

SEASHORE PASPALUM PLATINUM TE™ GREENS SPEED CHALLENGES

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INTRODUCTION

Tournament quality greens speeds can be achieved and sustained with Seashore Paspalum Platinum TE through pro-active monitoring and maintenance. The following is a comprehensive review of turf management techniques for golf courses that desire the highest quality greens speeds.

THE CHALLENGE

Perceived slow greens, whether we like it or not, are not well received by many golfers, but what management choices determine greens speed and sustainable putting quality surfaces for **Platinum TE** seashore paspalum?

Management of any turfgrass on greens is a challenge due to specific cultivar morphological traits, height-of-cut, traffic and compaction issues, mowing frequency, type of mowing equipment, aeration equipment & schedule, and other micro-maintenance issues such as fertility nutrient stabilization, irrigation water quality, greens soil infrastructure, inorganic & organic amendments in the greens mix, sand or soil physical quality, and proactive pest management.

Constant complaints come from golfers & upper management concerning cultivation frequency, sand topdressing, trueness of ball roll, bumpiness or ‘chatter,’ and perceived greens speed. This article provides some insight into normal maintenance practices for **Platinum TE** paspalum on greens as well as both common and unique aspects of the grass that must be considered to avoid poor putting quality and the subsequent lack of tournament ready playing surfaces.

Every turfgrass cultivar that is planted on greens can be impacted by variability from greens construction such as USGA greens specifications or other modified greens type construction (California style or push-up), development of truly functional drainage systems, irrigation water

distribution uniformity and efficiency, and topography issues both inside the greens complex and the periphery zones around the complex. Include changing and unpredictable climatic conditions as well as micro-environmental turf ecosystem variability such as tree shade and air movement around the greens complex, and the manicuring of turf canopies for expected greens speeds becomes both an art and a challenge.

POSSIBLE CAUSES FOR SLOW PASPALUM GREENS SPEEDS

1. Internal nitrogen concentrations >3% causing succulence or puffiness and soft canopies
2. Potassium concentrations <3%
3. Horizontally positioned leaves and surface stolons that expose a heavy wax load on the canopy surface and causes friction-based slow down of ball roll
4. Wet ecosystem conditions: Humidity >50%, foggy mornings, over-watering, saturated greens soil profiles, soft greens surface, lack of a sandy matt
5. Liquid fertilizer application the previous day
6. Irrigation application or rainfall overnight
7. Single roll during early morning, second roll after sunshine and wind exposure; repeat rolling events during the week and especially prior to tournaments
8. Micro-pockets or mini-depressions on the soil surface
9. Lack of sharp greens mower blades
10. Lack of proper manicuring with groomers and/or light verticutting
11. Long, broad horizontally positioned leaf blades
12. Need for application of silicates to enhance stiffness of leaf tips

PRIMARY MANAGEMENT CONSIDERATIONS

Choice of paspalum cultivar

Platinum TE is the only paspalum cultivar that has been identified with genetically controlled vertical leaf tip orientation. All other paspalum cultivars that are on the market have horizontal leaf tip orientation, which requires a more dedicated manicuring program to re-orient the leaf tips into a vertical position in order to achieve expected greens speeds. With the horizontal leaf tip orientation, brushing and sand topdressing become critical management tactics to re-position the leaf tips into a more vertical position in order to improve ball roll and greens speed. Rolling tends to flatten out the leaves on the surface, which exposes the ball to the wax load on the leaves and increased friction during the ball roll that slows down greens speed.

Moisture impact on Platinum TE

The grass was exposed to ocean water and rainfall during evolution on sand dunes. As a result, the grass developed the capability to absorb moisture during high humidity and foggy conditions and to genetically adapt to prolonged drought periods as well as repeated exposure to water inundation on sandy soils. As a result, Platinum TE has a propensity to absorb water during high humidity conditions (>50%) or from exposure to any form of moisture including fog. Generally, the grass has an inherently higher internal water content (which causes the grass to retain higher water concentrations than most other warm season grasses and this results in a time-lag phase in which the plant readjusts internal cellular turgor pressure using potassium). Consequently, the

grass will transition from plump (excess internal cellular moisture) cells in the leaves to potassium-readjusted normal turgid cells that will be needed to achieve expected greens speeds.

