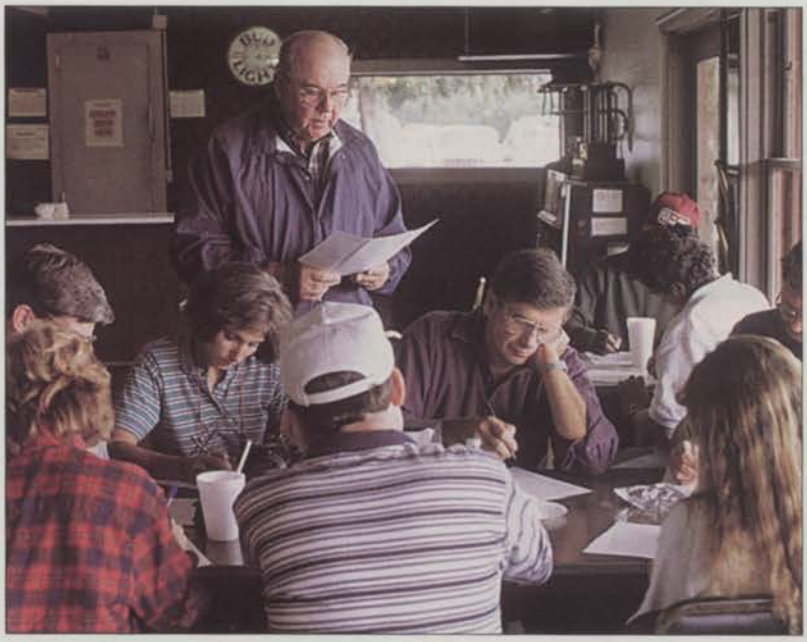
# Grubs: digging for answers

by RON HALL / Senior Editor



Dr. Harry Niemczyk, standing, gives volunteers data arising from the second day's dig at the Valley View Golf Course in Akron.

There's nothing fancy about a Harry Niemczyk grub dig. I can say that from first-hand experience.

But you should be excited about what we "diggers" learned this past fall: several new chemical products and one strain of BT show excellent promise as grub controls.

Some of the control products, the "dig" indicated, provide excellent control in these particular plots. Notable were Bayer's Merit, a strain of *Bacillus thuringiensis* (Bt) being readied for market by Mycogen Corp., and a compound submitted jointly by American Cyanamid and Rohm & Haas Co. This last molecule is being described as a molting inhibitor and is scheduled to receive an EPA experimental use permit next season, say sources at the dig.

Here's the discovery process we used:

**1)** Spade out a small square of earth.

**2)** Get down on your knees and start crumbling soil from the small chunk of sod.

**3)** As the soil falls into the plastic kitchen tub, pluck out the plump gray grubs and drop them into what looks like an empty cottage cheese container.

**4)** Count the grubs, some no larger than the head of a wood match.

"Rep 1, plot 3, no grubs," shouts one of the 15 volunteers, both men and women.

"Rep 1, plot 6, two grubs," shouts another. For two full days, that's the language of the grub dig. Some plots contain many grubs; some contain just a few; some contain none. Diggers yell out what they've found in each square plot.

Dr. Niemczyk records on a clipboard our numbers as he walks among the wooden stakes marking the boundaries of the individual test plots. We're digging to determine the effectiveness of various control products. Technicians applied the products in different formulations and rates to the test plots weeks prior to the dig.

### What does what

Some of the products applied to the plots are familiar to us—Dursban, Merit, diazinon, Sevin; some aren't because they've not yet come to market. But as we work, we're not aware which products were applied to which plots. (Nor do we care. We just dig, count, and shout out the number of grubs we've turned up.) Control plots,

About 15 volunteers, including representatives from companies testing products in the plots, dig and count grubs. Some make the dig an annual event.

**It wasn't hard to find Japanese beetle grubs in some test plots. They'd grown fat in the roots of turfgrass plants, particularly in the controls.**

because of the large number of grubs they contain, virtually announce themselves.

At lunch, over burgers and fries, we do finally learn what products were used. That's when Harry and Dr. David Shetlar tabulate the number of grubs found in each replication.

