ments by weight and color pattern. Treatments were 1) placing calves on bromegrass pasture until mid October, at which time they were removed and finished in a drylot (OCT); 2) placing calves on bromegrass pasture until approximately July 1, at which time they were moved to a drylot for finishing; 3) placing calves on bromegrass pasture until mid June, at which time they were moved to warm-season pastures until being returned to bromegrass pasture from mid August until sometime in October when they were placed in a drylot for finishing (WARM); and 4) placing 28 steers directly into a drylot at the start of the tests (FEEDLOT). The bromegrass pasture consisted of 24 paddocks, each 1.7 acres in size. Each grazing treatment of 28 steers (except for 32 steers placed on warm-grass pastures) was rotated among paddocks at 3- to 4-d intervals early in the season and at about 2-d intervals later in the season. An 82% concentrate diet containing whole shelled corn, ground alfalfa hay, and a protein–vitamin mineral supplement with ionophores and molasses was provided ad libitum daily in the drylot. On pasture, calves were provided supplement blocks containing ionophores. Pens of cattle were harvested at approximately 568 kg. Cultural energy used for pasture establishment, feed consumption, and maintenance were calculated using the actual inputs and corresponding energy values from the literature. The FEEDLOT cattle had higher and OCT cattle had lower total cultural energy expenditures than other treatments ($P < 0.01$). Feed energy made up more than half of the total cultural energy and was highest for FEEDLOT cattle and was lowest for OCT cattle ($P < 0.01$). Energy expended per kilogram live weight gain was higher for FEEDLOT cattle ($P < 0.01$). The energy output ratio, defined by kilocalories input/kilocalories output, was better for the OCT treatment followed by the WARM treatment ($P < 0.01$). Results show that pasturing cattle is an effective way of reducing cultural energy expenditure and that grazing cool-season grass was better suited to the concept of sustainable agriculture.

Key Words: cultural energy, feedlot, pasture, sustainability

doi: 10.2527/msasas2016-056

057 Cultural energy analyses of climatologically suitable places in Turkey for feedlot cattle production determined by using the comprehensive climate index model. H. Koknaroglu[1,*], J. A. Harrington Jr.[2], T. L. Mader[3], [1]*Suleyman Demirel University, Isparta, Turkey,* [2]*Kansas State University, Manhattan,* [3]*Mader Consulting, LLC, Gretna, NE*.

The objective of this study was to conduct cultural energy analyses on feedlot cattle production in Turkey. The comprehensive climate index (CCI) model was used to predict DMI, ADG, and feed efficiency of feedlot cattle in 15 locations in Turkey. The CCI enables one to quantify beef cattle performance for a number of breeds based on environmental conditions (temperature, relative humidity, wind speed, and solar radiation) at any time in the year. Because mostly dairy breed calves are placed into the feedlot in Turkey, the Holstein (dairy breed) option in the CCI was chosen to calculate the maintenance energy requirement. Based on previous feedlot feeding studies conducted in Turkey, it was assumed that calves would be placed on feed at 250 kg and be marketed at 520 kg and that the diet would have 2600 kcal/kg metabolic energy and would have DMI of 2.31% of the BW. It was assumed that cattle would receive 2 kg/d straw and that the concentrate mixture would consist of 52.65% barley, 26% corn, 19% cotton seed meal, 1.5% limestone, 0.25% vitamins, 0.5% salt, and 0.1% minerals. Cultural energy inputs were calculated by multiplying the amount of inputs and their corresponding cultural energy based on values from existing literature. Cultural energy used for feed was derived from DMI of cattle and corresponding values for each feed ingredient. Transportation energy was also included in the analysis, including costs for shipping calves from animal market to the farm, shipping yearlings to slaughterhouse, and shipping feed ingredients to the farm. Cultural energy expended for feed made up more than half of the total cultural energy and differed among cities ($P < 0.05$). Cultural energy for feed was highest for the coldest places and lowest for hot locations. Cultural energy of transportation constituted the second highest cultural energy expenditure. Cultural energy expended per kilogram live weight gain (defined as total cultural energy expended divided by kg live weight gain) was highest for the coldest location and lowest for relatively hotter cities ($P < 0.05$). Cultural energy use efficiency (defined by kcal input/kcal output) followed the feed efficiency ranking with cattle having better feed efficiency also have better cultural energy use efficiency. Results showed that cattle having higher ADG did not mean that they would also have better cultural energy use efficiency.

Key Words: beef cattle, comprehensive climate index, cultural energy, feedlot

doi: 10.2527/msasas2016-057

058 Determination of suitable sample size and number of simulation for predicting dry matter intake of feedlot cattle. O. Koskan[1,*], H. Koknaroglu[1], D. D. Loy[2], M. P. Hoffman[2], [1]*Suleyman Demirel University, Isparta, Turkey,* [2]*Iowa State University, Ames*.

Close-out information, submitted by Iowa cattle producers to the Iowa State University Feedlot Performance and Cost Monitoring Program, was used to develop a suitable sample size and number of simulations for predicting DMI in feedlot cattle. Close-out information consisting of 3452 pens of cattle included information on start and end dates, cattle per pen, sex, housing type, days on feed, initial and sale weight, feed conversion (FC), proportion of concentrate, ADG, percent death loss, feed cost and total cost per 45.35-kg gain, break-even sale price, nonfeed variable cost, nonfeed fixed cost, and corn price. Dry matter intake was not provided but was calculated