Comparative Growth Results of Cycloptics 315W Ceramic Metal Halide Lighting And 600W MH and 1000W HPS to Grow Sour Diesel MMJ Indoors

The following are the results of a licensed grower in Denver, CO that purchased thirty-five (35) 315W CMH All-Bright™ fixtures manufactured by Cycloptics to grow Sour Diesel MMJ in an 18' x 18' x 9' indoor grow room. The All-Bright™ fixtures were mounted to the ceiling of the room in fixed positions and did not require being raised or lowered. The purpose of the test was to compare All-Bright™ effectiveness to the lighting regime traditionally used by the grower. This system consisted of a combination of eight 54W T5HO fluorescents and four 600W metal halide lamps for the vegetative phase and sixteen 1000W high pressure sodium fixtures for flowering. The All-Bright™ reflectors used the Philips 315W Green Power CMH lamp producing 1.90 PPF/W; rated for use in the open reflectors with a rated life of up to 30,000 hours at 90% lumen maintenance. The comparative growth performance metrics were:

- Average ounces of DW (dry weight) mass per plant after trimming
- Total grow days from the start of the vegetative phase through flowering
- Total combined kWh for the lighting and inline fans per harvested DW pound
- Percentage of Total Active Assayable Cannabinoids
- Payback period for the incremental cost of installing All-Bright™ lighting system

The Sour Diesel plants were grown hydroponically using 3ft x 3ft trays that were 15" off the floor. The plants were transferred into the grow room with All-Bright™ lighting after being cloned in Grodan 2"x2" cubes under eight 54W T5 HO fluorescent tubes for 14 days with 18 hour lighting. Prior to being moved under the All-Bright™ lighting the plants were transferred into 6"x6" Grodan cubes.

The full grow cycle for the plants using All-Bright™ lighting lasted 73 days. The lighting regime was 13 hours On 11 hours Off. To optimize the average intensity and uniformity of the All-Bright™ light landing diffusely on all areas of the plants the walls and ceiling were lined with 94% reflective diffuse white Orca grow film, and the concrete floor was painted with white epoxy paint. The temperature was maintained at 85°F during the day and 75°F at night. Humidity was controlled at 65% day and night without any carbon dioxide enhancement.

At the end of 73 days the plants grown under All-Bright™ were harvested at an average height of 35"and dried for 7 days prior to trimming. The comparative growth performance results are:

	T5 + 600W MH 1000W HPS	Cycloptics 315W CMH	Cycloptics Impact
Avg DW Ounces/Plant	**4.4 oz.**	**5.7 oz.**	**30% Increase**
Total Veg Days	**60 Days**	**73 Total Days**	**36% Faster Growth**
Total Flower Days	**60 Days**		
Total kWh Per Harvested Pound	**682 kWh**	**386 kWh**	**43% Reduction**
Total Assayable Active Cannabinoids		**28.3%**	
Cycloptics 315W CMH Payback	**1.2 Months**		

Lighting Electricity Cost

T5HO + 600W MH 1000W HPS	Nbr Lamps	Lamp Watts	Ballast Watts	System Watts	Hrs/ Day	Days	Lighting kWh	Cost/ kWh	Cost/ Crop
Veg-54W T5	4 x 2	54	15	123	18	30	**266**	$0.10	**$27**
Veg-600W MH	4	600	65	665	18	30	**1,436**	$0.10	**$144**
Flower-1000W HPS	16	1000	100	1100	12	60	**12,672**	$0.10	**$1,267**
						Total kWh	**14,374**		
							Total Electricity Cost of T5 + 600W + 1000W Lighting		**$1,437**

Cycloptics 315W CMH	Nbr Lamps	Lamp Watts	Ballast Watts	System Watts	Hrs/ Day	Days	Lighting kWh	Cost/ kWh	Cost/ Crop
Veg-MH	35	315	16	331	13	73	**10,994**	$0.10	**$1,099**
Flower-HPS	35	315	16	331	13				
						Total All-Bright 315W Lighting kWh	**10,994**		
							Total Electricity Cost of All-Bright™ Lighting		**$1,099**

