

Zebra mussels muscling their way onto golf courses

By James E. Guyette,
Contributing Editor

■ Zebra mussels are muscling their way onto golf courses throughout the United States. These water-borne pests are found in ponds and other sources of untreated irrigation water. They make their presence known to golf course superintendents by clogging irrigation systems and rendering them inoperable. Among the available control methods are chlorination and filtration.

"It's become a real problem over the past three to five years," says Dave Davis of Davis Associates, an irrigation consulting firm headquartered in Rancho Cucamonga, Calif. "You never know where it's going to pop up, but when it does it's a pain in the neck. You've got small devices that you're putting the water through, and these devices are going to clog up."

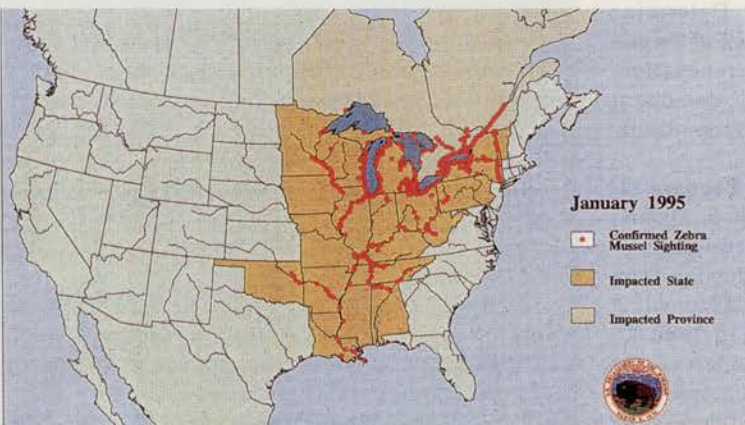
"If the mussels get into the system, it's either pay me now or pay me later," says Steve Springer, vice president at Amiad Filtration Systems, Van Nuys, Calif. "You can have literally miles of pipe clogged because they set up a colony inside there, and they can literally shut off the flow in one growing season."

A 36-inch intake pipe can become so infested that the flow area is reduced to just eight inches. (A golf course irrigation system typically has an intake pipe no larger than 12 inches.)

"That's a major problem, especially for smaller intakes," warns James C. Schmidt, vice president of sales and marketing at Applied Biochemists Inc., Milwaukee, Wis. Once the zebra mussel hits a region, it spreads rapidly to other water supplies. "They can survive hanging onto the side of a boat. These buggers can attach themselves to anything, including water fowl, aquatic plants and even plant fragments."

It is believed that zebra mussels first

came to the U.S. in the late 1980s as they stowed away in bilge water carried by an eastern European freighter. When the water was discharged the zebra mussels infested the Great Lakes and have been moving inland ever since. The massive Midwestern floods of 1993 assisted the



Orange shaded area in map above shows greatest areas of zebra mussel infestation in the United States.

zebra mussel in its migration.

"Every tributary off the Mississippi is contaminated," claims Springer. The beast has been spotted from St. Paul to New Orleans, plus it hits points east to Pittsburgh and points west to Tulsa. (The West also contends with a similar situation spawned by the Asiatic freshwater clam.)

Intakes at water treatment plants for industry and municipalities are especially plagued by the pest, and a golf course that takes its water from an untreated source is likely to have similar problems.

"It can create problems with the sprinklers and valves," Davis explains. "You find it all over the country."

Superintendents in New York have been battling the zebra mussel for a while. "We've got an awful lot of golf courses that



This retrieved golf ball shows the clinging tenacity of zebra mussels.

siphon water from the Erie Canal," points out Chuck O'Neill, coastal resources specialist with the New York Sea Grant. The contaminated canal was especially rocking

the boat at Rochester's prestigious Locust Hill Country Club, where PGA golf tournaments were threatened by a clogged irrigation system. "That got the attention of a lot of golf courses," O'Neill recalls.

Locust Hill was eventually able to control the problem.

"We chlorinate the water coming from the canal," explains superintendent Rick Slattery. "It doesn't take much chlorine to kill them," he notes. "There's a recharge pump that pumps from the canal to the irrigation pond," and a chemical feed metering pump was used to distribute the proper dosage levels. About 50 gallons of chlorine is used per season.

The two most common methods of zebra mussel control are chlorination and filtration. O'Neill notes also that iron can be used to adjust the pH of the water. "It's possible to push the pH too high or two low for the zebra mussels."

The choice between chlorination or filtration depends upon a number of factors, and superintendents or other landscape managers facing irrigation problems should choose a method that is geared toward their operation.

