298 Measuring aseasonality in a crossbred pedigree developed for mapping QTL. R. G. Mateescu*, M. L. Thonney, W. R. Butler, and M. C. Smith, *Cornell University*, *Ithaca, NY*.

An experimental crossbred pedigree was created to identify QTL contributing to aseasonality by crossing Dorset ewes with East Friesian rams and breeding F1 rams to Dorset ewes. Aseasonality in 117 yearling backcross ewes was assessed using a blood progesterone profile prior to, during and after the spring 2003 breeding season. Blood samples were taken twice weekly during 14 wk from 3 February to 9 May. This period included 28 d prior to breeding with teaser rams included the last 16 d, 31 d with intact Dorset rams known previously to sire August-September born lambs, and 21 d after the intact rams were removed. Rams were brisket-painted and the identification numbers of freshly marked ewes were recorded twice weekly. Blood progesterone levels were used to determine the estrous cycles for individual ewes and to detect early conception as indicated by a constant high level of progesterone. Transabdominal ultrasound was performed at 35 and 55 d after the breeding season to detect early pregnancy. The final measure of lambing out-of-season was the actual lambing in the August-September lambing season. Only 9 ewes did not exhibit an estrous cycle during the spring breeding season. However, only 20 ewes (18.5% of ewes cycling) were detected with an early conception based on the progesterone level. Ultrasound confirmed 19 of them. Only ten ewes lambed in the August-September lambing season. While brisket-painting resulted in 63 ewes marked by vasectomized rams and 43 ewes marked by intact rams, only three of the 10 ewes that lambed were marked by intact rams, indicating that this method of detecting estrus was unreliable. Whether a ewe lambs and how many lambs she delivers after spring breeding is the ultimate and economically important measure of aseasonality. Our data suggest that low out-of-season lambing success is not related to lack of ovulation, but to relatively lower ability to conceive and to maintain pregnancy after spring conception. These results are in agreement with Pope et al. (1989) indicating that relatively lower ability to maintain pregnancy after a spring conception is an important factor contributing to low aseasonal reproductive success.

Key Words: Aseasonality, QTL, Sheep

299 Advanced reduction of estradiol negative feedback on secretion of LH facilitates induction of precocious puberty in heifers that are weaned early and fed a high-concentrate diet. C. L. Gasser*, G. A. Bridges, M. L. Mussard, D. M. Dauch, D. E. Grum, J. E. Kinder, and M. L. Day, *The Ohio State University*, *Columbus*.

Puberty can be induced precociously (< 300 d of age) in beef heifers by early weaning and feeding a high-concentrate diet. We conducted an experiment to test the hypothesis that precocious puberty occurs as a result of advanced reduction of estradiol (E) negative feedback on secretion of LH. Thirty crossbred Angus heifers were weaned at 83 ± 1.9 d of age, blocked by weight, and randomly assigned to receive either a high-concentrate (60% corn; H) or control (30% corn; C) diet and to either receive ovariectomy (OVX), OVX with an E implant (OVXE), or remain intact (INT). All heifers were fed a receiving diet until 4 mo of age, at which time heifers were transitioned to treatment diets. Blood samples were collected weekly starting at 6 mo of age to determine concentrations of progesterone and E. Serial blood samples were collected at 12-min intervals for 12 hr at 4, 5, 6.5, 7.5, 8.5, 9.5, 10.5, 12, 13.5, and 15 mo of age to characterize LH concentrations. Due to incomplete ovariectomy, 6 heifers were removed from the experiment (OVX-C, n = 3; OVXE-H, n = 2; OVXE-C, n = 4; OVX-H, INT-H, INT-C, n = 5). Heifers fed the H diet were heavier ($P < 0.05$) than C heifers by 160 d of age. Heifers in the INT-H treatment attained puberty earlier ($P < 0.05$) than INT-C heifers (275 ± 29.9 and 385 ± 13.6 d of age, respectively). Concentrations of E did not differ between OVXE and INT heifers across the experiment. In OVXE-H heifers LH secretion "escaped" E negative feedback (≥1 LH pulse/hr) earlier ($P < 0.05$) than in OVXE-C heifers (307 ± 29.7 and 420 ± 21.0 d of age, respectively). Age at escape did not differ from age at puberty for INT heifers within the respective diets (OVXE-H vs. INT-H, OVXE-C vs. INT-C). Characteristics of LH were not different between OVX-H and OVX-C heifers. Advanced reduction of estradiol negative feedback on secretion of LH is the mechanism by which early weaning and feeding a high-concentrate diet results in precocious puberty in heifers.

