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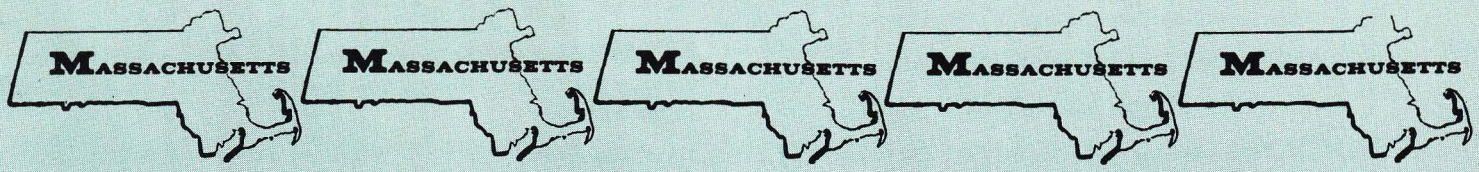
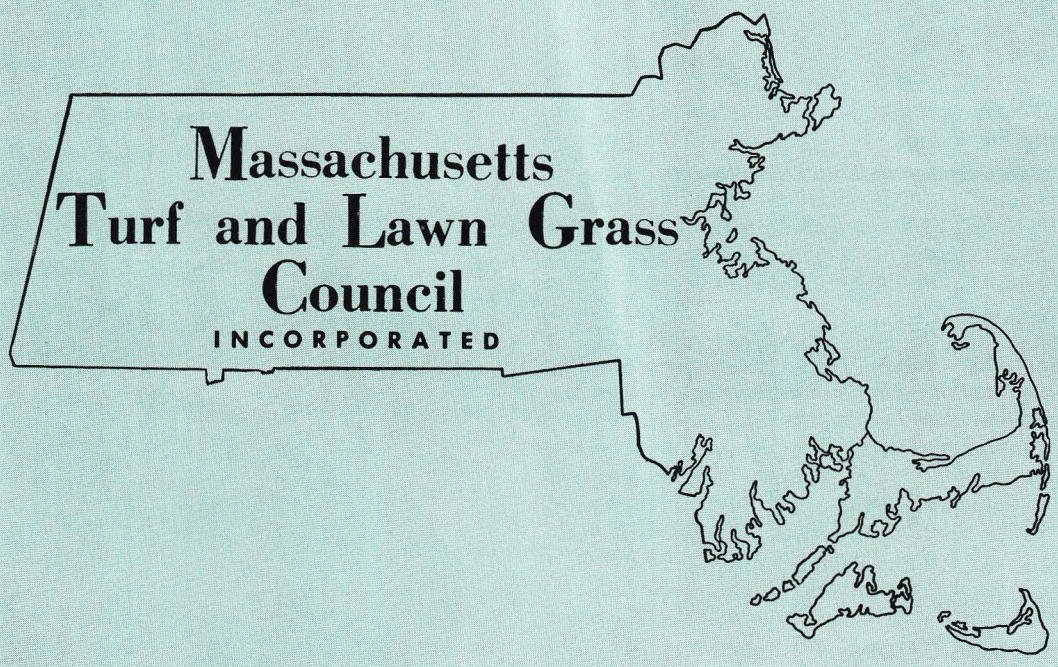


Turf Bulletin



BETTER TURF THROUGH RESEARCH AND EDUCATION

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TURF BULLETIN

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September 1, 1964

COLLEGE OF AGRICULTURE

To: Mr. Joseph A. Keohane
Stockbridge Hall

I enjoy reviewing the TURF BULLETIN each month and would like to compliment you, as its editor, on the fine service which you are rendering to the turf interests of the state.

The article in the July issue entitled "Golf-Course Dermatitis Due to Thiram Fungicide" raised some interesting questions which I propose to discuss with some of my golfing friends.

You always manage to come up with informative and timely articles for your readers.

Yours very truly,
J. RICHARD BEATTIE
Associate Director of Extension

cc: Dean A. A. Spielman
Dr. Franklin Southwick

A Turf Tip

With the cooler, wetter weather of fall coming soon, now is the time to take a good look at the lawn and see if it needs work.

Dry weather can be blamed for some poor lawns, but the most likely cause is malnutrition. Like all living things, grass must eat, and if it does not get the fertilizer it needs, it not only loses its attractiveness, but also is more prone to disease and less able to stand the rigors of dry summers and cold winters.

Exactly what fertilizer to use, and how much, depends on many factors, but the most common needs of turf can be met with a complete fertilizer containing nitrogen, phosphorus, and potassium. The numerical percentage of each of these nutrients appears on the bag in the above order, such as 10-6-4.

Determining the right amount to put on a lawn cannot be left to guesswork. A sample of the soil should be sent to the state experiment station or county agent for testing.

Nitrogen, probably the most important element for grass, promotes growth and helps produce a dense stand of dark green leaves. Phosphorous aids root development. Potassium adds to overall plant vigor.

The nitrogen is generally available as either a chemical or an organic fertilizer. The first acts quickly. The second is absorbed more slowly by the soil and supplies steady nutrition over a longer period of time.

In any case, a proper lawn maintenance program in New England requires a complete fertilization at least once a year — preferably three times a year. The third — or first application if this a new fertilization program — should

Grass And Man

by ALLEN H. MORGAN
Executive Vice President

MASSACHUSETTS AUDUBON SOCIETY

A Maine dairyman visiting my Southern New England home in late winter kept looking out the window at the lawn and exclaiming with some excitement:

"By God, she's greenin' up!"

He was, of course, thinking in terms of what soon would be happening to his fields in Maine. And, he was echoing less elegantly that cattleman of antiquity, the Biblical prophet who noted: "All flesh is grass."

The Maine dairyman's concern about the seasonal progress of grass accented the distance that most of us have travelled fro man's basic origin — a distance that permits most Americans today to think of grass only in terms of an ornamental carpet surrounding a house!

