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Is Overseeding With Supina Bluegrass a Viable Option?

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Athletic fields are under significant stress during the playing season, which, in southern Ontario and most of Canada for that matter, is from the time the snow melts until it falls again. The predominate amount of play, however, is during the spring and fall months when most turfgrasses are slowly breaking from or entering dormancy. Play on already slowly growing grasses results in increased mortality and the appearance of thin or bare patches. These areas leave openings for opportunistic weeds to encroach on the field. A common practice athletic field managers employ to compete with weed invasion is overseeding desirable species into the turfgrass stand. The verdict is still out on which species are the best ones to use in southern Ontario as each have pros and cons (Table 1, page 13).

The verdict is still out on which turfgrass species are the best ones to use for overseeding in southern Ontario. Traditionally, Kentucky bluegrass has dominated, but what about supina bluegrass?

Overseeding Options

Traditionally, Kentucky bluegrass (*Poa pratensis*, which I will refer to as KBG), with its preferred dark green colour and ability to withstand traffic due to its rhizomatous growth habit, is used on athletic fields. Although KBG should be the predominant species chosen for establishing newly seeded/sodded fields due to its slow germination rate and the inability of seedlings to establish under trafficked conditions, KBG seed is not recommended as the primary species in overseeding mixtures.

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Previous studies have examined the use of perennial ryegrass (*Lolium perenne* L., subsequently referred to as PR) for overseeding into pre-existing fields. Both Elford et al. (2008) and Rossi (2004) found that frequent overseeding with high rates of perennial ryegrass could result in a more uniform stand with fewer bare ground patches and weeds. However, this practice may lead to decreased winter survival rates of the fields since perennial ryegrass is susceptible to extreme weather conditions. For this reason, there is merit in investigating other turfgrass species that could perform well under trafficked conditions.

Supina bluegrass (*Poa supina*) is native to the European Alps and has been bred...

Inside Features

Figure 5: Guelph Turfgrass Institute Irrigated Youth Soccer Fields (Photo: Peter Purvis)

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and used as a turfgrass in Germany since the 1930s (Stier, 1998). The German name Lägerrispe, which translates in English to "where the cows lay," reflects the ability of this grass species to withstand tremendous traffic pressures and still thrive (Sorochan and Rogers, 1998). *P. supina* is a turfgrass that has fallen out of favour in North America mainly due to its lime green colour and numerous dark seed heads in the spring as both of these characteristics are at odds with the aesthetic needs of sports field managers (especially in the United States).

With the changing attitudes towards turf management, *P. supina* appears to be an ideal candidate for highly trafficked and shaded turf areas. Supina bluegrass' growth strategy is what ecologists refer to as a competitive-ruderal. Competitive ruderal plants have a high capacity for biomass production and can quickly fill in a disturbed area within the plant community (Grime, 1977). Supina bluegrass tends to grow laterally with a dense canopy, while also producing numerous seed heads that enter into the soil seedbank and colonize other disturbed areas of the field (Sorochan and Rogers, 1998). Its aggressive, stoloniferous growth habit, relatively late fall dormancy and early spring green-up make it an ideal candidate for competing with early germinating spring weeds. One such weed, prostrate knotweed (*Polygonum aviculare* L.) is becoming a more common weed on athletic fields in southern Ontario.

Prostrate knotweed is an annual weed that is typically associated with areas of high traffic and compacted soils. Due to its low-growing prostrate growth habit and patch-forming long stems, it can be a tripping hazard causing unsafe playing conditions. This weed is particularly dominant because it begins to germinate early just as temperatures start to increase in the spring. This is where supina bluegrass comes in as a potential competitor for germinating prostrate knotweed seeds.

Expense & Future Potential

Supina bluegrass is relatively expensive seed, with an average price of $12-15/kg ($25-35/lb), as most of it is produced only in Germany. It is a small statured plant and requires different seed production systems than the typical system of the Pacific Northwest of the United States where most of our grass seed is produced. Currently there are only two cultivars of supina bluegrass available on the market, but recent research from Pecettie and colleagues (2011) has led to the recent collections of new germplasm from the Italian Alps. These samples are currently being stored and classified for increasing the genetic diversity of this species. This means that there is hope for future cultivar choices that may be more drought tolerant, darker green and/or more affordable.

