Nitrogen and Yield Potential

There is continued interest in increasing the yield potential of crop plants in order to meet world needs of food and fiber. In most cases, major crop plants have greater genetic yield potential than is being realized through current production practices. For the purposes of this chapter, "potential yield" is defined as the ultimate yield attainable in any geographic region when all controllable production factors are at an optimum and when the uncontrollable factors (mainly weather conditions) are generally favorable. Although some soil conditions are not easily modified, they will be generally classified as controllable factors. From a soil fertility standpoint, N is the element that is of primary importance in the determination of plant yields, especially in relation to the attainment of maximum yield potentials.

Since the beginning of plant domestication, attempts have been made to increase crop yields. Early efforts were directed toward selecting plants with large, numerous seeds that were retained to maturity. Over the years, gradual improvements in yield were also attained through fallowing, use of organic manures, growing legumes, etc.; however, it was not until the latter part of the 19th century that dramatic yield increases began to occur. This initial upsurge in plant yields was based chiefly on increasing knowledge of the chemical elements required in plant nutrition and supplementation of soil sources of these elements with chemical fertilizers. Evans (1980) illustrated graphically the historical trends in yields of wheat (*Triticum aestivum* L.) in England and rice (*Oryza sativa* L.) in Japan from about 1200 A.D. to

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1 Deceased 28 January 1981.

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