I am certain that turf and lawn experts think of grass in broader terms than that. I know that most conservationists appreciate grass as perhaps our most important basic generator of organic energy — although they do not use that exact terminology when discussing its merits publicly.

Since U. S. Senator John James Ingalls of Kansas in his soliloquy of 1872 so well pointed up the role of grass in man's estate, it would be a waste of energy to try and outdo him, particularly on these paragraphs:

> "Grass is the forgiveness of nature — her constant benediction.
>
> "Fields trampled with battle, saturated with blood, torn by the ruts of cannon, grow green again with grass, and carnage is forgotten. Streets abandoned by traffic become grass-grown like rural lanes, and are obliterated. Forests decay, harvests perish, flowers vanish, but grass is immortal."

Close scrutiny of those paragraphs, I believe, will cause turf experts to conclude: (1) that Senator Ingalls had a silver tongue, (2) that he was acquainted with the pervading nature of grass, and (3) that he knew little about botany and probably never had tried to grow a lawn.

Any homeowner could have assured him that grass is not "immortal."

Even the so-called perennial lawn grasses under excellent care live but three years or less. They maintain a turf by reseeding and spreading underground runners.

A few years ago a newspaper cartoonist invented a mythical creature which he named the "shmoo." The feature that set the shmoo aside from most of the things we know was its ability to be eaten by predators — mainly man — and yet not disappear. In fact, the more it was eaten, the more it multiplied.

The cartoonist was a city lad. He could have saved himself a lot of trouble by using an actual organism invented by nature which has quite similar qualities — grass. As both turfmen and conservationists are aware, however, this matter of eating grass and having it too can be overdone. Some of our overgrazed and badly deteriorated grasslands of the West testify to this truth.

The freshwater angler who makes a serious study of his sport and the fish and water that make it possible, soon comes to an appreciation of grass that approaches that of the dairyman's. While this is true to some extent in New England, it becomes increasingly true as one travels westward and assumes the proportions of an urgent matter to anglers bordering the Great Plains.

The serious angler soon learns that the quality of fishing depends not upon fishing tackle but upon the organic wealth and purity of water. In our own area — since we are primarily in a forest natural economy — trees play a large role in checking erosion, holding back the runoff and maintaining a steady flow water in streams.

But where trees have disappeared — or never existed to any great extent — grass performs this service for anglers.

Soon after World War II the Izaak Walton League undertook a mammoth project to grass the banks of streams and improve fishing. Every member received packets of grass seed — small packets the size that one finds in the suburban hardware store garden seed display in spring. They were advised to take along a packet on each fishing trip and to scatter the seed on some barren spot along the stream's bank.

No one need explain to grass specialists the spotty results that might be expected from such haphazard seeding. But the real value of the program lay in dramatizing the interrelationship between clean water and grass. The fisherman who spread grass seed learned a lesson in conservation.

In our own New England, forage grass was almost nonexistent when the Pilgrims landed. The American Indian had made great strides in the domestication of such grass as corn, or maize, but his adventures in cultivation centered solely upon human food. His animal protein came from hunting or fishing rather than from livestock husbandry. Where the Indians had burned the underbrush to maintain cleared fields, the colonists found but two forage plants, wild rye and broomstraw.

As early as 1635 prospective settlers of the New World were advised to carry English grass seed with them to support their livestock. The "English" grass regularly included bluegrass and white clover. Every shipment of livestock that crossed the Atlantic was accompanied by a hay supply to keep it alive. When the ships were cleaned and the hay and manure thrown ashore, all the grasses of Europe had a chance to establish themselves — a chance that many failed to take.

This same careless procedure of dumping ashore the refuse from livestock shipments — and the colonial laxness in not winnowing out undesirable weed seeds — established along our coasts many of the persistent European weeds with which lawn experts still must cope.

It interests me that Senator Ingalls praised grass in an essentially arid area and that in recent years I have found

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myself praising grass in one of the world's wettest areas — the New England salt marsh. If nothing else, it illustrates the incomparable versatility of grasses. The good senator spoke of bluegrass and I speak of cordgrass. In final essence, a salt marsh is nothing but a gigantic grass field and everything in it or associated with it, is dependent upon that grass.

I shall not bore you with details of marsh composition: of grasses that must be wet at every tide and other grasses that grow only in those areas reached at six-month intervals by the extreme high tides. But I think it interests grass men to know that even the ocean — or, at very least, the continental shelf — depends in large measure upon grass for organic energy. The salt marsh ranks among the earth's richest producers of basic food. The detritus — the decomposed compost of dead salt grass that flows out of the marsh as though it were tiny particles of dirt — is among the most important organic riches that permeates coastal waters. It is the food of plankton and shellfish. It begins a food chain that leads through larger fishes to the nets of man.

But enough of the bluegrasses, fescues, bentgrasses, redtops, ryes and cordgrasses! There are more than 6,000 species of grasses that encircle the globe, ranging from the low-tide mark to 14,000 feet above sea in the Himalayas. And there is not a single species but what helps bind our earth together and make it habitable for man and wildlife!

Cytospora Kunzei Sacc.

FRANCIS W. HOLMES
Shade Tree Laboratories
Department of Entomology and Plant Pathology

Our most common disease of Norway and blue spruces is the canker caused by attacks of the fungus *Cytospora Kunzei* Sacc. Other evergreens, larches, and common deciduous trees, such as poplars and willows, may also be infected by this fungus, or closely related species.

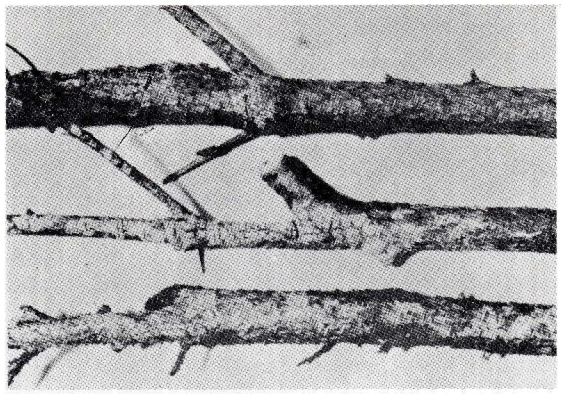
SYMPTOMS

The lowest branches, and then progressively higher ones, are killed by the cankers. A mass of dead, leafless branches is left in the lower part of the tree. Rarely are upper branches affected first. The cankers usually discharge pitch which dries near the point of issue to a greyish-white color. The extent of the cankered area can be determined by cutting away the bark in the region of resin flow.

