USDA Agricultural Research Service
U.S. DEPARTMENT OF AGRICULTURE

USDA-ARS Salinity Laboratory
Riverside, California

Agricultural Water Efficiency and Salinity Research Unit

Overcoming water quality and water scarcity constraints on agriculture and human health

U.S. Salinity Laboratory Timeline

1928: Rubidoux Laboratory
Water quality impacts on irrigation, boron toxicity

1937: United States Regional Salinity Laboratory
Agriculture on saline and alkali soils

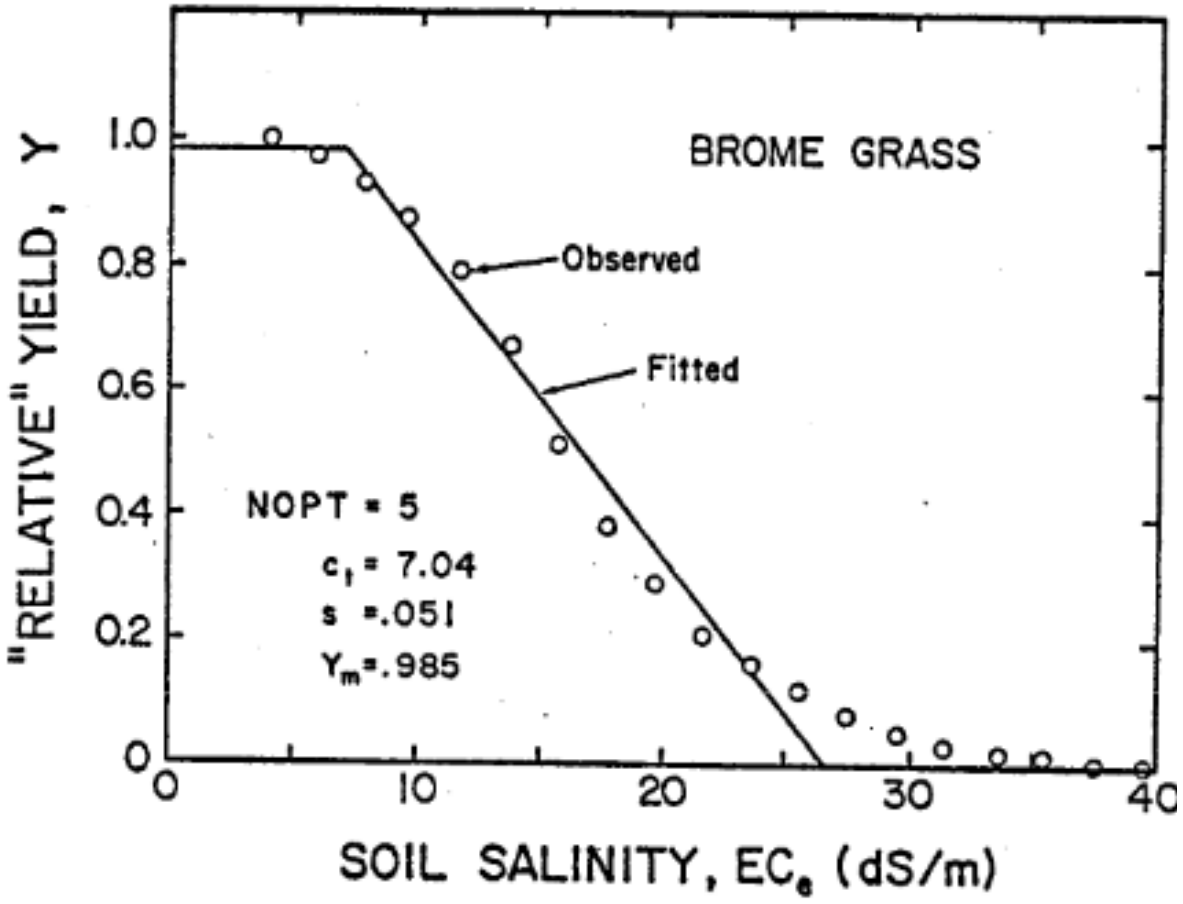
1948: United States Salinity Laboratory
Combined Regional and Rubidoux Laboratories

