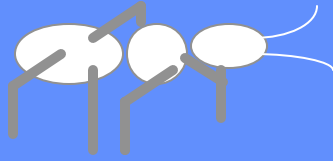
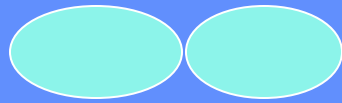


The Biology of Wood Decay



Insects

- Physically Disrupt Lignin
- Cooperate with Bacteria to Degrade Cellulose



Bacteria

- Rapidly Degrade Cellulose
- Move into New Layers as Lignin is Degraded



Fungi

- White Rot Fungi
- Brown Rot Fungi



Environmental Factors Affecting Wood Decay

Temperature

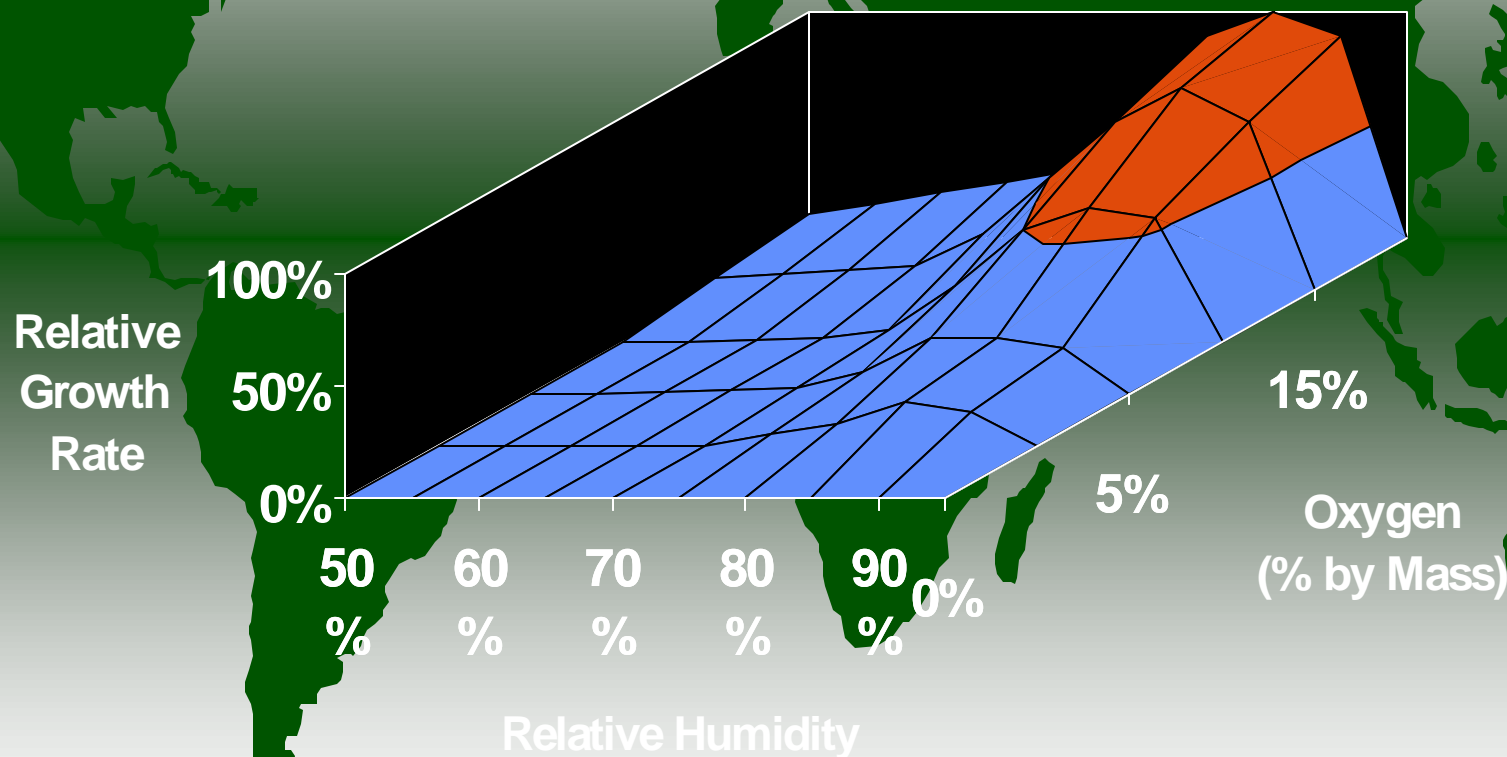
Soil Structure (Clay, Sand, Loam, etc.)

