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Artificial Insemination Practices in Cattle Farms of the Chlef Region, Algeria

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Abstract

The development of cattle breeding has always been a priority for Algeria to meet the population's needs for animal protein. Particularly for the northern regions of the country, which are considered to be major consumers of red meat. The objective of this communication is to show the practice of artificial insemination in cattle farms in Algeria. For this, a survey was carried out in the Chlef region, located in the northwest of Algeria. It took, with 75 farms, comprising a total of 488 cattle. This workforce includes 261 dairy cows, 65 heifers, 72 old cows and 79 calves. Most of the cows come from improved breeds (63%). The rest of the livestock is made up of imported breeds (23%) or offspring from crossbreeding imported breeds called local (14%). To conduct our survey, we established a questionnaire that addresses aspects related to reproduction, breeding management and AI practice of the bovine species. We can say that there is a weakness in the practice of artificial insemination, due to the lack of know-how among breeders to master this technique. Indeed, almost half of the farms practice artificial insemination in dairy cows, while the other half practice natural mating and are reluctant towards this reproduction biotechnology. As a result, breeders are far from 100% practice of this technique. The majority of breeders, i.e. 2/3, make the diagnosis themselves, while for the rest of the breeders it is carried out by the veterinarian and the technician. This is how inseminations are performed during the seasons favorable to feeding and at the coolest times of the day and heat detection requires that each task be correctly performed and at the right time.

I. Introduction

The development of cattle breeding has always been a priority for Algeria to meet the population's needs for animal protein [1] , particularly for the northern regions of the country, which are considered to be major consumers of red meat. However, this breeding is experiencing technical, economic and social constraints that hinder its development and are mainly manifested by the strong dependence (on imports of animal feed and milk), weak mastery and integration of the technical models adopted, resulting in low productivity [2].

The evolution of the cattle herd is conditioned by the level of seasonal and annual fodder availability that shapes the management method and the level of supply. Indeed, the total cattle population increased from 1561000 heads in 2003 to 1733000 heads in 2021 [3], an increase of 172 000 heads, due to the few development actions in recent years and the importation of females made possible by the herd reconstitution effort during this period (figure 1). The rate of dairy cows in the total cattle population remained almost the same, at 50% throughout the entire period of development. These dairy cows originally imported for milk production undergo a high rotation and only remain on the farm for three to four lactations, with the maintenance of mixed meat-milk breeding. This low growth in the population is the result of several causes:

1) Insufficient policies to support livestock breeding and the development of fodder crops.

2) Inadequacies in the mastery of the technical management of livestock farming in an integrated manner.

3) Length of the cycle of droughts recorded in recent years.

4) Appearance of several cases of contagious diseases (tuberculosis, etc.), which sometimes led to forced slaughter.

In 2016, there were 915,400 heads of dairy cows, or 44% of the cattle population. This subgroup is subdivided into 239,776 modern dairy cattle (breeds imported from European countries, such as Pie-Rouge, Pie-Noir, Brune des Alpes, Tarentaise, Holstein and the Austrian Fleckvieh breed) and 675,624 improved or local dairy cattle (cattle resulting from multiple crosses between the Brune de l'Atlas breed and its variants and imported breeds). The rest of the herd is represented by heifers over 12 months old (10.20%), then bulls with 6.2%. Young bulls aged 12 to 18 months represent 256,000 heads, or 12.3% of the total cattle, calves under 12 months old, 13.72% and old ones 9.78%.

II. Materials and methods

The survey was carried out in the Chlef region, located in the northwest of Algeria (figure 2), characterized by a climate with extreme temperatures of the subhumid Mediterranean type in the northern part and of the continental type towards the south, thus a hot and dry season in summer, is a cold and humid season in winter, a rainfall of 600 mm / year [4]. It has a total agricultural area of the order of 262,511 ha, including the cattle herd which occupies a significant place, with a workforce of the order of almost 50,000 heads. Its population estimated at 1,237,277 inhabitants on a total area of 489,120 ha. It took, with 75 farms, comprising a total of 488 cattle. This population includes 261 dairy cows, 65 heifers, 72 old cows and 79 calves. Most of the cows are from improved breeds (63%), the rest of the herd is made up of imported breeds (23%) or offspring from crossbreeding imported breeds called local (14%). To conduct our survey, we established a questionnaire that addresses aspects relating to reproduction, breeding management and AI practice of the bovine species. During our survey the following aspects were developed and which are the age of the breeder, existing cattle breeds, cattle numbers held by the breeder, the condition of the buildings, insemination season, the average age of the heifer at the onset of the first heat, the signs of heat identification, the time interval between the start of heat and artificial insemination, Number of V.L (dairy cow), inseminated. Time of pregnancy diagnosis after insemination, establishment of the pregnancy diagnosis, the means of pregnancy diagnosis, calving difficulties, the rest periods of the females and the duration of rest, the factors of success of insemination.

