No single solution, cause for red tide

RED TIDE

Mote scientists say Okeechobee pollution is not fueling the outbreak

By Carlos R. Munoz

carlos.munoz@heraldtribune.com

SARASOTA — Pollution from Lake Okeechobee is not fueling a red tide outbreak in the Gulf of Mexico, according to Mote Marine Laboratory scientists.

"What we are seeing now is not unprecedented, but it is bad," said Vincent Lovko, a phytoplankton ecologist at Mote. He said cyanobacteria (blue green algae) traveling from the Caloosahatchee includes nutrients used by other organisms in estuaries, sea grass beds and macroalgae and phytoplankton. The amount that actually makes it into the coastal systems is greatly reduced when it reaches the Gulf.

See RED TIDE, A7

No single solution, cause for red tide

RED TIDE

From Page A1

Lovko made his comments before a sold-out crowd Thursday at a "Meet the Minds" panel discussion on red tide presented by Sarasota's Argus Foundation.

Cyanobacteria's effect is localized at the point of contact, Lovko said, and it doesn't survive long in saltwater.

Lake Okeechobee and the Caloosahatchee River "brings a lot of freshwater with it," the Mote scientist said. "Karenia brevis (red tide bacteria) is a marine organism; it doesn't really like freshwater."

Mote president and CEO Michael Crosby said that blue-green algae and red tide both have significant negative effects that need to be investigated through collaborations with scientific partners and the local community. He said there are many sources of land-based nutrients besides Lake Okeechobee, including terrestrial runoff from rainfall and runoff from creeks and rivers into coastal ecosystems.

Crosby said finding the answer to mitigating red tide will be complex.

"Unfortunately, part of human nature, and I fall prey to it myself, when you see a problem, you really hope there is one thing that you can correct," Crosby said. "If only we could fix that one thing, it would make everything better. Red tide is not that simple. It's just not."

Panelist Alan Jones, owner of Jones Potato Farm in Manatee County, which has reduced fertilizer use 30 percent through precision farming, said major rain events can flush more than 20 billion gallons of water through coastal communities into the Gulf.

He said cooperating with regulatory agencies like the Florida Department of Agriculture can be part of the solution.

"There has been a very proactive approach by the FDA to take on dairies to keep their runoff contained," Jones said.

Argus Foundation president Jack Cox said the discussion was "eye-opening" for attendees.

"I thought they were all tied together," he said. "There is not one single cause for this issue. There's a lot of people responsible for it."

Cox said the event was put together in 12 days. They chose to address red tide because it is currently the major issue facing the community.

"One thing I never thought about is our septic tank issue," Cox said. "

There are roughly 250,000 septic tanks still on the west coast of Florida — a majority are still down in Charlotte County. ... I think people had the same takeaway I did. People walked away knowing Mote is working on it and people walked away being more informed of what red tide is all about."

Panelists Alan Jones, owner of Jones Potato Farm, Vincent Lovko, phytoplankton ecologist at Mote Marine Laboratory, Michael Crosby, president and CEO of Mote, Richard Pierce, ecotoxicologist at Mote, and Tracy Fanara, manager of Mote's environmental health program, discuss red tide at The Argus Foundation event "Meet the Minds: Red Tide — What it is, solutions and prevention" at Sarasota Yacht Club. on Thursday. [HERALD-TRIBUNE STAFF PHOTO / CARLOS MUNOZ]

Panelist Alan Jones, owner of Jones Potato Farm, discusses nutrient runoff at "Meet the Minds: Red Tide — What it is, Solutions and Prevention," hosted by The Argus Foundation at Sarasota Yacht Club on Thursday. [HERALD-TRIBUNE STAFF PHOTO / CARLOS MUNOZ]

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florikan
E.S.A., LLC

Florikan's Journey to a Spinoff

Precise timed release polymer coated fertilizer granules that reduce fertilization application and environmental damage.

Florikan founder, Ed Rosenthal, noticed one of his clients struggle to get fertilizer to mix into a water solution for easier application. This inspired Rosenthal to develop a new method, allowing easier and more accurate fertilizer application.

In 2003, Florikan introduced its first Staged Nutrient Release (SNR) fertilizer. Three polymers were developed to coat three components of the fertilizer. This concept, patented in 2004, proved to be very successful for growers.

Growers could more accurately apply and use less fertilizer because the staged release kept nutrients in the soil longer. This resulted in increased crop yields and significantly less environmental damage from excess fertilizer leaching into groundwater, a critical problem in the agricultural industry.

The National Society of Professional Engineers selected the technology for its 2004 "Most Innovative New Product" award, which afforded Florikan 40 hours of consulting research and technical advice. Florikan engaged the NASA-funded Space Alliance Technology Outreach Program, or SATOP, designed to help small businesses overcome technological using expertise derived from the U.S. space program.

The alliance partners that supported the SATOP program included NASA Kennedy Space Center (KSC) staff and local aerospace and technology companies. Florikan continues with KSC today in developing fertilizers to support NASA's research into long-term space flight.

SATOP engineers analyzed the high product cost issues that limited Florikan's widespread use, determining that Florikan could coat all three fertilizer components with the same material – a single polyurethane material that NASA has used in past projects. Florikan developed a new staged release fertilized using this single coating, and in 2006 patented the technology ensuring its commercial success.

Throught the late 2000s Florikan continued to manufacture and market their SNR fertilizer. Use of the company's product began to spread th the eastern United States. In 2012, the J.R. Simplot Company purchased the rights to Florikan's technology, allowing worldwide distribution, thus providing more growers access to the product and its many benefits.

Florikan's staged nutrient-release fertilizer has proven beneficial, not only to the astronauts and researchers on the International Space Station, but to the environment and humanity on Earth.

Ed Rosenthal, Eric Rosenthal, and KSC Leadership
(Provided by Space Foundation)

Ed and Betty Rosenthal and the NASA Veggie Team

The Florikan team and Hardee County representatives at our facility grand opening.

