“.

To keep this status (second stage), the herd has to be examined physically and serologically in an annual interval, as shown besides. Contact to other flocks, rams or replacement is permitted if the other flock or originating herd is also recognized as unsuspectuous. Evidence of CL in this stage results in deprivation of the status „unsuspectuous“, the herd has to start from the very beginning with the protocol.

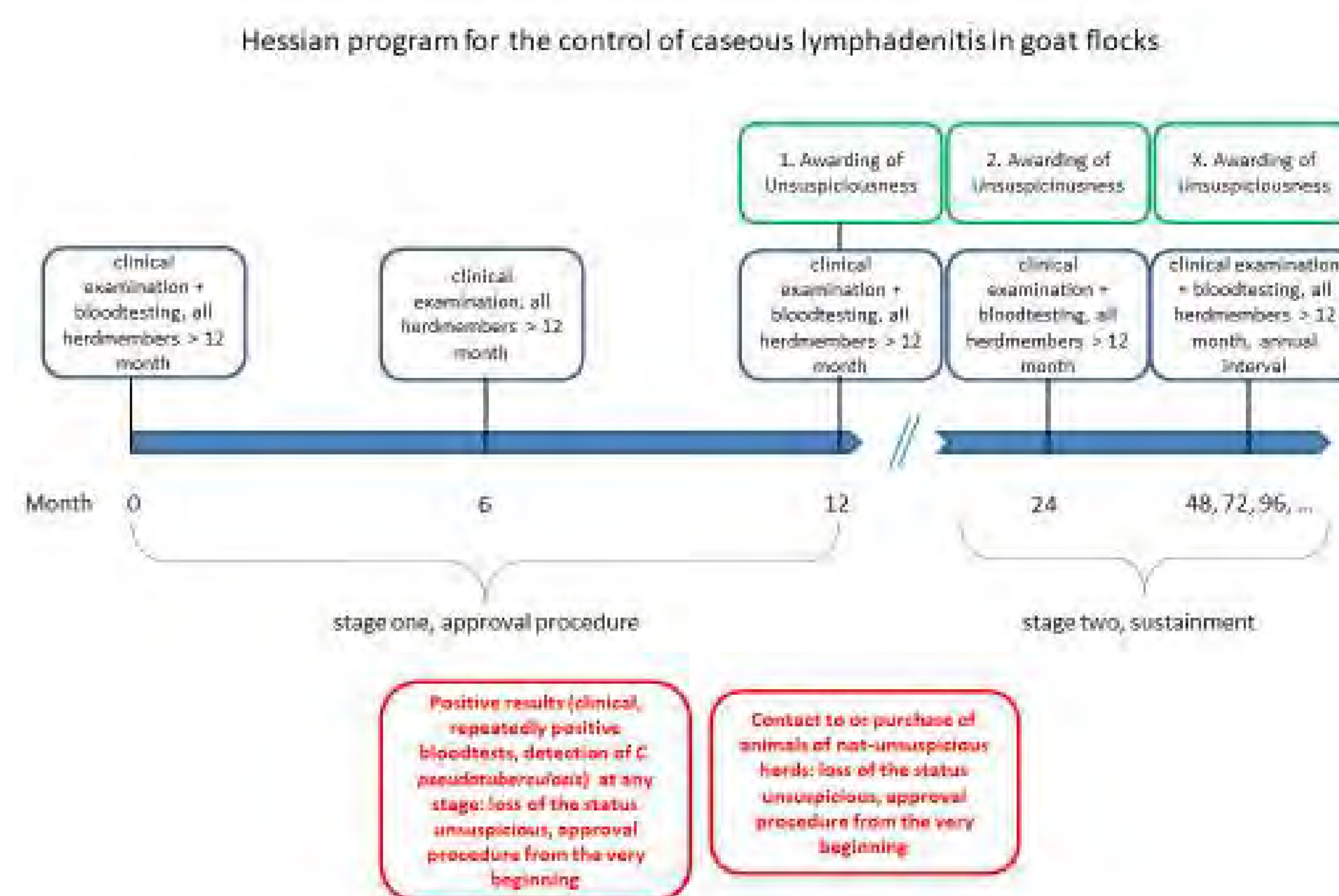


Chart 1: Schema of the hessian program for the control of caseous lymphadenitis in goat flocks

In 2017 35 goat keepers took part at the control program, two of which were identified as infected. In 2018 the number of participants was 46, one of them was detected positive.



Image 1: Palpation of the Ln. mandibularis



Image 2: Palpation of the prescapular lymph node



Image 3: Palpation of the prefemoral lymph node

Costs

The herd owner bears all costs of the program. The Hessische Tierseuchenkasse (hessian animal disease fund, HTSK) and the Hessian Ministry of Environment, Climate protection, Agriculture and Consumer protection (HMUKLV) support the costs by 80%.

Discussion

Because of the increasing spreading of caseous lymphadenitis, a control program was established in Hesse in 2014. In 2017 it was modified according to the minimum standards implemented for all German states, as mentioned above. The combination of physical examination and serological testing has proved as a viable and successful method to detect and control CL in goats. Depending on the infestation rate of a herd it can be hard or even impossible to achieve unsuspectiveness, especially in rare breeds. In unsuspectuous herds with no clinical signs of CL it is challenging to handle positive serological blood results, which do not prove true when repeated. In these cases a shorter testing interval (physical as well as serological) for a certain time period (e.g. every three months for a year) might be worth to be discussed. So far the control program is frequented only by members of the HZZV. For the containment of CL, the integration of goat keepers on a wider basis would be desirable.



Evaluation of behavior during grazing for crossbred hair sheep in the Caribbean

Clara Rúa-Bustamante¹, Sandra C Perdomo-Ayola¹, Juan Zambrano-Ortiz¹, Lorena Aguayo-Ulloa²

¹Corporación Colombiana de Investigación Agropecuaria – AGROSAVIA, CI. Motilonia, Codazzi-Cesar, Colombia.
²Corporación Colombiana de Investigación Agropecuaria – AGROSAVIA, CI Turipaná, Cereté –Córdoba,, Colombia.
 Contact: Clara Viviana Rúa-Bustamante. CI Motilonia, Agrosavia. Email: crua@agrosavia.co

Introduction

The behavior during grazing is useful since it allows to make decisions regarding the management of animals, pastures, or shade requirements (natural or artificial) (Silva et al, 2015). It also allows to acquire knowledge about behavioral events, which are early indicators of adaptation, and to provide a response to environmental alterations that influence food consumption, since animals will choose to change their grazing habits, especially those that are not thermoregulated or in their comfort zone (Solórzano et al, 2018). In addition, it may be of interest for determining animal welfare. Cross-bred hair sheep, classified as Creole, can produce more efficiently due to their years of adaptability to Caribbean conditions. However, little is known about their behavioral events, therefore, the objective of this project was to evaluate the behavior of crossbred hair sheep, grazing in dry agroecological conditions in the northern part of the Colombian Caribbean.



Figure 1. Behavior evaluation in cross-bred sheep during grazing and fruit consumption.

Metodology

The behavior of nine males (300d) in a pasture composed of native trees, shrubs, weeds and different tropical grasses, was recorded. During four consecutive days, an instantaneous sampling was performed between 8:00 and 15:30, every 15 min. The behavioural events recorded were grazing, eat fruit (mango), browse, resting, walking, ruminating, drinking, others. The temperature (T) and relative humidity (H) were stored in dataloggers. An Temperature Humidity Index (THI) was calculated. For the statistical analysis, three blocks were formed: morning, noon and afternoon, using SAS 9.4 statistical software.

Results

The general behavioural budget was 56.4% grazing, 12.4% eating fruit, 9.8% browsing, 7.6% rest, 6.4% walking, 5% ruminating, 0.1% drinking, 0.1% others. Most grazing was during afternoon (44.9%) , then morning (39.8%) and noon (15%), where the THI index was respectively 74.8 (T=23.7 ± 0.31°C, RH= 100%), 74.1 (T= 23.3 ± 0.1°C, RH 100%) and 73,7 (T= 23.1 ± 0.17°C, RH 100%).

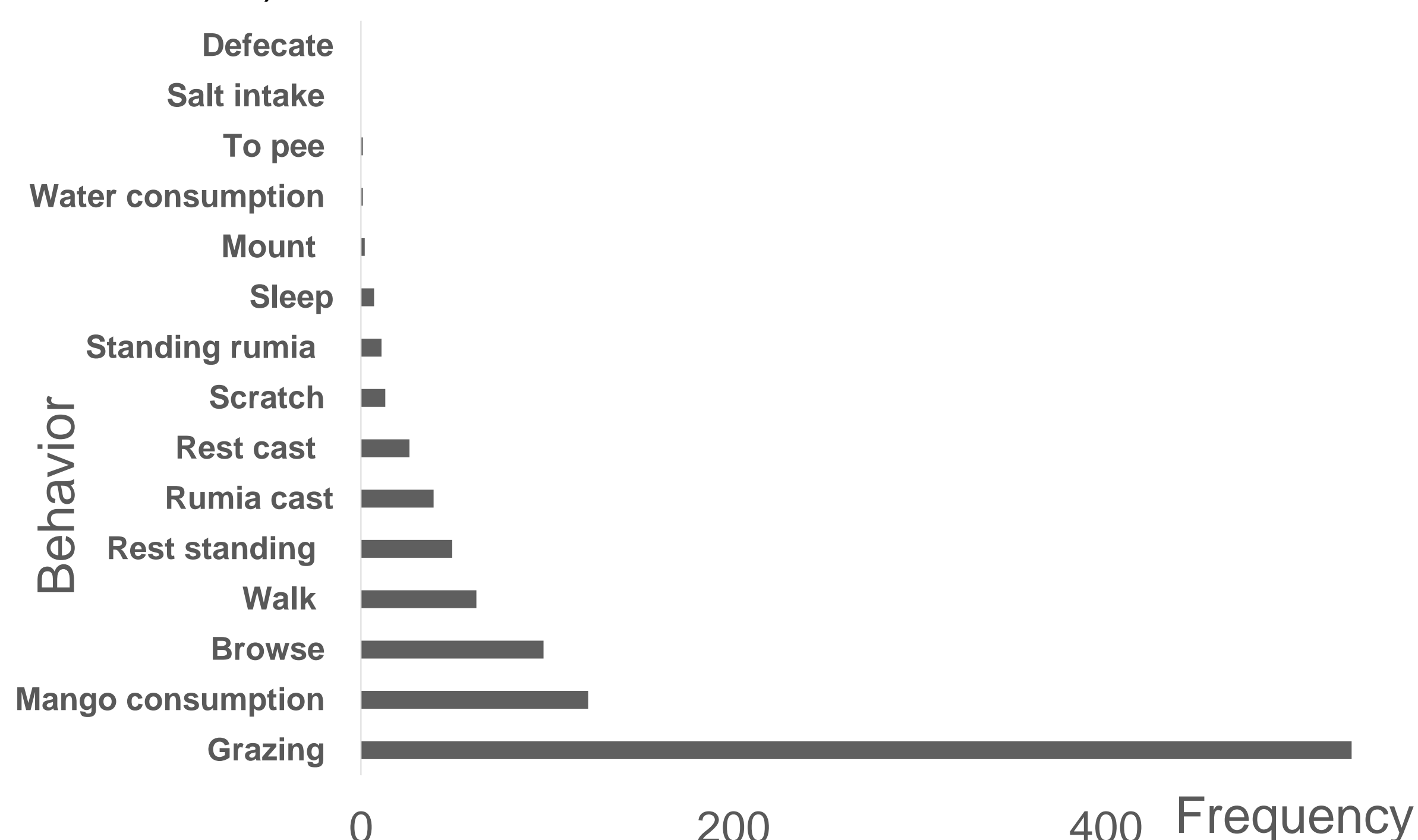


Figure 1. Frequency of different behaviors associated with grazing time in crossbred sheep in the raising and fattening stage.

Table 1. Average, maximum and minimum values for the climatic variables evaluated

Location Datalogger	Temperature °C			Relative humidity %		
	Average	Max	Min	Average	Max	Min
Corral/Pen	26.7	34.8	22.7	86	98.5	50.4
Sun paddock	24.2	42.3	8.7	66	99.9	18.2
Shadow paddock	22.9	39.7	8.7	65.7	99.9	17.3

This could suggest that grazing frequency does not depend on this indicator. The consumption of mango (49.2%) and browsing (49%), was mainly in the morning.



Figure 2. (a) Location of dataloggers in corral, shade and sun to capture local environmental variables. (b) Information capture in the field.

Discussion

In the afternoon, the sheep spent more time grazing (44.9%) than in the morning (39.8%) and at noon (15%), different from that reported by Zambrano et al (2010), where the animals grazed more frequently in the morning and its inactivity under shade increased in the afternoon. The THI index has been reported by different authors who have evaluated the effect of temperature - humidity, mentioning a breaking point or indicative of heat stress 80 and 86 units (Singh et al, 2015; Reyes et al, 2018). It should be noted that during the grazing day, the sheep had the presence of scattered trees in the pastures, which contribute to mitigate the effects of heat stress.

Conclusions

The frequency of behaviours appears to not be limited by the THI-related variables rated within normal values. More studies are necessary to determine if the intensity of ultraviolet radiation is a factor that may be influencing the behaviour of sheep in general, and consumption specifically.

References

- Reyes, J., Herrera, M., Marquina, J. R., Enjoy, D. D., Pinto-Santini, L. (2018) Ambiente físico y respuestas fisiológicas de ovinos bajo sombra en horas de máxima radiación. Archivos de Zootecnia. 67(259), 318-323. <https://doi.org/10.21071/az.v67i259.3786>
- Silva, T. P. D., Marques, C. A. T., Torreão, J. N. C., Bezerra, L. R., Araújo, M. J., Gottardi, F. P., Edvan, R. L., Oliveria, R. L. (2015). Ingestive behaviour of grazing ewes given two levels of concentrate. South African Journal of Animal Science. 45(2), 180-187. https://www.researchgate.net/publication/281163779_Ingestive_Behaviour_of_Grazing_Ewes_Given_Two_Levels_of_Concentrate
- Singh, K. M., Singh, S., Ganguly, I., Ganguly, A., Nachiappan, R. K., Chopra, A., Narula, H. K. (2016). Evaluation of Indian sheep breeds of arid zone under heat stress condition. Small Ruminant Research. 141, 113-117. <https://www.infona.pl/resource/bwmeta1.element.elsevier-25c4b59a-99ee-3cf4-aa4f-233dd8bcddca>
- Solórzano, J., Pinto, L., Camacaro, S., Vargas, D., Ríos, L. (2018) Efecto de la presencia de sombra en áreas de pastoreo de ovinos.2. Actividad animal. Pastos y Forrajes, 41(1), 41-49. <https://payfo.ihatuey.cu/index.php?journal=pasto&page=article&op=view&path%5B%5D=2021>
- Zambrano, C., Altuve, Elianny; Zambrano, L., Parraga, C. (2010). Conducta de ovinos a pastoreo en sistema silvopastoril tradicional con predominio de samán (Pithecellobium saman) y guácimo (Guazuma ulmifolia). Revista Unellez de Ciencia y Tecnología. (Volumen especial), 29-34. <https://fcvinta.files.wordpress.com/2015/11/212-825-1-pb1.pdf>

Genetic polymorphism in the TLR4 gene and its association with milk traits in Egyptian sheep

Ahmed M. Sallam

Animal and Poultry Production Division, Desert Research Center, Al-Mataria 11753, Cairo, Egypt.
Email: ahmedsallam2@gmail.com



INTRODUCTION

Milk production is one of the most desirable traits in livestock. The dairy sheep industry plays an important role in the economics of several countries especially in the Mediterranean area. Sheep contributes about 98570 tones of milk, which is about 5% of the total whole milk produced annually in Egypt. Milk production traits are important targets for genetic improvement and early predictions using genetic markers and are therefore important criteria in the livestock breeding.

The Toll-like receptor (TLR) is one of the TLRs families, which are known as pathogen-recognizing molecules. Recently, a number of studies reported the association between TLR4 polymorphisms and lactation persistency in the dairy cattle worldwide. Accordingly, the gene has been identified as a candidate gene for milk traits in cows. So far, there is no information concerning the contribution of this gene in milk traits in sheep.

Single nucleotide polymorphism (SNP) is the most preferable markers in the genetic studies because of lower mutation rate, easy to follow in population studies, more robust and easy interpretation, and suitability for various genotyping techniques. It is very useful in candidate gene association studies to predict the performance of the animal and its offspring in the future, which is important in selection schemes.

AIM OF THE STUDY

Identify genetic variants potentially associated with milk traits in Barki sheep, which may be used to make predictions about the superior ewes kept for dairying, selection programs and genetic improvement strategies in sheep in Egypt and worldwide.

MATERIALS & METHODS

Animal resources

This work was carried out at the facilities of the Animal Molecular Genetic Improvement Laboratory (AGIL), which belongs to the Animal and Poultry Production Division at Desert research Center (DRC). Approximately 300 milk-producing ewes were recorded during the season of 2017 - 2018 for the following milk traits: daily milk yield (DMY), total fat percent (FP), total protein percent (PP), lactose percent (LP) and total solid percent (TSP). The milk composition was analyzed using a MilkoScan (130 A/SN, Foss Electric, Denmark). The test-day protocol was considered to collect milk records. The milk yield was recorded biweekly from the time of parturition till the 12th week using hand-milking technique.

Genotyping and identifying the polymorphisms

Genomic DNA was extracted from the whole blood samples using Intron bio (commercial kits, Germany) following the manufactures protocol. A part of the *Ovis Aries TLR 4* gene (GeneBank: [DQ922636.1](https://www.ncbi.nlm.nih.gov/nuccore/DQ922636.1)) was amplified in the PCR using the following specific forward and reverse primers: F: 5'-¹³⁰⁹TGAGGTGCTGAATATGAGTCA¹³⁰⁹-3' and R: 5'-¹⁷⁴²CTCTCACCCCTGCCATACTT¹⁷⁶¹-3'. The PCR products (453 bp) were performed using thermal cycler apparatuses in tubes containing a 12.5 μ l of PCR mixture containing 0.8U Taq DNA polymerase (Qiagen/Germany). The PCR conditions were used as follow; initial step of one cycle of 5 min. at 95°C, followed by 35 cycles of 1 min. at 95°C, 1 min. at 58°C, 1 min. 30 sec. at 72°C with final extension of 10 min. at 72°C.

PCR-Single strand conformation polymorphism (SSCP) technique was used to genotype the ovine TLR4 in Barki ewes. Briefly, A 15- μ l aliquot of each amplicon was denatured at 95°C for 5 min, the samples were place in wet ice and immediately loaded onto 12% acrylamide: bisacrylamide (37.5:1; Bio-Rad) gels. Electrophoresis for 18 h in 0.5X TBE buffer at 200 V was undertaken in Bio-Rad Protean II xi cells with water circulation at 25°C. The gels were silver-stained subsequently.

DNA Sequencing

To identify the polymorphic SNPs, PCR amplicons representing different SSCP banding patterns were delivered to MacroGen sequencing company for DNA sequencing purposes.

Association analysis

The association analyses between the ovine TLR4 genotypes and milk production traits was performed using the general linear model (GLM) process in SAS using the following liner model:

$$Y_{ijklm} = \mu + G_i + Y_{sj} + H_k + e_{ijklm}$$

Where, Y_{ijklm} =the trait of interest; μ =the overall mean; G_i =the effect of genotype; Y_{sj} =the effect of parity of the ewe (4 levels); H_k =the effect of age of the ewe (4 level: 1st level= animals at 2 and 3 years old, 2nd level= animals at 4 and 5 years old, 3rd level= animals at 6 and 7 years old, 4th level= animals above 8 years old; and e_{ijklm} =random error. The age of dam and parity were included in the model, while the type of birth (singles or twinning) was not considered, as all births were singles.

RESULTS

Table 1. Effect of the ovine TLR4 genotypes on milk traits in Barki ewes

Trait	Genotype			P-value
	TT	GT	GG	
Daily Milk Yield (g/day)	141.96 ± 44.47	233.76 ± 28.10	246.42 ± 31.07	0.07
Fat Percentage (FP)	6.88 ± 0.63	5.07 ± 0.34	5.35 ± 0.39	0.024*
Protein percentage (PP)	7.80 ± 0.63	6.45 ± 0.34	5.90 ± 0.39	0.020*
Lactose percentage (LP)	7.43 ± 0.75	7.09 ± 0.41	7.16 ± 0.42	0.89
Total solid percentage (TSP)	17.25 ± 2.25	13.92 ± 1.24	13.69 ± 1.41	0.28

Effect of the age of ewe and parity on the milk traits

- The age of ewe and parity significantly influenced the DMY, FP and TSP. Ewes at 3 and 4 years old tended to produce the highest DMY (286.87±31.37g/day) compared to 174.01±82.68 g/day produced from ewes above 8 years old.
- Similarly, the TSP tended to decrease in milk as the ewe is getting older, as it was 17.81±1.46%, 17.43±1.95% and 10.66±3.53%, for the corresponding levels of age, respectively.
- Conversely, the FP in milk was the lowest at ages 3 and 4 years old (4.53±0.55%) while it was the highest at the above 8 years old ewes (6.92±0.99%).
- Likewise, the effect of parity of ewe on milk traits was highly significant (p<0.01). Ewes at third parity tended to produce the highest DMY (340.62±32.46g/day) followed by ewes at the second parity (256.33±34.31g/day), while the ewes at the fifth parity produced the lowest DMY (127.36±94.21g/day).
- Similarly, ewes in the first parity produced the highest TSP in milk (21.78±2.11%) compared to those who are in the fifth parity, which produced the lowest TSP (3.60±4.05%).
- Conversely, ewes in the second parity produced the highest FP in milk (6.63±0.45%) and ewes at the third parity were the lowest FP producers (5.04±0.43%).

The TLR4 variation in Barki ewes

- The PCR-SSCP patterns identified two distinctive conformation patterns (named G and T) in the TLR4 in the investigated ewes (Fig. 1).
- The allelic frequencies were 63.5% and 36.5% for G and T alleles, respectively. Likewise, the genotypic frequencies were 44.6%, 35.7% and 19.7% for GG, GT and TT genotypes, respectively.
- DNA sequencing results of the representative patterns identified a missense mutation located in the coding sequence of exon 3 of the gene (c.1710C>A). Interestingly, the identified SNP was predicted to change in the amino acid sequence (Fig. 2) of the resulted protein (p.Asn570Lys).

Effect of variations in TLR4 gene on milk traits

- Results of the association analyses suggested that ewes with the GG genotype significantly produced more milk (DMY=246.42±31.07; p-value=0.07) with lower FP (5.35±0.39; p-value=0.024) and PP (5.90±0.39; p-value=0.020). In contrary, ewes with the TT genotype significantly produced higher FP (6.88±0.63), PP (7.80±0.63) and lower milk production (MY=141.96±44.47). Nonetheless, TLR4 genotypes did not significantly affect the LP and TSP in Barki ewes' milk.



Figure 1. PCR-SSCP patterns of the ovine TLR4 gene in Barki sheep representing G and T alleles and different genotypes.