III. Results and discussion

The herd of cattle farms is mainly composed of dairy cows with an average of 43 heads, followed by calves with 13 heads, old ones, 12.33 and heifers 10.66 heads. The average herd size is 19.75 with a maximum of 97 and a minimum of 0. The livestock building is an important element in dairy cattle

farming. Its quality is assessed according to its general condition, its construction materials and its hygiene. Most of the farmers' stables remain traditional, with a cemented floor. Indeed, the stable is formed of a single block divided into small rooms intended for housing the different categories of cattle (newly born calves and old ones, weaned calves and old ones, dairy cows and trunnions). The housing of dairy cows is hampered, on the other hand, modern buildings are designed so that each category of animals has a stable adapted to the category, the housing of dairy cows is free, which allows artificial insemination to be successful in this type of building. However, the majority of livestock buildings on farms are traditional, i.e. 68%, while the rest, i.e. 32%, represent modern buildings. Almost the majority of breeders use fodder and pasture as feed for their cows in addition to straw, hay and concentrate. Cow feed is by far the essential element for the success of bovine artificial insemination. Indeed, depending on the season, the availability of feed varies, with a considerable drop in this availability in the dry season and a reduction in grazing time during the rainy season, which affects the success of insemination. However, 75% of breeders state that feed has an effect on the success of artificial insemination, while 25% believe that feed has no effect. Therefore, monthly determination of body condition allows to assess changes in the body condition of animals in the herd [6], and is a good feed management tool. Indeed, this technique, easy, fast (10 to 15 seconds per cow), repeatable, and inexpensive, allows livestock stakeholders (breeders, veterinarians, nutritionists, etc.) to detect feeding errors early, and to make the necessary corrections; to avoid the negative effects of insufficient energy or excess fattening on the health, production, and fertility of dairy cows [7], which is absent in cattle farms in the region. It was found that 43% of farms consider that the onset of the first heat in heifers is at 18 months, followed by 34% of breeders who estimate the age at 15 months, 22% at 24 months and finally 1% at 20 months. Indeed, according to [8] the first mating of heifers is at the age of 779 days (25 months), while the first calving is obtained at the age of 1052 (35 months). As a result, only 10% of heifers enter reproduction at an age below 18 months, while 60% achieve their first fertilization from the age of 24 months, which is a significant economic loss for farmers. Also, 64% of females have calves at an age between 2 and 3 years and only 2% of heifers are awake before the age of 2 years.

The average age of the first calving of heifers is 25.5 months and the calving-calving interval is 14 months. This age is still far from the desired objective which is 12 months [9]. In the region, heifers born in spring start breeding at the age of 22 months before heifers born in other seasons, while heifers born in autumn are two months late, which affects the profitability of cattle farms in the Chlef region.

The variation of fertility and fecundity according to the season is controversial. Some authors affirm it, others maintain that the season does not influence them. In addition, the seasonal influence on reproductive parameters varies depending on the climatic regions. Indeed, in temperate regions, fertility is maximum in spring and minimum during winter. Artificial insemination of cattle does not condition seasonality in the Chlef region. Indeed, the technique is practiced mainly during the spring and summer seasons with 44% and 41% respectively and remains less practiced during the other seasons of winter and autumn with 9% and 6% respectively (Figure 3).

The time of diagnosis of pregnancy by farmers is done from the first month. Indeed, 49% of farmers do it in the 3rd month, while 38% check it in the 2nd month. The rest, or 9% and 4% do it in the 1st month and 4th month respectively (Figure 4). This diagnosis is established by the farmer in 67% of farms, by the veterinarian in 31% of farms and 2% by the technician.

The most used means of diagnosis of pregnancy are the non-return of heat in 49% of farms and the rectal examination with 27%. While the other least used means are ultrasound and progesterone dosage, with 17 and 5% respectively (Table 1).

