

# Foliar Nitrogen Application at *Véraison*: What Goes to the Fruit Stays in the Fruit

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Two independent pot experiments were conducted to test whether foliar-applied nitrogen (N) at veraison moves to the fruit and other plant organs, enhances berry ripening and quality, and potentially replenishes the available N pool to support next year's crop.

## Experiment 1: tracking foliar-applied <sup>15</sup>N

Potted Riesling (2022) with 4 spray treatments: whole vine, leaf and cluster (enriched urea), and a non-enriched control. 4 replicates/treatment, spray of <sup>15</sup>N-labelled urea (10% atom enrichment, 40 g/L urea) at veraison in 3 applications

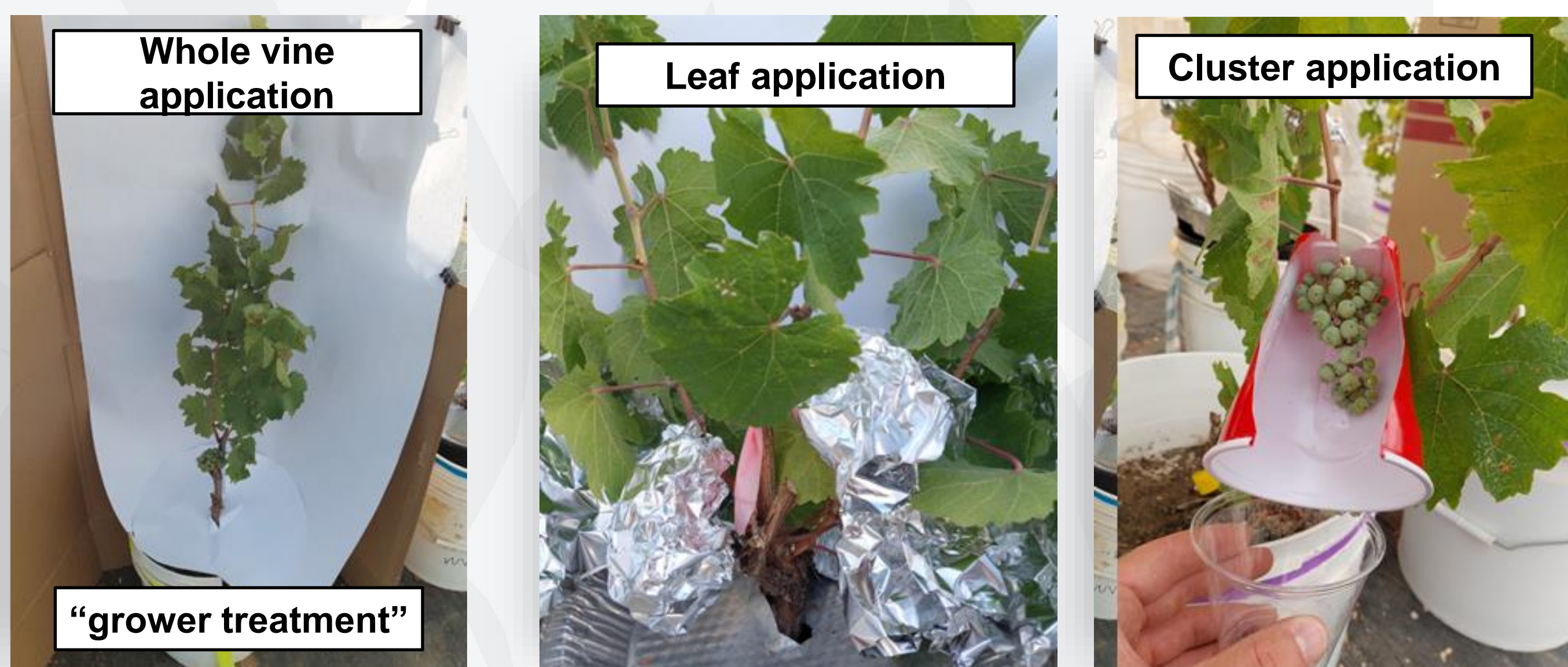


Photo 1: treatment application on specific organs. Labelled urea was sprayed at veraison, once a week for 3 weeks. At about 20 Brix, the whole vine was dissected, and after fresh weigh collection, all samples were oven-dried, and analyzed at an isotope lab.

