

# CULTIVAR PERFORMANCE IN SOD BLENDS AND MIXTURES

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The modern-day sod grower not only must be a good businessman, but he should have sophisticated appreciation of trends within the industry. One trend gaining momentum is the planting of top-flight proprietary cultivars, marketed as seed of exceptionally high quality ("sod quality" is the watchword for premium quality seed in the trade). With a wealth of proprietary cultivars from which to choose nowadays, blends (multiple cultivars of a single species) and mixtures (multiple species) are more and more employed. In the Chicago area, perhaps nearest thing to birthplace for the modern sod industry, Ben Warren confirms that almost all sod is blended today, although not many years ago it consisted almost entirely of a Merion monoculture.

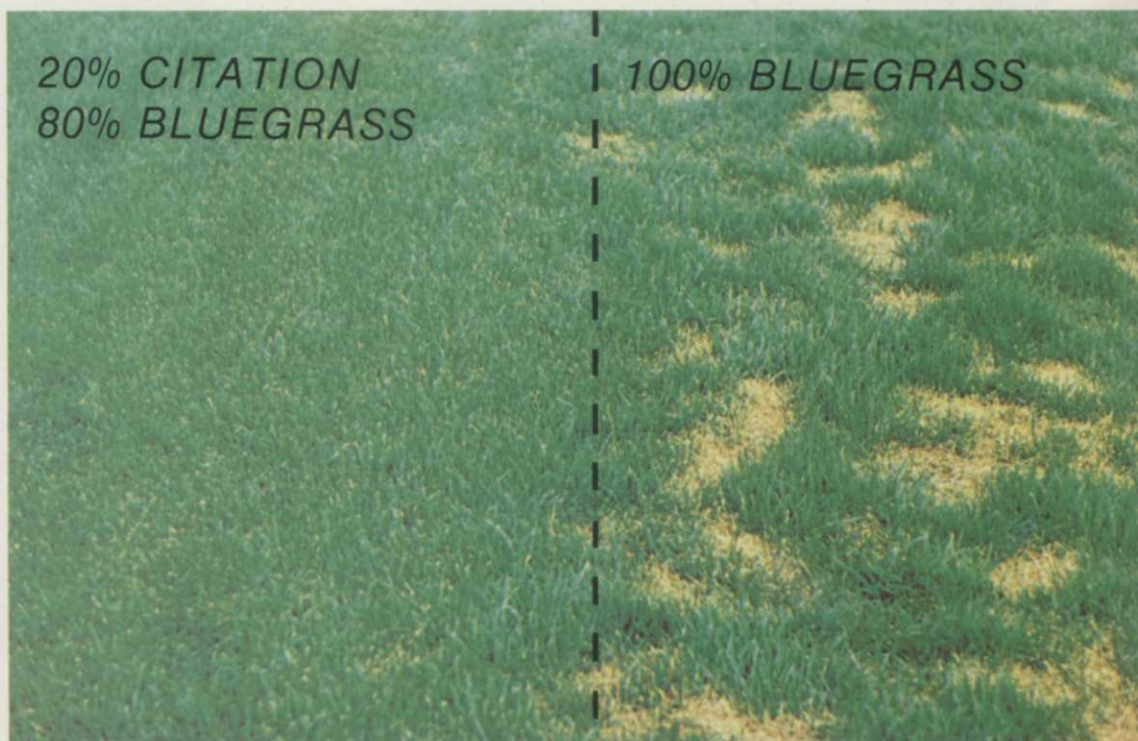
Both artistry and practicality are involved in sod production; combinations must reflect costs, but even more so performance of the end product. While most sod purchasers know rather little about individual lawngrass cultivars, they are appreciative of sod quality. Sales advantage does accrue from the publicity constantly being accorded the new proprietary cultivars. Thus some "pull" results from demand for elite grasses, although equally important is the "push" provided by sod growers wishing to demonstrate leadership. In any event, no longer is there only Merion, but rather a swelling list of topflight cultivars (table).

## The blend and mixture concept

Utilizing a diverse assortment of genetic strains for turf is not a new idea. Indeed, nature has employed a mixture of species since time immemorial in her native prairies. And for years seedsmen have combined species for home lawn seeding, better to provide some grass suited to varying conditions, knowing that the typical home owner is not expert on what to choose specifically. Thus there has been some ryegrass for quick cover, some fine fescue for shade, along with bluegrass as a sod-forming basic. Independent opinion from college extension has always backed this idea, in realization that a monoculture is difficult to maintain without professional management. Throughout Europe mixtures are standard for seeding wear-tolerant athletic fields, and reports abounded at the most recent International Turfgrass Research Conference on mixtures and blends. Thus theory and practical results seem to concur, and lawnseed mixtures enjoy widespread usage.

