

'Quality' water for your plants

by W. Lee Berndt, Ph.D.

Water quality is vital to turf and landscape plants. Four aspects of water govern its quality:

- 1) the level of dissolved salts;
- 2) the level of sodium ion relative to other cations;
- 3) the level of bicarbonate ion relative to cations; and
- 4) the level of potentially toxic ions like boron.

Lab testing is needed to judge the quality of a water. A better grasp of the lab terms will give more meaning to the test results.

Salinity and Soluble Salts. Some waters have high levels of dissolved salts. Irrigating with these waters adds salts to the soil. As the salts accumulate, they cause plant stress. For example, salt build-up in soil causes the water in plant cells to flow back into the soil. This is called crenation. It causes the plants to wilt when

soil water is adequate. As a result, the plant's energy is diverted away from the normal growth process.

Irrigating with water that is high in sodium may destroy the soil's structure.

The EC (electrical conductivity) of a water is measured to find the level of dissolved salt. The EC of a water varies directly with the salt content. EC is measured in units termed micromhos per centimeter ($\mu\text{mhos cm}^{-1}$). Water with an EC of less than $750 \mu\text{mhos cm}^{-1}$ is the most suitable for irrigating turf and landscape plants (see Table 1).

Leaching to Control Salts. Leaching a soil with water will help to prevent the build up of salts. Without leaching, the salts gather in direct proportion to the EC of the water. The LR (leaching requirement) is given by the formula: $LR = EC_{iw} \div EC_{dw}$ where EC_{iw} is the EC of the irrigation water and EC_{dw} is the EC of the drainage water percolating from the bottom of the rootzone. In effect, EC_{dw} is the maximum level of salt the plant of interest can tolerate (see Tables 2 and 3).

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Table 1. Classification of irrigation water based on the level of soluble salts (EC), and the ratio of sodium to calcium plus magnesium (SAR). EC is measured in units called micromhos per centimeter ($\mu\text{mhos cm}^{-1}$)*.

Class of Water	Designation	EC ($\mu\text{mhos cm}^{-1}$)	SAR
C1	Low Salinity	< 250	---
C2	Medium Salinity	251-750	---
C3	High Salinity	751-2,250	---
C4	Very High Salinity	> 2,251	---
S1	Low Sodium	---	< 10
S2	Medium Sodium	---	10.1 - 18
S3	High Sodium	---	18.1 - 26
S4	Very High Sodium	---	> 26

* Many labs give the value of EC in millimhos per centimeter (mmhos cm^{-1}), in desci-siemans per meter (dS m^{-1}), or in siemens per meter (S m^{-1}). $750 \mu\text{mhos cm}^{-1} = 0.750 \text{ mmhos cm}^{-1} = 0.750 \text{ dS m}^{-1} = 0.075 \text{ S m}^{-1}$.

Table 2. Approximate salt tolerance of select grasses and landscape plants.

2,000 $\mu\text{mhos cm}^{-1}$	3,000 $\mu\text{mhos cm}^{-1}$	4,000 $\mu\text{mhos cm}^{-1}$	6,000 $\mu\text{mhos cm}^{-1}$	8,000 $\mu\text{mhos cm}^{-1}$	> 8,000 $\mu\text{mhos cm}^{-1}$
Star Jasmine	Pineapple Guava	Kentucky Bluegrass	Glossy Privet	Tall Fescue	Creeping Bentgrass
Oregon Grape	Chinese Holly	Colonial Bentgrass	Yellow Sage	Perennial Ryegrass	Bermudagrass
Photinia	Rose, cv. Grenoble	Red Fescue	Orchid Tree	Chewings Fescue	Zoysiagrass
Pyreneas Cotoneaster	Glossy Abelia	Annual Bluegrass	Southern Magnolia	Blue Gramma	St. Augustinegrass
	Southern Yew	Centipedegrass	Japanese Boxwood	Orchardgrass	Western Wheatgrass
	Tulip Tree	Meadow Fescue	Indian Hawthorne	Smooth Brome	Tall Wheatgrass
		Heavenly Bamboo	Spreading Juniper	Weeping Bottlebrush	Alkaligrass**
		Laurustinus	Thorny Elaeagnus	Oleander	Seashore Paspalum**
		Algerian Ivy	Pyracantha	European Fan Palm	Natal Plum
		Chinese Hibiscus	Cherry Plum	Blue Dracaena	Evergreen Pear
		Strawberry Tree	Japanese Black Pine	Spindle Tree	Bougainvillea
		Crape Myrtle	Oriental Arborvitae	Rosemary	Stone Pine
			Xylosma	Aleppo Pine	Ceniza
				Sweet Gum	Brush Cherry
					White Iceplant*

* > 10,000 $\mu\text{mhos cm}^{-1}$

** > 16,000 $\mu\text{mhos cm}^{-1}$

Table 3. Leaching requirement (LR) as related to the electrical conductivity (EC) of irrigation water and plant salt tolerance.

EC of Irrigation Water ($\mu\text{mhos cm}^{-1}$)	Maximum Plant Salt Tolerance		
	4,000 $\mu\text{mhos cm}^{-1}$	8,000 $\mu\text{mhos cm}^{-1}$	12,000 $\mu\text{mhos cm}^{-1}$
100	2.5	1.2	0.8
250	6.2	3.1	2.1
750	18.8	9.4	6.2
2,250	56.2	28.1	18.8
5,000	---	62.5	41.7

Example: Assume the plant has a maximum salt tolerance of 4,000 $\mu\text{mhos cm}^{-1}$, and assume that the EC of the water utilized for irrigation is measured at 2,250 $\mu\text{mhos cm}^{-1}$. An extra 56.2% more water would need to be applied with each irrigation to continuously leach salts from the rootzone. $LR = EC_{iw} \div EC_{dw}$ where EC_{iw} = EC of the irrigation water to be applied, and EC_{dw} is basically the salt tolerance of the plant of interest.