Inline Fans Electricity Cost

600W + 1000W Inline Fans	Days	Nbr Fans	W/ Fan	Hrs/ Day	kWh	Cost/ kWh	Cost/ Crop
Veg	60	0	0	0	**0**	$0.10	**$0.00**
Flower	60	3	220	12	**634**	$0.10	**$63.36**
					Total kWh	**634**	
					Electricity Cost for 600W and 1000W Inline Fans		**$63.36**

Cycloptics 315W CMH	Days	Nbr Fans	W/ Fan	Hrs/ Day	kWh	Cost/ kWh	Cost/ Crop
Veg	73	0	0	0	0	$0.00	**$0.00**
Flower		0	0	0	0	$0.00	**$0.00**
					Electricity Cost for Cycloptics Inline Fans		**$0.00**

Total Electricity Cost for Lighting and Inline Fans Per Harvested Crop

Total Electricity Cost for Lighting and Inline Fans Per Crop	T5 + 600W MH 1000W HPS	Cycloptics 315W CMH
T5HO Veg kWh	266	10,994
600W MH Veg kWh	1,436	
1000W HPS Flower kWh	12,672	
Inline Fans kWh	634	0
Total kWh	**15,008**	**10,994**
Cost/kWh	$0.10	$0.10
Total Electricity Cost for Lighting and Inline Fans Per Crop	**$1,501**	**$1,099**

Lighting and Inline Fans Electricity Cost Per Harvested Pound

Cost of Lighting & Inline Fans Electricity Per Pound	T5 + 600W MH 1000W HPS	Cycloptics 315W CMH
Average Dry Weight Ounces Per Plant	**4.4**	**5.7**
Plants (Sixteen 4x4 trays X 5 plants/tray) Per Crop	80	80
Harvested Pounds Per Crop	**22.0**	**28.5**
Total kWh-Lighting	14,374	10,994
Total kWh-Inline Fans	634	0
Total kWh - Lighting and Inline Fans Only	**15,008**	**10,994**
kWh/Lb.	682	386
Lighting/Inline Fans Electricity Cost/Harvest	$1,501	$1,099
Lighting and Inline Fan Electricity Cost Per Harvested Pound	**$68.22**	**$38.58**

Annualized Relamping Cost Comparison

Annualized Relamping Cost	600W MH	1000W HPS			Cycloptics 315W CMH Annualized Relamping Cost	
Stage	**Veg**	**Flower**			**Veg & Flower**	
Hrs/Day	18	12	**1000W MH and HPS Annualized Relamping Cost**		13	**Cycloptics 315W CMH Annualized Relamping Savings**
Days	30	60			73	
Total Hours/Crop	540	720			949	
Crops/Year	**2.9**	**2.9**			**4.5**	
Total Hours/Year	1,540	2,053			4,276	
Hours/Replace *	7,200	4,320			30,000	
Lamps/Year	0.21	0.48			0.14	
Cost/Lamp	$100.00	$70.00			$100.00	
Lamp Cost/Year	$21.39	$33.27			$14.25	
Total Fixtures	4	16			35	
Relamp Cost/Year	**$86**	**$532**	**$618**		**$499**	**$119**
* Based upon EYE Lighting MH and HPS Hortilux lamp data, and Elite Agro rated life using CeramaTek ballast						
Annualized relamping cost for the eight T5HO lamps used during first 30 days of Veg not included						

Net Income Comparison Per Crop and Year

Net Income Per Per Crop and Year Comparison	T5 + 600W MH 1000W HPS	Cycloptics 315W CMH
Total Veg Days	60	73
Total Flower Days	60	
Total Turnaround Days for Room	8	8
Total Veg and Flower Days Per Crop	128	81
Crops per Year	**2.9**	**4.5**
Number of Plants (16 4x4 trays X 5 plants/tray) Per Crop	80	80
Avg Pounds Per Harvest	22.0	28.5
Wholesale Price/Lb.	$2,300	$2,300
Average Net Income Per Crop	**$31,680**	**$50,864**
Total Pounds Per Year	62.7	128.4
Average Annual Revenue	**$144,289**	**$295,380**
Lighting and Inline Fans Electricity Cost/Year	-$4,280	-$4,954
Relamping Cost Per Year	-$618	-$499
Annual Net Income	**$139,392**	**$289,927**

