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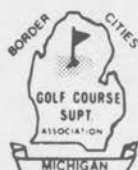
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A PATCH of GREEN

Official Publication of the
Michigan & Border Cities Golf Course Superintendents Association



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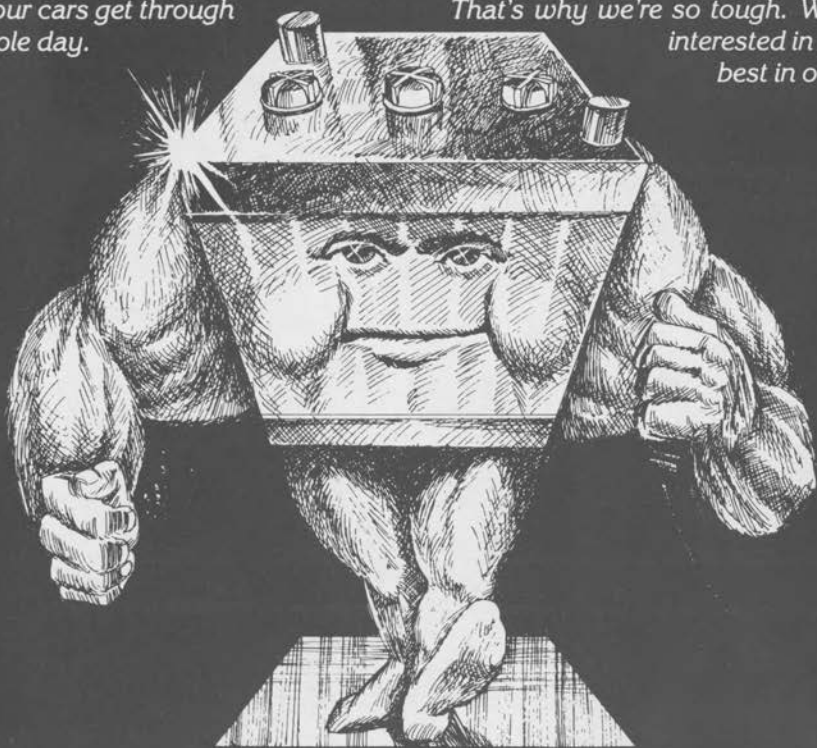
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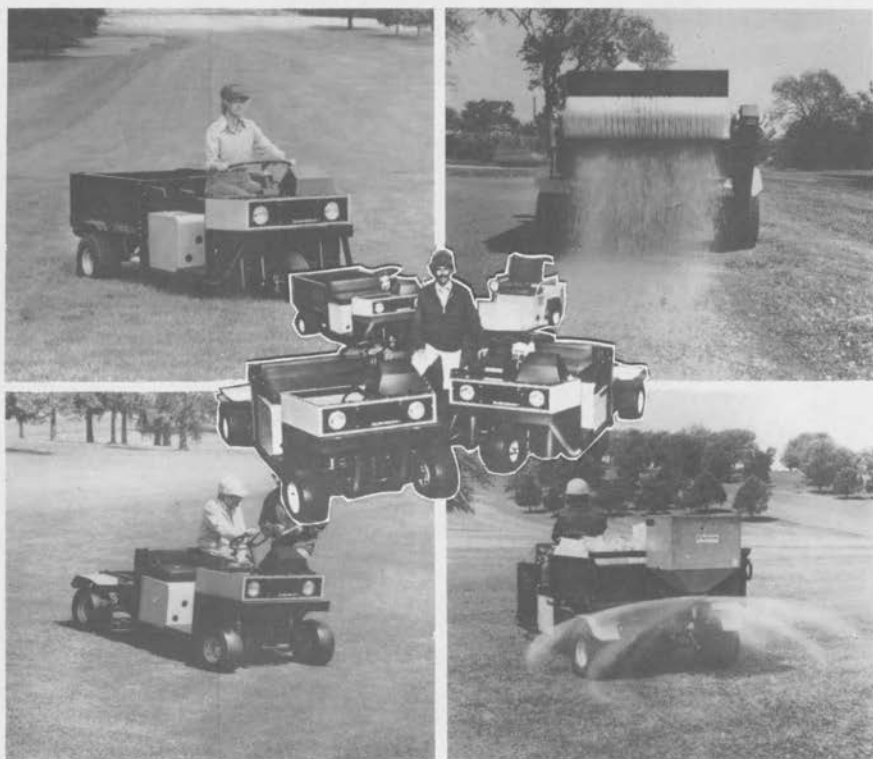
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Bacterial Wilt of Toronto (C-15) Creeping Bentgrass

