Longevity in Dairy Cattle

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Abstract

Longevity of productive life in dairy cattle is a characteristic difficult to evaluate. This measurement is complicated, in part, because the phenotype is expressed late in the life of the animal, but also because the methods of evaluation are complex. The molecular bases of longevity are still far from being fully understood, although some genes begin to be associated with this characteristic. In this short communication will be discussed the criteria for selection in dairy cattle and to report some studies evaluate the molecular bases of longevity; your progress and current perspectives of selection by genic information.

Keywords: Molecular bases; Productive life; Selection; Type traits

Introduction

The genetic improvement programs of dairy cattle have selection criteria different to achieve the end goal of increasing production of milk with a lower cost of herd maintenance. One of point to be considered by milk producers is to set up heifers and cows healthy, fertile at the appropriate age, able to express their maximum genetic potential for a long productive period [1]. However, one challenge still present in dairy cattle is the short productive life of animals, called longevity. Longevity is not a trait easily measured due to the delayed recording of phenotypic data, which would increase the generation interval [2,3].

Reduction of calving number generates a reduction of cow permanence time in the herd, influencing directly on profitability of dairy production [4]. A short productive life limits the selection opportunities on futures dam, cause high economic losses, besides being related to animal welfare [1]. Considering the importance of dairy business on a global stage is essential identify not the most productive animals only, but animals which combine best production, fertility and disease resistance should be considered [10-12]. Currently, the discards considering only the economic criteria is decreasing, mainly because the most widely used criterion is to select the animal genetic merit for milk production [9]. However, the correlation of milk production and other functional traits, such as fertility and disease resistance should be considered [10-12].

Indirect selection for longevity based on linear type traits

Although milk production is considered one of most important products in the dairy farming is important to determine their association with other traits [13]. Currently, type traits are measured within genetic improvement programs aiming to associate the traits type with milk production and used together with other data for selection to conformation, reproduction and longevity [14]. The purpose of the inclusion of type traits is to improve the cows conformation, providing a better body, functional and reproductive structure that enable them to meet the challenges of increasing production.

Selection for Longevity

Direct selection

A longer the permanence of cows in the herd implies at a lesser number of heifers for replacement. Replacement of cows by heifers may be because to involuntary factors of production, such as problems related to udder ligaments, angulation, diseases, infertility and low speed of milking.
profitability [16]. The type traits that present a higher influence on cows longevity are the traits related to sections udder, feet and legs, such as: anterior insertion, texture, depth, height of rear udder insertion, insertion wide rear udder, central ligament, bone quality and angle of the hull [4]. In fact, the selection by width and height of posterior udder, udder texture, udder cleft, loin strength, bone quality and final score can lead to improvements in longevity and 305 milk productions [17].

However, the large number of linear type traits and the correlation among each other can lead to inaccurate estimates on longevity and milk production due to high collinearity with linear type traits [18]. An alternative to avoid the inaccurate estimates is the factors analysis, which removes redundant information among correlated variables defining a smaller set of derived variables, called factors (Vukasinovic et al., [18]). The factor analysis provides tools for examining the correlation structure in a large number of traits, defining traits sets that are highly interrelated [19].

Molecular Base of the Longevity

Genetic selection and management changes during the last decades have significantly increased the productivity in dairy cattle. However, this recent success has not correlated with an extension of longevity [21,22].


References
