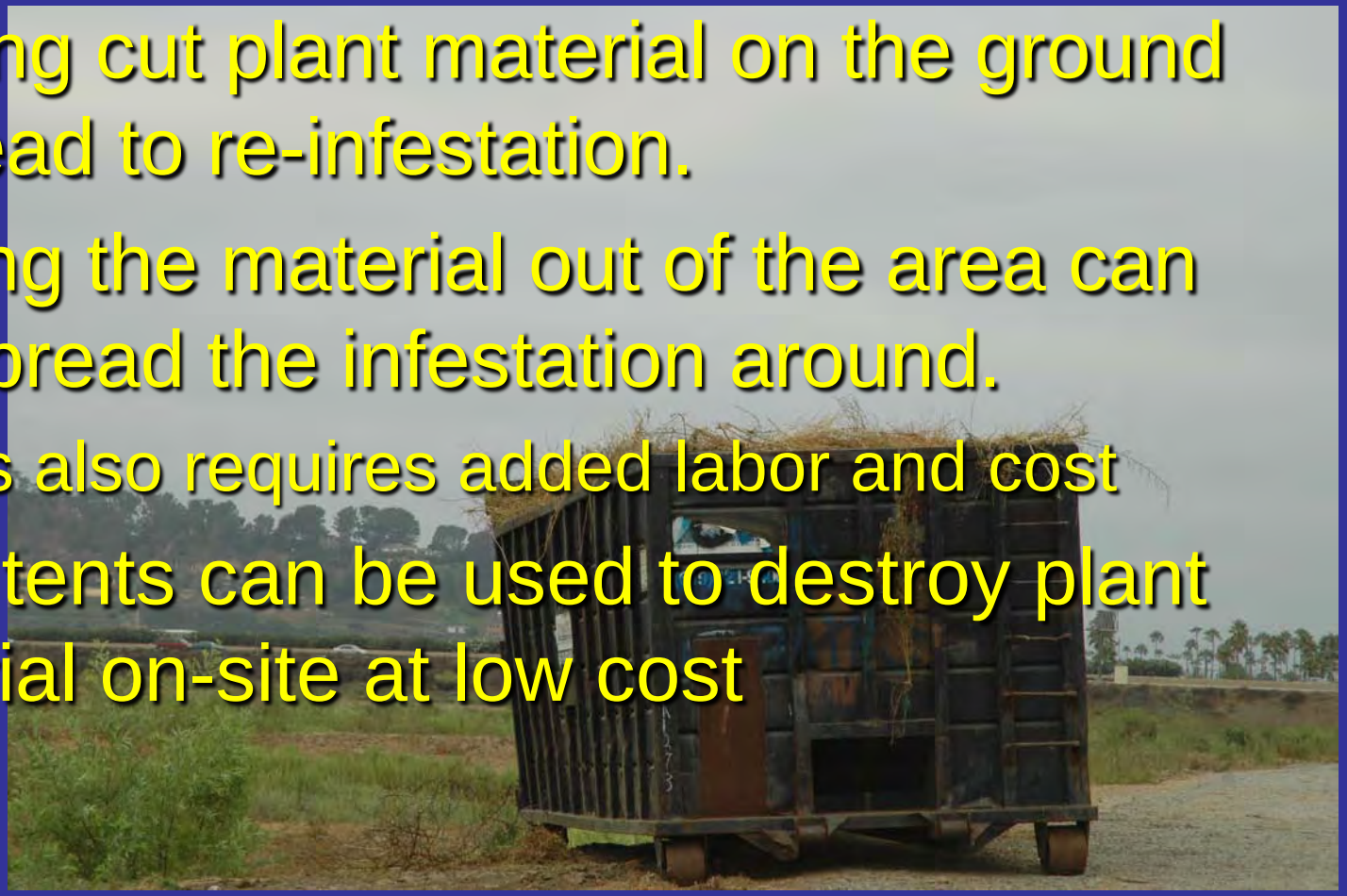
Solar Tents Demonstrated to be Effective in Several California Climatic Areas for Inactivating Plant Propagative Material

