



Understanding

turfgrass species for athletic fields and rec areas

Turfgrass selection is perhaps the most important part in developing and maintaining a healthy and vigorous turf stand. There are many choices available to us today and the planning process cannot be underestimated. Over the years plant breeders have made significant advancements in the development of cultivars within cool-season species like Kentucky bluegrass, perennial ryegrass, fine fescue and tall fescue. During this time seed companies have consistently released varieties with improved growth characteristics, turf quality, resistance to drought, insect, disease and other important benefits. Today the turf manager faces the ever difficult task of making the decision of “Which variety or varieties are right for me?”

In going through the decision process for new construction, renovation or maintenance (overseeding), it is important to review all the elements in which turf has to perform. The following points should be a part of the planning and selection process of the appropriate species and cultivars for the intended use.

Species selection: environmental factors

- Type of sport or use: football, baseball, soccer
- Physical characteristics: soil or sand, climate and environmental stresses and concerns, drainage.

- Management issues: wear (goal mouth, center of field, sidelines)
- Repair and maintenance: time of repair and renovation (during difficult times, during play)
- Maintenance budget
- Maintenance: number of staff, type and number of equipment, cultural practices, irrigation system.
- Inputs: fertility, pesticides, irrigation, topdressing material, seed, etc.
- Other uses: concerts, events

Species selection: turf characteristics

- Growing environment: full sun or low light (stadium facilities)
- Wear tolerance, recovery period
- Establishment, turf density
- Turf strength, lateral stability, stable footing
- Disease resistance and winter persistence
- Heat and drought tolerance
- Other: salt tolerance, weed control, etc.

With ever increasing environmental, climatic and public demands while maintaining the need for high quality turfgrass athletic and recreational fields, seed varieties today offer the turf manager many benefits, agronomic stability and flexibility.

Specific areas are targeted for collecting where plants have been growing and surviving for generations under harsh conditions.

ty. Understanding the major and subtle differences between varieties within a species category is important in the selection process. For example Kentucky bluegrass is highly apomictic, meaning that plant alteration and variety improvement is a difficult and complex process, generally resulting in small differences in agronomic characteristics and range of genetic diversity within varieties categorized in the same 'Type' such as Midnight, Aggressive, America and Compact, to name a few. Other major cool-season species such as perennial ryegrass and fescue (tall and fine) are also organized into types offering different characteristics for specific use.

When selecting a new seed variety from a proven seed company with a well-established development and breeding program, you can be sure that the varieties have been thoroughly field tested and evaluated to produce a broad genetic base. The National Turfgrass Evaluation Program (NTEP) testing conducted at multiple locations

Adding perennial ryegrass will speed up establishment assisting with natural weed control and increasing disease resistance

and through independent university sites across the US and Canada, data confirms the improved qualities needed for producing a high quality turf. If the variety has no traceable testing history then it is not worth looking at.

Most importantly, parent plants for new varieties have survived the test of time growing in different locations. Over the years well established breeding programs have selected turfgrass clones from hundreds of locations across North America and other regions around the globe. During a site visit the plant breeder will identify and collect desirable turf samples. Plants identified for collecting have noticeable characteristics that would be beneficial to incorporate into breeding project, leaf textured, density, vertical growing, specific disease and insect resistance, drought tolerance, salt tolerance etc. Specific areas are targeted for collecting where plants have been growing and surviving for generations under harsh conditions.

The collected plants are brought back to the research farm for

evaluation. Collected plants, commonly referred to as "germplasm," are added to the already established collection. After a few years of evaluation only the best 1-2% of all plants collected will be considered for use in breeding a new variety. Ninety eight to ninety nine percent of collected plants will be discarded. Only the best performing plants will be used for developing a new variety. Typically, it takes 10-12 years to breed and commercially release a new improved variety for use on professional turf surfaces.

For example, with the breeding and development of a new variety, existing plants from proven varieties are used. Additionally, new clones or germplasm are crossed with a selection of the new material that has been identified for improved agronomic qualities and characteristics (disease resistance, drought tolerance, vigorous growth, wear and recovery, uniformity, density etc.). This would mean that the new variety would have a broader genetic base developed using 20 parent plants and therefore be superior and less likely to suffer from catastrophic failure. This summary of the detail and investment that goes into the development of a variety give turf managers confidence that there are significant agronomic advantages and benefit in working with an improved seed variety. NTEP.org and private independent research data is a good reference point for identifying proven new varieties in the Kentucky bluegrass, perennial ryegrass and fescue species.

