BioTherm®

CULTIVATION CLIMATE TECHNOLOGIES

HYDRO SCIENCES

BioTherm

CULTIVATION CLIMATE TECHNOLOGIES

At the forefront of BioTherm's mission is the belief that growers, their families, and the entire world will benefit from stronger, healthier crop yields. By providing innovative solutions for the grower, we take pride in contributing to happy, healthy, and thriving plant production.

HEAT

Our greenhouse heating systems are tailored to each grower's specifications, and our innovative technology meets the needs of even the most demanding projects -- whether new construction, major upgrades, or retrofits.

HYDRO SCIENCES

BioTherm Hydro Sciences has one simple focus... to enhance your irrigation system and boost plant growth using cutting edge technologies with efficiency in mind. Our products are proven to increase yields, improve plant vigor, and increase resistance to diseases and pests.

OPTIMIZED AIR

BioTherm creates innovative air technologies for plant growers. The atmosphere of the growing environment directly affects the health and productivity of the crop.

BIOTHERM TOOB DISSOLVED OXYGEN INFUSER SYSTEM

HYDRO SCIENCE SOLUTIONS

SUB-IRRIGATION SYSTEMS

Sub-irrigation systems, also known as zero runoff, are an environmentally responsibly alternative that conserve water and fertilizers. They are being installed by greenhouse growers to improve product quality, achieve more uniform growth, and increase production efficiency. In sub-irrigation systems, water and nutrient solution provided at the base of the container rises by capillary action through holes in the bottom and is absorbed by the growing media. These systems are adaptable to crops grown in pots or flats.

Our innovative technology provides a quick responding irrigation cycle time which is critical to greater control of nutrient uptake, timing, and prevents oversoaking. Our Flood Floor & Cascade Floor systems save water, energy, fertilizer and reduce labor costs by up to 95%.

Flood Floors are an important production system for many reasons: Growers can automate irrigation and reduce labor substantially, the systems recirculate all the irrigation water to maximize sustainability while having no runoff, and, many diseases related to top watering and splashing are substantially reduced.

FLOOD FLOORS & CASCADE FLOORS

Most commonly used in a facility with minimal aisles, leaving the entire area for plants. Floor heat is installed to provide rapid drying of the floor surface when the water is drained and to provide an ideal rootzone temperature. The finished floor slopes about ½ to ¾ inch from the post line to the center of the bay. A quick responding irrigation cycle time is critical to greater control of nutrient uptake and prevents oversoaking.

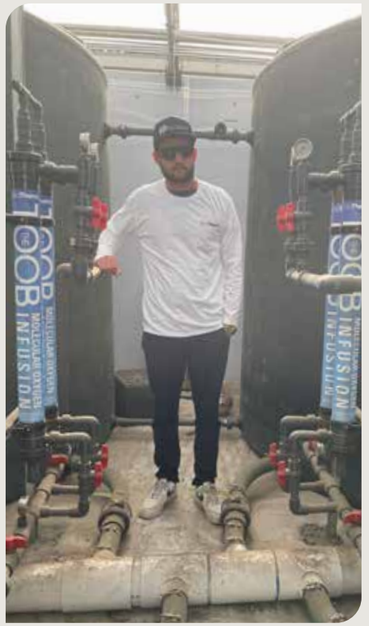
BioTherm's Cascade Floor irrigation systems create a thin sheet of water that flows evenly down an imperceptible slope from ridge to drain, uniformly distributing moisture for a homogeneous crop. Our Flood Floor and Cascade Floor systems save water, energy, fertilizer and reduce labor costs by up to 95%. A win for you and a win for your plants!

GROWER STORY MARVIN FESSLER, FESSLER'S NURSERY

Fessler's Nursery wanted to expand their production space to meet their ever-growing market demand. However, they also needed to provide the highest quality product, with the lowest labor cost, all the while maintaining their earth-friendly business practices.

"BioTherm Cascade Floors are the most efficient method of sub-irrigation. Water is pumped to individual irrigation zones where a thin skim of water evenly irrigates every plant as it flows from the fill side to the drain side of the zone," Fessler states.

Cascade Floors use a unidirectional slope which allows gravity to drain the system. Because the system fills and drains simultaneously, water is available for same cycle use. These design features allow for a faster irrigation cycle with less energy expended for pumping. Reduced labor and water conservation are additional benefits of a BioTherm Cascade Floor.



TOOB machines can be combined together to address greater flow systems to optimize the amount of DO to your plants.

TOOB® DISSOLVED OXYGEN INFUSION SYSTEMS

Simply put, dissolved oxygen is the amount of oxygen that is dissolved in water. Just like humans and animals, your plants require an optimal amount of oxygen not only to survive, but to thrive. Because oxygen is a gas and water is a liquid, the mixture of the two elements needs to be done efficiently to ensure the oxygen is dissolved properly.

Why is maintaining proper dissolved oxygen levels in your irrigation water so vital to your plant's growth quality? The answer is simple, yet fundamental – root health. Roots receive the essential elements your plants require to grow and thrive: water, oxygen, and nutrients. When crops do not receive a proper amount of dissolved oxygen, the root system weakens and compromises their ability to absorb nutrients. This put your crops at risk for disease.

