

Gardening under lights

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Lighting Supplement
to Hydrocentre's Hydroponic Gardening guide
Please read this supplement first if growing indoors



Growing under lights is a popular hobby

Why Grow Indoors?

Although it seems obvious to many growers, others seem to question why gardening under lighting is so popular. Here is a short list with properly setup grow rooms:

- Up to 18 hours of light per day (which is 2-3 times what a plant might get in a garden)
- Accelerated growth
- More yield from enhanced environments
- Away from Pests / less pesticides
- Away from Wind and Rain

Price Changes

Some prices have changed, we have been forced to raise some items prices in line with that of our suppliers, however, others have actually come down in price. We are still proud of our competitive pricing and are pleased that the majority has remained the same since 2009. Prices are subject to change at any time.

- Environment is under your control
- Less cold damage in winter
- Less heat damage in summer
- Enjoy your hobby at home, inside, all weather, whenever you want to enjoy your garden

How to set up a growing area indoors

IF YOU DO NOT SET UP A GROWROOM PROPERLY you can have Plants too hot or too cold, affected by mould, or pests, and Plants that are stressed or sick. So ensure you setup your room correctly and have the right equipment for your proposed growing area.

1. Select a room

The room must be accessible so you can do your gardening. There must be some way to draw in fresh air, and expel stale air. The area should not be excessively hot or cold (e.g. a tin shed is usually bad as it would be excessively hot in summer and excessively cold in winter)

Plants grow well in the same climate we feel comfortable in. If you feel comfortable, then the plants will grow fine. If you are hot, sweaty, cold or the room feels stuffy, then these are things you will need to change before plants will be happy.

2. Select a Grow light—see grow light chart below

Lighting is the most important aspect of growing a plant, either indoors or outdoors. When growing indoors we need to ensure the lighting system we get is the correct light

LIGHT SELECTION CHART

Total lighting	Area Covered	Size of plants	Light intensity	Heat and ventilation	Best Overall Lamp types
400Watt HPS (high pressure sodium)	Up to 1m x 1m	up to about 50cm high	Around 50,000 lumens at start, lamps last around 8-12 months	Use inlet and exhaust fan See ventilation guide	GE Lucagro
600Watt HPS	1.0m x 1.0m to 1.5m x 1.5m	up to about 75cm	Around 90,000 lumens at start, replace at 8-12 months	Use inlet and exhaust fan See ventilation guide	GE Lucagro
1000Watt Metal Halide	1.3m x 1.3m to 1.6m x 1.6m	up to 85cm	Lamps run at near 125,000 lumens by 3 months down to 100,000 or lower. Replace lamps at 6 months	Use inlet and exhaust fan See ventilation guide	Sylvania SuperGro
1000Watt HPS	1.3m x 1.3m to 1.7 x 1.7m	up to 95cm	Around 140,000 lumens at start, replace at 9-12 months	Use inlet and exhaust fan See ventilation guide	GE Lucagro

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spectrum (colouring) and is bright enough without being too hot for the plants.

Lighting systems are made up of three parts

1. The lamp,
2. The reflector and lampholder
3. The control box (or ballast).

Phillips make a 423 Watt lamp called a SON T AGRO 400 Watt. These lamps use around 4cents per hour. Note that a SonT Plus 600W has not been made for growing and isn't as bright as the GE Lamp.

General Electric make very good lamps. they make a 400watt, 600watt and 1000 watt LucaGrow Lamp, and use 6-8cents, 10 -12cents and 16-20 cents of electricity per hour respectively. When no other sunlight or lighting is available, we recommend 400 Watt lamps for an area of up to 1 meter by 1 meter as per the chart below. For 600 Watt lamps for an area of 1.5 meters by 1.5 meters.

Remember side-lighting can always assist plants to grow higher. The reflector design varies depending on the height of the plants and the area

requiring illumination. Highly recommend that you seek advice regarding reflector design.

Control Boxes all look the same. THEY ARE NOT. Price is a good guide. A good ballast will be completely safe, will not emit noise, or large amounts of heat. They will match the lamp precisely, and will ensure the light levels are as close to 100% output of the lamps design. Cheap control boxes may not even run reliably, emit a loud hum, and get too hot to touch as well as failing to put the correct power to the lamp resulting in lower light levels. Please ask for advice before buying any equipment built in the back rooms of hydroponic stores. Imagine if someone sold you a five litre bottle of nutrient and it was missing 20% (1 litre) of nutrient. Some cheap ballasts do the same thing and output 20% below lamps nominal rating. This will reduce yield.

Good Digital Ballasts (e.g. Lumatek) are more expensive because they are able to output more pulses of light per second (higher frequency) and result in more light on the plant, about 15-25% more yield, don't overload circuits during startup, and can save about 1 cent per hour in

electricity as well.

Cheap Digital ballasts don't have the higher frequency and have a reputation of not improving yields at all.

3. Reflective walls

It is very important if you want good results to make your grow room light tight. No light getting in or out. Strangely enough, light getting into a grow room when the light is off



Son T Agro 400W

can extend your growing time by a great deal.

Make your light count.

A light and reflector only illuminate the top of the plant.

To get light to the lower leaves you need to bounce the light off the wall or add side lighting. If you are in a room that is bigger than the lighting you are setting up, such as a 400W in a 3m x 3m room, you need to have a reflective plastic curtain to light up and ventilate only the area the light covers, in this case 1m x 1m, and to keep the light concentrated in that area.



4. Ventilation—See also Ventilation Chart

Select a fan that will keep the area between 20 and 30 degrees Celsius. Plants also need fresh quantities of Carbon Dioxide. Ventilation will stop grow rooms becoming excessively hot, as well as supplying life giving fresh air.