Understanding Kentucky bluegrass cultivars

Kentucky bluegrass is the primary species for athletic fields and recreational turfgrass use in North America. With proper management forms a fine-textured, high quality, long lasting turf stand. The rhizomes of Kentucky bluegrass increase stability, improve traction and provide good recovery to damaged and bare areas. Kentucky bluegrass can be used as a monostand, but to maximize the genetic base it is advantageous to select a polystand or blend of types.

It first must be understood that Kentucky bluegrass in contrast to all other cool-season turfgrasses, is highly apomictic. This means that almost every seed (usually over 95%) is an identical copy of the mother plant, which means that there is very little genetic diversity within a variety. This is because most varieties fall into similar groups or classifications. To maximize diversity it is best to blend together similar varieties from different categories. For example there is little agronomic benefit for an athletic field to be seeded containing five varieties similar to Midnight. The best approach would be to blend top varieties able to tolerate very low cutting heights from within the "Compact Elite," the "America Elite," the "Aggressive" type and possibly within the "Early Spring Greening" categories.

Improved drought tolerance of Texas hybrids

Recently much attention has been given to the development of heat and drought tolerance in Kentucky bluegrass. Known as hybrid bluegrass (Texas hybrids) these new cultivars have proven

to perform equivalent to tall fescue varieties in a number of different trial locations. Other studies have also concluded that under limited irrigation cycles Texas hybrids perform better and maintained greater turf quality than tall fescue cultivars. In the same study tall fescue had higher water use. Along with improved heat and drought tolerance other benefits, extensive rhizomes for improved wear and recovery, lower water usage and good performance under lower maintenance.

Ryegrass a good companion

Perennial ryegrass is a fine textures species with the potential to develop into a high quality, hardwearing turf stand. It's fast establishing characteristics combined with high quality, color, texture and close mowing tolerance make perennial ryegrass ideal for athletic sports field use. These qualities are why perennial ryegrass is best used in a sports field seed mixture as a companion to Kentucky bluegrass. It is also important to remember that by blending the two species genetic diversity is increased maximizing each species strengths and weaknesses. Adding perennial ryegrass will speed up establishment assisting with natural weed control and importantly increases disease resistance and is resistant to different diseases than Kentucky bluegrass such as necrotic ring spot.

Perennial ryegrass is also endohpyte enhanced that improves tol-

erance to insects such as billbugs. Mix with Kentucky bluegrass the ryegrass component ranges from 10- 50% dependent on application. The percentage of perennial ryegrass used in a mixture should be based on the desired time period from time of seeding to planned use. If the establishment period is limited then a greater percent of ryegrass is recommended.

Intermediate ryegrass has been introduced over the past 8 years and offers some excellent benefits. Based on the principals of an annual plant Intermediate ryegrass has been develop to produce a high quality turf stand similar to perennial turf type ryegrass. Characteristics include germination under cool soil conditions, rapid establishment and improved turf quality over traditional annual ryegrass. Intermediate is an excellent overseeding tool for high traffic areas and is less competitive in a mixture with Kentucky bluegrass than perennial ryegrass.

Fescue offers alternatives

Turf-type tall fescue has traditionally been used on non-irrigated low-maintenance sports fields in transition zone and cooler climates. Tall fescue has two limiting factors that need to be considered; improved disease resistance and poor establishment. Generally speaking tall fescue is very wear tolerant once fully established, but getting tall fescue established before traffic and wear is

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*This chart is for general observation only. Individual performance of varieties within each classification may vary widely and require comprehensive regional test results to determine the best performance. To see chart in its entirety please visit www.pickseed.com.

