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The Turfgrass Seed Market

What was once a relatively simple task of selecting turfgrasses for a particular site is now a skill requiring a degree of expertise by turf managers.

As recently as the 1960s, the choices were limited to a few improved public varieties for each type (genus) of turfgrass. Merion Kentucky bluegrass, released in 1950, proved there was an interest in improved (and more expensive) turfgrasses.

Today this interest has developed into an industry valued in excess of \$400 million and a multitude of improved turfgrasses. The monostand is gone. Quite often a fairway, lawn, or athletic field will be seeded with a mixture of three bluegrasses, two or three fine fescues, and two or three perennial ryegrasses. Turf managers consequently need an expanded basic knowledge of turf seed.

This knowledge should include a history of turfgrass improvement, the advantages of certain turfgrasses, the technology of seed production, and trends in variety development. Such information can provide the logic required to make a wise selection for a particular site.

The total of this information would stress anyone's memory, but portions of it can be memorized if the desire is present. To create the desire, one needs only to realize the historical richness of the story. The remainder of the information can be as close as this magazine for reference.

For these reasons, we offer this profile of the turf seed market. We hope it results in a new perspective of improved varieties and the recognition of the effort, dedication, and cooperation of those who developed them.

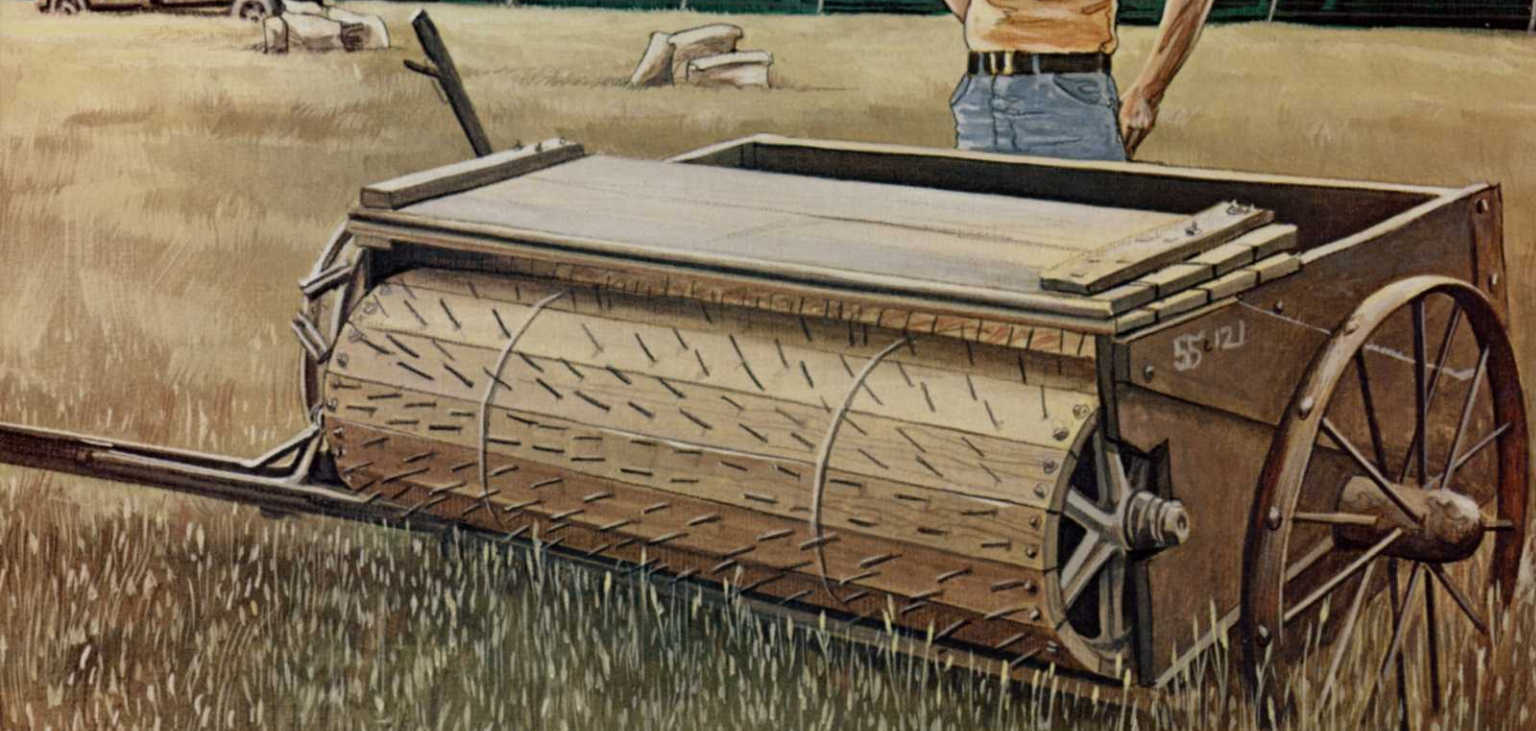
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Bruce F. Shank

