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Lot Feeding of Ostrich Growers Compared with Lucerne Silage Supplementation or Grazing on Pasture

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Abstract: Feed is a major cost in ostrich production. As a result there is interest in grazing ostriches on pasture or using silage to reduce feed costs and improve farm profitability. The purpose of this experiment was to conduct an on-farm trial to examine the performance of ostrich growers (49-78 kg liveweight) supplemented with lucerne silage or grazing on high quality pasture. This was compared with lot feeding of ostrich growers fed a commercial grower ration. There were 4 treatments imposed over a 6 week feeding trial; 1) birds fed 80% of their grower diet and allowed 3-5 hours/day of grazing on a lucerne-based pasture; 2) birds fed 80% of their grower diet and 1 kg of lucerne silage; 3) birds fed 50% of their grower diet and 1 kg of lucerne silage; and 4) control group fed a commercial grower feed in a feedlot. Birds fed 80% of the commercial grower diet with 3-5 hours/day grazing on the lucerne pasture or provided 1 kg lucerne silage as a supplement per day had similar (P>0.05) weight gain (14.15 and 14.40 kg respectively) as the control group (14.39 kg) over the 6 week experimental period. Birds fed on 50% of the grower diet with 1 kg of lucerne silage supplement had lower (P>0.05) weight gain (12.72 kg) over 6 weeks, but this was not significant. The results indicate that supplementing diets with lucerne silage or grazing on a lucerne based pasture can replace 20% of the grower diet without a negative effect on ostrich growth over a 6 week period.

Key words: Ostrich growth, grazing, lot feeding, silage

Introduction

Traditionally most ostriches are fed intensively with high energy and protein rations. Under this system, mortality caused by diseases can be high and feed accounts for over 60% of the production cost (Glatz *et al*., 2003). Experience from ostrich farmers in Australia and overseas suggest that grazing ostriches improves the profitability by reducing the cost of feed. The ostrich is herbivorous with a long digestive tract and well developed hindgut. Swart *et al*. (1993a) reported that the large intestine and caeca of the ostrich provide a suitable environment (pH 6.9-7.3) for microorganisms to ferment fibre. Swart *et al*. (1993c) indicated the fibre digestibility of neutral detergent fibre, hemicellulose and cellulose were 47, 66 and 38% respectively, and was not influenced by body weight (5-50 kg). The main fermentation products are volatile fatty acids (VFAs) which can contribute 52-76% of the daily intake of ME (Swart *et al*., 1993b). This is similar to the value (60-70%) for ruminants (Bergman *et al*., 1965).

The purpose of this study was to conduct an on-farm feeding trial to compare the growth of ostriches in a feed lot with grazing on a lucerne-based pasture or providing lucerne silage.

Materials and Methods

Paddocks: The trial was conducted on a commercial ostrich farm located near Winchelsea in Victoria, Australia. The farm was utilized so that the results were more relevant to the commercial Australian ostrich industry. Four identical paddocks (40 x 40m) with 1.5m high fences were established. For the grazing pasture treatment ostriches were walked daily from a feedlot paddock to another paddock, which had lucerne pasture available with some clover and rye grass. The birds were allowed to graze for 3-5 hours/day. Water was available *ad libitum* to all birds.

Treatments: Four treatments were used in this experiment. The control group (treatment 1) were fed 1.5 kg/day/bird of a commercial grower diet; treatment 2 was fed 0.8 kg/day/bird commercial grower diet plus 1 kg/day/bird lucerne silage; treatment 3 was fed 1.2 kg/day/bird of commercial grower diet plus 1 kg/day/bird of lucerne silage and treatment 4 was fed 1.2 kg/day/bird of commercial grower diet and also allowed to graze on lucerne-based pasture for 3-5 hours/day. The formulation and nutrient content of the commercial grower diet and nutritional value of lucerne silage are listed in Table 1.

Table 1: Composition (%) and estimated nutritive value of the commercial grower diet and determined nutritive value of lucerne silage

Ingredient	Commercial grower diet	Variable	Nutritive value of commercial grower diet (%)	Nutritive value of lucerne silage (% DM)
Barley	10	GE (MJ/kg)	16.40	17.45
Mill run	15.9	AME (MJ/kg)	9.6	10.54
Maize	31	CP	15.03	16.35
Oat hulls	10.3	CF	6.53	24.79
Pre-mix	0.35	ADF	9.45	32.16
Lucerne meal	10	NDF	17.85	42.68
Soybean meal	4.9	Methionine	0.49	0.21
Canola meal (solv.)	12.5	Aspartic acid	1.20	NA
Limestone	2	Threonine	0.44	0.44
Dicalcium Phosphate	0.2	Serine	0.79	0.45
Molasses	0.5	Glutamic acid	2.78	NA
Lysine	0.15	Glycine	0.60	NA
Methionine	0.2	Alanine	0.79	0.45
Zn bacitracin	0.03	Valine	0.72	0.64
		Isoleucine	0.56	0.49
		Leucine	1.16	0.79
		Tyrosine	0.49	0.39
		Phenylalanine	0.66	0.45
		Histidine	0.37	0.23
		Lysine	0.99	0.57
		Arginine	1.10	0.62

NA=not available; DM=dry matter.