D.L. Roberts, J.M. Vargas, Jr.,
K.K. Baker and R. Detweiler

Since its selection in the 1930's, Toronto creeping bentgrass (C-15) has been considered an exceptional turfgrass for golf course putting greens. In recent years, a disorder of unknown etiology commonly referred to as the "C-15 problem" or "C-15 decline" has baffled scientists and turfgrass managers alike. In 1979 and 1980, a disease of unknown etiology destroyed the 'Toronto' greens at the Butler National Golf Course in Oak Brook, IL. Individual plants appeared to be wilting from the tip down and were dark green and shriveled. Initially, roots and crown appeared healthy; however, eventually

the entire plant became brown and decomposed. Fungi and other disease causing agents commonly associated with turfgrass diseases could not be isolated.

When transmission electron microscopy was used to ascertain the presence of internal agents in May, 1980, many rod-shaped bacteria were observed in the xylem (Fig. 1) from diseased plants. Individual bacteria measured approximately 0.5 μm by 1-1.5 μm and possessed a rippled cell wall (Fig. 2) similar to rickettsia-like bacteria associated with Pierce's disease of grapevines, phony

Continued on Page 12



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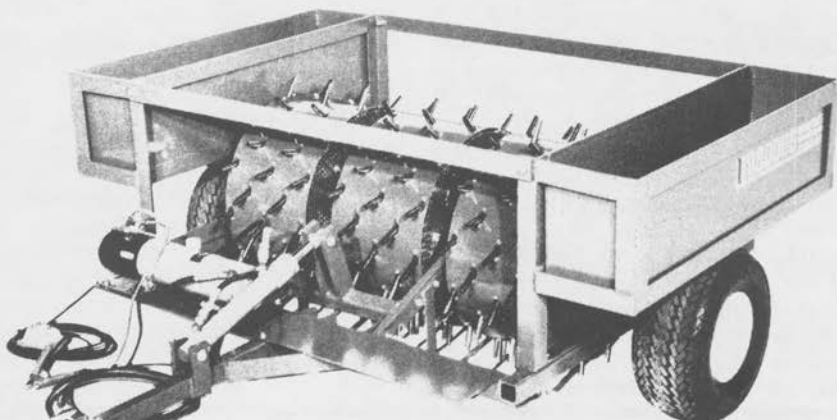
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ANALYSIS OF 170 SAND SAMPLES

W.H. Daniel, Turf Research
Department of Agronomy,
Purdue University
W. Lafayette, Indiana

Sands are being extensively used in the installation and management of rootzones for turf. Seven important characteristics for a rootzone sand include:

1. The finer fraction-10%, 2. The coarsest fraction-10%, 3. Uniformity-26%-48%, 4. pH-Less than 8.0, 5. Less than 1% silt and clay when washed, 6. Reasonable priced source, 7. Continued availability.

1. The finest 10% is all-important. The fine particles settle into openings between larger fractions. The author believes as little as 5%, if silt and clay, or as much as 25%, if very fine sands, actually describes this predominance. These fine particles:

a. Determine the pore space. b. Control the rate and extent of capillary action. c. Permit increased rootzone moisture capacity. d. Increase surface stability. e. Improve ease of managing turf.

2. The coarsest 10% particles:

a. Form a filter for slits and narrow openings. b. Tend to reduce moisture retention. c. Tend to provide a less stable surface. d. Appear more obvious. e. May collect and cause dry spots. f. May adversely affect equip-

ment and putting surface. g. Occupies space-does little work.

3. Uniform particle sand is preferred. Perfectly uniform particles can provide 48% pore space. Naturally occurring sands seldom provide uniform texture, but a "good" (refer to chart) dune (wind sorted) sand may provide 40-44% pore space. Many dune sands provide only 35-40%. Washed "pit" sands provide 26-32%, since all particle sizes are often included. When all sizes of sand, plus silt and clay particles are mixed, the pore space is reduced to 18%.

Mortar and asphalt production is a primary use of the combined particle sizes. The variety of particle sizes provides increased density and requires the addition of less cement or adhesive. The quality needed for cement production is the opposite of that best suited for turf production.

For evaluating sand particles our turf laboratory uses a stack of graduated sieves which divide dried sand into 14 fractions. The range of sand available has been documented in the 170 samples tested.

