

Turfgrass Seed Sources in Ontario

TURF SEEDING RATES The following are seeding rates per 100 m² for specific species of grass seeds: creeping bentgrass, 0.5-1.0 kg; Kentucky bluegrass, 1.0-2.0 kg; perennial ryegrass, 2.0-4.0 kg; fine fescue, 1.0-3.0 kg; tall fescue, 2.0-3.0 kg; and velvet bentgrass 0.5-0.8 kg.

Source: *Turfgrass Management Recommendations, Publication 384, OMAFRA*

SPECIES	SUPPLIER					
	Ontario Seed Company		Pickseed Canada Inc.		Quality Seeds	
Kentucky bluegrass	Award Beyond Blue Chip Plus Freedom III Midnight Star NuBlue Plus NuGlade Perfection	America Appalachian Armada Blue Velvet Crest Evora Explorer	Granite Langara Mercury Quantum Leap Touchdown Touche	Abbey Alene Aviator Barduke Barimpala Barinque Bariris Baron Baroness Barrister	Barvette BlackJack Blue Angel Blue Coat Blue Note Blue Sapphire Cadet Corsair Courtyard Dauntless	Everglade Gaelic Hampton HGT Midnight Midnight II Prosperity Raven Rubicon Rubix
Texas/Kentucky bluegrass hybrid		Bandera	Spitfire	Fahrenheit 90	SPF 30	
Poa compressa	Canada Blue Reubens	Canon	Reubens	Reubens		
Poa supina		Supernova		Supranova		
Poa trivialis	Havana	Colt Darkhorse	Racehorse	Laser Sabre IV	Sun-Up	
Fine fescue: Blue		Azay Blue		Little Big Horn	MX 86	
Fine fescue: Chewings	J-5	Silhouette Victory II Windward		Fairmont Jamestown IV	Longfellow II	
Fine fescue: Creeping Red	Aruba Audubon	Boreal Garnet Jasper II	Mystic Sea Link	Boreal Crossbow Kent	LiFine Navigator II Trapeze	
Fine Fescue: Hard	Ecostar	Bornito	Spartan II	Chariot Firefly Heron	Rhino Ridu	
Fine Fescue: Sheeps	Marco Polo	Azay		Little Big Horn	Quatro	
Tall fescue	Arid III Inferno	Cayenne Crossfire 3	Mustang 4	Darlington Lexington Sitka	Tahoe II Talladega	
Tall fescue: Spreading/Rhizomatous		Blade Runner II	Team Blend	RTF Rhizomatous		
Perennial ryegrass	Evolution Revenge	Arctic Green Cutter II Dasher 3 GLSR Double 4N Edge II Express III	Fiesta 3 Mighty Nightsky Quebec Transist 2600 Intermediate TXR Annual	Amazing GS Apple GL Ecological Home Run Palace	Pillar Premium Presidio Primary Prominent	
Perennial ryegrass: Creeping/Regenerating	CSI	Blazer 4 Fiesta 4 GLSR	Karma Sideways	RPR Regenerating		
Weeping alkali	Fults	Fults	Salty	Fults II		
Contact Information	Ontario Seed Company 77 Wellington Street South Kitchener, ON N2G 2E6 P:519.886.0557 F:519.886.0605 richard@oscseeds.com www.oscturf.com	Pickseed Canada Inc. 1 Greenfield Road Lindsay, ON K9V 4S3 P:705.878.9240 F:705.878.9249 pstevens@pickseed.com www.pickseed.com	Quality Seeds 8400 Huntington Road Vaughan, ON L4L 1A5 P:905.856.7333 support@qualityseeds.ca www.qualityseeds.ca			

Member Profile

ROGER MACKLIN, GENERAL SUPERVISOR PARKS,
NORTH YORK DISTRICT, CITY OF TORONTO, ON



An Interview with Roger Macklin

What is your role with the City of Toronto? General Supervisor Parks, North York District. The Parks branch is divided into five operating districts: North York, Toronto and East York, Scarborough, Etobicoke and York, and the Waterfront District (WF). It's a North – South - East – West and WF split.

