

TRIAL RESULTS

TOBACCO

YUNNAN, CHINA (2014 and 2015)

HIGHLIGHTS

Tobacco yield was more responsive to POLY4 than SOP.

In 2014, POLY4-treated plants required 29% less fertilizer than SOP.

POLY4 reduced the incidence rate of Black Shank infection by 17% and of Bacterial Wilt by 22%.

TRIAL OBJECTIVE

To evaluate the effectiveness of POLY4 as a multi-nutrient fertilizer on tobacco in China and to assess the disease resilience.

PARTNER: Yunnan Agricultural University

LOCATION: Yunnan, China

YEARS: 2014 and 2015

TREATMENT TABLE²⁻⁴

Treatment	Nutrients applied (kg ha ⁻¹)			
	K ₂ O	CaO	MgO	S
SOP	88 – 263	0	0	32 – 95
POLY4	88 – 263	107 – 319	38 – 113	119 – 357

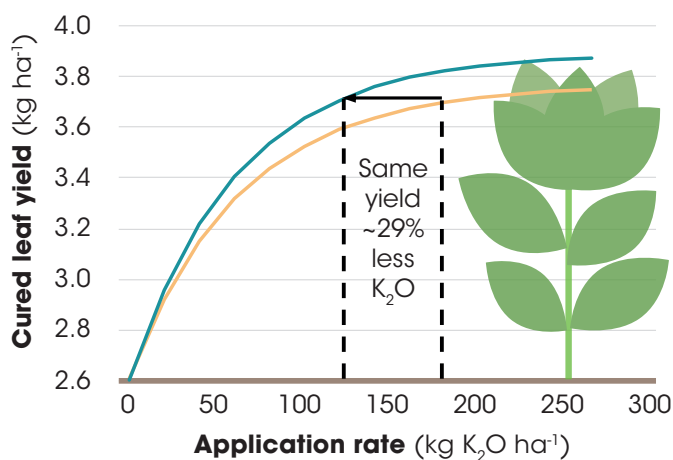
OVERVIEW

- China is the world's largest tobacco producer supplying 40% of global tobacco.¹
- Yunnan province is the largest producer of tobacco in China.
- Tobacco yield and quality is typically improved by K fertilizer. However, the crop's quality can be degraded by chloride co-application.
- A randomised block design was used for each trial with four replicates on two varieties of tobacco.
- Crop performance was assessed in Yunnan over two years with cultivar YN87. POLY4 and SOP were applied at 88, 116, 175 and 263 kg K₂O ha⁻¹.
- Incidence of disease was measured over two years after application 175 kg K₂O ha⁻¹ as POLY4 or SOP on Red Huge cultivar.
- Disease incidence results presented are averages of the data.

