

IMPROVING WATER CONSERVATION IN THE SOIL WITH POROUS AMENDMENTS

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

WHAT ARE POROUS AMENDMENTS?

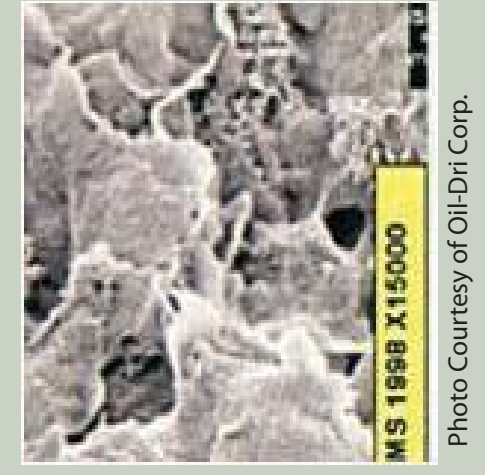
Porous Amendments have Active Internal Pores

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

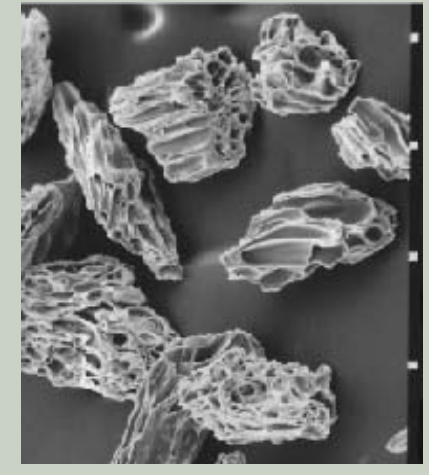
Pictures Not to Scale



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



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.



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.

