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Peter Loft

President of Loft's Pedigreed Seed Co., Peter and his brother Jon manage a diverse company in the turf and vegetable seed industry. Loft's proprietaries include Baron, Jamestown, Ram I, Yorktown, Rebel and Pinto reclamation mixtures.

Jacklin has commercial relationships with nearly all major seed companies in the world. They work closely with Lofts on reclamation mixtures and improved grasses. They work with many European firms for production and distribution. They produce much of the seed for Scotts, Bristol and Windsor, and Warren's A-20 and A-34.

Equally as significant are Jacklin's contributions to seed production technology. Row cropping to produce foundation seed had been done before by Bohnert, but Jacklin applied it to the production of certified seed. The original technology was using a stripper on natural stands in the midwest. In the Northwest this technology was altered to solid seeded stands of grasses which were cut and dried on large concrete drying slabs. Arden Jacklin applied row cropping to the field production of certified seed, used a swather to put the cut grass in windrows for drying in the field, and used a combine to pickup and separate the dried seed from the stems. This technology cut losses of seed during drying and reduced seed handling to a minimum.

In 1972, Jacklin Seed Co. merged with Vaughan Seed Co. of Chicago to form the Vaughan-Jacklin Corpora-

tion. The Jacklin Seed division maintains its original integrity under this agreement according to Doyle Jacklin. In 1978, Jacklin moved to a new location in Post Falls, Idaho, and is rapidly expanding its seed handling and storage facilities there.

Today, Jacklin handles 80 different proprietary turfgrasses, half of which are in commercial production. It owns 5,500 acres and contracts another 16,000 acres for production.

Northrup King Co. began the first commercial breeding effort on the perennial ryegrasses for turfgrass use in 1956.

Northrup King Co., founded in 1884 as a seed store in Minneapolis, Minnesota, entered the turf seed business in the 40's with a line of lawn seeds. It was one of the first developers of improved varieties of agricultural crops in the 30's, with corn, and radishes.

Northrup King was among the first U.S. companies to begin a turfgrass breeding program in 1948, for ryegrasses and Kentucky bluegrass. In 1954, the first turfgrass trials to contain a large group of European varieties was established. During the early 60's, Northrup King released NK100 perennial ryegrass, Holfior Colonial bentgrass, Pelo perennial ryegrass, Prato Kentucky bluegrass and Ruby creeping red fescue. NK100, sold primarily through J & L Adikes, was the first improved turf-type perennial ryegrass made available to the market. Holfior was the first pure colonial bentgrass released in the U.S. and Ruby was the first pure spreading red fescue released in the U.S. Newport was the second improved bluegrass variety released in the U.S., following Merion.

Northrup King was one of the first to recognize and supply an overseeding mixture for the South with the release of Medalist in 1970. In 1972, it released NK200 perennial ryegrass which exhibited improved winter hardiness. In 1974, NK released Aquila and Parade Kentucky bluegrass varieties.

Since that time, Northrup King has been part of the release of the cultivars Adelphi Kentucky bluegrass, Pennfine Perennial ryegrass, Rugby Kentucky bluegrass, Eton, Delray, and Goalie perennial ryegrasses; Wintergreen and Atlanta Chewings fescues; Dawson red fescue; Scaldis hard fescue, and Fults *Puccinellia distans*.

Lofts Pedigreed Seed, Inc. was founded in 1923 by Selmer Loft as a local seed supplier. From its New Jersey location, it has been close to nearly all U.S. breeding work from Rutgers. Today, Peter and Jon Loft manage one of the largest seed companies in the U.S.

In 1962, Lofts purchased Great Western Seed Co., in Albany, Oregon, which had vast production contacts in the Willamette Valley and marketing arrangements with European seed producers. This strengthened its marketing and production position in the turf seed market. Through a series of expansion and acquisitions, Lofts broadened its base even further with outlets in Maryland, New York, Massachusetts, Wisconsin, and recently Sunbelt Seeds in Tucker, Georgia.

Lofts' closeness to university research, Northwestern production, European seed companies, and other U.S. seed companies, positions it very close to the center of the turf seed industry. Lofts and Jacklin are cooperating on reclamation mixtures for the future.

