



# NEWS LETTER

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The men who try to do something  
and fail are infinitely better than  
those who try to do nothing and  
succeed.

—Lloyd Jones.

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**AUGUST**

**1936**

This NEWSLETTER is published monthly by the Greenkeepers Club of New England, and sent free to its members and their Green's Chairmen. Subscription price ten cents a copy, or a dollar a year.

GUY C. WEST ..... Editor  
312 Mt. Pleasant St., Fall River, Mass.

JAMES McCORMACK . . . Business Mgr.  
450 William St., Stoneham, Mass.

August, 1936

Vol. 8, No. 8

### LAWN DAY AT MASS. STATE COLLEGE

What was probably the most complete program in turf growing in its various phases ever presented in five hours was presented as the Lawn Day program at the Mass. State College on July 30th. Some over a hundred interested turf growers, among whom were several greenkeepers, attended this meeting, which was under the direction of Prof. L. S. Dickinson, who had as his efficient aides, Dr. Sprague of the New Jersey Agri. Exp. Station, Dr. Odland of the R. I. Exp. Station, and Miss Klaucke, his assistant at Mass. State.

The program was as follows:

#### PROGRAM

##### Morning

Soil Water and Its Relationship to the Grass Plant —Dr. H. B. Sprague  
Artificial Watering of Fine Turf

—L. S. Dickinson  
The Fungus and How It Works

—E. Klaucke  
The Desirable Range of Soil Acidity

—Dr. T. E. Odland  
Conditions Favorable for Weed Growth

—Dr. H. B. Sprague  
Fifteen Minutes With the Lawn Mower

—L. S. Dickinson  
Discussion of the Common Grass Fungi

—E. Klaucke  
Vegetative Indications of Plant Food

Deficiencies —Dr. T. E. Odland

##### Afternoon

Fundamentals in the Control of Turf Weeds —Dr. H. B. Sprague

Duration of Efficiency of Various Fertilizers —L. S. Dickinson

What Happens Inside a Grass Blade —E. Klaucke

Turf Insects and Controls

—Dr. T. E. Odland

Changing the Soil Structure

—Dr. H. B. Sprague

Lawn Management Facts

—L. S. Dickinson

We are including for your approval several outlines as presented by the various speakers, and notes from some of the other talks.

### SOIL WATER AND ITS RELATION TO THE GRASS PLANT

Dr. H. B. Sprague

The supply of soil water is indispensable to growing grass. Living green plants are 70 to 95% water, and this content must be maintained. Water is used to manufacture new cells and tissues in roots, stems and leaves, and all of the soil nutrients enter the plant dissolved in water. In addition, it has been estimated that 20 to 40 gallons of water are given off by the leaves of grass on each 1,000 square feet of lawn surface during a single hot day. The most important point to note is that every drop of this water must be absorbed by the plants' roots from the soil.

The principal supply of water is rainfall. This is supplemented by artificial watering in dry periods. The effectiveness of rainfall is determined by the rapidity with which it falls, the ability of the soil to absorb it, and the evaporating power of the air. Gentle rains are more effective than sudden downpours, and gentle slopes permit greater penetration than steep slopes. The drying power of the air normally increases from April until it reaches a peak in July, and thereafter it falls steadily with the season. May, June, July and August are all months when evaporation normally is high in comparison to rainfall, in contrast with September and October which permit the restoration of soil moisture exhausted in summer.

Only a portion of the soil moisture is available for use by plants. The thin films of water held tightly by the soil particles are not used by grass roots. Thus, plants wilt when there is still moisture in the soil, because it is held so strongly that the grass roots cannot absorb it. Only the water in the capillary spaces between the soil granules is useful to plants. After a heavy rain,

or watering, some free water is present in soils, but this quickly drains away in good soils. The maximum water holding capacity of soils is the amount of total water which the soil contains after the superfluous water has drained off. To illustrate, a certain sandy soil may have a water capacity of 17 pounds per 100 pounds of soil. Since 4.5 pounds will be unavailable to plants in this soil, the potential supply for use by plants is 12.5 pounds.