Table 1. *Most used means of diagnosis of pregnancy*

	Zeboudja	Ain Merane	Boukadir	Beni Hawa	Oud fodda	Chlef
Non-heat return	67	6	44	86	55	50
progesterone dosage	5	0	0	0	3	0
Ultrasound	0	0	19	0	3	50
rectal leaf	0	82	37	0	10	0
Others	28	12	0	14	29	0

Veterinarians face difficulties in calving the herd. We found that 77% of farmers do not encounter difficulties in calving cows, while 23% find difficulties in calving. Voluntary rest is important, since 93% of farmers have spoken out in favor of voluntary rest. Obtaining optimal fertility and fecundity depends on the farmer's choice and performance of a first insemination at the best time of the postpartum. Indeed, fertility increases progressively until the 60th day of the postpartum, is maintained between the 60th and 120th day; then decreases thereafter [10]). Thus, the interval between calvings depends on the number of days between calving and the start of the next gestation. The number of days between calving and fertilizing mating depends on the days between calving and the first insemination or mating (voluntary waiting period) and the duration of the breeding period, namely, the number of days between the first and last insemination followed or not by a pregnancy. The dry period, which lasts from 45 to 60 days, constitutes a period of physiological rest, during which dairy cows must not lose weight and therefore during this period, the cow is never in a strict maintenance state [11]. We found that most breeders observe voluntary rest in cows after calving. In the Chlef region, 93% of breeders practice voluntary rest of females after calving, while 7% do not practice repo. We recorded 54% and 34% of farmers who rest their cows for 45 and 60 days respectively. Thus, 10% and 8% of farmers let their cows rest for 90 and 50 days respectively, while only 3% of them rest for 40 days (Figure 5).

The success of artificial insemination depends on several factors according to breeders. Indeed, 29% of them are for the quality of the semen, followed by weight and age with 23%, feeding with 19% and finally

9% are for environmental factors. According to the latter, it is necessary to point out the negative effect exerted by the transport of animals [12] or by poor electrical insulation of the milking parlor or the animal stabling [13], which is found among cattle breeders in the Chlef region, where the movement of animals is important. Thus, concerning age, we usually observe for the cow a reduction in fertility with the increase in age. Which reduces for some authors the age of entry into reproduction and can increase the number of births per cow [14]. In addition, the later the heifers give birth, at an age of 36 to 40 months, the more they can have an extra calf during their productive careers compared to those with an age at first calving of less than 25 months. We have noticed that this aspect is not taken into consideration by breeders in the region, which affects the profitability of the herd.

Conclusion

We can say that there is a weakness in the practice of artificial insemination, due to the lack of know-how among breeders to master this technique. Indeed, almost half of the farms practice artificial insemination in dairy cows, while the other half practice natural mating and are reluctant towards this reproduction biotechnology. As a result, breeders are far from 100% practice of this technique. The majority of breeders, or 2/3, make the diagnosis themselves, while for the rest of the breeders it is done by the veterinarian and the technician.

This is why inseminations are carried out during the seasons favorable to feeding and at the coolest times of the day and the detection of heat requires that each task be correctly carried out and at the right time.

The development of this breeding is subject to strong constraints, the level of training of the breeders as well as their financial resources lead to a low adoption of technical models which lead to problems of control of the breeding. Considerable efforts are being deployed by the extension agents and technicians in order to ensure the supervision and assistance of the breeders.

Declarations

We hereby inform you and attest that the livestock farmers interviewed during this survey on "Artificial insemination practices in cattle farms in the Chlef region of Algeria" consented to participate in this survey.

Competing Interests

The authors declare that they have no competing interests.

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Author Contribution

The author, Mohamed Sadoud, participated in defining the theme, establishing the questionnaire for the farmers, visiting the farmers and conducting the direct survey with each farmer, calculating the statistics, contacting agricultural services, veterinarians, the chamber of agriculture, the farmers' association, and writing the article.The author, Hafidh Zemour, participated in the design of the histograms for the various figures and the geographical map of the region and its location in relation to Algeria, and also contributed to the verification of language and scientific terms.

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Data Availability

All data generated or analyzed during this study are available from the corresponding author upon reasonable request.