First, you will need an inlet fan to let cool air into the growing area. This is best situated low, as cool air is heavy and sinks closer to the ground.

Second, you will need an exhaust fan to draw hot air and CO2 weak air out of the growing area. This is best located high as Hot air rises to the top of the growing area.

Finally, you will need an oscillating fan to blow fresh air into the foliage or the air will just blow around the plants and be sucked out.

In Summer you will need to change the air as often as possible. Minimum would be around 60 air changes per hour and ideal would be up to 200+ changes per hour. Use Panda Film Plastic sheeting to create a growing area, and multiply height with width and depth, e.g. 1m x 1m x 2.5m (height) = 2.5 cubic meters. You would need a fan to deliver around 150 to 300 cubic meters per hour of fresh air, or to remove that amount of stale air every hour. If a room is sealed, an inlet fan is also recommended.

In winter this amount of airflow might make the growroom to cold, so using a fan speed control, putting fans on an intermittent timing, or using smaller fans is a good idea to stop the rooms getting to cold overnight. Make sure plants get an average of at least 10 air changes per hour however, if the plants are very cold, they won't be doing much growing so avoid the very cold primarily.

Plants grow best in the same sort of environment we find comfortable. Ideal temperatures would vary per plant, but around 20-25 degrees, and 40 to 60% humidity would be ideal. So as a guide, if you think that its too hot or cold, too humid or the air is stale, then the plants will feel that too and will not perform to the best they can.

Get advice before purchasing an exhaust fan. Most fans sold in retail stores are not designed to run continuously e.g.



Control box or ballast



Ventilation guidelines

	Incoming air is 0-10 degrees Celcius cold grow room	Incoming air is 10-20 degrees cool comfortable growroom	Incoming air is 20-25 degrees warm grow room	Incoming air is 25-30 degrees hot grow room	Incoming air is 30+ degrees humid uncomfortably hot growroom
Air Changes required.	10 changes for normal CO2 +heater	10-20 changes + heater may be required.	20-100 air changes	100-200 air changes	Airconditioning with 10 air changes per hour or 200+ air changes per hour

Bathroom fans. These will either fail or make a terrible noise and keep you up all night. If a fan fails during a hot day plants may get very sick as well. And as for the cheapest fans that catch fire, we don't want them! So get advice.

5. Deal with Pests / mould / smell etc in the design.

You can read more about this in this information pack. I suggest fly screen on inlet air sprayed with surface spray from time to time.

Types of Lights / Lamps



130Watt Fluoros are a recent development in grow lighting

Fluorescents

"Fluoros" are mostly used for seedlings and cuttings due to the low light output being insufficient for successful growth rates. There is very little heat so the young plants are not dried out by the lighting.

The Fluoros may be used for sidelighting or bottom lighting in the case of very dense foliage, but always in conjunction with a serious lighting source such as a



Metal Halide or High Pressure Sodium Fluoros are also used for plants that might get some sunlight but not enough, such as plants in a living room, needing some additional light to the indirect light they already receive. Latest development of 130Watt Fluoros with built in ballast are enabling us to grow plants under fluoro lighting. The light output is excellent for supplementing existing sunlight or growlight, and for growing plants indoors without high growth rates. (e.g.motherplants for cloning, cuttings)

LED's

LED lighting is more efficient than some forms of lighting. A normal incandescent bulb (not for growing) gives out 12-15 lumens of light per watt used. LED's typically produce 38-40 lumens per watt compared to around 50 lumens per watt for a 2ft fluoro tube. More development is required to get the LED's to the same performance of an HPS at 130-150 lumens per watt. When they stop using HPS lamps for streetlights, and use LED's to produce



the same brightness, you can bet we will be recommending them. Right now, as I write, customers find LED's slow, and yielding very poorly. LED's, like growing under fluoros, will keep plants alive like growing in the shade.

High Pressure Sodium - HPS

High Pressure Sodium (HPS) lighting runs off a HPS ballast (a type of transformer) and needs a specialized lampholder and reflector to run the lamp. They output light mostly in reds and orange bands, and have sufficient blue added to keep a plant happy if the lamp was designed for horticulture. (Avoid street lamps) Lamp differences include amounts of blue, light output, reliability, and thermal output (heat). Our most recommended would be the General Electric Lucagro in 400, 600 and 1000Watt sizes, we also carry Phillips 400Watt Son T Agro.



High Pressure Sodium (HPS) have an orange colour

Metal Halide (MH or MS)

There are still many growers that use metal halide lighting, and there has been a resurgence in the last few years. Metal Halide is a blue-white colour of light, suited to plants growing needs. Only the 1000Watt Supergro and similar 1000Watt lamps have enough reds to give fast growth, and good flowering. Metal Halides are best used for growth, and the lack of reds produces a shorter stockier plant, and excellent leaf development. Metal Halides run from a Metal Halide ballast.



Metal Halide lighting

Lamp differences include amounts of red, light output, reliability, and thermal output (heat) We recommend the 1000W Supergro grow and flowering lamp for 1000W Metal Halide users.