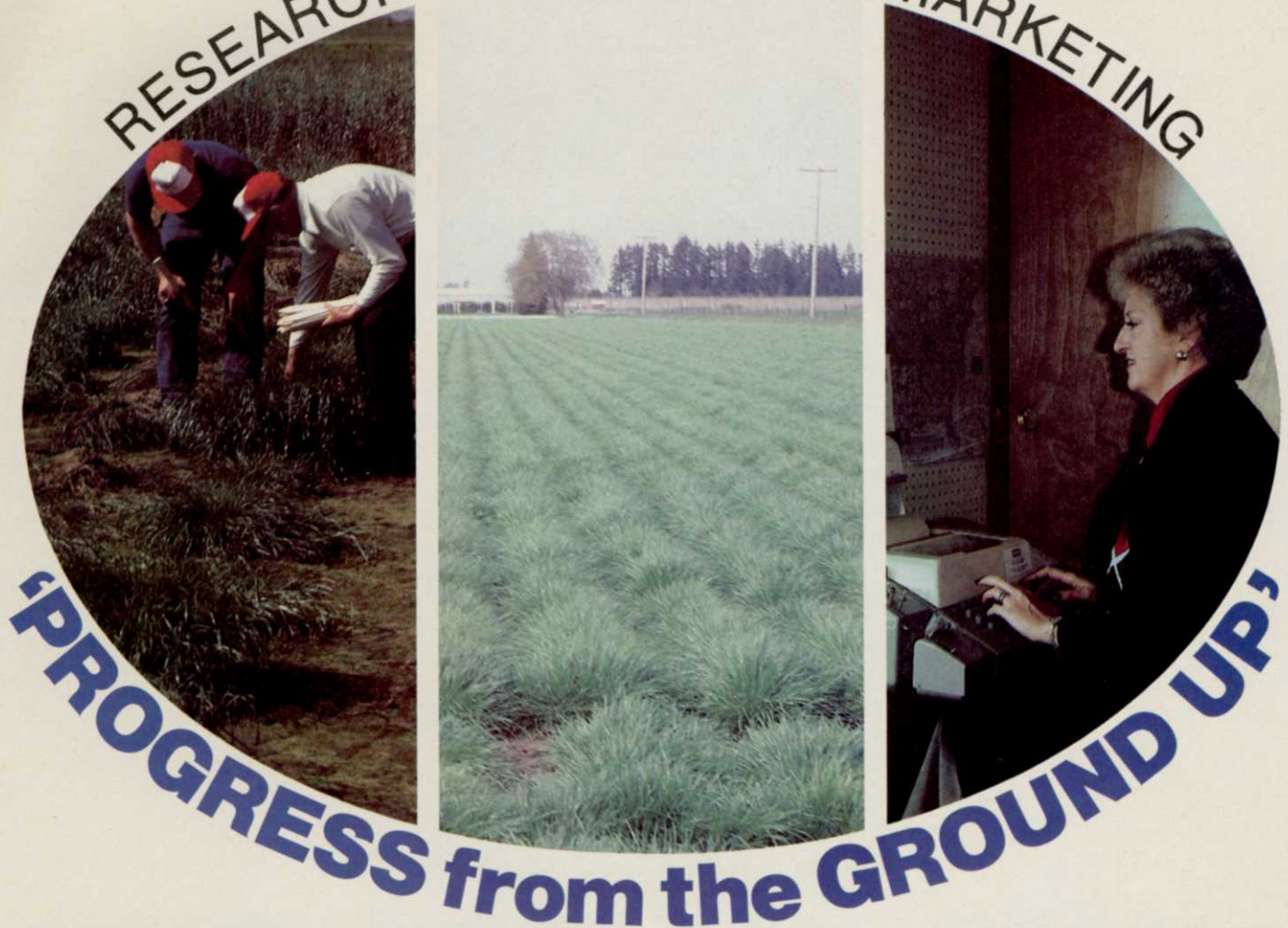
Included in the Lofts' stable of U.S. proprietary varieties are: Baron, Ram I, Georgetown and Mystic Kentucky bluegrasses; Yorktown, Yorktown II, and Diplomat perennial ryegrasses;



Bob Peterson

In the 15 years that Peterson has worked for E. F. Burlingham he has arranged for the proprietaries Bonnieblue, Majestic, Banner, and Falcon.

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Rebel tall fescue; Jamestown chewings fescue; and Beamont meadow fescue. Lofts and Jacklin share rights to the Pinto Reclamation mixtures.