Organic Matter Content

Moisture

Oxygen

The Effect of Moisture and Oxygen on Microbial Growth



Oxygen Diffusion Rates

The Diffusion of Oxygen Through Air:

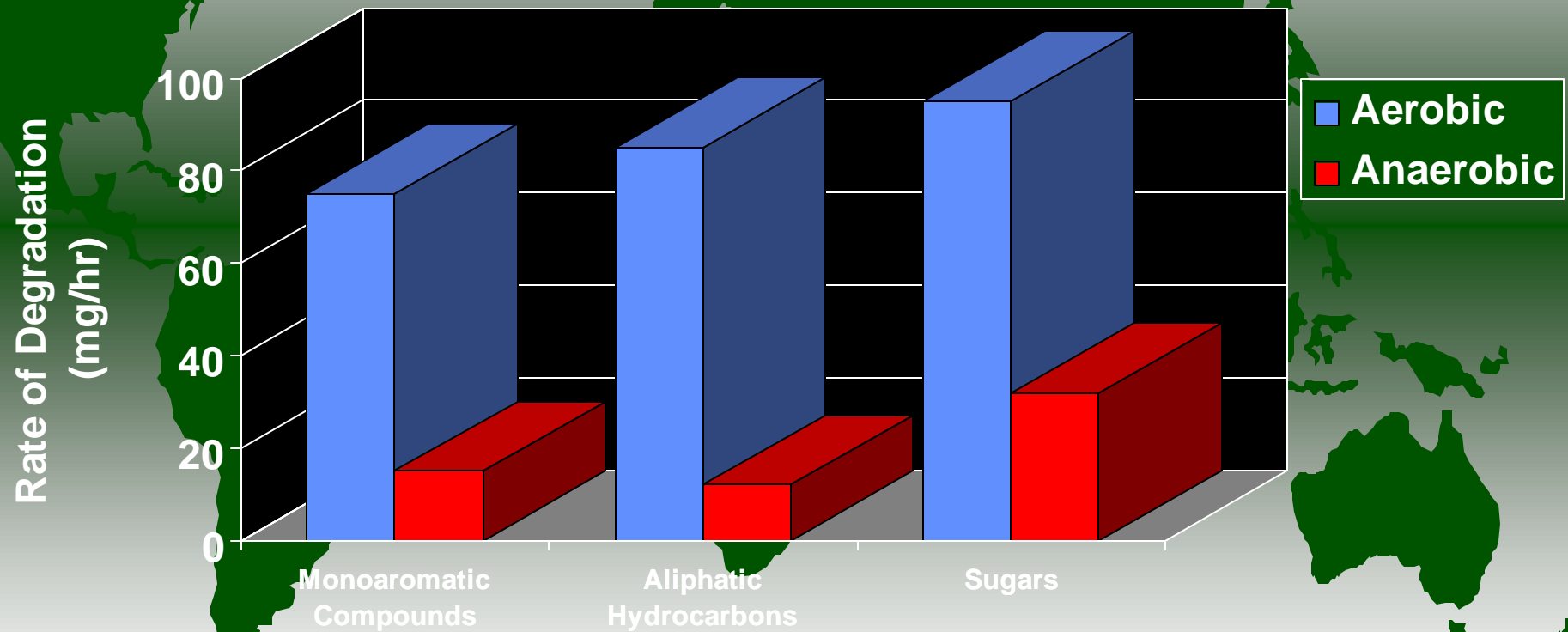