As demand for lawn quality increased, conflicting eddys occurred in the stream of progress. Monocultures of elegant types, especially Merion, became "high fashion", although they are the most difficult to keep impeccable. Style called for uniformity, practical wisdom for diversity! Old-time "common" grasses carried a good measure of genetic variability within them, harvested as they

**Research** by Jacklin Seed Co. and Turf Seed shows some evidence of disease reduction by including perennial ryegrass in a bluegrass mixture.



were from an assortment of locations and biotypes. But a single selection, chosen for especial elegance and perpetuated apomictically (i.e. almost all seeds carrying the same heredity as the parent plant), risked an epidemic from any weakness that might surface. A new strain of disease, for example, could spread like wildfire, wiping out the population. Dr. A. J. Turgeon of Illinois, in his presentation to the Third International Turfgrass Conference in Munich in 1977, pretty well sums up prevailing opinion.:

"Combining different turfgrass species and cultivars provides a turf with a broader genetic base than where single cultivars are planted alone. The presumed benefits of mixtures and blends include: better adaptation to local environmental conditions and a reduced potential for disease development. The disadvantages are: reduced uniformity of the turf and the eventual dominance of one component grass in some cases."

Of course the solution has encompassed a two-fold approach. First of all, newly bred varieties are screened for tolerance to commonplace ills. Thus modern cultivars are by and large not only better-looking, but more disease-resistant, denser, lower-growing, and all-around better adapted for lawns than were the old pasture-type common grasses. Secondly, two or more cultivars (as well as mixtures of species) are mechanically blended to introduce genetic diversity. It is not difficult to come up with compatible cultivars which give the illusion of single-strain monoculture, but which carry a goodly degree of assurance against epidemic disease or other threats to performance. It seems as if the future lies in this direction for the sod industry.

### **Practicality of operations**

Theory favoring blends and mixtures is well and fine, but a sod grower needs to know just what combination is best for his particular operations. Hard and fast answers are few and far between. Even where a cultivar is well known, as with Merion, slight changes in soil, environment, or weather can materially alter outcome. I recall the early experiences at Rutgers University when Merion and Fylking bluegrasses were planted in combination. With adequate fertilization, aggressive Merion seemed on the verge of squeezing unaggressive Fylking out of the stand, — until along came stripe smut and turned the tables. It well may be that if two cultivars are so very much alike as to be all but indistinguishable, that in time one will drive the other out of the population (a principle of ecology, the law of competitive exclusion, states that two quite similar organisms cannot co-exist indefinitely in a stable environment). Under standardized lawn maintenance perhaps the greatest advantage from blends comes in the initial years, after which the grass population will become dominated by one or another cultivar that has proven supremely successful under prevailing conditions? But since we can't predict which cultivars will triumph any better than we can foretell the weather or chance of new strains of disease, it makes sense to start a "full field" of candidate grasses, letting survival-of-the-fittest make the decisions.

Turf experts attempt to recognize cultivars for their compatibility in blends. Ordinarily, it would seem inadvisable to combine an aggressive cultivar with an extremely weak competitor. Michigan State experts recommend for blending only "strong" cultivars that resist all diseases (viz. Adelphi, Majestic, Touchdown bluegrasses, for example). New Jersey recommendations call for at

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least one cultivar in a bluegrass blend to have leafspot and stripe smut resistance. But I am amazed constantly how much of a secondary grass seems to show up when a dominant one gives ground, either seasonally, or because of unforeseen environmental changes. As a matter of fact I wonder whether even the experts can be sure of distinguishing one cultivar from another in a mixed turf; sometimes it is relatively simple, as with cultivars that green up differentially in early spring or exhibit differing morphology at a particular time. But when the whole population is growing lushly and being regularly mowed, I myself am seldom sure in making stand counts. It is often difficult to distinguish even between species (I remember trekking a golf course some years ago with one of the most eminent turfmen of the times, who could not say what species we were examining on a particular fairway!).