Incremental Investment for All-Bright™ 315W CMH Lighting

Upfront Investment	T5 HO Veg Room	600W MH Veg Room	1000W HPS Flower Room	Cycloptics 315W CMH
Light Fixtures-Qty	1	4	16	35
Cost/Reflector	$150.00	$200.00	$200.00	
Cost/Ballast		$200.00	$200.00	
Cost/Lamp	8 @ $7.00	$100.00	$70.00	
Total Cost/Fixture	$206.00	$504.00	$486.00	$638.00
Total Light Fixtures Cost	**$206.00**	**$2,016**	**$7,776**	**$22,330**
Inline Fans-Qty		0	3	
Cost/Fan		$275.00	$275.00	
Total Inline Fans Cost		**$0.00**	**$825.00**	
Power Boxes Installed		1	2	
Cost/Power Box		$500.00	$500.00	
Total		$500.00	$1,000.00	
Electrician-Installation		$0	$0	$4,500
Investment	**$206.00**	**$2,516**	**$9,601**	
Total T5, 600W, 1000W Investment	**$12,117**			
Total All-Bright™ 315W Investment				**$26,830**
Incremental Investment in All-Bright™ Lighting				**$14,713**

Payback on Incremental Investment in Cycloptics 315W All-Bright™ CMH Lighting

Payback on Incremental Investment in Cycloptics 315W CMH Lighting	T5 + 600W MH 1000W HPS	All-Bright™ 315W CMH	Cycloptics Incremental Investment	Cycloptics 5-Year Net Profit Impact	Cycloptics Investment Payback
Equipment Investment	**-$12,117**	**-$27,250**	**$15,133**		
Annual Gross Profit	**$139,392**	**$289,927**			
Year 1 Net Profit After Investment	**$127,275**	**$262,677**		**$135,402**	**1.2**
Year 2 Gross Profit	$139,392	$289,927		**$285,937**	**Months**
Year 3 Gross Profit	$139,392	$289,927		**$436,472**	
Year 4 Gross Profit	$139,392	$289,927		**$587,006**	
Year 5 Gross Profit	$139,392	$289,927		**$737,541**	

Growth Performance Comparison

	T5 + 600W MH 1000W HPS	315W CMH All-Bright™	All-Bright™ Impact
Avg DW Ounces Per Plant	**4.4 oz.**	**5.7 oz.**	**30% Increase**
Total Veg Days (T5 + 600W MH)	**60 Days**	**73**	**36%**
Total Flower Days (1000W HPS)	**60 Days**	**Total Days**	**Faster**
Total kWh Per Pound Harvested	**682 kWh**	**386 kWh**	**43% Reduction**
Total Active Assayable Cannabinoids		**28.3%**	
Cycloptics 315W All-Bright™ Investment Payback	**1.2 Months For 80 Plant Crop**		

CannLabs TESTED

Denver, CO 80216

Test Date	Expires	Sour Diesel	TestID	100300
7/25/2013	9/23/2013	Sample Type: Flower		

The below test is reported in percentage by weight , milligrams per gram, or milligrams per final consumable wieght. THC-A is not decarboxylated (not active) and shall not be reported in the total active cannabinoids. THC-A is converted to active THC in the calculated active column using the formula (THC-A x .877 = THC). Total assayable cannabinoids simply represents the sum of the cannabinoids detected in the sample. If THC-A is not detected in the sample, the calculated active and total active will remain the same. Edible results may be lower than expected; this is due to circumstances outside of CannLabs control, such as cannabinoid material adhering to the manufacturers' packaging. This report and all information herein shall not be reproduced, except in its entirety, without the expressed consent of CannLabs. This report is for informational purposes only and should not be used to diagnose, treat or prevent any medical related symptoms. Due to many factors outside of CannLabs control, results may vary. Results are only for the samples supplied to Cannlabs.
The statements and results herein have not been approved or endorsed by the FDA.