The water holding capacity of soils varies tremendously with texture, structure, and organic matter content. A rich silt loam may easily hold twice as much available water as a light sandy loam. In general, heavier soils are capable of storing more water than light soils. Also, soils which are in good structure or tilled will store much more water than soils of the same texture which are badly puddled or compacted and have but little pore-space. Soils that are rich in organic matter are more likely to be in good tilled, and the organic matter itself has at least 10 times the water holding power of soil particles.

The depth of the root system determines the use which grass roots are able to make of the soil. Poorly drained soils force plants to develop shallow root systems. On well drained soils, the height of cut and system of fertilization influence the root development. The ability of lawns to endure drought is determined by the water supplying power of the soil and the depth to which plants can use soil moisture.

## ARTIFICIAL WATERING OF FINE TURF GRASSES

by L. S. Dickinson

- I. Artificial watering should be considered only as a supplement to a deficiency in normal rainfall. Unless water supply contains an excessive amount of any element, artificial watering affects soil similarly to rainfall, i. e.,
  1. Makes plant food available, 2. Washes out plant food, 3. Increases acidity of the soil, 4. Puddles clay soils, 5. Starts erosion, 6. Accumulates in low areas, 7. Runs off of slopes, etc.
- II. Three periods in development of turf grasses.

1. Seed and seedling. Water requirement high.
  2. Development or root training. Placing of water supply important—should be deep.
  3. Mature stage. Both placing and amount of water important.
- III. Considering mature turf.  
Why water? 60% color effect, 40% health of grass.  
When is water needed? Not until after wilting has started and soil supply of capillary water exhausted as determined by examination of soil.
- IV. Fundamental factors determining method of applying water.  
Is the soil condition practically uniform in all ways?  
Yes. Large coverage sprinklers permissible.  
No. Small coverage sprinkling desirable.  
Hand watering ideal in many cases.
- V. Quantity of water desirable and rate.  
Enough to wet to a depth of 4 to 6 inches.  
Apply as rapidly as soil will absorb the water.  
Ohio State College Experiments show during 3 summer months 1½ times normal rainfall ample amount.  
At Amherst that means 18.16 inches or a 75 ft. diameter range sprinkler throwing 15 g. p. m. on 4000 sq. ft. must operate a total of 50 hours during the season. This amount is probably excessive for New England.
- VI. Late spring and early fall watering sometimes needed.
- VII. Incorrect watering has cumulative bad influences which may not become prominent for three or more years.  
Kentucky blue grass becomes very thin from excessive watering.
- VIII. Conclusion: Artificial watering of fine turf grasses is very beneficial if correctly done, otherwise it may be very harmful.  
More water requires more fertilizer, and more frequent clipping costs that are constant and seldom considered when planning a water system.

A letter from Frank Robinson, formerly at the Goddard Park course in East Greenwich, R. I., tells us that he is now located in Boston, as Ground-keeper at Fenway Park, the home of the Boston Red Sox. We shall expect an infield of No. 14276 soon!



## THE FUNGUS AND HOW IT WORKS

by E. Klaucke

Fungi, members of the plant kingdom, are composed largely of thread-like cells joined end to end called hyphae.

They reproduce by thousands of small "seed-like" bodies called spores.

Because they lack the green coloring matter necessary to food manufacture, fungi must obtain their food from another source.

Fungi that obtain their food supply from other living plants or from living animals are known as parasites.

In order to grow and reproduce, fungi require moisture, air and certain temperature conditions besides an available food supply—do not need light—as a rule like acid medium—in grass like thin-walled cells in grass leaf.

A blade of grass may become sick and die from a fungus parasite in the following ways:

A spore of the parasite is blown on to the grass blade.

Given the proper temperature and moisture conditions, it germinates and produces a young thread or hypha.

On both sides of the grass blade are numerous small pores.

The young hypha enters one of the pores.

It then secretes a substance that dissolves the cell walls of the grass leaf and then absorbs the grass juices into its own body, thus robbing and killing the grass plant.