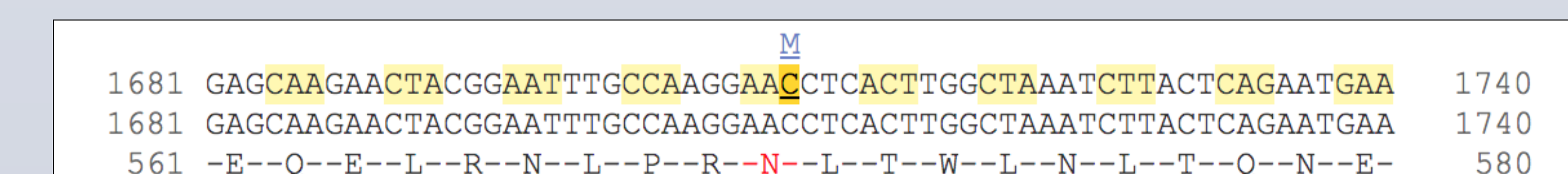


Figure 2. The predicted consequences of the identified variant of the ovine TLR4 gene on the resulted protein (ENSOARP0000006210.1: p.Asn570Lys) in Barki sheep from Ensembl.

CONCLUSION

- This report confirms the relationship between the TLR4 gene and milk traits in livestock as suggested by several reports, and in sheep for the first time.
- The additive/dominance models were reported significantly here, which enables understanding of the inheritance modes of the TLR4 markers in milk traits in sheep as general and Barki in particular.
- Important genetic markers in the TLR4 gene was identified, which may be used to identify the superior animals for successful genetic improvement strategies.

COMPARISON OF CONCENTRATE AND FLOUR MIXTURE DIGESTIBILITY RESULTS IN PUREBRED LATVIAN DARK-HEAD LAMBS



L. Šenfelde, D. Kairiša, D. Bārzdiņa

shenfelde@gmail.com, daina.kairisa@llu.lv, dace.barzdina@llu.lv

Latvia University of Life Sciences and Technologies

Faculty of Agriculture, Institute of Agrobiotechnology, Liela Street 2, Jelgava, LV-3001, Latvia

The local Latvian sheep breed - Latvian Dark-head - historically has been created for both wool and meat production. As a result of economic conditions, the Latvian dark-head sheep breed has been developing in the direction of meat production for several decades, which makes it necessary to study the digestibility of fodder in depth during the fattening of lambs.

In husbandry, 50-70% of the total costs are directed for animal feeding (Verbeke, et. Al., 2015), therefore maximal fodder digestion is an essential precondition for economically justified breeding of farm animals. Research was aimed to compare the efficiency of concentrate and flour mixture digestibility in lambs during fattening.

MATERIALS AND METHODS

The study was carried out on ram testing station of the association "Latvian Sheep Breeders Association". Eight purebred Latvian Dark-Head lambs (rams) were used in each group. Feed were provided *ad libitum* for two groups: CON (concentrate and grass hay) and BNF (flour mixture and grass hay). The mean live weight of the lambs at the start of research was 24.6 kg (CON) and 25.6 kg (BNF), with a mean age of 83 ± 1.4 days (CON; $p < 0.05$) and 75 ± 1.6 days (BNF). Concentrate and flour mixture were offered in loose trough. Lamb fattening were carried out 63 days, divided in three periods each by 21 day (figure 1).

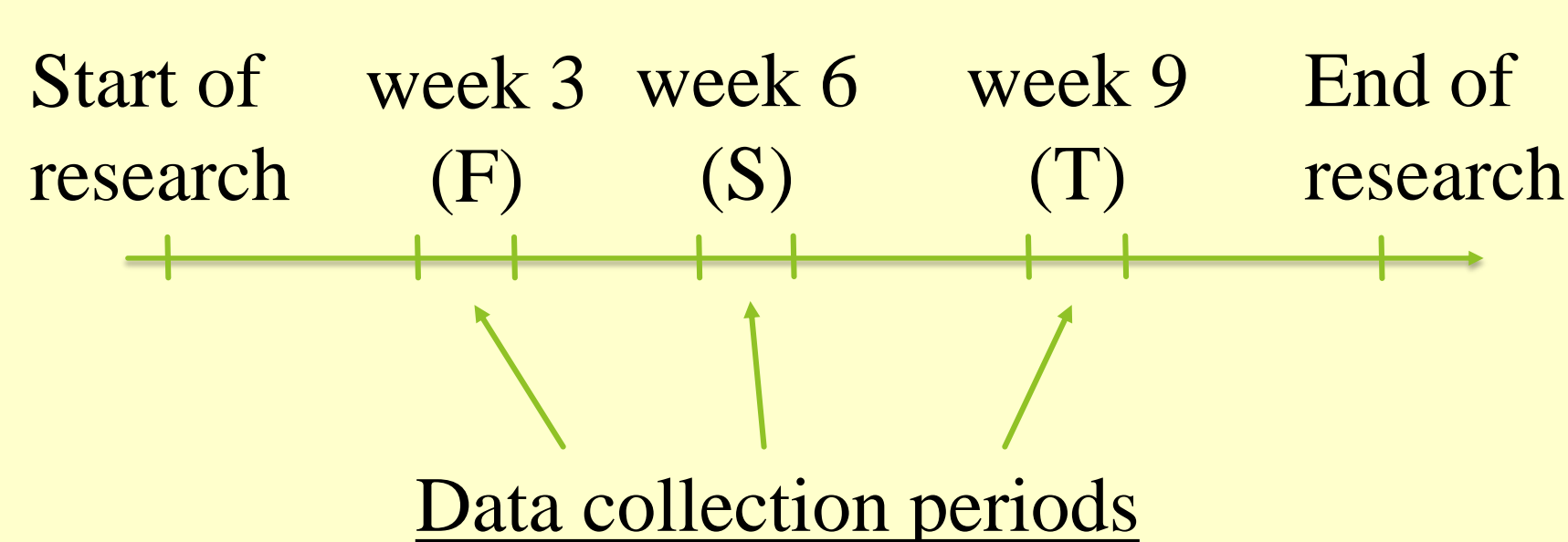


Figure 1. Research periods

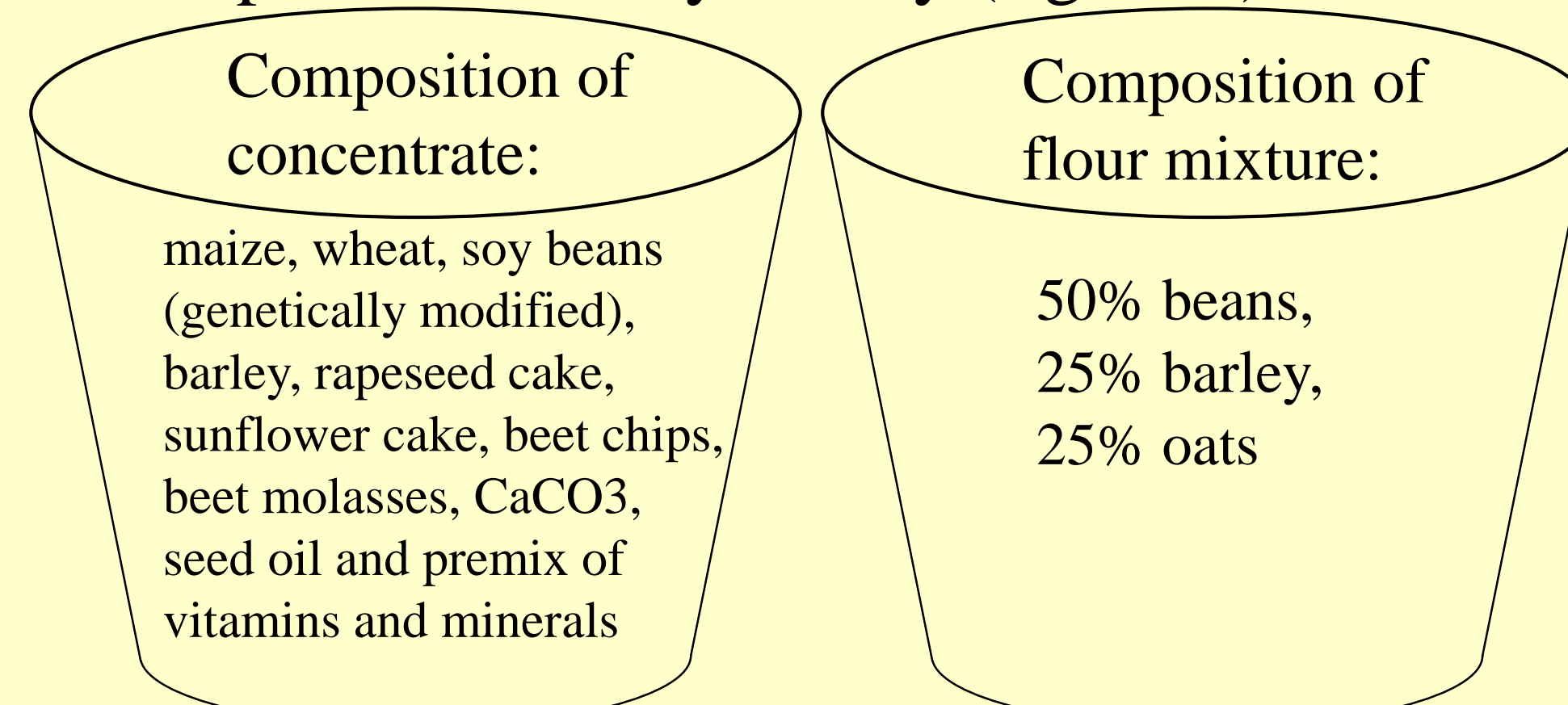


Figure 2. Feed content



Figure 3. Faecal samples (photo by L.Šenfelde)

Table 1. Forage chemical content

Chemical component, unit	Concentrate	Flour mixture	Grass hay
Dry matter, %	87.97±0.05	88.84±0.09	87.60±1.02
% of dry matter			
Crude protein, %	21.23±0.07*	20.37±0.36*	9.60±0.40
Bound protein, %	0.47±0.05*	0.38±0.03*	0.60±0.07
Soluble protein, %	4.30±0.10*	10.31±0.38*	4.60±0.26
Protected protein of crude protein, %	72.58±0.37*	43.66±1.21*	30.30±2.67
Crude fibre, %	5.22±0.23*	8.52±0.16*	32.20±1.15
Ash, %	7.12±0.02*	5.10±1.24*	5.50±0.21
Ca, %	1.23±0.02*	0.72±0.39*	0.50±0.04
P, %	0.58±0.01*	0.49±0.01*	0.20±0.01

* $p < 0.05$

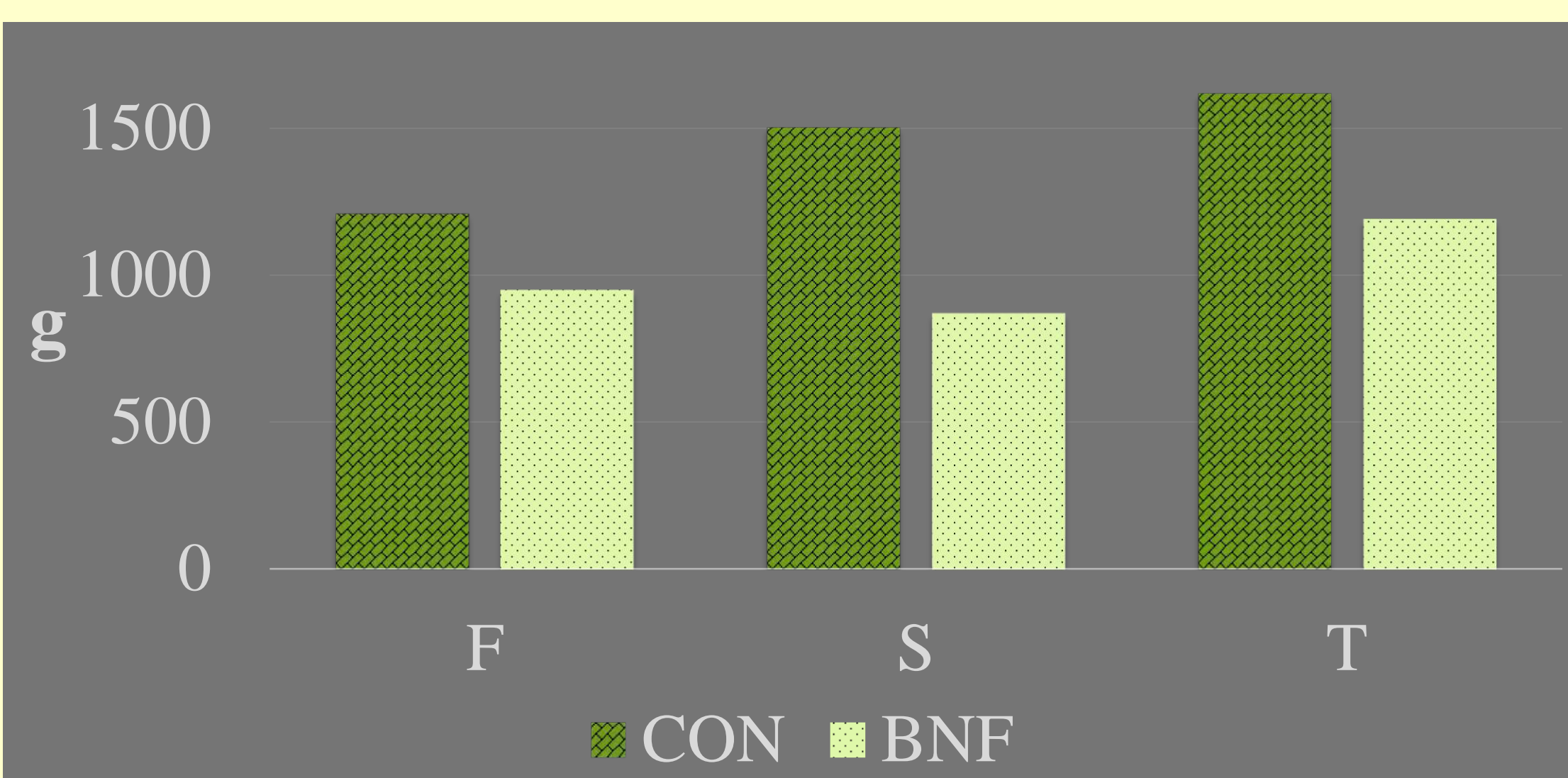


Figure 4. Daily mean dry matter intake per lamb, g

The dry matter intake of both concentrates and flour mixtures increased with each period of the research. Throughout the research, each lamb daily ingested an average of 1210 - 1618 g of concentrate (CON) and 950 - 1190 g of flour mixture (BNF; figure 4).

Table 2. Daily faecal and urine production per lamb

Data collection period	Faecal production, kg		Urine production, kg	
	CON	BNF	CON	BNF
F	0.70±0.08	0.85±0.05	0.61±0.14	0.42±0.06
S	0.94±0.06	0.86±0.02	0.86±0.12	1.06±0.20
T	0.91±0.07	0.96±0.07	0.75±0.08*	1.04±0.07*

* $p < 0.05$

Average daily faecal production per lamb were similar in both groups according to each research period. Average daily urine production per lamb were higher in BNF lambs (table 2). This indicates that fattening lambs with a flour mixture increases water consumption.

REFERENCES

- Wim Verbeke, Thomas Spranghers, Patrick De Clercq, Stefaan De Smet, Benedikt Sas Mia Eeckhout. 2015. Insects in animal feed: Acceptance and its determinants among farmers, agriculture sector stakeholders and citizens, *Animal Feed Science and Technology*, 204,72-87. doi: 10.1016/j.anifeedsci.2015.04.001
- Zhao, Y.G., Aubry, A., O'Connell, N.E., Annett, R. & Yan, T. 2015. Effects of breed, sex, and concentrate supplementation on digestibility, enteric methane emissions, and nitrogen utilization efficiency in growing lambs offered fresh grass. *Journal of Animal Science*, 93, 5764-5773. doi:10.2527/jas2015-9515
- Vranic, M., Grbeša, D., Bošnjak, K., Mašek, T. & Jareš, D. 2017. Intake and digestibility of sheep-fed alfalfa haylage supplemented with corn. *Canadian Journal of Animal Science*, 98, 135-143. doi: dx.doi.org/10.1139/cjas-2015-0168

RESULTS

The composition of all the nutrients were significantly different in both concentrate and flour mixture used in the research (table 1). The part of soluble protein was higher in flour mixture, but part of protected protein of crude protein was higher in concentrate.

Low crude protein content were found in grass hay. Content of crude fibre was elevated, indicating that the hay was prepared in the late phase of grass vegetation.

The results of nutrient digestibility (figure 5) shows that for the BNF group lambs all the nutrients were digested worse, except for crude fiber. It depends on both the different consistency of nutrients (concentrate had a granular consistency, flour mixture - floury) and the composition of the feed. Digestibility of dry matter was 69% (BNF) and 79% (CON). The results obtained correspond to the results reported in other studies about lamb fattening of other meat breeds or their crossbreeds (Vranic et al., 2017; Zhao et al., 2015).

CONCLUSIONS

1. Dry matter intake was higher in lambs of CON group at all periods of the research and all nutrients, except crude fiber, were better digested than in BNF lambs.
2. Average daily urine production per lamb in second and third fattening period for BNF group lambs exceeded 1 kg, that indicates the need to provide lambs with additional bedding.

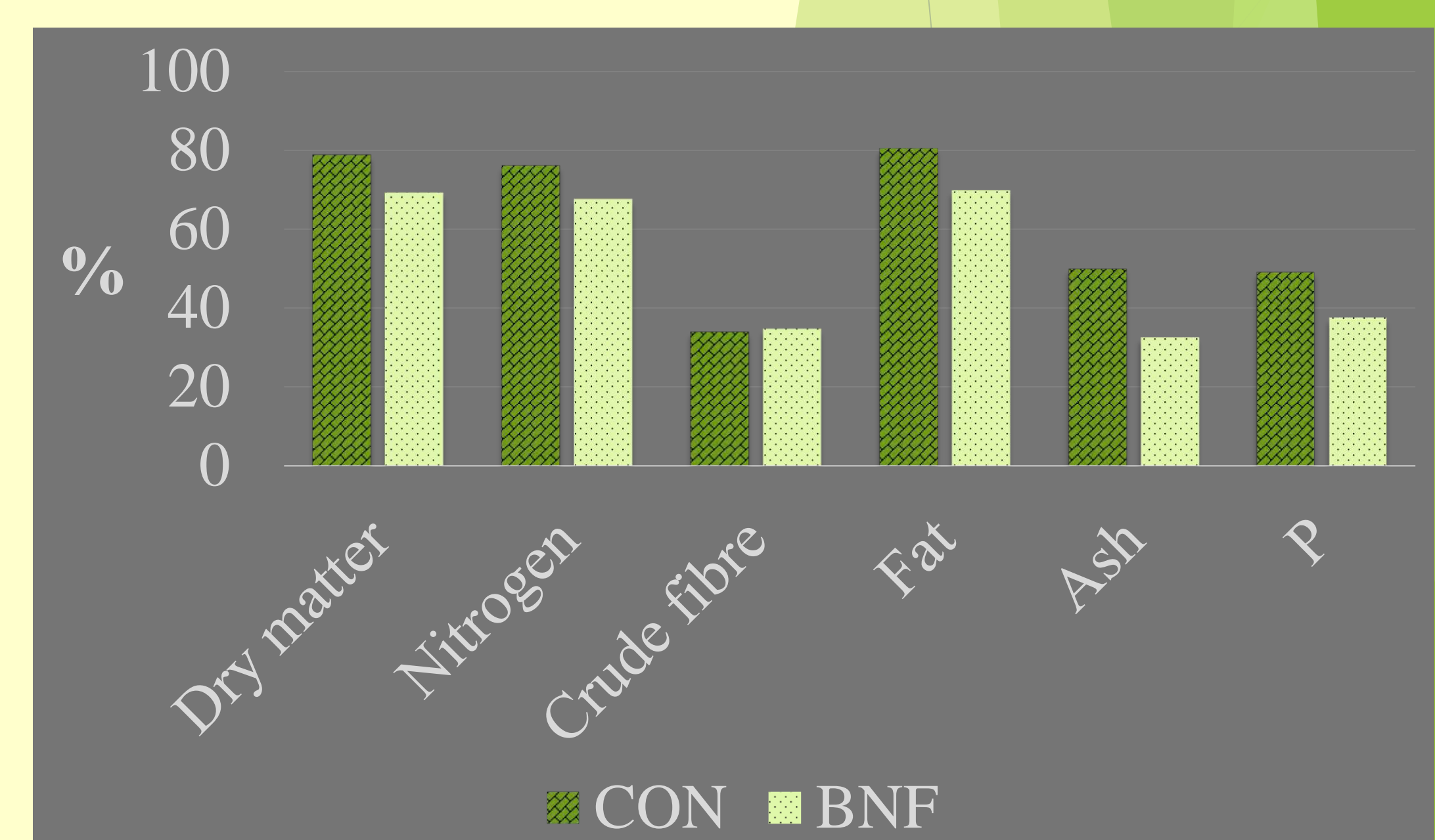


Figure 5. Nutrient digestibility

ACKNOWLEDGEMENTS. Latvia Republic Ministry of Agriculture founded study 'Studies of forage and nutrient digestibility in lambs under different feeding systems'.



Opportunities to mitigate GHG emissions from sheep and goat farming in Indonesia

Mohammad Ikhsan Shiddieqy¹, Bess Tiesnamurti¹ and Yeni Widiawati²

International Congress on Sheep and Goats 15-16 October 2020, Bonn, Germany



Introduction

- Sheep and goat farming play an important role in the livelihoods of the farmers in Indonesia.
- Small ruminants farming in Indonesia is identified with limited ownership by farmers (2-7 heads/household).
- Farming management systems are dynamic in response to the availability of resources.



- Increase in small ruminants population is related to the contribution of sheep and goat to GHG emission.
- Since goats are considered more climate resilient than other ruminant species (Pragna et al., 2018), their contribution to GHG emissions is more important to highlight.

Research Objective

This paper aims to provide an integrated overview on the opportunities to mitigate GHG emissions from sheep and goat farming in Indonesia.

Method

The method of this research was descriptive. We evaluate three GHG mitigation strategies from sheep and goat farming in farm level. Firstly, pasture management in semi extensive keeping. Secondly, crop-livestock integration using palm oil by-product. Lastly, nutritional intervention

Result and Discussion

- Pasture management in semi extensive keeping

Pasture-based small ruminants are common in West Nusa Tenggara Province and East Nusa Tenggara Province, Indonesia. Those province are home to many natural pastures, which is commonly used for cattle grazing, as well as small ruminants. The pasture owned and managed by groups of farmers and passed down from generation to generation. The *lar* (local language for pasture) is not only a grassland, but also a tradition. Pasture consists of grasses and legumes, such as *Lamtoro tarramba* and *Brachiaria decumbens*.

- Crop-livestock integration using palm oil by-product

The fibrous palm oil by-products include oil palm fronds (OPF) and oil palm trunk (OPT) generated from the palm crop trees and oil palm empty fruit bunch (OPEFB) and palm pressed fiber (PPF) generated from processing of fresh fruits to yield crude oil. These fibrous by-products cannot meet the metabolisable energy required for high growth rate and for lactation of sheep and goats due to low DM digestibility, low crude protein content, low fermentable carbohydrate and low level of intake (Ginting et al., 2018).