What kind of team do you work with? I report to a District Manager of Parks, who reports to the Director of Toronto Parks. My manager has another General Supervisor (GS) for Parks Operations, and we split the district east/west of Yonge Street. We also have one other GS for Parks Technical Services and Construction, and his team covers the entire district for trades work in all of our parks and recreation facilities. I have three Park Supervisors and we oversee the day to day parks operations, plus the landscape maintenance at several city arenas, community centres, libraries, heritage sites, and transportation division properties. Some horticulture displays are in the middle of busy streets. We also maintain the green space and flower beds at the Ontario Science Centre.

In my area there are 101 front line staff in peak season, 30 in non peak. With three parks supervisors and one support assistant in the office, and two parks foremen we form the Parks Operations management team east of Yonge Street.

Front line staff are members of the Toronto Civic Employees Union, CUPE Local 416. There are 40 permanent staff and 60 seasonal staff; 14 of the permanent staff leave my operation to work at outdoor artificial ice rinks each winter; 12 staff are on shifts to cover evening and weekend maintenance in peak season; the greenhouse gardeners are on a rotating shift all year.

What is your team responsible for? We are responsible for the turf and sports field maintenance, horticulture, general services, and winter maintenance at 250+ parks and city properties (over 950 ha of land area) maintaining approximately half of that area as recreational or passive open space and mowing 450 ha. Our crews work out of two main service yards year round with small engine mechanics on site, and staff work out of Edwards Gardens year round. Peak season we have staff located at three more seasonal/satellite yards to save on travel time. Parks have generally and highly maintained turf areas, sports fields, horticulture displays, playgrounds, natural areas, open bodies of water, splash pads, tennis courts, basketball courts, green houses, running tracks, a BMX bike park, skateboard bowls, environmentally significant areas, dog off leash areas, a disc golf course, an archery range, ravines, picnic sites, fire pits, a bake oven, parking lots, many kilometers of paved and natural surface trails, field houses, washroom buildings, lighting, irrigation, storm water and retention ponds – it's a long list of items we maintain year round.

- 7/365 operations at Sunnybrook Park and Edwards Gardens
- 74 outdoor sports fields for baseball, cricket, soccer, field hockey, football and Ultimate
- 30 ball diamonds Class A (4), B (19), C (7)
- 44 sports fields Class Premier (12), A (7), B (7), C (18)
- 12 field houses, washroom buildings
- 10 splash pads
- 10 picnic sites
- 2 greenhouses
- 2 formal gardens at Edwards, and Alexander Muir Gardens
- Over 100,000 annuals go in/out each year overall in our horticulture display beds

We have nine “flying” grass crews each led by a Lead Hand with one 16’ mower cutting the open areas, and two 6’ rotary mowers on a trailer that go park to park trimming and cutting an average 50 ha/week. One additional turf crew is dedicated to cutting, lining and maintaining the 12 premier sports fields and immediate grounds at Sunnybrook Park. They also cut the playing surfaces at the five diamonds at the Bond Park baseball complex up the street. The District has a dedicated Sports Field IPHC crew of a foreman and five staff that do the fertilizing, aerating, overseeding and topdressing at all the North District sports fields.

We have five flying horticulture crews, led by Lead Hands of Horticulture, and dedicated crews at Edwards Gardens and Alexander Muir Gardens as well as at the grounds of the Ontario Science Centre. An “orphan spaces” crew of gardeners does the horticulture and turf maintenance on the transportation sites. General services and shift crews keep up with the minor repairs to park amenities and maintain all the public use facilities in a clean and tidy manner.

What is the biggest challenge in your job? Making enough time to visit my parks on a regular basis and keep up with the correspondence requirements. You cannot run a quality parks operation from a desk or computer screen. You have to be “out-standing in your field(s).” Toronto Parks staff are very accessible to the public, and we respond to a lot of unique and direct customer service requests.

What is the most satisfying part, what makes the job worthwhile for you? That's a tough one as there are many satisfying parts of my job. The teamwork from my front line staff up to Manager and Director is great. Nobody hears us say, “No, we can't do it.” We figure out a way to get it done. I like being involved in city-wide projects about trail systems, storm water management, urban planning and transportation issues. Attending community meetings, and sports group meetings reinforce how important the parks system and features are to others as well. I still love the smell of fresh cut grass, especially the first cut of the season. I've had more than one person tell me I have the best job in the city – I don't argue that point. The fact that I can be paid to walk in a park some days, to confirm that it is clean and beautiful, is the icing on the cake.