Type	Description	PICKSEED Offering	Comparable Varieties		
Compact	* Low, compact growth	ALPINE	Argos	Indigo	Glade
	* High quality turf	MOONSHADOW	Amazon	Moonlight	Ram 1
	* 1/2 inch cutting height	INDIGO	Chicago II	Nugget	Golden Nugget
	* Excellent resistance to Leaf Spot	EXPLORER	Blacksburg	P-105	Amazon
	* Long Winter dormancy		Blackstone	Platini	Apex
	* Variable under summer stress		Conni	Broadway	Goldstar
	* Often purple winter color		Wildwood	Diva	Blue-tastic
			Ascot	Hallmark	Skye
			Blue Max	Casablanca	
			Apex		
Compact-Midnight	* Characteristics of compact type	QUANTUM LEAP	Barrister	Midnight	Beyond
	* Very dark green color	BLUE VELVET	Award	NuGlade	Rhythm
	* Late Spring green-up	GRANITE	Awesome	Midnight II	EverGlade
	* Good heat tolerance		Impact	Total Eclipse	Everest
	* Susceptible to Powdery Mildew		Liberator	Rugby II	Freedom III
	* Variable resistance to Summer Patch		Arcadia	Odyssey	Midnight Star
	* Many susceptible to stem and leaf rust		Courtyard	Absolute	Freedom II
			Midnight	NuDestiny	Alexa
			NuGlade	GINNEY	Blustone
Compact-America	* Characteristics of compact type	LANGARA	Showcase	Dybamo	Blue Knight
	* Finer leaf, higher density	AMERICA	Apollo	Unique	
	* Moderate Winter dormancy	MERCURY	Brilliant	Bedazzled	
	* Moderate Summer recovery		Bordeaux	Royale	
	* High Summer Patch resistance		Arrow	Boutique	
	* Resistant to Powdery Mildew		Mallard	Glenmont	
	* Good in shade		Sonoma	Kingfisher	
Aggressive	* Aggressive lateral growth	TOUCHDOWN	A-34	Northstar	Broadway
	* High shoot density		Baris	P-104	Durham
	* Very wear tolerant		Mystic	Cheetah	Fairfax
	* Quickly knit sod and repair		Brunswick	Julius	
	* May predominate in blend		Orfeo	Limousine	
	* Variable in other characteristics		Showcase	SR 2284	
BVMG	* High seed yields	CANNON	Abbey	Fortuna	Merit
	* Medium-good turf	CREST	Baron	Gnome	Famous
	* Stripe Smut susceptible		BlueChip	Goldrush	
	* Medium low growth		BlueStar	Clearwater	
	* Medium wide leaf		Marquis	Nassau	
	* Very stemmy turf		Dragon	Raven	
	* Poor Winter performance		Envicta	Victa	
	* Resistant to leaf spot				
	* Billbug susceptible				
			<i>* BVMG = Baron, Victa, Merit, Gnome</i>		
Shamrock	* Moderate Winter color	PARKLAND	SR 2100	Shamrock	Wild Horse
	* Good resistance to Leaf Spot		Atlantis	Brooklawn	
	* Good turf quality and sod strength		Champlain	Lakeshore	
	* Billbug susceptible		Moonshine	Champagne	
	* High seed yields		Durham	Mongoose	
	* Less stemmy than BVMG				
	* Strong rhizome development				
	* Summer performance variable				
Julia	* High turf quality	RAMPART	Avalanche	Julia	
	* High density		Ikone	Ulysses	
	* Good Summer performance		Caliber		
	* Very high wear tolerance				
	* Good Leaf Spot & Stripe Smut resistance				
	* Generally susceptible to Brown Patch & Dollar Spot except for Ulysses, Rampart and Avalanche				

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introduced is an issue. This characteristic also affects the ability of tall fescue to recover quickly after heavy wear. Recent developments have seen the introduction of tall fescue cultivars with rhizomes improving establishment and wear tolerance. Tall fescue performs best when combined with 5-10% of Kentucky bluegrass.

Fine fescue cultivars offer some good alternatives for non-irrigated athletic fields and recreational turf areas. Specifically the Red fescue family Chewings fescue, Strong red fescue and Slender red fescue are examples of fescue groups that can be used in low-maintenance situations. Improved chewings and red fescue have seen recent advances in traffic tolerance, improved heat and drought tolerance, germinate more rapidly, have excellent cool temperature growth (spring and fall) and perform well in shady locations. Improved fine fescue cultivars also have the additional benefits of endophytes and should be seed in a blend with Kentucky bluegrass and perennial ryegrass for best performance.