Nova reflector



Batwing small



Batwing large



Adjustashade small



Cool tube



Lumatek ballast
30% more light

Lighting Kits

125Watt Horticultural fluoro system have the advantage of low heat, and plants must be between 10cm to 50cm from the lamp. Lamps come in either a growing spectrum (6400K), a flowering spectrum (2700K) or a Marine Spectrum (14000K) Please specify when ordering.	Price 1+	Price 4+
125Watt lamp with Nova shade and adaptor (Lamp horizontal)	175	170
125Watt lamp with Chinahat spun reflector (lamp hanging down)	195	185
<i>Spectrum 130 Watt lamps are available for the above lighting systems (add \$30)</i>		
NEW Very bright 80W Philips lamp, (equal to 250W) with small reflector	120	
400Watt lighting systems will cover around 1x1meter, and require some ventilation fans (Digital Lumatec Ballast adds \$230)	Price 1+	Price 4+
400W GE LucaGrow Lamp, JBL Ballast, Small Ultrabrite 9 fold reflector	\$220	\$210
400W GE LucaGrow Lamp, JBL Ballast, small or mini Defender Shade (same design as the no longer available Adjustashade reflector)	\$240	\$220
400W GE LucaGrow Lamp, JBL Ballast, Cool Tube reflector	\$260	\$250
400W GE LucaGrow Lamp, Digital Lumatek ballast, Small Ultrabrite 9 fold reflector	\$450	\$440
400W Digital Lumatek ballast, GE Lucagrow lamp and small Adjustashade	\$480	\$460
600Watt Horticultural lighting systems cover an area 1.2m to 1.5m across, and require good ventilation fans, or small fans with a large air-conditioner.	Price 1+	Price 4+
600Watt GE Lucagrow lamp, JBL Ballast, small Ultrabrite	260	250
600Watt GE Lucagrow lamp, JBL Ballast, large Ultrabrite	275	265
600Watt GE Lucagrow lamp, JBL Ballast, small Adjustashade	275	265
600Watt GE Lucagrow lamp, JBL Ballast, large Adjustashade	295	285
600Watt GE Lucagrow lamp, JBL Ballast, Cool Tube reflector	295	285
600Watt GE Lucagrow lamp, JBL Ballast, Spun China hat small	285	275
600Watt GE Lucagrow lamp, JBL Ballast, Spun China hat large	295	285
600Watt GE Lucagrow lamp, Lumatek digital Ballast, large Ultrabrite	505	515
600Watt GE Lucagrow lamp, Lumatek Ballast, large Adjustashade	545	535
1000Watt Lighting Systems come in with a GE Lucagrow HPS lamp or a Metal Halide Supergro lamp	Price 1+	Price 4+
1000Watt HPS with JBL Ballast and Large Adjustashade (Add \$250 for digital ballast)	450	430
1000W HPS with JBL Ballast and Cool Tube (Add \$250 for a digital ballast)	450	430
1000W Metal Halide Supergro with JBL Ballast and Large Chinahat	375	360

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Metal Halide and Retrofit lamps

250W MH for HPS or MH ballasts	POA
400W MH for HPS or MH ballasts	POA
600W MH for HPS or MH ballasts	POA
360W HPS retrofit for MH Ballast (*check stock)	POA
880W ULX HPS retro lamp for 1000W MH ballast (*check stock)	POA
1000W Sylvania MH Super Gro	\$135

Control Box / Ballast replacements

250W HPS control box (Check Stock)	\$160
400W JBL HPS Ballast	\$130
400W MH ballast (Check Stock)	\$130
600W JBL HPS ballast	\$150
1000W MH JBL Ballast	\$260
1000W HPS JBL Ballast	\$300
Lumatek 400W Digital Ballast	\$360
Lumatek 600W Digital Ballast	\$395
Lumatek 1000W Digital Ballast	\$560

Timers

Timers allow you to time lights and pumps. Pumps can use a basic timer as they use very little electrical load, but it is important not to buy a pump timer that cannot keep good time (e.g. cheap Chinese made timers often lose or gain up to 1 hour per day) It has taken us a lot of failures to find ones that are generally reliable.

With Lighting, the timers have a knack of **jamming in the on position** due to the inductive load the lighting puts on them. It's a big spark flowing through the little timer when the timer starts and stops the light. It's not surprising that the little contact relay welds together. Normal duty timers are 10amp, and are suitable for household duties, turning on a house lamp, pumps and such. These timers fail on HPS and MH lighting.



Digital JBL 30 Amp timer with Battery backup (for time programs) recommended for lights \$55

For reliability we recommend at least the JBL timer as it is made for JBL Lighting who make our ballasts.

Since you won't be in the room to see if the lighting stays on, the damage from a cheap



Mechanical timer
96 programs of 15 minutes each per 24hrs
Recommended only for Pumps \$10

timer stuck in the on position may not be noticed for weeks.

Power blackouts or interruptions

If a light goes out from the power being blacked out, HPS and MH lamps will have to cool down and start again, which will take up to 20 minutes. If the power goes out for less than

15 minutes, adjust your timers and don't worry. If the power goes out and interrupts a flowering period, keep the lights off until 12 hours has passed. Once the night has passed and the lights are on again, you can keep the lights on until their normal off time. If it's a growing period (18 Hour) then this will not matter.

Reflectors

Horizontal – UltraBrite, Adjust-A-Wing Defender. Horizontal means closer to tops of plants. More direct light producing more intense light. Usually around 15-25% better than vertical systems

Reflectors should send light down evenly, with emphasis on boosting light levels at the furthest area from the lamp to keep all the plants the same height and growth rates. They should also dissipate heat quickly so you can get the light as close to the tops of the plants as possible.

Adjust-A-Wing Defender

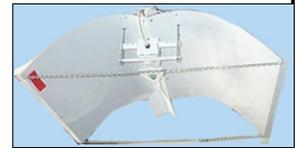
Comes flat packed easy to assemble

Small for 400W and 600W

inc lampholder \$115

Large for 600W and 1000W

inc lampholder \$145



Cool Tube – A bit more expensive, but used to keep heat coming directly off the lamp, which is a more efficient method to keep grow room temperatures down. Using a fan on any reflector will help.

