61-90 d, 91-120 d, 121-150 d), herd-year-season (3-mo seasons within the seven herds), age at calving (linear, months), and PTA of Holstein maternal grandsire (linear). Cows that had test day observations that were 3x-milking were pre-adjusted to 2x-milking using USDA-AIPL adjustment factors. Least squares means for fat plus protein were 1.97 kg (H), 1.83 kg (NxH), 1.94 kg (MxH), and 2.01 kg (SxH). Normande-Holstein crossbreds had significantly (P<.01) lower production (-7%) than pure Holsteins. Montbeliarde-Holstein (-1%) and Scandinavian Red-Holstein (+2%) crossbreds were not significantly different than pure Holsteins for production.

Key Words: Crossbreeding, Production, Hybrid Vigor

96 Crossbreds of Normande-Holstein, Montbeliarde-Holstein, and Scandinavian Red-Holstein compared to pure Holsteins for dystocia and stillbirths. B. J. Heins*, L. B. Hansen, and A. J. Seykora, *University of Minnesota*, *St. Paul*.

Holstein, Normande-Holstein, Montbeliarde-Holstein and Scandinavian Red-Holstein crossbred cows calving from June 2001 to August 2004 were compared for dystocia and stillbirths from seven California dairies. Dystocia scores were 1, 2, 3 (no calving difficulty) and 4, 5 (calving difficulty), and stillbirths scores were 1 (alive) and 0 (dead). Effects of calf sex, age at calving and herd-year-season were included in the general linear model. For the effect of breed of sire, 1769 first-parity Holsteins were bred to Holstein (n=31), Montbeliarde (n=22), Brown Swiss (n=13), and Scandinavian Red (n=17) sires. Calf sex and herd-year-season were included in the model and had significant effect (P<.01). Dystocia rates were 16% (H), 12% (M), 11.9% (BS) and 5.5% (SR). Stillbirth rates were 15.7% (H), 13.2% (M), 12.0% (BS), and 7.9% (SR). Scandinavian Red sires had significantly (P<.01) less dystocia and fewer stillbirths than Holstein sires. For 2nd to 5th parity Holstein dams, cows were bred to Normande sires in addition to the other breeds. Dystocia rates were 7.7% (H), 9.1% (N), 5.7% (M), 5.4% (BS) and 2.6% (SR). Stillbirth rates were 11.8% (H), 6.5% (N), 4.4% (M), 4.9% (BS), and 4.2% (SR). Scandinavian Red sires had significantly (P<.01) less dystocia than Holstein, Montbeliarde, and Normande sires. All breeds of sire other than Holstein had significantly (P<.01) fewer stillbirths than Holstein sires. For the effect of breed of dam, 1398 first-parity Holsteins, 269 Normande-Holstein, 370 Montbeliarde-Holstein, and 264 Scandinavian-Holstein cows were bred to Brown Swiss (n=15), Montbeliarde (n=26), and Scandinavian Red (n=17) sires. Mean dystocia rates for breed of dam were 9.3% (H), 9.2% (MxH), 8.1% (MxH) and 4.7% (SxH). For stillbirth rate, least squares means were 11.8% (H), 7.8% (NxH), 7.1% (MxH) and 4.9% (SxH). Scandinavian Red-Holstein crossbred cows had significantly (P<.10) less calving difficulty and significantly (P<.05) fewer stillbirths than pure Holsteins at first calving.

Key Words: Crossbreeding, Dystocia, Stillbirths

97 Crossbreds of Normande-Holstein, Montbeliarde-Holstein, and Scandinavian Red-Holstein compared to pure Holsteins for days to first breeding, first service conception rate, days open, and survival. B. J. Heins*, L. B. Hansen, and A. J. Seykora, *University of Minnesota*, *St. Paul*.

