INFIELD SOILS AND TOPDRESSINGS - PART I

By Paul Zwaska

Editor's Note: The following article is the first in a two-part series and was written in 1999 when the author was Head Groundskeeper, Baltimore Orioles.

Baseball is a unique sport in grounds management. It’s the only major sport that is played on a field that has both turf and exposed soil for a playing surface. Ballplayers scrutinize the playability of your skinned areas more closely than you’re turf areas. Your reputation as a groundskeeper will depend on the skin you keep.

This is not to say that the turf areas on a baseball field are unimportant. But if you think about it, 75% or more of the game occurs on the skinned areas of the field. Unfortunately, this crucial subject is avoided by the academic institutions that teach many of today’s up and coming athletic field managers.

With no written guidance, new groundskeepers must resort to trial and error if they haven’t been lucky enough to learn from another groundskeeper in the business.

GOALS FOR A QUALITY INFIELD SKIN

Traction: Most players desire the same quality in an infield skin: traction. That’s the reason for the spikes in their shoes.

Nothing makes a player happier than a firm infield skin that is moist and cork-like, not hard and baked dry. The cleat should penetrate the skin and leave a perfect imprint. Very little soil should be disturbed or displaced. When players plant their feet to throw, field the ball, or run, the soil should not give way under them. The traction in your infield skin comes from its base soil. Choose your mix carefully. Many companies that sell infield skin mixes know nothing about their proper function.

Many mixes are too sandy. Soils that don’t firm up (high sand content of 75% or higher) are more mobile. This creates low spots in high-traffic areas (around bases and fielders’ positions) more quickly, especially as the field dries out. The loosened material is more likely to be carried to other portions of the field to create high spots and huge lips at the infield skin/turf interface.

These sandy infield mixes increase infield skin maintenance problems. The loose soil also causes unstable footing for ballplayers, increasing the risk of foot, ankle, and hamstring injuries.

Drainage: The proper drainage on your infield skin dictates how quickly you will resume play after a rainfall. About 95% of the interface. The traction in your infield skin comes from its base soil. Choose your mix carefully. Many companies that sell infield skin mixes know nothing about their proper function.

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Testing:

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Testing: If you don’t know the percent breakdown of sand, silt, and clay in your skin base mix, you have to test it to give you a reference point for comparisons. Send a sample of your soil to a private testing lab or county extension office that performs particle size analysis or soil texture analysis work. These labs will give you the composition percentages, and they’ll show you where your soil fits into the soil texture triangle. A simplified home version of the test is also available. It can give you a ballpark figure of your percentages.

There is a simple way to get an estimate of the percentages of sand, silt, and clay that are in your base mix. This experiment provides a nice, cheap way of checking soils if you are looking around and can’t afford to do a lot of testing.

DETERMINING SOIL TEXTURE

Step 1. Obtain a quart mason jar with a lid, like the ones used for canning. Fill it a little more than half way with the soil you wish to test. Fill the rest of the jar with water, and attach the lid tightly.

Step 2. Shake the jar vigorously for a couple of minutes to fully separate and wet the soil. There should absolutely be no lumps of soil left when you’re finished agitation it.

Step 3. When you feel that the soil is fully dispersed in the solution, set the jar down and begin timing. After 45 seconds, mark a line on the side of the jar with a grease pencil or White-Out where the top of the layer of sand has settled out in the jar. Next, put a mark at the top of the next layer after three hours have passed; this is your silt layer. After 24 hours, your clay will have settled out as well.

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With spring soon to arrive, it is an important time to begin thinking about options for controlling crabgrass. If a significant soil seed bank exists and there are voids in the turf stand which minimize competitive benefits of the turf, as a summer annual, crabgrass will germinate profusely in the spring, mature throughout the summer months, and die in early fall at the first killing frost leaving dead “skeletons” throughout the landscape. Crabgrass seed will typically begin germinating after April 10 in South Jersey and by April 20 in Central and North Jersey. Crabgrass will continue to germinate though mid-July.

Integrated Pest Management (IPM)
Recall that IPM attempts to reduce the risk that pest control strategies may have on the environment and people by incorporating all suitable techniques to maintain pests within acceptable limits. Although it is a common misconception, IPM does not entail the elimination of pesticide use. They simply mean that a fitting level for each of the specific turfgrass species or mowing at a frequency at which such scalping is avoid can constitute IPM. Improper mowing techniques leading to scalping turf will thin-out turfgrass areas, leading to voids in the turf stand, and will eventually provide opportunities for crabgrass to encroach. IPM also entails proper fertilization. Under-fertilizing turfgrasses will often result in a weak stand, poor turf density, and an environment in which crabgrass can readily invade. Yearly nitrogen requirements per 100 ft² for cool season turfgrasses used on New Jersey sports fields are: Kentucky bluegrass, 2.5 lbs; perennial ryegrass, 3.5 lbs; tall fescue, 2.4 lbs. High-use sports fields often necessitate the high-end of these nitrogen fertilization guidelines in order to encourage turfgrass recovery from traffic.

