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The impact of poultry manure and rock phosphate in heavy metal and nutrients concentrations on ryegrass grown in two Cambisols

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INTRODUCTION & AIM

Ecofriendly amendments are willing to maintain crops productivity because they are a good source of organic carbon for promoting soil biology. However, there are some counteractions led might by inputs of ecotoxicological elements to soil-plant environments.

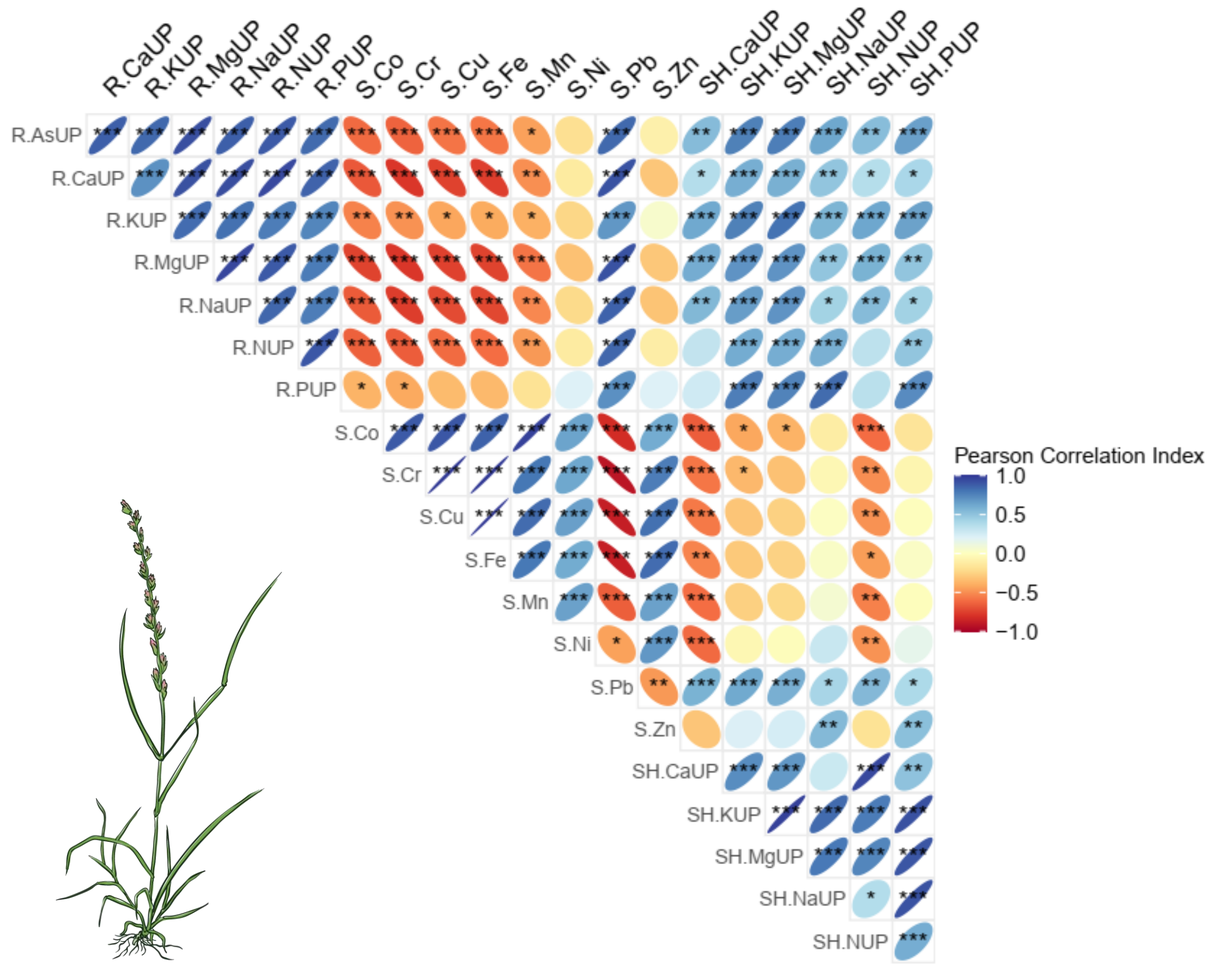
This study evaluated the effects of poultry manure (PM), rock phosphate (RP), and their combination (PMRP) on the growth, nutrient uptake, and heavy metal accumulation in ryegrass grown in two soil types: moderately acid and alkaline.

