During the long days of spring and summer these varieties make noticeably taller growth. This results in the removal of a higher percentage of the leaf area and makes maintenance of good turf in late spring and summer difficult. Carbohydrate food reserves are depleted and such varieties become highly susceptible to damage from the Helminthosporium leaf spot and crown rot disease.

Varieties such as Nugget, America, Eclipse and Glade appear to exhibit the short day length response of decumbent growth and slow leaf elongation through much more of the year than the common type bluegrass varieties. Additional research related to differential varietal growth response to day length should be of great value in breeding bluegrasses with better turf-forming properties and reduced mowing requirement.

Tolerance of close mowing

For golf course fairways, the turf should make an attractive, uniform carpet which is dense enough to give a good lie to the ball. It must also be able to heal divots rapidly, tolerate considerable traffic and resist the invasion of annual bluegrass.

Frequent, close mowing, adequate fertility and water are needed to produce the firm, dense turf required to support the ball above the soil surface. A dense turf has a much higher population of tillers per unit area which causes increased competition between tillers. This, plus severe defoliation by low fairway mowing and ample fertilization weakens the grass. It develops a less extensive root system and is more subject to drought damage and disease attack.

Close cutting and frequent watering encourages rooting above the soil surface and thatch buildup. This favors many disease organisms. Also, damage from disease is more apparent on an otherwise attractive, uniform closely cut turf.

Kentucky bluegrasses have some tolerance of the close mowing and other factors associated with the production of the dense, firm, aggressive turf desired on fairways. They have the best chance of success with high light intensity, cool temperatures and moderate humidity.

In less favorable climates, improved varieties and better management are needed for successful results. Many of the current Kentucky bluegrass varieties including Nugget, Warren's A-20, Touchdown, Bonnieblue, Eclipse, Birka, Fylking, Majestic, Merion, Adelphi, Glade, Sydsport, Victa, Cheri, RAM 1, and Baron have characteristics which make them more suitable for close-cut fairways than Common Kentucky bluegrass and other erect-growing leaf-spot-susceptible varieties. Unfortunately, each of these varieties has some weakness.

Proper blending of seeds of these improved varieties might help but will not solve all the potential problems associated with fairway turf. Those who use the turf-type ryegrasses as a major fairway grass will find maintaining Kentucky bluegrass in the mixture helpful. New Kentucky bluegrass selections collected from close-cut areas and those generated in hybridization programs give promise of additional improvement.

Heat tolerance

Kentucky bluegrasses with greater tolerance of summer heat and drought conditions common to the transition zone would be of great benefit.

Most of our attractive, dense, lower-growing, turf-type varieties were selected in the cool summer climate of Northern Europe and from other breeding and evaluation tests located in cool environments. Many of these varieties are often disappointing in southern trials.

An extensive program to collect and evaluate adapted germplasm from summer stress areas of the Mid-Atlantic areas should provide varieties with improved summer performance and dependability. Under conditions of moderately low nitrogen fertility and high cut, varieties that typify common types, such as Kenblue, have survived well in the transition zone.

Troy was selected from a seed lot introduced from Turkey. It is a tall, erect-growing grass highly susceptible to leaf spot. Troy has been useful as a pasture grass in Montana region but performs very poorly as a turfgrass.

Vantage (International Seeds) was developed by O.M. Scott and Sons of Marysville, OH. Vantage is a persistent Kentucky bluegrass with deep spreading rhizomes, a medium dark green color and a medium texture. It has very good heat and drought tolerance. Vantage has performed well in higher cut, medium maintenance turfs in the Middle Atlantic region of the U.S. where it has shown good resistance to the Fusarium blight disease. However, this same variety has been seriously damaged by Fusarium blight disease in California trials. Vantage has good resistance to stripe smut and dollar spot and moderate resistance to leaf spot. It is susceptible to leaf and stem rusts.

