Alberta Turfgrass Research Foundation

Quarterly Update: October 2026

Thank you for chiming in to the latest update from the Alberta Turfgrass Research Foundation. We've begun the 3rd quarter of our fiscal year, and the end of the 2026 growing season have much to share. This report provides conclusive details from our Drought Avoidance project, field day with WCTA, a new study in the traffic tolerance of tetraploid turfs, and the 180 day assessment of our tarping project.

Fall Tarping project:

This fall we enter the 2nd year of the study: *"Surviveability of poa annua subjected to forced hardening".* The greens are covered in four ambient temperature stages; (image right) recording temperatures, gases, and UV to measure variables affecting hardening and survivability. We acknowledge Brett Young, Greenjacket, Canadian Turfgrass Research Foundation, Ontario Turfgrass Research Foundation, and IRIT Canada for their support and sponsorship Special mention of Syngenta for also supporting in kind supply of 6x SPIIO sensors to further data collection in this ongoing trial. Complete project underway here - LINK



The following provides initial assessments following the first 180-days survivability of poa annua in bentgrass greens. The collected metrics are combined to assist superintendents in evaluating the relative performance of permeable and impermeable tarping systems installed across four ambient temperature regimes.

$$WRI = 100 \times \left(1 - \frac{CO_{2(actual)} - C_{base}}{C_{peak} - C_{base}}\right)$$

The ***"Winter Readiness Index"*** formula aims to present superintendents a traffic light style measurement tool, to assess timing risks for tarping.

- **Safe Zone (WRI > 80):**
  - **Action:** Proceed with **Impermeable** covers. The data shows these systems successfully achieved the "Respiration Floor" (CO_2 < 2750 ppm), minimizing the risk of winter injury.2
- **Caution Zone (WRI 40–80):**
  - **Action:** If your future installations fall in this range, utilize **Permeable** tarps to allow the turf to continue gas exchange without the acute sealing risks observed in the trial.1
- **Danger Zone (WRI < 40):**
  - **Action: Do Not Cover** with impermeable tarps.
  - **Reasoning:** At +10°C, the turf is metabolically active and "suffocates" under a seal. At -5°C, the turf is in "sealing risk" and produces high CO_2 that creates an anoxic environment. For these conditions, only permeable options are viable to prevent crown hydration and turf death, where poa annua is least tolerant.12

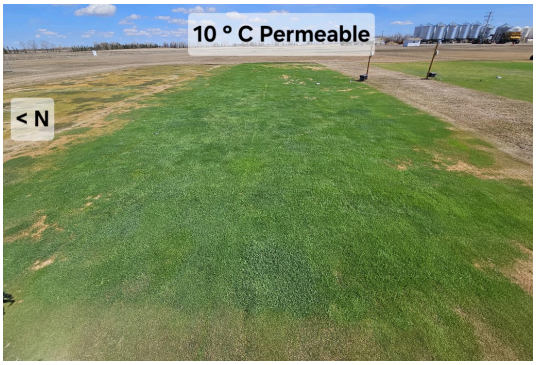






+10°C Treatment Category : Interpretive summary

- Permeable (Kit 1)
    - Gas Dynamics: High metabolic activity; nighttime CO2 peaks of 1100–1200 ppm; daytime floor of 500 ppm. Stable O2 (21–22%).
    - Moisture: High humidity (90–97%); gradual soil moisture drop.
    - Overall: Continued photosynthetic activity suggests the turf did not fully harden under these conditions.
- Impermeable (Kit 3)
    - Gas Dynamics: Extreme CO2 volatility with peaks reaching 11,145 ppm. The system acted as a semi-closed environment.
    - Moisture: High humidity (88–97%); soil moisture spiked to 45% sealing potential.
    - Overall: High risk of anaerobic stress due to moisture entrapment

