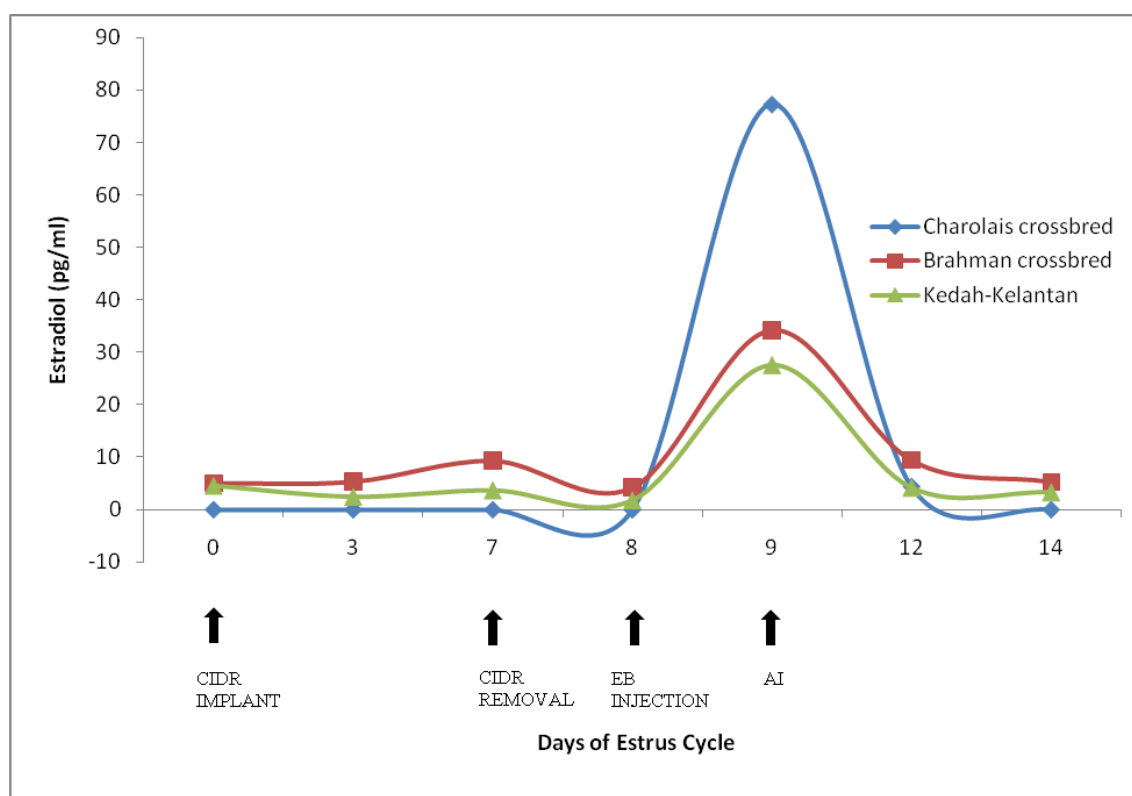


**Figure 4.3** Estradiol profile in the peripheral plasma of synchronized cows (n=28)



**Figure 4.4** Estradiol profiles in the peripheral plasma of synchronized Charolais crossbreds, Brahman crossbreds, and Kedah-Kelantan cows

