Solar Tents – A New Twist on an Established Method for Inactivating Plant Propagative Material

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SOLARIZATION

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“Double-tent” solarization has been approved by CDFA for production of nematode-free nursery stock.
QUESTION:

Can solarization techniques be adapted and used to eradicate seedbanks from localized infestations of invasive weeds?
To Clean up Seedbanks of Invasive Plants by Solarization:

- Inactivation of seeds fallen to the ground
- Inactivation of seeds in living and skeleton plants and debris

Requires two approaches!
How to Set Up Tent Solarization Using Locally Available Materials
2007 Double Tent Solarization - Ned Gulch

Temperature (°F)

Date

7/12/07
7/24/07
Temperature Data

- Air temperature 82 F
  Bags only - 107 F;
  Double Tent - 143 F

- Air temperature 87 F
  Bags only 114 F;
  Double Tent 164 F
Figure 1. Annual sowthistle percentage mortality vs. time at constant temperatures. At 42 C, % mortality = \(\frac{1}{1 + e^{[-0.129(d - 29.459)]}}\), pseudo \(R^2 = 0.93\); at 46 C, % mortality = \(\frac{1}{1 + e^{[-0.525(d - 9.109)]}}\), pseudo \(R^2 = 0.96\); at 50 C, % mortality = \(\frac{1}{1 + e^{[-2.665(d - 1.313)]}}\), pseudo \(R^2 = 0.96\), where \(d\) = duration of exposure at each temperature.
Hours to 90% mortality vs. temperature

- Tumble pigweed
- Black nightshade
- Common purslane
- London rocket
- Barnyardgrass
- Annual sowthistle
CONCLUSION:

Yes, solarization techniques can be adapted and used to eradicate imbibed seeds in soil and aerial seedbanks.
http://solar.uckac.edu

University of California

Soil Solarization
Informational Website

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