



PHOSAGRO®

Improving soil fertility and water use efficiency in various environments: PhosAgro best management practices

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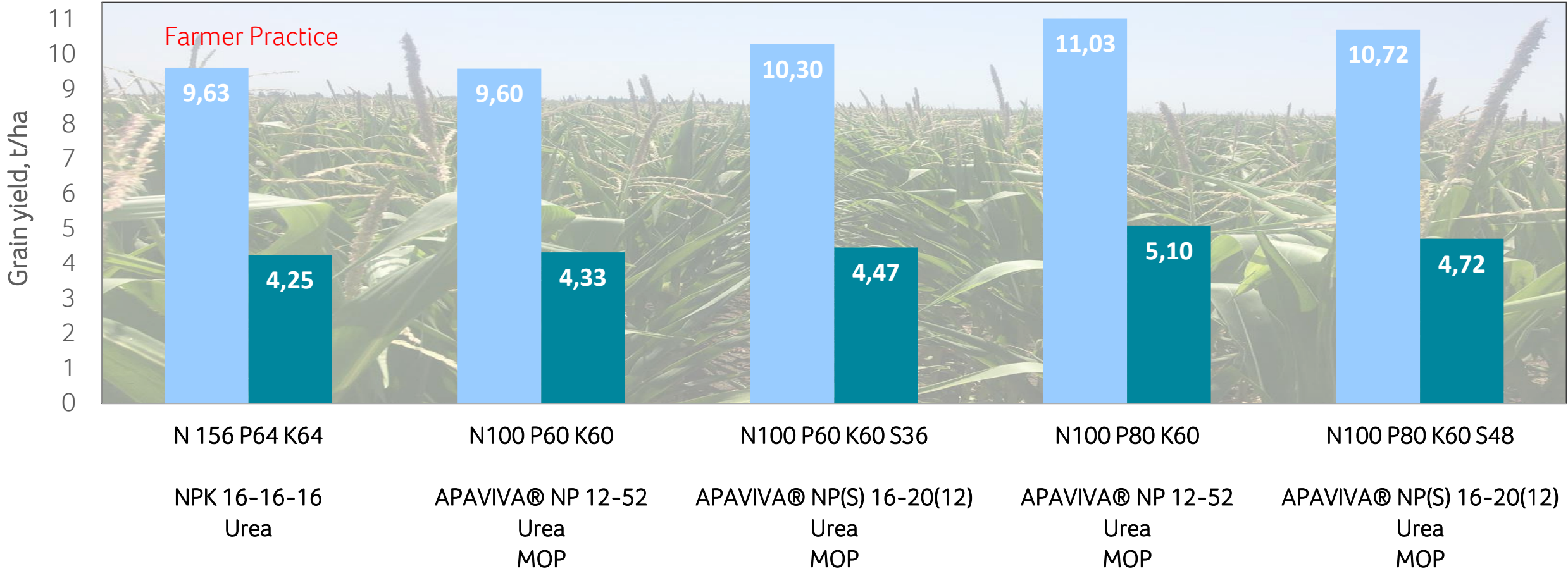


PhosAgro strategies to improve soil fertility and WUE

- Optimization of the nutrient management: source, rate, time and place
- Ecoefficient fertilizers
- Reclamation and amelioration of soils
- Si-containing biostimulants: seed treatment and foliar application



