

# IMPROVING WATER CONSERVATION IN THE SOIL WITH POROUS AMENDMENTS

## Increasing Plant Available Water (PAW) with Porous Amendments Reduces Irrigation

### WHAT ARE POROUS AMENDMENTS?

*Porous Amendments have Active Internal Pores*

Porous amendments are inorganic minerals with continuous internal pores. They are extremely porous (54% to 82%), light-weight aggregates, that are very absorbent, durable and non-biodegradable. The entire granule can exchange much more air, water and nutrients than solid particles, or particle surfaces, or from the pores between particles. The internal pores are active compared to other mineral amendments whose internal pores (air) are trapped within mineral structures and can not store, exchange, or add more air and water to improve soil.

### TYPES OF POROUS AMENDMENTS

*Descriptions & Microscopic Views of Pore Structures*

*Pictures Not to Scale*



MS 1898 X15000  
Photo Courtesy of Oil-Dri Corp.

Calcined Clay (C.C.) internal pores are formed from the kiln firing process which creates cracks, fissures, and indentations within the granule.

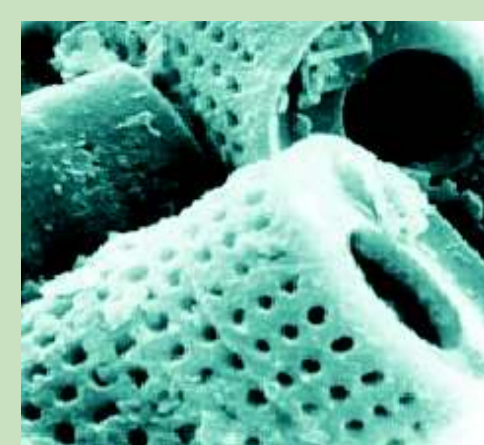


Photo Courtesy of EP Minerals

Calcined Diatomaceous Earth (C.D.E.) is a sedimentary ore, formed by the accumulation of porous diatom structures, which are the skeletal remains of plankton.



Volcanic Ash, Courtesy USGS

Calcined Diatomaceous Earth & Volcanic Ash (D.E.V.A.) two minerals in one deposit. Volcanic Ash is made by expanding gas in magma that fragments into rock & glass.

Zeolite is mined and processed without calcining. It is a naturally porous mineral with very high Cation Exchange Capacity (C.E.C.), which aids in nutrient transfer to plants.

