EFFECT OF CUTTING HEIGHT AND FREQUENCY ON THE FORAGE YIELD OF SIGNAL GRASS *(Brachiaria decumbens)*

By

Shwarpshakka. .S.Y., Dalakon. C., Kapang. H. and Yahaya, M.A.D
Federal College of Animal health and Production Technology, Vom, Plateau State.
National Veterinary Research Institute, Vom, Plateau State.
E-mail: samshwarps@gmail.com
Telephone: +2348035668633

ABSTRACT

An experiment to study of the effect of **cutting height** and **cutting frequency** on the forage yield of signal grass was conducted by demarcating 18 plots using iron pegs and roped at the forage unit plots of the College of Animal Health and Production Technology, Vom. Three cutting heights (2 cm, 3.5cm and 5cm) and two cutting frequencies (2 weeks and 4 weeks) were functionally combined into 2 weeks/2cm, 2 weeks/3.5cm, 2 weeks/5cm, 4 weeks/2cm, 4 weeks/3.5cm and 4 weeks/5cm. These made six treatment combinations which were laid out in a Randomized Complete Block Design and replicated 3 times. 1m x 1m quadrant was used to harvest forage yield of all the treatment combination at the height and frequency for each treatment and record for both fresh and dry forage yields were recorded for up to the end of the rains (October). Data collected were analyzed using the Analysis of Variance. Result showed significant difference (P≤_ 0.05) in fresh forage yield between 2 weeks and 4 weeks cutting intervals. Fresh forage yield is significantly higher when signal grass is harvested, grazed or cut at 4 weeks intervals. Then cutting, grazing or harvesting at 2 weeks interval. No significant difference was recorded in the same treatment for dry forage yield. It is therefore suggested that farmers or pastoralists who wish to propagate signal grass for forage should graze, or harvest/cut at 4 weeks interval and not below 2cm high above the ground level, for optimum forage yield.

KEY WORDS: Forage yeild, Cutting-interval, Cutting-frequency, Cutting-height.

INTRODUCTION

Signal grass is a vigorous, trailing perennial grass with short, dark green leaves, rooting from the lower nodes of erect culms. These arise from a long, prostrate, stoloniferous base to 30-45 cm high when vegetative and up to 1m high when in flower (Loch, 1977).

Signal grass (*Brachiaria decumbens*) is a vigorously trailing perennial grass which branches and roots mostly at the lower nodes, forming a dense guard leaf blade which is hairy and lanceolate in shape with a rounded base up t0 10cm long and 10-15cm inside leaves. They are commonly dark green during the dry season and grow up to 70cm in height with errant flowering stem of upto 8.5cm in height (Murphy, 1998). Signal grass is a high yielding forage that forms low leafy herbage and it is mainly used as permanent pasture. It is palatable to cattle and withstands heavy grazing (Cook et al., 2005; Loch, 1977). Signal grass can be grazed, cut to be fed fresh or to be made into hay. Signal grass is also used as cover crop and in the control of weeds (Cook et al., 2005). The grass has a crude protein content ranging from 6.0-8.5% while crude fibre content ranges from 31.0-32.5% with low levels of calcium and phosphorus (Loch, 1977).

Signal grass can grow on a wide range of soils, but does best well on drained and deep alluvial soils and clay soils balsaltic origin. It tolerates weathered tropical soils characterized by low pH and high aluminum saturation (Mohd-Jajib, 1995).

In developed countries, forage crop production and utilization is practiced by all farmers who keep ruminant livestock. However, in Nigeria, the production and utilization of forage crops is still at the juvenile stage. The term forage refers to crop/plants eaten by animals directly as pasture, crips residues or immature cereals, but it is also used more loosely to include similar plants cut for fodder and carried to the animals especially as hay or silage (Givens and Teitzei, 2000). Signal grass is one of the most important materials utilized by grazing animals or harvested and fed as a whole crop, the levels of

frequency and grazing by livestock determines the levels of yields of forage crops (Barham *et al*., 2000).

In Nigeria, information on the utilization of forage crops in relation to frequency of grazing and signal grass as affected by grazing pattern, time of grazing, level of grazing and season is scarce. With this in mind this study is designed to determine the effect of cutting (grazing) height and frequency on the forage yield of signal grass and ascertain the interactive effect of cutting height and cutting frequency on forage yield of signal grass.