First-lactation Normande-Holstein, Montbeliarde-Holstein, and Scandinavian Red-Holstein crossbred cows were compared to pure Holsteins for days to first breeding, first service conception rate, days open, and survival. Cows were in seven commercial dairies in California and calved from June 2002 to October 2004. Holstein cows were required to have sires with a NAAB code to assure they were sired by A.I. sires. Normande, Montbeliarde and Scandinavian Red crossbreds were all daughters of A.I. sires via imported semen. For days open, cows having greater than 250 days open were truncated to 250 days and cows were required to be at least 250 days in milk. Adjustment was made for herd-year-season. PROC GLM of SAS was used to analyze phenotypic differences. Least squares means for days to first breeding were 69(H), 62(NxH), 65(MxH), and 66(SxH). First service conceptions rates were 22%(H), 35%(NxH), 31%(MxH), and 30%(SxH). Least squares means for days open were 150(H), 123(NxH), 131(MxH), and 129(SxH). Normande-Holstein, Montbeliarde-Holstein and Scandinavian Red-Holstein crossbreds cows had fewer days to first breeding (P<.01), higher first service conception rates (P<.01), and fewer days open (P<.01) than pure Holsteins. Three measures of survival were used; survival to 30 days, 150 days, and 305 days postpartum. For survival to 30-d postpartum, 692 Holsteins were compared to 465 Normande-Holstein, 655 Montbeliarde-Holstein, and 434 Scandinvaian-Holstein crossbred cows. Least squares means for survival to 30 days were 95%(H), 98%(NxH), 98%(MxH), and 98%(SxH); for survival to 150 days were 91%(H), 96%(NxH), 96%(MxH), and 96%(SxH); and for survival to 305 days were 86%(H), 93%(NxH), 92%(MxH), and 93%(SxH). All crossbred breed groups survived significantly longer (P<.05) than pure Holsteins during first lactation.

Key Words: Crossbreeding, Survival, Days Open

Ruminant Nutrition: Dairy—Grazing

98 Genotype and feed effects on BW and BCS profiles for grazing dairy cows. J. R. Roche*[1], D. P. Berry[2], and E. S. Kolver[1], [1]*Dexcel*, *Hamilton, New Zealand*, [2]*Teagasc Moorepark*, *Ireland*.

To determine the effect of genotype and concentrate supplementation on BW and BCS (scale 1-10) lactation profiles, fortnightly data across 113 lactations from 2002 to 2004 were analyzed. New Zealand (NZ) and North American (NA) cows of equal estimated genetic merit for milk production were randomly allocated to three levels of concentrate supplementation (0, 3 or 6 kg DM/cow/d) on a basal pasture diet. The Wilmink exponential model ($Y_{DIM}= a+b*e^{(-0.05*DIM)}+c*DIM$) was fitted within lactation. Days to nadir were calculated by setting the first derivative of the function to zero, defining nadir as the corresponding value for that day. The function explained 73 and 62% of the variation in BW and BCS, respectively. There was a tendency (P<0.1) for NZ cows to reach BW (9d) and BCS (12d) nadir earlier. Concentrate supplementation tended (P<0.1) to shorten postpartum interval to nadir BW. New Zealand cows had a lower BW(P<0.001) but were in greater (P<0.001) BCS at nadir. Nadir BCS increased (P<0.01) with each increment of supplementation. New Zealand cows lost less BW (P<0.001) and BCS (P<0.1) between calving and nadir. Supplementation with concentrates reduced (P<0.1) the amount of BCS lost postpartum, but did not affect BW change. The *a* parameter (height of the curve) for BW and BCS was lower and higher, respectively, for NZ cows compared with NA cows (P<0.05). Feeding system did not affect the height of either BW or BCS curves. The *b* parameter (pre-nadir phase) for BW was affected (P<0.001) by genotype; the rate of postpartum decline being less in NZ cows. The *c* parameter (post-nadir phase) for BW was not affected by genotype, but rate of BW gain in cows offered 6 kg DM concentrates/d (0.39 kg/d) was greater (P<0.001) than cows offered 0kg DM/d (0.24kg/d) or 3kg DM/d (0.27kg/d). The NZ cows gained more (P<0.001) BCS post-nadir ($4.7x10^{-3}$ units/d) than NA cows (2.2x10}$^{-3}$ units/d). Rate of BCS replenishment increased (P<0.001) with concentrate supplementation from $1.9x10^{-3}$ at 0 kg DM/d to $3.1x10^{-3}$ and $5.3x10^{-3}$ units/d at 3 and 6 kg DM/d concentrates, respectively. No significant genotype by environment interactions were found.

Key Words: Pasture-based, Genotype × Environment, Body Condition Score

99 Genotype and feed effects on annual milk production and reproduction of grazing dairy cows. E. S. Kolver*, C. R. Burke, and J. R. Roche, *Dexcel Ltd.*, *Hamilton, New Zealand*.

