

# Gardening under lights

Updated December 2008

Prices Subject to Change

## We have moved !

Please note our new address:

Shop 1, 27 Lawrence Drive, Nerang QLD 4211.

## Price Rises

Please note, as of July 2008 we have been forced to raise our prices in line with that of our suppliers, while some products have risen by no more than a few cents others have had to change to reflect global markets. We wish this didn't have to happen and are still proud of our competitive pricing. A new catalogue is being produced to reflect the new prices, in the meantime please use the information in this catalogue to continue growing healthy plants and contact us for an accurate quote when purchasing. Thank you.

## Lighting Supplement



Growing under lights is a popular hobby

- 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

**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.

## How to set up a growing area indoors

## 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 growrooms:

- 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

### 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.

## LIGHT SELECTION CHART

Total lighting	Area Covered	Size of plants	Light intensity	Heat and ventilation	Best Overall Lamp types
<b>400Watt HPS</b> (high pressure sodium)	about 1mx1m	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	Phillips Son T Agro or GE Lucagro
<b>600Watt HPS</b>	up 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
<b>1000Watt Metal Halide</b>	up 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
<b>1000Watt HPS</b>	up to 1.7x1.7m	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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## 2. Select a Grow light

*(see light selection chart on previous page)*

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 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 & lamp holder
3. The control box (or ballast).

**Phillips** make a good 423 Watt lamp called a SON T AGRO 400 Watt. These lamps use around 4cents per hour.

**General Electric** also make good lamps. they make a 400watt, 600watt and 1000 watt LucaGrow Lamp, and use 4cents, 6cents and 12 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 1m<sup>2</sup> (1 meter by 1 meter), as per the chart on page 1. Use 600 Watt lamps for an area of 1.5m<sup>2</sup>.

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



Son T Agro 400W

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 I sold you a five litre bottle of nutrient and it was missing 20% (1 litre) of nutrient. Some cheap ballasts output 20% below lamps nominal rating. This will reduce yield.



Control box or ballast

## 3. Reflective walls

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



## Ventilation guidelines

Total lighting power used	Typical room size	Incoming air 0-10 deg.C cold/cool growroom	Incoming air 10-20 deg.C comfortable growroom	Incoming air 20-25deg.C warm growroom	Incoming air 25-30 deg.C hot room	Incoming air 30+ deg.C humid uncomfortably hot growroom
<b>Up to 400W</b>	1m x 1m (x2.5high)	10 changes for normal CO2 +heater	10-20 changes + heater	20-100 air changes	100-200 air changes	Airconditioning with 10 air changes per hour <u>or</u> 200+ air changes per hour
<b>400W to 600W</b>	1.5m x 1.5m (x2.5high)	As above	As above	As above	As above	As above
<b>600W to 1000W</b>	1.7m x 1.7m (x 2.5high)	As above	As above	As above	As above	As above
<b>1000W to 2000W</b>	3m x 1.5m (x 2.5high)	As above	As above	As above	As above	As above
<b>2000W plus (consultation recommended)</b>	6sq.meters+ (x 2.5high)	As above	As above	As above	As above	As above

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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 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. 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.



120mm computer fan fits 150mm ducting easily

Fluros 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 Fluros with built in ballast are enabling us to grow plants under fluro lighting. The light output is excellent for supplementing existing sunlight or growlight, and for growing plants indoors without



130Watt Fluros are the latest development in growlighting



High Pressure Sodium (HPS) have an orange colour

high growth rates. (e.g. motherplants for cloning, cuttings)

#### **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 Phillips

400Watt Son T Agro, and the General Electric Lucagro in 400, 600 and 1000Watt sizes



Metal Halide lighting

#### **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 Superagro and similar 1000Watt lamps have enough reds to give fast growth, and good flowering. Metal Halides are best use for growth, and the lack of reds produces a shorter stockier plant, and excellent leaf development. Metal Halides run from a Metal Halide ballast. If you only have a HPS ballast, you can get a 'retrofit lamp' which case they run from High Pressure Sodium (HPS) ballasts. In this case a grower may use a retrofit MH lamp for growing a plant, and switch to a HPS lamp for flowering stage, all using the one HPS ballast. This only applies to the 400Watt and 600 Watt models, but these account for nearly all lighting sold today anyway. Lamp differences include amounts of red, light output, reliability,