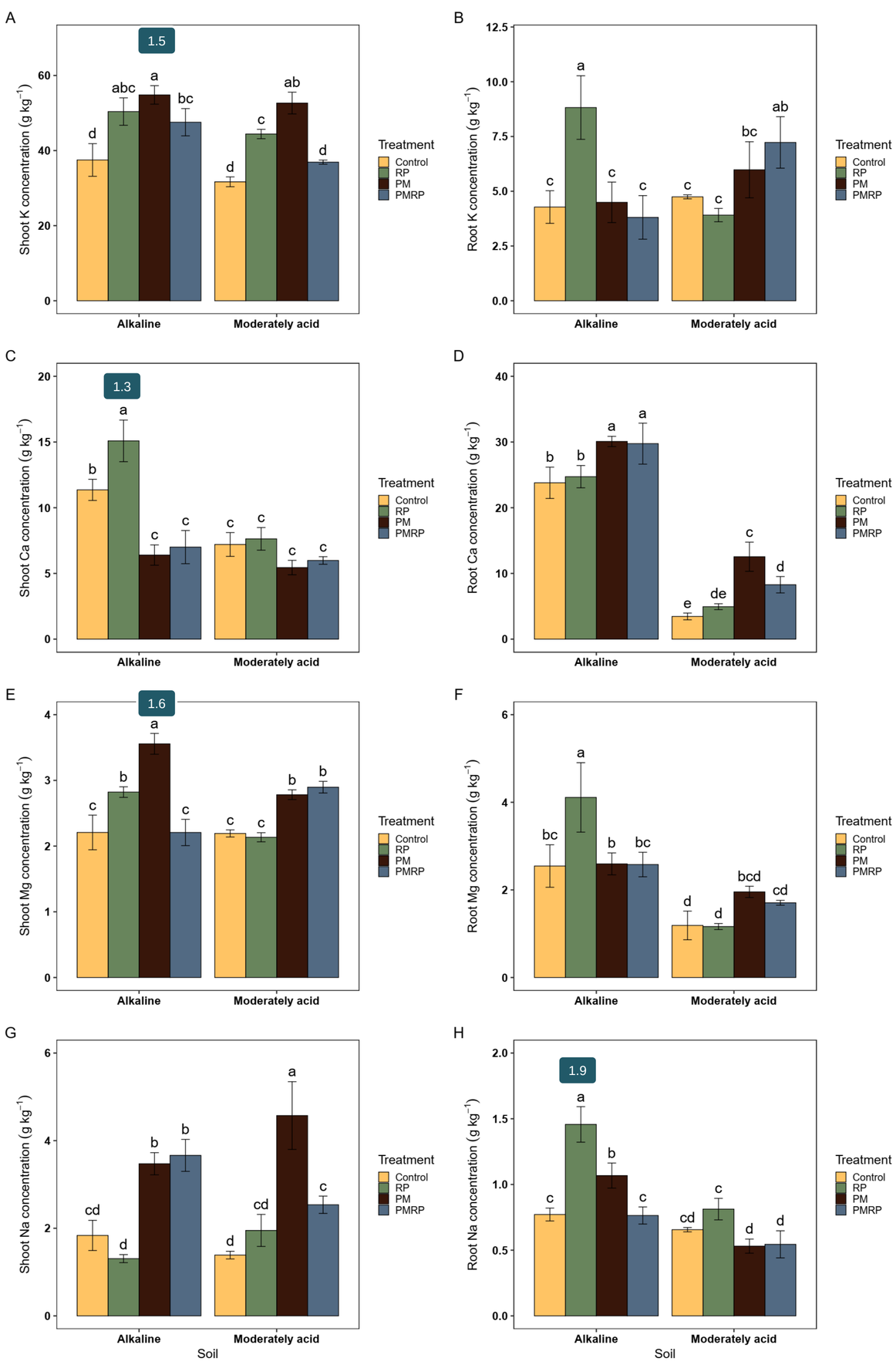
METHOD

A growth chamber experiment was conducted over seven weeks to assess the impact of these amendments on nutrient and heavy metals concentrations in soil, shoots, and roots.

RESULTS & DISCUSSION

	Alkaline				Moderately acid			
	Control	RP	PM	PMRP	Control	RP	PM	PMRP
Co (mg kg^{-1})	0.8±0.1c	1.5±0.1a	1.1±0.1b	0.8±0.1c	0.7±0.0cd	0.8±0.1c	0.5±0.1d	0.5±0.1d
Cu (mg kg^{-1})	2.9±0.0d	3.0±0.06d	3.2±0.0c	3.0±0.1cd	5.4±0.0c	5.4±0.0c	6.1±0.3a	5.9±0.2b
Cr (mg kg^{-1})	0.0±0.0c	0.0±0.0cd	0.0±0.0d	0.0±0.0d	0.1±0.0c	0.1±0.0c	0.1±0.0a	0.1±0.0b
Mn (mg kg^{-1})	15.9±1.4d	14.2±0.6d	34.3±1.5c	29.4±0.7cd	74.6±0.2a	37.7±1.9c	57.1±7.1b	51.2±1.3c
Ni (mg kg^{-1})	0.4±0.0d	0.4±0.0d	0.7±0.0b	0.6±0.0cd	0.6±0.00c	0.7±0.0a	0.7±0.0c	0.7±0.0c
Pb (mg kg^{-1})	3.4±0.1c	3.3±0.1c	4.0±0.1a	3.8±0.2b	1.9±0.1d	1.6±0.0d	2.3±0.2c	2.2±0.1dc
Zn (mg kg^{-1})	0.7±0.1d	1.2±0.1d	4.7±0.4c	3.7±0.4cd	4.2±0.2c	5.0±0.7c	12.2±0.5a	9.6±0.7b
Fe (mg kg^{-1})	5.7±0.6d	6.7±0.6d	9.2±0.6c	7.7±0.4cd	251±6c	263±9c	359±36a	338±17b





CONCLUSION

The findings underscore the importance of balanced fertilization strategies that optimize nutrient uptake while minimizing environmental risks. This study contributes to the understanding of integrated fertilization strategies, emphasizing the need for careful management to ensure sustainable and safe agricultural practices.

Acknowledgments

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