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Trees and Turf: Learning to Live Together

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TREES – THE BIGGEST PROBLEM OF GOLF COURSE TURF

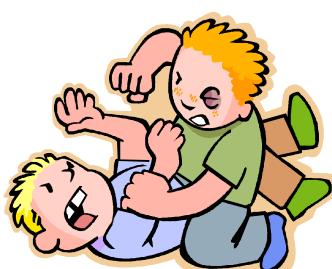
James T. Snow
USGA Green Section
Far Hills, NJ

Trees clearly are important assets on most golf courses in the northern sections of the United States, providing a great deal of beauty and strategic interest and serving a variety of other important functions. On the other hand, the effects of trees are a major cause of poor quality turf on parts of many courses. In some cases, trees have come to overwhelm the courses from both an agronomic and playability



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Trees and Turf: Doomed to Fight?





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Potential impact between trees and turf

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Where you stand depends on where you sit

- Tree impacts on turf
- Turf impacts on trees

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Potential interaction between plants

- Negative
 - Competition
 - Allelopathy
- Positive
 - Facilitation

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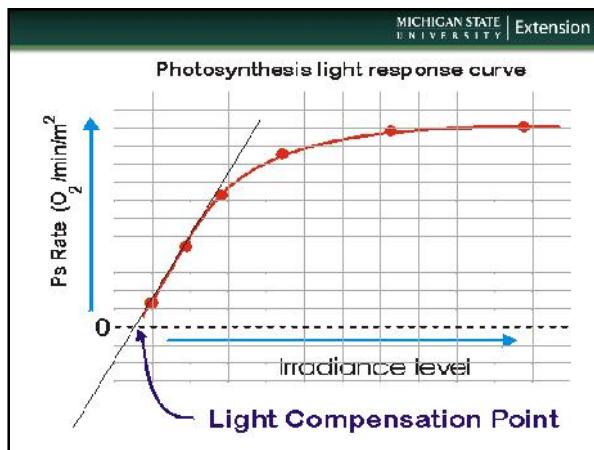
Competition

- Above ground
 - Light
- Below ground
 - Water
 - Nutrients

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Light

- Shade is typically the biggest impact of trees on turf

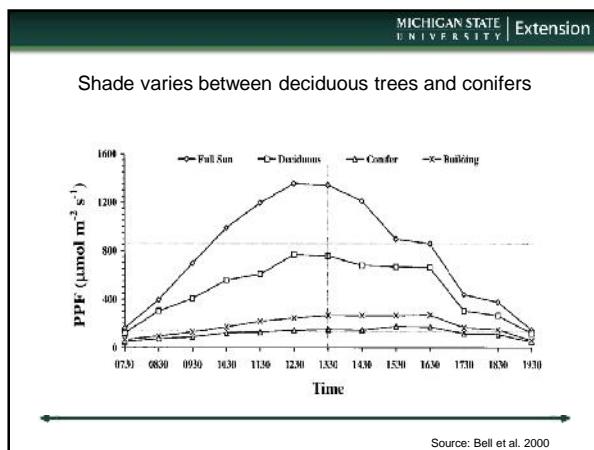
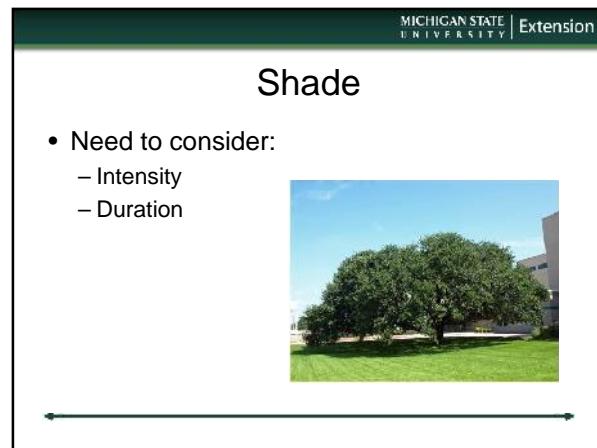
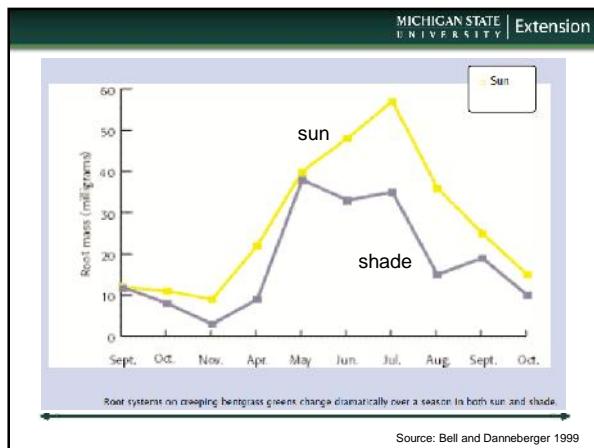


