

CASE STUDY: ACF Products for Drought Resistance



Introduction:

This study examined the effects of ACF microbial crop treatments on soybean plants under simulated drought conditions in the lab. The study followed the growth progression of two different groups of planted trays: one set of seeds treated with ACF ST bacteria prior to planting, and an untreated control group for comparison.

Key Study Events:

March 15

Seeded. All trays at 5750 grams of soil

24 seeds were planted per tray:
8 control trays
8 treatment trays

Humidity domes in place for moisture retention.

March 22

250 grams of distilled water added. At this time, seeds require little additional water due to effect of humidity domes.

March 25

Ten days after planting (10DAP), germination numbers and heights were counted and measured.

- Control Germinations: 12.5 of 24 seeds germinated per tray
- Treated Germinations: 14.75 of 24 seeds germinated per tray

Treated seeds demonstrated 18% better germination rates than control group.

A field dose rate of Plant Growth Promoting ACF (ACF-SR) was applied to four of the eight control trays, and four of the eight ST-treated trays. These trays were chosen randomly from among the eight treated trays and the eight control trays.

All test and control trays also received 500 grams of water at this time.

Key Test Point: On this date, humidity domes were removed, allowing for rapid water loss. Greenhouse growing lights remained on from 8:00AM to 6:00PM.

March 25-28

Initial drought period. All trays lost water rapidly during this time.

March 28

All trays had lost about 750 grams of water.

Due to a holiday weekend the following day, 600 grams of water were added to all trays on this date (one day prior to intended end of this drought period).

March 28 - April 3

Intentional severe simulated drought period. No water added after March 28.

April 3

Tray photos and plant measurements taken (see figures 1-5 on the following pages)

Conclusion

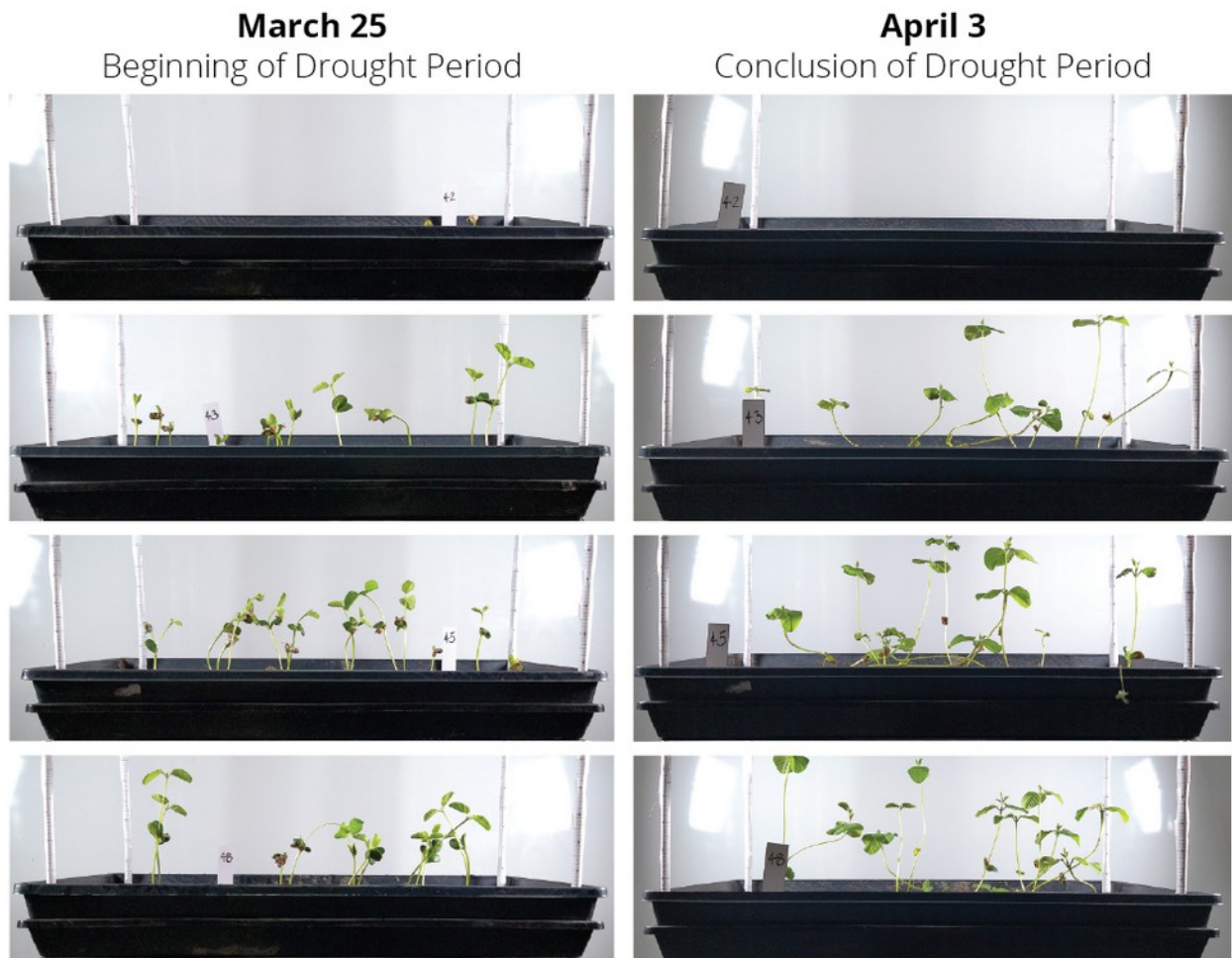
Trays that received treatment, whether seed treatment only, seed treatment with an additional March 25 ACF dose, or the additional March 25 ACF dose only, dramatically outperformed the control trays under drought conditions. Plants treated with ACF products increased in average size during drought conditions. The control group that received zero treatments lost biomass when deprived of water.