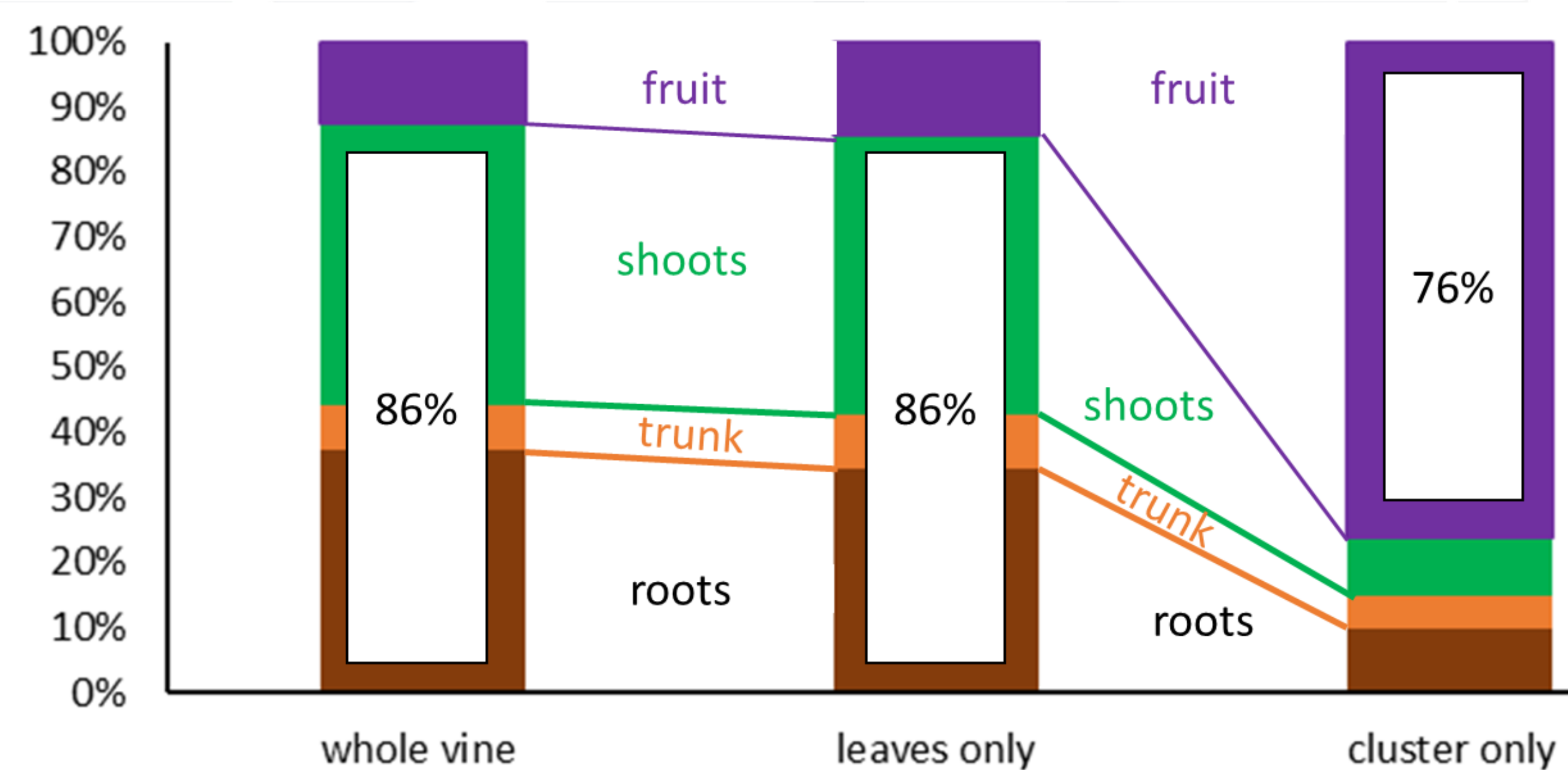


Figure 1: partitioning of newly applied <sup>15</sup>N

### TAKE-HOME

- Fruit-applied N increased YAN
- Leaf-applied N increased nutrient reserves
- Whole canopy-application can serve both purposes

### ACKNOWLEDGEMENTS

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## Experiment 2: interaction between soil N and foliar N

