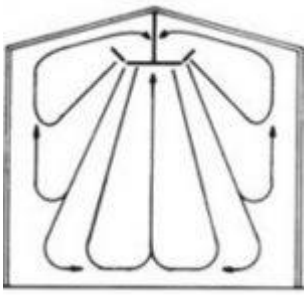
Nivolator V9 Greenhouse

'Creating a homogeneous climate on plantlevel with vertical air circulation.'

In professional medicinal cannabis greenhouses air circulation is of upmost importance. The trend towards higher and larger greenhouse complexes is continuing. Optimising the climate in these greenhouses requires a different approach. How do you get a homogeneous climate everywhere in these high medicinal cannabis greenhouses? It's a matter of air movement! The sophisticated design of the nine-leafed Nivolator V9 creates a unique air pattern. The air is sucked in from the floor up and brought back down in a cone-shaped airflow, creating an optimal mixing of the air without draughts. The temperature distribution in the crop is more even, there is an exchange of air above and below the screen cloth, there is no draught and there are fewer risks of crop condensation. The Nivolator V9 is successfully used in many different crops. These include tomatoes, peppers, roses, gerberas and other flowers, cucumbers, strawberries, etc.



Advantages

- Improved microclimate
- Homogeneous temperature and CO2 distribution throughout the greenhouse
- Homogeneous air distribution
- Energy efficient
- Small vertical temperature gradient between roof and ground
- No draughts, no dead climate
- Ingenious air pattern
- Speed controllable
- Low-noise
- No draughts
- Maintenance free
- Small vertical gradient
- Adjustable blades
- Thermal protection



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Technical specifications

- 1 on 250 m^2
- Motor power of 180 Watt

Technical specifications Greenhouse Nivolator 110V

Type:	TVE-7 with V-9 fan
Color:	White cup and motor, aluminium fans
Plug:	American plug Revolutions: 800 RPM
Motor power:	380 W / 110 V – 1 fase
Ampere:	3 Amp.
Frequency:	60 Hz

Technical specifications Greenhouse Nivolator 230V

Type:	TVE-7 with V-9 fan
Colour:	White cup and motor, aluminium fans
Plug:	European plug
Revolutions:	700 RPM
Motor power:	180 W / 230 V – 1 fase
Ampere:	1 Amp.
Frequency:	50 Hz

Difference Horizontal vs vertical ventilation

Nivolator	*Horizontal fan*
Vertical air circulation	Horizontal air circulation
Energy savings up to 30 % - Brings the warm air in the top of the greenhouse down, in between the crop	Circulates horizontal,
Homogeneous climate - Less humidity and you are allowed to grow at a higher humidity since you have an equal climate, less condensation on the leaves.	- Circulates the air above the crop, instead of in between the crop
Material - The Nivolator is made from aluminium, and therefore very low maintenance and a very long lifetime	- Mostly plastic
Hydro consumption - 700 rpm, only (max)180 W per fan	- Minimal 280 W
Noise - Much lower than horizontal since the Nivolator runs on 700 rpm.	- Runs on at least 1400 rpm
Air displacement - 8000 m3/hour	- Max 4500 m3/hour
Airflow - Very gentle - No dry spots	- High speed air nearby the fan
Diseases - Airflow in between the crop. Less moisture in between the leaves.	

Important points

Temperature distribution: Plants must be grown in as similar a temperature distribution as possible. With horizontal fans, you only circulate air in the top of the crop and certainly with tomato. Air is circulated only at the top of the tomato plant.
Minor horizontal and vertical temperature differences. Hot air at the top of the greenhouse caused by external radiation and lighting is transferred by the Nivolator to the bottom of the greenhouse. Heat produced by external radiation near walls is also dispersed. This means there are fewer horizontal and vertical temperature differences in the greenhouse. Therefore, crop growth is more uniform and harvesting starts at approximately the same time everywhere in the greenhouse. In a 1-hectare greenhouse used for growing tomatoes there was a temperature difference of 6ºC. The Nivolator was installed, after which the temperature difference was less than 1ºC.

