Combinations of nitrogen and sulphur for signal grass yield

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Introduction Signal grass (*Brachiaria decumbens*) is grown in Brazilian pastures, and the increase in forage yield of such pastures is achieved by fertilization. Nitrogen (N) is the nutrient mostly demanded for increasing grass productivity, and its utilization creates a demand for other nutrients, such as sulphur (S). These two nutrients are well related in plant metabolism, but the S nutrition of signal grass must be better understood. The use of a fractional factorial makes possible the study of several rates of these two nutrients, that combined with the response surface methodology allows anyone to find out the responses to these rates combinations. The objective of this research was to obtain the responses in dry matter yield of plant tops and roots of signal grass grown under N and S combinations.

Materials and methods An experiment with *Brachiaria decumbens* was carried out in greenhouse conditions, with ground quartz as substrate, during Summer-Fall seasons, at Piracicaba, São Paulo State, Brazil. A 5^2 fractional factorial experiment, based on Littell & Mott (1975), was set in randomized blocks, with four replications. Nitrogen rates (14; 126; 210; 336 and 462 mg L^{-1}) were combined with S rates (3.2; 12.8; 32; 64 and 80 mg L^{-1}) and the 13 nutrient solutions were prepared according to Sarruge (1975) nutrient solution, modified for N and S rates. Plants had two growth periods, the first one with 36 days after the seedling transplanting into the pots, and the second 34 days following the first harvest. Plant tops and roots were dried (65ºC) and weighed. Data was analyzed by using response surface methodology through the use of the Statistical Analysis System (SAS, 1996).

Results Nitrogen x sulphur interaction was significant ($P<0.05$) for plant tops dry matter yield in the two harvests (Figures 1 and 2), and also for roots dry matter. Polynomial models fitted well for the studied variables. The use of N at 210 mg L^{-1} (usual rate as in the Sarruge's solution) is far below the rate that results in the maximum signal grass yield. Increasing yield by supplying higher amount of N demanded the supply of higher rate of S, and maximum forage production was obtained with high rates of both N and S.

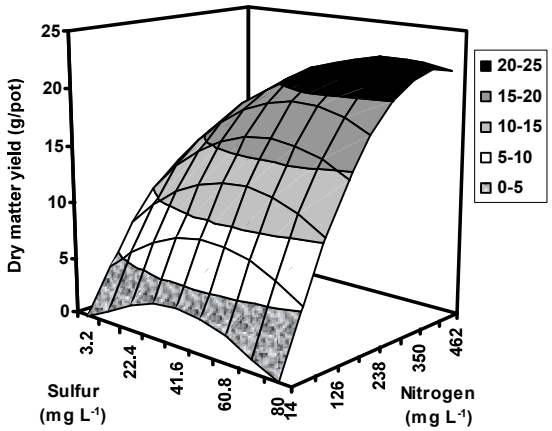

Figure 1 Above ground dry matter yield in the first harvest of *Brachiaria decumbens*, as related to the combinations of nitrogen and sulphur rates

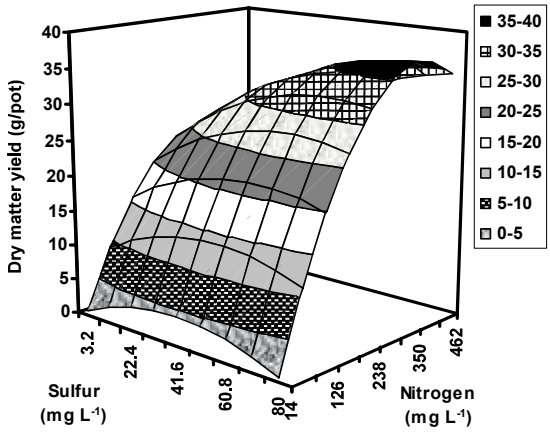

Figure 2 Above ground dry matter yield in the second harvest of *Brachiaria decumbens*, as related to the combinations of nitrogen and sulphur rates

Conclusion Sulphur must be combined with nitrogen in the fertilization of signal grass to attain high forage yield.

References

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