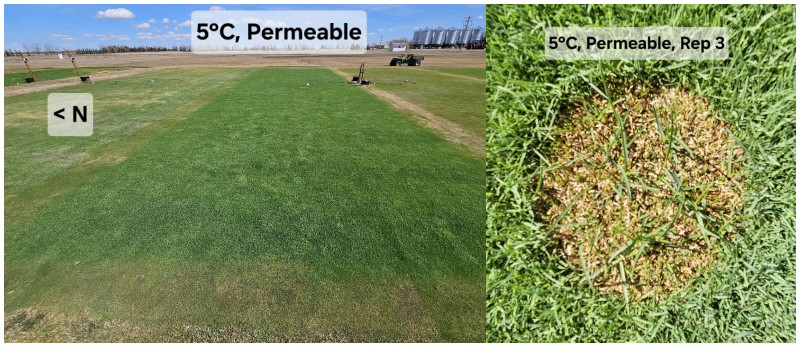


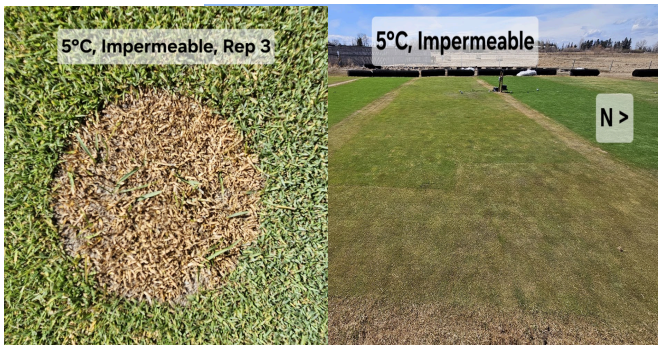




+5°C Treatment Category: Interpretive summary

- Permeable (Kit 8)
    - Gas Dynamics: Stable CO2 (500–700 ppm) and O2 (21–22%). Effective gas exchange throughout the 180 days.
    - Moisture: Drained effectively; peaks at 80% post-thaw but no persistent saturation.
    - Overall: Best performing system; maintained healthy respiration and successfully transitioned into spring.
- Impermeable (Kit 4)
    - Gas Dynamics: Severe sealing risk; CO2 peaks exceeded 12,700 ppm by April. O2 dropped significantly (10.8–14%).
    - Moisture: Saturated environment (95–100% humidity); soil moisture reached 50%.
    - Overall: High risk of crown hydration and anaerobic stress due to lack of gas exchange.





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0°C Treatment Category: Interpretive summary

- Permeable (Kit 5)
    - Gas Dynamics: Aerobic conditions maintained; CO2 rose to 800+ ppm during April microbial reactivation.
    - Moisture: Rapid shifts during late-February freeze-thaw cycles.
    - Overall: Biologically suppressed until mid-February, followed by a gradual spring flush.
- Impermeable (Kit 6)
    - Gas Dynamics: Substantial CO2 accumulation (1000–9400 ppm); O2 drops observed (down to 18%).
    - Moisture: Trapped humidity (95–99%); moisture peaked at 39.9% in spring.
    - Overall: Minimal light penetration and moisture trapping created unstable under-tarp conditions.

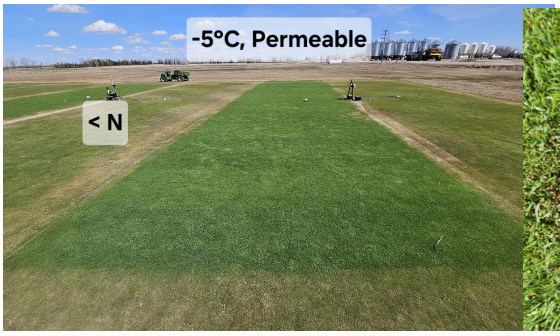






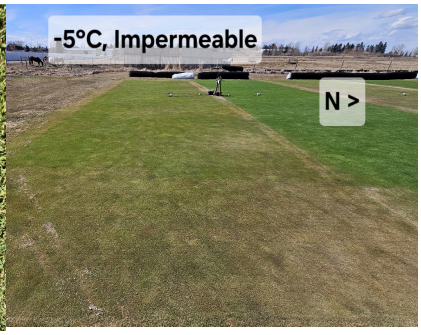
-5°C Treatment Category: Interpretive summary

- Permeable (Kit 7)
    - Gas Dynamics: Stable O2 baseline; CO2 averaged 670 ppm.
    - Moisture: Volatile, but effectively managed via adequate drainage.
    - Overall: Maintained consistent baseline despite cold and intermittent moisture.
- Impermeable (Kit 2)
    - Gas Dynamics: Highest anoxia risk. Acute sealing events at -2°C triggered CO2 spikes (2522.6 ppm) and O2 depletion (17.15%).
    - Moisture: High humidity (89%) triggered sealing events that blocked O2 replenishment.
    - Overall: High risk of anoxia; sealing events were driven by physical constraint rather than soil oxygen depletion.









Assessment: The +10°C and -5°C treatments both end up in the Red Light danger zone, *two different causes lead to the same result: trapped gas and suffocation result of anoxic conditions.* In short: At +10°C, the plant creates too much gas for the tarp to handle; at -5°C, the tarp locks down too tightly to let any gas escape. Only the 0°C to +5°C "sweet spot" avoids both extremes.

