Cannabis 5 phase model

Scope of this version

Grodan Improved Block

Warehouse grown crop (not glasshouse)

LED lights providing DLI 40 – 50 Mole per 24 hrs

Phase 1

Start of Phase

When the young cuttings are placed into the block.

End of Phase

When the photoperiod is changed to 12 hr day /12 hr night and the plants are induced into flower.

Objective

Fast and uniform rooting in, so that the roots are penetrating the growing media in line with the increasing plant size. Build a strong foundation in order to support future plant growth and development.

Target crop

Uniform vegetative growth should continue as you start to define the structure of the plant. The leaf area should increase to enable the plant to intercept as much light as possible in order to sustain maximum flower development.

Target root zone

Fast rooting in will allow early vegetative steering and the development of a root system throughout the entire volume of the growing media for maximum water and nutrient uptake in later phases. Young roots should be able to leave the plug and establish themselves easily and without interference.

Special interest

Before planting, it is essential to fully saturate all the blocks with nutrient solution. The initial saturation of Grodan blocks is crucial to the success of the cultivation process. *The best way to*

ensure 100% saturation is by submerging the block in tank filled with nutrient solution (blocks should sink under the water). After initial saturation allow excess nutrient solution to drain away. Check the weights of the blocks (water content to ensure they are fully saturated. Insert your rooted cutting in the Hugo block and apply right after an initial irrigation in order to have a good contact of clone and the big block using the same nutrient solution used to saturate the block.

Reference table

Start time	+3 hrs of lights on
Stop time	-3-4 hrs light off
Target max day level WC%	75% 1st week-70% 2nd week
Target min day level WC%	70 %1st week-60% 2nd week
Target decrease WC overnight	5%-10%
Shot size (% sub. Vol 3.2 L)*	1-3%
Frequency (daily)	1-3 cycles
Moment 1st drain	After the 3rd irrigation
EC drip	2.0-2.5
EC block	2.5-3.5 (end of stage reach maximum)
pH*	5.5
24 hr drain	0-10%

*Ensure that the pH of the nutrient solution is not lower than 5.2

Actualities

What are the precision growing tips (consultancy) you would like to state in this growing phase?

During this stage the WC of the block should go down slowly so roots colonize the entire block. If WC goes down very quickly all the roots go to the bottom. At this stage plant requirements for water are very small. Using the Grosens will guide us to make the right decision when to water. It is important not to over-saturate the block after initial transplant. Over-saturating the root zone will lead to algae establishment, slow plant growth, and increased pest and disease pressure. EC in the block should increase daily, high EC at this stage contributes to a compact resilient plant for the future. Since the WC goes down and very little drain (5-10%) is required the EC will go up naturally so no need to increase EC in the dripper. An increase of pH is observed at this stage but this is normal because of fast vegetative growth of the plant.
Make sure you have adequate 24 hrs. temperature and CO2 in relation to the light. To ensure a fast growth and compact plants very small to none DIF (Day T-Night T) is required at this stage.

Phase 2

Start of Phase

When the photoperiod is changed to 12 hr day /12 hr night and plants are induced into flower.

End of Phase

When the flower sites have been formed and the plants stop stretching.

Objective

Continuation of uniform and controlled plant development and the realisation of a root system that fills the entire volume of the growing media. Maintain a healthy balanced leaf area and structured plant growth to support the shift from vegetative growth to bud initiation.

Target crop

Flowers will be initiated by changing the photoperiod. The climate should be adapted to encourage and support flower initiation.

Target root zone

With the change from vegetative growth to flowering it's important to keep the root system healthy and active and to continue their development into the entire volume of the growing media. Fertilizer recipe should be reviewed and changed as needed to support the flower initiation.

