

USDA Regional Project NC-1201
9/24/13-9/25/13
Omaha, NE Candlewood Inn and Suites
Meeting Minutes

Attendees: Allen Bridges, Cliff Lamb, Rick Funston, Paul Fricke, Jeff Stevenson, Teresa Steckler, Darrel Kessler, George Perry, Jamie Larson, Carl Dahlen, Vitor Mercadante, Mellissa Schook, Dani Black, Luis Kozicki, (Adelle Turzillo and Bill Ravlin gave updates via telephone)

Meeting called to order at 8:00 by Jamie Larson.

Introductions.

Station reports:

University of Florida:

Exp. 1) Summary of a project comparing a CO-Synch + CIDR protocol with a protocol that gave prostaglandin at the time of the first GnRH administration of the CO-Synch +CIDR in suckled beef cows. Participants in the project included 5 universities in the NC-1201 group. No differences among treatments in pregnancy rates to AI, follicle diameter, at d -10 and -3, or concentrations of progesterone. Led to discussions about potential differences in progesterone sensitivity among *Bos taurus* and *Bos indicus* cattle as similar protocol led to greater pregnancy rates in *Bos indicus* females.

Exp. 2) Summary of a project comparing a CO-Synch + CIDR protocol with a protocol that gave prostaglandin at the time of the first GnRH administration of the CO-Synch +CIDR in beef heifers. Participants in the project included 5 universities in the NC-1201 group. No differences among treatments in pregnancy rates to AI, follicle diameter at d -10 and -3, or concentrations of progesterone. Discussion revolved around whether administration of GnRH and PGF coincidentally changed the pattern of luteolysis of existing CLs.

Exp. 3) Overview of the "AI Cowculator" developed using data from Rodgers et al., 2012. Reviewed inputs in the model and how you can specify operation specific items and determine whether artificial insemination or natural service would result in greater overall returns for individual producers. Most useful for AI representatives, Extension personnel, and pharmaceutical salesmen for having conversations regarding incorporating AI into commercial production.

University of Minnesota:

Exp. 1) Overall concept is to look at dietary changes around AI and the subsequent impact on pregnancy success. The particular model looked at d 6 embryo quality (single embryo flushes) after nutrient changes initiated at the time of insemination. Treatments included a control diet fed over ME requirement and a restricted diet that was below ME requirement. Control diets resulted in greater embryo stage, quality and total number of cells, compared with the restricted diet.

Exp. 2) Evaluating the impact of progesterone concentration on follicle number, oocyte competence in beef heifers. Transvaginal oocyte collection was used on day 10.5 and d 15.5. More follicles were aspirated, more oocytes recovered, and greater number of grade 1 to 3 oocytes in the low progesterone group compared with the high progesterone group.

Exp. 3) Evaluating the impact of progesterone concentration on follicle development, and oocyte yield and quality in beef cows. Transvaginal oocyte collection was used to collect embryos. More follicles were aspirated and greater number of cells were observed, but no differences were observed in embryo grade, cleavage rates, and % live embryos in the low progesterone group compared with the high progesterone group. Exactly what the greater number of cells in blastocysts is telling us is

unknown; is this indicative of greater potential embryo growth in the future, or health of the embryos that made it to the blast stage?

Exp. 4) Impact of dietary protein on follicular growth. Resulted in greater growth and final size of ovulatory follicle, but lower progesterone content 7 d after ovulation in heifers fed a high crude protein diet compared with lower crude protein diet.

Exp. 5) Project to evaluate whether we need GnRH at the time of CIDR insertion in a 5-day CO-Synch + CIDR protocol. No differences in pregnancy rate among heifers that were given GnRH at the time of CIDR insertion and those that were not. This project is currently being repeated and timing of AI after CIDR removal has been refined (moving from 72h to 60 h). Discussion about estrus distribution after CIDR removal and some of the issues revolving around implementation of protocols with various timings and the difficulties that producers have with administration of products and protocol compliance.

Kansas State University:

Exp. 1) Evaluating 25 mg vs 50 mg dose of PGF in 5 day TAI protocol. Luteal tissue area and concentrations of progesterone declined at a more rapid rate in cows given 50 mg of PGF compared with cows given 25 mg PGF. Clearly showed that with 50 mg injection of PGF could consistently induce luteal regression in a 5 day protocol.

