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**ESTIMATION OF GESTATIONAL AGE BY THE USE OF FETAL
PARAMETERS; PLACENTOME, FEMUR LENGTH, AND BIPARIETAL
DIAMETER**

A dissertation presented in partial fulfillment of the requirements for the degree of Master of
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Dedicated to Wilson Bunyaga, Theresia Kigadye, Mary Bunyaga and Zilatashe Bunyaga

Abstract

The research was conducted at (LATU) Large Animal Teaching Unit, Massey University, New Zealand. The study involved 23 beef cows and 60 dairy cows. The aim of the study was to test and assess the agreement between actual gestational age and that predicted using a model developed in previous studies based on placentome length (gestational age = placentome*2.88 - 6.11; Adeyinka et al., (2014) and to compare this agreement with that obtained using fetal measurements of femur length and head size (biparietal diameter). The research commenced on February 2015 and July 2015 for beef and dairy cows respectively and ended June 2015 and September 2015 for beef and dairy cows respectively. Beef cows were scanned transrectally every after three (3) weeks while dairy cows were scanned every after one (1) week.. Overall there was no evidence of bias in all the parameters studied. The strongest association ($R^2=0.85$) was seen in dairy cattle when biparietal diameter was measured and the weakest was placentome size in dairy cattle ($R^2=0.39$). This is the first study that has specifically focused on the agreement between estimates of gestational age from fetal size and actual gestational age. This study has shown biparietal diameter to be a better predictor of gestational age than mean placentome size across the range of gestational ages found in this study. However, because the limits-of-agreement for biparietal diameter increase as gestational age increases, by 120 days of gestation the difference between the limits-of-agreement for biparietal diameter and those for mean placentome size are much smaller than in early gestation, and the limits-of-agreement for biparietal diameter are similar to those previously reported where data from all placentomes measured were used to predict gestational age rather than just a single mean placentome size. At 120 days of gestation, placentomes can be measured in a much higher proportion of cattle than biparietal diameter, and even when the latter can be measured, placentome measurements are markedly easier to obtain. Femur length was by far the most difficult parameter to measure and especially by 120 days was much less precise than mean placentome size or biparietal diameter. Therefore, femur length should be restricted to use only in early gestation and then should be used alongside other parameters like biparietal diameter.

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List of Abbreviations

AI	Artificial insemination
BPD	Biparietal diameter
CL	Corpus luteum
CRL	Crown Rump Length
FTAI	Fixed-time artificial insemination
GH	Growth Hormone
IGF 1	Insulin-like growth factor 1
IVF	In vitro fertilization
LATU	Large animal research unit
MHz	megahertz
mm	millimetres
NT	Nuclear transfer
P	P-value
R ² Squared	correlation, R-squared
SPSS	Statistical Packages for Social Sciences
Vs	Versus

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