

**RELATION BETWEEN BIRTH WEIGHT OF LAMBS AND  
MILK PRODUCTION IN EWES****G. Pulina, R. Bencini, S.P.G. Rattu****Summary**

Milk production in sheep seem to be related to lamb weight at birth. This is probably due to the lactogen placental hormone whose secretion depends on the weight of the placenta. 4 experimental trials were carried out, 2 on Sarda ewes (S) and 2 on Merino (M) and Awasi x Merino (A x M) ewes, during the period between 5-th and 8-th week post partum. Data of body weight of ewes, weight at birth weight of lambs and milk production were collected. Linear regression analysis between grams of lamb at birth per kg of ewe's body weight and grams of milk produced per kg of ewe's body weight show that the two variables are positively correlated and that milk removal by twin lambs increased milk yield.

key words: milk production, lamb weight, sheep.

*Introduction*

Milk production is affected by the number of the lambs born and may be affected by weight of the lambs at birth. Ewes with twin lambs produce more milk than ewes with single lamb. This is seen both in meat breeds (Torres-Hernandez and Hohenboken, 1980; Snowden and Glimp, 1991) and in dairy breeds (Bertoni et al, 1988; Pulina et al., 1993).

The greater milk production can be attributed to two factors. Firstly, twin lambs remove more milk than single lamb. Secondly, multiple or bigger foetuses may produce larger amount of ovine placental lactogen hormone that promote mammogenesis (King and Thatcher, 1993).

This work tested the hypothesis that there is a relationship between lamb weight at birth and milk production in ewes.

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### Materials and Methods

We carried out 4 experiments: two in Sardinia (Italy) on Sarda ewes (S) and two in Western Australia on Merino (M) and Awassi x Merino ewes (A x M).

We recorded the number and weight of lambs born per ewe and the body weight of ewes at lambing. In experiments 1 and 3 we had only single lambs.

We recorded daily milk production between weeks 5 and 8 post-partum: on the S sheep after weaning by hand milking, on the M and A x M sheep during suckling with oxytocin technique (Bencini et al., 1992).

In experiment 4 the M and A x M ewes that gave birth to twin lambs had one lamb removed at birth and suckled the remaining lamb. Because of the positive correlation between body weight of ewe and milk yield and between body weight of ewe and lamb weight at birth, we calculated the relationship between grams of lamb produced per kg of ewe body weight (g LP/kg E) and grams of milk produced daily per kg of ewe body weight (g MP/kg E) using the linear regression analysis.

### Results and Discussion

In all breeds the weight at birth of lambs and the milk production of ewes are positively correlated as shown by the sign of the regression coefficient "b". This is case for single and twin lambs combined (table 1 and figure 1).

Table 1 - PARAMETERS OF THE REGRESSION EQUATIONS FOR SINGLE AND TWIN LAMBS TOGETHER

Breed	n	Y(gMP/kgE)	a	b	X(gLP/kgE)	RSD	R <sup>2</sup>
Sarda	67	(38.9)	29.8	0.076	(121.2)	10.3	0.094**
Merino	14	(25.4)	21.7	0.033	(111.0)	6.9	0.013n.s.
Aw.x Mer.	20	(33.9)	18.0	0.132	(120.5)	7.8	0.223**

RSD = Residual Standard Deviation; \*\* P<0.01; into brackets medium values.

Table 2 - PARAMETERS OF THE REGRESSION EQUATIONS FOR SINGLE LAMBS

Breed	n	Y(gMP/kgE)	a	b	X(gLP/kgE)	RSD	R <sup>2</sup>
Sarda (1)	16	(38.8)	22.0	0.165	(101.6)	6.9	0.116n.s.
Sarda (2)	43	(37.4)	27.4	0.106	(94.3)	10.8	0.035n.s.
Merino (3)	26	(27.2)	-0.8	0.290	(96.4)	7.5	0.137*
Merino (4)	7	(25.1)	17.1	0.084	(94.3)	7.4	0.035n.s.
Aw.x Mer (4)	10	(30.2)	-9.6	0.413	(95.9)	4.4	0.632***

RSD = Residual Standard Deviation;

\*p<0.05, \*\* P<0.001; into brackets medium values. (number of trial)

Figure 1. - CORRELATION BETWEEN GRAMS OF LAMB PRODUCED PER KG OF EWES AND GRAMS OF MILK PRODUCED PER KG OF EWES FOR ANIMALS WITH SINGLE AND TWIN LAMBS TOGETHER

