

COMPLIMENTARY COPY

A guide to understanding how light movers can increase your yields



The purpose
of this
brochure is
to clarify the
facts about light
movers:

How they work, and
their effects on the indoor
growing environment.

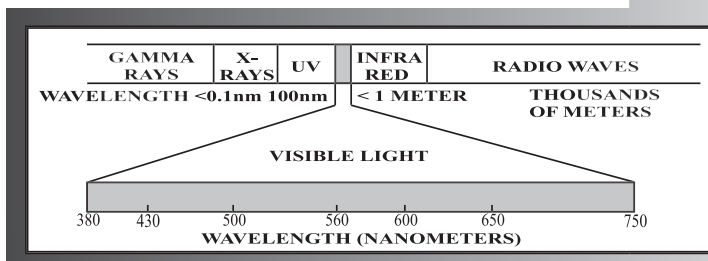
It also describes the key features
of the **JUPITER II**™ brand
of light movers manufactured by
Niccophonics Australia.

www.jupiter2lightmover.com

WAVELENGTHS OF LIGHT AND PLANT GROWTH

We humans see light over a short range of the sun's radiation within the narrow wavelength, or nanometer, band of 400 to 700 nanometers (nm). Plants respond to a slightly wider range of light, including parts of the ultraviolet range (290 to 400 nm) and in the far red (up to 800 nm - just outside our visible range). The term Photo synthetically Active Radiation (PAR) is used to describe the range of light which is responsible for plant growth. However most of plant growth is driven by what we recognise as visible light.

Plants respond most to blue and especially the red/far red. Plants receive energy in the form of packets of energy (photons) from the lamps. The photons are stored in the plants cells where they are used to fuel biological processes. It takes a certain amount of time for this conversion to take place (One of the fundamental reasons why light movers work).



LIGHT AND PLANT QUALITY

Some colours of the spectrum can influence the shape and height of the plant, branching and other aspects of plant quality. These main colours are:

BLUE LIGHT

Plants respond to the intensity of blue light, and reducing the blue light will encourage plant elongation and leggy growth. This response is not relative to the strength of radiation in any other part of the spectrum - it is the absolute intensity of the blue light which influences plant height and quality.

RED AND FAR RED LIGHT

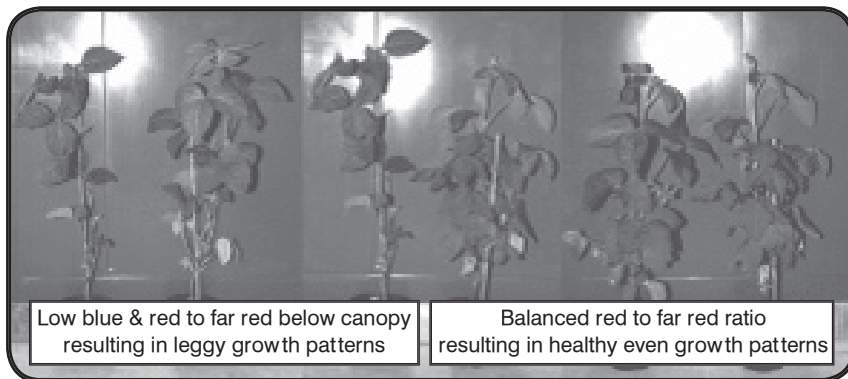
A more important response depends on the relative intensities of red (660nm) and far red (730nm) light. Increasing the amount of far red light relative to the red makes plants grow tall and spindly. Increasing the red relative to the far red does the reverse. If the red/far red ratio is increased significantly height reductions and changes in plant habit can be achieved.

Keeping this ratio as constant as possible, above and below the canopy, is crucial to a healthy even growth profile.

These responses are believed to be part of the shade avoidance mechanism of plants which allow the plant to regain its position in the higher intensity light. These responses are not linear with the red/far red ratio; for example, a small reduction in the amount of red light can bring about a significant amount of stem

elongation, whereas a large reduction of far red may be needed to achieve the reverse effect. As well as experiencing a dramatic reduction in light intensity, leaves within the lower canopy also experience a change in light quality. As the light passes through the leaves in the top canopy, the plant cells absorb a large proportion of red (660nm) and blue (400 to 500nm) shifting the red/far red ratio leaving a high proportion of far red (730nm) to red (660nm) to bathe the shaded area, resulting in unwanted stem elongation (See photo below).

These effects can be eradicated simply by continuously moving the light source over the plants. Light movers allow a reduced lamp to plant distance so will increase the intensity and keep the red /far red ratio in balance in the lower plant canopy. If you decrease this distance using stationary lamps, hot spots will occur leading to drying and burning of the tender growing tips which contain important growth hormones. When light movers are employed this heat is continually shifting and thus preventing any damage from occurring.



ARTIFICIAL LIGHT SOURCES AND INTENSITY

Artificial light intensity reduces quickly the greater the distance from the lamp.