MATERIALS AND METHOD

Signal grass seeds were sourced from the seed multiplication unit of the Livestock Investigation Department of the College Farm. The research site on the farm was ploughed and harrowed before seed sowing at the rate of 30Kg/Ha. The sowing date was 02/05/2013. At four weeks after crop emergence, 2,4-D was used as post emergence herbicide to control weeds on experimental plots at the Livestock Investigation Department (College Farm) of the Federal College of Animal Health and Production Technology, Vom; Plateau state. Vom is located on latitude 09º 44" and longitude 08º 47".

Three cutting heights (2cm, 3.5cm and 5cm) and two cutting frequencies (2 weeks and 4 weeks) were factorially combined into 2 weeks/2cm, 2 weeks/3.5cm, 2 weeks/5cm, 4 weeks/2cm, 4 weeks/3.5cm and 4 weeks/5cm, to give six treatment combinations which were laid out in a Randomized Complete Block Design (RCBD) and replicated 3 times.

Data Collection and Analysis

Six weeks after crop emergence, cutting commenced at the predetermined height and frequency for the treatment combinations. Wooden pegs were used to determine the cutting heights for remaining treatment to aid cutting at the correct level, cutting continued for up to 12 weeks resulting into six cuts for two weeks and three cuts for four weeks. Thereafter, yield for each cutting were recorded for both fresh yield and dry yield. Fresh yield was taken immediately after the harvest/cutting and then dried under shade before taking dry yield.

Data collected were subjected to Analysis of Variance (ANOVA), where significant difference exists; Least Significant Difference (LSD) was used to separate the means.

RESULTS

1. **Effect of cutting height and cutting frequency on the fresh forage yield of signal grass**
   The effect of cutting height and frequency on the fresh forage yield of signal grass grown in Vom in 2013 is presented in Table 1. The result showed that grazing/cutting signal grass at four weeks interval (resting period) resulted in significantly ($P \leq 0.05$) higher fresh forage yield than cutting or grazing at a shorter rest interval or 2 weeks. Similarly, the interaction between cutting height and cutting interval is significant ($P \leq 0.05$) regardless of the cutting height (2cm, 3.5cm and 5cm). Cutting of signal grass at 4 weeks intervals resulted in significantly ($P \leq 0.05$) higher forage yield.

Table 1: Effect of cutting height and cutting frequency on the fresh forage yield of signal grass grown in Vom in 2013.

Cutting Height (cm)	Cutting Fequency		Total	X	SEM (±)
	2 Weeks	4 Weeks			
2	0.26	0.53	0.79	0.395	0.050
3.5	0.40	0.72	1.12	0.560	0.062
5	0.30	0.76	1.06	0.530	0.057
Total	0.96	2.01	2.97		
X	0.32	0.67			
SEM (±)	0.071	0.073			

2. **Effect of Cutting Height and Cutting Frequency on the Dry Forage Yeild of Signal Grass Grown in Vom in 2013**.

Interaction between frequency and cutting height is significantly (P≤0.05) only at 3.5cm while there is no significant difference between frequency of cut and cutting interval of cut and cutting interval at 2cm cutting height, the difference is significant (P≤0.05) where cutting at 3.5cm produce signal grass forage with higher yield than at 2cm and 5cm.

Table 2: Effect of Cutting Height and Cutting Frequency on the Dry Forage Yeild of Signal Grass

Cutting Height (cm)	Cutting Frequency		Total	X	LSD
	2 Weeks	4 Weeks			
2	0.09	0.22	0.310	0.155	0.040
3.5	0.16	0.26	0.42	0.210	0.050
5	0.178	0.33	0.508	0.254	0.052
Total	0.428	0.81	1.194		
X	0.142	0.27			
LSD	0.069	0.069			

Grown in Vom in 2013

DISCUSSION

The dry matter content of *Brachiaria decumbens* as reported by Funes *et al*., (1980), with frequent cutting was significantly low compared to less frequent cuttings A result of increased number of recovery phases which in all times affects the recovery of carbohydrate resources and lowered rate of dry matter production. These reports lend support to the findings in this study as observed in the tables 1 and 2 above.