150mm cool tube reflector up to 600W \$99
(+ needs 150mm ducting and 150mm fans to suit)



Vertical – Chinaman's Hat / witches hat. Spreads light sideways.

Deep bowl chinahat 1 pc with lampholder

3ft 400W \$85 inc holder

4ft 1000W \$110 inc holder

Lampholder for chinahat or

adjustashade \$40



Small horizontal reflectors are more intense as light is reflected straight down and this is good for reducing heat and growing closer to lamps. Larger reflectors will generally lower the intensity of the light at the plant tops
Open ends allow lamps to run cooler so they burn at high intensity for longer.

The perfect reflector is impossible to design as the light is moved up as the plants grow. Panda film (White and Black plastic) walls help a good reflector create the closest to a perfect reflector – As the reflector is lifted, it spreads wider, and wider. The most sensible approach is to line the walls with white plastic sheeting. (Panda film) This is the only way to ensure your light gets into the undergrowth

Reflective Film—Panda Plastic

Panda Film—White Reflective film—220um thick

Per metre x3 metres) off the roll	\$10
5 metres (x3m wide) bagged	\$35
10 metres (x3m wide) bagged	\$65
Roll of 15 metres (x3m wide)	\$93
Roll of 30 metres (x3m wide)	\$180

Mylar—silver reflective film (check stock before orders)

Mylar is a reflective material like a mirror. We do not recommend it because it traps and concentrates heat in the grow room. It also tarnishes quickly and because it can't be cleaned like Panda film, it needs to be replaced too often to provide good reflection.

Mylar reflective film 1.2 meter x 15m \$32
(Check Stock of Mylar before ordering)

Growing Frames

Quicklock Aluminum box section and fittings make it easy to construct frames easily. To custom design your frame measure up your design and we will cut it to size for you.



Custom frame designs are \$7 per meter plus \$3 per corner/fitting.

400W frame—1m x 1m x 2m high with fittings \$135 + 5m panda add \$35 = \$170

600W Frame—1.5m x 1.5m x 2m high with fittings \$140 + 8m panda add \$56 = \$196

2 x 600W frame—3m x 1.5m x 2m high with fittings and side supports \$220 + 13m panda add \$91 = \$311

Add 2m lightproof zippers at \$30ea to make an easy opening
NOTE: GROWFRAME SUITS ALL FAN SIZES

HomeBox Growing tents

For a while we recommended people stay away from growing tents, as the PVC in the tents gave off a funny smell and plants often became sick.

We found a tent that is PVC FREE!

Homeboxes are available in white and silver (we recommend white)

XS 0.6 x 0.6 x 1.2(h)m \$200

Fan inlet 130mm / outlet 160mm

L 1.0 x 1.0 x 2m \$300 (silver \$420)

Fan inlet 160mm / Outlet 200mm

XL 1.2 x 1.2 x 2m \$350 (silver \$450)

Fan inlet 160mm / Outlet 200mm

XXL 2.4 x 1.2 x 2m \$690 (silver POA)

Fan inlet 2x160mm / Outlet 260mm



Ventilation Fans

Ventilation as we have discussed earlier is the most important aspect to growing indoors after the light. We must emphasise that the more air you give them the better the result will be. Temperature plays a part on how much you ventilate, as plants grow best in the same sort of climate you and I find comfortable, between 20 and 30 degrees and not too humid. If you feel uncomfortable in your growroom, that is exactly how your plants will feel, and the plants will perform well only if the environment is good.

After looking at the chart for the amount of air ventilation required, see the Fan chart for sizes and prices.

Black Ducting and Y fittings

We use Black Ducting to keep light from reflecting into the grow room and disturbing the plants photoperiod. See chart on right for sizes and prices for Ducting and Y fittings.

100mm Spigot adaptor to fit ducting to reflectors \$17

150mm Spigot Adaptor to attach ducting to reflectors \$20

30m Silver Duct tape roll \$6

Right: Lenco fans are great value for money and can be bought with ducting collar (below) to suit 250 or 300mm ducting



Right: Industrial Axial Fans move high quantities of air.



Above Right: Centrifugal fans suit high pressure applications like carbon filters

Ventilation Fan sizes (others on request)	Approx. cubic meters per hour	
12cm fan 140m3/hr suit 150mm duct with lead and plug (noise level 3 out of 5)	600	\$40
Lenco Fan 250mm blade (300 hole) continuous rating (noise level 1 out of 5)	600	\$55
Lenco fan with ducting collar (250 or 300mm duct) (noise level 1 out of 5)	600	\$65
150mm Inline Ducted Fan (noise level 2 out of 5)	650	\$95
250mm Industrial Axial Fan (noise level 3 out of 5)	2000	\$320
300mm Industrial Axial Fan (noise level 3 out of 5)	3000	\$350
250mm Industrial Axial 2 pole Fan—High output/noisy (noise level 5 out of 5)	3000+	\$350
300mm Industrial Axial 2 pole Fan - High output/noisy (noise level 5 out of 5)	4000+	\$410
150mm CAN centrifugal fan for Carbon filters (noise level 3 out of 5)	Suits 1 light	\$210
200mm CAN Centrifugal Fan for Carbon filters (noise level 4 out of 5)	Suits 1-2 lights	\$270
250mm CAN Centrifugal Fan for Carbon filter (noise level 4 out of 5)	2-4 lights	\$285
315mm CAN Centrifugal fan for Carbon filter (noise 5 out of 5)	4-6 lights	\$395

Fan Thermostats and speed controls
 Growlush Thermostat (hot or cold switch) \$130
 Temp/humidity controller unit-control fans/heaters POA
 Fan Speed Controller \$ 80

Carbon Filters and other odour devices

Ozone Generators

HOW DOES OZONE WORK?
 Ozone Generators turn normal oxygen (O2) into ozone (O3) which reacts with the particles it comes in contact with and has a oxidization reaction. What that means is it will react with single celled organisms like bacteria, mould, fungal spores, insect eggs such as spidermites, etc and then smell particles, and as it reacts, the ozone reverts back to oxygen. High levels of excess ozone can be dangerous to plants and humans, however, we have a simple system. By using 15 minutes per hour of ozone generation you will



Left: Black ducting stops light being reflected into your room from outside which can make flowering take much too long
Upper Right: Y fittings make a neat alternative to cardboard and tape.

able to detect either plant smell or ozone with your nose. By increasing or decreasing the number of 15 minute “doses”, until you have little or no residual ozone, you will be able to set the system up for yourself.