Table 4. Background information on ions with regard to the quality of irrigation water for turfgrasses.

Ion	Name	mg meq ⁻¹	meq mg ⁻¹	Acceptable Level for Irrigation Water
Na ⁺	sodium	22.98	0.0435	SAR of 9-10 or less; SAR _{adj} of 3-6 or less; less than 70 ppm or 3 meq L ⁻¹
K ⁺	potassium	39.10	0.0256	
Mg ²⁺	magnesium	12.16	0.0823	
Ca ²⁺	calcium	20.04	0.0499	
Ni ²⁺	nickel	29.35	0.0340	less than 0.5 ppm or 0.02 meq L ⁻¹
Cu ²⁺	copper	31.77	0.0318	less than 2 ppm or 0.06 meq L ⁻¹
Zn ²⁺	zinc	32.69	0.0306	less than 5 ppm or 0.15 meq L ⁻¹
Cd ²⁺	cadmium	56.20	0.0178	less than 0.005 ppm or 9.0 x 10 ⁻⁵ meq L ⁻¹
B ³⁺	boron	3.60	0.2778	less than 1-2 ppm or 0.2-0.6 meq L ⁻¹
Cl ⁻	chloride	35.45	0.0282	less than 250 ppm or 7 meq L ⁻¹
HCO ₃ ⁻	bicarbonate	61.02	0.0164	RSC of less than 1.25; less than 120-180 ppm or 2-3 meq L ⁻¹
NO ₃ ⁻	nitrate	62.00	0.0161	
CO ₃ ²⁻	carbonate	30.01	0.0333	
SO ₄ ²⁻	sulfate	48.03	0.0208	less than 250 ppm or 5.2 meq L ⁻¹
PO ₄ ³⁻	phosphate	31.66	0.0316	

ppm = parts per million = milligrams substance per liter of water (mg L⁻¹)

meq = number of milliequivalents of a substance

meq L⁻¹ = number of milliequivalents of substance per liter of water

meq mg⁻¹ = number of milliequivalents of substance per milligram of substance

mg meq⁻¹ = number of milligrams substance per milliequivalent of substance

(ppm)(meq mg⁻¹) = meq L⁻¹

(example: 70 ppm sodium x 0.0435 meq mg⁻¹ = 3 meq L⁻¹)

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Sodium Ion and the Sodium Hazard. Irrigating with water high in sodium (Na⁺) may destroy the soil's structure. As the Na⁺ is added to the soil, it adsorbs to the exchange sites.

If Na⁺ becomes the dominant cation on the exchange sites, the soil particles tend

Ions in a water can affect plants—even be toxic to them.

to repel each other. This is termed dispersion. When a dispersed soil is dried it forms a hard crust. Dispersion hinders the drainage that is vital to plant growth.

The levels of Na⁺ and other ions in a water are measured in a variety of ways. The levels are given in units called meq L⁻¹ (milliequivalents per liter) or in units called ppm (parts per million) (see Table 4). Once the levels of Na⁺, calcium (Ca²⁺), and magnesium (Mg²⁺) are known an SAR (sodium adsorption ratio) can be calculated for a water:

$$SAR = \frac{Na^{+}}{\sqrt{(Ca^{2+} + Mg^{2+}) \div 2}}$$

The SAR is a term that expresses the relative Na⁺ hazard of a water. It is a ratio of the level of Na⁺ to the levels of the other major cations. Water that has an SAR value of less than 9-10 is the most suitable for irrigating turf and landscape plants (see Table 1). SAR values greater than 9-10 imply that Na⁺ levels are excessive.

Bicarbonate Hazard. Irrigating with a water that has a high level of bicarbonate (HCO₃⁻) may also destroy the structure of the soil. When HCO₃⁻ is present in a water it can react with the Ca²⁺ and Mg²⁺ to form carbonate salts. This reaction increases the proportion of Na⁺.

The bicarbonate hazard of a water is given by the term RSC (residual sodium carbonate). Once the levels of HCO₃⁻ and CO₃²⁻ are known the RSC can be calculated: $RSC = (HCO_3^- + CO_3^{2-}) - (Ca^{2+} + Mg^{2+})$

A water with an RSC of less than 1.25 is safe. A water with an RSC of greater than 2.5 has a high HCO₃⁻ hazard. An adjusted value of SAR will also reflect the HCO₃⁻ hazard of a water: $SAR_{adj} + SAR [1 + (8.4 - pH)]$ where pH is a calculated value (see Table 5). Water with an SAR_{adj} of less than 6 is safe while water with a value greater than 9 may pose severe prob-

lems regarding HCO_3^- .

Toxic Elements. Certain ions that are present in a water can be directly toxic to plants. Ions in a water that may be toxic to plants include Na^+ , Cl^- (chloride), and B^{3+} (boron). Boron is needed for normal growth in very small quantities. Injury can occur to plants if that level is exceeded. Boron can injure lemon trees and American elms when levels in soil water are 0.5 ppm (see Table 6).

Summary. Ions that are in a water will affect the health and vigor of landscape plants. High levels of dissolved salts cause plant stress while high levels of Na^+ and HCO_3^- affect soil structure. Other ions like B^{3+} can be directly toxic to plants. Routinely test a water that is used to care for plants. The results of water testing can make a difference in your plant care practices.

