Fertilization of Greens and Related Practices

MANURE compost in the topdressing, and an occasional dressing of bone meal, comprised greens fertilization in olden days. Sulphate of ammonia was the first concentrated fertilizer to receive serious consideration. Its use started about fifteen years ago and gathered momentum until a climax was reached in 1928. Following that disastrous year, sulphate of ammonia was not entirely abandoned, but quantities were reduced materially, other fertilizers received justified consideration, and lime was restored to favor.

Today leaf sturdiness is emphasized more than vivid green color; and turf density is considered more important than soil acidity in weed control.

NITROGEN KEY TO STURDY GRASS: Manipulation of nitrogen is the key to sturdy turf, for it is the growth producing element. In excess, nitrogen causes development of soft, succulent grass, which is ready prey to disease and insects. Contrary to general belief, these evil effects are not overcome entirely by so-called balancing with phosphate and potash.

The opposite extreme, namely complete abandonment of nitrogen fertilization, does not avoid midsummer difficulties, for without adequate nitrogen, turf deteriorates and serious clover and weed invasion then follows.

The secret of sturdy turf is to confine major nitrogen feeding to spring and early fall, and to decrease gradually the spring rate as summer approaches. Summer rates should barely maintain growth and color. Likewise, in extreme northern sections, fall feeding should be completed by mid-September at the latest, so grass can harden-off before winter.

All greens do not need nitrogen at the same rate. In shady spots growth is naturally less robust so less nitrogen is needed. Vegetative bents, which tend to fluff, require less nitrogen than the seeded bents.

KIND OF NITROGEN: Since nitrogen in nitrate form is not recommended for fine turf, choice of a nitrogenous fertilizer is limited to the organics and the various compounds of ammonia.

The true organics include such materials as bone meal, Milorganite, cottonseed meal, blood, tankage, etc. Their use on greens is justified to insure a more continuous and uniform rate of growth. This occurs because soil processes gradually release the nitrogen over extended periods. Materials which contain only a small amount of water soluble organic nitrogen, and release the insoluble nitrogen slowly are best. In this respect, Milorganite and cottonseed meal are superior to the higher nitrogen containing tankages and dried blood.

Ammonium sulphate and the various ammonium phosphates are the principal commercial sources of ammonia nitrogen. Being water soluble, they deepen color almost immediately, but effects are not long lasting. Both tend to suppress clover, but if used continuously, ammonia compounds eventually increase soil acidity and then lose their efficiency. This can be overcome by the moderate use of lime.

NEED FOR PHOSPHORUS AND POTASSIUM: Removal of clippings tends to reduce the soil supply of available nutrients, particularly phosphorus and potassium, so replenishment of these elements is more essential on greens than on fairways. Where needed, applications of phosphate or potash fertilizer can be confined to two a year, one in early spring and the other in early fall. When the topdressing contains manure or spent mushroom soil, additional potassium is seldom needed because it is abundant in both materials.

SUGGESTED FERTILIZER PROGRAM: Due to the many factors involved, it is impossible to propose a rigid program of green's fertilization. However, the following scheme has been very successful on many greens.

INDICATED RATES ARE POUNDS PER 1000 SQUARE FEET:

In early spring and in early September, greens receive 8 to 15 pounds of 20% superphosphate. When potassium is needed also, 50% muriate of potash is applied at 3 to 4 pounds, along with the phosphate.

Both organic and inorganic forms of nitrogen are used. Organics (such as Milorganite) are applied in early spring and early fall at 15 to 30 pounds. When needed, an additional application at half this rate is made in late May or early June. If topdressing contains appreciable manure, the lower rate is approached, otherwise the full quantity is used. To start growth in early spring from 1 to 3 pounds sulphate of ammonia may be used also. Midsummer feeding consists of ammonium sulphate at light rates only, approximately 1 to 3 pounds.

FERTILIZATION OF NEW GREENS: Best practice is to use 15 to 25 pounds superphosphate, and 20 to 50 pounds organic fertilizer (such as Milorganite) per 1000 sq. ft. Both should be applied prior to seeding and worked into the surface soil. This will insure rapid cov-

erage with uniform turf. Heavy rates of soluble fertilizer should be avoided.