We find two types of white grubs basically, Japanese beetle grubs and masked chafer grubs. They're easy to tell apart. The "mc" grubs are further in their development and about twice the size of the "jb" grubs. They also have a light brown head and there are much fewer of them. We find most of the grubs in the turfgrass roots, and at the thatch layer, but a significant number perhaps an inch, in some cases about two inches, in the soil.

Harry's been directing the digs for more than 25 years at various northeast Ohio locations. This year we work on plots on the 15th fairway of the Twin Lakes Golf Course in Mansfield, Ohio, and in a rough at the Valley View Golf Course in Akron. Both afternoons we dig in a commons area at the OARDC in Wooster. A dig has never been rained out, says Harry, although once a wet snow briefly covered the plots.

### Growing fat

Grubs are the most damaging insect pests of turfgrass in the northeast and a major problem in the midwest too. By the time they reach the third instar they've grown fat on turfgrass roots and thatch. Then, when heat or drought of late summer stresses the grass, it dies in irregular patches. Peel off the dead layer of turf like you're peeling an orange, only the turf comes off much easier. Sometimes, skunks and crows find the grubs and eat them. They worsen the turfgrass damage.

None of this is probably news to you. But what might surprise you is the amount of money Americans (both professionals and homeowners) spend to control grubs. A representative of a major chemical company at the dig estimated the "grub market" at $50 million annually.

Dr. Niemczyk will provide a detailed look at grubs and their control, and what the 1995 grub dig uncovered on the opening day of the Ohio Turfgrass Conference, Tuesday, Dec. 5, in Columbus, Ohio. Look for our report of his findings in LANDSCAPE MANAGEMENT's spring insect control issue.

## A perfect golf gift

Want to out-environmental the environmentalists? How about using stationery made with actual turf clippings collected from golf course greens? Or giving out the stationery at Christmas?

"Golf Paper," manufactured by Four Corners Paper, is the ultimate in recycled golf products. It's available as part of a handsome stationery set.

The catch? It's not cheap. Twenty-seven note sheets and nine envelopes cost $32. Each sheet and envelope are letterpress-printed with one of three historic golf icons: a golfer, a golf ball on a tee and hickory shafted clubs.

"We were going to go with a standard 25 per box," says Christi Ballard of Four Corners. "But everyone felt three 'nines' would be more appropriate—one for the front, one for the back and one for good luck."


For a retailer near you, call (602) 991-2320.

# NASA's synthetic soil may mean less fertilizer, pollution on Earth

Imagine a flower bed that needs fertilizer only once every few years yet has a higher annual fertility than is capable with any mix of current fertilizers. And it would have less potential to pollute, to boot.

A soil to allow such fertility may soon come from space.

NASA's Johnson Space Center in Houston is working on zeolite soil, a synthetic soil system with the capability of time-releasing nutrients, perhaps over a period of years.

The key to the substance is a group of minerals called zeolites, which are found commonly across the western states as chalky, white rock. But they have the ability to adsorb and hold plant nutrients. And they can be engineered to time-release the nutrients, according to NASA's Doug Ming, a researcher at Johnson Space Center.

Zeolite can store nitrogen and potassium; another NASA-developed supplemental mineral called synthetic apatite can similarly store the other essential plant nutrients (phosphorus, calcium, magnesium, sulfur, iron, zinc, manganese, copper, molybdenum, boron and chlorine). The enriched zeolite and synthetic apatite are mixed together to form the zeolite soil mix, Ming says.

Original research stemmed from a problem of how to grow plants in the lunar soil and turned into a project involving hydroponics—growing plants in a precisely controlled and circulated nutrient-rich water solution—such as was planned to be used aboard spacecraft.

"We have continuously grown wheat in a zeolite soil mix for 225 days and still had 85 to 90 percent of its total fertility left," Ming says. "With its absorption and holding characteristics, it could provide a cost-effective solution to the increasing problem of pollution from fertilizers and their runoff."

If commercial concerns can reduce the expense involved in creating the zeolite soil, the potential for widespread use is great, NASA believes. In addition to a type of zeolite soil mix as a fertilizer, just the synthetic apatite could have potential as a fertilizer, providing the secondary and trace nutrients, Ming adds.

Future research may even reduce the need for watering by combining the zeolite soil mix with already-known materials that absorb water from the atmosphere.



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