Extensive rearing hinders Maedi-Visna virus infection in sheep in Spain

Name: Eduardo Berriatua

I.Leginagoikoa[1] , RA. Juste[1] , J. Barandika[1], B. Amorena[2] , D. De Andrés[2] , L. Luján[3] , J. Badiola[3], E. Berriatua[1]*
[1]Instituto Vasco de I+D Agrario (NEIKER) , Derio, [2]Instituto de Agrobiotecnología y Recursos Naturales, CSIC-UPNA, Pamplona,
[3] Patología Animal, Universidad de Zaragoza, Spain. *(present address: Murcia Veterinary School: berriatu@um.es)

INTRODUCTION

- Maedi-Visna virus (MVV) is an important slow, degenerative and fatal disease of the lungs, CNS, mammary gland and joints of small ruminants
- Sheep become infected from MVV-containing colostrum and milk and from horizontal contact with infected sheep and the later route is most important in confined sheep. However, the type and extent of contact required for infection is unknown and there is no quantitative information on lactogenic MVV infection.
- Traditionally, MVV control is based on culling all infected sheep and their progeny however, a recent study in Basque semi-intensive dairy flocks housed in winter only showed that the annual No. of sheep that seroconvert is < No. of sheep replaced (annual flock culling=15-25%) so seroprevalence can be gradually reduced by selective culling without increasing average flock culling percentage.
- This study investigates MVV seroprevalence, transmission and control in 38 flocks raised: (i) extensively at pasture, (ii) intensively &housed most time and (iii) semi-intensively & housed only in winter.

MATERIAL & METHODS

Flock selection

- 10 intensive flocks from a list of 30 similar flocks attended by a vet. concerned with high MMV incidence. Selected flocks, were the only ones with periodic milk production analyses.
- 5 semi-intensive flocks had participated in previous MVV studies and not reported MVV cases for a decade.
- 23 extensive flocks including all the flocks with <500 sheep under the care of a vet. that had never diagnosed MVV infections.

10 intensive Assaf dairy-flocks from Castile-León

5 semi-intensive Latxa dairy-flocks from the Basque Country

23 extensive Manchega cross lamb-producing flocks from Castile la Mancha

Sampling & testing

- 6654 blood samples from ≥1 yr-old sheep tested for MVV antibodies by indirect ELISA with Se. and Sp. >98%.
- Farms visited to :
  (i) find out about housing time and rearing of replacement lambs preweaning (with the dam or artificially with MVV- free milk).
  (ii) Measure dimensions of sheep buildings

RESULTS

Table 1. Flock number & size, production system, weaning age of replacement lambs and housing time and space available

Type Flocks	Flock size	Median weaning age (days)	Ewes flock median housing time and space			
			Housing time	Floor area/ Sheep(m²)	Shed volume/ Sheep(m³)	Shed open area/Sheep
Intensive	211-700	42	338	1.0	7.1	0.08
Semi-intens.	272-283	37	171	1.1	10.3	0.14
Extensive	150-392	62	11	1.9	7.9	0.20

Table 2. Ewe and ewe-flock MVV-seroprevalence in the 38 flocks investigated.

Sheep breed and Production system	Ewes		Flocks					
	No. Tested	% Seroposit.	No. Tested	% Seropositives				
				Min.	Quartiles			Max.
					25%	50%	75%	
Intensive Assaf dairy	3913	77	10	44	66	82	94	96
Semi-intensive Latxa dairy	1479	25	5	5	14	31	31	47
Extensive Lamb production	1262	5	23	0	0	4	7	21
Total	6654	52	38	0	2	9	47	96

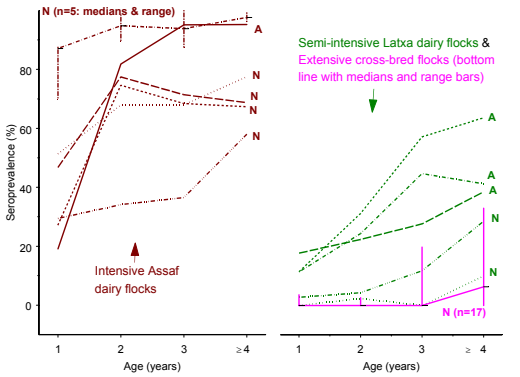

Fig.1.Age-seroprevalence and relationship with mode of rearing pre-weaning (N: raised naturally with the dam, A: artificially with MVV-free milk,)

- Sheep in intensive flocks were housed for longest, at greatest stocking density in poorest ventilated buildings and the opposite was the case for extensive flocks (Table 1).
- Seroprevalence was highest in intensive flocks and lowest in extensive flocks (table 2). Among the latter seroprevalence was 0% in six flocks.
- Overall, seroprevalence was associated to housing time and not to other housing variables (univariate results in Table 2).
- However, within a particular system seroprevalence was not associated with housing time and increased with age (Fig.1).
- The slope of the age-seroprevalence curve differed according to the system and mode of rearing preweaning (Fig. 1); in intensive flocks seroprevalence at 1 yr-old it was much lower in lambs raised artificially but most seroconverted in the year after joining the adult flock (Fig. 1).

SUMMARY & CONCLUSIONS

- Extensive rearing appears to prevents MVV-infection from reduced horizontal transmission - this may explain absence of MVV in extensive systems such as in Australasia.
- Lack/reduced infection in extensive flocks could be further evidence that lactogenic transmission alone may be unable to maintain flock infection (R_0<1)
- Seroprevalence variability in similar intensive flocks indicates other unknown factors affect infection including host & parasite genetic traits, other diseases and management practices.
- Like shown for semi-intensive flocks, extensive flocks and intensive flocks with moderate seroprevalence could reduce seroprevalence by selectively culling seropositives without needing to increaseaverage flock culling percentages, and replacing them with progeny from older seronegative sheep (shown to be less MVV susceptible).
- Instead, it is unlikely that the later control strategy will be effective in intensive flocks with high seroprevalence and more research is required to elucidate MVV transmission and control in these flocks.

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