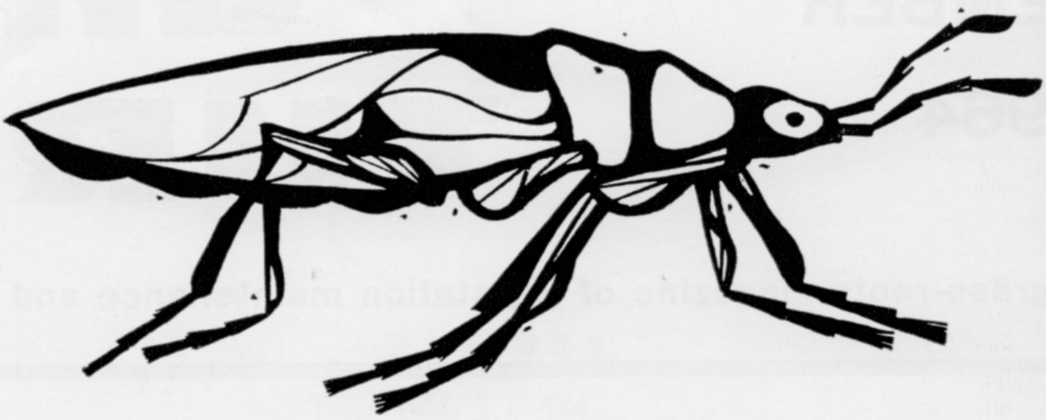

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WEEDS and TURF

November 1964 **Volume 3, No. 11**

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Setting a Good Example

Elsewhere in this issue is a story about a new film on safe use of pesticides produced by the Ortho Division of California Chemical Co. Films on safety in pesticide handling aren't uncommon, but this venture is particularly praiseworthy, since it is, in Ortho spokesmen's words, "a non-commercial venture."

Products in the picture are referred to as "Brand X," and the producer has even offered to supply prints of the film to other manufacturers at cost. These firms can then affix their individual film leaders to identify the safety-preaching movie with their own operations.

This is setting a good example in a big way. Films such as these, which benefit the entire industry, from producer to custom applicator to customer, are costly to produce. It would be easy to capitalize on the impact of the picture with frequent references to this or that safety precaution the producing company carries out when it manufactures pesticides.

But, in addition to the immediate value this endeavor possesses intrinsically, it is worthwhile to reflect on the lesson posed here. We have sometimes heard of weed, turf, and tree maintenance companies which were reluctant to share company secrets at conferences, or which refuse to engage in free exchange of ideas with other firms, supposedly in fear of relinquishing a competitive edge of one kind or another.

This kind of thinking, while perhaps somewhat advantageous in the immediate instance, is suicidal in the long run. The future of the vegetation maintenance and control business rests in ever-increasing competence and professionalism. Whoever heard, for example, of a doctor who refused to discuss his medical discoveries because he feared he might lose a patient to one of his colleagues?

It may seem trite to say "Professional is as professional does," but this is one of those truisms which bears constant repeating.

Applicators should be eager to share talents with fellow businessmen just as one often wishes to share problems. Only in the thorough exchange of technical know-how and proficiency can be found the united front which vegetation control professionals must present to the public and to the lawmakers.

Only in taking the long-range view will your company continue to flourish. The future of the industry is by definition the future of every company which makes up that industry.

WEEDS AND TURF is the national monthly magazine of urban/industrial vegetation maintenance, including turf management, weed and brush control, and tree care. Readers include "contract applicators," arborists, nurserymen, and supervisory personnel with highway departments, railways, utilities, golf courses, and similar areas where vegetation must be enhanced or controlled. While the editors welcome contributions by qualified freelance writers, unsolicited manuscripts, unaccompanied by stamped, self-addressed envelopes, cannot be returned.

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CLOSING DATE NOVEMBER 16th

Effects of Excess Rain On Turf Management

Dr. Watson

By J. R. WATSON, JR.
Director, Agronomy Division
Toro Manufacturing Corporation
Minneapolis, Minnesota

THE ANNUAL distribution of rainfall plays a major role in turfgrass care and management. The ideal situation, with regard to annual rainfall, would be periodic rains of a gentle-soaking nature. Seldom, if ever, does Mother Nature cooperate to this extent. The average annual rainfall for a given area may remain more or less constant, but the distribution, as well as the intensity, varies from year to year and particularly from season to season.

