Overseeding Warm-season Grasses

TECH TALK

Young ryegrass emerging through Legend couchgrass

With autumn now upon us, AGCSATech technical officer Andrew Peart examines the overseeding of warm-season grasses.

The use of cool-season grasses for overseeding couchgrass or other warm-season varieties is a practice undertaken not only to enhance winter colour but also improve playing surface quality and protect the couchgrass from winter wear.

The practice is undertaken extensively on resort golf courses in the United States as to present green playing surfaces year round in transitional zones where warm-season grasses go into dormancy during winter.

Simply defined a transition zone is neither a northern region where warm-season grasses are best adapted nor a southern area where cool-season grasses prosper. Therefore, the use of one of these grass types is compromised for a period of the year.

The practice is not restricted to golf courses but is often undertaken on couchgrass playing fields in transitional zones. The major advantage in overseeding playing fields is the ability for wear recovery during the winter months when cool-season grasses have been oversown. The addition of a cool-season sward not only protects the warm season understorey from excessive wear but provides some cushioning for players.

The objective for successful overseeding is being able to get the seed close to the soil where conditions are more favourable for germination and the likelihood of seed movement from wind or water is reduced.

In couchgrasses that produce a dense canopy, verticutting is usually required to enable seed migration into the sward. While verticutting is disruptive to play, it can provide a great benefit in the success of the overseeding program. However, the timing and severity of the verticutting is important.

As the temperature cools and the day length shortens, the couchgrass begins to store carbohydrates for the cooler months and to provide a source of energy to aid its recovery when temperatures again become more favourable in spring.

If severe verticutting is undertaken to not only open the canopy but also reduce thatch while the couchgrass is still actively growing, the grass will expend carbohydrates to recover from the verticutting and therefore reduce couchgrass hardiness in the spring, leading to poor transitioning.

The main objective for the oversown variety is for a quick establishment phase and a minimum transition period when the couchgrass is coming out of dormancy.

TEMPERATURE

The optimum time for overseeding is late enough into autumn so the couchgrass growth has been slowed by lower temperatures but early enough that temperatures are still favourable for germination of the oversown variety.

If seeding is done too early there is an increased likelihood for seedling diseases as well as competition from the couchgrass, while too late will slow the coverage of the oversown species due to a drop in temperature. Beard 2002, states that the best time is when daily mean soil temperature at a 100mm depth is between 22-26˚C.

While monitoring soil temperatures to determine the optimum planting time is more effective than setting a convenient calendar date, it can be quite impractical. The best option therefore would be to set a date based on historical soil temperatures.

Chunhua et. al (1999) reported that the percentage germination in a growth chamber of *Poa trivialis* exceeded 80 per cent on day seven with day/night temperatures of 25/15˚C. However, at temperatures of 10/0˚C germination was delayed by two weeks and the final germination percentage never reached 70 per cent.

SPECIES USED

The species chosen for overseeding is dependant on the type of playing surface and environmental conditions. For example overseeding of golf greens is usually restricted to either bentgrass (*Agrostis palustris*) or rough bluegrass (*Poa trivialis*), while tees are generally oversown with either rough bluegrass, perennial ryegrass (*Lolium perenne*) or creeping red fescue and chewings fescue (*Festuca rubra commutata*).

Fairways are generally oversown with perennial ryegrass, intermediate ryegrass or fine fescues, while playing fields are normally oversown with some variety of ryegrass. The following points are made regarding aspects of each species used for overseeding.

Perennial ryegrass

- Fast germination;
- Good cold tolerance;
- Good wear tolerance;
- High quality;
- Dwarf growth habit; and
- Slow to transition out due to high heat tolerance.

Rough Blugrass

- Relative small seed for ease of canopy penetration;
- Reasonable establishment time;
- Excellent turf quality; and
- Poor wear tolerance.

Annual ryegrass

- Germinates quickly;
- Inexpensive;
- Poor heat and cold tolerance;
- Rapid growth; and
- Poor turf quality.