Ed and Betty Rosenthal receiving one of their two Gulf Guardian awards on behalf of Florikan

CONNECT WITH US

Florikan ESA, LLC • 6801 Energy Ct, Ste 100, Sarasota, FL, 34240 • **P:** 800.322.8666 • **F:** 941.377.3633 • **W:** florikan.com

Text Courtesy Space Foundation

CORPORATE AWARDS AND HONORS

Space Technology Hall of Fame
Awarded by The Space Foundation - Nominated by NASA Spinoff

Gulf Guardian Award (Two Time Winner)
Awarded by the EPA Gulf of Mexico Program Partnership

Florida Governor's Business Diversification Award
Awarded by Enterprise Florida

Allied Associate of the Year
Awarded by the American Nurserymen and Landscape Association

Environmental Awareness Award
Awarded by the Florida Nurserymen and Growers Association

National New Product Award
Awarded By The National Society of Professional Engineers

Excellence in Industry Award
Awarded by the Economic Development Committee of Sarasota County

Manufacturer of the Year
Awarded by the Economic Development Corporation of Sarasota County

Florida Ag-Environmental Leadership Award (Finalist)
Awarded by the Florida Department of Agriculture

American Red Cross
Corporate Hero of Hurricane Andrew
Awarded by the American Red Cross

4R NUTRIENT STEWARDSHIP

Florikan's commitment to sustainability is right in the name. Our company was founded as Florikan ESA, (Environmentally Sustainable Agriculture). As a result we are proud to be a partner with the 4R nutrient stewardship program, the concept encompasses:

- Right Fertilizer Source
- Right Rate
- Right Time
- In The Right Place

NASA PARTNERSHIP

Florikan is proud to be part of a unique partnership with Space Plant Biology Team within NASA. They have chosen to use select portions of our innovative Nutricote® line of products to be the foundation for microgravity plant growth.

This knowledge exchange has allowed us to begin to forge ahead into new and exciting areas of research and development.

CERTIFIED SPACE TECHNOLOGIES

GAL-Xe^{ONE} was developed in conjunction; and with assistance from NASA using cutting edge research, quality control and scientific methodology.

Nutricote® contains technology to grow more ecologically. Use of this product helps raise awareness about the influence of sustainable principles for the future and environmental advocacy by Florikan.

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FERTILIZER TECHNOLOGY PLANTS PIONEER IN HALL OF FAME

March 8, 2017

https://www.nasa.gov/feature/fertilizer-technology-plants-pioneer-in-hall-of-fame

Dr. Gioia Massa, NASA payload scientist for Veggie, left, Betty and Ed Rosenthal, founders of Florikan Fertilizer Corp., observe ground control experiments in the Veggie Lab at NASA's Kennedy Space Center on Feb. 16. **Credits: NASA/Bill White**

By Frank Gonzales
NASA's Kennedy Space Center, Florida

Pushing envelopes isn't just for test pilots at NASA -- Ed Rosenthal's agricultural creativity has been so successful that it is getting ready to take its place in the Space Technology Hall of Fame.

A few years ago, Rosenthal reached out to NASA's Space Alliance Technology Outreach Program, or SATOP, designed to help small businesses overcome technological challenges using expertise derived from NASA. NASA helped in his testing and development of polymer coatings for time-release fertilizers for growing plants. His company, Florikan, has been improving and marketing these products to commercial greenhouse growers, and expanding more and more into home (yard) and field agricultural applications – and now he can add space to this growing list.

"I figured if it works in Florida, it will work anywhere else . . . including space," Rosenthal said.

For years, plant researchers from Kennedy Space Center have been testing this fertilizer named Florikan Controlled Release Fertilizer (CRF) that is blended by Rosenthal's company. Nearly three years ago, Dr. Gioia Massa, Veggie project scientist, reached out to Rosenthal and discussed how the Veggie team had been using a Florikan CRF on ISS and asked if he would like to collaborate on a grant proposal for future Veggie experiments involving Chinese cabbage and dwarf tomatoes.

"The Florikan Controlled Release Fertilizer provided all the nutrients for our plants to grow well," said Dr. Gioia Massa, of NASA's Veggie science team. "It worked exceptionally well in our very unique conditions."

According to Dr. Ray Wheeler, a plant physiologist with NASA, Florikan has been a great partner in helping develop specific fertilizer formulations that could improve growth of plants in the Veggie growth systems.

"Controlled or time-release fertilizers have advantages for both commercial and home users," said Wheeler. "With Florikan CRF, we now only require a single application, which can last for months. This technology avoids rapid release of nutrients typical for most conventional fertilizers, which can leach through the soil and even get into waterways."

Dr. Gioia Massa, NASA payload scientist for Veggie, left, Betty and Ed Rosenthal, founders of Florikan Fertilizer Corp., observe ground control experiments in the Veggie Lab at NASA's Kennedy Space Center on Feb. 16. **Credits: NASA/Bill White**

Dr. Gioia Massa, NASA payload scientist for Veggie, left, Betty and Ed Rosenthal, founders of Florikan Fertilizer Corp., observe ground control experiments in the Veggie Lab at NASA's Kennedy Space Center on Feb. 16. **Credits: NASA/Bill White**

Florikan's CRF fertilizers have been used for Veggie experiments on the International Space Station, and they will be used for the Advanced Plant Habitat that will fly to the space station later this year.

Back in Florida, Florikan set up their new CRF production facility in Bowling Green, providing new jobs to an economically depressed area of the state.

"The induction of Florikan's Staged Nutrient Release (SNR) Fertilizer into the 2017 Space Technology Hall of Fame is a prestigious award that exemplifies the kind of mutually beneficial innovative solutions that can be achieved when industry and government partner to solve common technical challenges," said David Makufka, Kennedy's Technology Transfer Program manager.

Florikan, NASA Kennedy Space Center and SATOP will be inducted as Innovating Organizations into the Space Technology Hall of Fame. In addition, J.R. Simplot will be recognized with a commendation for the significant role they have played in allowing world-wide distribution of SNR Fertilizer, thus providing access of the product and its many benefits.

CONTROLLED-RELEASE FERTILIZER TAKES ROOT IN FIELDS, GROVES WORLDWIDE

NASA Spinoff Program

https://spinoff.nasa.gov/Spinoff2017/ee_2.html

Energy and Environment
NASA Technology

Astronaut ice cream may be an exotic treat for kids, but for real space explorers, it turns out a fresh, crunchy salad could sometimes really hit the spot. The ability to grow food in space could also prove crucial for longer-duration voyages envisioned for the next decades.