It is the seasonal variation in intensity and distribution that creates problems for the turfgrass manager. He must continually adjust his management practices to fit the prevailing weather conditions. The techniques employed to counteract the adversities of weather, whether they be drought or excessive rainfall, will influence, to a large extent, the quality of turfgrass produced—especially golf course turfgrass. There will be certain conditions brought on by adverse weather over which the manager will have no control; there will be others which will create no special problem, providing adequate materials, equipment, and facilities are available.

In many instances, however, the turf pro will be able to counteract the adversities and prevent serious damage. Careful planning and programming based on the facilities available to him, as well as a knowledge of the special features and conditions on the course, will enable turf specialists to produce satisfactory turfgrass in spite of adverse weather conditions.

Excess moisture may be defined as that moisture which is applied in excess of the actual needs of the particular crop or plant being grown. Basically, the amount of water needed or used is a function of the environment in which the plant is growing. Environment is used in its broadest sense and means climate and soil.

Over the years, a number of investigators have worked to determine just how much moisture is required by various plants. Research on estimating evapotranspiration has been in progress since the heat effect method was developed by C. R. Hedke in 1924. In 1940, C. W. Thorthwaite developed a method based on climatic data. This method was simplified by Harry F. Blaney and Wayne D. Criddle in 1945, and was further adjusted to reflect turfgrass needs by the Soil Conservation Service in 1960.

When the potential evapotranspiration is subtracted from rainfall, the result indicates the *average* excess or deficit for a given period of time.

Tables I-III, calculated by the Commercial Research Department of Toro Manufacturing Corporation, present data for three locations in Iowa.

Excessive rainfall may be

classified into two categories: (1) frequent rains—mostly of low to medium intensity, and (2) floods—whether arising from prolonged rainfall or from heavy, intense rains of a relatively short duration. For convenience, the problems associated with these two conditions may be discussed from the standpoint of the effect they have on soil and growth.

Drainage Problems

Soil. The most obvious condition created by excess rainfall is that associated with drainage—both surface and internal. Surface drainage is the most rapid and effective means of removing excess water. When the soil is saturated from continuous rainfall and the topography is such that water does not move off rapidly, then the excess water will accumulate in the low areas. If the water remains "ponded" for too long a period, turfgrass may be destroyed. The length of time that water may remain ponded without killing the grass depends upon the temperature and the species of grass. High temperatures will cause severe damage in a very short period of time; whereas if the temperatures are cool, the grass will survive for a longer period. *Poa annua* appears to be quite susceptible to damage from ponded water, while bentgrass is more tolerant.

Surface runoff may cause washouts and severe erosion, especially on newly seeded areas or on steep slopes with thin cover. Floods, particularly along rivers and streams, often leave heavy deposits of silt which may destroy the turf and leave layers that will create future problems. Heavy silt deposits often must be removed in order to restore the flooded area for play.

Heavy, slowly permeable soils, when subjected to frequent and prolonged rainfall, become saturated and may remain at or near this level of soil moisture for extended periods. Under such conditions there will be a deficiency of oxygen and buildup of reduced compounds which are

(Continued on page 16)

Table I: Precipitation—Evapotranspiration, Dubuque, Iowa

Month	Average Potential Evapotranspiration	Average Precipitation	Deficit or Surplus
January	...	1.83	1.83
February	...	1.40	1.40
March	.46	2.76	2.30
April	1.79	3.08	1.29
May	3.65	4.22	.57
June	5.50	4.21	−1.29
July	6.56	3.51	−3.05
August	5.64	3.73	−1.91
September	3.42	3.74	.32
October	1.77	2.74	.97
November	.45	2.59	2.14
December	...	1.90	1.90
Total	29.24	35.71	+6.47

1. Rainfall is based on 30-year average. (1930-1961)
2. Potential evapotranspiration calculated from modified Blaney-Criddle formula. See: Blaney, Harry F.; "Climate As An Index of Irrigation Needs" in the Yearbook of Agriculture, 1955, entitled *Water.*
3. Consumptive coefficients for lawngrass as developed by the Soil Conservation Service in 1960—reported in a paper entitled "A Method For Estimating Irrigation Water Requirements Of Lawns" Presented by Quackenbush, T. H.; and Phelan, J. T.; 1963 Meeting of the American Society of Agronomy at Denver, Colorado.