Decision rules for supplementing North American (NA) and New Zealand (NZ) Holstein Friesians (HF) were investigated over two years using 57 cows fed well on pasture throughout lactation and receiving 0, 3 or 6 kg concentrate DM/cow/d. Cows calved in spring as a single herd and were individually fed a grain supplement. Treatments were balanced at the start of each season for estimated genetic merit, and for sire and live weight within genotype. The 2 x 3 factorial design was analysed by the REML procedure of Genstat. No significant genotype x diet interaction was detected for any production response. However, genotype responses were more divergent at the highest level of supplementation. Over the 291-d lactation, milk yield and yield of fat and protein (milksolids: MS) responded linearly (P<0.001), and production efficiency quadratically (P<0.05) to supplementation. Genotype differences were observed for milk yield (P<0.01), and MS as a % BW (P<0.05), but not for MS. NA cows gave a greater (P<0.05) linear production response than NZ cows (37 vs. 74 g MS/kg concentrate DM; 0.67 vs. 1.22 kg milk/kg concentrate DM, respectively). NA cows maintained a lower (P<0.001) BCS (scale 1-10) throughout lactation. BCS responded linearly (P<0.001) to supplementation. NA cows had a lower (P<0.01) 42-d pregnancy rate (31 v. 55%) and 11-wk in-calf rate (58 v. 86%). Supplement level did not affect reproductive performance. While NA HF gave twice the milksolids response to supplements compared to NZ HF, NZ HF were more efficient (MS as a % BW), maintained higher BCS throughout lactation, and had a higher pregnancy rate. These results suggest that when fed high quality pasture ad libitum, NZ HF can largely meet their requirements from an all-pasture diet, whereas NA HF have a requirement for additional high-energy supplementary feed.

	NZ0	NZ3	NZ6	NA0	NA3	NA6
Milk kg/cow	5568	6365	6632	6112	7114	7827
Milksolids kg/cow	462	512	519	462	520	567
Milksolids % of BW	94	104	101	83	95	99
BCS	4.3	4.5	4.9	3.9	3.8	4.3
42-day pregnancy rate %	58	45	63	20	44	26
11-wk in-calf rate %	84	78	95	54	67	53

Key Words: Genotype, Supplement

100 Genotype and feed effects on milk production profiles for grazing dairy cows. J. R. Roche*[1], D. P. Berry[2], and E. S. Kolver[1], [1]*Dexcel*, *Hamilton, New Zealand*, [2]*Teagasc Moorepark*, *Ireland*.

The objective was to determine the effect of genotype and concentrate supplementation on milk production lactation profiles. Data from 76 cows across 113 lactations from 2002 to 2004 were used. New Zealand (NZ) and North American (NA) cows of equal estimated genetic merit for milk production were randomly allocated to three levels of concentrate supplementation (0, 3 or 6 kg DM/cow/d) on a basal pasture diet. The Wilmink exponential model ($Y_{DIM} = a + b * e^{(-0.05*DIM)} + c*DIM$) was fitted within lactation. Days to peak yield were calculated by setting the first derivative of the function to zero, defining peak yield as the corresponding yield for that day. The function explained 81, 57 and 62% of the variation in milk, fat and protein yield, respectively. Days to peak milk and protein yield were not affected by genotype, while NZ cows exhibited a later (P<0.05) peak fat yield. In contrast, supplementation delayed (P<0.05) the interval to peak milk and protein yield. Peak production was lower (P<0.05) for NZ cows across all variables investigated. Peak milk and protein production increased (P<0.01) with concentrate supplementation. The *a* parameter (height of the curve) for milk and protein yield was augmented in NA cows (P<0.1) and cows receiving concentrates (P<0.01). The *a* parameter for fat yield was not significantly affected by genotype. Genotype did not affect the *b* parameter (pre-peak phase) for milk or protein yield, but NZ cows expressed a lower *b* value for fat yield. Level of supplementation accelerated the rate at which peak protein (P<0.01) and milk (P<0.1) yield were reached. Only the *c* parameter (post-peak phase) for fat yield was affected by genotype (P<0.05); the rate of post-peak decline being greater for NZ cows. Concentrate supplementation did not affect the *c* parameter for any of the production variables investigated. Milk and protein 270d-yield was greater (P<0.001) in NA cows (a difference of 933 and 25 kg, respectively). All measured 270d yields increased (P<0.05) with concentrate supplementation. No significant genotype by environment interaction was found for parameters reported.

