

Commercial Field Trial on Onions, Ceres, Western Cape. (May 2014)

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Location

The trial was conducted on a farm located in the Koue-Bokkeveld in the Ceres area, Western Cape. Two centre pivots (60 ha each) were selected on which onions were grown commercially. One pivot has served as a control and the other as a treatment.

Aim of the Trial

To illustrate the effect of a high concentration phyto-fulvic acid on the efficiency of nutrient uptake and resulting increased yield as well as the impact of the application of dissolved and therefore available sulphur on yield and quality of onion that has a high sulphur requirement.

Treatments

Soil treatments of both fulvic acid and sulphur were done as the 1:2 water extract analysis of the soil has clearly shown that the water-soluble availability of all the macro and micro elements in this sandy soil is very low, which is probably also highly leached. The traditional soil analysis, however, indicates that there is a reserve of certain elements, but it is unavailable to the crop. The divalent (2+) cations are probably all bound to phosphate in the soil rendering it insoluble and then both elements are unavailable for use by the crop.

Furthermore, the analyses indicated clearly very low levels of sulphur in the soil and since onions, which is a major consumer of available and recordable sulphur; it is a further constraint on yield and quality. Therefore, emphasis was placed on applying soluble and plant available Sulphur (**DynoSulf**), which was applied at 20 litres per ha during the season.

Sulphur plays an important role in production and development of aroma in onions together with an effective and balanced application of fertilizer and micro-nutrient foliar spray resulting in a significant improvement in yield and return.

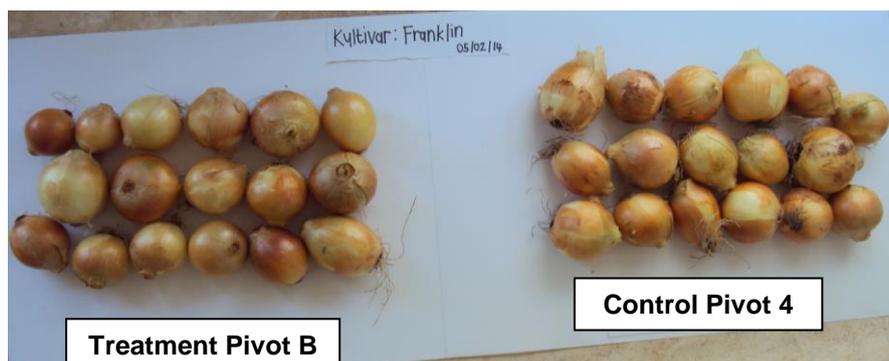
LiquiCompost, Agrilibrium's high concentration phyto-fulvate product (renewable tree extract, 16 -18% pure fulvic acid content) was standardly used at 40 litres per ha with the fertilizer for improvement of efficiency of nutrient uptake, especially in the sandy soil.

Macro element fertilization is done on an expected yield of 80 tons per hectare.

Results

A representative sample of onions was taken to harvest at each pivot and the following parameters were measured in 20 onion bulbs.

Bulb size (diameter, cm):



Results of the 20 representative bulbs indicates an improvement in quality and size. For all three growth, quality and yield parameters, namely bulb size (8.5%) (Figure 1), fresh weight (15%) and dry weight (11%) (Figure 2) an increase was observed which also correlated well with the increased final yield data although the actual final yield per hectare increased difference of 28% (Figure 3) are understated. The increased diameter indicates larger onions and implies a higher yield.

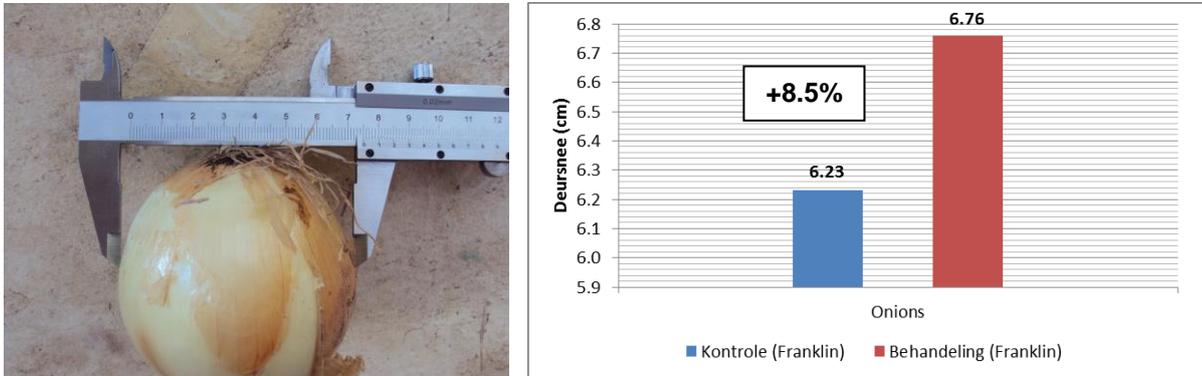
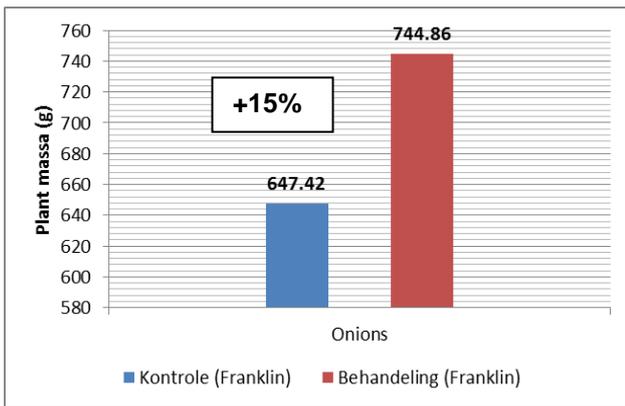


Figure 1: Diameter comparison between treatment and control.

