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CHARACTERIZATION OF THE CALVING INTERVAL IN THE MERTOLENGA BREED: THE INFLUENCE OF THE COMMON AGRICULTURAL POLICY BETWEEN 1986 AND 2012

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ABSTRACT

Natural conditions in most of the Portuguese territory (marginal soils and severe water deficit in the summer) do not favor intensive meat production, which in turn determines a low stocking rate unless the pastures are well managed and the animals adequately supplemented when necessary. These improvements are costly and pointless in most cases explaining why breeders do not adopt this strategy. As grassland and forage production, in most cases, are not suitable for efficient fattening, the conversion of land use has led to an increase in the number of suckler cows in the studied period (1986 to 2012), since these animals are less dependent on forage quality and have lower feed costs. It is under this complexity of factors that the Mertolenga breed stand out for its sturdy build, ease of delivery and low food requirements. Establishing periods of calving/mating, and the shortening of these periods, allows co-ordination of the greater nutritional requirements of the animals with the time of the year of greater pasture growth. This would enable the reduction of supplementary feed. The definition of breeding season allows the use of reproductive technologies, which increases neonatal survival until weaning. When the political conditions are added to the natural conditions, the question arises as to the extent to which the efficiency of production has been altered through the stages of the CAP. Also how can the economic viability be supported in the future regardless of the Community support.

Keywords: *Mertolenga, Calving interval, Productive efficiency, CAP.*

INTRODUCTION

The Common Agricultural Policy (CAP) of the European Union (at the time European Economic Community) was established in 1962 in order to respond the needing of increase agricultural productivity, to ensure the regular supply of agricultural products and to stabilize prices, together with the guarantee of fairer and more stable incomes for farmers. The negative side-effects were, in particular, environmental imbalances, creation of surpluses, excessive protectionism of

Community products and high expenditure of the agricultural sector in the EU budget (in 1970 the CAP consumed about 70% of the budget).
The situation led to a revision of the CAP in 1992, which adopted measures such as the establishment of prices closer to the world market and therefore more competitive, establishing quotas for some products in order to avoid the accumulation of surpluses and the promotion of a more environmentally friendly agriculture (Alves, 2011). During the CAP reform period under study (from 1986 to 2012), the beef sector in Portugal has continuously increased its dependence on subsidies, losing competitiveness and leading to an inverse result. However, the differentiation in the production of food products, with a certificate of origin and a quality label, allowed the domestic bovine breeds sector to gain their own dynamics through their Breeders' Associations, in particular that of the Mertolenga Breed, leading to the emergence of new specific products and regions other than those traditionally housing herds. The aim of this study was to assess the dynamics of the farms' adaptation to the successive stages of the CAP and how they reflected on the reproductive management of holdings, particularly on the interval between calving.

MATERIALS AND METHODS

The Association of Mertolenga Cattle Breeders (Associação de Criadores de Bovinos Mertolengos - ACBM), since its establishment in 1987 made the collection of information provided by its members continuously, and therefore has a very complete database that allows to characterize the dynamics of the national Mertolenga breed and influence of different CAPs. The period under study covered the years 1986 to 2012 comprising 4 stages of the CAP, namely: - Stage 1 - from 1986 to 1991; - Stage 2 - from 1992 to 1999; - Stage 3 - from 2000 to 2007; - Stage 4 - from 2008 to 2012. Bettencourt and Romão, (2009) and Vinatea and Madrigal, (2010) emphasize the importance of reproductive performance, since obtaining a calf weaned per cow and per year directly affects profitability, so adjust the genetic characteristics of bovine populations to conditions is key to improving productive efficiency (Nielsen et al., 2013). In this context, defining clear reproduction objectives allows the development of economically more effective reproductive strategies and allows the identification of parameters that contribute to the accurate prediction of characteristics that affect commercial profitability (Costa, 2015).
The establishment of periods of calving / mate and the shortening of these periods allow to coincide the moment of greater nutritional requirement of the animals with the time of the year of greater availability of pasture, enabling the reduction of food supplementation or even its elimination (Valle *et al*., 2000). On the other hand, it also has the advantage of allowing health management to fit with reproductive management through a prophylactic plan (Valle *et al*. 2000; Reis, 2010). The definition of breeding season allows the use of reproductive technologies such as synchronization of heat, or group management, which increases neonatal survival and until weaning, due to reduced cohabitation of offspring of different ages (Reis,

