

Scientific Paper

Effect of body condition on the ovarian activity in cows[▲]

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The objective of the study was to evaluate the effect of body condition (BC) on ovarian activity. The study was conducted in the Guayabal genetic farm, belonging to the Agricultural University of Havana –Mayabeque, Cuba–, with 57 empty cows from four dairy farms. The animals were under similar management and feeding conditions, and were divided into three groups according to the body condition scale for the cattle dedicated to milk production: I: < 2,5; II: 2,5-3,5; III: > 3,5. To determine the ovarian activity the general status was inspected and gynecological exploration was carried out. Afterwards, the cows were divided into two groups: those which showed anestrus and the ones that were cycling. A high percentage of anestrus cows with BC lower than 2,5 was found. Likewise, there was a low percentage of cows which were cycling in this group in the four studied dairy farms. Anestrus values of 48,0; 51 and 0 % were observed for groups I, II and III, respectively; while in the ones diagnosed as cows that were cycling after rectal palpation and could be incorporated to reproduction it was 16; 79 and 4 % for groups I, II and III, respectively. It is concluded that the cows with body condition lower than 2,5 had ovaries with characteristics compatible with functional anestrus; while the highest ovarian activity was shown in the cows that had BC between 2,5 and 3,5. To analyze possible solutions for the animals of this herd is recommended, due to the implications in subsequent milk production.

Keywords: estrus cycle, reproduction, cow

Introduction

The world's economic situation requires efficacious management practices to improve the profitability of milk production facilities. Although the management systems of commercial dairy farms differ in different parts of the world, the main purpose that should be taken into consideration in any dairy farm is impregnate cows as soon as possible after parturition (Bó *et al.*, 2012).

In Latin America, animal husbandry is the one that favors the most and makes the highest contribution to the agricultural domestic product of the different countries (Barragán-Hernández *et al.*, 2015). Over time, as part of livestock management, several cattle breeds have been combined among them, based on the crossing approach (*Bos taurus* and *Bos indicus*) in obtaining a double purpose animal, with which its rusticity and adaptation to the environment have increased.

In spite of the breeding work, the best results have not been obtained in the reproductive efficiency of cattle herds. Such inefficiency is ascribed to inadequate reproductive management practices,

environmental factors, genotype and reproductive diseases; although the most important are nutritional factors (Álvarez *et al.*, 2015), which affect profitability negatively (Balarezo *et al.*, 2016).

An example of negative factor is anestrus, which is the major cause of decreases in the production rate of cattle, and is generally caused by deficiency in nutrient ingestion, which causes the depletion of the body reserves of the animals (Ferreira *et al.*, 1999).

The objective of this work was to evaluate the effect of body condition on ovarian activity in the Guayabal genetic farm, Mayabeque province.

Materials and Methods

Location of the study. The research was conducted in the Guayabal genetic farm, belonging to the Agricultural University of Havana (UNAH) –Mayabeque, Cuba–, located at the latitude 22.9613895 and longitude -82.1511078, in the Northern hemisphere.

Animals and management. Empty cows from four dairy farms (022, 023, 024 and 025), subject

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to similar management and feeding conditions and declared epizootiologically free from infective-contagious diseases, were used. The dairy farms were integrated by cows from different Holstein x Zebu crossings. In all the dairy farms the calf rearing system was artificial (the calves suckled beside their mother until they were seven days old and were later transferred to post-weaning, with artificial feeding), and milking was performed twice: first from 5:00 to 6:30 a.m. and the second time, from 3:30 to 5:00 p.m.

Management and feeding system. The feeding system in the four dairy farms was semi-intensive. The cows grazed from 6:30 to 10:00 a.m. and from 5:00 to 7:00 p.m. They remained in the sheds from 10:00 a.m. to 5:00 p.m. and from 7:00 p.m. to 6:30 a.m. They fed from cultivated pastures while grazing. In the sheds they received water *ad libitum* and forage. At milking, from the second liter, they were supplied 400 g of concentrate feed.

Experimental procedure.

