

# ESSENTIALS FOR GROWING HYDROPONIC STRAWBERRIES SUCCESSFULLY

Hort Americas has the products and technical expertise you need to grow strawberries in controlled-environment, hydroponic production systems.

Strawberries are a high value crop recognized for their flavor, color and nutrient content. However, growing strawberries can be a challenge.

The following information provides the essentials that should be considered when growing strawberries in hydroponic production systems. At Hort Americas we offer an extensive list of products that can you help produce this crop successfully.



## GROWING SUPPLIES

When growing strawberries hydroponically it is necessary to carefully select all of the products that will be used to produce the crop. This starts with the troughs in which the plants will be grown. Strawberries need at least 2 liters of substrate volume per plant.

Hort Americas offers a variety of troughs from Beekenkamp and Bato. These troughs are designed specifically for strawberry production with volume options from 8-15 liters. Some troughs are available in different colors.



You can choose the trough size and color depending on the amount of production area and the environmental conditions. Hort Americas will be happy to assist you in selecting the best options for your production needs.

## SUBSTRATE

One of the most important factors in growing strawberries hydroponically is the substrate.

Strawberries require good root zone aeration. Therefore, it is recommended that strawberries be grown in a substrate than can provide at least 15 percent porosity in the root zone.

Hort Americas offers a couple of different options. First we can offer a custom designed peat based mix from our Dutch colleagues at Horticoop. Or we can offer a ready to use grow bag specifically designed for berry production from Riococo. This substrate contains a blended mix of 7-8 mm crushed coco material and <5 mm coco pith material. The mix provides excellent aeration and drainage properties for strawberry production.



# ENVIRONMENTAL CONTROL

Monitoring the strawberry crop environment is the best way to achieve good production. Every crop has specific environmental requirements that enhance development and improve production.

The better environmental control you are able to maintain in your greenhouse, the better control you'll have over crop production and quality.

Hort Americas has partnered with 30MHz to bring smart sensing to North American growers. 30MHz provides agribusinesses with the wireless sensors and platform they need to start monitoring their crops and growing environment accurately and in real-time.

Using 30MHz sensing technology will enable you to make the best decisions for your crops. This technology includes interactive heatmaps, charts, custom calculations, alerts and shareable devices to track all of your metrics in one central, easy to use platform that's accessible on any device. You can use real-time crop-level data to drive yields, reduce losses, optimize irrigation, improve storage, prevent disease risk and reduce energy usage.



The recommended environmental parameters for growing strawberries include:

- **TEMPERATURE:** Day: 65°F-75°F, Night: 50°F-55°F. Low night temperatures increase the flavor of strawberries.
- **HUMIDITY:** Maintaining the proper relative humidity is critical for growing strawberries. Low humidity affects calcium uptake, causing tipburn which affects photosynthesis and fruit quality. You need to maintain at least 60-75 percent air relative humidity. A high night time humidity benefits nutrient movement.
- **EC AND pH:** Strawberries are very sensitive to pH and EC. The nutrient solution needs to be maintained at a maximum of 1.2 dS m<sup>-1</sup> and the pH of the draining water should be within a range of 5.5 to 6.5.
- **LIGHT:** A minimum daily light integral (DLI) of 17 mol m<sup>-2</sup> d<sup>-1</sup> is recommended for strawberry plant runner growth and fruit production. 20 mol m<sup>-2</sup> d<sup>-1</sup> is considered the optimum DLI level. Studies of strawberries grown inside greenhouses have shown a maximum photosynthetic capacity and saturation point under 800-1,200 μmol m<sup>-2</sup> s<sup>-1</sup>.

All sensors required to monitor the environmental and substrate parameters listed above can be provided by 30MHz.

**Sensors available from 30MHz include:**

Airflow sensor (0-2 m/s)

Airflow sensor (0-20 m/s)

CO<sub>2</sub> sensor

Temperature Humidity sensor

Pointed Temperature sensor

Wind Direction sensor

Wind Speed sensor

Arable Soil Moisture sensor

Potted Soil Moisture sensor

Substrate Moisture sensor

Pointed Microclimate sensor

Vented Temperature Humidity sensor

Photosynthetically Active Radiation (PAR) sensor

PT 100, 500, 1000



## PHOTOPERIODIC AND SUPPLEMENTAL LIGHTING

Strawberry plants require a minimum DLI of  $17 \text{ mol m}^{-2} \text{ d}^{-1}$  to maintain good fruit production and runner growth. In order to enhance growth and production, supplemental lighting is recommended when the optimum DLI levels cannot be achieved with natural light.