Overseeding Trials

Currently there are two studies underway examining the efficacy of overseeding with supina bluegrass at the Guelph Turfgrass Institute. The first is examining the idea of companion overseeding which would allow a turfgrass manager to fill in the bare spots of turf with a fast germinating species (PR), while still being able to add in a more wear tolerant but slower germinating species over time (supina bluegrass). The second study is looking at the viability of overseeding solely with supina bluegrass and comparing it to perennial ryegrass on in-use fields in southwestern Ontario.

Table 1: Characteristics of grass species that can be used for overseeding in Ontario. (?) = Unknown or more evidence needed

Characteristics	Kentucky Bluegrass (Poa pratensis)	Perennial Ryegrass (Lolium perenne L.)	Supina Bluegrass (Poa supina Schrad)
Traffic tolerance: established	High	Moderate	High
Traffic tolerance: seedlings	Poor	Moderate	(?)
Vegetative reproduction	Rhizomes	None	Stolons
Self-seeding	No	No	Yes
Germination speed	Slow	Fast – 1wk	Slow
Cost of seed	Expensive	Inexpensive	Expensive
Spring green-up	Cultivar dependant	Cultivar dependant (?)	Early
Dormancy	Late	Early	Late
Colour	Dark green	Dark green	Lime green
Temperature tolerance	Good	Susceptible	Good

Figure 1. The SISIS wear machine developed by SISI and STRI is equipped with cleats on rollers. The rollers have differential slip in order to tear the turf and cause cleat damage, similar to athletes playing. (Photo: Alex Porter)

Figure 2. Plots having received (A) no overseeding, (B) overseeding once at full rate (1x/season) and (C) overseeding at 1/3 of the rate (3x/season) on June 20, 2010.

Figure 3. Plots having received (A) no overseeding, (B) overseeding once at full rate (1x/season) and (C) overseeding at 1/3 of the rate (3x/season). Last seeding date was September 14, 2010. Photo taken on October 12, 2010.

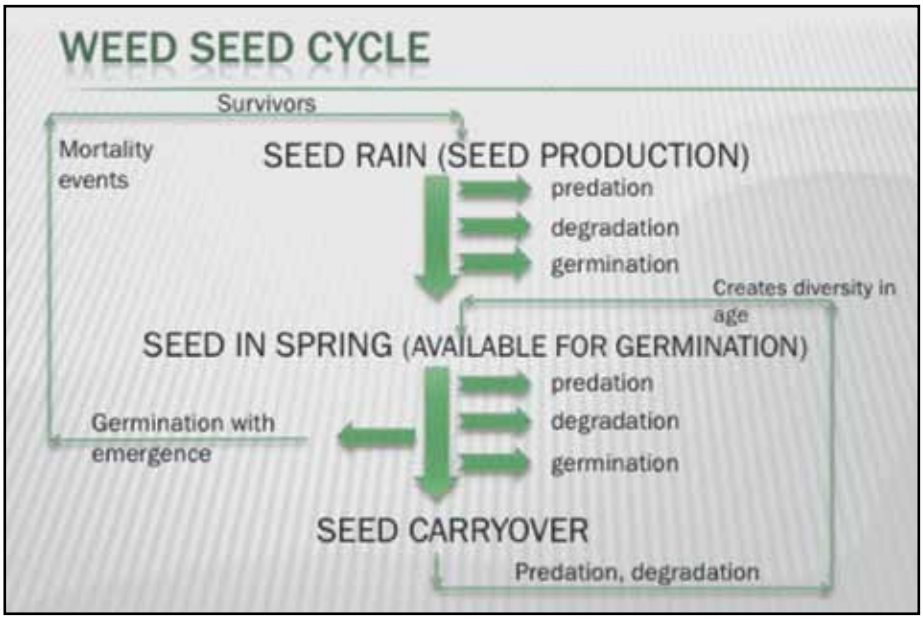
The companion overseeding trial is evaluating five seeding rates, seeding frequencies, and height of cut in order to determine the optimum method of introducing and maintaining a field overseeded with supina bluegrass. Keeping in mind the current expense of supina bluegrass seed, creating an overseeding companion program may provide turfgrass managers with a viable way of overseeding with high amounts of seed to maintain a uniform field while introducing supina bluegrass into the turfgrass sward. The seeding rate of PRG was maintained constant while five different rates of supina bluegrass were used (Table 2). Comparison of the impact of overseeding once per year to overseeding the same amount of seed three times per year is also being evaluated. The trial is being maintained at two different heights of cut, 3.8 cm (1.5 in) and 7.6 cm (3 in), to determine the ideal height for playing fields overseeded with supina bluegrass. All treatments are being compared with a non-overseeded control at both mowing heights.

