As with any plant grown for the use or benefit of people, understanding the nutritional requirements of turfgrasses is among the most important factors in their successful culture. Inadequate soil nutrient levels, insufficiently or excessively applied nutrients, and improperly applied nutrients can each lead to problems in the general health, vigor, and quality of a turfgrass stand. As the use or quality expectations of a turfed area increase, so does the importance of adequate soil fertility and a proper fertility program. In extreme cases, poor or improper fertility can lead to the decline and eventual loss of major portions of a turfgrass stand.

In classical plant nutrition literature, 17 elements are generally considered essential for plant growth. These include: C, H, O, N, K, P, Ca, Mg, S, Fe, Mn, Zn, Cu, Mo, B, Cl, and Co. Other elements, such as Si, may be beneficial to some plants in some situations, but have not been shown at this time to be absolutely essential according to strict classical definitions. Traditionally, when plant nutritional requirements are discussed, C, H, and O are not addressed in detail since they are obtained in sufficient quantities by the plant from air and water rather than from existing soil or applications by people. Thus, the thrust of this chapter includes turfgrass responses to the remaining essential elements and other elements that, though not essential, may influence turfgrass performance. Since detailed discussions of the soil chemical reactions involved with these elements can be found in other monographs, they will not be reviewed in detail in this chapter.

I. NITROGEN

Nitrogen management is one of the more important cultural aspects in establishing and maintaining quality turfgrasses. Excluding O₂, H, and C, N is required in the largest amount of any of the 17 essential plant nutrients.