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EFFECT OF COMPENSATORY GROWTH AND FATTENING DURATION ON COMPOSITION OF CARCASS COMPONENT OF AUSTRALIAN COMMERCIAL CROSS CATTLE

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ABSTRACT

The objective of the experiment was to investigate the effect of compensatory growth and fattening duration on the composition of meat, bone, and fat of carcass from Australian Commercial Cross (ACC) cattle. Eighteen heads of young castrated of 2-3 years old and male ACC cattle were used in this experiment. They body weight of approximately 320 to 360 kg and were divided into 2 treatments. Treatment I was compensatory growth cattle (C), and Non Compensatory growth cattle (NC). Treatment II was fattening duration of 2, 3, and 4 months (FT-2, FT-3 and FT-4), respectively. The feeding given amounting of 2.4% to 2.7% of body-weight (based on dry-matter) with concentrate was 90% and King grass was 10%. The ration was composed by 12% crude protein, 2392 cal Metabolizable Energy (ME/kg DM). The results showed that the average of daily-gains (ADG), slaughtered weight and carcass weight for compensatory (C) cattle was higher compared to the Non Compensatory (NC) ($P<.05$). Feed conversion (gain/feed ratio) for C was higher compared to the NC ($P<.05$). Percentage of carcass and percentage of fat for C were higher compared to NC ($P<.05$), but percentage of bone for C was lower compared to the NC ($P<.05$). Carcass weight, dressing percentage, and fat percentage increased ($P<.05$) for FT-2, FT-3 and FT-4, respectively. On the contrary, percentage of meat and percentage of bone from carcass decreased ($P<.05$). It was concluded that efficiency of feedlot could be applied by implementation of compensatory growth phenomena and by manipulation of fattening duration.

Key words : Compensatory growth, Fattening duration, Composition of carcass component, Australian Commercial Cross cattle

INTRODUCTION

Body composition is a dynamic and changes continuously in the response to environmental factors. Some of these factors are feeding, ambient temperature, climate and management. Knowledge of variation sources of body composition can help in developing strategies to alleviate undesirable effects of poor nutrition on growth and to optimize the use of feed-stuffs by cattle. Body composition changes in cattle also undergoing compensatory growth (Kabbali, 1992).

Some management improvement affected in product efficiency and composition of carcass component from cattle are manipulated by fattening duration and applied phenomenon of compensatory growth in feedlot system.

If cattle are deprived food and their growth down slightly, they are often able to catch up by growing faster if their feeding supply is restored. This phenomena is called compensatory growth (Swatland, 1984). In feedlot system, catch up of growth is required rarely. It is an important aspect for overall growth to market weight.

Recently, the feedlot system in Indonesia showed in faster development, but one of the problems have to be interested is the management improvement, namely to create a better in feedlot management, optimality in all factors which it usable in product affectivity. Those, the feedlot resulted the profitable greatly.

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The experiment was conducted to investigate the effect of fattening duration and applied the phenomena of compensatory growth in feedlot system on composition of carcass component from Australian Commercial Cross (ACC) cattle.

Implementation results from this experiment are expected to improve the management and to increase the productivity of feedlot, especially in Indonesia.

MATERIALS AND METHODS

Materials

Cattle consisting of : 18 heads of Australian Commercial Cross (ACC) castrated cattle, 2 to 3 years of age, healthful condition, good palatability with the body weight of approximately 320 to 360 kg. These cattle were composed by 9 heads in lean condition (protrusion 3-4 ribs). In good feeding existence with compensatory growth (C), and ADG over than 1 kg. Using of 9 heads of Non Compensatory growth (NC), not thin condition with ADG less than 1 kg.

Diets

The ration cattle was composed by concentrate (90%) and King grass (10%) (based on dry-matter). Feeding given accordingly (2.4 % to 2.7%) of body-weight (DM calculation). The ration chemical composition was concentrate and King grass (enclosed in Table 3).

Methods

Eighteen (18) Australian Commercial Cross (ACC) cattle were divided into 2 treatment groups. Treatment I. Compensatory growth (C) *versus* Non Compensatory growth (NC), consisting of 3 heads of cattle per treatment, respectively. Treatment II. Fattening cattle for 2, 3 and 4 months (FT-2, FT-3, and FT-4), 3 heads of cattle per treatment, respectively. Cattle were fattened at the Cattle Holding ground (PT. Kariyana Gita Utama, Cicurug, Sukabumi, West Java). The slaughtered cattle was done in Sampico Adhi abattoir, Tambun, Bekasi, Jakarta; which its were fattened for 2, 3 and 4 months before. Parameters measurement were involving of average of daily-gains (ADG), feed consumption, feed conversion (feed/gains), slaughtered weight, dressing percentage, carcass weight, carcass composition of meat, bone and fat components, respectively.