Table 5. Data necessary to calculate pHc and SAR_{adj} .

Total meq L^{-1}	$\text{pK}_2 - \text{pK}_C$	pCa^{2+}	pHCO_3^-
0.1	---	4.30	4.00
0.5	2.11	3.60	3.30
1	2.13	3.30	3.00
2	2.16	3.00	2.70
4	2.20	2.70	2.40
6	2.23	2.52	2.22
8	2.25	2.40	2.10
10	2.27	2.30	2.00
15	2.32	2.12	1.82
20	2.35	2.00	1.70
25	2.38	1.90	1.60
30	2.40	1.82	1.52
35	2.42	1.76	1.46
40	2.44	1.70	1.40
50	2.47	1.60	1.30

Sample calculation: assume water contains 2.0 meq Ca^{2+} per liter, 1.0 meq Mg^{2+} per liter, 3.0 meq Na^+ per liter, and 5.0 meq HCO_3^- per liter. The total cation concentration is 6 meq per liter. Therefore, $\text{pK}_2 - \text{pK}_C = 2.23$. The value of pCa^{2+} at 2 meq per liter equals 3.00 and the value of pHCO_3^- at 5.0 meq per liter equals 2.31. The pHc is the sum of these values, or 7.54. The $\text{SAR} = 2.45$. The $\text{SAR}_{\text{adj}} = 2.45[1 + (8.4 - \text{pHc})] = 4.56$.

Table 6. Approximate boron tolerance limits of select grasses and landscape plants.

Sensitive < 0.5 ppm	Sensitive 0.5-1.0 ppm	Semi-sensitive 1.0-2.0 ppm	Semi-tolerant 2.0-4.0 ppm
Oregon Grape	Persimmon	Gladiolus	Bottlebrush
Photinia	Grapefruit	Olive	Date Palm
Xylosma	Avacado	Sweetpea	Carnation
Thorny Elaeagnus	Cherry	Blue Dracaena	California Poppy
Laurustinus	English Walnut	Sunflower	Japanese Boxwood
Wax-leaf Privet	Apple	Marigold	Oleander
Pineapple Guava	Zinnia	Poinsettia	Chinese Hibiscus
Spindle Tree	Pansy	China Aster	Sweetpea
Chinese Holly	Violet	Gardenia	Kentucky Bluegrass
Juniper	Larkspur	Southern Yew	
American Elm	Glossy Abelia	Brush Cherry	Tolerant
Yellow Sage	Geranium	Ceniza	4.0-8.0 ppm
Lemon	Rosemary	Blue Dracaena	Indian Hawthorne
Blackberry	Orange		Natal Plum
			Oxalis
			Purple Vetch

SOIL: the source of turf life

The savvy landscape manager knows soil is a medium to support ornamental plant life, a vital component of the ecosystem.

by John Fech, Ph.D.,
University of Nebraska

■ To some, it's nothing more than "dirt" that sticks to their shoes when wet. Others think of soil as something to be swept away and discarded or covered. An engineer may view soil as something to be moved during a construction project.

Good, healthy soil is a dynamic living system with many biological, chemical and physical properties. In landscape soils, one of the most important properties that affects plant growth and vigor is aeration.

Aeration is a measure of the rate at which oxygen is able to move through the soil to the plant roots.

Oxygen movement depends on the soil water content. A well aerated soil is composed of about 50 percent solids, 25 percent water and 25 percent air spaces or voids (Fig. 1). Soils which have less than 25 percent air spaces are considered compacted and limit root growth to some degree.

Compaction can be caused by foot and vehicle traffic, soil texture and maintenance procedures conducted on the site such as irrigation, fertilization and mowing. Heavily trafficked areas are subject to compaction, and the turfgrass growing in compacted sites usually becomes thin and non-vigorous (Fig. 2).

Soils most likely to be compacted are those with a heavy clay content. The percentage of clay, sand and silt in a given soil combine to form the soil's texture. A soil testing laboratory can make the most accurate assessment of a soil's texture. Once the percentage of each component is calculated, soil texture is determined by using a textural triangle (Fig. 3). The

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three sides of the triangle represent increasing or decreasing percentages of sand, silt and clay. By drawing lines through the known percentages, a soil texture classification can be made. A loam is an ideal combination of the three.

Water retention—Each component (sand, silt and clay) varies in its capacity to retain nutrients and water. Clay has the greatest retention capacity.

Sands tend to drain quite readily, and silty soils range from

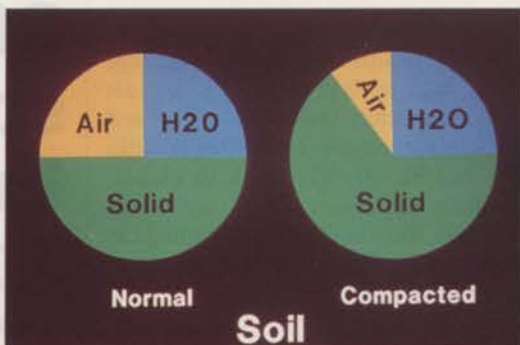


Fig. 1—A well aerated soil is composed of about 50 percent solids, 25 percent water and 25 percent air spaces or voids.



Fig. 2—For a very small fee, soil labs will test your soil and tell you its components so you can make fertility determinations.

intermediate to slow draining.

Soil drainage and water/nutrient retention is a function of particle size and surface area. Clays and loams have much greater surface area than sands. In fact, the surface area increases 1000 times per unit weight as the particles decrease in size from very coarse sand to clay.