Table II: Precipitation—Evapotranspiration, Des Moines, Iowa

Month	Average Potential Evapotranspiration	Average Precipitation	Deficit or Surplus
January	...	1.30	1.30
February	...	1.10	1.10
March	.62	2.09	1.47
April	2.10	2.53	.43
May	4.28	4.07	− .21
June	6.16	4.71	−1.45
July	7.46	3.06	−4.40
August	6.42	3.67	−2.75
September	3.99	2.88	−1.11
October	2.15	2.06	− .09
November	.58	1.76	1.18
December	...	1.14	1.14
Total	33.76	30.37	−3.39

1. Rainfall is based on 30-year average. (1930-1961)
2. Potential evapotranspiration calculated from modified Blaney-Criddle formula. See: Blaney, Harry F.; "Climate As An Index of Irrigation Needs" in the Yearbook of Agriculture, 1955, entitled *Water.*
3. Consumptive coefficients for lawngrass as developed by the Soil Conservation Service in 1960—reported in a paper entitled "A Method For Estimating Irrigation Water Requirements Of Lawns" Presented by Quackenbush, T. H.; and Phelan, J. T.; 1963 Meeting of the American Society of Agronomy at Denver, Colorado.

Table III: Precipitation—Evapotranspiration, Sioux City, Iowa

Month	Average Potential Evapotranspiration	Average Precipitation	Deficit or Surplus
January	...	.78	.78
February	...	.89	.89
March	.56	1.46	.90
April	2.00	2.25	.25
May	4.12	3.23	− .89
June	6.09	4.33	−1.76
July	7.28	3.11	−4.17
August	6.27	2.66	−3.61
September	3.82	2.74	−1.08
October	1.97	1.42	− .55
November	.28	1.16	.88
December	...	.74	.74
Total	32.39	24.77	−7.62

1. Rainfall is based on 30-year average. (1930-1961)
2. Potential evapotranspiration calculated from modified Blaney-Criddle formula. See: Blaney, Harry F.; "Climate As An Index of Irrigation Needs" in the Yearbook of Agriculture, 1955, entitled *Water.*
3. Consumptive coefficients for lawngrass as developed by the Soil Conservation Service in 1960—reported in a paper entitled "A Method For Estimating Irrigation Water Requirements Of Lawns" Presented by Quackenbush, T. H.; and Phelan, J. T.; 1963 Meeting of the American Society of Agronomy at Denver, Colorado.

Turfgrass Portraits V:

Bermudagrass

By DR. ROBERT W. SCHERY

Director, The Lawn Institute

Marysville, Ohio

This is the fifth in a series of nine articles on the basic traits and maintenance procedures for common turfgrasses. Next month author Schery discusses Zoysias.

BERMUDAGRASS is as successfully ubiquitous in the warmer regions as is Kentucky bluegrass farther north. And its origins and interrelationships are equally complicated. Bailey lists "Europe and Asia" as place of origin, but most authors do not care to be even that definite, describing *Cynodon* (the bermudagrass genus) merely as native to warmer regions of the world. There is reason to suppose that early introductions into the United States were from Europe via the Atlantic islands; otherwise why "bermuda" and "bahama" grass for *C. dactylon?* Genetic source of many lawn varieties is Africa. Of course so widespread and aggressive a grass has received many common names, including the derogatory "wiregrass" familiar along the eastern seaboard. Even the generic name, *Cynodon*, lacks priority, but has been conserved (over *Capriola*) by international agreement.

No wonder that from among this worldwide complex of species, hybrids, varietal selections, and ecotypes, a welter of bermudagrass possibilities faces the lawnsman. And no wonder universities concerned with bermuda breeding have hundreds of selections under observation, in such dissimilar climates as Florida, Kansas, and Arizona. But perhaps the richest source of improved bermudagrasses has been the Coastal Plain Experiment Station, Tifton, Ga.

Bermudagrasses can be grouped as the heterogeneous "common," volunteering widely, and available as seed; and a series of finer-textured, denser varieties, many of them hybrids, which must be propagated from living shoots because they are either sterile or do not come true from seed. The latter are for the finer-kept lawns and golf courses; the former for more casually kept turfs, where economy is a consideration.

All bermudagrasses love warm climates, doing well in the United States from Southern California to the Piedmont of the Carolinas. Sunturf and U-3 are fairly winter-hardy from eastern Kansas into the Ohio Valley. Even more reliably hardy selections are promised out of Kansas research (in recent winters much U-3 has been killed in latitudes as far north as Missouri).