Since Platinum TE leaves contain less lignin and cellulose compared to other warm season grasses, the shoot cells tend to be more elastic with a softer-textured canopy surface due to the heavy wax load on the shoots and stolons. Water composition can rapidly change with moisture-laden environmental conditions and the canopy can become puffy with increased exposed wax loads on the leaves until turgor water pressure adjustment in the plant is potassium-activated. In addition, a thick canopy density on the greens soil surface will trap excess moisture at the grass:soil interface (normally when the first rolling event occurs) and greens speeds early in the morning are traditionally going to be slow until sunshine and wind exposure coupled with mowing and additional rolling escalates moisture evaporation and intracellular turgor pressure is readjusted by potassium. Plant tissue analyzed (wet chemistry procedure) potassium concentrations should be maintained near 3% in order to achieve adequate turgor pressure adjustments in the turf. Potassium concentrations lower than 3% can generally result in slower greens speed and can predispose the grass canopy to potential scalping problems even without changing height-of-cut on the mowers. Application of silicates (such as calcium or potassium silicate products) can be applied to improve stiffness of the leaf tips which can also improve greens ball roll.

Any rainfall the previous afternoon or during the night or scheduled irrigation applications or unexpected fog overnight is going to reduce greens speed the next morning. The early morning mowing and rolling will squeeze the moisture at the soil:grass canopy interface to the surface and sun + wind induced evaporation will be needed to occur to improve greens speeds. A second roll during late morning or early afternoon with reduced surface moisture can improve greens speeds and some of those improved speeds will usually carry over to the next morning. Rolling several days each week may be needed to maintain the expected greens speed on the course.

Manicuring Greens Surfaces

Rollers:

Most greens mowers have Weihle rollers, which very aggressively bruise the softer seashore paspalum surface leaf tissues, especially as cutting height is gradually reduced below 0.125 or 3 mm. Continual injury to these more succulent leaf blades can result in predisposition of **Platinum TE** paspalum to pathogen attack (when environmental conditions favor disease development) as well as result in slow ball roll speeds. Cosmetically, the bruised tissue can turn brown, but that tissue often remains adhered to the shoot stems and results in a darkened appearance to the greens surface rather than the shiny lustrous dark green hue that is characteristic of the grass. Smooth rollers or paspalum Weihle rollers will enhance canopy quality and decrease disease frequency. Since the original Weihle roller normally is used to create a more upright leaf orientation for mowing on other greens grasses, installation of brushes in conjunction with the smooth or paspalum Weihle rollers can be used with other techniques to reduce injury to the paspalum playing surface while maintaining an upright leaf tip growth habit. The primary strategy is to never scalp **Platinum TE** paspalum, especially on greens or surrounds. Original Weihle rollers can be used on tee or fairway height-of-cuts above 0.250 or 6.25 mm.

Brushes:

Installation of brushes on the greens mower will help to ensure that leaf blades are pulled up from the horizontal position, vertically orienting them for proper leaf tip cutting. The result will be leaf tips that are being mowed instead of leaf blades or edges, or simply non-cutting of horizontally positioned leaves in small depressions. This is one of the first steps in improving ball rolls and speeds with **Platinum TE**. With careful manicuring of paspalum greens, you can achieve expected greens speeds with single cuts at a preferred height-of-cut.

Sand topdressing that is integrated in and around the leaves will then promote more persistent vertical upright leaf orientation, plus fill in the slight micro-depressions that contribute to ball chatter or bumpiness during ball roll. If the wax-laden leaves remain horizontal within these mini-depressions, ball roll will be slow due to the chatter and friction effect.

Stiffness of brush is also important. Extremely stiff brushes or often new brushes from the factory will normally create grooves in the paspalum grass that can lead to pathogen attack—again due to the softer canopy and leaves of **Platinum TE** paspalum when compared to hybrid bermudagrasses and bentgrasses. Medium to soft-textured brushes are recommended for regular use on **Platinum TE** paspalum greens at low mowing heights. Once the leaf orientation is persistently upright, you can either remove the brushes from the mowers or only use them as needed to assist in maintaining upright leaf positioning for effective ball speeds and trueness of roll. Platinum TE's genetically controlled vertical leaf tip orientation is a bonus morphological trait during the greens manicuring process.