NASA astronaut Steve Swanson harvests red romaine lettuce on the ISS, the first fresh produce grown and eaten in space. The Veggie project, which is ongoing, uses Florikan's controlled-release fertilizer to nourish the growing plants. **Credits: NASA/SPINOFF**

Growing plants in a spaceship, and one day on another planet, is a complicated endeavor, as Gioia Massa, science team lead for the NASA Veggie project at Kennedy Space Center, will tell you. But one tool making it much easier is a specially formulated fertilizer, developed years ago with NASA help, that has also drawn huge accolades from growers on Earth.

The fertilizer, blended by Sarasota, Florida-based Florikan, is coated in polymers that control when and how much of each ingredient—macronutrients like nitrogen, phosphate, and potassium, and micronutrients like magnesium and zinc—is released over six months to a year.

"We don't use soil, because soil is very nonuniform and makes it hard to ensure a good outcome," Massa explains. Instead, the Veggie plant-growth platform aboard the International Space Station (ISS) uses a porous, baked-clay substrate. That clay holds the roots and the water in place, but it doesn't provide any nutrition for the plants—that all comes from the fertilizer.

"Having the ability to add a controlled-release fertilizer—which adds the right amount of nutrients over time without any mixing or any chemicals that you have to measure out—makes it much simpler," Massa says.

There is still research being done to optimize the fertilizer for different plant types, including modifying the blend of ingredients and release rates and examining how different fertilizers impact the nutrient content of the harvest. But using a single-application, controlled-release fertilizer means that, day-to-day, the astronauts and the Veggie research team can focus on other challenges, like how often to water the plants and how best to use lighting to promote growth.

Their efforts have already borne fruit—or, technically, leaves—with red romaine lettuce grown and eaten on the ISS in 2015, and zinnias cultivated through 2016. Future experiments are planned for 2017 and 2018 to grow dwarf tomatoes and Chinese cabbage, with a second Veggie plant-growing module to be sent up to increase the variables able to be tested.

"We're learning a lot. We've certainly had our challenges, but we've also had tremendous success," Massa says. She is excited about breaking new ground with these experiments—and confirms Florikan controlled-release fertilizer will continue to play its important role.

Technology Transfer

Florikan founder Ed Rosenthal didn't intend to push the frontiers of where plants are grown when he first began developing his award-winning fertilizer. But he saw how fertilizers, including those sold by the company he and his wife had founded in 1982, were getting used, and saw an opportunity.

Here, large batches of the Florikan fertilizers await quality control testing before being bagged up and sold. The high-tech process to coat the fertilizer in a porous polymer to control how quickly the nutrients dissolve in water was perfected with help from NASA. **Credits: NASA/SPINOFF**

"I went to see a very good friend of mine: a PhD, who produces ornamental plants," Rosenthal recalls. "He's throwing bags of water-soluble fertilizer, must have been 40 or 50 bags, in the tank. And as I'm watching it, some is floating to the top, some is segregating to the bottom. He has to turn on an agitator just to keep the fertilizer in the solution."

Rosenthal was dismayed—if farmers were dousing their plants with this poorly mixed solution, a huge proportion of the nutrients would leach out into the groundwater. That was terrible for the environment and not very helpful for the plants.

He started studying the problem and eventually told the grower, "I believe you're wasting more than two-thirds of your nitrogen: it's going straight into the groundwater."

The segregation was occurring because different nutrients dissolved

CONTROLLED-RELEASE FERTILIZER TAKES ROOT IN FIELDS, GROVES WORLDWIDE

NASA Spinoff Program

https://spinoff.nasa.gov/Spinoff2017/ee_2.html

in water at different rates, and that gave Rosenthal an idea. Although not a chemist by training, by 2002 he'd spent decades working with fertilizers and polymers at Florikan and before that at a company that manufactured polymer-based plastic plant containers.

"I wondered if I could separate each nutrient based on its relative solubility and when it was needed by the plant," he says. If he could then coat each nutrient in a different polymer, some with a larger-porosity polymer to let a lot of water in to dissolve the substrate and release the nutrient as quickly as possible, some with a smaller porosity to slow down the release, he thought he could create a fertilizer that delivered exactly the right amount of each nutrient at exactly the right stage of growing.

Florikan's clients had typically been applying fertilizer monthly. "For example a nursery with 100 acres of potted calamondin orange," would have a huge workforce applying a tablespoon per pot, 12 times a year. Rosenthal's new staged-release fertilizer would get the same results with just four tablespoons applied once a year, according to his calculations.

> "IN A GLOBAL WORLD, IT'S ULTIMATELY ABOUT FEEDING MORE PEOPLE IN AN EFFICIENT MANNER THAT IS SUSTAINABLE."
>
> — *Jeff Roesler, J.R. Simplot*

He brought the prototype to a leading nursery grower who was skeptical but agreed to let Rosenthal try it out on a few acres of plants. "In six months, when the grower saw our plants looked the same as the ones he had already hit with six applications, he said, 'Ed, you got any more of that stuff?'"

The new product innovation, dubbed Staged Nutrient Release (SNR), was quickly embraced by the market, and in 2004, Florikan was recognized by the state of Florida and by the National Society of Professional Engineers for making one of the year's most innovative new products. The latter award came with a special perk: 40 hours of free consulting with a Federal agency to take the innovation forward. Rosenthal chose NASA.

Fertilizer made with Florikan's patented formula, now owned by J.R. Simplot and sold as Gal-XeONE, nourished this lush grass at a golf course in Arizona. J.R. Simplot was interested in the product because it was more efficient and better for the environment. **Credits: NASA/SPINOFF**

"I knew NASA was working with some space-age polymers, really sophisticated polymers that had yet to make it into the mainstream commercial field," he says. He was connected with Kennedy researcher Chris Gilfriche in October 2005 through the Space Alliance Technology Outreach Program (SATOP).

