

EVALUATION OF POLYHALITE AS A FERTILIZER INFLUENCING YIELD AND HEALTH IN CABBAGE CROP

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INTRODUCTION

The cabbage crop is usually cultivated on soils with high fertility, overly corrected and fertilized; Thus, a low response to the use of nutrients in fertilization is expected.

Soils usually present high amounts of chloride and sodium, so the use of less saline fertilizer sources may be an alternative for higher yields and also for quality.

OBJECTIVES

Evaluate the yield and quality of the cabbage as a function of the substitution of MOP fertilizer as a source of potassium, by the natural fertilizer obtained from the processing of the mineral Polyhalite, which contains 14% K₂O, 12% Ca, 3.6% Mg, 19.2% S, and reduced Cl and Na contents.

MATERIAL AND METHODS

- **Location** - Piedade/SP
- **Soil** - 525 g kg⁻¹ clay, 326 g kg⁻¹ sand, 149 g kg⁻¹ silt and 0-20 layer fertility according to Table 1

Table 1. Chemical characteristics in soil before planting

O.M.	pH	P _{Resin}	K	Ca	Mg	Na	Al	H+Al	SB	CEC	V	S	B	Cu	Fe	Mn	Zn
g dm ⁻³		CaCl ₂	mg dm ⁻³			mmolc dm ⁻³				%				mg dm ⁻³			
14,0	5,0	305	5,1	46,0	13,0	0,5	0,0	25,0	64,6	89,6	72%	12,0	1,7	6,5	23,0	10,6	7,9

O.M. (sodium dichromate4N e H₂SO₄, 10N); P, K, Ca, Mg (Resin), Na (Mehlich), Al (MOP); H+Al (SMP); S (calcium phosphate); B (hot water); Cu, Fe, Mn, Zn (DTPA)

- **Experimental design** – 7 treatments in 4 randomized blocks;
- **Treatments** – blends of MOP and Polyhalite, considering fertilizers weight, to supply a 200 kg ha⁻¹ K₂O rate:

1. **Control, without potassium application;**
2. **100% MOP;**
3. **80% MOP / 20% Polyhalite;**
4. **60% MOP / 40% Polyhalite;**
5. **40% MOP / 60% Polyhalite;**
6. **20% MOP / 80% Polyhalite;**
7. **100% Polyhalite.**

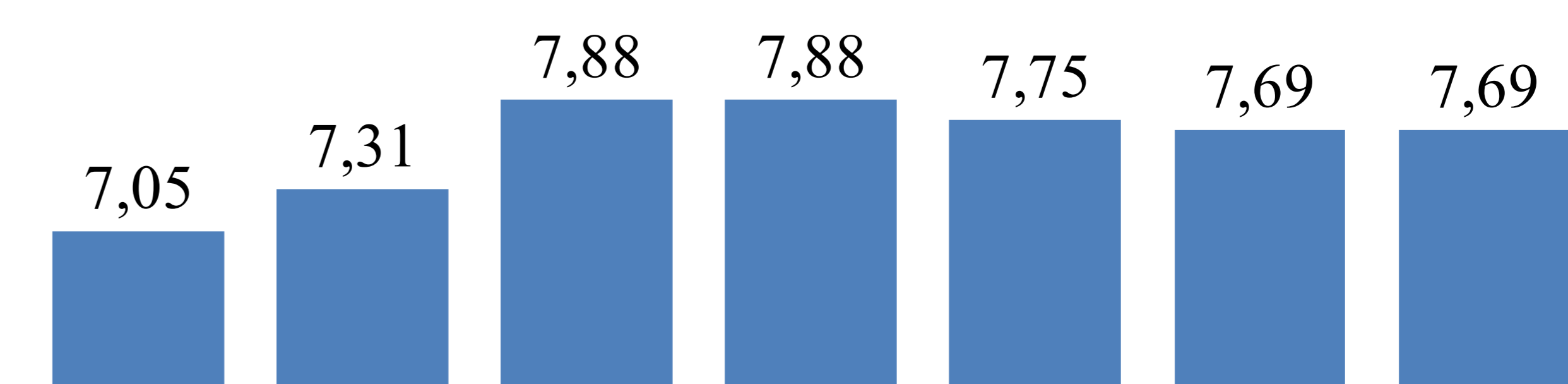
- Applied in soil surface, broadcast, 4 replications with same rates, first in pre-planting in the day before planting, and the following at 14, 28 and 42 days after planting
- At planting - 400 kg ha of P₂O₅ (MAP) broadcast and incorporated in the soil. 200 kg ha of N (urea) were applied at the same moment of the other treatments application
- Planting on Oct 10th /2016, variety Atlanta, 56.250 plants ha⁻¹.

