

Fertility management is an important aspect in irrigation economics. A soil analysis is essential to determine pH and soil nutrient status. Adequate soil potassium and phosphorus levels relate to drought tolerance. Iron fertilization, even in the humid area of the country, has been associated with drought avoidance. Recent research has shown that turfgrasses treated with certain growth stimulants such as certain triazole fungicides or seaweed extracts developed good root systems in droughty soils.

Providing nitrogen nutrition to cool season grasses mid to late fall has been shown to enhance root development in late winter to early spring. On the other hand, heavy nitrogen fertilization during heat stress periods increases transpiration rates and inhibits root development.

In certain areas of the country, recycled water is being used in turf production when potable water use is restricted. Water quality must be considered in programming non-potable water irrigation. Often recycled water contains essential nutrients for turfgrass growth and development. However, the water may contain sodium, salts, bicarbonates, or heavy metals which may be detrimental to turfgrass sod development. Accumulation of salts may require periodic flushing irrigations to permit satisfactory turf development. Gypsum applications may be required to offset a sodium buildup.

Results of recent research at Virginia Tech has indicated that salt influence on turfgrass production may be offset with applications of certain fortified seaweed extracts. □

The heritage of the turfgrass industry

By James B. Beard

It is occasionally beneficial to look back over the history and development of an industry. It gives perspective on how much progress has been made in not only the *art* but, more importantly, the *science* of turfgrass culture, and the associated management of groundsmen, equipment, budgets and record keeping. It also reminds us how long turfs and their proper usage have contributed to an improved quality of life, to surfaces for healthy recreation, and to the functional aspects of erosion control, dust stabilization, heat dissipation, noise abatement and reduced visual pollution.

Evolution of ornamental plantings

When did turfgrasses, lawns, parks, greens and sports fields as we know them today begin to evolve? There are sufficient records existing to indicate that very splendid gardens were constructed and maintained in the ancient civilizations of China, Egypt, Mexico, Babylon and Persia. There are records of detailed garden plans as early as 1500 B.C. Reference to parks have been found in the Egyptian tombs and in the records of ancient Babylon and Assyria. These early pleasure gardens primarily emphasized the collection of trees, shrubs and vines plus the very elaborate use of water in fountains, ponds, canals, and irrigation. Herbaceous, perennial and annual flowers were used occasionally.

There is also reference to the use of grass and "grass plots." However, these may have involved the use of unmowed, low-growing grass covers and/or ornamental grass clumps valued for their beautiful inflorescences. Water and shade were important criteria in the pleasure gardens of the ancient civilizations.

During the era of Imperial Rome the concepts of ornamental horticulture and its use in the development of gardens first evolved. Pliny the Younger (62 A.D.) described his own pleasure gardens, including reference to "a flat lawn area." However, it was evidently planted to a soft acanthus, a type of ground cover, rather than grass. He also mentioned that one section of the garden "was devoted to meadow land," which could have involved the use of grass.

There was a decline and low ebb in the care of gardens

during the Dark Ages. Many of the early formal gardens were destroyed, as were most of the associated records and drawings. Most activities relating to pleasure gardens were restricted to the monasteries.

There is reference in the medieval literature of the 1400s to "flowery meads." These medieval "lawns" were essentially imitations of natural meadows and consisted of a low-growing, open grass cover containing a profusion of brightly colored flowering plants. Most were grown within an orchard setting. Turfed seats were also a common feature of 15th century gardens. They usually consisted of low-growing grasses and flowers such as daisies, violets and camomile. Thus, most references to lawns during the medieval times involved flowering plants as a major component of the plant community.

Turf areas

There are a few references to pure grass stands. The earliest occurs in the 1200s. Albertus Magnus describes a green plot in a garden as "a plot of grass carefully weeded and trampled under foot, a true carpet of green turf with no projections on its uniform surface. Behind the grass plot are planted in quantity aromatic and medicinal herbs."

There is also reference to lawn bowling greens during the 1200s. In fact, there are records showing that a bowling green known as Master's Close existed as early as 1299 in Southampton, Eng. It has been in use ever since, with drawings of the green dating from 1611. An annual championship has been played there since 1776. This is one of the earliest records relating to the culture of turfs for a sport which is still played today. It represents a period of almost 700 years.

Bowling greens such as these were probably the forerunner of modern fine turfs and fine turf culture. Cricket started to evolve during the 13th century in the form of elementary club ball and was played on turfs during the latter portion of the 13th century.

The game of golf originated near St. Andrews, Scot., in the 12th century. It evolved on undulating seaside terrain.

The sandy soil produced a turf of fine leaf texture which formed a relatively smooth, dry surface. Mary, Queen of Scots, was known to have played golf at St. Andrews. Grazing sheep cut the grass fairways. Rabbits were also grazed on the famous greens of St. Andrews for an extended period of time in the 1500s. It was not until the late 1700s that golf was introduced in North America.

Renaissance gardens

During the 1300s and 1400s, the use of ornamental gardens was revived as part of the Renaissance. The design concepts were geometrically oriented. One or two grassy areas were utilized in some of these formal designs for games and recreation. During the the Italian Renaissance, gardening continued to evolve and stimulated development of the very formal French gardens of the 16th and 17th centuries. The most elaborate remaining examples are the gardens of Versailles. Turfs played a role in these garden designs but the emphasis remained on flowers, shrubs, vines, trees and water.

Leadership in the evolution of gardening concepts and designs shifted to England in the 1600s. The 18th century became the Golden Age for England. This included the emergence of such great landscape architects as William Kent, Lancelot "Capability" Brown and Humphry Repton.

It was during this period that the concept of a grass lawn became a major feature of the landscape. This is probably the point in history from which the use of lawns and turf-grasses as we know them today evolved. It was also during the 1600s and 1700s that the first detailed writings on cultural practices for turfgrass appeared in the gardening books of such individuals as John Rae and John Evelyn.

First lawn mower

A major event and perhaps the single most significant contribution toward modern turfgrass maintenance was the invention and patenting of the first mowing machine for turfs by Edwin Budding of Stroud, Gloucestershire, Eng., in 1830. This original concept of a reel mower design is still in use today. Subsequently, the first published turfgrass research was conducted by the noted botanist W. J. Beal at the Michigan Agricultural Experiment Station around 1880.

Thus began a shift in the evolution of turfgrass maintenance from the trial-and-error methods of the artisan to the development of the science of turfgrass culture. Since then there have evolved many significant phases in the development of new turfgrass cultivars, cultural practices, fertilizers, irrigation systems, pesticides and sophisticated turfgrass maintenance equipment. □



The first mechanized reel lawn mower, invented in England.

Business

Business First or Family First?

By John L. Ward, Ph.D.;
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Businesses thrive on competition. But families thrive on harmony and equal treatment for members.

So what's a *family business* to do when it comes to the tough questions? Questions about salary, promotion, ownership and perks—in other words, questions about money, power and pride?

Given the conflicting dynamics of families and businesses,