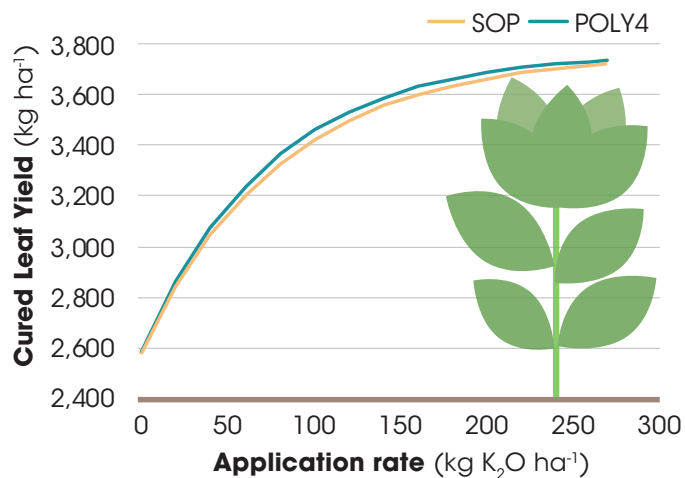


TOBACCO YIELD³⁻⁵

2014



2015

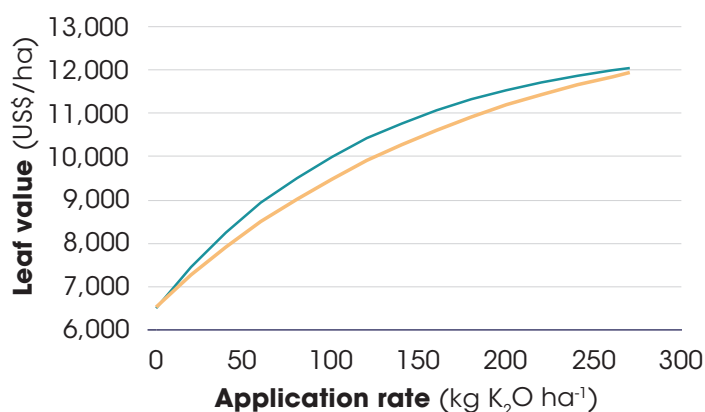


- Tobacco yields responded to increased K fertilizer rate with the greatest response between 100 and 150 kg K₂O ha⁻¹.

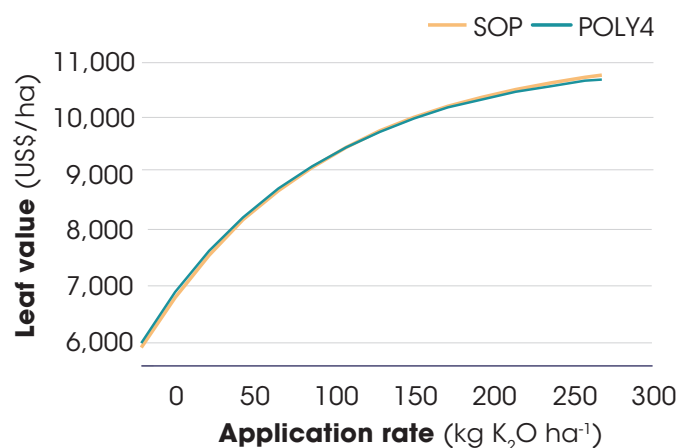
- At the recommended application rate of 175Kg K₂O ha⁻¹, POLY4 reached the maximum yield achieved by SOP of 3.7 t ha⁻¹ requiring 29% less K₂O.

CROP VALUE⁵⁻⁷

2014



2015



- Economic income is fundamental to farmers.

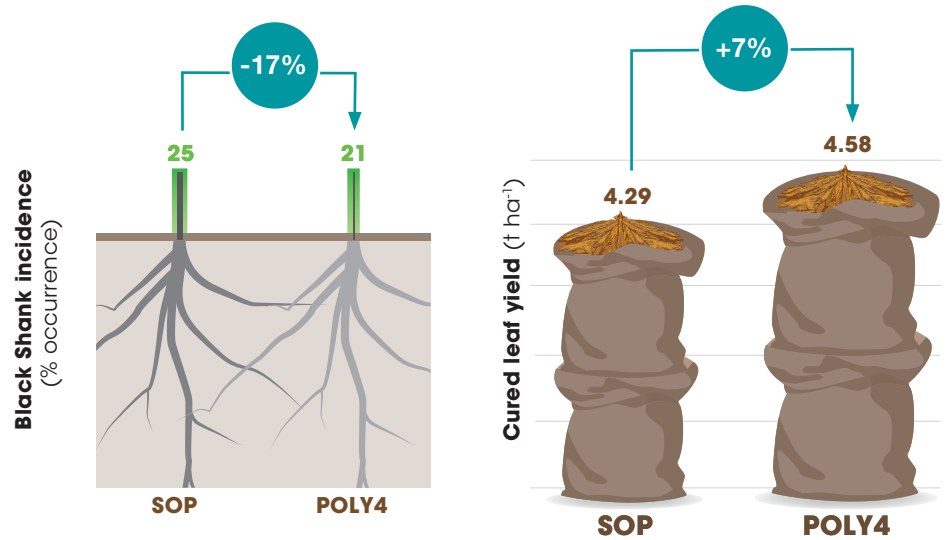
- POLY4 generated the greater crop value in 2014 trial and equivalent value in 2015 giving overall greater value across the two years.