The effect of decreasing particle size can be related to a deck of playing cards, which has a small amount of surface area exposed. However, when the deck is subdivided into each card, surface area increases greatly. Chemical and physical reactions in the soil relating to nutrient and water holding capacity and availability occur at the particle surface. Therefore, the greater the surface area, the greater the nutrient and water-holding capacity.

An ideal soil profile is depicted in Fig.

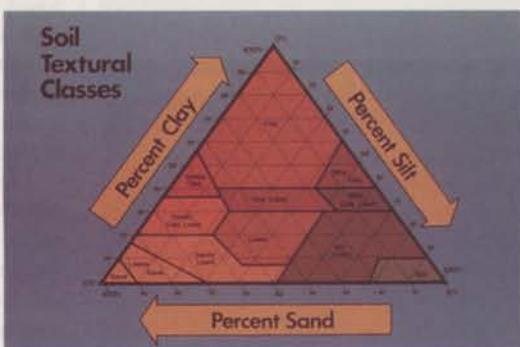


Fig. 3—Once the percentage of each component is calculated, soil texture is determined by using a textural triangle.

4. In general, the "A" horizon is rich in organic matter and water/nutrient holding capacity. At least 12 inches of "A" horizon is desirable to support turf and tree growth. In many recently disturbed soils (as in new housing developments, shopping malls), little or no "A" horizon exists.



Fig. 4—At least 12 inches of rich organic matter ("A" horizon) is desirable to support turf and tree growth.

Instead, a thin layer of "A" covers extensive depths of "B" and "C" horizons, which have poorer rooting properties.

pH a factor—Relative soil acidity—or pH—is another major property. Soils with a pH of 7 are neutral, with a balance of positive and negative ions. Most ornamental plants and turfgrasses grow well in slightly acid soils that have a pH between 6 and 7. The pH of a soil has a major effect on nutrient availability. Alkaline soils above 8, and acid soils below 5.5 tend to "tie up" certain nutrients and make them unavailable. The classic example of this is pin oak chlorosis.

When diagnosing plant disorders, remember to consider the soil as a potential cause of the decline. The old adage, "out of sight, out of mind" applies to soils. Half of the plant is growing in the soil below, and can't be seen. Examination of the physical and chemical properties of soil through soil testing and root system observations can go a long way toward diagnosing a suspected plant problem.

—The author is an extension educator for the University of Nebraska Cooperative Extension.

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HOT TOPICS

Heat, humidity fry turf in Midwest and East; promote disease and crabgrass; force turfseed prices up.

NATIONAL REPORT—"It's a year of burnout," says Stan Zontek of the USGA Green Section. "It's September 13th and there's some dead grass, and trees are already dropping leaves."

"But most of the grass looks worse than it is. Turfgrass is amazingly resistant."

A worldwide shortage of grass seed, coupled with blistering heat, then a late-summer drought in the grass-rich Midwest and Eastern U.S., are forcing prices of proprietary brands up drastically.

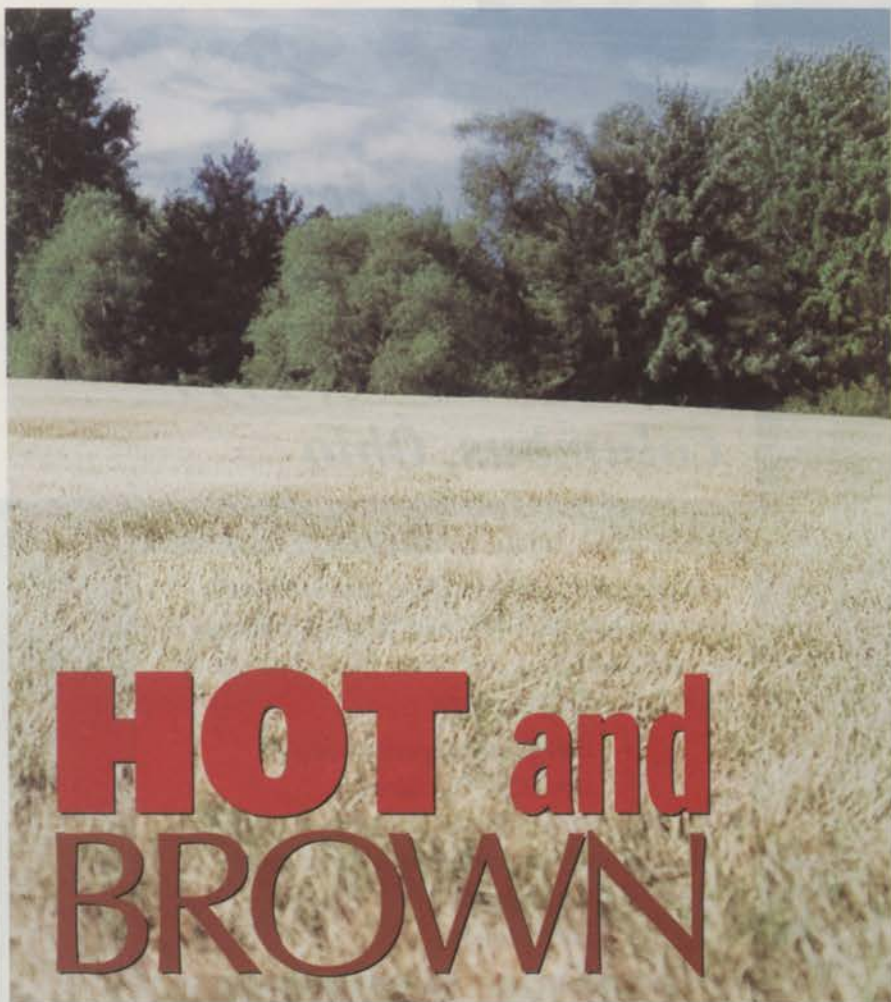
"Demand is tremendous," Mike Robinson of Seed Research of Oregon told LM on September 11th. "Sales are up at least 20 percent, and I think that's industry-wide—and we've still got half of September and all of October to go."