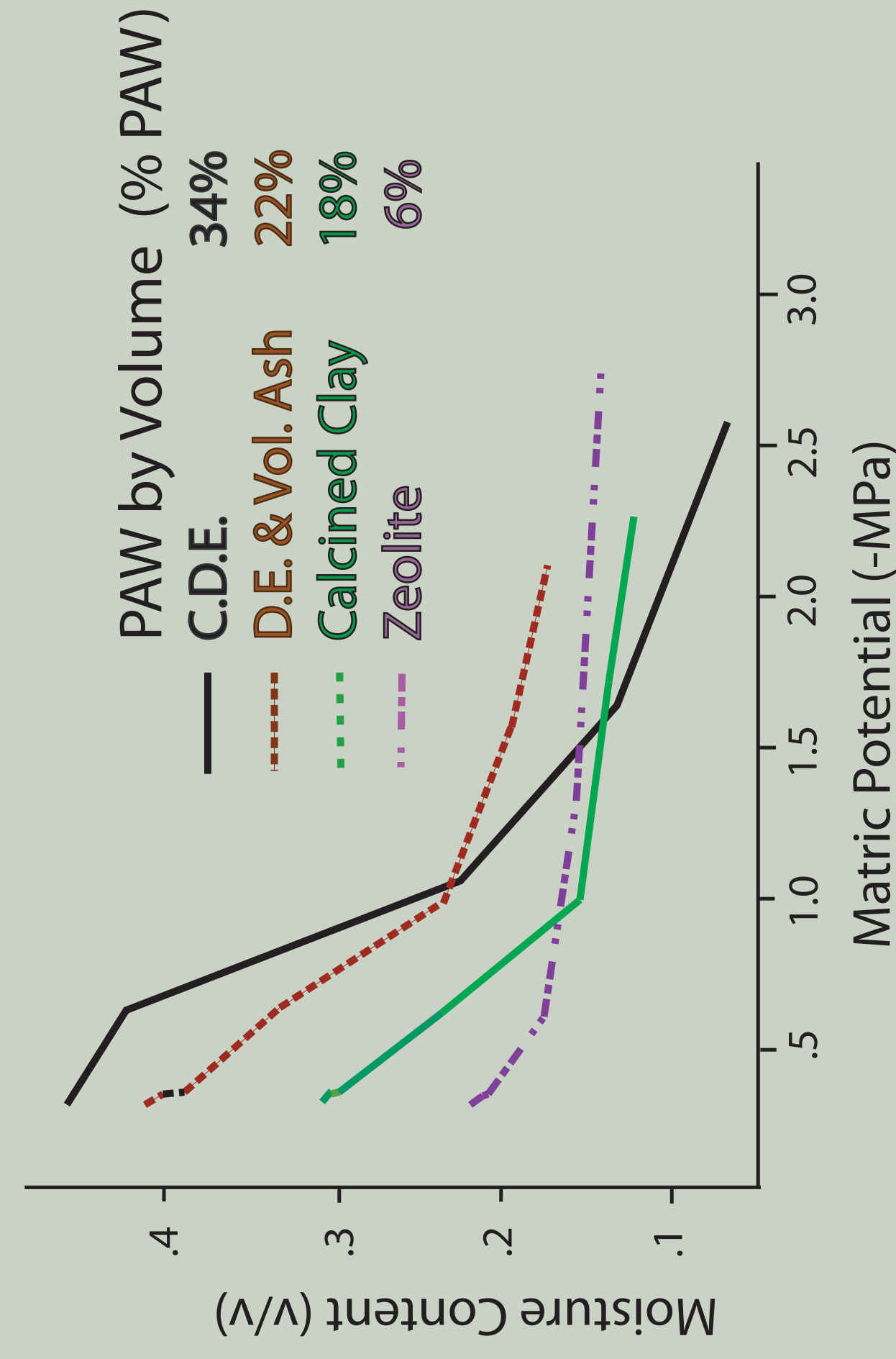


Zeolite is mined and processed without calcining. It is a naturally porous mineral with very high Cation Exchange Capacity (C.E.C.), which aids in nutrient transfer to plants.

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

Mig's Labels, Porosymetry Tests, U. Augsburg

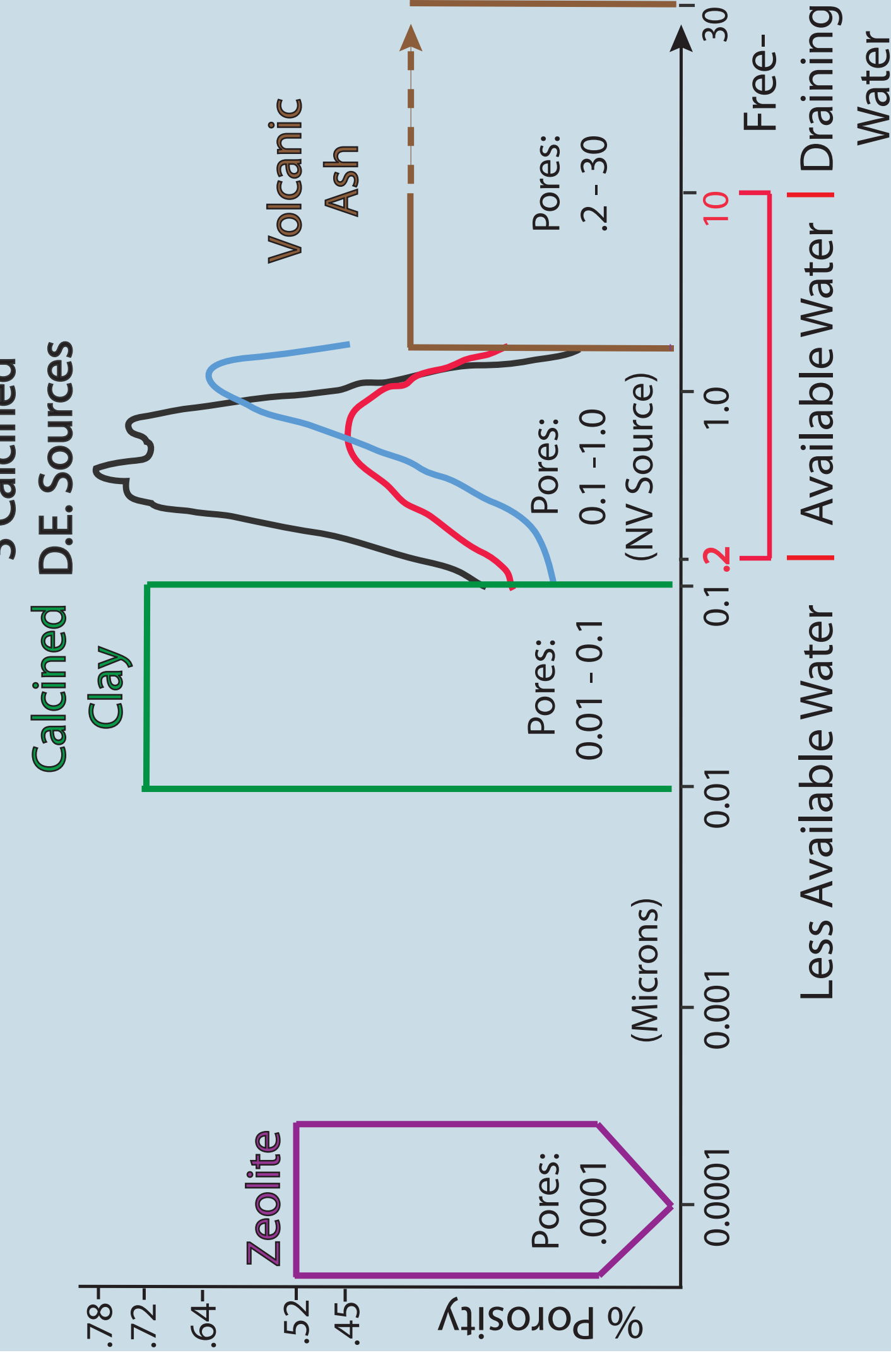


Photo Courtesy of Spin Martin

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.