Key Words: Puberty, LH, Heifer

300 Effect of maternal undernutrition on capillary vascularity of the bovine placentome. K. Vonnahme*[1], L. Reynolds[1], P. Borowicz[1], D. Miller[1], B. Caton[1], B. Hess[2], and S. Ford[2], [1]*North Dakota State University*, *Fargo*, [2]*University of Wyoming*, *Laramie*.

Improper maternal nutrition during pregnancy in ewes greatly impacts the capillary vascularity of placentomes (Redmer et al., 2004. Dom Anim Endo. 27:199-217). In the beef cow, the effect of early maternal undernutrition followed by realimentation on placentomal capillary vascular density was determined. Multiparous beef cows bred to the same bull and carrying female fetuses (n=30) were fed in equal numbers to either meet NRC requirements (control; C) to gain weight (average = + 4.25% body weight) or fed below NRC (nutrient restricted; NR) to lose weight (average = - 6.8% body weight) from d 30 to d 125 of gestation. On d 125, ten C and ten NR cows were necropsied, and the remaining 5 C and 5 NR cows were realimented to 100% NRC until necropsy on d 250 of gestation. At necropsy, weights of placentomes were recorded and placentomes were fixed by perfusion of Carnoys-Mercox via the caruncular (CAR; maternal portion of the placentome) and cotyledonary (COT; fetal portion of the placentome) arteries. After fixation, the placentomes were embedded in paraffin, sectioned and stained (hematoxylin and periodic acid-Schiffs). Vascularity was then determined by image analysis (Image-Pro Plus). For modeling purposes we evaluated for CAR and COT: capillary area/unit tissue area (capillary area density, CAD; blood flow related measure), capillary no./unit tissue area (capillary no. density, CND), and capillary surface area/unit tissue area (capillary surface density, CSD; nutrient exchange related measure). On day 125 of gestation, there were no differences between C and NR cows in CAD, CND, or CSD in either COT or CAR tissue. On day 250 of gestation, CAD, CSD, and CND from COT were decreased ($P<0.01$) in NR vs C cows (8.3 ± 1.3 vs 11.2 ± 0.8 um2; 0.039 ± 0.004 vs 0.054 ± 0.004; 421 ± 64 vs 613 ± 82, respectively). CSD in NR CAR tended to be increased ($P<0.09$) compared to C CAR (0.244 ± 0.04 vs 0.193 ± 0.01). The increase in the ability of nutrient exchange in the CAR on day 250 of gestation may have resulted in the catch-up of fetal growth by the end of gestation in the NR cows that were realimented (presented in another abstract at this meeting).

Key Words: Placenta, Vascularity, Cow

301 Effects of estradiol (E2) and flaxseed meal (FSM) on organ weights in ovariectomized (OVX) ewes. M O'Neil*, G. P. Lardy, L. P. Reynolds, J. S. Caton, and K. A. Vonnahme, *North Dakota State University*, *Fargo*.

Flaxseed contains secoisolariciresinol diglycoside (SDG), a phytoestrogen (PE) proposed to have both estrogenic and anti-estrogenic properties. The objective of the current study was to determine the estrogenic properties of SDG in OVX ewes. OVX ewes (n = 48) were fed a PE-free diet for four weeks (d -28 to d 0) following OVX to ensure the absence of any circulating endogenous estrogen or dietary PE. On d 0, OVX ewes were assigned randomly to a control group (PE-free diet; CON; n=12) or a 12.5% FSM for 1, 7, or 14 d (n = 12/group). Diets were based on beet pulp and formulated to provide similar amounts of energy (2.7 Mcal/kg) and CP (13.6%). On the last day of FSM feeding, OVX ewes were implanted with a subcutaneous E2 implant (100 mg) for 0, 6, or 24 h. At necropsy, uteri, liver, and duodenum were weighed. Tissue weights are expressed as % empty body weight (live weight minus blood and digesta weight). Effect of E2 on uterine weight depended upon hours exposed to E2 and days fed FSM ($P < 0.05$). Uterine weight increased ($P < 0.05$) from 0 h to 24 h E2

