Cultivation, Topdressing and Thatch

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Soil Cultivation (Aerification)

Benefits from aeration:

- reduced soil compaction
- improved air exchange between soil and atmosphere
- increased water infiltration
- reduced water runoff
- stimulated root growth within the holes
- breaking up soil layers
- thatch control
- improved wetting of dry soils and drying of wet soils
- better uptake of fertilizers


Worn Turfgrass

Soil Compaction

Factors Affecting Soil Compaction:

- soil texture
- use
- soil water content
- salts and/or sodium level
- organic matter content

Main Affect of Soil Compaction

- decrease in soil oxygen level
- decrease in macropore (capillary) space in soils
- increase in micropore (noncapillary) space in soils

Affect of Soil Compaction on Soils

Degree	bulk density	% pore space total	macro	micro
none	1.09	58.9	33.1	25.8
Moderate	1.47	44.6	19.2	25.4
Heavy	1.80	27.9	3.0	24.9

Affects of Compaction on Soils

Degree	infiltration	% runoff
None	3.0 +	0
Moderate	1.13	19
Heavy	0.28	80

Increasing Amount of Macropores in Compacted Soils

A hollow tine is the most effective aerifier to increase the amount of macropore space in a compacted soil.

Aerification Equipment

- hollow/solid tine
- deep tine aerifiers
- drill and fill
- slicers
- spikers

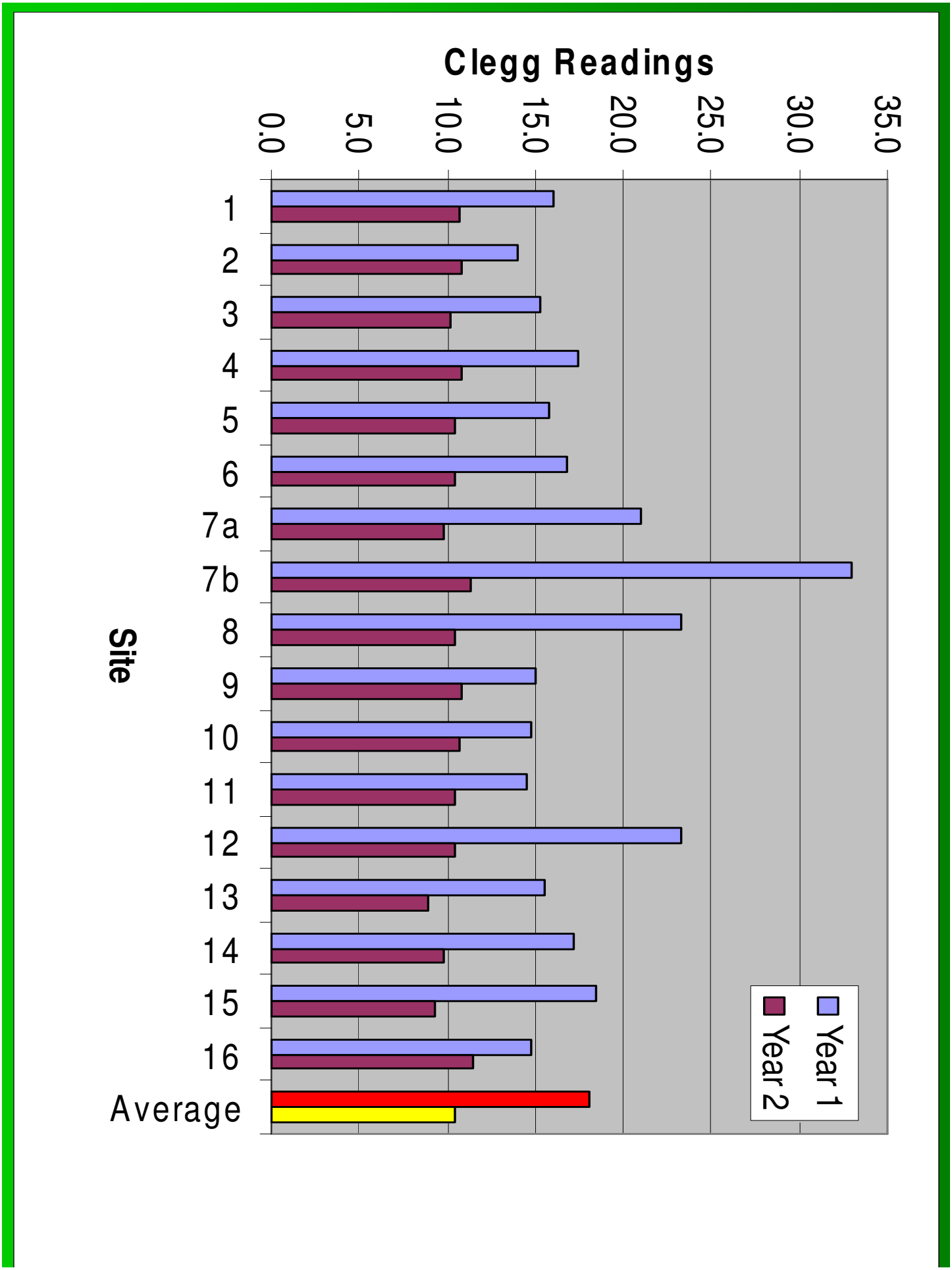

Hollow Tine


Solid Tine


Deep Tine


Drill and Fill


Slicing Unit


Clegg Readings
0.0
5.0
10.0
15.0
20.0
25.0
30.0
35.0
Site
1
2
3
4
5
6
7a
7b
8
9
10
11
12
13
14
15
16
Average
Year 1
Year 2

How Often Should You Aerify?

Depends!!!!

Factors Affecting Aerification Frequency

- amount of annual traffic (events).
- type of activity.
- type of players.
- type of soil.
- construction problems.

Number of Events


Type of Activity
COOGS

Type of Players

Type of Soil

- sand
- sandy loam
- clay


Construction Problems

How Many Times Does Each Field Need to be Aerified?

Depends, on heavily used fields a minimum goal would be to aerify enough times to affect 15 to 20% of the soil surface each year.

