THEME 4 | GENETICS, GENOMICS, ANIMAL BREEDING AND REPRODUCTION

Persistency of Holstein, Gir and Girolando dairy breeds using non-linear models

Darlene S. Daltro[1], Juliana D. Machado*[1], Alessandro, P. Haiduck[1], Elisandra L. Kern[1],
Marcos Vinicius G. B. Silva[2], João C. C. Panetto[2], José Bracinni Neto[1], Jaime A. Cobuci[1]

[1]Universidade Federal do Rio Grande do Sul, Porto Alegre/RS; [2]EMBRAPA Gado de leite,
Juiz de Fora/MG

*Graduation student – julianadm@yahoo.com

Persistency is one of the main traits used to describe the lactation curve. The ability of a cow to maintain constant level of milk yield until the end of lactation is important economically and indirectly related to cows' welfare. There is no consensus on how to express that trait in mathematical terms. The objective of this study was to identify the mathematical function that best describes lactation persistency of three genetic breed compositions of Girolando dairy cattle. A total of 200,821 test day records of 31,682 primiparous cows of Holstein (H), Gir (G) and Girolando breeds, with genetic composition of 1/2 H: 1/2 G (1/2 HG), 1/4 H: 3/4 G (1/4 HG) and 5/8 H: 3/8 G (5/8 HG), managed in the state of Minas Gerais, were used. The estimation of lactation curves of animals were estimated by non-linear models of Wilmink (WIL) and Wood (WD) using NLIN procedure of Statistical Analysis software. The estimated parameters were used to calculate persistency. The first persistency measure (S1) is directly related to the parameters of the non-linear models. The persistency estimated by WD is obtained by $S1 = -(b+1)\ln(c)$, where b and c are the regression coefficients and, in WIL, it is represented by coefficient b. The second measure of persistency (S2) was calculated by the relation of milk yield estimated by WD and WIL between 201 and 300 days of lactation after calving and the production of the first 100 days of lactation. The estimated values of S1 for the 1/2 HG, 1/4 HG, 5/8 HG, G and H groups were 7.791 (WD) and 6.850 (WIL), 7.833 (WD) and 6.866 (WIL), 7.646 (WD) and 5.157 (WIL), 7.010 (WD) and 7.952 (WIL), and 7.289 (WD) and 12.007 (WIL), respectively. The standard error was 0.318 for WD and -2.245 for WIL. The higher S1 was observed for the 1/4HG cows, followed by the 1/2 HG in the WD model. In WIL model, the purebred cows (H and G) were more persistent than the other groups. S2 was estimated as 89.087 (WD) and 89.087 (WIL), 89.252 (WD) and 89.505 (WIL), 87.337 (WD) and 87.511 (WIL), 84.370 (WD) and 112.068 (WIL), and 89.677 (WD) and 89.774 (WIL) for 1/2 HG, 1/4 HG, 5/8 HG, G and H, respectively. The standard error of S2 was the same to WD (1.750) and WIL (1.750). For S2, in WD model, the most persistent was the H group followed by 1/4 HG. In WIL model, the pure breeds (G and H) were more persistent. The WIL model overestimated S1 of the H group and S2 of the G group. Overall, the WD model showed better quality in the adjustment of S1 and S2 and can be used independently of the genetic compositions of the Girolando breed.

Keywords: lactation, mathematical model, persistency, dairy cattle