## Appendix 1. Malaysia: Per Capita Consumption of Livestock Products, 1999-2008

### MALAYSIA : PENGGUNAAN PER KAPITA HASILAN TERNAKAN, 1999-2008

Malaysia : Per Capita Consumption of Livestock Products, 1999-2008

KOMODITI Commodity	WILAYAH Region	1999	2000	2001	2002	2003	2004	2005	2006 <sup>R</sup>	2007 <sup>R</sup>	2008 <sup>P</sup>
DAGING LEMBU/ KERBAU Beef (Kg)	Malaysia	4.08	4.75	5.01	5.06	5.18	5.81	5.32	5.49	5.48	5.43
	S. Malaysia	4.68	5.50	5.58	5.74	5.69	6.82	6.21	6.25	6.22	6.24
	Sabah	1.50	1.80	1.60	2.10	3.70	2.10	2.11	2.11	2.14	2.19
	Sarawak	2.55	3.13	4.04	2.83	2.50	2.77	1.51	3.12	3.43	2.42
DAGING KAMBING/ BEBIRI Mutton (Kg)	Malaysia	0.60	0.64	0.66	0.60	0.50	0.59	0.65	0.67	0.68	0.70
	S. Malaysia	0.74	0.75	0.79	0.73	0.60	0.72	0.79	0.81	0.82	0.85
	Sabah	td	td	td	td	td	td	td	td	td	td
	Sarawak	0.23	0.19	0.28	0.20	0.26	0.19	0.28	0.32	0.33	0.30
DAGING BABI Pork (Kg)	Malaysia	6.47	6.91	7.75	7.97	7.67	7.86	8.63	8.40	7.60	7.28
		** 16.18	** 17.10	** 19.38	** 19.92	** 19.19	** 19.65	** 21.58	** 21.00	** 19.00	** 18.20
	S. Malaysia	6.93	7.67	8.11	8.30	7.70	7.89	7.75	8.61	7.52	7.41
				** 20.28	** 20.76	** 19.26	** 19.73	** 19.38	** 21.52	** 18.79	** 18.52
	Sabah	3.10	3.90	3.30	3.00	2.90	2.91	3.07	2.93	3.10	2.66
							** 7.28	** 7.67	** 7.32	** 7.74	** 6.65
Sarawak	8.87	7.29	12.53	11.95	14.31	14.03	13.29	15.35	16.11	12.20	
						** 35.08	** 33.23	** 34.15	** 35.20	** 30.50	
DAGING AYAM/ITIK Poultry Meat (Kg)	Malaysia	26.18	27.30	28.03	31.88	31.85	33.63	30.07	31.11	33.24	34.38
	S. Malaysia	29.48	29.96	30.00	35.28	35.22	37.43	32.66	33.73	35.76	37.26
	Sabah	12.00	21.50	22.40	21.80	19.50	19.10	19.04	18.67	20.46	20.92
	Sarawak	17.89	19.19	17.10	19.28	20.42	20.67	21.12	22.44	24.81	26.10
TELUR AYAM/ITIK Chicken/Duck Eggs (Egg)	Malaysia	275	246	251	248	251	253	260	267	271	280
	S. Malaysia	293	270	262	250	261	265	278	279	279	294
	Sabah	156	212	196	192	175	163	140	151	157	158
	Sarawak	281	149	208	302	250	265	251	267	321	313
SUSU Milk (Kg)	Malaysia	33.21	45.14	56.07	51.73	51.08	50.84	34.26	36.63	39.27	41.67
	S. Malaysia	40.76	56.62	68.99	63.87	63.60	62.90	42.52	45.50	48.59	51.77
	Sabah	3.90	4.80	4.80	4.60	1.80	5.70	2.65	2.76	3.13	3.19
	Sarawak	11.00	6.15	6.14	6.72	1.40	4.60	3.50	3.68	3.85	1.33

td : Tiada maklumat (Not available)

P : Provisional

R : Revised

\*\* Berdasarkan kepada 40% bilangan penduduk bukan Islam

\*\* Based on total consuming population of 40% non-Muslim

Source: Department of Veterinary Services Malaysia (2008)

## Appendix 2. Malaysia: Livestock Population, 2004-2008

Malaysia : Livestock Population, 2004-2008

JENIS TERNAKAN <i>Livestock Type</i>	2004	2005	2006	2007	2008 <sup>P</sup>
<b>KERBAU (Buffalo)</b>					
S.Malaysia (P. M'sia)	83,454	79,495	79,044	80,931	80,086
Sabah	43,210	44,500	44,923	45,385	45,839
Sarawak	11,434	9,237	8,965	7,687	7,456
<b>Jumlah (Total)</b>	<b>138,098</b>	<b>133,232</b>	<b>132,932</b>	<b>134,003</b>	<b>133,381</b>
<b>LEMBU (Cattle)</b>					
S.Malaysia (P. M'sia)	731,484	723,771	716,390	772,323	787,871
Sabah	43,860	45,170	45,802	46,718	47,652
Sarawak	12,040	12,375	12,918	11,919	12,234
<b>Jumlah (Total)</b>	<b>787,384</b>	<b>781,316</b>	<b>775,110</b>	<b>830,960</b>	<b>847,757</b>
<b>KAMBING (Goat)</b>					
S.Malaysia (P. M'sia)	225,520	247,460	293,871	373,319	398,031
Sabah	29,370	30,250	30,272	30,157	30,585
Sarawak	9,504	9,960	11,146	9,202	9,189
<b>Jumlah (Total)</b>	<b>264,394</b>	<b>287,670</b>	<b>335,289</b>	<b>412,678</b>	<b>437,805</b>
<b>BEBIRI (Sheep)</b>					
S.Malaysia (P. M'sia)	109,511	109,898	111,103	122,106	121,263
Sabah	1,840	1,890	1,824	1,842	1,861
Sarawak	4,147	4,134	3,334	1,912	1,625
<b>Jumlah (Total)</b>	<b>115,498</b>	<b>115,922</b>	<b>116,261</b>	<b>125,860</b>	<b>124,749</b>
<b>BABI (Swine)</b>					
S.Malaysia (P. M'sia)	1,483,515	1,528,942	1,514,170	1,441,036	1,441,862
Sabah	83,299	120,000	91,091	69,590	64,580
Sarawak	544,033	386,705	423,858	231,421	227,024
<b>Jumlah (Total)</b>	<b>2,110,847</b>	<b>2,035,647</b>	<b>2,029,119</b>	<b>1,742,047</b>	<b>1,733,466</b>