Mass (g):

Fresh mass:



Dry mass:

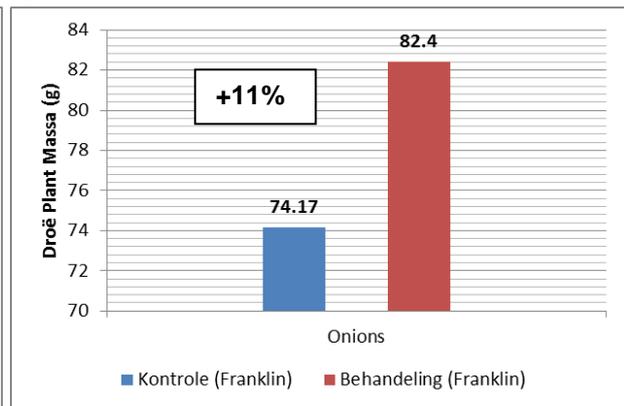


Figure 2: Total fresh and dry mass comparison between treatment and control for 20 onion bulbs.

Fresh bulb mass determined after drying and weighed again after drying resulted in an average fresh weight increase of 15% with the dry mass increase 11%.

Although aroma composition and concentrations were not determined physically, a distinct aroma difference was noted with scent. The treated bulbs released a much richer and stronger aroma.

Yield (tons / ha):

Yield assessments were done per pivot and by harvesting control and treatments separately.

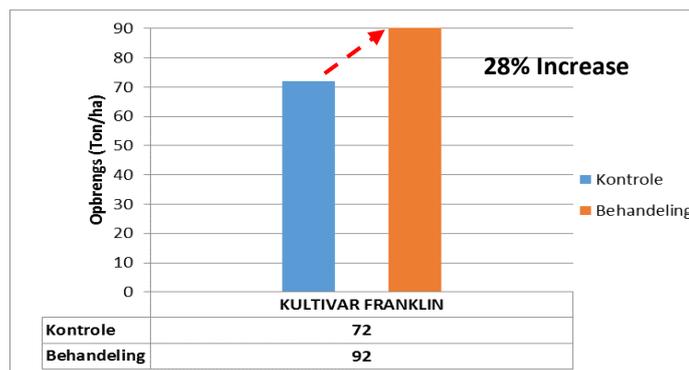


Figure 3: Commercial yield per ha at the end of the season.

Marketability and Value of Harvest

Final yield figures showed that in the test block where the crop was treated with the Agrilibrium program and products (sulphur and fulvic acid), 92 tonnes of marketable product was produced in comparison with other conventional grown onions on the farm that on average produced 72 tons per ha. The previous season's average yield was 68 tons per ha. Marketable product in terms of total harvest was 95.7% for the treated pivot and 94.4% for the control.

Return on Investment (Return on investment, ROI).

In the Agrilibrium program R 2 245 per ha was finally spend extra for the soil applications of phyto- fulvic acid (**LiquiCompost**) along with fertilizers and for dissolved sulphur (**DynoSulf**). The table below summarizes the improvement in yield, quality and profitability with the use of the program and Agrilibrium products. Note that the specific recommendations were based on the results of both the 1: 2 water extract analysis and traditional chemical analysis of the soil. Availability of soluble nutrient elements for root uptake can only be determined with the 1: 2 water extract analysis and to be able to do meaningful logical balanced recommendations it is not possible without this specific information.

Table 1: Comparative commercial figures to illustrate Rand revenue and profit% per R1 spent on fulvic acid and sulphur products. Assumption of R25 per bag onions sold.

	Yield Ton/ha	Ton/ha marketed	% Waste	Number of 5 kg bags	Aver R /bag	Gross income /ha	Difference /ha	R/ha Agrilibrium products	(R income per R1 spend)	(% profit per R1 spend)
Treatment	92	88	4.3%	17600	R25	R440,000	R100,000	R2,245	R44.54	4454.3%
Control	72	68	5.6%	13600	R25	R340,000				

The total amount per ha spend was R2 245 and the additional gross profit realized was R44.54 for each Rand spend.

Summary

The above figures clearly illustrate that the quantification of the nutritional status of the soil in terms of plant-available elements that are dissolved in the ground water by using the 1: 2 water extract analysis, as well as the reserve status as determined by traditional soil analysis, is of utmost importance for the proper and efficient balancing and correction recommendations to be made.

It is also important to use the right products at the right concentration and efficient formulation to ensure that the nutritional elements are accessible and available so that it can be used in the plant's metabolism. Insoluble nutrients cannot be taken up and is therefore totally ineffective.

That soil treatment with the **LiquiCompost** product with its high phyto fulvic acid content and which is able to unlock insoluble nutrients and to make it available for root uptake and the application of the liquid sulphur product (**DynoSulf**) contributed to the improved growth and yield.

The constant increased yield figures suggest that the balanced nutrition management of treated plants resulted in better growth and photosynthesis.