were not different between treatments (P<0.05) and averaged 0.016% of total fatty acids. Color stability tests were performed tri-weekly on top loin steaks for 21 d. By day 7, FO steaks had a higher hue angle (indicating brownness), which continued until day 20 (P<0.05). Neck muscle vitamin E levels in FO were lower than in LO and TF, but not different from ML (P<0.05). Vitamin E values for ML, FO, TF, and LO were 2.35^{ab}, 1.58^{b}, 3.29^{a}, and 2.99^{a}, g/kg of neck muscle, respectively. Off-flavor was stronger in FO (P<0.05) according to a trained taste panel. In the present study, supplementing trans fat and linseed oil increased cis-9 trans-11 CLA levels in beef tissue by 88% and 71% compared to control, respectively. The TF and LO treatments had 108% and 89% higher tissue vitamin E levels than FO, respectively. Feeding fish oil decreased color stability and introduced an off-flavor to the beef.

Key Words: Beef, Fat, Conjugated linoleic acid

Dairy Foods Symposium: Dairy foods research success stories

439 Dairy foods research success stories. W. Sandine*[1], C. White[2], D. Hettinga[3], J. Hotchkiss[4], R. Thunell[5], M. Mangino[6], and D. Willrett[5], [1]*Oregon State University,* [2]*Mississippi State University,* [3]*Land O' Lakes, Inc.,* [4]*Cornell University,* [5]*DSM,* [6]*Ohio State University.*

This symposium results from the need to remind federal granting agencies and legislators of the economic and social benefits from agricultural research. While research funding from NSF and NIH has increased dramatically since 1990, that for agriculture has decreased,especially for agricultural experiment stations. Examples will be given. Research success stories benefiting this nation will be presented: A brief history of dairy foods research and its contribution to the American way of life; the dramatic impact of increased market milk shelf life for consumers and industry profits; the value of cheese starter culture media developments to industry and consumers; the defined strain starter culture program for Cheddar cheese plants; carbon dioxide and shelf life extension in cottage cheese for an expanded market; and successful whey research yields new products and eliminates an environmental polluant. From these and other success stories the 38 member societies of CAST along with N-CFAR and other agencies are developing Fact Sheets to distribute to members of the U.S. congress and administrators to heighten their awareness of needed funding increases for agricultural research.

Key Words: Research, Funding, CAST

Beef Species: Beef cattle performance

440 Influence of breed on performance and dry matter intake by feedlot bull calves in Brazil. R. Almeida*[1,2] and D.P.D. Lanna[2], [1]*UFPR and PUCPR, PR, Brazil,* [2]*LNCA-ESALQ/USP, SP, Brazil.*

Performance and daily feed intake records from the largest bull test in Brazil were analyzed to determine differences attributable to breed. Postweaning performance of purebred calves was evaluated from seventeen pens, which held 145 Angus, 342 Brangus and 911 Nellore, for a total of 1,398 bulls tested in 2000, 2001 and 2002. Bulls calves arrived at 8 months of age and initial weight of 218 kg, and were fed for 28 days of adaptation and 112 days of test. A high forage diet (50% of DM as concentrate; 14% CP and 67% TDN) typical of brazilian feedlots was used and monensin included at 27 ppm. Data were analyzed using GLM procedure of SAS. The first data set (performance data) included 1,398 individual records and the second set used 17 pens monitored daily for dry matter intake. Breed type affected weights at 8, 9 (P<.01) and 11 (P<.05) months, but not (P>.05) at 13 months of age (end of feedlot period). Nellore bulls started on test with heavier weights but had the same final weight (13 months) as Angus and Brangus. Breed type also affected (P<.01) average daily gain. Brangus and Angus had higher gains (1.34 ± 0.04 and 1.27 ± 0.03 kg/d) than Nellore bulls (1.19 ± 0.02 kg/d). Angus and Brangus consumed more feed (P<.01) than Nellore calves. During the 112 day-evaluation period intakes for Angus, Brangus and Nellore calves were: 7.23 ± 0.12, 7.19 ± 0.10 and 6.71 ± 0.06 kg/day, and 2.55 ± 0.05, 2.49 ± 0.04 and 2.20 ± 0.02% of BW, respectively. There were no differences (P>0.05) in feed efficiency among breeds. NRC (1984 and 1996) equations were used to predict DMI. The biases were -0.3, +0.6 and +10.0% for the NRC (1984) and -3.0, -2.1 and +7.2% for the NRC (1996), and for Angus, Brangus and Nellore, respectively. NRC equations overpredicted DMI for *Bos indicus* breeds. New DMI prediction equations for high roughage and purebred Zebu cattle need to be developed and validated.