Key Words: Pasture-based, Genotype × Environment, Nutrition

101 Extending lactation in pastoral systems using divergent Holstein-Friesian genotypes and levels of nutrition. E. S. Kolver* and J. Roche, *Dexcel Ltd.*, *Hamilton, New Zealand*.

Milking cows for two successive years, with calving and mating occurring every second year, may overcome the reduced pregnancy rates and exploit the superior lactation persistency of North American (NA) Holstein-Friesians in pastoral dairy systems. Production results are reported for the first 535 d of lactation from a study that tested the feasibility of extended lactations in pastoral systems using divergent dairy cow genotypes (New Zealand; NZ or NA Holstein-Friesian) and levels of nutrition (0, 3, or 6 kg concentrate DM/cow/d). Cows calved on 28 July 2003 (±3.5 d SEM) and were managed as a single herd. A grain supplement was fed to individual cows twice daily at milking. Treatments in the 2 x 3 factorial design were balanced for estimated genetic merit, and for sire and live weight within genotype and analysed using the REML procedure of Genstat. Of the 56 cows enrolled, 6 cows were dried off when production was less than 4 kg milk/cow/d for two weeks (NZ0 2 cows; NZ6 3 cows; NA3 1 cow). DIM did not differ between treatments. Genotype x diet interactions (P<0.05) were detected for the total yield of milk, 4% FCM, and fat and protein (milksolids). These interactions only became apparent during the extended phase of lactation (>290 DIM). Differences between genotypes were greatest at the highest level of supplementation (NZ0 9320; NZ3 11092; NZ6 9629; NA0 10226; NA3 12696; NA6 13760 kg 4% FCM/cow; NZ0 716; NZ3 853; NZ6 741; NA0 780; NA3 972; NA6 1053 kg milksolids/cow). Compared to NZ cows, NA cows produced 22% more (P<0.001) 4% FCM, 18% more (P<0.001) milk fat, 25% more (P<0.001) milk protein, and at 535 DIM had 1.7 units less (P<0.01) body condition (1-10 scale). Milk protein content was high at 4.17% (±0.12 SEM) across all treatments at 535 DIM. These results indicate that productive extended lactations of 535 d or more may be biologically possible on pasture diets, and that NA-type cows with superior lactation persistency may be more suited to pasture-based systems that are not constrained by a 12-month calving interval.

Key Words: Extended Lactation, Genotype, Pasture

102 Performance of lactating dairy cows fed varying levels of total mixed rations and pasture. R. Vibart*, V. Fellner, J. Burns, and M. Gumpertz, *North Carolina State University*, *Raleigh*.

An 8-week study beginning October 2004 was conducted to examine animal performance under different combinations of partially-restricted total mixed ration (TMR) feeding and high-quality pasture grazing. Thirty Holstein cows in early to mid lactation averaging 33.3 kg/d of milk at the initiation of the study were used. Cows were assigned to either an all-TMR diet (100T, no access to pasture, positive control) or one of the following three TMR-restricted dietary treatments: 1) 85% TMR-restricted diet (85T), 2) 70% TMR-restricted diet (70T), and 3) 55% TMR-restricted diet (55T). Cows on TMR-restricted diets were confined to pasture (annual ryegrass, average paddock size 0.17 ha/d) as a single group for 7 h/d between the a.m. and p.m. milking. Individual pasture intake was measured weekly on one cow selected randomly from each grazing group for 6 weeks. Body weight and body condition scores were recorded at the beginning and during weeks 5 to 8 and averaged 570 kg/cow and 3.0, respectively. Data from individual pasture intakes (n=18), total mixed ration intakes (n=30), and milk weights (n=30) were analyzed separately according to a randomized complete block design using PROC GLM with initial days in milk as a covariate. Individual pasture intakes averaged 6.9 kg/d and did not differ between grazing groups due primarily to a large variation among cows. Intakes of total mixed ration were different ($P < 0.05$) among all treatments and were 26.7, 17.9, 14.8, and 12.0 kg/d for 100T, 85T, 70T, and 55T, respectively. Milk yields were 36.1, 33.6, 30.5, and 30.8 kg/d for 100T, 85T, 70T, and 55T, respectively, and only tended ($P = 0.06$) to be different between treatments 100T and 70T. Total intakes (pasture + TMR) and milk yields were similar between cows fed 85T and 100T. As the proportion of pasture in the ration increased cows ate less TMR and maintained pasture intake. Cows fed 70T and 55T had similar milk yields to cows fed 85T and 100T but lower TMR intakes suggesting a higher feed to milk efficiency.