P : Provisional

Source: Department of Veterinary Services (2008)

### Appendix 3. Malaysia: Consumption of Livestock Products, 1999-2008

#### MALAYSIA : PENGGUNAAN HASILAN TERNAKAN, 1999-2008

Malaysia : Consumption of Livestock Products, 1999-2008

KOMODITI Commodity	WILAYAH Region	1999	2000	2001	2002	2003	2004	2005	2006	2007 <sup>P</sup>	2008 <sup>P</sup>
DAGING LEMBU/ KERBAU Beef (M. Tan/M. Ton)	S. Malaysia	82,973	99,611	106,773	112,295	113,630	138,966	129,138	132,407	135,092	137,704
	Sabah	4,407	4,502	4,204	5,207	10,271	3,213	6,362	7,416	6,549	7,055
	Sarawak	5,173	6,480	9,293	6,518	5,746	6,367	3,480	6,550	7,205	5,937
	Jumlah Total	92,553	110,593	120,270	124,020	129,647	148,546	138,980	146,373	148,846	150,696
DAGING KAMBING/ BEBIRI Mutton (M. Tan/M. Ton)	S. Malaysia	13,148.0	13,501.0	15,148.0	14,208.0	11,967.0	14,631.0	16,336.0	17,129.0	17,896.0	18,775.6
	Sabah	td	td	td	td	td	td	td	td	td	td
	Sarawak	457.5	388.0	650.0	466.0	606.0	441.0	637.0	671.0	704.6	735.6
	Jumlah Total	13,605.5	13,889.0	15,798.0	14,674.0	12,573.0	15,072.0	16,973.0	17,800.0	18,600.6	19,511.2
DAGING BABI Pork (M. Tan/M. Ton)	S. Malaysia	122,719	138,908	155,345	162,308	153,785	160,756	185,520	182,506	163,154	163,457
	Sabah	6,305	6,653	6,121	5,683	5,535	8,593	9,268	9,016	9,486	8,571
	Sarawak	17,956	15,111	24,650	27,480	32,920	31,710	30,700	32,235	33,847	29,893
	Jumlah Total	146,980	160,672	186,116	195,471	192,240	201,059	225,488	223,757	206,487	201,920
DAGING AYAM/ITIK Poultry Meat ('000 M. Tan)	S. Malaysia	522.50	542.76	577.90	696.07	703.02	762.54	679.36	715.12	776.15	822.05
	Sabah	35.80	52.69	59.39	47.88	54.45	54.56	57.51	57.50	62.69	67.37
	Sarawak	36.26	39.76	35.82	38.02	40.38	43.29	48.79	56.11	64.52	63.95
	Jumlah Total	594.56	635.21	673.11	781.97	797.85	860.39	785.66	828.73	903.36	953.36
TELUR AYAM/ITIK Chicken/Duck Eggs (Juta Biji/Mil. Eggs)	S. Malaysia	5,199	4,894	5,021	4,887	5,215	5,393	5,792	5,921	6,047	6,485
	Sabah	470	525	523	492	492	467	422	490	481	508
	Sarawak	570	308	476	695	588	614	580	696	835	767
	Jumlah Total	6,239	5,727	6,020	6,074	6,295	6,474	6,793	7,107	7,363	7,761
SUSU Milk (Juta Liter/Mil. Litres)	S. Malaysia	722.37	1,025.73	1,321.00	1,248.59	1,269.46	1,281.35	884.45	964.56	1,054.64	1,142.01
	Sabah	11.15	11.69	12.44	6.27	6.76	16.20	7.99	8.50	9.60	10.26
	Sarawak	20.70	12.74	12.99	13.78	3.23	2.92	2.62	2.75	2.89	3.26
	Jumlah Total	754.22	1,050.16	1,346.43	1,268.64	1,279.45	1,300.47	895.06	975.81	1,067.13	1,155.53

R : Revised

P : Provisional

td : Tiada maklumat. (Not available)

Source: Department Veterinary of Services Malaysia (2008)

