

# Unbalanced Feeding, Not Excess Diet, Fertilizing Danger

By J. F. FONDER

**T**HE LITERATURE that generally finds its way to the greenkeeper's desk and is often depended upon by him as a source of information refers again and again to the "overfeeding" of grass plants. Many of the ills which beset the turf of a golf course are frequently attributed to this cause, when in reality overfeeding hasn't occurred. It appears that a better understanding of what is considered overfeeding would be of value.

As a beginning, let's say that it is not possible to overfeed plants, and then find what really happens. Plants do not gorge themselves simply because they have an abundant supply of food available to them. Such intemperance is peculiar to the animal kingdom, and more especially to that class of animals known as man. The intake of food by plants is controlled to a large extent by conditions existing within the plants and approximately only that quantity they actually require will be absorbed. This condition prevails unless there is either too little plant food to meet requirements or so much present that osmotic action is reversed, causing water to move out of the plants and into the soil rather than from the soil into the plants.

Plant growth, as well as the processes within the plant which contribute to it, is regulated by a number of external factors. These growth factors, are the temperature of air and soil, velocity of wind, amount and intensity of sunshine, length of day, moisture supply, plant food dissolved in the soil water, diseases, insect pests, and a few others of less importance. As long as all of these growth factors are very favorable, plants will make excellent growth and the food supply will be drawn upon as needed to meet the needs of the plants for making new tissue and carrying on different processes. But let any one factor become unfavorable and growth of the plants is checked and absorption of plant food from the soil becomes slower.

The influence of different growth factors in determining the condition of grass is evident on the golf course at all times during the year. In spring, all growth factors usually become favorable and grass grows luxuriantly. During summer, the temperature may become too high, the moisture supply may become too limited, and insects and diseases may be very active. At this time grass growth becomes much slower and plants may become practically dormant. In fall, external conditions again become generally more favorable and there is another period of rapid growth. With the appearance of winter, low temperatures usually restrict growth and frequently produce an entirely dormant condition in the grass.

As a result of the influence of these external factors the grass plants absorb and utilize much larger quantities of plant food during spring and fall. During those seasons it is desirable that abundant plant food be present in the soil. It is not possible to measure accurately what this quantity should be, but the point of interest here is that there could usually be 4 or 5 times the quantity of plant food needed and still the plants would not over-feed. Of course it would not be economical to supply this excess because of the loss which naturally occurs through soil leaching.

## Balanced Feeding Is Need.

If it is possible to have in the soil several times the amount of plant food actually needed and still have the plants grow only in accordance with the limit established by the other factors, it evidently would be difficult to bring about over-feeding through excessive fertilization. But in this regard it is necessary to recognize that bad results do frequently occur from the application of excessive amounts of certain fertilizers, and this injury is distinct from that produced through over-concentration of the soil solution. Almost



First women's golf class at Harlem G. C. in the free golf school conducted by Chicago Tribune at courses of the Chicago Daily Fee Golf association. There are approximately 300 women in this Harlem class. Almost 16,000 pupils registered at all the courses. William Philpot is the Harlem professional in charge of this record-size class.

an unlimited amount of evidence indicates that the general type of injury is not "over-feeding" but rather "improper feeding" or "unbalanced feeding."

Unbalanced feeding is very easily accomplished and is one of the most important mistakes to be guarded against in fertilizing. To this end it must be recognized that there are at least 13 elements necessary to normal development of plants. The majority of these are sufficiently abundant in most soils to meet normal requirements. But three of them, —nitrogen, phosphorus, and potassium—are frequently so deficient that unless they are supplied plant growth will be restricted. In most soils it is possible to add such amounts of any one of these that either of the other two will become definitely too deficient to meet the needs of the plants. When this occurs an undesirable type of growth will result and unbalanced feeding has been accomplished. The extent to which this type of feeding is objectionable usually depends largely upon whether external growth factors are favorable or unfavorable. It is common knowledge that extremes of temperature, unfavorable moisture conditions, diseases, and the like are generally more injurious to such improperly nourished plants than to others.

Nitrogen is the one most generally used improperly. This has been aggravated by the emphasis which has been placed upon the importance of nitrogen in the growth of grass and by the fact that an over-feeding of nitrogen produces an undesirable type of growth more readily than is the case with other elements.

### Too Much Nitrogen Is Bad.

There is no denying the value of nitrogen in the diet of grass plants. It is used

in large amounts by them and should be provided in abundance, but it should be recognized that phosphorus, potassium and other elements are equally important and should also be present in abundance. If nitrogen is present in the diet in excess, there almost certainly will be produced a soft type of growth and the vigor of the grass will be impaired.

An excess of nitrogen in the diet of grass plants produces a soft type of growth because this element is so important in the production of protein, the compound making up the bulk of new and living cells of the plants. But in the production of these proteins it is necessary that a supply of sugar also be present that it may combine with the nitrogen and such other elements as sulfur and phosphorus. If an excess of nitrogen is present it may encourage the production of new cells more rapidly than sugar can be manufactured and this results in a depletion of any reserve of this or closely related compounds which may have been built up previously. In addition, it prevents plants from producing compounds responsible for hardening and making them more resistant to unfavorable conditions.

In order to prevent this unbalanced feeding of grass it is generally desirable to use a complete fertilizer, or in other words one containing compounds of all three of the elements, nitrogen, phosphorus, and potassium. These complete fertilizers vary considerably in the proportions of nitrogen, phosphorus, and potassium they carry, making it possible to select one which provides the quantities desired. Selection should depend upon the nature of the soil in which the grass is growing, upon external conditions to which the grass is subjected, and upon the type of growth desired.