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Relative shade tolerance of turf grasses

Tolerance	Grass	
	Cool-season	Warm-season
Excellent	Fine fescues	St. Augustinegrass
Good	Creeping bentgrass	Zoysiagrass
	Colonial bentgrass	
	Rough bluegrass	
	Tall fescue	
Fair	Perennial ryegrass	Bahiagrass
		Carpetgrass
		Centipedegrass
Poor	Kentucky bluegrass	Bermudagrass

Source: Dudek and Peacock 1992



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Light quality

- Tree canopies intercept red wavelengths
- Red/Far red can impact plant morphology
- Low red contributes to thin turf blades and poor root systems

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Tree shade affects light quality

Shade type	R/FR
Full sun	0.9950
Deciduous	0.9147
Coniferous	0.8058
Building	0.9430
LSD [‡]	0.0204

Bell et al. 2000

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Other impacts of trees on turf

- Diseases
- Litter
 - Leaves
 - Debris
 - Honeydew
- Roots
- Root suckering
- Wildlife

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Stem and root suckers

The illustrations show:

- Tree-like:** A small tree with multiple stems growing from a single base.
- Fir:** A tree stump with a single stem growing from the top.
- Poplar:** A tree stump with multiple stems (root suckers) growing from the side.

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Turf impacts on trees

A diagram showing a large tree next to a small person to illustrate its size, and a circular cross-section of a tree trunk showing its internal structure.

