

The most common diseases in intensive dairy cattle farms in the Mediterranean region

Abstract

This study was conducted in an intensive dairy cattle farm with a capacity of 200 lactating cow in the Mediterranean region. In this study, 2-year health records in the farm were systematically analysed. The common diseases seen in the records were determined and the recurrence status and the periods of occurrence were determined. Based on the information obtained from the records of the farm, the most common diseases and the diseases that affect the efficiency of the farm the most were determined and evaluated here. In the results, it was understood that the most common diseases treated in the dairy farming operating in the Mediterranean region in a period of 2 years were mastitis, lameness, reproductive problems and metritis.

Keywords: Mediterranean, intensive, dairy cattle, dairy farm, common, diseases

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Introduction

As of 2023, Turkey's cattle population is recorded as approximately 17 million heads. Cattle breeding has an important place in animal production, especially in terms of milk and meat production. In 2023, total red meat production is around 2 million tons. Most of this is cattle meat and a smaller portion is sheep, goat and buffalo meat. Turkey's milk production is also at an important level and is largely based on cow's milk. According to 2023 data, Turkey's annual cow's milk production is around 23-24 million tons.¹ As of 2023, the average annual milk yield of cows in Turkey is around 3,000 - 4,000 liters. Although this rate increases up to 6,000 - 8,000 liters in modern farms, it is still behind the average of 8,000 - 10,000 liters in developed countries. In order to increase the productivity per animal in Turkey, breed breeding studies, improvement of care, feeding and management practices and modern farm management practices are trying to improve the situation of animal husbandry. Nevertheless, common diseases as well as common diseases in Turkey reduce productivity. Deterioration of animal health can lead to a decrease in the quantity and quality of milk production, increase costs and decrease the profitability of the farm. Therefore, control and management of diseases are of vital importance for dairy cattle farms. Diseases, which are encountered in dairy cattle farms and can be caused by various factors, are important causes of loss. Factors such as farms conditions, feeding status, wrong practices, stress, insufficient hygiene, gestation, milk yield, season are effective in diseases. Each enterprise should analyze its own conditions, identify the dominant factors and take the necessary precautions. Tedla et al.² reported respiratory problems 7.80%, mastitis 5.13%, actinomycosis 5.12%, difficult labour 4.42%, endoparasites 3.81%, placenta retention 3.6%, tick problem 2.91%, lameness 2.94%, vaginal and uterine prolapse 2.51%, skin problems 1.70% and litter drop rate 1.70%. Tedla et al.³ reported actinomycosis (16.00%), mastitis (15.00%), tick (10.00%), respiratory diseases (9.16%), gastrointestinal parasitism (9.16%), black leg (6.00%), pasteurellosis (38%) in cattle, 31%, contagious ecthyma (12, 10.00%), tick (9.00, 0.00%) are the most common diseases detected in different regions.⁴ Stärk et al.⁵ reported that the most frequently diagnosed health problems in cows were reproductive and udder diseases.

Conditions with hot and humid climates, such as the Mediterranean Region, increase the risk of animal diseases. These diseases cause significant losses, especially in cattle farms. The geographical characteristics of the region and the intensity of animal husbandry activities cause some diseases to be more common. Hot and humid conditions increase the risk of disease spread. In this region, the enterprises that are not able to carry out animal husbandry should also take the necessary measures to ensure the comfort zone for their animals. It is extremely important to take necessary measures to prevent animal diseases from causing yield losses, increasing production costs and serious economic losses in the region. In order to prevent the spread of these diseases, livestock breeding enterprises in the Mediterranean Region should apply care, feeding and herd management practices, vaccination, hygiene, regular tests, controls and biosecurity issues without neglecting. However, each farm should also carry out individual investigation against the main causes by identifying the common problems in their own conditions. For this reason, instead of treating common diseases in farms, it is a permanent solution to determine preventive measures by focusing on the causes of these common diseases. At this point, business health records provide important information. Keeping health records in livestock enterprises is important for the efficiency, sustainability and animal welfare of the enterprise. Health records are one of the herd books that should be kept in every enterprise to monitor the health status of each animal, diseases, treatments and vaccinations. These records both improve the general management of the farm and increase economic gains. However, there is a general negligence in farm in terms of record keeping. It is possible to prepare a successful action plan by examining common diseases of business records. Preparing a successful action plan aims to prevent these problems by systematically examining the health records in the enterprise and identifying common diseases and risk factors. Firstly, the farm records are investigated to determine the common diseases seen in the last few years. This data will show which diseases are frequently recurring and in which periods (seasonal, breeding period, etc.) they occur more frequently. The success of treatments can also be assessed. By analyzing the records, the transmission routes of common diseases and how diseases spread according to seasonal or environmental factors can be analyzed. In hot and humid regions such as the Mediterranean

Region, successful herd management is possible by making risk assessment by taking into account the effective factors.

