

**Historical Control Data for  
Development and Reproductive  
Toxicity Studies using the  
CrI:CD<sup>®</sup> BR Rat**

Compiled by MARTA  
(Middle Atlantic Reproduction and Teratology Association)

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LABORATORIES

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# INTRODUCTION

This project is a continuation of MARTA's (Middle Atlantic Reproduction and Teratology Association) efforts to collect and summarize historical control data from developmental and reproductive toxicology studies conducted at laboratories of member companies. Previous MARTA efforts include projects concluded in 1979 (Sprague-Dawley rat reproduction), 1982 (New Zealand White rabbit reproduction), 1990 (CD\* rat and New Zealand White rabbit reproduction), and 1991 (external anomalies in CD\* rats). The first two projects were published as abstracts (Woo and Hoar, 1976, 1982), while the latter two projects were distributed in mailings to the MARTA membership. The present project collected data on reproduction, visceral, and skeletal anomalies in the CD\* rat. The previously collected data on external anomalies is included here for completeness. There have been very few other comprehensive compilations of these type of data in the open literature. A list of available references for rodents and rabbits is provided in this document.

## HOW THE SURVEY WAS CONDUCTED

A request for data was sent to 38 companies in the US. Forms were included that requested specific information from each study group. Data were transcribed by the submitter onto these forms provided, and the forms were returned to MARTA. Twenty-one companies responded and all data provided were entered into a spreadsheet program for tabulation.

The data are presented here by study group. The external anomaly data are summarized as affected fetuses/total fetuses.

## ANIMAL SOURCES AND ENVIRONMENTAL CONDITIONS

The survey requested data from Sprague-Dawley rats with the source and location (e.g., Charles River/Raleigh) for each study to be specified. **Data are** summarized in **various ways** including by Charles River production site and by contributing company. **Environmental** conditions, housing, food, or water system used were not requested in the survey. Since all participating laboratories conduct GLP studies, it is assumed that conditions meet or exceed federal **regulations** for the care and housing of **laboratory** animals. All animals were of VAF• **health** status at the time of delivery. Health status at the time of study was not indicated in the reports.

## TERMINOLOGY AND GENERAL INFORMATION

The final tables presented in this document list the reproduction parameters and fetal anomalies as they were listed in the initial survey forms. Only positive findings are reported. Terminology used in this publication was established from the MARTA Glossary of terms (1989 and 1993), distributed by the organization. Participants were instructed not to include skeletal anomalies considered to represent delayed or incomplete ossification. The initial survey forms of visceral and skeletal anomalies contained "free-form" fields for entry of findings not listed. A committee consisting of MARTA members summarized the data and made judgments as to the inclusion or exclusion of certain "free-form" findings.

One additional note: It should be emphasized that the presented averages in the C-section and natural delivery tables are derived from all the individual study groups that fall in the particular category, and are thus on a "per study group basis". Of all the studies in a particular category (e.g., all gestation day 20 studies), every study did not necessarily contain all parameters. Thus, the "N" of the various parameters may be different. In Figure 11, the study groups that were averaged to obtain the mean post-natal day 21 pup body weight for males and females together are different from the study groups which reported the sexes separately. That is why the means for the weight of the combined sexes is lower than for the means for either the males or females reported separately.

In the fetal anomaly tables, the reported "fetal incidence (%)" is also on a per study basis, and the incidence within each study was calculated as: (total affected fetuses/total fetuses in the group) x 100. The more appropriate method of calculation would be on a per litter basis (i.e., affected fetuses/total fetuses in each litter is calculated and the group average is derived from these). The survey design precluded this.

## ACKNOWLEDGMENTS

The MARTA historical control committee consists of Dr. L. David Wise (Merck Research Laboratories), Dr. Alan M. Hoberinan (Argus Research Laboratories), and Ann L. Tappan (Argus Research Laboratories). **This document was reviewed by the MARTA Steering Committee prior to distribution.**

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## PARTICIPATING COMPANIES

Argus Research Laboratories., Inc.  
Burroughs Wellcome Co.  
Du Pont Co., Haskell Labs  
CIBA-GEIGY Corp., Farmington, CT  
CIBA-GEIGY Corp., Summit, NJ  
Eli Lilly and Co.  
Exxon Biomedical Sciences  
G.D. Searle Res. & Devel.  
Hazleton Labs. America, Inc., Madison  
Hazleton Labs. Washington, Inc.  
Merck Research Laboratories  
Mobil Oil Corp.  
Pfizer Central Research  
Rhone Poulenc Rorer Central Research  
R.W. Johnson Pharm. Res. Inst., Raritan, NJ  
Research Triangle Institute  
Schering-Plough Corp.  
Smith Kline Beecham Pharm.  
Sterling-Winthrop Res. Inst.  
Upjohn Co.  
**Warner-Lambert/Parke-Davis**

TABLE 1  
CESAREAN-SECTION DATA

	ALL GESTATION DAY 20 STUDIES				ALL GESTATION DAY 21 STUDIES			
	AVG	S.D.	MIN	MAX	AVG	S.D.	MIN	MAX
TOTAL FEMALES:	<b>4366</b>				<b>2094</b>			
PREGNANT FEMALES:	<b>3978</b>				1860			
TOTAL STUDIES:	221				96			
AGE ON GD 0 (WKS)	11.92	2.42	6.00	23.00	12.88	<b>2.44</b>	9.00	20.00
FEMALES/STUDY	19.76	8.20	5.00	47.00	21.81	<b>8.58</b>	3.00	64.00
PREGNANT FEMALES	18.00	7.61	4.00	40.00	<b>19.38</b>	<b>6.93</b>	3.00	<b>46.00</b>
% PREGNANT	91.23	9.26	56.00	100.00	89.81	10.18	60.00	100.00
# ALL RESORBED	0.03	0.18	0	1.00	0.06	0.24	0	1.00
% OF PREG. ALL RESORBED	0.17	0.96	0	7.69	<b>0.42</b>	1.74	0	11.11
# CORPORA LUTEA	17.47	1.64	13.50	21.50	16.99	1.39	13.80	20.00
# IMPLANTS	15.45	1.31	11.00	18.00	<b>15.52</b>	1.25	11.10	17.60
# RESORPTIONS	<b>0.88</b>	0.36	0.19	2.10	0.98	<b>0.43</b>	0.00	2.80
% RESORPTIONS	6.08	2.77	1.50	20.60	<b>6.86</b>	3.74	0.00	24.40
# DEAD FETUSES	0.006	0.07	0	1.00	0.004	0.02	0	0.10
# LIVE FETUSES	<b>14.58</b>	1.28	10.60	16.80	14.59	1.35	<b>8.50</b>	17.04
%DEAD+RESOR./IMPLANTS	5.92	2.81	1.10	20.60	6.82	3.71	0.00	24.40
SEX RATIO (% MALES)	49.53	<b>3.51</b>	38.60	60.40	49.17	<b>3.09</b>	37.00	55.70
<b>LIVE FETAL WEIGHTS (GRAMS):</b>								
ALL FETUSES	<b>3.52</b>	0.16	<b>3.03</b>	<b>3.94</b>	5.25	0.20	<b>4.65</b>	<b>5.78</b>
FEMALE FETUSES	<b>3.44</b>	0.17	2.94	<b>3.89</b>	5.20	0.26	<b>4.50</b>	<b>5.80</b>
MALE FETUSES	3.61	0.17	3.10	4.05	5.30	0.20	4.80	5.91

	ALL STUDIES, GESTATION DAYS 20 & 21			
	AVG	S.D.	MIN	MAX
TOTAL FEMALES:	<b>6460</b>			
PREGNANT FEMALES:	<b>5838</b>			
TOTAL STUDIES:	317			
AGE ON GD 0 (WKS)	12.21	2.47	6.00	23.00
FEMALES/STUDY	20.38	8.37	3.00	64.00
PREGNANT FEMALES	18.42	7.44	3.00	46.00
%PREGNANT	90.80	9.57	56.00	100.00
# ALL RESORBED	0.04	0.20	0	1.00
% OF PREG. ALL RESORBED	0.24	1.25	0	11.11
# CORPORA LUTEA	17.32	1.58	13.50	21.50
# IMPLANTS	15.47	1.30	11.00	18.00
# RESORPTIONS	0.91	0.39	0	2.80
% RESORPTIONS	6.32	<b>3.13</b>	0	24.40
# DEAD FETUSES	0.005	0.06	0	1.00
# LIVE FETUSES	14.59	1.30	8.50	17.04
% DEAD+RESOR./IMPLANTS	<b>6.18</b>	3.12	0	24.40
SEX RATIO (% MALES)	49.42	3.39	37.00	60.40

TABLE 2  
CESAREAN-SECTION DATA  
GESTATION DAY 20

	KINGSTON				PORTAGE			
TOTAL FEMALES:	740				1262			
PREGNANT FEMALES:	676				1180			
TOTAL STUDIES:	36				64			
	<b>AVG</b>	<b>S.D.</b>	<b>MIN</b>	<b>MAX</b>	<b>AVG</b>	<b>S.D.</b>	<b>MIN</b>	<b>MAX</b>
AGE ON GD 0 (WKS)	12.00	1.61	6.00	17.00	11.46	3.07	8.00	23.00
FEMALES/STUDY	20.56	7.60	6.00	26.00	19.72	8.12	5.00	41.00
PREGNANT FEMALES	18.78	6.76	6.00	25.00	<b>18.44</b>	<b>7.83</b>	4.00	38.00
%PREGNANT	92.70	7.37	68.00	100.00	93.10	7.47	71.43	100.00
# ALL RESORBED	0.06	0.23	0	1.00	0.02	0.12	0	1.00
% OF PREG. ALL RESORBED	0.24	0.98	0	4.55	0.11	0.89	0	7.14
# CORPORA LUTEA	18.06	1.23	14.30	20.00	16.29	1.44	13.50	19.60
# IMPLANTS	15.61	1.12	12.30	17.70	14.66	1.37	11.00	17.40
# RESORPTIONS	0.75	<b>0.22</b>	0.50	1.30	<b>0.85</b>	0.34	0.30	2.00
% RESORPTIONS	4.96	1.41	2.90	8.00	6.26	3.09	1.70	20.60
# DEAD FETUSES	0.001	0.01	0	0.05	0.016	0.12	0	1.00
# LIVE FETUSES	14.87	1.08	11.70	16.80	13.81	1.33	10.60	16.60
% DEAD+RESOR./IMPLANTS	4.99	1.42	2.90	8.00	<b>6.25</b>	<b>3.06</b>	1.70	20.60
SEX RATIO (% MALES)	48.74	3.02	41.00	53.60	49.55	3.58	38.70	60.40
<b>LIVE FETAL WEIGHTS (GRAMS):</b>								
ALL FETUSES	3.55	0.11	3.23	3.77	3.47	0.16	3.13	3.94
FEMALE FETUSES	3.46	0.11	3.13	<b>3.67</b>	3.40	0.18	3.02	3.89
MALE FETUSES	3.64	0.12	<b>3.33</b>	<b>3.86</b>	3.55	0.16	3.22	4.05

	RALEIGH				WILMINGTON			
TOTAL FEMALES:	1691				196			
PREGNANT FEMALES:	1522				181			
TOTAL STUDIES:	93				9			
	<b>AVG</b>	<b>S.D.</b>	<b>MIN</b>	<b>MAX</b>	<b>AVG</b>	<b>S.D.</b>	<b>MIN</b>	<b>MAX</b>
AGE ON GD 0 (WKS)	11.91	<b>2.05</b>	9.00	17.50	10.11	0.84	8.00	11.00
FEMALES/STUDY	18.18	8.50	5.00	30.00	21.78	5.41	8.00	28.00
PREGNANTFEMALES	16.37	<b>7.83</b>	4.00	27.00	20.11	5.49	8.00	25.00
%PREGNANT	89.94	10.42	56.00	100.00	92.66	11.14	65.00	100.00
# ALL RESORBED	0.03	0.18	0	1.00	0	0	0	0.00
% OF PREG. ALL RESORBED	0.14	0.80	0	5.56	0	0	0	0.00
# CORPORA LUTEA	18.26	1.37	14.90	21.50	15.63	1.04	14.00	17.40
# IMPLANTS	16.06	1.05	12.80	18.00	14.07	1.19	12.00	15.60
# RESORPTIONS	0.92	0.41	0.19	2.10	0.81	0.36	0.23	1.40
% RESORPTIONS	<b>6.48</b>	3.04	1.50	16.50	<b>6.96</b>	2.60	4.70	11.00
# DEAD FETUSES	0.001	0.01	0	0.07	0	0	0	0.00
# LIVE FETUSES	15.14	1.04	12.00	16.80	13.50	1.23	11.00	15.23
% DEAD+RESOR./IMPLANTS	5.91	2.92	1.10	16.50	5.89	<b>3.06</b>	1.40	11.00
SEX RATIO (% MALES)	49.81	3.65	38.60	57.70	50.26	3.62	44.00	56.00
<b>LIVE FETAL WEIGHTS (GRAMS):</b>								
ALL FETUSES	3.59	0.13	3.30	3.87	3.46	0.17	3.13	3.60
FEMALE FETUSES	3.51	0.13	3.19	3.79	3.42	0.20	3.07	3.78
MALE FETUSES	3.69	0.14	3.40	3.97	3.59	0.20	3.18	3.94

TABLE 3  
CESAREAN-SECTION DATA  
GESTATION DAY 21

	KINGSTON				PORTAGE			
	AVG	S.D.	MIN	MAX	AVG	S.D.	MIN	MAX
TOTAL FEMALES:	429				603			
PREGNANT FEMALES:	399				540			
TOTAL STUDIES:	18				29			
	AVG	S.D.	MIN	MAX	AVG	S.D.	MIN	MAX
AGE ON GD 0 (WKS)	11.25	0.98	10.00	13.00	13.93	1.70	11.00	17.00
FEMALES/STUDY	23.83	3.11	12.00	25.00	20.79	<b>2.50</b>	13.00	25.00
PREGNANT FEMALES	22.17	<b>2.83</b>	12.00	25.00	18.62	<b>3.75</b>	11.00	25.00
%PREGNANT	93.28	5.14	84.00	100.00	89.16	11.86	60.00	100.00
# ALL RESORBED	0.06	<b>0.23</b>	0	1.00	0.10	0.30	0	1.00
% OF PREG. ALL RESORBED	0.22	0.92	0	4.00	0.73	2.15	0	7.69
# CORPORA LUTEA	17.12	1.17	14.60	19.10	<b>15.84</b>	1.13	13.80	18.70
# IMPLANTS	16.01	0.96	13.40	17.40	14.63	1.11	11.10	17.20
# RESORPTIONS	0.89	0.34	<b>0.38</b>	1.70	1.13	0.55	0.40	2.80
% RESORPTIONS	5.79	<b>2.45</b>	2.20	10.90	8.94	<b>4.97</b>	3.70	24.40
# DEAD FETUSES	0	0	0	0.00	0.007	0.03	0	0.10
# LIVE FETUSES	15.14	0.94	13.00	16.40	13.60	1.38	<b>8.50</b>	16.00
% DEAD+RESOR./IMPLANTS	5.79	<b>2.45</b>	<b>2.20</b>	10.90	8.65	4.93	3.10	24.40
SEX RATIO (% MALES)	49.69	2.00	46.00	53.60	49.02	3.21	40.00	55.00
<b>LIVE FETAL WEIGHTS (GRAMS):</b>								
ALL FETUSES	<b>5.44</b>	0.12	<b>5.20</b>	<b>5.60</b>	5.10	0.17	<b>4.65</b>	5.40
FEMALE FETUSES	<b>5.28</b>	0.16	<b>5.05</b>	5.61	4.97	0.17	4.50	5.30
MALE FETUSES	5.49	0.16	5.22	5.70	<b>5.23</b>	0.19	4.80	5.60

