

Analysis of the Stayability in Milk Buffaloes using Survival Models

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ABSTRACT: In this study the trait Stayability (SA) was evaluated according to the year of cull after first calving, i.e., SA 1 to 6 for 1 to 6 years from first calving in lactating females from bubaline milk herds spread in nine farms located in São Paulo state. Informations were used regarding 1027 lactating Murrah breed buffaloes. The statistical analyses were made using LIFEREG (SAS, 1999) procedure. The SA was evaluated using the fixed effects: farm production, birth year, calving season (Season 1- April to September and Season 2 October - March) and class of milk yield at 270 days. The age at first calving (AFC) was considered as a random effect. The mean observed for total milk yield was 1458.75Kg. Calving Season 2 encloses 65.6% of births. The means of cull age, in months, and the percentage of SA were, respectively: 10.69 e 69% (SA1), 19.30 e 63% (SA2), 26.4 e 54% (SA3), 33.15 e 42% (SA4), 38.53 e 36% (SA5) e 42.65 e 26% (SA6). It is verified that most of culls happens after the first lactation, among the sixth and eleventh month after first calving. It was observed that the factors: farm production, birth year and class of milk yield at 270 days affected significantly all SAs. Factors like calving season and the age at first calving (AFC) were only significant for SA1. Being significant the factor AFC in level of 1% and factor time in 10%. For other SAs these factors were not statistically significant.

Key words: *Bubalus bubalis*, Cull Age, Milk yield.

INTRODUCTION - In Brazil, the traits used as selection criteria, to reach genetic improvement in bubaline, it is mainly, the one of production of milk and of their constituent. The selection of reproductive trait is not simple, presenting difficulties since the moment of the collection of data to the statistical analysis and prediction of the genetic values. Besides, in general, present low heritability. The suggestion of including stayability (SA) in the programs of genetic improvement was made by Robertson and Rendel (1950). These authors suggested as advantages: reduction of the replacements annual cost; increase in the average yield of the herd; reduction of the number of replacements (heifer), allowing a potential increase of the herd and in possibility of selection of females. As disadvantage, we have the increase of the generation interval. The definition of the SA proceeds in most of the works, the of agreement Hudson and Van Vleck (1981), that they defined as the animal permanence probability in the herd to a specific age, given that had the opportunity to reach

this age. In Brazil, a few works with this trait (Silva et al., 2003a; Silva et al., 2005) and involving bubaline is very scarce. The objective of this work was to verify which and in how proportion the trait SA is affected by the different present systematic in nine herds properties of creation of bubaline milk using parametric models for flaw data in the time (survival models) and different distributions.