A band of land from Chicago to Philadelphia was among the hardest hit. In Chicago, for instance, at least 50 golf greens had been killed, says Robinson.

"Turf is just dead everywhere," he says, "and it's not just home lawns; it's golf courses, too—even those with irrigation."

Bruce Church says the second-hottest summer in Chicago history forced D.R. Church Landscaping to send out water trucks in double shifts, night and day. Yet increased incidence of crabgrass, summer patch, leaf spot and grubs were unavoidable, meaning...

"We're doing tons of renovations," he says. "We're trying to blend in patches of new turf, but I get the feeling that the renovations we're doing now will be just a small portion of what we'll be asked to do



next spring."

Even though the weather boosted the demand for turf renovations, nobody's hoping for a repeat of 1995's crabgrass and turfgrass disease problems.

"We've had a ton of crabgrass," reports Steve Van Noord of Weed & Feed Lawn Care, Byron Center, Mich. "Everybody has their theories as to why, and I'm not sure either, but it seems that every fourth or

fifth year we have a bad year for crabgrass."

Several Ohio lawn care pros speculate that the near-tropical conditions—weeks of continuous high heat and humidity—proved to be too much for pre-emergents at their labeled rates. Most customers generally understood that the unusual conditions were at fault, they say.

Clark Throssel, associate professor at

ELSEWHERE

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Purdue University, West Lafayette, Ind., says frost will kill the crabgrass. Even so, some managers will probably be looking for new products when buying pre-emergents this winter.

He provides these tips:

✓ When selecting a pre-emergence herbicide, stick with what works.

✓ If change is necessary, talk with peers and colleagues and find out what's working in your area.

✓ Once you chose a new product, try it on only a small portion of your accounts.

✓ Keep in mind the kind of equipment you use and if it is compatible with the pre-emergent.

✓ Be aware that some products stain sidewalks and equipment.

Turfgrass diseases clobbered many turfgrass areas, too.

Joe Rimelspach, extension turfgrass pathologist with the Ohio State University, says that brown patch (rhizoctonia) and phythium were especially active in Ohio. Turf got a double whammy when soil temperatures kept rising through mid-summer. When cooler temperatures finally did arrive, so did drought in many parts of the Midwest and Mideast. All these factors combined to stress turfgrass.

"Roots were deteriorating and there was no new root growth or initiation for weeks on end," says Rimelspach of the unusually hot summer weather. "Turfgrass just got weaker and weaker and weaker."

The problem was most dramatic on golf courses where high traffic and low mowing heights gave turfgrass little respite. "A lot of the grass that died on golf courses was almost out of control of the superintendents," says Rimelspach.

Meanwhile, seed prices are rising, partly because the international market is so tight. In other high-demand years, U.S. turfseed marketers were able to import seed from New Zealand or Europe. This year, that won't happen because of high overseas demand. An early indication was the price of tall fescue, which went up almost 15 cents a pound from mid-August through mid-September.

"We can't get the seed cleaned fast enough," Seed Research's Robinson contends. "And if the grass gets moister—as it is starting to do—and the fall stays mild, we will also see tight supplies next spring.

"We have never totally run out of seed, but that's not to say it can't happen."

—Jerry Roche, Ron Hall, James Holter

GIE GREEN INDUSTRY EXPO

The National Expo For Lawn & Landscape Professionals

Keynote message: learning how to cope

MARIETTA, Ga.—Charlie Plumb, a former prisoner of war, is the keynote speaker Nov. 13th at the Green Industry Expo.

Plumb, a former naval aviator who was shot down during his 75th combat mission over North Vietnam, spent six years in a Communist POW camp. The author of "I'm No Hero" and "The Last Domino" will emphasize the value of inner strength and how people in their business and personal lives create their own prisons through fear of failure, blaming others and self-pity. His message is said to be upbeat and entertaining.

Plumb's presentation on how to overcome adversity to achieve a more effective, productive life will begin at 2:30 p.m. in the Fort Worth (Texas)/Tarrant County Convention Center theater. It is one of many exciting events to be held during this nearly week-long celebration of the lawn and landscape industries.

Educational conferences by the three Expo co-sponsors (Professional Lawn Care Association of America, Associated Landscape Contractors of America, Professional Grounds Management Society) begin Sunday, Nov. 12.

The trade show kicks off with its Grand Opening and reception Monday at 4 p.m. It continues Tuesday and Wednesday. The GIE concludes with its popular outdoor equipment demonstration at nearby Trinity Park Thursday morning.

Although trade show registration will be available on-site for \$15 per day, to attend any of the educational sessions, you must register with one of the sponsoring organizations. A registration with one co-sponsor will automatically entitle you to attend educational sessions sponsored by any of the three organizations.

For more trade show details and exhibitor information, contact Eleanor Ellison at (770) 973-2019. To register for one of the three conferences, contact PGMS at (410) 584-9754; PLCAA at (770) 977-5222; or ALCA at (703) 620-6363.