Hort Americas is a leading distributor of lighting solutions for agriculture. One of the best options for supplemental lighting in greenhouses is GE Arize™ Element Top Light. This LED growing system is designed to enhance greenhouse and indoor farming. The Arize system delivers high light output with less heat than a HID (high pressure sodium or metal halide) system. Also, the Arize system provides the perfect spectrum to grow efficiently year round. The GE Arize™ Element Top Light is designed to be an LED replacement for HID/HPS lighting used in indoor farms and greenhouses.

## FLOWER INDUCTION

Another important use of supplemental lighting is for flower induction. Early flowering of a crop can be an advantage for harvest timing.

Strawberries are available in a large variety of cultivars that can be grouped by photoperiodic response: short-day, long-day and day-neutral cultivars.

To promote early flowering photoperiodic lighting can be applied to facultative (day-neutral cultivars with early flowering response during short days or long days) or obligate short-day and long-day cultivars. Studies have shown that 8 weeks of treatment (8-hour photoperiod to simulate short-day plants and a 16-hour photoperiod to simulate long-day plants) are enough to trigger flowering in strawberry cultivars.

Photoperiodic lighting differs from regular supplemental lighting because the light intensity requirement to trigger flowering can be achieved with  $2 \mu\text{mol m}^{-2} \text{ s}^{-1}$  of light radiation. Specific lamps have been designed for photoperiodic lighting in order to save energy consumption.

Hort Americas offers the GE Arize™ Greenhouse Pro Photoperiodic LED Lamp. This LED lamp is designed to facilitate greenhouse photoperiod control.

Photoperiod control not only allows strawberry growers to accelerate flowering throughout the year by extending or shortening day length, but it also allows them to manage vegetative growth when runner production is the goal. This lamp helps to control plant growth so the crop is ready at the right time.

Low energy and high results are the focus of GE Arize™ Greenhouse Pro LED Lamp. The lamp will provide optimal plant management in your greenhouse. If you have questions regarding the photoperiodic response of strawberry cultivars, please contact Hort Americas to determine the best treatment for your specific cultivars.



## PEST MANAGEMENT

Most hydroponic strawberry production is done inside greenhouses. One advantage of greenhouse strawberry production is the greenhouse structure allows, to a certain extent, the exclusion of pests and the containment of biological controls. Biological controls are a good option to keep plants healthy, reducing or eliminating the use of chemical-based pesticides.

The most common pests of strawberries are spider mites and thrips. These pests can be biologically controlled.

Hort Americas is a BioBee Biological Systems provider. BioBee is one of the leading international companies in the field of biologically-based integrated pest management, natural pollination and medfly control. Hort Americas offers biological control solutions to keep strawberry plants free of pests.

- **SPIDER MITE CONTROL:** Bio® Persimilis
- **THRIPS CONTROL:** Bio® Swirskii, Bio® Orius



## MORE RESOURCES

### URBAN AG NEWS:

[Strawberries can be adapted to greenhouse production systems](https://urbanagnews.com/blog/strawberries-can-be-adapted-to-greenhouse-production-systems/)

<https://urbanagnews.com/blog/strawberries-can-be-adapted-to-greenhouse-production-systems/>

[What are the production and training issues facing controlled environment agriculture growers?](https://urbanagnews.com/blog/exclusives/what-are-the-production-and-training-issues-facing-controlled-environment-agriculture-growers?)

[https://urbanagnews.com/blog/exclusives/what-are-the-production-and-training-issues-facing-controlled-environment-agriculture-growers/](https://urbanagnews.com/blog/exclusives/what-are-the-production-and-training-issues-facing-controlled-environment-agriculture-growers?)

[Deciding which strawberry varieties to grow in greenhouse production systems](https://urbanagnews.com/blog/exclusives/deciding-which-strawberry-varieties-to-grow-in-greenhouse-production-systems/)

<https://urbanagnews.com/blog/exclusives/deciding-which-strawberry-varieties-to-grow-in-greenhouse-production-systems/>

<sup>1</sup> Garcia, K and Kubota, C. 2017. Physiology of strawberry plants under controlled environment: Diurnal change in leaf net photosynthetic rate. Acta horticulturae. 1156: 445-452.