Groomers:

Because of the propensity for paspalum leaf blades to generally lay down with normal mowing and rolling practices, plus the fact that the final fill-in during grow-in from sprigs is from surface stolons, groomers need to be used frequently enough to trim the surface stolons and the broader width lower leaf blades (oldest leaves nearest to the soil surface) plus clip the longer leaves in order to achieve desired greens speeds. The groomer height should vary in depth between grooming events and be based on amount of broad leaf blades being removed in the clippings from each **Platinum TE** green with each mowing plus the amount of surface stolons that remain to be severed. Grooming can range from light to moderately light to a periodic deeper grooming (almost simulating a verticutting event). All paspalum cultivars have 'Mother plants' that are aggressive in growth and require additional grooming in multiple directions in order to even out the canopy surface, leading to smooth ball roll.

The softer canopy and wax-laden leaves respond well to light grooming (i.e., a 'tickle grooming') and seem to give the same effect as more severe grooming events on stiffer, more rigid stolons and grass leaves such as the hybrid bermudagrasses. No grooming or limited grooming will not remove the broader and longer more basal leaves that contribute to slow ball roll and that characteristically contribute to a more horizontal growth habit with rolling. Remember that the initial leaves that emerge on **Platinum TE** paspalum sprigs will be larger and longer due to the higher height-of-cut needed to achieve grow-in canopy density first, prior to starting mower height reductions. Additionally, internode lengths on the initially emerging stolons during grow-in will be longer than anticipated and light verticutting that clips the top of the stolons will be needed to promote a tighter and smoother **Platinum TE** canopy density. After

the more aggressive grooming events, sand topdressing should be added at a quantity that will assist in smoothing out the surface canopy and to protect the surface stolons. Grooming can be performed at some level on **Platinum TE** greens ranging from 2-7 times weekly, depending on requirements for greens speeds and trueness of ball roll plus stage of the greens manicuring program.

Mowing practices:

More frequent cutting (i.e., single vs. double) can also influence green speeds and putting quality. Frequency of double-cutting vs. single-cutting can enhance predisposition to diseases when trying to increase ball roll speeds, especially if original Wiehle rollers are used. However, periodic (not daily) double cutting can sometimes promote better green speeds---a site-specific green x green balance should be established between frequency of double cutting and reducing potential injury to the canopy at close mowing heights (<0.25- inch or <3 mm) vs. desired green speed.

With a regimented and precision mowing program, single cutting can provide acceptable **Platinum TE** greens speeds when groomers and brushes coupled with sand topdressing are combined. With a softer canopy, the mower tends to set down into the canopy with each cut; therefore, triple cutting can easily result in scalping of some areas especially if the surface is moist or on clean up passes along the edge of the greens cavity or mounds and slopes. Repeated scalping to the **Platinum TE** greens canopy coupled with continual use of the wrong rollers and/or stiff brushes often produce additive injury effects, which frequently progresses into serious persistent problems with take-all and other root borne-type diseases. Remember that any damage or greens soil limitation will result in the grass reverting to root regeneration as a genetically controlled defensive response with an eventual loss of canopy density.

Height reductions should be slow and methodical, and normally not exceed 0.05 per day to avoid scalping. If significant money is being spent on fungicides with **Platinum TE** paspalum turf, then micro-management is not correct for the grass in that specific turf ecosystem. **Platinum TE** fertility programs must be developed for site-specific challenges. Because seashore paspalum is generally a softer-textured grass than other warm season grasses that are used on greens, triplex mowing should be minimized (not more than twice weekly) due to the weight of the machines and walk-behind units with **sharp blades** should be used more frequently once the height-of-cut is reduced below 0.125 or 3 mm if you expect to achieve tournament quality conditions.

The extra weight of the triplex units can cause additional bruising of leaf tissue and increased surface compaction problems with very closely mowed **Platinum TE** greens, leading to more frequent predisposition to diseases when weather conditions are favorable for pathogen activity (hot, humid, and frequent rainy or prolonged cloudy or foggy conditions) compared to use of walk-behind mower units and hybrid bermudagrass greens. **Platinum TE** was selected for its excellent disease resistance, but any grass can be overwhelmed and predisposed to disease attack if management is not correct and the fertility program has not been fine-tuned for the specific site.

Verticutting

With full **Platinum TE** canopy density, occasional light verticutting will be needed to

- 1) cut the top of surface stolons in order to diminish the chatter or bumpiness of the putting surface, and
- 2) to allow topdressing sand to integrate into the top soil profile zone to fill in small depressions and smooth out that surface. As **Platinum TE** paspalum greens mature, the grass has a tendency to create a very dense, compact surface that requires regularly scheduled periodic verticutting depending on density of the grass and supplementation with grooming to maintain acceptable smoothness and ball roll speeds. However, aggressive deep verticutting that penetrates into the sand/soil or double-verticutting is not recommended except in extreme situations.