Studies have proven that elevating the dissolved oxygen levels in water result in increased root growth. Plants with bigger roots grow faster and healthier, due to increased nutrient consumption and distribution. Increasing the oxygen saturation levels maximizes your crops ability to utilize essential nutrients and defend itself from diseases and pests.

TOOB® DISSOLVED OXYGEN INFUSER

A groundbreaking new way to economically boost dissolved oxygen (DO) levels in your irrigation system and enhance plant health and production. The BioTherm TOOB™ is a revolutionary, efficient method of increasing the dissolved oxygen (DO) content of irrigation water, significantly improving plant health and productivity.

TOOB Craft – 2' machine targeted for smaller-grows with less volume of water flow (around 8GPM)

TOOB Solo – 4' machine targeted for larger growing operations using up to 15GPM and can address greater flows by adding multiple machines to a manifold. (As seen left)

DISSOLVED OXYGEN ACCESSORIES

DO STAT
BioTherm DO Stat closely monitors your DO levels. Control how much DO to infuse into your system.

O2 GENERATOR
O2 Gen connects directly to your TOOB system without needing oxygen tanks.

DO METER
Dissolved oxygen level measuring in the palm of your hand!

GROWER STORY CRESCIVE SOIL

"Our business recently started measuring dissolved oxygen (DO) levels of the source water at client farms during site visits, and we have been shocked at how many farms have source water that with DO levels below 3ppm.

We have seen positive effects on plant growth and health when using DO-enhanced water from the TOOB, and look forward to providing more in-depth data on the full benefits of the TOOB in the near future."

- Scott Skamnes,
Crescive Soil Services

HYDRO SCIENCE SOLUTIONS

IRRIGATION TEMPERING SYSTEMS

Each plant species prefers to be irrigated with water that is the "right" temperature — just as mother nature intended. Irrigating with appropriately tempered water will encourage faster plant growth and produce greater yields.

University studies have shown that, after watering, a plant's growth can stop for hours until the media temperature recovers from the cold shower you just gave them. Now you can provide your plants with a shower of water sent at the optimum temperature to keep them actively growing.

Whether you irrigate with cold well water warmed up prior to irrigation or with warm water that needs to be cooled down, we can help. BioTherm Solutions provides stand-alone systems or integrated pre-heat and pre-cool systems that work in tandem with our traditional heating and cooling designs.

ADVANTAGES OF IRRIGATION TEMPERING SYSTEMS

- **PREVENTS THERMAL SHOCK (PLANT GROWTH CAN STOP FOR HOURS WHEN DOUSED WITH COLD WATER)**
- **WARM WATER INCREASES ROOTING, GERMINATION RATES, AND IMPROVES NUTRIENT MIXING**
- **HELPS PREVENT SPOTTING AND DISEASE**

Heating a greenhouse but watering with cold water wastes energy. Not only can irrigating plants with cold water shock plants, extra fuel is required to reheat the greenhouse water when watering with cold water.

