Soil Health: 
It’s Role in Today’s Orchard Systems

Session Sponsor: 
Northwest Wholesale

Thank You!
Soil Health: Its Role in Today’s Orchard Systems

Introduction

David Granatstein
WSU-Center for Sustaining Agriculture and Natural Resources
Wenatchee, WA

WSHA, Wenatchee, WA -- Dec. 4, 2013
Welcome!

Today’s questions:

• Does organic matter matter?

• How do we measure ‘soil health’?

• How does management influence soil health and orchard performance?

“Take home”:

• Some of what we know and don’t know

• Help identify areas for research, extension

• Are there some key principles, practices to work with?
SOIL HEALTH

Definition
“Capacity of a soil to function...to:

• sustain biological productivity
• Maintain environmental quality
• promote plant and animal health.”

Not a soil property, but an evaluation based on human needs.

Soil health and quality are used interchangeably.
<table>
<thead>
<tr>
<th>Current System</th>
<th>Native Ecosystem</th>
<th>Reference Point</th>
</tr>
</thead>
<tbody>
<tr>
<td>Dryland wheat (KS)</td>
<td>Prairie</td>
<td>Prairie</td>
</tr>
<tr>
<td>Rainfed corn (WI)</td>
<td>Temperate forest</td>
<td>Pasture ?</td>
</tr>
<tr>
<td>Paddy rice (Asia)</td>
<td>Tropical rainforest</td>
<td>??</td>
</tr>
<tr>
<td>Irrigated potatoes (ID)</td>
<td>Shrub-steppe</td>
<td>Pasture ?</td>
</tr>
<tr>
<td>Orchard (Yakima)</td>
<td>Shrub-steppe</td>
<td>??</td>
</tr>
</tbody>
</table>
Soil Health

- Dynamic interplay of these 3 aspects
- Influenced by environment (climate, geology, plants)
- Influenced by human activity (erosion, fertilization, irrigation, plants)
Greatest single factor determining natural soil productivity = amount & depth of SOM

L. Carpenter-Boggs
Site History

- Soil chemical changes in five orchards (12–40 years old); sprinkler irrigation and ammonium based fertilizer

<table>
<thead>
<tr>
<th></th>
<th>Row</th>
<th>Alley</th>
</tr>
</thead>
<tbody>
<tr>
<td>pH\textsubscript{w}</td>
<td>4.2</td>
<td>6.7</td>
</tr>
<tr>
<td>Ca (ppm)</td>
<td>736</td>
<td>2592</td>
</tr>
<tr>
<td>Al (ppm)</td>
<td>621</td>
<td>27</td>
</tr>
<tr>
<td>Bases (%)</td>
<td>56</td>
<td>99</td>
</tr>
</tbody>
</table>
Mini Tatura Trellis on M.9
Washington

Standard System
Herbicide strip, grass alley
‘Mow and blow’ mulch
Lots of Questions

Is there an ideal soil health for tree fruits?

Is there a connection between soil quality and fruit quality?

How should we measure / monitor soil health in orchards?