DryGair SOLUTION CASE STUDY

Basil Greenhouses

The data presented in this case study was collected from measured user experiences in basil greenhouses, utilizing the DryGair system. These greenhouses span diverse climates around the world.

Intro

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

The Problem

Basil crops are susceptible to a number of humidity-related diseases, such as botrytis, powdery mildew, and basil downy mildew. The dense plant placement and foliage produces high amounts of transpiration, which constantly increases humidity levels.

High humidity in basil greenhouses causes:

- Damaging diseases and molds
- Lower quality produce
- Smaller yields

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

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DryGair Horticulture Dehumidifiers
a new way to grow.

RESULTS

The Problem with Ventilation for Greenhouse Humidity Control

Ventilating causes energy loss, as heat escapes to the outdoors, especially at night, when it's cold outside. This energy must be reinvested as heating, at a great expense.

Ventilation also leads to constant fluctuations to the greenhouse climate, creating non-uniform growing conditions, leading to yield loss and lower produce quality.

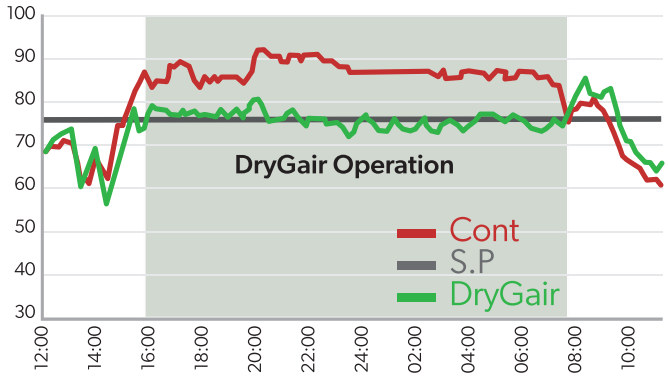
Under certain weather conditions, such as rain or clouds, this method may not be capable of reducing humidity at all, leaving growers with no solution.

Humidity & Temperature Control

Humidity

DryGair provided optimal humidity conditions at a steady rate of ~75% RH during the DryGair operation hours. The control greenhouse (without DryGair), exhibited high relative humidity levels of up to 90%, with major fluctuations throughout the night.

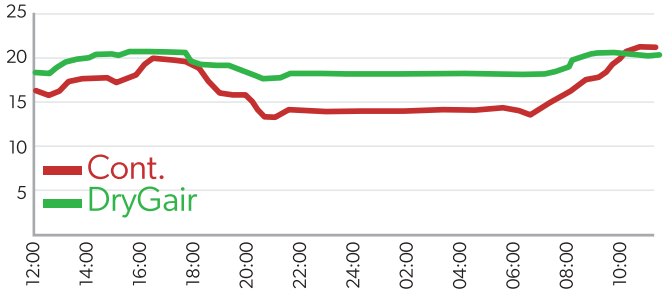
Relative Humidity (%) / Time of Day (Figure A)



Temperature

DryGair provided a 2-3˚C temperature increase during its operation, creating both optimal nighttime temperatures and relative humidity levels.

Temperature (˚C) / Time of Day (Figure B)



The DryGair concept reuses all of the energy invested in the operation of the unit and the energy released from the water condensed

in the process. This energy can increase the temperature inside the greenhouse by 1-8˚C, depending on the greenhouse structure and needs.

Improved Yields

Better Growing Conditions

Using DryGair improves climate conditions inside the greenhouse, by creating optimal humidity and temperature levels, with minimal fluctuations. This contributes to larger yields due to shorter grow cycles and improved plant growth.

More Plants Per Meter

DryGair also allows growers to increase their crop placement density, by reducing humid microclimates, and allowing for more plant mass, without risking disease outbreaks.

Disease Prevention

In this trial, the control greenhouse exhibited 15% yield loss due to disease and mold infections. In the greenhouse using DryGair, there were no diseases found. That's a 15% yield increase just based on disease prevention.