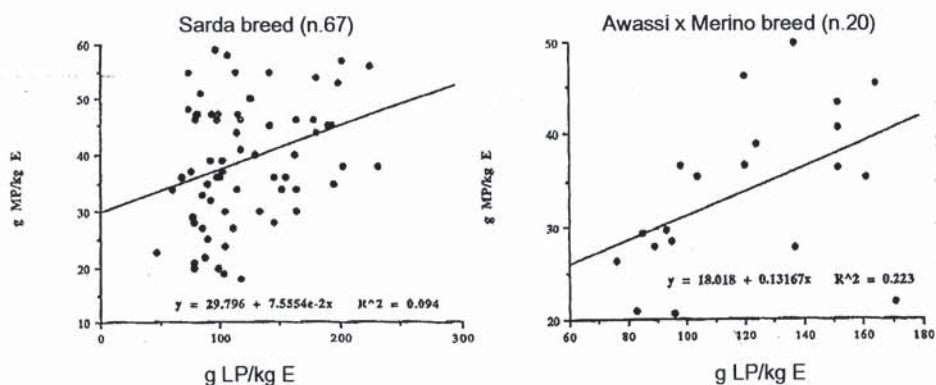
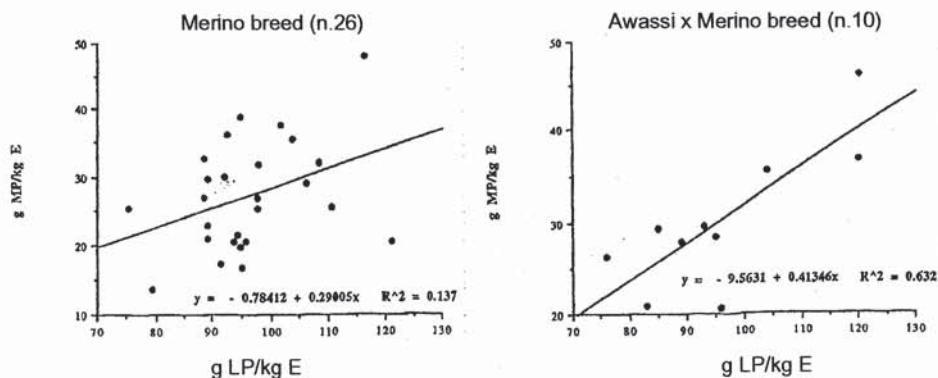


Figure 2. - CORRELATION BETWEEN GRAMS OF LAMB PRODUCED PER KG OF EWES AND GRAMS OF MILK PRODUCED PER KG OF EWES FOR ANIMALS WITH SINGLE LAMBS



The determination coefficient  $R^2$  is significantly different from zero both in the S ewes ( $P < 0.01$ ) and in the A x M ewes ( $P < 0.01$ ), but not in M ewes; it is significantly different from zero in M ewes ( $P < 0.05$ ) and A x M ewes ( $P < 0.001$ ) with single lambs (table 2 and figure 2) and only in the S ewes ( $P < 0.05$ ) with twin lambs (table 3 and figure 3).

The small number of animals of the M breed (single and twins together) and the large variability in the S breed (single lambs) can explain the lack of a significant correlation for these thesis.

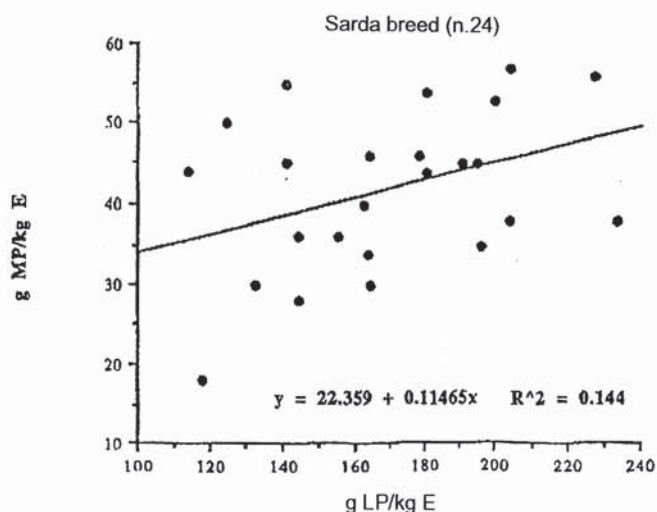


Table 3 - PARAMETERS OF THE REGRESSION EQUATIONS FOR TWIN LAMBS

Breed	n	Y(gMP/kgE)	a	b	X(gLP/kgE)	RSD	R <sup>2</sup>
Sarda	24	(41.8)	22.4	0.115	(169.5)	9.1	0.144*
Merino	7	(25.8)	26.2	-0.004	(127.8)	5.2	0.000
Aw. x Mer.	10	(37.6)	45.8	-0.057	(145.0)	7.7	0.023n.s.

RSD = Residual Standard Deviation; \*\* P<0.05; into brackets medium values.

Figure 3. - CORRELATION BETWEEN GRAMS OF LAMB PRODUCED PER KG OF EWES AND GRAMS OF MILK PRODUCED PER KG OF EWES FOR ANIMALS WITH TWIN LAMBS



In experiment 4, where one lamb of two was removed after lambing, the correlation was however low and non significant. This suggests that milk removal by twin lambs plays an important role in determining milk production.

Our results support the hypothesis that milk production in ewes and live weight of lambs at birth are positively correlated.

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**ODNOS IZMEĐU TEŽINE JANJADI I OVACA PRI JANJENJU I PROIZVODNJE  
MLIJEKA U OVACA**

**Sažetak**

Čini se da je proizvodnja mlijeka u ovaca povezana s težinom janjadi pri janjenju. To se vjerojatno može pripisati laktogenom hormonu placente čije izlučivanje ovisi o težini placente. Obavljena su 4 pokusna ispitivanja, 2 na ovcama Sarda (S) i 2 na Merino (M) i Awassi x Merino (A x M) ovcama, u razdoblju između 5. i 8. tjedna post partum. Sakupljeni su podaci o tjelesnoj težini ovaca, težini janjadi pri janjenju i proizvodnji mlijeka. Analize linearne regresije između grama janjadi kod janjenja na kg tjelesne težine ovce te grama mlijeka proizvedenog na kg tjelesne težine ovce pokazuju da su ove dvije varijable u pozitivnoj uzajamnoj vezi i da uklanjanje mlijeka u slučaju janjaca blizanaca povećava davanje mlijeka.

Ključne riječi: proizvodnja mlijeka, težina janjadi, ovce

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