The entire tree may be killed if the trunk is girdled, but trunk cankers are less common than branch and twig cankers. Ordinarily, dying branches do not revive, although in some cases, especially after fertilizer treatments, dormant buds may sprout on the trunk near the bases of dead branches. Even if a tree recovers, however, its symmetry and beauty may have been largely destroyed.

LIFE HISTORY

The fungus fruits in minute, black, flask-shaped structures which resemble buckshot embedded in the bark of the cankered area. From these, in wet weather, exude yellowish-white curled tendrils containing millions of spores, each less than 1/4000 of an inch long. The tiny spores are carried to other branches by wind, insects, tools, hands, clothing, and especially splashing raindrops. Spores deposited in wounds in the bark may develop and cause cankers. A canker usually starts on the lower side of a branch or twig, and when it girdles a branch, all of the branch between the canker and the tip dies. More fruiting pustules form in the killed tissues.



CONTROL

To prevent further spread of the disease, the infected branches should be cut off several inches below the cankers, or at the main stem if the entire branch has been killed. The debris should be burned promptly at a safe distance from the tree. *Prune only when the weather is dry* to reduce the spread of spores to other branches. Unnecessary wounds should always be avoided. Pruning tools should be disinfected promptly by being wiped clean with full strength alcohol or, if more convenient, by being scalded with hot water.

Measures designed to improve general tree vigor may help control the disease. Appropriate fertilizing and watering and, in particular cases, mulching or cultivating the top soil are advisable.

At 1 to 2 week intervals starting before the early spring rains, several sprays with Bordeaux mixture (or a similar fungicide) may help to reduce the spread of the fungus.

Ants

HARVEY L. SWEETMAN

Dept. of Entomology, UMass.

Ants are very common insects in Massachusetts. There are over one hundred species, but only about a dozen are pests in and about homes. Three of the latter, Pharoah's, pavement and crazy, are foreign introductions; the others are native.

HIGHLY DEVELOPED SOCIETY

Ants are colonial insects. Each colony or nest may contain from a few up to several thousand individuals. These are divided into castes depending on the species and usually include egg-laying queens, winged males, large and small workers and soldiers. The soldiers may be only large workers with duties of crushing and tearing apart of food particles, etc. rather than protection. Young in all stages of development, eggs, larvae, and pupae, may be numerous, particularly in the spring and summer. The young are helpless and are cared for by the workers. The workers are the most numerous caste in the colony.

The workers are most commonly observed running over surfaces and scavenging for food. The winged queens and males may swarm from time to time, especially in the spring and summer following showers. Mating usually occurs at this time although some ants mate in the nest also. The swarming queens, after mating, shed their wings and seek shelter in a soil crevice, or soft wood in or above soil, preparatory to establishing new colonies. The males succumb after mating. Some species establish new colonies also by separation and migration to new sites. Whole colonies may change nesting sites from time to time.

The eggs deposited by the queens are cared for attentively by the workers. The larvae, which are helpless. are fed and groomed as larvae and later as pupae by the workers. Some ant species pupate in cocoons, others are free. The young are often moved about in the nest to areas of suitable temperature and moisture. The periods of development are closely correlated with temperature and vary from a few weeks to a few months.

ANTS EAT EVERYTHING (ALMOST)

The foods of ants consist of sweet materials, greasy or oily matter, seeds and animal materials. The sweet foods are honeydew from insects, nectar, excretions from plant nectaries, honey, sugar, sweet fruits, saps, pastries, jellies, jams, etc. The greasy or oily foods come from plant and animal sources and include such materials as nuts, seeds, vegetable oils, peanuts, bacon, meats, cheese, dead carcasses, and insects. They do not feed on mineral oils. Thus ants may be divided into sweet or sugar ants, and grease ants, depending on which type of food is preferred. Neither type is consumed exclusively.

The grease ants may feed on food that does not appear oily or greasy. They may remove the oil from peanut butter, nuts or seeds, leaving only a dry granular mass, or extract the shortening from a flour mix and leave little evidence of change. Sweet materials are extracted in solution and thus the food becomes reduced in volume, disappears, or may become dry. Ants need water and often collect water from taps and sinks. This need for water may be fulfilled from sweet solutions also. The food may be eaten where found or carried to the nest. Often liquids only are extracted and taken to the nest.

RUIN LAWNS, BUILDINGS

Ants become pests for a number of reasons. In the lawn or garden they may injure plants by cutting rootlets, drying the soil and roots by excessive aeration through their tunnels, spreading and protecting aphids and other honeydew-producing insects on roots and aerial portions of plants, killing of plants for clearing of runways or perhaps killing the plants in the runways, incidentally with formic acid from scenting to mark runways, and killing of plants for mound-building purposes. In wood as trees, posts, and buildings, ants may produce serious damage by mining and building galleries in rotten, soft or solid wood. Appreciable damage in wood is produced by the carpenter ant only. In buildings ants become aesthetic nuisances, destroy and contaminate food, and produce off-flavors in foods. They may be of secondary value through destruction of other insect pests.

Most of the structural pest ants do not sting and seldom bite. Those still possessing the sting include the acrobat, thief and pavement ants, which can, but seldom do, sting man. Ants commonly spray formic acid from the poison gland into bites made by the mandibles when attacking living organisms. However, none of the structural pest ants are important because of sting or bites to man.

The tropical species, as Pharoah's and crazy ant, are largely confined to buildings and greenhouses in Massachusetts.

