



MitoGrow Aqua^{3-IA} 2.5% for Hemp Potential Field Efficacy Trial

Summary

Purpose

Evaluate the growth response of field grown CBD dominate hemp to MitoGrow Aqua^{3-IA} 2.5%, when applied during the vegetative growing period.

Evaluation Objectives

1. Vegetative and root growth enhancement
2. Plant quality, health/vigor and phytotoxicity
3. Harvest yield and cannabinoid profile

Trial Design

- **Non-Randomized:** Two 80 ft rows, with 20 plants per row and 8 plants per treatment
 - Treatment and plants were randomized within the rows
 - Plants were spaced 4 ft apart in the row with 8 ft between row middles
 - 6 ft grass cover crop between rows
 - Row spacing was to accomodate tractor, mowers and equipment
- **Plant Age:** 8 week old transplants grown from feminized seed
- **Hemp Strain:** Cherry Wine (sourced from Eastern Plains Hemp – Aurora, CO)

Trial Requirements + Miscellaneous Details

- CBD dominate “female” hemp transplants
- Uniform, well drained soil with site soil analysis
- Provide field history for one year prior, no residual herbicides within the previous year
- All treatments will have the same underlying nutrient, maintenance and cultural practices
- Black Poly Row Cover (for weed control)
- Drip irrigation system (T-Tape) for supplemental watering

Treatments	Applied Rates
Trt 1: MitoGrow Aqua 3-IA 2.5%	20 PPM Water Solution (3.1 grams of product per gallon of water)
Trt 2: MitoGrow Aqua 3-IA 2.5%	40 PPM Water Solution (6.2 grams of product per gallon of water)
Trt 3: MitoGrow Aqua 3-IA 2.5%	60 PPM Water Solution (9.3 grams of product per gallon of water)
Trt 4: Soil Balance Pro (Std)	0.06 grams per plant
Trt 4: Control (untreated)	Water only

Notes

- Treatments were applied via a directed drench to soil at the base of the plant
- All treatments were mixed with 4 gallons of water and a water soluble fertilizer
- Each plant received 2 qts of solution (1890 ml) per application: at planting, at 4 weeks post and at 8 weeks post
- Applications: 6/10/19*, 7/10/19 and 8/6/19
 - * Initial applications at planting for each treatment were made at 25% more than noted above. This was due to mistakenly weighing and mixing the 25% more product into the 4 gallons of water.



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General Information + Details

1. Trial Site: Delaware Valley University
2. Soil Preparation: Rototilled planting strips three times per row pre-plant
3. Fertilizer Program:
 - Pre-plant incorporated: 15-11-17 at 1,075 lb per acre (applied to 3 ft swath)
 - At Planting: 2 tbsp per gallon of water of Miracle Grow (Performance Organics, 11-3-8) as soil drench
 - ~20 floz solution per transplant
 - Post Plant: All water soluble fertilizer was applied as soil drench to base of plant at 1,000 ml per plant
 - Jack's 20-20-20 at 1 tbsp per gallon of water: 1 application - 7/10/19
 - Jack's 5-50-18 at 200 PPM (54 oz prd/100 gal) in water: 3 applications - 8/6/19, 8/19/19 and 8/25/19
 - Jack's 5-12-26 at 300 PPM (78 oz prd/100 gal) in water: 6 applications - 8/30/19, 9/3/19, 9/6/19, 9/10/19, 9/13/19 and 9/17/19
4. Irrigation: Drip to the row - applied twice per week at ~0.5" of water per week (7/1/19 through 8/15/19)
5. Transplants: Grown from seed in greenhouse with supplemental full spectrum light at 18/6
 - Grown in 50 cell seed trays with Pro-Mix LP growing media: peat (75-85%), perlite and vermiculite mixture
 - Transplants ~5 weeks old (from seed) at time of planting
 - Transplanted by hand using trowels: 6/5/19
6. Pest Maintenance:
 - No weed pressure – 100% weed control with fabric row cover
 - Very little insect or disease pressure
 - Primary insects present – Corn earworm and European corn borer
 - Primary disease present – Botrytis and Leaf spot
 - Pest applications (foliar broadcast):
 - Bon-Neem (7/1/19)
 - Serenade + Bon-Neem + NIS (8/20/19 and 9/3/19)
 - Serenade + Bon-Neem + Thyme Guard + NIS (9/17/19)
7. Cannabinoid profile / potency samples: Samples were composites of multiple plants per treatment and replicated
 - Mid-flower: 9/5/19
 - Harvest (cured): 10/28/19
8. Harvest: Manual harvest (Whole plant cut at base)
 - Field: 10/5 – 10/8 (Fresh whole plant weights)
 - Drying: 10/8 to 10/22 (Branches hung on netting in enclosed drying container)
 - Bucking/curing: 10/23 to 11/5 (Usable bio-mass weight: flower and remaining leaf)

Data Collection

- Due to nature of the field trial, it was not possible or practical to evaluate the roots of the hemp plants. This would have involved destructive sampling and would have affected the major priority of the trial – which was to demonstrate efficacy of Aqua_{3-IA} regarding yield of both biomass and CBD.
- Accompanying data can be found on page 3.
- During the course of the trial there were no noticeable differences in plant vigor, quality, plant size or color.
- There was no phytotoxicity observed with any treatment.

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		Yield (kg) Whole Plant	Yield (kg) Biomass	Dry %	Biomass as % of	% CBD	% CBD	% Increase (over control)	% Total
	Treatment	Harvest	Post Drying	Moisture	Whole Plant	at Flower	at Cure	CBD	THC
Trt 1	Aqua 3-IA 20 PPM	7.27	1.06	13.80	14.60	4.47	18.42	32.4	0.621
Trt 2	Aqua 3-IA 40 PPM	6.46	1.15	14.30	17.80	5.12	18.28	30.7	0.609
Trt 3	Aqua 3-IA 60 PPM	5.44	0.95	14.27	17.50	3.70	15.13	8.2	0.489
Trt 4	Soil Balance Pro	6.16	0.99	14.37	16.10	5.03	13.75	0	0.337
Trt 5	Control	6.85	1.18	12.47	14.60	3.44	13.99	N/A	0.474

Notes

- Three applications of Aqua 3-IA (at planting, at 4 weeks post and at 8 weeks post) are applied as a drench to the base of the plants
- Data presented are means of six plants per treatment for Fresh Weight, Harvest Yields (Whole Plant), Usable Biomass and Post Drying (flower and leaf)
- Percent CBD at Flower: average of 2 reps
- Percent CBD Post Harvest/Cured Flower: average of 3 reps
- Total THC is THCa plus delta 9 THC (laboratory standard equation is as follows: % Total THC = % THC + (% THCa x 0.877)

Trial Layout + Design