	RALEIGH				WILMINGTON			
	AVG	S.D.	MIN	MAX	AVG	S.D.	MIN	MAX
TOTAL FEMALES:	779				50			
PREGNANT FEMALES:	668				47			
TOTAL STUDIES:	35				5			
	AVG	S.D.	MIN	MAX	AVG	S.D.	MIN	MAX
AGE ON GD 0 (WKS)	12.77	2.81	9.00	20.00	10.50	0.00	10.50	10.50
FEMALES/STUDY	22.26	11.38	3.00	64.00	10.00	0.00	10.00	10.00
PREGNANT FEMALES	19.09	8.34	3.00	46.00	<b>9.40</b>	0.49	9.00	10.00
%PREGNANT	88.21	10.83	63.33	100.00	94.00	4.90	90.00	100.00
# ALL RESORBED	0.03	0.17	0	1.00	0.20	0.40	0	1.00
% OF PREG. ALL RESORBED	0.12	0.69	0	4.17	<b>2.22</b>	4.44	0	11.11
# CORPORA LUTEA	17.63	1.00	15.60	20.00	17.58	<b>1.22</b>	15.80	19.40
# IMPLANTS	15.90	1.18	12.70	17.40	15.68	1.39	13.40	17.60
# RESORPTIONS	0.89	0.36	0.00	2.00	0.96	0.26	0.60	1.40
% RESORPTIONS	5.70	2.61	0.00	12.00	6.12	1.68	4.50	9.30
# DEAD FETUSES	0.004	0.02	0	0.10	0	0	0	0.00
# LIVE FETUSES	15.06	1.18	12.00	17.04	14.70	1.40	12.90	16.80
% DEAD+RESOR./IMPLANTS	5.73	2.59	0.00	12.00	6.12	1.68	4.50	9.30
SEX RATIO (% MALES)	48.99	3.31	37.00	53.80	49.10	3.29	44.70	52.60
<b>LIVE FETAL WEIGHTS (GRAMS):</b>								
ALL FETUSES	<b>5.32</b>	0.14	5.12	5.78	5.14	0.15	5.00	5.40
FEMALE FETUSES	5.17	0.13	4.96	5.55	5.07	0.17	4.90	5.30
MALE FETUSES	5.45	0.14	5.26	5.91	5.27	0.12	5.10	5.40

**TABLE 4**  
**GESTATION DAY 20 CESAREAN-SECTION DATA**  
**AVERAGES BY COMPANY**

<b>COMPANY NUMBER :</b>	<b>1</b>	<b>5</b>	<b>8</b>	<b>14</b>	<b>17</b>	<b>20</b>
TOTAL FEMALES :	1921	20	72	48	170	432
PREGNANT FEMALES :	1754	17	65	48	166	391
FEMALES ALL RESORBED :	2	0	0	0	1	1
NUMBER OF STUDIES :	98	1	3	2	8	17
AGE ON GD 0 (WKS)	13.26	13.00	9.00	10.50	10.75	11.59
FEMALES/STUDY	19.60	20.00	24.00	24.00	21.25	25.41
PREGNANT FEMALES	17.90	17.00	21.67	24.00	20.75	23.00
%PREGNANT	91.68	85.00	90.28	100.00	97.00	90.53
#ALL RESORBED	0.02	0	0	0	0.13	0.06
% OF PREG. ALL RESORBED	0.12	0	0	0	0.89	0.27
# CORPORA LUTEA	17.85	19.60	13.87	16.30	17.11	18.08
# IMPLANTS	15.66	14.40	11.97	15.15	15.41	15.33
# LIVE FETUSES	14.67	13.50	11.60	14.45	14.54	14.68
# RESORPTIONS	0.99	0.90	0.37	0.75	0.94	0.67
% RESORPTIONS	6.35		2.90	4.85	6.75	4.71
# DEAD FETUSES	0	0	0	0	0	0.003
% DEAD+RESOR./IMPLANTS	6.48		2.90	4.85	6.75	4.76
SEX RATIO (% MALES)	49.55		51.73	52.15	48.00	47.65
<b>LIVE FETAL WEIGHTS. (GRAMS):</b>						
ALL FETUSES	3.46		3.50	3.20	3.49	
FEMALE FETUSES	3.37	3.58		3.11	3.42	3.48
MALE FETUSES	3.56	3.72		3.27	3.56	3.67

<b>COMPANY NUMBER :</b>	<b>21</b>	<b>22</b>	<b>23</b>	<b>26</b>	<b>31</b>	<b>34</b>
TOTAL FEMALES :	120	189	569	288	360	153
PREGNANT FEMALES:	112	180	512	274	323	137
FEMALES ALL RESORBED :	0	0	1	0	0	0
NUMBER OF STUDIES:	5	14	30	19	24	6
AGE ON GD 0 (WKS)	9.80	11.50	11.67	9.00	11.00	9.00
FEMALES/STUDY	24.00	13.50	18.97	15.16	15.00	25.50
PREGNANT FEMALES	22.40	12.86	17.07	14.42	13.46	22.83
%PREGNANT	93.80	94.60	89.06	94.36	89.97	89.70
#ALL RESORBED	0	0	0.03	0	0	0
% OF PREG. ALL RESORBED	0	0	0.13	0	0	0
# CORPORA LUTEA	15.00	17.18	18.25	15.41	17.64	15.97
# IMPLANTS	13.60	15.66	15.83	14.29	16.09	15.18
# LIVE FETUSES	13.00	14.66	14.76	13.53	15.46	14.77
# RESORPTIONS	1.04	0.99	1.06	0.76	0.63	0.39
% RESORPTIONS	7.80	6.22	7.00	5.47	6.23	2.92
# DEAD FETUSES	0	0	0.033	0	0.042	0
% DEAD+RESOR./IMPLANTS	7.80	6.22	7.00	5.47	4.04	2.92
SEX RATIO (% MALES)	49.00	49.21	50.17	49.28	49.92	50.33
<b>LIVE FETAL WEIGHTS (GRAMS):</b>						
ALL FETUSES	3.56	3.64	3.57	3.54	3.62	3.82
FEMALE FETUSES	3.46	3.55	3.48	3.50	3.59	3.71
MALE FETUSES	3.64	3.72	3.66	3.58	3.78	3.90



**TABLE 5**  
**GESTATION DAY 21 CESAREAN-SECTION DATA**  
**AVERAGES BY COMPANY**

<b>COMPANY NUMBER :</b>	<b>1</b>	<b>2</b>	<b>3</b>	<b>4</b>	<b>11</b>	<b>13</b>	<b>14</b>	<b>31</b>	<b>38</b>
TOTAL FEMALES :	307	232	274	147	<b>540</b>	341	98	127	76
PREGNANT FEMALES :	270	<b>218</b>	<b>250</b>	135	481	272	95	116	71
FEMALES ALL RESORBED :	0	0	1	1	3	0	1	0	0
NUMBER OF STUDIES :	14	10	11	6	26	14	5	7	3
AGE ON GD 0 (WKS)	14.57	10.90	12.00	12.00	13.92	14.21	10.50	10.43	11.00
FEMALES/STUDY	<b>21.93</b>	23.20	24.91	24.50	20.77	24.36	10.00	18.14	25.33
PREGNANT FEMALES	19.29	21.80	22.73	22.50	18.50	19.43	9.40	16.57	23.67
%PREGNANT	87.79	<b>94.30</b>	91.20	91.71	<b>88.81</b>	<b>85.69</b>	94.00	91.11	93.33
#ALLRESORBED	0	0	0.09	0.17	0.12	0	0.20	0	0
% OF PREG. ALL RESORBED	0	0	<b>0.38</b>	0.67	0.81	0	2.22	0	0
# CORPORA LUTEA	17.13	16.23	18.11	17.45	15.92	17.18	17.58	18.92	18.03
# IMPLANTS	15.19	15.53	16.27	16.01	14.66	15.71	15.68	16.81	16.70
# LIVE FETUSES	14.23	14.55	15.41	15.25	13.62	14.81	14.70	16.07	15.90
# RESORPTIONS	<b>0.95</b>	1.01	<b>0.95</b>	0.77	1.14	0.91	0.96	0.80	0.83
% RESORPTIONS	<b>6.13</b>	6.38		<b>5.38</b>	9.16	6.35	6.12	<b>4.69</b>	5.00
# DEAD FETUSES	0	0	0	0	0.008	0.007	0	0.008	0
% DEAD+RESOR./IMPLANTS	6.13	6.38		5.38	8.82	6.39	6.12	4.73	5.00
SEX RATIO (% MALES)	49.02	<b>49.90</b>	48.70	<b>48.83</b>	48.88	49.83	49.10	48.29	51.27
<b>LIVE FETAL WEIGHTS (GRAMS):</b>									
ALL FETUSES	<b>5.78</b>	<b>5.42</b>	5.37			5.32	<b>5.14</b>	<b>5.22</b>	5.27
FEMALE FETUSES	<b>5.55</b>	<b>5.25</b>	<b>5.23</b>	5.10	<b>4.96</b>	<b>5.18</b>	<b>5.07</b>	5.10	5.13
MALE FETUSES	<b>5.91</b>	<b>5.56</b>	<b>5.50</b>	<b>5.38</b>	<b>5.22</b>	<b>5.49</b>	<b>5.27</b>	5.37	<b>5.40</b>

TABLE 6  
NATURAL DELIVERY DATA

	ALL STUDIES				KINGSTON				PORTAGE			
TOTAL FEMALES:	4048				639				1018			
PREGNANT FEMALES:	3541				567				930			
TOTAL STUDIES:	209				34				59			
	AVG	S.D.	MIN	MAX	AVG	S.D.	MIN	MAX	AVG	S.D.	MIN	MAX
LENGTH OF GEST. (DAYS)	22.42	0.53	21.2	23.8	22.41	0.60	21.4	23.4	22.40	0.46	21.6	23.2
AGE OF FEMALES (WKS)	15.24	4.82	7	34.5	13.06	3.69	7	24	15.39	3.64	8	26
FEMALES/GROUP	19.37	9.13	5	80	18.79	7.78	8	35	17.38	10.82	5	80
MATED FEMALES	17.78	8.74	5	80	17.76	7.40	6	32	16.33	11.55	5	80
%FEMALESTHATMATED	92.93	11.1	47.5	100	94.41	8.5	66.7	100	97.10	6.8	62.5	100
PREGNANT FEMALES/GROUP	16.94	7.96	4	74	16.68	6.98	6	29	15.90	9.95	4	74
%, PREGNANT/MATED	95.72	6.65	72.7	100	93.69	7.32	75	100	96.29	6.26	72.7	100
%, PREGNANT/TOTAL	88.78	11.8	40	100	88.92	10.7	66.7	100	92.18	9.2	62.5	100
PREGNANT W/ PUPS	16.41	7.86	4	73	14.79	6.62	6	29	15.45	9.70	4	73
%, PREGNANT W/ PUPS	98.70	3.64	76.9	100	97.99	4.96	76.9	100	98.66	3.18	86.7	100
PREGNANT W/ NO PUPS	0.13	0.44	0	4	0.03	0.17	0	1	0.15	0.40	0	2
%, FEMALES W/ NO PUPS	0.76	2.49	0	18.2	0.14	0.78	0	4.55	0.88	2.50	0	10
# IMPLANTS/FEMALE	15.51	1.85	11.4	18.8	16.08	1.22	13	17.8	14.69	1.46	11.4	18.8
% POSTIMPLANTATION LOSS	8.13	3.35	2.8	17.7	8.44	2.65	5.2	15.9	9.92	4.13	2.8	17.7
# LIVE PUPS/LITTER	14.14	1.42	10.1	17.1	14.51	1.55	11.7	17.1	13.18	1.27	10.1	15.8
# STILLBORN/LITTER	0.24	0.26	0	1.5	0.28	0.31	0	1.5	0.26	0.29	0	1.3
DEAD PUPS, PND 1-21	0.41	0.39	0	2.2	0.41	0.33	0	1.17	0.31	0.38	0	1.5
SEX RATIO (% MALE)	49.68	3.90	35.7	60	49.39	4.17	39.8	55.3	50.58	4.59	35.7	57
BIRTH WEIGHTS (GRAMS)												
ALL PUPS	6.33	0.29	5.7	7	6.28	0.27	5.8	6.9	6.17	0.21	5.8	6.6
FEMALE PUPS	6.18	0.29	5.7	7.1	6.13	0.27	5.73	6.71	6.05	0.29	5.7	7
MALE PUPS	6.55	0.31	6.03	7.6	6.51	0.27	6.03	7.12	6.43	0.34	6.1	7.5
PND 21 WEIGHTS (GRAMS)												
ALL PUPS	49.33	5.96	37.3	65.1	49.45	8.63	37.3	65.1	47.19	3.21	42.8	53
FEMALE PUPS	53.05	6.00	37.2	70.1	50.54	5.05	40.2	58.9	50.52	5.66	40.9	70.1
MALE PUPS	55.53	6.09	38.7	73.1	53.15	4.95	42.5	60.1	53.16	5.67	44.6	73.1