NPKS balanced application: rainfed maize



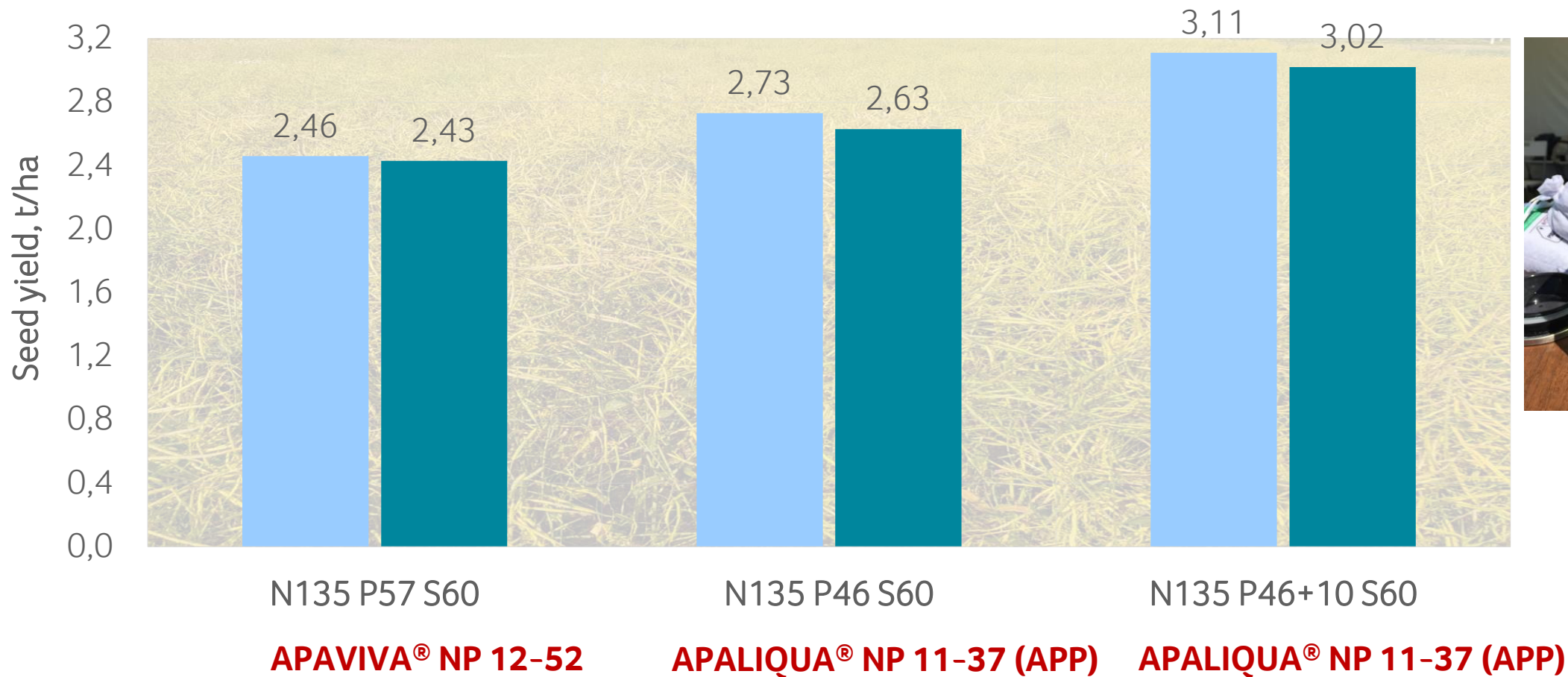
■ 2020: HSD0.05 = 0.38

■ 2022: HSD0.05 = 0.19

Medium deep clay loam carbonate chernozem [Serbia]:

- very low - low Olsen P (9.3-13.6 mg/kg)
- medium - high available K (174-206 mg/kg, AL-method)
- low available S (1 mg/kg, 1 M KCl)

APP as a source of P: rainfed winter rapeseed



■ 2020 ■ 2021

LSD_{0.05} = 0.11 (both seasons)

Soddy-podzolic loamy sand soil [Lithuania]:

- close to neutral soil pH (pH_{KCl} = 6.0-6.2)
- good available P (210-226 mg/kg P₂O₅, AL-method)

Cd concentration in crop and soil: sprinkler irrigation of cabbage

No	Treatment	Fertilizers	Physical weight, kg/ha	Marketable yield, t/ha	Cd concentration in cabbage heads, mg/kg wet weight	Soil available Cd prior to harvesting, mg/kg
1	Zero fertilizer		-	55.4	0.02	0.22
2	N ₁₂₇ P ₁₀₂ K ₆₉ S ₅	APAVIVA® NPK(S) 8-20-30(2)	230	70.1	<0.02	0.18
		APALIQUA® NP 11-37 (APP)	150			
		UREA	200			
LSD _{0.05}					0.001	0.08

