

## BiOWiSH™ Crop

### Tomato Trial Arise Research & Discovery, Inc., USA

#### Background

BiOWiSH Technologies partnered with Arise Research & Discovery, Inc. to demonstrate the benefits of BiOWiSH™ Crop on early-stage growth of tomato crops. Testing was done over a four week period from April 21 through May 19, 2014 at Arise's research greenhouse in Martinsville, Illinois. Previous testing of BiOWiSH™ Crop products has shown success at harvest stage for lettuce, cucumber, pepper, corn, rice, melon, tomato, and other crop production.

#### Objectives

The objective of this case study was to determine the effectiveness of BiOWiSH™ Crop on early stage tomato plant growth.

#### Solution

The BiOWiSH™ Crop technology contains a novel consortia of metabolically cooperative microorganisms, with endogenous and exogenous enzymes, and small molecule metabolic co-factors which support both biocatalytic and metabolic activity. The BiOWiSH™ Crop technology can be impregnated or coated onto many fertilizers and fertilizer fillers. Because BiOWiSH™ Crop increases yields, it can help farmers globally increase production and achieve self-sufficiency. BiOWiSH™ agronomy products increase micronutrient uptake in plants, improve plant vigor and stimulate microbial activity in the soil, resulting in higher crop production.

#### Implementation Program

Plants were grown in 6-inch diameter plastic pots which were placed on heavy wire mesh tables 38 inches above the concrete floor of the greenhouse. Supplement heat was added as needed with a kerosene space heater.

Tomato seeds were planted April 21, and germination checked on April 28, 2014. Plants were watered daily. Physical parameter measurements were conducted on May 13th, 22 days after planting.

Three treatments were included in the test design:

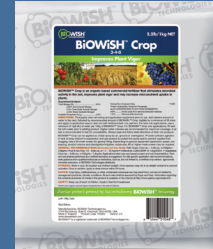
1. Control (no BiOWiSH™) = current best management practice 130 lbs. N/ac (7.8g UAN per pot)
2. Control + BiOWiSH™ Crop and 10% reduced Nitrogen (7.0 grams UAN per pot)
3. Control + BiOWiSH™ Crop and 20% reduced Nitrogen (6.2 grams UAN per pot)

Each treatment was replicated 3 times and each replicate held 18-6 inch pots for a total base size per treatment of 54 plants.

#### Methods

Stem diameters were measured with a Performance Tool 6" Digital Caliper. Chlorophyll was measured with a Konica Minolta Spad meter. Root and plant mass weights were recorded with an Ohaus HH320 scale to the nearest 0.1g. Soil tests and plant tissue analyses were conducted by Midwest Laboratories, Omaha, Nebraska.

### BiOWiSH™ Crop



- Improves yields
- Improves plant vigor
- Increases total number of crops per annum
- Increases nutrient availability to plants
- Stimulates microbial activity in the soil
- Accelerates crop residue decomposition