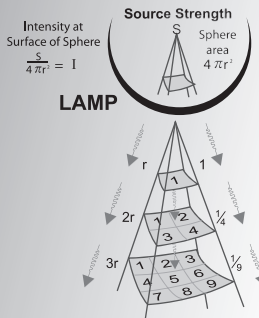
(Inverse square law; see diagram below) This can easily be seen in night time photos, taken using a flash. Everything looks fine in the foreground but fades to darkness in the background.) In the grow room, even though it may appear light enough below the canopy to our eyes, the intensity of the light is insufficient to support reasonable growth patterns, for reasons as explained previously.

The measured luminous flux density from a point light source decreases along any line from the source. It falls in inverse proportion to the square of the relative distance.

An illuminance measurement 2 metres from the light source will be 1/4 of the measurement 1 metre from the source.

Inverse Square Law

The law holds because the energy from the source radiates in all directions, in effect spreading itself over the surface of a sphere. At a greater distance, the same amount of energy is spread over a larger surface, and thus any one area of the surface will receive less. The increase of area is proportional to the square of the radius.



The energy twice as far from the source is spread over four times the area, hence one-fourth the intensity.

DO LIGHT MOVERS WORK, WHAT PERCENTAGE INCREASES SHOULD I EXPECT?

There are many figures being discussed as to the yield figures you should expect and how many lamps can be reduced whilst expecting the same, or greater output figures.

First of all I would like to make a statement as to the efficiency of light movers.

The *JUPITER II*™ light mover has been in production for over 16 years, If they didn't work I would not still be in business.

Over the years I have received hundreds of positive reports with previous customers returning to purchase a second or third unit.

I have heard all sorts of testimonials as to percentage increases in yield when using light movers, some I can't believe. I feel that it would be fair to say that you should expect a minimum 20% rise in yield, if you stay within certain parameters in regards to how far each lamp is moved etc. The highest figures will be achieved if you move the lamps only up to 1 metre. It doesn't sound like much, but testing has proven that this works the best.

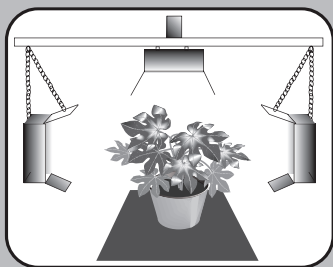
WHAT TYPE OF REFLECTOR'S SHOULD I USE?

As you can see the whole purpose of using a light mover is to increase the penetration and distribution of quality light. Therefore it makes good sense to use reflector's that concentrate the beam of light straight down. A good comparison can be seen by shining a Mag Light (Those torches with the adjustable beam) onto the ceiling, you can adjust the focusing to make a beam of higher intensity which travels further but doesn't spread out or you can do the opposite - a wider beam with lower intensity, typical of China mans hat type reflectors. Even though these type of reflectors will work they are definitely not the best choice. For maximum penetration use a closed end, horizontal globe mount reflector.

CONFIGURATIONS

You can use the *JUPITER II*™ in a number of configurations.

Discuss this with your hydroponic retailer and choose the one most suitable for your set up. Remember we can custom make a system to suit your requirements.



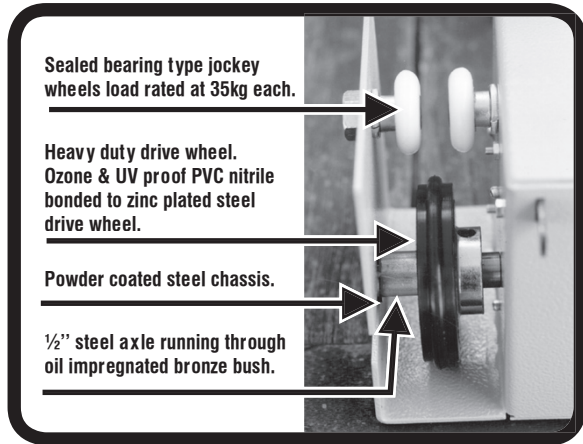
Use a crossbar and mount one lamp directly under the motor. Suspend reflector's either side of the foliage and maximise penetration of light to lower areas. You will achieve excellent results using this method.

Always try to concentrate the light in your grow room to the immediate growing area by making use of panels

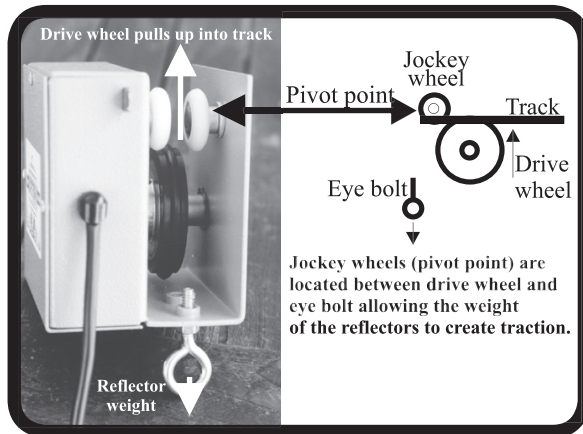
made from a good reflective surface such as Mylar. The panels can be portable so that you can move them out of the way when tending plants.