The animals were divided into three groups, according to the body condition (BC) scale for dairy cattle (1-5 points): group I: < 2,5; group II: 2,5-3,5; group III: > 3,5. A clinical inspection was performed on all the animals and the gynecological exam was carried out. The cows with smooth ovaries (with non-palpable cavitory follicle) were

considered anestrus cows; while those that were cycling showed developed cavitory follicles in the ovaries, besides the *corpus luteum*.

Statistical analysis. For the data processing the statistical package Statgraphics plus version 5.1 was used, for comparing the proportions.

Results and Discussion

Table 1 shows the results after rectovaginal palpation of the cows. In the lower body condition, in general, the highest quantity of cows with ovaries that had characteristics compatible with anestrus, that is, without palpable structures, were placed.

These results indicate that there was a high percentage of anestrus cows (without palpable ovarian structures) with BC lower than 2,5 ($p \leq 0,001$). Likewise, there was a low percentage of cows which were cycling, that is, which showed palpable ovarian structures, in this group in the four studied dairy farms ($p \leq 0,001$). In this regard, Grigera and Bargo (2009) referred that when cows have a BC < 2,5, they generally do not show estrus manifestation, for which they are catalogued as anestrus animals.

On the other hand, Stahringer (2012) stated that, in high milk-producing cows or cows that can be suckling their calf, this reproductive problem occurs later, which is classified as lactational, although they have BC > 2,5. Bó and Cutaia (2009) reported

Table 1. Relation between the body condition of cows and the presence of ovarian structures.

Dairy farm	Quantity of cows	Body condition	Presence of ovarian structures				Significance
			Without presence		With presence		
			n	Proportion	n	Proportion	
1	17	<2,5	6	0,75	2	0,25	***
		2,5- 3,5	5	0,55	4	0,44	**
		>3,5	0	-	-	-	
2	13	<2,5	3	1	0	-	***
		2,5- 3,5	4	0,40	6	0,60	**
		>3,5	0		0		
3	13	<2,5	3	0,75	1	0,25	***
		2,5- 3,5	2	0,25	6	0,75	***
		>3,5	0	0,00	1	1	***
4	14	<2,5	4	0,80	1	0,20	***
		2,5- 3,5	5	0,55	4	-0,44	*
		>3,5	0		0		

n: number of animals

*** $p \leq 0,001$, ** $p \leq 0,01$.

Table 2. Effect of body condition on the reproductive evaluation of the cows, according to the ovarian activity.

Group	Functioning of the estral cycle			
	Anestrus		Cycling	
	n	Proportion	n	Proportion
I: < 2,5	16	0,48	4	0,16 ^b
II: 2,5-3,5	17	0,51	19	0,79 ^a
III: > 3,5	-	-	1	0,04 ^c
Total	33	1	24	1
Significance		**		***

n: number of animals

*** p ≤ 0,001, ** p ≤ 0,01.

a group of cows that were not in lactation process or suckling, but which did have a BC lower than 2,5; it was a group affected by anestrus due to nutritional deficiencies (proteins, vitamins, minerals and lipids). Stahringer (2012) also stated that the clinical signs of anestrus can be developed in obese cows. In a study conducted in beef cows, the existence of anestrus with ovarian cysts was observed (Brito *et al.*, 2000).

Table 2 shows a summary of the entire farm. Anestrus values of 48,0; 51 and 0 % for groups I: < 2,5; II: 2,5-3,5 and III: > 3,5, respectively, were shown; while in the cows diagnosed as females that were cycling after rectal palpation and which could be incorporated to reproduction it was 16; 79 and 4 % for groups I, II and III, respectively.

Morales and Cavestany (2012) stated that all cows, mainly those which are in the postpartum stage, can go through negative energy balance; and that when the BC is lower than 2,5 no sign of estrus should be manifested. Nevertheless, in this study due to the time that passed since they were separated as problem cows, it is assumed that this is not the diagnosis and that it is probably due to nutrition, in quality as well as quantity. However, Baruselli *et al.* (2007) stated that the high milk-producing cows of the *Bos taurus* breed do not accumulate fat in the tissues as the *Bos indicus* ones, for which the former can show estrus clinically and subclinically after parturition.

It is concluded that in the studied farm a high percentage of cows with anestrus-compatible characteristics was shown, which could be ascribed to nutrition due to its relation with body condition. To

study further the causes which produce postpartum estrus in cows is recommended.

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