



## Increased soybean yields with foliar applications of potassium nitrate based sprays

On behalf of the Potassium Nitrate Association (PNA), Landlab research company in Italy conducted a trial to study the effect of potassium nitrate (PN) based foliar applications on soybean growth and yield parameters. In this article, the focus will be on soybean yield only.

### Trial set up

The effect of the treatments was tested in a completely randomized design with two factors:

1. Foliar treatments (Table 1).
2. K dose rate in basal dressing with KCl (Table 2).

In total, the trial consisted of 80 plots (4 K dose rates x 4 foliar treatments x 5 replicates). Plot size was 2,0 m x 1,5 m = 3,0 m<sup>2</sup>.

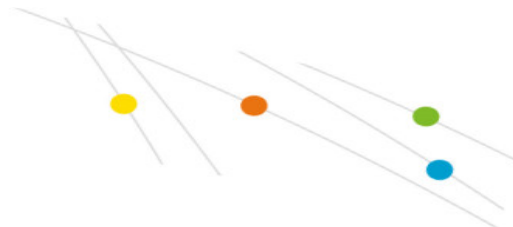
Sowing of soybean with Rhizobium inoculum was carried out on the 27th of May 2015. Harvesting was done on the 20th of October 2015.

Foliar treatments were applied two times: at the growth stages V3 (Third node, 29th of June) and R3 (Beginning pod development, 28th of July 2015). Foliar application was done plot by plot at a spray volume of 600 l/ha.

### Results

The average soybean yield was 4,5 ton/ha, which is in line with the soybean potential of the area.

Main effects on total yield were found for both the foliar treatments and for the K dose



rate in basal dressing. No statistically significant interaction ( $P=0,05$ ) was found between the trial factors foliar treatments and basal dressing K dose.

Soybean yield was increased with 5% - 12% by two applications of the foliar PN based sprays, compared to the not foliar treated control. Foliar spray application of potassium nitrate (without addition of P source) resulted in the greatest statistically significant yield increase of 12%, followed by PN+MAP with 10% yield increase (Table 1).

Table 1. The effect of various foliar spray applications with potassium nitrate on soybean yield (MT/ha).

Foliar treatments*, applied twice: at growth stage V3 and R3	Soybean yield**	Soybean yield increase compared to the no foliar treatment	
	MT/ha	MT/ha	%
No foliar treatment (control)	4,2 a	-	-
PN 5 kg/ha/application + UP 3 kg/ha/application	4,4 ab	+ 0,2	+ 5%
PN 5 kg/ha/application + MAP 2,2 kg/ha/application	4,6 b	+ 0,4	+ 10%
PN 5 kg/ha/application	4,7 b	+ 0,5	+ 12%

\*) PN = potassium nitrate; MAP = monoammonium phosphate; UP = urea phosphate.

\*\*) Means followed by the letter same are not statistically significantly different (Fisher's protected least significant difference test at 5% level).

Increasing K dose in the basal dressing had a positive effect on soybean yield. Yield was statistically significantly higher (20% - 30%) at all doses of K compared to no KCl



application in the basal dressing (Table 2).

Table 2. The effect of increasing dose rates of K applied as KCl in basal dressing on soybean yield.

K dose in basal dressing as percentage of crop K-removal	Potassium chloride (KCl) applied at basal dressing	Soybean yield ^	Relative soybean yield increase compared to 0% treatment	
%	Kg K <sub>2</sub> O/ha	MT/ha	MT/ha	%
0	0	3,8 a	-	-
40	40	4,6 b	+ 0,8	+ 20%
75	75	4,9 c	+ 1,1	+ 30%
100	100	4,7 bc	+ 0,9	+ 24%

\*) Means followed by the letter same are not statistically significantly different (Fisher's protected least significant difference test at 5% level).