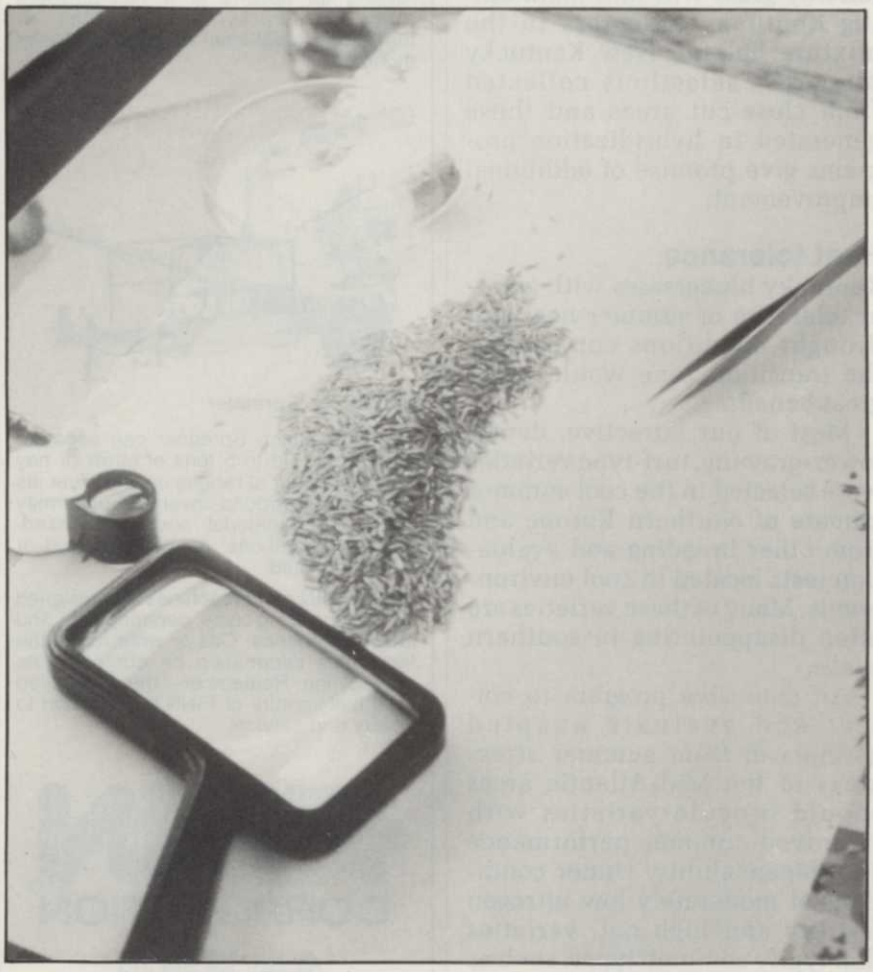
Victa (Scotts) was developed by O. M. Scotts. It has medium broad leaves, a moderately low-growing, turf-type growth habit and a medium dark green color. The variety has shown moderately good resistance to leaf spot. It has shown moderate resistance to leaf rust, stem rust, dollar spot and powdery mildew in New Jersey tests. Victa is moderately slow in spring green-up. It has large seed and rather good seedling vigor.

Wabash was developed at Purdue University. It is a is a vigorous variety with exceptionally good rhizome development and ability to recover from stress. It produces a turf of medium density, medium wide leaves, and a bright, medium green color. Wabash often shows substantial damage from the Helminthosporium leaf spot and melting-out disease, especially when mowed closely. However, it recovers well and looks very attractive by fall. It showed the best fall recovery of all bluegrasses studied in a test at North Brunswick which had received severe summer stress.

Warren's A-34 (Warren's) is a vigorous, disease resistant variety with somewhat better shade tolerance than most other Kentucky bluegrass varieties. When maintained at a 2-inch growing height, it will tolerate 65% shading. A-34 does rather well in full sun, producing a dense, medium green turf with moerately good resistance to stripe smut, powdery mildew and leaf spot. It also performed well in wear tolerance trials in Michigan.