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Key Words: Total Mixed Ration, Grazing, Milk Yield

103 Acidosis in pasture-fed dairy cows: Risk factors and outcomes. E. Bramley[1], I. J. Lean*[2], N. D. Costa[3], and W. J. Fulkerson[1], [1]*University of Sydney*, *Camden, NSW, Australia*, [2]*Bovine Research Australaisa*, *Camden, NSW, Australia*, [3]*Murdoch University*, *Murdoch, WA, Australia*.

Differences in rumen function characterized three groups of 797 cows examined in a randomized cross-sectional survey in 100 dairy herds from five areas of Australia. Rumen fluid was obtained by both rumenocentesis (RC) and stomach tube (ST) from eight fresh cows < 100 DIM; three primipars and five multipars; randomly selected from each herd. Acidotic cows had higher valerate, propionate, D-lactate and lower pH and ammonia concentrations than groups 2 and 3. Category 2 cows had high ammonia concentrations and a ′ suboptimal ′ rumen function, while group 3 cows had lower VFA concentrations. Table 1 shows mean production data (± SE) for cows in categories where a herd test was recorded (corrected for DIM, parity and effect of herd). Herds were categorized as acidotic (group 1), suboptimal (group 2) or non-acidotic (group 3) if the herd had ≥ 3/8 cows in a category. Acidotic herds were significantly more likely to be fed diets higher in NFC% and lower in NDF% and higher in the B1 CHO fractions than non-acidotic herds. Acidotic herds were best described by the NDF%: NFC% ratio on multivariate modelling. Observed differences in ruminal biochemistry between cows in non-acidotic and suboptimal herds were supported because suboptimal herds tended ($P < 0.1$) to have a higher prevalence of poor forages and fibrous byproducts fed and less prevalence of ryegrass pastures. Acidotic herds had 150% more risk of being herds with a high prevalence of lameness than the other group herds. Groups characterized by differences in rumen function had differences in diet and outcomes that provide insight to subclinical acidosis in pasture fed dairy cows.

Table 1

Mean production	Category 1	Category 2	Category 3
	(n=39)	(n=132)	(n=276)
milk volume (L)	33.0±0.94[a]	27.0±0.54[ab]	29.1±0.4[b]
%milk fat	3.3±0.11[a]	3.9±0.07[ab]	3.7±0.04[b]
%milk protein	3.2±0.05	3.2±0.03[c]	3.1±0.02[d]
%fat:protein	1.1±0.04[a]	1.2±0.02[b]	1.2±0.01[b]
Milk fat yield (kg)	1.1±0.04	1.0±0.02	1.0±0.02
Milk protein yield (kg)	1.0±0.04[a]	0.9±0.02b[c]	0.9±0.01[d]

[a,b]means within a row with different superscripts differ ($P < 0.01$). [c,d]means within a row with different superscripts differ ($P<0.05$)

Key Words: Dairy Cows, Acidosis

104 Changes of β-carotene content in plasma of cows following different diets: Influence of pasture and farm location. S. Carpino*[1], P. Palozza[2], A. Valdannini[1], and G. Licitra[1,3], [1]*CoRFiLaC, Regione Siciliana*, *Ragusa, Italy*, [2]*Institute of General Pathology, Cattolica University*, *Rome, Italy*, [3]*D.A.C.P.A, Catania University*, *Catania, Italy*.