Continued on Page 15

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Bacterial Wilt, Cont.

peach disease and other diseases. Several different bacteria were isolated and tested for pathogenicity on C-15. A frequently isolated bacterium (Fig. 3) produced and characteristic symptoms of the C-15 problem. Scanning electron microscopy confirmed the presence of the bacteria within the xylem of laboratory infected plants (Fig. 4). Because of the symptoms and discovery of bacteria with diseased plants, we elected to name the disease "bacterial wilt" of Toronto creeping bentgrass.

Antibiotic field tests for the control of bacterial wilt were initiated in the Detroit area in early Fall of 1980. Streptomycin and oxytetracycline applied as 600 parts per million (ppm) in 5 gallons of water per 1000 ft² were ineffective. Heavy drench applications of 1000 ppm of streptomycin, oxytetracycline, and cupric hydroxide at 50 gallons per 1000 ft² were made in Detroit (Edgewood) and Chicago (Village Links) locations in early April 1981. Oxytetracycline was observed to give effective control whereas strep-

tomycin and cupric hydroxide did not inhibit disease progression. In cooperation with Peter Leuzinger, St. Charles Country Club, St. Charles, IL., drench applications of 50 gallons per 1000 ft² of 1000 and 1500 ppm oxytetracycline provided absolute control of bacterial wilt (Fig. 5). Scanning electron micrographs of treated (Fig. 6) and nontreated plants (Fig. 7) revealed the prevention of infection in oxytetracycline treated plants.

The discovery of bacteria, the infection by an isolated bacterium and the subsequent management by oxytetracycline proves that the C-15 problem is a bacterial disease. Research on bacterial wilt, the first bacterial disease of a cultivated turfgrass spp., will provide a research basis for combating new or existing bacterial diseases on other turfgrasses.

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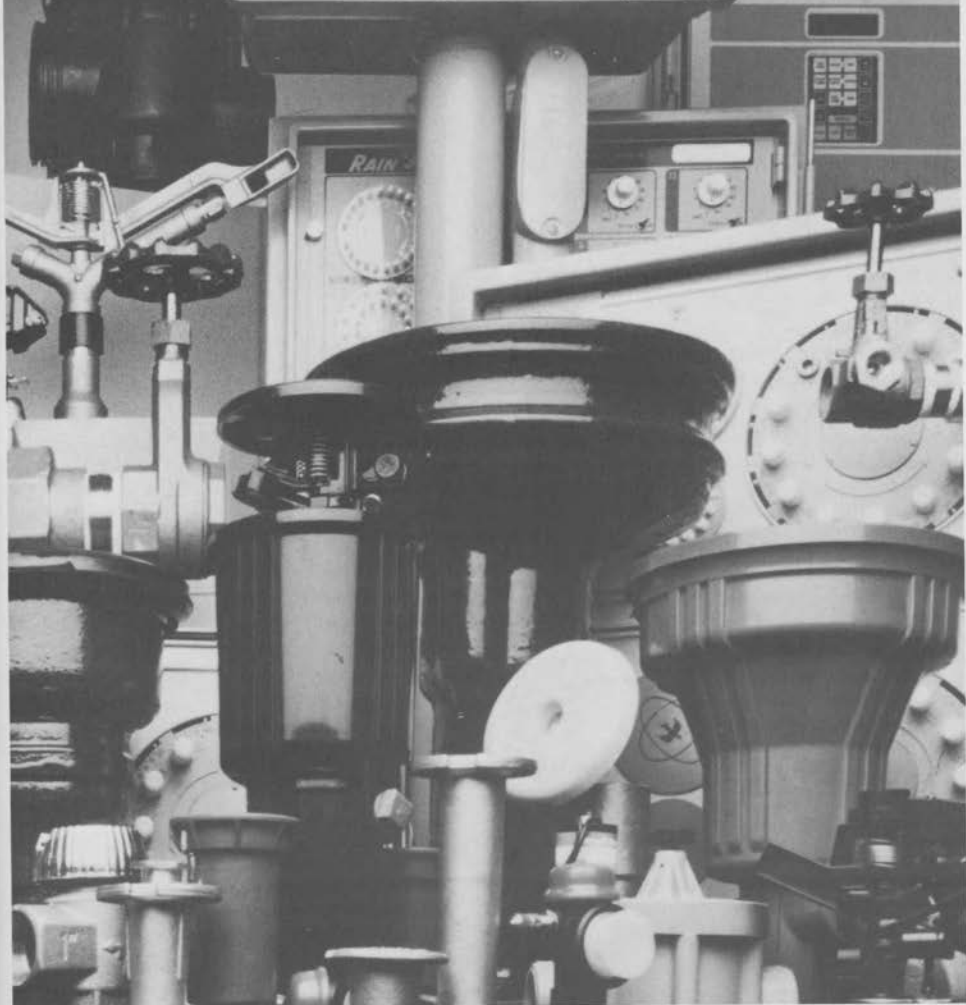
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Recent studies at several universities have shown that organo-phosphate and phosphate and carbamate pesticides are decomposed in alkaline water by a process called "alkaline hydrolysis". This process causes the pesticide molecule to split into inactive or non-active compounds. The rate of decomposition depends on the pesticide involved and the alkalinity of the water in which it is dissolved or suspended. Usually the greater the alkalinity of the water, the more rapid the decomposition process.