## **Types of Lights / Lamps**

### **Fluorescents**

"Fluros" 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 Fluros 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



and thermal output (heat) We recommend the 1000W Supergro grow and flowering lamp for 1000W Metal Halide users, and the 400W and 600W retro bulbs for HPS ballasts. Occasionally we sell 250W metal halides for aquariums and for slow growing systems like mother plants. The 130W fluoro has become more popular.

## Lighting Kits

### Complete Lighting packages – No additional sunlight

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

Lighting systems are made up of three parts

The lamp

The reflector

The control box (or ballast).

The **high output ballasts** have a 3 year warranty, because they are much safer, have longer lasting ignitors, better lamp output and lamp life, and because of their output, will increase yield over the basic ballast most stores sell. We estimate that the added cost of the better ballast will come back to you in the first crop usually.

## 400W systems (around 50,000 lumens)



400Watt in a mini Adjustashade

**400W Ballast, Budget lamp, Horizontal reflector \$199 (special)**

### UPGRADES

- **400W BALLAST UPGRADE** to Gold Label Ballast guaranteed quiet ballast, with 3 year warranty, special safety features and high output. Add \$10
- **400W REFLECTOR UPGRADE** to Mini Adjustashade for small areas like wardrobes +\$10
- **400W REFLECTOR UPGRADE** to normal size Adjustashade +\$5
- **400W LAMP UPGRADE** to Son T Agro Lamp +\$5
- **400W REFLECTOR UPGRADE** to Air cooled Adjustashade +\$100
- **400W LAMP UPGRADE. Add a 400W MH Retro Lamp for growth stage \$75**

## 600W systems (around 85-90,000 lumens)



600 Watt in large adjustashade

**600W Ballast, Budget lamp, Horizontal reflector \$265 (special)**

### UPGRADES

- **600W BALLAST UPGRADE** to Gold Label Ballast guaranteed quiet ballast, with 3 year warranty, special safety features and high output. Add \$10
- **600W REFLECTOR UPGRADE** to standard Adjustashade +\$5
- **600W REFLECTOR UPGRADE** to large Adjustashade for spreading light wider +\$15
- **600W LAMP UPGRADE** to GE Lucagro Lamp +\$5
- **600W LAMP UPGRADE** to Son T Plus Lamp (no blue and increased heat) +\$10
- **600W REFLECTOR UPGRADE** to Air cooled Adjustashade +\$100
- **600W LAMP UPGRADE. Add a 600W MH Retro Lamp for growth stage \$85**

## 1000W HPS systems (around 140,000 lumens)

**1000W HPS Ballast, Lamp, Large Adjustashade reflector \$450**

**1000W Budget Ballast, Budget lamp, Horizontal reflector \$410**

### UPGRADES

- **1000W BALLAST UPGRADE** to Gold Label Ballast guaranteed quiet ballast, with 3 year warranty, special safety features and high output. Add \$10
- **1000W REFLECTOR UPGRADE** to large Adjustashade for spreading light wider +\$5
- **1000W LAMP UPGRADE** GE Lucagro Lamp +\$5
- **1000W LAMP UPGRADE** Son T Plus Lamp (no blue and increased heat) +\$10
- **1000W REFLECTOR UPGRADE** to Air cooled Adjustashade +\$110

## 1000W Metal Halide systems (around 100,000 or 125,000 lumens)

**1000W Metal Halide Ballast, Budget lamp,  
chinhat reflector \$350**

### When to replace your lamps

Make of Lamp	Size	Useful life
Fluorescent tubes	Up to 80W	Max light output is only 3 months.
Phillips Son T HPS	400W Agro	8-12 months of operation
GE Lucagro HPS	600W	8-12 months of operation
Sylvania SuperGro Metal Halide	1000W	3 months at 125,000lum. (some replace lamp at 3 months) 3-6 months@ 100,000lum (After 6months replace)
GE Lucagro HPS	1000W	12 months of operation
Budget versions	All sizes	Approx 50-80% of above
Retrofit lamps	400W and 600W	6 months of operation

