GRAND CHALLENGES GREAT SOLUTIONS

Nitrogen and Chlorophyll Correlation Index in Marandu Palisadegrass Leaf Fertilized with Nitrogen Sources

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INTRODUCTION

Chlorophyll index of leaf calculated by the equipments is usually highly correlated with leaf chlorophyll content and may identify nitrogen (N) deficiency without need for the determination of N in plant tissue. The objective of this experiment was to evaluate N concentrations, chlorophyll index of leaf and correlation of these parameters in Marandu palisadegrass (*Brachiaria brizantha* cv. Marandu) in response to sources of N (urea, urea with urease inhibitor, polymer coated urea, ammonium sulfate, ammonium nitrate, ammonium sulphonitrate and without N) in seven harvests.

MATERIAL AND METHODS

The field experiment was conducted in Ilha Solteira, SP, Brazil (20º 21' S, 51º 22' W and 226 m) from November 2012 to July 2013. The experimental design was a randomized complete block design with four replications.

The concentrations of N in the diagnostic leaves were determined as described by Sarruge and Haag (1974). Nitrogen was determined by sulfuric acid digestion and the analytical micro-Kjeldahl method. The chlorophyll index of leaf was determined indirectly with a ClorofiLOG, model CFL 1030, chlorophyll meter. Chlorophyll index of leaf readings were performed on the same day of the harvest, in the middle third of the two newly expanded leaves (diagnostic leaves). The mean was computed of ten readings performed on the plants in each treatment.

All parameters were analyzed statistically by means of using the Statistical Analysis System (SAS, 2004). The analysis of variance of the effects due to N sources was performed by ANOVA procedure and the level of significance of the F test was performed by Tukey test. It was used a significance level of 5% for statistical test. Also, the Pearson's correlations among the variables were analyzed.

RESULTS AND DISCUSSION

Nitrogen concentration in diagnostic leaves was influenced by N sources for the first, fourth, fifth, sixth and seventh harvest. Sources of N did not influence chlorophyll index of leaf in all harvests, with the exception of the fifth and seventh harvest, but were lower in the control (absence of N). Pearson's correlation for the index chlorophyll of leaf and N concentrations in diagnostic leaves was positively significant (Table 1).

Table 1. Means, Least Significant Difference (LSD), Coefficients of Variation (CV) and Tukey test related to concentration of nitrogen, chlorophyll index of leaf and Pearson's correlation for nitrogen concentration and chlorophyll index of leaf in diagnostic leaves in seven harvests of Marandu palisadegrass in response to nitrogen (N) sources

	1° Harvest 11/25/12	2° Harvest 12/28//12	3° Harvest 01/25/13	4° Harvest 03/08/13	5° Harvest 04/05/13	6° Harvest 05/23/13	7° Harvest 07/03/13
Sources of N (100 kg ha^{-1} of N)	**Nitrogen (g kg^{-1})**						
Control treatments	17.80c	19.34b	20.06b	16.89d	22.09b	13.63b	18.78b
Ammonium nitrate	26.83a	26.36a	26.86a	25.13bc	24.43ab	21.58a	27.41a
Ammonium sulfate	24.36ab	25.78a	25.32a	26.95ab	28.67ab	20.35a	28.09a
Ammonium sulphonitrate	26.15ab	26.99a	26.01a	28.11a	28.98a	22.03a	27.65a
Urea	24.20ab	25.01a	24.87a	24.22bc	28.77ab	17.13ab	26.18ab
Urea treated with urease inhibitor	22.42b	25.36a	25.87a	23.45c	29.54a	19.25a	24.06ab
Polymer coated urea	25.71ab	25.01a	25.81a	18.90d	26.02ab	20.06a	24.61ab
LSD (5%)	4.41	4.39	4.48	2.80	6.72	5.37	8.36
CV (%)	7.88	7.56	7.67	3.57	7.23	12.01	14.16
	Chlorophyll index of leaf						
Control treatments	18b	25b	22b	21b	20b	17b	27b
Ammonium nitrate	27a	37a	32a	32a	37a	35a	33ab
Ammonium sulfate	27a	41a	29a	34a	32a	35a	34ab
Ammonium sulphonitrate	30a	39a	32a	29a	29ab	35a	33ab
Urea	28a	39a	31a	33a	28ab	32a	36a
Urea treated with urease inhibitor	27a	39a	30a	33a	34a	34a	33ab
Polymer coated urea	32a	38a	32a	30a	33a	35a	36a
LSD (5%)	8	8	6	8	11	7	8
CV (%)	12.11	9.04	8.23	7.47	10.41	9.97	10.31
	Pearson's Correlation						
	Chlorophyll index of leaf						
Nitrogen (g kg^{-1})	0,54**	0,50**	0,70**	0,69**	0,57**	0,66**	0,67**

Means within column followed by the same letter are not different using the Tukey test (*P > 0.05*), *** significant at 0.1% probability.

CONCLUSION

Index chlorophyll of leaf can be used to N fertilization recommendation. As the effect of N sources varied among harvests for N concentration and the leaf chlorophyll index in diagnostics leaves, the option is the use of urea, because it is lower cost and higher N concentration.

REFERENCES

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ACKNOWLEDGMENT

UNIVERSIDADE ESTADUAL PAULISTA "JÚLIO DE MESQUITA FILHO" Câmpus de Ilha Solteira

CNPq Conselho Nacional de Desenvolvimento Científico e Tecnológico