- Nutritional intervention

Indonesia has potential forages to reduce methane emission in sheep and goat. There are some traditional plants used as ruminants feed, either through the 'cut and-carry' method or through integrated farming. Complete rumen modifier (CRM) is an improved feed additive comprised a mixture of *Sapindus rarak*, *sesbania*, *albizzia* leaves and minerals that functions as a methane inhibitor.

Conclusion

Our review suggests that the most effective mitigation strategies in Indonesia is through nutritional intervention, such as utilization of tropical legumes and palm kernel cake as small ruminants feed which reduce enteric CH₄ production

¹ Indonesian Center for Animal Research and Development (ICARD), Bogor, Indonesia ² Indonesian Research Institute for Animal Production, (IRIAP), Ciawi, Indonesia

Influence of Lipoprotein lipase (LPL) gene polymorphism on production traits in dairy goats

Evaldas Šlyžius¹, Birutė Šlyžienė¹ and Renata Bižienė²

¹Lithuanian University of Health Sciences, Department of Animal Breeding, Kaunas, Lithuania

²Lithuanian University of Health Sciences, Institute of Biology Systems and Genetics, Kaunas, Lithuania

Contact: Evaldas Šlyžius, email: Evaldas.slyzius@ismuni.lt



The objective of this study was to investigate the influence of *LPL* gene polymorphism on production traits in dairy goats.

Materials and Methods

The polymorphism of the goat was analysed in 272 unrelated individuals belonging to three pure goat breeds (Saanen, n=104; Anglo Nubian (Fig 2), n=88 and Alpine, n=80 (Fig 1)) in Lithuania. All investigated goats were raised in the same feeding and housing conditions. Milk yields were recorded by monthly control milking during the period of 2018-2019. The milk samples were analysed for milk fat, milk protein, lactose and urea concentrations. The analysis was carried out using spectrophotometers LactoScope 550 and LactoScope FTIR (Delta Instruments, the Netherlands). The somatic cell count (SCC) in milk was determined by flow cytometry method using the Somascope CA-3A4 (Delta Instruments, the Netherlands). The method of polymerase chain reaction and restriction length polymorphism were used to genotype the *LPL* gene G50C polymorphism. The statistical characteristics were calculated using IBM SPSS Statistics, version 20. The SCC ($\times 1000$ cells/mL) values were transformed into base 10 logarithm to normalize their distribution. Data analysis was performed by using the Student's t test. The results were considered statistically significant when $P \leq 0.05$.

Results

In the examined herd, the genotype CC of *LPL* gene was present in 24.3% of goats, 19.9% of goats had heterozygotic CG genotype and 55.8% of goats had GG genotype. Allele G was observed almost 3 times more often than allele C, with estimated frequency amounting to 0.658 and 0.342, respectively. The results showed that goat *LPL* gene with CC genotype has a higher milk yield (0.14 kg higher compared to GG and 0.72 kg higher compared to CG genotype, $P < 0.01$). The goats with GG (table 1) genotype have a higher fat content (0.09% higher compared to CC, 0.23% higher compared to CG genotype, $P < 0.05$), while the protein content was higher in goats with CG genotype (0.06% higher compared to CC, 0.03% higher compared to GG genotype, $P < 0.05$). We also estimated, that goats with CC genotype had higher lactose (4.29 %) and lower SCC log₁₀ (4.51) value ($P < 0.01$). The analysis of the goat milk production parameters showed the significant mean differences between the breeds ($P < 0.01$). The highest milk yield was estimated in Alpine goats, while the lowest SCC and the highest milk fat and protein content in Anglo Nubian goats ($P < 0.01$).

Conclusions

The results of our research show that examined *LPL* gene polymorphisms seem to be the valuable biomarkers of the goat selection process.



Figure 1. Anglo Nubian goat breed. Photo by Gitana Mikalauskienė (owner).



Figure 2. Anglo Nubian goat breed. Photo by Regina Vaitkevičienė (owner).

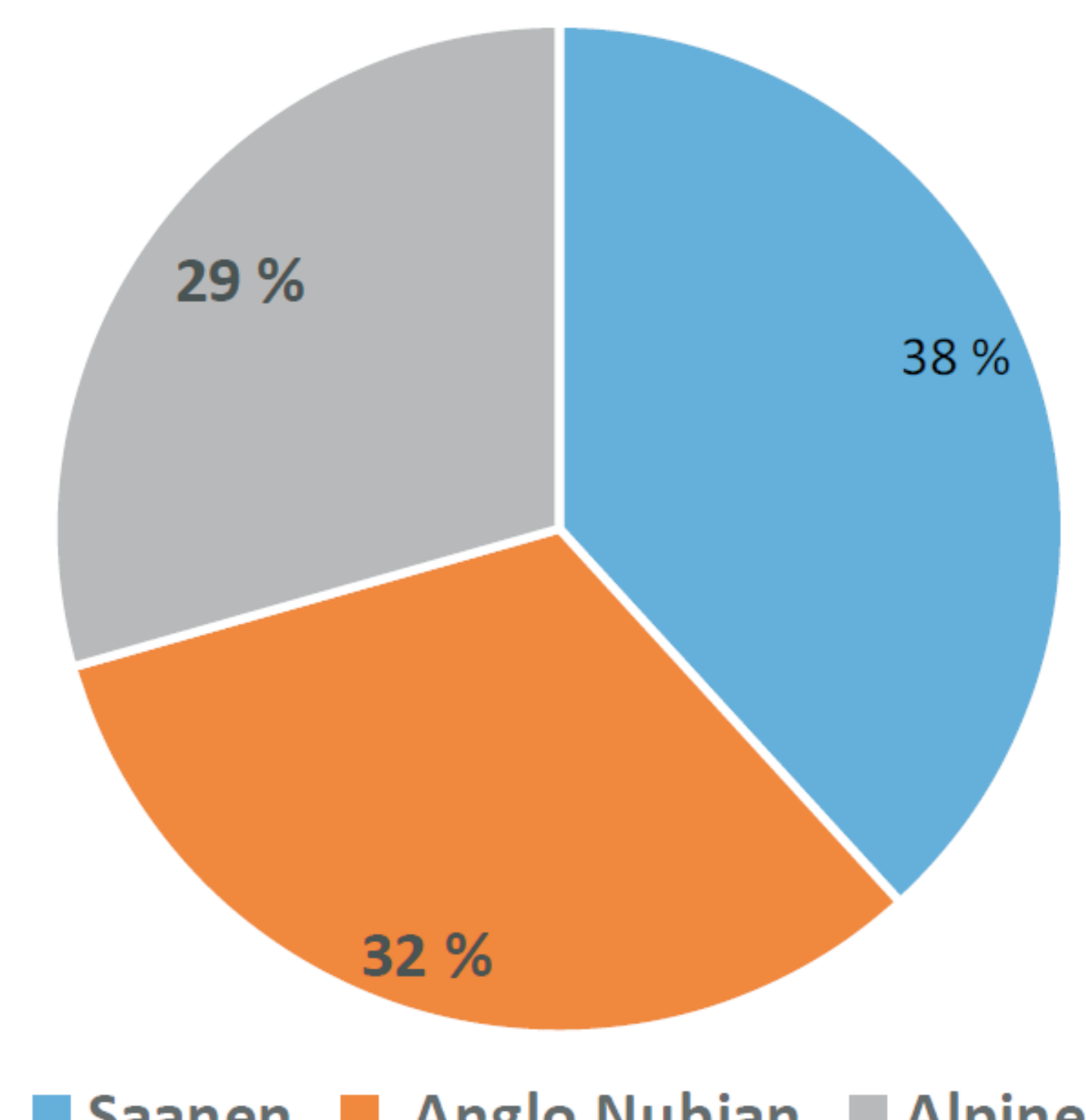


Figure 3. The distribution of goats by breed.

Table 1. Investigated traits between genotypes of examined gene

Genotype	Milk yield, kg	Fat, %	Protein, %	Lactose, %	Urea, mg/dl	SCC_log0
CC	3.14±0.15	4.00±0.17	3.08±0.09	4.25±0.10	37.86± 2.86	4.51±0.11
CG	2.42±0.14	3.86±0.12	3.15±0.06	4.30±0.03	30.10±2.62	4.78±0.11
GG	3.00±0.14	4.09±0.13	3.12±0.02	4.05±0.06	52.50± 3.29	4.90±0.14
P value	P<0.01	P<0.05	P<0.05	P<0.05	P>0.05	P<0.01

Handling Sheep without docking of the tail - Demonstration Project Animal Welfare

Duration: November 2017 – May 2020

The German Federal Ministry of Food and Agriculture support the “Demonstration Project Animal Welfare” through the Federal Office of Agriculture and Food to give farmers the opportunity to change husbandry conditions in order to improve welfare to the sheep. In total 6 farmers were chosen to keep sheep with long tails.



Demonstration objects

- ❖ 6 farmers
- ❖ different grazing systems
- ❖ different experiences in sheep husbandry with uncutted tails
- ❖ dairy and meat sheep breeds
- ❖ different breeds of Merino Landschafen, Scottish Blackface and others
- ❖ flocks of 250 – 2000 ewes

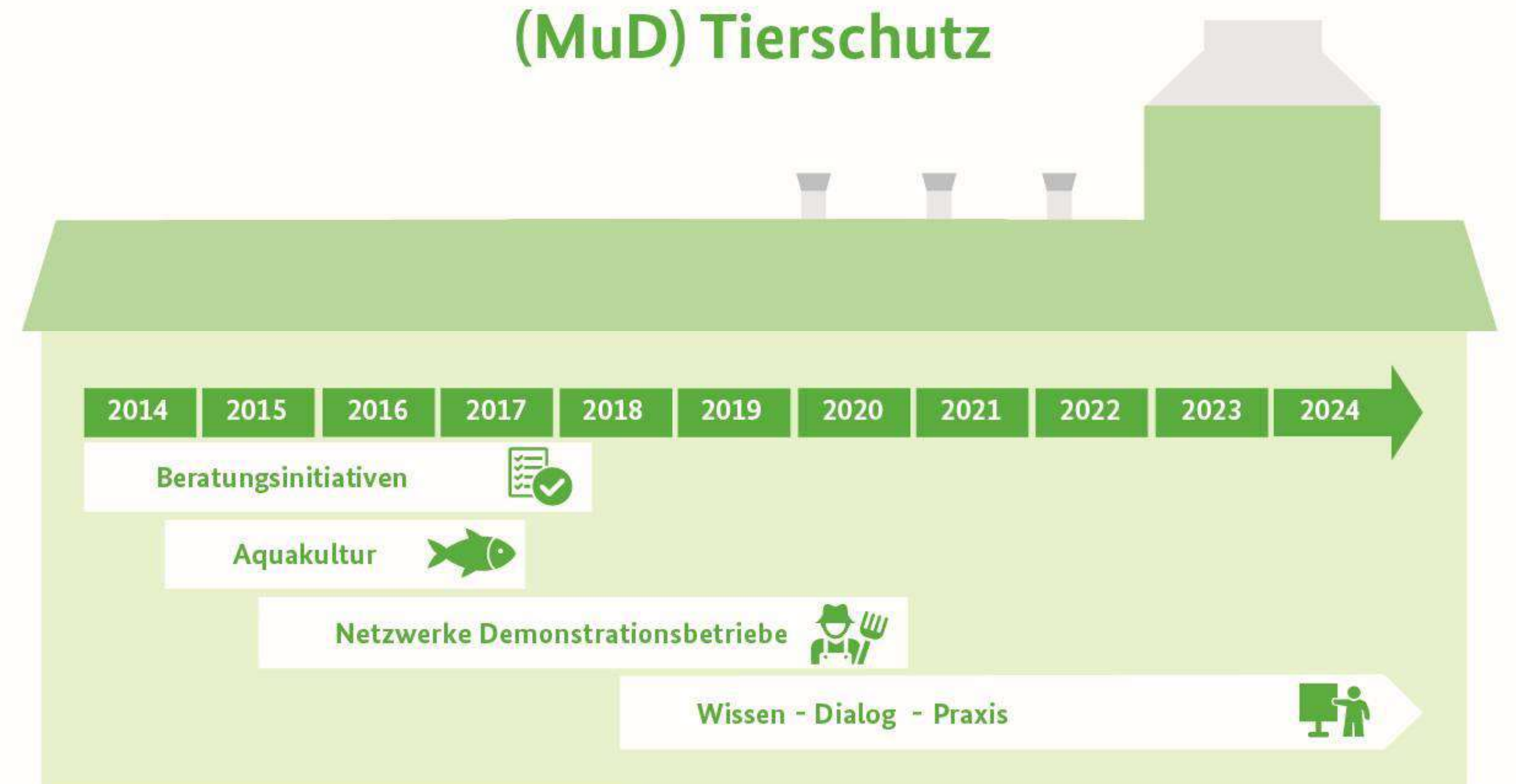
Measures for keeping sheeps with undocked tails

- ❖ optimization of parasite management
- ❖ optimization of stable and pasture hygiene
- ❖ avoidance of feed changes
- ❖ additional roughage feeding
- ❖ use of herd management programs
- ❖ selection for short tails
- ❖ additional shearing around the backside
- ❖ battery machines for shearing
- ❖ continuous shearing system
- ❖ sheep handling systems
- ❖ Weighing machine for classification

Motivation to participate the project

- ❖ interchange between farmers and scientists
- ❖ increase of animal welfare
- ❖ taking a pioneering role
- ❖ share expertise with others
 - knowledge transfer

Modell- und Demonstrationsvorhaben (MuD) Tierschutz



Initiiert und gefördert durch das Bundesministerium für Ernährung und Landwirtschaft (BMEL)
Umsetzung durch den Projektträger Bundesanstalt für Landwirtschaft und Ernährung (BLE)



Gefördert durch:



Modell- und Demonstrationsvorhaben (MuD) Tierschutz -
www.mud-tierschutz.de



ECHOTEXTURE CHARACTERIZATION OF ACCESSORY GLANDS IN BUCK

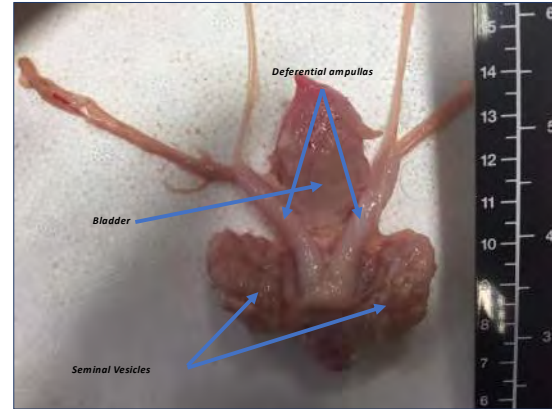
Calogero Stelletta^{1,2}, Koray Tekin²

¹ Department of animal medicine, production and health, University of Padova, Italy

² Department of animal reproduction and artificial insemination, Faculty of veterinary medicine, Ankara university, Turkey

Contact: [Prof. Calogero Stelletta, Department of animal medicine, production and health, University of Padova, Viale dell'Università 16, 35020, Legnano (PD), Italy. Email: calogero.stelletta@unipd.it]

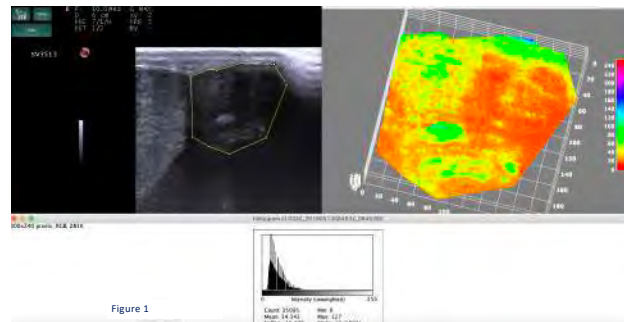
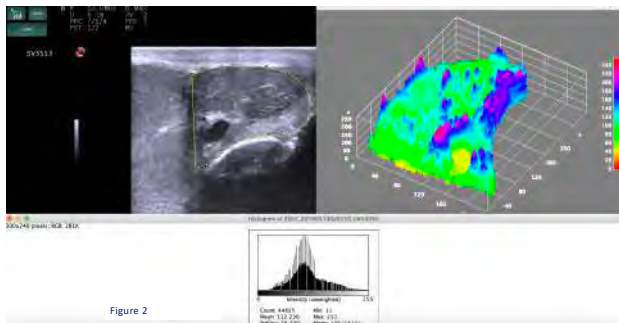
Accessory glands (AGs) are the producers of seminal plasma which have strong influence on the quality of the ejaculates and the suspension of spermatozoa in it. AGs can be classified in epididymis, deferential ampullas, seminal vesicles, prostate and bulbo-urethral glands. Each AG is able to give specific compounds that are extremely important for the functionality of sperm within the female reproductive tract, other than the regulation of the resistance to chilling or freezing procedures.



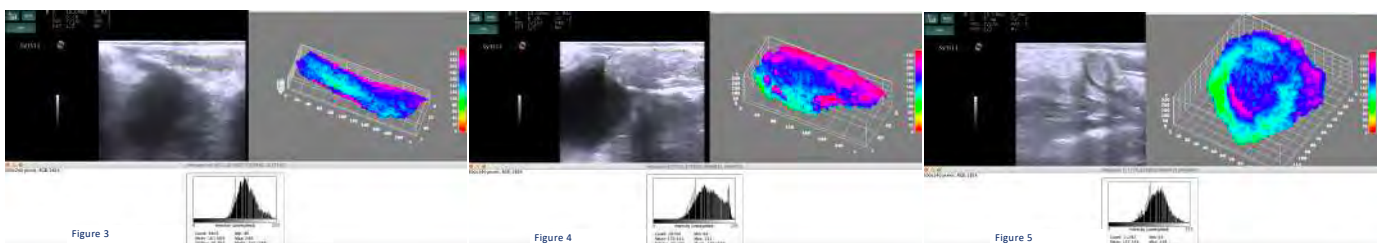
AGs high resolute ultrasonography (US -10 MHz) can be considered as a monitoring tool to optimize the accuracy and precision of small ruminant male evaluation, thanks to the possibility of pixel grey intensity (PGI) calculation of regions of interest (ROIs) of US images.

The aim of this work was to evaluate the variability of difference among the PGI accessory glands US images in buck. Twenty adult and fertile bucks were used to measure the PGI of accessory glands by using an image analysis software (Image J).

Epididymal tails presented the lower PGI (62.13 ± 20.67) with highest variability (figure 1 and 2) due to the presence of anechoic areas within the ROI.



Deferential ampullas (figure 3), seminal vesicles (figure 4) and bulbo-urethral glands (figure 5) showed different echotextures with 141.2 ± 14.4 , 141.11 ± 19.26 and 171.7 ± 12.68 PGI respectively.



Echotexture index of accessory glands can give useful indications of edematous parenchyma and/or sclerotic glandular conditions and it could be used as tool for male health and reproductive management.

Problems with the back teeth !

Relevant for breeding sheep and goats in Germany ?



Philip C. Tegtmeyer

Tierarztpraxis Tegtmeyer, Veterinary specialist for small ruminants, Langenhagen, Germany



Fig.1: The thin ewe syndrome – are molar teeth problems in your mind ?

Teeth problems, particularly the defective position of molar teeth may have a considerable importance for malnutrition of sheep and goats in Germany. It is recognized in elder animals mainly.

It is generally known that the set of teeth of small ruminants wears down over the years. This might be influenced by the type of feed. Due to a following defective position of back teeth and loss of teeth sheep and goats often cannot eat adequately and fast enough. Malnutrition and death are the consequences.



Fig. 2: A geriatric set of teeth

To begin with incisors

Loss of incisor teeth is a common finding in German sheep flocks (Fig. 4). In most cases the animals do not suffer from the loss of incisors but they are often culled. In the author's experience we have to look closer at the back teeth instead of the common practise of controlling incisors (Fig. 3). In cases with skinny animals we have to establish molar teeth control in veterinary consultancy and breeding check ups.



Fig. 3: Check of the Incisors: Important for the detection of brachygnathia.



Fig. 4: Loss of the incisors is obvious but overestimated concerning productivity and animal welfare in Germany.

We have to set the Focus on the molar teeth

In clinical examinations of the oral cavity of skinny sheep and goats in our veterinary practice molar teeth disorders are frequently diagnosed.



Fig. 5: Examination of the oral cavity.

What kind of teeth problems can be detected?

Comparable with horses, small ruminants develop sharp edges on the molar teeth caused by the chewing process. These edges often overtop the other teeth and cause mechanical irritations when animals are chewing. Often, the corresponding teeth of the other side are damaged by these edges.



Fig.6: Incongruence of third molars



Fig.7: Malocclusion caused by the first molar

The prevalence of back teeth disorders is not known

In order to get some numbers 18 skulls of preselected old ewes were examined for teeth disorders in 2017 in a local slaughterhouse.

Eight ewes had back teeth problems which caused functional damage.

Postmortem examinations are needful to see the often massive failures of the denture from the buccal side (Erjavec et al. 2010).

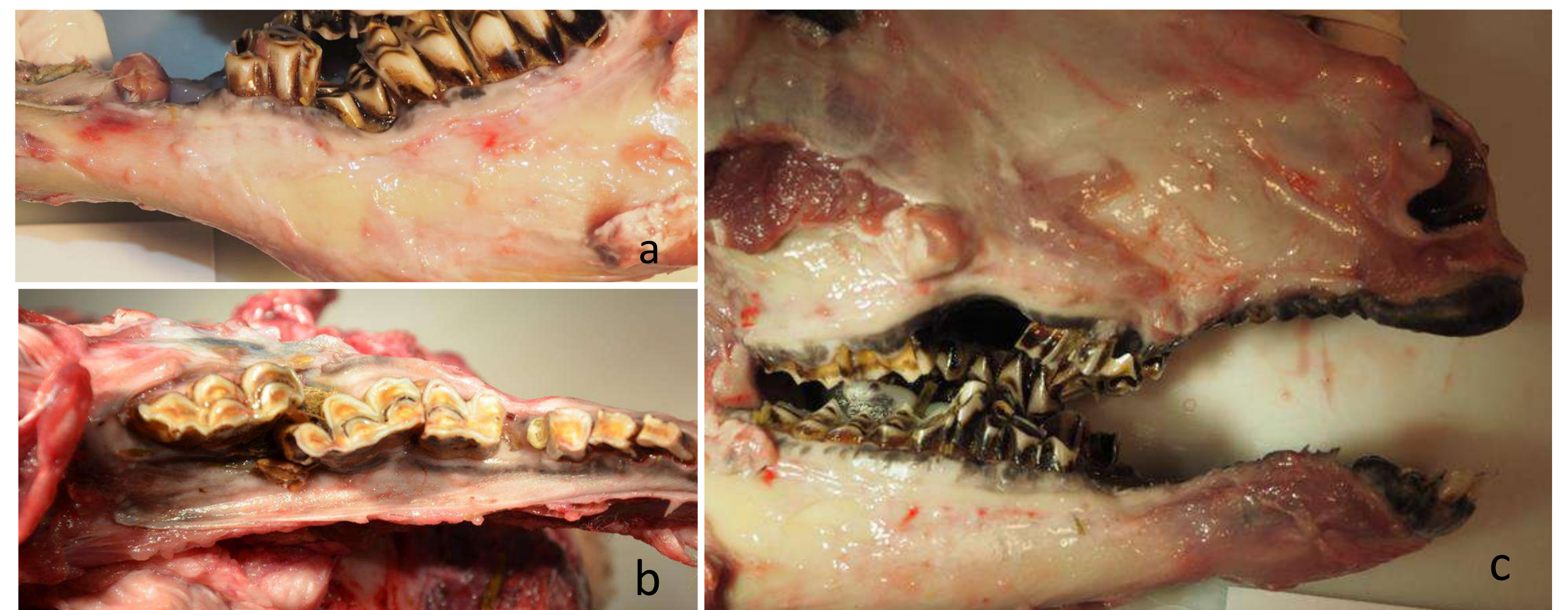


Fig. 8: Defective positions of molar teeth and malformation of jaws from related animals

Back teeth disorders can also be detected in younger sheep. Problems can become present for example under second dentition of gimmers.