DISEASE RESILIENCE

Treatment	Recommended rate (kg ha ⁻¹)			
	K ₂ O	CaO	MgO	S
SOP	175	0	0	60
POLY4	175	213	75	240

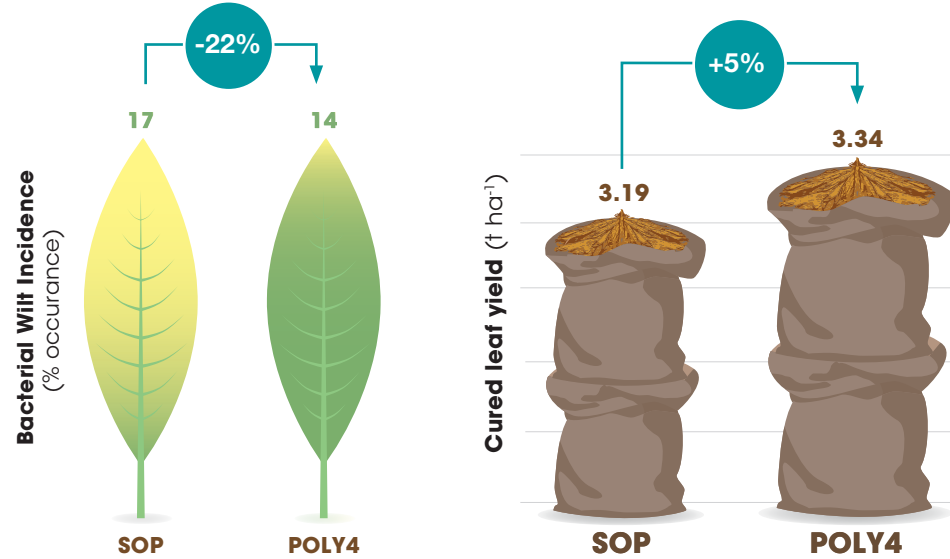
INFECTION BY BLACK SHANK (2014)^{8,9}

- Black Shank is caused by *Phytophthora nicotianae* and can infect both the shoots and roots of the crop at any growth stage.
- Balanced nutrition can make tobacco plants more resilient to a range of disease infections.
- POLY4 helped reduced the incidence rate of Black Shank infection by 17%, which in turn supported cured leaf yield increase.



INFECTION BY BACTERIAL WILT (2015)^{8,9}

- Bacterial Wilt is a common, soil-borne disease in tropical climates caused by *Ralstonia solanacearum*.
- The presence of calcium in the soil limits Bacterial Wilt incidences.
- The supply of calcium from POLY4 supported a decrease in disease by 22%, which in turn supported cured leaf yield increase.



Notes: 1) Fang et al. (2017); 2) Soil analysis in 2014: pH 7.2, organic matter 2.2%, 95 mg N kg⁻¹, 5 mg P kg⁻¹, 125 mg K kg⁻¹; 3) Soil analysis in 2015: pH 7.4, organic matter 2.7%, 109 mg N kg⁻¹, 28 mg P kg⁻¹, 216 mg K kg⁻¹; 4) Genstat regression analysis; 5) Tobacco variety: YN87; 6) Average tobacco prices for each grade in 2014: 1st (US\$5.00/kg), 2nd (US\$2.80/kg), 3rd (US\$1.50/kg); in 2015: 1st (US\$4.60/kg), 2nd(US\$3.10/kg), 3rd (US\$0.80/kg); 7) Based on Yuan:US\$ rate of 0.1627 average from 1 October 2014 to 31 March 2015; 8) Genstat means; 9) Variety: Red Huge, 2014 trial.

*Sirius Minerals recommends that growers utilise local good phytosanitary practices in disease management.