# FERTILITY RESPONSES AND HORMONE PROFILES OF SYNCHRONIZED DIFFERENT BREED OF COWS FROM DIFFERENT FARMING SYSTEMS

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**2012**

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**DISSERTATION SUBMITTED IN FULFILLMENT OF THE REQUIREMENT FOR THE DEGREE OF MASTER OF SCIENCE**

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## ABSTRACT

The objectives of this study were to determine the efficiency of controlled internal drug release (CIDR) to synchronize estrus in cow, and to study the success rate of estrus synchronization and fertility responses with respect to animal's breed, farming system and body condition score (BCS). The study was conducted between January 2007 to December 2008 in three private farms in Gua Musang, Kelantan. The cows aged between 3 to 7 years old were of Charolais crossbreds (n=52), Brahman crossbreds (n=13) and Kedah-Kelantan (n=37) breed. All cows were subjected to estrus synchronization with CIDR. On day 0, CIDR implant with estradiol benzoate capsules were inserted into the vagina of the cow. On day 8, estradiol benzoate was injected, 24 hours prior to insemination with frozen semen provided by the Department of Veterinary Services, Kelantan. Blood samples (10 ml) were collected by using jugular venipuncture on day 0, 3, 7, 8, 9, 12 and 14 of the experiment. Pregnancy diagnosis was carried out on day 60 post-insemination by rectal palpation.

Body Condition Score (BCS) for cows in intensive farm (4.59±0.22) was significantly higher ($p<0.05$) when compared to cows in semi-intensive (3.76±0.14) and integration farms (3.42±0.12). Cows in Intensive (59%) and semi-intensive (59%) farms showed significantly higher percentage of pregnancy for fixed time insemination than that of cows in integration farm (37%). Charolais crossbreds breed had better BCS (4.65 ± 0.18) than Brahman crossbreds (4.03 ± 0.11) and Kedah-Kelantan (3.43 ± 0.09) bred, respectively. Charolais crossbreds showed significantly higher percentage of pregnancy to fixed time insemination (58%) when compared to Brahman crossbreds (54%) and Kedah-Kelantan (49%) bred ($p<0.05$). The percentage of pregnancy for cows with BCS 4 (53%) and 5, 6, 7 (69%), were significantly higher than cows with BCS 3 (43%). Cows with ≥ 55 days of postpartum interval had significantly higher percentage of the estrus (75%) and pregnancy (62%) than cows with < 55 days of postpartum interval.

On day 0, progesterone level was 3.16±0.74 ng/ml for all bred of cows and reached the peak on day 3 (12.75±1.21 ng/ml). Level of progesterone started to decline on day 3 and the lowest level was observed on day 12 (1.37±0.48 ng/ml). Progesterone levels on day 0 were 7.47±1.13 ng/ml, 0.52±0.09 ng/ml, and 3.13±0.92 ng/ml, for Charolais crossbreds, Brahman crossbreds and Kedah-Kelantan breeds, respectively. Progesterone level was highest on day 3 for Charolais crossbreds (6.21±1.25 ng/ml), Brahman crossbreds (9.03±3.73 ng/ml) and Kedah-Kelantan (27.16±5.36 ng/ml). On day 0, estradiol level was 3.27±0.55 pg/ml for all bred of cows and reached the peak on day 9 (43,47±7.88 pg/ml). Estradiol levels were 0.00±00 pg/ml, 5.01±0.90 pg/ml, and 4.60±0.61 pg/ml, for Charolais crossbreds, Brahman crossbreds and Kedah-Kelantan breeds, respectively on day 0. Estradiol level was highest on day 9 for Charolais crossbreds (77.26±1.89 pg/ml), Brahman crossbreds (34.20±1.48 pg/ml) and Kedah-Kelantan (27.47±4.91 pg/ml) bred.

## ABSTRAK

Tujuan kajian ini adalah untuk menentukan keberkesanan "Controlled internal drug release" (CIDR) untuk mengsinkronisasi estrus dalam lembu betina dan mengkaji kadar keberkesanan pensinkronisasian estrus dan tindakbalas kesuburan berdasarkan kepada baka haiwan, sistem penternakan dan skor kondisi badan (SKB). Penyelidikan telah dilakukan antara Januari 2007 hingga Disember 2008 di tiga ladang swasta di Gua Musang, Kelantan. Lembu-lembu betina berusia antara 3 hingga 7 tahun adalah daripada baka-baka kacukan Charolais (n=52), kacukan Brahman (n=13) dan Kedah-Kelantan (n=37). Semua lembu betina disinkronikan estrus dengan CIDR. Pada hari 0, CIDR implan bersama kapsul estradiol benzoat dimasukkan ke dalam vagina lembu betina. Pada hari ke 8 estradiol benzoate disuntik 24 jam sebelum permanian beradas dengan air mani beku yang disediakan oleh Jabatan Perkhidmatan Veterinar Negeri, Kelantan. Sampel darah (10 ml) diambil menggunakan "venipuncture jugularis" pada hari kajian 0, 3, 7, 8, 9, 12 dan 14. Diagnosis kebuntingan dilakukan pada hari ke 60 selepas permanian beradas secara palpasi rektal.