Varietal Blends Admitted weakness of all currently available bluegrass varieties has caused many turf workers to recommend the use of varietal blends for better lawns, fairways and most other types of turf. It is hoped that the weakness of one variety will be covered up by a complementary strength of other variety. This may or may not be true depending upon a number of complex ecological factors. We need much more research data on ecology, long-term performance and regional adapation of bluegrass blends.

Research at Rutgers strongly suggests that varieties with good resistance to both stripe smut and Helminthosporium leaf spot should be included in all turfgrass blends recommended for use on intensely maintained turf areas. Also, one or more should have high tolerance of close-cut unless the turf will be mowed high. □



Seed samples are tested *in a lab after cleaning. Contents are reported on the seed label.*

Under conditions of somewhat closer mowing and higher fertility the lower-growing, wider leafed, open types having extensive deep rhizomes, such as Vantage, have performed better. Merion Kentucky bluegrass has shown above average summer performance when managed properly and when disease is not a problem.

Color

Visitors at experimental plantings of Kentucky bluegrass selections and hybrids are impressed by the great diversity of shades of green observed.

Mystic has a very attractive bright light green color. Adelphi ad Glade have bright, dark colors. Some selections like Bonnieblue, Parade, Columbia and Majestic retain excellent color into the winter and green-up early in the spring. Others like Midnight and Baron go dormant in late fall and green-up later in the spring. Still others like Nugget green-up very slowly in the spring.

Many types show a pronounced purplish cast in late fall, winter and early spring, whereas some, such as Parade, Columbia, Rugby, and Bonnieblue appear to lack this purplish pigment. **WT&T**

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Circle No. 103 on Reader Inquiry Card

Building Self-Preservation Into Turf Equipment

by Thomas M. Carter, Vice President, Engineering, Jacobsen Division of Textron Inc.

Overheating can destroy an engine. *Simple air intake systems are being improved with devices which prefilter ambient air from a high location and ducts it to the engine. The result is longer engine life.*

The evolution in turf equipment hasn't been confined to improving or expanding the tasks these machines perform, despite their growing sophistication.

Along with doing the work expected of them better and in less time, turf and grounds care people now more than ever demand a longer trouble-free life with reduced maintenance as an added bonus.

Public and private mandates haven't changed for attractive and useful parks, golf courses, recreational and other turf areas. Only the budgets have.

The turf equipment engineer's assignment has been very clear: design machines that do more, last longer and are easier to maintain.

While hydraulics and other systems and components that together mow, aerate, sweep or perform many other chores, have been constantly improved, nothing moves without power.

Evaluate power

In other words, the demands on our engines have never been greater, making it manditory for a variety of power plants to undergo a process of intense evaluation before one is selected.

Tough duty

In the same way, the turf machine user should evaluate the engine with the same care he applies to assessing overall function and key features like hydraulic versus conventional mowing.

The importance of engine evaluation can hardly be overstated when one considers the tough world of turf care. These machines are run for long periods of time under varying load conditions. Oftentimes, operators have little or no sensitivity to mechanical devices, overloading their machines and routinely subjecting them to other abuses. And, as budgets tighten, regular maintenance sometimes suffers.

On top of all that, turf machines operate in harsh environments of dust, dirt and other particulates that are often made even worse by high ambient temperatures and a surface seemingly designed to test every fastener.

Seasonality plays a role, too, with year-around turf use for some regions and six months of service for others.

There are the so-called "systems machines", such as our Turfcat II line, which with attachments like a dozer blade or snow thrower are used for clearing walks and drives in winter — or sweeping anytime of the year with a rotary broom. These versatile machines and the diverse and frequently harsh conditions under which they operate call for engines with a high degree of self-preservation designed and built into them.