Endophytes offer significant benefits

The availability of endophyte improved turfgrass cultivars is an important part of Integrated Pest Management (IPM) practices that can help reduce inputs. Endophytes are fungi that have a symbiotic relationship with some grasses, spreading through seed infection. The presence of endophytes in turfgrass has been

demonstrated to provide many benefits including resistance to surface-feeding insects, increased disease resistance and increased stress tolerance. Currently the species of turfgrass with endophytes that are available on the market include perennial ryegrass, tall fescue, Chewings fescue, strong creeping red fescue, slender creeping red fescue and hard fescue. In some of these species, most cultivars available will have high levels of viable endophyte. Attempts have been made to find or introduce endophytes into other turf species such as Kentucky bluegrass but so far these associations have not been stable and have not led to marketable cultivars.

There are many factors to be considered in the construction and maintenance of an athletic or recreation field. Seed cultivar selection is one of many inputs that can impact the long-term success and quality of the turf stand. As outlined there are many different aspects that are critical in the selection of the proper turf grass species and cultivar for each specific turf site. Proper selection of turf cultivars can be the most important decision you have to make. ■

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Type	Description	PICKSEED Offering	Comparable Varieties			
Other	<ul style="list-style-type: none"> * Exhibits traits that are intermediate between groups * Additional study required to classify * CYNTHIA shows excellent Rust tolerance 	CYNTHIA	Allure	Freedom II	Bariris	
			BRONCO	Ascot	Yvette	Baritone
			Baronie	Jewel	Blue Ridge	
			Bartitia	Misty	Chelsea	
			Baruzo	Monte Carlo	Blackstone	
			Geronimo	NuStar	Lily	
			Canterbury	Rita	Markham	
			Cardiff	Seabring	Blue Sapphire	
			Chateau	Sodnet	Fylking	
			Chicago	Washington		
Compact						
Coventry						
Texas x Kentucky Hybrids	<ul style="list-style-type: none"> * Hybrids between Texas & Kentucky Bluegrasses * Heat tolerant * Extensive rhizomes * Drought tolerant with good recovery * Wear tolerant 	BANDERA (SPTR2LM95)	DuraBlue	Fire and Ice		
			ThermalBlue	Longhorn		
			Solar Green	Fahrenheit 90		
			Reveille	STR 2844		
Bellevue	<ul style="list-style-type: none"> * Medium growth and shoot density * Medium wide leaves * Excellent Winter color * Early Spring green-up * Stemmy in Spring * Moderate recovery from Summer stress * Good Leaf Spot & Stripe Smut resistance * Susceptible to billbugs 	BANFF	Bellevue	Freedom	Parade	
			Classic	Georgetown	Suffolk	
			Dawn	Haga		
			Parade	Trenton		
Mid-Atlantic	<ul style="list-style-type: none"> * Deep, extensive roots and rhizomes * Vigorous turf and medium-high density * High Summer stress tolerance * Early Spring green-up * Good Winter performance * Rapid recovery from disease * Leaf Spot susceptible except Preakness 		Eagleton	Plush	SR2200	
			Livingston	Preakness		
			Monopoly	Wabash		
			Cabernet			
CELA	<ul style="list-style-type: none"> * Better Spring green-up than compact types * Less stemmy than Bellevue * Good turf quality * Good Stripe Smut & Leaf Spot resistance * Variable Winter performance 		Adelphi	Jefferson		
			Challenger	Liberty		
			Eclipse	Rambo		
			*CELA = Challenger, Eclipse, Liberty, Adelphia			
Cheri	<ul style="list-style-type: none"> * Good turf quality * Medium low growth, density and leaf width * Good resistance to Stripe Smut * Good sod strength * Moderate resistance to Leaf Spot * High seed yields * Less stemmy than BVMG types * Moderate Winter dormancy 		Cheri	Serene		
			Cobalt	Sydsport		
Common Kentucky	<ul style="list-style-type: none"> * Midwest ecotypes * Erect growth and narrow leaf blades * Good Summer stress tolerance * May go dormant during Summer * High Leaf Spot susceptibility * Poor Winter color and performance * Early seed production * Good for soil stabilization and conservation 	KENBLUE PARK ALENE CACHE	Garfield	Moonstruck	South Dakota	
			Geary	Alley Cat	Voyager	
			Ginger	Blue Angle	Argyle	
			Greenly	Huntsville		
			Wellington	Piedmont		
			Ronde	S-21		
			Newport			
* Developed from Rutgers Turfgrass Proceedings and observations by Pickseed Canada Inc.					update: 2/16/07	