



"The Newspaper That Cares About Rural Life"

# Country Market

The Country Today SECTION



**Left:** Butter lettuce grows in mid-winter in a warehouse at Natural Green Farms in Racine. The hydroponic crop thrives on filtered water from tanks that grow tilapia.

**Above:** Lettuce seedlings wait to be planted in the hydroponic growing system.

## Urban agriculture

Natural Green Farms sets up aquaponics enterprise to grow tilapia and lettuce in downtown Racine

**RACINE** — For Joe and Johanna Heineman, owners of Natural Green Farms, their field of dreams covers four floors of a warehouse once used by J.I. Case Co., the farm equipment manufacturer.

Not far from Lake Michigan, the old warehouse that was bustling more than 100 years ago is poised to be transformed into a vibrant produce and fish growing facility in southeastern Wisconsin.

"Based on what we are doing now, if you multiplied it out throughout the building, we would be able to grow 10 million heads of lettuce and 1 million pounds of tilapia a year," Joe Heineman said. "And it only takes up 1½ acres — unbelievable."

The Heinemans' business cards say they are owners and "chief farmers."

Neither was a farmer in the traditional sense. But in developing an aquaponic enterprise growing produce along with raising tilapia, the Heinemans are writing their own definition of farming.

Raising fish and produce puts the couple on a path toward a sustainable farm that embodies the buy-local fervor.

They also point out that their farm uses no herbicides or pesticides for weed or disease control.

Setting up their farm in the warehouse four years ago, the couple experienced growing pains as they transformed dark, dank warehouse space into a complex of pipes and pumps, fish tanks, filters and other systems necessary for fish and lettuce production.

"You have to build the first one and then from square one the question is what to do with the waste," he said. "That's where the lettuce comes in."

Heineman, 53, a former truck driver, knew the owner of the warehouse, who occasionally talked about fish farming in the warehouse.

"It was just a joke with him," he said. "But finally one day I started doing research on it. I found out you can make money on it. But I put it away because I was making money on my other job. But that job got slower. We kept pulling out the fish file and finally we said, 'Let's do it.'"

Raising tilapia led to growing lettuce in a closed loop system.

"Lettuce is easy to grow," Heineman said. "Lettuce grows in low light and cool temperatures. That's everything we have here." Recycled, nutrient-rich fish

water is used to grow lush lettuce. While not certified organic, Natural Green Farms' produce is all natural and certified hydroponic.

Johanna Heineman sells butter lettuce as far north as Green Bay. Her wholesale price of \$1.50 a head doubles at retail.

Natural Green Farms recently partnered with Tower Energy, which is experimenting with lighting systems to improve efficiency and reduce electricity costs.

"Our long-term goal is to get off the grid," Heineman said.

Under the current lighting system, growing lettuce for market takes 37 days.

Light fixtures incorporated in the system called "Omega Garden" might slice two weeks off that timetable.

Tower Energy designed a new light bulb that only uses 100 watts of electricity compared with bulbs that use 600 watts.

"The formula of the glass gives the plants the color spectrum they want," Heineman said. "It's red for flowering and fruit and blue for leafing. For growing lettuce you just want a blue. You can't see it but the spectrum of the plant sees it."

While Natural Green Farms grows its lettuce in beds, the Heinemans are experimenting with Omega Garden, a system that rotates with the lighting in the middle and plants lined up on paddles similar to a mini paddle wheel boat.

"If you laid it out flat it would take up more room," Heineman said. "Growing in a circle takes up less space. Long-term, I think this is the way you are going to be growing lettuce. We're going to design something like this to grow tomatoes."

He's enthusiastic about advances in lighting because lights that use less watts also are expected to have a much longer shelf life.

"The big bulbs we had to change every year since they lose their power," he said. "You don't see it with your eyes, but they only put out 60 percent of what the plants want."

Heineman said experiments with other energy-producing systems range from wind tur-



**Above:** Joe Heineman grows lettuce in a rotating cylinder called Omega Garden. Lights of 600 watts were replaced with 100-watt lights with no discernible growing differences.

**Right:** Johanna Heineman and her husband, Joe, own Natural Green Farms.

bines to making hydrogen. The farm would make hydrogen at night when electricity rates are reduced. The process produces heat and oxygen.

"We can use the heat to heat the fish tanks and oxygen for the fish," he said.

It makes sense, he said, to convert electricity to hydrogen because it results in medical grade oxygen.

The hydrogen can be saved for use during the day to run generators when electricity is at peak rates, he said.

Natural Green Farms buys liquid oxygen at about \$400 to \$500 a month for raising tilapia.

"With liquid oxygen you can increase the pounds of fish in a tank," Johanna said.

With liquid oxygen the population of fish is 3 pounds of fish per 1 gallon of water. That compares to 1 pound of fish per gallon when an air compressor was part of the system.

Liquid oxygen pumped into fish tanks promotes a faster rate of gain in tilapia, she said, not-



ing that fish are sold at about 2 pounds.

She sells to buyers in southeastern Wisconsin and northern Illinois.

For the lettuce, determining the nutrient content of water drawn from the fish tanks is key. A computer will flag any water supply that doesn't meet the standard for lettuce production, Johanna said.

In developing their farm, the Heinemans became distributors for the plastic-lined fish tanks and for the rotating Omega Garden.

Even though the couple has converted a portion of the ware-

house to production, most of the other three floors are empty because of a lack of capital for their venture.

Their website describes investment options.

"The technology that's developing here is really interesting," Heineman said.

Visitors such as produce buyers are equally impressed, he said, even though many wonder why they are there.

"Coming up the elevator they might expect to see a 55-gallon drum," Heineman said. "Instead they say, 'Wow.'"

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