

# Research

## Leaf fertilisation with nitrogen

### **Micronutrients + leaf fertilisation + pesticides – an effective, economical and environmentally compelling solution**

It is an easy decision to mix micronutrients with Bio NS 15-2 or Bio NS 15-2<sup>Carbon</sup> and apply them simultaneously. In addition to saving application costs, it provides a significant synergy effect, which ensures an unsurpassed high uptake of both macro- and micronutrients.

We therefore recommend adding 5 litres of BioCrop Opti<sup>P</sup> or BioCrop Opti<sup>XL</sup> while applying, e.g. 7.5 to 15 kg N/ha. When such large amounts of BioCrop Opti<sup>P</sup> or BioCrop Opti<sup>XL</sup> are added repeatedly, the plant can resist fungi and insect attacks far better. Add pesticides to the mixture and remember to optimise the pH of the spraying liquid with Bio pH Control for optimal effect.

### **Research**

In the Plant Congress 2023 presentation by Jan K. Schjoerring, professor at Aarhus University, the benefits that can be gained from foliar fertilisation rather than placing the fertiliser on the ground were considered.

As can be seen in the tests on page 15, the nitrogen efficiency kg seed/kg N is significantly higher in leaf fertilisation than when the fertiliser is applied to the soil.

### **Fertilise the plants, not the soil**

The leaf fertilisation concept provides excellent opportunities to target and thus optimise the addition of N and other nutrients.

This provides the best conditions for optimizing the economics of crop production, while also having significant positive environmental benefits.

### **Overall conclusion – Jan K. Schjoerring**

If it is done correctly, better nitrogen utilisation can be achieved with reduced input. Very topical with high fertiliser prices and carbon tax.

### **The potential of leaf fertilisation**

- Leaf fertilisation should only be carried out with a relatively small amount of nitrogen per application, 10-20 kg N/ha, to minimise the risk of loss. At the same time, it will reduce the risk of leaf scorch.
- Larger amounts of nitrogen should be added at intervals of several days.
- A  $\alpha$  agent should be added to the solution to reduce surface tension and ensure optimal leaf contact and nutrient uptake in the leaves.
- Furthermore, co-formulation with other nutrients, addition of a carbon source and lowering of the pH of the extracted solution can increase efficiency and prevent ammonia loss.

Bio NS 15-2 and BioNS 15-2<sup>Carbon</sup> are the only leaf fertilisers on the market that fully meet the above recommended composition.

See the results on page 2.

# Leaf fertilisation with nitrogen

Ferrari et al. 2021	Nitrogen test kg N/ha		Total N added kg N/ha	Seed yield t/ha	Nitrogen efficiency kg seed/kg N
	Soil	Leaves			
2019	32	0	32	5.57 ± 0.01	-
	148	12	160	6.39 ± 0.04	39.9 ± 0.3
	32	64	96	6.53 ± 0.10	68.0 ± 1.0
	32	72	104	6.19 ± 0.10	59.6 ± 0.9
	32	88	120	6.52 ± 0.07	54.4 ± 0.6
2020	32	0	32	5.91 ± 0.76	-
	148	12	160	6.12 ± 0.44	38.3 ± 4.7
	32	64	96	6.82 ± 0.29	71.1 ± 5.2
	32	72	104	6.21 ± 0.64	59.8 ± 10.7
	32	88	120	6.26 ± 0.29	52.2 ± 4.2

## Conclusion – Leaf fertilisation with nitrogen in wheat – Northern Italy

- A mildly significant ( $p > 0.05$ ) additional yield from leaf fertilisation even after application of 25-40% less nitrogen.
- Seed protein content and quality were not affected.
- Nitrogen utilisation efficiency was > 30% better after leaf fertilisation.

*N soil: 3 doses in ammonium nitrate. Leaf fertilisation: 4 doses of 12-32 kg N/ha in urea.*

Howels, N & Little, T 2022	Conventional fertilisation			Leaf fertilisation			Leaf fertilisation N utilisation versus conv. fertilisation %
	Total N added kg/ha	Additional yield kg/ha	N utilisation dry matter kg/kg N	Total N added kg/ha	Additional yield kg/ha	N utilisation dry matter kg/kg N	
Stage 1	275	5700	20,7	110	3200	29.1	140
Stage 2	245	2900	11,8	92	2800	30.4	257
Stage 3	275	2300	8,4	110	2900	26.4	315
Stage 4 solid fert.	270	4300	15,9	92	4100	44.6	280
Stage 5 slurry	425	9000	21,2	224	9200	41.1	194

## Conclusion – Leaf fertilisation with nitrogen for grassland – Wales

- Leaf fertilisation produced similar high yields (15-20 t dry matter/ha) as in conventional systems, even with application of 40-50% less N.
- Leaf-fertilised systems produced higher yields under suboptimal climatic conditions, e.g. in cool and/or dry growing conditions.
- The utilisation efficiency of nitrogen, defined as growth in dry matter yield per additional kg N applied, was 2-3 times higher in leaf fertilised systems.
- The cost per litre of extra milk produced was on average 39% lower in leaf fertilised systems.

*Report of the European Innovation Partnership (EIP) Wales.*