At the end of the 40 hours, the NASA researchers recommended a whole new approach: coat the nutrients in a single, impervious polymer, and then treat them with a chemical to open up pores to the exact specifications required. That spurred two more years of lab work to perfect the formula, including a continued back-and-forth with the SATOP group. By 2008, Florikan had two new patents, one for staged nutrient-release fertilizer and another for the polymer coating it was using.

"The ornamental industry—the nursery industry producing foliage plants—was the first to embrace the change to the controlled-release fertilizer," Rosenthal recalls, saying he soon had enough business to open a coating facility in Florida. Since then, he has sold both patents to agribusiness giant J. R. Simplot Company, which has introduced the technology across the western United States and overseas. Florikan retains a license in perpetuity to manufacture and sell the fertilizer in 32 eastern U.S. states, and its business has also grown in recent years, prompting a need for a brand-new 85,000 square-foot plant in Hardee County, Florida, and creating some 80 new jobs.

> "NASA'S EXPERTISE HELPED US ADVANCE OUR DEVELOPMENT BY YEARS. WE WERE HAPPY TO PAY IT BACK."
>
> — *Ed Rosenthal, Florikan*

Rosenthal credits a huge portion of this success to the guidance he got from NASA. "For us to be able to coat the fertilizer here in Florida and introduce it into the market, that was a result of NASA's SATOP help, no doubt. It made the product commercially affordable and made us become a huge manufacturer."

Benefits

The key advantage to Florikan's staged nutrient-release fertilizer is that growers need to use far less of it, far less often than traditional formulations. That significantly reduces the harmful environmental impact of nutrient runoff, and it also means less labor and lower costs for growers.

"With fertilizer, you want to put it where you intend it to be used, because if it goes into the groundwater, it may create problems," Rosenthal explains. Nitrogen, in particular, has been linked to harmful algal blooms, which can release toxins that harm, and even kill, marine wildlife including dolphins, manatees, and sea turtles.

"If you can apply less fertilizer overall, there is less of a potential impact from all nutrients. Applying fertilizer once a year or once every six or nine months is better than every 30 days."

CONTROLLED-RELEASE FERTILIZER TAKES ROOT IN FIELDS, GROVES WORLDWIDE

NASA Spinoff Program

https://spinoff.nasa.gov/Spinoff2017/ee_2.html

Every batch of Florikan coated fertilizer is tested to ensure the polymer coating allows the nutrients to dissolve at the expected rates. Small samples are placed in distilled water and held in an incubator at 100 °F for seven days. The quality control team checks the sample after one, three and seven days. **Credits: NASA/SPINOFF**

One of Florikan's early formulations was called Florikan Nutricote 18-6-8, for its ratio of nitrogen, phosphate, and potassium, and it was designed specifically for ornamental plants so they would get the right amount of each nutrient when they needed it without waste.

"Florikan's research for continuous improvement in controlled-release fertilizer formed the basis for the successful introduction of Nutricote in the United States," Rosenthal says. "From there, Florikan's commitment to innovative technology helped form the NASA SATOP partnerships, resulting in new polymer coatings for the custom-blended Florikan Nutricote and Florikote fertilizers and now for Simplot's patented Gal-XeONE product line."

As Florikan has grown, it has expanded its offerings into other types of plants, creating special blends for citrus groves and, more recently, sugar cane, where standard practice had been to drop fertilizer from airplanes five times a year. Florikan proposed a new fertilizer that farmers could apply just once when the cane was first planted. "They're now buying significant quantities for several thousand acres. Without NASA and SATOP, none of it would have happened," Rosenthal says.

J. R. Simplot's customers include large-scale nursery and turf growers across the western United States, as well as palm oil growers in Indonesia and Malaysia. Jeff Roesler, vice president for specialty business units, says the technology highlights two of Simplot's core values: "respect for resources and spirit of innovation."

"In a global world, it's ultimately about feeding more people in an efficient manner that is sustainable," he emphasizes, saying this enhanced-efficiency fertilizer does that extremely well.

And when NASA called Florikan for help with its Veggie project, Rosenthal created a new blend for flowering plants, like the tomatoes next heading up to the ISS. The new blend, which Florikan has since also released commercially, has a 14-4-14 nutrient ratio, designed to be applied every 100 or 180 days. "If we'd talked to him ahead of time," Massa notes, "we'd probably have tested that 14-4-14 formulation for the zinnias."

"NASA's expertise helped us advance our development by years," Rosenthal emphasizes. "We were happy to pay it back."

Florida SW Gulf Coast Coalition of Mayors

Mission Statement: A Comprehensive Think Tank
Focused on SW Gulf Coast Environmental Issues.
Goal: To Achieve a High Sustainable Environmental Quality of Life.

July 28, 2018

https://www.fox13news.com/news/355019318-video

FYI Watch the above video sent in by Charlette Roman
Vice Chair -Marco Island City Council
FYI Google- "Dead Zone Louisiana Gulf"

~ Never forget that the above could be our Florida future ~

Public education is a Number One Goal for both residents and future residents.
FACT: Our Nutrient runoff issue is **High Priority** which explodes algae blooms.
Main goal: reduction of nitrogen/fertilizer run off from our land masses.
Analysis of direct canal sewer releases in vintage neighborhoods
need to be placed as a **high priority** and to remedy ASAP.
Conventional septic systems are not presently designed to remove nitrogen.
Upgrades of septic systems must include enhanced nitrogen reducing technology.
Sewage treatment masterplans and technology must be be analyzed to
accommodate **all** future development.
"State of the Art" waste treatment principles need to be implemented.
FACT: Red tide is **fed by nutrient/fertilizer run off** and has caused this on going
devastation to both our wildlife and to our economy.
Google- Larry Brand- University of Miami Marine Biology - red tide -
Water quality monitoring **must** be reinstated and on a frequent basis.
Reinstate the "Algae Task Force" and expand the environmental / water
management agencies ASAP.
Should a "Building Moratorium" be on the table?
Should limits to residential density be created?
"Leaking septic tanks serve as fuel to keep the blooms going - like pouring gasoline on a fire" Florida Department of Health
FYI Amendment # 1- Do not forget it **overwhelmingly** passed in 2014 but was
ignored by the Florida Legislature- ***they failed to use this money to conserve land!***
Hot line DEP Report a Bloom: www.reportalgalbloom.com
Or Call 855-305-3903
Fish Kill Hot Line: 800-636-0511 / Injuries-Wildlife Alert: 888-404-3922
Contact Thea N Nelson - tnnelson@aol.com - Keep our Think tank going....