treatment in CON and 1 d FSM fed ewes. However, in ewes fed FSM for 7 or 14 d, E2 exposure had no effect on uterine weight. Similarly, liver and duodenal weights for CON ewes increased with increased E2 exposure ($P < 0.05$), but the increase in liver weight was ablated in ewes fed FSM for 1, 7, or 14 d. Furthermore, ewes fed FSM for 14 d and 24 h E2 exposure had decreased ($P<0.05$) duodenal weight compared to ewes fed 14 d FSM and 0 h E2 exposure. PE compounds in FSM influence the effects of exogenous E2 on organ mass in OVX ewes. These effects warrant further investigation at a mechanistic level.

Effect of dietary FSM and exogenous E2 on tissue weights in OVX ewes (% body weight)

		D Fed FSM				
	Hr Post E2	0	1	7	14	Pooled SEM
Uterus	0	$0.05^{a,b}$	0.05^{a}	$0.06^{a,b}$	$0.06^{a,b}$	0.01
	6	$0.07^{a,b}$	$0.07^{b,c,d}$	$0.07^{a,b,c}$	$0.06^{a,b}$	0.01
	24	0.10^{e}	0.13^{f}	$0.09^{c,d,e}$	$0.09^{d,e}$	0.01
Liver	0	1.34^{a}	$1.45^{a,b}$	$1.54^{a,b,c}$	$1.48^{a,b,c}$	0.04
	6	$1.52^{a,b,c}$	$1.51^{a,b,c}$	$1.50^{a,b,c}$	1.38^{a}	0.06
	24	1.63^{c}	$1.59^{b,c}$	1.63^{c}	1.39^{a}	0.06
Duodenum	0	0.12^{a}	$0.19^{b,c}$	$0.20^{b,c}$	0.21^{c}	0.02
	6	$0.16^{a,b,c}$	$0.19^{b,c}$	$0.20^{b,c}$	0.12^{a}	0.02
	24	$0.19^{b,c}$	$0.16^{a,b,c}$	$0.14^{a,b}$	$0.15^{a,b}$	0.01

^{a,b,c,d,e,f}Means ± SEM within tissue differ, $P<0.05$

Key Words: Flaxseed, Estrogen, Sheep

302 17ß-estradiol concentrations in Holstein whole milk. D. A. Pape-Zambito*, A. L. Magliaro, and R. S. Kensinger, *Pennsylvania State University*, *University Park*.

Some public health professionals have expressed concern over estrogens in food due to their potential to promote growth of estrogen sensitive cancers. Whereas papers have reported levels of estrogen in milk, relatively few whole milk samples from commercial dairy cows were analyzed. Objectives of this study were to reevaluate E_2 concentrations in Holstein whole milk using solvent extraction and RIA, as well as to relate E_2 concentrations to reproductive status of the cow. Milk samples and weights were collected during a single a.m. milking from lactating cows in the university dairy herd. Triplicate samples were collected; two were analyzed for fat, protein, and lactose content, whereas one was used for E_2 analysis. Homogenized whole milk (1ml) was extracted twice with ethyl acetate and once with methanol. After each extraction the solvent was dried under nitrogen at 50C. Assay buffer (PBSg) was used to reconstitute the final extract prior to quantification of E_2 using RIA. Cows were classified as: early pregnant (EP, 1-140 d pregnant), late pregnant (LP, 141-210 d pregnant), and other (O) which were primarily open cows. The E_2 concentration range in whole milk was 1.2 to 17.6 pg/ml. Milk E_2 concentrations were 4.30 ± 3.2, 8.50 ± 5.1, and 8.61 ± 4.4 pg/ml for O (n = 38), EP (n = 9), and LP (n = 11) cows, respectively. Milk E_2 concentrations were not significantly different between EP and LP cows but milk E_2 was lower for O cows ($p < 0.05$). There was no significant correlation between E_2 concentration and % fat in milk. Mean milk yield at that milking was 17.22 ± 6.02 L, and total E_2 mass in milk averaged 95.65 ± 84.5 ng which was not different among O, EP and LP. Fat and lactose % in milk were 3.63 ± 0.6 and 4.80 ± 0.3%, respectively, for all cows. Mean protein % was 3.15 ± 0.2, 3.27 ± 0.2 and 3.36 ± 0.3% for O, EP, and LP cows, with O having less milk protein than LP ($p < 0.05$). Although E_2 concentrations are increased in pregnancy, the relatively low concentrations of E_2 in whole milk are unlikely to pose a health risk to humans.

