

A SHORT SHORT-COURSE IN GREENKEEPING

HIGH rating placed by attending greenkeepers on the papers presented at the annual Lawn Day of Massachusetts State college suggested that GOLFDOM present available outlines of these papers as prepared by the authorities who read them.

In the following notes of the authors, greenkeepers will find considerable material for study and discussion.

SOIL WATER AND THE GRASS PLANT

By HOWARD 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 gal. of water are given off by the leaves of grass on each 1,000 sq. ft. 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 lbs. per 100 lbs. of soil. Since 4.5 lbs. will be unavailable to plants in this soil, the potential supply for use by plants is 12.5 lbs.

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 tilth 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 tilth, 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 grass to endure drought is determined by the water supplying power of the soil and the depth to which plants can use soil moisture.

AVAILABILITY AND LIFE OF 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 guaranteed 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

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 tannage	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
Tannage, High grade	70	10	14-18	40
Tannage, Low grade	30	20	30-35	45
Urea	90	8	12-15	25

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 above table is arranged with the assumption that each fertilizer is used under similar soil conditions.

WEED PROBLEM OF TURF

By HOWARD 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, foxtail 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: Dandelions, plantain, poison ivy, field sorrel.

Sources of Weed Seed:

- Carried by wind, drainage water, and animals, including man.
- Introduced in fresh or partly-rotted manure.
- Added in top-soil used for topdressings, or carelessly managed compost piles.
- Present in seeding mixtures, particularly cheap seed.
- Produced by weeds in turf, in spite of close mowing.

Control of Weeds:

- Remove sources of weed seeds; bake or steam topdressing to kill weed seeds, or purchase topdressing that carries no weed seed.
- Maintain turf in vigorous condition to prevent weeds from obtaining a foothold. Proper liming, fertilization, mowing, watering and rolling are very effective.
- Close mowing kills many types of weeds; prevention of seed formation in the fairways and the rough by mowing also aids.
- Use of chemicals, as sprays, or in topdressing (such as lead arsenate).

Some Troublesome Turf Weeds:

Crab Grass—Warm season annual, spreads by seed. Hand weed greens in June and July. Use lead arsenate in topdressings and keep turf vigorous, particularly in early spring and summer. Time-