Perfect Grass = Dead Manatee

PHOTO COURTESY OF UNIVERSITY OF MIAMI

Larry Brand, professor of marine biology and ecology at the Rosenstiel School of Marine and Atmospheric Science, collects a sample of water at one of his roughly 100 sites across Florida and the Everglades.

ANOTHER VIEW

Red Tide Q&A

By ROBERT C. JONES JR.
UNIVERSITY OF MIAMI

As red tide has evolved from occasional pest to regular menace in Southwest Florida, the standard line often heard from the state's power brokers has been that it's a naturally occurring event.

But over the years, University of Miami marine biology and ecology professor Larry Brand has been at odds at times with politicians and agencies such as Mote Marine Laboratory, which does its red tide report on visitbeaches.org.

The Herald-Tribune once wrote this about him:

"In the alternative universe of Florida red tide research, the devil wears, not Prada, but off-brand jeans and a shirt that recalls '60s madras plaid. He is tall and thin — another writer once described him as resembling "a lone pine" — with long, narrow hands that riff through stacks of scientific data like he's playing jazz. He is called Larry Brand, and what he has done to make his name a curse to some scientists and bureaucrats and policy-makers is use his pianist's fingers to point at a reason for the increasingly noxious blooms."

The long-time position of Brand, an expert in the ecology of algae and phytoplankton, has been that red tide has been getting worse because industry and development are dumping nitrogen, the principal ingredient of fertilizer, onto the land and flushing it into Florida's rivers and streams, which eventually carry it out to the Gulf. Brand isn't completely alone on this: Harvard biologist Lewis Agassiz connected nitrogen runoff to algal blooms 135 years ago.

And now nearly a century and a half later, Florida may be paying the price for its leaders ignoring the connection, especially in recent years.

This summer, the death of marine life has reached unprecedented and even the carcass of a whale shark have washed up. The turtles are dying at twice the normal rate, and barely past mid-year, more manatees have perished than in all of 2017. Pelicans, double-crested cormorants, and mallard and mottled ducks have also been affected. And what's worse is that authorities have said the wildlife found dead is only a fraction of the actual toll because most of the dead animals sink to the bottom of the sea.

Here's Brand's take on 2018's economically crushing event that has largely kept residents from regularly going to the beach for months and tourists from visiting.

Why is this particular red tide incident in Southwest Florida so bad? It started in October and has lasted well past the normal season.

It is probably primarily because of the large amount of nutrient-rich water coming down the Caloosahatchee River into the coastal waters.

Fish, sea turtles, and manatees are among the casualties of the red tide on Florida's southwest coast. What impact does it have on human health, and what precautions should people take?

Brevetoxin produced by the red tide is a powerful neurotoxin. Hospital records along the west coast of Florida show a 50 percent increase in people going to the hospital for various types of respiratory distress and a 40 percent increase for gastrointestinal distress. People should not swim in the water, eat seafood from it, or breathe the air near it.

What kinds of efforts, if any, can be initiated to combat red tide and lessen its impact?

There are no short-term solutions to this problem. Long term, we need to reduce the nutrients that feed the red tide and make it worse.

What major study on red tide are you currently conducting, and what's the importance of that investigation?

Of all the different types of Harmful Algal Blooms around the world, the Florida red tide is the only one to be examined carefully for the toxic aerosols that it produces. I, along with some of my colleagues, am now examining if other types of algae are also producing toxic aerosols, particularly the ones currently causing problems in Lake Okeechobee, the Caloosahatchee River, St. Lucie canal and estuary, Indian River Lagoon, and Florida Bay.

How critically important is it that more research be done on red tide, even given the current political climate when research funding is dwindling?

Of great importance is identifying and quantifying the relative importance of the different sources of nutrients, such as fertilizer and sewage, that feed the red tide and make it worse. This information is needed in order to reduce the amount of nutrients. Unfortunately a lot of disinformation is promulgated by economic and political special interests about the sources of nutrients, so we need objective facts to counter this and provide accurate information to the public and policymakers.

Information from the Sun, Herald-Tribune and the News-Press supplemented this report.

FYI...

florikan CRF

Florikan® Vertical Farming Products

Propagation

Florikan 14-4-14 NPK +ME MAX w/ GAL-Xe$^{ONE™}$ + NANO

- Small Particle Size for Maximum Nutrient Uptake
- Can Be Used With or Without WSF
- Excellent Distribution in Small Containers/Cell Packs

Photos courtesy of Sweetgrass Farms, Sarasota, FL

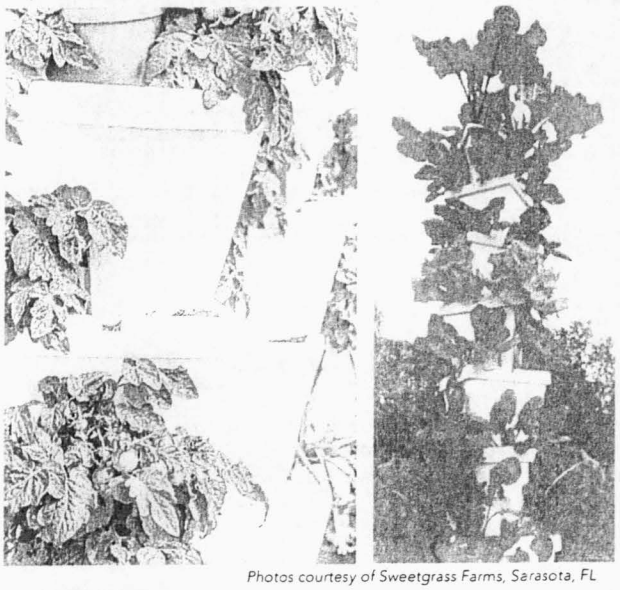
Production

Florikan 11-3-21 NPK +ME MAX w/Nutricote® Blend with extra SOP

100% Coated NPK + Micronutrients, w/Additional Potassium for Full Flowering

Florikan 12-2-12 NPK +ME MAX w/Nutricote with + Ca

100% Coated NPK + Micronutrients w/Additional Calcium Nitrate to Help Reduce Blossom End Rot



