

Dealing with a Hard Pan



Have Questions? Send them to Dave at: ISU, Hort. Dept., Ames, IA 50011

by Dr. Dave Minner

I would like your opinion on the type of aerifying unit to purchase. Here are some of my concerns, all related to aerifying a native soil field. I think that everybody agrees that we should pull a plug when aerifying. If that plug is always pulled at, for example, a 4-inch depth, I believe that over time a hard pan will develop at that depth. I have seen this in agriculture using a moldboard plow and especially with a disc. The only way to alleviate this problem is to rip the ground about 18-inches deep. In turf we would use a deep tine machine to do the same thing. Most of the affordable plug aerifiers will only pull a plug to a depth of 4 inches. So, here is my question:

CULTIVATION GOALS

There are many cultivation methods available for sports turf management. The best method of cultivation can be selected when specific cultivation goals have been determined.

Cultivation Goal

	HOLLOW TINE 4-INCH	SOLID TINE 4-INCH	HYDROJECT	SHATTER CORE 4-INCH	VERTIDRAIN	FLOYD MCKAY DRILL & FILL	SLICING/SPIKING	VERTICAL MOWER
Cultivation between playing seasons (no activities scheduled on the field)								
Change soil type in top 4 inches by removing soil and back filling with amendment	X							
Create large and deep holes that are back filled with a soil amendment such as Profile						X		
Remove surface soil layer that was attached to sod during sand-based field construction	X							
Promote deep rooting, 8 inches or more		X	X	X	X			
Maximum removal of water puddles				X	X			
Cultivation during playing season								
Increase initial water infiltration rate with minimal disturbance to surface		X	X				X	
Plant seed with minimal disturbance to grass and soil stability		X						
Encourage lateral growth of sod forming grasses							X	X
Fracture hard skin infield, drag surface and begin play			X					

If we are only able to afford one type of aerifier, would you be better off buying something like an AerWay type machine? They will go 6- or 7-inches deep, and claim to shatter the soil to an even deeper depth, including a sideways shatter. You would still have a hole in the ground for fertilizer and top dressing, but would lose the opportunity to turn the soil by pulling a plug. Would more frequent usage of the AerWay unit make up for not pulling a plug? I was able to get a demo with AerWay and on very compacted soil it will pull a "chunk" of soil out of the ground. On non compacted soil it will just make a hole with a minor disturbance to the soil surface.

Ken Hanawalt
Transportation Director/Grounds Keeper
Rockwell-Swaledale Community Schools
Rockwell, Iowa

Let me first say that we sports turf managers have developed a real love affair for sticking steel in the ground to create better growing conditions, and this has been driven by the great array of cultivation equipment that is on the market today. Aerification equipment can range from \$2,000

to \$20,000 and this gives nearly every sports field manager some opportunity to purchase a piece of equipment that can improve their field situation.

When selecting cultivation equipment first consider your specific goal. Coring, slicing and shattering are all beneficial, but they may not produce the effect that you desire unless you know what it is that you are trying to achieve. Examples of specific aerification goals and the equipment needed to produce the desired effect are listed below.

Now for your specific question. It is true that some research indicates that a compacted layer could develop just below the depth of the cultivation tines. From a practical aspect I would not worry too much about this hard pan phenomenon.

Most of the sport field situations that I encounter are more concerned with reducing surface compaction from excessive traffic rather than a hardpan layer caused by aerification equipment. What I typically see is that roots proliferate in the zone of aerification and then decrease below that zone of aerification, even if a hard pan does not exist.

Should a hard pan layer or any other type of layer develop below the 4-inch depth, simply contract with an aerification company that uses deeper penetrating equipment that can probe the field at depths of 8 to 18 inches. Watch out for the irrigation lines when using deep tine equipment and don't consider deeper aerifi-

cation only when you have a layering problem. It is becoming more of a routine practice on tight soil and even on sand-based fields.

As to what type of aerifier to purchase, I would always recommend that you first consider a good reciprocating tine machine that can utilize both hollow tines and solid tines. This gives you the most flexibility when deciding about core removal and topdressing incorporation. Slicing and fracturing machines are beneficial, but I would not consider them as a substitute for hollow coring. The tufts of grass that come up from seeding and persist in hollow core holes, even after continued traffic, are a real testimony to the usefulness of coring type aerifiers. Remember, any type of aerification will be better than none at all. So buy the machine that you have the most confidence in and use it often.

David D. Minner, Ph.D., is an associate professor with the Department of Horticulture at Iowa State University. He serves on STMA's Certification Committee. Send your questions to Dave AT: ISU, Hort. Dept., Ames, IA 50011; or call: (515) 294-0730, or e-mail: dminner@iastate.edu.