In the Deep South,—viz. southern Florida and the humid Gulf Coast,—bermuda does passingly well, but usually takes a back seat to other southern grasses better adapted or more easily cared for. Thus bermuda domain is most strikingly the "upper South," centering from middle Georgia to eastern Oklahoma, and the lower elevations of the Southwest.

Growth Pattern

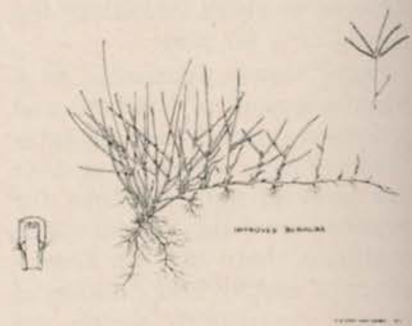
True to its southern personality, bermudagrass grows only in warmer weather. Indeed, it seems never too warm for bermuda, if water and fertility are adequate. But at the approach of frost, October in most of its homeland, bermuda slows, turns off-color (eventually to a dreary brown), not to revive again until about April. Aside from sometimes winterkilling, dormant bermuda restrains winter weeds poorly. These make the brown lawn even less attractive because of the contrasting splotches of green. That is why bermuda turfs are winterseeded to fescue-bluegrass mixtures, as described in Portrait IV (WT, Oct., pg. 16).

But in warm weather bermuda growth is insatiable. It spreads rampantly by both runners and rhizomes. That is at once a virtue and a fault. Such vigor makes a thick lawn in a hurry, squeezes weeds, and brings quick recuperation. Also it means that mowing must be uncomfortably frequent (twice per week, or more often on a golf green), and that a lot of fertilizing and watering are needed to keep bermuda looking well. A bermuda turf, especially of the select varieties, is not for low-maintenance swards.

Maintenance

Overriding is bermuda's abhorrence of shade; it will not grow under trees. Other than that, and the winter dormancy spoken of, its weaknesses are few and moderate. Appearance is attractively fine textured and deep colored. It is widely tolerant of soil. It is moderately resistant to drought, salt air, and wear. It is not frost tolerant, but recovers quickly when warm weather returns. It mows neatly, is not unduly susceptible to disease or insects. But most varieties are quite a bother in invading flower beds and borders.

Fertilization of well-kept turfs is recommended every four or five weeks, at 1 lb. elemental nitrogen/M, using a complete fertilizer at least occasionally. Natural vigor and this stimulation make frequent mowing mandatory, in most instances best accomplished with a reel mower set ½-1½ inches. Water-



Diagramatic drawing of a bermudagrass plant.

ing should fit soil and climate, keeping in mind that a "high-living" grass such as bermuda needs plenty of drink, especially on the sandy coastal plain.

What To Watch Out For

In the Southeast, sting and lance nematodes are becoming increasingly troublesome. Soil treatment with a nematocide often gives much improved turf. In the Southwest, the Eriophyid mite *(Aceria)* has become quite a pest; injury can be reduced by diazinon spray combined with fertilization. Arizona also has some spiral nematode trouble.

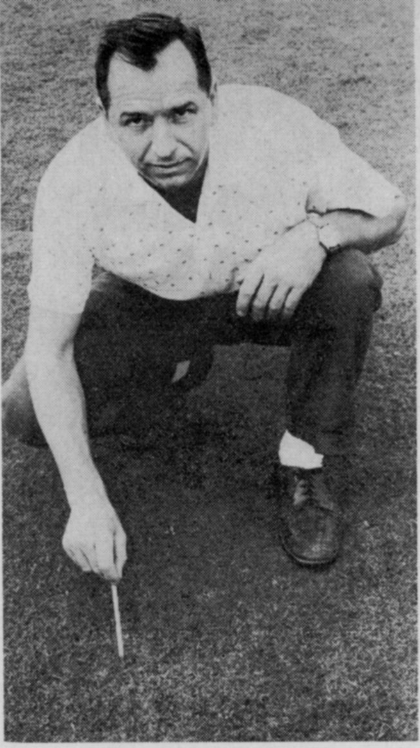
The upper Midwest has experienced severe winter loss from an uncertain ill called "spring deadspot." Patches of bermuda die much like snow mold on bent, and runners will not recolonize the blemishes. Dieldrin, an insecticide, helps thwart the trouble, and Mallinckrodt now has a preventive.