Key Words: 17B-Estradiol, Pregnancy, Whole Milk

303 The use of melatonin and progestagen to advance the breeding season in Awassi sheep. R. Kridli* and H. Muhdi, *Jordan University of Science and Technology*, *Irbid, Jordan*.

This experiment was conducted to evaluate the effect of administering hormonal treatments [melatonin, progestagen and pregnant mare's serum gonadotropin (PMSG)] on advancing the breeding season and reproductive parameters in Awassi ewes. Thirty-nine multiparous, winter lambing Awassi ewes were randomly assigned into four treatment groups; no hormonal treatment (NCON; n=9), progestagen (CON; n=10), progestagen and PMSG (PP; n=10) and melatonin plus progestagen and PMSG (MPP; n=10). Ewes in the CON, PP and MPP groups were fitted with intravaginal progestagen sponges for 14 days. On the day of sponge removal, ewes in the PP and MPP groups received 600 IU PMSG. Ewes in the MPP group received subcutaneous melatonin implants (Regulin®, 18 mg melatonin) 36 days before sponge insertion (50 days before the anticipated breeding season). Fertile, harnessed Awassi rams were introduced at the time of sponge removal. More ewes expressed estrus ($P<0.05$) in the CON, PP and MPP than the NCON group while the interval to onset of estrus was similar among treatments. Induced estrus pregnancy rate, lambing rate and the number of lambs born per exposed ewe were significantly greater ($P<0.05$) in the MPP group than NCON group while the remaining groups were similar. Ewes in the CON, PP and MPP groups lambed earlier ($P<0.01$) than those in the NCON group. Litter size was similar among all groups while litter birth weight was greater ($P<0.05$) in the MPP than the NCON group. Results of the present study indicate that early breeding of Awassi ewes can be induced by hormonal treatments. These treatments can be successfully applied to improve induced estrus reproductive parameters in Awassi sheep.

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Key Words: Reproduction, Sheep, Breeding Season

304 Plasma progesterone profiles in response to repeated blood sampling after estrus and mating in pregnant and open ewes. R. W. Godfrey*[1], R. E. Dodson[1], and S. T. Willard[2], [1]*University of the Virgin Islands*, *St. Croix, VI*, [2]*Mississippi State University*, *Mississippi State*.