Special interest

During this stage of flower initiation all focus is toward the bud formation, most of the energy that plant produce goes to support that process. At same time we still are filling the volume of rhizosphere, therefore important keeping the energy production and distribution in balance. Plants should not consume more than they produce. The new technology of growing media offers the possibility of large dry backs between irrigation sets and as well during the night to ensure an extra generative kick at same time maintaining root growth.

Reference table

Start time	+1-2 hrs of lights on
Stop time	-2-3 hrs light off
Target max day level WC%	70% -65% (end of stage)
Target min day level WC%	55 %-45 % 2nd (lower end of stage)
Target decrease WC overnight	15%-20%
Shot size (% sub. Vol 3.2 L)*	3%
Frequency (daily)	6-9 cycles (increase # of cycles with growth)
Moment 1st drain	After the 3rd irrigation (end of p1)
EC drip	2.5-2.8
EC block	3.0-4.0 (based on cultivars)
pH*	5.5
24 hr drain	10-15%

Actualities

During this stage plants will grow very fast and double on size sometimes more depending on cultivar. Based on your growing system you want to control this phenomenon at the same time you don't want to stunt this natural growth. We need assimilates to support that fast growth. Based on your system you have to maintain the control of stretching through fertigation, climate and canopy management (pruning, training, trelling)). Due to fast growth water uptake, transpiration and humidity in the air increase therefore make sure you maintain sufficient airflow (increase air-exchange rate). VPD should go up.

Ensure plants receive maximum of lights (first few days of transition light intensity can be gradually increased). Lack of light stimulate "stretch" and fewer buds

One of the ways to control "the stretch" process is through EC stacking. Best way to increase EC is by using small shots and less drain also larger dry backs are introduced.

Phase 3

Start of Phase

When the flower sites have been formed and the plants stop stretching.

End of Phase

When new flower initiation ceases.

Objective

To expand the flowers to their full size by maintaining balanced growth with a focus on flower bud development.

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Target crop

The flower sites are formed and internodal stretching has finished. As such Pistil elongation will be extensive. The canopy should be managed to allow for maximum light absorption and adequate airflow. Climate conditions should be balanced to maintain a steady rate of flower development.

Target root zone

Root quality and activity should be retained to ensure controlled growth of the crop following the initiation of flower buds. The decrease of WC% during the night will provide a good indication for the level of plant activity during the day and if start / stop times are optimised in line with lights on / lights off.

Special interest

What is unique about the Grodan growing media in this phase?

Achieving maximum EC levels at this stage is easy and possible with Grodan blocks still keeping nutrient ratios well in balance. Large dry backs during the dark period allows replenishing the growing media with Oxygen. Rootzone oxygen is essential for root formation, growth, respiration, health, water and nutrient uptake.

Reference table

Start time	+1-2 hrs of lights on
Stop time	-2-3 hrs light off
Target max day level WC%	60%
Target min day level WC%	40 %
Target decrease WC overnight	20%
Shot size (% sub. Vol 3.2 L)*	3%
Frequency (daily)	8-12 cycles (based on cultivars)
Moment 1st drain	After the 3rd irrigation (end of p1)
EC drip	2.5-2.8
EC block	4.0-6.0 (based on cultivars)
pH*	5.5
24 hr drain	15%

Actualities

What are the precision growing tips (consultancy) you would like to state in this growing phase?

During this stage the buds will continue to grow rapidly. It is essential to monitor the plants environment and root zone closely to ensure bud development. Leaf nutritional test or root zone nutrition test should be performed. Since the plants work really hard during this stage plants most likely will experience nutrient deficiency. Any disbalance in nutrients level will affect quality, consistency and yield at the final. Keep an eye on VPD / humidity levels and air flow.

Phase 4

Start of Phase

When new flower initiation ceases.

End of Phase

When the flowers are mature.

Objective

Balanced plant growth in relation to the desired rate of flower expansion and increasing dry matter content.

In the root zone it is important to maintain active hair roots as well as root development for sufficient nutrient and water uptake. Be aware that less energy is available to the roots due to flower development and root age becomes and influencing factor. Also new root development will come from the foot/base of the plant.

