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

A thesis presented in partial fulfilment of the requirement for the degree of

Master of Science

in

Animal Science

Institute of Veterinary, Animal and Biomedical Sciences

Massey University

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2017

## 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<sub>2α</sub> (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 ( $18 \pm 0.4$  mm versus  $12 \pm 0.2$  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

## ACKNOWLEDGEMENT

I would like to express my sincere gratitude and appreciation to my wonderful supervisors: Professor Tim Parkinson, who afforded me the opportunity to gain some knowledge from his pool of scientific knowledge and skills in cattle production, Dr Sam Peterson thanks for your thoughtfulness and patience and Associate Professor Richard Laven, thanks for your assistance with your expertise in statistical analysis, and for providing all the materials I needed in the field, making the work a reality. The previous two years have been extraordinary; guidance, advice, support and constructive criticisms and feedbacks with rare scientific and logical comments from all my supervisors, have been fundamental in accomplishing my goals at Massey University New Zealand.

Appreciation is extended to my co-supervisor from Nigeria, Dr Solomon Oloruneke who worked tirelessly with all dedication, and to my lecturers at Department of Animal Science, Ebonyi State University Abakiliki, Nigeria, Professor Osakwe I.I, head of Department of Animal Science, Mr Jude Ogunmkpebi, Professor Mrs Patience Onu, Dr Mrs Vivian Olefureh and students; Ambrose, Odinakachi, Chika and Monday, who all assisted me all through my field work. Your guidance and efforts to make this work a reality are well appreciated.

Special thanks are expressed to: Mr and Mrs Ojemba, whose inspirations and prayers kept me moving on the track, my wonderful cousins Uche Onwuama, Uche Dike, Chimma and Chizzy, your calls and encouragement are well appreciated, my wonderful friends Engineer Mrs Ifeaka Mezue, Mrs Udeh Grace, am grateful to you all. Professor and Dr Mrs Doris Adeyinka, thanks for being a wonderful family to me in New Zealand and to Grace Ehoche, thanks for being a wonderful sister.

I am grateful to the New Zealand Government for providing the scholarship through Ministry of Foreign Affairs and Trade (MFAT) to undertake my M.Sc. in New Zealand and in this great institution of learning. I appreciate all the efforts and kind gestures of Jamie Hooper, Broderick Dave, Sylvia and host of others from the Massey University International office, you all made my stay enjoyable and friendly.

Lastly, to my Dad and siblings, thanks for being there for me. To a wonderful family, Barr and lady Amaechi Okafor, I would not have attained this height without your parental guidance and efforts. Lady O, my Dearest, thank you for your daily contact all through my stay in New

Zealand, you walked with me through the thick and thin of this great journey, mum you are the best. To my Beloved, Dr Casmir, I appreciate all your love and care Together, they provided the emotional support to accomplish my goals throughout this extraordinary experience.

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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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