## Appendix 4. P. Malaysia: Import of Livestock and Livestock Products, 2003-2007

S. MALAYSIA : IMPORT TERNAKAN DAN HASILAN TERNAKAN, 2003-2007  
P. Malaysia : Import of Livestock and Livestock Products, 2003-2007

JENIS DAGANGAN Type of Commodity	UNIT KUANTITI Quantity	2003		2004		2005		2006 <sup>P</sup>		2007 <sup>P</sup>	
		KUANTITI Quantity	NILAI CIF Value CIF Juta RM Mli RM	KUANTITI Quantity	NILAI CIF Value CIF Juta RM Mli RM	KUANTITI Quantity	NILAI CIF Value CIF Juta RM Mli RM	KUANTITI Quantity	NILAI CIF Value CIF Juta RM Mli RM	KUANTITI Quantity	NILAI CIF Value CIF Juta RM Mli RM
<b>1 TERNAKAN HIDUP</b> <i>Live Animals</i>											
<b>Kerbau untuk Pembiakan</b> <i>Buffaloes for breeding</i>	Ekor No	643	0.88	2,496	3.40	0	0.00	3,705	5.19	8	0.04
<b>Kerbau untuk Penyembelihan</b> <i>Buffaloes for slaughter</i>	Ekor No	1,657	2.06	1,562	1.41	793	1.58	1,505	2.36	436	0.75
<b>Lembu untuk Pembiakan</b> <i>Cattle for breeding</i>	Ekor No	32,064	43.21	3,726	6.24	2,163	3.88	29,627	10.64	20,166	13.59
<b>Lembu untuk Penyembelihan</b> <i>Cattle for slaughter</i>	Ekor No	59,041	90.53	44,576	87.41	26,866	62.75	39,507	78.02	41,871	51.09
<b>Bebiri Hidup</b> <i>Live sheep</i>	Ekor No	20,897	6.85	22,160	6.54	27,249	8.24	46,591	6.25	27,800	8.84
<b>Kambing Hidup</b> <i>Live goats</i>	Ekor No	42,704	12.12	33,664	9.81	38,150	12.37	75,032	30.83	89,774	40.39
<b>Babi Hidup</b> <i>Live swine</i>	Ekor No	54	0.31	0	0.00	50	0.67	241	0.77	12	0.18
<b>Anak Ayam Sehari &amp; Anak Itik</b> <i>Day old chicks &amp; ducklings</i>	Ekor No	5,537,095	48.38	4,049,222	41.77	3,509,062	42.14	2,253,576	29.79	2,917,184	34.78
<b>Ayam Hidup</b> <i>Fowl and Poultry</i>	Ekor No	98,928	0.62	5,000	0.04	0	0.00	4,032	0.40	81,040	1.07
<b>Itik Hidup</b> <i>Live Ducks</i>	Ekor No	290,927	1.82	43	0.01	0	0.00	0	0.00	1,404	0.03
<b>Turkey, berat tidak melebihi 185 gram</b> <i>Turkey, weight not more than 185 gram</i>	Ekor No	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00
<b>Kuda Lumba</b> <i>Race Horses</i>	Ekor No	0	0.00	0	0.00	0	0.00	7,319	0.35	69	0.71
<b>Kuda selain dari Kuda Lumba</b> <i>Horses other than for racing</i>	Ekor No	0	0.00	0	0.00	0	0.00	3,560	5.64	205	3.65
<b>Lain-Lain Ternakan Hidup</b> <b>(Burung Timangan dan Lain Lain)</b> <i>Other live animals (Pet Birds and Others)</i>	Ekor No	463,587	18.49	83,826	5.43	48,196	10.13	63,397	33.55	70,290	37.45
<b>JUMLAH KECIL TERNAKAN HIDUP</b> <i>Sub Total Live Animals</i>			<b>225.27</b>		<b>162.06</b>		<b>141.76</b>		<b>203.79</b>		<b>192.57</b>