Carl E. Bell, Southern California
Kristin A. Weathers and Milton E. McGiffen, Jr.
UC Riverside, Botany & Plant Science
James J. Stapleton, UCIPM, Kearney Ag Center
University of California, Cooperative Extension

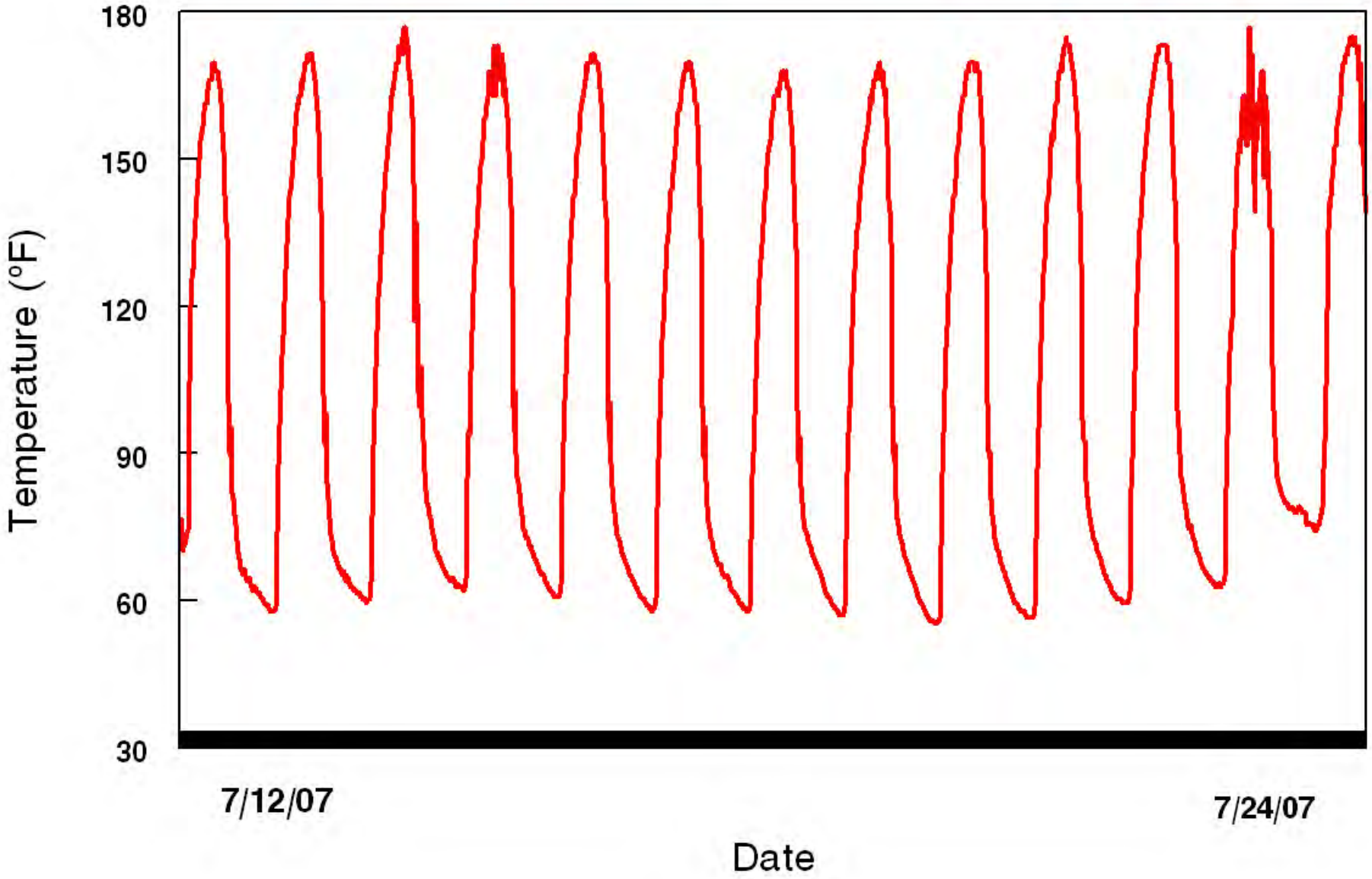
Invasive Plant Control usually takes place in remote areas

- Leaving cut plant material on the ground can lead to re-infestation.
- Hauling the material out of the area can just spread the infestation around.
  - It is also requires added labor and cost
- Solar tents can be used to destroy plant material on-site at low cost



Sanitation!