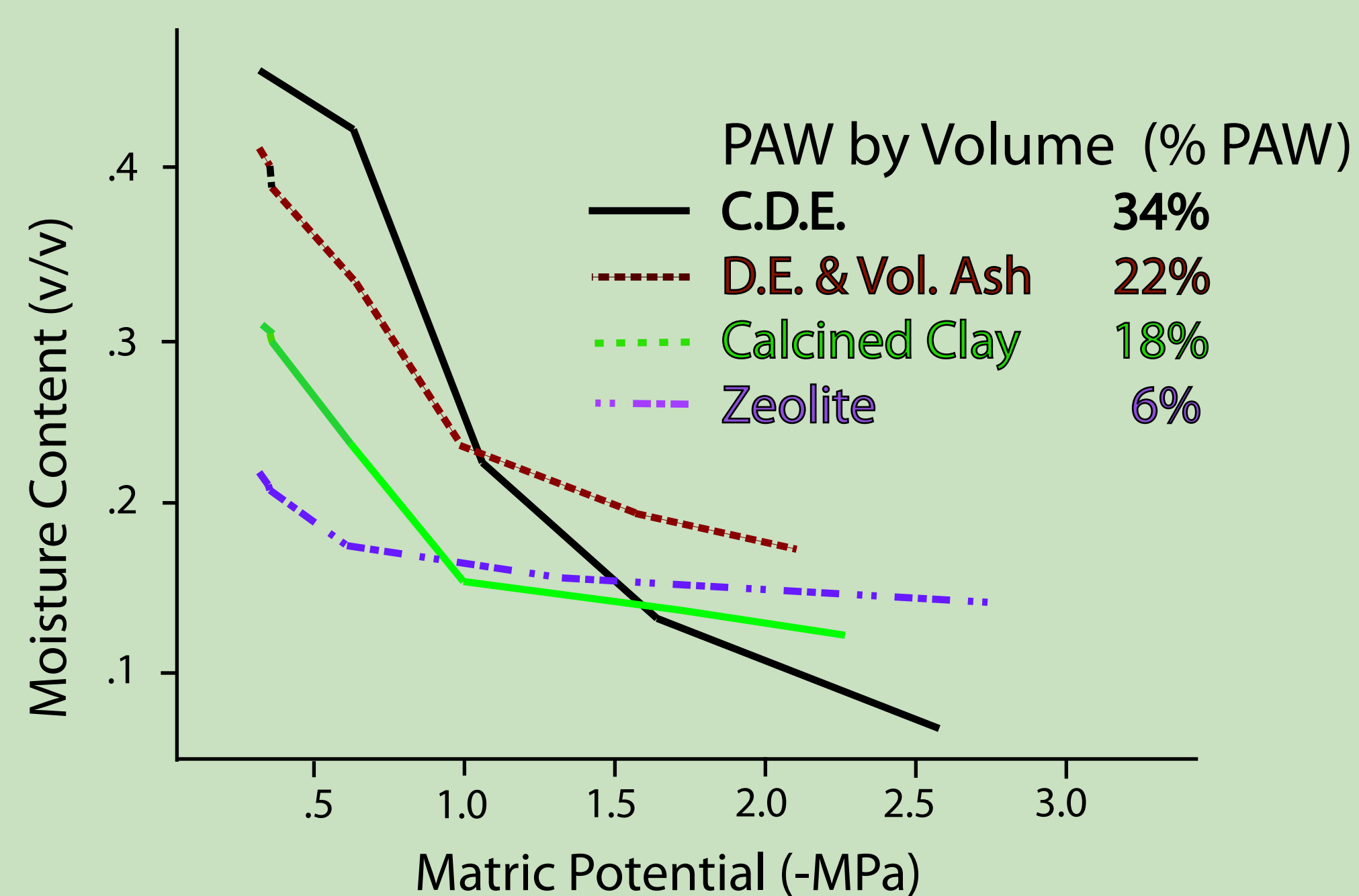


Photo Courtesy of St. Cloud Mining Co.