"Every area is a little different in what you have to do," Davis cautions. "A solution that works in Florida may not work in California. We even see it in well water in the Southwest."

Check with your county agent, water treatment companies, chemical suppliers, filtration system manufacturers, irrigation consultants or swimming pool contractors.

Chlorination "is no different than irri-

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gating with city water," says O'Neill, referring to piped-in potable water. "It's not hurting the turf if you keep the chlorine residual down low." (No more than one-fourth part per million.)

"Once the chlorine hits the air it breaks down before it hits the turf," says Slattery. A drip irrigation system may require closer monitoring to protect fragile plant materials.

Because zebra mussels die when deprived of water, baked in the sun or exposed to freezing temperatures, at Locust Hill the pond is drained each winter and all the pipes flushed in the spring. Dead or alive zebra mussels have to be removed from sprinkler heads and other parts by dipping in a bucket of chlorinated water and using fingers to pick them out.

A chemical feed metering pump can be purchased off the shelf, and this type of system can generally be implemented for under \$15,000, according to O'Neill. "It's not something that's going to break the bank."

A chlorine treatment strategy can be washed up if there are any concerns over chemicals coming in contact with sensi-



Zebra mussels die when left in freezing temperatures (left) or high temperatures, or the sun, say biologists. Actual experiences of landscape and golf course irrigation managers in the field attests to it.

tive wildlife or other environmental issues. Landscape managers at parks and some golf courses may find themselves faced with a public relations problem that needs to be addressed.

"It may become necessary to add really fine levels of filtration to the water sources," says Davis. A filtration system can cost from \$15,000 to \$30,000 on top of the initial pump station installation.

"The variables get to be so broad," Springer points out. It depends on what level of control is acceptable. It is relatively inexpensive to control the larger adult

zebra mussels. For complete control of zebra mussels, a 40 micron absolute filter is needed, while a typical golf course irrigation algae screen is in the 200 to 300 micron absolute range.

The best control strategy is to take into account local conditions when battling zebra mussels. "No two sites are exactly the same," Davis warns. Zebra mussels are a formidable opponent "They breed faster than rats," Springer notes. "They're just nasty little critters."

Annual bluegrass biology and control

by Nancy D. Williams
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■ Annual bluegrass (*Poa annua* L.) is one of the most persistent and troublesome weeds of high-maintenance turfgrasses. It is well adapted to close mowing, high nitrogen fertilization, frequent irrigation and compacted soils. It is a primary invader in damaged or open areas.

Consequently, it is sometimes maintained as a monoculture (if you can't beat it, join it) but requires intensive maintenance and frequent fungicide treatments.

Annual bluegrass is generally considered a weed because it is a prolific seed-head producer; susceptible to heat, drought and many diseases; and is unsightly when mixed with other grasses.

Lifecycle—Clearly, the most important difference affecting control decisions is the difference in the lifecycle: annual (*Poa annua* ssp. *annua*) versus perennial (*Poa annua* ssp. *reptans*) subspecies.

The perennial subspecies is more difficult to control because of its ability to survive summer heat and drought (which would kill the annual subspecies) by entering a summer dormancy and resprouting when weather is more conducive to growth.

Another difference is seed dormancy. Seed of the perennial subspecies can germinate at any time of the year while seed of the annual biotype germinates in the late summer or early fall (and sometimes early spring).

Cultural control—Weed management via cultural methods requires careful planning, close observation and patience. The five steps for reducing annual bluegrass competition are:

1) Prevent or reduce compaction.

Excess moisture and traffic induce compaction and shallow rooting, conditions which favor annual bluegrass. Using lightweight mowers, reducing traffic and core cultivation will relieve compaction. Good soil structure will provide better

drainage and water and air penetration, which encourages better root growth and competition in the desired species.

2) Avoid excess irrigation.

Proper irrigation alleviates excess moisture, providing better soil aeration and consequently better root growth. Less irrigation in the spring and fall may reduce annual bluegrass seed germination.

3) Avoid excess N fertilization.

Reduced nitrogen fertilization is the key to reducing annual bluegrass competition. In some situations, iron (Fe) may be used for turf "green-up" instead of higher N rates. Under certain conditions, low phosphorus rates have reduced annual bluegrass growth by reducing its ability to compete with desirable turfgrass species.

4) Mow at proper height.

Annual bluegrass can adapt to a wide variety of conditions, including mowing heights from 1/8 to 3 inches. Higher mowing heights will tend to favor the more

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