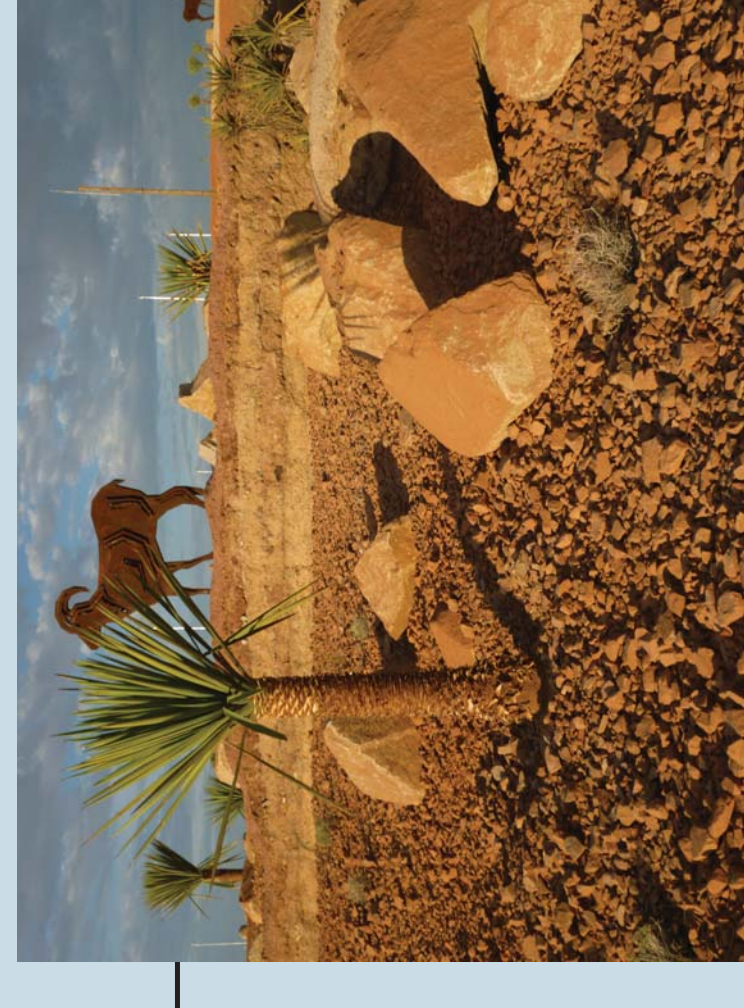


Photo Courtesy of Jeff Deason, Soil-Tech

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.