Higher Produce Quality

According to the growers participating in this case study, the basil was more uniform in size and shape, and of higher quality.

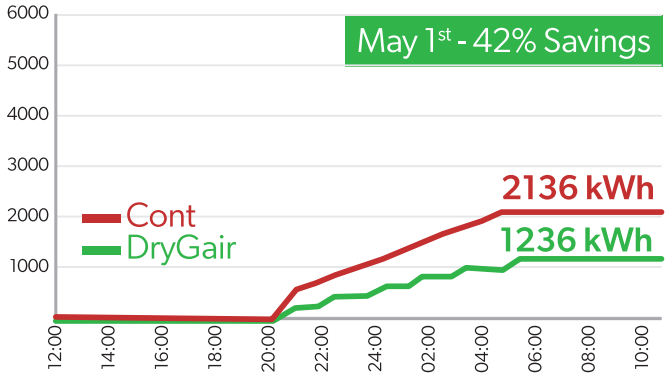
Simple Integration

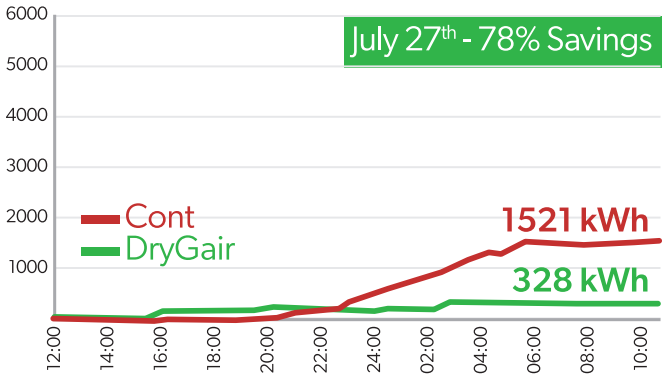
DryGair's integration is simple and easy to use. The unit is an automated plug and play solution that reduces the need for complicated infrastructure. The unit does not require any adaptation in the existing greenhouse, only minor rearranging of a few plants to make space.

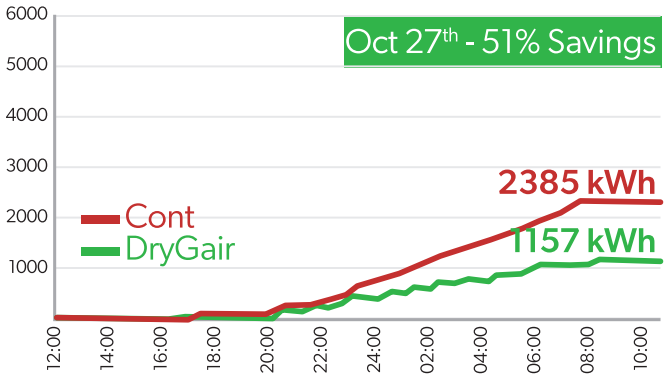
Energy Savings

The three greenhouses that used DryGair in this trial exhibited significant energy savings year-round, with 42% savings during spring, 78% in the summer, and 51% in autumn.

Energy Savings kWh / Time of Day







DryGair provides an average of 50% energy savings in greenhouses, compared to heating and ventilation. As basil is a sensitive crop, growers often use heating systems to maintain an ideal temperature range. However, when ventilating, this heat is lost to the environment, requiring more heating hours and capacity. This is a major portion of the growing costs, which DryGair negates, by allowing growers to operate within an entirely closed greenhouse.

Fast ROI

Increased yields translate to greater profits for growers. The reduction in heating expenses and humidity diseases lead to a return on investment of 1-3 years. This measurement is conservative and does not include additional advantages such as reduced fungicide use, CO_2 loss, decrease in working hours, etc.

The ROI on DryGair is highly dependent on energy prices. As energy becomes more expensive, the return on investment on DryGair shortens.

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