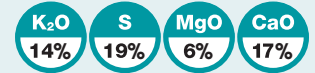


Added value: **REDUCING LODGING IN CEREAL CROPS**



POLY4
A SIRIUS MINERALS PRODUCT



KEY FINDINGS

POLY4 reduced lodging in Irish and Tanzanian cereal trials

Improved yield with decreased lodging



A CASE FOR POLY4

- Lodging is the proportion of plants that fall over or where the stem buckles. This can have a severe effect on yield, ease of harvest and crop quality. Lodging can also result in grain falling on the ground, which then germinate to become weeds in the subsequent crop.
- Crops are particularly susceptible to lodging when too much N is applied.
- Potassium fertilizers can alleviate this problem by increasing straw strength.
- Lodging has been measured at four trials: three corn (maize) trials in Tanzania, where farmers typically apply either no fertilizer or N + P fertilizer only, and one spring barley trial in Ireland.
- POLY4 supplies K, S, Mg and Ca in one product with a sustained nutrient delivery to meet crop demand.

poly4.com

POLY4 BENEFITS



Source of macro and micro nutrients



Extended nutrient delivery



pH neutral



Suitable for organic farming



Compatible with NPK blends

TANZANIA

Treatments	Applied nutrients (kg ha ⁻¹)						
	N	P ₂ O ₅	K ₂ O	CaO	MgO	S	% K from POLY4
No fertilizer	0	0	0	0	0	0	-
N + P (control)	120	60	0	0	0	0	-
MOP blend (22:30:7)	120	60	15	0	0	0	-
MOP blend (20:26:13)	120	60	30	0	0	0	-
MOP blend (18:24:17)	120	60	45	0	0	0	-
POLY4 blend (15:20:5)	120	60	15	18	6.4	20	100
POLY4 blend (15:20:10)	120	60	30	16	5.7	18	45
POLY4 blend (15:20:15)	120	60	45	11	3.9	12	20

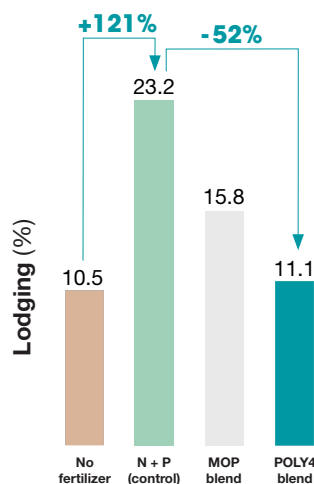
*N and P were applied at 120 kg N ha⁻¹ and 60 kg P₂O₅ ha⁻¹ to all treatments.

REDUCED LODGING



Across the three sites, most lodging occurred when N and P were applied without K. Crops fertilized with N, P and K had less lodging.

Corn fertilized with N, P and with K from MOP + POLY4 had significantly less lodging than the N + P (control), and less lodging than when the K was only supplied by MOP. The POLY4-fertilized and unfertilized corn had comparable lodging.

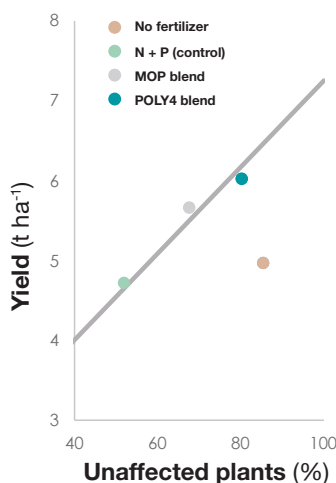


YIELD RELATED TO LODGING



The Lushoto site had the most severe lodging (48% of plants lodged in N + P (control) treatment). Excluding the unfertilized corn, there was a significant relationship between lodging and yield.

The POLY4-fertilized corn delivered the highest yield (6.0 t ha⁻¹) and had less lodging than MOP and N + P. Compared to the unfertilized crop, POLY4 had a similar amount of lodging but 21% (+1.1 t ha⁻¹) yield increase.



Tanzanian sites notes: N and P were applied at 120 kg N ha⁻¹ and 60 kg P₂O₅ ha⁻¹ to all treatments but the no-fertilizer control. N includes 45 kg ha⁻¹ base fertilizer from DAP and urea, and 75 kg ha⁻¹ top dressed as urea; values are means at the economically optimal potassium rate for each site: Karatu. Uyole, (30 kg K₂O) Babati (45 kg K₂O). Lushoto (average of rates). Analysed by Genstat ANOVA analysis with means separation by Fishers LSD at 5% level and Genstat regression analysis. Regression (R² = 38%) of the relationship between yield and plants unaffected by lodging excluded no-fertilizer plots, which had low lodging but also had low yield due to nutrient deficiency. Data points shown are treatment means.