What is the biggest misconception about your job? Many people think we just pick up litter and cut the grass in parks, so we must not do much in the winter. Yes, we are the keepers of the green, but that takes year round planning, stewardship and preventative maintenance to keep everything in a state of good repair. This winter I don't think we had many days we were not plowing or deicing paved trails, parking lots and park roadways.

Many people don't realize the extent of what we do in the summer. A parks system has so many components some folks take for granted. We ensure that for the public, our parks are a relaxing place to visit and enjoy nature, not a brain drain. Maybe that's one reason they don't notice all the work happening around them.

What is your educational/employment background? I started in the turf business in 1976 at the only job I know where they let you start at the top – digging holes to repair a water line leak at a local private golf course. Setting my sights on a Golf Superintendent position, I quickly realized you need good education to succeed in the field, so it was back to school time. I graduated from the Turf Managers' Short course in 1977, which whet my appetite for more turf knowledge. I received my Diploma in Agriculture from the University of Guelph in 1980, and had my Superintendent position at a small Par 3 course. I stayed in the golf business until 1984. I started with the City of North York Park Department in the spring of 1985 at a new sand-based soccer field and stadium they had just built, with six more soccer fields in the hydro corridor beside the stadium. That sand field is now synthetic infill turf.

Tell us about your family. I am a sixth generation Canadian from a long line of farmers, and the pioneer family recognized as the first settlers of Scarborough. The family names on my Mom's side (Thomson) and my Dad's side (Macklin) adorn heritage homes, elementary, secondary schools, and parks in the Scarborough area. We have three generations of University of Guelph Aggie grads in the clan.

What do you enjoy doing outside of the workplace? Hobbies, favourite past times? Like many in this business I like gardening – I play golf often (single digit index), and I've always played hockey.

How has the industry changed and in what direction(s) would you like to see the industry, as a whole, move towards? The demand for multipurpose sports fields has grown significantly. Multipurpose requests are growing where open green space is limited in a community. People want the ability to have layers of potential activities take place like special events, community markets and fitness camps on that ball diamond or soccer field that appears underutilized if dedicated only to sports.

There is more technology involved now, more finite maintenance regimes, and more demand for elite field conditions for longer periods of time.

The turf and sports field industry is becoming more important to the users. To facility providers they are a revenue source, as spaces to have open fields decreases and demand increases. I'd like to see synthetic fields used to meet the demand for longer seasons and reduce the wear tolerance issues on living turf fields. I think the synthetics can be great for practices, and learn to play, mini soccer and 7 on 7 recreational plays that puts so many feet on your field at once. Synthetics are good for wet weather/increment weather games. We still need to maintain quality living fields nearby for playoffs, elite youth, professional, international matches.

What do you consider to be the biggest benefit of being a member of Sports Turf Canada? Sports Turf Canada connections to sports turf industry experts is a great benefit, whether through educational seminars, publications or hands on at field days with our industry suppliers. I reference the publications on a regular basis to keep up with maintenance standards and innovations, as well as current research, and trends in the business. Sports turf is an ever improving and evolving field and Sports Turf Canada keeps me up to date, and provides the best opportunities for professional networking. •

If you are interested in being featured in this column, please contact Lee Huether at the Sports Turf Canada office.

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Facility Profile

SUNNYBROOK PARK SPORTS FIELDS, CITY OF TORONTO, ON



General facility information:

Sunnybrook Park is a 60 ha property that serves users from across the City of Toronto. It is connected to three other large parks in the Don River watershed, Wilket Creek Park, Serena Gundy Park and E. T. Seton Park, that combined total 235 ha of parks, accessible by transit, but with parking for 1,000 cars. There are permitted picnic sites, horse stable, walking/hiking trails, the sports fields and a Parks Operations service yard on site.

What types of sports fields are on site? Natural? Synthetic?

All fields are natural living turf and are:

- 4 premier field hockey / multipurpose fields
- 3 premier soccer fields
- 3 premier cricket grounds
- 2 premier rugby fields
- 1 Ultimate Frisbee field

All fields here have a sandy loam soil texture. Mowing height on seven of these premium fields is 1.5" by multi deck (7) floating head rotary mower. Mowing up to 3 times/week as required so as not to remove more than 1/3 of the leaf blade in any one cut. This same mower and operator go 2.5 km up the road to cut the playing surface of five baseball diamonds at Bond Park twice/week. Cricket grounds have a synthetic turf pitch area in the centre. We also have a synthetic turf area with 5 practice cricket pitches.