2010). According to Robalo Silva (2003), the parameters most used in the measurement of this efficiency are the distribution of deliveries throughout the time of delivery, (or the interval between deliveries in continuous breeding systems), fertility rates, gestation and weaning, and finally, the age at first calving. Regarding the interval between deliveries, it should not theoretically exceed 365 days, since gestation time varies between 285 and 290 days and postpartum anestrus is 75 to 80 days (Bettencourt & Romão, 2009). According to Fernandes (2011), the interval between delivery and conception should not exceed 83 days for this objective to be achieved. In order to study this parameter in the referred period, the statistical values of the Mertolenga breed and its three phenotypes - red, piebald and rosillo - were subjected to descriptive statistical analysis and analysis of variance. The analyzes was chronologically framed in the four stages of the CAP between 1986 and 2012 using the NCSS (Number Cruncher Statistical System) and Excel.

RESULTS AND DISCUSSION

The calving interval, usually an indicator of the reproductive management efficiency, did not undergo major changes during the 4 Stages of the CAP under study. In general, it can be said that the distributions followed the same trend with the asymmetry coefficients always positive and as such with tails displaced to the right, which means that the median is greater than the mode and the mean greater than the median. In relation to the measures of central tendency, Stages 2, 3 and 4 had coincident values for mode (365 days) which indicates that this is the reference value for the cattle producers regardless of the policies determined for the sector; the mode in Stage 1 (1986-1991) had a value of 369 days, 35% of calving being equal to or less than this value; this fact, combined with a median that was the lowest of all the Stages - 386 days - led to graphically the first 3 classes of frequency to stand out from the rest, as shown in Figure 1.

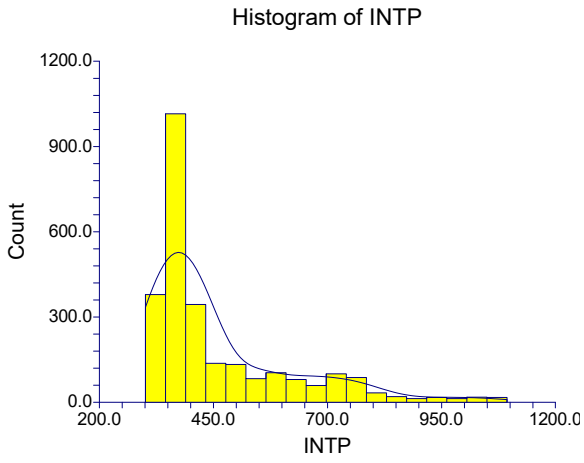

Figure 1 – Calving interval during Stage 1 of CAP (1986-1991)

During this Stage, there was a number of changes to the CAP. From 1 January to 5 April 1987, transitional arrangements were adopted to ensure the continuity of the calf premium and adjustments to the variable premium. From 6 April 1987 to 31 December 1988, the Commission authorized the intervention, maintaining the existing premiums (variable slaughter premium, calf premium, suckler cow premium). In addition, the suckler cow premium was increased from 15 to 25 ECU. During Stage 2 (1992-1999) statistically the mode of the calving interval decreased slightly from 369 to 365 days, but only 30% of deliveries occurred around or below this value, indicating that there was a widening of the interval. To confirm it the median increased from 386 to 404 days.

Graphically and by comparison with what happened in Stage 1, it can now be seen that the modal class and the median class still stand out from the rest, (Figure 2), but these now have greater expression in the graph set, since also the average rose from 460 to 468 days.

