

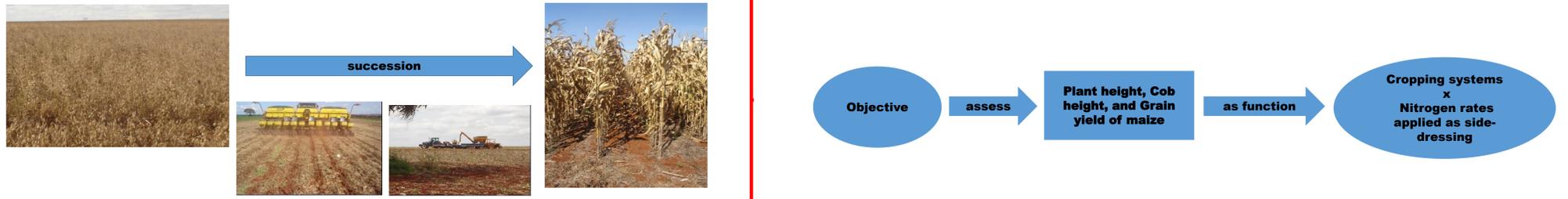
Cropping system and nitrogen supply interfere in sustainability of maize production in the dry season

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Introduction



Material and Methods

❖ Instituto de Zootecnia, Nova Odessa city, São Paulo state, Brazil ❖ Red-Yellow Argisol – Ultisol of medium texture. (22°42'S, 47°18'W, and 570 m altitude) (Figure 1).

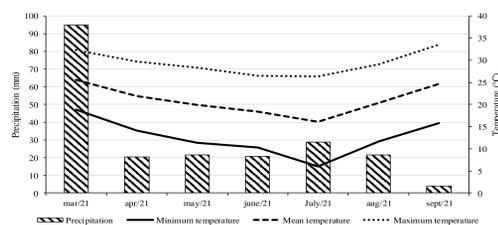


Figure 1. Maximum and minimum temperatures and rainfall in the period.

❖ Randomized complete block design in a split plot scheme, with four replications

❖ Main plots: maize monoculture; maize intercropped with Congo grass (*Urochloa ruziziensis* cv. Comum); and maize intercropped with Aruana Guinea grass (*Megathyrsus maximus* cv. Aruana)

❖ Subplots (0; 50; 100 and 150 kg ha⁻¹ of nitrogen rates applied as side-dressing in the maize and grasses rows) in an experimental block.

Results and Discussion

❖ The lowest plant height (138.36 cm) in maize intercropped with Congo grass occurred at the nitrogen rate of 125.71 kg ha⁻¹ (Table 2, Figure 2a).

❖ The cob height of the maize decreased as the nitrogen rates increased in maize intercropped with Congo grass (Table 2, Figure 2b).

❖ Grain yield of maize monoculture decreased linearly as the nitrogen rates applied as side-dressing increased (Table 2, Figure 2c).

❖ Grain yield increased linearly as the nitrogen rates applied as side-dressing increased in the maize intercropped with Aruana Guinea grass (Table 2, Figure 2d).

Table 2. Plant height, cob height and grain yield of maize at the time of its physiological maturity.

Cropping systems	N rates (kg ha ⁻¹)				Means	F test for regression	
	0	50	100	150		Linear	Quadratic
Plant height (cm)							
MM	171.50a	158.00a	182.00a	151.00a	165.63a	0.6089	0.7665
M+A	168.75a	151.50a	160.75a	176.00a	164.25a	0.6857	0.5881
M+C	184.25a	176.00a	121.50b	146.00a	156.94a	0.0168	0.0327
Means	174.83	161.83	154.75	157.67		0.1575	0.2556
CV%	10.35**						
Cob height (cm)							
MM	80.50a	72.75a	75.00a	67.25a	73.87	0.2689	0.9554
M+A	67.00a	62.75a	69.50ab	81.25a	70.12	0.2190	0.3193
M+C	90.00a	85.25a	52.50b	67.50a	73.81	0.0380	0.0774
Means	79.17	73.58	65.67	72.00		0.2117	0.2406
CV%	12.63**						
Grain yield of maize (kg/ha)							
MM	1933.06a	1025.53b	1562.09a	602.42b	1280.77a	0.0190	0.0709
M+A	1106.02a	1433.14ab	1348.75ab	1899.18a	1446.77a	0.0545	0.1532
M+C	1341.82a	1825.44a	733.39b	1138.45ab	1259.78	0.2033	0.4551
Means	1460.30	1428.04	1214.74	1213.35		0.2231	0.4781
CV%	5.55*						

MM: maize monoculture; M+A: Maize + Aruana Guinea grass; M+C: Maize + Congo Guinea grass. Means followed by different lowercase letters in the columns differ from each other by Tukey's test at the 5% level. Coefficient of variation referring to data transformed to *log(X) and **square root (X)

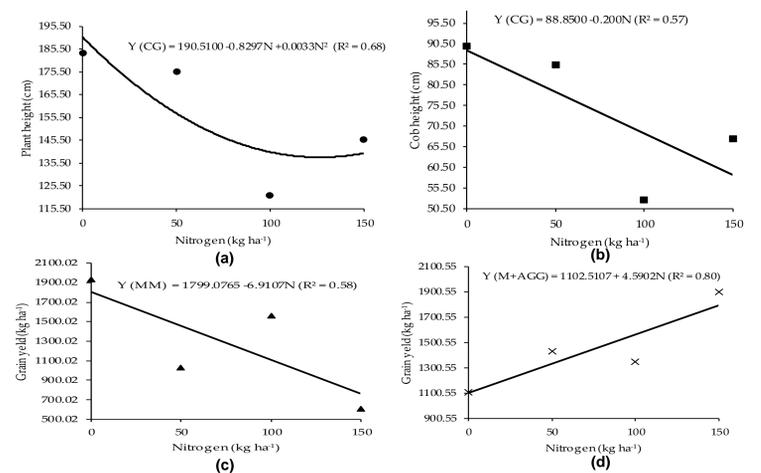
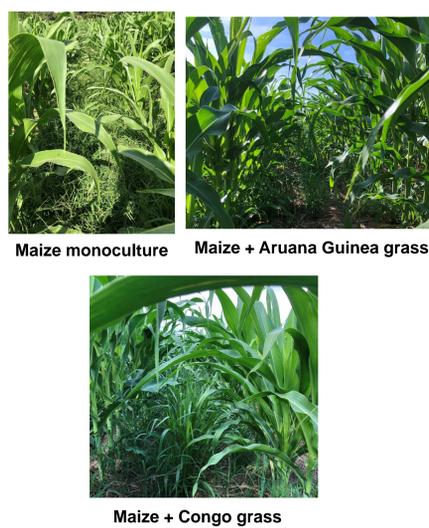


Figure 2. Plant height (a), cob height (b) and grain yield (c, d) of maize at the time of its physiological maturity as function cropping system and nitrogen rates applied as side-dressing.

Conclusions

❖ When maize is intercropped with Congo nitrogen supply interfered in plant height and cob height.

❖ In conditions, high nitrogen supply occurred low cob height.

❖ When maize is intercropped with Congo grass is necessary high nitrogen supply for high grain yield.

❖ Maize intercropped with tropical grasses is more nitrogen-demanding than maize monoculture.

Acknowledgments

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