Management of dairy cattle breeding in the semi-arid region of eastern Algeria

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Abstract. This study was conducted on 119 Holstein and Montbéliarde dairy cows in 4 pilot farms and one private farm in the semi-arid region of Sétif in eastern Algeria. The objective of this study is to analyze the reproduction following criteria: the interval calving-calving (CCI), calving-first insemination interval (CFI1) and the calving-fecundating covering interval (CFCI). The results obtained show that the calving-calving interval is on average 381.23 ± 65.56 days with a CV of 16.36%. On the other hand, the CFCI interval varies between 55.05 ± 39.9 days and 194.61 ± 134.01 days with an average of 105.65 ± 66.65 days and a CV of 62.09%. In addition, the average fertilization time is judged in the accepted standards, it depends on the CFI1 interval (88.08 ± 36.02 days) and on the other hand the number of protrusions per fertilizing projection (1.52 ± 0.78).

1. Introduction

Cattle breeding plays an important role in the Algerian agricultural economy. It helps to meet national needs in dairy production and red meat production. Despite the massive importation of dairy cows with high genetic potential, milk production in Algeria remains low. To make up for this deficit, the state is using imported milk powder with a very high bill of $ 939 million [1].

Indeed, the success of cattle breeding in general and dairy cattle breeding in particular requires a permanent follow-up, tending to a better control of the behavior among others the management of the reproduction which aims to allow the breeder to obtain one calf per cow per year, in order to achieve its milk quota. In order to find elements that may explain the poor results obtained in Algeria, we conducted a survey in the semi-arid region of Sétif at pilot farms and a private farm.

2. Materials and methods

2.1. Presentation of the study area

The wilaya of Setif belongs to the semi-arid region of eastern Algeria, it is characterized by a semi-arid climate with an average annual rainfall of about 400 mm/year [2]. Temperatures are low in winter and high during the summer period.

Feeding behavior of dairy cows is quite similar in the five farms, dairy females graze on natural grassland grown in the spring and stubble in summer, and are housed in the fall and winter, during which time they are fed meadow hay and/or forage grown twice a day. The complementation practices concern involves according to the availability of raw materials during periods of stabling.

2.2. Animal material

This work was carried out on 119 dairy cows of Holstein and Montbéliarde breeds spread over four pilot farms and a private farm in the region of Sétif during the 2009/2010 farming season. The information collected concerns the management of the reproduction of these dairy cows distributed on all farms.

2.3. Working method

The taking of information is carried out using the registration documents (barn planning), milk control, fodder calendar, reproduction monitoring register. A survey was conducted near the farms to characterize the study environment and better understand the practices and conduct of dairy farming on farms.

3. Results and discussions

3.1. The calving-first insemination interval

The results recorded in Table 1 show that the calving-first insemination interval (CFI1 interval) varies from one farm to another with the best results recorded on Farm 5 (66.33 ± 21.52 days). It is on average 88.08 ± 36.02 days with a CV of 32.44%, which shows that herd management is heterogeneous.

Table 1. Distribution of the calving-first insemination interval in the studied farms

	Farm 1		Farm 2		Farm 3		Farm 4		Farm 5	
	Nb	%	Nb	%	Nb	%	Nb	%	Nb	%
< 40 days	12	30,77	0	0	2	9,09	8	38,09	3	12,50
40 – 70 days	18	46,15	4	30,77	5	22,73	10	47,62	13	54,17
70 – 90 days	5	12,82	0	0	3	13,64	3	14,28	5	20,83
>90 days	4	10,26	9	69,23	12	54,54	0	0	3	12,50
Total	39	100	13	100	22	100	21	100	24	100

Nb: Number of cows for each class; %: Percentage of each class.

We can see that breeding at farms 2 and 3 is considered late. This often presents the first handicap in achieving the economic objective of one calf per cow per year. The percentage of cows raised before 40 days has a direct effect on the fertility of the herd, it influences the success rate of the first breeding, of which 30.77%, 38.09% of farm cows 1 and 4 require a second breeding in a gap CFI1 less than 40 days.

The goal of covering the vast majority of cows in the 40–70 days period is very far from being reached. Thus, the percentage of cows raised in a CFI1 interval greater than 70 days is well above the target of 15% [3] in the other two farms (farms 2 and 3). This delay in reproduction is related to the postpartum anestrus and is partly attributed to the visual observation method used by the farms studied for the detection of heat.

In addition, the herd of all farms is conducted in stall locked which affects the success of the first sieve, all nutritional imbalances strengthen the anesthesia postpartum, which results in an increase in the interval CFI1 and/or leads to more frequent interference, this is considered a handicap for the detection of heat. Falling winter temperatures and lack of exercise on farms are all causes that can increase the proportion of silent heats. On the other hand, [4] report that the interval CFI1 reflects the

time to reproduction, it depends both on the duration of the postpartum anoestrus (40 to 60 days), the quality of heat monitoring and the breeder's strategy.