Plant Size Change by Tray/Group

Treatment	Size Change 3/25 to 4/3		Average Change in Group
Test Trays ACF ST Initial Seed Treatment Received March 25 ACF Dose	41	49.5	41.875
	44	64	
	46	17	
	47	37	
Test Trays ACF ST Initial Seed Treatment No Additional ACF Dose	42	-16.5	39.625
	43	49.5	
	45	65	
	48	60.5	
Control Trays No Seed Treatment Received March 25 ACF Dose	26	-84	18.875
	29	50.5	
	30	63	
	32	46	
Control Trays No Seed Treatment No Additional ACF Dose	25	-47	-9.75
	27	44	
	28	-2	
	31	-34	

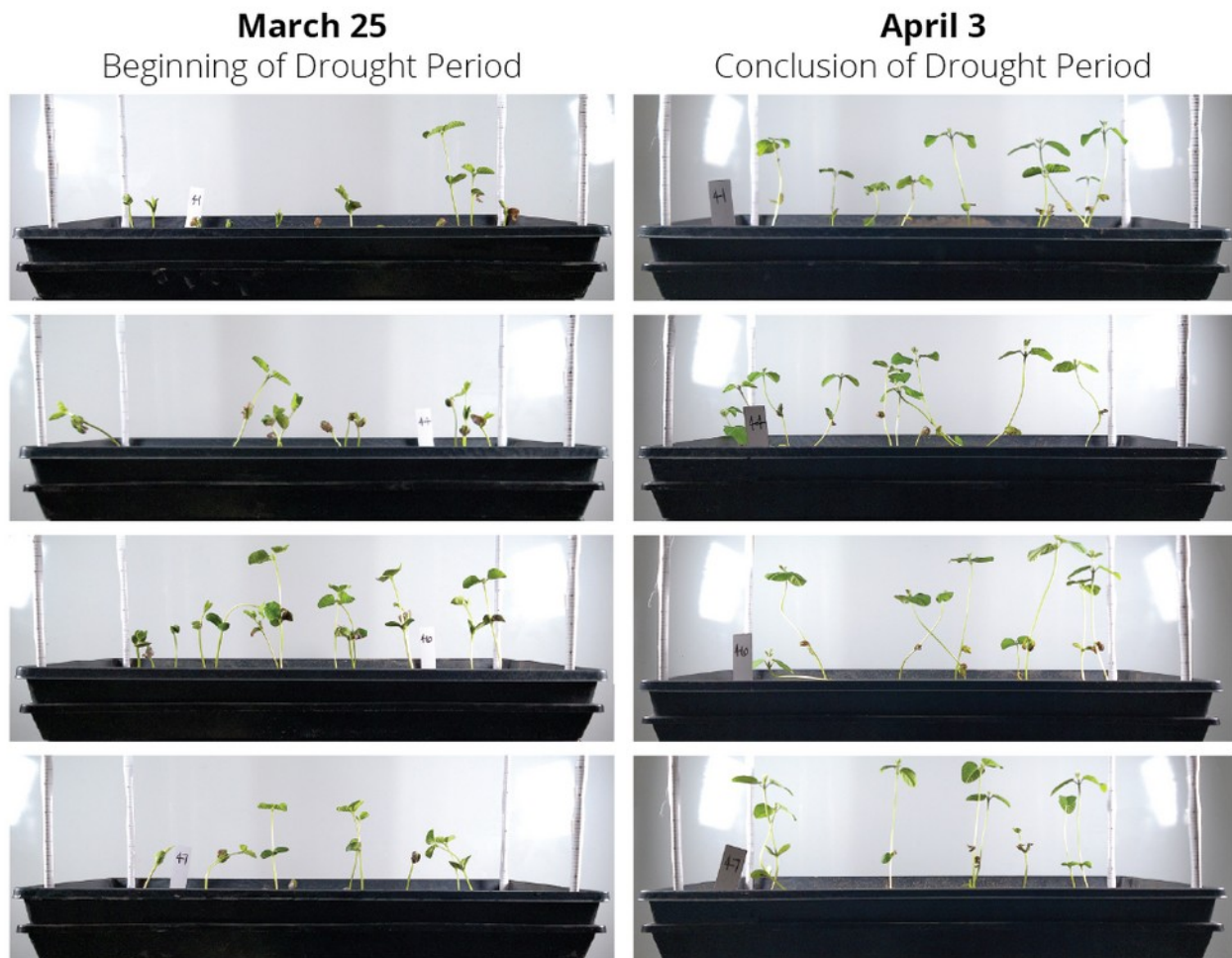
Figure 1: Average plant size change per tray/treatment group

Test Group 1 - Received Initial ACF ST Treatment No Additional Plant Growth Promotion Dose on March 25



