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Abstract

Feedlot data on 202 lots involving approximately 40,000 steers collected for five years were used to characterize feedlot performance each month of the year. Intake, average daily gain (ADG), and feed efficiency were measured. ADG was predicted for mean daily temperature (MDT).

Keywords

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Summary

Feedlot data on 202 lots involving approximately 40,000 steers collected for five years were used to characterize feedlot performance each month of the year. Intake, average daily gain (ADG), and feed efficiency were measured. ADG was predicted for mean daily temperature (MDT).

Introduction

Performance of feedlot cattle is affected by both heat and cold. When effective temperature rises above (heat stress) or falls below (cold stress) the thermal neutral zone (TNZ) average daily gain is reduced and feed to gain ratio increases. It takes more feed to meet increased maintenance requirements during thermal stress (heat or cold) and so less feed energy is available for growth. Net energy equations used to predict ADG do not include the effect of temperature. Accurate prediction of performance at different temperatures would allow feeders to adjust rations for specific thermal environments.

Procedure

We used five years of weather, feed, and growth records involving approximately 40,000 steers to determine the relationship between mean daily temperature and performance. All cattle were steers of similar type (Okie No.1) and size (mean weight 992±103 lb. or 450±47kg). Because all cattle were slaughtered in the feeder's plant, results were not affected by holding cattle for improved markets, etc. Temperature was monitored with a bimetallic type thermograph. Feed (Kcal ME 2.13/g) was weighed and recorded daily. Weigh periods ranged from 30 to 46 days with data from animal's first weighing not used. When data are presented by month, they refer to month the weigh period ended.

Results and Discussion

Voluntary intake per unit of metabolic size varied most during cold and least during heat (Table 12.1). The variations were as expected, but were not different ($P<.05$) when analyzed.

ADG's were significantly ($P<.05$) affected by temperature and are listed by month in Table 12.1. Highest ADG's were in fall and spring

with depressed ADG during winter and summer. Plotting ADG as a function of mean daily temperature (range 26 to 86F or -3 to 30C) gave a quadratic relationship. Maximum performance was at 59F (15C). However, when temperature below 59F (15C) is treated separate from temperature above 59F (15C) a linear effect of temperatures on ADG is found during cold and a quadratic effect during heat. During cold weather, maintenance increases are linear with maximum intake; during hot weather maintenance is non-linear and feed intake decreases. It must be mentioned that thermal effects depend on acclimation by the steers. Pooled data presented here do not remove that effect.

Feed efficiency differs significantly ($P<.05$) with temperature and is shown by month (Table 12.1). Feed to gain ratio is inversely related to ADG as expected. Feed efficiency is poorest during cold and heat and best during spring and fall, when temperatures are neither cold nor hot.

Table 12.1 Intake, ADG, and feed efficiency by month of year for 40,000 steers finished in an open feedlot during 5 years

Month[1]	Intake (ME/W.75)	ADG lb	ADG (kg)	F/G[2]
Jan.	271.8	2.91	(1.32)	9.2
Feb.	243.2	2.91	(1.32)	9.2
Mar.	241.1	2.91	(1.32)	8.1
April	246.4	2.93	(1.32)	8.5
May	255.8	3.15	(1.43)	8.1
June	256.9	3.11	(1.41)	8.2
July	249.1	2.87	(1.30)	8.8
Aug.	245.2	2.67	(1.21)	9.1
Sept.	243.0	2.98	(1.35)	8.4
Oct.	261.4	3.18	(1.44)	8.0
Nov.	264.9	3.48	(1.58)	7.7
Dec.	270.8	3.51	(1.59)	7.4

[1]Month refers to month steers were weighed and includes the preceding 30 to 46 days.

[2]Pounds of feed per pound of gain