	RALEIGH				FI AND F2			
TOTAL FEMALES:	1465				743			
PREGNANT FEMALES:	1277				612			
TOTAL STUDIES:	78				28			
	AVG	S.D.	MIN	MAX	AVG	S.D.	MIN	MAX
LENGTH OF GEST. (DAYS)	22.35	0.51	21.2	23.3	22.65	0.46	22	23.8
AGE OF FEMALES (WKS)	14.63	4.67	8	34.5	18.63	6.22	7	29
FEMALES/GROUP	18.78	8.46	6	40	26.54	4.69	12	35
MATED FEMALES	17.08	7.55	5	36	23.29	5.09	10	33
%FEMALESTHATMATED	92.43	12.5	47.5	100	87.86	11.9	52	100
PREGNANT FEMALES/GROUP	16.37	7.12	5	36	21.86	4.32	10	28
%, PREGNANT/MATED	96.38	6.41	75	100	94.66	6.99	77.8	100
%, PREGNANT/TOTAL	89.02	12.9	40	100	82.88	11.1	52	100
PREGNANTW/PUPS	16.21	7.05	5	36	21.64	4.38	10	28
%, PREGNANT W/ PUPS	99.10	3.33	81.8	100	98.98	1.96	94.7	100
PREGNANT W/ NO PUPS	0.15	0.56	0	4	0.14	0.35	0	1
%, FEMALES W/ NO PUPS	0.80	2.88	0	18.2	0.71	1.73	0	5.26
# IMPLANTS/FEMALE	15.84	2.19	13.3	18.1	15.31	1.10	13.9	17.6
% POSTIMPLANTATION LOSS	7.37	2.89	2.8	13.1				
# LIVE PUPS/LITTER	14.87	1.11	11.6	17	13.74	0.99	12.1	16.2
#STILLBORN/LITTER	0.20	0.22	0	1	0.29	0.21	0	0.7
DEAD PUPS, PND 1-21	0.43	0.43	0	2.2	0.46	0.33	0	1.25
SEX RATIO (% MALE)	49.51	3.77	41.9	60	49.66	2.35	45.4	53.6
BIRTH WEIGHTS (GRAMS)								
ALL PUPS	6.52	0.24	6	6.9	6.41	0.28	5.9	7
FEMALE PUPS	6.32	0.25	5.8	7.1	6.09	0.22	5.77	6.72
MALE PUPS	6.67	0.29	6.1	7.6	6.47	0.24	6.19	7.14
PND 21 WEIGHTS (GRAMS)								
ALL PUPS	50.90	4.82	39.4	56.8	51.78	5.08	42.7	61.6
FEMALE PUPS	56.47	4.13	41.4	64.9	52.21	5.53	42.5	68
MALE PUPS	58.81	4.51	43.6	67.1	54.84	5.43	46.2	70.1

TABLE 7  
NATURAL DELIVERY DATA  
AVERAGES BY COMPANY

<b>COMPANY NUMBER :</b>	<b>1</b>	<b>2</b>	<b>4</b>	<b>5</b>	<b>8</b>	<b>11</b>	<b>13</b>
TOTAL FEMALES :	1276	103	<b>348</b>	27	72	<b>295</b>	92
PREGNANT FEMALES:	1104	97	<b>284</b>	26	<b>65</b>	<b>265</b>	89
NUMBER OF STUDIES:	76	5	13	2	6	15	7
AGE ON GD 0 (WKS)	<b>18.88</b>	12.20	9.62	11.50	9.00	14.00	13.14
FEMALES/GROUP	16.79	20.60	26.77	12.00	12.00	19.67	13.14
FEMALES THAT MATED	<b>14.53</b>	20.60	24.15	12.00	12.00	19.29	13.00
%MATED	88.06	100.00	89.75	100.00	100.00	46.67	98.81
PREGNANT FEMALES	<b>14.53</b>	19.40	21.85	12.00	10.83	17.67	12.71
%PREGNANT/MATED	100.00	92.45	91.25	<b>93.33</b>	89.03	96.95	97.27
%PREGNANT/TOTAL	88.06	92.50	81.87	<b>93.33</b>	89.00	89.91	96.19
PREGNANT W/ LIVE PUPS	14.32	19.00	21.85	12.00	10.83	17.33	12.14
% PREGNANT W/ LIVE PUPS	98.68	90.85	100.00	100.00	100.00	98.00	97.40
PREGNANT W/ NO LIVE PUPS	0.12	0	0	0	0	0.13	0.71
% PREGNANT W/ NO LIVE PUPS	0.65	0	0	0	0	0.92	<b>4.03</b>
LENGTH OF GESTATION	22.90	21.80	22.40	22.50	21.90	22.10	21.40
IMPLANTS	15.06	16.40		14.40	14.17	14.71	15.83
% POSTIMPL LOSS TO BIRTH		7.34			7.47	10.91	<b>4.63</b>
LIVE PUPS AT BIRTH	13.93	16.14	13.59	13.00	12.32	13.21	14.66
STILLBORN	0.20	0.23	0.30	0.10	0.15	<b>0.48</b>	0.01
DEAD PUPS PND 1-21	0.39	0.53	0.16	0.00	<b>0.28</b>		1.37
LIVE PUP SEX RATIO (% M)	49.19	49.80	<b>50.43</b>		52.07		50.59
<b>PUP WT AT BIRTH (GRAMS)</b>							
ALL PUPS	6.34	<b>6.34</b>			<b>6.19</b>		
FEMALE PUPS			<b>6.33</b>	<b>5.93</b>		<b>5.92</b>	6.45
MALE PUPS			<b>6.72</b>	<b>6.30</b>		6.27	6.74
<b>PUP WT ON PND 21 (GRAMS)</b>							
ALL PUPS	<b>49.88</b>	<b>44.48</b>			50.02		
FEMALE PUPS			<b>48.14</b>	51.30	51.89	46.90	49.30
MALE PUPS			50.66	<b>53.40</b>	52.05	49.59	50.60

<b>COMPANY NUMBER :</b>	<b>17</b>	<b>20</b>	<b>21</b>	<b>22</b>	<b>24</b>	<b>31</b>	<b>33</b>
TOTAL FEMALES :	650	164	25	69	<b>46</b>	<b>808</b>	73
PREGNANT FEMALES :	583	146	<b>24</b>	63	33	700	62
NUMBER OF STUDIES:	<b>24</b>	7	1	6	2	40	5
AGE ON GD 0 (WKS)	18.17	14.00	10.50	11.50	10.00	12.01	13.00
FEMALES/GROUP	27.08	23.43	25.00	11.50	23.00	20.20	14.60
FEMALES THAT MATED	25.21	<b>22.43</b>	24.00	11.50	18.50	18.63	14.60
%MATED	92.81	95.92	96.00	100.00	80.68	94.47	100.00
PREGNANT FEMALES	24.29	20.86	24.00	10.50	16.50	17.50	12.40
%PREGNANT/MATED	93.00	92.86	100.00	91.67	89.18	94.46	86.21
%PREGNANT/TOTAL	90.38	89.07	96.00	91.67	71.97	89.30	86.21
PREGNANT W/ LIVE PUPS	23.42		24.00	10.50	16.50	17.38	12.40
% PREGNANT W/ LIVE PUPS	98.27		100.00	100.00	100.00	99.35	100.00
PREGNANT W/ NO LIVE PUPS	0.29		0	0	0	0.13	0
% PREGNANT W/ NO LIVE PUPS	1.66		0	0	0	0.65	0
LENGTH OF GESTATION	22.20	23.20	22.00	21.90	21.50	22.20	21.90
IMPLANTS		16.14	14.00	16.58	17.40	15.87	16.18
% POSTIMPL LOSS TO BIRTH		9.79	4.00	7.80	6.25	7.79	7.68
LIVE PUPS AT BIRTH	13.37	14.72	13.00	15.12	16.05	15.16	<b>14.42</b>
STILLBORN	0.35	0.31	0.56	0.16	<b>0.28</b>	0.24	0.04
DEAD PUPS PND 1-21	0.41	0.70	0.13	0.53	0.66	0.32	0.23
LIVE PUP SEX RATIO (% M)	49.88	<b>51.83</b>	52.00	48.33	49.81	49.54	51.20
<b>PUP WT AT BIRTH (GRAMS)</b>							
ALL PUPS			6.40	6.15	6.49		
FEMALE PUPS	<b>5.82</b>	5.94		6.00	6.39	6.24	6.80
MALE PUPS	6.20	6.37		6.30	6.58	6.60	7.24
<b>PUP WT ON PND 21 (GRAMS)</b>							
ALL PUPS			49.60	57.25	<b>38.54</b>		
FEMALE PUPS	54.38	<b>49.73</b>		56.55	37.90	57.69	58.30
MALE PUPS	57.13	52.85		58.15	39.16	60.18	61.25

TABLE 8  
EXTERNAL ANOMALIES

NO. COMPANIES:		15									
TOTAL STUDIES:		352									
TOTAL LITTERS:		6102									
TOTAL FETUSES:		88270									
		FETAL INCIDENCE		LITTER INCIDENCE				FETAL INCIDENCE		LITTER INCIDENCE	
		Incidence	Avg (%)	Incidence	Avg (%)	Incidence	Avg (%)	Incidence	Avg (%)	Incidence	Avg (%)
<b>GENERAL</b>						<b>TORSO</b>					
Anasarca	11	0.01	11	0.18	Atresia ani	9	0.01	9	0.15		
Conjoined twins	1	0.001	1	0.02	Gastroschisis	7	0.01	7	0.11		
Hematoma	19	0.02	18	0.29	Holorachischisis	1	0.001	1	0.02		
Local edema	5	0.01	5	0.08	Omphalocele	5	0.01	5	0.08		
Pallid fetus	2	0.002	2	0.03	Scoliosis	1	0.001	1	0.02		
<b>SKULL</b>						Shortened torso	2	0.002	2	0.03	
Cephalocele	1	0.001	1	0.02	Spina bifida aperta	4	0.004	4	0.07		
Craniorachischisis	7	0.01	7	0.11	Umbilical hernia	13	0.01	13	0.21		
Domed head	1	0.001	1	0.02	<b>EXTREMITIES</b>						
Encephalomeningocele	1	0.001	1	0.02	Clubbed forefoot	2	0.002	2	0.03		
Exencephaly	26	0.03	16	0.26	Clubbed hindfoot	1	0.001	1	0.02		
Meningocele	1	0.001	1	0.02	Ectrodactyly	1	0.001	1	0.02		
Microcephaly	1	0.001	1	0.02	Ectromelia	1	0.001	1	0.02		
<b>EYES</b>						Forelimb flexion	4	0.004	2	0.03	
Ablepharia	7	0.01	3	0.05	Micromelia	3	0.003	3	0.05		
Anophthalmia	16	0.02	16	0.26	Phocomelia	1	0.001	1	0.02		
Cyclopia	1	0.001	1	0.02	Tail malformation	42	0.05	41	0.67		
Exophthalmos	3	0.003	2	0.03	<b>ADDITIONAL FINDINGS</b>						
Microphthalmia	28	0.03	28	0.46	Abdominal hernia	1	0.001	1	0.02		
Open eyelid	9	0.01	6	0.10	Partial twinning	1	0.001	1	0.02		
<b>EAR</b>						Shiny	3	0.003	3	0.05	
Ear, displaced	4	0.004	4	0.07	Polymelia	1	0.001	1	0.02		
Microtia	1	0.004	1	0.02	Growth retarded	27	0.03	19	0.31		
<b>NOSE</b>						Fused placenta	4	0.004	2	0.03	
Nails atresia	2	0.002	2	0.03	Vibrissal pad, malf.	1	0.001	1	0.02		
Nasal dysplasia	3	0.003	3	0.05	Upper jaw missing	1	0.001	1	0.02		
Rhinocephaly	2	0.002	2	0.03	Hard palate missing	1	0.001	1	0.02		
<b>MOUTH AND JAW</b>											
Aglossia	3	0.003	3	0.05							
Agnathia	11	0.01	11	0.18							
Astomia	6	0.01	6	0.10							
Cleft face	2	0.002	2	0.03							
Cleft lip	1	0.001	1	0.02							
Cleft palate	9	0.01	9	0.15							
High-arched palate	4	0.004	2	0.03							
Microglossia	2	0.002	2	0.03							
Micrognathia	18	0.02	16	0.26							
Microstomia	4	0.004	4	0.07							
Protruding tongue	15	0.02	11	0.18							

TABLE 9  
VISCERAL ANOMALIES  
SUMMARY OF ALL STUDIES

TOTAL STUDIES:	223						
TOTAL UTTERS:	4698						
TOTAL FETUSES:	<b>37868</b>						
		<b>FETAL INCIDENCE (%)</b>			<b>LITTER INCIDENCE (%)</b>		
		AVG	S.D.	MAX*	AVG	S.D.	MAX
<b>CORONAL SECTIONS</b>							
Cerebrum:	Misshapen	0.011	<b>0.09</b>	0.97	0.072	0.62	5.56
Cerebral ventricular enlargement		0.106	0.40	4.18	0.788	3.34	35.00
Hydrocephalus		0.020	0.11	0.93	0.169	0.89	7.14
Lens:	Agenesis	0.018	0.11	0.78	0.128	0.78	5.88
	Hypoplastic	0.011	0.08	0.68	0.080	0.60	5.00
Nasal cavity:	Enlarged	0.005	0.05	0.56	0.037	0.39	4.17
Retina:	Agenesis	0.006	0.06	0.77	0.044	0.46	5.56
	Folded	0.022	0.14	1.38	0.142	0.92	9.52
Microphthalmia		0.027	0.16	1.68	0.230	1.30	12.00
<b>GENERAL</b>							
Abdominal cavity:	Fluid-filled	0.004	0.05	0.79	0.025	0.37	5.56
Situs inversus		0.012	0.08	0.86	0.095	0.63	4.55
<b>THYMUS</b>							
Thymus:	Split	0.008	0.08	0.92	0.069	0.65	6.25
<b>BLOOD VESSELS</b>							
Aortic arch:	Enlarged	0.003	0.04	0.62	0.018	0.27	4.00
	Interrupted	0.005	0.04	0.45	0.055	0.54	6.25
	Retrosophageal	0.003	0.05	0.69	0.021	0.32	4.76
Azygos vein:	Doubled	0.037	0.32	3.70	0.146	1.21	12.50
	Right-sided	0.011	0.09	0.97	0.063	0.55	5.56
Carotid:	Abnormal origin	0.025	0.15	1.79	0.226	1.11	7.69
Ductus arteriosus:	Hypoplastic	0.003	0.04	0.57	0.021	0.32	4.76
Innominate:	Agenesis	0.043	0.26	3.39	0.292	1.55	18.18
	Hypoplastic	0.007	0.08	0.91	0.041	0.43	4.76
Pulmonary artery:	Retrosophageal	0.001	0.02	0.28	0.018	0.27	4.00
Pulmonary trunk:	Stenosis	0.003	0.04	0.62	0.018	0.27	4.00
Subclavian artery:	Abnormal origin	0.019	0.14	1.79	0.182	1.02	7.69
	Retrosophageal	0.004	0.04	0.46	0.049	0.51	5.88
Truncus arteriosus:	Persistent	0.005	0.05	0.74	0.049	0.51	5.56
<b>HEART</b>							
Atrium:	Enlarged	0.005	0.06	0.60	0.037	0.39	4.17
Cardiomegaly		0.003	0.04	0.67	0.019	0.28	4.17
Dextrocardia		0.003	0.04	0.57	0.020	0.30	4.55
Double apex		0.003	0.04	0.60	0.019	0.28	4.17
Levocardia		0.000	0.00	0.00	0.000	0.00	0.00
Microcardia		0.008	0.11	1.70	0.041	0.61	9.09
Misshapen heart		0.014	0.10	0.94	0.075	0.55	4.35
Situs inversus, cardio-vascular		0.011	0.08	0.67	0.092	0.72	8.33
Ventricular hypertrophy		0.005	0.05	0.62	0.036	0.38	4.00
Ventricular hypoplasia		0.003	0.04	0.62	0.018	0.27	4.00
Ventricular septal defect (VSD)		0.016	0.10	0.85	0.134	0.88	<b>8.33</b>