Key Words: Beef cattle, Feed intake, Nellore

441 Evaluation of yearling bull sale prices at six regional locations. D. Dean* and A. Herring, *Texas A&M University, College Station.*

During the spring of 2001, a seedstock marketing cooperative conducted six sales in CO, IA, ID, MO, and SD. Breeders delivered bulls to locations approximately 150 d prior to sale date; bulls were fed to gain approximately 1.4 kd/d. The purpose of this study was to evaluate specific areas of selection used by commercial producers and their effect on sale prices of yearling purebred bulls. Data on Gelbvieh (GV, n = 675), Angus (AN, n = 65) and Red Angus (RA, n = 50) bulls were analyzed. Specific traits available included sale price, age-adjusted ultrasound ribeye area (ADJREAU), age-adjusted ultrasound intramuscular fat percentage (ADJUIMF), age-adjusted ultrasound 12th and 13th rib backfat thickness (ADJUBFT), actual birth weight (BWT), actual weaning weight (WWT), average daily gain (ADG), ADG ratio, adjusted yearling weight (ADJYW), Frame score (FRAME), scrotal circumference (SC), birth weight EPD (BWTEPD), weaning weight EPD (WWTEPD), yearling weight EPD (YWEPD), milk production EPD (MILKEPD), total maternal EPD (TMEPD). AN and RA bulls were combined into one group and analyzed separately from GV bulls. RA EPDs were adjusted to the AN base according to 2001 across breed EPD adjustments. Sale price was analyzed by GLM procedures of SAS with independent variables of sire, with regressions on ADJREAU, ADJUIMF, ADJUBFT, BWT, WWT, ADG, ADG ratio, ADJYW, FRAME, SC, BWTEPD, WWTEPD, YWEPD, MILKEPD, and TMEPD. EPDs did not account for differences in sale price for GV bulls. Sire (P = 0.0005), BWT (P = 0.0288), WWT (P = 0.055), ADG (P = 0.0386), ADGRATIO (P = 0.0159), SCROTAL (P = 0.0006) and ADJREA (P = 0.0001) affected prices paid by customers buying GV bulls with a slight trend for ADJBACKFAT (P = 0.0628). Among GV bulls, sale price difference per unit change of the independent variables BWT, WWT, ADG, ADG ratio, SC, ADJREAU, and BACKFAT were -$7.79, $1.09kg, -$256.88, $9.95, $41.71, $82.66, and $116.87, respectively. Among ANRA bulls, only ADJYWEPD affected (P = 0.05) sale prices, with a price per unit change of $34.24. EPDs were not influential in sale prices of these yearling bulls that had actual performance data reported in sale catalogs.

Key Words: Sale prices, Yearling bulls, Performance data

442 Evaluation of forage sources for finishing diets containing wet corn gluten feed. C. R. Dahlen[1], A. DiCostanzo*[2], R. T. Ethington[3], T. L. Durham[4], J. E. Larson[2], and G. C. Lamb[5], [1]*Northwest Research and Outreach Center, University of Minnesota,* [2]*Department of Animal Science, University of Minnesota,* [3]*Kansas Feeds, Inc,* [4]*ADM Corn Processing,* [5]*North Central Research and Outreach Center, University of Minnesota.*

Two hundred twenty-three Angus crossbred steers (308 kg) were used to evaluate effects of various forage sources in diets containing wet corn gluten feed. Steers were assigned by weight and origin to one of sixteen pens (14 or 15 steers/pen). Pens were randomly assigned to one of five dietary treatments. Dietary treatments consisted of diets balanced (1.39 Mcal NE_g/kg DM; 12.5% CP) using high moisture and dry rolled corn (50:50 DM basis) with one of the following forage sources: corn silage (n = 3), wet corn gluten feed (n = 3), or wet corn gluten feed in combination with corn silage (n = 3), grass-legume hay (n = 3), or both (n = 4). Effects of forage source on performance and carcass characteristics were determined using non-orthogonal contrasts. Steers fed diets containing