Sources 25000-SOH-25011-16 (Lushoto & Mbeya); 25000-SOH-25012-17 (Babati).



TRIAL FOCUS

To measure the incidence of lodging in cereals under different fertilizer regimes in four trials in Tanzania and Ireland.

PARTNER

Selian Agricultural Research Institute

LOCATION

Southern Highlands and Northern Tanzania

DATE

2017 - 2018

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IRELAND

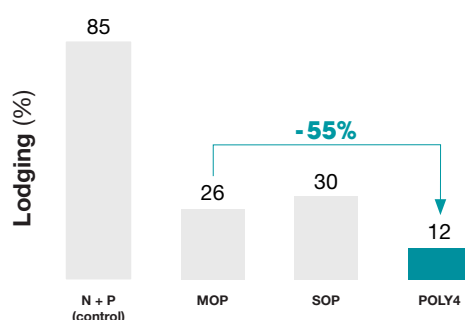
Treatments	Applied nutrients (kg ha ⁻¹)			
	K ₂ O	CaO	MgO	S
N + P + Ca (control)	0	144	0	0
MOP	48 - 145	144	0	0
SOP	48 - 145	144	0	17 - 52
POLY4	48 - 145	202 - 317	20 - 61	65 - 195

*All treatments received 150 kg N ha⁻¹ and 121 kg P₂O₅ ha⁻¹ from CAN and TSP.

REDUCED LODGING



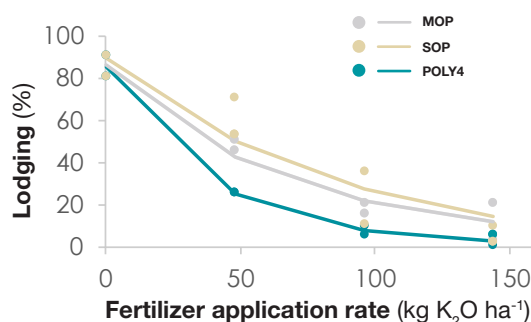
The spring barley site in Ireland suffered severe lodging. Both K fertilizers decreased lodging compared to N + P. POLY4-fertilized spring barley had the lowest incidence of lodging.



LODGING RELATED TO K RATE AND FERTILIZER SOURCE



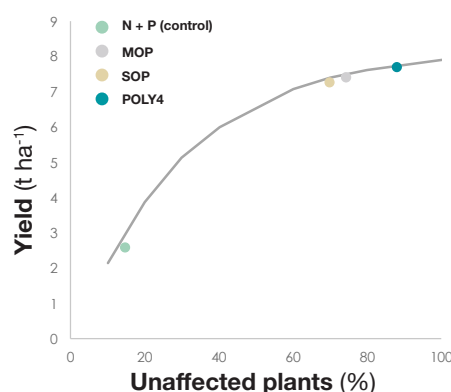
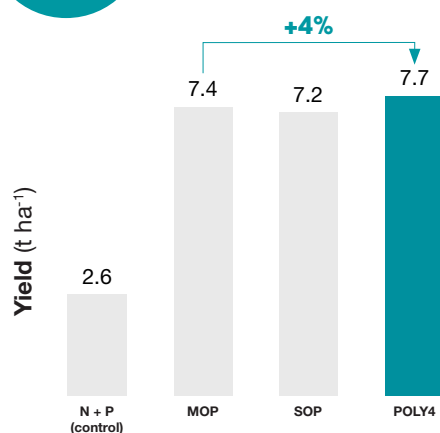
Lodging incidence decreased as the K₂O rate was increased. POLY4-fertilized barley had consistently less lodging than other K or S fertilizers.



YIELD RELATED TO LODGING



There was a significant relationship between yield and the proportion of plants affected by lodging. POLY4-fertilized plants had the fewest lodged plants and the greatest yield. Treatments that only received N + P had severe lodging and yield was severely restricted.



Irish site notes: All treatments received 150 N kg ha⁻¹, 21 P₂O₅ kg ha⁻¹ and 144 kg CaO ha⁻¹ from CAN and TSP; Initial soil analysis: pH 6.3, 2 mg P kg⁻¹, 17 mg K kg⁻¹. Genstat regression for individual plots (R² = 83%, n = 20) of the relationship between yield and plants unaffected by lodging. Data points shown are treatment means.

Source: Teagasc (2017) 65000-TEAG-65011-17.



TRIAL FOCUS

To measure the incidence of lodging in cereals under different fertilizer regimes in four trials in Tanzania and Ireland.

PARTNER

Teagasc

LOCATION

Rathdrum, Ireland

DATE

2017

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