Many diseases that bother other grasses attack bermuda, including *Helminthosporium* (summer blight is *H. cynodontis*), *Sclerotinia* dollarspot, and *Rhizoctonia* brown patch. Webworms frequently damage bermuda. And it is only natural for so vigorous a grass to thatch quickly.

Most bermudagrasses are tolerant of selective herbicides, fungicides, and insecticides. Tifgreen is a little sensitive to 2,4-D, and Texturf 10 discolors from chlorinated hydrocarbons, but both recover quickly. Banvel-D may cause blemishing, and Trifluralin has damaged bermuda. Most preemergence herbicides afford no difficulty, nor usually do even Simazine and Atrazine if applied when the grass is dormant. Arsonates may temporarily discolor some varieties. Of course, grass killers such as Dalapon, Vapam, and methyl bromide should be avoided.

Propagation

Seeding is simplest and most economical, but of course only applicable to the genetically mixed "common." Seed that has been dehulled sprouts quickly. It is usually sown at 2 lbs. or less/M. Unhulled seed requires more time to soak up moisture, but, if sowed amply ahead of need, is as adequate as dehulled seed. It is often sowed 3 lbs./M.



Striations in putting green bermudagrass made by vertical mowing are pointed out by Dr. Evert Burt, Plantation Experiment Station, Ft. Lauderdale, Fla.

The named varieties must be propagated from living starts,—plugs (biscuits of sod), sprigs (individual stems), or stolons (chopped stems,—scattered, top-dressed, and watered: if kept moist, bermuda roots readily). Quantity for planting varies with how quickly sod is demanded. Plugs and sprigs planted 6 inches apart will be quicker to fill than the same starts planted on 12-inch centers (but of course more than twice as much planting material is required). Stolons may be planted as lightly as one or as heavily as six bushel/M.

Varieties:

Common—Unselected *C. dactylon.* Attractive if well kept, but somewhat more open and coarser than named varieties. U-3 seed must be regarded as "common," since genetic reassortment results in turf not identical with parent U-3.

U-3—A denser, more cold-tolerant selection than the general run of common, widely planted in middle latitudes for golf course fairways. Wears well, is drought tolerant, but spreads more slowly than many varieties. In severe winters, it kills appreciably in the transition belt, and recently it has been injured by spring deadspot.

Sunturf—This is a purported natural hybrid between *C. dactylon* and *C. transvaalensis* (named *C. magennisii*), introduced from South Africa. A sterile triploid hybrid, it produces few seedheads. Like U-3 it is denser and more attractive than common. It is reasonably tolerant of cold, and remains green a little longer in autumn than do most bermudas. Runners stay mostly above ground, so that control at borders is easier than with varieties which rhizome strongly. Sunturf does suffer somewhat from rust.

Tifgreen (Tifton 328)—The most widely planted grass for golf greens in the South. Like Sunturf, a sterile triploid hybrid between *C. dactylon* and *C. transvaalensis.* An excellent fine-textured grass that has dominated low-clipped bermuda usage. Somewhat sensitive to 2,4-D and certain other herbicides, and to webworm, but fairly disease- and cold-resistant.

Tiflawn (Tifton 57)—A tough hybrid suited well to lawn and athletic turf, very vigorous, deep green, resistant to insects and disease. Moderately cold-tolerant and drought-resistant.

Tifway (Tifton 419)—A chance triploid hybrid of *C. dactylon* and *C. transvaalensis,* of fine texture and deep color, resisting cold discoloration, with a "stiffer" consistency than most bermudas and hence recommended for golf course fairways. Spreads rapidly.

Other Familiar Varieties—Ormond is a presumed natural hybrid found at Ormond Beach, widely planted in the deep South, quick-growing, of good color, but not too disease- or cold-resistant, mostly used for lawns and fairways. Everglades is similar. "Texturf" selections are from the Texas Experiment Station, with Texturf 10 receiving fair usage for lawns and athletic fields in the Southwest. Tiffine is an early Tifton hybrid of fine texture, not now widely used.

For a thorough review of bermuda selections, see Agricultural Handbook 270, USDA, "Evaluation of Bermudagrass Varieties," by Juska and Hanson, August 1964, Superintendent of Documents, Washington, D.C.

