

Rhodeps Grass Evaluation - Evaluation of Rhodes Grass Cultivars under Emirates Conditions

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Summary

Six genotypes of Rhodes grass (*Chloris gayana* L.) were evaluated for their forage yield and quality under Emirates conditions during 1991/1992. The results revealed no significant differences between Katambora, Callide and Samford which produced significantly higher forage yield than other cultivars. Forage yield of different cuts increased gradually and reached its peak at the fifth cut. Later cuts during summer had the highest forage yield.

Percent crude protein decreased while percent crude fiber increased with cuts but the difference was significant only for early cuts. Pioneer, an early flowering genotype, had the lowest protein and the highest crude fiber while the late flowering genotypes performed well.

Résumé

Evaluation selon Rhodeps des plants d'herbe de Rhodes dans les conditions des émirats

Six génotypes de *Chloris gayana* L. ont été évalués pour leur potentiel de production et leurs qualités fourragères dans les conditions des Emirats Arabes Unis pendant 1991/1992. Les résultats obtenus ne mettent en évidence aucune différence significative entre les écotypes Katambora, Callide et Samford qui ont produit significativement plus de matière sèche que les autres cultivars. Le rendement en fourrage des différentes coupes a augmenté progressivement pour atteindre son maximum à la 4^e coupe. Les dernières coupes réalisées en été présentaient les rendements les plus élevés. Une diminution du pourcentage de protéines brutes avec le nombre de coupes a été constatée alors qu'une tendance inverse a été observée pour le pourcentage de fibres brutes. Des différences significatives pour ces deux paramètres n'ont été observées que pour les premières coupes. Le génotype précoce Pioneer, présentait le plus bas niveau de protéines et le plus haut niveau de fibres brutes alors que les génotypes plus tardifs se caractérisaient par de bonnes performances.

Introduction

United Arab Emirates is a typical arid country with a harsh growing conditions. It lies within the subtropical desert with a hot (48°C) and dry weather during summer (Annual mean temperature 20-30°C) and a comparatively cool during winter. The rainfall is low and irregular (60 mm-120 mm/year). The climate is influenced by the prevailing winds, the upwelling of coastal water and cyclones. Water resources are limited and local over-pumping from underground water has led to salinity problems (1-5 dsm⁻¹). The soil is a sandy loam with high calcium carbonate and high pH (8.5-9.5). It is generally poor in organic matter and minerals.

Rhodes grass (*Chloris gayana* L.) has been gaining its popularity for general cultivation in Emirates as an alternative to alfalfa because of its drought and salt tolerance and better stand persistency in unfavourable edaphic and climatic conditions. The crop was useful for erosion control if well grazed (6). The roots can extract water to a depth of 4.25 m. Russell, (5) found

Rhodes grass to be one of the most salt tolerant grasses. At Hofuf, Saudi Arabia, Farmworth, (2) tested a range of summer grasses on saline high calcium soils and Rhodes grass yield 8.9 ton DM/ha in 188 days, more than double the yield of any other species. Among many exotic varieties from USA, Australia and Africa, about six genotypes are grown in the country with different growing habits and yield (3). The performance of different varieties was not yet investigated. This experiment was, therefore, aimed at evaluation of available cultivars in respect to their green matter production and quality.

Material and Methods

Field experiment was conducted at Al-Oha, Al-Ain, UAE (Latitude 24°15', Longitude 55°45' and Altitude 301.6 m above sea level) on a sandy loam soil. Six varieties of Rhodes grass namely Callide, Katambora, Samford, Pioneer, Alemba and Boma were planted on

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Table 1
Forage green yield (t/ha) of Rhodes grass cultivars

Cultivars	Cuts (t/ha)								Mean	Total
	1	2	3	4	5	6	7	8		
Katambora	11.36	12.84	14.25	14.86	23.81	18.88	16.41	12.24	15.58	124.65
Callide	11.26	12.41	13.62	14.76	22.21	18.70	16.25	12.24	15.18	121.45
Samford	10.15	11.54	11.81	13.63	20.22	18.11	14.30	11.14	13.86	110.90
Pioneer	8.20	9.50	9.80	12.50	16.82	15.21	12.34	10.62	11.87	94.99
Alemba	6.28	5.72	6.54	9.28	18.91	9.63	12.26	10.32	9.87	78.93
Boma	6.15	5.28	6.74	9.32	16.71	9.28	12.00	9.32	9.35	74.80
CD (0.05)	3.80	4.12	3.25	3.45	4.21	4.15	3.25	3.12	-	-

21.10.1991 in a randomized complete block design with four replications. Plots of 15 m² were uniformly scattered with seeds of 20 kg/ha. The seeds were covered with a thin layer of soil and a light irrigation was given frequently till germination. The crop was fertilized with 100 kg N before sowing and after each cut and with 100 kg of each P₂O₅ and K₂O before planting. Irrigation was performed by sprinklers as needed till the soil reached the field capacity. The first cut was taken after 45 days and the fresh weight was recorded in kg for each variety. Subsequent cuts were taken at 25-35 day intervals according to cultivars and season. Yields are not given in t.D.M./ha as the forage is baled after partial drying and not a complete drying. The yield data of eight cuts together with their chemical analysis (according to Summerfield et al.(7) were subjected to statistical analysis with the aid of MSTAT computer programme.

