

By MARK LESLIE

SAN DIEGO, Calif. — Who knows what biological controls are sitting on the shelves of university researchers, having been discovered but — until now — with no way to be applied?

“There are hundreds of researchers all over the country with great biological-control measures, but they haven’t been able to get them out,” said Dr. Joe Vargas of Michigan State University, who discovered *Pseudomonas aureofaceans*, a natural broad-spectrum, general-contact fungicide.

“That’s true,” agreed Dr. Henry Wilkinson of the University of Illinois at Urbana, who has a number of *Pseudomonas* on his own “shelf.” “We have *Pseudomonas flourescens* that controls Take-All Patch and other patch diseases... We have *Pseudomonas* for *Pythium* blight. You can get growth promotion through biologics, or disease suppression...”

The possibilities are endless as scientists look toward the future of biological-control agents to fight diseases and pests.

“Biologics work,” Wilkinson said. “We can document them in nature working by themselves. I believe the combination of more effort put into the development and application of natural biologics will bear fruit. But it will be expensive and will probably be driven by mandate and not purely by interest. What I mean is, when they [government agencies] start to take away all the other choices, all the chemicals, then the biologics as a vehicle will become more important.

“Also, the genetics of the plant will be the future. We have only scratched the future on manipulating turf genetics.”

Supply of biologicals unlimited?

At this time, Vargas’ *P. aureogaceans* is used in two-thirds of the 200 BioJect systems installed in irrigation systems worldwide in the last four years. (Daily application makes them effective, whereas they have little impact if used, say, once a week.)

“A lot of scientists have organisms they have identified and played with, but they had nowhere to go with them to develop as commercial products. We say, ‘This is a great opportunity, a rich opportunity to find these organisms that have been sitting on the shelf.’”

“Who knows what’s sitting out there in labs? We may have something that could ‘replace’ (and I use that term loosely) fungicides as we know them today.”

“There will be better biological-control agents,” Vargas said. “Certainly we will be able to make better hardware, come up with better media to grow them in. We’re looking for other organisms, ways to get greater numbers [of microbes]. Hopefully, some day we will get even this organism [*P. aureogaceans*] to produce more of the enzyme that controls fungi.”

Superintendent Dan Dinelli of North Shore Country Club in Glenview, Ill., is looking forward to release of an organism that has been discovered that suppresses frost, “allowing you to cheat 4, 5, 6 degrees, which can help in new seeding and other things,” and added: “Researchers are looking into organisms that can fix atmospheric nitrogen ... and put it into organic form. When it dies, other organ-

isms break it down, mineralize it and it becomes available to the plant.”

While saying “the basic premise that biological controls work is unquestionably true,” Wilkinson added the sobering point that “The difficulty comes when we try to manipulate and manage those natural processes to our own advantage. That’s where research, trial and error and many of the failures come from.”

More research needs to be performed, he said, regarding the growing medium for bacteria; the effects of water and its varying pH, nutrient base, cations, etc.; possible contaminants like the specific irrigation system; and response from various greens according to their type and management.

John Doyle, vice president of product development for BioJect manufacturer EcoSoil Systems, located here, agreed.

“We remain humble, knowing we have a lot of work to do,” Doyle said. “We have to continue to enhance the performance of the bacteria. Each bacteria we put through it is going to have some characteristic we need to exploit, whether it produces antibiotics, or steals food from other mechanisms. The system has to be adaptable to accommodate that organism and get it to grow and perform in the fashion we want it to. There will be an ongoing challenge as we discover a new organism to always be able to address the specific character of that organism.”

Wilkinson calls it “the farming of the soil.”

“Normally, we think of farming as grow-

ing plants in soil,” he added. “But another way to look at this is, managing and growing microbes to flourish and be responsive. You’re also cultivating and farming the turf. Both in agriculture and in the ornamental industry, farming both the soil and the plant are things we need to coincidentally consider in the future.”

Doyle said EcoSoil is re-designing the BioJect system to be “more sophisticated, more flexible, more user-friendly and more compact.”

He said it will be:

- Sophisticated as to how it performs its functions to meet the needs of the organism itself, “to exploit the character of the organisms we’re trying to fight.”


- Flexible because it doesn’t have to run the same way every day; the superintendent can be more flexible with his schedule and how it is tied into the system.


- User-friendly in that “we don’t want the superintendent to necessarily operate the machine, but we do want him to have the ability to tell the machine what he expects out of it.

“We don’t expect the superintendent to be the microbiologist. We want him to be the recipient of this biological product. We have trained service technicians.”


- More compact: “It is going down in size dramatically, but the total number of bacterial cells we produce will go up. A lot of scientists have organisms they have identified and played with, but they had nowhere to go with them to develop as commercial products. We say, ‘This is a great opportunity, a rich opportunity to find these organisms that have been sitting on the shelf.’”

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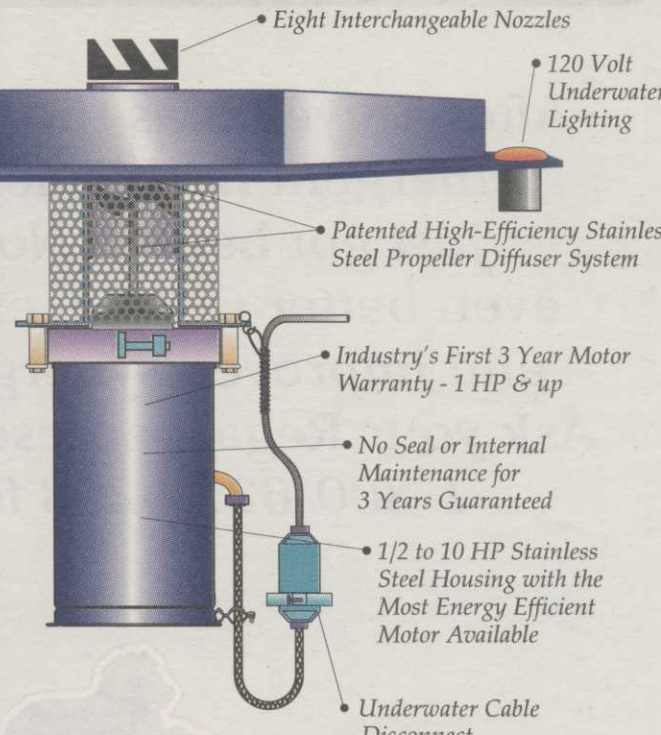
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