The fields for soccer and rugby are mown at 2.5", the same as the remaining park land. The crew has access to a wide area 16' rotary mower and operator from a flying turf crew as required. The sports fields and pavilion area are part of the fly crew wide area mowers 50 ha/week cutting schedule.

North York District staff has been maintaining the premier sports fields at Sunnybrook Park without synthetic pesticides, applying only organic fertilizer products, and following a turfgrass specific Integrated Plant Health Care (IPHC) program for the past 14 years. The cultural practices of fertilizing, aeration, overseeding and topdressing, along with timely irrigation and mowing with sharp bladed equipment are the main components of the program. Communication and cooperation with users so as not to use the fields during inclement weather, also helps immensely.

Insect pests have been mostly Japanese beetle, and are controlled by inoculating the soil with parasitic nematodes for three years running a few years back, and now

by using pheromone traps to catch the adult beetles before they lay eggs. We catch thousands of adult beetles annually to keep them under control.

There is also a field house pavilion building, with a meeting room and washrooms.

How many employees are involved with turf care at this facility? The Sunnybrook sports field crew is made up of:

- 1 Permanent Lead Hand Parks that works at Sunnybrook in summer for 36 weeks then works at an outdoor artificial ice rink in the winter
- 1 Permanent Parks Handy Worker grade 2
- 2 Seasonal Parks Handy Worker grades 3 for 25 weeks each
- 1 Seasonal Parks Handy Worker grade 3 for 16 weeks

This group cleans up, cuts, trims, and paints lines on all the fields. They also cut and trim the perimeter around the fields, and some additional parkland within Sunnybrook Park. They set up for special events and help maintain the field house... they are a very busy group. A dedicated Turf IPHC crew that covers the entire North York District comes in to do fertilizing, aerating, overseeding and topdressing on a prescribed schedule.

How many acres of turf are maintained at this facility? How many acres of sports turf?

55 acres of turf on the plateau area that includes 30 acres of irrigated sport fields.

What is the primary type of turfgrass? Name of varieties. There is a mix of species and varieties depending on the height of cut. On the fields cut at 1.5" for cricket and field hockey we have 50% perennial ryegrass, 20% annual bluegrass, and 25% Kentucky blue. We still have a component of white clover in these fields. The fields for rugby and soccer, cut at 2.5", are more perennial ryegrass and Kentucky bluegrass in equal parts.



Sunnybrook Field Hockey, Multi-purpose Field

Is yearly overseeding part of your sports turf maintenance program?

Yes, our current standard for overseeding on premier fields is 4 times/year. Slit seeding in early summer and fall with an irrigated field seed blend. The same blend is used on our Class A and B fields: 25% Arrowhead Kentucky bluegrass, 25% Yankee Kentucky bluegrass, 30% Cardinal creeping red fescue, 20% Stellar perennial ryegrass at 75 lb/acre.

In summer the standard calls for 2 slit seedings of a 3-way perennial ryegrass mix: 33% each, Charismatic perennial ryegrass, IQ perennial ryegrass, and 34% Affirmed perennial ryegrass at 115 lb/acre.

We use a different seed blend for non irrigated Class C fields: 40% Boreal creeping red fescue, 40% Jamestown IV chewings fescue, and 20% Primary perennial ryegrass at 90 lb/acre.

When we procure turf grass seed blends all must contain varieties from the most recent NTEP trials so we may confirm the desired growth characteristics and qualities of the proposed blend.

How many times do you fertilize? Four applications of fertilizer on premier fields. At this site we use only organic 4 – 1 – 2 at 560 lb/acre to continue with the long standing organic program. At other fields we use synthetic fertilizers with XCU and polymers coated urea forms, but still have at least one annual organic fertilizer application on all classifications of fields.

Do you aerate? Topdress? Yes, as soon as we can get the irrigation heads up and marked we will aerate with either hollow tines or solid spiker tines depending on permits to use the fields. Four aerations per season, on these premier fields and the fall aeration is always hollow tine.