•MIN = 0 in all cases

TABLE 9 (continued)  
 VISCERAL ANOMALIES  
 SUMMARY OF ALL STUDIES

		FETAL INCIDENCE (%)			LITTER INCIDENCE (%)		
		AVG	S.D.	MAX	AVG	S.D.	MAX
<b>LUNG AND TRACHEA</b>							
Lung:	Abnormal lobation	0.010	0.08	0.86	0.075	0.68	<b>8.33</b>
	Agenesis	0.005	0.06	0.62	0.037	0.39	4.17
	Diff. hemorrh. (mottled)	0.004	0.06	0.87	0.018	0.27	4.00
	Enlarged	0.003	0.04	0.62	0.018	0.27	4.00
	Hypoplastic	0.049	0.47	6.67	0.306	<b>2.51</b>	31.82
Trachea:	Short	0.004	0.06	0.94	0.019	0.29	4.35
<b>DIAPHRAGM</b>							
Diaphragm:	Agenesis	0.003	0.05	0.73	0.022	<b>0.33</b>	5.00
Diaphragmatic hernia		0.008	0.07	0.71	0.063	0.55	5.56
<b>LIVER</b>							
Liver:	Abnormal lobation	0.005	0.04	0.38	0.064	0.55	5.26
	Discolored	0.005	0.06	0.75	0.068	0.75	10.00
<b>DIGESTIVE TRACT</b>							
Esophageal atresia		0.003	0.04	0.67	0.037	0.56	8.33
Esophagus:	Short	0.004	0.06	0.94	0.019	0.29	4.35
Stomach:	Situs inversus	0.005	0.05	0.63	0.036	0.38	4.00
<b>SPLEEN</b>							
Spleen:	Hypoplastic	0.003	0.04	0.57	0.019	0.28	4.17
<b>ADRENAL</b>							
Adrenal:	Diffuse hemorrhagic	0.006	0.07	0.73	0.043	0.45	5.00
	Focally hemorrhagic	0.005	0.06	0.65	0.040	0.42	4.55
<b>KIDNEY</b>							
Distended renal pelvis		1.149	2.06	12.64	6.966	11.30	68.18
Hydronephrosis		0.100	0.57	6.12	0.521	2.64	28.00
Kidney:	Agenesis	0.003	0.03	0.40	0.047	0.50	5.88
	Diffuse hemorrhagic	0.014	0.12	1.26	0.078	0.71	8.70
	Displaced	0.006	0.06	0.68	0.042	0.44	5.00
	Hypoplas. (red. papilla)	1.044	3.13	16.38	4.140	11.26	62.50
	Supernumerary	0.003	0.05	0.74	0.024	<b>0.35</b>	5.26
<b>URETER AND BLADDER</b>							
Hydroureter		0.201	0.68	4.86	1.114	3.43	21.05
Ureter:	Convolutd	0.917	<b>3.39</b>	21.69	3.069	11.11	100.00
	Distended	2.874	5.48	28.28	12.394	20.92	78.26
Urinary bladder:	Enlarged	0.085	0.69	8.86	0.332	2.47	27.27
<b>FEMALE REPRODUCTIVE TRACT</b>							
Ovary, Oviduct, Uterus		01	01	0	01	01	0
<b>MALE REPRODUCTIVE TRACT</b>							
Testis:	Agenesis	0.005	0.07	1.09	0.019	0.29	<b>4.35</b>
	Displaced	0.251	1.39	15.58	1.287	6.74	63.64
	Supernumerary	0.003	0.05	0.74	0.024	0.35	5.26
	Hypoplastic	0.003	0.03	0.35	0.041	0.43	5.00

TABLE 10  
VISCERAL ANOMALIES  
GESTATION DAY 20

TOTAL STUDIES:	154						
TOTAL LITTERS:	<b>3240</b>						
TOTAL FETUSES:	22892						
		<b>FETAL INCIDENCE (%)</b>			<b>LITTER INCIDENCE (%)</b>		
		AVG	S.D.	MAX*	AVG	S.D.	MAX
<b>CORONAL SECTIONS</b>							
Cerebrum:	Missshapen	0.010	0.08'	0.79	0.069	0.60	<b>5.56</b>
Cerebral ventricular enlargement		0.126	0.46	4.18	0.944	3.89	35.00
Hydrocephalus		0.014	0.10	0.93	0.098	0.73	7.14
Lens:	Agensis	0.018	0.11	0.77	0.118	0.73	5.56
	Hypoplastic	0.016	0.10	0.68	0.116	0.71	5.00
Nasal cavity:	Enlarged	0.004	0.04	0.56	0.026	0.32	4.00
Retina:	Agensis	0.009	0.08	0.77	0.063	0.56	5.56
	Folded	0.024	0.16	1.38	0.141	0.94	9.52
Microphthalmia		0.027	0.17	1.68	0.195	1.19	12.00
<b>GENERAL</b>							
Abdominal cavity:	Fluid-filled	0.005	0.06	0.79	0.036	0.45	5.56
Situs inversus		0.015	0.10	0.86	0.110	0.67	4.55
<b>THYMUS</b>							
Thymus:	Split	01	01	0	01	01	0
<b>BLOOD VESSELS</b>							
Aortic arch:	Enlarged	0.004	0.05	0.62	0.026	0.32	4.00
	Interrupted	0	0	0	0	0	0
	Retroesophageal	0.004	0.06	0.69	0.031	0.38	4.76
Azygos vein:	Doubled	0.048	0.39	3.70	0.186	1.42	12.50
	Right-sided	0.005	0.06	0.72	0.027	0.33	4.17
Carotid:	Abnormal origin	0.006	0.07	0.91	0.031	0.38	4.76
Ductus arteriosus:	Hypoplastic	0.004	0.05	0.57	0.031	0.38	4.76
Innominate:	Agensis	0.049	0.30	<b>3.39</b>	0.324	1.73	18.18
	Hypoplastic	0.006	0.07	0.91	0.031	0.38	4.76
Pulmonary artery:	Retroesophageal	0	0	0	0	0	0
Pulmonary trunk:	Stenosis	0.004	0.05	0.62	0.026	0.32	4.00
Subclavian artery:	Abnormal origin	0	0	0	0	0	0
	Retroesophageal	0	0	0	0	0	0
Truncus arteriosus:	Persistent	0.005	0.06	0.74	0.036	0.45	5.56
<b>HEART</b>							
Atrium:	Enlarged	0.008	0.07	0.60	0.054	0.47	4.17
Cardiomegaly		0.004	0.05	0.67	0.027	0.33	4.17
Dextrocardia		0.004	0.05	0.57	0.030	0.37	<b>4.55</b>
Double apex		0.004	0.05	0.60	0.027	0.33	4.17
Levocardia		0	0	0	0	0	0
Microcardia		0	0	0	0	0	0
Missshapen heart		0.020	0.12	0.94	0.108	0.66	4.35
Situs inversus, cardio-vascular		0.011	0.08	0.63	0.079	0.56	4.17
Ventricular hypertrophy		0.004	0.05	0.62	0.026	0.32	4.00
Ventricular hypoplasia		0.004	0.05	0.62	0.026	0.32	4.00
Ventricular septal defect (VSD)		0.015	0.11	0.85	0.100	0.71	5.56

•MIN = 0 in all cases

TABLE 10 (Continued)  
 VISCERAL ANOMALIES  
 GESTATION DAY 20

		FETAL INCIDENCE (%)			LITTER INCIDENCE (%)		
		AVG	S.D.	MAX	AVG	S.D.	MAX
<b>LUNG AND TRACHEA</b>							
Lung:	Abnormal lobation	0.010	0.09	0.86	0.054	0.47	<b>4.35</b>
	Agenesis	0.008	0.07	0.62	0.053	0.46	4.17
	Diff. hemorrh. (mottled)	0.006	0.07	0.87	0.026	0.32	4.00
	Enlarged	0.004	0.05	0.62	0.026	0.32	4.00
	Hypoplastic	0	0	0	0	0	0
Trachea:	Short	0.006	0.08	0.94	0.028	0.35	<b>4.35</b>
<b>DIAPHRAGM</b>							
Diaphragm:	Agenesis	0	0	0	0	0	0
	Diaphragmatic hernia	0.007	0.06	0.57	0.055	0.48	<b>4.55</b>
<b>LIVER</b>							
Liver:	Abnormal lobation	0	0	0	0	0	0
	Discolored	0	0	0	0	0	0
<b>DIGESTIVE TRACT</b>							
	Esophageal atresia	0	0	0	0	0	0
Esophagus:	Short	0.006	<b>0.08</b>	0.94	0.028	0.35	<b>4.35</b>
Stomach:	Situs inversus	0.007	0.06	0.63	0.052	0.45	4.00
<b>SPLEEN</b>							
Spleen:	Hypoplastic	0.004	0.05	0.57	0.027	0.33	4.17
<b>ADRENAL</b>							
Adrenal:	Diffuse hemorrhagic	0	0	0	0	0	0
	Focally hemorrhagic	0.008	0.07	0.65	0.058	0.50	<b>4.55</b>
<b>KIDNEY</b>							
	Distended renal pelvis	0.753	1.58	6.94	4.030	7.63	36.36
	Hydronephrosis	0.145	0.68	6.12	0.754	3.14	28.00
Kidney:	Agenesis	0	0	0	0	0	0
	Diffuse hemorrhagic	0.014	0.12	1.26	0.087	0.79	8.70
	Displaced	0.008	0.07	0.68	0.061	0.53	5.00
	Hypoplas. (red. papilla)	0.957	3.17	16.38	3.156	9.73	50.00
	Supernumerary	0.005	0.06	0.74	0.034	0.42	5.26
<b>URETER AND BLADDER</b>							
	Hydroureter	0.281	0.80	4.86	1.557	4.02	21.05
Ureter:	Convolutated	0.747	2.80	21.69	2.564	<b>9.94</b>	100.00
	Distended	1.932	4.89	28.28	7.675	18.17	75.00
Urinary bladder:	Enlarged	0.123	0.83	8.86	0.480	2.96	27.27
<b>FEMALE REPRODUCTIVE TRACT</b>							
	Ovary, Oviduct, Uterus	01	01	0	01	01	0
<b>MALE REPRODUCTIVE TRACT</b>							
Testis:	Agenesis	0.007	0.09	1.09	0.028	0.35	4.35
	Displaced	0.364	1.67	15.58	1.864	8.04	63.64
	Supernumerary	0.005	0.06	0.74	0.034	0.42	5.26
	Hypoplastic	0	0	0	0	0	0



TABLE 11  
 VISCERAL ANOMALIES  
 GESTATION DAY 21

TOTAL STUDIES:	69						
TOTAL UTTERS:	<b>1458</b>						
TOTAL FETUSES:	14976						
		<b>FETAL INCIDENCE (%)</b>			<b>LITTER INCIDENCE (%)</b>		
		AVG	S.D.	MAX*	AVG	S.D.	MAX
<b>CORONAL SECTIONS</b>							
Cerebrum:	Misshapen	0.014	0.12	0.97	0.081	0.66	5.56
Cerebral ventricular enlargement		0.061	0.20	0.92	0.440	1.45	6.25
Hydrocephalus		0.033	0.12	0.58	0.325	1.17	5.00
Lens:	Agensis	0.019	0.11	0.78	0.148	0.87	5.88
	Hypoplastic	0.000	0.00	0.00	0.000	0.00	0.00
Nasal cavity:	Enlarged	0.008	0.06	0.54	0.060	0.50	4.17
Retina:	Agensis	0.000	0.00	0.00	0.000	0.00	0.00
	Folded	0.019	0.11	0.78	0.146	0.86	5.88
Microphthalmia		0.028	0.15	1.09	0.310	1.51	8.70
<b>GENERAL</b>							
Abdominal cavity:	Fluid-filled	0.000	0.00	0.00	0.000	0.00	0.00
Situs inversus		0.005	0.04	0.34	0.063	0.52	4.35
<b>THYMUS</b>							
Thymus:	Split	0.025	0.14	0.92	0.176 ~	1.02	6.25
<b>BLOOD VESSELS</b>							
Aortic arch:	Enlarged	0.000	0.00	0.00	0.000	0.00	0.00
	Interrupted	0.015	0.07	0.45	0.178	0.95	6.25
	Retroesophageal	0.000	0.00	0.00	0.000	0.00	0.00
Azygos vein:	Doubled	0.010	0.09	0.71	0.058	0.48	4.00
	Right-sided	0.024	0.14	0.97	0.144	0.84	5.56
Carotid:	Abnormal origin	0.067	0.24	1.79	0.661	1.85	7.69
Ductus arteriosus:	Hypoplastic	0	0	0	0	0	0
Innominate:	Agensis	0.029	0.14	0.92	0.219	1.04	6.25
	Hypoplastic	0.010	0.09	0.72	0.063	0.52	4.35
Pulmonary artery:	Retroesophageal	0.004	0.03	0.28	0.058	0.48	4.00
Pulmonary trunk:	Stenosis	0	0	0	0	0	0
Subclavian artery:	Abnormal origin	0.062	0.24	1.79	0.589	1.77	7.69
	Retroesophageal	0.012	0.07	0.46	0.158	0.92	5.88
Truncus arteriosus:	Persistent	0.005	0.04	0.36	0.076	0.63	5.26
<b>HEART</b>							
Atrium:	Enlarged	0	0	0	0	0	0
Cardiomegaly		0	0	0	0	0	0
Dextrocardia		0	0	0	0	0	0
Double apex		0	0	0	0	0	0
Levocardia		0	0	0	0	0	0
Microcardia		0.025	0.20	1.70	0.132	1.09	9.09
Misshapen heart		0	0	0	0	0	0
Situs inversus, cardio-vascular		0.010	0.08	0.67	0.121	1.00	<b>8.33</b>
Ventricular hypertrophy		0.007	0.06	0.48	0.058	0.48	4.00
Ventricular hypoplasia		0	0	0	0	0	0
Ventricular septal defect (VSD)		0.017	0.09	0.67	0.212	1.17	8.33