Associated with several fungus parasites of fine turf grass are small, hard bodies known as sclerotia that consist of a tightly woven mass of hyphae.

These hold the fungus over during adverse weather conditions and many are to be found near the top of the soil, particularly in fine turf grass areas.

When atmospheric conditions become right for the fungus, these sclerotia unwind from their tight, ball-like mass, and hyphae grow out in all directions in search of tender grass for food and sustenance.

### Flowers For Oscar

The gates were down but Oscar Shay

Decided, to his sorrow,

To speed across the right of way—

His funeral is tomorrow.

—Pathfinder.

## SUMMARY OF THE WEED PROBLEM ON TURF

Dr. H. B. Sprague

Weeds are plants growing where they are not planted. They are frequently more aggressive than turf plants. According to length of life, weeds are:

**Annuals** which complete growth in one year and produce seed abundantly. Examples: Crab grass, goose grass, fox-tail grass, knotweed, chickweed, panic grass.

**Biennials** which require two seasons to complete growth; the first being used to manufacture and store food for the production of flowers with the formation of seeds in the second. Examples: Common thistle, wild carrot.

**Perennials** which live more than two seasons, usually begin forming seed by the second season. The most troublesome perennials have creeping rooting stems which contain stored food and send up new shoots. Examples: Dandelion, plantain, poison ivy, field sorrel.

### Sources of Weed Seed

a. Carried by wind, drainage water, and animals, including man.

b. Introduced in fresh or partly rotted manure.

c. Added in top-soil used for top-dressings, or carelessly managed compost piles.

d. Present in seeding mixtures, particularly cheap seed.

e. Seed produced by weeds in turf, in spite of close mowing.

### Control of Weeds

a. Remove sources of weed seeds; bake or steam top-dressing to kill weed seeds, or purchase top-dressing that carries no weed seed.

b. Maintain turf in vigorous condition to prevent weeds from obtaining a foothold. Proper liming, fertilization, mowing, watering and rolling are very effective.

c. Close mowing kills many types of weeds; prevention of seed formation in the fairways and the rough by mowing also aids.

d. Use of chemicals, as sprays, or in top-dressing (such as lead arsenate).

### Some Troublesome Turf Weeds and Suggested Methods of Control

**Crab Grass**—Warm season annual, spreads by seed. Handweed greens in June and July. Use lead arsenate in top-dressings and keep turf vigorous,



particularly in early spring and summer. Timely fertilization and careful watering are very effective on lawns.

**Chickweed**—Dust plants with ammonium sulphate or ammo-phos, water thoroughly as soon as weeds turn brown, remove dead plants, and reseed.

**White Clover**—Stimulated by potash and phosphorous fertilizers. Undesirable only on fine turf. Largely controlled by careful nitrogen fertilization of the grass, and the use of aggressive strains of grass. It may be controlled temporarily by burning, as for chickweed.

**Silver Crab Grass** (Goose grass)—Warm season annual, spreads by seed only. Hand weeding in June and July. Same treatment as for crab grass.

**Poa Annua**—Very difficult to control. Keep soil moderately dry and well drained, and maintain vigor of the turf by proper treatment. Use lead arsenate in top-dressing. Hand weeding is the only method practicable for complete control and this is very expensive. Add new seed of desirable grasses in August or September, to compete with seedlings of Poa Annua.

**Foxtail Grass**—Warm season annual, spreads by seed. Hand weed fine turf in June and July. Prevent seed formation on lawns and fairways by close mowing wherever seed heads are formed. Follow same treatment as that recommended for crab grass.

**Stink Grass**—Same as for crab grass.

**Yarrow**—Perennials spreading by root stocks. When closely mowed, sometimes makes fine turf. To control, remove all turf and soil to a depth of 3 inches, fill in with clean soil, and sod or replant. Complete sterilization of soil with chlorate weed killers is also effective.

**Plantain**—Perennials without creeping stems. Hand weed or poison each individual plant with sulphuric acid or kerosene. If very abundant try spraying with iron sulphate solution (2 lbs. per gal.) after bruising leaves with suitable implement.