Smooth power

In mid-sized turf equipment perhaps the first item for your evaluation is the number of cylinders. Two-, three- and four-cylinder engines — gas or diesel — will outwear and be smoother than single-cylinder power. Though there are exceptions to the rule, generally multi-cylinder engines are more sophisticated with features that add up to better performance and increased longevity. But, no matter how many cylinders, an engine will depend on the machine around it and system components to be designed in such a way as to help assure a long, productive life.

Carburetion

Gas and diesel engines alike require a relatively specific ratio of clean air-to-fuel to function properly, so the air cleaner for each power plant should be sized to filter out damaging dust and dirt of turf care while allowing proper aspiration. One way to decrease performance and reduce engine life is to upset that ratio by not replacing the air filter at proper intervals and letting it become clogged.

To avoid clogging turf equipment engineers have gone a step further from the traditional placement of the air cleaner atop the carburetor on the engine. We take in air through a screened opening just behind the operator's seat and then duct it to the cleaner. The cleaner itself is non-traditional, too, because we use a large, industrial unit.

Cooling

Cooling the engines of turf equipment is far more involved than keeping the temperature in line on cars, trucks or even many agricultural machines. It's not enough to draw air in the conventional manner for either liquid- or air-cooled power plants. Turf machines require controlled air via special ducting, using precleaners to remove dirt that would eventually build up on radiator cores or cooling fins, thus raising engine temperatures to damaging levels.

In addition to looking for ducting and precleaners, check for the position of the air intake. It should draw from the ambient atmosphere; not from air preheated by the engine.

Lubrication

Lawn and garden tractor engine technology simply can't be used for turf machines. Usually that type of power has splash lubrication. That may be quite satisfactory for several hours of periodic work, but the duty cycle of the turf machine requires full flow lubrication to make certain all moving parts constantly receive a quantity of oil that relates to the work being performed. As power demands and rpm increase, so does the flow of oil to reciprocating and rotating parts.

But, engine oil can do more than lubricate. It also can cool, so watch for added touches like a larger remote oil filter and possibly an oil cooler. Check for a warning light on the control panel to let you know operating temperature has reached a level that, if sustained, could damage the engine. The latest machines may even have heat sensors that signal the operator.

Inside the engine

You can easily see engine peripherals — cooling, carburetion, exhaust system, and so forth. But what you can't see beyond the new paint of the engine may be even more important to performance, life span, and maintenance.

Take the valves. In addition to admitting the air-fuel mixture and exhausting combustion gasses, valves maintain compression, and thus, the power you required when you specified the machine.

To make certain power remains consistent, you'll want to look for a variety of features, such

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MORE IN 84! Mark your calendar. It's not too early to start planning for the lawn care industry's biggest week of the year — the Professional Lawn Care Association of America's 1984 Show and Conference.

And what a week it will be! PLCAA '84 is shaping up to be the biggest, best gathering of powerhouse speakers and exhibitors in our five-year history. The seminar program has been expanded to offer over 16 hours of educational programming hosted by a new lineup of outstanding speakers, problem solvers all.

In addition, last year's popular "Workshop" series will offer even more hours of "how to" advice on business basics like purchasing, business expansion, and promotional techniques. Subjects aimed at boosting the bottom line of your operation.

IT'S SHOWTIME, FOLKS! Virtually every major vendor and supplier to the lawn care industry will be among the over 100 exhibitors at PLCAA '84. Longer show hours and more floor space in the beautiful Curtis Hickson Convention Center will give showgoers an unparalleled opportunity to see, touch, and compare all that's new in lawn care.