Photos courtesy of Sweetgrass Farms, Sarasota, FL

Enhanced Yield and Quality w/FlorikanCRF

Florikan 0-0-47 w/ GAL-Xe^{ONE} Sulfate of Potash

Enhances Flowering in Vertical Growing

Florikan 12-0-0 23% Nutricote $CaNO^3$

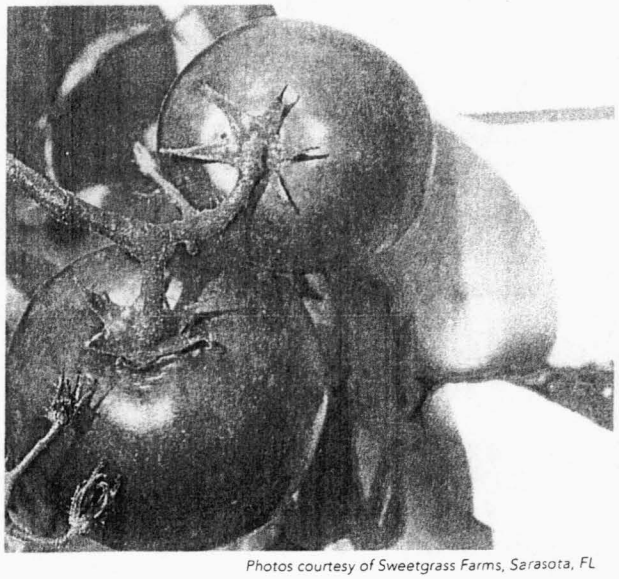
Improves Stem and Branch Strength and Helps Reduce Blossom End Rot in Tomatoes and Other Flowering Plants

FlorikanCRF Benefits

- Lower Labor Costs and Less Chance for Error in Mixing
- Flexibility to Work Indoors or Outdoors in Any Weather
- Safe, Reliable, and Predictable Longevity

FlorikanCRF Vertical Farming Results

- Higher Nutrient Content Rating (BRIX Scale) for Fruiting Plants
- Independent Testing Shows Strong Evidence of Shortened Crop Cycles
- Field Tests Show Effectiveness in 12 High Vertical Farming Baskets
- Contains both a *Certified Space Technology* and a *Certified Space Educational Product*



Photos courtesy of Sweetgrass Farms, Sarasota, FL

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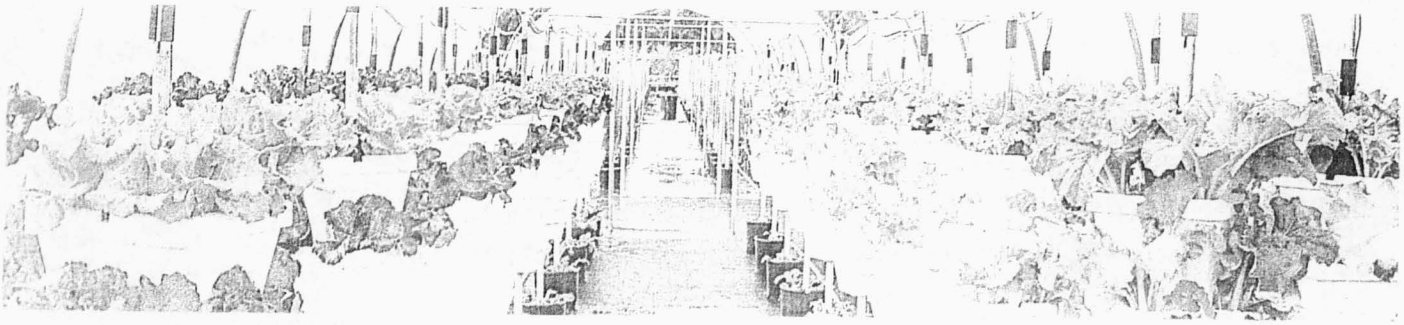
florikan CRF



Photos courtesy of Sweetgrass Farms, Sarasota, FL

Highlights of Florikan Vertical Farming Products

nutricote® TECHNOLOGY

The Nutricote release agent has resulted in a dramatic technological improvement in consistent and precise nutrient release. Every particle of Nutricote® is uniquely homogeneous, to ensure consistent analysis application after application.

GAL-Xe ONE TECHNOLOGY

GAL-Xe^{ONE}™ delivers optimal nutrients to the plant at a pace that matches a plant's uptake requirements. GAL-Xe^{ONE} fertilizer provides gradual release of plant nutrients to match a plant's growth cycle as needed. It improves efficiency, limits plant damage and reduces nutrient loss.

nano MINI SIZE PRILL

100 150SGN range prills for liners and starters providing a quick uptake and strong foundation.

WITH NUTRICOTE® $CaNo_3$

Additional Calcium Nitrate for disease resistance and hardiness to adverse conditions.

Your Local Distributor

Our Commitment to Sustainability

Florikan CRF's , require very few applications as compared to water soluble fertilizer. Florikan was honored to be the recipient of the Gulf Guardian Award by the United States Environmental Protection Agency (USEPA) This recognition was a result of Florikan's development of products which, with proper use, could result in reduced nutrient run off compared to liquid feed.

Florikan's commitment to sustainability is right in the name. Our company was founded as Florikan ESA, (Environmentally Sustainable Agriculture). As a result we are proud to be a partner with the 4R nutrient stewardship program, the concept encompasses:

- Right Fertilizer Source
- Right Rate
- Right Time
- In The Right Place

CERTIFIED EDUCATIONAL PRODUCT www.spacecertification.org

This product contains technology to grow more ecologically. Use of this product helps raise awareness about the influence of sustainable principles for the future and environmental advocacy by Florikan.

