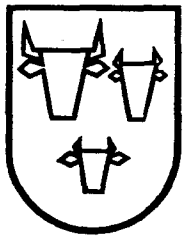
2nd. WORLD CONGRESS ON GENETICS APPLIED TO LIVESTOCK PRODUCTION

II CONGRESO MUNDIAL DE GENETICA APLICADA A LA PRODUCCION GANADERA



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OVARIAN ACTIVITY DURING SUMMER IN SHEEP SELECTED FOR EXTENDED BREEDING SEASON

ACTIVIDAD OVARIA DURANTE EL VERANO EN OVEJAS SELECCIONADAS PARA TEMPORADA DE CRIANZA EXTENSIVA

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INTRODUCTION

Most sheep breeds experience a period of reduced sexual activity during the hot summer months. In some breeds this activity can halt completely and the ewe starts a period of aneostrus. Using light control and/or hormone treatment were found to be effective in controlling the reproductive processes during this infertile period (Ducker, Thwaites and Bowman, 1970; Rommel, Muller and Elze, 1978; Hamilton and Lishman, 1979; Walton, Evins, Fitzgerald and Cunningham, 1980).

DLS is a pupulation of sheep presently being developed in Quebec for extended breeding season (Fahmy, 1976, Fahmy, MacIntyre and Chancey, 1980). The animals are selected from a population of ½ Dorset, ¼ Leicester and ¼ Suffolk for their ability to mate during the summer months. They are exposed to rams on June 1st each year and their lambing date recorded. The rams born to the early-lambing ewes are those used for breeding. An unselected control population was maintained to assess the genetic changes occurring in the selected group. The rams in this control population were chosen at random.

The objective of this study is to report on the ovulation observed from May to September in the selected as compared to the control group.

MATERIAL AND METHODS

In a preliminary study conducted in 1978 on 65 ewes born in 1974, five ewes were slaughtered per week from June 8 to August 31. The ewes were among the lowest in an index based on their Lambing date. A year later, 101 selected and 62 control ewes were slaughtered at the rate of 6 selected and 4 control ewes each week starting from May 9th to August 29th inclusive. Fifty ewes of the selected group were born in 1974, they lambed in 1976, 1977 and 1978. According to their lambing performance in 1976 and 1977 they ranked among the best among their contemporaries (H.S.). The remaining 51 ewes were born in 1975, and lambed in 1977 and 1978. Their lambing records placed them among the lower 50% of their contemporaries (L.S.). Similarly, the ewes in the control group were born in 1974 (35 ewes) and 1975 (27 ewes) and lambed in the same years as those of the selected group. Sixteen of the selected ewes were from the 4th generation of selection, the remaining 84 were from the 3rd generation.

Starting from May 19th, 1979 and for 16 weeks thereafter, 10 ewes, 6 selected (3 from each year of birth) and 4 control (2 from each year of birth) were slaughtered and their ovaries recovered. The ewes were assigned to the slaughter dates at random. The two ovaries from each ewe were identified as to the location (left or right) and the source (the ewe and group) and were frozen. When a sizable number of ovaries accumulated they were thawed and measured. The weight of the ovaries intact, the number of corpora lutea, and corpora albicana present, the diameter of the largest and the second largest follicules were recorded. Information on the previous lambing performance of the ewes was also recorded.

In order to present the results, the ewes were classified into those with active or inactive ovaries according to the presence or absence of corpora lutea, (CL), corpora albicana, (CA) and large follicules (7 mm or larger). Ewes with CL whether or not present with CA and/or large follicules were considered to be cycling, those with large follicules and no CL were considered to be starting their cycling activity and classified as active. Ewes with no CL, CA or large follicules were considered anoestrus and classified as inactive. The duration of the study was divided into 2 six-and 1 five-week periods to correspond to the seasonal changes in day-length (increasing, 1; decreasing, 2; further decreasing, 3).

RESULTS

The ovarian activity during the summer months of the ewes slaughtered in 1978 are presented in Table 1. During the 6 weeks from June 23 to July 27 three ewes out of 30 had ovulated. The number of ewes ovulating per week increased progressively during the month of August, in all 52% were found to have ovulated during this month.