•MIN = 0 in all cases

TABLE 11 (Continued)  
 VISCERAL ANOMALIES  
 GESTATION DAY 21

		FETAL INCIDENCE (%)			LITTER INCIDENCE (%)		
		AVG	S.D.	MAX	AVG	S.D.	MAX
<b>LUNG AND TRACHEA</b>							
Lung:	Abnormal lobation	0.010	0.08	0.67	0.121	1.00	8.33
	Agensis	0	0	0	0	0	0
	Diff. hemorrh. (mottled)	0	0	0	0	0	0
	Enlarged	0	0	0	0	0	0
	Hypoplastic	0.158	0.83	6.67	0.988	<b>4.45</b>	31.82
Trachea:	Short	0	0	0	0	0	0
<b>DIAPHRAGM</b>							
Diaphragm:	Agensis	0.011	0.09	0.73	0.072	0.60	5.00
Diaphragmatic hernia		0.010	0.09	0.71	0.081	0.66	<b>5.56</b>
<b>LIVER</b>							
Liver:	Abnormal lobation	0.015	0.07	0.38	0.207	0.98	5.26
	Discolored	0.016	0.10	0.75	0.221	1.34	10.00
<b>DIGESTIVE TRACT</b>							
Esophageal atresia		0.010	0.08	0.67	0.121	1.00	8.33
Esophagus:	Short	0	0	0	0	0	0
Stomach:	Situs inversus	0	0	0	0	0	0
<b>SPLEEN</b>							
Spleen:	Hypoplastic	0	0	0	0	0	0
<b>ADRENAL</b>							
Adrenal:	Diffuse hemorrhagic	0.020	0.12	0.73	0.138	0.80	5.00
	Focally hemorrhagic	0	0	0	0	0	0
<b>KIDNEY</b>							
Distended renal pelvis		2.033	2.65	12.64	13.519	14.86	68.18
Hydronephrosis		0	0	0	0	0	0
Kidney:	Agensis	0.010	0.06	0.40	0.151	0.88	5.88
	Diffuse hemorrhagic	0.014	0.11	0.95	0.058	<b>0.48</b>	4.00
	Displaced	0	0	0	0	0	0
	Hypoplas. (red. papilla)	1.238	3.03	16.00	6.337	13.85	62.50
	Supernumerary	0	0	0	0	0	0
<b>URETER AND BLADDER</b>							
Hydroureter		0.022	0.13	0.95	0.124	0.72	4.55
Ureter:	Convoluted	1.298	4.42	21.05	4.197	13.29	61.11
	Distended	4.976	6.13	26.77	22.926	22.74	78.26
Urinary bladder:	Enlarged	0	0	0	0	0	0
<b>FEMALE REPRODUCTIVE TRACT</b>							
Ovary, Oviduct, Uterus		01	01	0	01	01	0
<b>MALE REPRODUCTIVE TRACT</b>							
Testis:	Agensis	0	0	0	0	0	0
	Displaced	0	0	0	0	0	0
	Supernumerary	0	0	0	0	0	0
	Hypoplastic	0.009	0.05	<b>0.35</b>	0.133	0.77	5.00

TABLE 12  
SKELETAL ANOMALIES ALL STUDIES

TOTAL STUDIES:	<b>222</b>						
TOTAL UTTERS:	4729						
TOTAL FETUSES:	41917						
		FETAL INCIDENCE (%)			LITTER INCIDENCE (%)		
		AVG	S.D.	MAX*	AVG	S.D.	MAX
<b>SKULL</b>							
Basisphenoid:	Misshapen	0.002	0.03	0.51	0.023	0.33	5.00
Bone island		0.002	0.03	0.40	0.023	0.29	4.17
Frontals:	Contain holes	0.006	0.08	1.27	0.026	0.39	<b>5.88</b>
	Hypoplastic	0.005	0.05	0.68	0.041	0.43	5.00
	Misshapen	0.007	0.06	0.53	0.064	0.51	5.00
Hyoid, Ala(e):	Hypoplastic	0.009	0.11	1.54	0.095	1.15	16.67
Interparietals:	<b>Hypoplastic</b>	0.084	0.43	<b>3.35</b>	0.560	2.71	20.00
	Bifid	0.005	0.06	0.64	0.048	0.50	<b>5.56</b>
Mandible:	Agenesis	0.015	0.09	0.71	0.126	0.76	<b>5.26</b>
	<b>Hypoplastic</b>	0.003	0.04	0.59	0.019	0.28	4.17
	Misshapen	0.013	0.09	0.66	0.101	0.67	<b>5.26</b>
Maxilla:	Agenesis	0.003	0.05	0.71	0.020	0.30	<b>4.55</b>
	Misshapen	0.005	0.06	0.66	0.042	0.44	<b>5.26</b>
Nasals:	Fused	0.002	0.03	0.44	0.019	0.28	4.17
	Hypoplastic	0.002	0.03	0.43	0.019	0.28	4.17
	Misshapen	0.008	0.07	0.66	0.064	0.55	<b>5.26</b>
Orbits:	Hypoplastic	0.007	0.06	0.55	0.058	0.50	<b>4.55</b>
	Misshapen	0.025	0.12	1.02	0.192	0.97	8.00
Parietals:	Misshapen	0.002	0.03	0.51	0.018	0.27	4.00
Supraoccipitals:	Hypoplastic	0.075	0.42	<b>4.85</b>	0.547	<b>2.63</b>	25.00
<b>SPINAL COLUMN</b>							
Vertebral Scrambling		0.011	0.13	1.92	0.075	0.86	12.00
Atlas:	Split	.0003	0.004	0.06	0.005	0.07	1.01
Cerv./Thoracic vert. arches:	Fused	0.003	0.04	0.65	0.020	0.29	<b>4.35</b>
Cervical vertebrae:	Agenesis	0.0003	0.004	0.06	0.005	0.07	1.01
	Fused	0.018	0.10	0.72	0.112	0.71	<b>5.88</b>
	Hypoplastic	0.022	0.12	1.06	0.228	1.22	10.00
	Misaligned	0.003	0.05	0.68	0.023	0.33	5.00
	Misshapen	0.006	0.05	0.58	0.068	0.58	<b>5.88</b>
	Cervical Centra: Split	0.005	0.05	0.61	0.038	0.39	<b>4.35</b>
Thoracic vertebrae:	Agenesis	0.030	0.29	4.11	0.114	0.88	10.00
	Fused	0.022	0.12	1.18	0.164	0.86	<b>5.88</b>
	Hypoplastic	0.010	0.09	1.16	0.098	0.92	11.76
	Misaligned	0.011	0.07	0.58	0.102	0.68	<b>5.88</b>
	Misshapen	0.007	0.06	0.55	0.079	0.72	8.70
	Thoracic Centra: Dumbbell-shaped	0.522	2.08	21.48	<b>2.853</b>	9.11	70.00
	Split	0.638	1.21	11.19	<b>3.826</b>	5.82	34.78
	Misshapen	0.179	0.66	<b>4.82</b>	1.374	<b>4.96</b>	<b>36.84</b>
Lumbar vertebrae:	Agenesis	0.027	0.21	2.30	0.125	1.34	18.18
	Fused	0.010	0.09	1.19	0.062	0.67	9.09
	Hypoplastic	0.002	0.04	0.54	0.023	0.33	5.00
	Misaligned	0.013	0.12	1.63	0.099	0.70	<b>5.88</b>
	Lumbar Centra: Dumbbell-shaped	0.014	0.10	0.95	0.119	0.80	7.14
	Split	0.033	0.15	1.19	0.249	1.18	9.09
Sacral vertebrae:	Agenesis	0.010	0.07	0.65	0.076	0.56	<b>4.55</b>
	Fused	0.080	1.19	17.71	0.180	<b>2.68</b>	40.00
	Misaligned	0.015	0.10	1.09	0.187	1.24	12.00
Caudal vertebrae	Agenesis	0.014	0.09	0.58	0.125	0.76	<b>5.88</b>
	Fused	0.065	0.92	13.71	0.192	<b>2.45</b>	36.00
	Misaligned	.0003	0.00	0.06	0.005	0.07	1.01
Extra vertebra		0.017	0.12	1.17	0.117	0.84	<b>9.52</b>
Lumbosacral shift		0.019	0.14	1.30	0.148	1.11	10.00
Missing vertebra		0.056	0.26	2.50	0.462	1.87	<b>15.38</b>
Vertebral count > or < normal		0.111	0.32	1.94	<b>0.846</b>	2.39	14.29

•MIN = 0 in all cases

TABLE 12 (Continued)  
SKELETAL ANOMALIES ALL STUDIES

		FETAL INCIDENCE (%)			LITTER INCIDENCE (%)		
		AVG	S.D.	MAX	AVG	S.D.	MAX
<b>STERNEBRAE</b>							
1st fused to Manubrium		0.002	0.03	0.47	0.018	0.27	4.00
Multiple fusions		0.031	0.17	1.71	<b>0.259</b>	1.19	9.09
Agenesis		0.004	0.04	0.58	0.041	0.43	4.76
Split		0.126	0.51	<b>5.88</b>	0.540	2.19	21.74
Misaligned		0.471	1.44	10.19	2.990	7.37	47.37
Asymmetric		0.027	0.17	2.04	0.262	1.78	22.73
Duplicated		0.004	0.06	0.88	0.030	0.45	6.67
Misshapen		0.064	0.40	4.76	<b>0.439</b>	<b>2.54</b>	27.78
<b>RIBS</b>							
Agenesis		0.056	0.26	2.96	0.422	1.60	12.00
Branched/split		0.002	0.03	0.40	0.002	0.03	0.40
Cervical		0.394	0.75	5.00	2.814	4.80	25.00
Fused		0.034	0.13	0.68	0.287	1.11	<b>5.88</b>
Hypoplastic		0.926	2.81	21.64	2.778	<b>8.53</b>	61.90
Intercostal		0.004	0.06	0.84	0.025	0.37	<b>5.56</b>
Misshapen		0.270	0.96	7.50	1.628	<b>5.42</b>	42.11
Supernumerary		3.199	5.30	25.14	14.776	22.97	77.78
Wavy		0.409	2.00	28.40	1.461	3.18	20.00
Bent		0.050	0.31	<b>3.49</b>	<b>0.332</b>	2.31	29.41
<b>PELVIC GIRDLE</b>							
Pelvic bone:	Agenesis	0.003	0.05	0.72	0.023	0.33	5.00
	Misaligned	0.002	0.02	0.26	0.037	0.39	4.17
Ilium:	Misshapen	0.003	0.05	0.72	0.025	0.37	5.56
Ischium:	Hypoplastic	0.013	0.10	1.20	0.110	0.87	10.00
<b>SHOULDER GIRDLE</b>							
Scapula:	Misshapen	0.008	0.07	0.82	0.076	0.66	6.67
<b>APPENDICULAR SKELETON</b>							
<b>Forelimb</b>							
Long bone:	Hypoplastic	0.006	0.09	1.41	0.041	0.61	9.09
	Misshapen	0.001	0.02	0.28	0.020	0.29	<b>4.35</b>
Metacarpal:	Agenesis	0.012	0.11	1.37	0.090	0.82	10.00
	Hypoplastic	0.021	0.14	1.36	0.136	0.95	10.00
Phalanx:	Misaligned	0.002	0.04	0.54	0.023	0.33	5.00
	Agenesis	0.003	0.04	0.59	0.019	0.28	4.17
	Clubbed	0.006	0.09	1.41	0.041	0.61	9.09
	Fused	0.004	0.05	0.82	0.030	0.45	6.67
<b>Hindlimb</b>							
Long bone:	Small	0.006	0.09	1.41	0.041	0.61	9.09
	Hypoplastic	0.002	0.03	0.47	0.002	0.03	0.47
	Misshapen	0.005	0.04	0.47	0.041	0.41	<b>4.35</b>
Metacarpal:	Agenesis	0.004	0.06	0.88	0.030	0.45	6.67
Phalanx:	Agenesis	0.024	0.22	2.37	0.158	1.43	16.00
	Clubbed	0.006	0.09	1.41	0.041	0.61	9.09
	Supernumerary	0.005	0.07	1.03	0.018	0.27	4.00
	Misaligned	0.044	0.65	9.73	0.169	2.51	37.50
Talus:	Advanced	0.013	0.16	2.35	0.039	0.41	<b>4.55</b>

TABLE 13  
SKELETAL ANOMALIES GESTATION DAY 20

TOTAL STUDIES:		154					
TOTAL UTTERS:		3270					
TOTALFETUSES:		27121					
		FETAL INCIDENCE (%)			LITTER INCIDENCE (%)		
		AVG	S.D.	MAX	AVG	S.D.	MAX
<b>SKULL</b>							
Basisphenoid:	Misshapen	0	0	0	0	0	0
Bone island		0.003	0.03	0.40	0.027	0.33	4.17
Frontals:	Contain holes	0.008	0.10	1.27	0.038	0.47	<b>5.88</b>
	Hypoplastic	0.004	0.06	0.68	0.032	0.40	5.00
	Misshapen	0.006	0.05	0.51	0.053	<b>0.46</b>	4.17
Hyoid. Ala(e):	Hypoplastic	0	0	0	0	0	0
<b>Interparietals:</b>	Hypoplastic	0	0	0	0	0	0
	Bifid	0.004	0.05	0.64	0.032	0.40	5.00
Mandible:	Agenesis	0.012	0.09	0.71	0.087	0.62	4.55
	Hypoplastic	0.004	0.05	0.59	0.027	0.33	4.17
	Misshapen	0.004	0.05	0.66	0.034	<b>0.42</b>	<b>5.26</b>
Maxilla:	Agenesis	0.005	0.06	0.71	0.030	0.37	<b>4.55</b>
	Misshapen	0.008	0.07	0.66	0.060	0.53	<b>5.26</b>
Nasals:	Fused	0	0	0	0	0	0
	Hypoplastic	0	0	0	0	0	0
	Misshapen	0.008	0.07	0.66	0.060	<b>0.53</b>	<b>5.26</b>
Orbits:	Hypoplastic	0.007	0.06	<b>0.55</b>	0.054	0.47	<b>4.35</b>
	Misshapen	0.028	0.13	1.02	0.222	1.05	8.00
Parietals:	Misshapen	0.003	0.04	0.51	0.026	0.32	4.00
Supraoccipitals:	Hypoplastic		0	0	0	0	0
<b>SPINAL COLUMN</b>							
Vertebral Scrambling		0.012	0.15	1.92	0.078	0.96	12.00
Atlas:	Split	0	0	0	0	0	0
Cerv./Thoracic vert. arches:	Fused	0	0	0	0	0	0
Cervical vertebrae:	Agenesis	0	0	0	0	0	0
	Fused	0.016	0.10	0.72	0.061	0.48	4.17
	Hypoplastic	0.004	0.03	0.32	0.057	0.50	4.76
	Misaligned	0.004	0.05	<b>0.68</b>	0.032	0.40	5.00
	Misshapen	0.002	0.02	0.26	0.027	<b>0.33</b>	4.17
	Cervical Centra: Split	0.004	0.05	0.61	0.028	<b>0.35</b>	<b>4.35</b>
Thoracic vertebrae:	Agenesis	0.043	<b>0.34</b>	4.11	0.165	1.05	10.00
	Fused	0.019	0.12	1.18	0.117	0.73	<b>5.56</b>
	Hypoplastic	0	0	0	0	0	0
	Misaligned	0.007	0.06	<b>0.58</b>	0.054	0.47	4.35
	Misshapen	0.010	0.07	0.55	0.114	0.86	8.70
	Thoracic Centra: Dumbbell-shaped	0.411	<b>2.14</b>	<b>21.48</b>	1.837	<b>8.24</b>	70.00
	Split	0.700	<b>1.36</b>	11.19	3.664	5.75	34.78
	Misshapen	0.009	0.07	0.66	0.088	0.63	<b>5.26</b>
Lumbar vertebrae:	Agenesis	0.018	0.16	<b>1.84</b>	0.009	0.06	0.47
	Fused	0.010	0.10	1.19	0.062	0.73	9.09
	Hypoplastic	0	0	0	0	0	0
	Misaligned	0.013	0.13	1.63	0.062	<b>0.54</b>	<b>4.76</b>
	Lumbar Centra: Dumbbell-shaped	0.010	0.09	<b>0.95</b>	0.079	0.70	7.14
	Split	0.039	0.17	1.19	0.269	1.26	9.09
Sacral vertebrae:	Agenesis	0.003	0.04	<b>0.48</b>	0.026	0.32	4.00
	Fused	0.115	<b>1.42</b>	17.71	0.260	3.21	40.00
	Misaligned	0.016	0.11	1.09	0.198	1.32	12.00
Caudal vertebrae	Agenesis	0.007	0.06	0.57	0.053	0.46	4.17
	Fused	0.094	1.10	13.71	0.277	<b>2.94</b>	36.00
	Misaligned	0	0	0	0	0	0
Extra vertebra		0	0	0	0	0	0
Lumbosacral shift		0.028	0.17	1.30	0.214	1.33	10.00
Missing vertebra		0.011	0.07	<b>0.54</b>	0.138	0.87	7.69
Vertebral count > or < normal		0.128	<b>0.34</b>	<b>1.94</b>	0.998	2.68	14.29