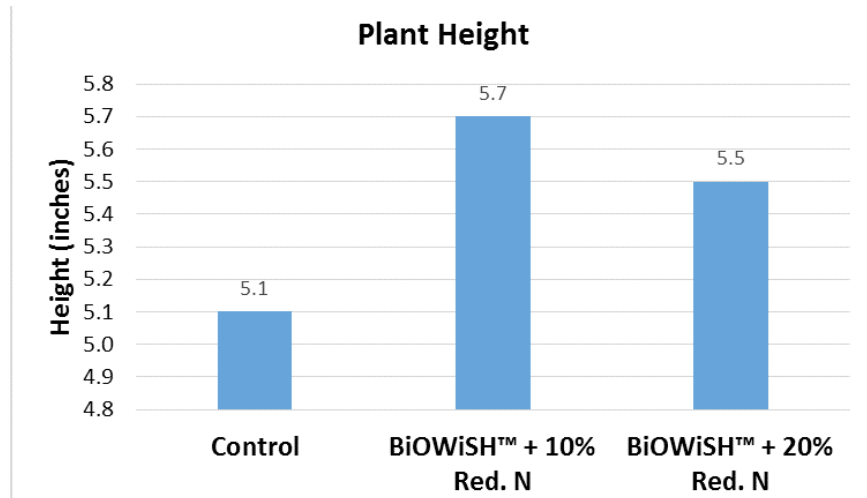
#### Available Sizes

- 3.5oz
- 2.2lb
- 11lb

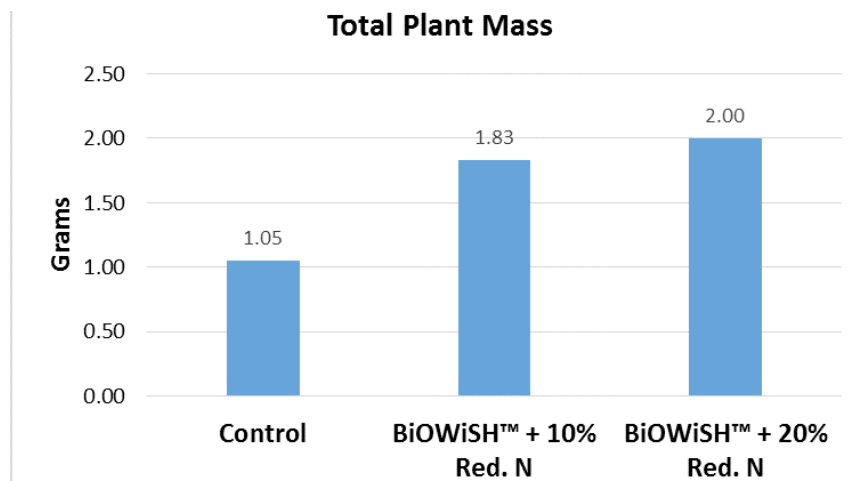


## Results

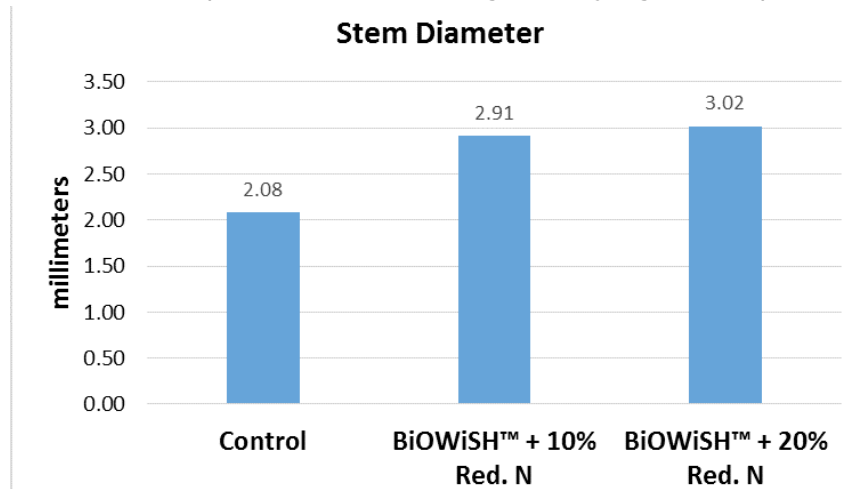
At the time of measurement the BiOWiSH™ treated plants were significantly larger, had significantly more root mass, and higher overall chlorophyll content versus the control:



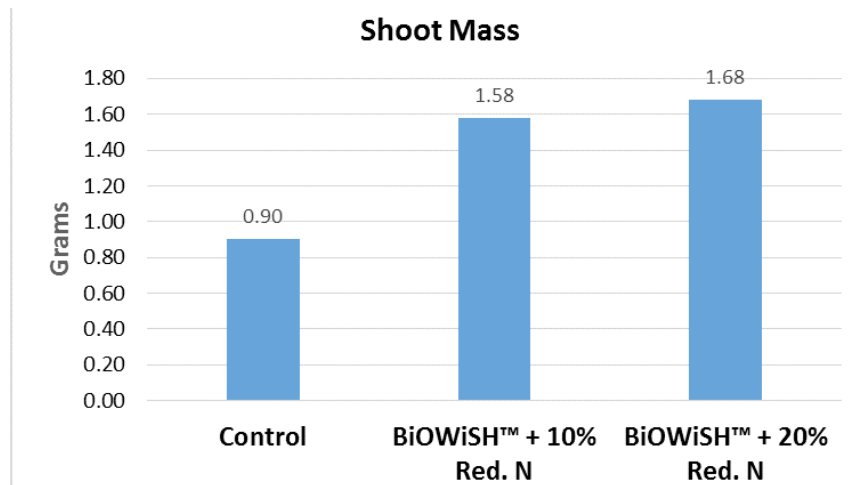
The data showed a trend toward taller plants for the BiOWiSH™ Crop treatments.