The target for verticutting is the upper portion of the stolons with heavy canopy density and visible or 'porpoising' stolons rising above the canopy surface. Another rule is to not cut rhizomes when verticutting; otherwise, if they are cut, the **Platinum TE** will revert to root system redevelopment and a rhizome reinforcement priority defensive strategy to rebuild its 'foundation', while redirecting carbohydrate, nutrient, and hormone allocations to roots at the expense of the shoots.

Surface shoot density recovery from the aggressive verticutting event that cuts or damages rhizomes can then be delayed 3-6+ weeks. Using a soil cupcutter, check on the depth of the rhizomes (irrigation scheduling should involve less frequent, longer duration water application events that typically 'trains' the root system deeper into the soil profile and promotes subsequent rhizome placement at least 1+ inch or 25+ mm deep) before verticutting. The depth of the verticutter should then be set at half that distance to the rhizome layer to minimize any possible cutting of those critical root organs.

If the rhizomes are cut, start an immediate twice weekly seaweed extract application (such as Kelpex or AlgaeGreen or other similar products that contain at least >35% actual cytokinins) to eventually help balance the total hormonal package in the grass. Cytokinins are designed to escalate the root system redevelopment phase in the grass and once that **Platinum TE** root system is rebuilt, extra cytokinins are redistributed into the shoots to balance gibberellins and auxins, which in turn, stimulates stolon regrowth and additional fill in that leads to full and more uniform **Platinum TE** canopy density.

Sand Topdressing

A general rule of thumb is to impact 20% of the surface of greens with aeration each year, followed by sufficient sand topdressing to maintain a sandy mat in the upper soil profile. In addition, timely topdressing on paspalum greens can promote vertical orientation of shoot tips for mowing and remove the mini-depressions that contribute to slow ball roll. With judicious nitrogen fertilization and irrigation applications, organic matter accumulation in the surface 0-2 inches (0-50 mm) can be maintained at an acceptable level much more easily than for the newer bermudagrass and bentgrass greens cultivars (however, if too much nitrogen and too frequent irrigation is used, seashore paspalum will efficiently absorb the nitrogen and aggressively produce excessive biomass that can promote thatch buildup; monitoring clipping counts as each green is mowed is a good monitoring strategy). When organic matter (thatch and matt) accumulation is controlled by proper nitrogen fertilization and irrigation practices, then less

topdressing is required to dilute the organic matter in the surface. Instead, topdressing practices (quantities and frequency) can focus more on maintaining surface firmness and putting quality with little to no 'chatter' or bumpiness. Paspalum was often covered up by beach sand during evolution on dunes and readily responds to sand topdressing.

Rolling

Platinum TE greens can be speed-rolled 2 or more times weekly, if needed, when proper surface management of canopy density has been implemented. If there are weak or thin turfgrass density areas in the greens, rolling is not recommended in these zones until the canopy areas recover and the density is 100% coverage. In order to achieve tournament quality greens speeds, a second roll during late morning or early afternoon will usually be required after early morning high moisture conditions have been reduced.

Fertility and irrigation programs

The high nutrient uptake efficiency of **Platinum TE** paspalum and its ability to maintain excellent shiny dark green color and high canopy density under reduced nitrogen and modest irrigation regimes are essential factors on which the turfgrass manager can take advantage. As previously noted, too much nitrogen (>3.0% in plant tissue; wet chemistry analysis) and too short-duration frequent irrigation on a mature **Platinum TE** paspalum green will result in organic matter accumulation and thatch/mat development. If this is allowed to happen, the surface will become softer (especially when these events are coupled with frequent rain or irrigation) and can exhibit the adverse effects of excessive surface organic matter similar to other greens grasses. Or, to state this in another manner, if nitrogen fertilization and irrigation scheduling are not adjusted to the **Platinum TE** grass and specific site ecosystem requirements, all other maintenance strategies to improve paspalum green speeds and playing quality will be difficult to achieve. Maximum color expression in Platinum TE paspalum can be achieved with sufficiency requirements for calcium, magnesium, iron, manganese, sulfur, phosphorus, and potassium.