ERADICATION AND CONTROL

CHLORDANE and MALATHION are good for elimination of ant infestations.

Chlordane is available as 2% oil base sprays, 4 - 6% dusts, 40 - 50% wettable powders and 45 - 75% emulsion concentrates. The dusts and oil base sprays are ready to use. Do not use oil base sprays on green plant tissues. The wettable powders may be used as a dust or diluted with water and applied as a spray or soil drench. The emulsion concentrates should be diluted with water. Follow directions and *precautions* on labels.

Malathion is available as 4 - 5% dusts, 25% wettable powders, and 47 - 57% emulsion concentrates. The dust is ready to use ;the wettable powder may be used as a dust or diluted with water and applied as a spray. The emulsion concentrates should be diluted with water. Follow directions for dilution and *precautions* on labels.

Outdoor Control — Either malathion or chlordane may be used to control outside colonies. Chlordane kills and does not repel ants. They are exposed by running over treated surfaces. Malathion kills and repels.

1. Ants on woody plants, trees and shrubs.

Ants are attracted by honeydew-secreting insects and plant exudates. Dust trunks and stems below leaves with malathion wettable powder. Blow into nests if in wood. Spray may also be used. Repeat application after 2 - 3 weeks when necessary. Chlordane may be used siminarly.

2. Ants on herbaceous plants and low shrubs.

Ants are attracted by honeydew from insects and by plant exudates. Ant burrows around herbaceous plants may be associated with plant lice or mealybugs on roots of plants. Spray or dust for plant lice and mealybugs or other insects to prevent honeydew accumulation. Treat soil and woody portions below leaves of shrubs with malathion dust, light application of wettable powder as dust, or with spray. If

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A Consultant's Views

by
KENNETH TURNER, JR.
American Liquid Fertilizer Co.

During the latter part of May, an observant Golf Course Superintendent in New England disclosed a condition which was soon to be a nightmare for many in the Northeastern area. Poa annua and bents were going off-color in his greens, a characteristic development which generally indicates improper nutrient levels. However, this was not the case, as ample supplies of N, P, and K had been applied shortly before the area was influenced by unusually hot and humid weather. Plugs of suspicious grass were removed and incubated to determine if the malady was pathogenic in origin. Inspected by our turf specialist, Joe Troll, at the University of Massachusetts, indicated that fusarium was indeed present, with curvularia and helminthosporium adding their deleterious influence.

This experience was a preview of what was to become a nightmare for many in the Northeastern area. From June 18th on, reports of Poa annua and other grasses going off color and dying became fairly common.

I made the following observations during my regular course of business tours. These observations are my own, and are stated here in hopes that they may be a useful reference for others.

1. Poa annua appears to be an excellent host plant and is generally the first to offer visual indications of malfunction due to infection.
2. Night watering on greens should be avoided if possible.
3. Water during the early morning and syringe only if necessary. This is a point of controversy; however, syringing is essential at times.
4. Most all bent grasses grown in this area are subject to the entire complex attack if environmental conditions are proper for pathogenic development. Look for soil temperatures of 78° or above and a corresponding high relative humidity. Grasses appear to be susceptible in the following order: Poa annua, creeper, then velvets.
5. Most superintendents having had experience with this situation in 1963 were first to recognize it again this season. This indicates persistence of fungus attack and is probably due to course location, greens location and general turf environment soils, etc.
6. Courses using chlorinated city water showed less tendency toward wholesale infection than those using private supplies.
7. Root length of grasses meant little as leaves and crowns were infected. A good root system did help many inasmuch as turf did not require as much syringing.
8. Aeration equipment spread diseases rapidly during humid weather. The practice of broadcasting clippings caused severe infection on aprons and approaches.
9. Golfers carried fungus from most approaches to pin locations in almost every instance.
10. Hydrate of lime applied at ¾ to 1 pound per 1000 sq. ft. proved helpful.
11. Chemicals which one might well classify as heavy metals also gave relief from fungi attack. Antibiotics exerted influence also.
12. There is no miracle chemical available at this point which will give positive control. The words contain or partially arrest would better describe the actions of all chemicals tried.
13. If the greens' structural base is clay, be careful when using heavy metal type chemicals — observe directions and do not overdose.
14. Do not overstimulate grass during stress periods. Acidulation created by natural phenomena regarding nitrogen sources seemed to incite infection. Let nature take its course, don't make a bomb out of the whole deal.
15. Hand watering is not a lost art. Use section men and water when necessary.
16. This point cannot be overemphasized. When suspicious symptoms appear send plugs to our turf specialist, Joseph Troll, at the University of Massachusetts. His report can be most helpful — it may save your job.

Much of what has been stressed here is old hat; however, who can deny practices which have proven successful for so many years? This is not meant to be a treatise on proper turf management, however, it is merely observations of an acute problem.

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ants are associated with root insects, indicated by nests or craters about base of plants, a drench application may be desirable, but usually surface applications will be adequate. A drench may be prepared by diluting the wettable powder with water and flooding onto the soil, or the wettable powder scattered on the surface and washed in well with a liberal application of water. Chlordane may be used similarly.

3. Nests in lawns and soil.

Apply chlordane or malathion as directed for soil in No. 2. Treat large nests of mound ants with a heavy application of wettable powder over and around base of mound and rake in or wash in well as drench.

4. Ants entering houses from outside nests.

Apply malathion around foundation just below siding, on steps, edges, and under porches for a toxic barrier, and on soil around plants and in contact with building that might serve as bridges over the treatment barrier. Treat nests as directed in No. 2.

5. Ants in buildings.

Apply chlordane dust (5 - 6%) or spray (2% in oil or diluted emulsion concentrate, 2%) to interior baseboards, door and window casing, around sinks and bathtubs, basement walls and wall crevices. The insecticide must be applied where the ants will be exposed during their normal travels. It will be necessary to treat floors, walls, ceilings, and closets, cupboards and cabinets if nests are located in such areas. Apply malathion to exterior foundations and walls if nests are located there or ants are entering from outside nests.