Black Ducting	3 meter length	6 meter length	Y splitter fittings
100mm	\$15	\$27	n/a
150mm	\$18	\$33	\$25
200mm	\$22	\$40	\$27
250mm	\$25	\$45	\$35
300mm	\$32	\$55	\$57

Note that as plants grow, or you grow different plants or change ventilation, you can easily adjust the number of doses for control of ozone levels. It is essential that in the initial set up of the ozone generator that you remove all smell from room in one constant initial dose, checking every 15 minutes until smells are gone. Once any built up smell is removed, you can accurately set up the ongoing dosing. Location behind an oscillating fan to spread the Ozone, or in the inlet air duct, or anywhere the ozone can be distributed easily, without missing areas of the grow room, overdosing any particular plants, or being vented out before it can do its job. We recommend speaking with one of us to check you have the operation set up correctly.

Wall master ozone generator 20W 500mg/hr
 Suit single light setup \$250
 40W Skunk buster Suit multiple light system \$295

20W replacement ozone lamp \$140
 40W replacement ozone Lamp \$140
 Ozona odour block 250g apple \$15



Carbon Filters

Carbon filters should be located in the room, and air sucked from the room, through the filter's outer layer to the inner core, then through the ducting to a fan.

The idea is to create a low pressure inside the filter in order to draw air through the carbon. Because of the back pressure created when pushing air into the core of the carbon filter, much more air flow is lost when pushing air into it.

You may need to reduce airflow with a timer when using air conditioning in rooms as the fans required to make these filters work will suck all the cold air out if run continuously. (For a/c systems consider Ozone) You must use a centrifugal fan with these fans or not enough air flow will get through the filter.

Carbon filters will only clean outlet air, not air from the grow room. Make sure air is not seeping into roof cavities, under doors etc.



CAN FILTERS

Made in Holland and in Canada, CAN filters are the best filter you can buy. You can change the collar and we will ask you about the right CAN FAN to go with your size room. Suggested life is 1-2 years, and is dependant on



absorbition of the contaminants in the air. Once fully absorbed it stops working as well.

CAN 33—suits CAN150 Fan for 1 light \$ 260 +fan
CAN 50—suits CAN200/250 Fan for 1-2 lights \$ 285 +fan
CAN 100— suits CAN 250 for 2-4 lights or CAN315 for 4-6 lights \$ 375 +fan

ODOR SOKS

Odor soks are a fabric based carbon filter, extremely light and easy to install. Last around 12 months

150mm—suits CAN150Fan for 1 light \$ 130 +fan
200mm—suits CAN200Fan for 1-2 lights \$ 130 +fan
250mm—suits CAN250Fan for 2-4 lights \$ 160 +fan
300mm—suites CAN315Fan for 4-6 lights \$ CALL +fan



Plant Support

Plant support

There are various methods of plant support in a grow room environment.

Horizontal mesh—A flower mesh is suspended above the plants, and whenever a plant's growing tip pokes above the netting, the grower uses the mesh to wind the plant sideways. This keeps all the plants the same approximate distance from the lighting. (**1 meter wide mesh \$2 per meter**)

Vertical mesh—Mesh is hung on the walls, and plants grown up the sides. They then try to grow towards the light in the centre. (**1 meter wide mesh \$2 per meter**)

Plant Spools—These are little rolls of string, tied to the base of the plant and stretched to the ceiling. The plants are wound around the string as they grow. (\$3.50 each)



Yoyos—These are a hook and nylon thread that is hung on the wall or ceiling, and the spring in them increases the tension until the plant can support. (\$3 each)

Frames—aluminum frames (\$7 per meter) are made for plants to lean or be tied to.

Stakes—Tied to the side of the system, and plants tied to them.



Pest Control

Pest control

Most insects only get in by coming through the inlet fan, or on your clothing. We suggest changing clothes before entering growroom, washing hands if you have handled soil (soil diseases) and fly mesh on the intake fan or ducting sprayed with surface spray. For information on Pest control, see our standard information guide and catalogue, or contact us with your specific problem.

Lighting System Packages

400W Hand watered 6 Pot Package System \$500

- 6 x 300mm Pots and saucers
- 100ltrs of Perlite growing media
- 400W Ultrabrite grow light
- Inlet Lenco fan with collar
- Exhaust Lenco fans with collar
- 3 meters of 250mm ducting
- Grow Research 2ltr Grow nutrient
- Grow Research 2ltr Bloom nutrient
- Just water every 1-2 days
- Can be altered for more pots of smaller size.