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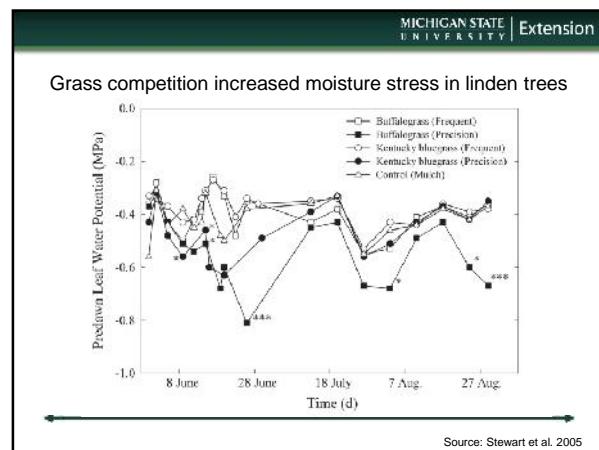
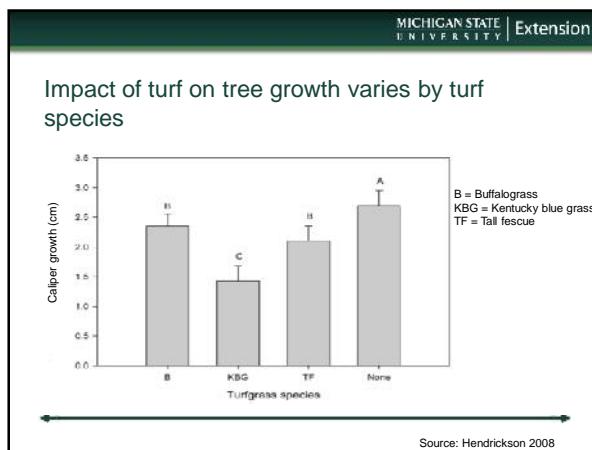
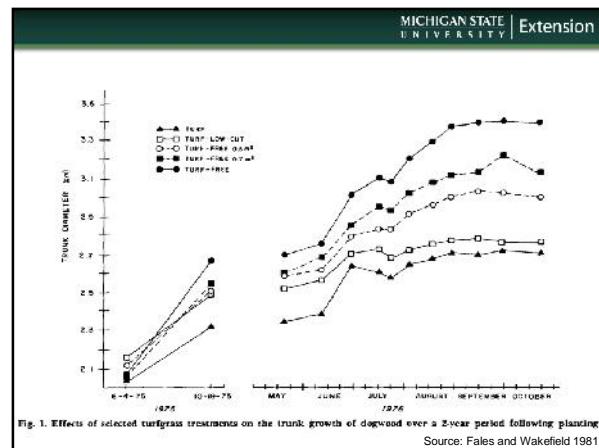
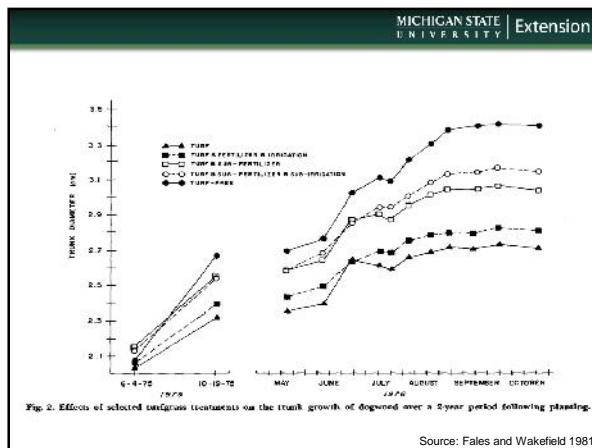
Below-ground competition

- Water
- Nutrients

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Common misconception about trees

- Tree crown mirrors above ground portion of tree
- Wrong: Most tree root systems are shallow and extensive
- Tap-roots are largely for support

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Table 4. Percentage of N in forsythia and dogwood leaf tissue.

Treatment	Forsythia		Dogwood	
	1975	1976	1975	1976
%				
1. Turf (check)	1.80 c*	1.90 b	1.73 c	1.54 b
2. Turf + fert.	1.78 c	1.82 b	1.75 c	1.57 b
3. Turf + fert. + irrig.	1.75 c	2.04 b	1.71 c	1.70 b
4. Turf + sub-fert. + sub-irrig.	2.18 b	2.61 a	1.90 bc	1.97 a
5. Turf + sub-fert.	2.31 b	1.86 b	2.17 a	1.61 b
6. Turf: low-cut	1.96 bc	1.75 b	1.81 c	1.55 b
7. Turf-free, 0.3 m ²	2.29 b	1.85 b	1.88 c	1.64 b
8. Turf-free, 0.7 m ²	2.66 a	2.08 b	2.06 ab	1.89 b
9. Turf-free	2.81 a	2.71 a	2.11 a	2.04 a

* Means within columns followed by different letters are significantly different at the 5% level according to Duncan's Multiple Range Test.

