Improving The Reproductive Performance of the Muturu Breed of Cattle in Nigeria using Modified Ovsynch and Progesterone Synchronization Protocol

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DEDICATION

I dedicate this work to the almighty God for His faithfulness and His ever-present help during my period of study.

ABSTRACT

The Ovsynch protocol has been used in cattle to synchronize ovulation and facilitate fixed-time AI (FTAI) but its efficacy has not been evaluated in the Nigerian Muturu breed of *B. indicus* cattle. The effects of a modified Ovsynch protocol (modified by the addition of progesterone, eCG and modification of time for AI) upon the reproductive performance of Muturu cows were therefore studied.

The study was conducted at Abakiliki in Ebonyi state, Nigeria. Muturu cows (n=100) were selected for the study based on their previous calving history and the presence of follicle of greater than 5 mm diameter. Cows were then allotted to Untreated and Treated groups (n=50 each). Synchronization was by an Ovsynch regimen (Day 0: 100 µg GnRH, Day 7: 500 µg $PGF_{2\alpha}$ (Ovuprost), Day 10: 100 µg GnRH), augmented by a progesterone-releasing intravaginal insert (CIDR) between Days 0 and 7, and 400 IU eCG (Norvomon) on Day 7. FTAI was performed 12 and 24 h after the second GnRH injection. Untreated animals were monitored over two consecutive oestrous cycles and examined daily for the presence of oestrus over a period of 49 days, and were exposed to natural mating upon detection of oestrus in the second oestrous cycle observed. Ovarian ultrasonography to ascertain follicle size was performed at the onset and end of oestrus in the Untreated group, and on Days 0,7,10 in the Treated group. Pregnancy diagnosis (ultrasonographic) was performed 45 days after FTAI (Synchronized) and 45 days after the last observed oestrus during the breeding season (Untreated). Blood samples were collected from Treated group of animals for progesterone, LH and oestradiol concentrations assay.

All animals in the Treated group displayed oestrus after synchronization and all animals in the Untreated groups displayed oestrus during the 49-day study period. Follicle size (18 ± 0.4 mm *versus* 12± 0.2 mm), ovulation rate (100% versus 64%), duration of oestrus (54 h versus 19 h) and 45-day pregnancy rate (84% versus 36%), were all greater ($p<0.005$) in Treated than Untreated animals. Additionally, the animals in the Treated group displayed 46% multiple ovulations, compared with none in the Untreated group. Oestradiol concentrations were related to follicle size. Increase in follicle size resulted in higher concentration of oestradiol. The

presence of multiple ovulations appears to have been related to the use of eCG in the protocol. No multiple pregnancies occurred.

It is concluded that the modified Ovsynch protocol produced synchrony of oestrus, ovulation and improved follicle size, that were supported by normal endocrine patterns. It therefore appears that oestrus synchronization and FTAI can improve reproductive performance of the Muturu breed of cattle.

Key words: Muturu cows, pregnancy, follicle size, ovulation, oestrus, modified Ovsynch, Nigeria

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LIST OF ABBREVIATIONS

AI	Artificial insemination
B	Bos
CIDR	Controlled internal drug releasing device
CL	Corpus luteum
DBG	dried brewers grain
DF	Dominant follicle
E2	Oestradiol
eCG	Equine chorionic gonadotropin
GNRH	Gonadotropin releasing hormone
GNRH-1-	First GnRH administration /injection
GNRH-2-	Second GnRH injection
FTAI	Fixed time artificial insemination
FSH	Follicle stimulating hormone
LH	Luteinizing hormone
MGA	Melengesterol acetate
OR	Ovulation rate
PR	Pregnancy rate
P/AI	Pregnancy per artificial insemination
PRID	Progesterone releasing device
PMSG	Pregnant mare serum gonadotropin
PGF	Prostaglandin
P4	Progesterone

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