Most modern pesticides are effective when mixed and applied in slightly acid water. Alkaline hydrolysis and the general effect of alkaline water on solubility may help explain why some pesticides show poor control. In the Twin Cities, a check of water showed the pH to be in the vicinity of 8. This pH level WILL damage the performance of some pesticides.

To avoid reducing pesticide effectiveness with alkaline water, follow several precautionary steps:

1. Check the pH of your water source.
2. Read the pesticide label to determine what information, if any, is given there concerning the pesticide and the pH of the tank mixtures (pesticide + water).
3. Use mixed pesticides as soon as possible. Do not leave them in the tank overnight.
4. Use alkali neutralizing adjuvants. (Iron sulfate, or Tricarboxylic Acid)



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Analysis of Sand Samples, Cont.

The average particle size for the finer 10% is 0.19 millimeters. The particle sizes range at 10% is .08 to 0.27mm. Of all sands tested, 61% measured 0.15 to .25mm.

At the coarse end of all samples tested, 53% had less than 10% particles more than 0.5mm in size. Another 17% had less than 20% coarser than 0.5mm. Therefore it is evident a rather adequate supply of good quality sands are available for rootzone use.

Commonly, turfgrass surfaces gradually develop an accumulation of thatch and dust which tend to predominate. A program of frequent, light sand applications as topdressing can result in a uniform predominance of sand.

4. pH of sands tested. Tests show dune sands generally are neutral, neither acid nor alkaline. Sand dug and crushed from pits formed by stream deposits in the Midwest tend to be calcereous. A pH range of 7.6 to 8.6 has been measured in many samples. The addition of sulfur plus ample phosphorus, potassium and iron may be needed as an initial and annual nutrient program to encourage maximum turfgrass growth on sands with a high pH.

5. Washed sand usually contains less than 1% silt and clay. A simple test to determine the amount of silt and clay in a sand sample: dilute a 5" column of fresh sand with two parts water, shake vigorously, let settle for 24 hours. The amount of silt and clay present will form a surface crust which should be barely discernable. Pit or unwashed sands vary a great deal, but may be suitable for use as rootzone medium.

6. Availability. Check all sand sources before choosing the best uniform sand available at reasonable cost. Large sand companies are equipped to prepare in one day all the sand needed for the turf areas in a metropolitan district for one year. Turf managers are encouraged to work together to create bulk orders so as to obtain a preferred supply.

Plans for a sand topdressing program should provide adequate machinery for efficient use. The repeated procedure should be an efficient oper-

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Suppose every member served on as many projects as you do.
Suppose every member treated guests as you do.
Suppose every member contacted and brought in prospects as often as you do.
Suppose every member supported ways and means and special events as you do.
Suppose every member were as tactful and understanding as you are.
Suppose every member were as friendly, thoughtful, considerate and appreciative as you are.
Suppose every member were as dependable, conscientious, enthusiastic and willing as you are.
Suppose every member had as many, or as few alibis as you do.
Suppose every member followed your example.
What kind of an organization would it be?

Illinois State Florists' Assn. Bulletin
July-August, 1978

Analysis of Sand Samples, Cont.

ation. The sand storage area should provide for an ample, dry supply. It should be arranged for easy dumping by truck when delivered and machine handling and spreading.

We at Purdue are encouraged by the availability of quality sands. Since 1972 we have records of 170 samples. Turf managers desiring to get an analysis of sand may send one pint or one pound of sand for each sample to be tested. Ship to: Dr. W.H. Daniel, Turf Research, Department of Agronomy, Purdue University, West Lafayette, IN 47907.

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BEWARE THE DEADLY BEE

What venomous animal causes more fatalities than any other? According to Dr. Ted Brook, it's not a rattlesnake or some incredibly deadly variety of spider — it's the common, everyday bee.