Bruce F. Shank, Editor



THE EARLY YEARS

Although cultivation of grasses for grazing, gardens, and sports dates back thousands of years, nearly all advancement in the turf seed industry has taken place in the last century. Advances in plant genetics, seed production technology, and the commercial attractiveness of the turf seed market have provided the impetus for growth, especially in the last 30 years.

Prior to 1886, when J. R. Olcott created an experimental turfgrass garden at the Connecticut Agricultural Experiment Station at Storrs, most discovery had been in the areas of taxonomy, genetics, and use.

One of Aristotle's students, Theophrastus, is credited with classifying plants into annuals, biennials, and perennials in approximately 300 B.C. The Romans made the first clear distinction between agriculture and ornamental horticulture in their language.

The Renaissance revived interest in formal gardens. Sports such as bowls, golf and soccer were developing from the 1300s (A.D.) to the 19th Century.

In 1694, the Dutch botanist Camerarius proved the sexual nature of plants. In the next century, Carl von Linne' (Linnaeus) improved upon previous methods of classifying living creatures and plants and developed the standard method of classification used today.

During this time, explorers from European countries were establishing the first settlements in the Western Hemisphere. Whether accidental or intentional, seed from European grasses found the North American soil suitable for growth. Settlers, afraid of attacks, preferred to surround themselves with open fields rather than closely spaced buildings and trees. The town green therefore became a characteristic of



Fred V. Grau

The first extension turf specialist in the country at Pennsylvania State University working with Burt Musser. Grau also served as director of the USGA Green Section from 1945 to 1953.

early settlements. Livestock grazed in the green to keep it under control.

During the 1800s, Gregor Mendel, an Austrian monk, created the base for the science of genetics by describing inheritance factors called genes and Dane Wilhelm Johannsen identified the difference between the genetic makeup of an organism and its physical appearance under varied conditions (genotype and phenotype).

At the end of the 19th Century, the turf market was beginning to organize for growth. In addition to Olcott's work in Connecticut, Rhode Island started evaluation plots at its Agricultural Experiment Station. In 1894, the United States Golf Association was formed to encourage the growth and improvement of all phases of golf. In 1883, the American Seed Trade Association was created and the industry of supplying seed to end users was clearly recognized.

As the 20th Century began, interest in turf was present but technology

was not. Little was known about management practices, turf diseases, hybridization of turfgrasses, or even equipment needed to mow. Agriculture was not much further ahead in a technological sense. The engine-driven tractor was still on the drawing boards.

The next 30 years were critical for both agriculture and turf industries. Unfortunately, when many improved agricultural products received protection from the original Plant Patent Act of 1930, no protection was afforded improved turfgrasses. Not for another 40 years did turf seed breeders get commercial protection so that they could recoup their development costs for improved turfgrasses.

By 1930, 13 states had turfgrass research of some type underway. Many of these state programs were established by the recommendation and cooperation of the United States Department of Agriculture and later the USGA Green Section who jointly managed the center of turf research, The Arlington Turf Gardens, located on the present site of the Pentagon. The Green Section was established in 1920, four years after the creation of the Arlington Turf Gardens. The Gardens, later moved to Beltsville, MD, was the central point for collecting and testing turfgrasses from natural stands as well as a testing site for management practices.