The overseeding rate trial is currently underway at the GTI research station. Traffic is applied with a SISIS wear machine (Fig. 1) to simulate six football games per week on the research plots. The plots are evaluated monthly for species composition, quality, colour and density.

Table 2. Overseeding rates of perennial ryegrass and supina bluegrass.

Seeding Rate	Perennial Ryegrass	Supina Bluegrass
1	6 kg/100m^2	0 kg/100m^2
2	6 kg/100m^2	0.5 kg/100m^2
3	6 kg/100m^2	1 kg/100m^2
4	6 kg/100m^2	2 kg/100m^2
5	6 kg/100m^2	4 kg/100m^2

Figure 4. The weed seed cycle: green arrows represent potential seed flow patterns. Adapted from Buhler, D.D. et al., 1997.



Preliminary Results

Initial results indicate that overseeding does help with overall uniformity of the turf sward; however, frequency of overseeding seems to play a major part in maintaining that uniformity. One month after the first overseeding, the overall wear is more prevalent in the plots that received no overseeding. Plots that received overseeding had very little wear and mean turfgrass species counts of 99% (Fig. 2). What is interesting is that the three-time treatment at this point had only received one third of its scheduled seed total. However if we fast forward to the end of the season, the one time overseeding treatment has more wear and 96% turfgrass species coverage (Fig. 3). So the take-home message is that overseeding does work, but being able to do it more frequently would be more advantageous to the overall quality of the sward.

As turfgrass managers, we need to consider that our sports fields are part of a larger ecosystem. Nature provides a diverse array of plant species that may establish during a disturbance. If we can find a turf species that mimics a weed's strategy for establishing in disturbed areas, overseeding can allow the desirable species to compete with the naturally occurring weed seed in our turfgrass swards.

Looking at the weed seed cycle shows that weeds are such great competitors due to the fact that they typically produce large amounts of seed, including seeds that are able to carry over into future growing seasons (Fig 4.). Supina bluegrass is known for its ability to self-seed during its first two growing seasons. It is also able to dominate turfgrass swards within three years when seeded in proportions as low as 10% supina (Sorochan and Rogers, 1998).

Current evaluation of the soil seedbank of the overseeded rate trial plots are showing that overseeding with *Poa supina* does cause the seeds of this species to be stored in the soil at much higher rates than perennial ryegrass seed. This may indicate that during the upcoming spring there will be more opportunities for supina to become established in the field rather than the early germinating prostrate knotweed.

The second supina bluegrass study began September 2010 on the in-use soccer fields at the GTI (Fig. 5) and will be continued on other in-use fields in the surrounding area over the next two growing seasons. These trials will examine the feasibility of overseeding with supina bluegrass alone, and examine the viability of this kind of overseeding program in southern Ontario.

While the current research at the GTI is an exciting examination of a new overseeding opportunity for turfgrass managers here in southern Ontario, it is important to remember that until our research on this little known species is complete, using supina bluegrass is likely not your best option at this time. However, current research has shown that overseeding with the relatively inexpensive perennial ryegrass seed will continue to provide uniform, playable and safe athletic fields. It is also important to try to remediate some of the underlying conditions that lead to invasions of prostrate knotweed and other weeds in the first place – specifically compaction. Remember that there is no silver bullet in turfgrass management that will cure all problems, however with a combination of well-timed cultivation activities and overseeding we can still provide safe, green fields for our athletes both young and old to enjoy for years to come.

Written by Kathleen Dodson M.Sc., Dr. Eric Lyons, Dr. Katerina Jordan and Dr. Francois Tardif. Kathleen would also like to thank Dr Ken Carey and Alex Porter for all their help with her experiments thus far.

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