We have reported previously that progesterone (P4) increased during a 6-h period in diestrus ewes. The objective of this study was to evaluate daily patterns of P4 secretion in ewes after mating. St. Croix White ewes were synchronized using CIDRs. On the day of CIDR removal ewes were put with either a fertile or sterile ram resulting in 10 pregnant (PREG) and 11 open (OPEN) ewes. Jugular blood samples were collected hourly from 0600 to 1800 h 2 days after CIDR withdrawal (d 0) and on d 3, 6, 9, 12, 15 and 18. Plasma was analyzed for P4 by RIA. Data were anlayzed using GLM procedures of SAS. The PREG ewes had higher ($P < 0.0001$) P4 than OPEN ewes on d 15 (4.3 ± 0.1 and 0.4 ± 0.1 ng/ml) and 18 (4.8 ± 0.1 and 0.1 ± 0.1 ng/ml). In OPEN ewes the 0600 h sample on d 0 (0.4 ± 0.3 ng/ml) was lower ($P < 0.0001$) than on d 6 (1.9 ± 0.3 ng/ml), d 9 (2.5 ± 0.3 ng/ml) and d 12 (2.9 ± 0.3 ng/ml) and the 1800 h sample on d 0 (0.3 ± 0.3 ng/ml) was lower ($P < 0.0001$) than on d 6 (3.1 ± 0.3 ng/ml), d 9 (4.1 ± 0.3 ng/ml) and d 12 (3.7 ± 0.3 ng/ml). In PREG ewes the 0600 h sample (0.1 ± 0.3 ng/ml) and 1800 h sample (0.1 ± 0.3 ng/ml) on d 0 were lower ($P < 0.0001$) than on d 9, 12, 15 and 18. In PREG ewes P4 in the 1800 h sample on d 9 was higher ($P < 0.02$) than the 0600 h sample on d 12, the 1800 h sample on d 12 was higher ($P < 0.007$) than the 0600 h sample on d 15, and the 1800 h sample on d 15 was higher ($P < 0.0001$) than the 0600 h sample on d 18. In PREG ewes the magnitude of change in P4, relative to the 0600 h sample, increased ($P < 0.0001$) from -0.1 ± 0.2 ng/ml on d 0 to 2.4 ± 0.2 ng/ml on d 18. In OPEN ewes the magnitude of change in P4 increased ($P < 0.0001$) from -0.1 ± 0.2 ng/ml on d 0 to 1.5 ± 0.2 ng/ml on d 9 and decreased ($P < 0.0001$) to 0.2 ± 0.2 ng/ml on d 18. These data show that P4 concentrations rise throughout the day more in pregnant than in open ewes after estrus. The physiological significance of the daily rise in P4 is unclear at the present time.

Key Words: Progesterone, Estrous Cycle, Sheep

305 Plasma progesterone profiles in response to repeated blood sampling in the late gestation ewe as influenced by time of day. S. Willard*[1], R. Dodson[2], and R. Godfrey[2], [1]*Mississippi State University*, *Mississippi State*, [2]*University of the Virgin Islands*, *St. Croix, VI*.

The adrenal gland has been suggested to contribute to pregnancy maintenance during stress through stimulation of adrenal progesterone (P4). We have reported previously a rise in plasma P4 (but not cortisol) during blood sampling (hourly for 12 h) in the pregnant ewe, suggestive of a diurnal rhythm or a response to sampling. The objective of this study was to evaluate 24-h plasma concentrations of P4 in the pregnant ewe as influenced by initiation time of repeated sampling. Pregnant ewes (n = 6 per group; 120.8 ± 1.0 d of gestation; 1.6 ± 0.1 lambs/ewe) were assigned to one of the following sampling schedules: 0600 to 1800 h (TIME-1), 1200 to 2400 h (TIME-2), 1800 to 0600 h (TIME-3), or 0600 (d 1), 1800 and 0600 h (d 2) only (TIME-4). Plasma was collected hourly from each group for analysis of P4 by RIA. Mean P4 was greater (P<0.05) in TIME-3 and TIME-4 groups (25.5 ± 1.3 and 23.5 ± 2.7 ng/ml, respectively) than TIME-1 and TIME-2 groups (18.6 ± 0.85 and 19.5 ± 1.3 ng/ml). The TIME-1 group (12.2 ± 1.8 ng/ml) had a lower (P<0.04) P4 starting value than the TIME-3 group (23.9 ± 4.6 ng/ml); but there was no difference (P>0.05) at the 6-h (20.9 ± 3.3 and 27.2 ± 5.6 ng/ml, respectively) or 12-h (22.0 ± 4.0 and 31.4 ± 6.9 ng/ml, respectively) time-points. Once normalized to starting values, the magnitude of P4 increase (Time: P<0.001) during the 12 h sampling period (a pooled 9.1 ± 1.3 ng/ml increase) did not differ (P>0.05) among the groups regardless of sampling initiation time. However, area under the curve analysis (AUC) of normalized values indicated a greater (P<0.01) AUC for TIME-1 (77.9 ± 15.4 relative units; RU) than TIME-3 (16.6 ± 9.9 RU). The TIME-4 group (minimally handled) exhibited elevated P4 at 0600 on d 2 (27.5 ± 4.1 ng/ml) compared to 0600 on d 1 (14.6 ± 1.9 ng/ml). These data suggest that regardless of sampling initiation time during a 24-h period, P4 continued to rise; yet the magnitude of the P4 increase was similar among groups. It remains unclear whether this rise in P4 is the result of a hormonal rhythm or is of physiological importance during repeated sampling in the pregnant ewe.