We topdress all fields at specific rates but these premier fields get topdressed with a 70:30 sand to ¼" screened compost blend applied at 44 yd³/ha in summer for 1/8" coverage, 88 yd³/ha in fall for ¼" coverage.

What is your maintenance regimen for synthetic turf?

The synthetic pitches in the cricket fields require minor surface repair after 1 - 2 seasons, significant repair after 2 – 3, and entire fabric replacement after 3 – 5 seasons.

I get my first synthetic turf field installed in 2014, at a location that was getting over 1,200 hours of permitting, plus some unauthorized use. It was a tough site to keep green. The City has four stadium fields with synthetic turf that easily handle up to and over 2,000 hours of permitted use. We also have six non stadium, outdoor synthetic fields in Toronto parks.

How many hours per year are the fields permitted? Who permits them? Are the fields ever closed during the season to give them a rest? How much input do you have in the amount and timing of use? The fields at Sunnybrook get an average of 700 hours of use a season. The fields are not lighted. We keep one soccer field at rest at all times, and rotate play as needed during the season. The season is 21 to 22 weeks long. We open living turf sport fields on the second Saturday of May annually and close September 30. Baseball diamonds at other park locations open May 1 annually and close September 30.

Field permits are available through the Parks, Forestry and Recreation Customer Service branch and they work more and more closely with Parks Operations to communicate with users, getting the word out when fields are closed for any reason, and trying to relocate groups and arrange rain out dates whenever possible.

We are implementing a new protocol about sports field playability and responsibility guidelines in 2014 that will improve issues related to field use during inclement weather, user safety, and potential for field damage. The Customer Service staff will have sent those guidelines to all sports field permit holders before the 2014 season begins.

We have a phone line at Sunnybrook for permit holders to call in; we update the field conditions, if anything is closed due to wet conditions and we have staff on site to uphold the conditions of the permit related to limiting use under poor field conditions. •

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WHAT'S THAT ORANGE STUFF ON MY SHOES?

Dr. Tom Hsiang, Professor, Environmental Sciences, University of Guelph



Rust diseases on plants have been known since ancient times, and are one of the plant diseases alluded to in the Bible. In Genesis 41:27 it states, "seven empty ears (of wheat) blighted by the east wind are also seven years of famine." This passage has been interpreted to describe rust spores carried by moist winds which led to famines in ancient Egypt. The Romans even had a God of Rust, Robigus, who was honoured or placated annually by sacrifices of red coloured animals such as cows or dogs, red wine, and perhaps even red-haired humans.

Rust diseases have caused severe economic impact, and a severe outbreak of rust on coffee in the mid-1800s was probably responsible for changing Britain to a land of tea drinkers. Rust diseases are notorious on cereal crops, and world-wide losses to wheat stem rust are estimated at several billion dollars each year. The rust diseases on cereals are also the ones causing disease on turfgrasses. Rust fungi require living host tissue to feed upon, although spores can survive for at least a short period on the surfaces of recently dead plant tissues. Rusts are also highly specific to their host species, and a rust of perennial ryegrass may be unable to infect Kentucky

bluegrass, and vice-versa. In some cases, some rust varieties are specific to particular host cultivars, so that they cannot attack other plant cultivars even within the same host species.

There used to be a very popular garden plant called barberry which has attractive variegated foliage (Figure 1), and served very well as hedges since they have prickly thorns. But then they mostly disappeared from the urban landscape. What did the disappearance of this plant have to do with turfgrass rusts? Barberry was banned in 1966 for import into and trade within Canada. The reason for this was because barberry acts as the alternate host for the rust *Puccinia graminis* which causes stem rust of wheat and also rust on a variety of turfgrasses. The meaning of alternate host is that the fungus needs both the grass host and the alternate host to complete a full life cycle. Many attempts have been made to reduce the severity of rust diseases by eliminating the alternate host.

Rust fungi have among the most complicated life cycles of all living organisms, and there may be five distinct spore stages with two different host plant species required to complete a full cycle. Wheat farmers over 500 years ago first started to notice that wheat



FIGURE 1 Variegated barberry plant which was very common up until the mid-1900's but almost disappeared from the urban landscape because of efforts to eradicate wheat stem rust by eliminating this alternate host.



