

DuPont wins fifth of nine Benlate lawsuits

The DuPont Co. has said that a federal judge granted a motion for summary judgment of the fifth of nine pending lawsuits connected to its Benlate fungicide.

A former clerical worker at a DuPont plant in Belle, W. Va., was told by the judge that she had produced no evidence that Benlate or other chemicals at the Dupont plant had caused her permanent illness.

Meanwhile, the Wilmington, Del., News Journal reported that media speculation linking Benlate and birth defects, especially the birth of babies with severe eye defects, is unsubstantiated. A Dupont spokeswoman said, according to the News Journal, that there was "not a fact, not a shred, not an iota of proof anywhere to substantiate these irresponsible claims about our products."

Report from
Iowa State University

Slow release fertilizers increase root mass

Application of four fertilizers, two synthetic slow release and two organic slow release, increased root dry matter from 52% to 131% over as compared with an unfertilized control plot. The fertilizer with the highest water-soluble nitrogen fraction, methylene urea, showed the lowest increase in root mass. The remaining slow release synthetic fertilizer, Ureaform, and the two organic fertilizers, Milorganite and corn gluten meal, all resulted in increases of over 100%. Accompanying this increase in root mass were some minor negative effects on overall quality (7% -11% decrease) for the two fertilizers that showed the greatest increase in root, Ureaform and Milorganite.

TGT's view: *This study demonstrates the long suspected benefits on root development of slow-release fertilizers. The more than 100% increases in root mass that occurred with the organic and slow release synthetic fertilizers strongly indicate that highly water soluble fertilizers based on urea and ammoniacal sources should not be used where turfgrass root development is an important consideration.*

This should also be a strong consideration where root damaging diseases such as Necrotic Ring Spot, Pythium Root Rot, Take-all Patch, Summer Patch, and Spring Dead Spot are an existing or possible problem. —CS

Michigan State study

Aeration, rototilling before planting improves rooting

A Michigan State University study found that sod rooting improved considerably when the sites were cultivated by aeration or rototilling prior to the sod installation. Rooting of Kentucky bluegrass sod improved by 49% 30 days after installation and by 46% 90 days after. This improved rooting was still evident 300 days after installation, with increased rooting ranging from 32% to 51% over non-cultivated controls. Solid tine aeration produced the best average increase of root mass (36%) over the 300 day period, followed by rototilling (29%) and hollow tine aeration (21%).

TGT's view: *Any site being prepared for sod installation should have some cultivation. If solid tine aeration is not available then either tilling or hollow tine aeration will help. Any activity that causes compaction should be avoided as the long term sodding results may prove very unsatisfactory. —CS*

Report from New Zealand

Soil permeability and deep cultivation techniques

The study compared the effects of three deep cultivation practices, Vibramole, Hydrojet and Vertidrain, on the permeability of sandy loam soil. Penetration techniques produced positive results that lasted for up to seven months. Vibration or soil-shattering did not, although the soil moisture levels were high enough to probably negate any benefits. The treated area showed increased permeability but these effects were limited to areas immediately surrounding the holes and were a function of the number of holes the procedure produced. Unlike core aeration, these techniques did not increase root mass.

TGT's view: *The use of deep cultivation techniques can be successful when used to alleviate standing water, poor drainage, or saturated soil problems, but their use as a means of improving root mass directly, like other aeration practices, is questionable. Indirectly the root mass should improve in combination with additional practices designed to combat the very negative effects of saturated soil conditions, such as improved soil chemistry and the use of wetting agents and root protecting fungicides. —CS*

New Zealand study

Greens establishment shows dramatic loss of water infiltration rates

A New Zealand study of six different means of establishing turf coverage on sand based greens showed dramatic losses of water infiltration rates for all of the establishment techniques after the turf was subjected to simulated wear.

Six different cover establishment techniques were used.

Table 1 shows the reduction in water infiltration rates of the six different establishment techniques after one simulated wear session and after a second wear session.

TGT's view: This study shows that wear or traffic stress will always reduce water infiltration rates on turf areas but turfgrass managers should choose establishment techniques with these results in mind.