**Continued**

2	DAGING LEMBU <i>Beef</i>	M. Tan M. Tonnes	85,277.00	383.92	116,944.00	617.62	113,797.00	678.03	105,786.33	632.66	102,304.00	683.22
3	DAGING KAMBING <i>Mutton</i>	M. Tan M. Tonnes	10,707.00	88.99	13,365.00	133.25	13,922.66	146.88	15,094.53	144.76	16,303.42	159.95
4	BAHAN-BAHAN DAGING BABI <i>Swine Meat</i>	M. Tan M. Tonnes	1,368.94	6.24	1,819.24	10.21	2,359.70	15.63	3,087.93	18.89	3,139.29	26.08
5	BAHAN-BAHAN DAGING AYAM (PROSES) <i>Poultry Meat (processed)</i>	M. Tan M. Tonnes	20,654.49	100.59	2,162.95	15.73	3,583.15	16.66	2,262.81	16.30	17,528.72	101.99
6	SUSU DAN HASIL SUSU <i>Milk and Milk Products</i>	Juta Lit. Mil Ltrs	1,499.25	1,143.24	1,574.08	1,548.73	1,552.20	1,676.57	1,489.29	1,667.55	1,556.16	2,392.09
7	MAKANAN TERNAKAN <i>Animal Feeds</i>	Juta (M.Tan) Mil (M.Tonnes)	2.49	1,698.31	2.48	2,171.37	3.29	2,408.62	4.04	2,822.00	3.46	3,384.31
8	BELULANG <i>Raw Hide and Skin</i>	M.Tan M. Tonnes	267.12	10.68	267.12	27.24	904.89	38.16	31,291.22	93.37	1,015.86	33.07
9	KULIT <i>Leather</i>	M.Tan M. Tonnes	6,266.00	312.35	7,373.00	372.74	7,710.00	396.64	8,786.00	372.27	8,334.00	370.52
10	TELUR AYAM/ITIK <i>Chicken/Duck Eggs</i>	Juta Biji Mil. Eggs	6.56	1.12	13.01	2.31	15.04	3.49	9.32	1.75	9.70	1.52
11	LAIN-LAIN (Bacon, Ham, Meat Sausages, Frankfurters, dll) <i>Others (Bacon, Ham, Meat, Sausages, Frankfurters, dll)</i>			54.79		20.21		14.68		15.21		13.78
	JUMLAH KECIL HASIL TERNAKAN <i>Sub Total Livestock Products</i>			3,800.23		4,919.41		5,395.36		5,784.76		7,166.53
	JUMLAH BESAR <i>Grand Total</i>			4,025.50		5,081.47		5,537.12		5,988.55		7,359.10

**Source: Department of Veterinary Services of Malaysia (2008)**

## **Appendix 5. List of Publications**

### **2011**

Syafnir., Noraida, I., Hashida, N.H., Normala, T., Hassan, Z., Fuad, M., Hazudi, A.R. Progesterone and estradiol profiles of co-administration of exogenous progesterone and estradiol benzoate during estrus synchronization in cows. *Indian J Anim Res.* 45(4): 295-299. (*ISI-Cited Publication*)

Syafnir., Noraida, I., Hashida, N.H., Normala, T., Hassan, Z., Fuad, M., Hazudi, A.R. Hormones profile of synchronized cows. 32st Malaysian Society of Animal Production (MSAP) Ann. Conf. Promenade Hotel, Tawau, Sabah. 6 – 9 June 2011. (*Proceedings*)

### **2010**

Syafnir., Hashida, N.H., Noraida, I., Normala, T., Hassan, Z., & Fuad, M. (2010). Effects of farming system and body condition score on fertility performances in synchronized cattle. *Indian J Anim Res.* 44(1): 28-31. (*ISI-Cited Publication*)

Syafnir., Noraida, I., Hashida, N.H., Normala, T., Hassan, Z. and Fuad, M. Effect of breeds and days of postpartum on pregnancy rate in synchronized cattle. 31st Malaysian Society of Animal Production (MSAP) Ann. Conf. Renaissance Hotel, Kota Bharu, Kelantan. 6 - 8 June 2010. (*Proceedings*) Malaysia. 2010. (*Proceedings*)

Syafnir., Hashida, N.H., Noraida, I., Normala, T., Hassan, Z., & Fuad, M. Effect of farming system on fertility responses in synchronized cattle. 31st Malaysian Society of Animal Production (MSAP) Ann. Conf. Renaissance Hotel, Kota Bharu, Kelantan. 6 - 8 June 2010. (*Proceedings*) pp. 157 158. (*Proceedings*)

### **2009**

Syafnir, Hashida, N.H., Noraida, I., Normala, T., Hassan, Z., & Fuad, M. Effect of body condition score on the estrus and pregnancy rate in synchronized cattle. 2nd International Conference on Sustainable Animal Agriculture for Developing Countries (SAADC). Corus Hotel, Kuala Lumpur, Malaysia. 8 - 11 Nov 2009. (*Proceedings*) (*Non-ISI/Non-SCOPUS Cited Publication*)

Syafnir, Noraida, I., Normala, T., Hassan, Z., & Fuad, M. 2009. Efficiency of CIDR (Controlled Internal Drug Release) for oestrus and pregnancy in cows. Proc. 30th Annu. MSAP Conf., 2-5 June 2009, Kota Kinabalu, Sabah. (*Proceedings*)