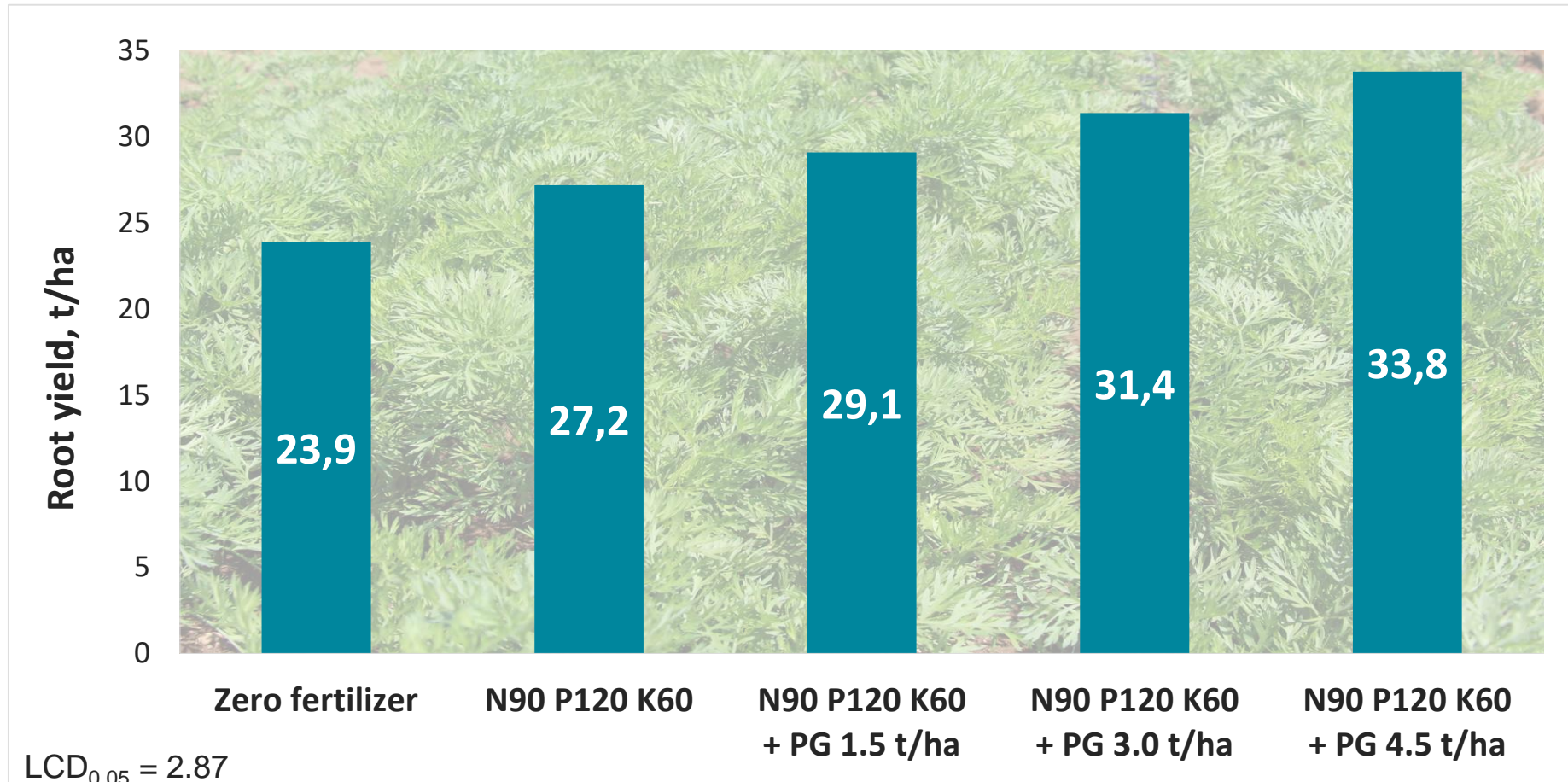


Limit for Cd concentration in cabbage heads = 0.03 mg/kg wet weight.

Average available Cd in soils of benchmark areas = 0.08 mg/kg (ammonium acetate buffer, pH 4.8).