References

1. *Ubifrance. 2014. The meat industry market in Algeria.*
2. Abbas K, Madani T, Abdelgherfi A (2011) Abbas, K., Madani, T., & Abdelgherfi, A. (2011). Le secteur des productions animales en Algérie. Une approche territoriale pour un développement durable. 6è Journées de Recherches sur les Productions Animales. Université Mouloud Mammeri. Algérie
3. ONS (2017) National Office of Algerian Statistics
4. *D.S.A. 2018. Directorate of Agricultural Services of the Chlef region.*
5. Boutaraa Z (2024) Risk preventive plan in seismic-affected zones: the case study of Chlef City (Algeria). Euro-Mediterr J Environ Integr 9:1959–1969. https://doi.org/10.1007/s41207-024-00611-2
6. Hady PJ, Domecq JJ, Kaneene JB (1994) Frequency and precision of body condition scoring in dairy cattle. J Dairy Sci 77:1543–1547
7. Drame ED, Hanzen C, Houtain JY, Laurent Y, Fall A (1999) Body condition profile during postpartum in dairy cows. Ann de Médecine Vétérinaire 143:265–270
8. Simerl NA, Wilcox CJ, Thatcher WW, Martin FG (1991) Prepartum and peripartum reproductive performance of dairy heifers freshening at young ages. J Dairy Sci 74:1724–1729
9. Lefebre D, Lacroix R, Charlebois J (2004) Growth monitoring: New curves for today’s heifers. Quebec Milk Producer, 1–19

10. Hanzen C *1994. Study of risk factors for infertility and puerperal and postpartum pathologies in dairy and beef cows. University of Liège, Faculty of Veterinary Medicine.*
11. Le Cozler Y, Peyraud JL, Troccon JL (2009) Effect of feeding regime, growth intensity and age at first insemination on performances and longevity of Holstein heifers born during autumn. Livest Sci 124(1–3):72–81
12. Clarke IJ, Thilbrook AJ (1992) Influence of non-photoperiodic environmental factors on reproduction in domestic animals. Anim Reprod Sci 28(1–4):1–20
13. Appleman RD, Gustafson RJ (1985) Source of stray voltage and effect on cow health and performance. J Dairy Sci 68(6):1554–1567
14. Pirlo G, Miglior F, Speroni M (2000) Effect of age at first calving on production traits and on difference between milk yield returns and rearing costs in Italian Holsteins. J Dairy Sci 83:603–608