(CLIP AND SAVE)

GIE SCHEDULE-AT-A-GLANCE Sunday, Nov. 12

ALCA certification exams, 9 a.m.-3 p.m.
PGMS computer sessions, 9 a.m.-noon, 1-4 p.m.
ALCA tour of leading companies, 1-5 p.m.
PGMS pre-conference tour, 1-5 p.m.
PLCAA pre-conference seminar, 2-5 p.m.
PLCAA President's Reception, 6-7 p.m.
ALCA welcome reception, 6-7 p.m.
PGMS welcome reception, 6-8:30 p.m.
PLCAA Western Roundup, 7-8:30 p.m.
ALCA rodeo party at Billy Bob's, 7-10 p.m.

Monday, Nov. 13

ALCA Breakfast with Champions, 6:45-8:30 a.m.
PGMS Business Over Breakfast, 6:45-8:30 a.m.
PLCAA, ALCA Western picnic lunch, noon-1 p.m.
PGMS annual business meeting, 1-2:15 p.m.
GIE keynote address, 2:30-4 p.m.
GIE Grand Opening & Trade Show reception, 4-6 p.m.
PLCAA new & prospective member Fiesta Reception, 6:30-7:30 p.m.
ALCA Ask the Experts, 6:30-10 p.m.
PGMS Brag Night, 8-10:30 p.m.

Tuesday, Nov. 14

ALCA Breakfast with Champions, 6:45-8 a.m.
PLCAA breakfast roundtables, 7-8:15 a.m.
PGMS Business Over Breakfast, 6:45-8 a.m.
PGMS Past Presidents Breakfast, 6:45-8 a.m.
PGMS Certified Grounds Manager (CGM) breakfast, 6:45-8 a.m.
PGMS CGM meeting, 8-9:45 a.m.
PLCAA Annual Meeting, 8:30-10 a.m.
GIE Trade Show, 10 a.m.-4 p.m.
PGMS Branch/National Meeting, 3:30-5 p.m.
PLCAA live auction, 5:30-7:30 p.m.
ALCA awards reception and banquet, 6-10:30 p.m.
PGMS awards banquet and reception, 7-10 p.m.

Wednesday, Nov. 15

PLCAA breakfast roundtables, 7-8:15 a.m.
ALCA Breakfast with Champions, 6:45-8:00 a.m.
PGMS Business Over Breakfast, 6:45-8 a.m.
GIE Trade Show, 10 a.m.-4 p.m.

Thursday, Nov. 16

GIE Outdoor Equipment Demonstration, 9 a.m.-noon
GIE Board of Directors meeting, 1-5 p.m.



Environmental issues becoming politicized

ALEXANDRIA, Va.—"Environmental issues will be focused on by both parties," predicts David Crow, a Washington-based political consultant to RISE, Responsible Industry for a Sound Environment.

"We need to work the regulatory process a lot harder than we have been," Crow contends. "Our issues have become politicized in a way we didn't want.

"We don't expect to get much work done [in Congress] in 1996," says Crow, because politicians will be posturing for the election year. "In a lot of ways, the system isn't built to work better."

Crow was one of a raft of speakers at RISE's annual meeting here last month.

"We think we can get FIFRA through this year," he said, "and maybe a water bill that we can live with. If we can get these two things done, we'll have had a great year. But we have to stay focused on our issues, and make them good bipartisan

Manufacturers file suit against the U.S. EPA

BETHESDA, Md.—On September 5th, the Portable Power Equipment Manufacturers Association (PPEMA) filed suit against the U.S. EPA.

The PPEMA is challenging the EPA's recent approval of California's Tier II exhaust emission regulations for portable power equipment which, according to an independent study, will virtually eliminate the market in California for portable gasoline-powered equipment.

The suit requests judicial review of the EPA's decision. It charges that the EPA failed to comply with the requirements of the Clean Air Act, which mandate that it conduct a comprehensive feasibility study of the California regulations before granting approval.

If the Tier II regulations are, indeed, enacted, several major user groups will be affected, including landscape contractors, arborists and parks & recreation departments.

efforts."

"(We can probably expect legislation in September" on the Safe Drinking Water Act, the newest press release from RISE says.)

Delaney—Congressmen, generally, are recognizing that the Delaney Clause to FIFRA is outdated because of definitions that have not evolved with technology.

If passed, H.R. 1627, now in committee, would:

- replace the Delaney Clause with a negligible risk standard;
- require tolerances that protect the health of infants and children;
- streamline EPA's authority to remove certain pesticides from the market by requiring it to cancel and suspend dangerous pesticides within one year;
- provide uniform pesticide tolerances; and more.



Despite a Republican majority, the 'Senate didn't really embrace the Contract with America,' David Crow says.

"I'm skeptical that the whole package of FIFRA can make it through," observes Kate DeRemer of the Senate Agriculture, Nutrition and Forestry Committee, "but the 'minor use' portion could."

She notes that Sen. Pat Leahy (D-Ver.) believes that "some sort of stewardship should be legislated rather than voluntary" on the part of manufacturers.

Predictions—National legislation will continue to move slowly, several speakers noted, because the country is divided over most issues.

"There's no real consensus in this country" said Crow. "It's as confusing a time as I can remember. What's happening in Washington is absolutely as clear as mud.

"I would bet that in 1996, Clinton will be re-elected, but the House and Senate will pick up more Republicans."

Other major programs at the meeting focused on the President's Council on

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L.A. continues attack on power leaf blowers

LOS ANGELES—Councilman Marvin Braude of Los Angeles has proposed the third bill in nine years aimed to ban the sale and use of gasoline-powered leaf blowers.