Similarly, Stur *et al*., 1994 reported that growing and cutting signal grass at an early stage usually does not positively influence forage yield, but cutting frequency exerted greater effect on yield. It is well known that too early, too heavy and too frequent grazing/cutting does not only reduce the vegetative performance of the pasture crop, it leads to negative

effect on the vigour of the sward, death of some of the plants and consequent development of bare or weedy patches.
Cutting at 2cm reduce general forage performance of signal grass, in both 2 weeks and 4 weeks, cutting 5 cm for both intervals does not significantly ($P \leq 0.05$) increase forage yield. A reasonable compromise of 3.5cm above ground level produced signal grass with significantly ($P \leq 0.05$) higher forage yield. Too early and lower cut levels weaken the general performance of the forage crop. This weakening of the herbage is generally considered to be due to depletion or exhaustion of it nutrient reserves.

This trend has been seen in other forage grasses as reported by Da Silveira *et al*., 2010 who studied the effect of cutting height and interval on morphogenesis and forage accumulation of guinea grass another forage grasses.
Forage yield increases as cutting frequency decreases, with frequent cutting interval affecting forage quality. Defoliation affects both above ground growth and the underground rooting system. (Aminah and Chen, 1991). Also, experiments carried out by Sumran et al., 2009 on King Napier grass (*Pennisetum purpureum*); a similar forage grass concluded cutting height can affect the forage dry matter yield and nutritive value of the grass. These findings show that frequent cutting intervals affect other forage pastures apart from signal grass.

CONCLUSION

Livestock production in Nigeria depends for most of their feed requirement on forage. Before now, lots of emphasis has been made on improving high forage yield without much emphasis placed on forage quality. An informed decision on the cutting height and interval of forages will lead to the improvement on the quality of forage produced for ruminant livestock in Nigeria.
It is suggested therefore, that farmers who wish to grow signal grass for grazing, green chopping, and/or cut and carry should give a periodic rest of up to four weeks with a cutting height of 3.5cm. This will avoid the depletion of food reserves at the root and stem bases, thereby enhancing forage yield and availability of feed for livestock.

REFERENCES

Aminah,H. and Chen, C.P. 1991. Future Prospects for Fodder and Pasture Production. FAO Animal Production and Health Paper 86. www.fao.org.

Cook, B.G., Peengelly, .C., Brown, S.d., Donnelly, J.L., Eagle, D.A, Franco, M.A., Hanson, J., Mullen, B.f., Patrigde, I.J., Peters, M., Schultze-Kraft, R., 2005. Topical forages. CSIRO, DPI&F (Qld), CIAT and ILRI, Brisbane, Australia.

Da Silveira, M.C.T., Nascimento, D.J., Da Chuna, B.A.L., Difante, G.s., Pena,K.S., Da Silva, S.C. and Sbrissa, A.F. 2010. Efeect of cutting interval and cutting height on morphogenesis of and forage accumulation of guinea grass. (Panicum maximum). *Tropical Grasslands*. 44, 103-108.

Funes, F., Perez, L. and Randa, A. 1980. Growth and developments of grasses in Cuba. 2.Effect of three cutting intervals on the yield of eight grasses. *Cuban Journal of Agricultural Science* 14:181-188.

Givens, D.I. and Teitzei, J.K. (2000). Pastures for the wet tropical course-3, *Queensland Agricultural Journal*, **95**: **464**-**467**.

Loch. D.S. 1977. *Brachiaria decumbens* (Signal grass). A review with particular preference to Australia. Tropical Grasslands VOL.11, No. 2, pg 141.

Mohd-Jabib, M.A. 1995. Quality of *Bracharia humidicola* silage at different cutting intervals and its acceptability to sheep . proc., 17th Ann. Conf., Malaysian Society for Animal production.

Stur, W.W., Shelton, H.M and Gutteridge, R.C. 1994. Defoliation management of forage tree legumes. In; Gutteridge, R.C. and Shelton H.eds. Forage tree legumes in tropical agriculture. CAB *International*, U.K, pp 158-167.

Sumran, W., Pornchai., L. and Chutipong. A, 2009. Effect of cutting heights on Productivity and Quality of King Napier Grass (*Pennisetum purpureum*) under *Irrigation. Pakistan Journal of Nutrition*, 8: 1244-1250.