

eperez-agredano@ucmerced.edu
rryals@ucmerced.edu



Funded by the Almond Board of California and in collaboration with UC Davis, a regional survey was carried out across the Central Valley. A total of 30 sites were surveyed and categorized as “conventional”, “intermediate”, or “regenerative”. Plant biomass and soils were sampled at each site and analyzed for soil health and carbon indicators.

The timeline shows the following events:

- July 2022:** Baseline soils (biomass & soil sampling campaign)
- Nov 2022:** Orchard turnover (management implementation)
- 2023:** Cover crop application (management implementation)
- March 2024:** Survey biomass sampling (biomass & soil sampling campaign)
- May 2024:** Survey soil sampling (biomass & soil sampling campaign)
- YR2 2024:** Demo soil sampling (biomass & soil sampling campaign)
- March 2025:** Survey biomass sampling (biomass & soil sampling campaign)
- June 2025:** Survey soil sampling (biomass & soil sampling campaign)
- YR4 2026:** Demo soil sampling (biomass & soil sampling campaign)

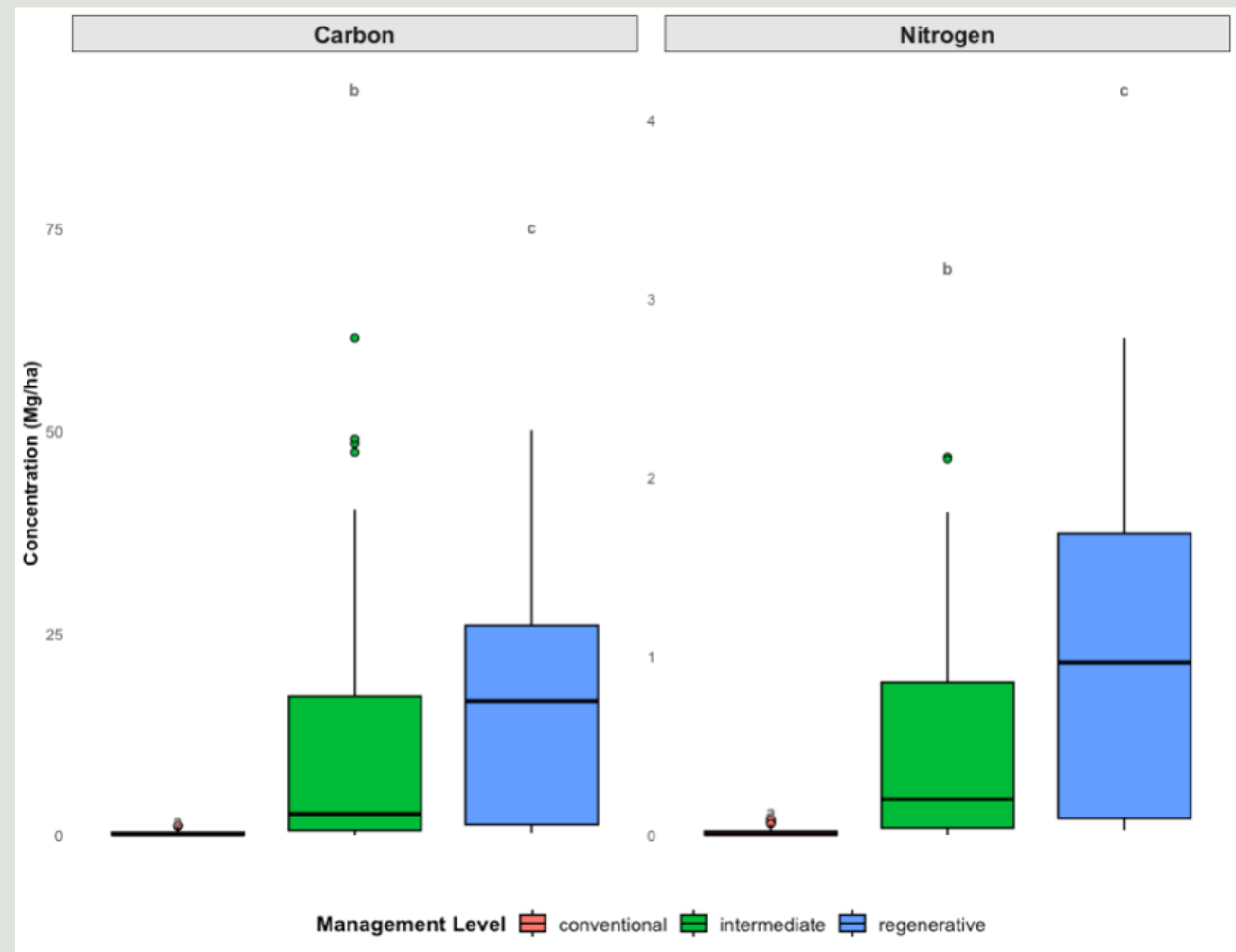
Legend:

- Blue triangle: biomass & soil sampling campaign
- Red dot: management implementation
- Green square: compost application

IMPLICATIONS FOR LONG-TERM CARBON STORAGE & SOIL HEALTH : REGIONAL SURVERY

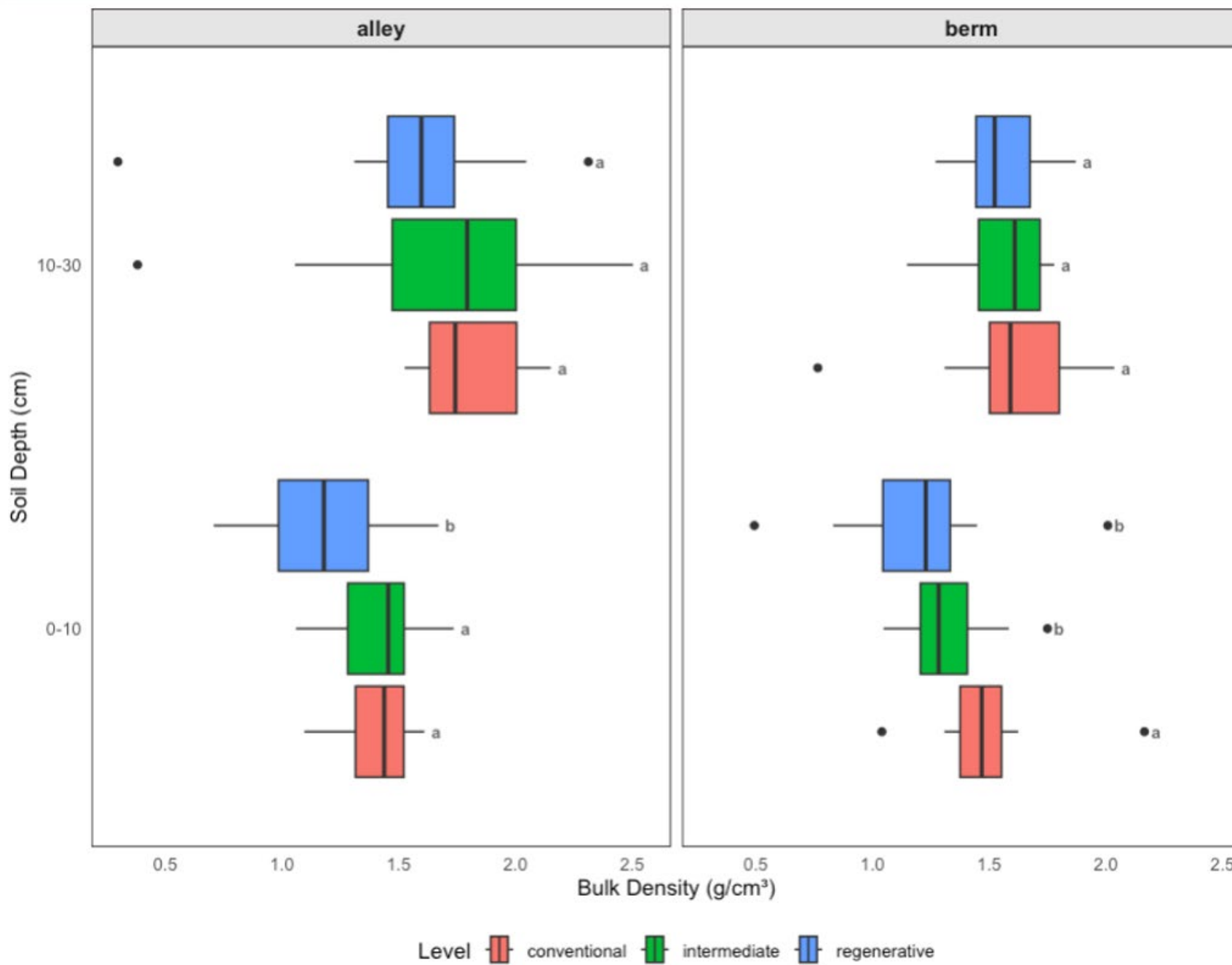
PRELIMINARY RESULTS

PLANT BIOMASS C&N:



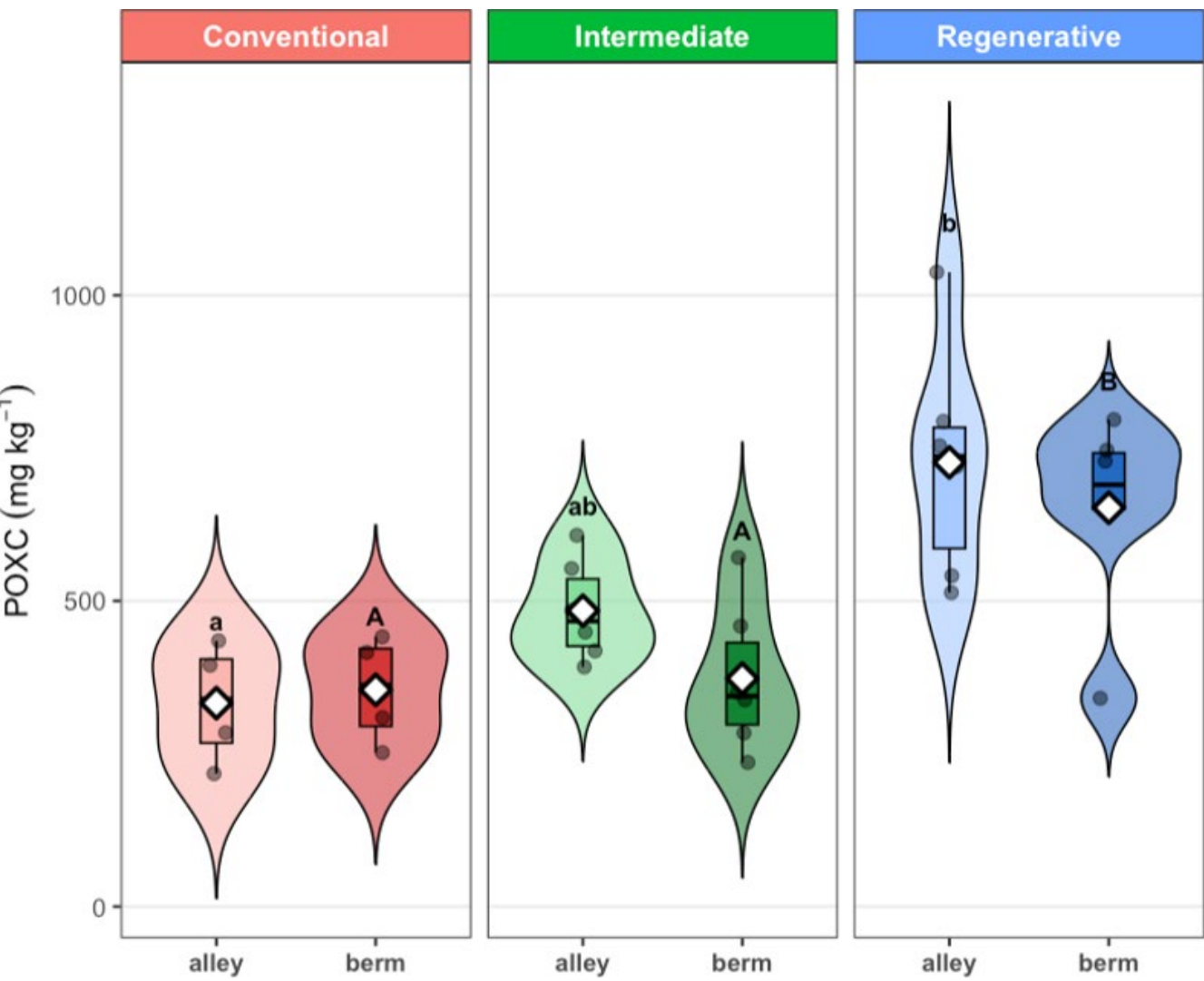
Regenerative-managed orchards significantly had 54.6x more plant carbon and 51.4x more plant nitrogen than that in conventionally-managed orchards.

BULK DENSITY:



Regenerative agriculture significantly reduced bulk density in surface soils by 14.7% and 20.1% across alleys and berms, respectively, compared to conventional sites.