6. Other insecticides.

Other insecticides available for ant control that may be used include heptachlor, lindane, DDT, dieldrin, and diazinon. Use as directed for malathion outdoors. Lindane, diazinon and DDT may be used indoors. These names will appear in the list of active ingredients on labels of commercial products which contain them.

Insecticides and control methods not generally recommended include calcium cyanide dust, carbon bisulphide, paradichlorobenzene, and poison baits in general.

If at first
You don't succeed,
Give up — why be a hardhead.

Kingstown Bent

UNIVERSITY OF RHODE ISLAND
Kingston, Rhode Island

Velvet bentgrass *(Agrostis canina L.)* is a species of bentgrass little known or used throughout most of the United States. It has been difficult or impossible to obtain pure seed of this species and varietal strains or selections are currently maintained only vegetatively. Throughout New England velvet bentgrass is frequently encountered on golf greens and fairways and occasionally in lawns.

The literature indicates that the species has been in limited use and in trials for many years. Based on past performance in New England velvet bent has been called the aristocrat of grasses for putting greens and other fine turf areas. Over 30 years ago at the Arlington, Virginia, turf gardens it was rated by golf professionals over all other bents as producing the finest putting surface.

Velvet bentgrass is the finest and most uniform textured of the commercial bentgrasses. It has several other fine attributes. It is more tolerant of shade, poorly drained and acid soils than Colonial or creeping bents. It produces a tighter turf than the other bents and for this reason is less subject to weed encroachment. The maximum beauty of this grass is apparent under close cut. A luxurious green-velvety carpet appearance can be developed and maintained with proper management.

Problems of maintenance and availability of pure seed that would produce uniformly have prevented the species from becoming more widely accepted. Because of the superior turf quality that is potential, Agronomy personnel of the Rhode Island Agricultural Experiment Station have maintained an active interest in velvet bentgrass. Research has continued for many years in breeding and selection and management.

A breeding program was started in 1929 using the best strains of velvet bentgrass available. Two hundred inbred selections, each from a single seed, were established vegetatively in puttin-green plots in 1935 and were compared with the parent strains. In 1940 eleven of the selections were taken from this trial and established in larger plots. They were selected on the basis of their performance and in every case were superior to their parent strain. During 1941, 1942 and 1943 additional selections from the original nursery were established in larger plots and by the end of 1943, 27 selections had been made from among the original 200.

The seed production potential and seed characteristics of eight of the 27 selections were studied. Seed production of one strain, designated B-11, was superior to all others. Turf established from first generation seed in 1944 appeared to compare favorably with that established vegetatively.

Based on accumulated averages of quality notes in all trials over many years, the B-11 selection appeared to be superior to all others. B-11 is an inbred selection from Piper (USDA BPI No. 14,276). Not only was the quality of turf higher than the other selections but it was uniformly good throughout the seasons.

At the present time turf of the original vegetative stock planted in 1940, turf started from seed of the original vegetative material in 1944 and from second generation seed, 1951, are all in excellent condition. The turf developed from seed has very similar quality factors to the original. The only differences noted were that the seeded plots were slightly green in color, less aggressive and finer textured. The differences were very small but could be noted when plots were adjacent to each other. Differences in turf development from first, second and third generation seed could not be detected.

Seed of B-11 would have been sent to other states for testing but it developed a smut disease *(Tilletia pallida)* that seriously interfered with seed production and its introduction into other areas. In September of 1960 a quantity of B-11 breeders seed was sent to Dr. John R. Hardison, Department of Botany and Plant Pathology, Oregon State University, Corvallis, Oregon. Dr. Hardison, through a very fine effort, was able to eliminate the smut and establish a foundation planting during 1961. Seed produced from the Foundation planting at the Oregon Agricultural Experiment Station has been allotted to Elite seed growers in Oregon for seed production.

The Rhode Island Agricultural Experiment Station officially released B-11 velvet bentgrass as the variety "Kingstown" in March 1963 and immediately requested its acceptance into the seed certification program of the Oregon Seed and Plant Certification Board. The request was accepted in May 1963. It was stipulated that only breeders seed processed by Dr. Hardison's technique, and tested to make sure that the smut organism had been completely eliminated, would be eligible to produce foundation seed for use in the certification program of the variety in Oregon.

"Kingstown" velvet bentgrass, developed from one seed of a self-fertilized head of Piper in 1929, has the following quality factors:

Color — semi-brilliant dark green.

Vigor — good, aggressive, will invade most other bents under similar management.

Texture — slightly wider leaf blade than Pipe velvet bentgrass.

Density — high, comparable to Piper.

Uniformity — excellent, even with plots of second and third generation seed after ten years.

Diseases — good resistance to most diseases. Only a trace of dollar-spot disease was recorded throughout the trials.

It is anticipated that some certified seed of "Kingstown" will be harvested in 1964. The amount will likely be small.

The release of the variety makes available another specialty grass that can be established with seed. With increased knowledge of its management requirements and with vastly improved maintenance equipment velvet bentgrass may now be used to advantage in certain sections of the northern, cool, humid regions. Within this region the variety may lend itself for use on golf courses (particularly greens), for use in various shade-lawn mixtures, on damp soils and for the lawn hobbyist who desires the ultimate in turf and is willing to manage it accordingly.

They told us it couldn't be done
But, smiling, we went right to it.
We tackled the job that "Couldn't
Be done," and, by gosh — we
Couldn't do it."

Fish And Chemicals

Testimony gathered during a two-day hearing by the Senate Subcommittee on Reorganization and International Organizations in late June continued to fix the cause of massive fish kills in the lower Mississippi River last winter as endrin, a widely-used agricultural pesticide. The hearings were conducted by Senator Abraham Ribicoff (Conn.) in Washington, D. C., on June 29-30, in his capacity as chairman of the subcommittee to the Senate's Committee on Government Operations.