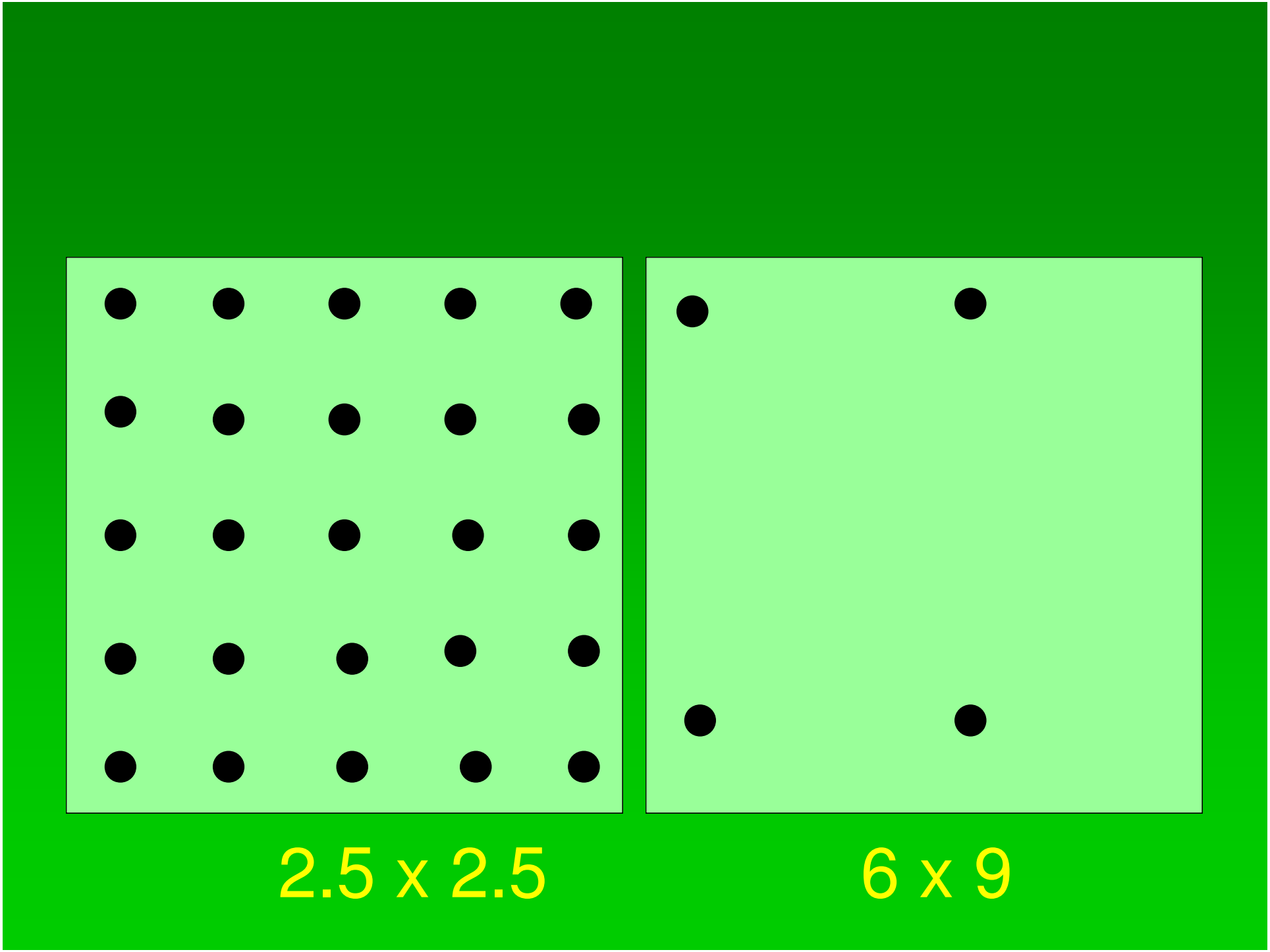
- hole diameter
- tine spacing

Chart for Holes per Square Foot

TINE SPACING	HOLES/ SQ FT	HOLE DIA.	IN SURFACE AREA/SQ FT	% SURFACE AREA/SQ FT
2.5 x 2.5	23	5/8	7.05	4.9
	23	3/4	10.16	7.1
	23	1	18.06	12.5
2.5 x 5	11.5	5/8	3.53	2.5
	11.5	3/4	5.08	3.5
	11.5	1	9.03	6.3

Chart for Holes per Square Foot

TINE SPACING	HOLES/ SQ FT	HOLE DIA.	IN SURFACE AREA/SQ FT	% SURFACE AREA/SQ FT
4 x 4	9	5/8	2.76	1.9
	9	3/4	3.98	2.8
	9	1	7.07	4.9
6 x 9	2.67	5/8	0.82	0.6
	2.67	3/4	1.18	0.8
	2.67	1	2.10	1.5


2.5 x 2.5
6 x 9


Flagging Irrigation Heads

Aerification Timing

- warm season turfgrasses: spring through late summer
- cool season turfgrasses: spring and in the fall


Thatch

Thatch Definition

Thatch is defined as a tightly intermingled layer of living and dead stems, leaves and roots that develop between the zone of green vegetation and the soil surface.

Problems Associated With Thatch

- increased disease and insect activity
- localized dry spots (hydrophobic)
- prone to scalping injury
- decreases in stress tolerance

Causes of Thatch

- aggressive plant species
- excess applications of nitrogen
- excess irrigation
- soil compaction
- improper soil pH

Grasses Prone to Thatch

- Hybrid bermudagrasses
- St. Augustinegrass
- Zoysiagrasses
- SeaShore paspalum
- Centipedegrass
- Kentucky bluegrass

Correcting Thatch Accumulation

- Vertical mowing
- frequent aerification
- frequent topdressing
- complete removal (replant)


Vertical Mowing


Vertical Mower

Best Time to Dethatch

- warm season grasses: late spring through early summer
- cool season turfgrasses: early to mid-fall