Key Words: Progesterone, Gestation, Ewe

306 Effect of ovulatory follicle size and standing estrus on estradiol concentrations, LH surge, and ovulation. G. A. Perry*[1] and D. C. Busch[2], [1]*South Dakota State University*, *Brookings*, [2]*University of Missouri*, *Columbia*.

In postpartum cows ovulatory follicle size at time of insemination (GnRH/TAI) influenced pregnancy rates following timed AI, but follicle size had no effect on pregnancy rates when cows spontaneously ovulated. Furthermore, cows that exhibited estrus (± 24 hr of GnRH/TAI) had higher pregnancy rates compared to cows not detected in estrus. The objective was to assess the relationship between ovulatory follicle size and estradiol concentrations, timing of the LH surge, and timing of ovulation. Cows were synchronized with the CO-Synch (n = 64; induced ovulation) or the Select Synch (n = 20; spontaneous ovulation) protocol. Cows that exhibited estrus and were induced to ovulate medium (11.5-14 mm) or large (> 14) follicles had preovulatory estradiol concentrations similar (*P>0.05*) to cows that spontaneously ovulated and higher (*P<0.05*) than cows not exhibiting estrus. Cows not exhibiting estrus had lower (*P<0.05*) preovulatory estradiol concentrations compared to cows that spontaneously ovulated. There was no effect (*P>0.36*) of follicle size or estrus on LH concentrations. Among cows induced to ovulate, cows that exhibited estrus had a shorter (*P<0.01*) interval from GnRH to the LH surge compared to cows not exhibiting estrus. Cows that spontaneously ovulated were intermediate (interval from onset of estrus to LH surge). Estrus and follicle size affected the interval from GnRH or onset of estrus to ovulation, with cows induced to ovulate and not exhibiting estrus having a longer interval to ovulation compared to cows that exhibited estrus and were induced to ovulate (*P<0.01*) or spontaneously ovulated (*P=0.02*). Cows that ovulated medium follicles had a longer (*P=0.03*) interval to ovulation compared to cows that ovulated large follicles. Cows that ovulated small follicles (≤ 11 mm) were intermediate. In summary, estradiol concentrations, timing of the LH surge, and timing of ovulation could explain the increased pregnancy rates in cows that exhibit estrus and are induced to ovulate compared to cows that do not exhibit estrus.

Key Words: Follicle Size, Estradiol, LH

307 Effect of ovulatory follicle size and expression of estrus on progesterone secretion in beef cows. D. C. Busch*[1], J. A. Atkins[1], J. F. Bader[1], D. J. Schafer[1], D. J. Patterson[1], T. W. Geary[2], and M. F. Smith[1], [1]*University of Missouri*, *Columbia*, [2]*USDA-ARS, Fort Keogh Livestock and Range Research Laboratory*, *Miles City, MT*.