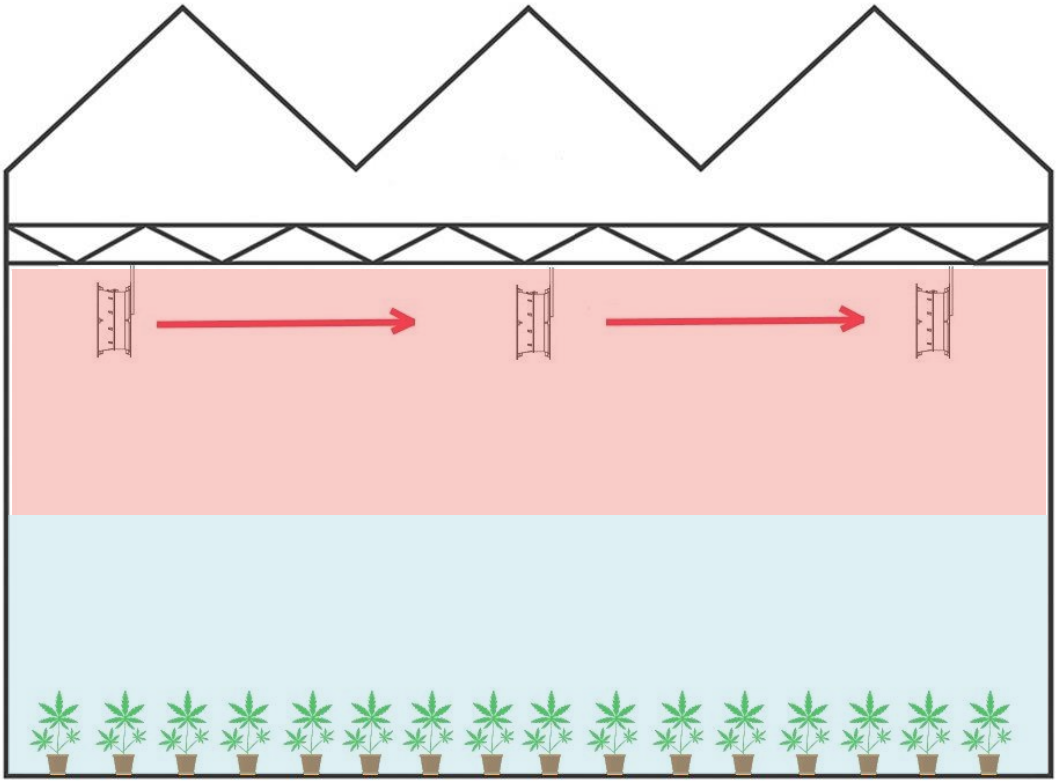
Circulation in the greenhouse:
Air always chooses the path of least resistance. With horizontal circulation, the air will not be circulated through the plant because the air is circulating horizontal above the crops and will never goes through the crops. As a result, it only circulates above the crop. The Nivolator circulates and forces the air through the crop. This creates circulation and therefore activity in the crop.

Co2 emissions:
If there is little or no air current between the leaves, the CO2 concentration close to the leaf surface drops, owing to the uptake of CO2 and the limited supply. With the Nivolator, the air ensures better dispersal of CO2 between the leaves, thereby increasing the plant's CO2 uptake. The circulating air also disperses CO2 better throughout the entire greenhouse.

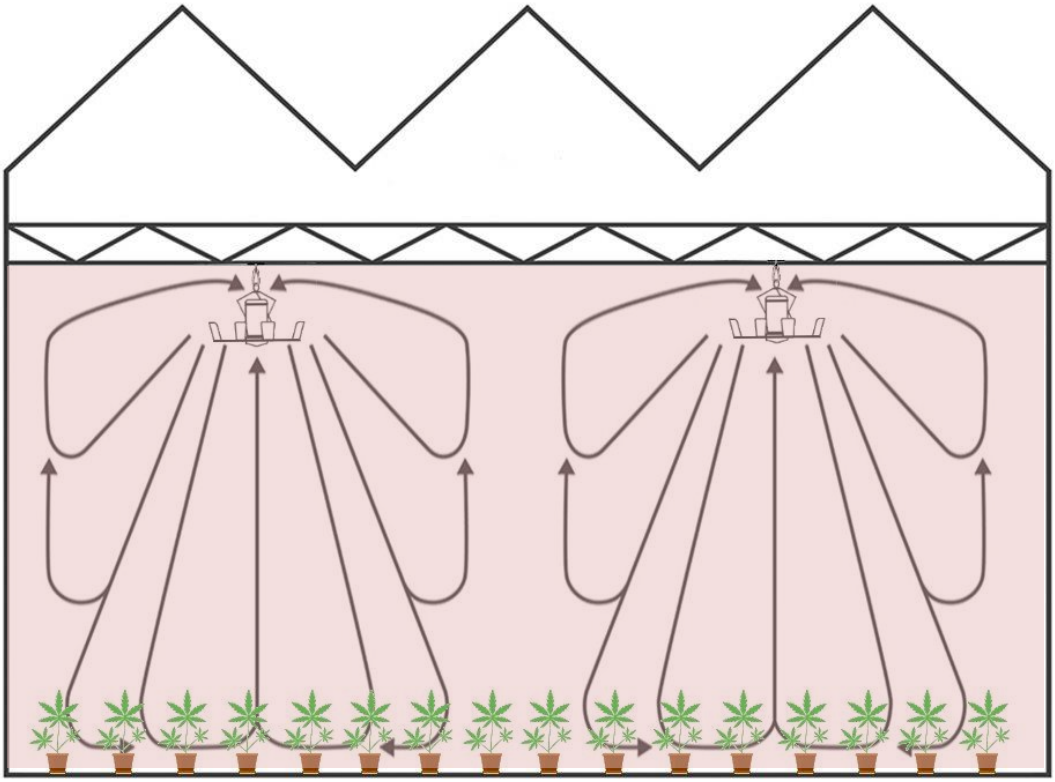
Moisture
Too much accumulation on leaves causes the stomata to close to the plant, which reduces the growth, by just removing the moisture through circulation there and spreading more throughout the greenhouse, the plant can run much better production. Stomata should be open for oxygen removal When the Nivolator is used, the even temperatures result in a more uniform crop. The better air movement combined with high CO2 uptake benefits the crop. In the case of tomatoes, the plants remained 1-2% shorter, the leaves 5% longer and the top was also 3-4% thicker.

Fewer fungal problems.
The Nivolator produces good air currents through the crops, thereby preventing local areas of excessive humidity and reducing the likelihood of the crop being damaged by fungal growth. Tomato plants were found to have fewer Botrytis patches on the stem.

Air pattern Horizontal VS Vertical (Nivolator):



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