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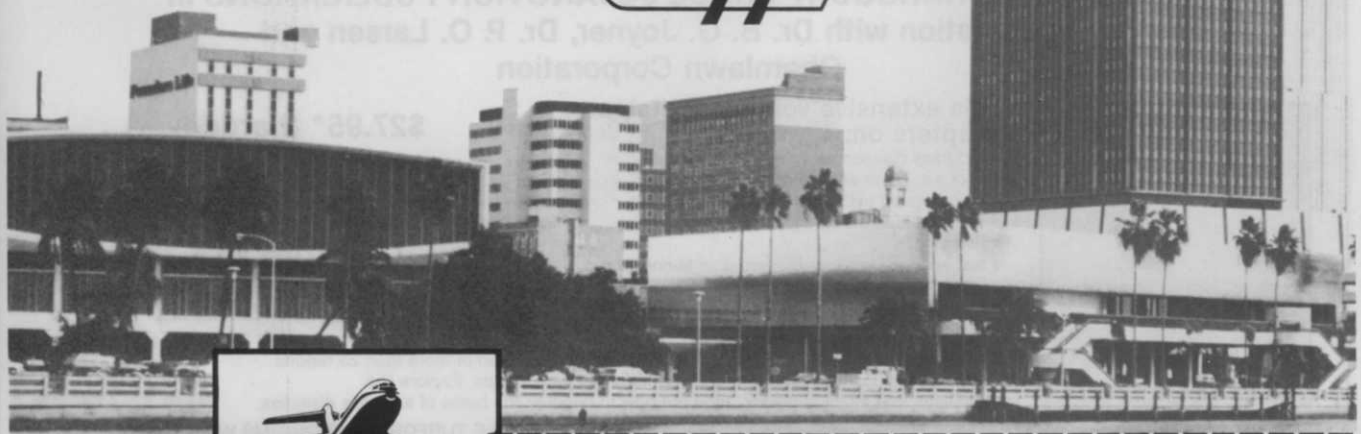

Delta Airlines have been appointed official carrier for PLCAA '84. Delta has regular scheduled flights from most major US cities to Tampa and will be offering discounted fares to all PLCAA '84 participants — **up to 30% off regular prices.**

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as rotators for both intake and exhaust valves. These cause valves to turn minutely as they actuate to help assure proper seating. Valve stem wipers are another desirable feature. These nonmetallic "sleeves" prevent carbon buildup on the stems by wiping off traces of that element with every stroke. Excessive carbon on the stems can deteriorate their guides, allowing sump oil to escape into combustion chambers, reducing plug performance and increasing oil consumption.

High temperatures created by sustained operation could cause valve warpage were it not for the special high-carbon alloy steel (such as Stellite) used for the valves in some engines. Besides loss of compression, severe warpage can lead to a breakdown.

The power you count on is primarily maintained by compression rings pressure fitted on the pistons. Those engines that use high-grade steel in compression rings will deliver many thousands more hours of performance. The difference in head gaskets can spell blow-by. A top quality product such as the metal-clad Graphoil gasket resists erosion from extreme combustion pressures, gasses and sustained high operating temperatures. The small extra cost of a quality product is negligible when compared with the downtime involved in replacing a head gasket.

Combustion chambers vary, too, with the more sophisticated head design almost always worth the investment. For example, crowned head chambers create a highly turbulent swirling action to optimize the air-fuel ratio. This adds up to more power from a smaller displacement — and more economical operation.

Intake and exhaust manifold design should be considered, too.

Other features to watch for include industrial-grade bearings, heavy-duty crankshaft, and a mechanically driven fan (turf machine speeds are too slow for ram air cooling common in automotive road speeds).

Vibration and sound

How the engine is mounted will influence performance, too. Isolated mounts, those that separate and cushion the engine from the frame, greatly reduce vibration, which is as important to operator comfort as it is to component life.

An industrial-grade muffler not only makes sense from a standpoint of longer wear and less resistance to exhaust pressures, its quieter operation is less stressful for the operator and better conforms to noise restrictions.

Cursory appraisals of turf equipment have no place in today's economic climate. Functionally, machines may look quite alike. Even performance specifications may be similar.

It's only when the buyer goes well beyond the obvious that the product designed for a decade or more of regular use begins to emerge. The engine should head an evaluation list, for measuring the productivity of the machine begins with its performance.

WT&T