### Fluorescent Lamps

**Cool White tubes** are suitable for seed raising and cloning only (propagation)

2ft 18watt \$4      4ft 36watt \$5

**GROLUX Fluro grow tube** can be used for propagation as well as sidelighting and keeping plants growing slowly if you are waiting for places in the main system to become available. They are known for their purple growth colour

2ft 18Watt \$12.50      4ft 36Watt \$19.50

### Sylvania 40w U Shaped Fluoros

for old style growth chambers \$25

Compact fluro BC 20W 4500K neutral white (EC fitting available) \$30 (orders only)

**130W Fluorescent** Built in Ballast \$95 (see under florescent lighting systems above)

### Light Movers

Light movers move the lights above the plants to enhance yield and increase area.



Left:  
Jupiter  
Rail  
light  
mover

Jupiter 2 light rail with no delay at ends \$350

Jupiter 2 light rail with 30 sec delay at ends \$370

Add on another light kit for Jupiter - Trolley, rod and spacer/block no rail \$35

Jupiter 2 2.1mtr rail only \$55

Jupiter 2 trolley only \$25

### Lamp replacements

### Florescent lighting systems



2foot fluro twin

2ft fluro twin lamp batten with reflector available with:-

2 x propagation lamps \$55.00

2 x GROLUX Grow lamps \$70.00

2ft twin lamp flurobay (larger trough-style) available with:-

2 x propagation lamps \$75.00

2 x GROLUX Grow lamps \$95.00

4ft twin lamp flurobay larger trough-style available with:-

2 x propagation lamps \$95.00

2 x GROLUX Grow lamps \$130.00

#### Propagation lights

130W Fluorescent Built in Ballast \$95

with lampholder and plug and adaptor \$130,

with horizontal reflector \$170

68w Sunmaster lamp and ballast \$190.00 (Orders only)



**130Watt Fluro** light Right fits into any typical grow light type 40mm ceramic lampholder.

Left: special reflector available



Replace Lamps when plants slow their growth/flowering and the lamps are approaching replacement age (\*see table left)

#### HPS Lamps

**GE Lucagro (All are agricultural spectrum)**

400 Watt Lamp HPS \$65

600W Lamp HPS \$75

1000W Lamp HPS \$130

#### Phillips Son T HPS lighting

250W HPS son T lamp \$85 (\*check stock)

423W Son T Agro lamp \$55 (Agricultural spectrum)

600W Son T Plus lamp \$85 (**Not** agricultural spectrum)

#### Metal Halide and Retrofit lamps

250W MH for HPS or MH ballasts \$85

400W MH for HPS or MH ballasts \$75

600W MH for HPS or MH ballasts \$95

360W HPS retrofit for MH Ballast

(\*check stock) \$85

880W ULX HPS retro lamp for 1000W MH ballast (\*check stock) \$230

1000W Sylvania MH Super Gro \$120

## Control Box / Ballast replacements

400W Budget HPS ballast	\$130
400W Gold Label HPS Ballast	\$140
400W MH ballast Gold Label	\$Call
600W Budget HPS ballast	\$150
600W Gold Label HPS Ballast	\$160
1000W Metal Halide Budget Ballast	\$285
1000W MH Gold Label hi quality	\$295
1000W HPS Budget Ballast	\$300
1000W Gold Label High Quality	\$310

**NEW For 2008** Lumatech Electronic Ballasts now in stock, up to 30% more lumens from your bulb, works with standard reflectors. Call the store on (07) 5527 4155 for information.

## 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)



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.



For reliability we recommend at least a 15 Amp Relay or a 30 Amp relay. Since you won't be in the room to see if the lighting stays on, the damage from a cheap 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** – Batwing, Starwing, Adjust shade. 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.