The Green Section worked closely with the Arlington Gardens and published much of the research in "The Bulletin", which was published from 1921 to 1933. During that period Dr. John Montieth Jr. served as Green Section pathologist. From 1925 to 1940, Montieth made major contributions to the development of turf fungicides and other management practices.

In 1940, Dr. Fanny Fern Davis became acting director of the Green Section. She helped develop the early use of the new herbicide 2,4-D for turf. Dr. Fred Grau assumed the directorship in 1945 and served until 1953 when USGA changed the scope of the Green Section.

Another major organizational factor in the development of turfgrasses and turf management was the National Association of Greenskeepers of America, formed in 1926. Today known as the Golf Course Superintendents Association of America, the group was formed largely by the organizational efforts of John Morley, superintendent of Youngstown Country Club, Youngstown, OH; Robert E. Power, green chairman at Westwood Country Club, Cleveland, OH.; and Fred Burkhardt, greenskeeper at Westwood. They helped organize a meeting of representatives of greenskeeper associations from New



Joseph Valentine
Superintendent of Merion Golf Club near Philadelphia who discovered Merion bluegrass on his course in 1936.

determine the cost of production as compared to the price of the seed on the market.

Merion was considered a poor seed producer, but it offered the special advantage of resistance to leaf spot, powdery mildew and stripe smut. A high price was set to cover production costs and the market was willing to bear it. Poor seed production is considered less than 400 lbs. per acre.

Hundreds of candidates for new grasses are under evaluation by universities and seed companies. Few of these will pass the seed production test. Compromising certain qualities for seed production ability is sometimes necessary.

While turf research began in the United States in 1885, the actual release dates of some of the earlier selected turfgrasses were: Merion Kentucky bluegrass - 1950; Illahee creeping red fescue - 1950; Meyer zoysiagrass - 1951; Tiflawn ber-



Jesse A. DeFrance
Director of the turf program at Rhode Island during the 40's and 50's. His work involved bentgrasses and tall fescues.

England, Michigan, Philadelphia and western Pennsylvania which led to the formation of NAGA. GCSAA has proceeded to make major contributions to turf management during its 54 years of service.

The method used to find improved turfgrasses into the 1940s was the search of golf courses, parks, and any other turf area for stands of

grass which exhibited superior appearance, disease resistance, shade tolerance, etc. They were natural selections to common turfgrasses. The most famous turfgrass discovered this way, and the grass that made the market boom, was Merion, found on Merion Golf Club near Philadelphia by golf superintendent Joe Valentine in 1936.

The USGA Green Section and GCSAA encouraged golf course superintendents to search their course for stands of naturally selected turfgrasses. These grasses were those which persisted and developed under conditions of low mowing, periodic fertilization, shade, irrigation, and other conditions found on golf courses. Ben Warren, founder of Warren's Turf Nursery in Chicago, and university turf specialists such as Fred Grau, Jesse de France, and Glenn Burton travelled extensively looking for naturally selected turfgrasses in golf courses, parks and cemeteries. From these searches the original genetic base was established.

These collections were evaluated for characteristics desired of turfgrasses; color, leaf coarseness, disease resistance, drought tolerance, low mowing, and fertilizer requirements. Once a grass was identified as promising, its seed producing ability had to be judged to



John Morley
The first president of the National Association of Greenskeepers of America in 1926. Today the group is known as the Golf Course Superintendents Association of America.

mudagrass - 1952; Penncross bentgrass - 1954; and NK100 perennial ryegrass - 1962.

Although important advances in breeding turfgrasses took place in the 1930s, few if any hybridized turfgrasses reached the market by 1960.