O.M. Scott & Sons is greatly responsible for the commercial success of both professional and homeowner seed markets. Founded as a supplier of agricultural seeds in 1870, by Orlando Scott and his sons Hubert and Dwight. In 1890, the company began to handle turf seed and was prominent in the early years of common seed production in the Midwest. In the early 20's Scotts was a supplier of seed and stolons to golf courses and was the first to market German bentgrass to U.S. golf courses. In 1928, realizing the potential of the homeowner market long before others, Scotts began publication of *Lawn Care*, a small magazine of how-to tips for homeowners. Combined with the seed and the release of *Turf Builder*, the first turf fertilizer formulated for lawns, Scotts had begun to provide homeowners with a total lawn care package that was supported by educational material on its use. In 1936, the spreader was added to the product line, and in 1941, Scotts was one of the first to market 2,4-D as a turf herbicide. Another accomplishment was the introduction of the first preemergent crabgrass herbicide in 1950.

Scotts was more than a seed producer. Its emphasis was on meeting all the turf needs of a customer, not just one. Scotts has one of the largest turf research centers at its ProTurf headquarters in Marysville. The ProTurf Division was created in 1965 to realign the company with professional users of turf products. The division provides technical assistance in addition to products to golf course superintendents and landscape contractors across the U.S. ITT purchased Scotts in the early 70's.

Some of the improved turfgrass seed sold by Scotts includes Vantage, Victa and Bristol Kentucky bluegrass; Loretta and Caravelle perennial ryegrass; Banner chewings fescue, and Biljart hard fescue. Scotts deals with Jacklin for much of its seed production needs.

E. F. Burlingham and Sons was formed in the early 1900's by E. F. Burlingham as a feed and seed operation in Forest Grove, Oregon. His son Gordon and grandson George have followed in his footsteps. Burlingham has been involved in a variety of ways with the seed market. The company has a reputation as an international trader

of turf seed due to its North American rights to European turfgrass seed such as Sydsport and Birka. These grasses may be sold by other seed companies but they are marketed through Burlingham as the wholesaler.

In 1964, Bob Peterson joined Burlingham from Northrup King and proceeded to arrange marketing rights for new material from Rutgers. These arrangements include turf seed Majestic and Bonnieblue bluegrasses; Banner chewings



Dwight Scott

*Son of the founder of O. M. Scott & Sons, Dwight led the company through the first half of the 20th Century. His goal was a complete product line for the turf industry and consumer education through *Lawn Care*.*

fescue; Belle perennial ryegrass; and Falcon tall fescue.

Prior to this new material, Burlingham had handled mainly public varieties such as Merion, Highland bentgrass, Pennlawn red fescue, Linn perennial ryegrass and others. They manage seed production for re-export to seed companies in Europe.