Extensive research on teeth disorders in different disciplines was carried out in the past. without evident results. (West et al. 2009).

The aspect of heredity

Case histories of related animals with similar findings of defective positions of molar teeth (Fig. 8) may advance the hypothesis that these problems are hereditary.

First of all a prevalence study is needed for a real confirmation of the hypothesis.

Furthermore research on the aspect of the heritability has to be conducted.

molar teeth problems are probably underestimated as...

... an animal welfare problem

... a hereditary problem

... in sheep and goats

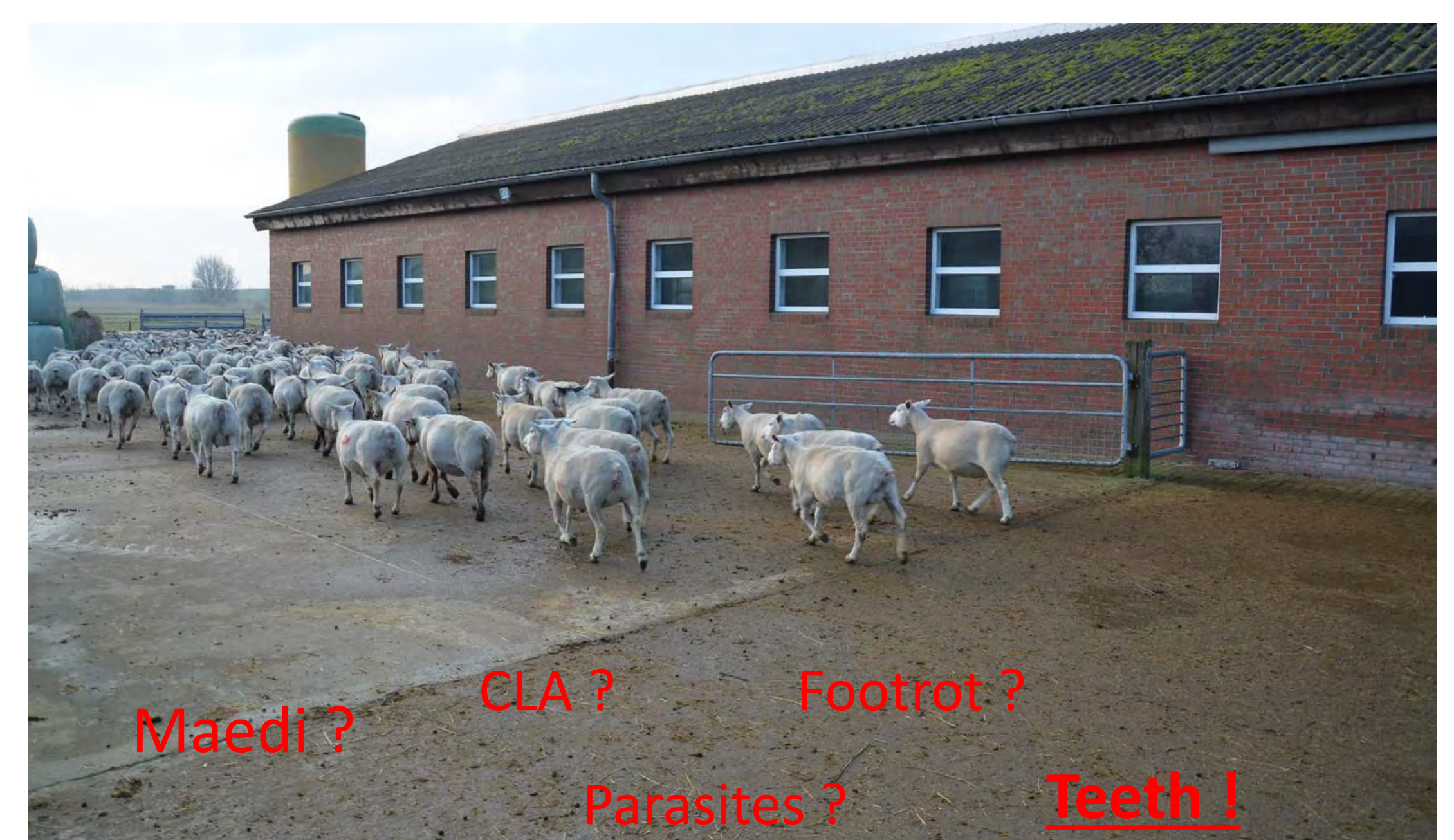


Fig. 9: The last 10 sheep of the flock are coming home. Check dental problems !

Literature:
West, DM, Bruere, AN, Ridler, AL (2009): The sheep, Health, disease and Production, VetLearn, Wellington NZ4
Erjavec, V., Crossley, D. (2010). Initial observations of cheek tooth abnormalities in sheep in Slovenia. Veterinary Record 167, 134-137
Laws, AJ., Baker, RL., Aitken, WM. (1993): The heritability of gingival crevice depths in sheep. Res Vet Sci. May;54(3):379-83.
Kaulfuß, K.H., Hoffmann, B., (2004): Erkrankungen der Kiefer und Zähne beim Schaf. Literaturübersicht und Ergebnisse eines Zuchtversuchs zur Brachygnathia inferior beim Ostfriesischen Milchschaaf. Tierärztl. Umschau 59, 380-387.

Stanislaus v. Korn, Hochschule für Wirtschaft und Umwelt Nürtingen-Geislingen (HfWU)
Stefan Völl, Vereinigung Deutscher Landesschafzuchtverbände (VDL)

1. Introduction

The evaluation of the profitability of farm sectors is of fundamental importance for managers, consultants, animal breeding associations, political decisions

2. Aim of the project

Combination, adjustment and testing of the different data to a nationwide representative statement regarding the profitability of German lamb meat production.

3. Data and information basis

In Germany, data on the profitability of sheep farming is already being collected in some regions

Data from farm surveys from 9 federal states as well as data from so-called test farms between 2013-2019:

→ 730 farm survey with more than 450.000 ewes.

➤ **23 parameter:** (not every parameter could be generated from all surveys)

- basic data
- benefits and income
- costs and
- profitability results

4. Results

Tab. 1: Major results in an overview

Parameters	Mean	Min - Max	No. of farm surveys
Herd size (number of ewes)	611	408-1060	730
grassland area (ha)	168	80 - 283	701
Total income from sheep farming <u>with</u> public grants (€/ ewe+year)	280	189 - 378	668
Public grants (€/ ewe+year)	160	42 - 225	730
Production costs (€/ ewe+year)	246	146 - 328	467
Profit <u>with</u> public grants (€/ ewe+year)	55	23 - 93	462
Profit <u>without</u> public grants (€/ ewe+year)	-68	-157 - + 10	326
Calculated result (€/ ewe+year)	-72	-134 - +5	140
Profit of sheep keeping in total (€/ farm+year)	31.940	14100 – 56382	672

Fig. 1: Total income, public grants and production costs in different Federal States of Germany

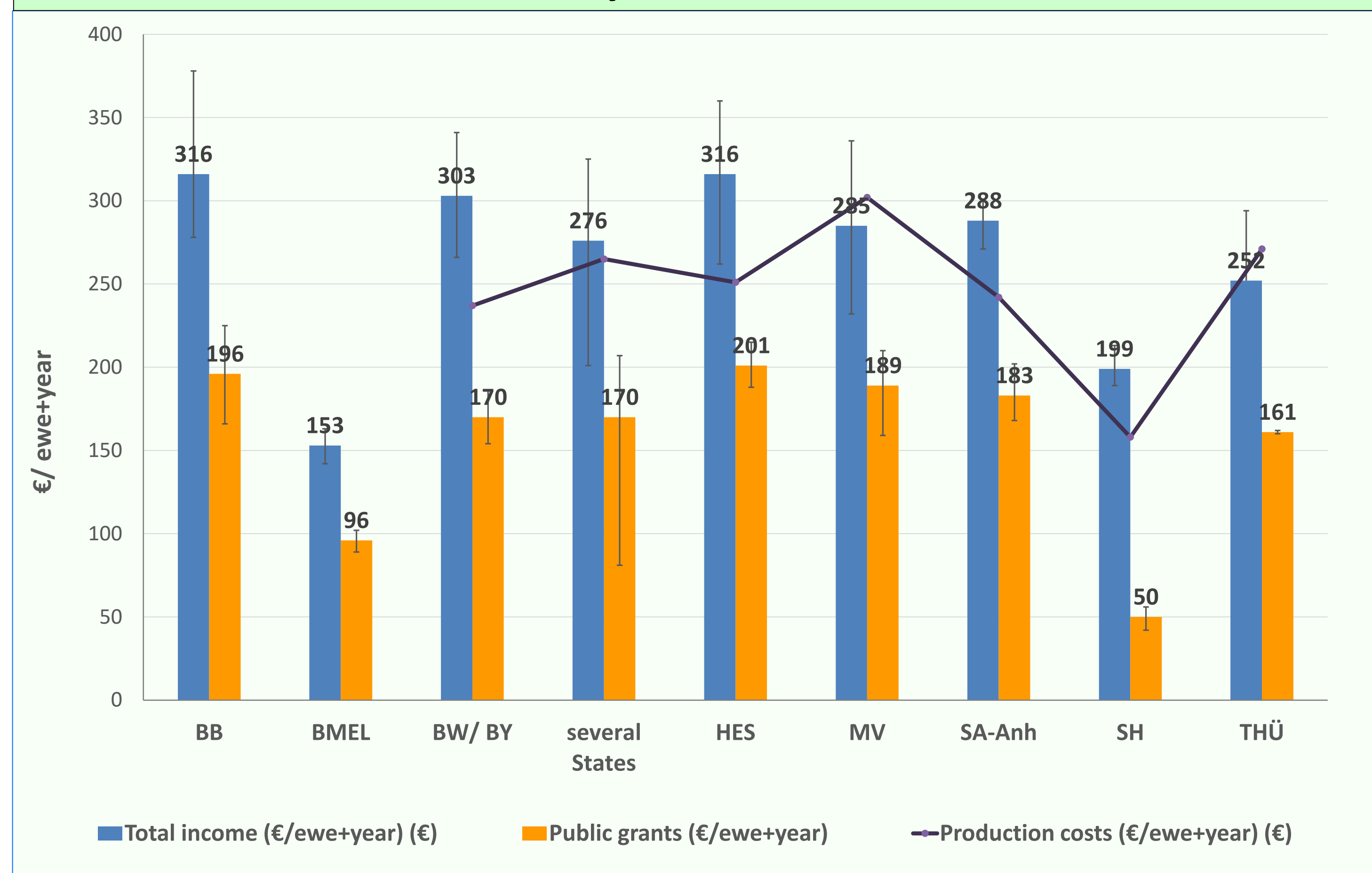


Fig. 3: Profit of sheep keeping in total by federal states

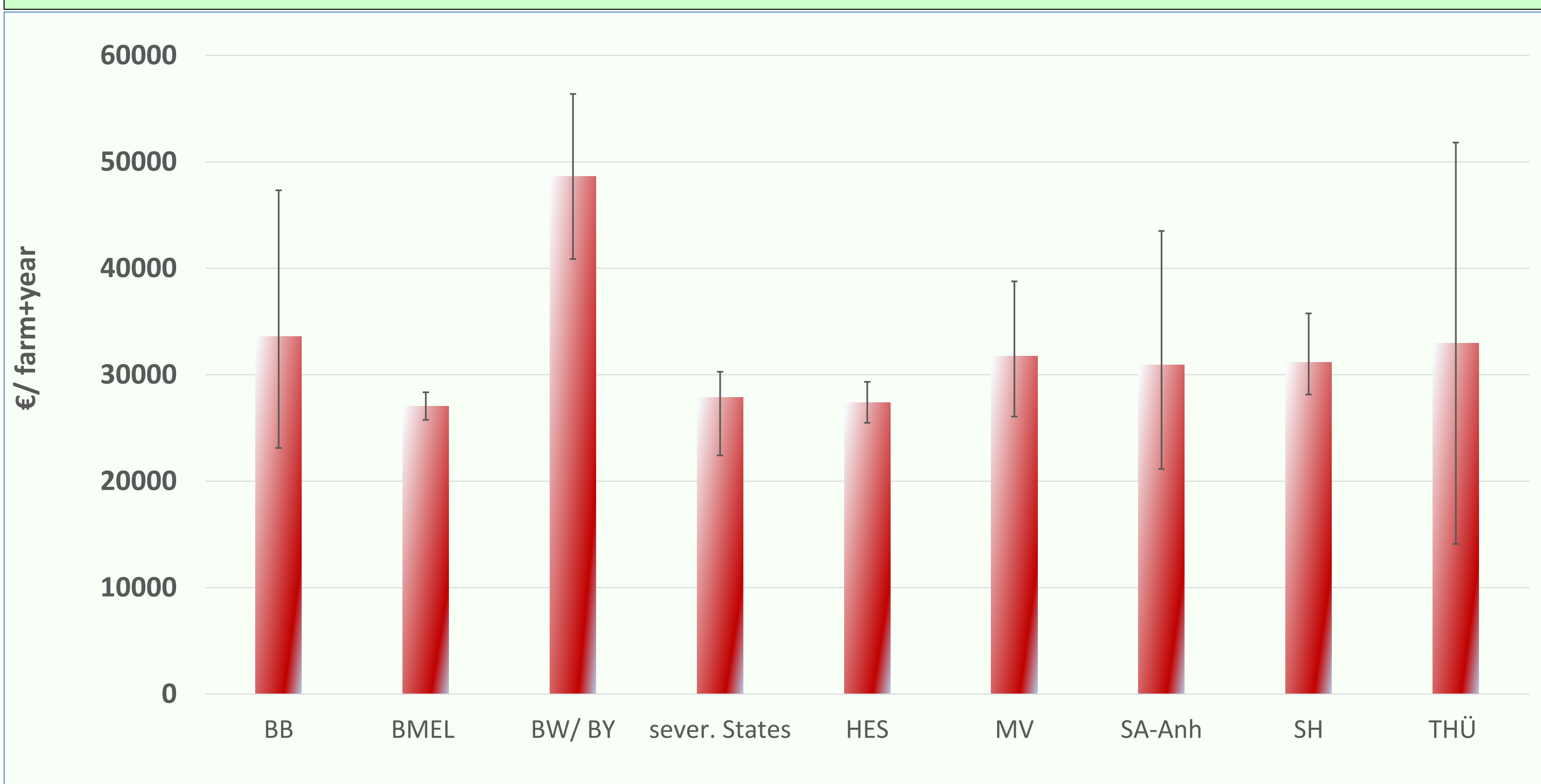
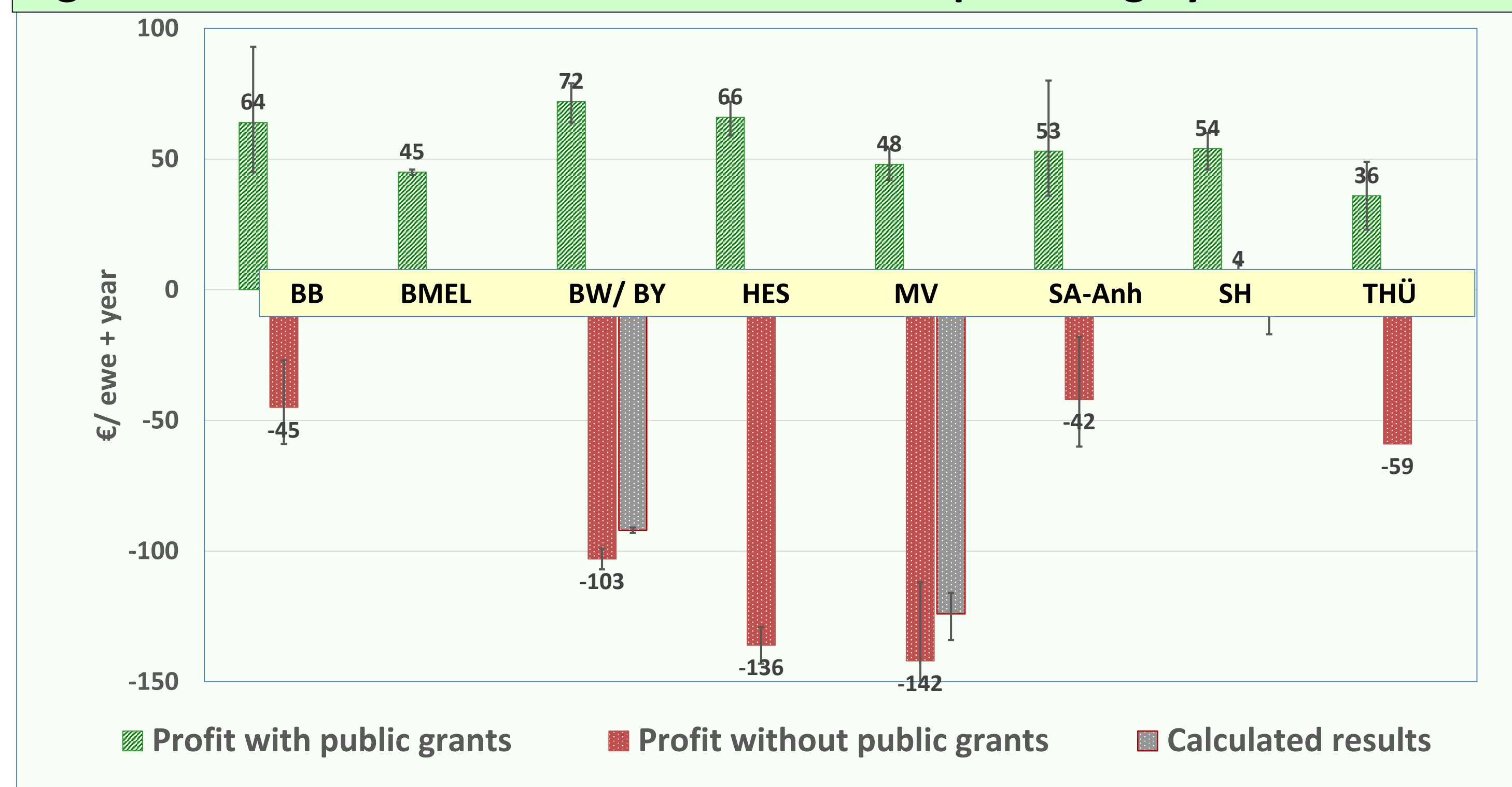


Fig. 2: Profits and Calculated results from sheep farming by federal state



5. Conclusions

➤ As expected, there are differences between regions and years.
➔ different region-specific conditions, changing lamb prices, ...

➤ **Public grants account for about 60%** of total sheep farming income !

➤ Nevertheless, the **full costs can often not be compensated!**

➤ The income from sheep farming is limited and **ranks in the lower third of other farm scales.**

➤ The present study is an initial step, where not all data from the various sources were fully compatible

➤ Continuation of the investigation:

➤ **Development of a standardized data mask** in order to generate reliable statements in the future via even better data compatibility.

➤ **To compare the German sheep farming with these in other European countries.**



Efficiency of Estrus Synchronization Protocols and Artificial Insemination technologies in Abergelle Goat at Station and on farm conditions of Waghemira, northern Ethiopia

Bekahegn Wondim^{1,2}, Mengistie Taye^{1,3}, Kefyalew Alemayehu¹, Aynalem Haile⁴, Mourad Rekik⁵

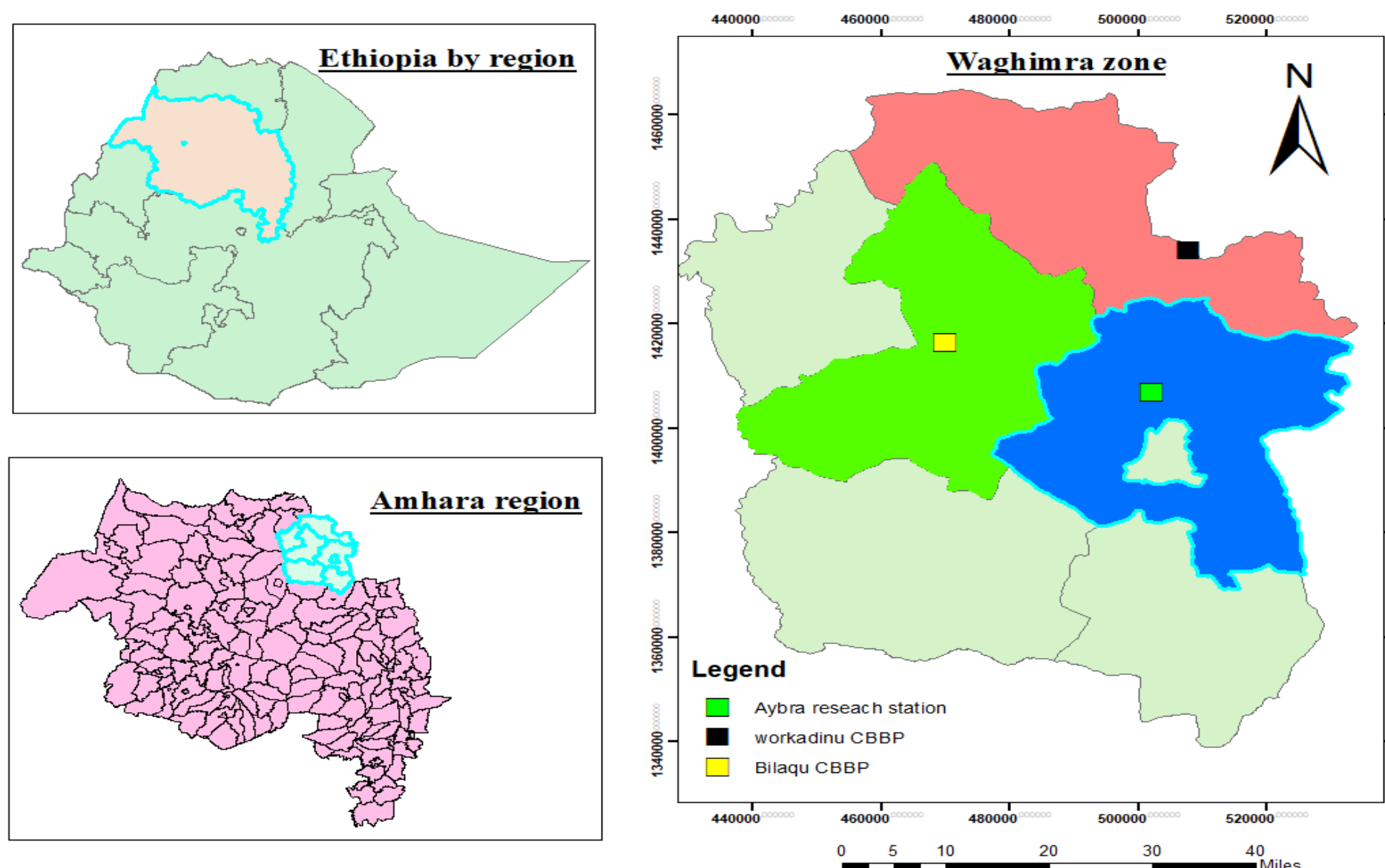
Introduction

Estrus synchronization combined with AI with the use of improved semen accelerates the rate of genetic gain within a herd/flock, maximizes the number of offspring from a desirable sire, enables genetic exchange over wide geographical areas, and also allows the use of genetic material from incapacitated sires or those no longer alive if their semen had been preserved (William Knox, 2013). For instance, because of the presence of larger flock size and very short mating season for the case of the study breed, there is a need for keeping higher number of serving sires for addressing the whole females so that intensity of selection must be relaxed. Thus, use of reproductive biotechnology tools together with the selection program will be enabling for faster genetic progress. Adjusting birth season with feed availability should be come other important step for improving survival rate, birth and weaning weight of kids. Therefore, the study was aimed to evaluate the efficiency of different estrus synchronization protocols and Artificial insemination technologies in Abergelle goat at station and on farm management conditions.