Analysis of data

The collected data were analyzed by using a variance analysis of completely randomized design (CRD), followed by testing for the significant means by Duncan's New Multiple Range Test (DMRT).

RESULTS AND DISCUSSION

The results (Table 1) showed that the average of daily-gains (ADG) for Compensatory growth (C) steer higher than Non Compensatory growth (NC). Steer was treated with Compensatory growth (C), majority in lean condition (protrusion ribs). This condition was caused by the hot stress or malnutrition since they were raised in Northern Australia territory. In health condition and best palatability by sufficiently ration in quantity and nutritional, showed it growth-rates was overall normally (compensatory growth) (Soeparno, 1994).

The cattle which it condition over lean (over thin), tissue degradation reached to the inner organs as in the digestive tracts and it made trouble metabolism and digestion activity, then not existing compensatory growth were observed or uncompleted compensatory growth.

Table 1 showed that feeding for C cattle more efficient ($P<.05$) compared to NC cattle. This reason, that the feed consumption did not differ and the C cattle grew faster significantly ($P<.05$) than the NC cattle (Kabbali, 1992). Most factors affected feed cost per kg gains are reflected in the animal average of daily gains, so that feed efficiency is very important economically frait for the feedlot (Taylor, 1984).

Cattle with compensatory gains are typically light for their ages, and that means they have restricted nutrition for part or all of their life. When they are finishing fed response in the feedlot, they compensate for the earlier restriction feed by gained rapidly.

Table 1. Production performance of the Australian Commercial Cross cattle in different fattening duration and different growth trials

Parameters	Compensatory growth (C)*			Non Compensatory growth (NC)		
	Fattening durations (months)			Fattening durations (months)		
	2	3	4	2	3	4
Average of Daily-gains (Kg)	1.33[a]	1.20[b]	1.03[c]	0.71[d]	0.87[e]	0.89[e]
Daily Dry Matter Intakes (Kg)	8.67[a]	8.74[a]	9.80[b]	7.63[c]	8.49[e]	8.96[e]
Feed/gains** (kg/kg)	6.52[a]	7.32[b]	9.51[c]	10.74[d]	9.76[c]	10.04[d]
Slaughtered Weight (kg)	446.00[a]	454.67[b]	463.33[c]	392.00[d]	422.33[e]	456.30[b]

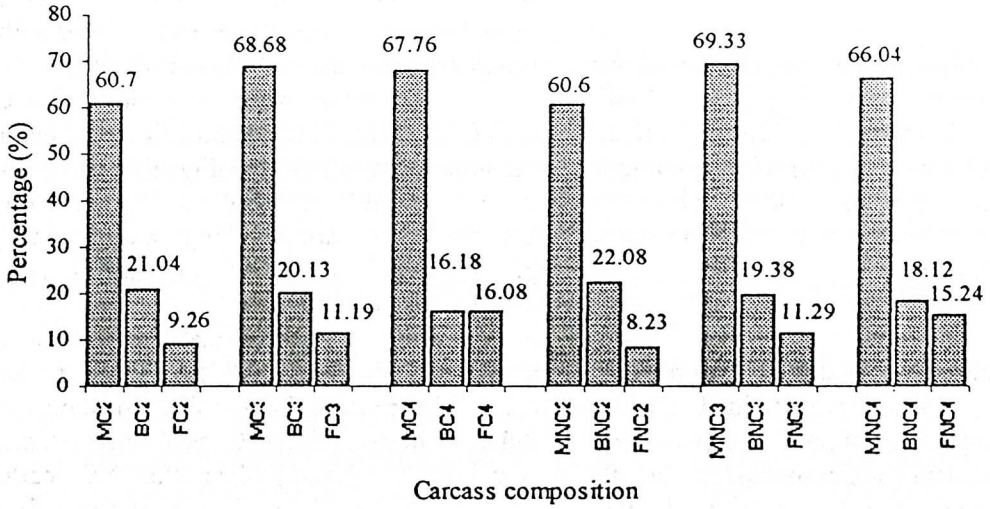
[a,b,c,d,e] means with different superscript within same parameters indicated significant difference (P<.05)

* compensatory growth : ADG > 1.0 kg ; normally growth : ADG < 1.0 kg

** Feeding in dry-matter intake

Within faster compensatory growth (P<.05) resulted the slaughtered weight from C cattle to be heavier slaughtered weight (P<.05) than NC cattle.

Table 1 showed that more long fattening duration for C cattle resulted decreased ADG (P<.05). On the contrary, for NC cattle showed that there was ADG increased (P<.05). By the ADG changes, it implication affected feed conversion ratio (feed/gains), especially for C cattle resulted feed conversion ratio tended more efficient (lower) (P<.05). It was caused by daily dry-matter intake (DMI) for C and NC cattle resulted in small value relatively (P>.05).