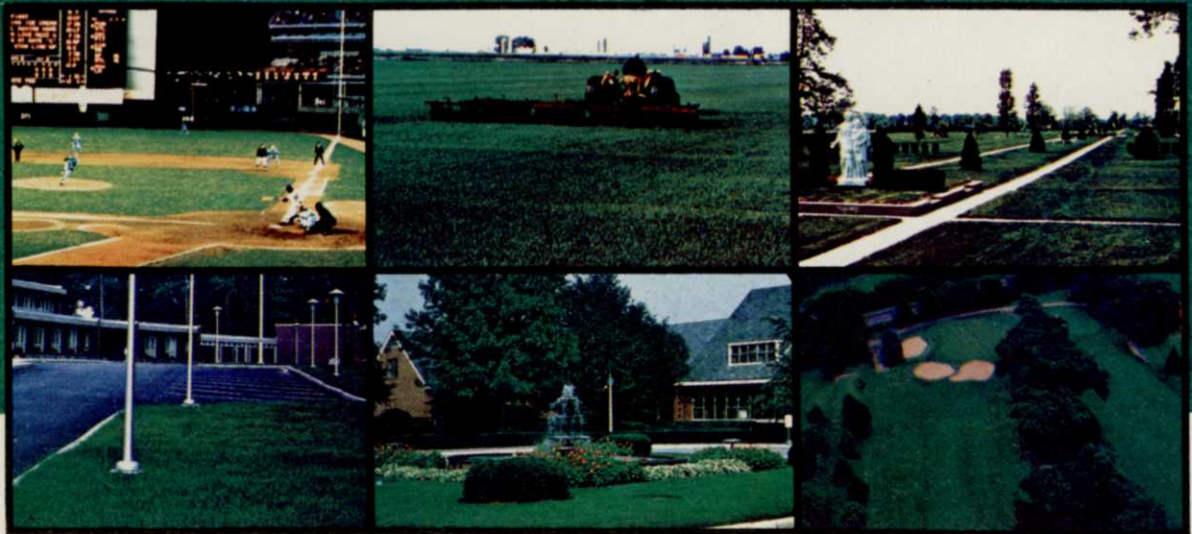
J. & L. Adikes, like Scotts, was founded in 1855 as a local seed supplier and added a line of turf seeds later, in this case the early 30's. Located in Jamaica, New York, Adikes was not far from universities working on improved varieties. The company played an early role in the marketing of NK100 perennial ryegrass. Bob Russell, vice president, tells the story that Northrup King had abandoned the seed as a poor seed producer. He obtained some seed and had it tested in two different locations and it proved to be green longer in the fall and earlier in the spring. Adikes got Northrup King to look for any leftover NK100 seed. They found about 300 pounds and Northrup King took it from there, arranging production and Adikes handling marketing. This was prior to variety protection regulations and Adikes had to devise a way to protect its investment in the perennial ryegrass. This was accomplished by only selling NK100 in a mixture. Adikes took all production of NK100 into the mid 70's. Russell believes this experience with NK100 in the late 50's got Reed Funk interested in a perennial ryegrass improvement program at Rutgers which resulted in the development of Manhattan.

Adikes owns the rights to the first bluegrass hybrid from Reed Funk and Jerry Pepin at Rutgers, Adelphi. Adelphi is considered one of the most consistent bluegrass performers across the country. Adikes was an early promoter of using a blend of bluegrass over a single one in the mid-50's.

Stanford Seed Co. in Plymouth Meeting, Pennsylvania, is a strong supporter of the reclamation market with Penngift crownvetch, Tioga deertongue, Birdsfoot Trefoil and Lathco flatpea. It was also the original marketer of Pennfine perennial ryegrass. The company has placed reclamation and highway grasses as a specialty.

In late 1979, Stanford arranged the purchase of Whitney Dickinson in Buffalo, New York, and thereby regained a marketing role with Pennfine as a member of SPIC. Stanford had earlier been one of the original marketers of Pennfine.

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For example, Dr. Richard Skogley at Rhode Island, worked and trained under Jesse DeFrance, one of the original specialists in bentgrasses. Skogley's students include Richard Hurley, vice president of research and development at Lofts Pedigreed Seed Co.; Jim Wilkinson, director of research for Chemlawn Corp.; Victor Gibeault, extension agronomist for the University of California; Tom Cook, extension turf specialist at Oregon State University; and Bob Mazer, turf specialist at Clemson University.

Another example is Henry Indyk of Rutgers had considerable influence on Reed Funk's decision to be the first full-time turf geneticist at Rutgers. Indyk came from Nebraska where Fred Grau had helped establish a turf program. Today, Jerry Pepin, Kevin McVeigh, and other Funk students are making substantial contributions to turf breeding.

The future presents significant challenges to turf breeders. Rising costs for water, fertilizer, insecticides, fungicides and herbicides will force development of hardier species for climatic regions. Joe Duich of Penn State points out, "There is still no satisfactory turfgrass for fairways in the North. Fairway grasses must stand up to low cutting, heavy irrigation, and *Poa annua*. In the future, overuse of water and chemicals will be discouraged and the grass on the fairway will have to get by on less. We have been working on a strongly rhizomatous colonial bentgrass. We must adapt to reduced levels of maintenance by developing turfgrasses that match this lower level of maintenance."

For the transition zone tall fescues and other deep rooting grasses are needed to survive without extreme dependence upon irrigation.

In the South, insect resistance must be added to the traits of improved grasses. Work with centipede may eventually obtain this goal.

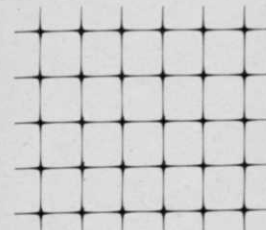
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The grass family is one of the most numerous and most important plant species to man, with more than 600 genera and 10,000 species.