Comparing the impermeable treatments at 0°C (Kit 6) and -5°C (Kit 2) reveals why the -5°C regime exhibits a higher average CO_2 concentration (3,406.94 ppm vs. 2599.68 ppm):

1. **Acute Sealing Triggers at Sub-Zero Temperatures:** The trial data for the -5°C impermeable system (Kit 2) explicitly notes that **acute sealing events at -2°C and 89% humidity** drove significant CO_2 spikes (up to 2,522.6 ppm). When an impermeable cover is installed over turf already experiencing sub-zero ambient temperatures (-5°C) in high humidity, moisture at the surface rapidly freezes into a dense, impermeable ice or frost barrier right at the turf-tarp interface.1
2. **Immediate Gas Entrapment:** This rapid, hard-freeze sealing cuts off any further gas exchange instantaneously. Because the system locks shut under freezing conditions while internal biological or chemical processes (or trapped baseline respiration) continue, the gas is abruptly contained with no pathway for dissipation.
3. **The 0°C Transition State:** At the 0°C installation threshold, the system hovers right at the freezing point. While it still accumulates substantial CO_2 (averaging 2,599.68 ppm), the thermal environment allows for a slightly different moisture and phase-change dynamic during the initial settling period compared to the immediate, rigid sub-zero freezing front that triggers acute sealing events at -5°C.

The tarping project continues indefinitely, we acknowledge the generosity of Brett Young, GreenJacket, NTRF, IRIT Canada, Olds College and Syngenta for their ongoing support.

Snow Mold Product Testing:
Annually, the PTRC performs product trials for distributors looking to advance new herbicides, insecticides and fungicides. As arguably one of Canada's harshest winter climates, the PTRC site has been a key testing location since the 1980's. This fall we are pleased to conducting another fungicide trial for Syngenta in the rain shadow of the rockies.

Turf Research Field day at Eagle Lake Sod Farm
Over 140 delegates, guests and vendors gathered at Eagle Lake Sod Farm in Strathmore this September 17th, a beautiful day with great success. The ATRF supported the Western Canada Turfgrass Association at what would be a perfect day of education and demonstration, and the ideal backdrop 9 pivots, and 1400 acres of premier sod. Special thanks to Eric Heuver for hosting and sponsoring, and WCTA for coming out to Alberta. We hope to see everyone in Olds next August. WCTA published: LINK





Trials Completion: Drought Avoidance - City of Calgary, Sod Growers Commodity Group

The joint project between the City of Calgary and the Sod Growers Commodity group has come to conclusion. The study, which tested drought-avoidance perennials alongside eight sod varieties from Alberta Sod Growers, provided insightful data: minimum acceptable turf quality requires 12L/m²/week (or 1/2"/week), with turf potentially entering an initial dormancy stage after 25 days. A third and final year of testing data is in and under analysis. The final report results will be available in the new year.
Below : 16 replications of 8 species among Calgary's "Yard Smart" plant list were grown as individual gardens AKA experimental units, under rain-out shelters since 2022.

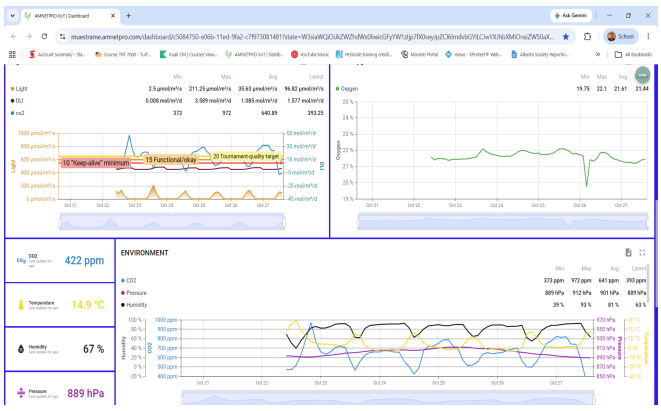




Drought avoidance testing over two years has illustrated some key take-aways, including minimum water requirements for turf establishment, the limitations of several perennial species when subjected to strict water regimen.
Next steps : Several prototypes of passive Irrigation controllers are currently being evaluated - in 2027 we hope to leverage this drought avoidance research to continue towards a passive, water conservation model which also satisfies minimum water requirements. The next stage of this research aims to evaluate passive value systems - stand by!