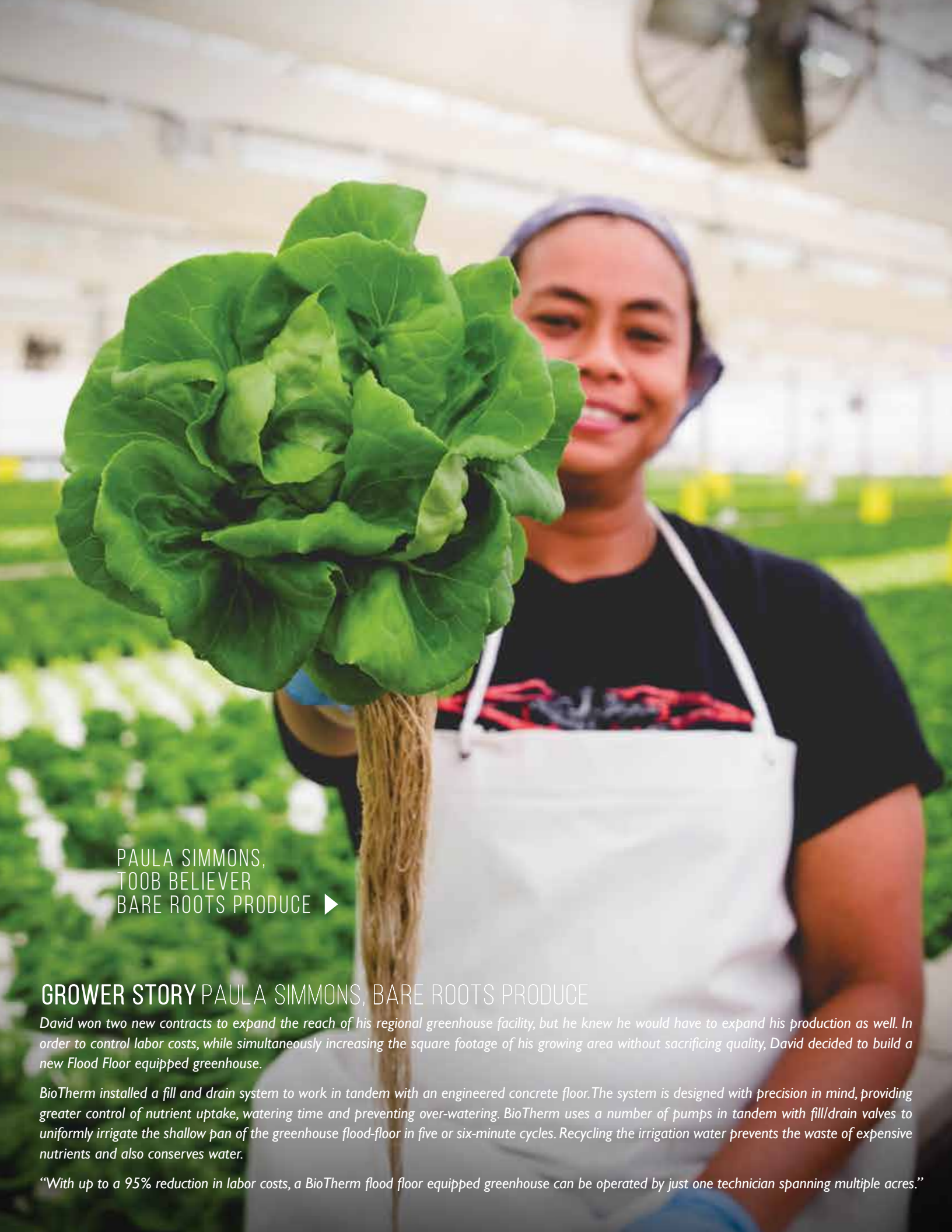
Our irrigation pre-heat and pre-cool systems are custom designed by our BioTherm engineers. If you have an existing hot water heating system, we can integrate our tank and heat exchanger to provide warmth in your irrigation system. If you don't heat with hot water, we will design and provide a standalone system. Either way, if you want your plants to treat you right, treat them right … water them with tempered water from a BioTherm system.

TEMPERING SYSTEMS

WARMING: You might be surprised to find out that it is not only the plant that can experience shock from cold water, but also the medium it is growing within. Both plants and soil biology thrive when watered at optimal temperatures. By implementing a pre-heating system from BioTherm, you will eliminate nutrient waste, improve plant growth, and produce quality harvests time and time again.

COOLING: Depending on your situation, you might also be looking to pre-cool your irrigation water to achieve the optimal temperature for your plants. We design systems specific to your growing needs, helping you to achieve amazing results. Not only will a controlled pre-cool system help your plants grow better, it will save you time, energy, and money.

COMBINATION: Get the best of both worlds with a combination pre-heat and pre-cool system. Here at BioTherm, we aim to meet the needs of cultivators of all kinds. No matter what temperature your plant requires or how your greenhouse is designed, we will work with you to maximize growth through tempered irrigation systems.



PAULA SIMMONS,
TOOB BELIEVER
BARE ROOTS PRODUCE ▶

GROWER STORY PAULA SIMMONS, BARE ROOTS PRODUCE

David won two new contracts to expand the reach of his regional greenhouse facility, but he knew he would have to expand his production as well. In order to control labor costs, while simultaneously increasing the square footage of his growing area without sacrificing quality, David decided to build a new Flood Floor equipped greenhouse.

BioTherm installed a fill and drain system to work in tandem with an engineered concrete floor. The system is designed with precision in mind, providing greater control of nutrient uptake, watering time and preventing over-watering. BioTherm uses a number of pumps in tandem with fill/drain valves to uniformly irrigate the shallow pan of the greenhouse flood-floor in five or six-minute cycles. Recycling the irrigation water prevents the waste of expensive nutrients and also conserves water.

"With up to a 95% reduction in labor costs, a BioTherm flood floor equipped greenhouse can be operated by just one technician spanning multiple acres."

ROLL'N GROW MACHINE
AT BIOTHERM HQ

MIKE MUCHOW,
BIOTHERM CO-FOUNDER

Raypak® A Rheem® Company

BIOTHERM IS THE EXCLUSIVE DEALER FOR RAYPAK® BOILERS TO THE CEA AND CANNABIS INDUSTRIES

RAYPAK PRODUCTS OFFER UP TO 98% EFFICIENCY

GROWER STORY MIKE GOODER, PLANTPEDDLER

BioTherm installed two Raypak boilers, which have run continuously since 1984. Tied to an Argus control system, they serve the greenhouse's needs well, even in the bitterly cold, snowy winter months – Mike says they get 20° F below weather, blizzards with 40 mph winds and dinner plate-sized chunks of ice on the greenhouse roof.

"We have them set about 160 to 175°, and they roll with what we need. The water temperature is always there."

"The crops we produce are very fragile, needy," he says. "We make sure we have redundancy, and work with BioTherm who understands the loads greenhouses require, how heat integrates into our short-range plan."

BioTherm®

Elements...Enhanced.

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