

expensive to manufacture and ship. Synthetic organics are higher analysis and are increasing in use rapidly. If a synthetic organic nitrogen source is properly balanced with a quickly available nitrogen and these are combined with phosphate and potash into compact granules, we have practically eliminated the problem of "burn" and the necessity for more than 2 or 3 applications for top quality general purpose turf. Both natural and synthetic organic nitrogen sources depend on soil bacteria and fungi to break down the material to make it available to plants. The first year synthetic organics are used, particularly in the South, growth response has been reported as less than expected. It might well be that a year is needed to build up the population of micro-organisms that make this material available.

The growth response to nitrogen is so great that it overshadows response to phosphorus and potassium. Applications of nitrogen is like accelerating a car — you don't go any farther on a tankful of gas, just faster. Almost all soils are naturally deficient in phosphorus and will require liberal phosphate additions at time of grass establishment. With continued liberal fertilization, phosphorus tends to accumulate because it does not leach out of the soil. When grass is being established, a fertilizer high in phosphate is used, such as 6-10-4. Once established, a grade like 10-6-4 is good. For irrigated areas, especially when the clippings are removed and a high level of maintenance is practiced, a grade high in nitrogen and potash is required, such as 12-4-8.

When to Fertilize Turf

Grass should be fertilized just ahead of its natural growing season. In general there are two groups of grasses; cool-season grasses, and warm-season grasses. Cool-season grasses include bluegrass, fescues, bents, ryegrass, and red top. These grasses will grow in very cold soil; in fact, whenever the soil is not frozen. They do not stand prolonged high temperatures and will usually not survive in southern areas except at higher altitudes and in the shade.

From a custom applicator's standpoint there is a decided ad-

vantage in the growth habits of cool-season grasses since fertilizer can be applied any time in late winter or early spring. These grasses should not be fertilized heavily during the hot months. If they are overstimulated, food reserves are taken from the roots and they are easy prey to disease and extended droughts. The best time to fertilize cool-season grasses heavily is during the fall. There is proportionally greater root growth compared to top growth during this period than during the spring flush of growth (in the spring the grass is trying to form seed heads). In the fall there is less danger of overstimulation resulting in an outbreak of disease, and the trees do not compete as strongly for water and light. In the mowing management of cool season grasses, it is important to use a high cut (2"-3") during the summer months.

Warm-season grasses (Bermuda, zoysias, bahia, centipede, carpet, St. Augustine) grow little when air temperature is less than 60° F. and soil temperature is less than 50° F. These grasses should be fertilized when the above conditions are first reached in the spring, and depending on the growth desired, periodically until cool weather comes in the fall.

How Much to Use?

The amount of fertilizer to use depends on a lot of factors and it is impossible to prescribe for all possible conditions. Managers of airports and highway engineers are going to want the minimum growth necessary to control erosion and dust, while a golf course superintendent must keep the greens growing all season. The golf course superintendent will use 10 to 20 times the fertilizer per unit area as the highway engineer and both may be using the right amount.

The most attractive grasses have relatively high fertilizer requirements and will not present a superior appearance unless these requirements are met. Bents, Merion bluegrass, and improved Bermuda varieties should be fed quite heavily. Kentucky bluegrass, red fescues, St. Augustine, zoysia, and common Bermuda are moderate in their fertility requirements. Bahia, centipede, carpet,

ryegrass, and tall fescues are useful for low maintenance areas.

In general, southern areas will require more fertilizer than northern areas, particularly on sandy soils where leaching losses are high. Irrigated grass requires more fertilizer than nonirrigated, and grass grown under trees or around ornamentals will require higher amounts. Cool-season grass grown for ordinary lawn purposes in the moderate group should receive 2 to 3 lbs. of nitrogen. Ten lbs. of a 10-6-4 grade in early spring and 10 to 20 lbs. in the early fall will meet these requirements. If only one application is to be made it should be made in the fall. A comparable application rate for southern grasses would be 3-4 lbs. of nitrogen. Applied, for example, at 10 lbs. of a 10-6-4 per 1,000 sq. ft. in early spring, June, July and September.

Fertilizer comes in many physical forms — granules, dusts, slurries, and liquids. Each form has its advantages and disadvantages. Most applicators have found the fine granule to be the most acceptable and easiest to use with the widest range of equipment. Uniformity of application is a must as overlaps and skips ruin the appearance of grass areas. Applicators with spinning fans do a good job around obstructions and feathering of one application strip into the next without streaking.

Meeting Dates



International Shade Tree Conference, Western Chapter, Annual Convention, Star Dust Hotel, Las Vegas, Nev., May 12-15.

Chemical Specialties Manufacturers Assn. Mid-Year Meeting, Drake Hotel, Chicago, Ill., May 20-22.

National Plant Food Institute Annual Conference, Greenbrier Hotel, White Sulphur Springs, W. Va., June 9-12.

3rd Annual Meeting, Fla. Society of Golf Course Superintendents, Jacksonville, June 18-20.

American Society of Landscape Architects Annual Meeting, Penn-Sheraton Hotel, Pittsburgh, Pa., June 23-26.

American Assn. of Nurserymen Annual Convention, Shamrock Hilton Hotel, Texas, July 29-24.