wet corn gluten feed had similar (P > 0.05) performance and carcass characteristics as those fed the corn grain and corn silage diet. Steers fed the diet containing wet corn gluten feed without added forage gained faster (P = 0.05), required fewer (P < 0.05) kg DM/kg gain and were heavier at slaughter (live and carcass weights; P < 0.05) than steers fed diets containing wet corn gluten feed with additional forage. Steers fed the diet containing wet corn gluten feed and hay gained faster (P < 0.05), reached heavier final and carcass weights (P < 0.01), and greater dressing percentage (P < 0.01) than those fed the diet containing wet corn gluten feed and corn silage. Steers fed diets containing wet corn gluten feed in combination with both forage sources and those fed diets containing wet corn gluten feed in combination with either forage source had similar (P > 0.05) feedlot performance and carcass characteristics. Diets containing corn, wet corn gluten feed and corn silage either alone or with hay resulted in negative associative effects on estimated energy content of the diet (R^2 = 0.71; P < 0.01). The magnitude of this effect was greater (more negative) for the diet containing wet corn gluten feed in combination with corn silage. Combining wet corn gluten feed with corn silage, hay, or both lead to associative effects that reduced feedlot performance.

Key Words: Steers, Corn gluten feed, Associative effects

443 Evaluation of implants containing different combinations of trenbolone acetate and estradiol on performance and carcass merit of short-fed finishing heifers.
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There has been speculation as to whether short-fed finishing heifers require exogenous estrogen in addition to trenbolone acetate (TBA) when melengestrol acetate (MGA) is fed only in the final finishing ration. The objective of this study was to evaluate the effects of implants containing different levels of estradiol (E_2) and TBA compared to implants containing TBA alone on performance and carcass traits of short-fed finishing heifers. A total of 1,796 yearling heifers (352 kg.) were used in a randomized complete block study. Treatments were: 1) REV-IH (80 mg of TBA and 8 mg of E_2), 2) REV-H (140 mg of TBA and 14 mg E_2), 3) REV-200 (200 mg TBA and 20 mg E_2), and 4) FIN-H (200 mg TBA). All heifers were fed .4 mg of MGA per head daily, starting with the finishing ration (d 24-27) and were fed for a total of 121 days. Heifers implanted with REV-200 tended to gain faster (P<0.10), were more efficient (P<0.05) on a carcass-adjusted basis, and tended to have heavier hot carcass weights (P<0.10) than heifers in any other treatment group. Implanting with REV-200 tended to cause a reduction in percentage of Prime & Choice carcasses (P<0.10) and increased the percentage of Select carcasses (P<0.05) compared to FIN-H or REV-H. However, differences in quality grade corresponded to differences in Yield Grade. In this study, REV-200 tended to improve rate of gain and hot carcass weights and improved and efficiency of gain and dressing percentage compared to other implant treatments. When single implant strategies are utilized in short-fed finishing heifers, and MGA is included only in the final finishing diet, implanting with higher levels of E_2/TBA may improve rate and efficiency of gain, carcass weight, and dressing percentage.

Item	REV-IH	REV-H	REV-200	FIN-H
Carc. Adj. ADG, kg	1.41^{ef}	1.42^{e}	1.48^{d}	1.38^{f}
Carc. adj. G/F	$.168^{h}$	$.166^{h}$	$.174^{g}$	$.166^{h}$
Dressing %	63.59^{gh}	63.23^{i}	63.74^{g}	63.31^{hi}
HCW, kg[a]	331^{f}	334^{e}	338^{d}	330^{f}
Pr+Ch, %[b]	64.3^{de}	67.1^{d}	59.2^{e}	70.4^{d}
EBF, %[c]	32.35	32.53	32.35	32.46
Yield Grade	2.45^{d}	2.56^{e}	2.47^{d}	2.55^{e}

[a] HCW=hot carcass weight; [b] Pr+Ch=Percentage of carcasses grading Prime and Choice; [c] EBF=Empty Body Fat, Calculated using equations from Perry and Fox (J. Anim. Sci. 75:300); Values in a row without common superscripts differ: ^{d,e,f} (P<0.10); ^{g,h,i} (P<0.05)