Intelligent Tree Planting Will Determine America's Future Beauty, Minn. Treemen Hear

200 Delegates to 3rd Annual U. of Minn. Course Learn Step-by-Step Program for Tree Selection When Landscaping

"The future beauty of America will in great part depend on the way we plant the landscape and integrate country with city through plantings," Donald B. White told an audience of nearly 200 attending the third annual Shade Tree Maintenance Short Course on the University of Minnesota's St. Paul Campus Sept. 14 and 15.

White is Associate Professor of the University of Minnesota's Department of Horticultural Science, specializing in ornamental horticulture and turf management. He spoke to an audience composed of nurserymen, arborists, and others professionally engaged in tree maintenance in homes, parks, and public grounds.

All the elements of the town-and-country scape can be harmonized through the use of trees, which tie the whole landscape together, White said.

The horticulturist challenged his audience to become acquainted with a wide diversity of shade trees—to be familiar with all those that are adapted to the area—in order to select them intelligently. He outlined three important steps preparatory to selecting trees for any site:

1. Determine the need for a shade tree by recognition of the required function.

For example, is the tree to be used to provide shade, frame the house or a building, control wind, provide a background or beauty interest? Since trees are a functional element in the landscape, choose them to fulfill the necessary function.

2. Make a complete evaluation of the ecology of the site: the space available, the soil type, moisture, drainage, climate of the total environment, exposure. Is the location in town or country? In what part of town? What are the esthetics of the site?

3. Make a physical evaluation of the area to be planted.

Determine the size and shape of the tree needed, the desirable growth rate, the texture, color, seasonal interest desired, as well as other esthetic factors.

After you have fulfilled these steps, you can begin the process of selecting your trees, White said. Determine whether they should be deciduous or evergreen and whether they are adapted to the particular environment.

Always ask yourself if the trees you select will create unity in the planting and overall area involved. But, White reiterated, it is impossible to select trees for public or private grounds intelligently without a knowledge of a great diversity of shade trees.

The Ash as a Street Tree

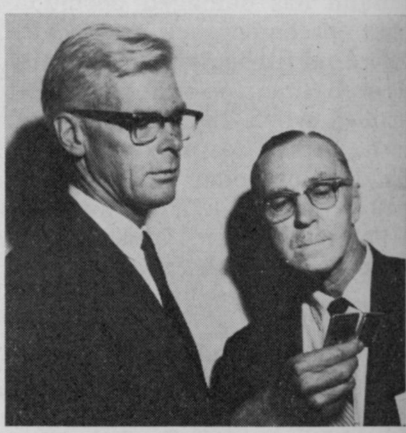
In an appraisal of the ash as a street tree and a substitute for the boulevard elm, Lawrence Bachman of Bachman's, Inc., Minneapolis, listed these assets of the ash: rapid growth rate; upright symmetrical growth habit; lacy leaf pattern, permitting filtered sunlight; strong crotches and branch structure; fibrous root system, yet not competing with adjacent vegetation or causing heaving of walks.

The ash "will not produce the high arching branches which have literally bridged over many of our streets and boulevards as the elm has done, but I feel it will provide a uniform wall of green on each side of our roads," Bachman said. Because the trees grow symmetrically of their own accord, less pruning would be needed over their life span. The relatively few disease problems which affect the ash would mean less spraying and preventive maintenance.

Among newer ash varieties are the Summit ash and the Marshalls ash. Yellow-leafed varieties are now being offered, and a red-leafed variety, particularly striking in the fall, will soon be available. Bachman recommended growing only seedless varieties of the ash and offering the budded male selections for sale to customers.

Unreasonable Demands On Street Trees

"When I stop to think what we ask of a tree when we use it as a street or boulevard tree, I shudder to recommend any at all," Bachman declared. "We really throw every obstacle in the world at these poor trees. Smoke, other air pollutants, mechanical injuries, a disrupted water table, highly compacted soil, lack of organic matter in the soil, limited root space, reflected heat from buildings, roads and walks, lack of water, use of salt on roads and walks, plus the usual infestations of insects and infection of roots by soil inhabitants and on and on. It is a wonder they grow at all. I almost



A discussion of the best of the maples was a highlight of this year's Minnesota course. Albert Johnson (left) used slides to point out maple characteristics to A. B. Stitt, forester for Northern States Power Co.