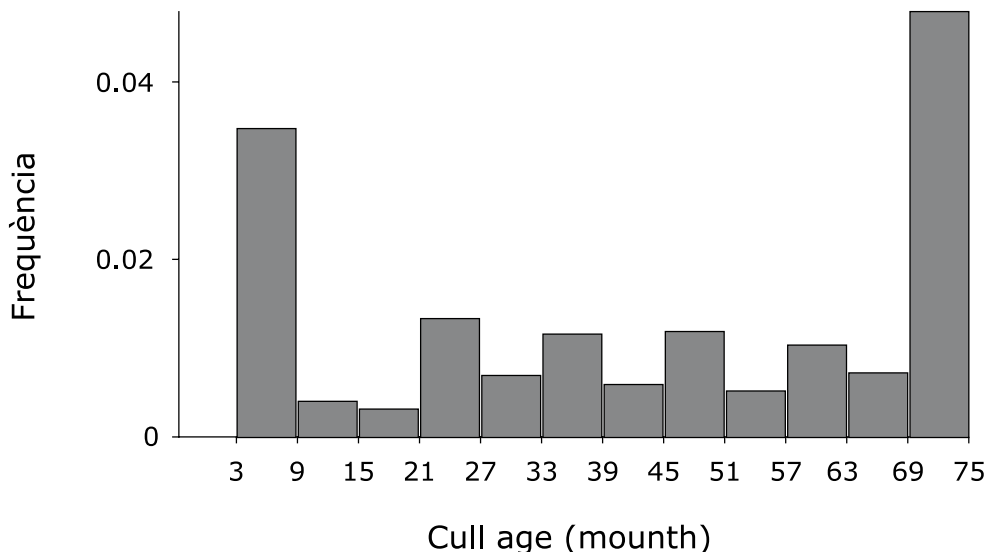
MATERIAL AND METHODS - The source of data was the program bubaline milk control maintained by the Department of Zootecnia of FCAV/Unesp, Jaboticabal, SP- Brasil and regarding nine located herds in São Paulo state. These herds were composed by "Murrah" breed animals at grazing systems in pasture formed, for the most part, with *Brachiaria* and *Panicum* species. In general, practice of alimentary supplementation is adopted, mainly in the dry period (April to September). The characteristic SA was defined as the ability of staying in the herd one year (SA1), two years (SA2), three years (SA3), four years (SA4), five years (SA5) and six years (SA6) after the first childbirth. They were only included in the analyses the bubaline with age to the first childbirth between 18 and 42 months, besides. For the bubaline control milk dates were registered, being considered these dates as the moment that they still stayed in the herd. After this were maid a trait named age of the discard and filled out with the result of the difference between the last control and age of the first childbirth, in months, for the animals that failed in staying in the herd. For the females that stayed after the specific ages and that they present censured data the right, the value for SA was same to 1 (success) and the variable age of the discard was filled out with the values of 12, 24, 36, 48, 60 e72 months, respectively for SA1, SA2, SA3, SA4, SA5 and SA6. In other words, they stayed after 1, 2, 3, 4, 5 and 6 years in the herd after the first childbirth. The SA was evaluated using the fixed effects: farm production, birth year, calving season (Season 1- April to September and Season 2 October - March) and class of milk yield at 270 days. The variable production of total milk was studied as lineal random effect and also as fixed effect, being divided in five classes in agreement with the productions of milk of each animal. Smaller productions than 1.001kg of milk were inside of the class 1, larger than 1.000kg and smaller than 1.501 kg in the class 2, larger than 1.500Kg and smaller than 2.001kg in the class 3, larger than 2.000Kg and smaller than 2.501Kg in the class 4 and larger productions than 2.500kg in the class 5. In pré-preliminary studies decided for the use as fixed effect in classes. The age at first calving (AFC) was considered as a random effect. The analyses of data with flaw in the time they were accomplished with the procedure LIFEREG of the SAS (1999), using Log-normal distributions. The LIFEREG procedure fits parametric models to failure time data that can be right-, left-, or interval-censored. The models for the response variable consist of a linear effect composed of the covariates and a random disturbance term. The distribution of the random disturbance can be taken from a class of distributions that includes the extreme value, normal, logistic, and, by using a log transformation, the exponential, Weibull, lognormal, log logistic, and 3 parameter gamma distributions SAS (1999).

RESULTS AND CONCLUSIONS - In the work, age to the first childbirth was among 18 to 42 months of age. The medium of the production of milk in the first lactating of bubaline of the race Murrah, with yield at 270 days was of 1.458,75 kg. The births are concentrated in the second calving season (October to March), with 65,6% of the births. The age of discard

of bubaline milk is a variable little studied, not being found in the literature specialized references on the subject. Figure 1 it is verified that most of the discards happen after the first lactating of the animals between the third party and ninth month. That is indicative that in case the bubaline has not reached determined production, is discarded, before one year after the first lactating. Observing, that in the last column they are the animals that arrived until the six year-old age, and for analysis through the, is made necessary that the animals present value for the variable age of discard. The factors farm production, birth year, calving season, age to the first childbirth, class of production of milk yield at 270 days of lactating and the results obtained in the it analyzes with the procedure LIFEREG for the characteristics SA1, SA2, SA3, SA4, SA5, SA6. It is verified that the significant variables in level of 1% were production farms, birth year and production of milk divided in classes for all SA_s. Indicating that, the applied handling in each farm is a factor for the permanence of the animal in the herd. As well as the birth year demonstrating, that the probable handling alterations (nutritional, sanitarium and reproductive) happened in every year healthy factors that it contributes to the permanence of the animal in the herd. The production of milk divided in classes factor that interfered in the permanence in the herd was also. Factors like calving season and the age at first calving (AFC) were only significant for SA1. Being significant the factor AFC in level of 1% and factor time in 10%. Showing that AFC and calving season are only taken into account by the producer in the first year after the childbirth. That time passed, these factors don't interfere in stayability.

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Figure 1. Cull age (in month) for females bubaline Murrah breed for class of production of milk yield at 270 days in lactation.



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