Latest in a long series of meetings and hearings since the U. S. Public Health Service announced results of its investigations on the lower Mississippi last March, the Ribicoff subcommittee hearings were aimed at obtaining answers to five key questions: Was Endrin responsible for the fish kill? If so, where did it come from? Were the Public Health Analyses accurate? Did the Government exaggerate the extent of the fish kill? Do the federal agencies — Public Health Service and Department of Agriculture — conduct their regulatory proceedings in a manner that is fair to both the public and industry?

Industrial and agricultural interests had disputed findings by the Public Health Service that Endrin was the primary cause of the fish kill. A USDA witness, Robert J. Anderson, deputy administrator of the Agricultural Research Service, said his department does not question the PHS findings that Endrin was responsible for the fish kills but claimed USDA hearings did not produce any evidence "to substantiate a conclusion that agricultural use was the source of the Endrin." In earlier hearings, several witnesses had pointed out that kills occurred frequently after heavy rainfall in the lower Mississippi River Basin, leading most observers to conclude that pesticides had washed into the river and itstributaries with the run-off which follows such storms. The inference was that the pesticides had been properly applied but the rain storms had caused an accidental discharge into the streams. This led Senator Ribicoff to ask Anderson, "Does this suggest that rainfall is an accident or is run-off from land following rain excused on the grounds that the use of the insectcide prior to storms is not proper?" Anderson replied, "We certainly do not consider this a normal practice." Most observers and especially those interested in wildlife protection may now well wonder if the USDA expects farmers and orchardists to be weather prophets and postpone spraying when they know thunderstorms or heavy rain showers are imminent.

Were the Public Health Service tests and analyses accurate? One witness at earlier USDA hearings and the HEW conference in New Orleans had disputed the findings, claiming that he had subjected fish to endrin without finding symptoms of poisoning similar to those reported by HEW scientists. Senator Ribicoff pointed out that his tests were done at the request of an industrial manufacturer and that they had been accomplished in one week. The HEW tests had covered a period of months, were made not only by government scientists but also a private research organization with complete impartiality.

Controversy over the size of the fish kill had arisen at the HEW conference in New Orleans. Testimony there had centered on only 175,000 fish, rather than the 10 million referred to in previous reports. The Ribicoff subcommittee hearings emphasized the urgency of the situation. On-the-spot roving laboratories are being initiated to check the possible danger areas.

Tractor Safety

L. F. WHITNEY AND E. S. PIRA

Agricultural Engineering Dept., UMass.

The rising toll of tractor accidents suggests the need for increased safety precautions to protect tractor operators. High speed operations, front-end loaders and more powerful tractors are but a few factors contributing to this disturbing trend along with tractor operator carelessness and misuse. The very features for which tractors have been designed — high clearance, sharp turning, etc. — often convert a useful machine into a deadly killer when improperly maneuvered. Potential hazards contributing to tractor upsets are numerous. Haste without caution is the number "one" killer, but hillside cutting, improper hitching, front-end loaders and hidden obstacles are a few of the other hazard factors.

This points to the advantages of using a tractor safety frame which can protect the operator from either side rolls or rear tips. Combined with the useof a safety seat belt, this has been demonstrated to effectively protect the operator from serious injury. Evidence from Sweden where a national law has been in effect since 1959 requiring safety cabs as original equipment, indicates a sharp decline in tractor operator fatalities.

Such a frame has been designed by the Agricultural Engineering Department which combines protective requirements with the potential versatility of a sun protector or enclosed cab. The design is streamlined to ward off branches and other obstructions yet provide maximum strength maximum weight obtained through use of the triangular truss.

THE FRAME is designed using 2 and 2½-inch double strength black iron pipe which is easily welded and which is readily available. Corner joints are mitred either by a hack saw or a cutting torch, welded and then fitted with triangular gusset plates of ¼ x 8 x 8 inch steel. Overall dimensions of the frame are designed to accommodate standard width plywood and/or a combination of canvas panels with appropriate windowed areas as desired. Headroom over the tractor seat of 48 inches allows for freedom of movement of the operator. The frame is centered about the seat.

MOUNTING ATTACHMENTS will vary to suit individual tractor models so as not to interfere with tractor mounted implements. Some models will require bolt-on attachment plates at the rear axles while others may require a clamp-on arrangement around the axle housing. The base of the pipe frame should be securely welded to ¼-inch steel plate formed and drilled appropriately. The front braces, made of 2-inch pipe, are attached to steel plates bolted to the side frame of the tractor. These may extend as far downward as desired.

SAFETY SEAT BELT is an essential part of properly fitting a tractor for safe operation. This should be securely anchored to the tractor frame as in automotive applications. A three-inch-wide belt, preferably with shoulder straps, is desirable. Metal to metal buckling is essential.

Use of this equipment, combined with constant vigilance and awareness by the tractor operator of its potential danger (resulting in his safer driving habits), will prevent many serious accidents. For further information contact the authors at the University of Massachusetts.

A Grass Killer?

A lawn-killing disease that is difficult to control and spreads alarmingly rapidly, threatens to destroy lawns and golf greens throughout the eastern half of the United States.

Plant experts have identified a fungal disease that threatens to wipe out lawns and golf greens all over the eastern half of the United States.

First observed in 1959, but only identified this year, Fusarium blight, an uncontrollable lawn disease, has already caused hundreds of thousands of dollars in damages to several eastern localities.

Even the Merion Kentucky bluegrass on the White House lawn was completely destroyed by the disease last year.

A Massachusetts golf green was completely wiped out in one wee's time. In several Long Island communities, one week of mid-80 degree teperatures and fog provided the proper conditions for the Fusarium blight to destroy the sodded lawns of several hundred home owners at a cost of $8,000 each last year. When the fog cleared, the lawn grass was dead.

Prof. Houston B. Couch, plant pathologist at Pennsylvania State University College of Agriculture, University Park, believes that the Fusarium threat poses a major problem to every golf green and sodded lawn in the eastern United States.