ONAS


180
150
120
90
60
30
Temperature (°F)
7/12/07
7/24/07
Date

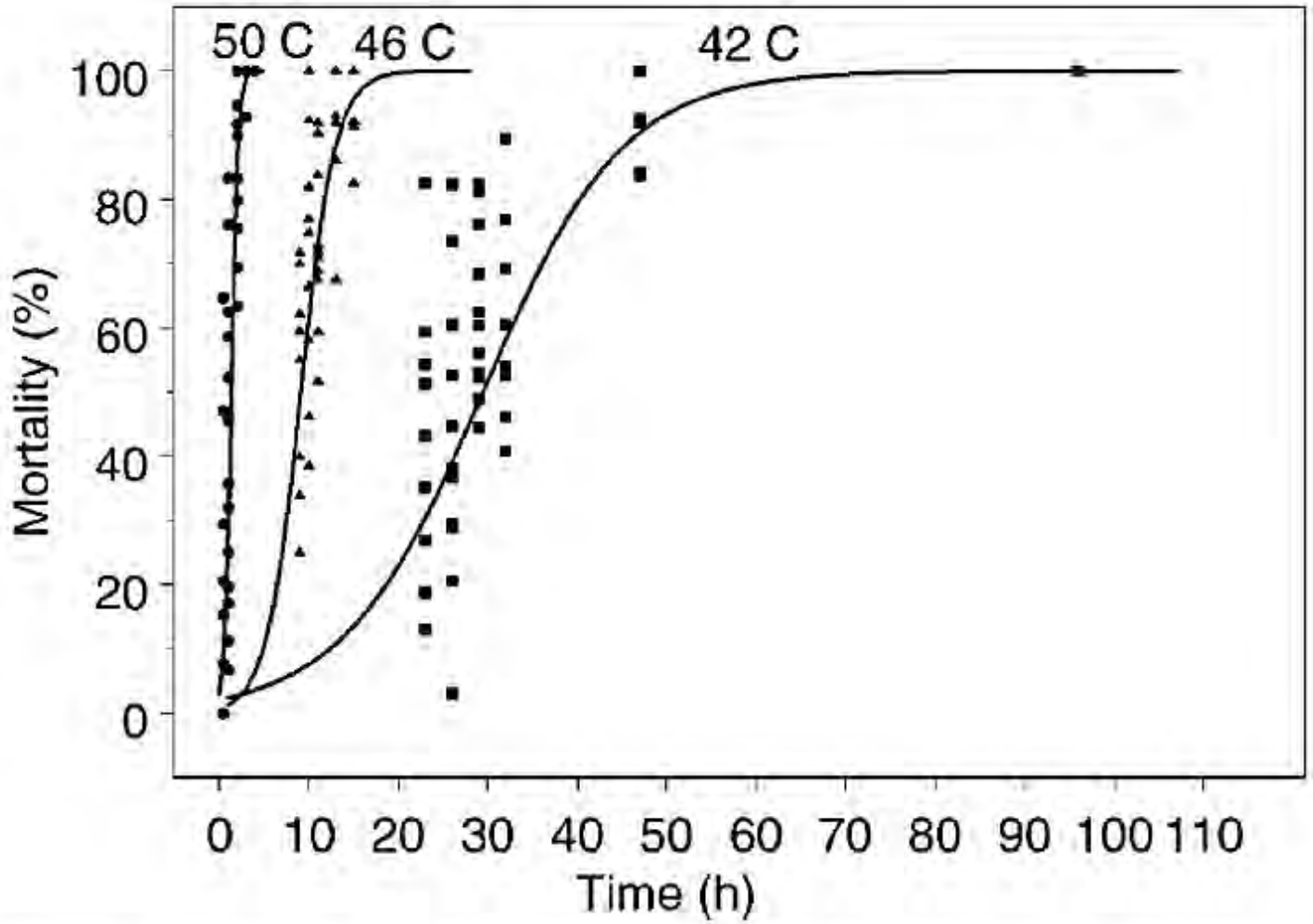
