

Physiological parameters of maize cultivate with sewage sludge

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INTRODUCTION

The use of sewage sludge as a source of nutrients and organic matter for agricultural soils is a well-established practice. However, few reports highlight the effect of the organic waste application on the plant physiological parameters. We evaluate the effect of sewage sludge in the relationship between plant physiological parameters and yield indicators.

MATERIAL AND METHODS

We performed a greenhouse experiment with maize exposed to a dystrophic red Latosol amended with mineral fertilizer and the following rates of sewage sludge: 10 Mg⁻¹, 20 Mg ha⁻¹, 40 Mg ha⁻¹, 80 Mg ha⁻¹, 160 Mg ha⁻¹.

RESULTS AND DISCUSSION

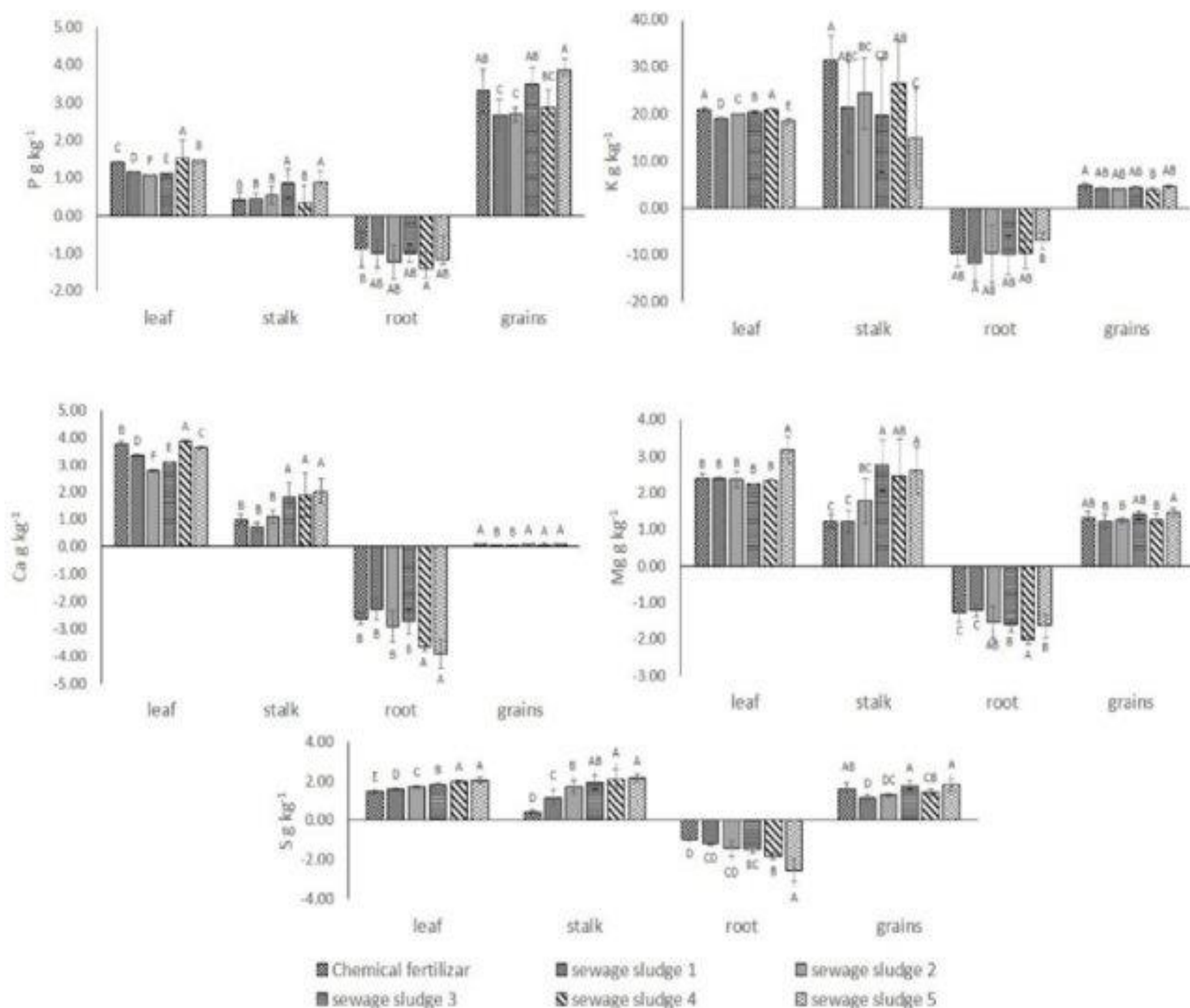


Figure 1: Effect of mineral fertilizer and sewage sludge rates on the distribution of trace elements in different parts of maize plants.

Table 1: Yield indicators of maize cultivated with different sewage sludge rates and mineral fertilizers.