Skor kondisi badan (SKB) lembu betina di ladang intensif (4.59 ± 0.22) bersignifikan lebih tinggi ($p<0.05$) berbanding dengan ladang semi-intensif (3.76 ± 0.14) dan ladang integrasi (3.42 ± 0.12). Lembu-lembu betina di ladang intensif (59%) dan ladang semi-intensif (59%) menunjukkan peratus signifikan kebuntingan yang lebih tinggi kepada masa inseminasi yang telah ditetapkan berbanding dengan lembu-lembu betina di ladang integrasi (37%). Baka kacukan Charolais mempunyai SKB (4.65 ± 0.18) yang lebih baik daripada baka kacukan Brahman (4.03 ± 0.11) dan baka Kedah-Kelantan (3.43 ± 0.09). Baka kacukan Charolais menunjukkan peratus kebuntingan yang lebih tinggi dan signifikan kepada masa inseminasi yang telah ditetapkan (58%) apabila dibandingkan dengan baka kacukan Brahman (54%) dan baka Kedah-Kelantan (49%) ($p<0.05$). Peratus kebuntingan untuk lembu-lembu betina dengan SKB 4 (53%), dan 5, 6, 7 (69%), adalah bersignifikan lebih tinggi berbanding lembu-lembu SKB 3 (43%). Lembu betina dengan tempoh lepas beranak ≥55 hari mempunyai signifikan yang lebih tinggi bagi peratus estrus (75%) dan peratus kebuntingan (62%) yang bersignifikan lebih tinggi berbanding lembu-lembu betina dengan tempoh lepas beranak <55 hari.

Pada hari 0, aras progesteron adalah 3.16 ng/ml untuk semua baka lembu betina dan mencapai puncak pada hari ke 3 (12.76 ng/ml). Aras progesteron mulai menurun pada hari 3 dan aras terendah diperhatikan pada hari ke 14 (0.97 ng/ml). Aras-aras progesteron pada hari 0 adalah 7.47 ng/ml, 0.52 ng/ml, dan 3.13 ng/ml, masing-masing untuk baka kacukan Charolais, baka kacukan Brahman dan baka Kedah-Kelantan. Aras progesteron tertinggi pada hari ke 3 bagi kacukan Charolais (6.21 ng/ml), kacukan Brahman (9.03 ng/ml) dan Kedah-Kelantan (27.16 ng/ml). Pada hari 0, aras estradiol adalah 3.27 pg/ml untuk semua baka lembu betina dan mencapai kemuncak pada hari ke 9 (43.47 pg/ml). Aras estradiol adalah 0.00 pg/ml, 5.01 pg/ml, dan 4,60 pg/ml, masing-masing untuk baka kacukan Charolais, baka kacukan Brahman dan baka Kedah-Kelantan, pada hari ke 0. Aras estradiol adalah tertinggi pada hari ke 9 untuk baka kacukan Charolais (77.26 pg/ml), baka kacukan Brahman (34.20 pg/ml) dan baka Kedah-Kelantan (27.47 pg/ml).

## ACKNOWLEGEMENT

Many people gave assistance to me during the writing this thesis, but it is to Dr. Noraida Ismail and Dr. Noor Hashida Hashim, that I am most deeply indebted and whom I must thanks first. I would also like to thank the Department of Veterinary Services of Kelantan (Pn. Hajjah Normala, Cik Hasan, Cik Fuad, Cik Hazudi, Tok Wan) for their help and support during my research.

I owe a special debt to my parents, Razali (Alm.) and Hazana for their encouragement and love and who have patiently waited for the completion of this dissertation and also to my mother-in law Dra. Hj. Djarnis Darin Ismail. Furthermore, I would like to thank my siblings: my brothers Syukri, Aprizal, Erizal, Yunizar and my sister Erlina, for their help and encouragement throughout my life as well as in my studies. Most special appreciation is to my wife, Kemala Syamnis Azhar, who has extended the support, patience, and understanding for me to pursue and complete my study.

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| | |
|---|---|
| AI | Artificial insemination |
| BCS | Body condition score |
| C | Celcius |
| CIDR | Controlled internal drug released |
| CL | Corpus luteum |
| cm | Centimeter |
| d | Day |
| DVS | Department of veterinary services |
| E2 | Estradiol |
| EB | Estradiol benzoate |
| FELDA | Federal land development authority |
| FSH | Follicle stimulating hormone |
| FTAI | Fixed-time artificial insemination |
| GnRH | Gonadotropin releasing hormone |
| h | Hour |
| KK | Kedah kelantan |
| LH | Luteinizing hormone |
| mm | Millimeter |
| ng | Nanogram (s) |
| P4 | Progesterone |
| pg | Picogram (s) |
| PKC | Palm kernel cake |
| RIA | Radioimmunoassay |
| RISDA | Rubber industry smallholders development authority |
| SEM | Standard error of mean |
| SPSS | Statistical package for social science |
| TAC | Targeted area concentration |

## LIST OF APPENDICES