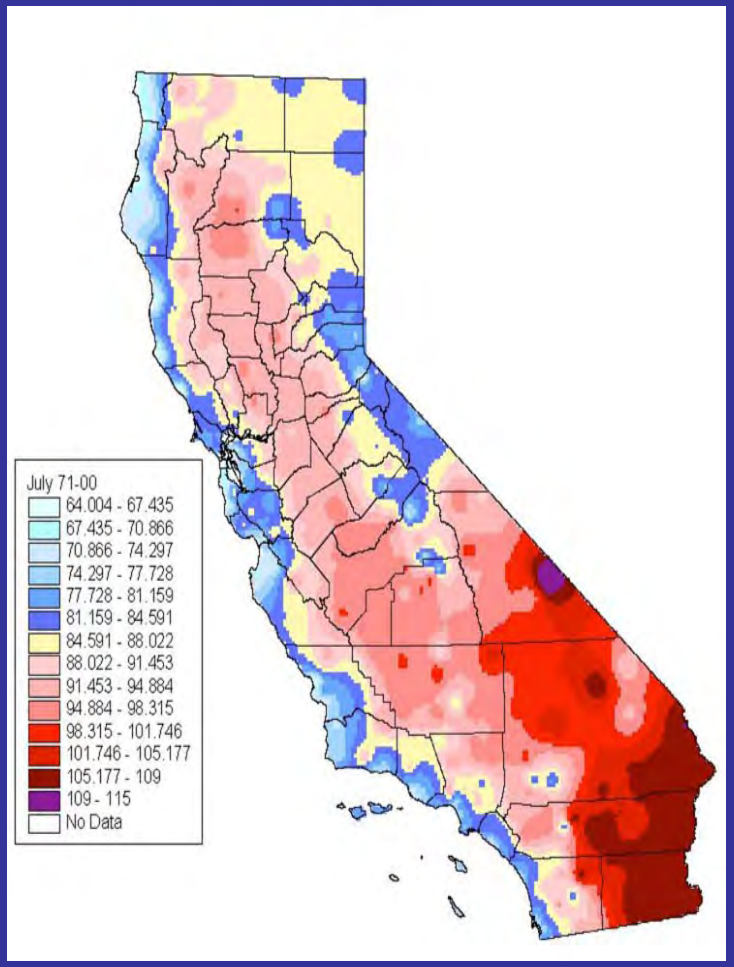
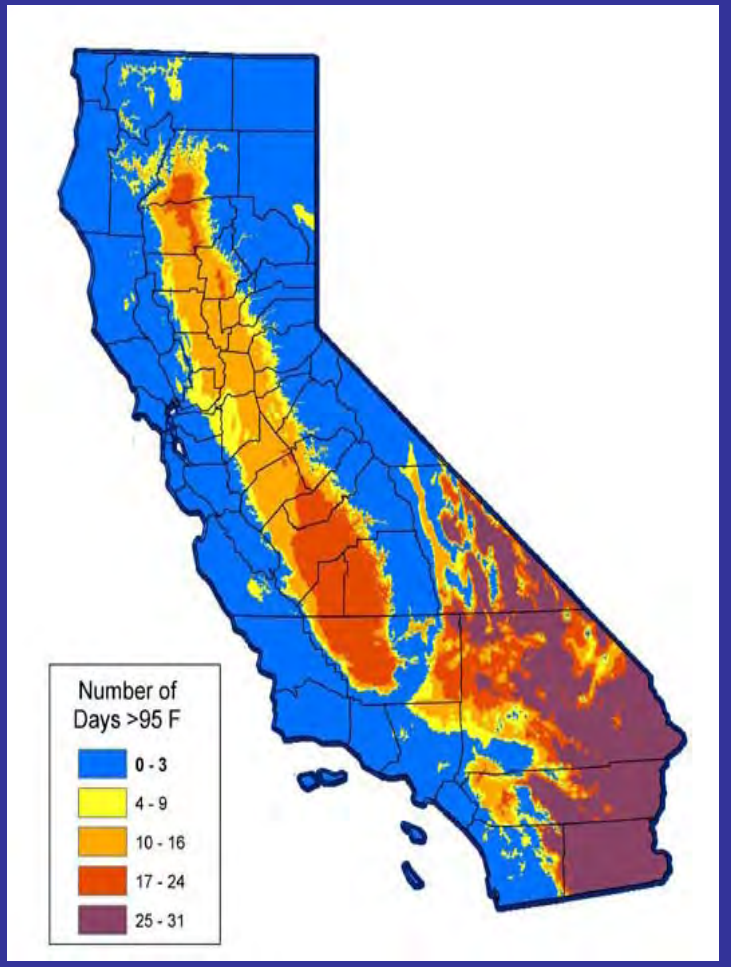