Target crop

The flowers are nearing full expansion and terpene development is increasing. Ensure the branches are adequately supported to prevent breakage under the weight of the flower load.

Target root zone

Lower water contents and increased overnight dry backs in the blocks can increase the production of volatile oils. However during the lighting hours irrigation should be matched to the needs of the crop for maximum cooling potential to help create a good climate inside the growth room.

Special interest

What is unique about the Grodan growing media in this phase?

The new technology of Grodan Improved will help at this stage to easily achive desired dry backs and maintain an optimal root zone environement.

Reference table

Start time	+1-2 hrs of lights on
Stop time	-2-3 hrs light off

Target max day level WC%	60%
Target min day level WC%	40 %
Target decrease WC overnight	20%
Shot size (% sub. Vol 3.2 L)*	3%
Frequency (daily)	8-12 cycles
Moment 1st drain	After the 3rd irrigation (end of p1)
EC drip	2.5
EC block	3.0-4.5 (based on cultivars)
pH*	5.6
24 hr drain	10-15%

Actualities

What are the precision growing tips (consultancy) you would like to state in this growing phase?

During this stage maximum swelling of buds happens. Buds will become denser and their trichomes will continue to produce resin. Important to give plants right amount of water and nutrients to ensure such expansion, so maintain high water content during the day and large dry backs during the night. Botrytis may become an issue during this stage. Since buds get denser and they have limited transpiration temperature is always higher than plant the buds themselves may become humidity traps, so make sure one reduce the humidity in the air, increase air flow through plant canopy to eliminate microclimates and even out the environment conditions throughout plant.

Phase 5

Start of Phase

When the flowers are mature.

End of Phase

With the harvest of the flowers.

Objective

Maintain production potential whilst ensuring the plant feeds from its internally stored nutrients.

Target crop

Create a climate that helps the flowers to finish ripening and preserve terpenes levels before harvesting. Flowers should ripen with the fan leaves changing color.

Target root zone

To encourage the plant to feed off its internal stored nutrients, steadily decrease the irrigation EC and EC in the growing media. The irrigation strategy should be aimed optimising the water content in the block therefore creating flowers with the right dry matter content such that they can be harvested without damage and dried quickly.

Special interest

What is unique about the Grodan growing media in this phase?

The properties of Grodan allows minimum water content during the night, still being able to raise during the day at desired levels. As well a slow decrease of EC in the growing media is easily achieved in the last few days.

Reference table

Start time	+2-3 hrs of lights on
Stop time	-3-5 hrs light off
Target max day level WC%	50% -45% (end of stage)
Target min day level WC%	35 %-25 % (end of stage)
Target decrease WC overnight	15%-20%
Shot size (% sub. Vol 3.2 L)*	3%
Frequency (daily)	8-6 cycles (decrease # of cycles at the end)
Moment 1st drain	After the 3rd irrigation (end of p1)
EC drip	2.0-1.0 (last few days lower EC in the dripper)
EC block	3.0-1.0 (end of stage lower EC in block)
pH*	5.6
24 hr drain	10-15%

Actualities

What are the precision growing tips (consultancy) you would like to state in this growing phase?

In the final weeks of flowering stage, the buds will continue to ripen, pistils will change colour, many leaves will change colour and plants are very vulnerable to fungal attack. This late stage as well is the moment when the bulk of desired phytochemical compounds are synthesized and up to 30% of the dried flower weight is gained. Even though plants do not require the same amount of minerals (Nitrogen levels should be reduced) still they required to be feed in a controlled way in order to maintain all biochemistry reaction and physiological processes inside the cell in order to maximize the phytocompounds that we are aiming for. Very important to reduce and control humidity in the air to prevent bud rot in the large buds. Temperature should be reduces and a bigger DIF (Day-Night T) helps to preserve Terpenes and give a purple color to buds.