WHY SHOULD I CHOOSE A **JUPITER II™** LIGHT MOVER?

Having been manufactured now for over 16 years and distributed throughout Australia, New Zealand and the UK, means the **JUPITER II™** has well and truly passed the test regarding it's quality and reliability. We are aware that light movers have to be dependable in adverse conditions that is why we have designed it to such exacting specifications, giving you peace of mind that they will do the job.



Using only the highest quality components, starting with the Swiss manufactured motor/gearbox down to the fail safe French micro-switch. The **JUPITER II™** has been over-engineered on purpose. The ozone, UV proof drive wheel is manufactured from PVC nitrile and is the largest and most durable on the market today. The **JUPITER II™** carries the CE and C Tick electrical safety certification required for the Australian and European markets.



Overall, the **JUPITER II™** light mover is the toughest on the market in the world today, designed as a modular unit which can be added onto as your garden expands.

Heavy Duty Light Mover with Extra Heavy Duty Track

Australian
Made and
Serviced in
AUS & UK

Variable Time
Delay Available
Now



ESTABLISHED 1990

**Over 16 years of proven
dependability.
The only fully modular Light
Mover in the world today.**

- Sealed heavy duty motor unit
- Large zinc plated steel drive wheel
- Powder coated steel chassis

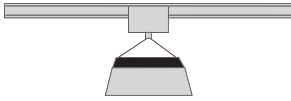
Advantages of using **JUPITER II**[™]

- Superior Engineering
- Improved Quality
- Healthier growth
- Increased Profit
- Decreased Power Usage
- Closer Lamp to Plant Distance

Standard Models Available

CUPBOARD MASTER

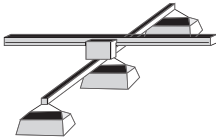
- Max 1 Lamp



TRACK LENGTH 1.5mt

MODEL 1 + 2mt X/Bar

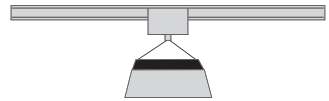
- Max 3 Lamps



TRACK LENGTH 2.1mt

MODEL 1

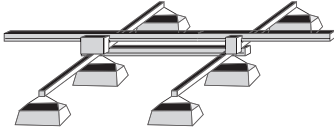
- Max 1 Lamp



TRACK LENGTH 2.1mt

MODEL 2 & 3 + 2mt X/Bar

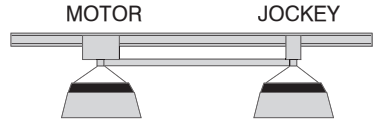
- Max 6 Lamps



TRACK LENGTHS Model 2 - 4.2mt
 Model 3 - 3.0mt

MODEL 2 & 3

- Max 2 Lamps in line



TRACK LENGTHS Model 2 - 4.2mt
 Model 3 - 3.0mt



TIME DELAY UNIT

Variable time delay from .5 to 55 seconds is achieved by way of an adjustment screw on the front panel of the motor unit.

Model 2 & 3 use one motor unit connected to a set of Jockey wheels by a push rod.



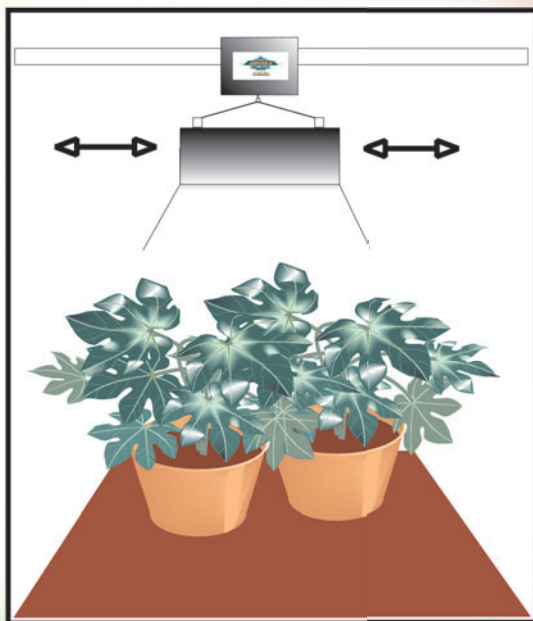
We encourage feedback on the Jupiter II. Please send to jupitertwo@digisurf.net.au

* Please note, we do not sell direct to the public

www.jupiter2lightmover.com

A LIGHT MOVER IN YOUR CUPBOARD GROW ROOM?

If you believe that light movers are only of benefit in larger systems, think again.



EXPECT AN EXTRA 20% GAIN IN OUTPUT

Tests have given conclusive results:
One lamp moved by one reflectors length
can give around 20% higher yields.

If you don't believe it,
then remain in the dark.