Preemergence herbicides: Are they an option?
For sports field managers whose cultural program includes spring overseeding of his or her fields, applying most preemergence herbicides at the appropriate time will not only deter crabgrass emergence, it will also inhibit establishment of cool season turf. Products such as pendimethalin (Pendulum or Pre-M), benefin trifluralin (Team), prodiamine (Barricade), oxadiazon (Ronstar), and dibromoxynorflurion are not viable options for preemergence crabgrass control if overseeding is a part of the manager’s spring program. Depending on the product and the application rate, the residual of these herbicides is such that the seeding of desired cool season turfgrasses may not begin for 2 to 6 months following the application of the herbicide. Additionally, these products many not be used in newly seeded turf as young turfgrass seedlings are highly susceptible to the phytotoxic effects of these herbicides.

Sodiron
Sodiron (Tupersan) is a herbicide that is labeled for preemergence crabgrass control at seeding stages. Large crabgrass seedlings are characterized by upright growth and leaves that are rolled in the bud, lack auricles, and have a jagged membranous ligule. Large crabgrass leaf blades and sheaths are covered with stiff hairs. Smooth crabgrass is similar to large crabgrass, however it has fewer hairs on its leaf blades and sheaths.

Quinclorac and fenoxaprop
Quinclorac (Drive) and fenoxaprop (Acalux Extra) are labeled for the selective postemergence control of crabgrass in perennial ryegrass, Kentucky bluegrass, and tall fescue. Quinclorac is effective in controlling young, un-tillered crabgrass seedlings and may be applied up to 0.75 lbs/Acre (1.0 lb Drive/Acre). To increase the efficacy of weed control, the label recommends applying quinclorac with an oil-based adjuvant such coil or concentrate or methylated seed oil. Quinclorac may be applied up to 7 days prior to the seeding of tall fescue, Kentucky bluegrass, and perennial ryegrass, at the time of seeding for perennial ryegrass and tall fescue, and 14 days after the emergence of tall fescue, and 1 month after the emergence of Kentucky bluegrass, perennial ryegrass and tall fescue. The label notes that admixtures should not be added to quinclorac applications to newly seeded turf prior to 28 days after seeding emergence.

Step 4. Measure the total depth of the soil in the mason jar. Then measure the thickness of the each of the layers using your tape measure.
Step 5. Calculate the percent of sand, silt, and clay in your soil sample with the following procedure:

1. Divide the thickness of the sand layer by the total depth of the soil in the jar.
2. Follow the same instructions for both the silt and clay layers.
3. Multiply each of the three figures by 100, and you will have the percentages of sand, silt, and clay in your sample.

Step 6. You can now check the soil texture triangle to see where the interaction of the three values places you on the triangle. Remember that this is an estimate. If you need a more precise test, it is worth while you to have a professional test done in a private lab or a county extension office.

Soil testing labs use a couple of different quantitative methods to determine relative amounts of sand, silt, and clay. One method is the pipette method which is based on the relative content of one of the three soil particle sizes.

General Guidelines: Remember that soils differ greatly around the country and they react differently to many things. The following guidelines are a guide for base mixes. Soils in your area might not always fall into these guidelines.

You want to keep the sand fraction of your base soil between 50% and 75% (normal base mix). Soils with higher sand content normally become too loose and mobile. The soil becomes too loose with play and is transported to other areas of the skin by the dragging process or by play. If you go in with a sandy base mix, the soil will drain too rapidly because your base mix has high sand content. In fact, it creates more maintenance headaches.

The mobile soil rapidly develops high and low spots in the skin, and can drainvariably, depending on structure. Those low spots and high spots in the skin due to lack of porespace from compaction. The result is a hard field that is unable to take up moisture to help soften it. The best solution is to add sand clay and help reduce compaction and increase pore space. But be careful not to blend in too much material.

The lesson to be learned here is don’t just pick any old soil for your base mix. Know what you are getting by asking for a soil particle size analysis. And whatever you do, don’t purchase a mix just because some salesman says that he has “x” hallmark and “y” hallmark using it. Most of those people have zero knowledge of what kind of soil creates the best infilled skin.

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High-clay and high-silt soils create a different problem: compaction and hardness. When speaking, the combination of these two materials should not exceed 40% to 50% of your soil mix. Too much of either of them can inhibit intake of water into the skin and the lack of pore space can compact the soil. The result is a hard field that is unable to take up moisture to help soften it. The best solution is to add sand clay to help reduce compaction and increase pore space. But be careful not to blend in too much material.

Till it well, let it settle, and pack and see how it reacts before you add more. The alternative is to replace the base mix with a new mix.

Rocks and pebbles in an infilled base mix can be a major problem. Your base soil should be able to pass through a 1/4-inch screen, or at the very least a 3/8-inch screen, to eliminate any rocks or pebbles.

For Osirice Park at Camden Yards, I use a 60% sand, 20% silt, 20% clay base mix. This translates to a borderline sandy loam and sandy clay loam. I’ve used it since it day the we moved here. It’s a very stable soil with little mobility. Low spots on my infills are rarely a problem, but that is also partially due to the management of the skin.

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