Our objective was to determine the influence of different level of the same native pasture in the diet on β-carotene content in cows plasma. β-carotene content in bovine plasma was studied in three groups of cows in a farm of Hyblean region sited on mountain level (ML) in Spring 2004. In this farm we had three groups of cows (10 per group): group 1 fed TMR (ML0); group 2 fed TMR supplemented with 30% DM of native pasture (ML30), and group 3 fed TMR supplemented with 70% DM of native pasture (ML70). Blood samples from each cow were collected before evening milking. Blood sample was taken from jugular vein, immediately refrigerated, and centrifuged at 2000 rpm 4°C x 10 min. Plasma samples were stored at -80°C. β-carotene was then extracted from plasma with hexane and analyzed by HPLC (mobile phase: 60% acetonitrile/10% methanol/30% isopropanol; flow rate:1 ml/min; detection: 460 nm). The experiment was repeated three times. β-carotene content in plasma was: 0.123 ± 0.010 µM (ML0), 0.242 ± 0.022 µM (ML30), 0.637 ±0.056 µM (ML70), respectively, suggesting that pasture addition in the diet was responsible for a significant ($P<0.01$) carotenoids increase in plasma content. Another farm sited on sea level (SL) was also tested. In farm SL there was only one group of cows fed TMR supplemented with 30% DM of native pasture (SL30). Cattle breed (Fresian), TMR, lactation days and milk production level were similar to the ML farm. Plasma content of β-carotene in SL30 group was found to be 0.197 ± 0.020 µM. When plasma β-carotene level was compared between the two groups, fed the same pasture addition (ML30 and SL30), a significant ($P<0.05$) interaction was observed, suggesting that a different altitude of the farm may deeply increase carotenoids concentration in bovine plasma. Analysis are in progress to verify if plasma content of β-carotene in the different experimental groups may also affect milk and cheese composition.

Key Words: β-Carotene, Pasture, Diet

105 Omega-3 and conjugated linoleic acid contents in blood plasma of cows grazing on native pasture plants. S. La Terra*[1], S. Carpino[1], S. Banni[2], L. Curdeddu[2], M. Caccamo[1], and G. Licitra[1,3], [1]*CoRFiLaC, Regione Siciliana*, *Ragusa, Italy*, [2]*Cagliari University*, *Cagliari, Italy*, [3]*D.A.C.P.A. Catania University*, *Catania, Italy*.

Fatty acid profiles of bovine plasma were studied in three groups of cows in a farm of Hyblean region sited on mountain level (ML) in Spring 2004. In farm ML we had three groups of cows (10 per group):group 1 fed TMR (ML0); group 2 fed TMR supplemented with 30% DM of pasture (ML30), and group 3 fed TMR supplemented with 70% DM of pasture (ML70). Blood samples from each cow of each farm were collected before evening milking every 15 days during the experimental period. Blood sample was taken from jugular vein immediately refrigerated, and centrifuged at 2000 rpm 4° C x 10 min. Plasma samples were stored at -80°C. The experiment was repeated three times. Our objective was to determine the influence of different level of pasture in the diet on omega-3 and CLA content in cows plasma. The concentrations of 20:5 (EPA) and 22:6 (DHA) were influenced by the diet ($P \leq 0.01$). EPA and DHA level increased with the percentage of pasture content in the diet. EPA concentration increased, from ML0 to ML70, respectively from 7.47 to 18.46 (nmoles/mg fat), DHA increased from 4.40 to 9.84 (nmoles/mg fat). The effect of pasture in the diet was also significant ($P \leq 0.01$) for CLA concentration. CLA level increased with the percentage of pasture in the diet: 1.17 (nmol/mg fat) in the ML0, 2.07 (nmol/mg fat) in the ML30, and 2.70 (nmol/mg fat) in the ML70 treatment. Another farm sited on sea level (SL) was also tested. Cattle breed (Fresian), TMR, lactation days and milk production level were similar to the ML farm. In this farm there was only one group of cows fed TMR supplemented with 30% DM of pasture (SL30). The impact of the location of the farms (ML-SL) was also significant on plasma bovine fatty acid profiles. EPA, DHA, vaccenic acid, 20:3, and the 20:2 acid had a higher concentration in the bovine plasma of the mountain area. The increase of EPA, DHA and CLA in plasma may have a beneficial impact not only for a possible increase of these fatty acids in milk and meat, which will be tested in the near future, but also for possible beneficial effects on animal health. As a matter of fact, an increase of CLA and omega-3 in tissues may result in an increased protection against inflammatory events.

