Forage yield and structural traits of Tanzaniagrass (*Panicum maximum*) at four canopy heights

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Introduction Pasture forage production is based on the growth of tillers (Hodgson, 1990). Although the effect of canopy height and structural traits on productivity of temperate grasses are well known e.g. (Bircham & Hodgson, 1983; Binnie & Chestnut, 1994) tiller studies on tropical pasture species are scarce.

Material and methods A trial was carried out in 3x3m plots to evaluate the effects of height on total forage biomass, forage yield and structural traits of the canopy of *Panicum maximum* cv. Tanzania. Canopy heights of 20, 35, 50 and 65cm were studied in a completely randomised design, with three replications. Evaluations were performed in summer from Dec. 2003 to March 2004. Weekly cuts were taken to maintain experimental heights, and 0.5x0.5m samples were collected for yield estimates. Harvests were also taken fortnightly at ground level to assess total herbage biomass, its fraction components and tiller number.

Results Vegetation structure was affected by canopy height (Table 1). Dead material increased with plant height. Forage yield in Dec-Jan was 50% more than in Feb-March (Table 2), with significant differences for the 20 and 35 cm heights only. Surprisingly, the leaf/stem ratio was not affected by canopy height, but it was by summer period ($P<0.05$), with lower values being observed toward the end of summer. Tiller population density declined and tiller weight increased with canopy height, according to the tiller size/weight compensation law. Heavier tillers were observed in the first period as compared to the second (Table 2). Forage biomass increased with canopy height quadratically and linearly ($r^2 = 0.97$) in the first and second period, respectively.

Table 1 Effect of canopy height and summer period on structural traits of cv. Tanzania

	Height (cm)				Period	
	20	35	50	65	Dec-Jan	Feb-Mar
Dead Material (kg/ha)	867 b	1029 ab	1139 a	1085 ab	933	1127
Leaf/Stem ratio	2.51	2.20	2.18	2.35	2.68 a	1.94 b
Tiller / m^2	441 a	412 ab	408 ab	332 b	400	396
Tiller weight (g)	0.72 d	1.05 c	1.35 b	1.66 a	1.35 a	1.09 b

Means followed by different letters differ by Tukey test ($p<0.05$)

Table 2 Mean and total herbage mass in cv. Tanzania according to canopy height and summer period

	Height (cm)				
	20	35	50	65	
Period	Mean fortnightly herbage mass (kg DM / ha/week)				Average
Dec-Jan	1,164 Aa	1,003 Aa	940 Aa	576 Ab	920.7
Feb-Mar	553 Ba	564 Ba	713 Aa	652 Aa	620.5
Average	858.5	783.5	826.5	614	
	Total Herbage Mass (kg DM/ha)				
Dec-Jan	3,579 Ac	4,595 Abc	7,106 Aa	5,546 Ab	5,206
Feb-Mar	2,634 Bc	3,993 Ab	4,455 Ba	5,091 Aa	4,043
Average	3,107	4,294	5,780	5,318	

Means followed by different capital letters in columns and lower case letters in rows, differ by Tukey ($p<0.05$)

Conclusions Cv. Tanzania should be managed to maintain a canopy height range from 20 to 50cm for maximum DM yields

References

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