Evaluations

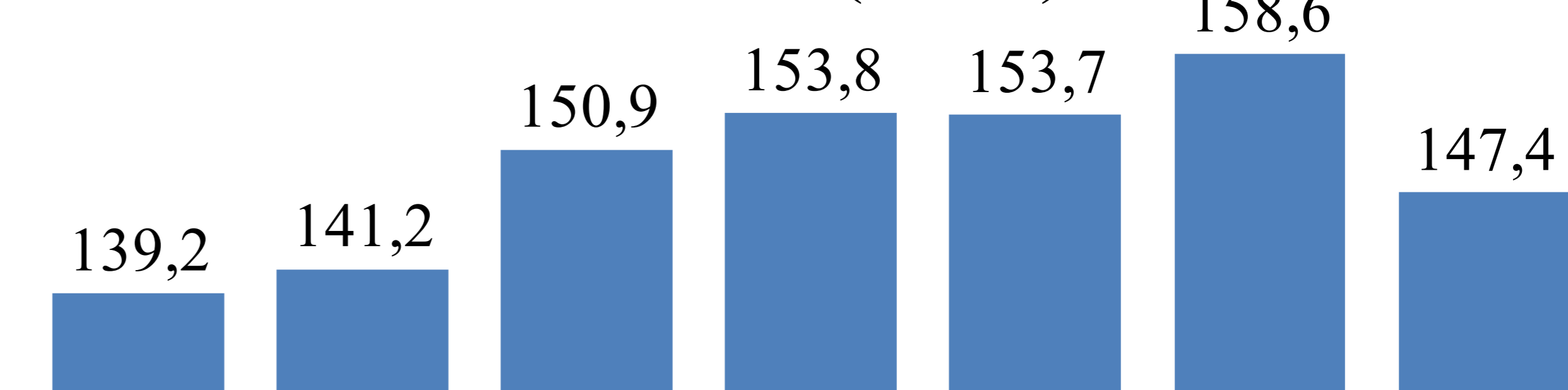
- Incidence of black rot in the leaves (*Xanthomonas campestris*) on Dec 13th 2016, assigning grades from 0 to 10 (lower to higher)
- Plants' vigor on Dec 16th 2016, grades from 0 to 10 (high to low)
- Harvest on Dec 28th 2016, obtaining the average weight, in kg, of each unit of cabbage, converting to t ha⁻¹ of cabbage.

RESULTS AND DISCUSSION

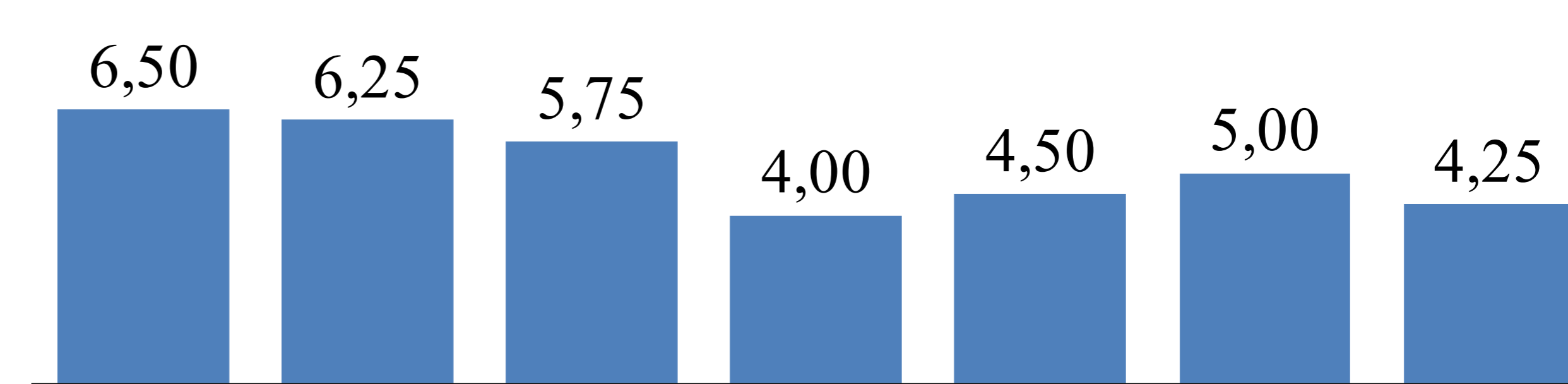
Vigor



Yield (t ha⁻¹)



Visual evaluation of *Xanthomonas*



Analysis of variance	Yield	Vigor	Severity
F treatments	6,08 **	3,18 *	1,29
Average	149,26	7,61	5,18
Standard deviation	5,74	0,35	1,76
MSD (5%)	13,41	0,81	4,11
VC (5%)	3,85	4,56	33,93

	Tukey's Test at 5%		
Zero K ₂ O	139,22 c	7,05 b	6,50 a
100% KCl	141,19 bc	7,31 ab	6,25 a
80% KCl + 20% Poly	150,89 abc	7,88 a	5,75 a
60% KCl + 40% Poly	153,84 ab	7,88 a	4,00 a
40% KCl + 60% Poly	153,70 ab	7,75 ab	4,50 a
20% KCl + 80% Poly	158,63 a	7,69 ab	5,00 a
100% Poly	147,38 abc	7,69 ab	4,25 a

Significance level: **, 1%, 5% DF: degrees of freedom, MSD: minimum significant difference; VC: variation coefficient.

CONCLUSIONS

- Polyhalite increased vigor and reduced leaf rot potential
- Partial replacement of MOP by Polyhalite increased crop productivity; the ratios between 40 and 80% Polyhalite in the blend with MOP are the most indicated, even in high fertility soils.

ACKNOWLEDGMENTS