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Impact of crossbreeding on development and productivity in beef cow-calf systems

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DESCRIPTION

The diversity of breeds and crosses used in cow-calf production systems produce phenotypic variations in biological type, weight, growth, and milk yield both within and between herds. These variations could result in economically significant outcomes, such weaning weight. They also serve as a measure of the cow herd's upkeep expenditures. Models that make it easier to explain these variations as genetic effects are offered. These models can be used to simulate a range of crosses and crossbreeding systems. Because of a growing live calf export market in the country's Central West, crossbreeding is currently being used more frequently in Brazil. The genetic distance between the paternal breeds affects heterosis. To promote wise breeding choices, it may be helpful to evaluate the many crosses between taurine and zebu, taurine and taurine, and taurine and regionally adapted taurine.

Based on the prevalent production processes, it is not practical to measure the amount of feed that cows are consuming. However, a cow's calorie intake can be inferred from milk production and body weight mass. It has been demonstrated that nonlinear equations, with their relatively few parameters and straightforward biological interpretations, are able to accurately represent the growth of cattle. Such equations can be incorporated into simulation models to assess trade-offs like those between feed consumption and weaning weight production in cow-calf production systems. In order to compare growth curve parameters determined through nonlinear regression, milk production, calf weaning weight, predicted energy intake, and efficiency for various breed groups of cows raised under extensive grazing conditions in southern Brazil, the present study compared these variables. Predicting breed-specific genetic influences on these attributes was a second goal in order to make it easier to employ the findings in simulation modelling. The cows had an average of 19.2 body weight records beginning at birth, continuing every two months through the time they were first exposed at age two, and then ending when their calves were weaned. A Tru-Test XR3000 electronic scale with a 1,500 kg maximum capacity and a precision of 100 g was used to measure the weights. Animal productivity is directly correlated with growth features. Here, body weights were correlated with age using a nonlinear model, which has the advantage of condensing various data made throughout the animal's life into a small number of parameters with clear interpretations. Animals typically achieve adult weight very late in life in vast systems of beef production where nourishment is solely based on natural resources, which results in a decrease in maturing rate. When contrasting the growth curve of the cows in the present study with those bred in more intensive production systems, this trend is clear.

The ratio between the mass of the calf produced and the feed inputs needed to keep the cow alive and enable her to feed her calf is one approach to quantify Cow Efficiency (CE). In the present investigation, CE was calculated as the ratio of weaning weight to projected calorie intake. This made it possible to estimate productivity in situations where it was not practical to evaluate feed intake directly. Given that weight gain, development, and milk production account for the majority of a cow's energy requirements, equations were created to forecast energy consumption based on these factors. Due to heterotic effects that may differ depending on the distance between the parental breeds, crossbred cows typically develop faster and weigh more. Crossbred and purebred H cows had comparable maturity weights, though. Heterosis also affected the features of bigger calves and more milk production in crossbred cows. They were less reliant on the separation between the participating breeds, though. Energy intake (input) and calf weight at weaning were both raised by the influence of taurine indicine heterosis (output). The efficiency of the crossbred cows increased as a result of the larger relative relevance of output increases.