Figure 1. Annual sowthistle percentage mortality vs. time at constant temperatures. At 42 C, % mortality $= 1/\{1 + e^{[-0.129(d - 29.459)]}\}$, pseudo $R^2 = 0.93$; at 46 C, % mortality $= 1/\{1 + e^{[-0.525(d - 9.109)]}\}$, pseudo $R^2 = 0.96$; at 50 C, % mortality $= 1/\{1 + e^{[-2.665(d - 1.313)]}\}$, pseudo $R^2 = 0.96$, where d = duration of exposure at each temperature.

QUESTION:

Can tent solarization techniques for weed inactivation be adapted and used throughout California?


July 71-00
64.004 - 67.435
67.435 - 70.866
70.866 - 74.297
74.297 - 77.728
77.728 - 81.159
81.159 - 84.591
84.591 - 88.022
88.022 - 91.453
91.453 - 94.884
94.884 - 98.315
98.315 - 101.746
101.746 - 105.177
105.177 - 109
109 - 115
No Data


Number of
Days >95 F
0 - 3
4 - 9
10 - 16
17 - 24
25 - 31

Constructing a solar tent in a remote location.

- You need to bring;
  - Clear plastic UV resistant sheeting
  - Black Plastic sheeting
  - Large plastic trash bags
  - Knife or scissors, duct tape, shovel
- Local materials;
  - Rocks
  - Tree branches or twigs

Max Air Temperature Data

July 25-Aug 7, 2009

- **Riverside 81-98 F**
- **LaJolla 70-75 F**
- **Otay Lake 75-91 F**

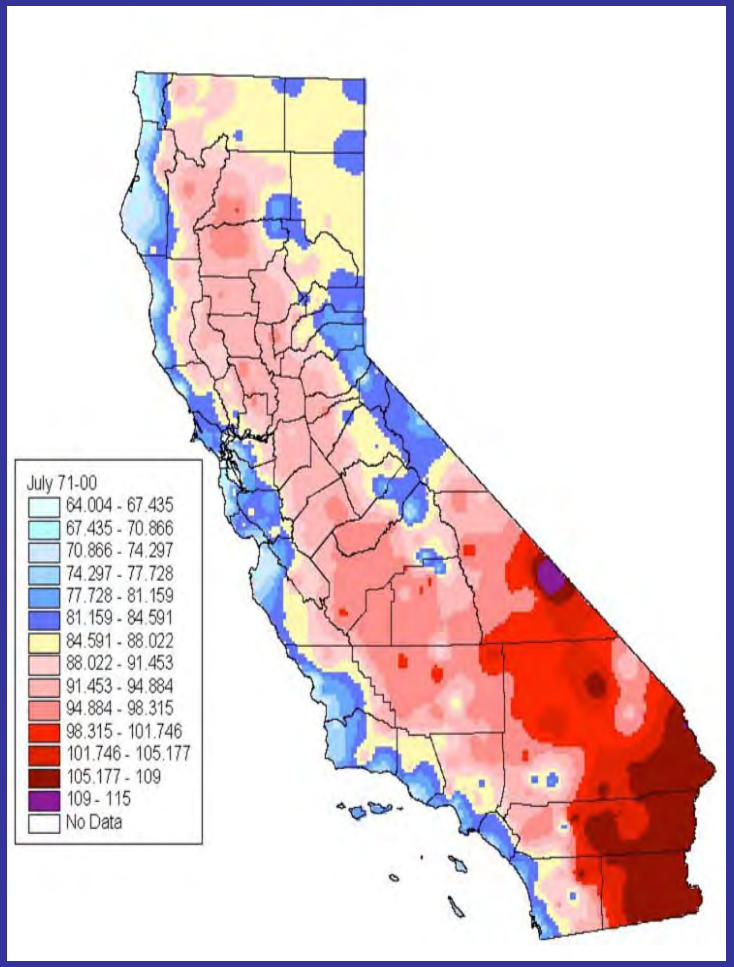
Germination results from three sites in southern CA in 2009.