Exp. 2) Compared methods of presynchronization in dairy cows; PG3G vs. Pre10 protocol. Evaluated ovulation and LH surges at different time of each protocol. The PG3 protocol consistently ovulated follicles and had a coincident LH release as part of the presynch process. At the time when both treatments were given the first GnRH of OvSynch the Pre10 group had a greater LH release, likely due to the elevated concentration of progesterone in the PG3G treatment compared with the Pre10 group.

Exp. 3) Study aimed to determine when cows actually ovulate relative to increased activity signaled by accelerometer activity. Cows were fitted with heat watch patches and accelerometers. Cows with accelerometers became active and triggered alert about 2 hours prior to standing estrus alerts triggered by heat watch monitoring system but the correlation between heat watch and activity monitoring was near perfect. Duration of physical activity via accelerometer lasted longer compared with duration of standing estrus. Discussion surrounded topics of various reasons besides estrus that can cause false positive accelerometer readings. Herds buy accelerometers with intention of eliminating synchronization and repro performance can subsequently crash. What additional items need to be considered for herds wishing to implement an accelerometer system? We still have a learning curve to follow and adding accelerometer monitoring is likely just one part of a total herd reproductive management program.

Exp. 4) Large data set (>7,000 hd) that evaluated the impact of concentrations of progesterone prior to protocol initiation on likelihood of pregnancy success. In addition, the relationship among factors of body condition, parity, and days postpartum were explored. Overarching question is whether we can eventually get to the point where, chuteside, producers can implement specific protocols for different categories of cows.

Adelle Turzillo- called in from office in Washington, DC to give USDA NIFA update. Recap of organization and leadership at NIFA. Raised indirect cost rate to 30% from 22%. New this year- water program RFA that is coming out in December. Don't write it off yet- look at RFA once it comes out as there may be possibilities for interdisciplinary work. No RFAs will be listed for Bioenergy and Climate Change. Significant \$ have been invested in these challenge areas and 2010-2011 projects are being given continuation grants, thus no additional projects will be funded. Reviewed success rates of Foundational Programs in Animal Health and Production for the last RFA, read with caution, however, as

the success rates reflects an RFA that had funds for 2 years combined. Reviewed funding opportunities through NIFA and funds available in collaboration with other agencies; NIH, NSF, and the UL Biotechnology and Biological Sciences Research Council. Stakeholder listening sessions for AFRI program are planned for Spring of 2014.

Budget information- lots of numbers but the only real numbers are the FY2012 and 2013 Enacted Appropriations. FY2014 numbers are preliminary and must go through the legislative process for review, revisions, and final approvals. President's budget for FY2014 had a nice increase for the AFRI program with hatch dollars equivalent to 2012 levels, but sequestrations and lack of a farm bill could play a role in the actual approval for \$ into the respective programs. Bottom line for budget: Uncertain. Need to see what happens and they will keep us posted. Allen- Questions about the Biotechnology Risk Assessment Grants program. Answer; grants to provide regulatory agencies with information they need to request biotech approvals, etc. Cliff- if no budget approved soon will it affect when AFRI programs RFAs come out? Answer- Will not hold release of RFAs, but actual amount available will not be known until budget is approved. Cliff- Regarding foundational programs- is it safe to say that funding rate will likely be about ½ of what the success was last year. Answer- Nothing certain, but not a bad bet. Maybe not ½ for each specific program, but overall level will likely be proportionally smaller due to only having 1 year of funding as opposed to two. George- Cuts in travel, budget cuts, etc.. how are these budget reductions going to affect future outlook for multistate projects? Answer- Hatch funding is legislatively mandated- won't change. Regional committees will still exist. Group should go forward and do good work, but certainly will impact the ability of AFRI representation with respective regional project groups. Video capabilities, phones, etc. are options, but we won't be seeing AFRI representatives at very many meetings.

South Dakota State University:

Exp. 1) Relationship among preovulatory estrogen and follicle diameter. Some small follicles with high estradiol and some large follicles with very little estrogen. Positive correlation between follicle size and estradiol, and the relationship gets even stronger when only females exhibiting estrus are evaluated. In all replicated evaluated, starting ~36 h prior to 2nd GnRH injection an increase in concentrations of estradiol is being observed in females that show estrus compared with those that did not.