FERTILIZATION BEFORE SODDING GREENS: Apply superphosphate under the sod, but always wait until sod is laid before applying nitrogen, otherwise root injury may occur. With this modification of procedure, rates recommended for new greens can be used.

GREENS SOMETIMES NEED LIME: Although lime is often needed, indiscriminate liming is not good practice. Unless tests show marked acidity, general liming should await trial application on limited test areas.

Lime is best applied in late fall or early spring. It is safe to use ground limestone up to 50 pounds or more per 1000 sq. ft. but hydrated lime beyond 20 pounds per 1000 sq. ft. is unwise at any one time. Even then it should be watered-in to prevent burning. Allow 10 to 14 days to elapse between use of lime and application of any fertilizer containing ammonia compounds.

WATER PRACTICES IMPORTANT: Troubles from overwatering usually occur in midsummer. Very often golfers are responsible for this reprehensible practice. When a green refuses to hold a pitched ball, they know by experience that the trouble can be overcome by more generous use of water. In most instances, the underlying cause is too heavy soil. Rather than more generous watering, the permanent cure is to build a suitable layer of soil by topdressing.

Both quantity of water used and time of sprinkling are important. If water can be squeezed from soil pressed between the fingers several hours after watering, the evidence clearly points to overwatering. In this connection greens in shade need less water than those out in the open. There are sound reasons for advocating early morning sprinkling. With night watering grass remains damp throughout the night, a condition which favors fungus diseases. Early morning watering actually dries the grass by destroying droplets of dew and thereby tends to lessen disease.

Periodic thorough watering is better than light sprinkling daily, but if roots are extremely shallow, the axiom does not always apply in very hot weather. By mid-afternoon, because of serious wilting, turf turns blue and burns in foot prints. Immediate light syringing to restore soil moisture, prevents extensive turf loss.

In summer, handwatering may be necessary on heavily contoured greens to prevent loss on elevations from insufficient moisture, and to overcome the damage from too much water in low spots. Water can be directed to high points, and surface run-off will take care of depressions.

On elevated greens, outside banks and slopes should be kept moist at all times. Otherwise it is not easy to hold grass along the outside edge of the closely cut greens area. Some use a battery of cricket sprinklers in the daytime for this purpose.

Occasionally soil becomes powder dry in localized areas. Turf first takes on a bluish, metallic color, and finally turns brown. Sprinkling is of no avail, because dry soil does not absorb applied water. Deep forking followed by several thorough drenchings is the proper treatment.

SUN SCALD: In this type of injury grass collapses rather suddenly. It is accompanied by foul smelling soil, and a green scum of algae may overspread the area. Scum is the result and not the cause of sun scald, as some think. Algae are present in all soils, but they need sunlight, so on greens their development is checked unless grass thins sufficiently to expose soil surfaces.

A water-logged soil is the real cause of sun scald, although excessive nitrogen accentuates turf injury. Spiking and forking to accelerate surface evaporation are the first essentials to recovery. Sometimes it is possible to check the algae by spraying with hydrated lime at light rates. Fertilization is warranted only after new roots begin to form.

Despite the fact that Washington and Metropolitan bents are among the best hot weather grasses, troubles are not uncommon. The cause is not always clearly understood. Conditions at the time of injury resemble those producing sun-scald, but the actual cause is somewhat different. When these grasses are allowed to develop a deep fluffy mat of grass, applied topdressing buries leaves and stems instead of making contact with the soil. Fermentation of these buried layers of highly decomposable vegetable matter causes turf loss. To avert trouble, development of a deep mat must be avoided. This involves thorough cross-raking, followed by close cutting in the spring, as well as occasional brushing in summer. Likewise, the use of front rollers on greens mowers should be avoided.

This concludes the ABC of Turf Culture, by O. J. Noer, agronomist and turf consultant for the Milwaukee Sewerage Commission. If you do not have the entire series, a bound volume will be sent to you on request —including, also, four interesting "Case Histories" based on Soil and Situation Surveys of golf fairways and greens by Mr. Noer. Address:

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