Brook, writing in the Mississippi Turfgrass Association newsletter, says that bees, wasps, hornets, yellow jackets and ants are insects that can cause discomfort or allergic reactions by their stings. For most people, the reaction to the injection of venom into the skin is more often uncomfortable than deadly. However, a sizable number of people are very allergic to bee and wasp venom, and the reaction can sometimes be fatal.

Brook recommends that if you got stung by an insect, capture it for identification, if possible, especially if you don't know if you have an allergy. If a reaction, such as swelling, fainting, hives, nausea or shock, develops get immediate medical help from a doctor or hospital. If you are allergic, be sure to carry identification, such as a medic alert bracelet or tags and a wallet card.

In a golf course operation, you should instruct your workers to report the location of nests so that they can be removed. You should also be aware if any of your employees are known to have an allergic reaction to insect stings and instruct them in the proper procedures to follow in case they are nearby when a golfer is stung.

Forefront

IT ISN'T EASY

To apologize,
To begin over,
To be unselfish,
To take advice,
To admit error,
To face a sneer,
To be charitable,
To keep on trying,
To be considerate,
To avoid mistakes,
To forgive and forget,
To think and then act,
To keep out of a rut,
To make the best of time,
To shoulder a deserved blame,
To recognize the silver lining,
... BUT IT ALWAYS PAYS!

SAFETY IN MOWING

Attractive turf requires good mowing practices and proper mowing means sharp cutting parts. Rotary mowers in particular seem to be responsible for a large number of careless accidents. To insure safer mowing, the following precautions should be observed.

1. Remove the ignition wire from the spark plug before sharpening the blade or removing debris from under the housing.
2. Make certain that hands and feet are away from the blade before starting the mower.
3. Never refuel a hot engine. Make certain the tank and cap do not leak. Fill the tank on the driveway, or sidewalk, away from the lawn.
4. Remove all debris, rocks, toys, sprinklers, etc., from the lawn before starting to mow.
5. Never pull the mower backward. This greatly increases the opportunity for accidents.
6. Keep children and pets away from the mower while mowing. Never allow small children to operate the mower.
7. Do not allow anyone to stand or walk beside the discharge ports.
8. Stop the mower whenever you leave for just a few moments.
9. Try to avoid mowing turf when the grass is wet. It is difficult to cut properly and footing may be uncertain.
10. Mow across steep slopes and not up and down. Try to wear shoes that assure good traction.

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No. 7K
No. 8K



Model 7K has a 7 H.P. Heavy Duty Cast Iron Engine.
Model 8K has a 8 H.P. Heavy Duty Cast Iron Engine.
Fully pneumatic 10 x 3.50 wheels are standard.

GIANT BLO

GIANT-VAC Mfg., Inc.

Affiliate of H.L. Diehl Co. Inc. • South Windham, Conn. 06266

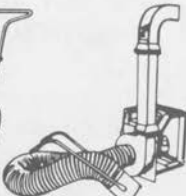
Giant-Blo whisks away leaves and debris at super-hurricane velocities. Well balanced for operator ease and maneuverability. A Giant-Blo will clean many acres in a fraction of the normal time. A unique exhaust deflector is standard on all models and directs the air in either a side or forward direction. This is ideal for cleaning hard to get at places. Intake and Exhaust hose kits are also available. Giant-Blos clean debris as neatly as hand raking, yet, 11 times faster and 10 times easier.



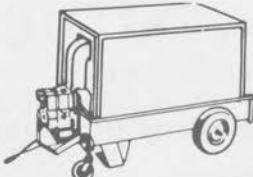
VACUUM
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BLOWERS



LOADERS



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Jacobsen 524-100 and 548-100 Seeders.



Broadcast-type seeders can give up to 15% germination when overseeding and up to 40% when seeding new beds. The Jacobsen seeders provide a 70% rate of germination whether overseeding or planting new beds. The 524-100 is a self-propelled seeder and seeds a 21" wide swath planting on 3" centers. The 548-100 is tractor pulled using a 3-point hitch and PTO. It seeds a 48" wide swath and plants 16 rows on 3" centers.

Planting depths are adjustable from 0" to 2" below ground with the 524-100 and 0" to 3" below ground with the 548-100 seeder. Both seeders were designed with a floating action which allows them to accurately follow ground contours and plant seeds evenly, and both accept optional high speed sprocket which increases seed flow rate by 25%.

W.F. Miller Garden & Lawn Equipment Company

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