All cool and warm-season grasses considered turf type today originated outside of the United States. Most cool-season grasses were brought to North America from Europe during colonization, including bentgrass, all fescues, ryegrasses, and bluegrasses. Even crabgrass came from Europe. If you are wondering what grasses are indigenous to North America, they include buffalograss, reed canarygrass, and blue gama.

Warm-season grasses had the following origins; Bermudagrass - Africa, Centipedegrass - S.E. Asia, Zoysia - Asia, St. Augustine - Africa, Bahiagrass - Brazil, and Kikuyugrass - Africa.

Turfseed selection and development is a building process. First collections of turf and forage type grasses are made. Selections from these collections are the first level of improved turfgrasses. These selections are crossed to get first generation hybrids. The most recent group of improved turfgrasses are crosses of first generation hybrids. These are considered second generation hybrids.

The turf seed market has developed into an attractive market with adequate protection for proprietary turfgrasses. The additional push on development of new turfgrass varieties by private enterprise is causing an evaluation of all types of grasses for turfgrass use. The reclamation market and low maintenance turfgrass market are considering grasses which were



Glenn W. Burton

Breeder of the "Tif" series of bermudagrasses and originator of radioactive mutation techniques for turfgrasses.

previously excluded from breeding and selection work. Now, all genera and species are being considered for a role in the turf market.

An outline of each genus applicable to turf are needed to grasp the overall scope of turfgrasses today.

COOL SEASON GRASSES

Bentgrasses

Bentgrasses, because of their importance to golf, received much of the initial attention of turf researchers. Bentgrasses are naturally low-growing and tolerate low mowing. Redtop and German creeping bentgrasses were common on golf courses and other turf areas prior to the 40s. Scotts used to sell German bentgrass stolons to golf courses in the 20's.

Much of the early work of the USDA and USGA Green Section involved bentgrasses. Pennsylvania State, the University of Rhode Island, Oregon State Agricultural Experiment Station, and Rutgers all

contributed to selection and development of bentgrasses.

There are three primary types of bentgrasses used for turf today; creeping bentgrass, colonial bentgrass and velvet bentgrass.

Creeping bentgrass, *Agrostis palustris*, is very aggressive when fertilized and irrigated. It is propagated either by seed or stolons. Seeded varieties at one time exhibited a certain degree of segregation which would cause a green to look patchy. The problem has been resolved for the most part with the newer varieties. Improvements in disease susceptibility have also been made with newer varieties. The latest release is Penneagle (1979) developed by Joe Duich at Pennsylvania State University. Penneagle was evaluated for more than 20 years before its release. Penncross was released in 1954 by Penn State and suffered from lack of protection until Tee-2-Green Corp. was established to represent growers and to control purity in the mid-70's. Tee-2-Green also markets Penneagle.

International Seeds, Inc., distributes a Swedish creeping bentgrass called Emerald. It is known as Smaragd in Europe and is owned by W. Weibull in Sweden. Emerald was developed in Europe from progeny of Congressional, a vegetative variety developed in the U.S.

The oldest seed type creeping bentgrass marketed today is Seaside, selected by Oregonian Lyman Carrier and released in 1928.

Colonial bentgrass, *Agrostis tenuis*, is aggressive but has a lower tendency to creep. The last cultivar to be released in the U.S. was Exeter by Rhode Island in 1963. It too suffered from lack of protection and marketing effort, but will soon be repromoted by Pickseed.

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RAM I was found growing on the ninth putting green at Webhannet Golf Club in Maine. There it grew vigorously though consistently mowed at $\frac{1}{4}$ ". It was selected by Mr. Ernest W. Brown, superintendent, in consultation with Alexander M. Radko, National Research Director, USGA Green Section. The original plant was submitted to Dr. C.R. Funk at Rutgers University for further evaluation and testing. University testing proved this new variety to have superior qualities.

Having been selected and tested by two of the leading turf specialists, RAM I is now brought to you by two leading seed companies.

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1. Lime is applied to the fields after they have been turned under. Then the fields are plowed again and fine graded, very similar to soil preparation for lawn seeding.



2. Charcoal banding is a process where the seed and liquid fertilizer are layed in rows and sprayed with a band of charcoal covering the seed. The charcoal protects the seed from Karmex or Atrazine applied to kill weeds.