Materials & Methods

Description of the study area

The study was conducted at the research farm and at the two community based breeding villages, located 12°43'65"N and 39°02'027"E, 12°58'12" N and 39°04'25" E and 12°48'41" N and 38°43'43" E, respectively which was 737-785 Km far from Addis Ababa.



Experimental Animals

A total of 335 Abergelle does (92 for the on- station and 243 does for the on-farm) were used for the experiment.

Treatment allocation

- Treatment 1:** Single injection of prostaglandin (Enzaprost®)
- Treatment 2:** Double injection of prostaglandin (Enzaprost®) 11 days apart
- Treatment 3:** PMSG (pregnant mare serum gonadatropins) with (Enzaprost®) as separate injections
- Treatment 4:** With no hormonal treatment (Control)

Statistical analysis

Gen mode procedure of Statistical Analysis System SAS (9.0) and GLM procedure of the statistical analysis system SAS (9.0) were used for the analysis. Each of the means were separated with Tukey's HSD test and significant differences was test at $\alpha = 0.05$.

Results

Estrus response

Table 1. The effect of hormone, management condition, parity, Age and Bcs on estrus response (%), Onset of estrus (LSM±SE) and estrus duration (LSM±SE) of Abergelle Does.

Variables	N	Estrus response (%)	Onset of estrus(hr) (LSM±SE)	Estrus duration(hr) (LSM±SE)
Over all	278	188 (67.6)	14.4±0.47	45.5±0.45
Cv			36	21
Treatments				
Management condition	NS	***		Ns
On-station	75	50 (66.6)	11.9±0.62 ^b	39.5±1.44
On-farm	203	137 (67.4)	15.5±0.47 ^a	42.3±0.87
Protocol	***	***		Ns
PMSG+Enzaprost®	97	85 (87.6) ^a	12.8±0.66 ^b	39.0±1.09
PGF2α (Single)	83	51 (61.4) ^b	18.8±0.85 ^a	41.6±1.39
PGF2α (double)	98	52 (53) ^b	9.5±0.58 ^c	42.1±1.56

Where: BWT (birth weight), TMWT (three month weight), SMWT (Six month weight), NMWT (nine month weight), YWT (yearling weight), LSM (least square means), SE (standard error) and N (population size)

Conception rate

Table 1. Effect of hormone and management condition on conception rate (%), kidding rate (%), litter size (LSM±SE) and birth weight (LSM±SE) on Abergelle does.

Variables	N	Conception (%)	Kidding Rate (%)	Litter size (LSM±SE)	Birth weight (LSM±SE)
Over all	188	123 (65.4)	110(89.4)	1.23±0.04	2.27±0.03
Cv				36	14
Treatments					
Management	NS	Ns	Ns		***
On-station	50	32 (64)	28 (87.5)	1.17±0.07	2.02±0.07 ^b
On-farm	138	91 (65.9)	82 (90.1)	1.19±0.05	2.34±0.03 ^a
Protocols	*	*	***	**	
PMSG+Enzaprost®	85	49 (57.6) ^b	45 (91.8) ^a	1.65±0.1 ^a	2.0±0.07 ^b
PGF2α (Single)	51	33 (64.7) ^b	30 (90.9) ^a	1.0±0.0 ^b	2.3±0.06 ^a
PGF2α (double)	52	41 (77.7) ^a	35 (85.3) ^b	1.0±0.02 ^b	2.2±0.05 ^a
Control	57	30 (52.6) ^b	30 (100) ^a	1.0±0.04 ^b	2.1±0.04 ^a

Discussion

Estrus result of PMSG+Enzaprost® in the present study was exceeded than 75% response from PGF-eCG protocol in Iranian downy goats reported by (Majid and Mazaher, 2017) though there is hormone difference between the two studies as well as breed and agro ecology differences. However, it was comparable with the result 94.4% reported by (Bukar *et al.*, 2012) in boar does with same protocol but lower than 100 % obtained by (Dogan *et al.*, 2004) in Saanen does treated with 750 IU PMSG and 97.4% in Somali goats of Ethiopia treated with intra vaginal sponges (MAP and FGA). In comparison with other results, the current result for conception rate was higher than (29.4%) using natural mating and (44%) using AI on Rawa goats (Abid Mehmood, 2011) and (61.54%) in Ethiopian local goats (Gidena, 2017) and comparable with the report (83.3%) from PGF groups in Iranian downy goats (Majid and Mazaher, 2017). In the current study, PMSG+ Enzaprost® showed significantly higher ($p < 0.05$) proportion of litter size (1.6±0.22) compared with other protocols and the control group which was in agreement with the rationale of super ovulatory response of equine Chorionic Gonadatropins (eCG) or PMSG and FSH (Rahman *et al.*, 2008).

Acknowledgements

We thank farmers who allowed their animals for the study. We wish to acknowledge the Amhara agriculture research institute (ARARI) and International Center for Agricultural Research in the Dry Areas (ICARDA) for funding.

For more information:

Please contact Sekota Dry-land Agricultural Research Center small ruminant breeding research team at:
 Email: bewondim23@gmail.com
 Tele: +251334401105 or
 Fax: +251334400409 P.O.Box: 62, Sekota, Ethiopia



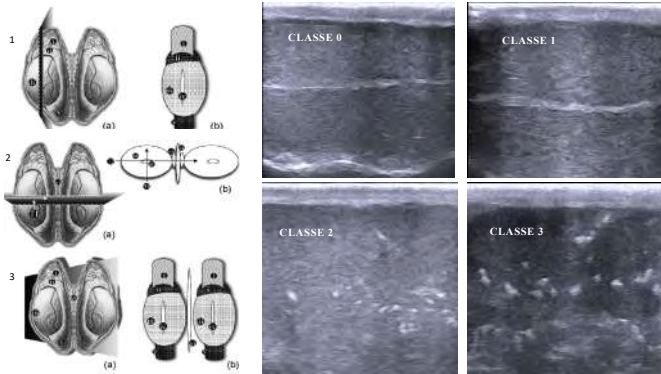
Relationship between seminal vesicles echogenicity and semen quality in rams of endangered Venetian sheep breeds

Calogero Stelletta

1 Department of animal medicine, production and health, University of Padova, Italy

Contact: [Prof. Calogero Stelletta, Department of animal medicine, production and health, University of Padova, Viale dell'Università 16, 35020, Legnaro (PD), Italy. Email: calogero.stelletta@unipd.it]

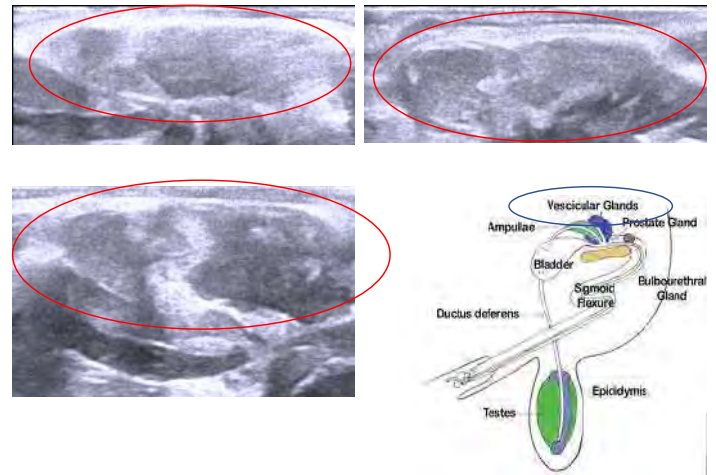
Seminal vesicles are the main producers of seminal plasma (SP) in rams. Their secretions can greatly influence the quality of sperm suspended on them. Endangered sheep breeds (ESB) need more attention on semen treatment after collection because the genetic materials should be maintained efficiently to enhance the biodiversity sustainability.



Aim of this work was to investigate the relationship among testosterone under GnRH challenge test (T), echogenicity of seminal vesicles (low, medium, high) and testicles (Vencato et al., 2014), SP composition (P, Ca, Mg, PT, ALP, LDH, cholesterol, triglycerides) and spermatid post-thawed kinetic parameters (total motility, progressive motility, VAP, VSL, VCL, ALH, BCF, STR, LIN) in 4 Venetian ESB (Alpagota, Brogna, Foza, Lamon).

A total of 22 rams (N=5, Brogna, N=7 Lamon, N=5 Foza e N=5 Alpagota), 1-5 years old, were used as breeders submitted to a preservation program for extinction threatened breeds and collected two times with electro-ejaculator. Data analysis showed significant relationships among scrotal circumference, T and semen kinetic parameters.

Negative correlations indices ($P < 0.05$) resulted between testicular parenchymal echogenicity and semen volume as well as among seminal vesicles echogenicity, semen volume (-0.76) and seminal plasma total proteins (-0.82).



	CE	T60	TA	MM	AG	P	Ca	Mg	PT	ALP	LDH	COL
CE		0.43	0.37	-0.52	-	0.35	0.16	-0.56	-0.12	0.53	0.15	-0.97*
T60			0.97	-0.84	-0.56	0.97*	0.87	-0.34	0.01	-0.09	0.76	-0.44
TA				0.09	-0.44	0.97*	0.84*	-0.39	0.12	0.09	0.82*	-0.39
MM					0.52	-0.06	-0.23	0.032	-0.52	0.99*	0.67	0.51
AG						-0.42	-0.44	-0.52	-0.82*	0.31	-0.48	-0.07
P							0.93*	-0.46	-0.15	0.00	0.70	-0.38
Ca								-0.41	-0.09	-0.12	0.46	-0.23
Mg									0.82	0.06	0.00	0.67
PT										-0.41	0.05	0.24
ALP											0.42	0.54
LDH												-0.09

↑ Echo Vesicle glands = ↓ TOTAL Protein SP

↑ Echo score Vesicular Glands = ↓ Ejaculate volume

↑ CONCENTRATION = ↑ MASS MOTILITY

Moreover, lower levels of calcium (2.15 ± 0.3 mg/dl) and cholesterol (28.83 ± 3.37 mg/dl) concentrations than reference levels (Juyena and Stelletta, 2012) were revealed in all breeds.

Clinical biochemistry can be considered routinely to check the quality of the SP helping the eventual make-up of the extenders for chilled or frozen inseminating doses.

Sadoud M. Sadoud Y.

H.Benbouali Chlef University, Algeria
 E-mail: m_sadoud@yahoo.fr

Authors biography

The author is a doctor in Economics and Rural Sociology of the National Agronomical School of Algiers (Algeria) and teacher-researcher in agribusiness economics at the University of Chlef since 1989. The author conducts research on animal sectors. He has presented several papers in international congresses and published several articles in international journals.

Methodology of research

The region of Chlef is located in the north of Algeria, it occupies a total area of 454,800 ha and the land allocated to agriculture represents 53% or 227,500 ha. It is a semi-arid region, characterized by rugged relief and low rainfall varying between 350 to 500 mm / year. It is located between two large urban centers, Algiers (the capital) and Oran (the second largest city in the country) (figure 1),.



The work was based on data from a semi-structured questionnaire survey carried out on a sample of 200 households.

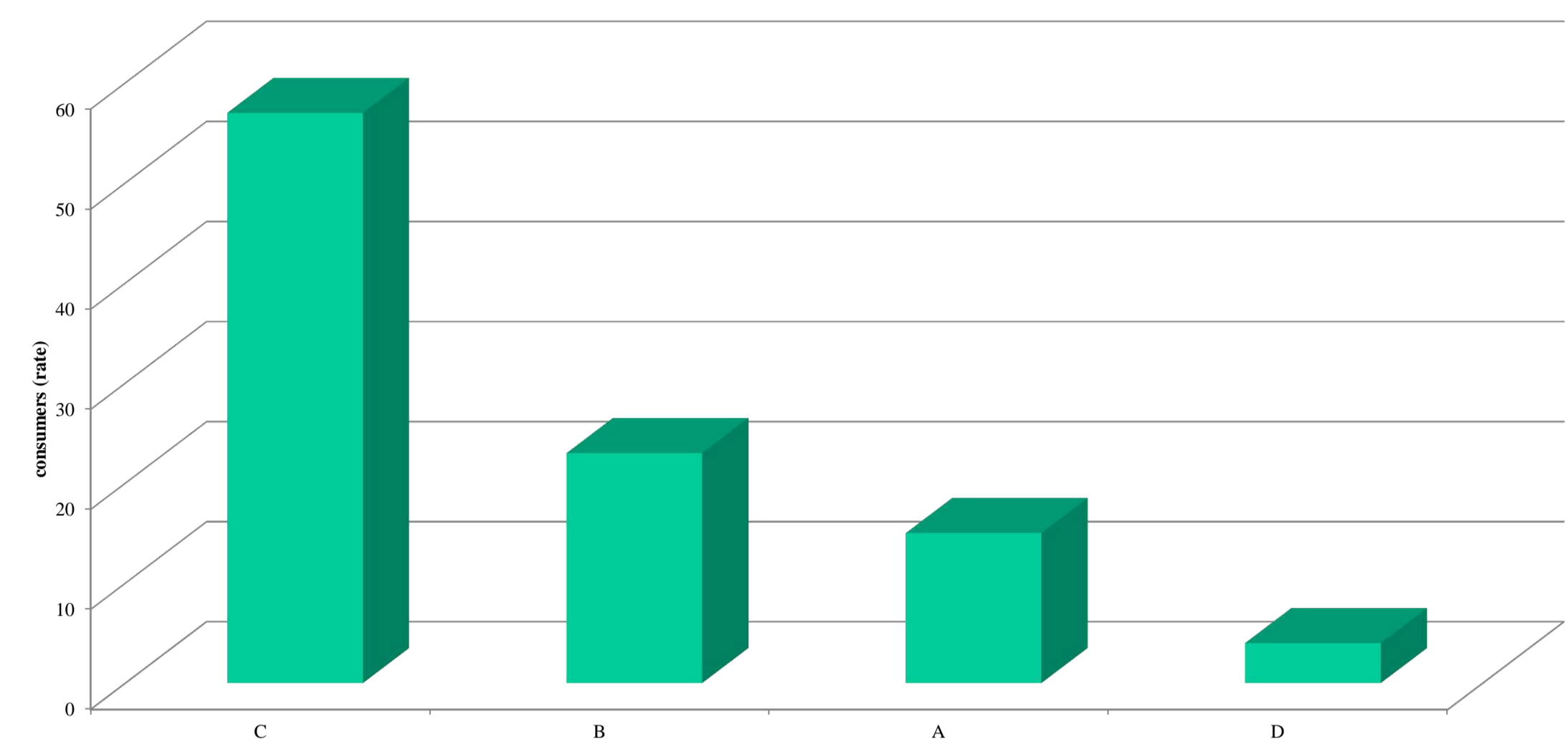
The questionnaire was sent to heads of households, who are mainly men who are responsible for purchasing meat. 72% of those interviewed were men and 27% married women responsible for purchasing meat. Our investigation took place during 2019.

To conduct our survey, we established a questionnaire which addresses the relative aspects of the perception of goat meat, consumer expectations, consumption determinants, perception of quality, consumption preferences.

Introduction

In Algeria goat breeding is one of the most traditional agricultural activities, associated with sheep breeding; located in areas of difficult access. It represents an invaluable animal resource for difficult regions. According to FAO statistics; in 2017, Algeria had about 5 million head of goats, or 2% of the workforce of African countries, 28% of that of EU countries, well ahead of the first country which is Greece which holds a workforce of 4.5 million heads. Thus, Algeria produces 42,000 tonnes of goat meat, well after Greece, the leading producer of this species with 45,000 tonnes. Goat farming in the region of Chlef (Algeria) plays a socio-economic role in the rural life of the region. The goat herd is around 81,000 head, or 2% of the national herd, including 50,000 head of goats.

2. Appreciation of goat meat

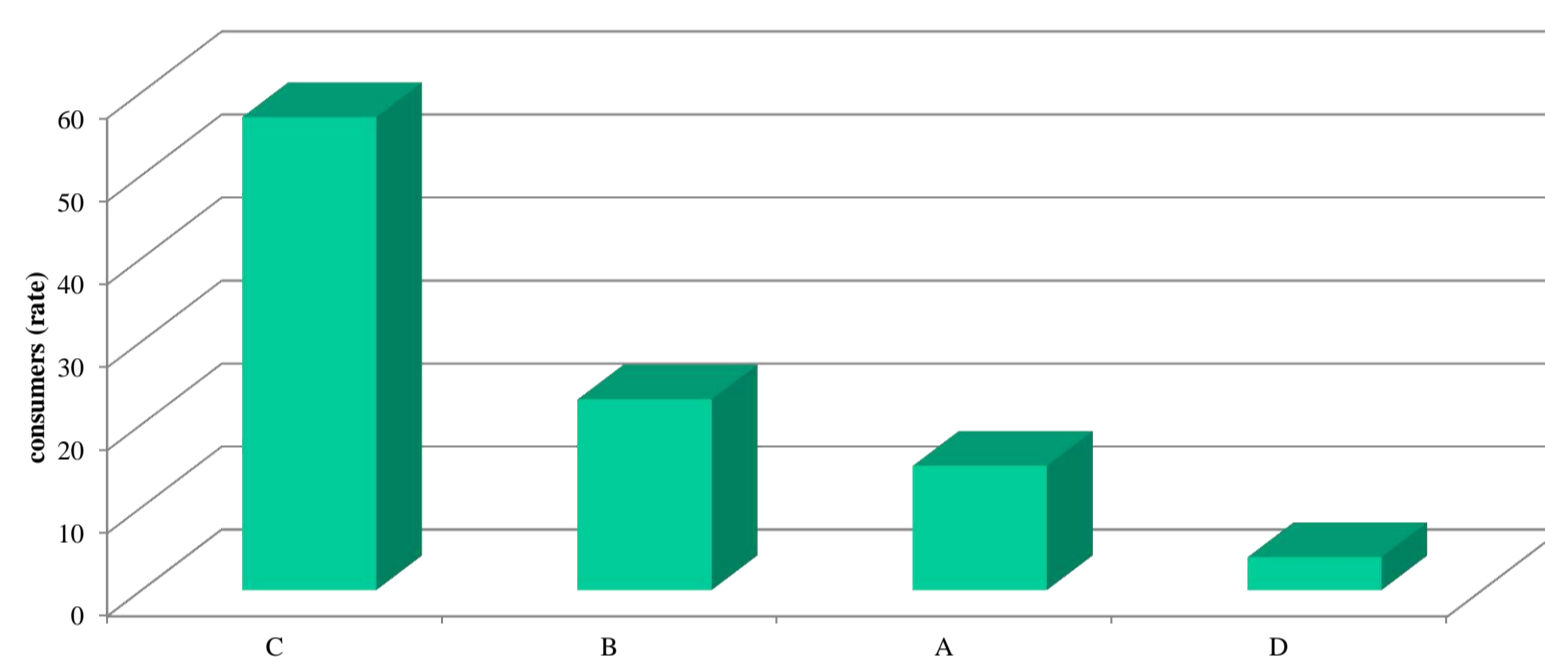


A: I like goat meat, is an important part of my diet.
 B: I quite like goat meat, I eat it regularly.
 C: I eat goat meat, but I really don't mind not eating it.
 D: I hardly ever eat goat meat.