Sensor Technology: SPIIO, IRIT, Robots & Dashboards advances at PTRC





Technology is advancing at an unprecedented rate, the advantages to precision golf course management are undeniable. Utilizing new tools and evaluating their place in the turf industry has become an integral part of what we do everyday, reducing costs of labor and infrastructure, improving the efficiency of fertilizers and water use, and providing quantifiable data to set true parameters for optimum turfgrass health. This winter, we will employ 6 SPIIO sensors on the plots to evaluate their effectiveness and ability to forecast our pest pressures and thresholds, and support the tarping project. Thanks to Matt Legg and Syngenta for their contributions to this project.

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NEW: Comparative Wear Tolerance of Diploid and Tetraploid Sportsturf Species



Support from City of Edmonton, Olds College, and DLF seed, a new project in 2027/2028 will Evaluate the most promising wear tolerant species and blends for their respective wear tolerance and turfgrass quality. The most promising turfgrass mixtures for combined ability to resist wear under minimum sustainable moisture levels will be evaluated. Blends of USA, Europe include TWCA certified, Qualified but not certified, and not qualified varieties, Tetraploid Perennial Rye, and mixes of tetraploid and diploids will be assessed. Regular project updates will be provided through speaking engagements this winter.

Fall Fertility and Overwintering? Myth: "We don't want to enter the winter too lush"

Pack carbs. If your grass can't see the sun, its burning reserves. Make sure you've applied sufficient fall fertility and ensure it has the energy to "hibernate". Proven research recommends a 2:1 N/K ratio in late fall; despite ambient temperatures dropping, the plant is still green and photosynthesizing - packing carbohydrates as this physiological change slows top growth. The energy applied is redirected - top growth has shifted towards storage. Notably, foliarly applied N can accumulate as well as granular, up to 4.% tissue content. Conversely, potassium applications are best applied granularly. When choosing fall fertilizer, remember IBDU releases primarily via hydrolysis, not reliant on microbes. This is why it is best suited for fall or dormant applications. LINK : Anderson, Pick



When should we close the course? An objective approach.

It can be a challenging time of year when our owners are pushing to stay open, losing our summer staff, it's arguably the busiest time of year to prepare for closure. Aerations, blow-out, fall fert., spray snow mold protection, etc., all become priority one. We rarely have time to fight that "closure time" battle with the board, perhaps because that conversation is clouded with subjectivity. That inevitable conversation is right around the corner, on when to close.

We are all here to make the course money, but extending too late carries risk - without minimum temps of 10'C, when the turf has been injured (by traffic) it cannot heal. Without healthy leaf blades, we risk the effective translocation of fall fungicides.
To add a degree of objectivity to the course closure discussion, consider the growing degree day model to base course closure upon. The simple math is, take daytime high plus daytime low, divided by 2. 13'C+3'C / 2 = 8'C. If that number is below 10'C, it's time to shut down.

Below images, Edmonton AB, Oct 14. Average weekly daytime temperatures 13'C, nighttime temperatures 3'C. Two pictures taken the same day: On the left, roped off bentgrass nursery, and on





the right, in-play golf green still running roughly 120 rounds per day. Macro lens identifies the turf on the right was injured, damaged from foot traffic and maintenance rolling and occasional cut. The left, a perfectly healthy green with all the same maintenance performed minus the golfer traffic. I feel this was a good example why we propose a "10 degree" rule for daily average temp.

It's Microdochium Season!



As temperatures fall, be on the lookout for small, circular patches on our greens. White or pink fungal threads (mycelium) may be visible - these are sporadochia. Few other diseases will occur during this time of year when temperatures drop 0-10'C at night. This is the precursor to pink snow mold, and occurs without snow cover. Image right - courtesy J.Pick

Prevention:

When conditions are right, apply a preventative for microdochium about a month prior to your final treatment. Reverse engineer your fall applications - ensuring fall treatments are applied before the minimum 10'C to ensure adequate translocation of your systemics. In accordance to your product label interval, 21-28 days prior to that, should be your microdochium preventative application.

New ATRF Executive



Introducing the newest Faculty member of Olds College turf program, and Operations Officer of the ATRF. Darren Reddekopp brings over 30yrs Golf Course Superintendent experience to Olds College, a graduate of U of C with a Bachelor of Commerce, Ivy school training from Western, and turf grad from Fairview College. As a past president of the ATRF, we could not imagine a better fit, energetically welcoming Darren back to an operational role of the research foundation.

Thank you for your membership, we'll see you soon on the conference circuit!

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