Birds and feeding: In September 2004, 80 ostriches (32-36 weeks of age) were drafted from a large group of ostriches. Twenty ostriches in the weight range from 49-78 kg were allocated to each paddock. Birds were allowed 3 weeks to adapt to the high fibre source by being fed lucerne silage with the commercial grower diet. After the adaptation period, birds were allocated to the different treatment groups. The silage (chopped to a length of about 5cm) was placed in large tractor tyres (1.5m diameter; two feeders/paddock). The commercial grower diet (pellets) was tipped onto the top of the fibre source every second day to ensure all birds consumed their share of the grower diet. In treatment 4, birds were allowed to graze on pastures for 3-5 hours/day. Birds were fed the diets for 6 weeks and weighed at the start of the trial and every two weeks until the experiment was competed. Alternate day feeding was practiced when feeding of the grower diet to reduce the impact of bird dominance. It also allowed the birds sufficient time to consume the large volume of lucerne silage and pasture.

Methods: Acid detergent fibre (ADF), neutral detergent fibre (NDF) and crude fibre (CF) were determined using methods developed by the ANKOM company (Pig and Poultry Production Institute Nutrition Laboratory). Gross Energy was determined using a Parr 1281 Calorimeter. The amino acids were determined by a Waters Alliance HPLC, controlled via Waters proprietary Millennium software. Primary amino acids were detected at 570nm and secondary amino acids at 440nm. Millennium software was used for data collection and calculation.

Statistical analysis: The paddocks were selected at random for each treatment. For the purposes of this experiment each bird was considered a replicate. This decision was made on the basis of the paddocks being alike in all respects, each bird had equal access to the diets and the difficulty of obtaining a large number of replicated paddocks in a farm environment. The data was analysed using the ANOVA in the Systat software (Wilkinson, 1996).

Results

Feed wastage: No feed residue was left for all treatment groups except for birds on 1.2 kg/day/bird commercial grower diet plus 1 kg lucerne silage. They left a small amount of lucerne silage during the first week, but none thereafter.

Body weight and growth: There was no significant ($P>0.05$) difference in body weight and growth between the treatment groups (Table 2). Body weight of birds fed on 0.8 kg concentrate and 1 kg lucerne silage was slightly lower ($P>0.05$) at week 4 and 6 compared to the body weight of other treatments. Birds on 1.2 kg/day/bird commercial grower diet and allowed to graze on lucerne based pasture for 3-5 hours/day gained more ($P>0.05$) weight over weeks 1-4, but there was less ($P>0.05$) weight gain between weeks 4-6 of the experiment due to high environmental temperature during that period. Birds fed on 0.8 kg/day/bird commercial grower diet plus

Table 2: The growth (kg) of ostriches on different treatments

Treatment	Weight and weight gain							
	Start	2 weeks	4 weeks	6 weeks	Weight gain (1-2 weeks)	Weight gain (2-4 weeks)	Weight gain (4-6 weeks)	Weight gain (total)
Control	62.31	67.81	74.39	76.69	5.50	6.58	2.31	14.39
0.8kg grower /1kg silage	63.05	68.57	72.97	75.77	5.25	4.40	2.80	12.72
1.2kg grower /1kg silage	62.32	9.62	74.10	76.72	7.30	4.47	2.62	14.40
1.2kg grower /grazing	62.40	68.55	74.92	76.55	6.15	6.37	1.62	14.15
P value	0.979	0.911	0.859	0.970	0.371	0.194	0.768	0.482
SEM	0.698	0.865	0.814	0.777	0.411	0.469	0.421	0.442

1 kg lucerne silage showed a lower (P>0.05) weight gain over the experiment compared to the other 3 treatment groups, but this was not significant.

Discussion

The growth of ostriches was not affected when fed the commercial grower diet with lucerne silage or when allowed to graze on lucerne based pasture. However, there was a non-significant (P>0.05) reduction in growth when birds were fed 0.8 kg of commercial grower diet and 1 kg lucerne silage compared to the control. The birds fed on grower pellets, or on 1.2kg grower pellets supplemented with 1 kg lucerne silage (CP 16.35%, AME 10.54 MJ/kg) or allowed to graze on lucerne pasture had similar growth over the 6 week experimental period. This suggests that 0.8 kg of commercial feed with 1 kg lucerne silage satisfied the nutrient requirements of ostrich growth, but at a lower growth rate. Farrell *et al.* (2000) found that when concentrate supplementation is provided at 50, 75 and 100% of appetite, the pasture (Rhodes grass, Kikuyu grass and white clover) intake of ostriches ranged from 185-315 g/day and the daily gain ranged from 180 to 408g. Reducing the concentrate supplementation (not lower than 70%) increased the pasture intake regardless of the quality of the pasture. However, ostriches ingest more high quality pasture than low quality pasture if they have a chance.

Cilliers *et al.* (1998) reported that the average daily gain of birds (50-70kg) fed on 2.0 kg maize silage and 1.25 kg/day/bird concentrate was 25% lower than the control group fed the commercial grower diet. This may be because the daily allocation and the quality of the silage were different from our study. This suggests that the better quality silage or pasture can significantly contribute to the nutritional requirements of growing ostriches. Maximum production may be achieved at reduced cost by effective use of silage or pasture sources combined with a suitable commercial grower diet supplement.

This study has provided some evidence that it is possible to achieve lower costs and reasonable weight gains by supplementing a commercial grower ration with high quality pasture and silage up to a point somewhere between 50 and 80% of the ration. Ideally it would be important to have an extended trial to see how long it takes the birds to reach slaughter weight on a much higher grazing reliance system and possibly on a system that is supplemented with a simple grain mix rather than a commercial grower ration. The results of this trial now need to be verified on a larger scale using a crop and pasture rotation system which allows ostriches to utilize cheap forage sources.

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