Figure 2

Results and discussion

1. Reasons to eat goat meat



A: good for health
 B: by habit
 C: family fun
 D: for the growth of children

Figure 1

3. The level of quality of the goat meat consumed

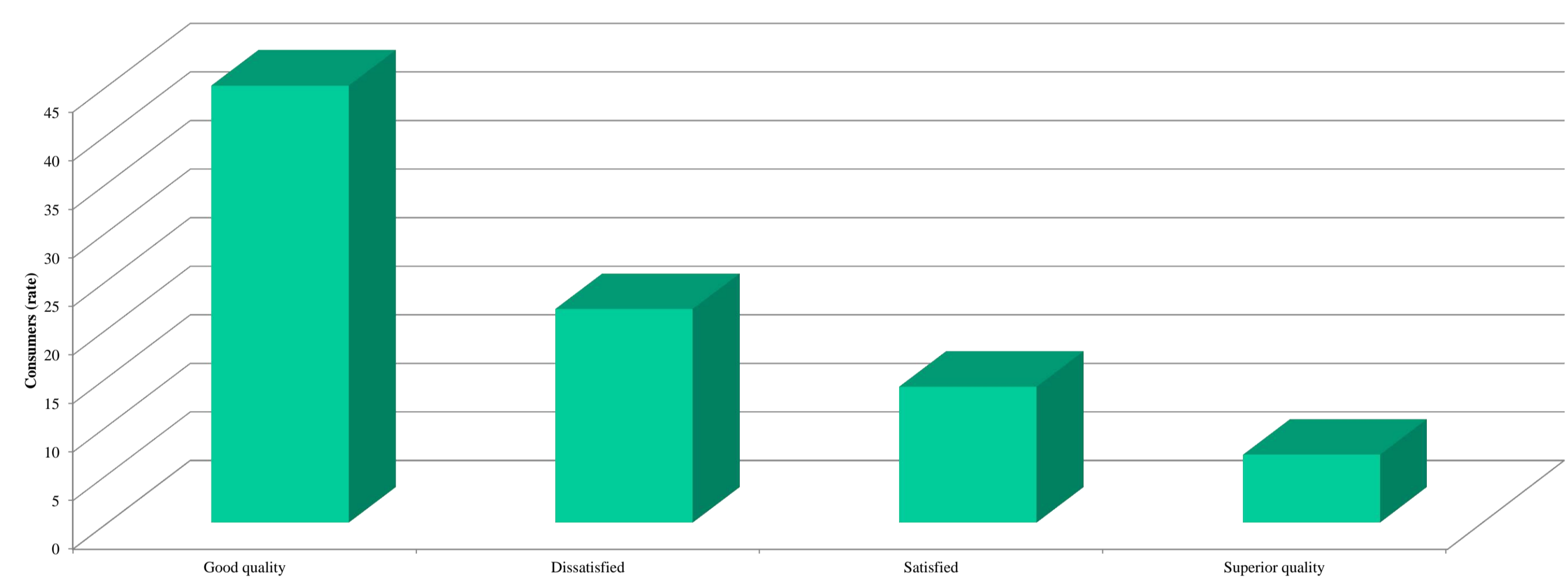


Figure 3

4. Tenderness

(Babiker et al 1990), (Griffin et al. 1992) noted that the tenderness of goat meat compared to sheep meat is similar

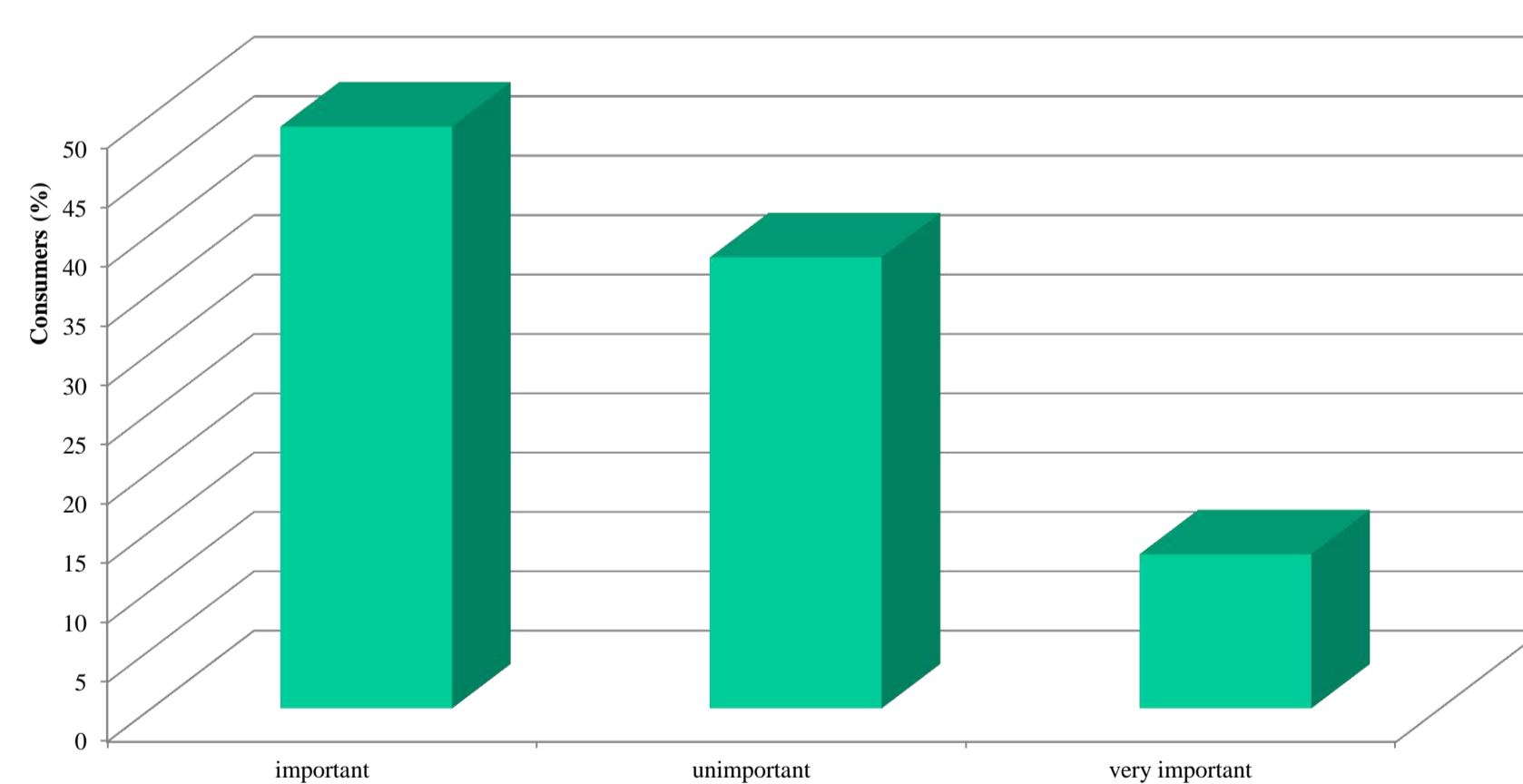


Figure 4

5. Juiciness

Goat meat has a similar degree of juiciness to that of sheep meat with a significant difference of 1% (Ameur 2016). 46.67% of respondents consider the fairness of goat meat to be important, while (42.96%) consider that the fairness of meat is very important. Finally, (10.37%) of households say that the suitability of goat meat is not important and therefore it is not a very important choice factor.

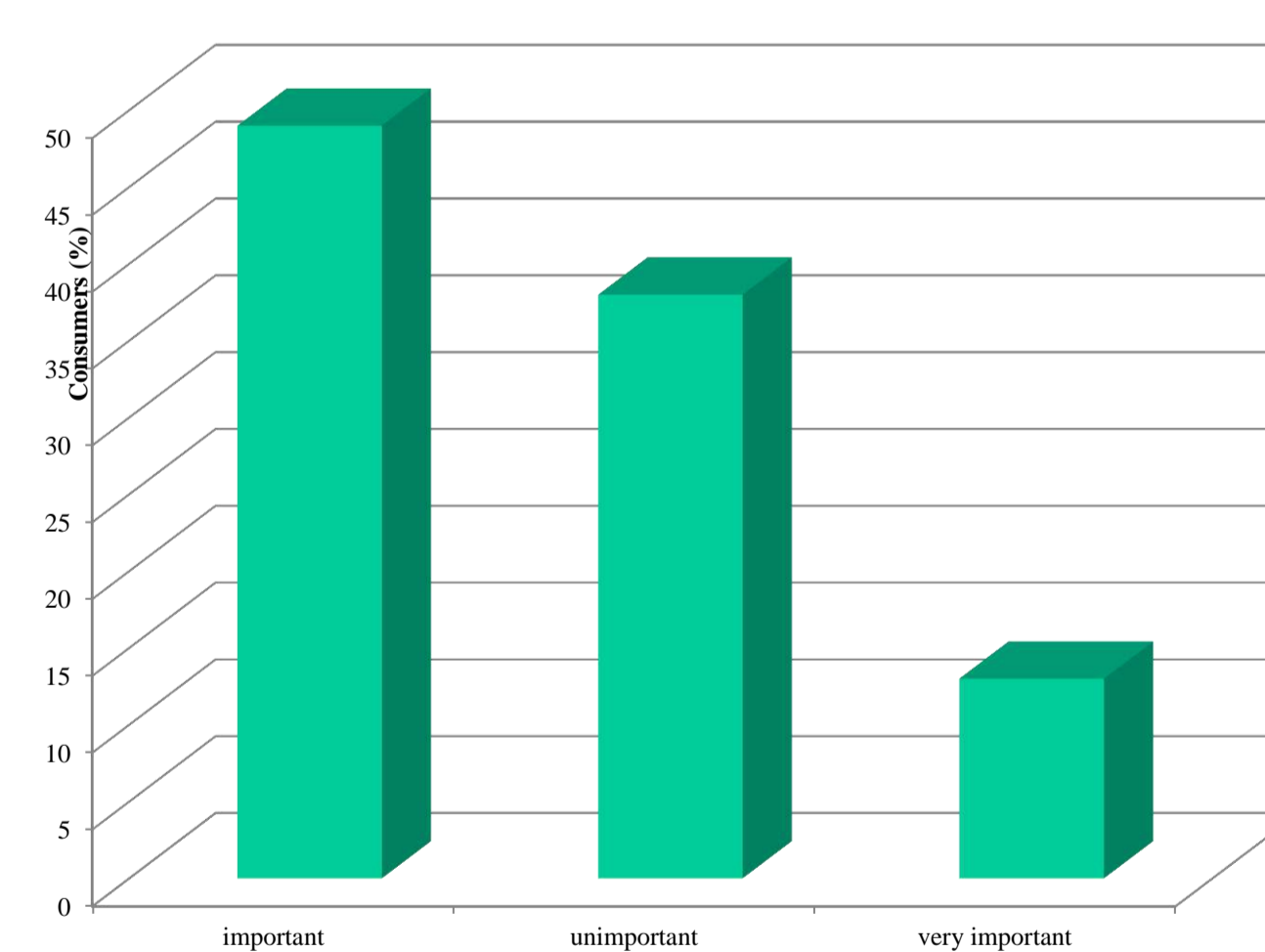
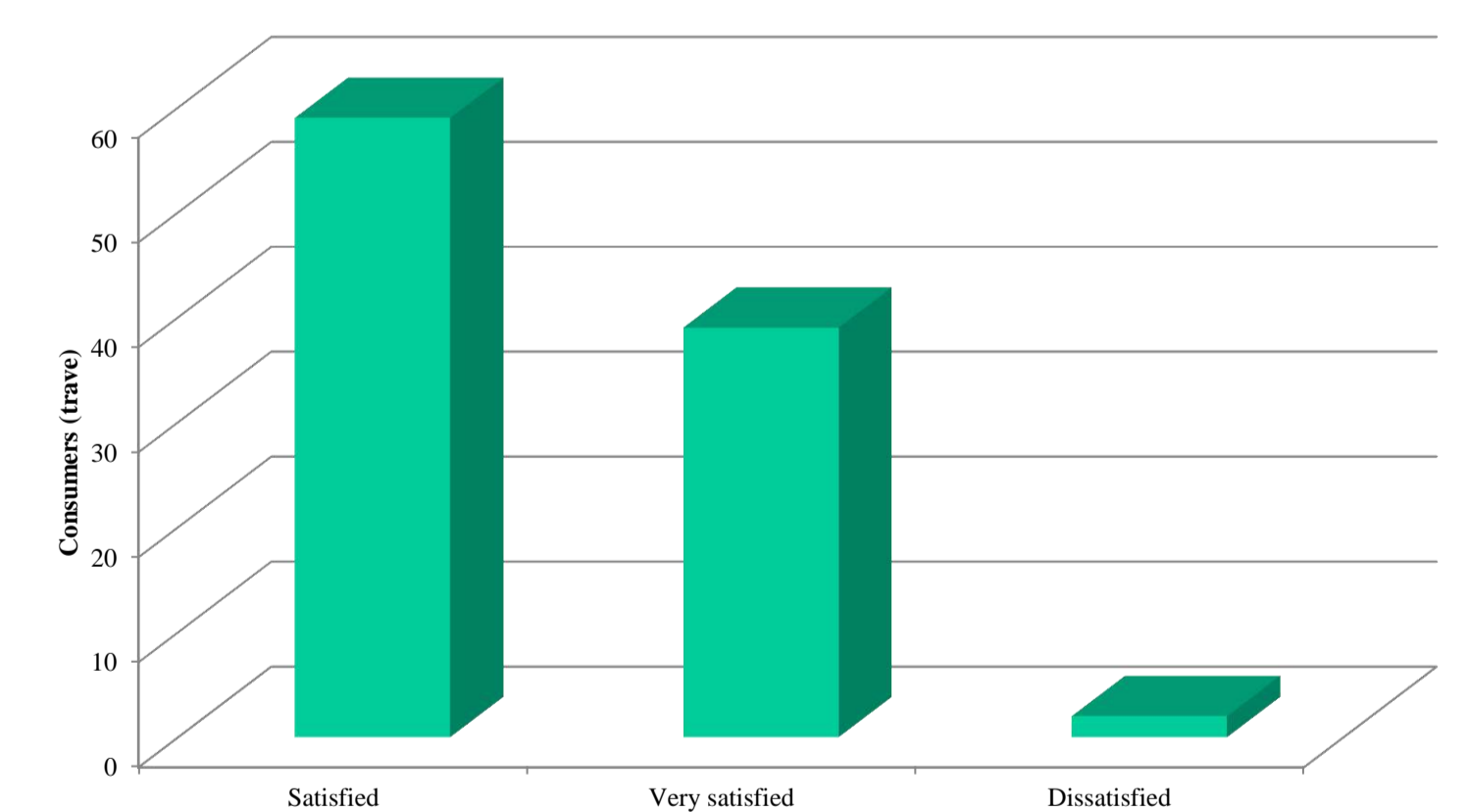


Figure 5

6. Taste

59.26% consider that the taste of goat meat is satisfied and 38.52% are very satisfied with the taste, while (2.22%) are dissatisfied with the taste of this meat. Because the flavor corresponds to all the olfactory and gustatory impressions experienced at the time of consumption of the food (Rosset, 1978; Coibion, 2008).



Figure

Tapez une équation ici. Conclusion

The goat is considered to be the symbol of Organic Farming, diversification and quality products, following the renewed interest of consumers in these products. Its meat takes more and more place in consumption compared to other meats.

Despite the rapid changes in the way Algerians eat, the processing of goat meat remains almost non-existent. To sustain this production, it would be necessary to set up a processing industry which upgrades goat carcasses according to the characteristics of the different muscles that compose them in order to be able to offer a much wider range of goat products to Algerian consumers.

Bibliographical references

Babiker, S.A., I.A. El Khider, and S.A. Shafie. 1990. Chemical composition and quality attributes of goat meat and lamb. Meat Sci. 28: 273–277
 Coibian L. 2008. Acquisition of the organoleptic qualities of bovine meat. Adaptation to consumer demand, ENVT, 97p. <http://oatao.univ-toulouse.fr/2075/>
 FAO stat, 2017
 Griffin, C.L., M.W. Orcutt, R.R. Riley, G.C. Smith, J.W. Savell, and M. Shelton. 1992. Evaluation of the palatability of lamb, mutton and chevon by sensory panels of various cultural backgrounds. Small Rumin. Res. 8: 67–74.
 Rosset M R., Et Linger P. 1978. The Color of Meat. Scientific and Technical News in Agro-Food Industries. 22nd Edition Apria. Paris. P 1-3.

7. Consumer favorite parts of goat meat

The goat meat parts most preferred by consumers in the Chlef region are the thigh (36.29%), the ribs (28.14%) and the shoulders (25.18%), thanks to their nutritional values. On the other hand (10.37%) of consumers prefer other parts of goat meat such as offal

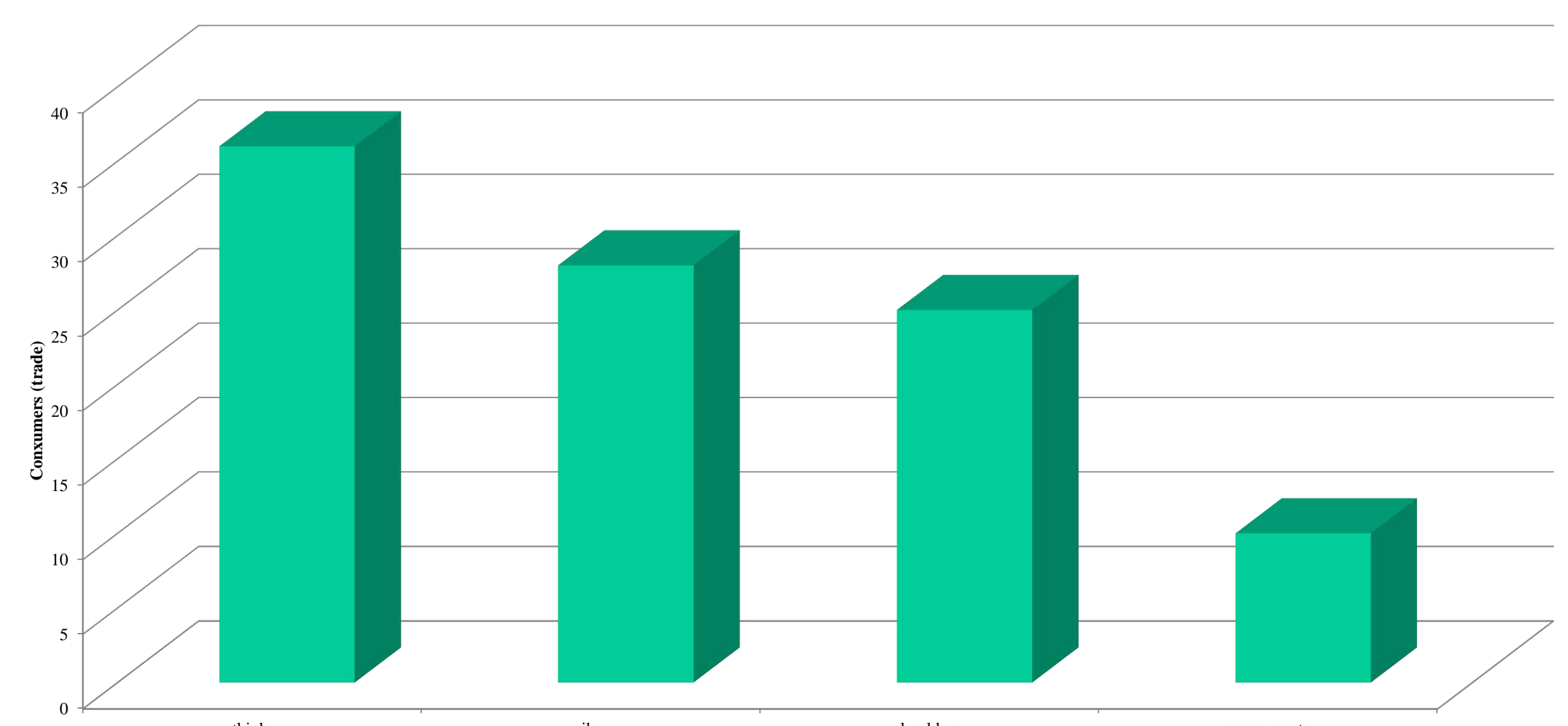


Figure 7

Impact of direct ewe support on the cost – income situation of the sheep farm

BENCE JÁVOR¹ – ANDRÁS NÁBRÁDI² – FERENC KUKOVICS³ – SÁNDOR KUKOVICS⁴

INTRODUCTION

The basic condition for the survival of sheep sector is that it is worth keeping sheep. This requires, in addition to the revenue generated by the products manufactured under the given condition scheme, a level of support for the services provided to the community.

MATERIAL & METHODS

To analyse the situation of domestic sheep farming, the economic database of the sector was subjected to a sensitivity analysis. Database contained data on existing sheep farms in test farm system (FADN), data from Central Statistical Office, and analyses of sectoral organizations made during the period between 2003 and 2018.

In examinations, the production value per ewe, revenues (animals, wool, milk), direct ewe support, costs (wages, feed, services, overheads), the margin contribution, and the sectoral result were analysed.

The effect of area-based direct payments has not been examined in this analysis, although this form of support is a key driver of sheep farming on farm level – however it is not in sheep sector level.

Data were processed using Microsoft Excel 2016 software and correlation studies (Pearson's correlation, covariance analysis, χ^2 test) were performed.

In Hungary, sheep farms are basically mixed farms and also carry out other activities. Therefore, they also receive area-based grants and other activity grants. In the present study, only the data of the sheep sector were taken into account, the data analysis of other activities of the farms was omitted.

RESULTS

For reasons of length, only some of the results of the analysis are presented in the present study.

80% of production costs are accounted for by wages and public charges (14.68%), veterinary costs (4.39%), feed costs (52.9%) and the cost of producing female replacements (7.92%) (FIGURE 1). Other costs give the remaining 20%. In the present analysis, only the change in the 80% cost elements was evaluated.

The cost of the supply of breeding animals was on average 7.92% (FIGURE 3), and its effect on the cost structure varied over a wide range.

Wages and public burdens averaged 11.43% over the period under review, with a significant annual effect and a wide range of movements.

Over the 16-year period, veterinary costs averaged 4.39% (FIGURE 4), but its impact on the cost structure changed at significant intervals.

In each sales revenue element (FIGURE 6), the proportion of slaughter animal (mainly slaughter lamb) sales dominated (68.81%), followed by the amount from ewe support (15.07%), the sales revenue of young sheep was only the third in the ranking (13.20%) and sales of wool produced contributed minimally to the result (2.84%). Their minimum and maximum values varied at quite different levels and their impact on revenue was also different.

The results show that production costs (FIGURE 7) increased at a faster rate than revenues during the period under review, and direct ewe support plays a very important role in shaping the sectoral result (FIGURE 8).

The extent of the surplus reproductive rate that can be sold for economic operation was fundamentally influenced by the existence of direct ewe support and its amount (FIGURE 9).

The development of the sectoral result (FIGURE 10) shows even more strongly the effect of the ewe support on the sectoral result. In the process of this since 2012, with the increase of this support, the sectoral income per ewe has increased, which has yielded a positive result since 2014, however, there was a significant drop in 2018.

CONCLUSIONS

In conclusion, we found that at the current level of production, only direct ewe support allows for economical sheep farming. Without this, the utilised progeny rate should be improved from 85% to 150%.

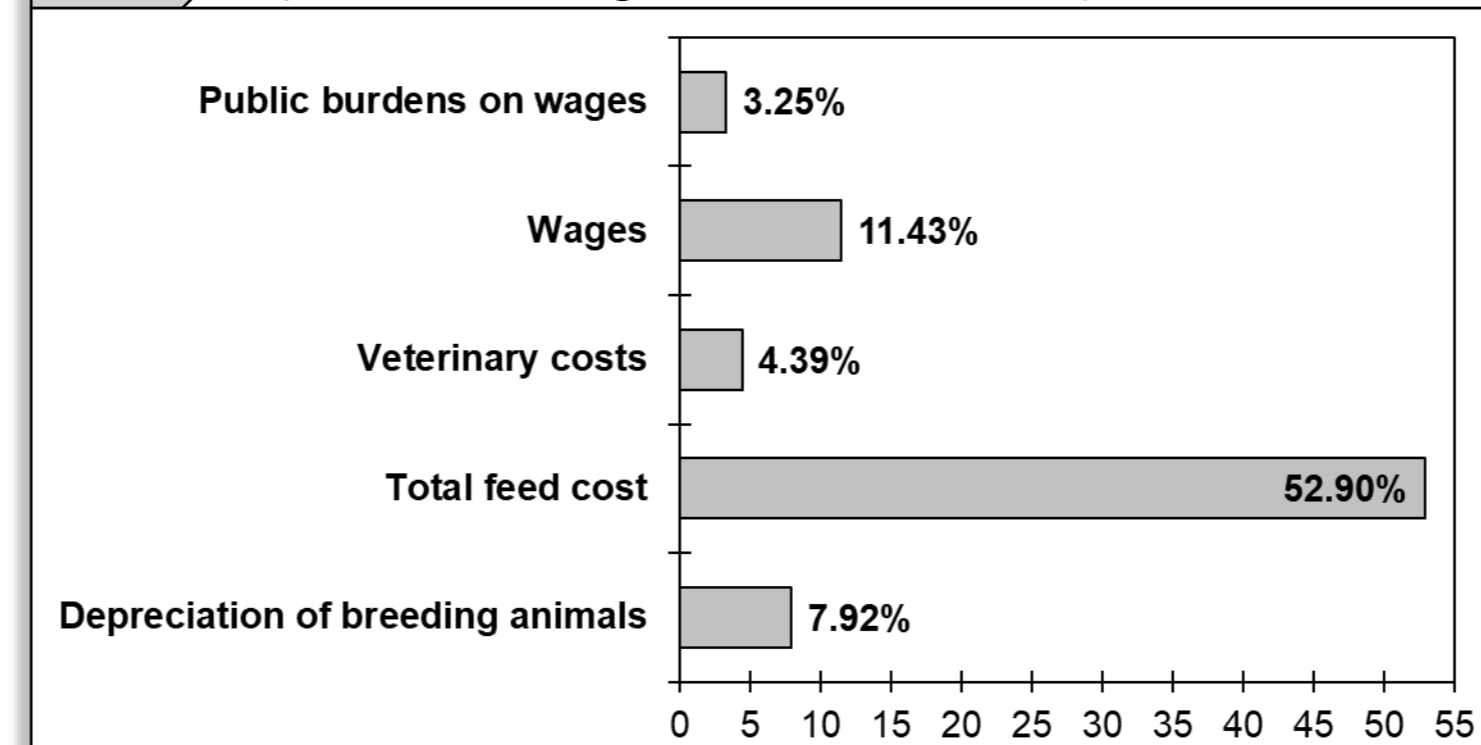
In addition, area-based direct payments represent the real income of a given sheep farm.

