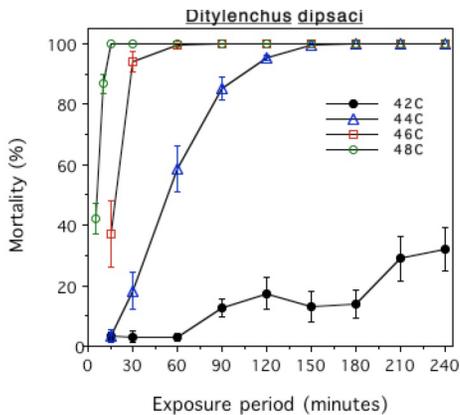


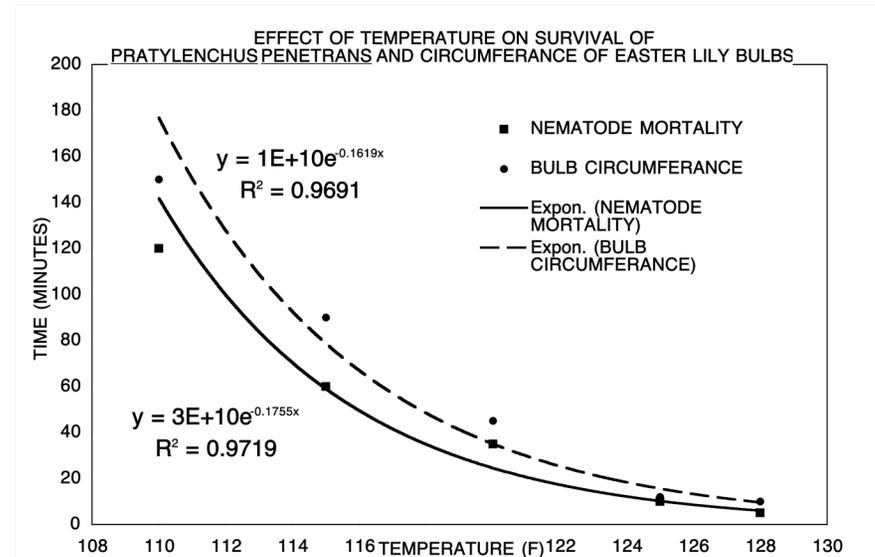
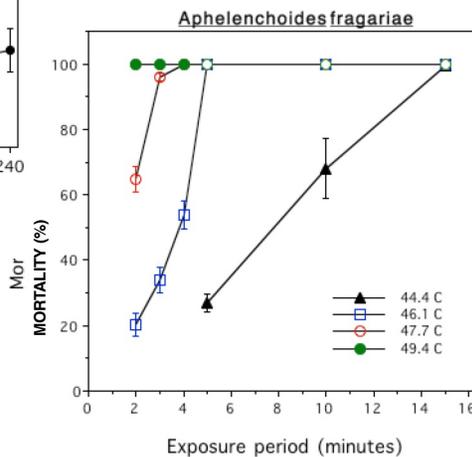
HOT WATER TREATMENT:

**TEMPERATURE & TIME NEEDED DEPEND ON
NEMATODE SPECIES
CROP VARIETY OR CULTIVAR
ACCURATE TIME AND TEMPERATURE CONTROLS
ARE NEEDED
TOO HIGH OF A TEMPERATURE OR TOO LONG OF
AN EXPOSURE PERIOD CAN DAMAGE PLANT
MATERIAL
TOO SHORT A TIME PERIOD OR TOO LOW A
TEMPERATURE MAY NOT KILL NEMATODES
MAY AGGRAVATE FUNGAL PROBLEMS**



**42C = 107.6F
44C = 111.2F
44.4C = 112F
46C = 114.8F
46.1C = 115F
47.7C = 118F
48C = 118.4F
49.4C = 121F**

**COMPARISON OF TIME
AND TEMPERATURE
NEEDED TO KILL STEM
AND BULB NEMATODE
AND FOLIAR NEMATODE**



GRAPE ROOTSTOCK HOT WATER TREATMENT:



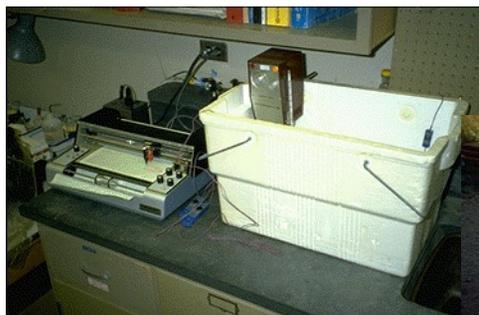
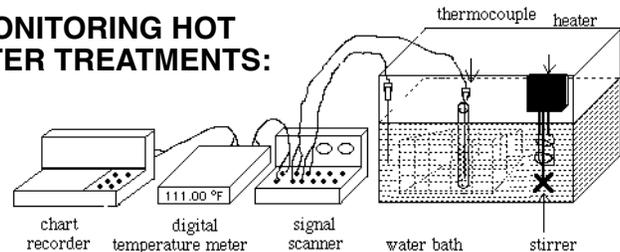
STRAWBERRY PLANT HOT WATER TREATMENT:



STRAWBERRY PLANT HOT WATER TREATMENT:



MONITORING HOT WATER TREATMENTS:



STEAM STERILIZATION



STEAM STERILIZATION



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Band Steaming for Weed and Disease Control in Leafy Greens and Carrots

Nelly Guerra

Horticulture and Agronomy Graduate Group, University of California Davis, One Shields Avenue, Davis, CA 95616

Steven A. Fennimore

Department of Plant Sciences, University of California Davis, 1636 East Alisal Street, Salinas, CA 93905

Mark C. Siemens

Department of Biosystems Engineering, University of Arizona, 6425 West 8th Street, Yuma, AZ 85364

Rachael E. Goodhue

Department of Agriculture and Resource Economics, University of California Davis, One Shields Avenue, Davis, CA 95616

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Band Steaming for Weed and Disease Control in Leafy Greens and Carrots

Steam injected into the soil such that the soil temperatures reach 150-160°F for 20 minutes will kill weed seed in the soil as well as *Pythium ultimum*, and nematodes.

The dwell time to kill soil pests means that when the soil temperature is raised to 150-160°F for 15-20 minutes weed seed and pathogen propagules in the soil are killed by the heat.

There is a selective range of soil temperatures from 150 to 160°F that kill soil pests but allows beneficial organisms such as nitrifiers to survive.

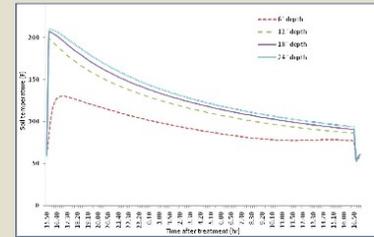
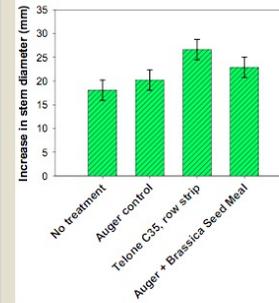


Figure 1. Tractor towed steam applicator tested in 2022 and 2023 (top). Self-propelled commercial scale steam applicator in Yuma, AZ Feb. 16, 2024 (bottom).

Steam Treatment of Replant Sites

Spot treatments, Non-fumigants

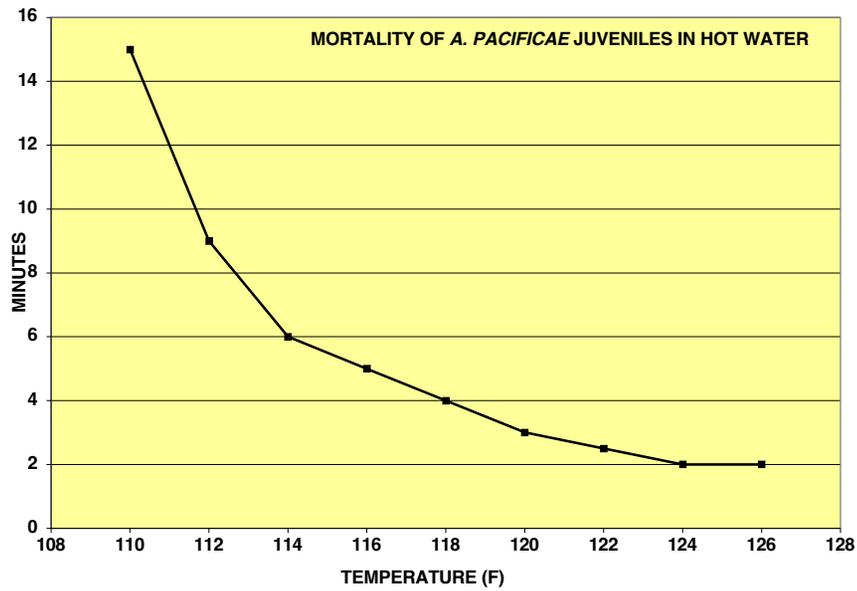
- Collaborative project, Hanson, Fennimore, Browne, Doll, Almond Board of CA
- Augers built by Weimer, Fennimore- 2.5' & 3.0' diameter



PREPLANT HEAT TREATMENTS – SAN FRANCISCO GOLF COURSE



	ROOT-KNOT	RING	SPIRAL	ROTY-LENCHUS	CYST
UNTREATED	150	750	450	600	750
MBR	0	0	0	0	0
MBR	0	0	0	0	0
110F	0	0	0	0	0
130F	0	0	0	0	0
140F	0	0	0	0	0
190F	0	0	0	0	0



ROOT PRUNING



(SOIL SOLARIZATION)



Soil Solarization Treatment Setup