"They merely blow one person's dirt and leaves onto someone else's yard or onto their car or under their door and into their living rooms," Braude contends. "Simply blowing debris from one place to another accomplishes nothing, except polluting the air and making people angry."

Section 112.05 of the current Municipal Code allows leaf blowers if they are no louder than 65 decibels at a distance of 50 feet.

"If we had a law which simply banned... these machines, we would not have to

worry about having specially trained [noise abatement] officers using expensive, sophisticated equipment to handle enforcement," Braude said in a press release.

The press release went on to mention that:

- "one hour's use of a leaf blower produces as much volatile organic compound pollution as 100 miles of driving an automobile" and

- "by generating air currents...twice the speed of a hurricane, the blowers kick up clouds of dust, insecticide, animal waste and debris which can be harmful to people with respiratory problems."

Similar legislation was also up for review in Greenwich, Conn., at presstime.

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Sustainable Development and Multiple Chemical Sensitivity.

MCS—Dr. Janette Sherman, author of "Chemical Exposure and Disease," contended that Multiple Chemical Sensitivity is a bona fide disease, which is in direct conflict with a position paper by the American Medical Association.

"Pesticides are contaminating much of the world," she said. "The intellectual and educational ramifications of pesticide use are enormous. Registries are quick fixes, but they're not long-term answers."

Taking the side of the AMA, Dr. Suellen Pirages of the Environmental Sensitivities Research Institute noted that "MCS doesn't follow the principle of toxicology and causation. We need carefully designed and controlled medical studies on this phenomenon."

RISE's approach—Issues like MCS mean a change in philosophy for RISE.

"We will become activists for our industry," RISE executive director Allen James promised. "Defense is no longer adequate."

—Jerry Roche

GRASS CLIPPINGS

Unusual news & notes from the turf & ornamental world

'Silverdome West' decked out

■ The research dome known as "Silverdome West" is decked out in new outerwear as part of ongoing research to learn more about growing grass indoors.

Dr. Trey Rogers says that the Sheerfill IIA Architectural Membrane allows roughly twice the amount of sunlight through than the material that currently covers the real Silverdome.

The Michigan State University research facility at East Lansing was constructed to mimic conditions at the Pontiac Silverdome, where MSU's turfgrass scientists perfected the portable indoor turf on which the 1994 World Cup soccer games were played.

Low light is the greatest challenge to growing durable grass indoors. "The theory is that this new membrane will allow turfgrass to stay indoors without supplemental light for a long period of time," says Rogers.

Interesting uses of grasses

■ Author Craig Tufts, in his book "The Backyard Naturalist," urges people to consider more interesting uses and varieties of grass.

"Tall, graceful, murmuring grasses look great all year round (with once-a-year cutting), and others can be plucked to make dry-grass arrangements," he writes. "As a bonus, most grasses are highly attractive to wildlife (especially to birds and butterflies) for both food and shelter."

Tufts, who also directs the National Wildlife Federation's Urban Wildlife Division, recommends hardy native species to add texture to the landscape, help control erosion, attract wildlife and look pretty.

For more information on native grasses available for landscaping, Tufts recommends "Grasses, an Identification Guide" by Lauren Brown.

Around the world on a lawnmower

■ Ben Garcia, listed in the "Guinness Book of World Records" for longest lawnmower ride, plans to break his own record by riding around the world, beginning March 13, 1996.

In 1986, he drove the "Woofmobile" from Maine to California, riding for W.O.O.F. (World Order of Friends) and ended up in the national media. Before he begins his current around-the-world itinerary, he and Sister Rosalie Curran, Ph.D., are asking for sponsorships. Sister Curran is W.O.O.F. president.

"An amateur seven-minute action-filled video from Ben's initial transcontinental lawnmower ride is available, on request, for your inspection and pleasure," Sister Curran writes. You can contact her by phoning (201) 292-6300 or by writing W.O.O.F., Tiffany Village, Summit Lane, Old Orchard Beach, ME 04064.

GREEN INDUSTRY EVENTS

NOVEMBER

1-Jan. 10: Arboriculture Skills Workshop, Kent (Ohio) State University. Phone: Chris Carlson, (216) 332-0361 or Anita Linde, (614) 433-0045.

2: 2,4-D Reregistration Status Report, O'Hare Airport Marriott Hotel, Chicago. Phone: (800) 345-5109.

5-8: National Institute on Park and Grounds Management, Toledo, Ohio. Phone: (414) 733-2301.

11: International Hong Kong & China Golf Exhibition & Conference, Hong Kong Convention & Exhibition Center. Phone: 011 (61-9) 322-3222.

7-9: Penn State Golf Turf Conference, Nittany Lion Inn, University Park, Pa. Phone: (814) 863-3475 or Dr. Peter Landschoot, (814) 863-1017.

7-10: New York Turf & Grounds Exposition, Rochester Riverside Convention Center. Phone: (800) 873-8873 or (518) 783-1229.

12-14: International Irrigation Exposition & Technical Conference, Phoenix Convention Center. Phone: (703) 573-3551.

12-14: Golf Courses on Landfills Conference, Industry Hills (Calif.) Sheraton Resort. Phone: Bill Burbaum or Judy Thompson, (407) 744-6006.

14-16: Midwest Turfgrass & Ornamental Seminar, Lafayette, Ind. Phone: Bev Bratton, (317) 494-8039.

16-18: Tree Care Expo, Indiana Convention Center, Indianapolis, Ind. Phone: (800) 733-2622.

16-19: International Golf Show & Golf Course Europe, Pabellon de Cristal, Madrid, Spain. Phone: Charles Duff, (510) 526-6922.