**Dandelion**—Same as for plantain. Spray with iron sulphate solution after mowing and bruising leaves with some suitable implement.

**Poison Ivy**—Perennials with creeping stems. Poison with sulphuric acid or spray with calcium chlorate, or grub out roots and rootstocks. Caution: Calcium chlorate applied as spray may destroy all other vegetation in the same

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Guy C. West, Chr.

area. However, the soil is not permanently poisoned and may be reseeded after several heavy rains. Fine spray applied to leaves only, or dust applied to leaves only, may be used to kill plants without injury to neighboring trees, if used with care. Commercial chlorates are sold under the trade names of **Atlacide** and **Vegecide**.

**Lawn Pennywort**—If deep rooted, same treatment as for Yarrow. If shallow rooted, dust with fertilizer as for chickweed.

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### WHAT HAPPENS INSIDE A GRASS BLADE

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by E. Klaucke

The main difference between the nutritional processes of plants and animals is that plants manufacture their own foods from raw materials, whereas animals cannot. All living cells, whether plant or animal, require starch and sugars (carbohydrates), proteins and fats.

It is in the grass blade that photosynthesis, the process of starch and sugar manufacture, takes place. This process consists essentially of the following: carbon dioxide and water are synthesized to sugars and starch under the influence of the green coloring matter of the leaf (chlorophyll) and light. Oxygen is given off as a waste product.

Although photosynthesis is the most important blade function, the synthesis of fats takes place largely in the leaves as does a considerable quantity of the proteins utilized by the plant cells.

Transpiration or the loss of water vapor from the plant through the numerous small "pores" of the leaf is another very important blade function. The amount of water vapor passing from the leaves by transpiration is extremely large.

All living cells respire or breathe all the time. Thus, respiration is another process going on in the grass blade. Oxygen is taken into the cells and carbon dioxide and water are given off as waste products—the very reverse, it will be noticed, from photosynthesis. Photosynthesis and respiration go on simultaneously during the daytime, but only respiration goes on at night.

Certain conclusions are to be drawn from the above:

Mowing, particularly the close clipping of putting green areas, tampers in no small degree with the natural processes of a grass plant.

Dust collecting on the surface of leaves clogs the "pores" on the leaf surface, thus reducing photosynthesis.

Because turf grass is kept under unnatural conditions, the turfman should supply raw material in the form of fertilizers according to a definite program to fit the requirements of his grass. Whenever, possible, the clippings should be left on the area to decay.

The grass should be cut less often and the height of cut of the mower should be raised during very dry periods in the summer.

The grass should not be clipped late in the fall in order that the blades may make as much reserve food material as possible for the following early spring growth.

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### CHANGING THE SOIL STRUCTURE

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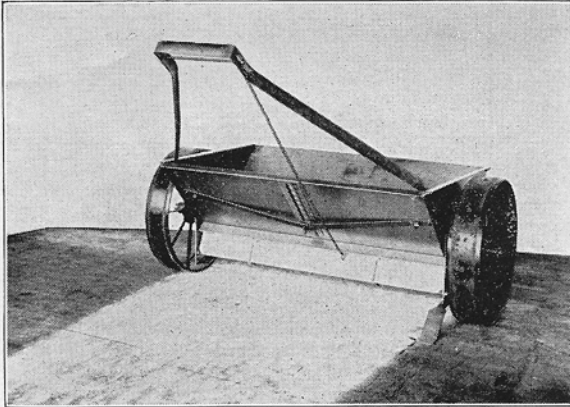
Howard B. Sprague, Agronomist  
N. J. Agricultural Experiment Station

Desirable soil structure is highly essential on turfed areas, from the standpoint of drainage and aeration, and of water-holding capacity. Soils naturally differ greatly in soil structure and subsequent treatments are responsible for further changes. Three vital factors affecting soil structure are the texture, lime content, and humus supply.