Figures

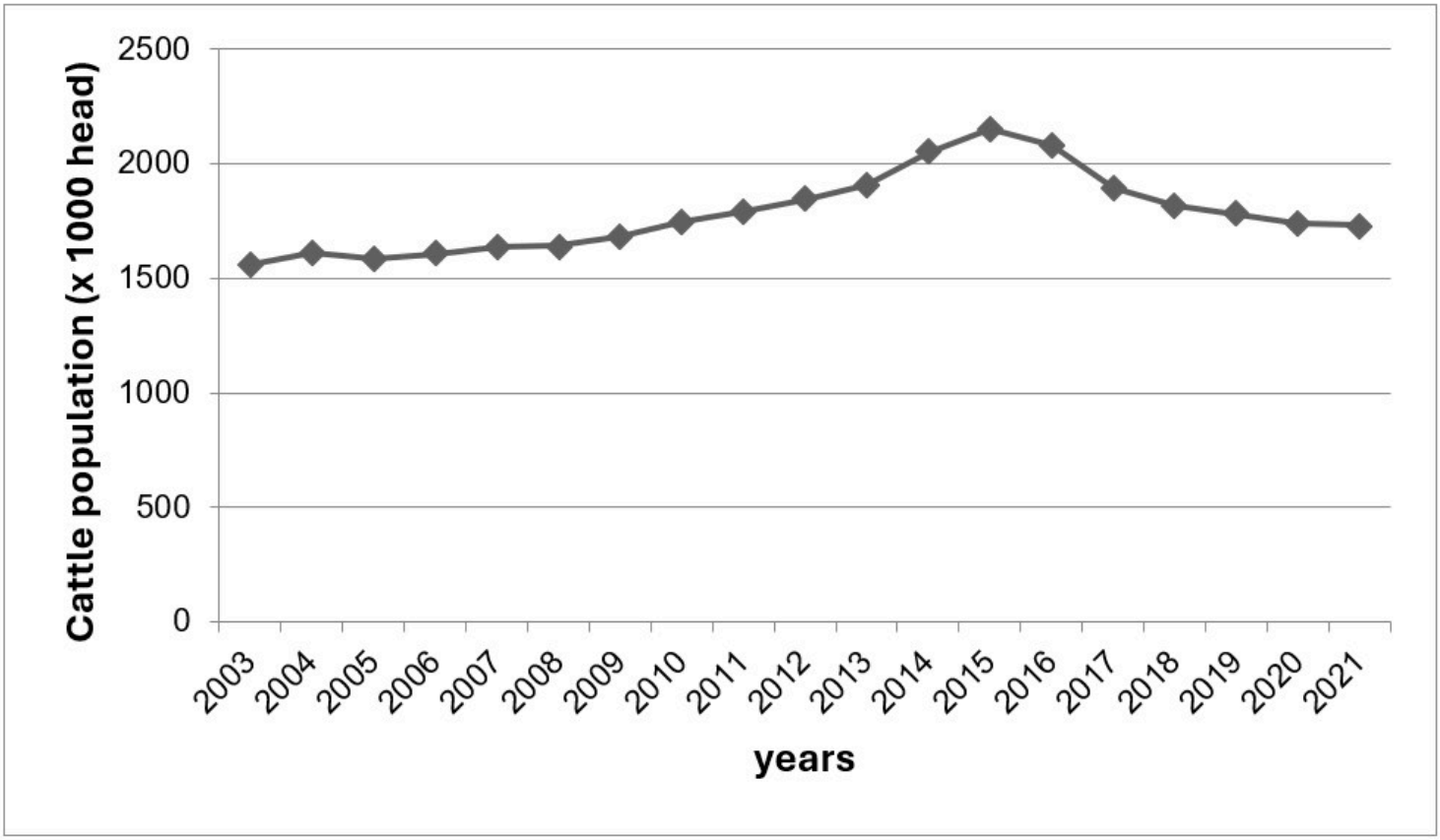


Figure 1

Evolution of the cattle population in Algeria

Source: Algerian National Statistics Office (2003-2021)



Figure 2

Study area: Chlef region [5]