25-28: Forum on Golf Course Building at the International Trade Fair for Design, Equipping and Care of Amenity Areas, Cologne (Germany) Exhibition Center. Phone: Dr. George Heim, 011 (0221) 971-3021.

27-29: North Central Turfgrass Exposition, Pheasant Run Resort, St. Charles, Ill. Phone: Jack Lagershausen or Nancy Jones, (312) 201-0101.

SUPPLIERS CORNER

The **Scotts Co.** is now accepting nominations for the 1996 Tradition of Excellence Award that recognizes outstanding achievements among superintendents in advancing the science of course maintenance. Nomination forms are available from Burke Geeler at (913) 832-4465, Darlena Huffman at (513) 644-7633 or Deb Strohmaier at (614) 846-7777.

Homelite, a subsidiary of **Deere & Co.**, purchased the assets of Green Machine from Mark Machine, Wadsworth, Ohio. This fall, the company introduced a new line of commercial grade outdoor power equipment called Green Machine by John Deere. The line includes string trimmers, brushcutters, edgers, blowers, hedge trimmers, chain saws, a sprayer and walk-behind mowers.

2,4-D takes another step to re-registration

BELHAVEN, N.C.—The latest in a series of tests show no evidence of carcinogenicity and occurrence of brain tumors in laboratory rats at doses three times higher than previously tested.

The tests, required by the U.S. Environmental Protection Agency for re-registration of 2,4-D, will be the focus of a symposium to be held Thursday, Nov. 2 at the O'Hare Airport Marriott in Chicago. The symposium will also include a briefing on the status of 2,4-D in the re-registration process.

The symposium, sponsored by the Industry Task Force II on 2,4-D Research Data, is open to all interested parties at no charge.

For more information, contact Don Page, the executive director of the Task Force II, at (919) 964-4558.

2,4-D is a broad-spectrum herbicide used extensively in the green industry as well as in agriculture and at the homeowner level. It is the third-most popular herbicide in the country. Use of the 50-year-old product has been increasing for several years because of its excellent fit in no-till and other reduced-till ag systems.

American Cyanamid and Rohm & Haas have formed **RohMid L.L.C.**, a marketing and sales joint venture to develop, register and commercialize a new insecticide, RH-0345, for the U.S. turf and ornamental market. RH-0345 is a diacylhydrazine insecticide that controls grubs and other soil-borne pests. RohMid hopes that the EPA will grant a registration by early 1997.

William Brehm, founder of **B&G Equipment Co.** and inventor of the B&G compressed air sprayer, died Aug. 20 in Atlanta. He was 70. A scholarship fund has been established at Purdue University in his name. Further information is available by writing William Brehm Scholarship Fund, Purdue University, 1158 Entomology Hall, West Lafayette, IN 47907.

MacKissic Inc. purchased a commercial duty chipper-shredder line from **Ameri-quip Corp.** that will be manufactured in MacKissic's Parker Ford, Pa. facility. The chipper-shredders are compact, highway towable, high performance machines for landscapers.

Rodney Sams of Evergreen Lawn Service in Hamilton, Ohio, is winner of the **Ransomes America Corp.** Fantasy Vacation Sweepstakes. The prize is a four-day cruise in the Bahamas and three days at Walt Disney World. More than 20,000 lawn and grounds care professionals entered.

Educational opportunities

APPLICATIONS are being accepted for Penn State University's two-year Turfgrass Management Technical Program, beginning September, 1996. Application fee is \$35; deadline for application is Dec. 31st. Applications can be obtained by calling (814) 865-8301 or by writing to: Turfgrass Management Technical Program, 306 Ag Administration Bldg., P.S.U., University Park, PA 16802-2601.

THE UNIVERSITY System of Georgia has an independent study course in turfgrass management. Earn college credit

According to reports from **Snapper**, a national factory rebate program on its commercial walk-behind mowers is achieving tremendous success. Since announcing the program the first week in August, the company says, business has tripled. The rebate includes \$500 on commercial walk-behinds, which includes the full "10/5/2" factory warranty and the "no payments until '96" credit program.

Terrasorb of Bradenton, Fla. now has a business alliance with Plant Health Care Inc. of Pittsburgh, Pa. to market to horticultural markets its family of mycorrhizal fungi spore products called MycorTree.

PanAmerican Seed has put its products on CD-ROM for growers, seed distributors, university teachers and students and retail garden staffers. The system fits most desktop computer systems equipped with a CD-ROM drive. The CD-ROM itself costs \$30 and is available through GrowerTalks BookShelf at (800) 456-5380.

Gravely International and DewEze Manufacturing are now jointly manufacturing and marketing DewEze mower products. That includes three models of the All-Terrain Mowers sold primarily to governments. The products will now be sold under the Gravely brand name.

Woods Equipment Co. bought **Gill Manufacturing Co. L.P.** Gill's core products include pulverizers, turf renovators, seeders, core plug aerators, landscape rakes, rearblades, backhoe and skid steer buckets, tillers and spreaders. Woods products are sold through a network of 6,000 independent dealers in North America.

while completing this course in the comfort of your home or workplace. All basic principles of turfgrass management for both cool- and warm-season grasses are covered. For more information, call the UGA Independent Study Office, (706) 542-3243.

EROSION COURSES are being offered by the International Erosion Control Association. Subjects include erosion and sediment control; bioengineering; and streambank/lakeshore erosion control. The courses run for three consecutive days: Nov. 7-9 in Columbia, S.C. and Nov. 28-30 in Houston, Texas. For more information, phone (800) 455-4322 or fax (970) 879-8563.