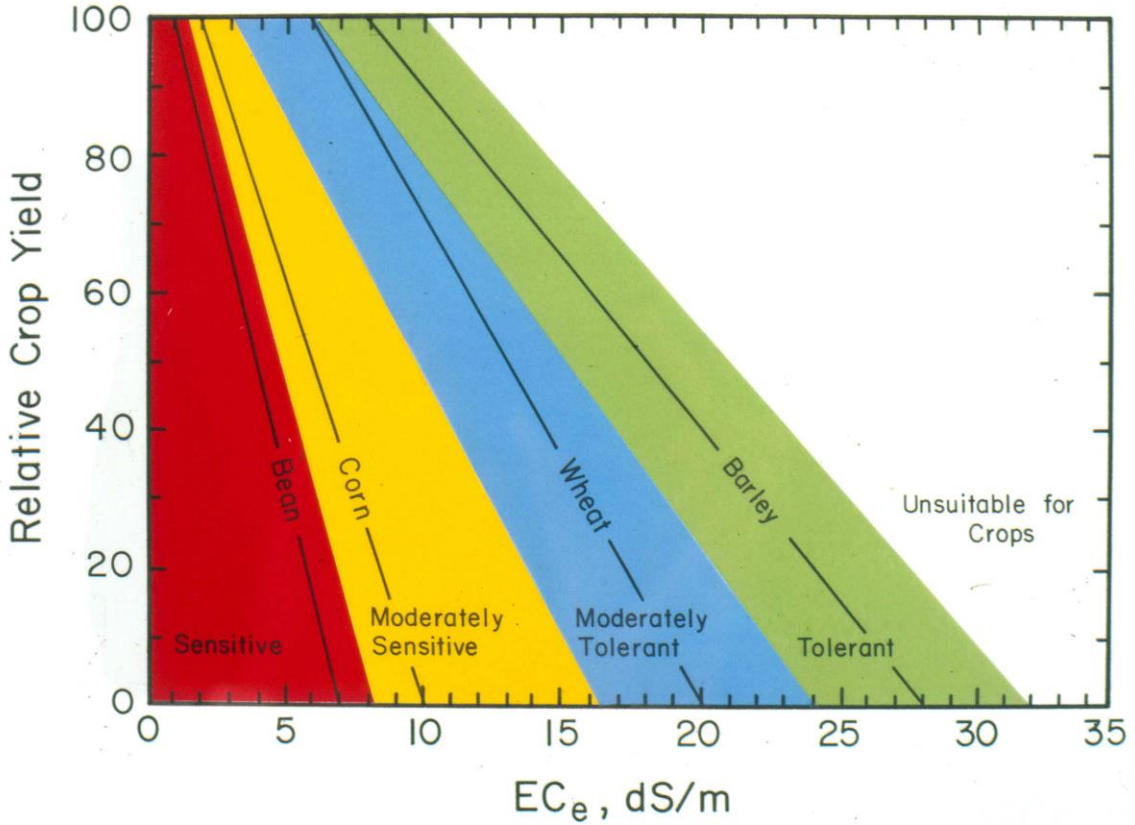
1954: Publication of Handbook 60

1995: Moved to current facility at U.C. Riverside

2000: Renamed George E. Brown, Jr., Salinity Laboratory

Plant Salt Tolerance

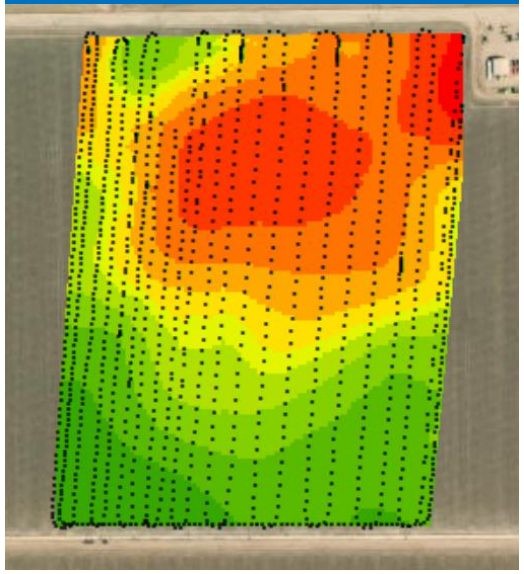


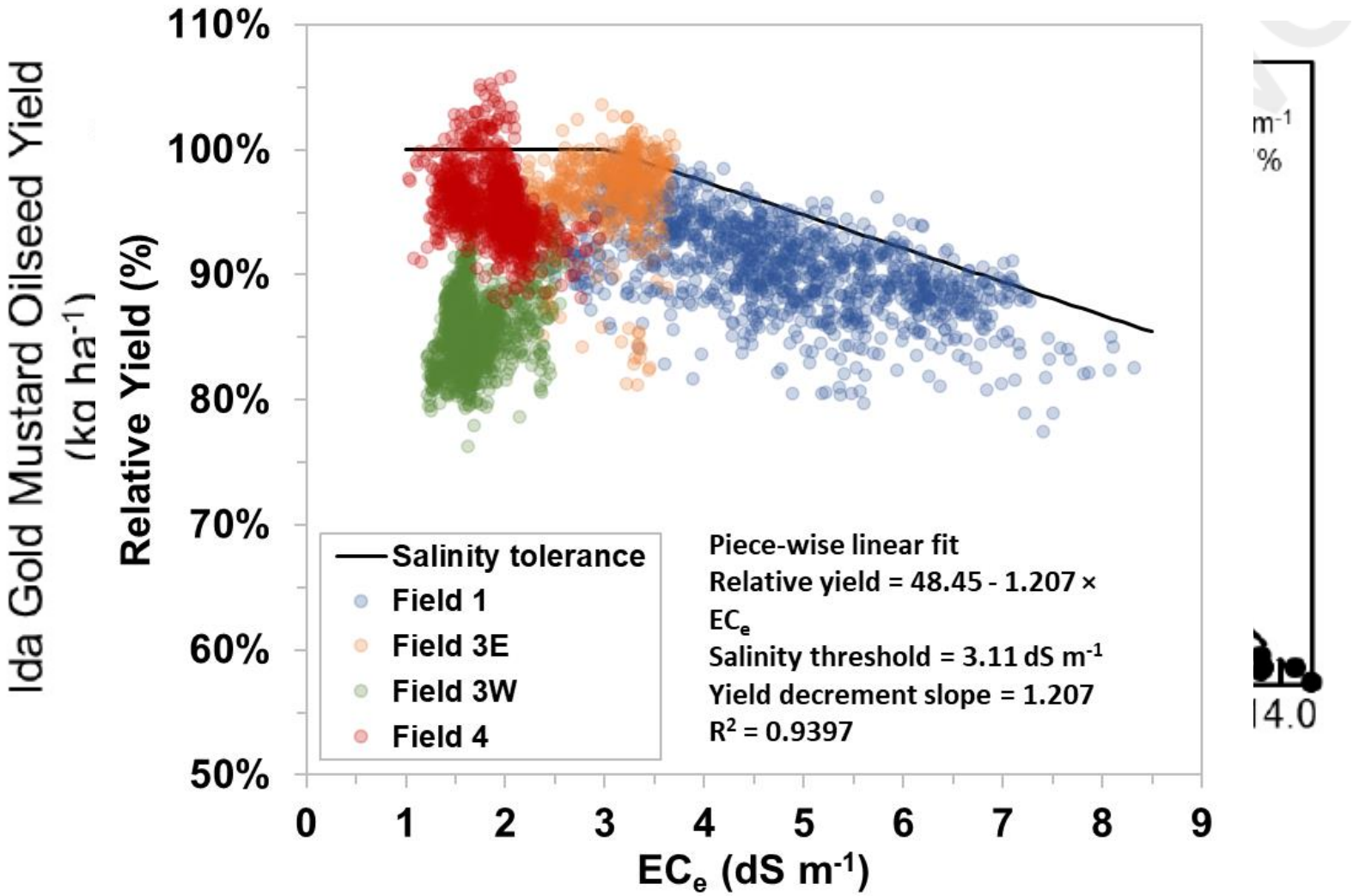


Alternative Approach for Plant Salt Tolerance Studies

ECa field survey

ECa map





Corwin, Scudiero

MECHANISTIC INSIGHT INTO THE SALT TOLERANCE OF ALMONDS

BY **DEVINDER SANDHU**
USDA-ARS, US Salinity Lab, Riverside California
AND **BISWA R. ACHARYA**
University of California Riverside

Good quality water is extremely important for agriculture throughout the world. However, due to reduced availability of water and increasing food demands, future use of degraded waters is evident. One of the major concerns of utilizing degraded waters for irrigation is their high salt concentration.

Salinity is one of the main abiotic stresses faced by the agriculture industry. Modest increase of soil salinity level impacts both plant growth and yield by causing several physiological and biochemical changes. Based on salt tolerance level plants are classified broadly in two groups: halophytes and glycophytes. The halophytes have special mechanisms to tolerate high concentrations of salts and therefore can grow in saline environments. The majority of plants (including almonds) are glycophytes and cannot tolerate high salt concentrations and so grow in soil containing low salts. However, among glycophytes, salt tolerance level varies tremendously not only at the species level but also at he variety level within a species. This variation is directly dependent on the functional status of various molecular components that play critical roles to protect the plant during salt stress.

In the initial stages of salinity exposure, a plant faces osmotic stress, resulting in ion imbalance in cells, membrane disintegration and reduced photosynthesis. In addition, osmotic stress in the root sends a signal throughout the plant causing reprograming of physiological and molecular activities to initiate defense response against salinity stress. Slowly ionic stress develops, leading to accumulation of Na^+