CONTACT

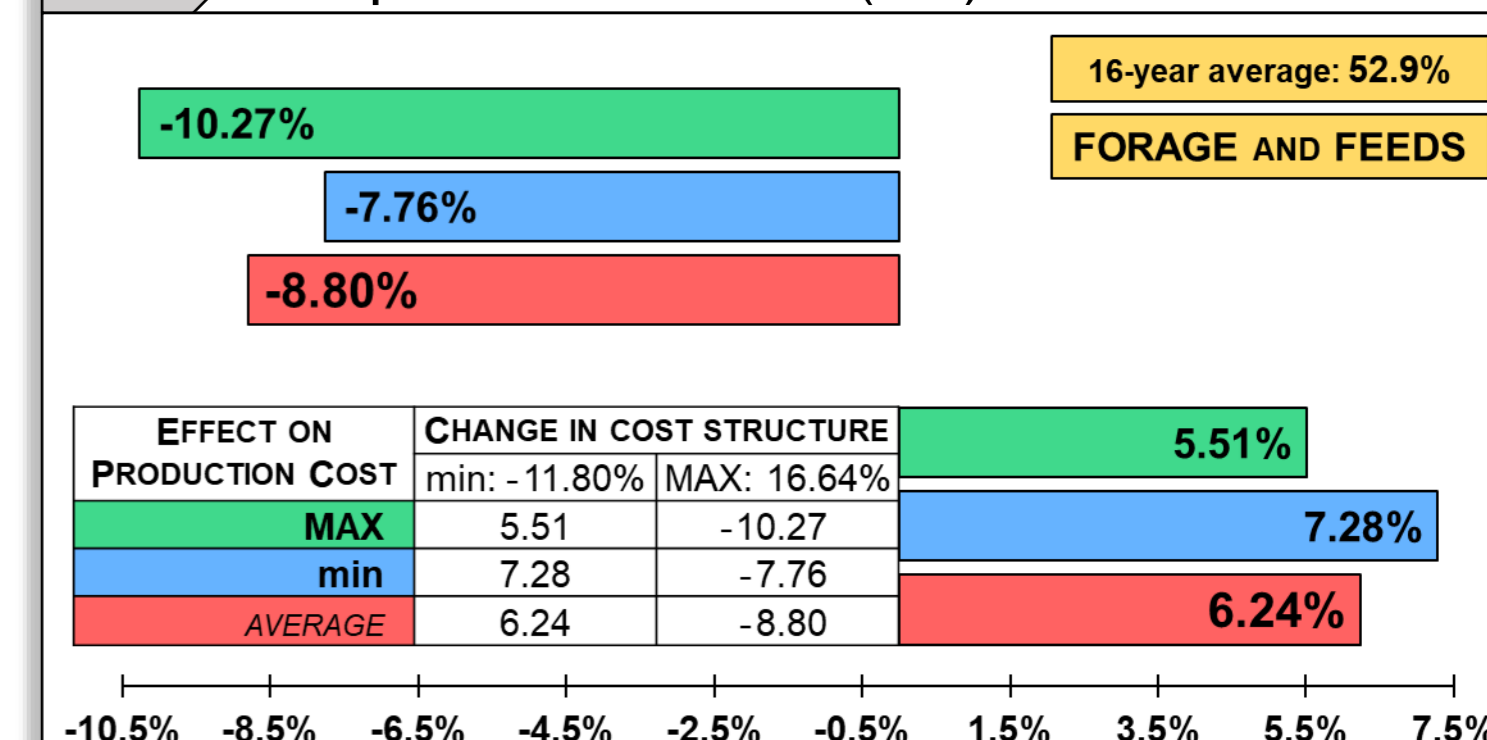
- 1 BENCE JÁVOR: Hódmezőgazda Closed Corporation, HÓDMEZŐVÁSÁRHELY
- 2 ANDRÁS NÁBRÁDI: University of Debrecen, DEBRECEN
- 3 FERENC KUKOVICS: Hungarian Sheep and Goat Dairying Public Utility Association, HERCEGHALOM
- 4 SÁNDOR KUKOVICS: Sheep and Goat Products' Board and Inter-professional Organization, VÁRPALOTA



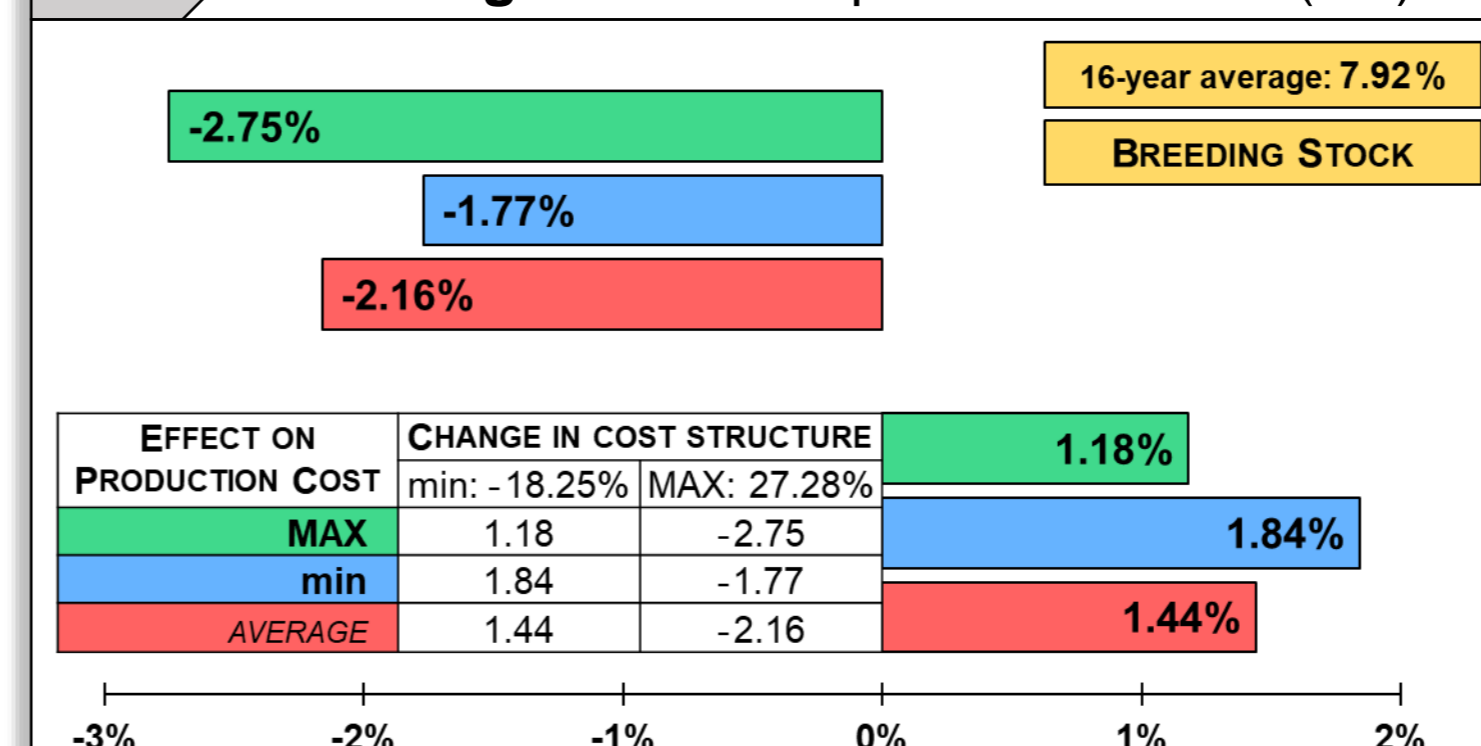
1 Determining cost elements in sheep farming (% on average in 2003–2018)



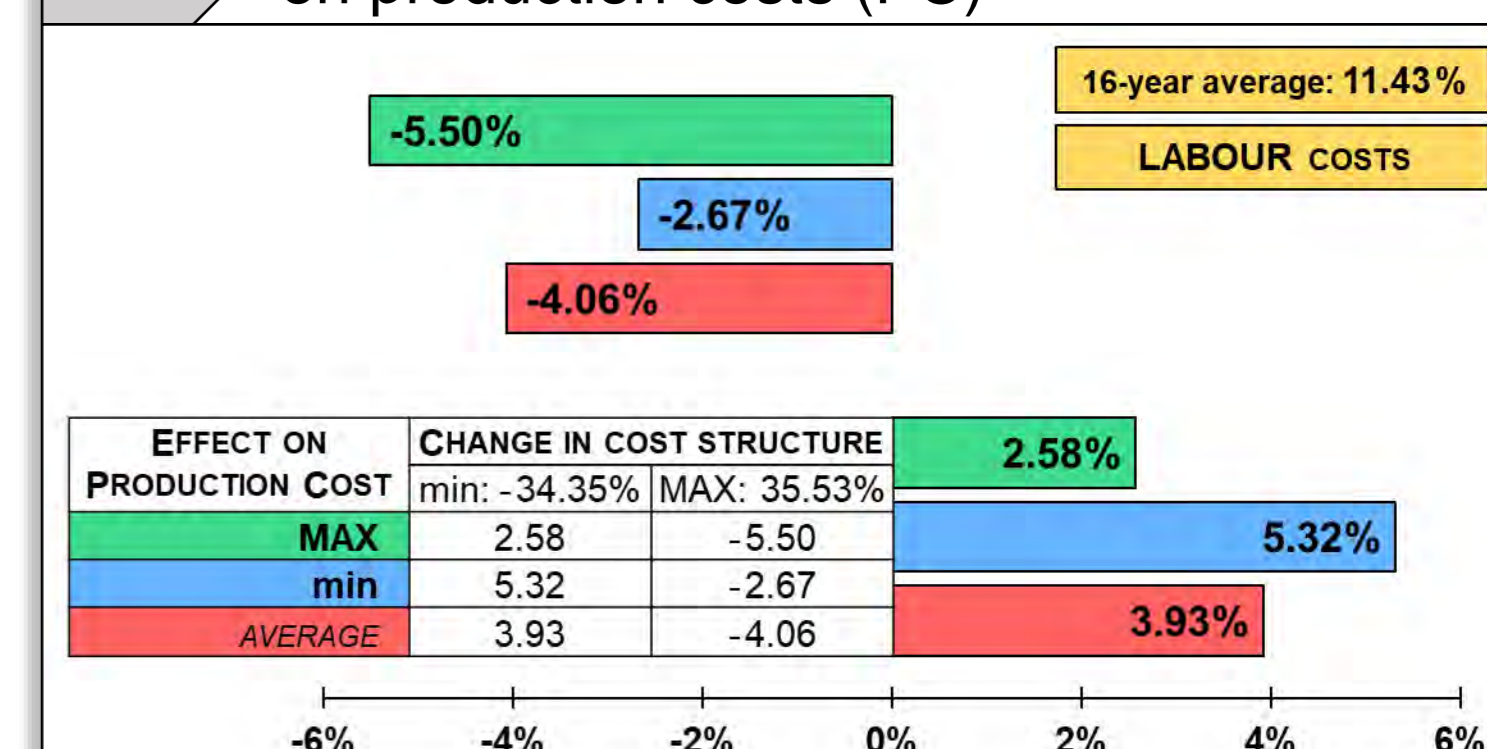
2 Impact of changes in feed costs on production costs (PC)



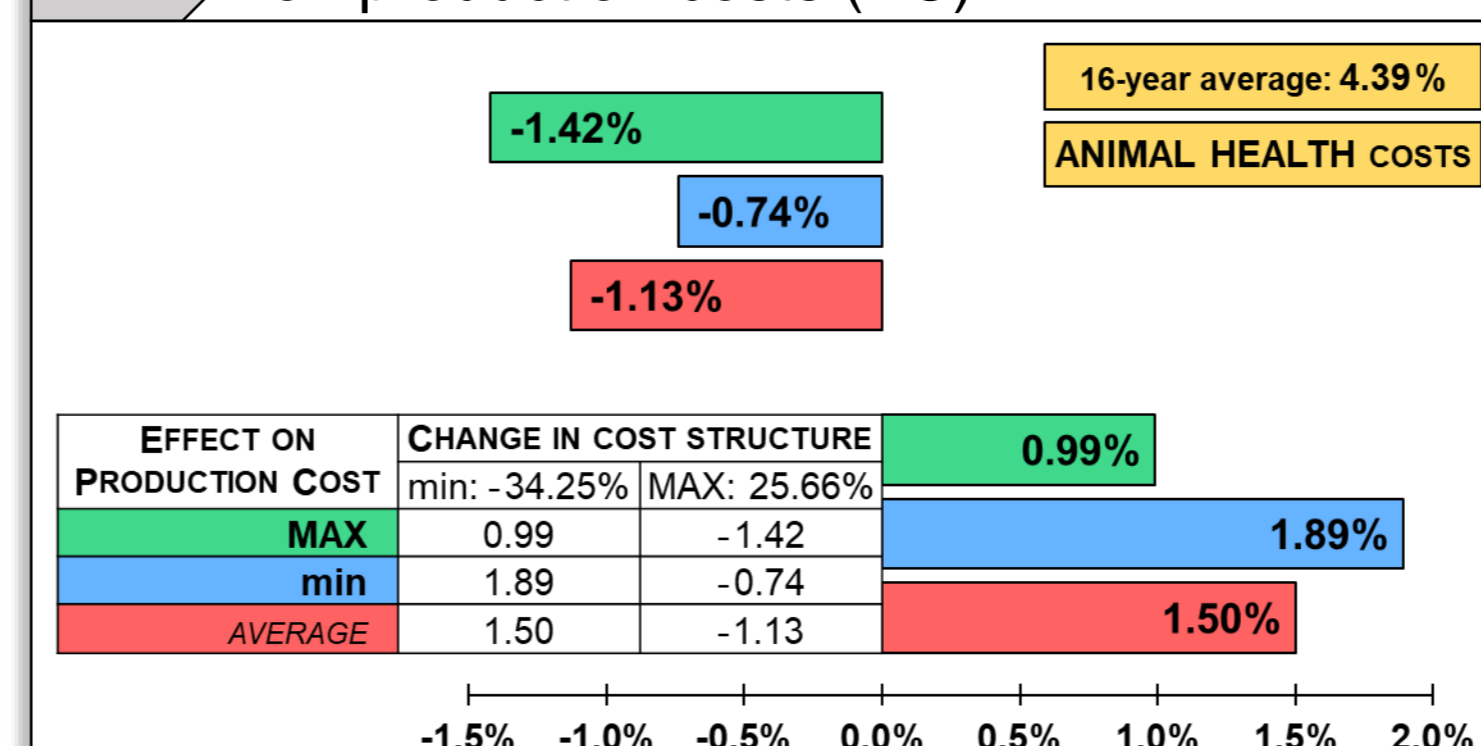
3 The effect of changes in the depreciation of breeding animals on production costs (PC)



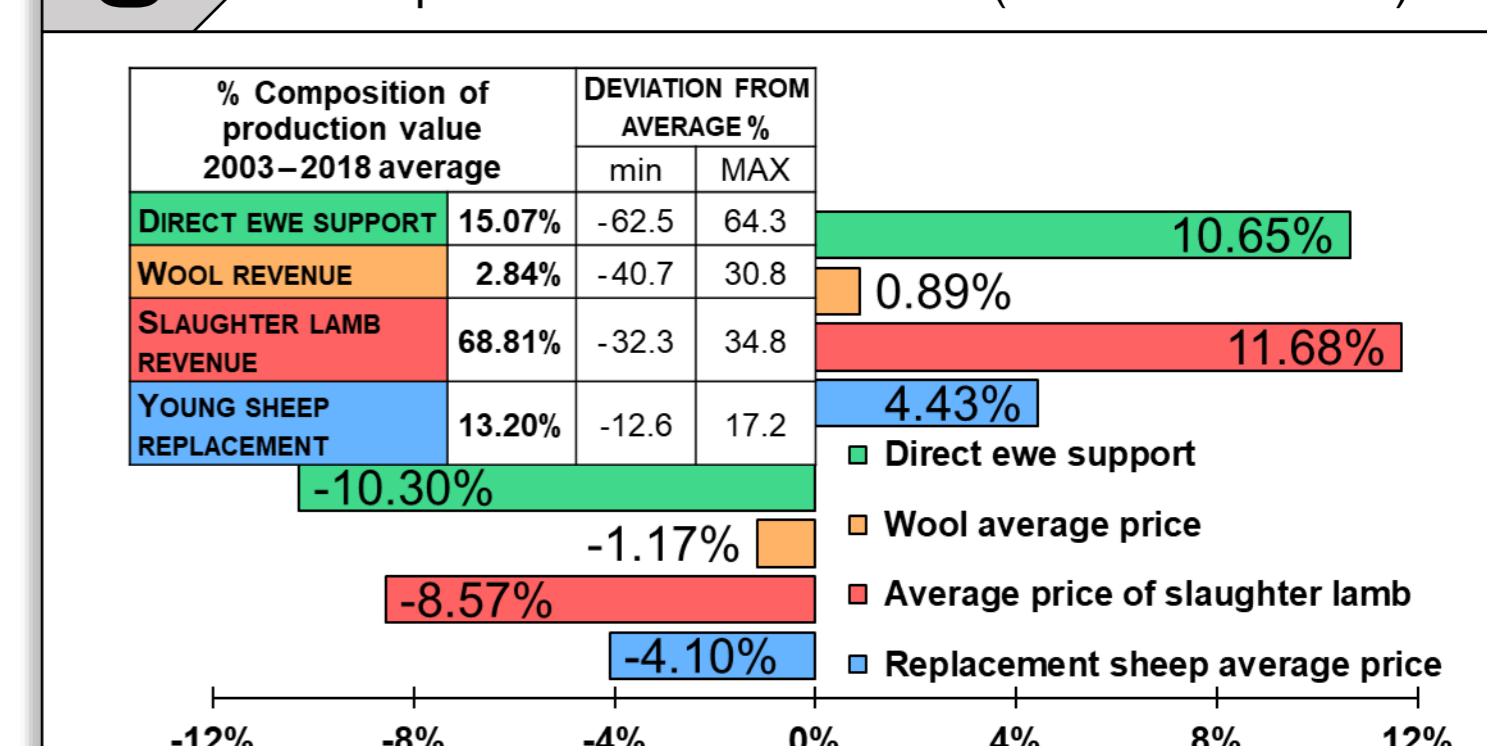
4 Effect of labour costs change on production costs (PC)



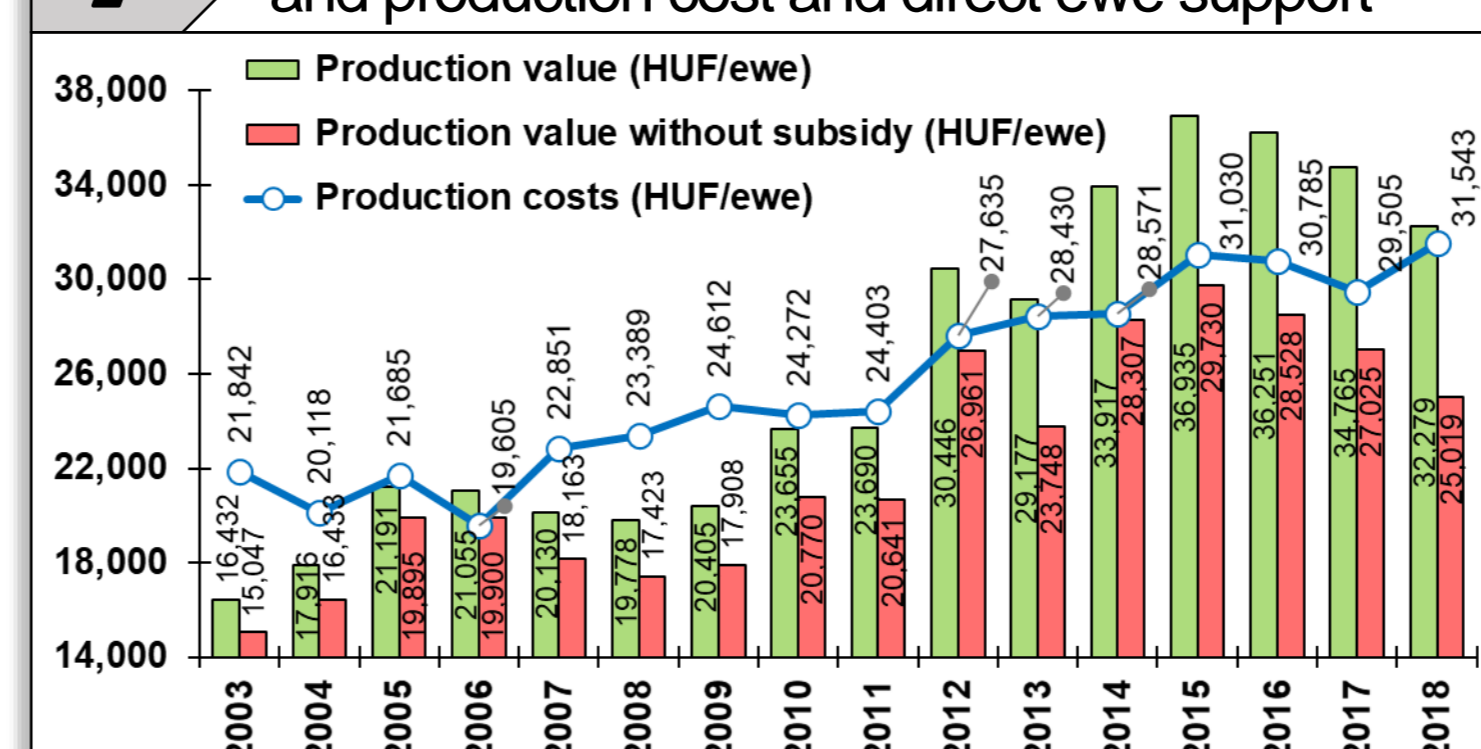
5 Impact of changes in animal health costs on production costs (PC)



