DryGair SOLUTION CASE STUDY

Flower Greenhouses

Based on measured user experiences.
The data presented in this case study was collected from greenhouses growing gerberas, alstroemeria, hydrangeas and potted plants utilizing the DryGair dehumidification system.

Intro

Humidity is a critical factor that impacts the growth, health and quality of flowers. The DryGair solution provides innovative, effective and energy efficient humidity control for greenhouses and closed growing facilities.

The Problem

Flowers are bred and cultivated for their appearance. Humidity affects the quality and yield of flowers and may cause diseases, changes in color and physical defects. Additionally, high levels of humidity may cause crop loss due to disease and suboptimal growing conditions.

- Flowers are susceptible to several humidity-related diseases, such as botrytis and mildew
- Humidity affects flower and leaf quality, including appearance and color intensity
- Humid environments, with a low VPD, slow down nutrient uptake and flower growth
- Traditional humidity management methods are associated with high energy costs. These methods involve a lot of heat loss due to ventilation and opening thermal screens

DryGair CONTACT drygair.com

DryGair Horticulture Dehumidifiers
a new way to grow.

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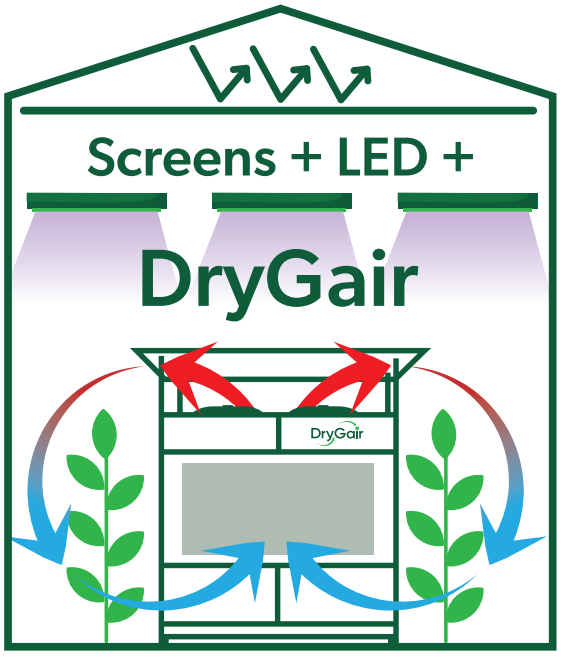
The DryGair Solution

DryGair, in partnership with the Israeli Agricultural Research Organization, the Volcani Center, has designed a solution to control humidity inside greenhouses and closed growing facilities.

How It Works
Close the greenhouse, spread thermal screens (if applicable) and operate the DryGair unit to remove excess moisture.



Extracts 45 L/hr (12 G/hr)* of water using 10kW of electricity
*At designed conditions of 18˚C, 80% RH

Treats 22,000 m^3 (13,000 CFM) of air

Circulates the air to create uniform conditions

Saves ~50% energy on average

RESULTS

Alstroemeria Greenhouse

The image (Figure A) features a climate control computer display for 2 separate compartments:

- The top 2 results show sensor measurements in a compartment using ventilation and heating to control humidity
- The bottom 2 results show measurements in a compartment using DryGair

Maintain Similar Temperature Without Heating

DryGair allows the greenhouse and the screens to be closed 100% while controlling humidity. This greenhouse was able to maintain optimal temperatures with absolutely no heating. In the control greenhouse, screens needed to be opened by 3% to release moisture, resulting in the need to heat. 30°C water was used in the heating pipes to maintain greenhouse temperature.

Despite the open screens and added heating, the control greenhouse still suffered from over 90% relative humidity.

Average energy savings in DryGair greenhouses is 50% and higher.

Optimal Humidity Control

Relative Humidity	**10% Reduction** ▼
Absolute Humidity	**2.2 g/m³ Reduction** ▼

Controlling humidity in the greenhouse allows growers to provide the best conditions for flowers while avoiding condensation and reducing the risk of disease and water damage. DryGair acts as a steering wheel for climate control, giving growers a tool to achieve a more resilient and higher quality crop.

Dew Point Temp	**2°C Reduction** ▼

The lower dewpoint achieved with DryGair provides a larger safety buffer. This means greenhouse and leaf temperature can fall lower, without risking dew point condensation. As temperatures may drop rapidly during certain times of the day, increasing this buffer zone helps protect the flowers.

Humidity Deficit	**1.7 g/kg Air Increase** ▲

Increased humidity deficit stimulates transpiration and promotes generative action in flowers. Creating an active climate leads to larger yields of higher quality flowers.

Improved Co_2 Retention

CO_2 Retention	**81% Boost** ▲

By closing the greenhouse and utilizing DryGair, the alstroemeria greenhouse managed to retain much more CO_2. Higher CO_2 concentrations increase the rate of photosynthesis, leading to improved growth and an increase in overall yield.