Adjustashade—Australia's Favourite reflector comes flat packed easy to assemble (unlike copies)

Small for 400W and 600W inc lampholder \$95  
Large for 600W and 1000W inc lampholder \$110

Air Cooling add on kit for Adjustashade (add fan and duct)  
Small inc glass \$35 Large inc glass \$45

**Air-cooled** – 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.

Mini aircool sealed reflector up to 600W \$135  
Small aircool sealed reflector up to 1000W (some lamps will not fit) \$150



## Reflector Design

**Vertical** – Chinamans Hat / witches hat. Spreads light sideways.

Deep bowl chinahat 1 pc  
3ft 400W \$55  
4ft 1000W \$80

Lampholder for chinahat or adjustashade \$35

**Small 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.

## Reflective Film—Panda Plastic

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

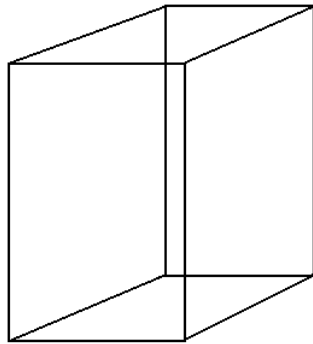
**Panda Film—White Reflective film**

Black and White reflective film 3 meter wide off the roll  
 Medium 150 micron \$7 per 3m wide per mtr  
 Thick 250 micron \$10 per 3m wide per mtr  
 Roll 50m x 3m x 150 micron Panda \$250  
 Roll 30m x 3m x 250 micron Panda \$250

30m Silver Duct tape roll \$6

**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 \$2.50 per fitting.**



1m x 1m x 2m high with fittings \$104 + 5m panda add \$35  
 1.5m x 1.5m x 2m high with fittings \$120 + 8m panda add \$56  
 3m x 1.5m x 2m high with fittings and side supports \$180  
 13m panda add \$91

**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 on page 2 for the amount of air ventilation required, see the Fan chart, (right) for sizes and prices.

**Black Ducting and Y fittings**

We use Black Ducting to keep light from reflecting into the growroom and disturbing the plants photoperiod. See chart on right for sizes and prices for Ducting and Y fittings, (top right).



Black Ducting	3 meter length	6 meter length	Y splitter fittings
100mm	\$15	\$27	n/a
150mm	\$18	\$30	\$25
200mm	\$22	\$40	\$27
250mm	\$25	\$45	\$35
300mm	\$30	\$50	\$57

**Fan Thermostats and speed controls**

Temp/humidity controller unit-control fans/heaters \$230  
 Fan Speed Control for Ziehl fans - no wiring supplied \$70  
 Thermostat 0.5degree switching - to switch fans on at set temperature \$135

100mm Spigot adaptor to fit ducting to reflectors \$17  
 150mm Spigot Adaptor to attach ducting to reflectors \$20

**Ventilation Fan sizes**

(others on request)	Approx. cubic meters per hour	
150mm 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	\$60
150mm Inline Ducted Fan (Spectrum) (noise level 2 out of 5)	650	\$140
250mm Inline Ducted Fan (Spectrum) - super quiet—big seller (noise level 1.5 out of 5)	1200	\$170 (2 for \$300)
250mm Industrial 4 pole Axial Fan (noise level 3 out of 5)	2000	\$320
300mm Industrial Axial 4 pole 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 Centrifugal Fan for 150mm carbon filter (noise level 4 out of 5)	N/a	\$265
200mm Centrifugal Fan for 200mm carbon filter (noise level 4 out of 5)	N/a	\$290
250mm Centrifugal Fan for 250mm carbon filter (noise level 4 out of 5)	N/a	\$325
300mm Centrifical Fan for 300mm carbon filter (noise level 4 out of 5)	N/a	\$425

## Ozone Generators



### HOW DOES OZONE WORK?

Ozone Generators turn normal oxygen (O<sub>2</sub>) into ozone (O<sub>3</sub>) which reacts with the particles it comes in contact with and has an 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 be 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.

