

# Getting **below** the surface

*New granular injection machine uses streams of high-pressure water to control insect pests like mole crickets without damaging turf.*

By ROGER STANLEY

**T**he steady "dunk-dunk-dunk" beat is music to the ears of Chuck Barclay, golf course superintendent for the Twisted Oaks and Pine Ridge Country Clubs in Beverly Hills, FL. Sounding like a muffled air hammer operating at a slow speed, a new SGI (Subsurface Granular Injector) sweeps back and forth over one of Barclay's greens as it injects granular insecticide below the turf surface.

Last year several greens on both of Barclay's courses were treated with an SGI, a self-propelled applicator specially designed to use high-pressure water to inject granular insecticides into the soil. It is manufactured by LIS, Inc., in Crystal River, FL.

In March 1997, the SGI was field tested with Talstar GC Granular Insecticide on Barclay's two courses. A single subsurface granular application resulted in zero mole crickets on the treated greens for the entire season.

**The Subsurface Granular Injector (SGI™) uses high-pressure water injection to apply Talstar GC granular insecticide at Twisted Oaks CC in Florida.**

By placing the insecticide exactly in the soil zone where the target pest is living, the SGI increases speed of initial kill and overall efficacy, extends residual, reduces exposure to humans and virtually eliminates the possibility of environmental run-off.

Best of all, the SGI does not damage greens. In fact, the jets of water actually serve to aerate the turf. And golfers can play greens immediately after, especially if a greens mower follows behind the SGI. A typical golf green can be treated in three to four minutes.

Don Taylor and his son Tom invented the patented SGI. The Taylors' company, LIS, Inc., specializes in industrial use of high-pressure water. The company has developed technologies using high-pressure water to cut metal or concrete, for industrial cleaning, and to inject salt-inhibiting chemicals into soil. When an avid golfer suggested that their technology might be useful in turf pest management, the Taylors began to experiment. They developed and patented a liquid sub-soil injection unit in 1994. They began working on the Subsurface Granular Injector in 1996.

While some industrial applications require up to 35,000 pounds per square inch (PSI) of water pressure, the SGI requires a mere 4,000 psi. Still, that relatively low water pressure is powerful enough to inject a granular product six to 12 inches into the soil, depending on the soil type and moisture level.

By regulating the travel speed of the SGI and selecting one of three pressure accumulators (a 6-, 20- or 60-cubic inch unit), the SGI injects granular materials to precise depths ranging from one-half inch down to the maximum of six to 12 inches. In their initial field tests, the Taylors targeted mole crickets for control and injected the insecticide to a depth of  $\frac{3}{4}$ -inch. At that injection depth the SGI's application ground speed is about 5 mph.

Licensed to control turf pests, they tested their prototype SGI unit in 1996 in a nearby park heavily infested with mole crickets. They selected a pyrethroid insecticide formulated on sand. They treated one-half acre at a depth of  $\frac{3}{4}$ -inch.

"Within days we found dead mole crick-





ets all over the place," says Don Taylor. "We came back for more than a month and saw no signs of mole cricket activity on the treated area. We also learned from the treatment that Talstar granular did not damage our equipment."

They sent a video of the treatment and results to Geri Cashion, a Florida-based technical representative with FMC Corporation, the insecticide manufacturer. Cashion met with the Taylors in early 1997 to arrange field tests on Twisted Oaks, Pine Ridge and several other sites with complementary product. For the Twisted Oaks and Pine Ridge SGI applications, the product was applied at the 140 lbs./acre rate on several of the greens. All other greens on the two courses were either left untreated as controls or treated with a standard insecticide used for mole crickets.

By May 1997, two months after the field tests began, Barclay had to treat the



**Don Taylor, president of LIS, Inc., Crystal River, FL, developed the SGI after years of working with high-pressure water for industrial uses. He says SGI can be used to apply granular or liquid.**

untreated greens because they were being chewed up by mole crickets. But his treated greens were free of the pests.

"I did not have a single mole cricket on one of my treated greens for the season," says Barclay. "There were a few fly-ins late in the fall, but I slept real good throughout the entire season."

FMC's Cashion says this study and oth-

## *The cost savings possible in reduced insecticide use and other cultural benefits could offset the SGI's \$32,000 price tag.*

ers done since with the insecticide on turfgrass, commercial turf and athletic turf show that the SGI application increases both efficacy and residual.

Cashion says subsurface application of the granular product has extended residual control of mole crickets in our field tests. Cashion says. "In others, where we would have only expected suppression due to the application rate or conditions, we have seen control."

With 45 holes on two courses to care for, Barclay says that the cost savings possible in reduced insecticide use and the many other cultural benefits could quickly offset the \$32,000 price tag for an SGI.

"An SGI can be purchased as a multi-purpose turf tool. We have used it to apply granular products, to aerate greens and to treat localized dry spots in turf. It can be used to make granular applications without concern about rainfall or during the day while golfers are using the course. It even elimi-

nates the need to water-in some products. We could use an SGI throughout the year."

Taylor says LIS began commercial production and sales of the SGI this year. Sales are already outstripping production, so LIS is moving production to a larger factory in Florida this summer.

Additional field tests with this granular

product and other granular and liquid products are also being done. Most tests are being done on golf courses along the eastern seaboard but SGIs are also being used on sports and commercial turf, parks and rights of ways.

Cashion says more research is needed to quantify the enhanced efficacy and residual gained with Talstar through an SGI application. One interesting application to explore is the use of an SGI to apply the product in flowable and granular form at the same time.

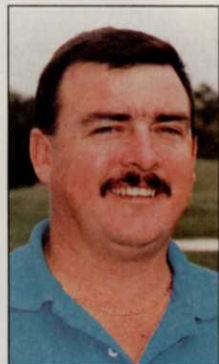
The benefit: a flowable might provide and enhanced initial kill of mole crickets, while the granular provides longer residual control.

Don Taylor says success with the SGI is proving that granular injection will be important in commercial turf management. Now the company is working on a smaller version of the SGI for use in residential lawn care.

"Subsurface granular injection in residential treatments could mean lower environmental impact and reduced exposure to people and pets," he says. "It could also require fewer applications since the residual control can be extended. Those are important benefits and we are working with several companies to test the concept.

"We feel very good about our results with the SGI. The feedback we are getting from commercial applications shows that subsurface injection is effective and meets environmental requirements." □

*Roger Stanley is a writer living in Milwaukee, WI.*



**Superintendent Chuck Barclay liked results of treatment.**