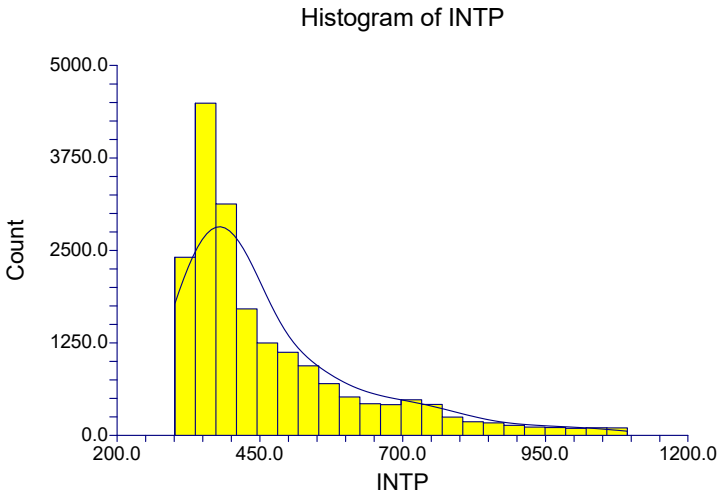

Figure 2 – Calving interval during Stage 2 of CAP (1992-1999)

Since the policies adopted led to a growth of agricultural production of 2% per year, while domestic consumption stood at 0.5%, this gap between supply and demand quickly accumulated stocks of various products, including beef. In order to solve the problem of agricultural surpluses, the volume of production was reduced through *set-aside*, extensification, conversion of production and aid linked to non-use of land.

In the beef sector, income support was largely proportional to the volume of production and therefore the bulk of support was given to larger and more intensive holdings; there was therefore a widening of the calving interval as the fall in prices did not justify a greater efficiency of production and the income was ensured by the mere holding of the animals.

In Stage 3 (2000-2007), although statistically the mode remained at 365 days and 30% of deliveries occurred below this value, there was a slight contraction of the median (from 404 to 401 days) and the mean (from 468 to 450 days). From Figure 3, it can be seen by comparison with Graph 2 that the upper classes including the middle class have a higher frequency and with fewer lags between them, giving the tail of the graph a more regular aspect.

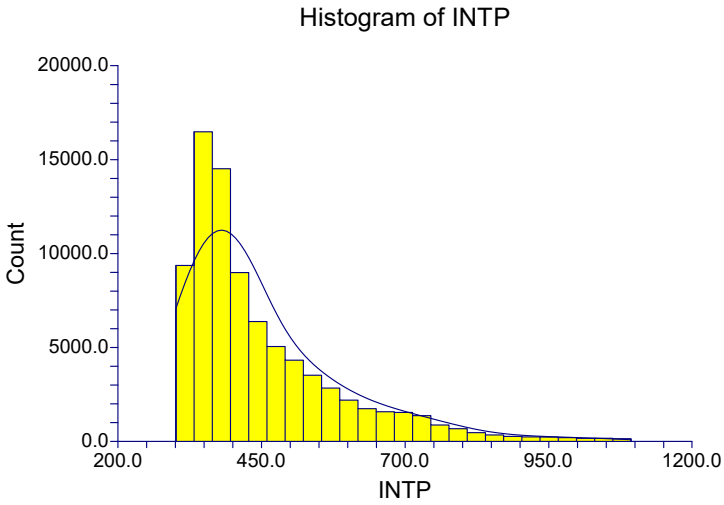

Figure 3 – Calving interval during Stage 3 of CAP (2000-2007)

As the dispersion coefficient decreased between Stages 2 and 3, from 27.7% to 23.8%, this means that deliveries recorded in frequency classes above the median were more concentrated contributing to this aspect of the graph. The reasons for this were that direct aid was introduced, in which the new regulation introduced a series of changes by increasing the value of premiums over a period of three years (special premium for males and cows) and introduced a slaughter premium on the condition that it would be paid directly to the producer.