Key Words: Plasma, Diet, CLA

106 Lipid content and fatty acid composition of grasses sampled on different dates through the first 139 d in 2004. P. Mir*[1], S. Bittman[2], D. Hunt[2], T. Entz[1], and B. Yip[1], [1]*Agriculture and Agri-Food Canada*, *Lethbridge, AB, Canada*, [2]*Agriculture and Agri-Food Canada*, *Agassiz, BC, Canada*.

Hydrogenatable fatty acids (HFA) content of the grasses was estimated after determining dry matter (DM) yield, lipid content and fatty acid concentration in samples of orchard grass (OG), perennial rye grass (PRG) and tall fescue (TF) from four plots per species, on d 89, 113, 119, 133 and 139 of 2004. Fatty acid and HFA content of the grasses was estimated as the product of fatty acids concentration and lipid content, and the sum of the content of C18:1, C18:2 and C18:3, respectively. The HFA content is the available substrate for production and deposition of fatty acid bioconversion compounds such as conjugated linoleic acid in ruminants that consume the grass. The DM yield of the three species of grasses increased (P < 0.05) between 89 and 113 d to average yields of 3694 ± 153 kg. By d 139 the DM yield estimates were 5246 ± 234, 6185 ± 514, 8642 ± 502 kg, for OG, PRG and TF, respectively, and different (P < 0.05) from each other. However, the lipid content decreased in all the grasses over the 139 d of sampling. Although concentration of the saturated fatty acids and C18:1, C18:2 and C20:4 increased over the sampling period, the content did not alter substantially. In OG samples, C18:2 concentration and content was higher (P < 0.05) than that in PRG or TF samples obtained on d 89, 119, 133 and 139. The concentration and content of C18:3 was highest (65 to 70% of fat) in all the forages, but declined progressively to 52-55% of fat. The C18:3 concentration remained the highest in PRG samples obtained up to 113 d. The availability of HFA up to 113d was greatest in PRG, (3.1 ± 0.2%) and lower (P < 0.05) in OG and TF (2.2 ± 0.1 and 2.0 ± 0.4%). However, by d 139 of the season TF produced more DM but with substantially reduced lipid (1.6 ± 0.2%) and HFA (1.1 ± 0.1%) content. The results indicate that PRG would provide greater levels of HFA until the first 113 d of the season in 2004.

Key Words: Grasses, Hydrogenatable Fatty Acids, Ruminants

ADSA-SAD: Original Research (Undergraduate)

107 On-farm Rota-Coronavirus prevention methods. A. Nelkie*, *North Carolina State University*, *Raleigh*.

Rota-Coronavirus is one of many scours-causing pathogens and costs calf growers time and money. It is prevalent 7 to 10 days after birth. There are 2 different vaccination approaches used to prevent this virus; 1) through passive immunity by vaccinating the dam pre-calving, then feeding the calves the immunoglobulin-rich colostrum; 2) administering an oral vaccine to the calf at birth. Currently, there is no recommended time at which the oral vaccine should be given in relationship to feeding colostrum. In this case study, a farm vaccinating all cows and heifers pre-calving still had a 100% scour rate among calves 7 to 10 days after birth and lost 3 calves. An initial fecal sample collected in March was sent to Michigan State University Diagnostic Laboratory where the Rota-Coronavirus was cultured. In August, a scouring calf sent to Michigan State University was diagnosed with Rota-Coronavirus. Due to the presence of Rota-Coronavirus on the farm, 5 different protocols were attempted to prevent scours in calves, including: 1) administering Calf Guard®, an oral Rota-Coronavirus vaccine given at birth with colostrum (n=30); 2) using Bio Moss®, a mannan oligosacharide that prevents the binding of pathogens to the lining of the small intestine (n=10); 3) cleaning the maternity pen with bleach (n=3); 4) administering Calf Guard® 10 minutes before colostrum (n=5); and 5) cleaning the maternity pen with bleach and administering Calf Guard® 10 minutes before colostrum (n=24). The fecal samples were taken: 1) at the beginning of the study; 2) during protocol 1; and 3) after protocol 2. Because scours stopped, fecal samples were not taken after protocols 3, 4, and 5. Since the implementation of protocol 4 scours have not been observed, therefore, protocols 4 and 5 appear to be successful in eliminating scours caused by Rota-Coronavirus, while protocols 1-3 were not successful as scours continued. Limiting calves' exposure at birth to the Rota-Coronavirus by cleaning maternity pen and administering preventative Calf Guard® 10 minutes before colostrum appears to be part of successful protocols to prevent scours caused by the Rota-Coronavirus.

