Bug off!

Beyond pesticides: Mosquito control goes high-tech

By ANDREW OVERBECK

When it comes to controlling mosquitoes and other biting insects, common tools such as pesticides and electric zappers may soon become a thing of the past. Thanks to cooperative research between the U.S. Department of Agriculture and two New England-based biotech companies, the latest mosquito abatement technology is now available.

American Biophysics, based in East Greenwich, R.I., launched the Mosquito Magnet in September 1998 and BioSensory of Willimantic, Conn., will release its Dragonfly model this month.

While the science behind the two products is complicated, the concept is simple. Both use carbon dioxide and an octenol lure to mimic the respiration of mammals and attract mosquitoes to the trap where they are killed and collected. However, the two machines use different luring and killing techniques and have different sources of CO2.

American Biophysics manufactures mosquito abatement equipment for scientists and entomologists who collect live insects for study. The company's professional line of equipment uses dry ice or pure CO2, two items that present some difficulties in mass production.

In order to expand the technology and the market, we had to develop a device that used a readily available source of inexpensive fuel," said Karen Salvatore, sales director for American Biophysics. "We invented a catalytic converter that

Some myths debunked concerning blue-rye mixes

By DR. ERIC K. NELSON

Combining Kentucky bluegrass and perennial ryegrass can provide a versatile, high-performance turfgrass for golf course tees, fairways and roughs in cool-season grass areas, proving to be a quick-establishing, persistent, resilient and versatile playing surface.

This statement is more true now than ever with recent releases of several new low-mow tolerant Kentucky bluegrasses. Kentucky bluegrass and perennial ryegrass have complementary characteristics, where the features and benefits of one can overcome the potential disadvantages of the other.

The key to taking advantage of both species in turf is to get them established in a balanced stand. There are many conflicting theories concerning the proper way to uniformly establish these species together. Some of the techniques are based upon research, experience and good agronomics. Others are based on hypotheses and conjecture.

However, there is more than one proper way to get the job done. Factors including species ratio in the seed mixture, seeding rate, seedling management, establishment timing and the immediate influence of Mother Nature on plant survival can all affect the results.

My general recommendation for taking advantage of features and benefits of both species in a balanced stand is to sow a mixture consisting of 80 percent (by

Al develops Environmental Audit

By JEAN MACKAY

Talk to golf course superintendents and you discover that most consider themselves stewards of the environment. After all, they work outdoors amidst the natural beauty of water, grass, trees and wildlife. But how can superintendents and course managers be sure they’re not just touting environmental stewardship, while in actual practice, hitting a double bogey? How do they know whether management practices are really on par with widely accepted standards for environmental performance?

Now, an effective new tool is available to help superintendents and club managers do just that. Audubon International has developed an Environmental Performance Audit to help superintendents, club managers and others rate their environmental performance.

The Environmental Performance Audit is a self-assessment that uses environmental performance indicators, or best management practices, to measure their work. The audit is a simple, inexpensive means to help superintendents and club managers evaluate current management practices that safeguard

Barber forms Blue Ridge

By MARK LESLIE

GREENVILLE, S.C. — He was a golf course superintendent, then a college professor and researcher, then an executive with two course management companies, at one time overseeing 44 courses in 17 states. Now Dr. Joel F. Barber has formed Blue Ridge Golf "to pro

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Mastering the mix
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weight) Kentucky bluegrass (two to four varieties) and 20 percent perennial ryegrass (one to two varieties) at 125 pounds per acre (3 pounds per 1,000 square feet, 15g/square meter). The justification for the recommendation is supported by research results and field experiences.

**JUSTIFICATION**

At 125 pounds of seed mixture per acre, the bluegrass component is sown at 100 pounds per acre which approximates optimum seeding rates for Kentucky bluegrass identified by J.H. Madison (1966). Meanwhile, the perennial ryegrass rate of 25 pounds per acre will provide for early erosion control and stabililty of the young stand.

The species ratio by bulk weight in the mixture, where Kentucky bluegrass may appear to dominate, is necessary to permit the more desirable Kentucky bluegrass to establish successfully among the perennial ryegrass seedlings. The reason that so little ryegrass is necessary is because of the difference between inherent characteristics of perennial ryegrass and Kentucky bluegrass including: number of seeds per pound, germination energy, field survival and seedling competitive ability.

**THE SEED COUNT PARADOX**

The number of seeds per pound of perennial ryegrass and Kentucky bluegrass are quite different. Most perennial ryegrass varieties have approximately 250,000 seeds per pound. Most elite Kentucky bluegrass varieties on the market may average about 1.5 million seeds per pound.