### AMENDMENT PLANT AVAILABLE WATER (PAW)

*Matt Curtis, Vic Claassen, UC Davis 2008*

PAW = moisture between field capacity & wilt point



### PORE SIZES OF ZEOLITE, C.C., D.E., & VOL. ASH

*Mfg's Labels, Porosymetry Tests, U. Augsburg*

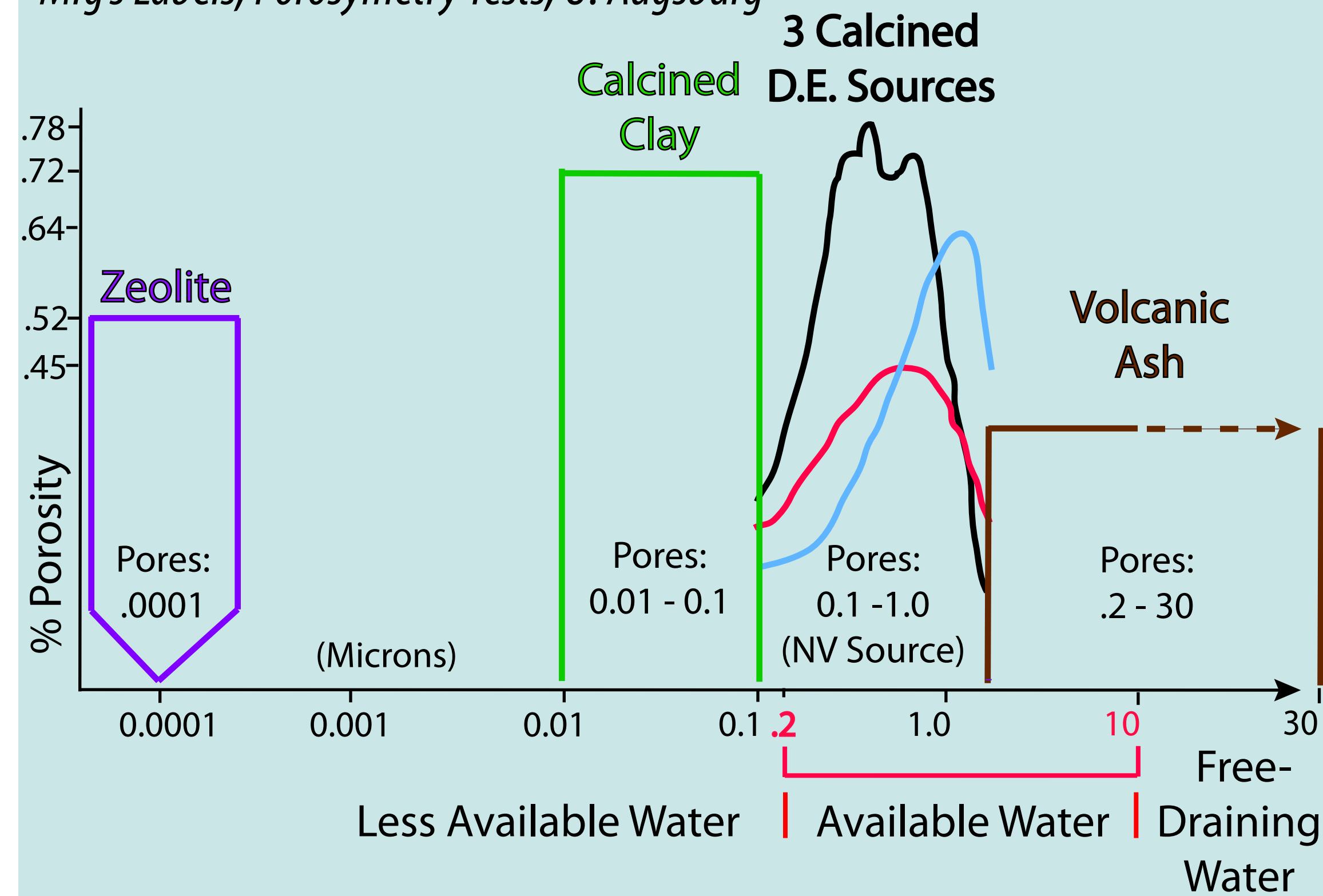


Photo Courtesy of Spin Martin

### Grass - 60% Less Water

Indianapolis, IN

Less irrigation & less wear on NFL Practice Field. Spin Martin, past Head Groundskeeper of the Indy Colts, says, "It's a no brainer."

### Transition to No Irrigation

Nevada DOT Landscape, Las Vegas, NV

Backfill amended at 15% by volume to increase PAW and establishment of native plants that must transition from occasional irrigation to none.



Photo Courtesy of Jeff Deason, Soil-Tech



### Greenroof - No Irrigation

Clackamas Comm. Col., Oregon City, OR

Right side - treated at 25% by volume to reduce soil weight, improve plant establishment, and to reduce runoff. Left side - 2 Commercial Mixes



### Specialty Application

Disney Concert Hall, Los Angeles, CA

Soil enhanced for drainage and viability of locally transplanted specimen trees craned into patio planters up to 10' deep, that are 32' above ground.

### INCREASES MICROBIAL POPULATION BY 10X

*Dr. Charles Bruno, Quantum Consultants*

Porous amendments increased beneficial bacteria populations of azotobacter, bacillus, and pseudomonas by 10 fold due to increased moisture and air content in the soil.



Photo courtesy of www.dot.ca.gov/hq/LandArch/research/docs/atf.pdf

### 4X More PAW than Compost

Caltrans Final Report, UC Davis

"(Porous amendment) has an additional beneficial characteristic to release water in stressful moisture periods for plants."