History of State Turfgrass Research Programs

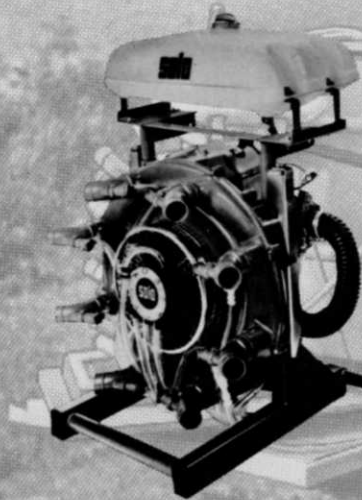
State	Turf research initiated	First turf grass conf.	Location	Early investigators
Alabama	1927	1960	Auburn Univ.	D. G. Sturkie
Alaska	1950	None	Univ. of Alaska	H. Hodgson, A. Kallio, A. Wilton, R. Taylor, L. J. Klebesadel
Arizona	1949	1953	Univ. of Arizona	S. Fazio, J. Folkner A. Baltensperger
Arkansas	1959	None	Univ. of Arkansas	A. M. Davis
California	1951	1951	Univ. Cal., Davis	L. Currier, R. Hagan
	1948	1949	Univ. Cal., Riverside	V. Stoutemeyer, P. Miller, R. E. Endo
Colorado	Early 1940's	1954	Colo. State Univ.	G. Beach, J. Fufts
Connecticut	1885	None	Univ. of Connecticut	J. B. Olcott
Delaware	1965	1968	Univ. of Delaware	W. Mitchell, C. Phillips
Florida	1945	1953	Univ. of Florida	R. Bair, G. Nutter
Georgia	1946	1946	Tifton, Georgia	G. W. Burton
Hawaii	1963	1965	Univ. of Hawaii	R. Voss, D. Watson, W. McCall
Idaho	None	None	Univ. of Idaho	None
Illinois	1934	1960	Univ. of Illinois	A. Lang, J. Pieper, F. Weinard
Indiana	1942	1937	Purdue Univ.	M. Clevitt, G. Hoffer, G. Mott
Iowa	1931	1932	Iowa State Univ.	V. Stoutemeyer, H. Lantz, S. Edgecomb, E. Roberts
Kansas	Late 1920's	1950	Kansas State Univ.	J. Zahnley, L. Quinlan
Kentucky	1948	None	Univ. of Kentucky	E. Fergus, J. Spencer
Louisiana	1960	1963	Louisiana State Univ.	T. E. Pope
Maine	1958	1962	Univ. of Maine	R. Struchtemeyer
Maryland	1931	1928	Univ. of Maryland	R. Thomas, E. Cory, E. Deal
Massachusetts	1927	1931	Univ. of Massachusetts	L. Dickinson
Michigan	1929	1930	Michigan State Univ.	R. Cook, J. Tyson, M. McCool
Minnesota	1936	1964	Univ. of Minnesota	H. Hayes, H. Schultz
Mississippi	1956	1960	Mississippi State Univ.	C. Johnson, L. Wise
Missouri	1910	1960	Univ. of Missouri	J. Whitten, E. Brown
Montana	1920's	None	Montana State Univ.	None
Nebraska	1927	1963	Univ. of Nebraska	F. Keim, F. Grau
New Hampshire	1961	1965	Univ. of New Hampshire	L. J. Higgins
New Mexico	1954	1955	New Mexico State Univ.	C. E. Watson
Nevada	1965	None	Univ. of Nevada	R. Ruf, R. Post
New Jersey	1924	1929	Rutgers Univ.	H. Sprague, E. Eval, G. W. Musgrave
New York	1947	1947	Cornell Univ.	J. F. Cornman
North Carolina	1961	1963	N. Carolina State Univ.	J. Harris, W. Gilbert
North Dakota	1962	None	N. Dakota State Univ.	J. Carter, K. Larson, I. Dietrich
Ohio	Early 1920's	1938	Ohio State Univ.	F. Welton, G. McClure, R. Davis, K. Bader
Oklahoma	1948	1946	Oklahoma State Univ.	W. Elder, R. Chessmore
Oregon	1930	1948	Oregon State Univ.	H. A. Schoth
Pennsylvania	1929	1929	Penna. State Univ.	H. Musser, F. Grau
Rhode Island	1890	None	Univ. of Rhode Island	L. Kinney, H. Wheeler J. A. DeFrance
South Carolina	1959	None	Clemson Univ.	P. M. Alexander
South Dakota	1955	None	S. Dakota State Univ.	William Macksam
Tennessee	1938	1947	Univ. of Tennessee	J. K. Underwood
Texas	1940	1946	Texas A & M Univ.	G. Warner, R. Potts, A. Crain, J. Watson, E. Holt
Utah	1958	1964	Utah State Univ.	H. Peterson, K. Allred
Vermont	1959	1965	Univ. of Vermont	G. M. Wood
Virginia	1910-1915	1957	Va. Polytechnic Institute	L. Carrier, A. Smith
Washington	1942	1948	Washington State Univ.	A. G. Law
West Virginia	1930	1967	W. Virginia Univ.	Collins Veatch
Wisconsin	1920	1959	Univ. of Wisconsin	F. Burcalow, E. Nielsen, D. C. Smith, J. Sund
Wyoming	1962	None	Univ. of Wyoming	Loyd Ayres
USDA cooperating with USGA	1920 1941	None None	Arlington, Va. Beltsville, Md.	John Monteith, Jr. John Monteith, Jr.