### 2022: treatment application



Soil N No N N 5 N 15 N  
Foliar N +/- +/- +/- +/-  
Photo 2 : N levels applied the first year

Potted Cabernet-Sauvignon with 2 factors:  
- Soil-applied N (ammonium-nitrate) at bloom: no N, 0.25 g (N), 1.25 g (5N) and 3.75g (15N)  
- Foliar-applied N at veraison(40 g urea/L): + or - F  
8 treatments, 6 replicates  
Harvest: berry phenolics, TSS, pH, TA, YAN  
Winter pruning weights

	No N	N	5 N	15 N
pH	1.1	1.05		
YAN	8.6	7.6	2.4	1.4
PAN	7.1	5.9	2.3	1.5
Ammonia	13.3	15.7	2.5	1.3

Table 2: effect of foliar spray, expressed as a multiplying factor

N levels increased pruning weights and foliar spray increased in a lesser proportion

### 2023: carry-over effect



Photo 3: Whole vine dissection

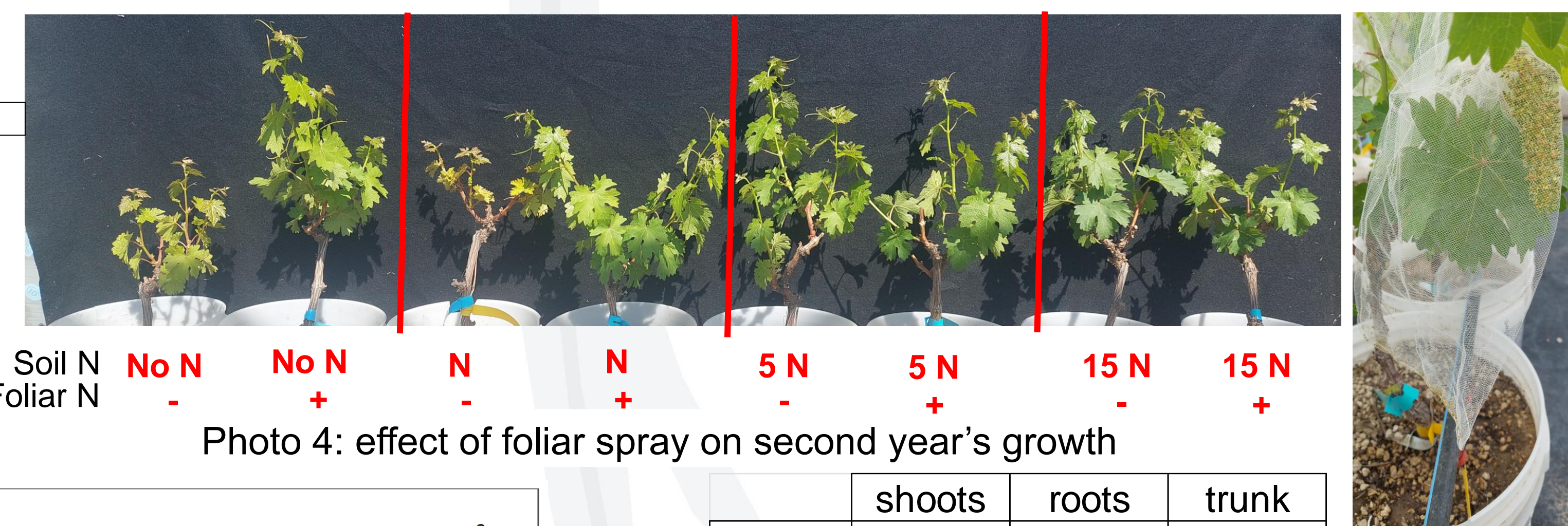


Photo 4: effect of foliar spray on second year's growth