From this point of view, in this study, it was aimed to examine the status of the most common diseases during the year by examining the past herd health records of an intensive farm.

Table 1 Monthly climatic data for Adana province

Months	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Highest temperature (°C)	26,5	26,7	32,0	37,5	40,6	41,3	44,0	45,6	43,2	39,4	33,3	30,8
Average highest temperature (°C)	14,9	16,2	19,5	23,8	28,2	31,7	33,8	34,6	33,1	29,0	22,5	16,8
Average temperature (°C)	9,6	10,5	13,5	17,5	21,7	25,6	28,1	28,5	25,9	21,3	15,5	11,2
Average lowest temperature (°C)	5,5	6,1	8,5	12,1	15,9	20,0	23,2	23,5	20,4	15,9	10,7	7,1
Lowest temperature (°C)	-8,1	-6,4	-3,6	-1,3	5,6	11,2	11,5	14,8	9,3	4,8	-4,3	-4,4
Average precipitation (mm)	109,8	84,8	67,8	54,7	47,6	19,8	7,0	5,3	17,6	40,6	72,7	126,7

Source General Directorate of Meteorology

In the farm with 200 milking capacity, the average number of lactating cow is around 200 heads. The average milk yield is 25 kg and the average live weight of the cows varies between 550 and 750 kg. In the farm where health records are monitored, milking cow barns are open barns with free stalls. The farm barns also have a large promenade area in order to provide the conditions (temperature, relative humidity, ventilation, etc.) desired by the animals. In addition, in the barns; feeding, feed distribution, animal drinking water, manure cleaning works are arranged in such a way that they can be done without disturbing the animals.

In the farm, milking is done with an automatic milking system in the central milking parlor in the morning and evening with 12 hours' intervals. Milk yields of the animals are kept daily with the automation of the milking system during milking. During milking, the cows are pre-cleaned and teats are attached to the cows and when the milk flow rate decreases, they are followed and removed by the milkers. Total mixed ration (TMR) feeding system is applied in the enterprise and the ratio of mixed feed: roughage in TMR composition is 60:40. Cows are fed with a total feed mixture containing corn silage, alfalfa, wheat straw and concentrate (18% crude protein and 2650 kcal/metabolic energy (ME)/kg). Total mixture rations are prepared daily and given to animals as two meals at 07.00 in the morning and 16.00 in the afternoon.

In this study, the health records of 2 years were examined systematically. The common diseases seen in the records were identified and the recurrence status and the periods of occurrence were determined. Based on the information obtained from the records of the enterprise, the most common diseases and the diseases that affect the efficiency of the enterprise the most were determined and evaluated here. The data obtained in the research were organized with Excel program and evaluations were made using SPSS 20 statistical package program. Descriptive statistical tools were used to show the incidence of different diseases.

Results and discussion

In this study, it is understood that mastitis, lameness, reproductive problems and metritis were the most common diseases in dairy cattle farms operating in the Mediterranean region in a period of 2 years. The recurrence status of the common diseases seen in the records and the periods in which they occur are evaluated in detail below.

Material method

This study was conducted in 200 intensive dairy cattle farms with 200 milking units located in the Mediterranean region (Table 1). Adana has a typical Mediterranean climate. Winters are mild and rainy and summers are hot and dry. The highest temperature was 45.6 °C on August 24, 1958. The lowest temperature was recorded as -8.1 °C on January 20, 1964 (Table 1).

Mastitis

Mastitis is a disease caused by pathogenic microorganisms in cow mammary glands and causes physical, chemical, pathological and bacteriological changes in udder secretion tissue and milk composition.⁶ A total of 155 applications (114 in the first year and 41 in the second year) were detected in the 2 years in which mastitis applications were followed up (Table 2). It was understood that 38.41% of the cows in the herd were treated for mastitis. It is understood that 18,07% of the cows were treated for the 2nd time, 10,94% for the 3rd time and 1,6% for 4 times repeatedly.

Table 2 Number of mastitis case according to years

Years	Number of mastitis case			1-4 mastitis case
	1	2	3+	
1st year	64	32	18	114
2nd year	27	12	2	41
Total	91	44	20	155

When Table 2, which was created by calculating the intervals between mastitis therapy in the enterprise, is examined, it is understood that 40% were applied for 1 to 30 days, 18,18% for 31-60 days, 4,55% for 61-90 days, 9,09% for 91-180 days and 27,27% for more than 181 days (Table 3).

Table 3 Time between mastitis treatments in the farm

Interval between treatments days	Number of Cows	ratio
1-30	18	40,91
31-60	8	18,18
61-90	2	4,55
91-180	4	9,09
181+	12	27,27

The incidence of mastitis is closely related to breed, age, body condition, herd size and mastitis history. The change in mastitis practices according to months is given in Figure 1.