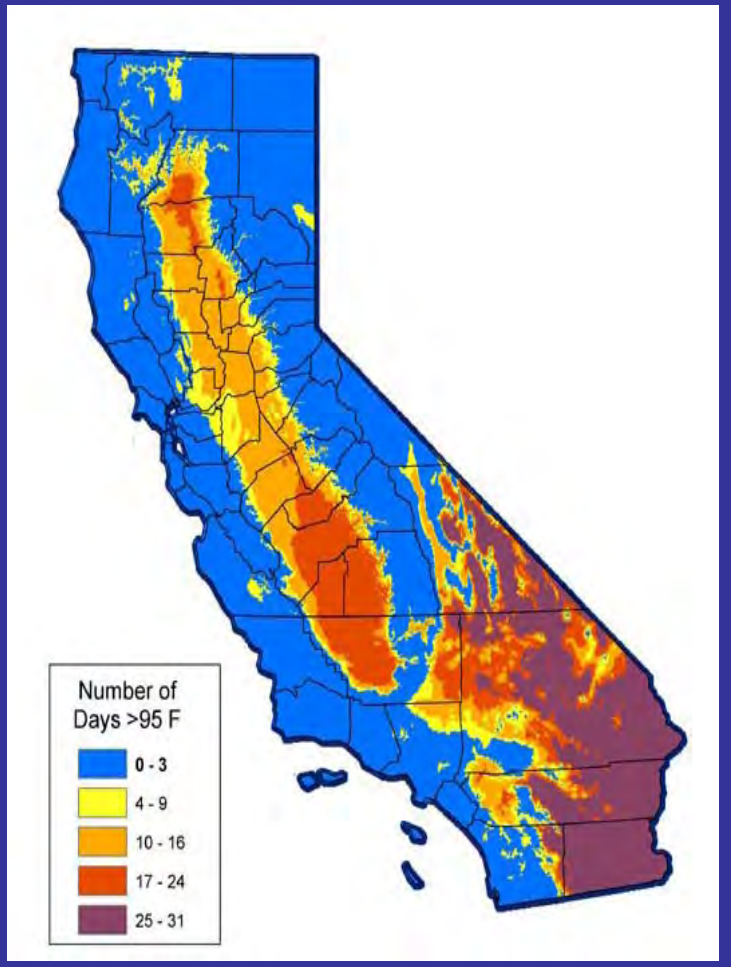
- Riverside:
  - Shortpod mustard – solar tent – 0%
    - Untreated control – 76-92 % germination
- Del Mar
  - Bristly oxtongue – solar tent – 0%
    - Untreated control - > 90% germination
- Lakeside (inland San Diego County)
  - Bristly oxtongue – Solar tent – 0%
    - Untreated control – 94-98 % germination
  - Curly dock – Solar tent – 0%
    - Untreated control – 34-40% germination

Moisture is important!

CONCLUSION:

Yes, tent solarization can be adapted and widely used to eradicate weed propagative materials in California.


July 71-00
64.004 - 67.435
67.435 - 70.866
70.866 - 74.297
74.297 - 77.728
77.728 - 81.159
81.159 - 84.591
84.591 - 88.022
88.022 - 91.453
91.453 - 94.884
94.884 - 98.315
98.315 - 101.746
101.746 - 105.177
105.177 - 109
109 - 115
No Data


Number of
Days >95 F
0 - 3
4 - 9
10 - 16
17 - 24
25 - 31

http://groups.ucanr.org/socalinvasives/files/78121.pdf

http://solar.uckac.edu