Figure A

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1	-METRO- BT	WS	WR	StralSom	GMSSom	Regen	Storm	Vorst
	7.3	1.7	NW	297	321	NEE	NEE	NEE

	Greenhouse Temp	Relative Humidity	Humidity Deficit	AV	CO_2 [PPM]	R1	R2	Heat Pipe Temp	Giet
Heating & Ventilating	21.8 20.5	90 X 91 X	1.9 1.5	17.3 16.3	534	0 0	5 5	30 29	- -
DryGair	21.2 20.2	81 82	3.6 3.2	15.0 14.3	1078 0	0 0	5 5	- -	- -

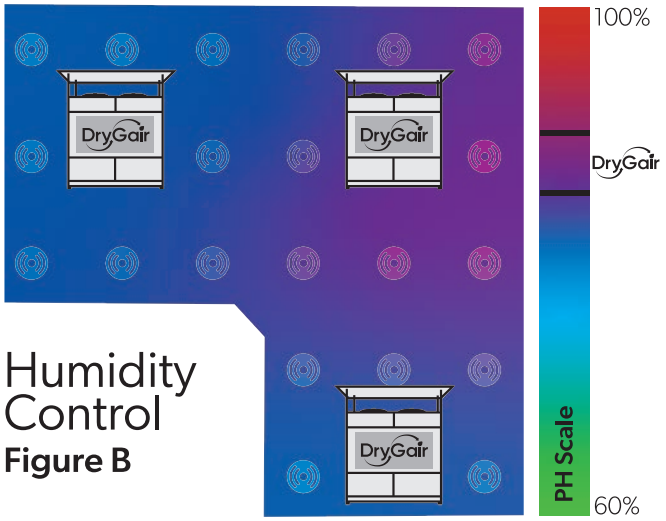
Potted Plants Greenhouse

Climate Uniformity Through Air Circulation

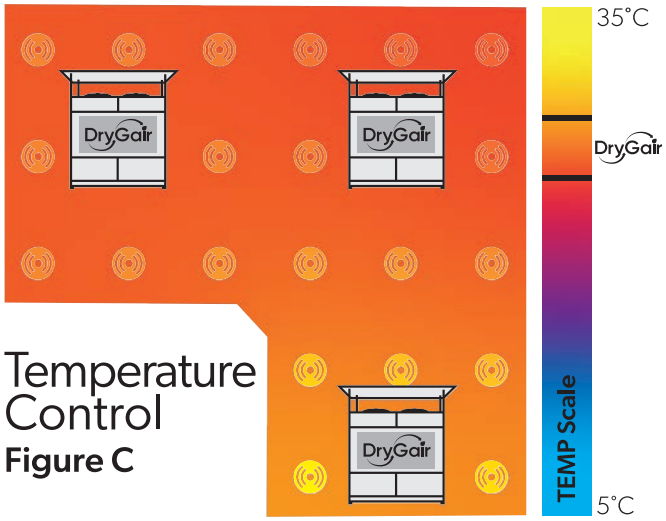
The humidity and heat maps show 24 sensors spread evenly throughout an 18,000 m^2 greenhouse growing potted plants. This greenhouse deploys 3 DG-12 units (Figure B and C).

Results

Homogenous relative humidity & temperature. DryGair's patented 360° air circulation creates homogeneous and optimal conditions for the plants throughout the entire greenhouse. Climate uniformity prevents the formation of humid microclimates within the foliage, which may damage plants.
Homogeneous climate conditions are crucial for the prevention of condensation and disease outbreak.



Humidity Control
Figure B



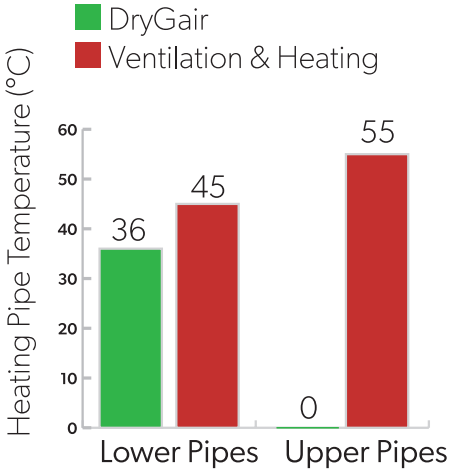
Temperature Control
Figure C

Gerbera Greenhouse

Less Heating And Huge Energy Savings

This gerbera greenhouse, operating with DryGair, managed to maintain optimal temperatures with a 10°C reduction in lower pipe heating and a 55°C reduction (no heating) in the upper pipes, compared to the control greenhouse.

Heating Pipe Temperature



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