Exp. 2) Slaughter study with synchronized cows. All females cycling, identified 5 cows with highest concentrations of estradiol and 5 cows with lowest concentrations of estradiol. Aromatase activity and number of LH receptors were greater in cows that had high concentrations of estradiol compared with low. Number of antral follicles and concentrations of progesterone in small follicles (1 to 5 mm) was greater in "High" cows compared with "Low" cows.

Exp. 3) Influence of estrus activity at TAI on accessory sperm numbers and embryonic development. Embryos had almost double the number of accessory sperm, better stage and greater quality in females that showed estrus compared with those that did not. Next step in this line of work- culture granulosa cells and evaluate the response to LH stimulation. But the overarching question remaining is why is it that we are getting a population of cows that have follicles not producing estrogen? If there is a way to get low estrogen-producing cows to produce greater concentrations of estrogen then quite likely overall pregnancy rates can be increased.

Break for Lunch:

Bill Ravlin called in at 1:00. Rollout of report system that is replacing CRIS system. Big differences- need an IACUC number associated with the projects which adds to the time of protocol approval. For the standpoint of the group it seems like just that much more reporting that has to happen. The term

“Impact” has been removed from the reporting process but that does not mean that we don’t need to include impact in the reports. Discussion of how this group should proceed with reporting metrics of economic value into future reports. Look for PRSS group to see how a group can report back good economic numbers... look for projects that win the “multistate awards.” Bill will send a list of groups that are doing a good job of this type of reporting and send to our committee.

Nebraska:

Overview of the University of Nebraska beef cattle research locations and facilities.

Exp. 1) Impact of maternal nutrition and post-weaning management on steer and heifer progeny- May calving system. Pregnancy rates are 20-30% lower for May calving herd compared with early spring calving herd. Question ends up being what is signaling a later breeding herd to have poorer pregnancy rates; is it the declining forage quality in cattle with adequate body condition.

Exp. 2) Impact of protein source on ADG, feed intake, calf BW, and rebreeding in pregnant heifers. Final pregnancy rates to rebreeding were similar among supplemental treatments.

Exp. 3) Comparing MGA-PGF system to a 14 d CIDR protocol for fixed-time AI. No differences were observed among protocols in pregnancy rate to AI (avg of 61-62%).

Cows bred at appointed time within a 7-d CO-Synch & CIDR protocol, or bred the following day.. helped cyclic cows, hurt the ones that were not cyclic.

No differences in pregnancy rate to AI among heifers that were pubertal or non-pubertal. In a set of heifers not bred to AI, more calves born in the first 21 d if they were pubertal at breeding, calf age was older, and they bred back earlier compared with heifers that were not pubertal. Heifers that had at least 1 estrus cycle had greater pregnancy rates compared with those that had not had estrus cycles prior to the breeding season.

Data were also presented on the impact of pubertal status at the time of breeding season initiation on pregnancy rates through several years in the herd.

Mississippi State University:

Exp. 1) Reviewed a study that monitored whether nutritional status of dairy cows during early gestation was correlated with growth, development, and hemodynamics of her offspring. For now means were reported along with correlations among different cow and calf traits. Difficulties at this point come in terms of how to appropriately classify cows into different categories for subsequent analysis. Discussion included ideas for analysis of the resulting data.

North Dakota State University:

Exp. 1) Recap of a project comparing AI and natural service breeding systems. No differences in pregnancy rates at the end of the year among treatments. However, calving distribution was altered calves from the AI system were lighter at birth, and calves born within the first 21 d in the AI system weaned at greater weights compared with calves from the natural service system. Results in cattle that were not cyclic at the initiation of the breeding season led to discussion of the potential impact that placing a group of cyclic females into a herd could have on hastening the resumption of estrus in non-cyclic cows.

Exp. 2) Evaluated physiological response of different methods of heat treating used CIDRs prior to insertion. Various on-farm heat treatment methods were used and all of them failed to improve release of progesterone similar to what autoclaving CIDRs did. Overall no benefit was observed with any alternative heat treating method (besides autoclaving) compared with an untreated used CIDR.

Exp. 3) Update on the PregCard pregnancy rate monitoring system. Data from >96,000 beef cattle were collected from over 700 groups of cattle. Comparisons of pregnancy rates attained at

different herd sizes, classes of females (cows vs. heifers), body condition scores, and breeding systems (AI and natural service) were reviewed. These data begin to quantify the impact of several routine best management practices on herd level reproductive performance.