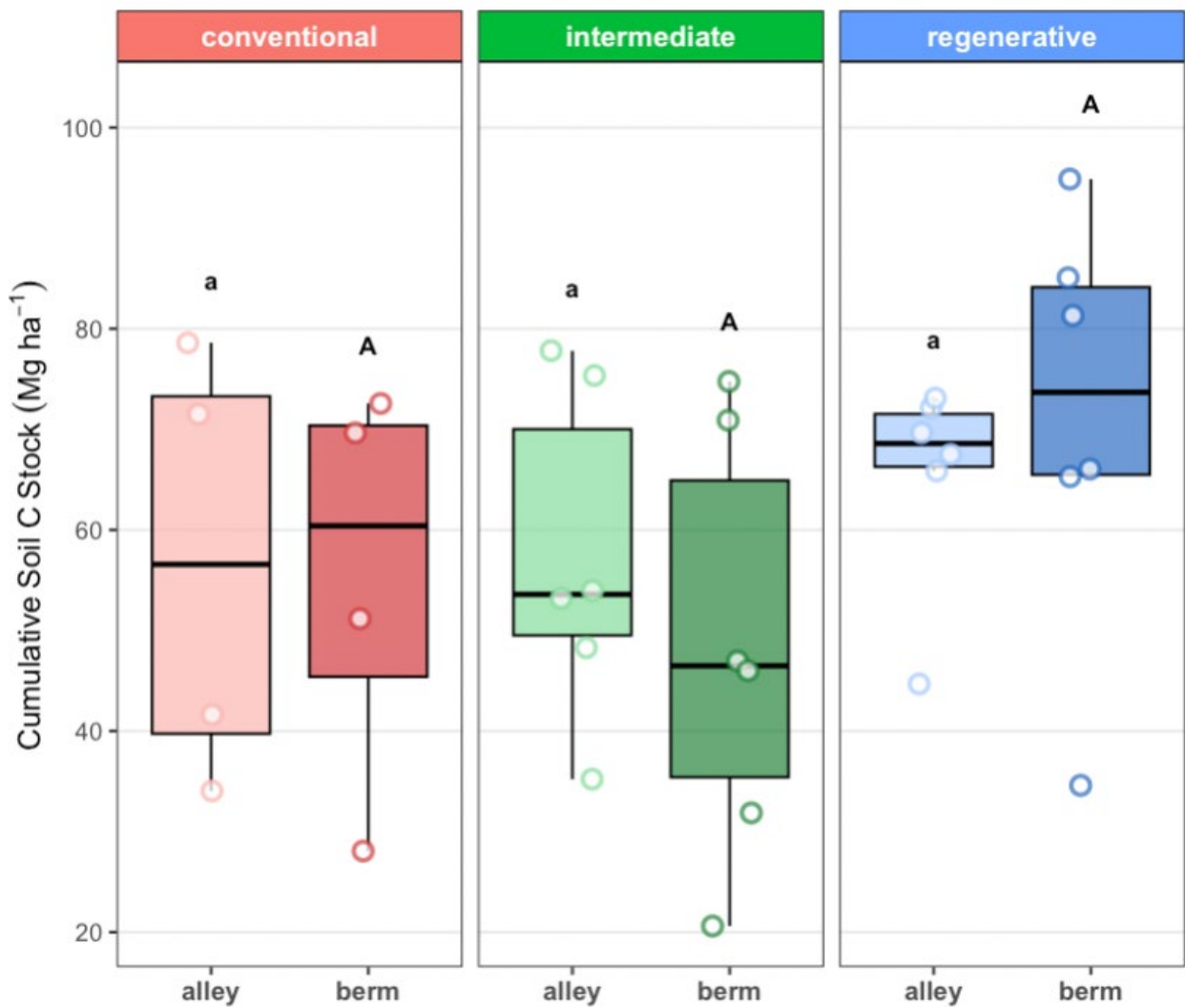
ACTIVE CARBON:



Active carbon (POX-C) differed significantly among levels of regenerative agriculture and orchard position. Regenerative sites demonstrated significantly higher POX-C concentrations.

TOTAL SOIL CARBON:

On average, we observe higher cumulative stocks in regenerative sites, but no significant difference between management type or orchard location.



PH & ELECTRICAL CONDUCTIVITY:

Level	Location	Mean pH	SE pH	Mean EC	SE EC
conventional	alley	7.37	0.04	218.77	18.24
conventional	berm	7.29	0.05	230.50	30.15
intermediate	alley	7.20	0.04	175.17	13.80
intermediate	berm	7.15	0.04	164.93	21.60
regenerative	alley	7.56	0.04	259.42	17.73
regenerative	berm	7.54	0.04	260.14	22.91

On average, alleys exhibited higher pH than berms across sites. Regenerative management increased pH and EC in soils (0-10 cm) compared to conventional mangement.

SUMMARY & FUTURE DIRECTIONS:

- Preliminary data from our survey suggests that implementing stacked regenerative practices will improve long-term carbon storage and soil health benefits.
- Survey soils to be analyzed for wet-aggregate stability, POM/MAOM, microbial biomass C&N, and CO₂ mineralization rates.
- Demo trial soils to be analyzed for the same carbon- and soil health benefits.