FIGURE 2 Buckthorn in late spring infected by the crown rust fungus. The spores produced in specialized small cups on this host can only infect turfgrasses such as perennial ryegrass.

rust was often worse when barberry bushes were growing nearby. This led to the eradication programs for alternate hosts. Did these eradication programs for the alternate host manage to break the life cycle and eradicate the wheat rust also? Not really, because not all barberry plants were eradicated, and mostly because, in North America, wheat rust can survive on living host plants near the Gulf of Mexico and then travel northward in springtime by wind and infect newly growing plants.

In this article, we'll look at the major rusts that attack cool season turfgrasses. We'll discuss their biology, and ways of recognizing and controlling these diseases on turfgrasses.

Hosts: Nearly all grasses can be affected by their own rusts, but among cool season turfgrasses, perennial ryegrass seems to be most greatly affected. Rust disease is also a problem on Kentucky bluegrass, but often only one species is affected in an area. All of these rusts also have their cereal hosts, for example, *P. graminis* on wheat and *P. coronata* on oats. However, as they are so specialized, the strain attacking the cereal may not be able to attack turfgrasses. The alternate host for *P. graminis* is barberry (Figure 1), and that for *P. coronata* is buckthorn (Figure 2). Orange spots are visible on these alternate host plants in the spring to early summer. The common rust on perennial ryegrass is called crown rust caused by *Puccinia coronata*. It is called crown rust, not because it attacks the crown of plants, but because the spores have protrusions that look like crowns (Figure 3).

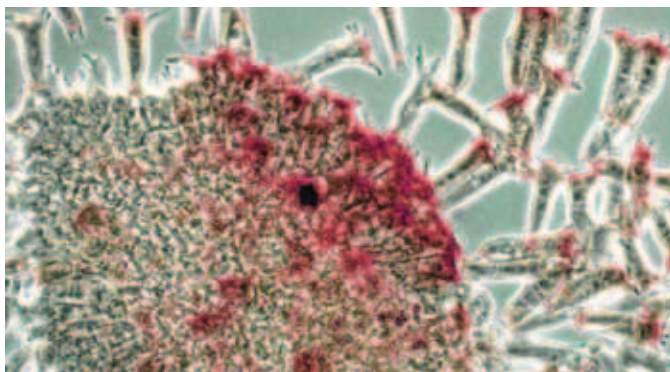


FIGURE 3 *Puccinia coronata* causing crown rust. It is called crown rust not because it attacks the crown of the plant, but because the spores have protrusions that look like a crown. (Courtesy of Dr. George Barron).

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Season of Occurrence: Rust on turfgrass is most commonly visible on leaf blades in late summer into fall. However, the infections may start in late spring, and through several cycles of infection (from spores landing on the plant surface and penetrating into the plant, until these new infections produce new spores), the levels of rust can build up exponentially by the end of summer.

Conditions Favouring Disease: The conditions that are favourable for initial infection differ from those that encourage development of the disease in the field. Infection is favoured under moist conditions, but symptoms on the plants are favoured by dry or hot conditions where plant growth is slowed. Alternation of wet cooler weather with hot dry weather during summer will greatly enhance infection and allow disease levels to build up. In the later part of summer and into early fall, dry, hot, sunny conditions slow the growth of the grass, and also allow the rust to almost completely infect the entire leaf blades and produce abundant orange spores that can coat shoes, socks, and sports equipment.

Symptoms: The first symptoms on grass are small yellow flecks on leaves or sheaths or upper or lower leaf surfaces depending on the species of rust. Reddish-brown pustules (Figure 4) appear on leaf blades, bearing masses of summer spores (Figure 5). These rust spores can easily be rubbed off, giving a reddish tinge to shoes and equipment which commonly occurs in fields with lots of rust, but the yellow-orange spore producing structures are still intact



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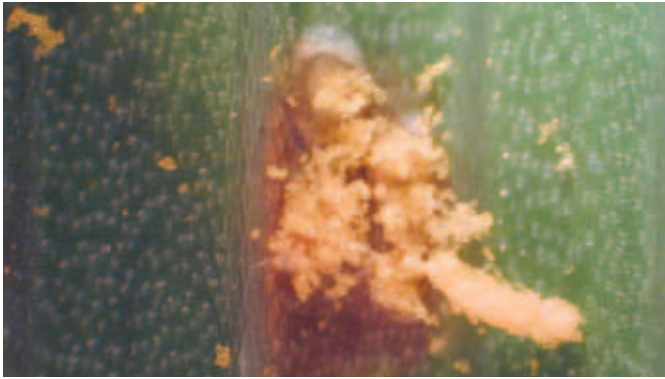


FIGURE 4 A yellow spot on a leaf blade caused by a rust is composed of the yellow plant tissue due to feeding by the rust, and the yellow-orange rust spores.

