Two key variables for greenhouse cannabis producers

Vapour pressure deficit and daily light integral are critical to the success of commercial greenhouse operators striving for consistency and quality. **Thomas Walker** explains what they are and how to optimise them.

Two crucial variables that greenhouse cannabis producers need to monitor are vapour pressure deficit and daily light integral.

VAPOUR PRESSURE DEFICIT (VPD)

VPD is the difference between the amount of moisture that is in the air at any particular time and how much moisture the air can hold when saturated.

The measure combines relative humidity and temperature and can be used as an indicator of a plant's transpiration potential.

In the context of plant production, VPD can be thought of as the difference between the amount of moisture in the air and the moisture on the leaf surface. The greater the difference, the greater the transpiration.

VPD can be used to control many factors of production.

For example, to manage pests better, prevent a wet leaf surface by ensuring that plant temperature is higher than the dew point (that is, the temperature at which water vapour condenses into water).

You can also stop condensate from dripping onto plants by making sure that the temperature of structures in the greenhouse is higher than the dew point.

To make sure the plants receive optimal light, prevent condensate forming on the greenhouse covering by ensuring that the glazing is warmer than the dew point.

Use precision watering methods such as drip irrigation for greater efficiency.

The normal greenhouse VPD range is 0,45kPa to 1,25kPa. A VPD greater than 0,20kPa will mitigate most damaging disease infections, while a VPD greater than 0,43kPa will mitigate most fungal pathogens.

DEHUMIDIFICATION

The following are methods of condensate removal and dehumidification:

- Install efficient condensate draining and use spray-on solutions to allow condensate to drain.
- Make sure there are no wrinkles in the greenhouse film, or dripping will occur.

DEHUMIDIFY AFTER SUNSET AND SHORTLY BEFORE SUNRISE AS THIS IS WHEN HUMIDITY TENDS TO SPIKE

- Circulate air with horizontal and vertical airflow.
- Purge humid air in the greenhouse and replace it with dry air from outside.
- Heat-vent operation: make sure the heating and cooling points are set close together, as mixing ventilation saves energy.
- Heat – mix – vent or mixed mode ventilation is best achieved by using an interlock between heat and vent. Delay for five minutes to allow the warm air to have more time to absorb moisture in the greenhouse before activating the vent operation.
- Dehumidify after sunset and shortly before sunrise, as this is when most spikes in humidity occur.

REDUCING VPD

To reduce the VPD, drop the air temperature, raise the air humidity, and lower plant temperature.

The following tools can help reduce VPD in the greenhouse:

- A shade curtain;
- Evaporative cooling;
- Fogging, misting, or wet cooling pad.

When fogging and misting, minimise the time that water remains on the plants or the greenhouse floor.

A warmer root zone and lower VPD are good for rooting and healing of newly grafted plants.

DAILY LIGHT INTEGRAL (DLI)

DLI is the measure of the quantity of sunshine received on a square metre in a 24-hour period. It is expressed as moles of light per square metre per day (mol/m²/day). DLI affects plant management decisions and affects water requirements and yield. Outdoor DLI varies according to latitude, time of year and cloudiness. When the DLI is low, you need to maximise the amount of natural light that reaches the crop. Outdoor DLI ranges from 5mol/m²/day to 60mol/m²/day during the year; in the greenhouse, however, values seldom exceed 25mol/m²/day due to glazing material, structure shading, seasonality, cloud cover and day length. The DLI can then be supplemented with other sources of artificial light such as light-emitting diodes.

When replicating natural sunlight, cannabis growers aspire to ensure uniform active ingredient content. Optimal light management is therefore crucial, as natural light fluctuates constantly. Light exposure is the most important variable affecting plant growth. It is thus important to measure the amount of light your plants receive. *Thomas Walker is the founder of Walker Cultivation, a consulting firm specialising in commercial cannabis production. Email him at thomas@walkercultivation.com. Subject line: Cannabis post.* **FW**