Induced ovulation of small dominant follicles (sdf, <12 mm; CO-Synch protocol) in postpartum beef cows resulted in formation of CL that exhibited a delayed rise in progesterone (P4; $P < 0.05$) compared to CL that formed from large dominant follicles (ldf, >12 mm). The objective was to characterize P4 concentrations (0-60 d post AI) among GnRH-induced or spontaneously ovulated sdf (≤12 mm) or ldf (≥13mm) to determine whether P4 secretion by CL formed from GnRH-induced sdf remains lower during early gestation. Postpartum beef cows were induced to ovulate 48 h after $PGF_{2\alpha}$ (CO-Synch) or undergo spontaneous estrus and ovulation. Follicle size was measured at AI in cows induced to ovulate or 12 h after onset of estrus for cows that ovulated spontaneously. Cows were classified into one of three groups: 1) sdf (≤12 mm)-GnRH-induced ovulation (SF-I; n=9); 2) ldf (≥13 mm)-GnRH-induced ovulation (LF-I; n=38); or 3) ldf (≥13 mm)-spontaneous estrus and ovulation (LF-S; n=26). Blood samples were collected every other day for 60 d beginning at AI (d 0). The rate of P4 secretion was increased (*P*=0.06) in pregnant (d 2-12) compared to nonpregnant cows. Although the rate of increase in P4 from d 2-12 was higher (*P*=0.01) in the LF-I compared to the SF-I groups, there was no difference (*P*=0.94) among groups in P4 from d 14-60 in pregnant cows. Pregnant cows in the LF-S group, however, had higher rate of increase in P4 from d14-60 compared to pregnant cows induced to ovulate. Follicle size at AI influenced the rate of P4 increase in cows that failed to conceive (*P*=0.007), but not among cows that became pregnant (*P*=0.32) to AI. The regression of follicle diameter at AI on serum P4 on d 6 was significant (*P*=0.002) and linear in cows induced to ovulate, but not among cows that ovulated spontaneously. In summary, P4 secretion following GnRH-induced ovulation of small dominant follicles was decreased from d 2-12 compared to large dominant follicles, but similar among pregnant cows from d 14-60 post AI (d 0).

Key Words: Follicle Size, Progesterone, Induced Ovulation

308 Corpus luteum size and function following single and double ovulations in non lactating dairy cows. G. E. Mann*, R. S. Robinson, L. M. Hicking, M. P. Green, and M. G. Hunter, *University of Nottingham,*, *Sutton Bonington Campus, Loughborough, UK*.

While cows are primarily a monovular species and progesterone is normally the product of a single corpus luteum, double ovulations are not uncommon, resulting in two corpora lutea contributing to progesterone secretion. The occurrence of double ovulation has been linked to high milk yield although in a series of recent studies investigating luteal function, we have found a high incidence of double ovulations in non lactating multiparous Holstein Friesian dairy cows. The aim of this study was to determine the effect of double ovulation compared to single on plasma progesterone concentrations in non lactating multiparous Holstein Friesian cows. Studies were undertaken in 53 cows slaughtered on day 5 (n=28, two studies) or day 8 (n=25, two studies) following synchronised oestrus. On day 5, double ovulations were seen in 9/28 (32.1%) cows. Corpora lutea from double ovulating cows (1.5±0.2g) were smaller (P<0.001) than from single ovulating cows (2.9±0.3g). However, total luteal weight in double ovulating cows (3.0±0.4g) did not differ from single ovulating cows. The progesterone content of luteal tissue in single (14.3±1.5ng/mg) and double (13.6±1.4ng/mg) ovulating cows was similar as was the mean plasma concentration of progesterone on the day of slaughter (single 2.0±0.2ng/ml; double 2.1±0.5ng/ml). On day 8, double ovulations were seen in 6/25 (24.0%) cows. Corpora lutea in double ovulating cows (3.4±0.3g) were once again smaller (P<0.001) than single ovulating cows (6.3±0.5g) while total luteal weight was again similar (6.9±0.6g). Both progesterone content (single 11.5±0.9ng/mg; double 12.7±0.8 ng/mg) and mean plasma concentration of progesterone on the day of slaughter (single 6.1±0.7ng/ml; double 5.6±0.7ng/ml) were similar in single and double ovulating cows. In non lactating cows, a relatively high incidence of double ovulation was observed leading to smaller corpora lutea but a similar total weight of luteal tissue with similar progesterone content. The occurrence of double ovulation did not affect circulating progesterone concentrations.

Key Words: Cow, Corpus Luteum, Ovulation