The disease spreads rapidly. It is transmitted by mowing equipment, shoes and the air. The spores of the Fusarium fungus, once started, are extremely difficult to check.

Signs of the blight appear only after it is too late to control it. "Haloes" of dead grass around green grass are the final signs of the infection on lawns.

The only thing that can be done is to completely resod the lawn, after fumigating with methyl bromide. The White House lawn was redone this way.

Some hope is provided by the commercially available fungicide, Dithane M-45, only if it is applied in time to halt the fungus in the invisible early stages of the disease.

The disease seems to thrive best in cooler sections of the country, stated Dr. K. W. Kreitlow, plant pathologist at the Beltsville, Md., station of the U. S. Department of Agriculture.

Fusarium roseum is the organism causing the disease, which spreads with "alarming rapidity."

—Science News Letter, July 4, 1964

FAMILIAR FRESHWATER FISHES OF AMERICA. By Howard T. Walden, II. 324 pages. Illustrated with numerous black and white drawings plus four full-color plates by Carl Burger. Published by Harper & Row, Inc., 49 East 33rd Street, New York, N. Y. Price: $6.95.

Here is a book to be welcomed by the fledgling naturalist as well as the serious fisherman. A new volume in the distinguished "familiar" natural history series (others include animals, insects, reptiles and amphibians), it describes the lives and habits of more than 100 species of freshwater fishes. Each fish is described in its natural habitat, with details on behavior and appearance. The salmon's determined homing instinct, the pike's fierce ability to find its prey, the eel's mysterious spawning pattern — all come alive in this multiple biography of America's important fishes.

A Bargain At Any Price!

A recent survey, by a firm of well known accountants, shows that golf course maintenance costs have increased manifold during recent years. The tabulation is representative of fifty well known golf courses scattered throughout the country. These figures make one realize that providing for the game of golf today is big business. The operation of modern golf plants with all of their complexities calls for skillful management if rising costs are to be kept under control.

Club officials are beginning to give more notice and pay attention to the value of a well qualified golf course superintendent. They are starting to recognize the relationship that exists between the supervisor of maintenance and the game of golf. The man in charge of grounds operations can no longer be classified as just the greenskeeper. He is now somewhat of a scientist, a plant superintendent, and a modern businessman. This present status is going to develop considerably more, because the game is growing by leaps and bounds.

The better a course is groomed — the more exacting players become. Yet, they do not know or comprehend how complex the art of raising and maintaining quality turf is. The day is fast approaching, if it is not already with us, when the average Country Club must face the fact that the management of a complicated plant such as a golf course requires the services of a highly skilled and trained individuals to guide its destiny.

The position of golf course superintendent is one of the most interesting of all agricultural professions. The challenge of new ideas, new courses, new grasses, new soil construction for greens, new fertilizers, new fungicides and insecticides gets into one's bloodstream and becomes a part of him. These are the principal reasons why the old-timers in the business are reluctant to seek more remunerative fields. However, eventually there must be replacements for the oldsters when time and age force them to leave the scene.

The question of where these replacements are to come from is beginning to cause concern in some quarters, and will continue to do so. Many of our leading agricultural colleges are instituting courses in turfgrass management. These schools are teaching the rudiments of scientific agronomy, without which a successful golf course superintendent cannot operate. Unfortunately, most of these students when they graduate seek agricultural fields other than golf. Why? Because they are more lucrative, the compensations is better. A graduate who has ambition desires an opportunity affording continuous advancement, and does not wish to remain in a static position that has no future. He is seeking to earn further rewards through his own ingenuity and resourcefulness. What is the answer and the remedy? First, make the job worthwhile, see that the pay envelope is equal to the responsibility involved. Give your golf course superintendent the proper recognition; full credence should be given to the fact that he is the custodian and supervisor of a large investment. Provide him with an understudy, so that you will not be left holding the bag, in case something should happen to cause the position to become vacant. Encourage his protege to become more proficient through study, help him to gain knowledge and practical experience.

These observations are made by one who has spent a lifetime on a golf course. They are not given with the thought of being authoritative, or of telling club officials how they should run their affairs. The writer's experience dates back to the period when eight clubs were considered a bagful. Since those days the art and technique of growing fine turfgrasses for tees, fairways, and greens has also changed and advanced to now where it is a major industry.

Management of a golf layout today requires a wide range of knowledge and experience. This in turn demands the services of a trained man, one who is a specialist in the golf field. His qualifications should include good executive ability and a thorough education in the technical phases of growing turf to meet the exacting requirements of golf players.

(Continued bottom of Col. 2)

—From Mid-Atlantic News Letter

Planting Your Tree

Small trees ranging in height from 6-12 feet and having a trunk diameter of 1-3 inches at ground level are recommended for successful transplanting. All of the trees in this leaflet should be planted while they are dormant, with one exception, the Cucumber tree. The sooner the trees can be planted after digging, the greater their chances of survival. If you cannot plant thm immediately, then you should heel them in, in some moist, shady spot, until you are ready to plant.

In planting trees, the hole should be dug large enough to accommodate the root system after it is spread out. Root pruning is not advised except to cut broken roots. If you are digging trees from your own woodlot, be sure to take one foot diameter ball of earth for every one inch diameter of the trunk. Move the tree with as many roots as possible, especially the fine rootlets that absorb most of the nutrients and water from the soil. Never let the roots dry out.

If you have a choice, always plant a tree on a cloudy day, because the bright sun quickly exhausts the stored up moisture. But whenever the tree arrives, *plant it without delay.* Thoroughly wet the soil in the hole. Set in the tree and spread out the roots so that they will be lying naturally, not crossed. Cut off, with a sharp knife, all roots that are broken or badly bruised. A mutilated root invites decay.