Certainly, in compounding blends and mixtures, one looks for grasses that offer complementary features. Should a cultivar be sensitive to cold, drought, harsh mowing, or whatnot? It is well to have others present not so sensitive to that particular factor. VPI utilizes this approach in the mid-Atlantic region, even calling for at least ten percent common bluegrass to supplement the improved cultivars in case low maintenance should prevail. New Jersey (Rutgers) suggests for park-type turf 60-75% bluegrass (including at least two improved cultivars), 10-20% fine fescue, 10-20% "turf-type" perennial ryegrass. Indeed, there is some evidence that certain grasses may buoy others. Jacklin research has noted that Citation perennial ryegrass sometimes helps restrict disease on a bluegrass component. Dr. Meyer, at Turf-Seed, has noticed that having bluegrass with perennial ryegrass reduces incidence of red thread and fusarium! Of course all risk can't be avoided simply by planting a blend or a mixture, for inadvertent weather changes and other unpredictables are sure to make a mockery of the best laid plans



(Murphy's law, — if anything can go wrong it will, — applies to turfgrass culture as well as to other endeavors).

Each sod grower has to gain experience with seeding formulae suited to his operations. We have noted that a cultivar may be quite aggressive under certain conditions, but not under others. For example a Touchdown Kentucky bluegrass may withstand low mowing especially well, or a Nugget bluegrass make a superlative turf in northerly locations where dollarspot is at a minimum. Certain strengths can be found in any cultivar; after all, cultivars were bred for superiority of at least certain characteristics. Even if a cultivar is eventually dominated by others, it is not "wasted" in the seeding mixture. The game is "survival of the fittest", and what if fittest under one circumstance may be entirely different from that under another mode of care or in another location. Which of a series of similar cultivars is "carrying the ball" is of no great concern in establishing sod. Just so long as grasses of good pedigree are planted nothing unsightly will crop up, and the sod will perform strongly.

### Some particulars

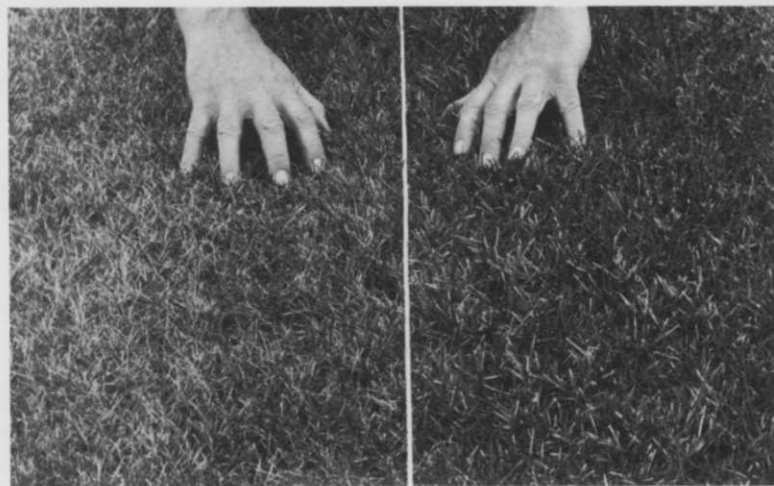
The differences between species in a mixture are, of course, more profound than those distinguishing cultivars. But, again, it is not always possible to predict which species will dominate. I remember a number of years ago at the University of Rhode Island, two identical seedings were made on opposite sides of a walkway, the only difference being that one side had the fertilizer raked in, the other not. In one case bluegrass dominated, in the other fine fescue! On the Lawn Institute grounds

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we have from time to time seeded bluegrass-fine fescue combinations, and for no very apparent reason end up sometimes with a predominately fescue population, other times with one almost entirely of bluegrass. Sowings of Fylking bluegrass, Manhattan ryegrass and Jamestown fescue were made across contiguous background seedings of Glade and Majestic bluegrasses. Both Glade and Majestic have remained low and very attractive by themselves (seasonally there are some differences), have blended well with Fylking, have somewhat dominated the fescue, but have been dominated by the ryegrass. Under other conditions I am sure that results could differ dramatically?



**Turf on both sides** of cord received exactly the same care. The grass on the right is a hybrid of the Nugget on left. Photo taken in late March in Oregon.

Dr. Blazer, of VPI, believes strongly in the influence of management. With a mixture containing ryegrass he advocates quick initial mowing to keep the ryegrass from shading slower, smaller bluegrass (he would also restrict the amount of ryegrass in the mixture). He believes that ryegrass grows at lower temperatures than other species, so mowing should begin early and continue late in the season to help offset ryegrass dominance. He notes how bluegrass profits from cooler temperatures, abundant nitrogen, and restrained watering, as compared to many summer "weeds" (he utilizes clover as his example, but the analogy would apply equally well to crabgrass and other hot weather species). He has enabled bluegrass to conquer quackgrass simply through regulation of mowing height. Engel, in New Jersey, notes that irrigation of bluegrass-fescue combinations tends to eliminate the fescue. In the benign coastal climate of Santa Ana, California, all combinations of bluegrass-perennial ryegrass had the same appearance after some months, no matter the proportions sown.