Similar to any grass grown on greens, a suitable holistic fertility management program is critical for maximizing performance of the grass for sustainable putting qualities. Because of the inherent capacity for efficient nutrient uptake coupled with low requirements for many nutrients, proper nutrient sufficiency requirement should be maintained in **Platinum TE** grown on greens in order to achieve healthy turfgrass canopy playability and minimal disease challenges. Micronutrient absorption and calcium (nutrient stabilizer) + potassium (stress tolerance mechanisms, water balance) nutrient balances are critical concentrations to maintain in any paspalum cultivar, especially when saline water is used for irrigation. Calcium + potassium in the shoots/stolons, manganese + zinc in the roots, and cytokinins to balance the inherent hormonal concentrations in Platinum TE are keys to maximum salinity tolerance mechanism activation.

Plant Growth Regulator Use

Primo (trinexapac-ethyl) or Aneuw (prohexadione calcium) can be used with lighter rates (3-8 oz/acre/application and not to exceed 10-12 oz/month) than are applied on hybrid bermudagrass greens, but do not apply these gibberellin-inhibitor plant growth regulators until you have a full turfgrass canopy with acceptable shoot density. Realize that Primo effects will usually have a 5-7

day lag period before you observe slow down in growth rates of **Platinum TE** as measured by amount of clippings coming off each green (should be ~1/3-1/4 basket per green if the nitrogen fertility program is correct). Elevated clipping counts from each green will usually indicate that the nitrogen fertility program may be too high for the grass on specific greens. Since Primo is a gibberellin-suppressant, application of this PGR on less than 100% canopy coverage is not recommended.

Recovery from damage to Greens

Platinum TE has a very aggressive growth rate and recovery from scalping, pest damage, chemical damage, or traffic can be very rapid IF nutrient sufficiency concentrations are properly maintained and hormones (cytokinins, gibberellins, auxins) are balanced in the plant. Recovery is much faster than zoysiagrasses and is often faster than most ultradwarf hybrid bermudagrass cultivars. Since paspalum is much more responsive to hormones than most other warm season grasses, regular applications of seaweed extract products containing >35% cytokinins as a scheduled chemical application is recommended in order to escalate recovery from damaged canopy areas and achieve acceptable fill in to 100% density on greens. Minimize application of GA and auxin hormonal products until full canopy density is achieved in the previously damaged green areas.

ADDITIONAL MANAGEMENT DECISIONS

Pest Control Program

Any grass grown on greens with mowing heights below 0.125 or 3 mm coupled with high rounds of golf play must be monitored properly for insect and disease challenges. Proper nutrition, careful irrigation scheduling, good mowing practices and properly maintained equipment, and regularly scheduled cultivation practices are essential for maintaining proper grass performance in **Platinum TE**. Monitoring for nematodes and the worm complex in paspalum will be no different than any other warm season grass. Platinum TE has demonstrated very good tolerance to nematodes due in part to development of an extensive root system. The spiral endoparasitic nematode should be carefully monitored since that nematode prefers to attack seashore paspalum.

Ball Mark Recovery

Normally, if ball marks are not recovering at an equal or greater pace compared to ultradwarf hybrid bermudagrass greens, several management-oriented conditions may be present: either the surface canopy-soil profile containing a sandy mat is not flexible enough to absorb the compression impact of the ball, or too much nitrogen has been applied that is promoting shoot succulence and puffiness plus growth rates that contribute to thatch buildup near the soil surface, the greens profile has retained too much moisture, or the nutrition and hormone application programs are not properly balanced to promote recovery.

Adequate micronutrients need to be applied to promote growth, especially nutrients like manganese that activate over 35 enzymes involved in growth and development when root absorbed. This balancing of the nutritional program becomes more critical with increases in salinity of irrigation water, since salt is a growth regulator that can suppress stolon growth or

slow down fill in and subsequent recovery from rhizomes. The **Platinum TE** grass will respond readily to nitrate fertilizer sources, but minimal nitrate-N is needed to achieve adequate growth responses. Potassium, which activates over 80 enzymes for growth, must be maintained at about 3% in paspalum plant tissues. Magnesium, which is the core molecule in chlorophyll, is involved in all photosynthetic activity and most enzyme systems. Frequent applications of cytokinin hormonal applications may be needed to escalate ball mark recovery in fairway landing zones and on tee surfaces.

Calcium, as an intracellular nutrient stabilizer, is critical for assisting recovery of the grass in and around the ball impacted zone. Careful grooming or light verticutting and sand topdressing has the potential to smooth out the ball-mark compression-depressed areas and to help maintain smooth ball roll and expected greens speed as long as the fertility program is sustaining nutrient sufficiency requirements. Proactive plant tissue monitoring and wet chemistry/spectrophotometric testing will determine the range of nutrient concentrations that the turf was able to absorb.