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 setup 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 \$350

250mm ducted Ozone generator 40Watt—Fits the inlet or exhaust of a multiple light system \$399

20W replacement ozone lamp \$60.00  
40W replacement ozone Lamp \$120.00

Ozona odour block 250g apple \$15



## Carbon Filters and other odour devices

Carbon filters should be located in the room, and air sucked from the room, through the outer layer to the inner core, then through the ducting to a fan. Because the outer layer is larger than the inner, this will reduce back pressure compared with pushing air into the core.

Not recommended for air conditioned rooms as the fans required to make these work will suck all the cold air out. (For a/c systems use Ozone) You must use a centrifugal fan with these fans or not enough air flow will get through the filter. In some humid rooms, moisture gets into the carbon and makes it less effective. Will only clean outlet air, not air seeping into roof cavities, under doors. (For that use Ozone)



### AV Carbon Filters—suggested 3-5 year life span

150mm neck x 500mm long x 1400W (max) of lights = \$250  
150mm neck x 1m long x 4000W (max) of lights = \$340  
200mm neck x 500mm long x 1600W (max) of lights = \$290  
200mm neck x 1m long x 5400W (max) of lights = \$370  
250mm neck x 500mm long x 2400W (max) of lights = \$320  
250mm neck x 1m long x 6200W (max) of lights = \$420  
300mm neck x 500mm long x 3000W (max) of lights = \$390  
300mm neck x 1m long x 7400W (max) of lights = \$470  
350mm neck x 500mm long x 4800W (max) of lights = \$460  
350mm neck x 1m long x 9600W (max) of lights = \$495  
350mm neck x 1.4m long x 12000W (max) of lights = \$660

**Growing Chambers**—coming soon.

## Plant Support

There are various methods of plant support in a growroom 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

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

# 400Watt

### Hand watered 6 Pot Package System \$365

- 6 x 300mm Pots and saucers
- 100ltrs of Perlite growing media
- 400W budget grow light
- Inlet Lenco fan
- Exhaust Lenco fans
- 3 meters of 250mm ducting
- Home 1ltr Grow nutrient
- Home 1ltr 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 \$7 per meter (3 mtrs wide) (note: No light timer included)

OPTIONAL: \$160 extra on kit price includes above plus 1 meter x 1 meter x 2 meter high growroom and Reflective Plastic Sheeting

### Satellite 6 Pot Recirculating System \$550

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

- 400Watt budget Light
- 250mm Inlet Fan
- 250mm Exhaust Fan
- 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 Growth stage Nutrient
- 2 litre Flowering Stage Nutrient
- No light timer included

Recommended: a 1 meter x 1 meter x 2 meter high growroom + Reflective Plastic Sheeting for \$150 more

### Wardrobe System \$475 (not including wardrobe)

*Designed to suit most wardrobes. We can fit all equipment into a Wardrobe. If you buy one at BBC/Bunnings you can have it delivered to our store for modification.*

Includes

- 400Watt budget Light
- 150mm Inlet Fan
- 150mm Exhaust Fan
- 3 meters of Exhaust Ducting
- Reflective Plastic Sheeting for inside doors
- 650 x 450 mm Crate 6 pot Clay Trickle fed Basica system or 6 pot Aeroponic System (includes Expanded Clay Growing Media, pump, Timer for pump, tray, stand, irrigation and drainage and nutrient tank)
- 2 litre Growth stage Nutrient
- 2 litre Flowering Stage Nutrient
- Note: No light timer included

# 600Watt

### Hand watered 6 Pot Package System \$495

- 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 budget light
- 250mm Inlet Fan
- 250mm Exhaust Fan
- 3 meters of 250mm Exhaust Ducting
- 100 Litres Perlite Growing Media
- 2 litre Growth stage Nutrient
- 2 litre Flowering Stage Nutrient
- 6m of Panda Film

(note: No light timer included. We recommend \$45 battery back up heavy duty hydroponic 15amp timer)