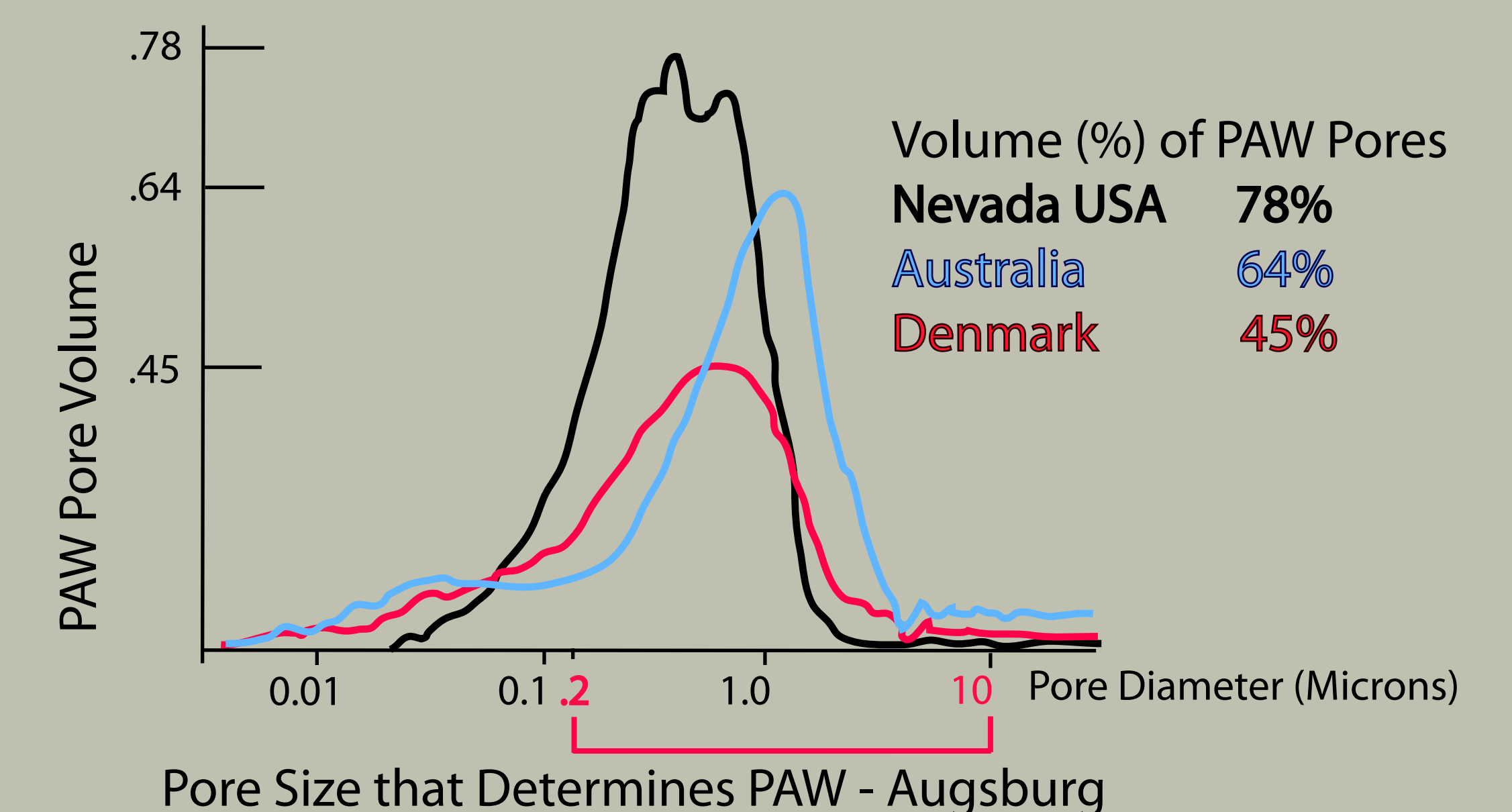
### Non-Irrigated Survival Rates

Wyoming DOT & USFS, 5 Projects

Survival of Forestry seedlings and native 2 gallon plants increased from 20-25% to 70-99% without irrigation, with 15% by volume in the backfill.

### PAW PORES OF 3 C.D.E. SOURCES

*Kalytta-Mewes, Mattern, Reller, University of Augsburg, Germany*



### SUMMARY OF POROUS AMENDMENTS

*Entire Aggregate Effective to Circulate Air & Water at Low Application Rates*

- Increases Infiltration
- Increases Air & Water Porosity
- Increases Water Holding Capacity
- Light Weight Reduces Compaction
- Improves Plant Available Water (PAW)
- Performs Long-term, Non Bio-degradable
- High Cation Exchange Capacity (C.E.C.)  
(C.E.C. transfers nutrient into available form)

866-546-3722  
info@axisplayball.com  
www.axisplayball.com

**EnviroTech**  
Soil Solutions, Inc.