Mastitis in cattle is caused by many factors including animal, environment and pathogens. Common and infectious bacteria are *Staphylococcus aureus*, *Streptococcus agalactiae*, *Corynebacterium bovis* and *Mycoplasma* species.⁷ Environmental mastitis can generally be defined as infection of the mammary glands (*E. coli*, *Klebsiella* species, *Strep. disgalactiae* and *Strep. uberis*) and the ecosystem is

the main reservoir in which the cow resides.^{6,7} Mastitis is most likely attributed to inadequate milk sanitation, low barn sanitation, lack of teat dipping and use of lubricants during contact, and lack of treatment in milking cows of various age groups.⁸⁻¹⁰

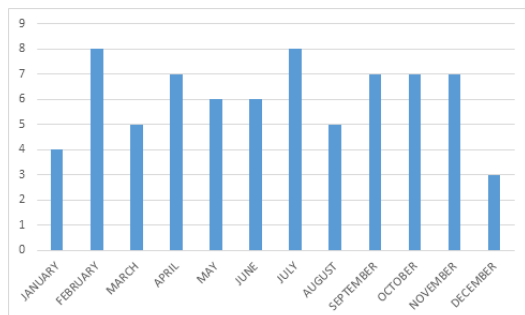


Figure 1 Distribution of mastitis practices according to months.

Laminitis

The number of treatments due to laminitis problems detected in cows in a 2-year period is summarized in Table 4.

Table 4 Number of Laminitis treatments performed in the facility in 2 years

	Number	Ratio (%)
1,00	47	26,6
2,00	35	19,8
3,00	18	10,2
4,00	11	6,2
5,00	3	1,7
6,00	1	,6
7,00	1	,6
8,00	1	,6
Total	177	100,0

When Table 4, which shows the number of times the cows received foot treatment, is examined, it is understood that 33.9 cows in the herd were not treated for laminitis and the remaining cows were treated for foot problems at least 1 time and at most 8 times. In dairy cattle breeding, foot diseases cause significant economic losses due to the disorders they cause.^{11,12} In studies, it is reported that 1.8%-30% of dairy cattle farms have congregation due to laminitis diseases.¹³⁻¹⁵ It is understood that the most laminitis care was performed in March with 17 and the least laminitis care was performed in October with 1. The results of studies conducted under different conditions^{11,12,16} show that hot weather, humidity and cooling systems applied will increase lameness, especially in summer. Tedla et al.^{2,3} state that there are statistically significant differences between breeds in terms of foot health. The black pied breed is fat in Turkiye as well as worldwide. It is known that milk production has been prioritized in the breeding studies to date and health issues have remained in the second plan.¹⁷⁻¹⁹ However, Holstein breed is reported to be exposed to mastitis and foot disease problems compared to Jersey cows. However, sufficient number of studies are not available.

Infertility and repeat breeding

Infertility and repeat breeding is the cause of extremely costly losses in livestock farms. Because the problem is often recognized late, it is often very difficult to determine the exact cause of losses. Fertility is shaped on the axis of cow, environment and manager starting with estrus detection. In this context, cow, farm and care and feeding management affect the success in every aspect. In this study, it

is understood that 23 cases of infertility were experienced in a period of 719 days, 17 cows were treated 1 time and 3 cows were treated 2 times due to infertility (Table 5). It is understood that there was an average of 1.15 cases of infertility per cow.

Table 5 Number of infertility cases in the enterprise

Infertility	Ratio (%)
1	17
2	3
Case	23
Cow	20
Average of cows	1,15
Total number of cows	177

The number of infertility cases according to years is given in Table 6. While 19 cases were detected in the first year, it decreased significantly with 4 cases in the second year.

Table 6 Number of infertility cases according to years

Years	Infertility	Ratio (%)
Year 1	19	10,73
Year 2	4	2,25
Total	23	177

The most common known causes of infertility in cattle are inadequate or unbalanced nutrition (energy and micronutrients), diseases, seasonal and herd management practices. Tedla et al.^{2,3} state that there is a significant relationship between reproductive problems and breed and infectious diseases among management systems. When the studies conducted in the last 50 years are analyzed, it is reported that the calving rate has been decreasing at the rate of 0.6% per year.^{20,21} This decrease is tried to be explained by the increase in milk yield, increase in herd size, changes in breed genetic structure and herd management practices. However, the fact that there is a similar downward trend in cows giving their first calf compared to cows with multiple births in the same period suggests different reasons.²² Nutrition is the most important factor of cow fertility. Cows that are energy malnourished and have a low body condition score and/or lose condition after calving are much less likely to conceive than cows with better condition. In general, it is considered normal for less than 6% of cows and 8% of heifers in a herd to be infertile. Infertility rates above 13% for cows or 24% for heifers are less than 5%.