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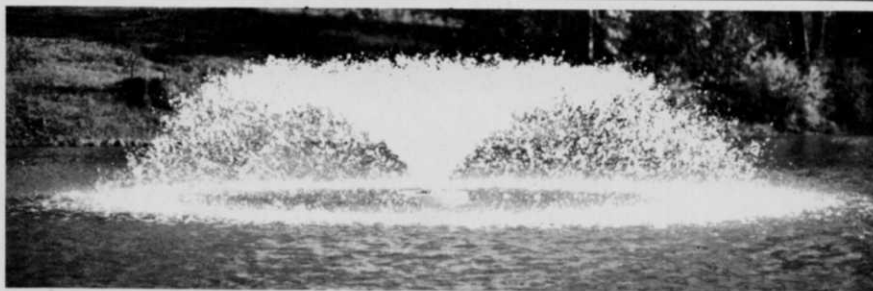
H. B. Musser

Leader in turfgrass development at Pennsylvania State University. Had a part in the development of many improved turfgrasses such as Pennfine and Penncross.

Following the war, the prewar work had to be reorganized. Strong pressure from universities and the Green Section resulted in the release of American improved varieties in the 50's. In the late 40's, the American Society of Agronomy, encouraged by Fred Grau and others, created a Turf Committee. A minor setback was the repositioning of the Green Section in 1953 to serve USGA member clubs only. Although its work still benefitted everyone indirectly, USGA concentrated its support on golf turf work.

The postwar years brought new consumer interest in housing and home landscapes. The value of a nice lawn was growing. Gradually, the dollars shifted to the homeowner market. Along with the seed industry, the sod industry grew rapidly to meet the new demand for quality lawns.

This growth in home lawn care, added to turf needs generated by golf, sod production, and road construction permitted states to increase their support of turf programs at state universities. This resurgence of support of university research resulted in most of the improved hybrids during the 60's and 70's. In 1961, Rutgers created a fulltime turfgrass breeder position and filled it with a graduate student from its corn breeding program, C. Reed Funk. His contributions, combined with breeding work of Penn State, Rhode Island, Oregon State and others, is the foundation of today's breeding effort.



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THE FORMATIVE YEARS

During 1930-1960, seed producers were highly involved with production of common grasses. They had a reliable demand for a product which they had developed an acceptable technology to handle. Basically, they collected seed from natural stands of common grasses by a practice called stripping. Seed companies would

arrange with farmers in the midwest to have certain pastures ungrazed during late spring and early summer.

"Many millions of pounds of seed were gathered with strippers beginning in mid-June in Kentucky and the southern portion of the Western District (Missouri north to southern Canada), and following the weather

northward to finish up in Minnesota and Canada during July," says Robert Schery, Director, of the Lawn Institute.

Arden Jacklin of Jacklin Seed Company recalls, "Common Kentucky bluegrass was occasionally overproduced. When I was working for the USDA Soil Conservation Ser-



Arden Jacklin checks a seed field in 1958 in eastern Washington.