•MIN = 0 in all cases

TABLE 13 (Continued)  
SKELETAL ANOMALIES GESTATION DAY 20

	FETAL INCIDENCE (%)			LITTER INCIDENCE (%)				
	AVG	S.D.	MAX	AVG	S.D.	MAX		
<b>STERNEBRAE</b>								
1st fused to Manubrium	0.003	0.04	0.47	0.026	0.32	4.00		
Multiple fusions	0.013	0.08	0.65	0.137	0.86	7.14		
Agenesis	0	0	0	0	0	0		
Split	0.158	0.59	5.88	0.551	2.25	21.74		
Misaligned	0.463	1.56	10.19	2.736	7.59	47.37		
Asymmetric	0.010	0.10	1.10	0.086	0.80	9.09		
Duplicated	0.006	0.07	0.88	0.043	0.54	6.67		
Misshapen	0.075	0.47	4.76	0.510	2.96	27.78		
<b>RIBS</b>								
Agenesis	0.064	0.30	2.96	0.432	1.72	12.00		
Branched/split	0.003	0.03	0.40	0.003	0.03	0.40		
Cervical	0.296	0.52	2.34	1.974	3.46	15.38		
Fused	0.022	0.10	0.68	0.170	0.83	5.00		
Hypoplastic	0.858	2.50	19.19	1.871	6.11	46.15		
Intercostal	0.005	0.07	0.84	0.036	0.45	5.56		
Misshapen	0.060	0.39	3.28	0.401	2.52	25.00		
Supernumerary	2.949	<b>5.24</b>	25.14	12.752	20.61	75.00		
Wavy	0.517	2.37	28.40	1.583	3.38	20.00		
Bent	0.041	0.32	3.49	0.275	2.47	29.41		
<b>PELVIC GIRDLE</b>								
Pelvic bone:	Agenesis	0.005	0.06	0.72	0.032	0.40	5.00	
	Misaligned	0.003	0.03	0.26	0.053	0.46	4.17	
Ilium:	Misshapen	0.005	0.06	0.72	0.036	0.45	5.56	
Ischium:	Hypoplastic	0.012	0.11	1.20	0.099	0.91	10.00	
<b>SHOULDER GIRDLE</b>								
Scapula:	Misshapen	0.005 ~	0.07	0.82	0.043	0.54	6.67	
<b>APPENDICULAR SKELETON</b>								
Forelimb								
	Long bone:	Hypoplastic	0	0	0	0	0	
		Misshapen	0	0	0	0	0	
	Metacarpal:	Agenesis	0.018	0.13	1.37	0.130	0.98	10.00
		Hypoplastic	0.030	0.17	1.36	0.197	1.13	10.00
	Phalanx:	Misaligned	0	0	0	0	0	
		Agenesis	0.004	0.05	0.59	0.027	0.33	4.17
		Clubbed	0	0	0	0	0	
		Fused	0.005	0.07	0.82	0.043	0.54	6.67
Hindlimb								
	Long bone:	Small	0	0	0	0	0	
		Hypoplastic	0.003	0.04	0.47	0.003	0.04	0.47
		Misshapen	0.003	0.04	0.47	0.003	0.04	0.47
	Metacarpal:	Agenesis	0.006	0.07	0.88	0.043	0.54	6.67
	Phalanx:	Agenesis	0	0	0	0	0	
		Clubbed	0.035	0.26	2.37	0.228	1.71	16.00
		Supernumerary	0	0	0	0	0	
		Misaligned	0	0	0	0	0	
	Talus:	Advanced	0	0	0	0	0	

TABLE 14  
SKELETAL ANOMALIES GESTATION DAY 21

TOTAL STUDIES:		<b>68</b>					
TOTAL UTTERS:		<b>1459</b>					
TOTAL FETUSES:		14796					
		FETAL INCIDENCE (%)			LITTER INCIDENCE (%)		
		AVG	S.D.	MAX	AVG	S.D.	MAX
<b>SKULL</b>							
Basisphenoid:	Misshapen	0.008	0.06	0.51	0.074	0.60	5.00
Bone island		0.001	0.01	0.10	0.015	0.12	1.01
Frontals:	Contain holes	0	0	0	0	0	0
	Hypoplastic	0.006	0.05	0.43	0.061	0.50	4.17
	Misshapen	0.009	0.06	0.53	0.088	0.61	5.00
Hyoid, (Male):	Hypoplastic	0.029	0.19	1.54	0.309	2.07	16.67
Interparietals:	Hypoplastic	0.274	0.74	<b>3.35</b>	1.829	<b>4.65</b>	20.00
	Bifid	0.008	0.07	0.56	0.082	0.67	5.56
Mandible:	Agenesis	0.023	0.11	0.56	0.215	1.00	<b>5.26</b>
	Hypoplastic	0	0	0	0	0	0
	Misshapen	0.033	0.13	0.65	0.253	1.01	<b>4.55</b>
Maxilla:	Agenesis	0	0	0	0	0	0
	Misshapen	0	0	0	0	0	0
Nasals:	Fused	0.007	0.05	0.44	0.061	0.50	4.17
	Hypoplastic	0.006	0.05	0.43	0.061	0.50	4.17
	Misshapen	0.008	0.06	0.51	0.074	0.60	5.00
Orbits:	Hypoplastic	0.007	0.05	0.44	0.067	0.55	4.55
	Misshapen	0.018	0.10	0.65	0.125	0.72	<b>4.35</b>
Parietals:	Misshapen	0	0	0	0	0	0
Supraoccipitals:	Hypoplastic	0.246	0.73	<b>4.85</b>	1.787	<b>4.52</b>	25.00
<b>SPINAL COLUMN</b>							
Vertebral Scrambling		0.007	0.05	0.44	0.067	0.55	4.55
Atlas:	Split	0.001	0.01	0.06	0.015	0.12	1.01
Cerv./Thoracic vert. arches:	Fused	0.010	0.08	0.65	0.064	0.52	4.35
Cervical vertebrae:	Agenesis	0.001	0.01	0.06	0.015	0.12	1.01
	Fused	0.023	0.11	0.58	0.227	1.06	5.88
	Hypoplastic	0.064	0.21	1.06	0.614	2.03	10.00
	Misaligned	0	0	0	0	0	0
	Misshapen	0.016	0.09	0.58	0.160	0.92	5.88
	Cervical Centra: Split	0.007	0.06	0.50	0.059	0.48	4.00
Thoracic vertebrae:	Agenesis	0	0	0	0	0	0
	Fused	0.028	0.12	0.65	0.268	1.09	<b>5.88</b>
	Hypoplastic	0.033	0.16	1.16	0.320	1.63	11.76
	Misaligned	0.019	0.09	0.58	0.212	1.00	5.88
	Misshapen	0	0	0	0	0	0
	Thoracic Centra: Dumbbell-shaped	0.772	1.94	13.22	5.154	10.46	59.09
	Split	0.497	0.73	3.64	4.194	5.97	28.00
	Misshapen	0.563	1.10	<b>4.82</b>	4.287	8.20	36.84
Lumbar vertebrae:	Agenesis	0.048	0.30	2.30	0.390	2.39	18.18
	Fused	0.010	0.08	0.65	0.064	0.52	<b>4.35</b>
	Hypoplastic	0.008	0.07	0.54	0.074	0.60	5.00
	Misaligned	0.015	0.08	0.58	0.183	0.97	<b>5.88</b>
	Lumbar Centra: Dumbbell-shaped	0.024	0.11	0.58	0.209	0.99	<b>5.88</b>
	Split	0.018	0.09	0.49	0.203	0.95	5.26
Sacral vertebrae:	Agenesis	0.024	0.11	0.65	0.190	0.88	4.55
	Fused	0	0	0	0	0	0
	Misaligned	0.012	0.07	0.51	0.162	1.02	8.00
Caudal vertebrae	Agenesis	0.031	0.13	0.58	0.290	1.17	5.88
	Fused	0	0	0	0	0	0
	Misaligned	0.001	0.01	0.06	0.015	0.12	1.01
Extra vertebra		0.057	0.22	1.17	0.383	1.48	9.52
Lumbosacral shift		0	0	0	0	0	0
Missing vertebra		0.158	0.45	2.50	1.196	2.99	15.38
Vertebral count > or < normal		0.073	0.26	1.72	0.502	1.50	5.88