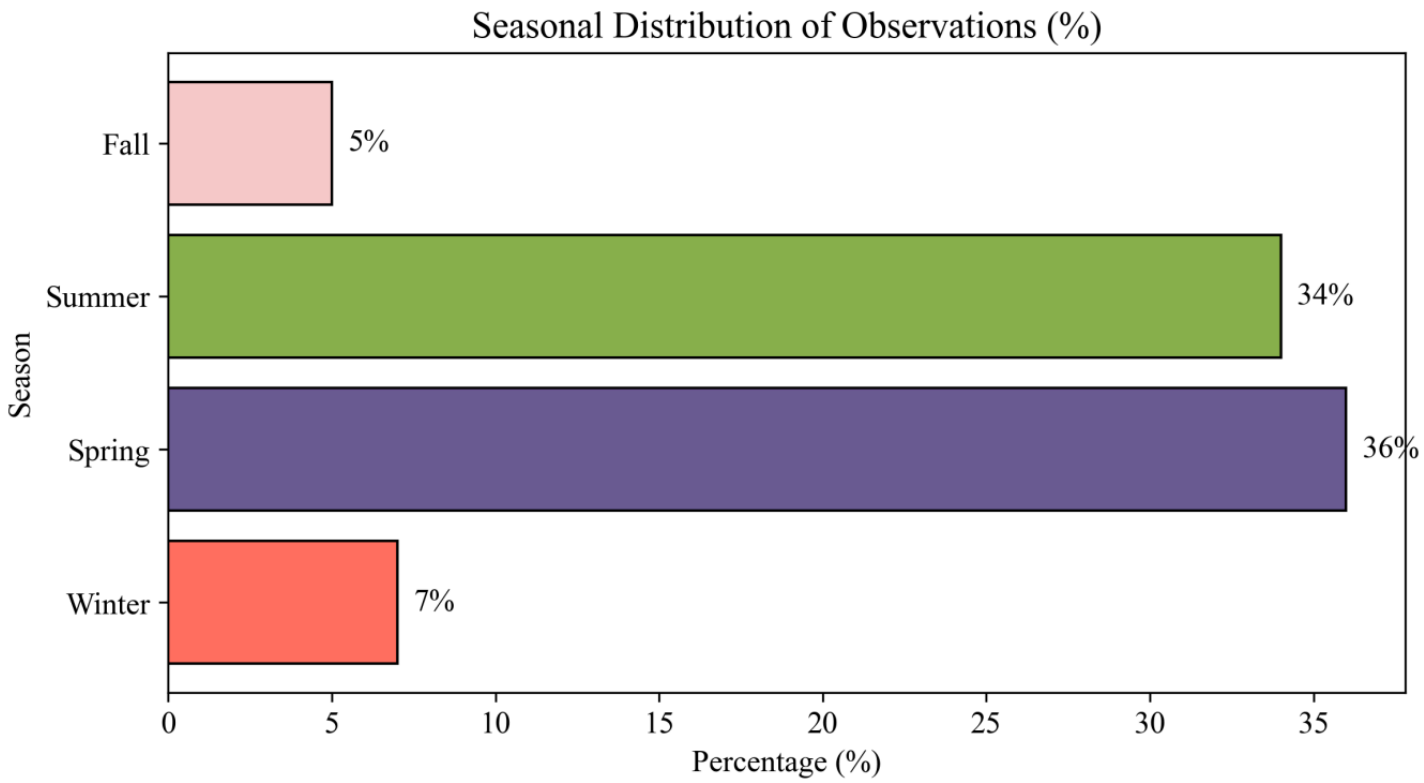


Figure 3

Artificial insemination seasons

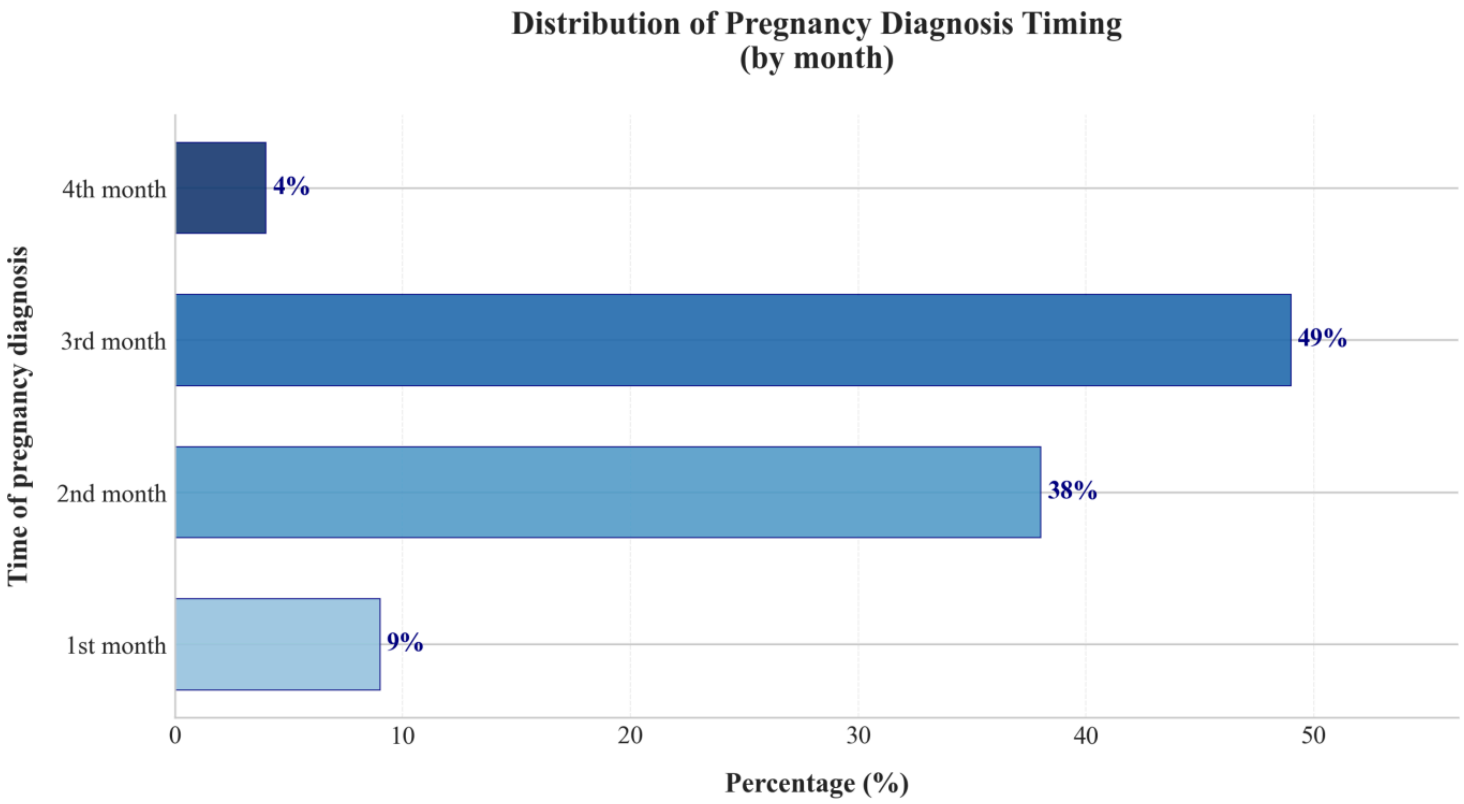


Figure 4