Creeping bentgrass

- Small seed size;
- Slow establishment;
- Excellent turf quality; and
- Poor to transition.

Chewings fescue

- Slow to establish;
- Very good quality;
- Performs well in drier climates;
- Low fertility requirement; and
- Good transition.

INTERMEDIATE RYEGRASS

In the past decade intermediate ryegrasses have been developed by plant breeders as an alternative species from perennial ryegrass for overseeding.

As the name suggests intermediate ryegrasses are a hybrid species between perennial ryegrass and annual ryegrass. The reasoning behind the hybrid cross was to keep the turfgrass quality of the perennial ryegrass but to incorporate the poor heat tolerance of the annual ryegrass for a quicker transition.

Early breeding of intermediate ryegrasses proved difficult due to the annual ryegrass part of the hybrid quickly dominating and the dark green colour, finer texture and slower growth characteristics of the perennial ryegrass being lost.

This breeding dilemma was solved through several cycles of top crossing select perennial ryegrasses with the first intermediate ryegrass allowing the perennial characteristics to become a stable part of the genetic makeup (Schmitz, 1999).

Heat tolerance of perennial ryegrass is one of the major problems in its ability to transition successfully from couchgrass. Richardson and Warner (2000) conducted an overseeding trial to evaluate the heat tolerance of three perennial ryegrasses, two intermediate ryegrasses and two annual ryegrasses to evaluate their respective heat tolerances.

Overseeding will improve surface quality

The trial assessed heat tolerance by measuring changes in the relative transpiration rates of the different ryegrass varieties under increasing temperatures within a growth chamber. As leaves transpire the evaporative cooling effect will generally lower the leaf temperature below the air temperature. However, as plants reach lethal high temperatures the photosynthesis/transpiration process will shut down and leaves will heat up beyond air temperatures. Figure 1 illustrates the difference of the varieties in their heat tolerance.

The trial showed that as temperatures rose above 35˚C the annual ryegrass leaves started to heat up and show severe signs of heat stress whereas the perennial varieties were able to maintain adequate transpiration and thus canopy temperatures as air temperatures exceeded 43˚C.

TRANSITIONING OUT

Horgan and Yelverton (1998) suggest superintendents can conduct the following cultural practices to aid the transition of perennial ryegrass from couchgrass fairways.

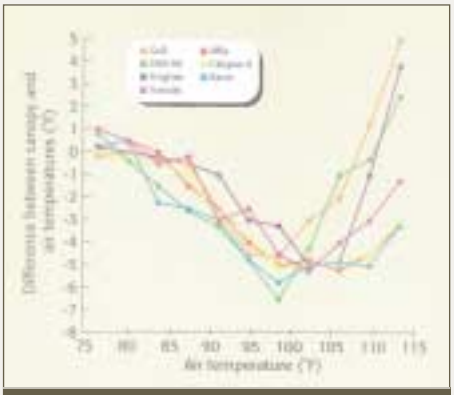

Figure 1: Differences between canopy and air temperatures (˚F).

- Lower the mowing height to scalp out perennial ryegrass and allow light to penetrate the turf canopy for couchgrass growth;
- Verticut to stimulate couchgrass at the expense of the overseeding;
- Core cultivate to warm the soil and stimulate lateral growth of couchgrass;
- Apply high rates of ammonium nitrate to burn perennial ryegrass; and
- A combination of these methods.

However, their research indicates that cultural treatments transition perennial ryegrass out at the same rate as no treatment at all. Ultimately, superintendents who use cultural methods to remove perennial ryegrass from overseeded couchgrass are relying on temperature and relative humidity to expedite transition. These are the key conditions that dictate when perennial ryegrass will transition (Horgan and Yelverton, 1998).

While overseeding of playing surfaces in transitional zones may improve playing surfaces in their playability and aesthetics, the ability to return to a monostand of warm-season grass is far from easy.

Ultimately the success of an overseeding program is not just the establishment of the oversown variety but also the transitioning out. The breeding of species to better transition and the formulation of new chemicals may provide smoother transitions for those turf managers that believe overseeding is a necessary management tool.