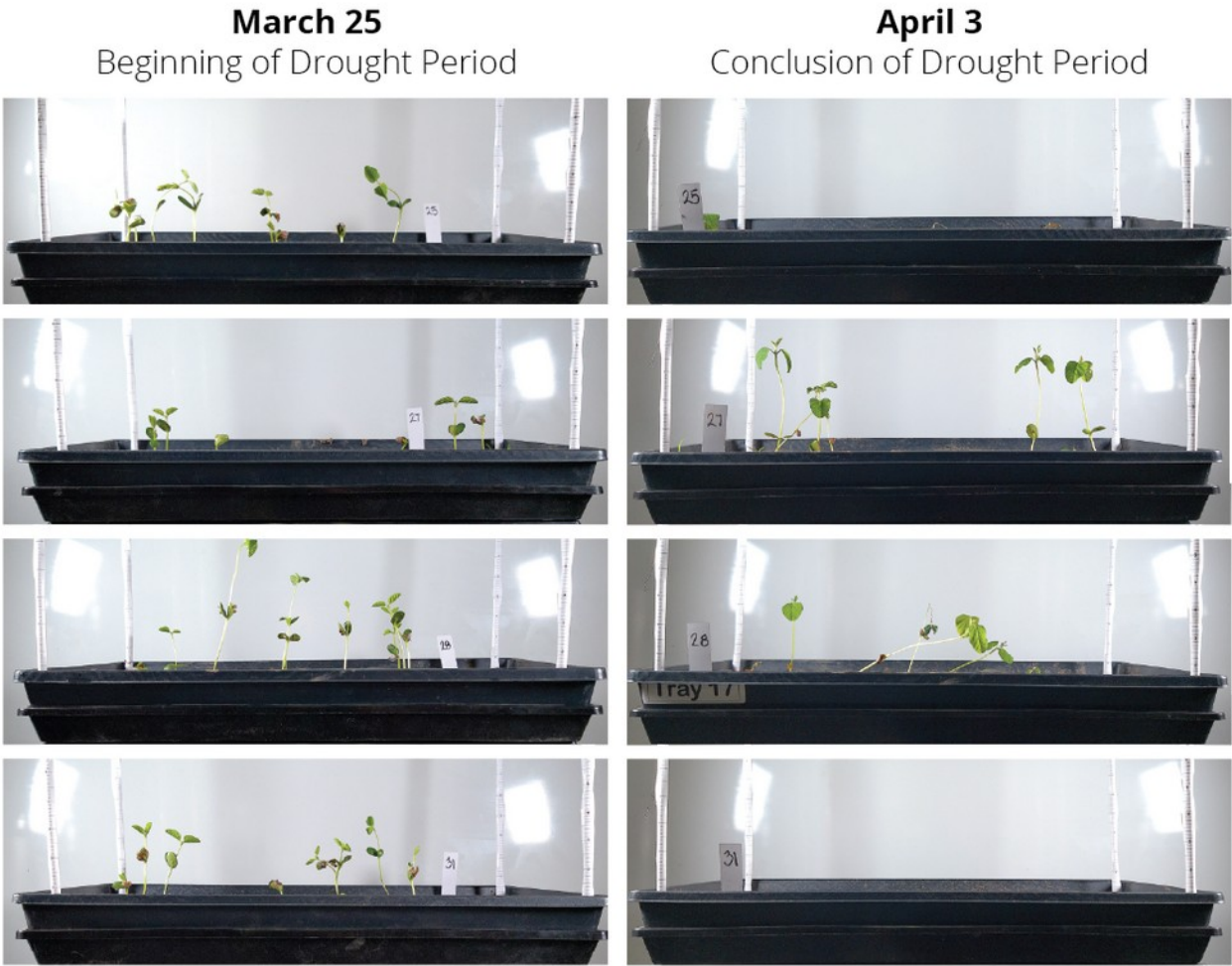
*Figure 2: Treated Trays received ACF ST seed treatment on Mar 15 BUT NO additional ACF-SR growth promotion dose (Mar 25)
39.6 cm average growth per tray during drought period*

Test Group 2 - Received Initial ACF ST Treatment Received Plant Growth Promotion Dose on March 25