TABLE 1

Preliminary results on the ovulation in DLS ewes during summer months.

Date	No. killed	Ewes ovulating		% ovulated
		Single	Multiple	
June 8	5	0	0	30
June 15	5	3	0	
June 23	5	1	0	
June 28	5	0	0	
July 5	5	0	0	10
July 13	5	1	1	
July 20	5	0	0	
July 27	5	0	0	
August 3	5	0	1	
August 9	5	0	1	
August 15	5	1	1	52
August 21	5	1	3	
August 31	5	3	2	
Total	65	19		29

The ovarian activity during the summer months of the ewes slaughtered in 1979 are presented graphically in figure 1. Over the period of the observations, 42% of the ewes in the high-selected (HS) group were exhibiting one form of ovarian activity or another (CL or large-size follicles) compared to 24% for the control group of similar age, and 31% for the low-selected (LS) group. The greatest difference between the HS and LS ewes was observed in the second period, the 28 percentage points being significant ($P<0.10>.05$). Over 63% of the selected ewes had active ovaries in the third period compared to about 28% for the control ewes.

With two exceptions, all the control ewes whose ovaries were found active during the period of the study, had at least one previous lambing before January 1st. The average lambing dates in the preceeding lambings of the ewes active and inactive during the study are presented in Table 2, together with the weight of the ovaries. The latter were calculated for the inactive ewes only and hence, the effect of the presence of CL, CA or large follicules was eliminated.

Very little differences were found between the selected and control groups in average date of lambing in the preceeding years, although the findings of the present study indicate otherwise had these ewes conceived when found active. Although there were noticable differences between the HS and LS groups, in date of lambing, it must be recalled that the year of lambing and age of ewe were confounded and hence direct comparisons are not valid.

Little difference was observed in the weight of the ovaries between the selected and control groups in 1974, the difference was however, significant in those born in 1975. In both years of birth, the ovaries of the selected ewes were slightly heavier than those of the controls.

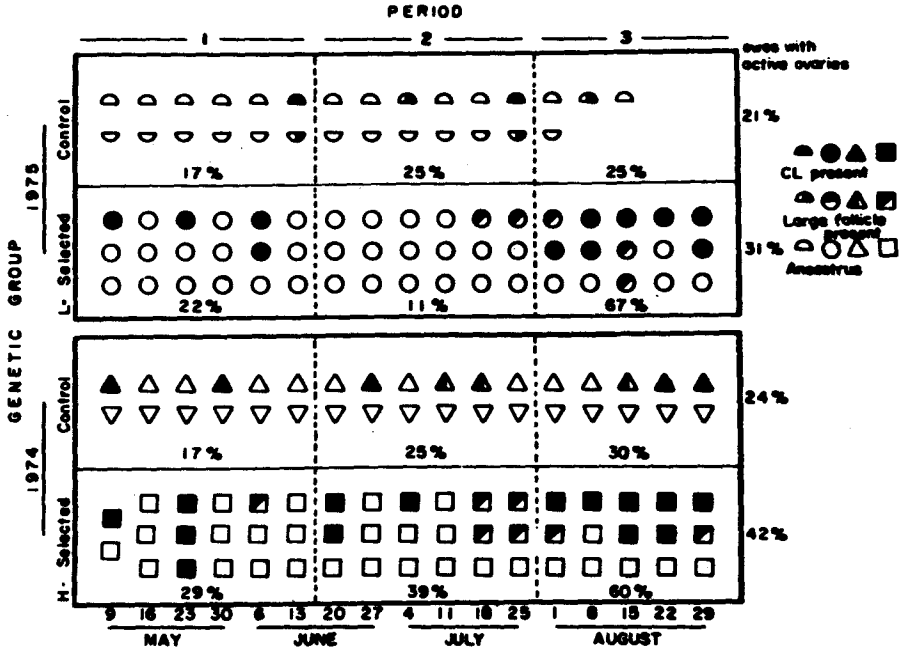

Figure 1. Ovarian activity in selected and control ewes during the summer.