3. Grassland drills are an economical way of reestablishment of the seed crop. This can only be done if the fields are burned to get rid of the straw. Drilling is a one-step process putting down both seed and fertilizer.

Northrup King distributes Holfior, a colonial bent developed in 1940 by D.J. van der Have of the Netherlands. Highland colonial bentgrass is a public variety released by the Oregon Agricultural Experiment Station in 1934. Production of this seed is carefully watched by an association of growers for quality and supply reasons.

Astoria was also released by Oregon in 1936. It does not have the winter hardiness of Exeter.

Velvet bentgrass, *Agrostis canina* L., has an extremely fine leaf which gives it a velvet appearance. It is less aggressive than creeping bentgrass but more aggressive than colonial. Velvet bentgrass is more tolerant of acidic soils than the other bentgrasses but prefers well drained and well aerated soil. New England is a prime area for use of velvet bentgrass in the U.S.

Rhode Island's Richard Skogley released Kingstown in 1963 as a public variety. It was the first velvet bentgrass released since the depression. Pickseed intends to market and promote Kingstown soon.

Redtop bentgrass, *Agrostis alba* L., is a coarse, stemmy bentgrass well adapted for use on poorly drained, infertile soils such as roadsides. It is occasionally used in mixtures for low maintenance areas.

Bluegrasses

Kentucky bluegrass is the most popular turfgrass in North America and as such has more cultivars available than any other turfgrass. The prime factor in bluegrass improvement was the discovery of apomixis, a characteristic which limits cross-pollination of some Kentucky bluegrass varieties. Kentucky bluegrasses which exhibit this characteristic were considered asexual and thus received patent protection prior to the 1970 Plant Variety Protection Act which provided protection to sexually propagated plants.

Dr. C. Reed Funk at Rutgers developed the technique to create Kentucky bluegrass hybrids that were apomictic. His work is part of nearly every Kentucky bluegrass developed since the mid-60's. Most other improved varieties are based upon collection and selection work.

Recently, International Seed, Inc., released a variety of rough bluegrass, *Poa trivialis*, called Sabre. Sabre was developed by Reed Funk and William Dickson at Rutgers for shady, moist areas where a low-

growing bluegrass is desired and for southern overseeding.

Kentucky bluegrass, *Poa pratensis* L., is the backbone of turf in the Northern U.S. Releases of improved Kentucky bluegrasses began in 1947 with the official release of Merion. The emphasis behind improvement programs for Kentucky bluegrass was disease resistance, color, low growth habit, texture, and sod strength. Later winter hardiness, shade tolerance, traffic tolerance, establishment rate, and spring and fall color were added to the list.

Merion had been found as a naturally superior Kentucky bluegrass by Superintendent Joe Valentine at Merion Golf Club near Philadelphia in 1936. It has proven itself under low mowing and golfer abuse. Nature did the work, but it took Valentine to find it and the Green Section's Fred Grau and Pennsylvania State's Musser and Duich to refine and evaluate it for the market.

Other Kentucky bluegrasses collected and selected include the European varieties Fylking, Baron, Aquila, Parade, Sydsport, Cheri, Birka, Enmundi, and Rugby. U.S. varieties collected and selected include Warren's A-20 and A-34; Glade, a shade tolerant bluegrass found by Reed Funk in an Albany, NY lawn; Ram I, which Green Section director Al Radko and Superintendent Ernest Brown found on his golf course in Maine; Scenic, picked out of a field of Merion by seed grower Otto Bohnert; and Newport, found by extension specialists in Oregon.

The selection process continues as an important contributor to new Kentucky bluegrasses. As the germ plasm base is expanded, the number of possible hybrids increases. From selections processed through Rutgers, Funk's team was able to develop the hybrids Adelphi, Bonnieblue, Majestic, America, and Bristol. Rutgers has been involved with the selections Glade, Touchdown, Columbia, Plush, and Brunswick.

O.M. Scott & Sons has developed the hybrid Merit and the selections Vantage, Victa and Windsor.

Dick Bailey, formerly a partner in Turf Seed and now working for Jacklin, found the selection Shasta out of a field of Pennstar. Shasta is considered a bluegrass specifically for the Northwest. Pennstar was a selection by Pennsylvania State. Sodco is a selection developed at Purdue.