3.2. Calving-fecundating covering interval

The results of the CFC interval of the different farms are shown in Table 2. It varies from 99.51 ± 74.92 days in farm 1 and 194.61 ± 134.01 days in the second then 104.41 ± 50.44 days 3rd and then 55.05 ± 39.9 days in the 4th and finally 74.67 ± 33.98 days in the 5th farms, it is on average 105.65 ± 66.65 days with a CV of 62.09%.

Table 2. Distribution of the calving-fecundating covering interval in the studied farms

	Farm 1		Farm 2		Farm 3		Farm 4		Farm 5	
	Nb	%	Nb	%	Nb	%	Nb	%	Nb	%
< 40 days	6	15,38	0	0	1	4,54	7	33,33	3	12,5
40-110 days	21	53,85	4	30,77	14	63,64	13	61,9	19	79,17
>110 days	12	30,77	9	69,23	7	31,82	1	4,76	2	8,33
Total	39	100	13	100	22	100	21	100	24	100

Nb: Number of cows for each class; %: Percentage of each class.

The CFC interval is on average long. It is in the order of 105.65 ± 66.65 days with 28.98% of the values beyond 110 days, it exceeds the target of 15% [3]. In addition, the longest interval CFC is recorded in farm 2. It is of the order of 194.61 ± 134.01 days with 69.23% of the values beyond 110 days. The results of this interval show that the poor fecundity of the flock is explained by late breeding at the wrong time of detection of heat.

3.3. Fertility parameters

Through the results recorded in Table 3, we can see that the number of protrusions per fertile projection is on average 1.52 ± 0.78 days with a CV of 47.13%. Given the objective to be achieved by the farms for this criterion (number of protrusion/fertilizing projection <1.6) [4], we find that the number of protrusion/fertilizing projection is in the standards only on farms 3, 4 and 5.

Table 3. Class distribution of number of protrusions per fertile projection in the farms studied

	Farm 1		Farm 2		Farm 3		Farm 4		Farm 5	
	Nb	%	Nb	%	Nb	%	Nb	%	Nb	%
1	20	51.28	7	53.85	16	72.73	19	90.48	19	79.17
2	7	17.95	3	23.08	6	27.27	2	9.52	3	12.5
3 or more	12	30.77	3	23.08	0	0	0	0	2	8.33
Total	39	100	13	100	22	100	21	100	24	100

Nb: Number of cows for each class; %: Percentage of each class.

This allows us to confirm that the problem of two farms (1 and 2) does not arise in the design faculty of dairy cows, but in the absence of protrusion, so the error is human by lack of detection of heat or by the absence of a declaration of the heat observed by the livestock stock to their managers.

At the level of the farms studied, the percentage of cows requiring a single projection by fertilizing projection is on average 69.50%. Given the goal of having more than 60% of successful first-year cows [3], this percentage is considered acceptable. On the other hand, the percentage of cows requiring three or more suckers is on average 12.44% given the target of 15% [3].

3.4. Calving-Calving interval

From Table 4, Calving-calving interval changes from 327.95 ± 42.16 days to 471.61 ± 142.38 days in the farm 2. It averages 381.23 ± 65.56 days with a CV of 16.36%.

Table 4. Distribution of the calving-calving interval in the studied farms

	Farm 1		Farm 2		Farm 3		Farm 4		Farm 5	
	Nb	%	Nb	%	Nb	%	Nb	%	Nb	%
< 330 days	8	20,51	3	23,08	3	13,64	13	61,9	8	33,33
330 – 400 days	18	46,15	2	15,38	11	50	7	33,33	14	58,33
>400 days	13	33,33	8	61,54	8	36,36	1	4,76	2	8,33
Total	39	100	13	100	22	100	21	100	24	100

Nb: Number of cows for each class; %: Percentage of each class.

The calving-calving interval is a very global criterion and has a strong economic significance. It is on average 381.23 ± 65.56 days and exceeds the 365-day target [4–5], of which 28.86% of cows on average have an CCI greater than 400 days.

The longest intervals are recorded on Farm 2 (471.61 days), Farm 3 (389.23 days) and Farm 1 (371.08 days) respectively. This is mainly due to long IV-SF and cows with IV-V greater than 600 days, or 15.38% in farm 2, respectively.

4. Conclusion

The survey carried out at pilot and private farm level shows that the lack of control of the feed, the management of the breeding and the sanitary state, has a negative impact on the production and reproduction performances of the livestock. The absence or bad detection of heat causes a delay of the first postpartum protrusions and a large gap between the projections which results in a very important fertilizing calving-projection interval. The neglect of livestock management (food, health status, etc.) is reflected in a delay in the recovery of postpartum cyclicity. The interaction of the different factors between them and their repercussion on the reproductive parameters being very complex; any actions to improve reproductive performance must take into account all factors simultaneously.

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