One doesn't have to be an ecologist to realize that height of mowing, timing of fertilization, irrigation regimen, soil pH, and so on, can all influence which species in a seeding mixture will gain dominance. The same seems true for cultivars. Penn State research (Sheffer, Watschke and Duich) has shown variable bluegrass cultivar response to changes in mowing height. Certainly Dr. Murray's (USDA) investigations indicate differential adaptability of bluegrasses to strong acidity. While it is unlikely any sod grower would fail to adjust pH to a favorable near-neutral stance, it might be reassuring with sod sold in acid-soil regions to know that cultivars such as Fylking, Glade, Plush and Ram I are present, — bluegrasses which are especially tolerant of acidity.

A pretty fair national dossier on the more prominent cultivars results from ratings in various regions. This affords a clue as to what to expect, even if not certainty. One impressive piece of direct evidence favoring blends over monocultures comes from the Rutgers "Blend-38" sowing,



Late winter photo shows disease damage to common bluegrass and resistance of improved Fylking.

in which thirty-eight bluegrasses were combined. This planting has consistently given above-average performance, and, more significantly, is one of the few cases where improvement continues with age. In another corner of the bluegrass belt, Dr. Portz, of Southern Illinois (Carbondale), similarly finds blends superior to individual cultivars in his region.

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Comparing ratings of combinations against the individual cultivars can be instructive. In general the combinations rate better, although occasionally the reverse is true. At Rutgers, using a 6-year average, combination blends of bluegrass rated slightly higher than all components individually. In one case Adelphi-Glade (6.8) was better than Adelphi (6.7) or Glade (6.3) alone. Nugget-Glade (6.6) was superior to Nugget (5.3) or Glade (6.3) alone. A different Nugget-Glade planting (6.8) was better than Nugget (5.3) or Glade (6.5) individually. Adelphi-Fylking (6.3) outscored Fylking (5.9) but not Adelphi (6.7), — Adelphi-Fylking-Merion (5.5) was much better than Merion alone (3.6), but including Merion lowered the Adelphi-Fylking standing. A Nugget-Park combination (3.7) didn't help Park (3.5) much, but did drag down Nugget (5.3). In Tennessee Merion-Baron, and Merion-Pennstar combinations were superior to any of the cultivars separately.

Fortunately, most cultivars are broadly tolerant and well adapted to a wide range of conditions. But rapid production of marketable sod, and good performance of that sod after sale, requires that its

needs not be neglected. How turf is managed is still of monumental importance, no matter the cultivars planted. A well prepared soilbed, consistent irrigation after transplanting, fertilization, considerate mowing, and occasional help with pests, are not too much to ask of a turf custodian.

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#### Commercial considerations

It is apparent that the new proprietary turfgrasses offer considerable opportunities, not only for superior sod, but for promotional recognition. Advertising and publicity sponsored by proprietors elicit cognizance of top cultivar names. One has only to glance through the advertisements in magazines such as this to realize how far-reaching are these promotional efforts. Response is strong among leading horticulturists, who in turn influence others through articles, columns, and everyday leadership. Lawn service organizations, though seldom involved with planting lawngrass, are an increasingly potent force for spreading basic information and varietal acclaim.

Kentucky bluegrass remains backbone to the sod industry, except for the deep South where St. Augustine and other warm-weather species may be offered. No better sod-forming species than bluegrass can be had; its roots and rhizomes knit a sod of remarkable strength. Some cultivars yield sod of slightly greater shear strength than others, but changed conditions generally overshadow natural differences. Experience has clearly shown that a little bluegrass is sufficient to bind a great amount of bunchgrass or species which rhizome weakly (e.g. Chewings fescues, Michigan; tall fescues, Virginia-Maryland and southern Illinois). The length of time necessary to mature a sod will vary with the climate; it may take two growing-seasons in the Rocky Mountain states, but as little as a few months in California flatlands.

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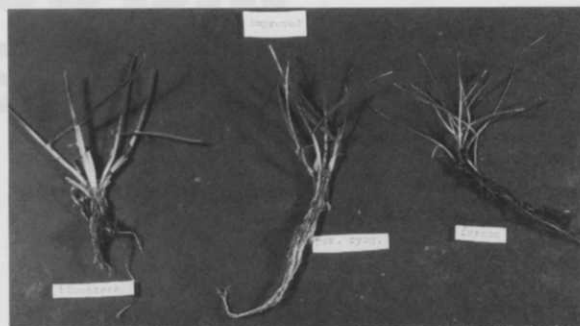
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For the most part the sod industry seems to have resisted inclusion of perennial ryegrasses in sod, a bunchgrass not strongly sod-forming. But from the business standpoint perennial ryegrass would seem to have potentiality for speeding up sod maturation, since the species sprouts and grows so rapidly. Now that many sod growers are turning to woven nettings to hold sod together, so that it may be lifted and sold at an earlier stage of maturity,

we may see greater interest in such "turf-type" perennial ryegrasses as are listed in the table. These cultivars are just as attractive as is Kentucky bluegrass, and as was mentioned may be synergistic in preventing disease. In order to obtain adequate bluegrass representation, perennial ryegrass must be limited in the seeding mixture, and the stand managed to restrain it from overwhelming slower bluegrass. Seeding rates for sod generally

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run about 80 pounds to the acre. Higher rates could provide greater density more quickly, and especially with larger-seeded cultivars such as perennial ryegrass (with only a fifth as many seeds to the pound as most bluegrasses have) seeding



**Improved bluegrasses** for basic strength, perennial ryegrass for quick establishment, and fine fescue for infertile-shady spots.

rates may require proportionate increase. No material difference in fertilization should be required with differing blends and mixtures, fertilization needs being tied more to soil conditions than to kind of grass or seeding rate.

All in all it does appear as though the sod industry has reached a vantage point from which it can benefit broadly by utilizing the new proprietary cultivars for blends and mixtures suited to various regions. Such sod should have enhanced sales appeal. Cultivars like those listed in the table would certainly seem worth considering.

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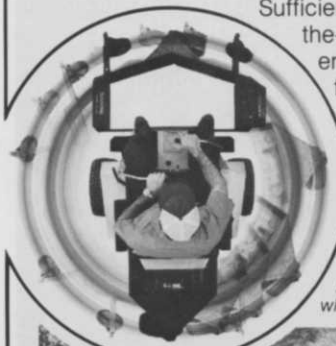
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**TABLE 1 — Examples of modern-day lawn cultivars** that might be used for sod blends and mixtures. They are specially selected or bred for particular uses, tend to be lower-growing, more attractive, and less prone to disease than common lawngrass.

- Bluegrass (*Poa pratensis*)** — Easily cared-for, best sod grass; prefers good soil; modern cultivars tolerate most diseases.
- Adelphi — dependable, with all-around merit
- Arboretum — persistent low-maintenance "old-fashioned" selection
- Baron — vigorous in early years, widely adapted and much used in mixtures
- Birka — attractive, persistent under low maintenance
- Bonnieblue — moderately competitive, high quality
- Enmundi — rates well everywhere, seems compatible
- Fylking — non-aggressive beauty in dependable supply
- Glade — good general qualities, plus shade tolerance too
- Majestic — especially decumbent, not too aggressive and blending well
- Merion — long the standard; new hybrid in the offing
- Nugget — very dense, endures shade, stronger northward
- Plush — broad adaptability with heat and drought tolerance, gaining acclaim
- Ram I — good persistence, excellent in blends
- Sydsport — robust, vigorous, of good general quality
- Touchdown — high-rating, unusually dense under low mowing

- Fescues (*Festuca rubra*, in variety)** — Great in shade, poor soil and low maintenance.
- Banner — dense, multi-clone polycross from eastern USA
- Chewings bloodlines
- Ensylva — spreading fescue, low-growing and well-adapted to mixtures; from Holland
- Highlight — elegant beauty in a dense Chewings variety; bred in Holland
- Koket — enjoys high ratings; a strong performing Chewings type from Holland
- Ruby — a spreading variety, much used in bluegrass mixtures; from Holland

- Perennial Ryegrass (*Lolium perenne*)** — Fast-starting and aggressive, attractive cover quickly.
- Blazer — one of the newer releases showing much promise
- Citation — an excellent "turf type" polycross with muted aggressiveness
- Derby — polycross with all the good features typical of modern releases
- Diplomat — a complex polycross from Rutgers with excellent credentials
- Fiesta — a promising release similar to Blazer
- Manhattan — outstanding, hardy, pace-setter for "new breed"
- NK-200 — unusual winter-hardiness adds to general attractiveness
- Omega — classical elegance combines with good performance
- Pennfine — an aggressive polycross from Penn State rating among the best
- Regal — a fine new polycross in the image of Derby
- Yorktown — an excellent all-purpose polycross of "aristocratic" mein