We would suggest you add some white panda film to suit your growing area at \$10 per meter (3 mtrs wide) (note: No light timer included—JBL \$55)

400W Satellite 6 Pot Recirculating System \$950

6 Pot recirculating high performance Hydroponic System with 400Watt light, 2 large ventilation fans

Includes

- 400Watt Ultrabrite grow light
- 250mm Inline Inlet Fan (*can substitute cheaper fan)
- 250mm Inline Exhaust Fan (*can substitute)
- 3 meters of Exhaust Ducting
- 6 x 300mm SATELLITE pot system (includes Expanded Clay Growing Media, pump, Timer for pump, tray, irrigation and drainage and nutrient tank)
- 2 litre Grow Research Growth stage Nutrient
- 2 litre Grow Research Flowering Stage Nutrient
- No light timer included (JBL \$55)
- (* Substitution for Lenco collared fan total is \$690)

Add to any of these systems

- Professional Waterproof CF and pH electronic testing kit with calibration solutions and pH up and Down solutions \$260,
- Cloning Kits from \$60
- Nutrient Heaters from \$55
- Vitamins from \$10
- Flowering Additive and Super Weight (see additives in hydroponics brochure)
- Oxygenation kits for nutrient tank from \$20
- Advice for our customers for FREE! Ask for a consultation

600W Hand watered 6 Pot Package System \$820

- 6 x 300 Pots and saucers, with light and ventilation fans, watered every 1-2 days. Can be altered for more pots of smaller size.
- Includes 600 Watt large Ultrabrite light kit
- 250mm Inlet Fan *
- 250mm Exhaust Fan *save \$220 if using lenco fans
- 3 meters of 250mm Exhaust Ducting
- 100 Litres Perlite Growing Media
- 2 litre Grow Research Growth stage Nutrient
- 2 litre Grow Research Flowering Stage Nutrient
- 6m of Panda Film

(note: No light timer included. We recommend \$55 battery back up heavy duty 30amp JBL timer)

600W Satellite 6 Pot Recirculating System \$980

- 6 Pot recirculating high performance Hydroponic System with 600 Watt large Ultrabrite light
 - 250mm Inlet Fan *
 - 250mm Exhaust Fan *save \$220 if using lenco fans
 - 3 meters of 250mm exhaust ducting
 - 6 x 300mm SATELLITE pot system (includes Expanded Clay Growing Media, pump, Timer for pump, tray, irrigation and drainage and nutrient tank)
 - 2 litre Grow Research Growth stage Nutrient
 - 2 litre Grow Research Flowering Stage Nutrient
- (note: No light timer included. We recommend \$55 battery back up heavy duty hydroponic 15amp timer)

NEW — The Ultimate \$1600

Double Light ,Tent and System Package

- 2.4 x 1.2 meter tent 2m high
- * 2 x 600W JBL magnetic Ballasts
- * 2 x ultra 9 fold open reflectors with heat diffusers for light cooling
- 2 x 600Watt GE lamps
- 2x Digital Heavy duty (30amp) timers
- * 150mm In line fan for exhaust
- * 150mm Odour sok for odour
- * 150mm Fan Ducting x 3meters
- * 150mm In line fan intake air
- * 150mm Fan Ducting x 3meters
- 2 x 6 Pot Satellite System
- pH-200 Meter for testing water pH
- pH Adjustment Solutions
- pH Calibration Solutions
- CON-100 Meter for testing nutrient strength
- Conductivity Factor Solution for CON-100 Meter

Also Available: The Ultimate (Premium Edition) - \$3100

The Ultimate (Premium Edition) is the premium upgrade to The Ultimate System. Upgrades include switchable, low power, higher yield Lumatek Electronic Ballasts, Cool Tube air cooled reflectors, additional ventilation fans, Can Fan centrifugal exhaust and Carbon Air Filter, Bluelab Combo Meter for water temperature, pH and Nutrient testing.

Gardening under lights

The stages of growth

There are several stages a growing plant will go through, but mostly, they can be characterised by three stages of growth - Seedlings and clones (cuttings), Vegetative, Flowering.

1. Seedlings and clones (cuttings)

- All a seed needs to germinate is warmth and moisture.
- Put seed in the fridge at around 4 degrees in a dry container to get seeds to germinate faster. Do not freeze! 2-4 days of coolness will help them germinate faster in a warm climate.
- A seed has all the nutrients it needs in the husk of the seed.
- Generally, the medium (rockwool, perlite, peat) used to germinate a seed must be well draining, but remain moist to the touch. Although moisture levels may vary for different varieties, the medium must not be too wet. The media is best described as not dry and never very wet. (Another description of moisture levels could be described as like a sponge used to wipe a counter. Not so wet as to leave water on the counter, but not so dry that it does not clean.)
- Taking a cutting of your favourite plant is an excellent way to ensure a good plant. This method of propagation is a form of Cloning, as the offspring has the same genetic information as the parent/ (or mother plant). For advice on cloning, ask your staff member.
- Clones take about 10 to 14 days of rooting before they can be placed into a growing system. Use a cloning gel and a clear-lid propagator to get best results. Ask for our cloning booklet for more information.
- Once a seed has sprouted, or a clone is striking roots it is a good idea to give it some indirect light in preparation for its first leaves.
- (Lighting should be Fluorescent close to the tops of the seedling or a Son Agro about 5 feet or 1.5 meters from the seedlings/cuttings. Any closer will dry out your plants as they have under developed root systems)
- The Seedling will sprout with small "false" leaves (cotyledons or seed leaves or water leaves), but when the first true leaves appear it is a good indication that the seedling now has roots and you should apply nutrient from now.
- For the first week, half strength nutrient can be applied to seedlings.
- It should be noted that the first two weeks of life are critical. If a plant does not have a good start, then you can say generally that the plant will not grow to be an excellent plant.

2. The Vegetative Cycle.

- Once a seedling becomes a young plant, and clones have roots, full strength nutrient should be used (On average 2 to 4 sets of true leaves is a young plant).
- Using a CF meter, adjust your nutrient to the correct

strength for your crop. If you do not own a meter yet, mix nutrients according to pack directions. Our staff should be able to provide you with specific crop directions.

