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MANAGING GLOBAL RESOURCES FOR A SECURE FUTURE

Forage yield and accumulation of fertilized Marandu grass, intercropped with forage peanut or not fertilized under rotational grazing

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Introduction

Introduction of forage legumes into tropical forage pastures is an alternative for nitrogen supply due to the input of biological N_2 fixation to legumes as well as the higher nutritive value. The aims of this study were to evaluate the forage production and accumulation of Marandu grass in a mixed sward with forage peanut, fertilized with nitrogen (N) and the control without N source.

Materials and Methods

Location: Forage and Pasture Sector (FCAV/UNESP, 21º14'05'' S, 48º17'09'' W)
Animals: 21 non-lactating dairy heifers, mean weight 300kg

Treatments:
Completely randomized design
T1) Marandu grass without N fertilizer (control);
T2) Marandu grass fertilized with urea (150 kg N ha^{-1} $year^{-1}$);
T3) Marandu grass in a mixed sward with forage peanut (*Arachis pintoi* cv. Amarillo).

Grazing management:
Rotational grazing with mob-stocking (Allen et al., 2011);
Grazing start: 95% LI and 35 cm of grazing height (Pedreira et al., 2007);
Grazing interruption: 20 cm of grazing height; one day period of occupation.

Statistical analysis: Tukey test to analyze the effect of treatment; polynomial orthogonal contrast to analyze the effect of grazing cycles.

Sward height measurement and collect of forage samples to estimate the forage mass and accumulation rate.

Results and Discussion

Table 1. Forage mass (kg DM ha^{-1}) of pastures of Marandu grass without N fertilizer (control); fertilized with urea and in a mixed sward with forage peanut, in different grazing cycles in the rainy season of 2017, in Jaboticabal/SP/Brazil. .

Grazing Cycle	Treatment			Mean
	Control (T1)	Fertilized (T2)	Mixed (T3)	
1	4309 (558)	5290 (493)	2751 (373)	4117 (475)
2	4864 (1017)	5573 (738)	-	5218 (878)
3	3852 (4936)	7170 (1816)	3787 (468)	4936 (950)
4	5870 (6141)	7892 (987)	4660 (509)	6141 (764)
5	7514 (8119)	11186 (1985)	5658 (752)	8119 (1377)
Mean	5282 (866) b	7422 (1204) a	4214 (526) b	5706 (889)

The ANOVA was significant for grazing cycles (P<0.05) with linear effect and for treatments. Means followed by the same letter in the row (treatment) do not differ by Tukey's test (P>0.05). Numbers in parentheses correspond to standard error of the mean (±).

Table 2. Forage accumulation rate (FAR) (kg DM^{-1} day^{-1} ha^{-1}) in pastures of Marandu grass without N fertilizer (control); fertilized with urea and in a mixed sward with forage peanut, in different grazing cycles in the rainy season of 2017, in Jaboticabal/SP/Brazil.

Grazing Cycle	Treatment			Mean
	Control (T1)	Fertilized (T2)	Mixed (T3)	
2	48.39 (27.7)	105.22 (40.4)	-	76.81
3	47.04 (15.8)	230.59 (55.2)	130.60 (22.8)	136.08
4	72.59 (36.4)	124.47 (42.3)	80.98 (13.6)	92.68
5	106.94 (46.6)	137.27 (49.1)	78.60 (27.9)	107.60
Mean	68.7 (31.6) b	149.4 (46.7) a	96.7 (21.4) b	105.70

The ANOVA was not significant for cycles (P>0.05), but it was significant for treatments (P<0.05). Means followed by the same letter in the row (treatment) do not differ by Tukey's test (P>0.05). Numbers in parentheses correspond to standard error of the mean (±).

- There was a significant linear relationship effect between grazing cycles and forage mass;
- Interaction among treatments and cycles was significant, that is, the difference among treatments was cycle dependent;
- FAR was affected by treatments for forage mass, but not by the grazing cycles and the interaction;
- T2 > T3: less energy spent by the plant to absorb the readily available nutrient of the fertilizer than to absorb the nitrogen fixed by the legume;
- T1 = T3:
  - Recent establishment of mixed sward was not enough for the return of nutrients from the legume to the greater use of the grass;
  - Fertile soil provided conditions for the growth of control treatment, even without N source

Conclusion

In terms of forage mass and FAR, the inclusion of peanut negatively affected the production, however, the nutritive value should be evaluated to address all benefits of mixed pastures.

References

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