In Stage 4 of the CAP (2008-2012) mode maintained as in Stage 3 but there was an increase in both the median (from 401 to 430 days) and mean (from 450 to 477 days). In Figure 4 it can be seen by comparison with Figure 3 that, similarly to what happened from Stage 2 to Stage 3, the upper classes present a higher frequency to the middle class and with fewer lags between them, further accentuating this trend.

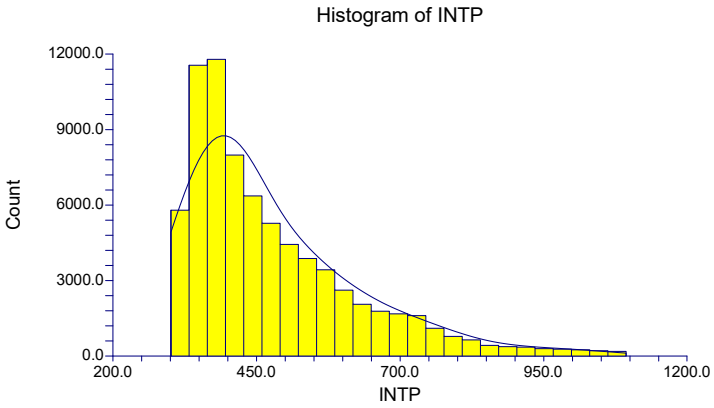

Figure 4 – Calving interval during Stage 4 of CAP (2008-2013)

More specifically, a breeder could qualify for the special premium for male bovines which would be increased in three stages to €210 per head / year for bulls and €150 per head per year for steers in the year 2002 and would continue to do so in the following years; the premium would be granted in the form of an annual premium per calendar year and per farm within the regional limits. The annual premium for suckler cows would be increased to €200 in 2002 plus a national supplement of €50 per head that could be added to that premium.
The variance analysis (Tukey-Kramer multiple comparison test) of the calving interval found in the ACBM regions over the 4 PAC Stages resulted in the values in Table 1.

Table 1 - Multiple comparison analysis of calving interval

Stages of PAC	Calving interval (days)
1 (1986 – 1991)	475,2 ab
2 (1992 – 1999)	473,0 b
3 (2000 – 2007)	459,3 c
4 (2008 – 2012)	483,9 a

The results show that during Stage 3 premiums for the slaughter of calves and steers encouraged breeders to increase the reproductive efficiency of their holdings in order to obtain more animals to benefit from Community aid than suckler cows.
During Stage 4, there was a significant widening of the calving interval, although the CAP measures for cattle did not change. The economic recession that has been felt during this period with a direct impact on the reduction in domestic demand for beef within the European Union may partly explain this lower reproductive efficiency (widening the interval between deliveries) to which some adverse climatic effects, in particular the years of precipitation below the average (2008, 2009 and 2012).

CONCLUSIONS

The calving interval of the Mertolenga breed varied throughout the four Stages of the CAP between 1986 and 2012 and was directly affected by the policy measures put in place, namely slaughter premiums, premiums for suckler cows and production premiums; when premiums for production were attractive, breeders worked to reduce the calving interval.

Indirectly, the economic recession that began in 2008 and had repercussions in the following years has altered the EU's internal consumption patterns affecting prices. This situation led to less efficiency on the part of breeders who, during the fourth Stage, supported the income of their holdings in the premiums obtained for the holding of suckler cows, thereby neglecting the production of calves; also the climatic irregularity and the low rainy years of 2008, 2009 and 2012, contributed to a deficient and irregular pasture production, which had a negative impact on the reproductive indices of the animals.

The calving interval of the Mertolenga breed was thus a reflection of measures of reproductive management inherent to the enterprises, political measures that could affect this management, and external economic and climatic factors that also exerted their effects.

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