Treat.	Wg	A	gs	Biomass	Cob _w	Cob _l	Cob _d	hi
	g kg ⁻¹	μmol m ⁻² s ⁻¹	mol m ⁻² s ⁻¹	g	cm	cm	cm	---
MF	21.0b	42.8b	0.2b	162.7cb	115.8b	140.7ab	43.0ab	38.1a
SS1	20.1c	69.5a	0.4ab	136.0d	85.9c	122.0c	40.6b	34.7ab
SS2	20.3c	74.6a	0.6a	158.5bc	95.5c	133.0abc	41.0b	33.4b
SS3	20.9b	76.8a	0.6a	142.7cd	93.1c	129.2bc	41.3b	35.4ab
SS4	22.8a	83.1a	0.6a	179.6ab	119.1ab	145.2a	42.8ab	36.2ab
SS5	23.1a	75.2a	0.5a	197.0a	134.0a	144.5a	46.0a	36.4ab
CV%	1.5	16.6	26.8	11.2	12.1	7.6	7.0	8.5

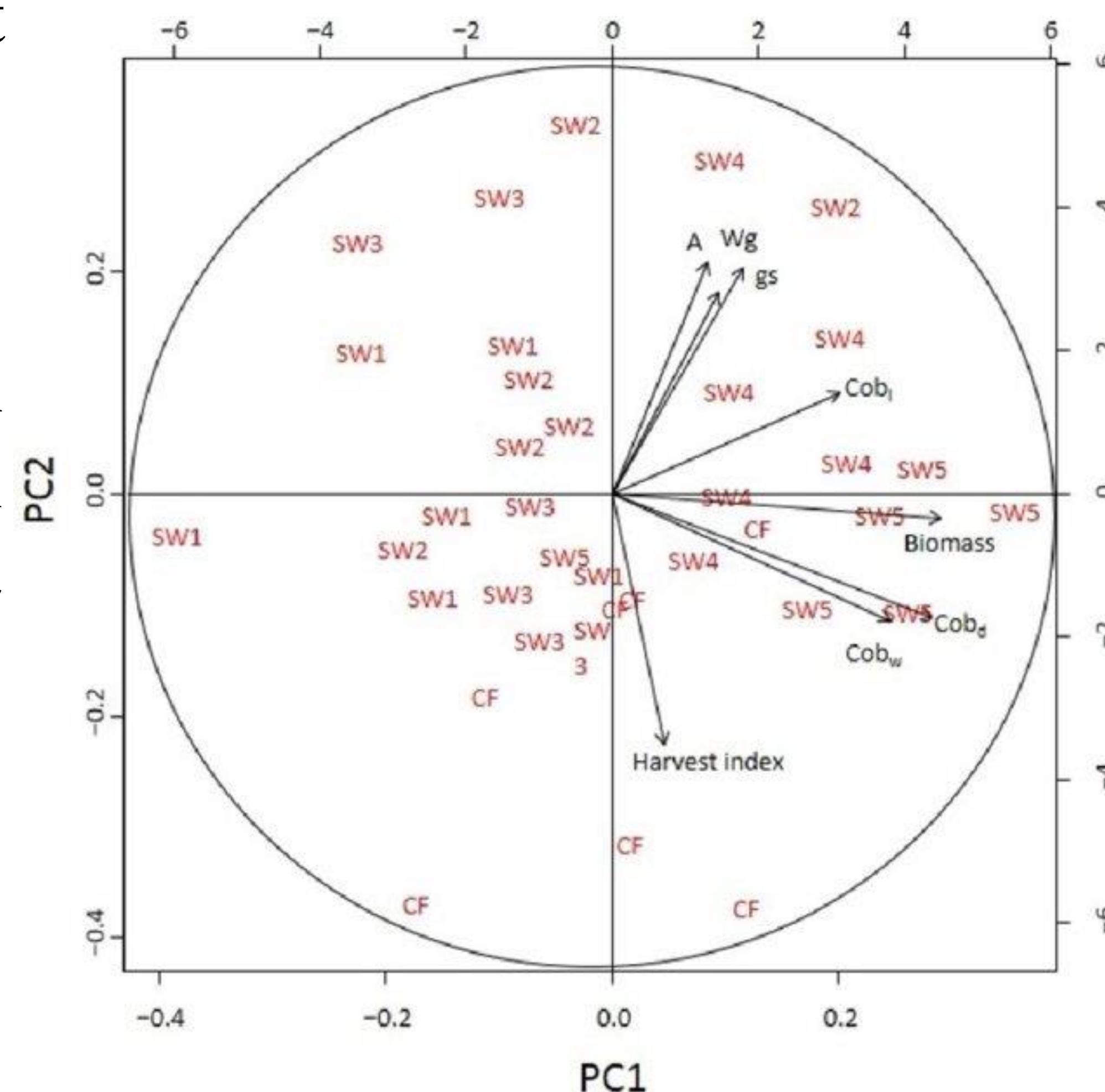


Figure 2: Principal components analyses of maize yield indicators cultivated with different sewage sludge rates and chemical fertilizer.

MF = mineral fertilizer; SS1 = 10 Mg ha⁻¹; SS2 = 20 Mg ha⁻¹; SS3 = 40 Mg ha⁻¹; SS4 = 80 Mg ha⁻¹; SS5 = 160 Mg ha⁻¹. Wg = weight of 1000 grains; A = photosynthetic activity; gs = stomatal conductivity; Cob w = cob weight; Cob l = cob length; Cob d = cob diameter.

CONCLUSIONS

The plants promote a higher translocation of macronutrients to the shoots in the sewage sludge treatments, which results in higher photosynthetic activity, stomatal conductivity, and maize yield parameters.

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