Our Patented Products & Process

These CRF Fertilizer Products and Processes Intended For Use on Vertical Farming or Soil Based Hydroponic Applications and Are Protected by U.S. Patent #9527778

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florikan CRF
WITH GAL- ONE

14-4-14 NPK MAX nano
MINI SIZE PRILL

Product Description

Florikan® Nano breaks the "Feast & Famine" feed cycle commonly associated with WSF by:

- Eliminating the risk of damage from excess salt build up
- Minimizing incidents of insect and disease pressures due to nutrient deficiencies or toxicities
- Reducing the potential excess growth resulting in a "too leggy" or "soft" crop

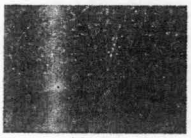
Florikan® Nano increases the uniformity of your crops by:

- Providing 10X more fertilizer particles than traditional fertilizers
- Ensuring every plant/container has the adequate amount of fertilizer
- Producing identical crops the meet your specifications for size and quality

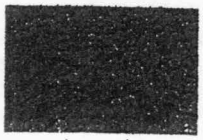
Florikan® Nano increases your control and flexibility by:

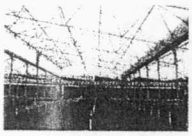
- Providing consistent availability of fertilizer to your crop regardless of your watering requirements
- Allowing you to control the crops finish time so you can adjust to a changing market
- Supplying a broad range of formula options to meet your production needs

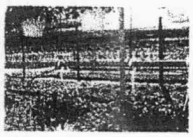
Recommended For Use On

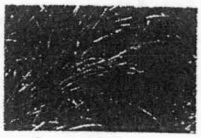

Liners


Perennials


Annuals


Greenhouse


Hanging Baskets


Ground Cover


Herbs


Impatiens


Pansies

Features

- 100% Polymer Coated Fertilizer
- 1:1 N to K Ratio
- NPK + Micronutrients
- Small Particle Size – SGN 100-150

Benefits

- Can Be Used Alone or Combined With WSF
- Excellent Distribution in Small Containers/Cell Packs
- Larger Percentage of Micros for Excellent Color
- Safe, Reliable, and Predictable Longevity

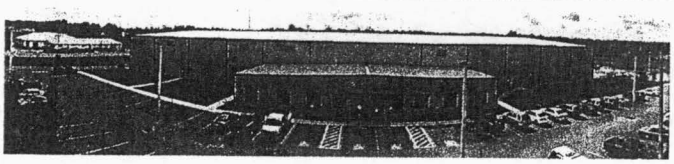
CERTIFIED SPACE TECHNOLOGY www.spacecertification.org

This product was developed in conjunction, and with assistance from NASA using cutting edge research, quality control and scientific methodology

Ideal Growth Locations

90 DAYS

About Florikan®



Florikan® is

- Solution Driven
- A Proven Performance Leader
- A Proud Family Owned U.S. Manufacturer

Your Local Distributor

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florikan CRF
WITH GAL-Xe ONE

14-4-14 nano
MINI SIZE PRILL

Guaranteed Analysis

Total Nitrogen (N)*	14%
6.5% Nitrate Nitrogen	
7.5% Ammoniacal Nitrogen	
Available Phosphate (P_2O_5)*	4%
Soluble Potash (K_2O)*	14%
Magnesium (Mg)*	1.50%
1.50% Water Soluble Magnesium (Mg)	
Sulfur (S)*	7.50%
7.5% Combined Sulfur (S)	
Copper (Cu)*	0.05%
0.03% Water Soluble Copper (Cu)	
Iron (Fe)*	0.70%
0.65% Water Soluble Iron (Fe)	
Manganese (Mn)*	0.10%
0.10% Water Soluble Manganese (Mn)	
Zinc (Zn)*	0.05%
0.05% Water Soluble Zinc (Zn)	

Derived From

Polymer Coated Ammonium Nitrate, Ammonium Phosphate, Calcium Phosphate, Ammonium Polyphosphate, Potassium Chloride, Potassium Sulfate, Magnesium Sulfate, Ferrous Sulfate, Manganese Sulfate, Copper Sulfate, Zinc Sulfate

Conversion

Unit of Measure	Grams	Std Prill Count	Florikan Nano Prill Count
Grams	1	20	100
Tablespoon	15	300	2,000
Cup	250	5,000	47,500
Pound	454	9,080	54,240

14-4-14 90 Day

Low Dose Rates (Grams Per Container)

	LOW	MED	HIGH	HEAVY
1 GAL	5	10	15	20
2 GAL	10	15	20	25
3 GAL	15	25	35	45
5 GAL	25	45	60	80
7 GAL	35	60	80	105
10 GAL	50	80	110	140
15 GAL	70	120	165	210
20 GAL	95	160	220	280
25 GAL	120	200	275	350
45 GAL	210	350	490	630
95 GAL	420	700	980	1260
24 IN BOX	205	345	485	620
30 IN BOX	255	430	600	770
36 IN BOX	305	515	720	925
48 IN BOX	405	685	960	1230
PER SQ FT	15	25	35	45

Incorporation Rates

	LOW	MED	HIGH	HEAVY
LBS./CU.YD.	1.5	2.5	4.0	4.5

Average Medium Temperatures

60°F	70°F	80°F
12%	4	90

Longevity in days and months (up to

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Herald-Tribune
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The fertilizer industry insider who's credited with helping Sarasota Bay

Michael Juchnowicz is president of Gardenmasters of S.W. Florida Inc. in Venice.

It has been nearly a decade since the founder of Gardenmasters of S.W. Florida Inc. broke with the fertilizer industry by pushing for stricter nitrogen-control laws a proposal many fertilization services believed at the time to be a threat to their industry. He testified before legislators, welcomed county commissioners into his private headquarters and worked with university researchers fighting the powerful lobbyists his own industry had hired.

But now that restrictions have been in place for several years, banning the use of fertilizer in Sarasota and Manatee counties from June 1 through Sept. 30, Juchnowicz says he has an established system, while many others are still scrambling to keep their lawns green during the peak summer months. "Why go against it," said Juchnowicz, a pilot and classic car collector. "Figure out a way to work it. It took years for us to develop a program a new way of doing it."