Retentio secundinarum

The treatment of retentio secundinarum detected in cows in the herd is summarized in Table 7.

Table 7 Number of retentio secundinarum treatments

	Number	Ratio (%)
None	108	61,0
Case	69	39,0
Total	177	100,0

When Table 7, which shows the status of the cows treated for retentio secundinarum, is examined, it is understood that 61.0% of the cows in the herd were not treated for this problem, while 39% were treated for this problem.

In cows, failure to abort the fetal membranes within 12 hours of parturition is called infertility. Retained placenta is when all or part of the placenta or membranes remain in the uterus during the third stage of labor. fetal membranes are generally not aborted because the calves

are twins, the birth is earlier or later than expected, the calf is abnormal, or diseases. In this study, it is understood that there were 70 cases of retentio secundinarum in a period of 719 days, 66 cows experienced 1 and 2 cows experienced 2 cases of non-shedding. It is understood that there was an average of 1.03 cases of retentio secundinarum per cow. However, considering that the study covered a period of 719 days, it is understandable that there were only 2 cases of mate failure. Richter and Götze²³ reported that 3-5% of births and Nilsson²⁴ reported that 10-15% of births resulted in retentio secundinarum. However, it is reported that these rates may increase up to 100% in case of litters, premature births and twin births.

Metritis

The distribution of treatment for metritis in the herd is summarized in Table 8.

Table 8 Number of metritis treatments in the facility in 2 years

Case	Number	Ratio (%)
None	144	81,4
One time	24	13,6
Two times	9	5,1
Total	177	100,0

When Table 7 showing the status of the cows treated for metritis is examined, it is understood that while 81.4% of the cows in the herd had no problem, 13.6% were treated once and 5.1% were treated twice. In dairy cows in the early lactation period, metritis is one of the important progeny loss diseases.²⁵ Risk factors for metritis include dystocia, twin births, retentio secundinarum, stillbirth.^{26,27} In this study, 31 cows were treated 1 time, 1 cow was treated 2 times and 1 cow was treated 3 times due to metritis. It is understood that the average metritis problem was experienced 1.03 times per cow in the herd. The average metritis level in the herd was determined as 18.6%. When Figure 2 showing the number of metritis cases according to months is analyzed, the highest number of metritis cases was detected in November with 8 cases. Although various risk factors have been identified for metritis such as difficult delivery, mate failure, herd size, number of lactations, ketosis, milk fever, shelter condition and calving season, some of them are controversial while others are consistent in the literature. In this study, the difference according to months is among the risk factors suggested.

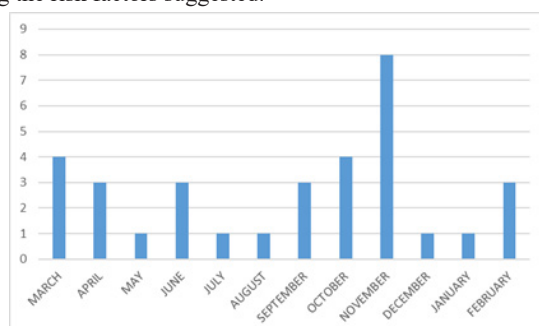


Figure 2 Number of metritis cases by months.

Roine and Salonemi²⁸ reported the risk of metritis in a dairy herd as 0.2%, while Martinez and Thibier²⁹ reported 39%. Bruun et al.³⁰ reported the risk of at least one metritis treatment in 391 herds to be between 1% and 21%. The wide variation is expected because many factors are reported to be influential, such as difficult parturition, retentio secundinarum, herd size, number of lactations, ketosis, milk fever, housing condition and calving season. The occurrence of metritis can be reduced by manipulating risk factors.

Conclusion

There are many reasons for the prevalence of disease in dairy cattle. Identifying these causes is the basis for improving treatment processes and disease management. It is possible to prevent many diseases before they cause losses with preventive measures, close follow-up and early diagnosis by reducing the medication and treatment costs of business owners. A short, medium and long term program should be developed for disease control action plan.

- Farm health records, cow health tracking book should be kept for the spread of diseases
- Identify the diseases prevalent in the enterprise and their risk factors
- Set concrete targets, such as reducing the rate of each disease in a given period
- There must be a responsible person to control the health status of the animals in the farm
- Business employees should be trained on disease management issues
- The business action plan should be reviewed regularly, feedback should be taken into account and necessary revisions should be made and continuous results should be analyzed
- Emergency plans should be ready.

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Conflicts of interest

The authors declare no conflict of interest in writing the manuscript.

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