Wisconsin:

Exp. 1) Comparing Double Ovsynch to GGPG for first timed insemination in lactating dairy cows under the premise of reduction (GGPG would reduce the number of injections administered to synchronize first service AI). Double Ovsynch resulted in about 10% pregnancy rate advantage compared with GGPG. Interestingly, cows that had either very low (< 0.5 ng/mL) or very high (≥ 4.0 ng/mL) concentrations of progesterone that were treated with GGPG had greater pregnancy rates compared with those treated with the Double Ovsynch. Overall the Net Present Value of the Double Ovsynch protocol was \$8.55 per cow per day whereas the GGPGF was \$8.43 per cow per day; a difference of \$0.12 per cow per day. This would be a total of \$43.80 for each cow over a year's time. At the current time this advantage for the double ovsynch protocol would add an additional **\$394,200,000** to the dairy industries current 9 million cows.

Exp. 2) Long-acting recombinant bovine FSH for superovulation of Holstein heifers. Evaluated a 3 different single injection products of recombinant FSH with a traditional 8 decreasing dose FSH regimen. One of the single injection products resulted in similar superovulatory response compared with the 8 decreasing dose regimen.

Exp. 3) Evaluate the impact of rumen protected Choline on milk yield and composition during the transition period (d -21 to 21 relative to calving) in Holstein dairy cows. Cows treated with Choline had lower concentrations of BHBA, lower incidence of metritis, and Log(SCC) compared with control cows. In addition, cows in parities 3+ had greater milk yield from week 4 to 15 in lactation. However, rumen protected choline did not result in improved reproductive performance rates compared with the control diet. In fact, there was a negative effect of feeding choline on pregnancy rates to AI.

Not in report: evaluated BCS change from calving to 3 weeks post calving into losing, maintaining, or gaining condition. If lost BCS = 25%, If Maintaining BCS = 38%, If gaining BCS = 83% conception rates to Double Ovsynch. Questions remain as to the level of milk production among each of the groups and other disease incidence. These items will be reported in the future.

Illinois:

Exp. 1) Treatments compared were CO-Synch+CIDR, PG-CO-Synch+CIDR, and ½ dose PG-CO-Synch+CIDR- no differences in pregnancy rates among treatments.

Exp. 2) CO-Synch + CIDR vs. PG-CO-Synch + CIDR in cows and heifers. No difference among treatments in pregnancy rates. Data will be added to dataset presented by Florida.

Discussion about potential nominations for the NC-1201 group for a multistate project award.

Date/Location of next meeting: Marianna, FL on September 23rd and 24th 2014.

Airports for travel to Marianna; Dothan, Panama City, Tallahassee

Carl Dahlen will be President/Chair for next year.

Teresa Steckler will be Secretary for 2014 meeting.

Adjourn 5:15 PM

9/25/13

Call to order at 8:00 by Jamie Larson

Discussion of collaborative projects:

Does administration of PGF dinoprost vs. cloprostenal impact age at puberty in beef heifers?

Potential steps in this area

- 1) Cell culture work to evaluate mode of action, etc..
- 2) Big group of heifers and see if puberty is impacted

Options for followup of the group project evaluating coincident injections of PGF and GnRH at the time of CIDR insertion? Need to go through the dataset and classify cattle by cyclic status prior to making any decisions about whether this should be pursued.

Discussion of eCG administration at 6 d postpartum in lactating dairy cows. Based off of Vojgani et al., 2013 paper that reported no differences in first service conception rates but there was an observed reduction in days to first service. General consensus was that we lack an understanding of the potential mode of action of eCG administered very early postpartum.

Impact of bST within a synchronization system; initiation of synchronization, around the time of breeding, or 14 d post-breeding. Greatest improvement has been observed around the time of breeding and 14 days after. Potential impacts include reducing loss of early pregnancies, impact on developmental programming. Vitor needs to write a proposal for his prelims and it will be related to bST administration in beef cows. Once a draft of the proposal has been developed it will be circulated for comment and requests for input and collaborators on specific projects.

Administration of specific protocols to different groups of cattle. How would something like this be implemented.. chalk/patches applied at 30 d prebreeding vaccinations, read at the time of protocol initiation?

Diluting maintenance costs of the cow herd... sexed semen, for generating females, calving them out and harvesting females early.

Several members will develop project outlines for distribution to the group.

Meeting adjourned at 11:02.