$$D = 0.163 \text{ sq.cm/sec.}$$

The Diffusion of Oxygen through Water

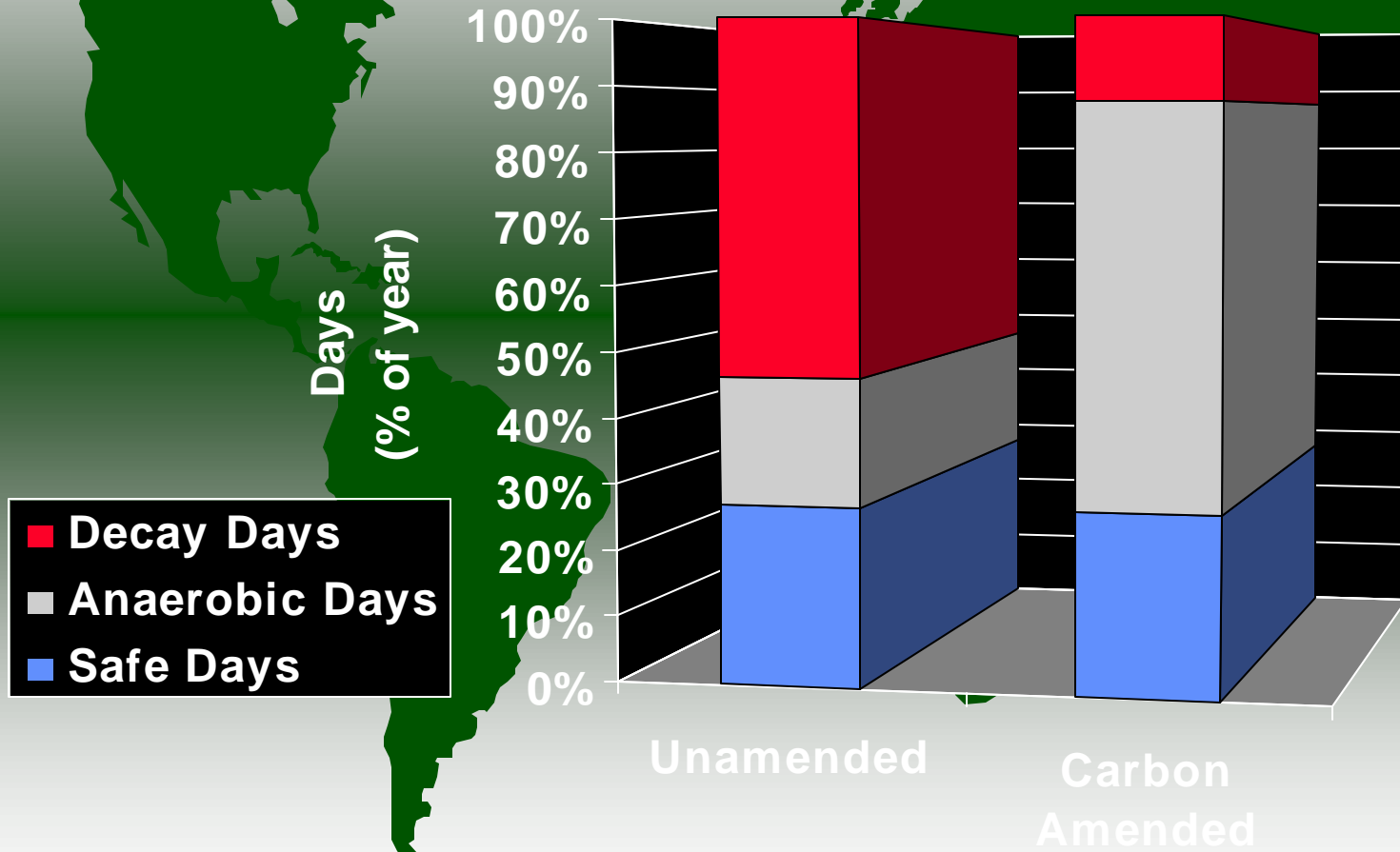
$$D = 2.0 \times 10^{-5} \text{ sq.cm/sec.}$$

Diffusion through Water is 4 Orders of Magnitude **Slower**.