Chemical Report

Cannabinoid Assay

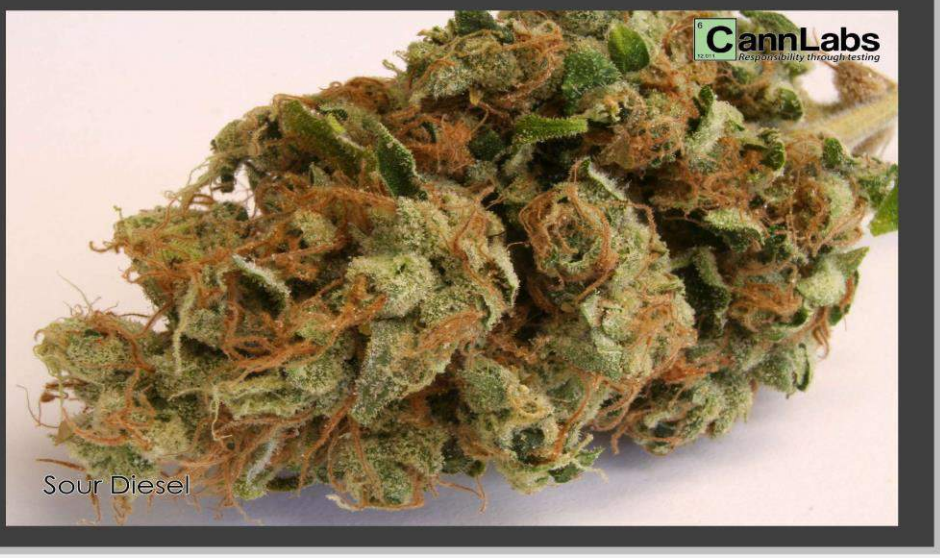
Assayable Cannabinoids		Active Cannabinoids	
CBD-A	<0.01 %	Max CBD	
		0.00 %	
CBD	<0.01 %		Total Active Assayable Cannabinoids
		Max THC	
THC-A	32.04 %	28.28 %	28.28 %
THC	0.18 %	CBN	
		0.00 %	
CBN	<0.01 %		

Physical Exam

Visual Inspection Assay

	Yes	NO	Severity 1-10
Mold		X	
Powdery Mildew		X	
Insects		X	
Misc.		X	

NOTES



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Pictures of Greenbeams 315W CMH MMJ Grow in 18ft x 18ft Room in Denver, CO

Day 0
4/27/13

Day 0
4/27/13 - Avg Height 12”

Grow Day 1
4/28/13

Grow Day 1
4/28/13 - Avg Height 13”

Grow Day 3
4/30/13

Grow Day 3
4/30/13 – Avg Height 14”

Grow Day 16
5/13/13 – Avg Height 16”

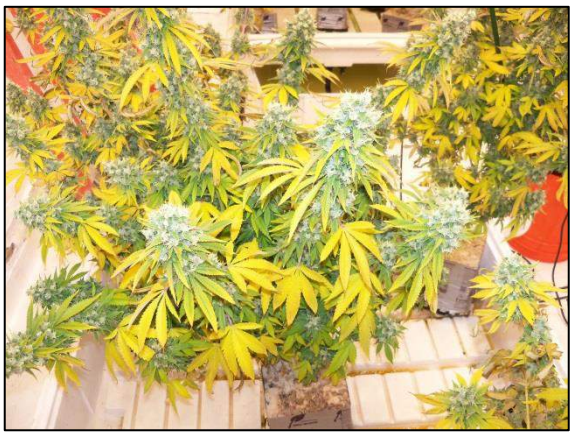
Grow Day 33
5/30/13

Grow Day 33
5/30/13 - Avg Height 27”

Grow Day 42
6/8/13

Grow Day 56
6/22/13 – Avg Height 33”

Grow Day 56
6/22/13



Grow Day 73
7/9/13

Grow Day 73
7/9/13

cycloptics®

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