MC2	= Meat compesatory 2 months	MNC2	= Meat non-compesatory 2 months
BC2	= Bone compesatory 2 months	BNC2	= Bone non-compesatory 2 months
FC2	= Fat compesatory 2 months	FNC2	= Fat non-compesatory 2 months
MC3	= Meat compesatory 3 months	MNC3	= Meat non-compesatory 3 months
BC3	= Bone compesatory 3 months	BNC3	= Bone non-compesatory 3 months
FC3	= Fat compesatory 3 months	FNC3	= Fat non-compesatory 3 months
MC4	= Meat compesatory 4 months	MNC4	= Meat non-compesatory 4 months
BC4	= Bone compesatory 4 months	BNC4	= Bone non-compesatory 4 months
FC4	= Fat compesatory 4 months	FNC4	= Fat non-compesatory 4 months

Figure 1. Carcass composition

Table 2. Production performance of the Australian Commercial Cross cattle in different fattening duration and different growth trials

Parameters	Compensatory growth (C)*			Non Compensatory growth (NC)		
	Fattening durations (months)			Fattening durations (months)		
	2	3	4	2	3	4
Carcass weight (kg)	237.73[a]	241.47[b]	279.33[c]	211.53[d]	227.15[a]	258.67[c]
Dressing percentage (%)	52.17[a]	54.14[b]	60.33[c]	52.07[a]	53.57[a]	56.90[d]
Carcass component :						
Meat (%)	69.70[a]	68.68[b]	67.76[c]	69.69[a]	69.33[a]	66.64[c]
Bone (%)	21.04[a]	20.13[b]	16.18[c]	22.08[d]	19.38[b]	18.12[c]
Fat (%)	9.26[a]	11.19[b]	16.06[c]	8.23[d]	11.29[b]	15.24[c]

[a,b,c,d,c]means with different superscript within same parameters indicated significant difference (P<.05)

Differences of small ADG relatively in different fattening duration affected (P<.05) on slaughtered weight increases. Otherwise, the compensatory growth affected significantly (P<.01) on slaughtered weight (Berg, 1978).

Figure 1 and Table 2 showed that more longer fattening duration applied, resulted increased (P<.05) carcass weight, carcass percentage, percentage of carcass fat, respectively. On the contrary, percentage of meat and bone decreased significantly (P<.05). These results are similar to Taylor (1984).

According to Taylor (1984), the cattle increased in the live-weight, fat growth initiated slightly, the increased geometrically since the cattle entrees to the fattening phase. Bone has a smaller growth relatively than either fat or muscle. The proportion muscle in carcass varying indirectly with fat and a higher fat proportion is associated with a lower muscle proportion and vice versa.

A superior carcass is characterized by a low bone proportionally, a high muscle proportionally an optimally fat content.

These results (Table 2 and Figure 1) are similar to the Taylor (1984) report. These results showed that the applied longer fattening duration provided great contributing fat deposite (Swatland, 1984); although did not greater economically.The changes of carcass composition improved that the animal gain-weight due to fattening durations did not always profitable. But, carcass weight, meat and fat of C cattle resulted

Table 3. Dietary composition for growing – finishing periods (2, 3 and 4 months) fattening duration

Ingredient (Concentrate)	Feed nutrient (DM basic)					
	DM (%)	CP (%)	CF (%)	Ca (%)	P (%)	ME (kcal/kg)
Coccolate-seed skin	9.97	1.44	0.83	0.02	0.09	231.39
Palm cake meal	9.97	2.20	1.27	0.01	0.05	292.23
White pollard	44.62	7.23	4.33	0.04	0.36	1244.88
Salt	0.44	0	0	0	0	0
Limestone	0.87	0	0	0.33	0	0
Onggok	23.62	0.59	2.04	0.06	0.03	467.72
	9.97	0.73	3.72	0.06	0.01	219.42
	0.48	0	0	0	0	0
	100.00	12.19	12.20	0.51	0.56	2455.64

more heavier cumulatively than NC cattle, so that the feedlot efficiency could be applied by implementation of compensatory and manipulation by fattening duration.

CONCLUSSION

1. Average of daily-gains (ADG), slaughtered weight and carcass weight for C cattle were higher compared to NC cattle (P<.05).
2. Feed efficiency of C cattle higher were compared to NC cattle (P<.05) .
3. Carcass weight, percentage of carcass, percentage of fat increased significantly (P<.05) for 2, 3 and 4 months fattening duration, respectively.
4. Carcass meat and bone percentage decreased significantly for 2, 3 and 4 months fattening duration, respectively.
5. Feedlot efficiency could be applied by implementation of compensatory growth phenomena and manipulation of fattening duration.

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