The natural differences in soil structure may be indicated by the water-holding capacity of 12 soils of three geographic provinces in New Jersey. Most of these are similar to types occurring in New England. These soils ranged from a capacity of 594 gallons of available water for a sandy soil to a depth of 6 2-3 inches over a surface of 1,000 square feet, to 1787 gallons for a silt loam soil. Not only did these soils differ in capacity to store water, but they also differed greatly in their ability to permit ready entrance of rainfall. Thus, Merrimac sandy loam allowed water to enter 7 times as rapidly as Wethersfield gravelly loam, under equal conditions. Obviously, the Wethersfield soil is a very inefficient soil, even though it has equal water holding capacity, as a result of its failure to absorb rainfall readily.

The structure of soils may be considerably changed by treatment. In

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general, continuous cultivation has greatly exhausted the humus supply of our soils, and caused a break-down in their granular structure. In many cases, lime has also been lost extensively and this has still further deflocculated the soil. Grass will gradually restore soil structure, to the depth of root penetration, provided the proper treatment is given. Improper management may be responsible for still further deterioration in structure even though the area is continuously in sod.

In a series of tests conducted at New Jersey on the same soil type, the continuous use of acid-forming fertilizers without the use of lime, has had the following effect: (1) increased soil acidity and broken down soil granules, (2) caused a tremendous accumulation of roots, producing a sod-bound condition, (3) greatly reduced the capacity of the soil to permit entrance of water, and (4) seriously injured the turf in spite of continued watering.

By contrast, the use of a properly balanced fertilizer together with lime has produced a sod that is durable, strongly drought resistant, and capable of sturdy growth in both cool and warm weather.

Discing or spiking is a great aid in renovating soils with poor structure. It speeds up the penetration of lime applications and hastens the entrance of water. Without such treatment lime may lie stranded on the matted surface layer of grass crowns for a considerable period (several months or years) before actually reaching the soil and exerting a beneficial effect. Lime applied in late summer or early fall will be more effective than spring applications, since autumn rainfall is more likely to be favorable for washing the lime into the soil. Lime is slow in its action and at least 1 or 2 years will be required to exert a significant effect, when applied as a top-dressing on established sod.

Organic matter additions are effective in changing soil structure, only when incorporated in the soil itself. Top-dressings of organic matter on established sod will not penetrate the soil to improve its structure or water holding capacity. When incorporated with soil, organic matter is extremely effective in improving the structure of all classes of soil.

#### NOTES FROM LAWN DAY!

**Sprague:** Soil moisture is indispensable; 70-95% of plant is water, in addition,

plant is using a large amount of water in producing new tissues. All nutrients come in the soil water. Drainage is necessary to remove the surplus water. Water holding capacity is due to texture, structure, and organic matter content. This last is related to and controls structure. The right structure cannot be had without a sufficient supply of lime.

**Odland:** We cannot grow a satisfactory lawn if soil is too acid or too alkaline. Plants differ a great deal in their acidity requirements; fortunately, grasses are quite tolerant in their acidity requirements. Different grasses differ in their acidity requirements; the blue grass needing more lime than the bent grasses. Keep range right by soil tests. If acid, apply lime as needed, an equal amount of ground limestone to the amount of sulphate of ammonia will balance. Actual measurement for grasses is difficult to give; average for blue grass might be 6.0 to 6.5, and for bents, 5.5 to 6.0.

**Sprague:** Weeds prefer same conditions that other plants do, but will tolerate other conditions. Weeds produced in vacant areas will seed into lawn areas. Weeds are also introduced in manure; lawns do not need manure. Weed seeds germinate and seedlings become established mainly in very thin turf. Excessive close mowing is sometimes favorable for weeds. Frequent light sprinklings are also ideal for weed seedlings. Competition factor is very important; the development of dense turf as tall as 1¼" is best control measure for weeds. Weeds prefer lack of competition. Some weeds prefer frequent applications of fertilizer. Some weeds are favored by dry weather; this is a clover year.