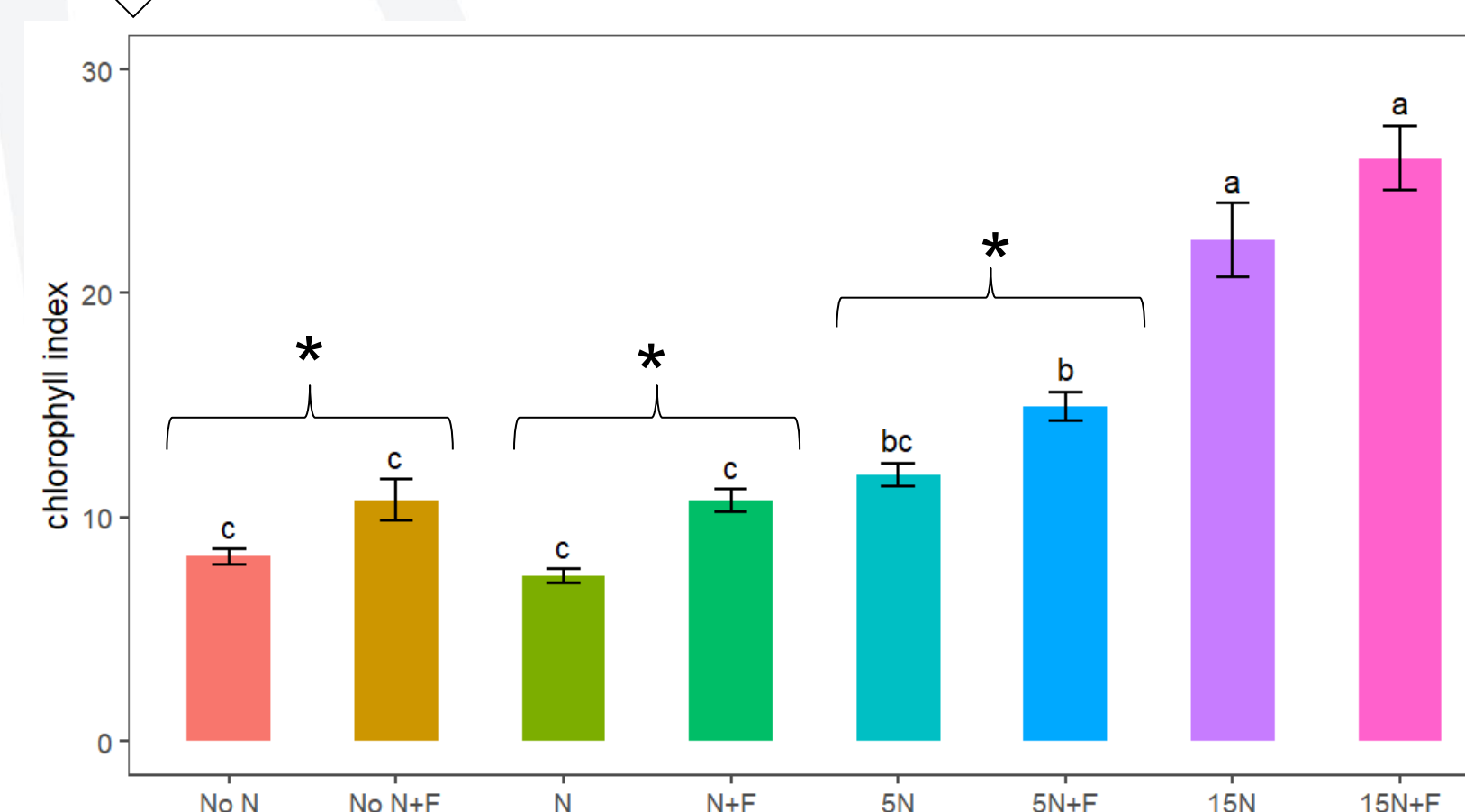


Figure 2: Pre-bloom chlorophyll index. \* and letters indicate significant differences

	shoots	roots	trunk
No N	0.12d	0.75c	0.07b
No N+F	0.18d	1.41bc	0.12ab
N	0.13d	0.82c	0.10ab
N+F	0.20cd	1.05c	0.10ab
5N	0.22cd	0.95c	0.15a
5N+F	0.27bc	0.98c	0.12ab
15N	0.34ab	2.42ab	0.13ab
15N +F	0.37a	2.86a	0.15a
p-value	<0.0001	<0.0001	<0.05

Table 2: N amount in organs (g). Letters indicate significant differences

Photo 5: flower cap collection, to estimate fruitset %

### TAKE-HOME

- Foliar spray strongly increased juice N the first year,
- The 2nd year, foliar N increased pre-bloom leaf chlorophyll and N % in tissues.
- % fruit set was not significantly impacted.
- The carryover effect of soil-applied N is much stronger than that of the additional foliar application. Foliar seems to benefit N-deprived vines.