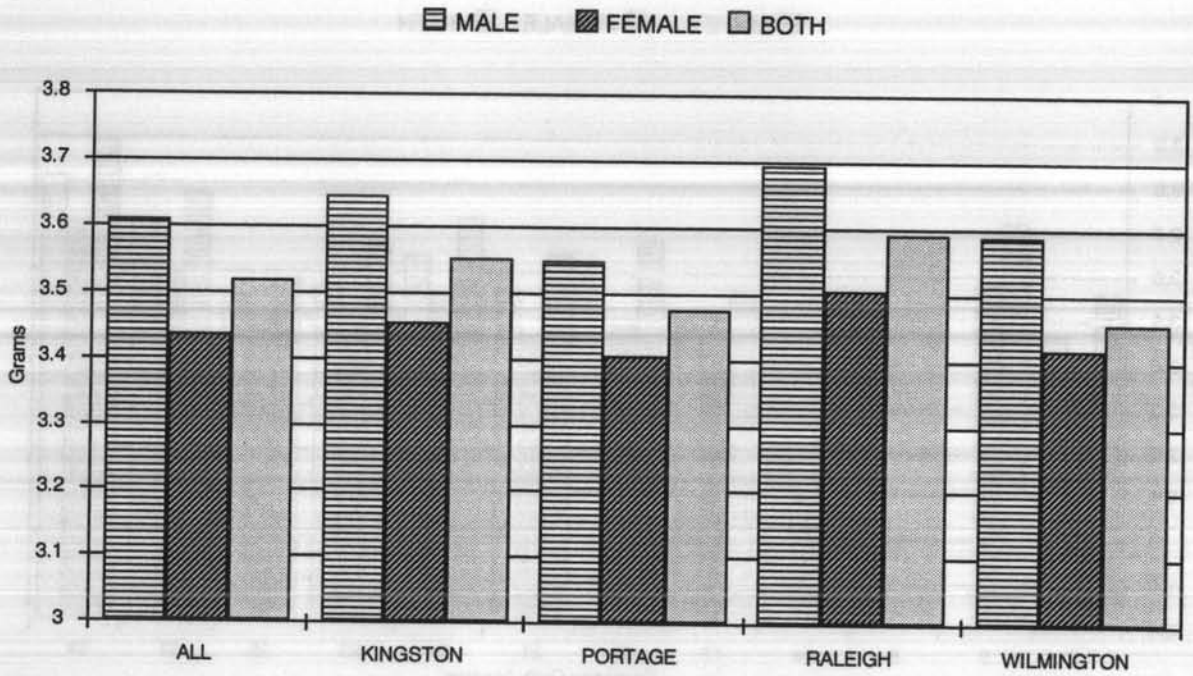
•MIN = 0 in all cases

TABLE 14 (Continued)  
SKELETAL ANOMALIES GESTATION DAY 20

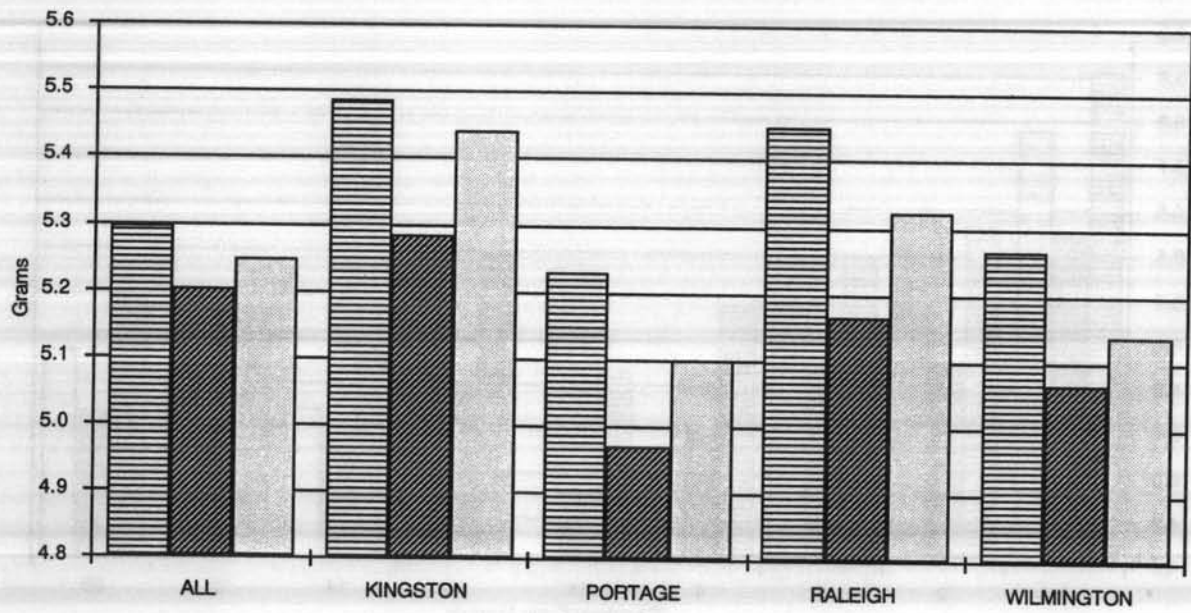
	FETAL INCIDENCE (%)			UTTER INCIDENCE (%)		
	AVG	S.D.	MAX	AVG	S.D.	MAX
<b>STERNEBRAE</b>						
1st fused to Manubrium	0	0	0	0	0	0
Multiple fusions	0.071	0.27	1.71	0.537	1.69	9.09
Agenesis	0.013	0.08	0.58	0.134	0.77	4.76
Split	0.054	0.21	1.22	0.517	2.05	<b>13.64</b>
Misaligned	0.487	1.12	6.86	<b>3.566</b>	6.82	34.78
Asymmetric	0.064	0.27	2.04	0.660	2.94	22.73
Duplicated	0	0	0	0	0	0
Misshapen	0.040	0.17	1.17	0.280	1.12	<b>5.26</b>
<b>RIBS</b>						
Agenesis	0.039	0.13	0.58	<b>0.399</b>	1.30	<b>5.88</b>
Branched/split	0	0	0	0	0	0
Cervical	0.615	1.08	5.00	4.716	6.56	25.00
Fused	0.060	0.17	0.65	<b>0.553</b>	1.53	<b>5.88</b>
Hypoplastic	1.080	3.41	21.64	<b>4.832</b>	12.12	61.90
Intercostal	0	0	0	0	0	0
Misshapen	0.743	1.53	7.50	4.407	8.40	42.11
Supernumerary	3.763	5.41	20.45	19.359	27.03	150.00
Wavy	0.162	0.43	2.79	1.185	2.63	10.00
Bent	0.069	0.29	1.67	0.460	1.89	10.00
<b>PELVIC GIRDLE</b>						
Pelvic bone: Agenesis	0	0	0	0	0	0
Misaligned	0	0	0	0	0	0
Ilium: Misshapen	0	0	0	0	0	0
Ischium: Hypoplastic	0.016	0.09	0.54	0.135	0.78	5.00
<b>SHOULDER GIRDLE</b>						
Scapula: Misshapen	0.0131	0.081	0.58	0.150	0.871	<b>5.88</b>
<b>APPENDICULAR SKELETON</b>						
<b>Forelimb</b>						
Long bone: Hypoplastic	0.021	0.17	1.41	0.134	1.09	9.09
Misshapen	0.004	0.03	0.28	0.064	0.52	<b>4.35</b>
Metacarpal: Agenesis	0	0	0	0	0	0
Hypoplastic	0	0	0	0	0	0
Phalanx: Misaligned	0.008	0.07	0.54	0.074	0.60	5.00
Agenesis	0	0	0	0	0	0
Clubbed	0.021	0.17	1.41	0.134	1.09	9.09
Fused	0	0	0	0	0	0
<b>Hindlimb</b>						
Long bone: Small	0.021	0.17	1.41	0.134	1.09	9.09
Hypoplastic	0	0	0	0	0	0
Misshapen	0.008	0.05	0.28	0.128	0.73	<b>4.35</b>
Metacarpal: Agenesis	0	0	0	0	0	0
Phalanx: Agenesis	0.143	1.17	9.73	0.551	4.51	37.50
Clubbed	0	0	0	0	0	0
Supernumerary	0.021	0.17	1.41	0.134	1.09	9.09
Misaligned	0.015	0.12	1.03	0.059	0.48	4.00
Talus: Advanced	0.043	0.29	2.35	0.128	0.74	<b>4.55</b>