Source: Fales and Wakefield 1981

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Allelopathy

- Chemical inhibition of one plant by another
 - Seed germination
 - Root growth

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Allelopathy

- Trees can have allelopathic effects on turf
- Turf can have allelopathic effects on trees

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Ensuring peaceful coexistence

- Minimize conflict points
- Identify priorities
- Consider alternatives
- Expect the unexpected
- Understand the other side

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Minimize conflict points

- Give each their own space
- Best done in planning and design
 - REMEMBER: Trees Grow!
- Design beds or borders specifically for trees
- Allow mulched turf-free zone around trees



Identify priorities

- Sometimes something has to give
- Decide on a priority and go with it

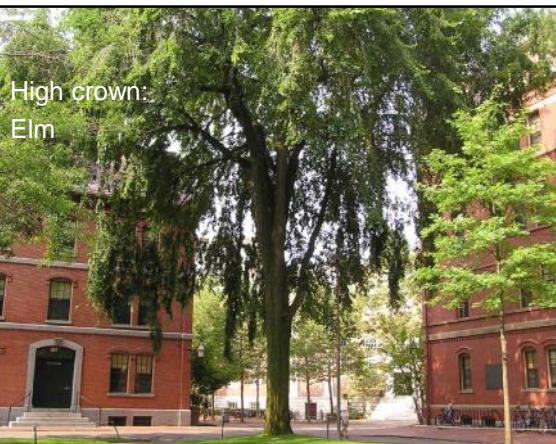
Consider alternatives

- May require some creativity
- Example: trees shading Kentucky blue grass turf resulting in decline
 - Thin trees or crown
 - Replace KBG with more shade tolerant turf

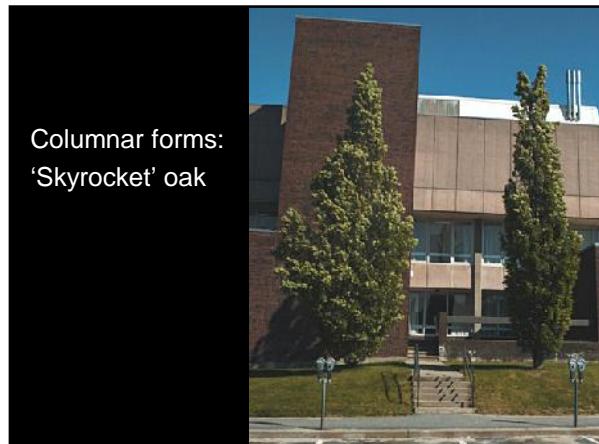
Consider alternatives

- Use deciduous trees instead of conifers
- Thin tree crowns or use trees with the naturally open canopies
- Use trees or shade tolerant ground cover in areas poorly suited to grass

Thin crown:
Honeylocust



Columnar forms:
'Skyrocket' oak



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Expect the unexpected

- Managing for one resource will invariably have impacts on the other



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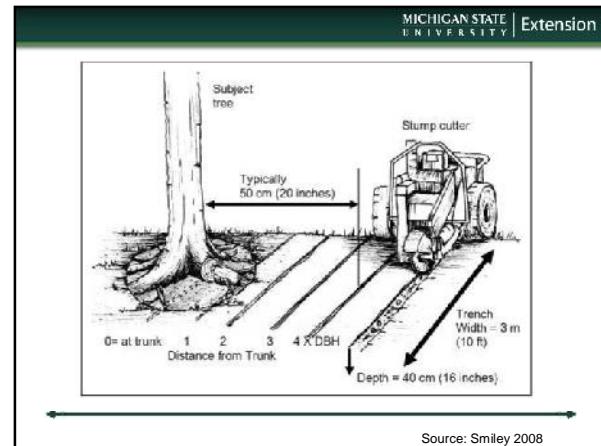
Factors affecting response of trees to root pruning

- Root size: larger roots may generate few new roots
- Number of cuts: more roots cut means more tree stress
- Proximity to the trunk: the closer cuts are to the trunk the bigger the impact
- Tree age: old trees are more likely to stress and die
- Tree condition: trees in poor health should not be root pruned
- Tree lean: leaning trees should not be root pruned
- Soil type and site drainage: shallow soils mean stay farther from the trunk

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How close to trunk can roots be safely pruned?

- Rule of thumb: 3-5 X trunk diameter
- For example: 24" (2') diameter tree
- Safe distance = $2' \times 3-5 = 6\text{-}10'$ from trunk



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Figure 1. Diagrammatic representation of the pull-testing setup.

Source: Smiley 2008