TABLE 2

Date of lambing (±SD) in the preceeding years of sexually active and inactive selected and control ewes during the summer, and weight of the intact ovaries.

Genetic Group/Year		State of the ovaries		Wt of the ovaries (Inactive)
		Inactive	Active	
1975	Control	Jan 26 ± 14	Jan 21 ± 12	1.49[a] ± .38
	L. Selected	Jan 28 ± 23	Jan 22 ± 19	1.86[b] ± .32
1974	Control	Jan 16 ± 23	Jan 15 ± 22	1.85 ± .40
	H. Selected	Jan 14 ± 21	Jan 12 ± 31	1.97 ± .47

a-b: Significantly different ($P<0.05$).

DISCUSSION

Although many differences reported in this study lacked significance, the trend was however consistant, and confirm observations previously made by Dufour (1974) and Dufour, Fahmy and Adelakoun (1982). Dufour (1974) observing the oestrus behaviour of 19 first-generation DLS ewes, showed that in May non was cycling, however in June, July and August, 32, 47 and 90% of the ewes were cycling respectively. In a recent study, Dufour et al (1981) reported that out of 29 DLS ewes 20 (79%) were cycling between May 1st and June 12th, 10 (34%) between June 12th and July 24th and 29 (100%) between July 24th and September 4th. As determined from the progesterone profile the authors reported that 2 (7%) kept on cycling throughout the entire summer.

Although the ideal method to detect ewes which are sexually active during the summer is by following the same ewes throughout the period either by repeated laparoscopy or by determining plasma progesterone level in blood samples (Robertson, 1977). Nevertheless, the findings of the present study indicated that there is a wide variation among the DLS ewes in their ability to maintain or initiate oestrous activities during the summer. Accordingly, selection for out-of-season breeding can be effective in improving the population in that direction, especially that the heritability of date of lambing was found to be moderately high (Fahmy, 1980). This improvement was manifested in this experiment by the relatively better performance of the selected as compared to the control group.

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SUMMARY

A total of 101 DLS ewes selected for extended breeding season from a population of ½ Dorset, ¼ Leicester, ¼ Suffolk and 62 unselected controls were slaughtered at the rate of 10 ewes per week from May 9th to August 29th to study the sexual activity of the ewes during the summer. Half the ewes of the selected group ranked among the best of their contemporaries according to date of lambing, of these 42% were sexually active during the period of the study compared to 31% for the other half which ranked lowest and 24% for the control group. From mid-June to the end of July, the difference between the high and low selected groups was 28 percentage points ($P<0.10>.05$). From August 1st to 29th, 63% of the selected and only 28% of the control ewes were active. The results agree with those of a preliminary study conducted a year earlier in which 65 low-ranked ewes were slaughtered from June 8 to August 31. Ten percent of the ewes had ovulated from June 23 to July 27 and 52% from August 3 to 31.

RESUMEN

Un total de 101 ovejas DLS seleccionadas para temporada de crianza extensiva de una población de ½ Dorset, ¼ Leicester, ¼ Suffolk y 62 controles sin seleccionar fueron sacrificados al promedio de 10 ovejas por semana del 9 de mayo al 29 de agosto para estudiar la actividad sexual de las ovejas durante el verano. La mitad de las ovejas del grupo seleccionado figuraba entre las mejores de sus contemporáneas de acuerdo a la fecha de paridera, de los cuales 42% fueron sexualmente activas

durante el período del estudio comparado al 31% para la otra mitad que promediaba como el más bajo y el 24% para el grupo de control. De mediados de junio a fines de julio la diferencia entre los grupos seleccionados alto y bajo fue de 28 puntos de porcentaje ($P<0.10>.05$). Del primero al 29 de agosto, se mantuvieron activas 63% de las ovejas seleccionadas y solamente el 28% de las de control. Los resultados coinciden con los de un estudio preliminar llevado a cabo un año antes durante el cual se sacrificaron 65 ovejas de rango bajo del 8 de junio al 31 de agosto. Diez por cinto de las ovejas habían ovulado del 23 de junio al 27 de julio, y 52% del 3 al 31 de agosto.

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