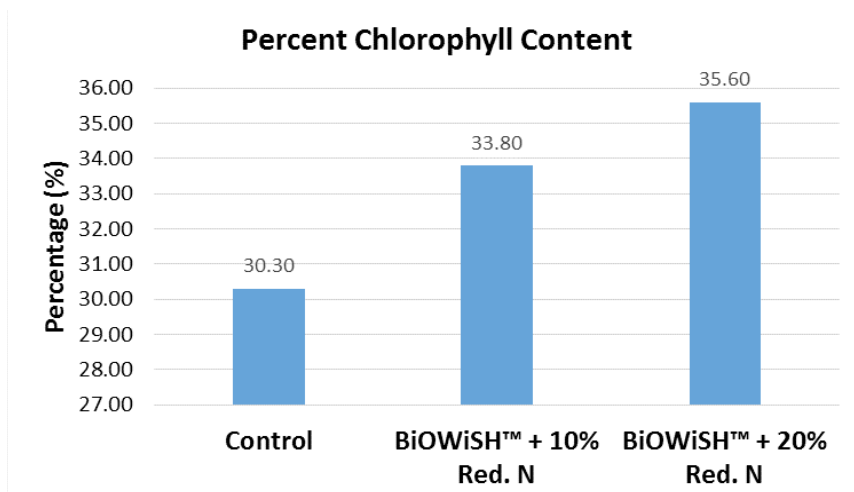
The BiOWiSH™ Crop treatments showed significantly higher total plant mass.



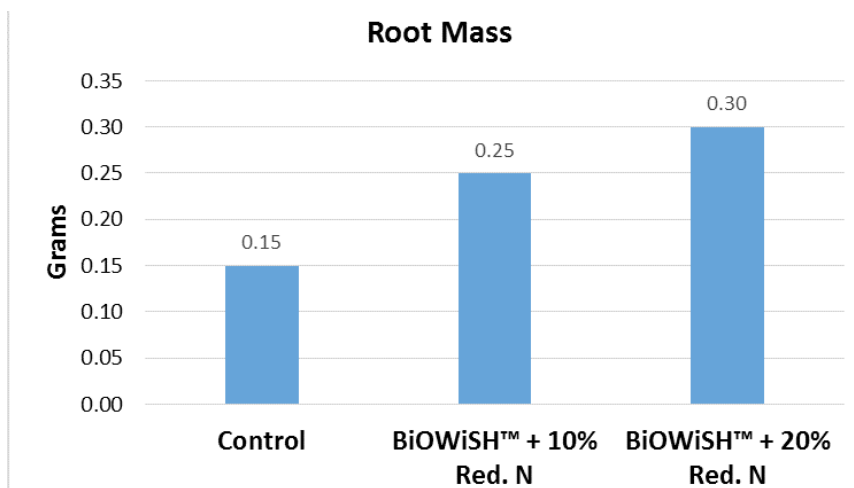
The BiOWiSH™ Crop treatments showed significantly larger stem diameters than the control.



The data showed a trend toward higher shoot mass for the BiOWiSH™ Crop treatments.



The BiOWiSH™ treated plants had significantly higher chlorophyll content than the other treatment.



The BiOWiSH™ treatments showed significantly higher root mass than the controls.

Plant tissue analysis showed that the BiOWiSH™ treatments generally had higher levels of key nutrients like nitrogen and phosphorous relative to the control:

Trt.	%N	%P	%K	%Mg	%Ca	%S	%Na	Fe (ppm)	Mn (ppm)	B (ppm)	Cu (ppm)	Zn (ppm)
1	3.55	0.33	6.46	0.67	2.68	0.78	0.25	354	50	43	17	57
2	4.53	0.38	6.97	0.74	2.73	0.61	0.27	196	41	39	18	47
3	4.61	0.40	6.30	0.82	3.10	0.65	0.29	182	39	49	17	44

Trt 1 = Control; Trt 2 = BiOWiSH™ + 10% reduced nitrogen; Trt 3 = BiOWiSH™ + 20% reduced nitrogen

## Conclusion

Compared to the control, less nitrogen than the traditional best management practice combined with BiOWiSH™ Crop provided the overall best results in early tomato plant growth. At these early plant growth stages, the biology in BiOWiSH™ Crop demonstrated the ability to improve nitrogen management in tomato plants promoting the development of other nutrient building blocks.

BiOWiSH™ Crop application rates vary by management practice and growing environment. The ability to reduce nitrogen application early in tomato plant development offers significant cost savings opportunity to the grower:

	Rate	\$/lb	\$/ac
100%UAN 28%	130 lbs./ac	\$0.52	\$67.60
90 %UAN 28%	117 lbs./ac	\$0.52	\$60.84
80% UAN 28%	108 lbs./ac	\$0.52	\$56.16



BiOWiSH™ is a registered trademark of BiOWiSH Technologies International, Inc.

### Contact us:

Tel: +1 312 572 6700

Fax: +1 312 572 6710

Email: [agronomy@biowishtech.com](mailto:agronomy@biowishtech.com)

Web: [biowishtech.com](http://biowishtech.com)