

# Medical Cannabis

Drip irrigation and fertigation protocol



## INTRODUCTION

Medical cannabis is a challenging crop:

1. A relatively new crop which carries specific commercial and legal regulations.
2. Until recently, Cannabis was grown illicitly, hence there is no standard regarding the optimal cultivation methods.
3. There are 5 stages in the Cannabis crop cycle that must be mastered to achieve optimal results.
4. Cannabis is a quality-biased crop. For example, level of Cannabinoids, as well as smell, color and shape of the flowers determine profitability.

In this document, we provide irrigation and fertigation guidelines aimed at helping you to maximize the potential of your Medical Cannabis investment. The protocols provided are based on our extensive global agronomic experience.

The following guidelines are for growing Cannabis in soilless under covers.

As with all crops, we recommend adjusting your plan based on your specific local conditions related to substrate type and water holding capacity, climate, variety, planting patterns and yield targets.

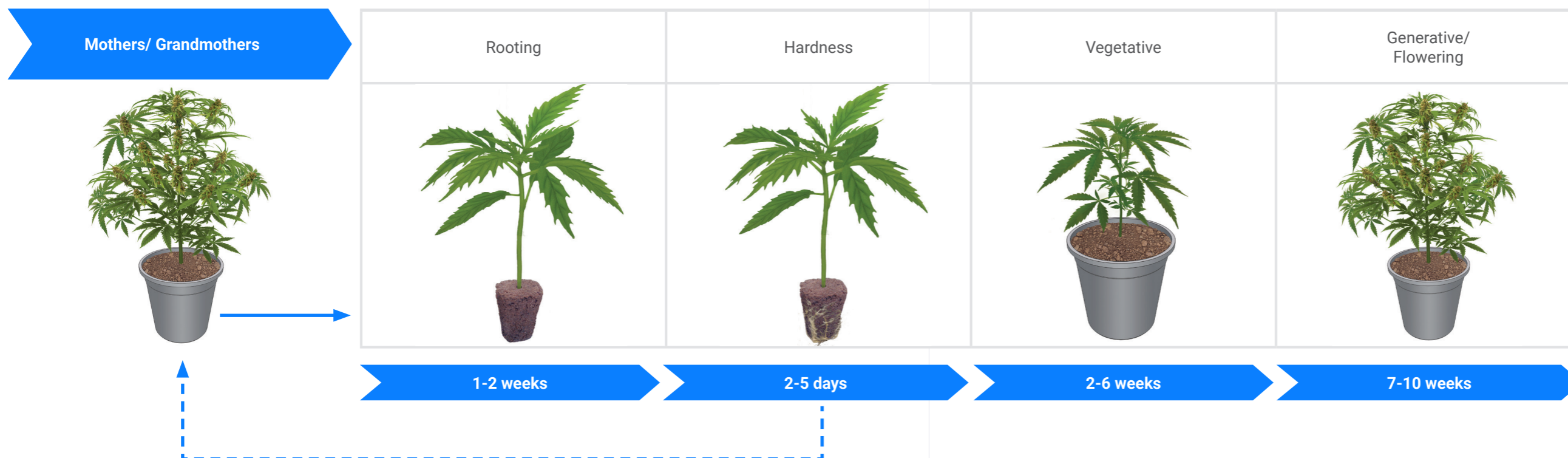


## IRRIGATION - GUIDELINES

- Substrate volume, chemical and physical characteristics and container dimension and shape have a major effect on irrigation quantity and frequency. This must be taken into consideration during irrigation planning.
- Cannabis plants undergo 5 stages to complete their growing cycle: Mothers, Rooting, Hardness, Vegetative and Generative/Flowering. At each stage, the plant requires a specific fertigation and fertilizer protocol.
- As container volume is limited, frequent irrigation is beneficial. Yet, length of irrigation must be moderate (> 5 min). If you work with a tank solution the irrigation pulse can be shorter.
- Adequate drainage is crucial to avoid salination of the substrate ~30% drainage.
- Always keep "EC-out" level higher than "EC-in" by ~ 0.5 mS/cm.
- In the last 3 days before harvesting, it is recommended to perform a flushing procedure (irrigation without fertilizer), while maintaining irrigation stable pH level.

## FERTIGATION - GUIDELINES

- In a soilless substrate, we work in concentration not quantities.
- It is highly recommended to apply fertilizer with every irrigation.
- Determine the required nutrient for plant growth according to the different growth stages.
- Continuously check and adjust the pH level.
- Trace elements (including silica – SiO<sub>2</sub>) are absent in soilless media and, therefore, must be added.
- Conducting on-going chemical analysis of both drainage and irrigation water is crucial.
- Avoid salinity problems. In case of salinity, wash the substrate with stable pH water until you attain the required EC level in the drainage.





**ROOTING**



In the Rooting Stage, don't fertilize, but do maintain 90-95% humidity around the cutting.

**GENERATIVE/FLOWERING**



**MOTHERS**

**HARDNESS**

**VEGETATIVE**



**GENERATIVE STAGE**

ELEMENT	N-NO <sub>3</sub>	N-NH <sub>4</sub>	N-TOTAL	P	K	Ca	Mg	S	Fe	Mn	Zn	Cu	B	Mo	Si
PPM	50-100	10-15	60-115	90-120	220-300	120-150	45-60	80-100	2-2.5	0.6-0.9	0.3-0.5	0.1-0.2	0.3-0.4	0.05-0.1	2.3-4.6
ELEMENT	NO <sub>3</sub> <sup>-</sup>	NH <sub>4</sub> <sup>+</sup>	N-TOTAL	H <sub>2</sub> PO <sub>4</sub> <sup>-</sup>	K <sup>+</sup>	Ca <sup>+2</sup>	Mg <sup>+2</sup>	SO <sub>4</sub> <sup>-2</sup>							
MMOL/L	3.6-7.2	0.7-1.1	4.3-8.2	2.9-3.9	5.6-7.7	3-3.8	1.9-2.5	2.5-3.1							

**EC – 1.6-2.1 mS/cm pH – 5.8-6.2**

**VEGETATIVE STAGE (MOTHER, HARDNESS, VEGETATIVE)**

ELEMENT	N-NO3	N-NH4	N-TOTAL	P	K	Ca	Mg	S	Fe	Mn	Zn	Cu	B	Mo	Si
PPM	110-130	10-15	120-145	40-60	140-200	90-110	35-50	40-60	1.5-2.0	0.4-0.6	0.3-0.5	0.1-0.2	0.3-0.4	0.05-0.1	2.3-4.6
ELEMENT	NO <sub>3</sub> <sup>-</sup>	NH <sub>4</sub> <sup>+</sup>	N-TOTAL	H <sub>2</sub> PO <sub>4</sub> <sup>-</sup>	K <sup>+</sup>	Ca <sup>+2</sup>	Mg <sup>+2</sup>	SO <sub>4</sub> <sup>-2</sup>							
MMOL/L	7.9-9.3	0.7-1.1	8.6-10.4	1.3-1.9	3.6-5.1	2.3-2.8	1.4-2.1	1.3-1.9							

**EC – 1.2-1.6 mS/cm pH – 5.8-6.2**



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