Renovation and Grow-in Highlights

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Overview

- Eradication of Existing Turf
- Greens Renovation - Strip & Regrassing or Complete Reconstruction
  - Selection of proper root-zone mix
  - Ensure equal depth of root-zone mix
- Grow-in Overview
  - Amendments
  - Fertility
  - Cultural Activities and Irrigation

Top Reasons for Renovations

- Golf course renovation/restoration
- Turf contamination
- Soil physical or drainage issue(s)
- Upgrade/change to new turfgrass species or cultivar
1. Eradication of Existing Turf

- PRIOR TO ANY RENOVATION, eradication of existing turf should be performed...even complete rebuilds to eradicate as many viable rhizomes as possible (95-98% control is best).
  - Should be performed even with soil fumigation
- Two (2) to three (3) applications of non-selective herbicide mix:
  - Glyphosate (Roundup) at 113 to 128 fl oz/A +
  - Triclopyr (Turflon Ester) at 32 fl oz/A +
  - Fluazifop (Fusilade II) at 24 fl oz/A +
  - Methylated Seed Oil at 0.5% v/v +
  - Ammonium Sulfate (21-0-0) at 10-20 lbs/100 gal
1. Non-selective herbicide mixture should be applied at least 3 weeks apart, so proper planning is important.
   - Allow turfgrass to “green-up” prior to sequential application to maximize
   - Eradicate turf slowly
2. Irrigation and quick release fertilizer should be applied between sprays (~2 weeks after sprays) to promote regrowth of underground rhizomes
   - No-till aerification and v-cutting should be performed between sprays
3. NOTE: In no-till situations or establishment where existing soil is used, 3 spray should contain Glyphosate only due to soil residual of Triclopyr and Fluazifop.

Eradication of Existing Turf – Program Keys

2. Root-zone Mix Selection in Putting Greens
   - Physical properties of root-zone mixes should be carefully considered in reconstructions and strip and re-grass renovations
   - All root-zone mixes should be analyzed by an accredited laboratory to ensure conformity to USGA specifications

Pitfalls in Greens Reconstructions
   - Ensuring equal depth of greens mix throughout entire putting green
   - Equal depth of root zone mix:
     - Moisture content at surface relatively similar due to equal depth to gravel layer and perched water table.
**Non-uniform depths of root zone mix:**

Moisture content at surface varies significantly due to differences in depth of root zone mix and distance to gravel layer and perched water table.

- Typically we see deeper depth of root-zone mix on mounds & shallower depth of root-zone mix in low lying areas, which only further confounds the issue:
  - Mounds now become drier and low areas, wetter.

**Pitfalls in Greens Reconstructions**

- USGA is considering Variable-depth construction (J.N. Rogers, MSU) as a future consideration for Putting Green Recommendations, which is an inverse of the previous slide.

  - Mounds (inherently dry areas) receive less root-zone mix &
  - Low-lying areas (inherently wet areas) receive more root-zone mix.

**Pitfalls in Greens Reconstruction/Renovations**

- Moisture content at surface varies significantly due to differences in depth of root zone mix and distance to gravel layer and perched water table.

**Avoiding varied depth putting greens:**

- Ensure subgrade matches finish grade
- Probe depth to gravel layer during construction to ensure similar depths

**Greens Stripping, Mix Replacement and Re-grassing**
Strip and Re-grassing of Putting Greens:

- Following eradication sprays, 4 to 6” of root-zone mix is removed and replaced with a compatible mix.
- Drainage functionality should be confirmed.
  - Flush-outs and drainage outlets
  - Ground penetrating radar to locate drains

Pitfalls in Greens Stripping and Re-grassing

Strip and Re-grassing of Putting Greens:

- CRITICAL - Selection of compatible root-zone mix.
  - Perform physical analysis of intact soil cores (ISTRC) to identify the physical characteristics (sand fractions, infiltration rate, etc.) of the root-zone in the 4-8” zone
  - Identify a new root-zone mix that is similar or slightly more coarse than existing root zone mix. **A finer root-zone mix should never be used.**

New Root-zone Mix vs Existing Mix

New mix is slightly more coarse than existing mix
Strip and Re-grassing of Putting Greens:

- Once compatible root-zone mix is found, it is added to the existing putting greens profile.
  - Best to blend new mix into existing mix to avoid layering effects.
- During this process, greens should be probed to ensure consistent depth of mix.
  - Less or more mix can be added for depth consistency.

Pitfalls in Greens Striping and Re-grassing

Do your homework:
- Perform soil nutrient and water quality reports.

New root-zone mixes on putting greens will inherently have a low soil CEC, therefore grow-in program and pre-plant amendments should be based largely upon water chemical composition (water quality report).