Time of diagnosis of pregnancy

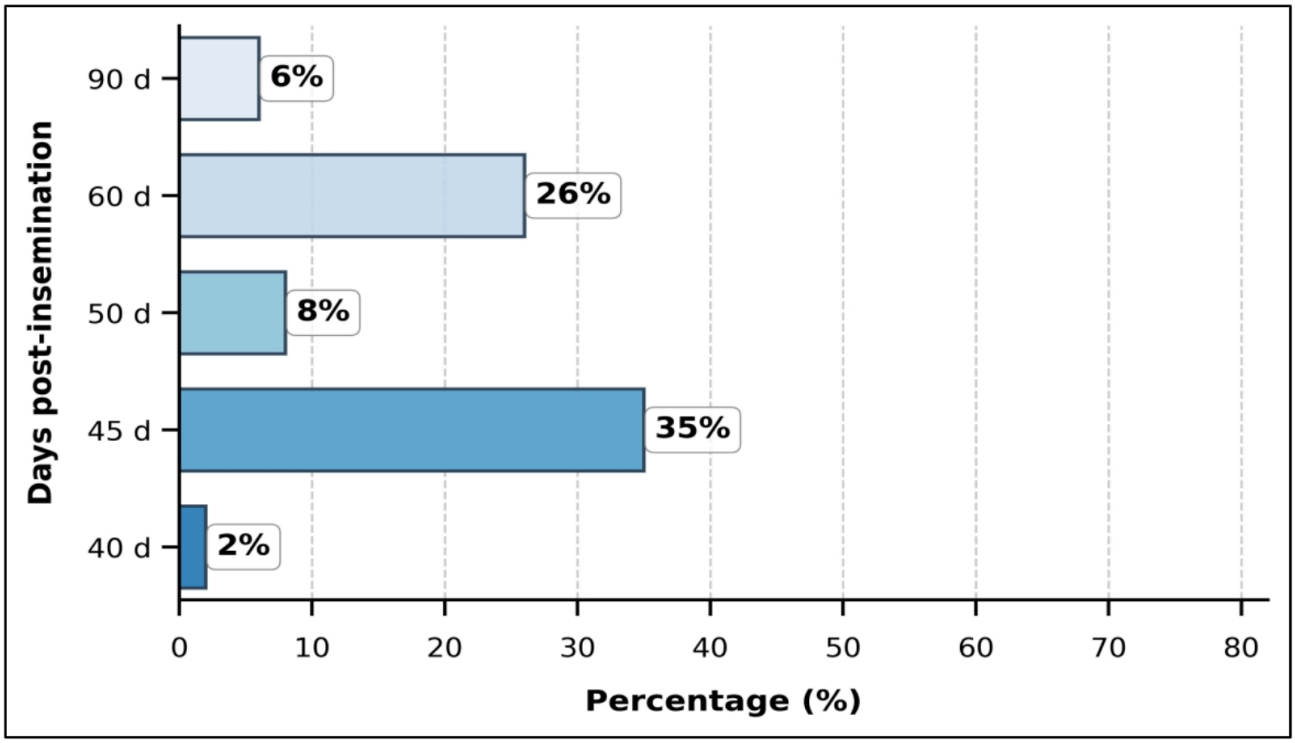


Figure 5

Duration of rest of cows before a new insemination.