NONLINEAR FUNCTION TO ESTIMATE GROWTH OF WEST AFRICAN DWARF SHEEP IN BENIN.

Gbangboche A.B[1]., Glèlè Kakaï R[1]., Adamou-N'diaye M[2]., Leroy P. L.[3]

1. Université d'Abomey Calavi, Faculté des Sciences Agronomiques, 01 BP 526 Cotonou, Bénin.

2. Université de Liege, Faculté de Médecine Vétérinaire, Département des Productions Animales, Bât 43, 20 Boulevard de Colonster, 4000 Liège Belgique.

Abstract

Four models expressing standard weight (Wt) at age t were used to estimate growth in West African Dwarf Sheep reared in Betecoucou breeding farm of Benin: Brody, $Wt=A(1-Be^{-Kt})$; Gompertz , $Wt=A \exp(-Be^{-Kt})$; Logistic, $Wt=A/(1+Be^{-Kt})$ and Von Bertalanffy, $Wt=A(1-Be^{-Kt})^3$ .The model parameters were solved using the language Matlab[®] R2006a and were substituted into the formula to estimate mean weight at age t and to calculate the Average Prediction Error (APE) that quantifies the relative disagreement between observed and predicted weight. Akaïke's Information Criterion (AIC) was accessed by full maximum likelihood estimation.

Final equations were as follow: Brody [$W_t = 46.9 (1-0.96 \exp(-0.002t))$, $r^2=0.821$, AIC=32395.1]; Gompertz [$W_t = 40.9\exp(-2.80\exp(-0.0072t))$, $r^2=0.841$, AIC=32893.4]; Logistic [$W_t=31.0/(1+11.11\exp(^-0.016t))$, $r^2=0.821$, AIC= 33408.6];Von Bertalanffy [$W_t = 62.50 (1-0.658 \exp(-0.004t)^3)$, $r^2=0.846$, AIC=32889.0)]. Average monthly weight (kg) observed from birth (d.0) to d.180 was respectively 2.0 kg and 17.3 kg and ranged from 1.8 to 2.0kg (d.0) and 17.6 to 19.1k (d.180) for predicted weight. Based on the coefficients of determination of the specific model, Akaike's Information Criterion (AIC) and Duncan's Multiple Range Test, the Brody model was found to be statistically most acceptable grow function followed by Von Bertalanffy model.