EFFECT OF NUTRITIVE VALUE OF BATIKI GRASS (*ISCHAEMUM ARISTATUM* VAR. *INDICUM*) SUPPLEMENTED BY LEAVES OF BROWSES (*GLIRICIDIA SEPIUM* AND *LEUCAENA LEUCOCEPHALA*) ON THE PERFORMANCE OF GOATS

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Two experiments were carried out to test the effect of incremental supplementation of batiki grass (*Ischaemum aristatum* var. *indicum*) with either *Gliricidia sepium* or *Leucaena leucocephala* and 16-growing goats (Anglo-Nubian x Local Fiji) were used to measure voluntary feed intake, apparent nutrient digestibility and to estimate live-weight changes. At the start of experiments 1 and 2, the mean age and live weight of the goats were 8–10 months and 8.7 ± 0.34 kg, and 10–12 months' and 12.3 ± 0.11 kg, respectively. In both experiments there were four treatments and batiki grass as a sole diet was used as control. Four amounts of *Gliricidia* (experiment 1) and *Leucaena* (experiment 2), respectively, were offered: 0 (control), 20%, 50% and 80% of the total daily forage allowance. The basal and supplemental components of the diets were mixed and offered as a whole diet. *Leucaena* forage had a higher CP but lower DM NDF compared to *Gliricidia* forage. In the two experiments, batiki grass had similar, DM, CP, ash and GE, but had a higher NDF (39.7% v. 34.5%) content in experiment 1. The DM and NDF contents of the diets decreased linearly with incremental supplementation of batiki grass with either *Gliricidia* or *Leucaena*. CP contents of diets increased with incremental supplementation of batiki grass with either of the browses. Leucaena diets were higher in CP than those of *Gliricidia*. OM content was within the same range for all diets in both experiments. GE (MJ/kg DM) contents of diets also increased with incremental supplementation of batiki grass with either *Gliricidia* or *Leucaena*. The intake of batiki grass by the goats in both experiments differed significantly ($P < 0.05$). Voluntary feed intake was observed to increase ($P < 0.05$) with incremental supplementation of batiki with either *Gliricidia* or *Leucaena*. In both experiments, incremental supplementation of either of the browses increased body weight gain and daily live-weight gain linearly (P). However, live-weight gains were relatively higher ($P < 0.05$) with *Leucaena* diets than with *Gliricidia's*. Feed efficiency (feed/gain) of the goats in both experiments followed the trend of live-weight gain and voluntary feed intake ($P < 0.05$). Supplementation of batiki grass with either *Gliricidia* or *Leucaena* increased the rate of digestion of DM, CP, OM and NDF by the growing goats. There was a decline in growth rate but not voluntary feed intake at the + 80 Gli and + 80 Leu diets. Data on growth rate and apparent nutrient digestibility coefficients suggest that both browses are potential sources of protein in ruminants' diets, however, *Leucaena* had advantages over *Gliricidia* in all the parameters measured. In conclusion, the best level at which either *Gliricidia* or *Leucaena* could be used to supplement batiki grass to obtain maximum growth of crossbred Anglo-Nubian goats in Samoa would be at + 50 Gli or + 50 Leu, respectively.

batiki grass; *Gliricidia*; *Leucaena*; feed intake; growth; nutrient digestibility; goats

INTRODUCTION

Batiki grass (*Ischaemum aristatum* var. *indicum*) is the most common propagated pasture grass species for ruminant livestock in Samoa and other small Pacific Island countries. It can tolerate heavy grazing and poor management. Due to its competitive nature, it is difficult to use in legume-grass mixtures (Pottier, 1983). The challenge in using pasture as a sole source of forage for animals is determining whether or not the pasture can supply adequate nutrients for maintenance, growth and production. In comparison with other grass species such as guinea grass, signal and elephant grass, it has low nutritive value (Aregheore, 2001a).

In the Pacific Island countries (PICs) a number of indigenous and introduced browse species abounds (Aregheore, Manueli, 2000). The leaves of browses are potential sources of nutrients. They are therefore used to improve the production of ruminant livestock consuming tropical pastures that have low nutritive values and at present form an integral part of ruminant feeding systems (Brewbaker, 1986; Preston, Murgeito, 1987; Ash, 1990; Yahaya et at., 2001). The importance of browses in the nutrition of ruminant livestock in the tropics and subtropics has been stressed (Mandal, 1997; Kaitho et al., 1998; Aregheore et al., 1998; Aganga, Monytsiwa, 1999; Abdulrazak et al., 2000).