Seed Heads

Paspalum cultivars vary in their capability to produce seed heads. Seed head expression normally occurs plus or minus 2-3 weeks around the longest day of the year or when the grass senses environmental stress conditions that triggers a defensive response in the grass. Excess phosphorus fertilization can also trigger seed head exsertion in **Platinum TE** paspalum. Even though seed heads are formed due to photoperiodic or stress conditions, monostands of paspalum cultivars do not produce seed. So the seed head issue is primarily a cosmetic issue and not a seed production issue.

A general seed head (fewest seed heads to most seed heads developed) exsertion rating is: **Platinum TE**<SeaIsle Supreme<SeaIsle 2000<SeaIsle 1=Velvetene<Seadwarf<<Salam. Most of the time, greens will be mowed at heights in which very few visible seed heads are apparent, except along the first cut or aprons around the greens complex. In case chemical control is needed, Trimmit (paclobutrazol) and Proxy (ethephon) at label rates can be used to suppress any new exsertion of seed heads.

Proactive Monitoring Program

Use tissue analysis (wet chemistry/spectrophotometric) coupled with water and soil (normal soil fertility test) data to adjust the fertility program on **Platinum TE** paspalum. Also have the soil testing laboratory to run a saturated paste extract (SPE) salinity test using your irrigation water to determine the overall salt accumulation limitations in the soil profiles; however, **do not base fertility adjustments on the saturated paste test** since the SPE is only an indicator of nutrients and salt ions that are in soil solution and potentially available for root uptake. Use scientifically based soil, water, and plant tissue properly analyzed data from greens to make fertility adjustment decisions.

A CRITICAL PLATINUM TE RULE

The general rule of thumb with **Platinum TE** paspalum greens is that the comprehensive management program should be geared to a 'slow and deliberate', but regimented pace. Be patient and the ball speeds with come. Try to force the grass or scalp the grass on **Platinum TE**

greens, and additional problems will ensue, leading to prolonged recovery, less than desirable canopy density, and slow greens speeds

SUMMARY

Nine basic guidelines for achieving desirable and sustainable putting speeds on **Platinum TE** paspalum greens include:

1. Start with evaluation of your N fertilization program and irrigation scheduling practices. Balancing the macro- and micro- nutritional programs for optimum site-specific growth responses is especially important on low CEC sands and when using saline irrigation water, with critical attention to Ca, Mn, Zn and other micronutrients. %N in **Platinum TE** leaves should be maintained less than 3.0%; concentrations above 2.8% can predispose the grass to increased pathogen attack due to creation of more succulent leaf blades on a softer textured canopy. Maintain potassium concentrations about 3% in the surface shoots.
2. Smooth or paspalum Weihle rollers instead of original Weihle rollers should be used on all greens mowers; use walk-behind light-weight mowers and less frequent use of triplex mowers on greens surfaces is preferable.
3. Use brushes with light to medium bristles to stand-up horizontally positioned leaves and to promote subsequent cutting of leaf tips to maintain greens speeds
4. Light verticutting to cut the top of surface stolons in order to tighten up the surface canopy
5. Groomers used at varying heights to cut and/or remove larger wax-laden leaves and remaining large surface stolons
6. Topdressing to smooth out mini-depressions and stand up any leaves with a tendency for horizontal growth. Platinum TE rapidly responds to sand topdressing applications.
7. Timely Primo or Aneuw applications (normally in the 3-8 oz/acre range) if needed to reduce clipping counts in canopies with 100% coverage.
8. A second daily rolling may be needed to finalize surface smoothness and to sustain expected ball speed. Rolling multiple times each week and especially leading up to tournament events may be needed to achieve expected greens speeds.
9. Application of liquid silicate products can also assist in improving traffic tolerance in key areas as well as assist in improving stiffness of leaf tips that can help to maintain expected greens speeds.

Understanding the grass, how it grows, and how it responds to nutrients when interacting with the microenvironment and with irrigation scheduling and water quality are keys to achieving and ultimately maintaining any desired greens speeds with this grass or any other grass grown under low cutting heights. You can achieve the greens speeds and ball roll that is desired IF all components of the management program are adamantly followed; skip one maintenance tactic, and you will experience slow greens and displeased vocal golfers.