Comparison of multiplicative age adjustment factors calculated for milk yield for the Mediterranean Italian Buffalo Breed for two base ages: a first lactation average age base (34 months, parity 1) and a mature age base (55 months, parity 2)

E. Parlato¹, D.L. Van Vleck²

¹ Associazione Nazionale Allevatori Specie Bufalina, via C. Battisti, 68 81100 Caserta, Italy
² Department of Animal Science, University of Nebraska, Lincoln, NE, 68583-0908 USA

Corresponding author: E. Parlato. Associazione Nazionale Allevatori Specie Bufalina, via C. Battisti, 68 81100 Caserta, Italy - Tel. 0039/0823/356743 - Fax: 0039/0823/320964 - Email: e.parlato@anasb.it. D. L.

ABSTRACT: This study was carried out to compare multiplicative age adjustment factors calculated for milk yield for the Mediterranean Italian Buffalo Breed for two different base ages: a mature age base (55 months, parity 2), and a first lactation average age base (34 months, parity 1) using a mixed model procedure. Fixed effects of age-parity classes and random effects of contemporary group, genetic and permanent environmental effects of cows were included in the model. Two data sets were formed: Data Set I consisted of 83,810 lactation records and was used to develop separate multiplicative factors for each base age. Data Set II consisted of 115,242 lactation records and was used to examine the effectiveness of the multiplicative age factors and especially to compare the factors with different base ages. Factors were larger for milk yield adjusted to a mature age than to a first lactation average age. However, age factors followed the same trend and effectively adjusted milk yields for the effect of age at calving for all of the two base ages. The only difference among the two base ages was that the adjusted average milk yields to a first lactation average age base (34 months, parity 1), as expected, were smaller than the adjusted average milk yields to a mature age base (55 months, parity 2).

Key words: Mediterranean Italian Buffalo Breed, Base age.

INTRODUCTION - To compare accurately producing ability of cows at different ages, records are usually adjusted to a common base age. Traditionally, a common base used to construct age factors has been the mature age (MA), the age of maximum production. One reason for choosing the MA as the base age was to make adjusted milk yields the highest, because a cow’s largest record was used as the measure of her breeding value. The disadvantage of choosing the MA as base is that only a small number of cows reach the mature age. Most lactations start at about 24 to 40 months of age. Thus, the average mature equivalent yield would be always higher than the average actual yield. McDaniel (1971) discussed many advantages of adjusting milk yields to another base age, a first lactation average age
(FLA). For example, an advantage of adjusting to a FLA is that usually all cows have a first lactation, so that it would be logical to use the first calving age as base for selection decisions. Another advantage of using a FLA as the base is that selection of cows and progeny tests of bulls is practiced mainly on first lactation records (Hickman and Gravir, 1968). The FLA base would minimize the number of records to be adjusted since the first lactation cows always represent the largest group. Therefore, bull evaluations could be more accurate (Hickman and Gravir, 1968).

The objective of this study was to compare multiplicative age factors calculated for milk yield for the Mediterranean Italian Buffalo Breed for two different base ages: a MA base (55 months, parity 2), and a FLA base (34 months, parity 1).

MATERIAL AND METHODS - In this study two data sets were formed: Data Set I (DS1) consisted of 83,100 lactation records and was used to develop multiplicative age factors. Data Set II (DS2) consisted of 115,242 lactation records and was used for validation of the age factors estimated from DS1 and for comparison of the two base ages: a MA base (55 months, parity 2), and a FLA base (34 months, parity 1). Multiplicative age factors were developed from solutions to mixed model equations. Separate factors were calculated for the two different base ages. Fixed effects of age-parity classes and random effects of contemporary group, genetic and permanent environmental effects of cows were included in the model. Multiplicative factors were calculated as the ratios of age-parity class estimates of mature and younger cows. To examine the effectiveness of the factors with different base ages, milk yields from DS2 were corrected for months of age and parity groups with the factors developed from DS1. After correction, age-parity solutions for milk yield from DS2 were re-computed with the mixed model to see if the age effects were eliminated by using the age factors. After observing the plots of the age-parity solutions for milk yield adjusted with the multiplicative age factors, these factors were smoothed to reduce obvious variation among the adjusted age-parity solutions.

RESULTS AND CONCLUSIONS - As shown in Figure 1, multiplicative age adjustment factors were larger for milk yield adjusted to a MA (55 months, parity 2) than to a FLA (34 months, parity 1). The larger age solutions from the MA compared to the solutions for a FLA explain these differences. The two sets of age factors, however, had the same trends. As shown in Figure 2, all of the two base ages effectively adjusted milk yields for the effect of age at calving. The only difference between the two base ages was that the adjusted average milk yields to a FLA base (34 months, parity 1), as expected, were smaller than the adjusted average milk yields to a MA base (55 months, parity 2). The two base ages effectively adjusted milk yields for the effect of age at calving. The only difference between the two base ages was that the adjusted average milk yields to a FLA base (34 months, parity 1), as expected, were smaller than the adjusted average milk yields to a MA base (55 months, parity 2). In Italy, milk yields for cow records are adjusted to a MA, so it would be convenient to also adjust milk yields for the buffalo to a MA. McDaniel (1973), however discussed many advantages of adjusting milk yields to a FLA which should also be considered when deciding which base age to use for the adjustment of milk yields for the effect of age. For example, an advantage of adjusting to a FLA is that usually all cows have a first lactation, so that it would be logical to use the first calving age as the base.
Another advantage of using a FLA as the base is that selection of cows and progeny tests of bulls is practiced mainly on first lactation records (Hickman and Gravir, 1968). Data could also be adjusted simultaneously during the analysis by including age-parity classes in the model. Then, estimates of age factors would not be needed.

Figure 1. Plots of smoothed sets of multiplicative age factors from Data Set I for parity 1 (■-■), parity 2 (▲-▲) and parity 3 or greater (●-●) with a MA (A) and a FLA (B).

ACKNOWLEDGMENTS - I would like to thank the Italian Buffalo Breeders Association, who financed the present study at the University of Nebraska, and the Professor Dale Van Vleck for giving me the opportunity to work with him.
Figure 2. Plots of age-parity estimates (kg) for DS2 for parity 1 (■-■), parity 2 (▲-▲) and parity 3 or greater (●-●) after adjustment with smoothed sets of age factors from DS1 with a MA (A) and a FLA (B).

REFERENCES - Hickman, C. G., Gravir, K., 1968. Yield adjustments for differences in age at calving. Acta Agr. Scand., 18: 199. McDaniel, B. T., 1971. Merits and problems of adjusting to other than mature age. J. Dairy Sci., 56: 959-967.