Key Words: Scours, Rota-Coronavirus

108 Effect of sunflower oil delivery method on conjugated linoleic acid (CLA) content in milk. G. McGregor*, A. Meszaros, Y. Parrott, S. Tam, M. Oba, and L. Doepel, *University of Alberta*, *Edmonton, Alberta, Canada*.

The effect of supplementing sunflower oil directly into the rumen vs. incorporating it into a total mixed ration (TMR) on milk CLA concentration was examined. Four ruminally cannulated multiparous Holstein cows (127 ± 4.5 days in milk) were used. Sunflower oil (2.5% of dietary dry matter) was either dosed ruminally twice per day (RD) or fed once daily in a TMR (CTL) in a crossover design with 6-day periods. The same basal TMR was fed to both groups except the TMR for RD treatment was devoid of sunflower oil which was instead dosed ruminally in an amount based on each cow's dry matter intake the previous day. Dry matter intake was 22.8 vs. 21.9 ± 1.6 kg/d (P = 0.39), and milk yield was 31.4 vs. 31.0 ± 0.7 kg/d (P = 0.50), respectively, for RD and CTL. Milk fat, protein and lactose content, and somatic cell count were also unaffected by treatment. Milk from cows receiving RD had a higher concentration of *trans*-10, *cis*-12 CLA (0.04 vs. 0.02 ± 0.003 %; P = 0.05), and tended to have a lower concentration of short-chain fatty acids (C: <16) compared to the milk of CTL cows (52.6 vs. 57.1 ± 0.9 %; P = 0.07). *Trans*-11 vaccenic acid concentration was greater (5.39 vs. 3.33 ± 0.27 %; P = 0.03), and *cis*-9, *trans*-11 CLA concentration tended to be greater (1.72 vs. 1.12 ± 0.12 %; P = 0.07) for RD cows. It is speculated that, compared to gradual consumption of sunflower oil supplemented within a TMR, infrequent large doses of sunflower oil suddenly increase the availability of unsaturated fatty acids, thus exceeding the capacity of the rumen microbes to complete biohydrogenation. This might have allowed accumulation of *trans*-11 vaccenic acid in the rumen which is then desaturated to *cis*-9, *trans*-11 CLA in the mammary gland. These results indicate feeding management affecting the frequency of lipid intake alters milk CLA concentration and fatty acid composition.

Key Words: Conjugated Linoleic Acid, Sunflower Oil, Ruminal Dose

109 Prostaglandin-induced luteolysis: Effects of dosage and route of administration in lactating Holstein cows. J. Brinkerhoff* and R. Silcox, *Brigham Young University*, *Provo, UT*.

We previously reported that the luteolytic response of cyclic, lactating dairy cows did not differ between cows administered 15 mg prostaglandin F2 alpha (Prostamate™)(PGF) by way of the ischiorectal fossa (IRF) as compared to those given 25 mg PGF intramuscularly (IM). This study utilized a two by two factorial design to determine if luteolytic response to PGF was affected by dosage (15 vs 25 mg) and/or by route of administration (IRF vs IM). A total of 100 non-pregnant, lactating Holstein cows that were approximately 128±5 (range=73-245) days in milk during their 1-5 lactation were recruited into the study based on the presence of a functional corpus luteum (CL≥20 mm) as determined by transrectal ultrasonography. Number, location, and diameter of CL, location and diameter of the two largest follicles, and body condition score were recorded. A blood sample (~7ml) was collected, and cows were injected with PGF according to their randomly assigned treatment. Blood samples were collected 24 and 72 hr later and ovaries of cows were examined by ultrasound 72 hours post-injection. Cows were considered responders (luteolysis induced) if CL diameter decreased by at least 5 mm. Luteal regression, induced in 80 of the 100 cows, was not affected by lactation number (P≥.05). Injection of 3 ml PGF by way of the IRF (92% responders) was just as effective in inducing luteolysis as 5 ml injected IM (88% responders)(P≥.05). Injection of 3 ml IM or 5 ml IRF