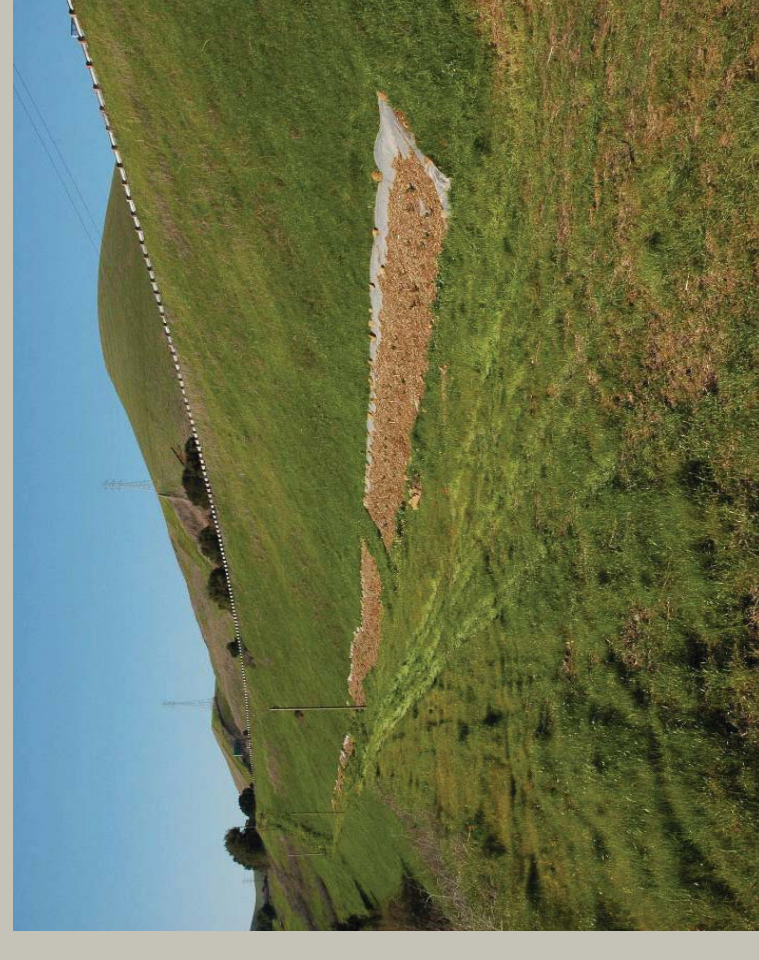


Photo courtesy of www.dct.ca.gov/hqj_landtech/research/dccslat.pdf

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."



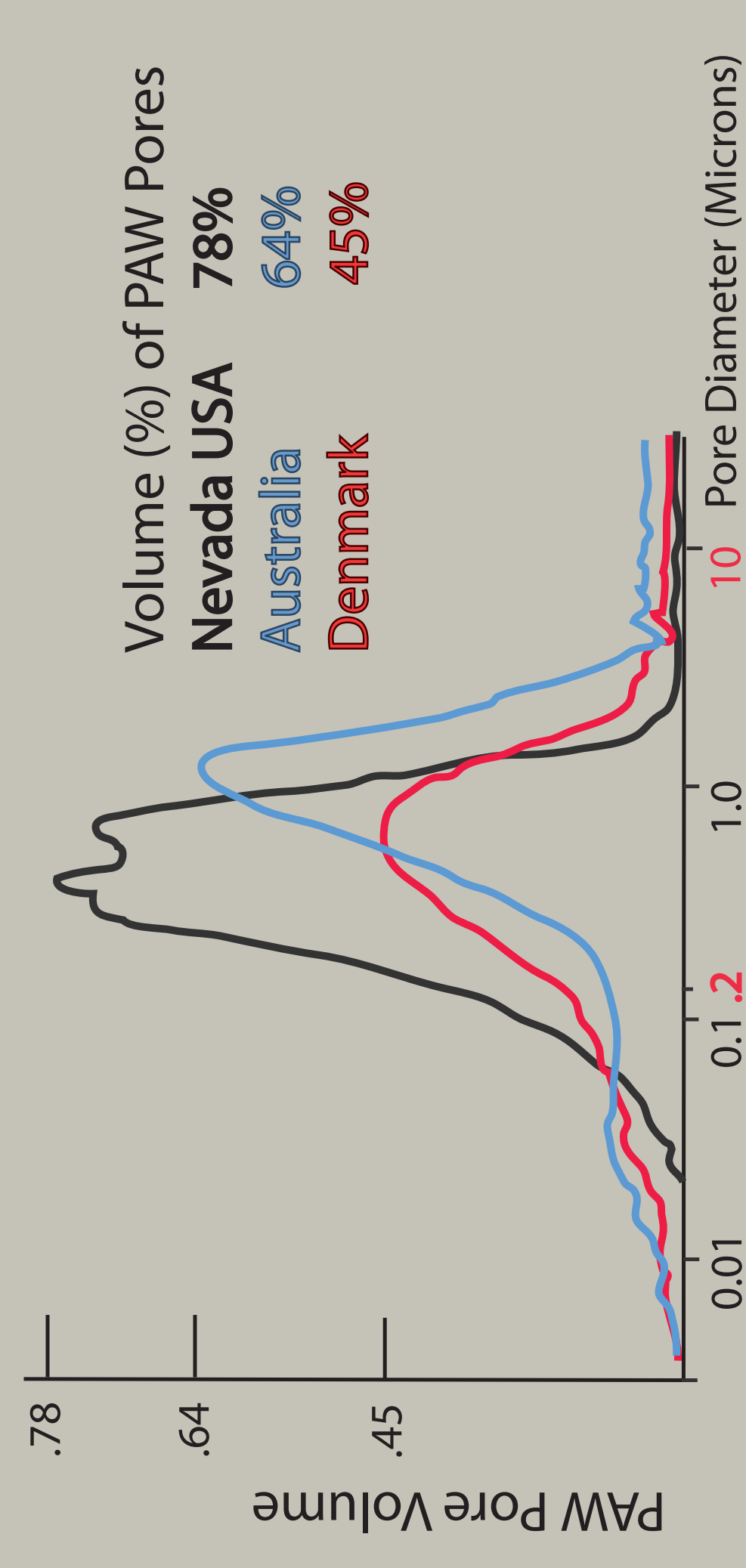
Non-Irrigated Survival Rates

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



Pore Size that Determines PAW - Augsburg

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)

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