Soddy-podzolic medium loamy soil [Central Russia]

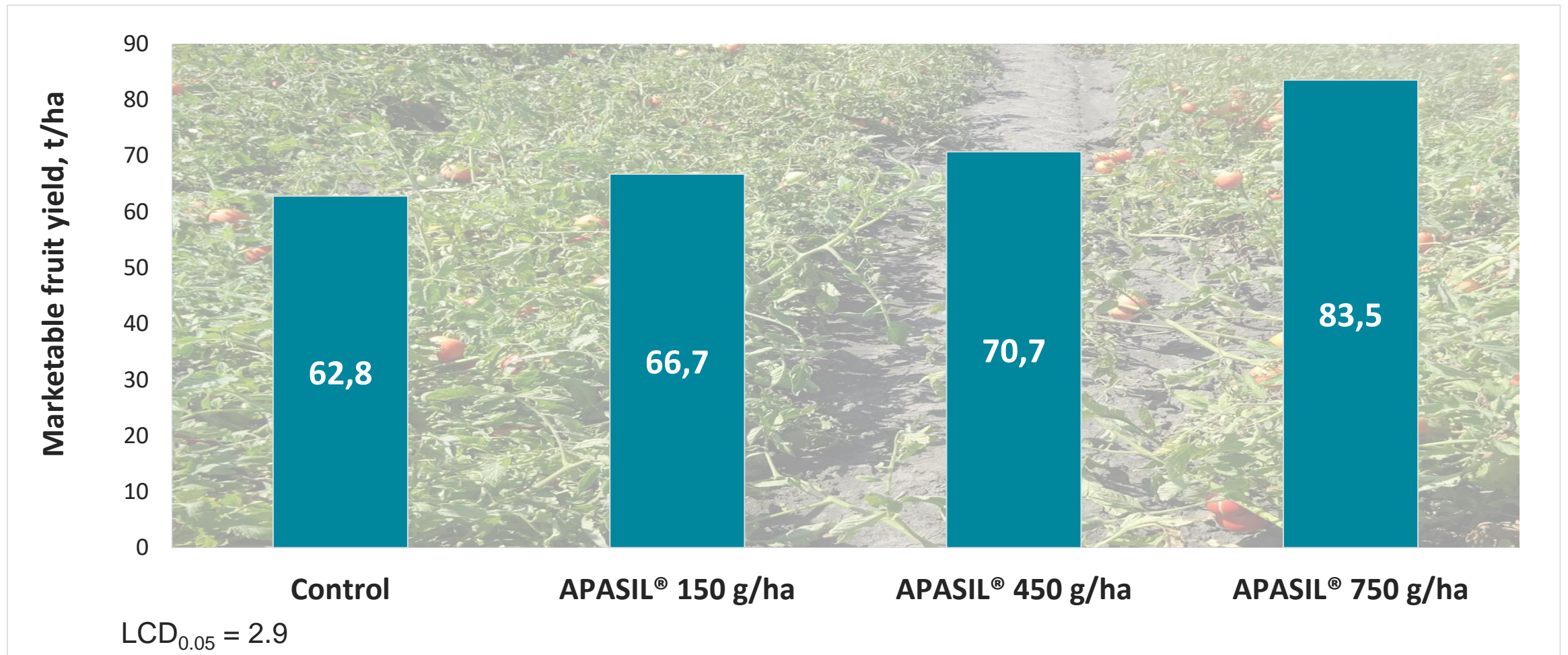
Phosphogypsum application: drip irrigation of carrot



Alluvial meadow medium loamy slightly saline soil [Southern Russia]:

- high available P (37-50 mg/kg P₂O₅, 1% (NH₄)₂CO₃)
- low - medium available K (116-295 mg/kg K₂O, 1% (NH₄)₂CO₃)

Foliar Si sprays: drip irrigation of tomato



Alluvial meadow medium loamy slightly saline soil [Southern Russia]

Foliar Si sprays: controlling grapevine downy mildew



Control



+ APASIL[®] 300 g/ha

Light-chestnut loamy slightly saline (solonetz-like) soil [Southern Russia]

Conclusions

1. Optimization of the nutrient management sometimes means a decrease of excessive nitrogen application balanced with phosphorus, potassium and sulfur. Optimal rates of sulfur need to be found under different environments.
2. Eco-efficient phosphate fertilizers produced from igneous Phosphate Rock contain safe levels of cadmium for soil and human health:
<https://www.phosagro.com/production/eco/>
3. Phosphogypsum is an efficient amendment in reclamation of salt-affected soils in arid areas that helps to increase crop water use efficiency.
4. Plant treatment with Si-based biostimulants is a new technology that enhances plant tolerance to abiotic and biotic stresses.

Thank you!

