

TRIAL RESULTS

FLORIDA, US (2014)

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TRIAL OBJECTIVE

To evaluate cabbage response to different application rates of K fertilizers with and without S.

HIGHLIGHTS

UP TO 73% IMPROVEMENT IN NUTRIENT UPTAKE OVER MOP

44% IMPROVEMENT IN ROOT WEIGHT

126% HIGHER PLANT BIOMASS

105% IMPROVEMENT IN CABBAGE HEAD WEIGHT

TRIAL DESIGN

PARTNER:	UNIVERSITY OF FLORIDA
LOCATION:	US
YEAR:	2014

- Global cabbage production totalled ~70 million tonnes in 2012¹.
- The global cabbage production is worth US\$17 billion annually¹.
- Cabbage production requires significant amounts of potash (~200 kg K₂O ha⁻¹)².
- Green cabbage is representative of a large group of head brassicas (e.g. savoy, broccoli).
- Bravo cabbage, the crop in scope for this trial, is an industry standard.
- Field trial conducted on very gravelly loam with a shallow profile that drains well.
- Nine beds of 1m width by 50m long by 0.1m high divided into pots with 19 plants per plot.
- Straight and blend treatments were applied at three rates 100, 150 and 200 kg K₂O ha⁻¹ with a control of N+P only.



TREATMENT TABLE

TREATMENTS AVERAGE NUTRIENT APPLIED IN TRIAL (kg ha⁻¹)

	Ν	P_2O_5	K₂O	CaO	MgO	S	CI	
Control	200	170	0	74	0	0	0	
MOP	200	170	150	74	0	0	120	
SOP	200	170	150	74	0	54	9	
POLY4	200	170	150	256	64	204	32	

LEAF NUTRIENT UPTAKE (DW mg kg⁻¹)³⁻⁵

- Magnesium (Mg) offtake in this scenario is only replaced when POLY4 is the potash (K) source.
- Balanced nutrition from POLY4 improves nutrient uptake and leads to elevated chloroplast numbers.



ROOT FRESH WEIGHT (g per plant)³⁻⁵

- The "balance of nutrients" provided by POLY4 is supportive of enhanced root growth.
- Larger roots provide greater physical anchorage for the plant.
- A more extensive root network improves plant ability to exploit soil nutrient and water resources.



LEAF FRESH WEIGHT (g per plant)³⁻⁵

- A POLY4 fed plant supports increased leaf area which increases photosynthetic capacity.
- The cabbage crop values the extra nutrients supplied by POLY4.
- Magnesium, calcium and beneficial micro-nutrients essentially support crop development.



PLANT BIOMASS (g per plant)³⁻⁵

- POLY4 significantly outperforms MOP by 126% and SOP by 9%.
- POLY4 provides extra nutrients which appear to contribute to crop performance.
- Total biomass represents a sum of all root growth and leaf growth.
- The result is a more vigorous, healthier, more robust crop which is supportive of greater yields.



HEAD WEIGHT (kg per plant)³⁻⁴

- Fresh weight is the most important and easily measured yield component.
- POLY4 supports the plant's growth and nutritional health which results in a significant yield improvement in comparison to MOP.
- Additional magnesium, calcium and micro-nutrients supplied by POLY4, seems to contribute to the enhanced head weight over other K sources.



Notes: 1) FAO 2017; 2) IFA 1982; 3) GENSTAT mean results; 4) All plots received 200 kg N ha⁻¹ and 170 kg P₂O₅ ha⁻¹; 5) Analysis at 98 days after planting; 6) Differences over N+P control. Initial soil analysis pH 7.3, P 90 mg kg⁻¹, Ca 22,334 mg kg⁻¹, Mg 155 mg kg⁻¹, SO₄ 16mg kg⁻¹, EC 93.3 uS/cm, K 87 mg kg⁻¹.

Sources: University of Florida (2014) 1000-UOF-1016-13

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