Grow-in Programs

- Slow-release Nitrogen (N) product at 4-6 lbs N/1000 ft². Target a release curve of approximately 0.25-0.33 lbs N/1000 ft²/week over 12-16 weeks.
  - Important to have a background release of N for new turf roots.

- Slow-release Potassium (K) product at 3-4 lbs K/1000 ft². Target a release curve of approximately 0.20 to 0.25 lbs K/1000 ft²/week over 12-16 weeks.

- All-mineral Phosphorus (P) fertilizer at 2 lbs P/1000 ft². This product will be reapplied multiple times during the grow-in.

- Ca-based product (lime or gypsum) depending upon pH of root-zone mix and irrigation water. Typically applied at 10-20 lbs/1000 ft².

- Organic fertilizer (Nature-Safe, Chicken Manure, etc.) at 10-20 lbs/1000 ft² to assist with slow release of N.

Grow-in Programs – Putting Greens

If possible, all preplant amendments should be raked into top 1-2” soil prior to sprigging using SandPro or leaf rake.
Reduced irrigation frequency by day ~14 allows for granular applications of N, P, and K to begin.

- All-mineral (quick release) fertilizers should be applied at this stage to promote rooting and shoot growth:
  - Nitrogen – Ammonium Sulfate (21-0-0) at 0.75 to 1.0 lbs N/1000 ft² every 4-7 days
  - Phosphorus – Various formulations at 2.0 to 2.5 lbs P/1000 ft² every 10-14 days
  - Potassium – K-Mag (Sulfate of Potash-Magnesia) at 1.0 to 1.25 lbs K/1000 ft² every 7-10 days
- By ~6 weeks from establishment, target an approximate ratio of 1N-1P₂O₅-1K₂O (1N-0.4P-0.8K) (Rodriguez, Miller and McCarty, 2001)

Grow-in Programs

Post-plant Applications – Putting Greens

Foliar sprays begin 4-6 weeks after sprigging using a 1N-1P-1K soluble fertilizer. Other additions to sprays:
- Cytokinins to promote shoot growth
- Humic acid based product to promote soil biology and nutrient/water retention
- Phosphite product for foliar Pythium prevention
- Granular applications discontinued when bermudagrass coverage is ~95%. Begin adding PGRs (Primo) to foliar sprays.
**Grow-in Programs**

**Cultural Activities – Putting Greens**

<table>
<thead>
<tr>
<th>Cultural Activity</th>
<th>Begin Activity (days after sprigging)</th>
<th>Frequency</th>
<th>Comments/Details</th>
</tr>
</thead>
<tbody>
<tr>
<td>Rolling</td>
<td>18-21 days</td>
<td>3-4x/week</td>
<td>Rolling should be performed prior to mowing. Begin with light roller. Heavier roller once sprigs more established, if needed.</td>
</tr>
<tr>
<td>Mowing</td>
<td>&lt;21 days</td>
<td>6x/week</td>
<td>Starting height of cut 0.18-0.20&quot;. Drop height by 0.01&quot; per week.</td>
</tr>
<tr>
<td>Topdressing</td>
<td>&lt;21 days</td>
<td>Weekly</td>
<td>Light topdressing at 100-150 lbs/1000 ft². Same sand as greens mix.</td>
</tr>
<tr>
<td>Spiking</td>
<td>28-35 days</td>
<td>2-3x/week</td>
<td>Perform in different directions.</td>
</tr>
<tr>
<td>Grooming/Verticutting</td>
<td>35-42 days</td>
<td>As needed</td>
<td>Light and frequent. Not aggressive.</td>
</tr>
<tr>
<td>Aeration (Solid or Core)</td>
<td>&gt;42 days</td>
<td>As needed</td>
<td>Assist with smoothness.</td>
</tr>
</tbody>
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Coverage less than 95% → Continue granular fertilizers & foliar sprays w/ N-P-K

Coverage at 95% → Transition to foliar applications
Highlights for Fairway/Rough Establishment

- Thorough eradication of existing turf – target at least 3 sprays, 3 weeks apart
- Aggressive core aerification/verticutting between eradication sprays in no-till establishments. Create a sprigging surface
- Ronstar + Fertilizer applied following sprigging and prior to first irrigation cycle on sprigs
  - Fertilizer should contain slow release N and P and K
- Weekly granular applications (Ammonium Sulfate, DAP, etc.) approximately 14 days after sprigging
- Mowing and slicing are critical

Summary Points for Successful Renovation/Grow-in

1. Thorough eradication of existing turf
   - eradicate it slowly
2. Proper selection of new rootzone mix
   - similar to slightly more coarse - never more fine
3. Consistent depth of rootzone mix
   - probe the greens to confirm
4. Complete grow-in program
   - soil nutrient and water quality reports
   - target ratio of 1N:1P₂O₅:1K₂O (1N-0.4P-0.8K)

Questions & Answers
Discussion
Thank You!

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