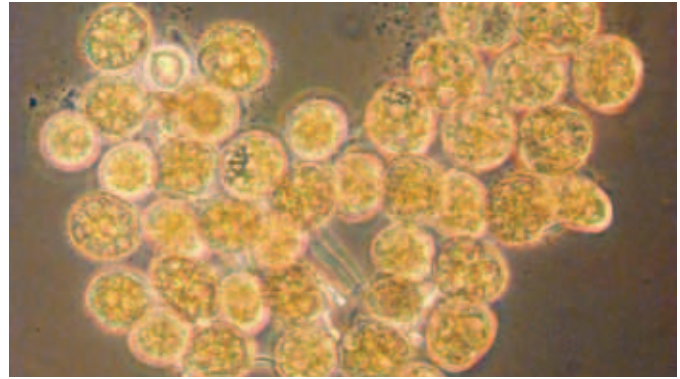


FIGURE 5 Rust spores are thick walled to withstand drying, and can travel long distances.

on the plant. These rust species are not known to be poisonous or produce toxins to animals, so occasional contact or even inadvertent ingestion shouldn't cause a health problem. Only aboveground plant parts are infected, and severe attacks may result in premature yellowing and shrivelling. After tissue has been killed or nearing the end of the growing season, brown or black spots composed of black winter spores may develop in place of the reddish-brown pustules (Figure 6).

Life cycle: Most rusts require more than one host species to complete a life cycle. In addition to the grass host, the other host, known as the alternate host, is usually a woody or herbaceous species such as barberry (Figure 1) or buckthorn (Figure 2). Typically the fungus overwinters on living or dead tissue of the grass host. If the fungus overwinters on living tissue, such as in areas of very mild winters, then there is no need to pass through the alternate host, and then the dormant mycelium will produce spores which serve as the primary source of infection in the following spring. This likely does not occur in northern latitudes including most of Canada because of the long winters.



FIGURE 6 Rust infections on perennial ryegrass later in the season. The rust has stopped producing the yellow-orange summer spores, and started producing the black winter spores which overwinter on dead grass foliage. The black spores will germinate in the spring to produce another short-lived spore than can only infect the alternate host, not the grass host.

In the spring, overwintering resting spores (teliospores) on dead grass tissue produce other spores (called basidiospores) which will only infect the alternate non-grass host. A few weeks after successful infection of this alternate host, another set of spores (called aeciospores) are produced in late spring or early summer which then infect the grass host. Infections on the grass host lead to production of pustules which bear many more spores (called uredospores) to re-infect grass (cycling stage which increases the amount of rust). As the grass host tissue dies off, another spore stage (usually black or dark brown and called teliospores) is produced on the grass tissue (Figure 6), and these structures overwinter to produce the next spore stage in spring.

Cultural Control: Mowing and managing fertility will usually control rust disease. If the grass is under irrigation, it should be watered infrequently but thoroughly early in the day to minimize leaf wetness periods and to avoid drought stress. Fertilization should be sufficient to avoid nutrient stress, and to improve leaf growth. Increased nitrogen fertilization may allow the plant to outgrow the disease so that infected tissues are mowed off before they have a chance to produce spores. Increased mowing height with greater frequency of mowing should also reduce disease symptoms, although some researchers recommend reducing the height of cut so that there is less foliage for infection. The drawback of this method is that the plant is weakened with a relatively smaller root system, and may be less able to fight off infection. Reducing shade and improving air circulation should lead to drier leaf surfaces and less opportunity for infection.

Chemical Control: No chemicals are registered for turfgrass rust disease control in Canada, but strobilurin and DMI fungicides have been found to be effective. Consult provincial publications and product labels for recommendations.

Resistant Turfgrasses: Cultivars of Kentucky bluegrass and perennial ryegrass with increased resistance to rust are available. Consult local publications or contact seed company representatives for lists of varieties. •

Except where noted, all images Tom Hsiang.