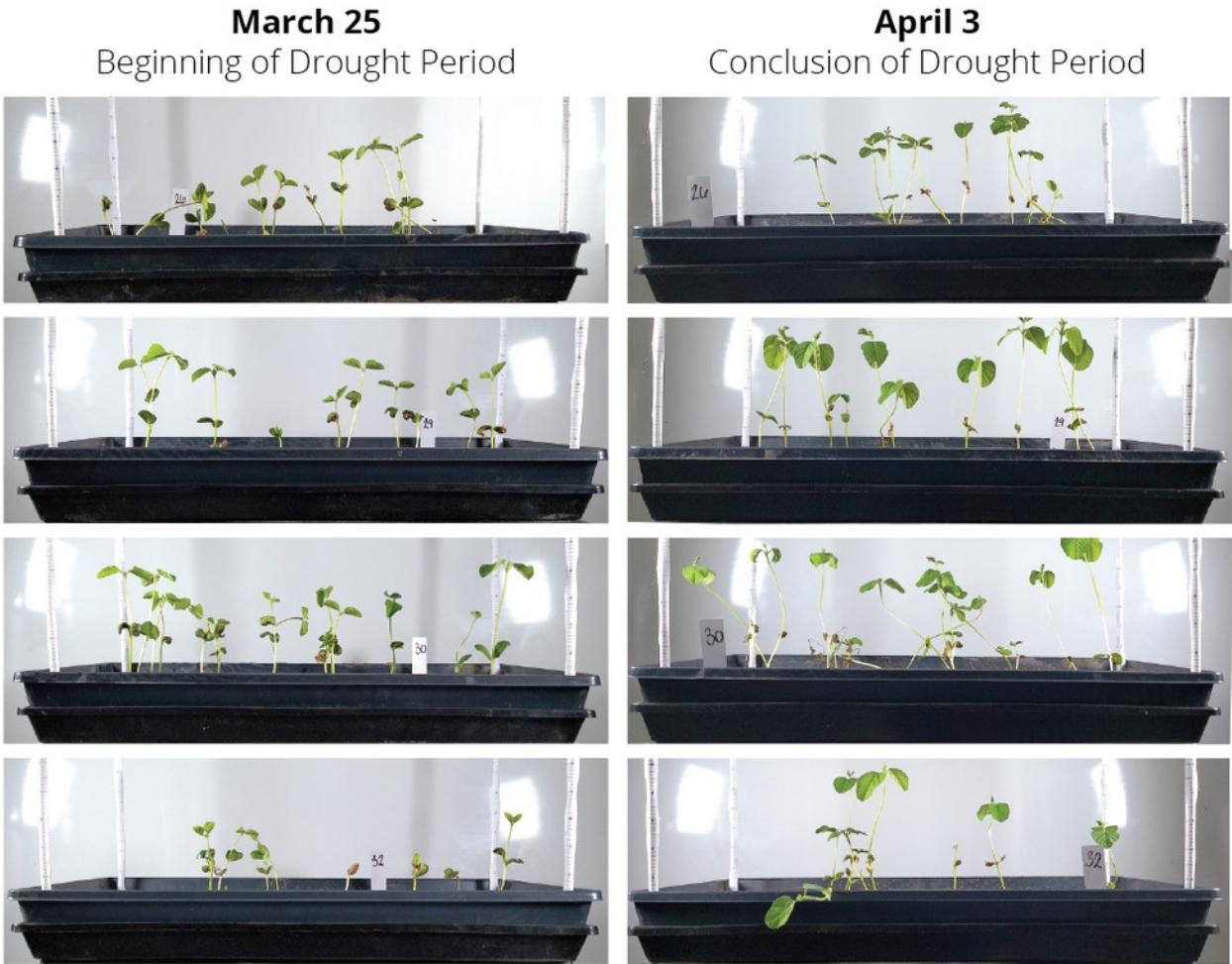
*Figure 3: Treated Trays received ACF ST seed treatment on Mar 15 PLUS additional ACF-SR growth promotion dose (Mar 25)
41.9 cm average growth per tray during drought period*

**Control Group 1 - No Initial ACF ST Treatment
No Additional Plant Growth Promotion Dose on March 25**



*Figure 4: Control trays received NO seed treatment on Mar 15 and also NO additional ACF-SR growth promotion dose (Mar 25)
-9.75 cm LOSS per tray during drought period*

**Control Group 2 - No Initial ACF ST Treatment
Received Plant Growth Promotion Dose on March 25**



*Figure 5: Control trays received NO seed treatment on Mar 15 BUT DID receive additional ACF-SR growth promotion dose (Mar 25)
18.9 cm average growth per tray during drought period*