The objectives of this research were to identify lactation curve function that best fitted daily (DD) and monthly yield (MD) data in an Ethiopian dairy cattle population. Three functions were compared: an inverse polynomial (IP), a modified inverse polynomial (MIG), and a modified composite (C) function. A goodness-of-fit of DD and MD and IP functions were compared using R-squared values. Both MIG and IP functions were better fitted to the lactation data than the other tested functions.

RESULTS AND DISCUSSION

The R² values were significantly affected by herd-year-season, parity, breed group of cow, lactation curve function, data type and the interaction between data type and lactation curve function (P < 0.001). Table 1. Both MIG (0.80±0.03) and IP (0.80±0.02) functions had similar LSMR values, they were significantly different from the IG (0.71±0.02) function. The goodness-of-fit of these functions to monthly yield data was also better than to the daily yield data (P<0.001). The R² values for IP functions were higher compared to MIG functions (P < 0.001). Milk data from cows in later parities (>4 parities, range 0.45 ± 0.05) showed significantly higher (P<0.05) R² values compared to cows in earlier parities (1 to 2), with first-parity cows showing the lowest LSMR value (0.80±0.02).

Among breed groups, Horn cows had higher (0.80±0.03) LSMR values than the other investigated breeds (P<0.001). The LSMR values for breed groups were significant (P<0.05). Although both MIG and IP were superior across all breed groups in both data types. The combination of MIG and IP showed the best fit for the lactation data compared to the other tested functions (Table 1). The goodness of fit of the MIG and IP functions to daily and monthly yield data obtained in this study was comparable to other reports (Debru, 1999). Although, among genetic type functions have been used in most comparison studies of lactation curve functions because of their desirable features to describe lactation curves (Debru, 2007), their goodness of fit in the present and previous studies (Debru, 2007) was low, but the combination of MIG and IP was used as an expected function to be associated with the short ascending phase of the lactation curve in the studied herds (Debru, 2007). Human and (Bate, 1978) indicated that the IP had a good fit for lactations that started at high level of milk and peaked earlier than average. Differences in R² of data type by breed type observed here were also found by Ali et al. (1999). Chak et al. (1999) reported a better fit for the IP function to weekly mean milk data compared to IP.

In the study, a number of significant differences (P < 0.05) were observed in parameters of lactation curve functions influenced R². The milk data were collected from 1999 to 2006 from hilly and plains of Maina Ababa, Tana River and Chifesh, Ethiopia. The milk data were fitted to the lactation curve functions of DD and MD data, and the best fitted function was selected based on the R². The goodness of fit of the inverse polynomial (IP) function was found to be the best fit for the lactation data compared to other tested functions (Table 1).

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