Key Words: Implants, Feedlot, Heifers

444 Evaluation of Revalor®-IS, Revalor®-S and Component®-ES on performance and carcass merit of short-fed finishing steers.
J. P. Hutcheson, C. D. Reinhardt, G. E. Sides*, and W. T. Nichols, *Intervet, Inc., Millsboro, DE.*

Eight hundred and three, English × Exotic crossbred yearling steers (431 kg) were used in a randomized complete block study. The objective of the study was to evaluate the performance of heavy yearling steers given one of 3 different dosage implants. Treatments were: 1) Revalor-S (RS; 120 mg trenbolone acetate (TBA) and 24 mg estradiol (E_2) 2) Revalor-IS (IS; 80 mg TBA and 16 mg E_2), 3) Component-ES (ES; 20 mg estradiol benzoate and 200 mg progesterone). Steers were blocked by weight into 4 pen blocks per treatment with 67 head per pen. Steers were implanted at initial processing and fed for a total of 118 days. Steers implanted with RS and IS gained 7.7 and 5.0% faster (P<0.05) and had 4.0 and 3.4% (P<0.05) better dry matter feed conversion when compared to ES steers. Also, RS and IS increased (P<0.05) hot carcass weight 11.3 and 7.7 kg over ES implanted steers. Steers implanted with RS had increased (P<0.05) ribeye area when compared to IS and ES steers. Dressing percent was similar (P=0.99) across all treatments. There were no differences in percent Choice and Prime carcasses, which averaged 52, 56 and 57% for RS, IS and ES, respectively. In heavy, short-fed yearling steers, utilizing either a reduced-dose or full-dose combination E_2/TBA implant increased performance when compared to using an estrogen-based implant, with no adverse impact on quality grade. The data indicates that the use of Revalor-S and Revalor-IS can improve performance while maintaining a similar number of carcasses grading Choice and Prime when compared to Component-ES implanted steers.

Key Words: Implants, Feedlot, Steers

445 Evaluation of single and re-implant programs on performance and carcass merit of finishing steers. .
C. D. Reinhardt*, J. P. Hutcheson, W. T. Nichols, and G. E. Sides, *Intervet, Inc., Millsboro, DE.*

One thousand three hundred forty-four English × Continental crossbred steers (avg. 307 kg) were used in a randomized complete block study. The objective of the study was to evaluate the performance of feedlot steers given different dose implants either as single or re-implant programs. Treatments were: 1) Revalor-S (120 mg trenbolone acetate (TBA) & 24 mg estradiol (E_2) day 0 (RS), 2) Revalor-IS (80 mg TBA & 16 mg E_2) day 0 (IS), 3) Revalor-IS day 0 and Revalor-IS day 50 (IS-IS), and 4) Revalor-IS day 0 and Revalor-S day 50 (IS-RS) 5) Component-ES (20 mg estradiol benzoate & 200 mg progesterone) day 0 (ES). Steers were blocked by weight, and there were 4 pens per treatment with 67 steers per pen. Steers were fed for 186 days. Data were analyzed using GLM of SAS with pen as the experimental unit, and means were separated using LSD with a protected F-test (P<0.10). Steers implanted with IS-RS tended to have higher average daily gains and heavier final weights than any of the single implant treatments (P<0.10) on a live basis and higher average daily gain and better feed conversion vs. all other treatments on a carcass adjusted basis (P<0.10). Steers implanted with IS-RS also tended to have significantly heavier carcass weights than any of the single implant treatments (P<0.10). Percentage of carcasses grading Prime + Choice combined were 36, 34, 34, 43, and 41%, for IS-RS, IS-IS, RS, IS and ES, respectively and were not different (P=0.35) between treatments but steers implanted with ES and IS tended to have a higher percentage of carcasses (18 and 17.6%) which graded Prime + upper 2/3 Choice combined than IS-RS or RS, (11.5 and 12.3%; P<0.10), with IS-IS being intermediate (12.5%). However, differences in marbling and quality grade were explained by differences in empty body fatness, as there was a correlation between empty body fat and both marbling score (r=.46; P=.04) and percent Prime + Choice combined (r=.57; P=.09). These data indicate that daily gain, efficiency and carcass weight may be improved using Revalor-IS followed by Revalor-S compared to single implant programs in steers fed for 186 days, with minimum impact on quality grade, provided cattle are marketed at a similar body fatness endpoint.

Key Words: Implants, Feedlot, Steers