- Lamps should be 1 to 2 Feet from the tops of the plants.
- Hold your hand at the top of the plant and check that is not excessively hot on your hand as this may be too hot for the plants. Close to the plants is good for light, however, they should not be hotter than you could deal with.
- The Photoperiod or length of artificial daylight is best set at 18 Hours with a normal household timer. Other "day" lengths are discussed below.
- The rate of growth will gradually become faster; Young plants are usually slower than they are when they become more mature.
- Plants have been flowered as early as six weeks old if from seedling (approx) but better end results occur when the plants are eight weeks old from seedling before reducing the light hours. The plants are growing at such a rate that they give better results if their metabolic (physical) age and chronological (actual) ages have a chance to catch up on each other.
- Cuttings / Clones are already mature adults even when small. Once the plants are given enough time to settle in, around 2-4 weeks, they can be put into a 12-hour cycle to cause them to flower.
- It is during the Vegetative stage that growers should take their cuttings or clones. For more detailed information on cloning, please consult our staff.



3. The Reproductive Cycle.

- The Light hours can be reduced to produce Flowering or Fruiting.
- Once the light hours are reduced to 12 Hours of darkness, ensure that the plants receive NO LIGHT at all during their dark 12 Hour "night". Should you open a door to your grow room and allow light from a hallway light to enter the room during their 12 hour sleep, this will stress the plants by "waking" the plants up and then putting them back to "sleep".
- Stress is to be avoided at all stages of growth. This stress will slow the flowering process.
- Beware power blackouts as this can appear to the plant as a night period. When the power comes back on the plants may think it has had a short night. For this reason we are developing a new lighting system that will run even if the power goes off.
- Use a *good* Digital timer with a 30 Amp or at least 15 Amp relay inside and a backup memory to avoid light length problems caused when cheap timers fail and the light stays on.
- Plants require less nitrogen during this cycle, and will consume more Phosphorus. There are two ways to combat this. Either increase the strength of your

nutrient, or purchase one of the range of Bloom solutions/additives available.

- Flowers generally will be visible in one to four weeks.
- From then it is only a matter of time for your plant to produce ripe fruit or fully form their flowers.
- Plants fruit and flowers can be harvested and an 18 Hour Vegetative Cycle begun again.
- It is generally better to restart from seed or cuttings. Usually 8 week flowering is most common.

Plant techniques under lights

Mass Planting – using very young plants, closely packed to be grown hardly at all, and turned to flower early. Multiple crops are intended to give more continuous harvest, but never yields as much over time.

Tying down – tying down the main stem allows the branches to stand up and become the equivalent of multiple main stems. Common and popular method.

Knuckling and bending - A modification of tying down, using bending or knuckling (squeezing the stem to form a crease, and then allowing the plant stem/branch to fall into an area where lighting is under utilised. The plant forms a knuckle to repair the crease and the plant stays bent.

Using Netting horizontally – plants are bent and twisted through a horizontal net between the plants and the lights.

Using Netting on walls— the net is run up the walls, and plants wound into the netting. The light is dropped into the gap in between the walls of plants

Using Plant growth stimulants – instead of removing the growing tips, you can use AntiGiberellins to shorten the plant, make the plant bushier and create more branches. This in turn should improve the yield. Avoid 'tipping' as use of this technique can remove the best parts of the plant and even stress it or allow infection.

Cloning

- Cloning is the use of a mother plant to produce smaller plants that grow up to be copies of the original mother plant.
- Clones are just cuttings, and can be taken off plants while vegetative, and even 2-3 weeks onto flowering.
- Clones root under 18 hour fluro light, and then are usually grown for 2 –4 weeks on a 400Watt 18 hour day length, and then moved to a flowering room or the lighting changed to 12 hours.
- Cloning is the best way to improve your techniques as using the same plant over and over teaches you what your plant responds well to.
- You should read our handout on cloning for more information

Setting up your Lighting system.

- When assembling your light for the first time, screw the bulb in until it is finger tight, and then give it a little more of a twist to ensure a firm contact. After a week to two weeks, the contacts will have worn in, and could need a little more of a turn. Please check the lamps are fully screwed in.
- Many people use nylon rope to hang their lights. Please ensure they do not contact the bulb and melt.

We recommend welded link chain or plant hangers (RIGHT) Unfortunately, chain do not go through pulleys very well, but it can be easier to use a hook, and unhook the light and move it up a couple of links at a time. Don't drop a light on your plants!

- Make sure your plants are well ventilated. A plant is 90% water and carbon. The only way a plant can take in Carbon is through the Carbon Dioxide in the air. If the Carbon Dioxide content in the garden is not replenished, plants will grow more slowly and could develop problems.
- Generally, the optimum temperature of the growroom is between 22 and 25 degrees Celsius and the optimum Humidity levels lie between 40% and 60% Relative Humidity. Generally, it may be difficult to obtain this range of temperature and humidity, however as a general rule, try to keep the room as close to the optimums and most plants will adapt themselves to their environment. Try to avoid sudden leaps of humidity or temperature as this may shock your plants. (e.g. opening up all windows and doors on the weekend, and then closing them up for the rest of the week) If you maintain the environment within the optimum ranges, you will see a much better growth rate.
- There are other essentials to good growing. These include Root moisture to oxygen ratio, pH (Acidity/Alkalinity), and Nutrient strength.
- **Call us if your plants do not look perfect – That is the GOLDEN RULE!**
- Replace lamps every 9-12 months or less if you want to keep lamp output at maximum.
- If purchasing second hand equipment note that the lamp has been run, and it is most likely to be close to 6 or 12 months or more of running. So replace it as soon as you can.
- Avoid any second hand ballasts if it has been dropped or damaged, or is an industrial and not a domestic design, you can end up with a ballast that trips out the power. Some badly damaged ballasts can smoke out your growroom. All our Ballasts are guaranteed not to have these problems and have been designed for home application and are extremely safe.