Some seed companies are quick to point out the seed count disparity when they make their recommendations for an 85-percent (bulk weight) perennial ryegrass and 15-percent Kentucky bluegrass seed mixture that will provide 50 percent of each species by seed count.

The false assumption when formulating 50/50 seed count mixtures is: A seed is a seed and they will all develop into a plant to give you a 50/50 species stand. Unfortunately, the assumption is not true because of the great difference in other more important species characteristics. As a result, these 50/50 seed-count mixes usually end up as all perennial ryegrass with none of the benefits of Kentucky bluegrass.

**GERMINATION ENERGY**

Kentucky bluegrass seed is not created equal to perennial rye seed, even though their germination percentage on the label is usually similar. First, perennial ryegrass germinates within four to 10 days from first irrigation. Kentucky bluegrass seed typically germinates in 10 to 21 days.

These germination energy differences are reflected in the standard test used to determine germination percentage for labeling purposes. The test for perennial ryegrass runs for 14 days, while the test for Kentucky bluegrass allows for a full 28 days. Since perennial rye gets the jump on Kentucky bluegrass in seedbed germination energy, the ryegrass may already start to dominate.

**SEEDLING VIGOR**

Next, after germination of both species, there is a differential rate of seedling development that favors perennial ryegrass. Perennial ryegrass will produce new tillers (shoots) and leaves rapidly and at an increasing rate, while Kentucky bluegrass does not tiller or grow as fast. Jacklin Seeds’ research director, Dr. Doug Brede, documented in his 1982 Ph.D. dissertation that individual perennial rye seedlings may develop seven to eight new tillers, while Kentucky bluegrass seedlings produce an average of only one to two new tillers after six weeks of establishment. Therefore, the difference in tillering capacity alone may quickly make up for the difference in seeds per pound between perennial ryegrass and Kentucky bluegrass.

**SEEDLING SURVIVAL**

As Kentucky bluegrass does not germinate nor develop rapidly, there is an increased risk of...
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loss in the field from environ-
mental stress, attack by pests or
competition from other plants.

Field survival of Kentucky blue-
grass seedlings was evaluated
in B rede's research that can help
judicious mowing technique.

The Latah Short Course in
Spokane, Wash., seeded tees
and fairways on Sept. 15, 1997,
with a 90-percent Kentucky blue-
gress mixture at 125 pounds per
acre. The course opened to
rave reviews on June 6, 1998. The
halfbluegrass is still going strong.

Don Tolson, superintendent at
Stock Farm Golf Course in
Hamilton, Mont., used a 90/10,
blue/rye mixture at 125 pounds
per acre.

After two weeks of establish-
ment on tees, it looked like the
ryegrass was too thin. But, after
two more weeks, the perennial
ryegrass was beginning to domi-
nate. Tolson used the close mow-
ing program to effectively set
the ryegrass back. The turfgrass
stand is now well balanced, with
a strong Kentucky bluegrass
component.

Taking the concepts of seed
count, germination energy, seed-
ling vigor and seedling survival
into consideration, sowing an 80-
percent Kentucky bluegrass and
20-percent perennial rye mixture
at a seeding rate of 125 pounds
per acre will provide 25 pounds
per acre of perennial ryegrass
(6.25 million seeds/acre assum-
ing 250,000 seeds per pound) re-
sulting in about one established
ryegrass plant every square inch.

But, remember that each
ryegrass plant is going to rap-
idly tiller and produce new leaves
that radiate out and begin to
cover the spaces between plants.
Within eight to 10 weeks, leaves
of one ryegrass plant will be
touching the surrounding
ryegrass plants in the turf and
shading the soil surface. How-
ever, about this time, the Ken-
tucky bluegrass should begin
producing rhizomes when it
reaches the three-tiller stage.
Once the rhizomes begin to
form, the entire turf stand should
be well on its way to maturity
and improved stress tolerance.

Following the recent advent
of Kentucky varieties tolerant to
closer mowing, Kentucky blue-
grass and perennial ryegrass
mixtures are a preferred choice
for golf course fairways, roughs
and tees in all traditional cool-
season grass areas.

Using the proper species ra-
tio, seeding rate and mainte-
nance during establishment, Ken-
tucky bluegrass and perennial
ryegrass mixtures will rapidly pro-
duce a dense and traffic-tolerant
turf with the diverse benefits of
both species. The mixture can
provide long-term advantages for
superintendents.