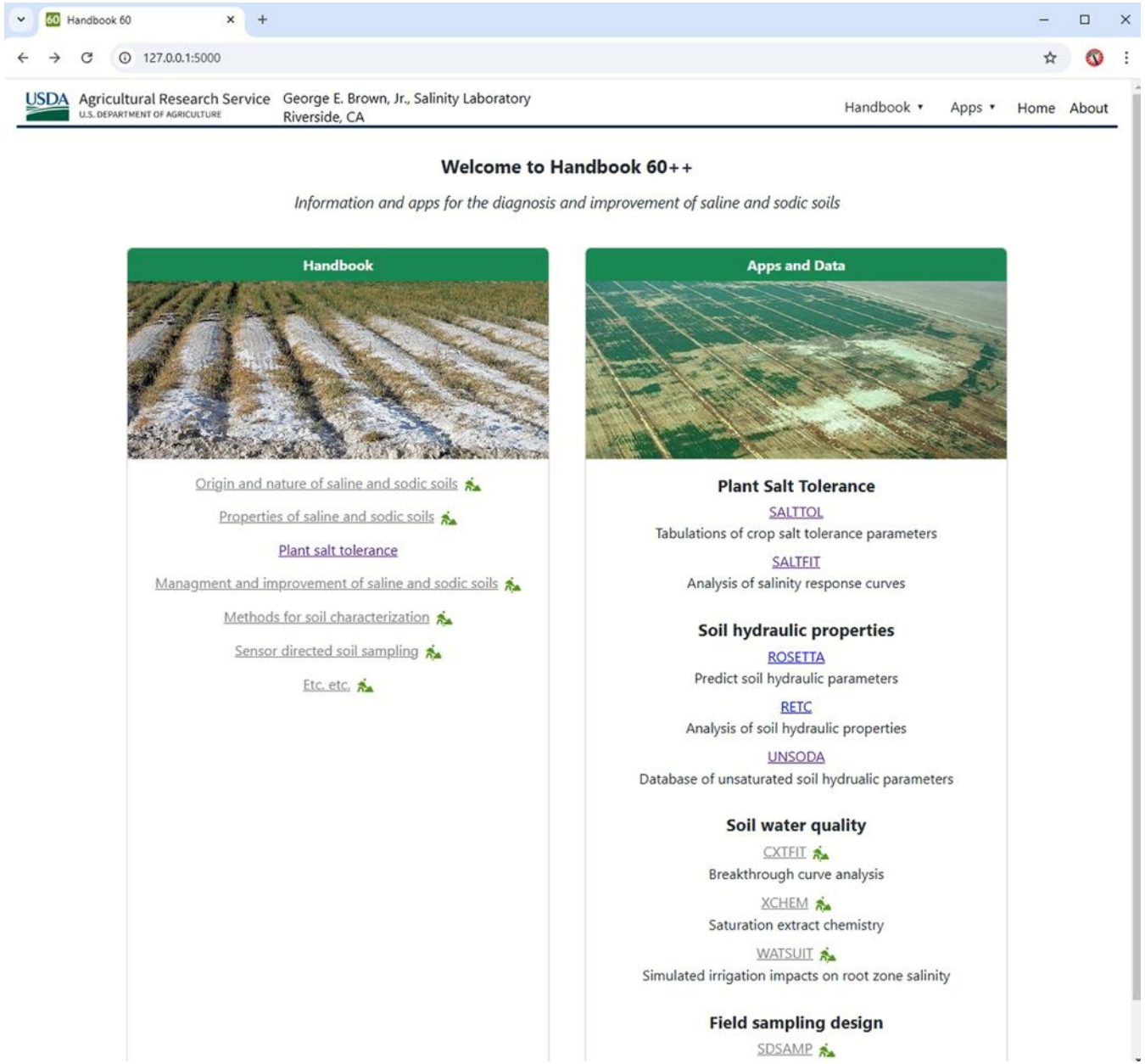
Continued on Page 46

Salt Tolerant Alfalfa Grown With Seawater

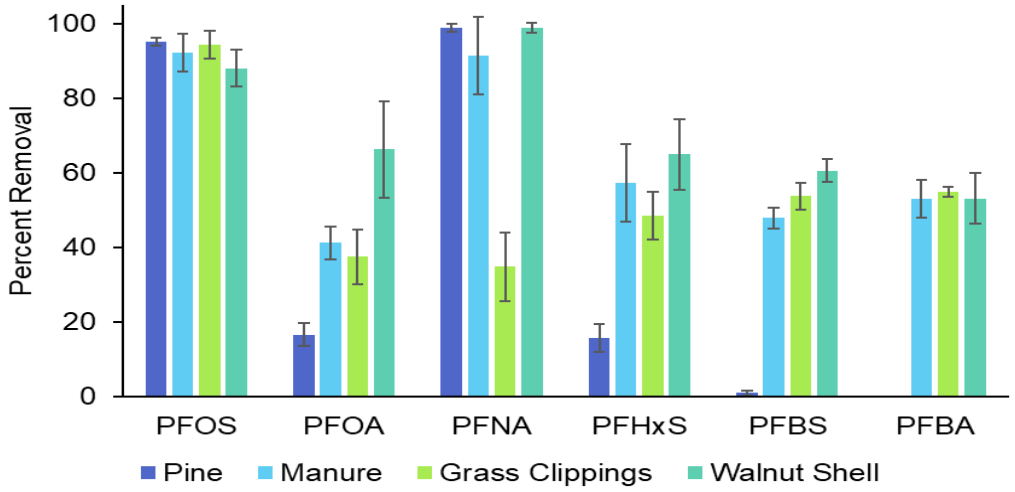
Diagnosis and Improvement of Saline and Alkali Soils

United States Salinity Laboratory Staff

Agriculture Handbook No. 60
UNITED STATES DEPARTMENT OF AGRICULTURE



PFAS & Biochar



Sustainable and Regenerative Agricultural Systems