Reflection

- Although the sun travels in the sky and will be sending light to plants from their eastern side in the morning, their northern side and top at noon (Southern side if in Northern Hemisphere), and the western side in the afternoon, we have to deal with a light that is usually fixed in one position most of the time.
- Instead of leaves all over the plant receiving a dose of light and energy, most of the energy will be concentrated above the plant.
- Using a reflector is important to focus all the light downwards, and it is important to note that most reflectors are advertised to have incredible reflective designs. However, the catch is, if you raise the light you change the area in which it focuses its light. A mathematician was once asked to make a reflector design and he asked how high above the plants it

would be. The answer was that it would change as the plants got taller, as the light would be raised. He said that a perfect reflector is impossible to design, and any design that stopped light going upwards was fine. He said that the best idea was to concentrate on using the walls as reflection, and to keep them as close in to the lamp as possible to keep the light strong and reflective.



- The best reflection is white as it reflects all the reds and blues.
- Silvered products or mirrors will reflect all of the spectrum. This means heat as well as light. Mirrors and silvered reflectors do not diffuse or spread the light, so may create hot spots of light and heat in corners. They may suit some peoples desire for performance, but my opinion is you need to polish the silver as the dust, humidity and heat will tarnish the silver quickly without regular cleaning. So white is easier.

Movement

- Moving a light is another way to improve growth.
- Plants under a continually moving light can be closer to the lamp, as heat build up which is known as the heat bloom, under a reflector, generally does not occur when a reflector moves. Exceptions include boxed in reflectors, and that the glass cover of the lamp may be very hot and should not touch the plants or plant tissue damage will occur.
- By increasing the light levels, plants can then grow faster, and the moving light will help shine on the plant from many angles ensuring bottom leaves contribute to plant energy as much as top leaves.
- The most common way of creating movement is to put a light on a motorized light rail. Also used are motorised light rotators.
- Manual devices can be used to move the light a little each day, and this would include using a chain to pull the light 10-30cm towards one wall, then releasing it again the next day. Curtain rods mounted on the ceiling allow you to move a light not only for light penetration, but also when maintaining your system to keep the reflector out of the way while you climb in among the plants.

Mail order Information

To place an Order

- Call us on (07) 5527-4155 (International code +617-5527-4155),
 - email us at info@hydrocentre.com.au,
 - Fax us on (07) 5527-4154,
 - SMS us on 0402 864986,
 - write to us at 1/27 Lawrence Drive Nerang QLD 4211 Australia,
- whichever you prefer. We will be most happy to process your order. Once a price has been worked out and your items are

checked to be in stock we will let you know we are ready for payment, and process that (payment options are below)

Packing of Goods:

We send all our goods addressed from R Andrew 1/27 Lawrence Drive Nerang QLD 4211 and use plain cardboard, bubble wrap and black plastic wrap to ensure the contents are not pilfered or dropkicked by freight or postal workers. Personal items seem to be given more care

Method

(East Coast - Cairns to Melbourne) Australia Post charge anywhere between \$10 and \$20 a parcel. If it cannot be posted, we will use a courier or freight company to get it to you or the nearest freight depot. www.austpost.com.au and use their postage calculator to do a quick estimate.

Where to?

We will send items that have been paid for care of your local post office, to your address, or care of the courier/freight company's depot. Other locations by arrangement and confirmation that it is satisfactory.

Privacy

We would appreciate it if you could contact us when you receive the goods, so we can get rid of our paperwork. We keep a record until then so you can let us know if anything is not perfect. It's all quite simple. Once its finalised there is no need to keep a record.

REMEMBER: Contact us to confirm amount before payment

Direct Deposits (Confirm amount first)

We have an account with the National Australia Bank. You can deposit from an **Internet banking package**, or **National Australia Bank Outlet**.

The Account Details

Name of Account: R Andrew
Bank number (BSB) 084852
Account number 799641000

CALL US when you have done this!!

Please call us on 07 5527 4155 and tell us that a deposit has been made so we can check our account.

If you do not do this we may not identify a payment for days. Alternatively, send us an email to info@hydrocentre.com.au or SMS to Scott on 0402 86 4986 or fax 07 5527 4154

Depositor Name and Address.

You may be requested to give a reference\$ for large deposits. You can get a reference number from us, or you can choose what reference information you wish to give. We suggest that you don't use your name for privacy sake, and as long as you can give us the right details, we can identify the deposit.

VISA, MasterCard and Bankcard Payments

Do not send credit card details by email.

Please use the phone 07 5527 4155, or use SMS to Scott on 0402 86 4986, or fax to 07 5527 4154 We need the number, expiry date, name on card, and the ccv (last 3 or 4 digits printed on the back after the credit card details)

Sending Postal Orders (confirm amount first)

For overnight delivery to us send money orders in a express post envelope.

Please make them payable to 'R Andrew' or 'Nerang Hydroponic Centre' (whichever you prefer)

Send to R Andrew or Nerang Hydroponic Centre
At 1/27 Lawrence Drive Nerang Qld 4211

COD - Cash on Delivery

We will send out items via Australia Post's COD system, but you will not get free postage, and they charge about \$20 on top of the goods per parcel. (A Charge plus postage) Better to pay for it first and save.

Future Payment Systems

Paypal is available if desired, with a small fee of 1%

Any Further Questions contact our staff at anytime

Happy Gardening!

MY NOTES: