

Tetraploid Ryegrass

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New grass variety perfect for overseeding bermudagrass

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Trials
conducted
by the
University
of Arkansas
reveal
tetraploid
perennial
ryegrass to
be nearly
identical
to normal
ryegrass in
management.

It's a term that's starting to appear more often in the turfgrass industry: tetraploid. The most prevalent use of the term is with tetraploid perennial ryegrass, a new type of grass variety, currently commercially available, which is becoming an attractive alternative in the overseeding of bermudagrass. In particular, these ryegrasses have been found to be valuable during the spring transition, when their peculiar characteristics make them disappear more quickly as the weather warms up.

"Ploidy" is a term common among turfgrass breeders, according to Mike Richardson, professor of turfgrass management and physiology at the

University of Arkansas, and it is nothing new. It refers to the chromosome configuration of a species. A normal plant is diploid, with a set of chromosomes from the male and a set from the female, but plants can be triploid, tetraploid or even hexaploid, with three, four or six sets of chromosomes.

Plant breeders manipulate chromosome configuration to produce new characteristics that might benefit users, Richardson says, a prime example being the triploid chromosomes of the Tifway hybrid bermudagrasses. The varieties have specific quality characteristics, as well as the benefit to suppliers of being infertile and unable to be duplicated from seed. The tetraploid perennial ryegrasses, most still experimental, have four sets of chromosomes that originally were induced through the use of chemical mutagens.

"Typically, what that does in most crops, especially the first time you do it, is to increase the vigor of those plants," Richardson says. That has been the case for some grass species that were developed as forage plants, which was desirable because of their ability to produce more biomass for livestock feeding.

In turfgrass, large biomass production may have benefits as well as drawbacks, but the specific varieties being developed for this industry have an interesting weakness that has proven beneficial. Although many of their other traits are similar to those of regular diploid perennial ryegrasses, they have markedly less heat tolerance. Normally, that would be a drawback in a grass, but not if it is grown only in the winter and the manager wants to transition out of it quickly in the spring.

Spring transition has been a primary bugaboo of managers of overseeded lawns, sports facilities and golf courses for decades because of the difficulty in bringing the warm-season species back for summer usage as the ever more vigorous perennial ryegrass varieties hang on to life. Tetraploid ryegrasses, Richardson has found in his trials in Arkansas, can serve as adequate overseeding species in the winter and then quickly fade out at the onset of the heat of summer.

"So for turf, where they focused their idea was in the fact that if it still had turfgrass qualities, but lower stress tolerance, we could use it in an overseeding situation." Richardson points out that the variety he has worked with proved to be a little more vigorous and upright early in the fall growing season, which can quickly give a good, lush lawn or fairway, but it also died back readily in the spring just when the bermudagrass began to grow in.

Richardson has looked at tetraploid perennial ryegrass (*Lolium perenne*) in test plots in one trial in Arkansas, Alabama and Arizona, comparing it to other overseeding options like diploid perennial ryegrass. One of his collaborators in this trial was Kenneth Hignight, the plant breeder with Nextgen Turf Research in Oregon who developed the variety tested. In addition to this test, two of Richardson's graduate students, Ryan Rolfe and Josh Summerford, have led several studies looking at tetraploid perennial ryegrass

qualities ranging from management to herbicide resistance. Also, the turfgrass group currently has test strips planted across the University of Arkansas practice football field.

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COURTESY OF
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SEED.*



Pennington Seed's T3 tetraploid perennial ryegrass is useful for overseeding both fairways and fringes where an easy spring transition is desired.

The findings overall—from overseeding studies conducted with all kinds of bermudagrass ranging from top sports hybrids to common seeded types—have indicated that the tetraploid perennial ryegrass is indeed a vigorous grass as it germinates, but later in the winter will match up fairly well in growth pattern and color with the diploid.

Richardson has observed one drawback: it doesn't tolerate heavy traffic quite as well. It also is very tolerant of salinity, he says, and has mowing characteristics that are very similar to the diploid. In addition, the tetraploid reactions to both common turfgrass herbicides and fertilizer regimes were very similar to the diploid reactions. Therefore, turf management for tetraploid ryegrass apparently will require nothing out of the ordinary, and in some situations it can be mowed short in high-use areas and allowed to grow out in fringe areas.

As the spring progresses, the tetraploid variety reacts very strongly. Richardson isn't positive that it is a reaction specifically to heat, but the tetraploid definitely has a lower survival rate, which results in a higher percentage of bermudagrass emergence as the ryegrass quickly fades. In addition, the tetraploid's summer survival rate, as measured by reemergence in the autumn, is much lower than the diploid's and, in fact, can be zero. In tests it yielded the most complete transition back to bermudagrass.

"In many areas of the country they overseed a lot of lawns for winter color," Richardson says, and this may become a common usage as turfgrass managers learn there is a grass that will allow them to get back to their warm-season grasses quickly in the spring. He hasn't seen it used in other species, such

as St. Augustinegrass, but he doesn't rule it out, and the overseeding of lawns could be a more valuable market than golf courses.

Richardson says he has not run a cost analysis, but feels that it would cost much less to achieve transition with the tetraploid perennial ryegrass than with the normal diploid. In the first place, herbicides are often necessary to knock back the normal overseeded ryegrass, and they might not be needed on the tetraploid. There is one element that increases costs with tetraploids, however. Richardson says that the seeds are larger than diploid seeds, which could mean that an increased seeding weight would be necessary. That would be a minor cost far outweighed by other savings.

Agreeing with this assessment is Russ Nicholson, agronomist for Pennington Seed in Madison, Ga. He has worked with Richardson and his collaborators to provide data for Pennington's T3 tetraploid perennial ryegrass seed. He not only verifies that the sports facilities and golf courses that have used T3 are getting a smooth transition back into bermudagrass, they are also doing it without herbicides, such as Revolver, that are often needed to kill off the ryegrass.

"It's a 100 percent transition," Nicholson says, as measured in the autumn as the summer bermudagrass goes dormant. In general, there are no new sprouts of ryegrass when the tetraploid T3 is used for overseeding the previous winter.

Nicholson says that T3 will be experiencing its third year in commercial sales this year, and the seed has become popular, basically selling out each year. It is in demand in the southern tier of states below the transition zone, and one of the primary uses has been in the overseeding of athletic fields for fall sports. Those fields need to be able to return to bermudagrass as soon as possible in the spring in order to establish strong turf for the fall.

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COURTESY OF
PENNINGTON
SEED.*



University tests reveal that the response of T3 to fertilizers and herbicides is similar to that of normal diploid ryegrass.

A surprising demand may be building in northern states, and that is in perennial ryegrass blends for a variety of uses not related to overseeding. For turf managers who want a quick emergence, the tetraploid T3 blended with diploid varieties will provide an early and vigorous establishment as well as good summer populations. Citing Richardson's research and his own experience with T3, Nicholson notes that cultural practices and management will be basically the same as for the other varieties in the blend. Thus far, it has not been used for the sod market.

One benefit of overseeding in the South with a ryegrass that completely dies out in the summer heat, Nicholson says, is that it is a boon to the long life of the bermudagrass stand. When normal diploid perennial ryegrass is used, it too often competes with the warm-season grass throughout the year and gradually thins the stand.

Nicholson says that right now, as far as he knows, T3 is the only variety of tetraploid perennial ryegrass available commercially, and it can be purchased all over the country from distributors that sell Pennington seed, but Pennington is also in the process of developing other varieties.

"There may be some other situations where this (turfgrass) could fit in," Richardson says, because any new variety that has good performance and special traits, such as early vigor and easy transition, can find niches.

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