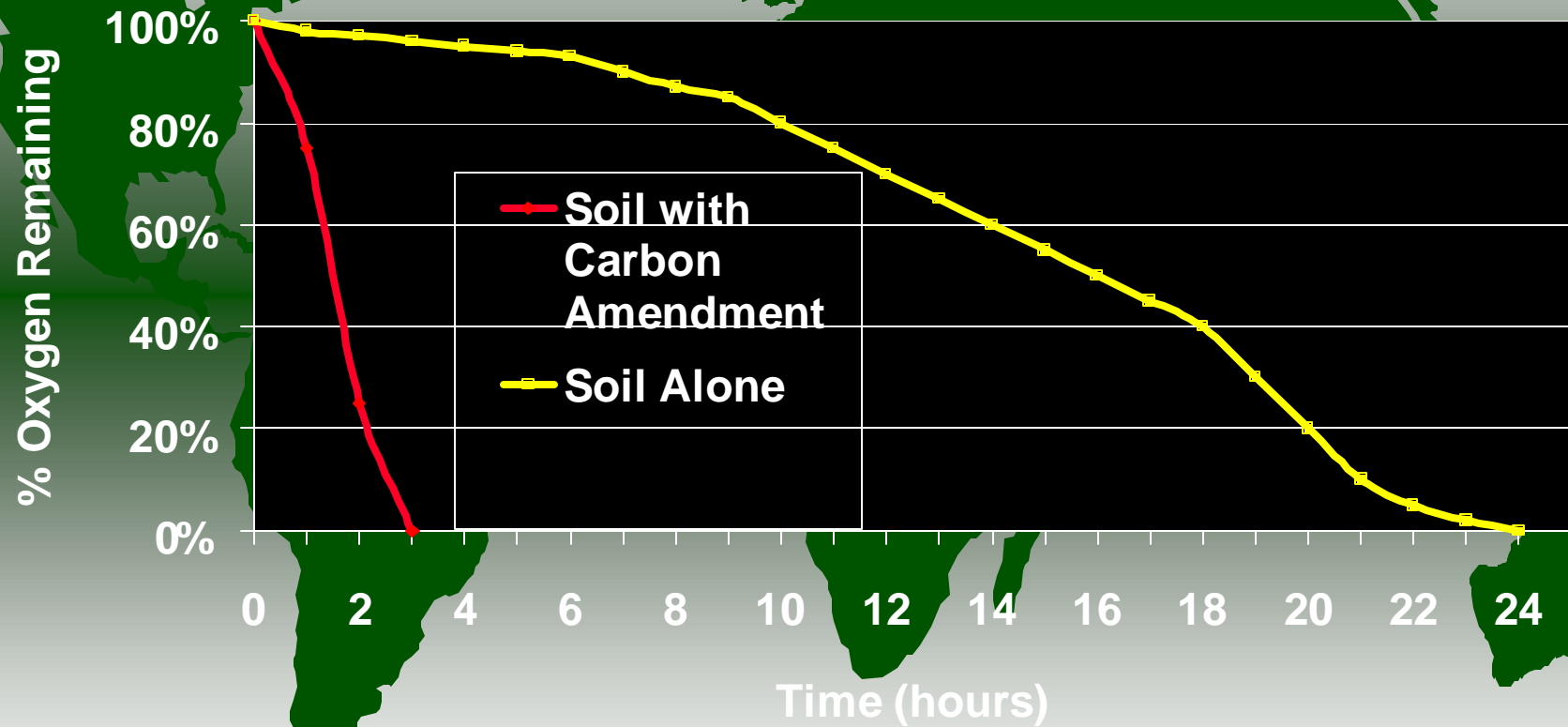
Controlling Decay by Controlling Oxygen



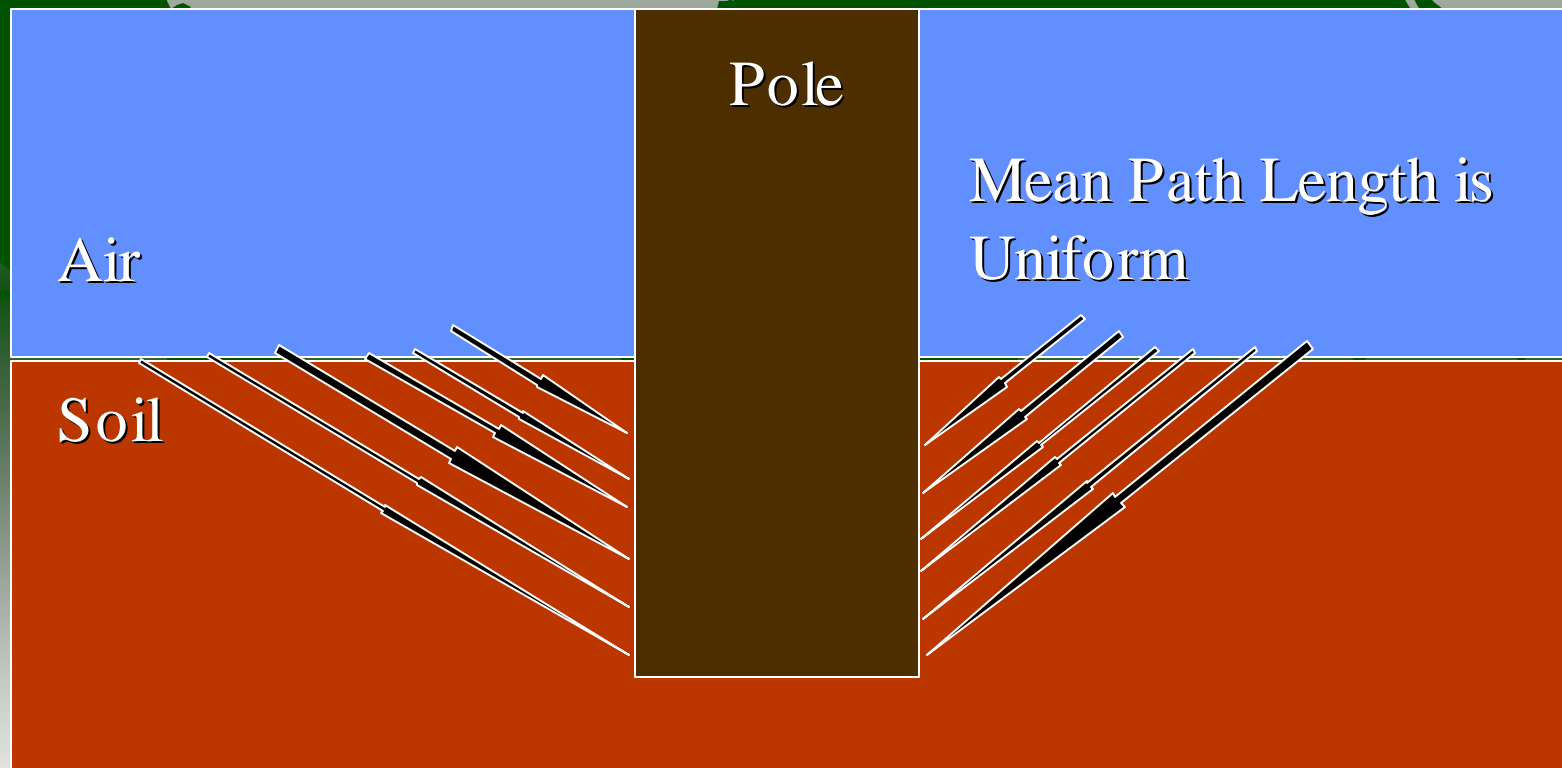
Estimate of Annual Decay Days



Oxygen Consumption Rates

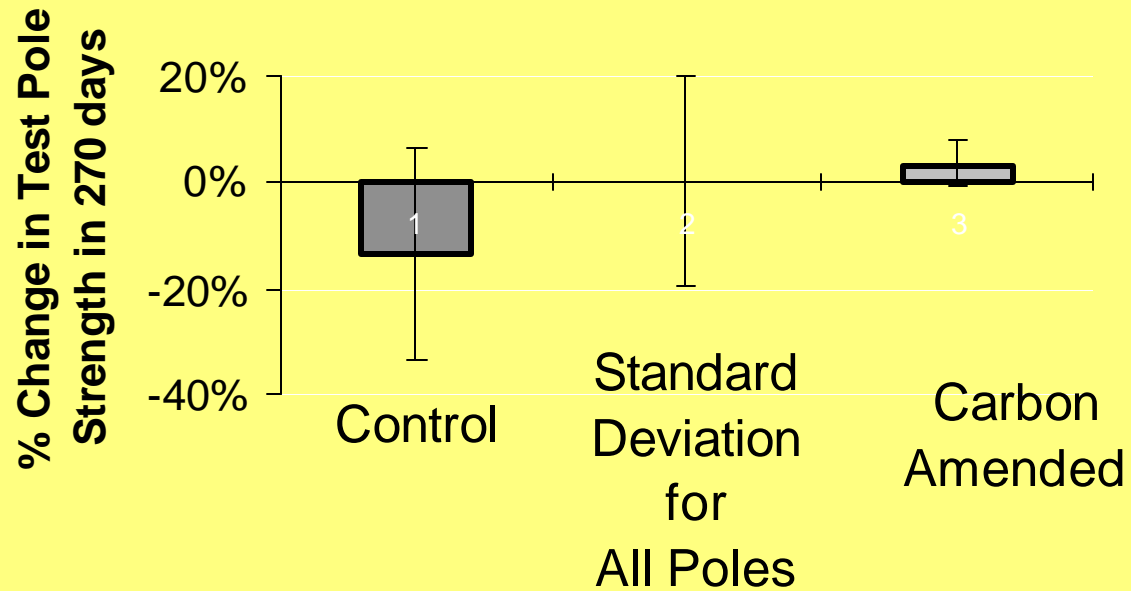


Conceptual Model of Oxygen Diffusing to Pole Surface



Oxygen Diffuses from the Bulk Air (20%) into the Soil
Oxygen Concentration Decreases with Depth as it is Consumed

Field Tests



Laboratory Tests