The soil mixture for filling should contain 1/3 organic matter such as peat moss, compost or well rotted manure. Work this mixture under and around the roots by hand and compact it firmly. If the soil is wetted down as it is put in, it will make better contact with the roots. Fill the hole to the ground level. When well compacted, rake over the surface and pulverize it to a depth of about 1 inch. Apply a mulch of straw or peat moss or leaves on the soil to retain moisture.

When planted, tie the tree to a firmly set stake ($2\frac{1}{2}$" x 8') with rubber-covered wire or canvas binder. If it is a street tree, cut off the branches up to 7 or 8 feet from the ground, assuming of course the tree you are planting is at least 12 feet tall.

One day as I sat musing sad and lonely
And with a friend, a voice came to me
From out of the gloom saying, "Cheer up
Things could be worse." So I cheered up
And sure enough things got worse.

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FROM

MASSACHUSETTS TURF AND LAWN GRASS COUNCIL INCORPORATED

51 FENWOOD ROAD, LONGMEADOW 6, MASS.

TO

Prof. Joseph Troll
Plants & Soil Science
Univ of Mass.
Amherst Mass.

TURF BULLETIN

TROLLING Virus May Hit Turf Grasses!

A bulletin issued in June of this year by the Ohio Agricultural Experiment Station reports that from a few corn plants in one locality near Portsmouth, Ohio, in 1962, a disease spread to about 10,000 acres of corn in the Scioto and Ohio River Valleys during 1963, and this year may reach a far wider area. It is suspected that corn stunt virus is causing the disease; but as yet this has not been determined. Losses in the affected area varied from a trace to 70 percent of the crop with overall estimated losses placed at 10 percent.

A mechanically transmissible virus has been isolated from some of the diseased plants which were collected; but Dr. Lansing E. Williams at the Ohio Agricultural Experiment Station says the virus has not yet been identified. Tests have shown that it will also infect sorghum, Sudangrass, Johnson grass, and possibly other turf grasses.

Scientists at the Experiment Station formed a research task force to study the disease as soon as the 1963 outbreak was reported; and studies are currently underway to determine if any of the corn selections have resistance to the virus. Meanwhile, the isolated virus is being purified in the laboratory, and antisera prepared to aid in identification.

A two-acre field study has also been esttablished in the Ohio River bottomland on the farm of Maurice Vaughter southwest of Portsmouth; and Dr. William R. Findley, Res. Agronomist, Crops Research Div., USDA, Agronomy Dept., Corn Office, at Wooster, Ohio, states that about 560 different strains of corn are being grown to see if any of them contain resistance to the disease in the field. These include state, federal and commercial inbreds and hybrids, and exotic varieties from Mexico and Central America as corn breeders may have to use the exotics in a breeding program to develop resistance in domestic strains of corn.

Richard Ritter, a fieldman trained in entomology and plant pathology, has been assigned to the study by the Experiment Station and has been making frequent observations of conditions as they develop during this year's growing season in the southern Ohio area, collecting plant and insect samples as part of the coordinated research effort.

Dr. Williams says that economic control of the disease will probably have to come from chemical or biological control of the insect vector if this is the transmitting agent, or by the development of resistant corn hybrids; and the Experiment Station's research program is aimed at finding whether a virus is present in the affected plants, whether it has other hosts, how it overwinters, whether it is carried by insects, and whether there is any source of corn that is resistant.

The virus may or may not be the corn stunt virus which was found in Louisiana, Arizona, Mississippi, New Mexico and one or two other states in 1962 and last year. The puzzling aspect of the situation lies in the fact that the corn stunt virus has onl ytwo known insect vectors, neither of which has been found in the Ohio fields. This points to two possibilities: either there is another vector which transmits the virus or there is a different virus at work in Ohio.

A bulletin on Corn Stunt Disease issued by the Mississippi State University Agricultural Experiment Station early this year written by Warren N. Stoner, Entomology Research Division, and A. J. Ullstrup, Crops Research Division, Agricultural Research Service, USDA, states that "the first symptoms of stunt appear as faint yellowish stripes in the younger leaves, together with a shortening of the uppermost internodes, causing the plant to appear bunched at the top. The yellowish may increase in extent and intensity.

"Further progress of the disease is seen in pronounced shortening of the newly formed internodes so that the height is only one-third to one-half that of healthy plants. Irregular areas of reddish purple often develop in the leaves after the appearance of the initial symptoms. The amount and intensity of coloration are usually greatest during infection. An increase in the number of ears is often seen on diseased plants. Such ears are smaller than normal and may bear little or no seed. There may be an increase in the length of the ear shanks and excessive tillering of the plant.

"Symptoms of corn stunt are not usually seen until the plants are about 6 weeks old; and infected plants may not develop all symptoms of the disease. Instead, a range of symptoms with differing degrees of severity will be seen in a particular field. This variation may be due to the plants being infected at different stages of growth with those infected early generally showing the widest range of symptoms and being the most severely affected.

"Corn stunt virus is known to be transmitted from diseased to healthy plants only through the feeding activities of two kinds of leafhoppers, commonly called "corn leafhoppers" (their scientific names being Dalbulus maidis and Dalbulus elimatus) These leafhoppers can only become carriers of the virus 2 or 3 weeks after weeding on a diseased plant. They are then said to be "viruliferous" or infective. After leafhoppers become viruliferous they remain so for several weeks and have the potential of infecting a succession of healthy plants.

"Corn stunt virus is not spread from infected to healthy plants by contact or rubbing. The virus is not transmitted through seeds nor is it carried in the soil.

"Both leafhopper carried (vectors) of corn stunt are slender active insects approximately one-eighth inch in length of pale ivory to straw yellow color. The adults have wings and can both jump and fly. The immature stages, or nymphs, of these leafhoppers resemble the adults except that they are smaller and wingless.

"These leafhoppers prefer to feed inside the whorl, or on the undersides of expanding leaves, piercing the leaf surface with very slender minute mouth parts to suck the plant juices. There is little visible feeding damage. The preferred feeding sites offer good concealment and unless the insects are distributed a large population can remain unnoticed."

—Seed World, Aug. 1964