Results

The results revealed no significant differences between Katambora, Callide, Samford and Pioneer cultivars but they were significantly producing higher forage yield than Alemba and Boma for the first cut (Table 1). The same trend was observed at the second and six cuts. Katambora, Callide and Samford were not significantly different but they were better than Pioneer, Alemba and Boma. Table 1 also showed no significant differences in forage yield between Katambora, Callide, Samford and Pioneer while there was a difference between Katambora, Callide and Samford compared to Alemba and Boma for the fourth cut. However, the fifth cut indicated that Katambora, Callide and Samford

were at par and produced significantly higher yield than Pioneer and Boma while Alemba was not different from all other cultivars. The seventh cut showed a significant yield difference between Katambora and Callide from Pioneer, Alemba and Boma while Samford was not significantly different from all other cultivars (Table 1). However, there was no significant differences between all cultivars for the eight cut.

For overall cuts Katambora performed the best followed by Callide and Samford (Table 1), with total yield of 124.65 t/ha and 110.90 t/ha respectively. The highest yield per cut was obtained by Katambora at the fifth cut (23.81 t/ha) while the lowest at the first cut for Boma (6.15 t/ha). Forage yields of different cuts increased gradually and reached its peak at the fifth cut (Table 1), then dropped slowly. However, the late cuts (5th onwards) were the highest yielding as they coincide with summer months (Table 1).

Percent crude protein decreased with cuts but the difference was significant only up to the fifth cut (Table 2). There were no significant differences between cultivars for the different cuts except for the first cut when Pioneer had significantly lower protein content than the others. Table 2 also showed that Katambora had the highest protein content (13.9%) for the first cut while Pioneer had the lowest (6.1%) for the eight cut. For all cuts the best performing cultivars were Katambora, Callide and Samford.

Percent crude fiber increased with cuts (Table 2) but the difference was significant only for the early cuts. There

Table 2
Forage quality (Percent crude protein (cp) & Percent crude fiber (cf)) of Rhodes grass cultivars

Cultivars	No. of cuts																	
	1		2		3		4		5		6		7		8		CD (0:05)	
	cp%	cf%	cp%	cf%	cp%	cf%	cp%	cf%	cp%	cf%	cp%	cf%	cp%	cf%	cp%	cf%	cp%	cf%
Katambora	13.9	30.5	13.6	31.0	9.7	33.8	8.6	33.9	6.2	38.4	6.4	38.5	6.6	39.5	6.4	39.7	4.5	6.5
Callide	12.8	30.1	12.6	30.8	10.2	32.6	9.4	33.8	7.3	37.6	6.8	38.2	6.4	39.2	6.2	39.7	4.7	7.1
Samford	12.4	29.2	12.0	30.2	11.0	32.0	9.8	33.2	7.4	38.1	6.6	38.7	6.4	38.9	6.4	39.2	3.9	7.8
Pioneer	10.1	35.1	10.2	34.4	9.6	35.2	9.4	35.2	7.4	37.9	6.4	39.0	6.2	39.7	6.1	39.9	3.6	3.6
Alemba	12.2	31.2	11.8	31.8	10.4	33.3	10.1	33.6	7.8	38.2	6.6	38.9	6.3	39.1	6.2	39.2	4.1	8.1
Boma	12.4	30.8	11.8	32.0	9.8	33.4	9.2	33.8	7.5	38.4	6.2	38.7	6.2	39.4	6.3	39.4	4.5	7.9
CD (0.05)	2.1	3.3	3.5	2.9	2.3	2.9	1.8	2.2	1.9	1.7	1.1	1.4	0.9	0.9	1.2	0.8	-	-

were no significant difference between cultivars for the different cuts except for the first and second cuts when Pioneer had significantly higher crude fiber content than the others. Results of Table 2 also revealed that Pioneer had the highest crude fiber content (39.95%) for the eighth cut, while Callide had the lowest (30.1%) for the first cut. For all cuts the best performing cultivars were Callide, Katambora and Samford.

Discussion

The results presented in Table 1 revealed the superiority of Katambora, Callide and Samford in forage yield over the other cultivars in cuts and overall yield. Ibrahim (3) stated that the three cultivars were late in flowering. The same results were reported by Nadaf et al. (4) and Akhtar et al. (1) who reported that Callide was the highest yielder followed by Katambora. Farmworth (2), reported at Hofuf, Saudi Arabia a yield of 8.9 t/ha in 188 days for Katambora, more than double the yield of any other species. The yield increased gradually and reached the peak at fifth cut and the late cuts were better than earlier ones (Table 1). These results reflect that late cuts coincide with summer months when plant growth was faster and better.

Protein content decreased with cuts while crude fiber content increased with cuts for all cultivars (Table 2). Among all cultivars, Pioneer showed the lowest protein content and the highest crude fiber content. This was attributed to the early flowering habit of the cultivar (3). When other cultivars were ready for cut, Pioneer will already reach the maturing stage. It was well known that protein content will decrease with age while fiber content will increase. Katambora, Callide and Samford were giving better quality forage. This can be explained by the fact that the three cultivars were late in flowering compared to others (3) and they were cut at the right time. Additionally, Ibrahim (3) reported that these cultivars will remain green till maturity.

In conclusion, Katambora, Callide and Samford performed well under Emirates conditions. The three cultivars produced better yield and quality. However, if more cuts were needed, the early flowering types like Pioneer are better although yield per cut is lower compared to other cultivars.

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