**Dickinson:** 16-17" width of cut best for home lawn owner's lawn mower. Flexibility of handle is desirable. Roller bracket adjustment with holes instead of slots is better. Types of bearing, roller best, then in order, high grade plain bearing, large ball, thoroughly housed, cheapest plain, and cheapest ball bearings. Adjustment of wiper blade to bottom knife is important. A six inch reel is best for home owner. A frequency of cut of 25 cuts per yard is good for lawn. At least two blades should be on the bottom knife at all times to give a continuous load. A ten inch wheel is best for the average home owner, with wheel outside housing if possible.



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**Sprague:** Some desirable management factors in making healthy thick turf as the best control of weeds: correction of acidity with correct use of lime. Proper use of fertilizers. Mowing should be conducted so as to favor grass. Watering may be used effectively to control weeds. Rolling is only a necessary evil; rolling other than in Spring will destroy some desirable soil

structure. Chemical treatment of weeds is lazy man's method. Chlorate treatment for crab grass is successful in some cases only. Chlorates are plant poisons; use just enough to kill the weeds. One pound of Nitrogen to a thousand square feet is maximum amount of fertilizer to use at once to get effective results; a half pound is the minimum amount.

### AVAILABILITY AND DURATION OF EFFICIENCY OF VARIOUS FERTILIZERS

by L. S. Dickinson

The availability rating of a fertilizer is a comparison with a standard whose nitrogen, phosphorus, or potash, as the case may be, is wholly useful to the plant use within a reasonable time after the fertilizer is applied. For example: In nitrate of soda all of the granulated nitrogen is immediately available for plant use when dissolved in water (soil water); cottonseed meal has an availability rating of 70 which means that only 70% of the guaranteed available nitrogen can be made ready for plant use within a reasonable time. The remainder of 30% is not lost, but made available in small quantities over a considerable period of time.

Obviously there are many factors that control the availability and duration of the effectiveness of fertilizers when applied to the soil, more especially so in the case of top dressing as is usually practiced in turf culture. The following tables are arranged with the assumption that each fertilizer is used under similar soil conditions:

TABLE SHOWING COMPARATIVE AVAILABILITY AND PERIOD  
OF INFLUENCE OF CERTAIN NITROGEN CARRIERS

Material	Availability of Nitrogen	Period of influence in number of days after application.		
		Start	Peak	End
Ammonia	90	3	6-9	16
Ammo-Phos	90	5	8-12	18
Bone Meal (steamed)	25	20	30-35	45
Castor bean pomace	70	9	25-28	42
Cottonseed meal	70	7	18-22	35
Calcium Cyanamid	90	10	14-18	25
Dried blood	80	5	8-10	22
Fish (ground)	70	7	12-16	30
Guano	70	8	14-18	30
Garbage tankage	30	22	30-35	42
Hoofard Horn meal	60	18	30-35	50
Manures, dried	60	12	17-22	35
Milorganite	80	5	12-15	40
Nitrates	100	1	4-8	15
Poultry Manure	70	5	10-14	25
Soybean meal	70	20	28-32	40
Tankage, High grade	70	10	14-18	40
Tankage, Low grade	30	20	30-35	45
Urea	90	8	12-15	25

One should carefully differentiate between grass which is being stimulated and that which has become improved as the result of previous stimulation.



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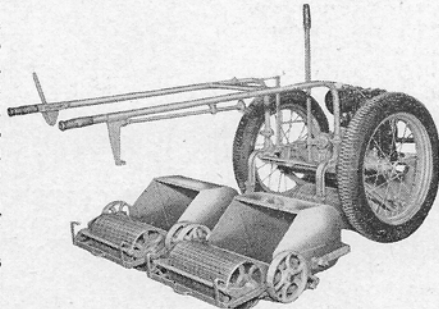
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On thin fairways use Milorganite quite generously soon after Labor Day. This will stimulate new growth during the long cool favorable fall season and thus induce existing grass to thicken. As turf density increases, weeds automatically diminish.

On apparently good fairways apply Milorganite at moderate rates anytime this fall. This prevents turf deterioration and consequent weed infestation. Systematic Milorganite feeding is cheaper than periodic fairway renovation.

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