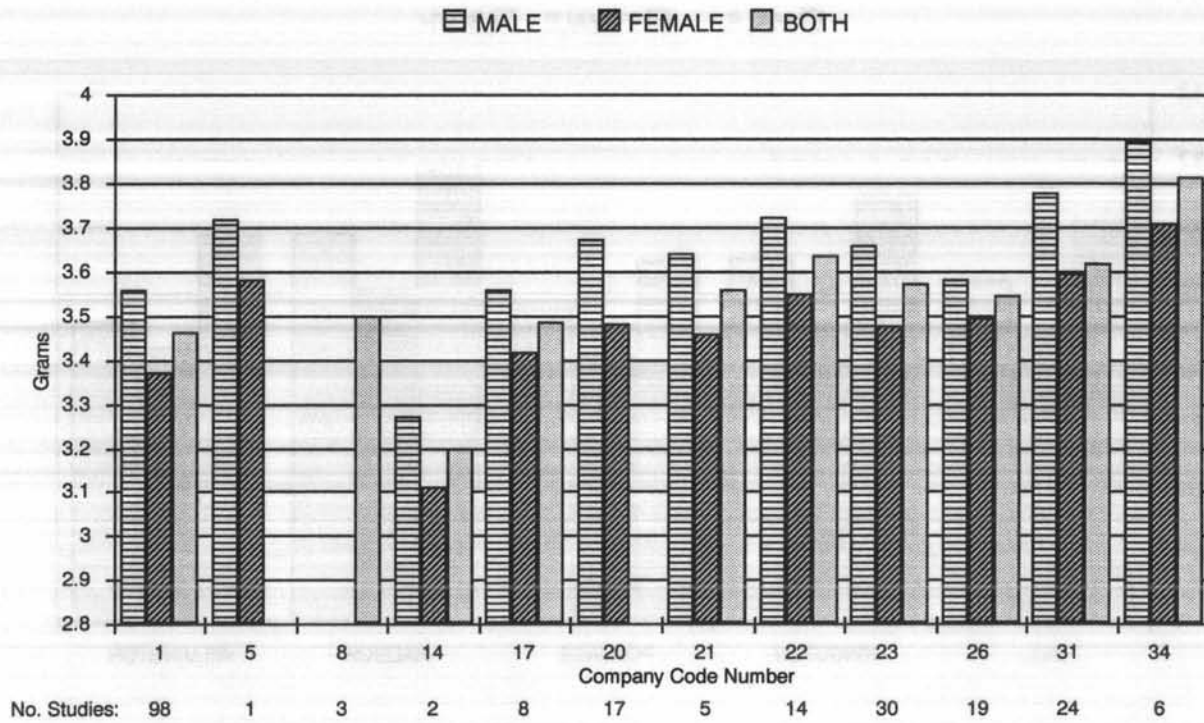
**FIGURE 1**  
**AVERAGE FETAL WEIGHTS**  
**GESTATION DAY 20**



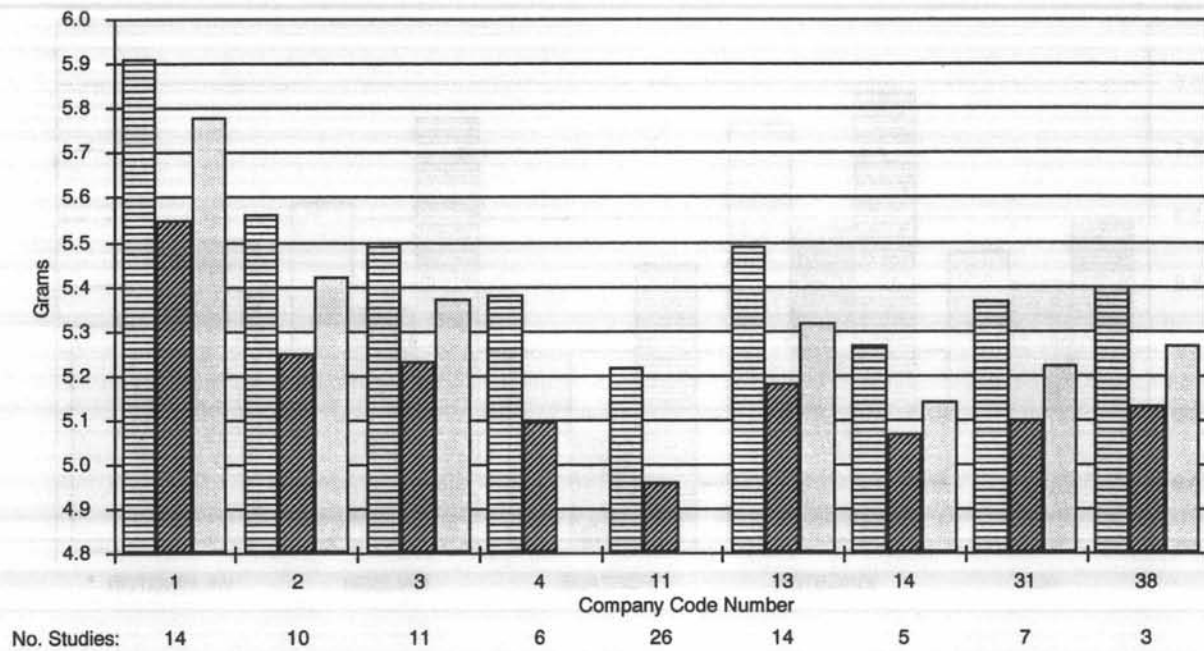
**FIGURE 2**  
**AVERAGE FETAL WEIGHTS**  
**GESTATION DAY 21**



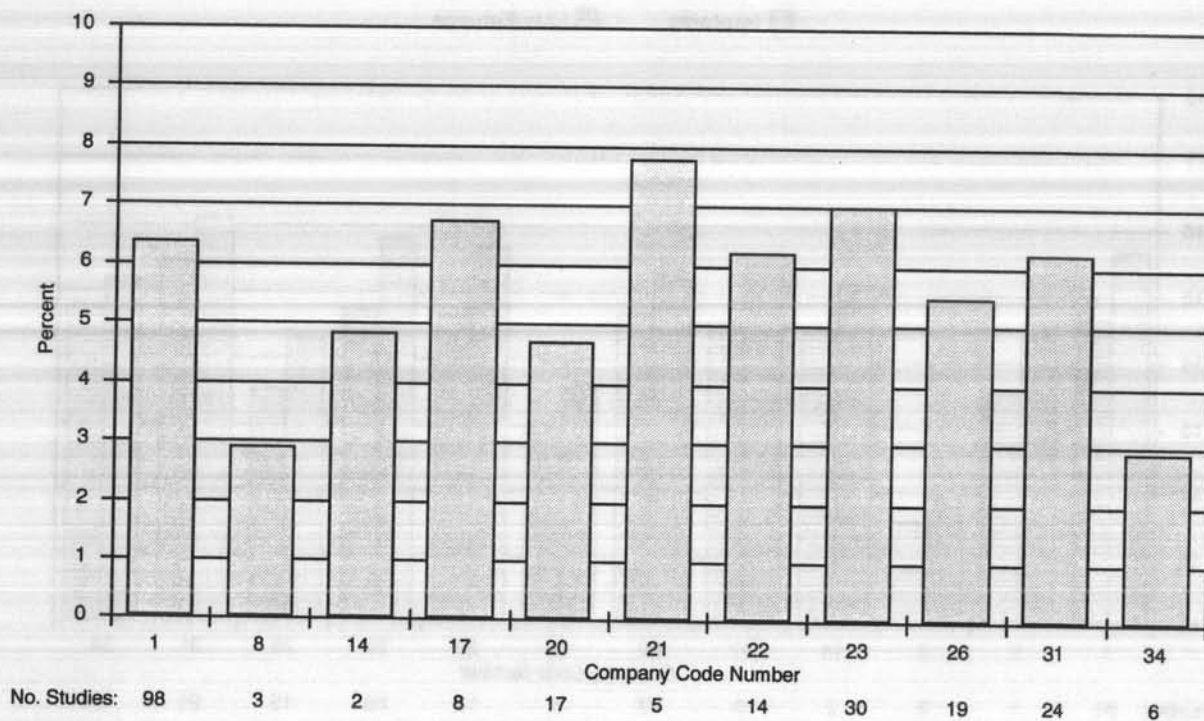
**FIGURE 3  
AVERAGE FETAL WEIGHTS BY COMPANY  
GESTATION DAY 20**



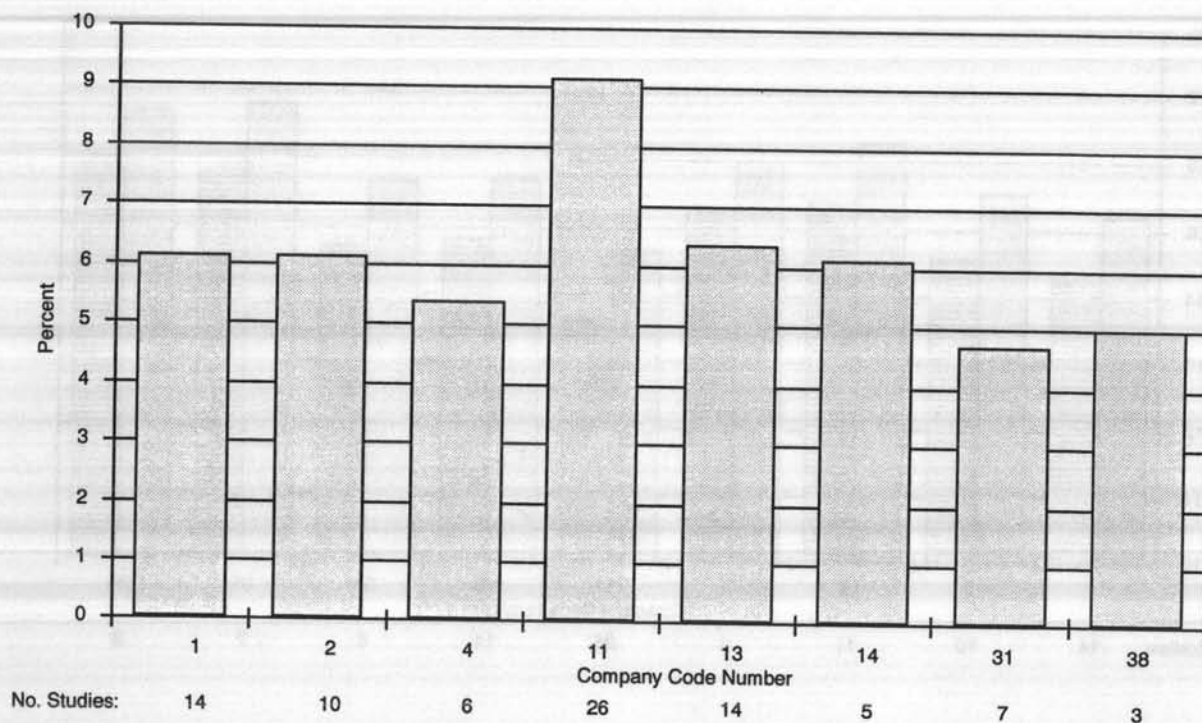
**FIGURE 4  
AVERAGE FETAL WEIGHTS BY COMPANY  
GESTATION DAY 21**



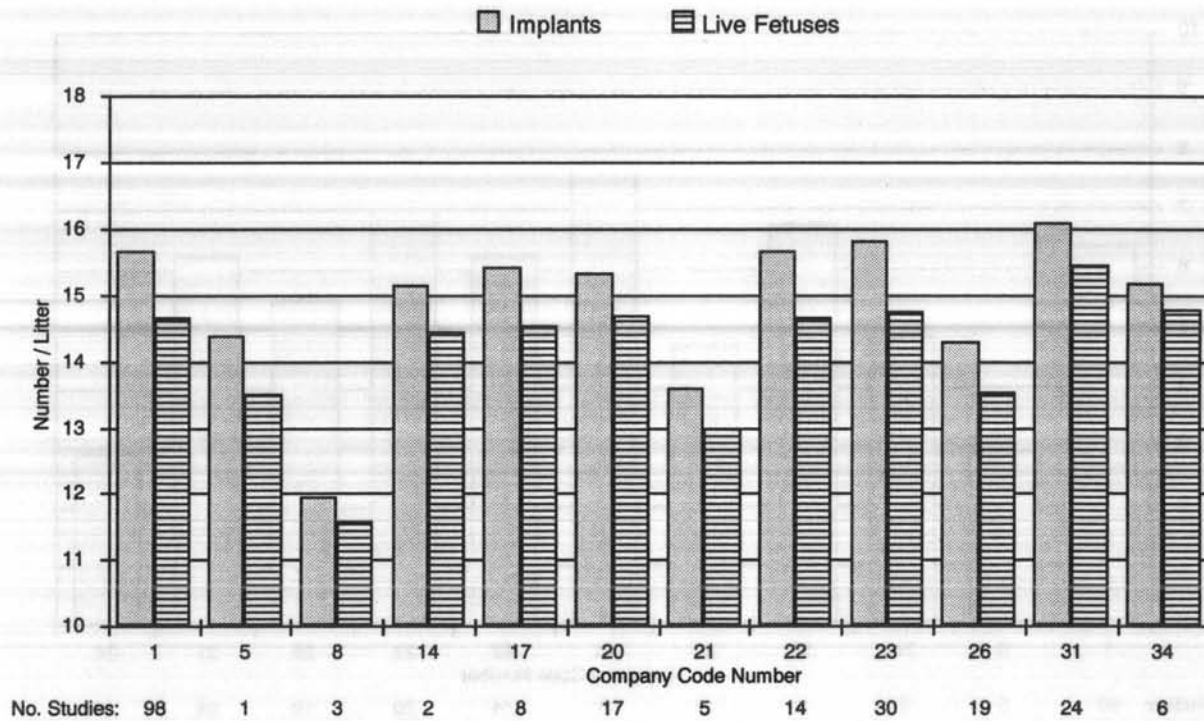
**FIGURE 5**  
**AVERAGE PERCENT RESORPTIONS BY COMPANY**  
**GESTATION DAY 20**



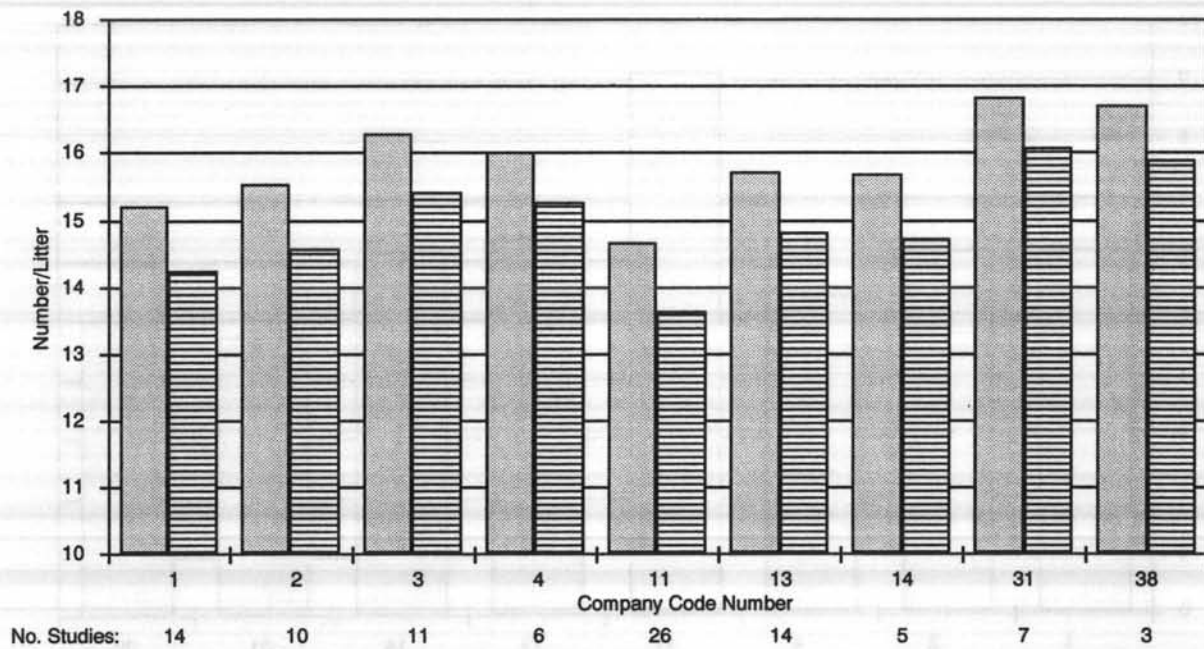
**FIGURE 6**  
**AVERAGE PERCENT RESORPTIONS BY COMPANY**  
**GESTATION DAY 21**



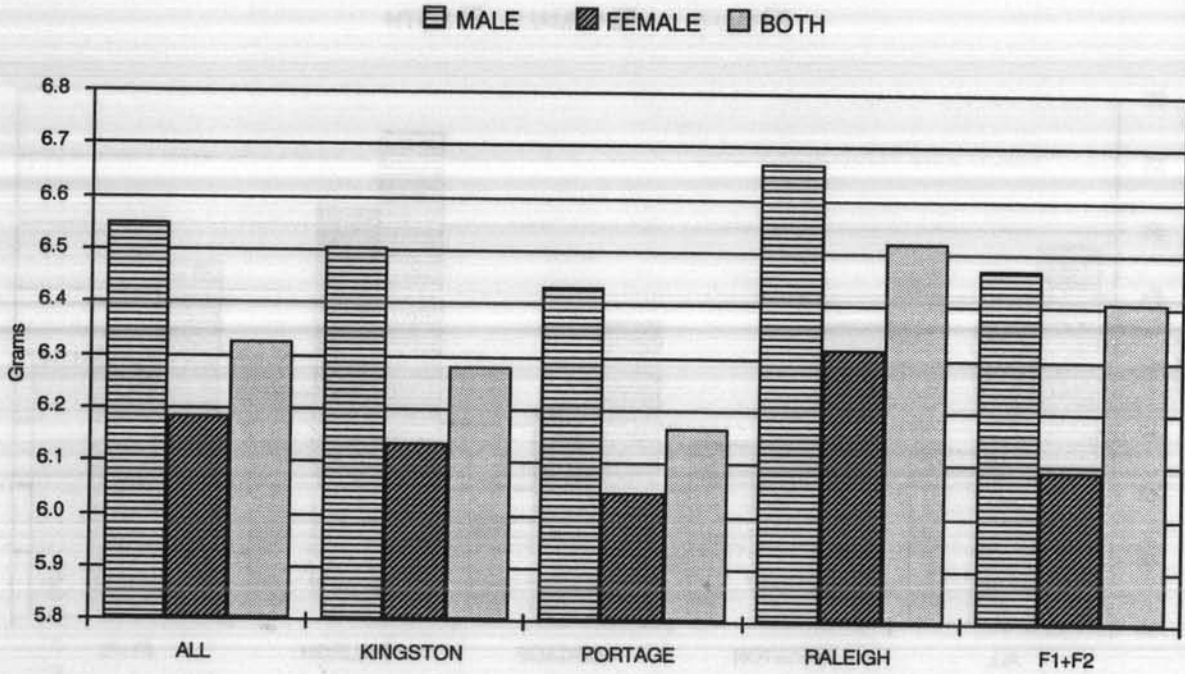
**FIGURE 7**  
**AVERAGE IMPLANTS AND LIVE FETUSES BY COMPANY**  
**GESTATION DAY 20**



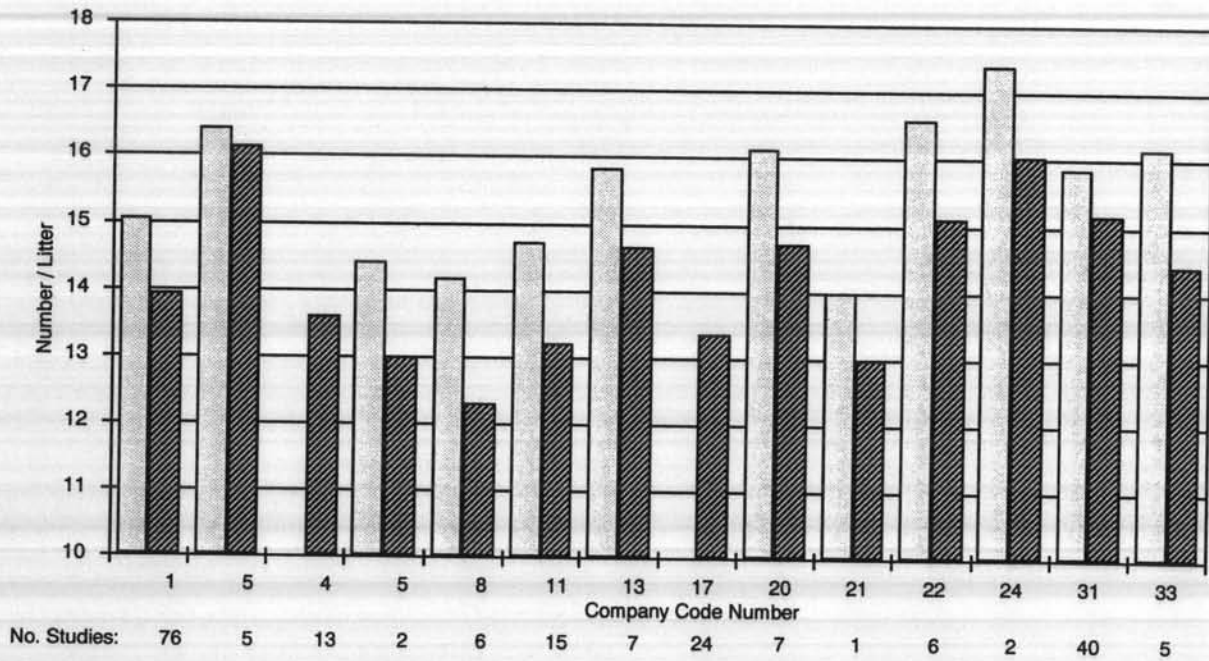
**FIGURE 8**  
**AVERAGE IMPLANTS AND LIVE FETUSES BY COMPANY**  
**GESTATION DAY 21**



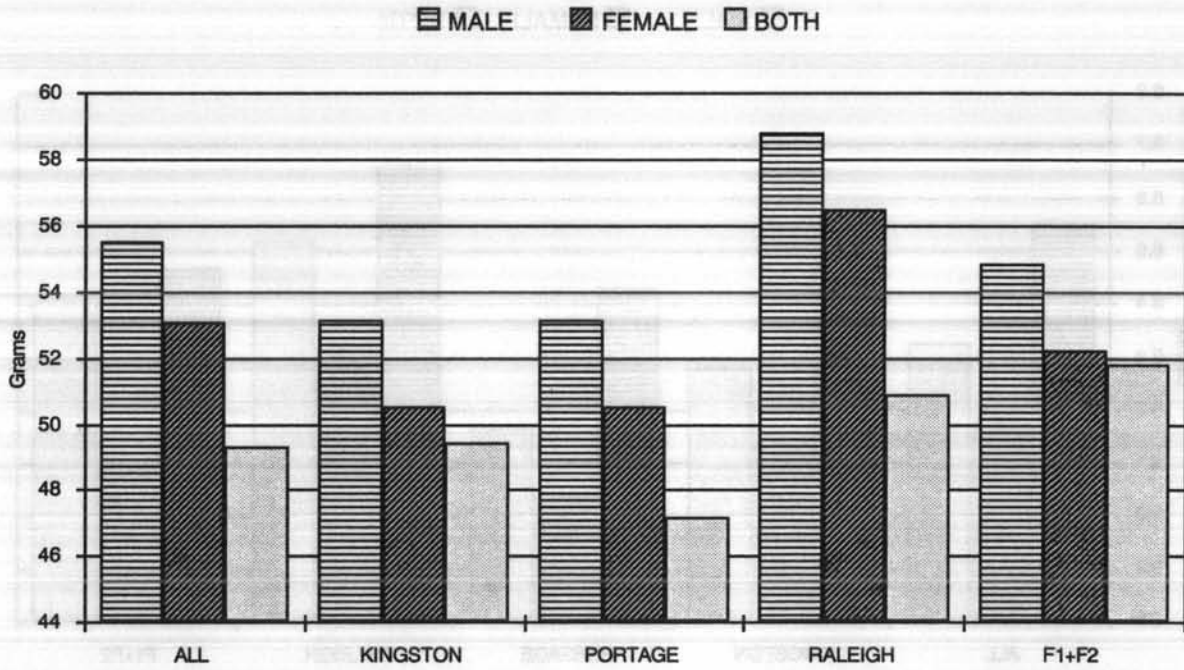
**FIGURE 9**  
**AVERAGE BIRTH WEIGHTS**  
**BY CRL PRODUCTION SITE**



**FIGURE 10**  
**AVERAGE IMPLANTS AND LIVE PUPS**  
**AT BIRTH BY COMPANY**



**FIGURE 11**  
**AVERAGE POST-NATAL DAY 21 PUP WEIGHTS**  
**BY CRL PRODUCTION SITE**



**Note:** Weights of both sexes combined are lower due to the fact that a separate set of studies were averaged (i.e., companies generally reported either combined or separate weight)