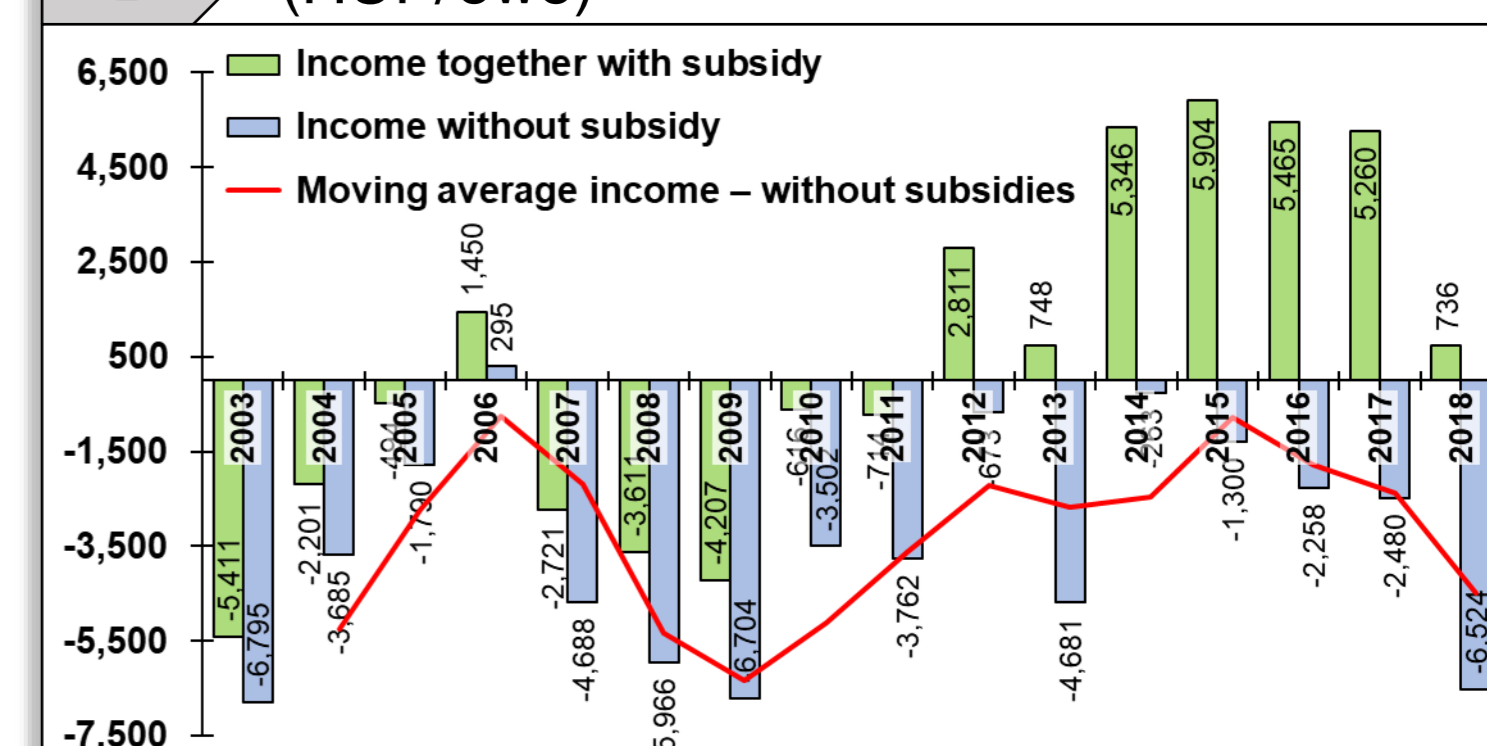
6 The effect of the change of individual sales revenue elements on the production value 2003–2018 (min-max. % values)



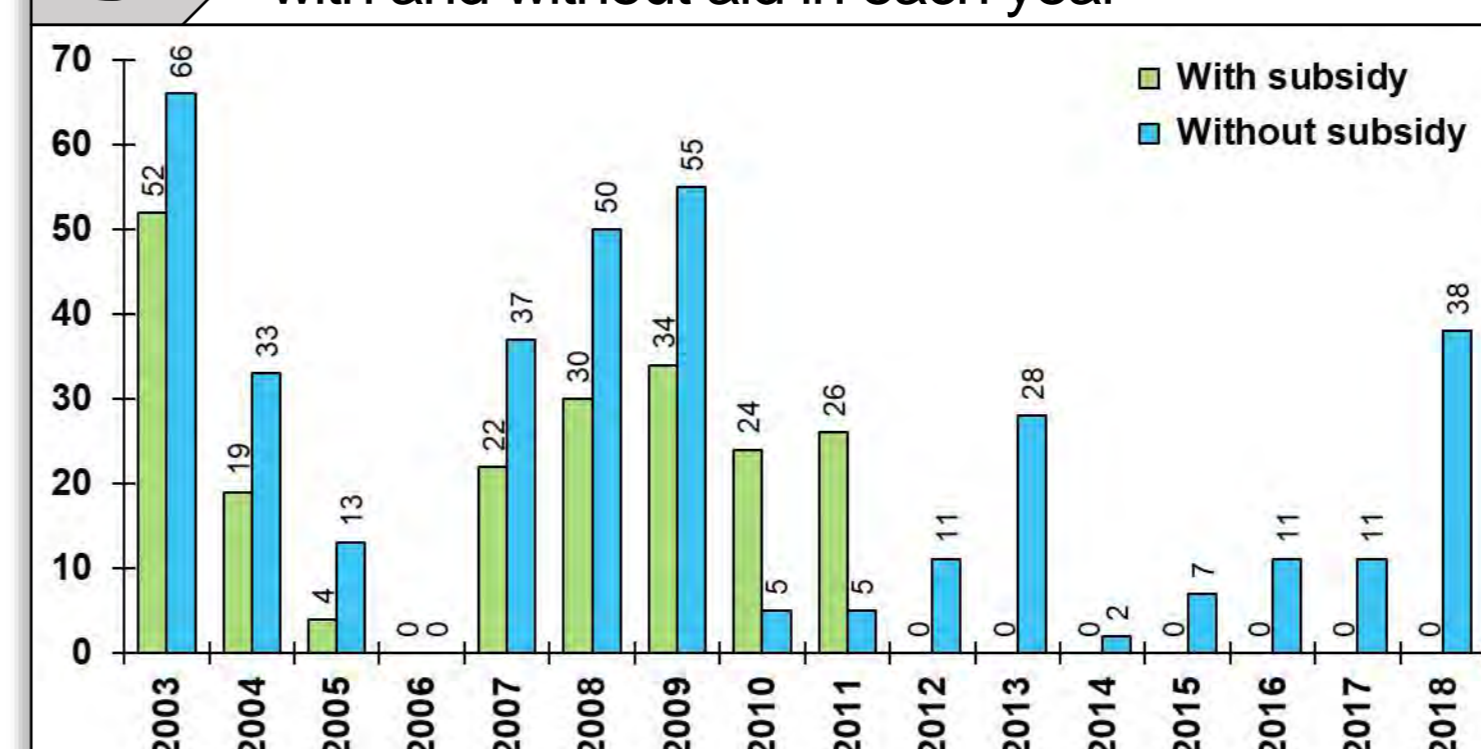
7 Relationship between production value per ewe and production cost and direct ewe support



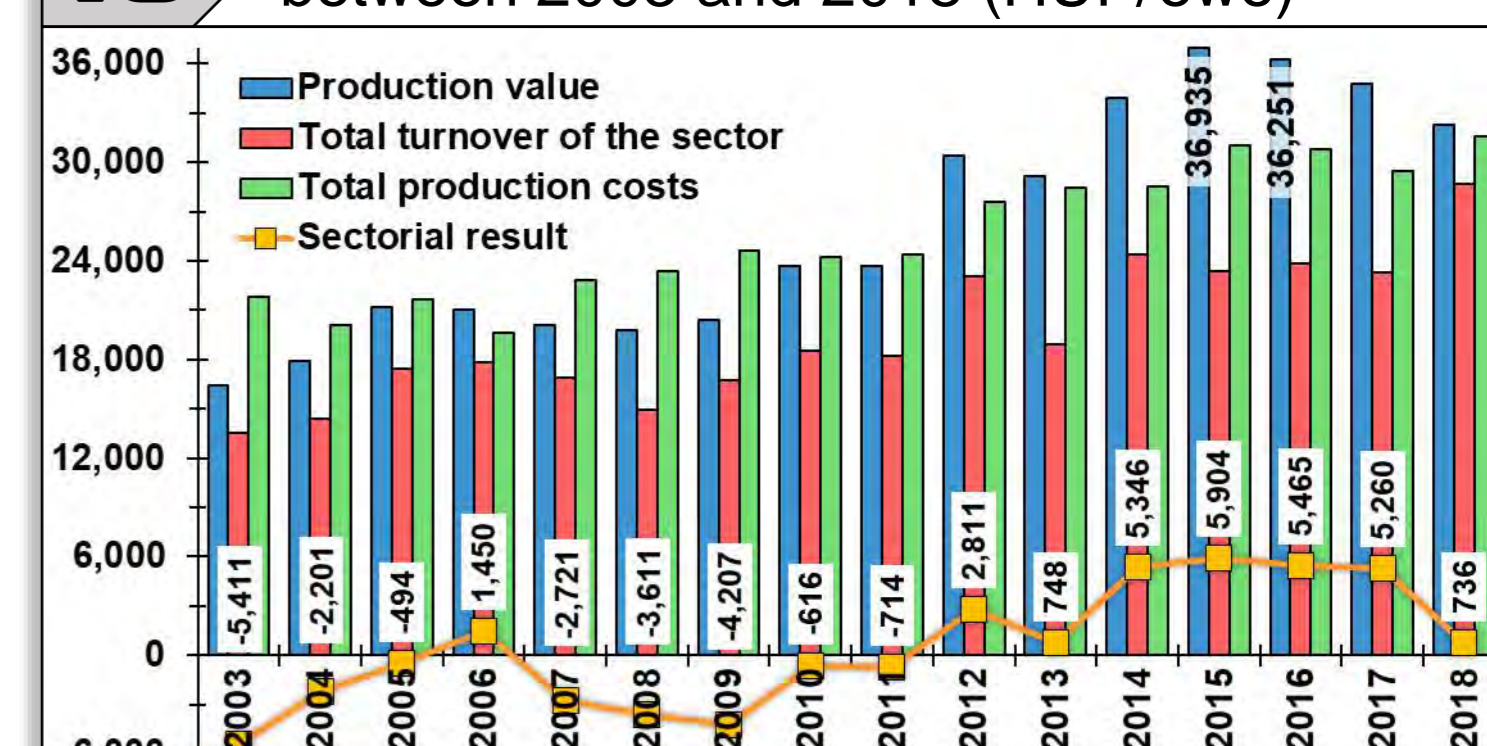
8 Income per ewe and its moving average (HUF/ewe)

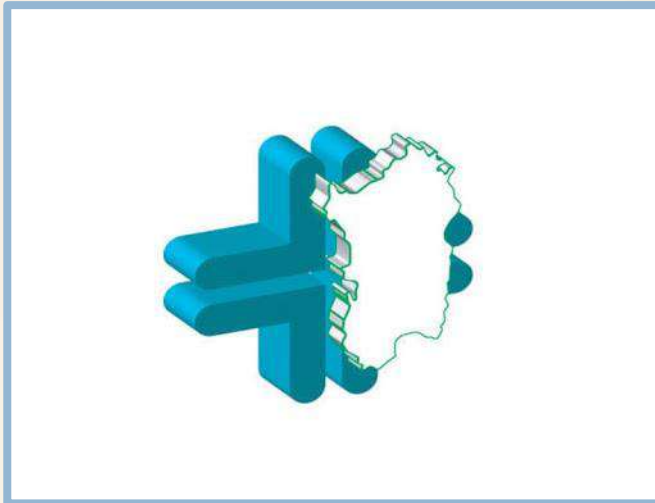


9 Excess per ewe utilized reproduction need (%) with and without aid in each year



10 Change in the sectoral result per ewe between 2003 and 2018 (HUF/ewe)





EFFICACY OF A STABULOGEN VACCINE FOR STREPTOCOCCUS DYSGALACTIAE-INDUCED DERMATITIS IN SHEEP

Sebastian Alessandro Mignacca¹, Lorella Ciccarello², Salvatore Di Bella²,
Vincenzo Di Marco Lo Presti³, and Gavino Marogna⁴

¹ Veterinary practitioner, Enna, Italy

² Azienda Sanitaria Provinciale, Palermo, Italy

³ Istituto Zooprofilattico Sperimentale della Sicilia "A. Mirri", Barcellona P.G., Italy

⁴ Istituto Zooprofilattico Sperimentale della Sardegna "G. Pegreff", Sassari, Italy

Streptococcus dysgalactiae has been reported to be the cause of several infections in farm animals, fishes and humans. In small ruminants, it has been associated with bacteremia, meningoencephalitis, mastitis, omphalophlebitis, polyarthritis and dermatitis. *S. dysgalactiae* has also been isolated from reproductive tract discharges and tonsils of healthy ruminants.

The authors described outbreaks of dermatitis in sheep by *S. dysgalactiae* and its treatment with a stabulogen vaccine in flocks in Sicily (Italy).

Outbreaks occurred during winter season, a couple of weeks after a new purchase of ewes, in 10% of animals of 4 semi-extensively flocks (1300 adults in total) reared in the same pastures (Fig. 1). The animals showed hemorrhagic-necrotic dermatitis to the udder, limbs and head (Figs. 2, 3, 4, 5). Swabs from lesions were collected and submitted for conventional bacteriological and virological tests.

Samples tested positive only for *S. dysgalactiae*. A stabulogen inactivated vaccine was set up following the national guidelines (Fig. 6). In particular, colonies were inactivated with formaldehyde, and aluminum hydroxide was used as adjuvant. It was calculated that the suspension contained around 10⁹ UFC/ml of *S. dysgalactiae*.

Sheep were subcutaneously inoculated with 2ml of vaccine, without showing adverse effects after administration, and treatments were repeated after 1, 6, 12, 18 and 24 months. Ameliorative effects had already been recorded in over 40% of the affected animals after the first inoculation, and complete recovery in the third year after outbreaks was observed.



Authors want to point out that the use of stabulogen vaccine represents a valid, quick and safe procedure for many diseases in farm animals. In the meantime, its use is authorized in symptomatic animals decreasing the use of antibiotics.

References:

- Abdelsalam M., Asheg A., Eissa A.E. (2013) *Streptococcus dysgalactiae*: An emerging pathogen of fishes and mammals. International Journal of Veterinary Science and Medicine, 1, 1-6.
Agnello S., Stancanelli A., Amato B., Campo F., Di Marco Lo Presti V., Mignacca S.A. (2016) Artrite da *Streptococcus dysgalactiae* in capretti in Sicilia: descrizione di un focolaio. In Proceedings of XXII National Congress S.I.P.A.O.C., Cuneo (Italy). 132.
Lacasta D., Ferrer L.M., Ramos J.J., Loste A., Bueso J.P. (2008) Digestive pathway of infection in *Streptococcus dysgalactiae* polyarthritis in lambs. Small. Rum. Res., 78, 202-205.



SHEEP FARMING IN MARGINAL LANDS OF CENTRAL ITALY: RECOGNITION OF COMMON FAILURES DURING SHEARING

Sebastian Alessandro Mignacca¹, Claudio Forte¹, Laura Vieceli², Nigel Thompson³, Luca Schillaci⁴, Chiara Francesca Magistrali¹, and Marco Antonini⁵

1 Istituto Zooprofilattico Sperimentale dell'Umbria e delle Marche 'Togo Rosati', Perugia, Italy
2 Department of Veterinary Medicine, University of Perugia, Perugia, Italy
3 Biella the Wool Company, Biella, Italy
4 Gran Sasso e Monti della Laga Park, L'Aquila, Italy
5 Italian National Agency for New Technology, Energy and Sustainable Economic Development (ENEA) Roma, Italy

Europe has a worldwide leading position in environmental and animal welfare legislation. Among other good practice recommendations, guidelines describing the recommended management of sheep shearing have been defined.

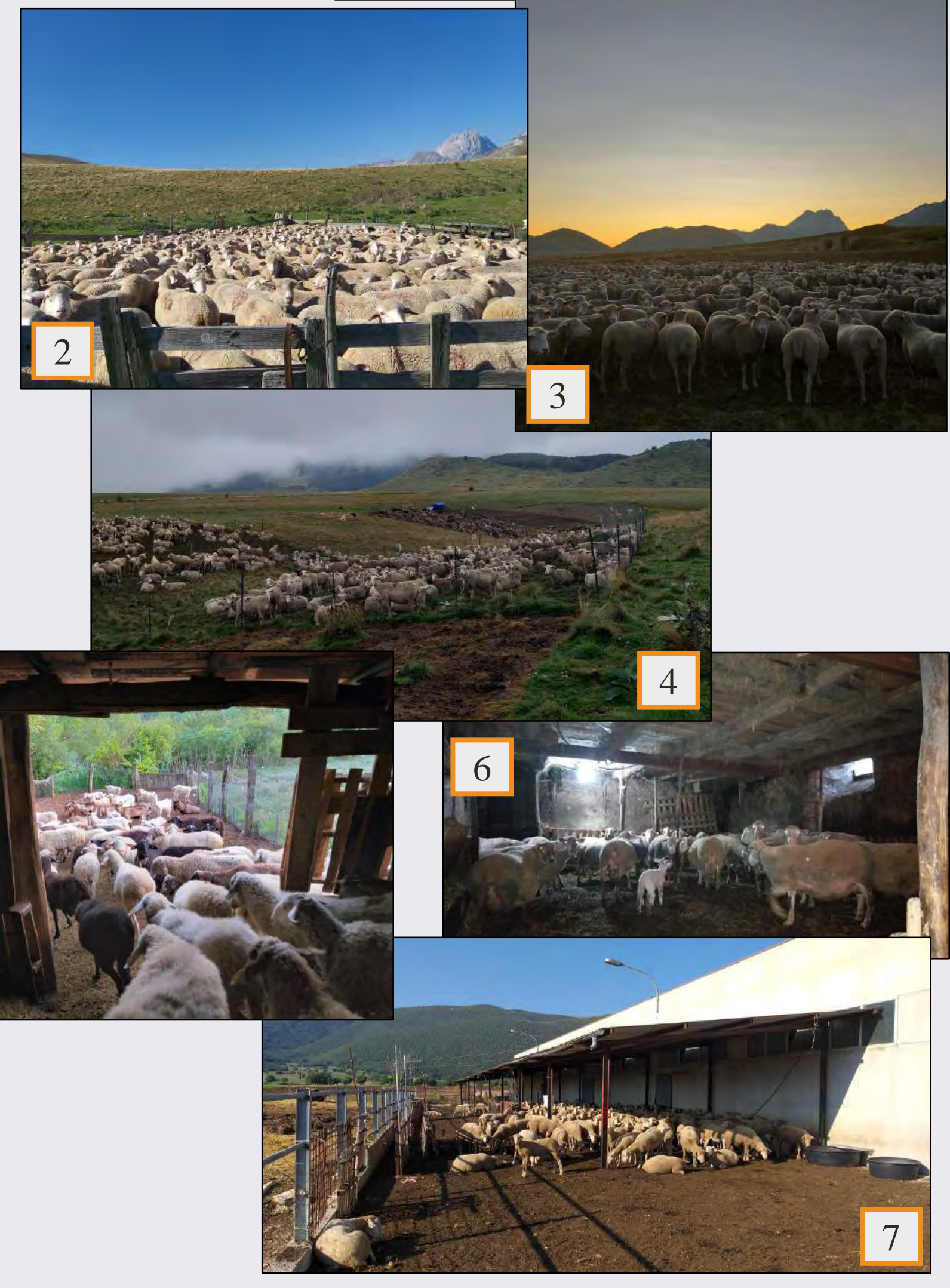
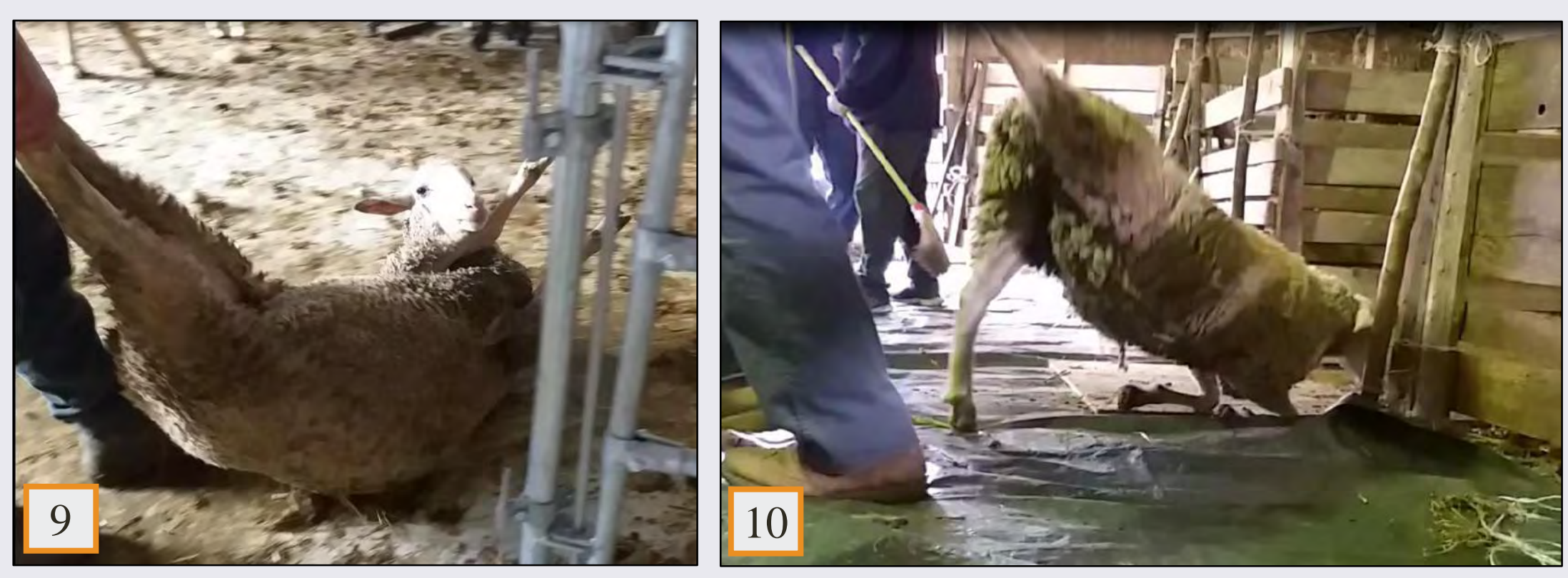
“Woolfair” is a project enrolling 95 farms (approximately 18,000 heads) aimed at addressing resilience, animal welfare and competitiveness of sheep farming in marginal lands in Central Italy (Fig. 1). The farm consistency ranged from a minimum of 6 to a maximum of 1200 animals (Figs. 2, 3, 4, 5, 6, 7), with an average of 187 heads per farm.

Major mistakes observed during the shearing season of 2019 in 25 randomly selected farms (approximately 5900 heads) are reported in this work.

Failures were detected in all the shearing phases.



During pre-shearing, inadequate protection of animals against weather conditions was recorded in 3 out of 25 farms, non-fasted animals in 15 farms (Fig. 8), overcrowding in 5 farms, and inadequate restraint and manipulation in 15 farms (Figs. 9, 10).



The shearing phase revealed inadequate restraint and manipulation in 15 out of 25 farms (Figs. 11, 12, 13), excessive presence of wounds in 8 farms (Figs. 14, 15), and excessive time of shearing in 7 farms.



Post-shearing management resulted in inadequate protection of animals against weather conditions in 3 farms (Fig. 16*), while inadequate nutrition supplementation was recorded in 10 farms.

*Freshly shorn dairy animals being kept outside on both cold days and night at the beginning of April.



Due to the peculiar local environment and farming systems, it does not result easy to adapt good shearing practices. During the on-farm visits, improvements to the shearing management and the link between animal welfare and wool quality have been discussed with stakeholders and easily applicable guidelines for a correct shearing procedure have been provided.