Penn State research has shown that turf establishment by sod is the best method in non-wear areas but this study suggests that, where traffic is a concern, seeding at normal and high rates is the preferable method of establishment for long term turf survival. —CS

Table 1
Percent Reduction In Water Infiltration Rates

Technique	After First Wear	After Second Wear
Seeded at 7lbs./1000 sq. ft.	41% reduced	22% reduced
Seeded at 21lbs./1000 sq. ft.	48% “	23% “
Juvenile sod (6-8 weeks old),	37% “	64% “
Mature sod on sandy soil,	89% “	91% “
Mature sod on clay loam soil,	95% “	78% “
Washed sod (sandy sod with soil removed).	77% “	68% “

Illinois study

Dormant fertilization shows higher rates of nitrogen produce best results

A study of various dormant fertilizer sources applied at two rates over a four-month span found that the higher rates of nitrogen produced the best spring green-up results in the spring. The study conducted in Illinois examined three fertilizers at 1# and 2# nitrogen rates applied in October through January. Although the spring green-up varied in its time of occurrence and was not comparable from year to year, the 2# nitrogen applications consistently produced better spring green-up results than the same fertilizer applied at the 1# nitrogen rates. Applications of Urea

produced the best results when applied in December or January, while organic-based fertilizers were consistent in their response by month and SCU produced the best results when applied in November and December.

TGT's view: The date of application should be determined by the fertilizers that are to be applied. Organics can be applied any time the turf has reduced its vertical growth. Intermediate release fertilizers should be applied in November and fast release fertilizers should be applied as late as possible. —CS

News Briefs

University of Rhode Island study

Tall fescues are more efficient at leaf growth

A study at the University of Rhode Island tested six varieties each of three turfgrass species for their ability to take up nitrogen and their ability to turn that nitrogen into leaf growth. Six varieties of tall fescue, bluegrass and perennial ryegrass were rated for their ability to produce clippings, nitrogen leaf concentrations, and efficiency of nitrogen use. Over the growing season, the tall fescue varieties produced an average of 50% more leaf tissue while having the lowest leaf nitrogen content and the greatest

nitrogen-use efficiency. Table 1. below lists the results of this study.

TGT's view: *Tall fescue varieties would be excellent choices for turf areas that have limited fertility or that have limited budgets for control or preventative applications. Tall fescue's efficient use of available nitrogen combined with that species insect and disease resistance make it an excellent choice for low maintenance areas. —CS*

Table 1

Species	Leaf Growth	Nitrogen Leaf Content	Nitrogen Use Efficiency
Ryegrass	0% increase	16% increase	4% increase
Bluegrass	28% “	12% “	0% “
T. fescue	50% “	0% “	21% “

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include *Cosmarium*, *Coccomyxa*, *Cylindrocystis*, *Dactylothece*, *Mesotaenium*, *Klebsormidium*, and *Ourococcus*. All but the latter two are capable of producing surface crusts and slime. The two most abundant genera of cyanobacteria in turfgrasses include *Nostoc* and *Oscillatoria*. The latter genus has been implicated as the primary cause of slime formation on golf greens. The cyanobacteria are also known for their abilities to fix atmospheric nitrogen, which, in some instances, may actually contribute to the nitrogen nutrition of the turfgrass plant.

Algae are strictly dependent on adequate soil moisture for activity. Algal problems occur whenever the soil remains wet for prolonged periods of time and where the soil surface is exposed or the turfgrass stand is thin and weak. Although fertility has no clear relationship to algal activity, the use of acidifying fertilizers such as ammonium sulfate can enhance algal colonization.

In addition to the more conspicuous colonies of algae on the surface of turfgrass soils, many algae colonize the surfaces of plants. Although in greenhouse ornamental production, many of these plant-colonizing algae can be detrimental to plant growth, their effects on turfgrass plants are largely unknown.

Challenges for the Future

Soil contains an extremely rich wealth of biological resources in the form of microorganisms. These microbes

influence all of the important processes related to plant nutrition and the general maintenance of plant health. Furthermore, soil microbial communities provide a genetic resource of potentially useful products and processes that can be exploited for the management of turfgrasses. The challenge to turfgrass managers is to become experts, not only in the management of what they can see above-ground, but to master the management of the beneficial soil microorganisms to achieve the maximum, sustainable means of plant nutrition and plant protection.

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enhancing fertility and horticultural properties. This emphasis will reflect sources of future funding for turfgrass research as well as a renewed sense of accountability among scientists and academic institutions in addressing and solving problems facing our society.

Because of the increased technical competence and knowledge base required of turfgrass professionals in coming years, we at *Turfgrass Trends* will do our best to keep you abreast of the latest developments in turfgrass science and technology as well as in management and regulatory issues affecting your profession. Information management will be central to your abilities to keep up with a rapidly changing societal, political, and scientific environment.