OPTIONAL: \$150 extra on kit price includes above plus 1.5 meter x 1.5 meter x 2 meter high grow room and 3m extra (9mtrs total) reflective plastic sheeting

**Soak up moisture in the air  
with Damprid—\$9  
(large refills \$11)**



### Satellite 6 Pot Recirculating System \$615

- 6 Pot recirculating high performance Hydroponic System with 600 Watt budget light
  - 250mm Inlet Fan
  - 250mm Exhaust Fan
  - 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 Growth stage Nutrient
  - 2 litre Flowering Stage Nutrient
- (note: No light timer included. We recommend \$55 battery back up heavy duty hydroponic 15amp timer)

Recommended: a 1.5 meter x 1.5 meter x 2 meter high grow room + Reflective Plastic Sheeting for \$200 more

### AERO-GRO Package System \$699

- Includes 600 Watt Budget Light
- 250mm Inlet Fan
- 250mm Exhaust Fan
- 3 meters of 250mm Exhaust Ducting
- 1.5 meter x 1.5 meter x 2 meter high grow room With reflective plastic sheeting.
- The AERO-GRO hydroponic system uses 6 x 80mm aero pots in a crate system with Special AERO-GRO low pressure sprinklers, Expanded Clay growing media, pump, timer for pump, tray, stand, all irrigation and drainage and the nutrient tank.
- Also a set of nutrients; 2 litre Growth stage Nutrient and 2 litre Flowering Stage Nutrient

No light timer included. Use 2 of 3 of these systems to achieve a revolving continuous clone system.

### Mega System

- 400 Watt Light for growing vegetative room,
- grow room 1 x 1 meters
- 2 Pot Satellite Mother System
- *plus* 2 foot Flurobay and propagator, with all cloning equipment
- *plus* 600 Watt Light for flowering room,
- grow room 1.5 x 1.5 meters,
- 6 pot Satellite flowering/fruiting system
- *plus* Ozone mould and odour control unit worth \$400,
- 2 inlet fans
- 2 exhaust fans with 6m ducting
- pH and nutrient strength meters and adjustment solutions,
- Growth and Flowering nutrients,
- pump timers,
- light timers,
- Basically like a Burger with the lot – **\$2200**

### 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 \$50
- Nutrient Heaters from \$55
- Nutriboost vitamins from \$10
- monstabud and Weight plus (see additives in hydroponics brochure)
- Oxygenation kits for nutrient tank from \$20
- Advice for our customers for FREE! Ask for a consultation

More products being invented every day—stop by for information.

## 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, 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 usually grow slower than they do 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 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 growroom 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 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 Bonza Bud 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 fluoro 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](mailto: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, so we absorb the cost of one postal parcel per \$70 into the goods because we either stupid, or just nice people. Our point is if you take the effort to put an order in from where you are, the least we can do is get it to you without costing you if possible. If it cannot be posted, well freight charges on bigger items can be very expensive and although we subsidise the freight, it is never free - Sorry.

Other Areas please ask for a quick quote or look at [www.austpost.com.au](http://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 a followmont transport Queensland depot if paying for freight. See [www.followmont.com.au](http://www.followmont.com.au) for locations. Other locations by arrangement and confirmation that it is satisfactory.

### **Records.**

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 and Australia Post Outlets\***.

(\*Australia Post may charge up to \$1 to make a deposit.)

### **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 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,

or SMS to Scott on 0402 86 4986 or fax 07 5527 4154

### **Depositor Name and Address.**

You may be required to give a name for large deposits. You should be able to say no to that. We suggest that you don't for privacy sake, and since we don't use any names, any name will be fine, not necessarily yours.

### **VISA, MasterCard and Bankcard Payments**

Do not send credit card details by email. (We will have a secure Internet form within a few months)

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 17/39 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**

We are also exploring a secondary St George Bank Account as well as a Bpay option. We will continue to accept VISA, MasterCard and Bankcard.

**Any Further Questions** contact our staff at anytime

Happy Gardening!