The efficiency of ruminant livestock production especially during adverse weather conditions (drought/dry season) is dependent upon the use of available feed for maintenance, growth and reproduction. Today a wide variety of browse species are used in livestock production in the tropics and temperate countries of the world.

It has been emphasized that most tropical grass species have low dry matter digestibility and intake (Minson, 1971; Humphreys, 1987). Livestock reared on batiki alone have problems in meeting their maintenance need (Aregheore, 2001b), therefore, it is imperative to balance their diet in terms of protein, vitamins and minerals through supplementation with leaves of browse trees (Yahaya et al., 2001; LeHouerou, 1980). The leaves, shoots and twigs of browse plants can help overcome the nutritional constraints of low quality feeds (roughage). Woods et al. (1994) and Mandal (1997) reported that leaves from browse and fodder trees form a major part of livestock feed in tropical countries, where they play an important role in improving dietary protein (Aregheore et al., 1998; Kaitho et al., 1998). It is the objective of this experiment to test the effectiveness of either *Gliricidia sepium* or *Leucaena leucocephala* as supplements to a basal diet of batiki grass (*Ischaemum aristatum* var. *indicum*) on voluntary feed intake, growth rate and nutrient utilization by growing goats in Samoa.

MATERIALS AND METHODS

Site

The experiment was conducted at the Goat Unit, School of Agriculture, The University of the South Pacific, Alafua Campus, Samoa (latitude = 13.5 °S, longitude = 172.5 °W). Experiment 1 was conducted between November 4–December 24, 2000, while experiment 2 was performed between December 31, 2000–February 19, 2001.

Animals

The same 16-growing goats (Anglo-Nubian x Local Fiji) were used to measure voluntary feed intake, apparent nutrient digestibility and to estimate live-weight changes. At the start of experiments 1 and 2, the mean age and live weight of the goats were 8–10 months and 8.7 ± 0.34 kg, and 10–12 months and 12.3 ± 0.11 kg, respectively. Before the commencement of the experiment the goats were drenched with an anthelminthic (Albendazole, Smithkline Animal health Products, Auckland, New Zealand) at a rate of 1 ml/10 kg bodyweight. These animals were weighed at the beginning and end of the experiment. Each experiment lasted for 51 days.

Diets, feeding and management

Batiki grass was harvested daily. This was chopped with a bush knife into pieces (6–8 mm) which limited preferential selection of forage components. *Gliricidia* and *Leucaena* were harvested in the morning for feeding in the afternoon, with some allowed to wilt overnight for feeding in the morning. Stems were removed from both forages to ensure that the fodder composition was uniform. In both experiments there were four treatments and batiki grass offered alone was used as control. Four amounts of *Gliricidia* (experiment 1) and *Leucaena* (experiment 2), respectively, were offered: 0 (control), 20%, 50% and 80% of the total daily forage allowance. The basal and supplemental components of the diets were mixed and offered as a whole diet. The levels of supplementation were calculated as percentage of total *ad libitum* daily forage allowance.

Experimental procedure and design

An adaptation period of 7 days was allowed for the goats to get used to the experimental diets. The diets were fed on an *ad libitum* basis to allow about 10–20% refusal. These were offered three to four times daily to ensure constant availability. Batiki grass, *Gliricidia* and *Leucaena* were sampled once a week for dry matter determination. Feeds offered and refused were recorded on a daily basis to estimate voluntary dry matter intake. The live weights recorded at the end of each week of the experiment were used to calculate the amount of the mixtures to be offered during the subsequent week.

All the goats were allowed free access to mineral blocks and ample drinking water was provided daily. The mineral/vitamin block contains salt, calcium, magnesium, copper, cobalt, iodine, phosphorus, manganese, iron, zinc, selenium (3 ppm), vitamins A, D and E, with copra meal and molasses added (Summit). At early morning feeding refusals of previous day's feed was weighed and sampled. The four diets were offered in a randomized complete block design for 16 goats, i.e four goats per treatment, measurements for 51 days. Cleaning of the pens and removal of leftovers from the previous day was done daily before supplying each day's diet.

Digestibility study

At the end of each growth trial, all the animals in each diet group were used for metabolic studies. Since animals were on the same diet and environment, digestibility study started 2 days at the end of the growth phase. The total faecal collection method was used for faeces. The total daily faecal output for each animal was weighed before a 25% sample was removed for dry matter determination. The faeces were later dried in a forced-air oven at 70 °C for 24 hours. The daily samples of faeces and diets were then bulked separately and milled with a simple laboratory mill and stored in air tight bottles until required for analysis.

Analytical methods

The AOAC (1995) method was used for nutrient contents of diets. All analyses were done in triplicate. Dry

matter was determined by drying at constant weight at 70 °C for 24 hours in a forced-air oven, ash by incineration at 600 °C for 24 hours, protein by the micro-Kjeldahl procedure (N x 6.25). Neutral detergent fibre (NDF) analysis was according to Goering and Van Soest (1970).

Statistical analysis

Data on voluntary feed intake, growth rate, feed efficiency and apparent nutrient digestibility coefficients were analyzed with ANOVA using individual goat as a replicate (S t e e l , T o r r i e , 1980). Where significant differences were observed treatment means were compared with Duncan's multiple range tests. Also, all data on growth, feed intake, feed efficiency and apparent nutrient digestibility coefficients between *Gliricidia* and *Leucaena* within treatments were subjected to a Student's *t*-test.

RESULTS

Chemical composition of feeds and experimental diets

All the goats remained healthy throughout the experimental periods. The chemical composition of the feeds used in the experiments is presented in Table I. The values given are the means of three observations. Among the two browses, *Leucaena* forage had a higher crude protein (CP) but lower dry matter (DM) and neutral detergent fibre (NDF) compared to *Gliricidia* forage. In the two experiments, batiki grass had similar, DM, CP, ash and gross energy, but had a higher NDF (39.7% v. 34.5%) content in experiment 1.

Table II presents the composition of diets offered to the goats in the two experiments. The DM and NDF contents of the diets decreased linearly with incremental supplementation of batiki grass with either *Gliricidia* or *Leucaena*. However, CP contents of diets increased with incremental supplementation of batiki grass with either *Gliricidia* or *Leucaena*. *Leucaena* diets were higher in CP than those of *Gliricidia*'s. OM content was within the same range for all diets in both experiments. As the supplementation of batiki grass diets with either *Gliricidia* or *Leucaena* increase, the gross energy (MJ/kg DM) content of the diets also increased.

Voluntary feed intake, growth rate and feed efficiency

Table III presents data on voluntary feed intake, growth and feed efficiency of the goats in experiments 1 and 2. The intake of batiki grass by the goats in both experiments differed significantly (P). The goats in experiment 2 had a higher level of batiki grass intake compared to those in experiment 1. Voluntary feed intake

I. Chemical composition of the food used in experiments

	Nutrients (on dry matter basis)				
	DM (%)	ash (%)	CP (%)	NDF (%)	GE (MJ/kg DM)
Experiment 1					
Batiki grass	37.3	7.6	5.3	39.7	12.8
Gliricidia	27.1	7.8	18.6	26.4	14.4
Experiment 2					
Batiki grass	34.9	7.6	5.2	34.5	12.4
Leucaena	23.0	6.8	24.6	22.5	15.2

DM – dry matter, CP – crude protein, NDF – neutral detergent fibre, GE – gross energy

II. Proximate chemical composition of diets offered – batiki grass; different ratios of batiki/*Gliricidia* and batiki/*Leucaena* (% DM)

Nutrients (%)	Diets							
	batiki/*Gliricidia*				batiki/*Leucaena*			
	batiki	+ 20 Gli	+ 50 Gli	+ 80 Gli	batiki	+ 20 Leu	+ 50 Leu	+ 80 Leu
Dry matter (DM) %	37.3	35.4	32.6	30.8	34.9	32.5	31.4	30.2
Analysis of DM (%)								
Crude protein (%)	5.3	9.6	14.8	16.3	5.2	11.1	12.8	15.3
NDF (%)	39.7	35.8	36.3	33.8	34.5	32.8	30.6	28.8
Ash (%)	7.6	7.1	7.0	7.0	7.6	7.2	7.1	6.9
Organic matter (%)	92.4	92.9	93.0	93.0	92.4	92.8	92.9	93.1
Gross energy (MJ/kg DM)	12.8	14.7	14.9	15.8	12.4	13.8	14.5	14.8

+ Gli – with *Gliricidia*, + Leu – with *Leucaena*
NDF – neutral detergent fibre

was observed to increase ($P < 0.05$) with incremental level of supplementation of batiki grass with either *Gliricidia* or *Leucaena*. The source of forage protein and level of supplementation with either (*Gliricidia* or *Leucaena*) were observed to have effect on voluntary feed intake of the goats.

The goats in experiment 2, had significantly higher feed intake ($P < 0.05$) compared to those in experiment 1. The *Leuceana* diets were accepted at the first presentation to the goats, unlike *Gliricidia* diets that were not initially accepted during the first few days. However, during the subsequent period of the experiment, *Gliricidia* diets offered to the goats, were consumed at all levels of supplementation.

In both experiments, incremental supplementation of batiki grass with either of the browses increased body weight gain and daily live-weight gain linearly ($P < 0.05$). But body weight and daily live-weight gains of the goats on diets at the higher incremental supplementation of batiki grass with either + 80 Gli and + 80 Leu were observed to decreased. The daily live-weight gain obtained in goats that received both diets were significantly higher ($P < 0.05$) than that for goats that received batiki grass as the sole diet (Table III). However, live-weight gains were relatively higher ($P < 0.05$) with *Leucaena* than with *Gliricidia*. Feed efficiency (feed/gain) of the goats in both experiments followed the trend of live-weight gain and voluntary feed intake ($P < 0.05$).

Apparent nutrient digestibility coefficients

Table IV presents the mean values with standard error for the mean effects of dietary treatments on apparent nutrient digestibility coefficients by goats offered batiki grass supplemented with either *Gliricidia* or *Leucaena*. The goats on batiki grass sole diet in experiment 1 had higher digestibility of DM and NDF compared to those in experiment 2. Organic matter (OM) and CP digestibility of batiki grass by goats in experiment 2 were significantly better ($P < 0.05$) compared to the digestibility of the same nutrients by goats in experiment 1.

At all levels of supplementation, the digestibility of nutrients (DM, OM, CP and NDF) by goats in experiment 2 (*Leucaena* diets) was significantly higher ($P < 0.05$) comparatively to those in experiment 1 (*Gliricidia* diets). It was observed that incremental supplementation with either *Gliricidia* or *Leucaena* increased digestibility of DM, OM, CP and NDF ($P < 0.05$). In both experiments apparent nutrient digestibility coefficients were remarkably better with incremental supplementation of batiki grass with the browse species (*Gliricidia* or *Leucaena*) compared to the batiki sole diets in experiments 1 and 2. However, *Leucaena* diets were better digested than those of *Gliricidia* by the goats (Table IV).

DISCUSSION

Chemical composition of feeds and experimental diets

The effects of the supplementation of batiki grass with either *Gliricidia* or *Leucaena* on the performance of growing goats are reported in two experiments. The comparison between the two browses is also made to facilitate discussion. The DM, OM and NDF of batiki grass used in both studies were similar to the values reported

III. Voluntary feed intake, live weight gain and feed efficiency of goats offered batiki grass; and different ratios of batiki/*Gliricidia* and batiki/*Leucaena* (% DM)

Experiment 1 (*Gliricidia*)		Diets				
Parameters		batiki	+ 20 Gli	+ 50 Gli	+ 80 Gli	*S.E.M
Initial live weight	(kg)	8.4	8.6	9.3	8.6	0.34
Final live weight	(kg)	11.1	12.2	13.1	11.8	0.72
Body weight gain	(kg)	2.7	3.6	3.8	3.2	0.42
Daily gain	(g)	53^{c}	71^{a}	175^{a}	163^{b}	18.41
Daily feed intake	(g)	300^{c1}	309^{b1}	309^{ab1}	313^{a1}	4.76
Feed efficiency	(feed/gain)	5.7	4.4	4.1	5.0	0.61
Experiment 2 (*Leucaena*)						
Parameters		batiki	+ 20 Leu	+ 50 Leu	+ 80 Leu	*S.E.M
Initial live weight	(kg)	12.5	12.3	12.3	12.2	0.11
Final live weight	(kg)	15.4	16.7	16.9	15.5	0.68
Body weight gain	(kg)	2.9	4.4	4.6	3.3	0.72
Daily gain	(g)	57^{d}	86^{b2}	90^{a2}	68^{a2}	13.86
Daily feed intake	(g)	320^{d2}	418^{c2}	424^{b2}	430^{a2}	45.23
Feed efficiency	(feed/gain)	5.6	4.4	4.5	6.3	0.89

+ Gli – with *Gliricidia*, + Leu – with *Leucaena*

[a, b,c,d] Means within rows with different superscript differ ($P < 0.05$)

[1,2] Means within each treatment for each variable of different superscripts differ ($P < 0.05$)

*S.E.M – standard error of the means

by Solomona (1988). However, the CP value of batiki grass reported here is lower than the values reported earlier by Solomona (1988), Ash et al. (1992) and Aregheore (2001b). The period of the year, forage age and maturity stage may be implicated for the differences observed in the CP content of the batiki grass.

The DM and NDF contents of batiki grass used in experiment 2 were lower than that of the batiki grass used in experiment 1. The browses had low DM and NDF compared with the batiki grass. The CP, OM and NDF content of *Gliricidia* and *Leucaena* reported here are within the range reported in the literature (Kaitho et al., 1998; Smith et al., 1995; Rootheart, Paterson, 1997; Getachew, 1998).

Gliricidia had lower CP, but had a higher NDF content than *Leucaena* in the experiments reported and this observation support the reports of Orden et al. (2000) with *Gliricidia* than *Leucaena* when both browses were used to supplement sheep fed ammonia treated rice straw in Japan. But contradicts the reports of Reed et al. (1990), Richards et al. (1994) and Abdulrazak et al. (1996), who reported lower fibre components for *Gliricidia*.

The linear differences observed in nutrient contents of batiki grass with incremental supplementation with either *Gliricidia* or *Leucaena* seems a common characteristics among grass species when supplemented weight by weight (w/w) at different ratios with browses or legumes (Wahynni et al., 1972; Aregheore, 2001b). The diets were all high in CP and were above the 11–12% CP contents recommended as adequate for growing goats (NRC, 1981). The gross energy contents of the different diets are also consistent with published estimates for forages fed to ruminants in other tropical and sub-tropical countries of the world (Butterworth, 1964).

Voluntary feed intake, growth rate and feed efficiency

Goats in the control group consumed an average of 320 and 300 g/head/day of fresh batiki grass in experiments 1 and 2. The intakes converted to DM are above the standard forage intake of 80 g DM per kg $W^{0.75}$ suggested by Crampton et al. (1960) for tropical forages that were proportionately 0.70 digestible. Generally, ruminant livestock in Samoa and other Pacific Island countries consume batiki grass solely without supplementation to meet their minimal requirements for growth, maintenance, reproduction and lactation.

Supplementation of batiki grass with *Gliricidia* and *Leucaena* affected total voluntary feed intake by the goats and with incremental supplementation, voluntary feed intake increased linearly. The increased voluntary feed intake observed in both experiments with incremental supplementation of batiki grass with either *Gliricidia* or *Leucaena* may be due to the fresh form at which the two browses were presented to the goats. Increase in voluntary intake of fresh *Gliricidia* and *Leucaena* with increasing levels of supplementation has been reported by Smith et al. (1995) for growing West African Dwarf sheep and by Balogun and Otchere (1995) for Yankassa rams, respectively, in Nigeria. Also Abdulrazak et al. (1996) reported increase dry matter intake with *Leucaena* but not *Gliricidia* when both browses were used as supplements to napier grass in the diets of steers in Kenya. The supplementation of batiki grass with either *Leucaena* or *Gliricidia* at the different levels was observed to increase the protein levels of the diets and this subsequently could have resulted to faster outflow rate thereby increasing intake and providing more degradable organic matter. The improved feed intake observed in the two experiments could therefore be due to the above reasons.

In this study *Gliricidia* and *Leucaena* were readily consumed and the goats did not reject any of the diets offered in both experiments. However, *Leucaena* diets were more accepted than those of *Gliricidia*. In general it was observed that voluntary feed intake of batiki grass was enhanced with incremental supplementation with either *Gliricidia* or *Leucaena* browses. The none rejection of the experimental diets suggested that anti-nutritive factors such as tannins and mimosine that could be major nutritional problems did not interfere with voluntary feed intake of the goats. Generally, the presence of anti-nutritive factors at lethal levels have effects on voluntary feed intake and on nutrient utilization by livestock. The animals remained healthy throughout the experimental period and no symptoms of illness as a result of anti-nutritive factors or any other factors were observed throughout the experiment.

Growth rate of the goats in both experiments is within the level reported by Solomona (1988) and Ash et al. (1992) for growing goats fed on sole diet of batiki grass in Samoa. The higher body weight and daily live-weight gains of goats on either *Gliricidia* or *Leucaena* could be associated with higher voluntary feed intake. Compared to control diets, the addition of *Gliricidia* or *Leucaena* at the various incremental levels of supplementation improved N utilization, provided more rumen degradable N, which resulted in increase consumption and subsequently improved live weight gain and feed efficiency. Available nitrogen from the browses at the different levels of supplementation contributed to improve in the live-weight gains of the goats in both experiments.

In both experiments the goats fed either + 80 Gli or + 80 Leu diets had relatively higher voluntary feed intake but lower body weight and daily live-weight gains compared to the other supplemented groups. These diets were, however, higher in CP and GE contents than the 13.3% CP and 13.4 MJ GE/kg BW suggested by Kumar (2000) as being adequate for growing crossbred Anglo-Nubian goats in Samoa.

The digestion of DM, OM and NDF in both diets (Table IV) were relatively low compared to other supplemented diets (not control diets). The low apparent nutrient digestion coefficients of DM and in particular OM and NDF could be responsible for the comparative

low live-weight gains obtained in the goats that received either + 80 Gli or +80 Leu diets. Both diets had higher CP content compared to others. It could be reasoned that there was a faster rate of passage from the rumen, therefore the rumen microbes could not degrade them effectively. Also, it was possible that the availability of protein in the + 80 Gli or + 80 Leu diets were modified by anti-nutritive factors such as coumarin and flavenol in *Gliricidia* and tannin in *Leucaena* (Smith et al., 1995; Petty et al., 1998).

Feed efficiency of the goats improved with incremental supplementation of batiki grass with either *Gliricidia* or *Leucaena*. Feed efficiency of the supplemented goats was relatively better than the control diets but the differences were of no statistical significance.

Apparent nutrient digestibility coefficients

The improved digestibility of the supplemented diets above the control diets are consistent with other studies (Siebert, Hunter, 1982; Ash, 1990; Ash et al., 1992; Smith et al., 1995; Balogun, Otchere, 1995). Supplementation of batiki grass with either *Gliricidia* or *Leuceana* increased the rate of digestion of DM, CP, OM, NDF and GE by the growing goats. It was observed that digestibility of OM and energy were better in the goats offered *Leucaena* diets, and this might be the possible reason for the better live-weight gain obtained.

In this trial *Leucaena* effected better response on digestibility of DM, CP, OM, NDF and GE than *Gliricidia* (Table IV). Our observation on nutrient digestibility conflicts with Abdulrazak et al. (1997) who reported better response on digestibility of steers on *Gliricidia* supplements than those on *Leucaena*. The source of grass species, the age and species of ruminant used could be implicated for the difference in response to the two browses. In terms of forage protein sources, *Gliricidia* and *Leucaena* are high in nutritive value and they could be incorporated as cheap protein sources for growth, maintenance, reproduction and lactation in the diets of ruminant livestock. Both browses have been effectively used in other tropical countries as supplements in the diets of cattle, goats and sheep (Osuji, 1987; Smith et al., 1995; Balogun, Otchere, 1995; Abdulrazak et al., 1997; Orden et al., 2000; Ondiek et al., 2000).

CONCLUSION

Supplementation of batiki grass with either *Gliricidia* or *Leucaena* improved voluntary feed intake, growth rate and nutrient digestibility of growing goats above those on sole diet of batiki grass in both experiments. The acceptability of the two browses confirm further that tropical browses are palatable and could offer considerable potential while being productive. In conclusion, there was a decline in growth rate but not voluntary feed intake at the + 80 Gli and + 80 Leu diets. Data on growth rate and apparent nutrient digestibility coefficients suggest that both browses are potential protein sources in ruminants' diets. The best level at which either *Gliricidia* or *Leucaena* could be used to supplement batiki grass to obtain maximum growth of crossbred Anglo-Nubian goats in Samoa would be at + 50 Gli or + 50 Leu, respectively.

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Efekt nutriční hodnoty trávy batiki (*Ischaemum aristatum* var. *indicum*) obohacené listy výhonků *Gliricidia sepium* a *Leucaena leucocephala* na užitkovost koz.

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Ve dvou pokusech byl testován účinek trávy batiki (*Ischaemum aristatum* var. *indicum*) obohacené listy výhonků *Gliricidia sepium* nebo *Leucaena leucocephala* na užitkovost 16 koz (anglo-nubijské x místní plemeno fidži). Byly zjišťovány příjem krmiva (*ad libitum*), stravitelnost živin a živá hmotnost. Na začátku prvního a druhého pokusu byl průměrný věk koz 8–10 měsíců a jejich průměrná živá hmotnost 8,7 ± 0,34 kg, resp. věk 10–12 měsíců a hmotnost 12,3 ± 0,11 kg V prvním pokusu byly doplňkem listy výhonků *Gliricidia* a ve druhém listy výhonků *Leucaena*. V rámci každého pokusu byly zkrmovány čtyři typy krmných dávek: 0 (kontrola), 20 %, 50 % a 80 % doplňků v rámci celkové krmné dávky. Kontrolou byla krmná dávka, která se skládala pouze z trávy batiki. Základní a doplňkové komponenty krmných dávek byly smíchány a předkládány ve formě celkové krmné dávky. Píce *Leucaena* měla vyšší obsah dusíkatých látek (NL), ale nižší obsah sušiny (S) a neutrálně detergentní vlákniny (NDF) ve srovnání s pící *Gliricidia*. V obou pokusech měla tráva batiki podobný obsah S, NL, popela a brutto energie (BE), ale měla vyšší obsah NDF (39,7%) v 1. pokusu v porovnání s NDF (34,5 %) v pokuse 2. Obsah S a NDF se v krmných dávkách lineárně snižoval se zvyšujícím se doplňkem *Gliricidia* či *Leucaena* v krmné dávce. Obsah NL se v krmných dávkách zvyšoval při zvýšeném zkrmování výhonků obou doplňků. Krmné dávky s pící *Leucaena* měly vyšší obsah NL než s pící *Gliricidia*. Obsah organické hmoty (OH) se pohyboval ve stejném rozmezí ve všech krmných dávkách obou pokusů. Obsah BE (MJ/kg sušiny) v krmných dávkách se také zvyšoval se stoupajícím doplňkem jak *Gliricidia*, tak i *Leucaena*.

V obou pokusech se příjem trávy batiki významně lišil ($P < 0,05$). Byl zjištěn zvýšený příjem krmiva ($P < 0,05$) při zvyšování obou doplňků. V obou pokusech došlo k lineárnímu zvýšení hmotnostního přírůstku a průměrných denních přírůstků ($P < 0,05$) při zvyšování doplňku *Gliricidia* nebo *Leucaena*. Hmotnostní přírůstky byly relativně vyšší ($P < 0,05$) při zkrmování píce *Leucaena* než při zkrmování píce typu *Gliricidia*. V obou pokusech účinnost krmiva (krmivo/přírůstek) u koz sledovala trend přírůstku živé hmotnosti a volného příjmu krmiva ($P < 0,05$). Zkrmování obou doplňků (*Gliricidia* a *Leucaena*) mělo za následek zvýšení intenzity trávení S, NL, OH a NDF u rostoucích koz. Byl zaznamenán pokles v intenzitě růstu, ale nikoliv v příjmu krmiva (zkrmovaného *ad libitum*) při krmné dávce + 80 *Gliricidia* a + 80 *Leucaena*. Údaje o intenzitě růstu a stravitelnosti živin naznačují, že výhonky obou typu rostlin jsou potenciálními zdroji bílkovin v krmných dávkách přežvýkavců, avšak píce *Leucaena* převyšovala typ *Gliricidia* ve všech sledovaných parametrech.

Závěrem je možné říci, že nejvyššího růstu u kříženců anglo-nubijské kozy x místní plemeno fidži v Samoe je dosahováno při zkrmování + 50 Gli, resp. + 50 Leu jako doplňku k trávě batiki.

tráva batiki; *Gliricidia*; *Leucaena*; příjem krmiva; růst; stravitelnost živin; kozy

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