Gardenmasters now is the largest lawn and garden fertilization company based in Southwest Florida, with a 15,000-square-foot warehouse in Venice and a satellite office in Naples. With customers from Apollo Beach to Marco Island, Gardenmasters services nearly 20,000 accounts and grosses millions in annual revenues. The company has 45 trucks and almost 50 employees. It put down more than 1 million pounds of fertilizer last month alone.

Continued on reverse. Look for special offers.

A better balance

He began experimenting with using fewer products a method used to maintain golf courses on tighter budgets and eventually he found the right balance that complies with the new regulations. The company now uses a slow-release product line that it says is a custom blend mixture that is environmentally friendly and compliant. It is lower in phosphate and nitrogen than the products more commonly seen before the new regulations, but Juchnowicz says it is just as effective. He also cut down on his use of insecticides.

Sarasota County took a leading role on fertilizer reforms, passing its own ordinance in 2007. Manatee County joined with a similar initiative in 2011. The local ordinances include numerous provisions. For example, lawn-chemical businesses are required to use best management practices when applying fertilizers. Grass clippings are to be kept out of storm drains; fertilizer spilled on impervious surfaces must be cleaned up so it does not wash into rivers and estuaries. Areas very close to waterways must be kept free of fertilizers year-round.

Experts say the new rules have made a difference for the better, and that Juchnowicz's role was crucial to the initiative. He was the best kind of spokesman, said Jack Merriam, who is now retired but worked as Sarasota County's environmental manager at the time the ordinance was passed.

A staff of experts

Gardenmasters works with all varieties of turf and plants. The company has a full-time horticulturist and chemist on staff. For basic lawn fertilization, for a property in a typical middle-class neighborhood, Gardensmasters charges about $480 a year. That includes monthly visits, with different services each time aimed to build stronger turf. During the summer, when fertilizer cannot be applied, the company focuses on turf inspections, weed control and plant treatments.

Herald-Tribune

The fertilizer industry insider who's credited with helping Sarasota Bay

By Josh Salman
Posted May 9, 2016 at 12:01 AM

Once viewed as a traitor, this businessman helped make water cleaner.

Michael Juchnowicz has been called a traitor, a deserter and a double-crosser by his peers. He thinks of himself more as a maverick.

It has been nearly a decade since the founder of Gardenmasters of S.W. Florida Inc. broke with the fertilizer industry by pushing for stricter nitrogen-control laws — a proposal many fertilization services believed at the time to be a threat to their industry.

He testified before legislators, welcomed county commissioners into his private headquarters and worked with university researchers — fighting the powerful lobbyists his own industry had hired.

But now that restrictions have been in place for several years — banning the use of fertilizer in Sarasota and Manatee counties from June 1 through Sept. 30 — Juchnowicz says he has an established system, while many others are still scrambling to keep their lawns green during the peak summer months.

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With customers from Apollo Beach to Marco Island, Gardenmasters services nearly 20,000 accounts and grosses millions in annual revenues.

The company has 45 trucks and almost 50 employees. It put down more than 1 million pounds of fertilizer last month alone.

Founded in 1997, the company also does outdoor and indoor pest control.

The way it was

For decades, companies that provide services like Gardermasters would fertilize heavily during the summer to help combat the heat.

But environmentalists began leading a campaign to change that in the early 2000s, when scientists showed that applying fertilizer during the rainy season can cause nitrogen and phosphorous runoff, even from what are considered to be more inland neighborhoods, to pollute the water.

"There's not one single measure that will correct the systemic problems that have happened over decades," said Jon Thaxton, a former Sarasota County Commissioner who championed the ordinance. "The fertilizer ordinance is a critical tool. The bay's recovery -- and the reduction of nitrogen -- has been remarkable."

The fertilizer industry fought hard to prevent change.

Juchnowicz was one of the few in the business to rebel against his peers, citing the importance of clean water.

A better balance

He began experimenting with using fewer products — a method used to maintain golf courses on tighter budgets — and eventually he found the right balance that complies with the new regulations.

The company now uses a slow-release product line that it says is a "custom blend mixture that is environmentally friendly and compliant."

It is lower in phosphate and nitrogen than the products more commonly seen before the new regulations, but Juchnowicz says it is just as effective. He also cut down on his use of insecticides.

"It's like seatbelts," he said of the fertilizer guidelines. "I remember when they first came out — nobody wanted to wear them. Now, I won't get in a car without it."

Juchnowicz says he just felt that testifying in favor of tighter guidelines was the right thing to do, even if it meant he'd be blacklisted in his own business community.

"I have a son, and he doesn't have any kids yet, but he will someday," Juchnowicz said. "This is making a difference."

Sarasota County took a leading role on fertilizer reforms, passing its own ordinance in 2007. Manatee County joined with a similar initiative in 2011.

The local ordinances include numerous provisions. For example, lawn-chemical businesses are required to use "best management practices" when applying fertilizers. Grass clippings are to be kept out of storm drains; fertilizer spilled on impervious surfaces must be cleaned up so it does not wash into rivers and estuaries.

Areas very close to waterways must be kept free of fertilizers year-round.

"Now, the whole state is pretty much doing it," said Dean Calamaras, a former Venice mayor who now works for Gardenmasters.

Experts say the new rules have made a difference for the better, and that Juchnowicz's role was crucial to the initiative.

"He was the best kind of spokesman," said Jack Merriam, who is now retired but worked as Sarasota County's environmental manager at the time the ordinance was passed. "He would sit at the industry table, and you would hear rumblings that he should be sitting with the environmentalists.

"We have more sea-grass now than we did in 1950, a benchmark, good year. The bay is doing better, we know that."

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That includes monthly visits, with different services each time aimed to build stronger turf. During the summer, when fertilizer cannot be applied, the company focuses on turf inspections, weed control and plant treatments.

The company has cared for the lawns of a $20 million home and helped the grass come to life at the 80-acre Premier Sports Campus in Lakewood Ranch, Juchnowicz said.

The company says it helped spot a potential problem with spiraling whitefly — a species that's been destroying plant life across Southwest Florida — before university scientists.

"Each month we do something different," Calamaras said. "We are always looking at ways to improve the turf."