Alternative Controls:

- Grazing
- Flaming
- Tarping
- (Plastic) Mulching
- Bio-Control

Grazing & Browsing


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Rent A Goat
Cost-effective, eco-friendly, and cute weed removal

Flaming


Propane cylinder not included.


Young Hop Clover


French Broom seedling

Tarping Solarization

Figure 3. Application of transparent polyethylene film to solarize a field on an organic vegetable farm in the San Joaquin Valley, California. (Source: University of California)

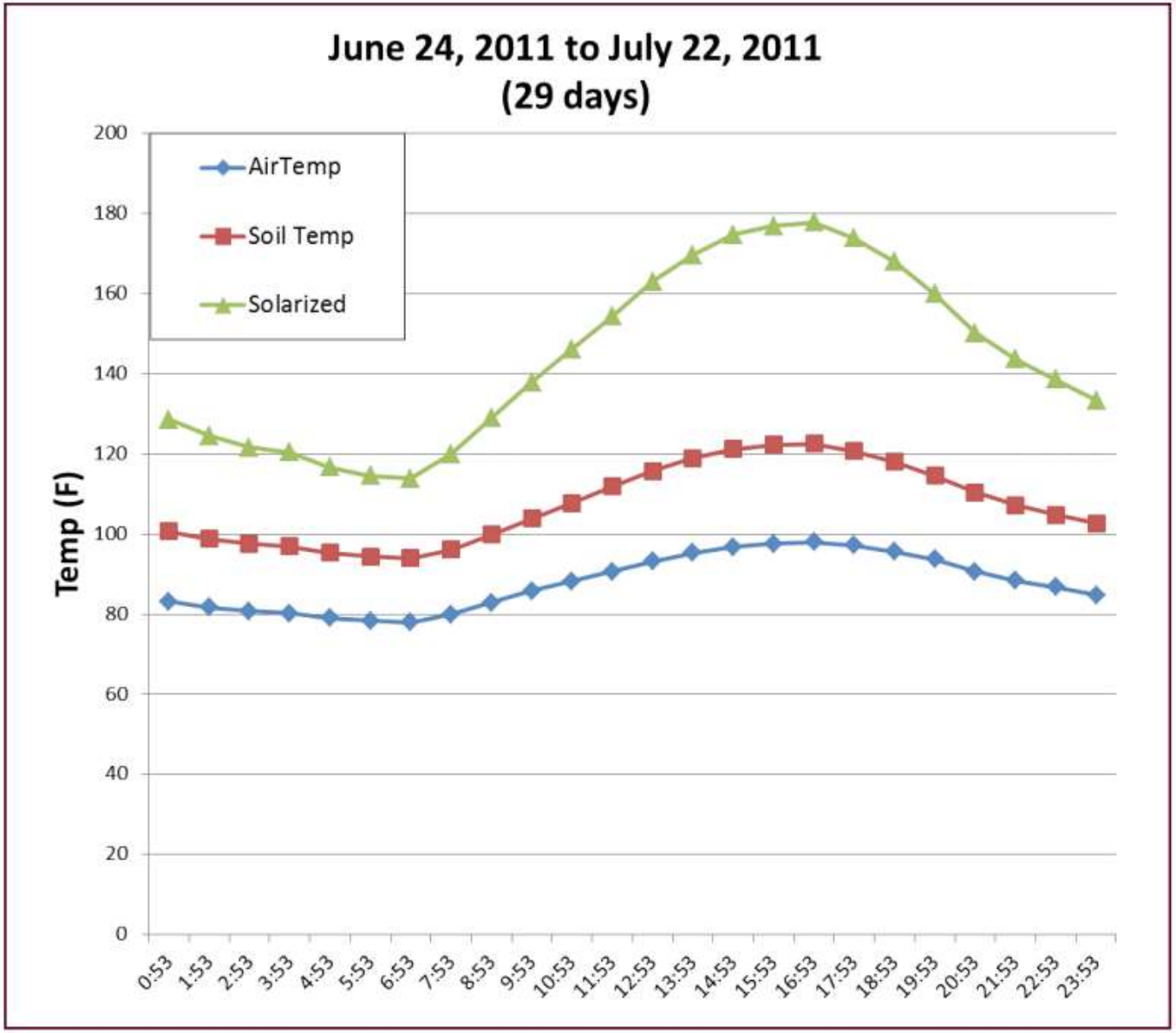

Figure 4. Temperatures of ambient air, solarized soil, and non-solarized soil recorded in College Station, TX, from June 24, 2011, to July 22, 2011.

Figure 7. Plots of A) solarized soil and B) non-solarized soil 3 weeks after the plastic cover was removed from the solarized plot.

Figure 8. Plots of A) solarized soil and B) non-solarized soil on March 12, 2013, which was 147 days after the plastic cover was

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Reducing Persistent Seed Banks of Invasive Plants by Soil Solarization—The Case of *Acacia saligna*

O. Cohen, J. Riov, J. Katan, A. Gamliel, and P. Bar (Kutiel)*

An important factor in controlling invasive plant infestations is frequently the acceleration of the deterioration of their persistent seed bank, which is often associated with physical dormancy mechanisms. We hypothesized that breaking dormancy by heat would enhance the vulnerability of the nondormant seeds to hydrothermal stresses. The aim of the present study was to examine the effect of soil solarization treatments (heating the soil by means of polyethylene mulching) on buried Australian *Acacia* seeds, with emphasis on *Acacia saligna* L. The results of three field experiments indicate that soil solarization treatments caused an almost complete eradication of buried seeds of *Acacia saligna* and two other Australian *Acacia* species, *Acacia murrayana* and *Acacia sclerosperma*. The killing mechanism of solarization was further studied in laboratory experiments. We observed two phases of the heat-induced deterioration of seed persistence: breaking the dormancy of the seeds and exposing the "weakened seeds" to lethal temperatures. From an ecological perspective of conservation, the present study shows for the first time the possible utilization of solar energy, by means of soil solarization, for reducing persistent seed banks of invasive woody plants.

Nomenclature: *Acacia saligna* L.

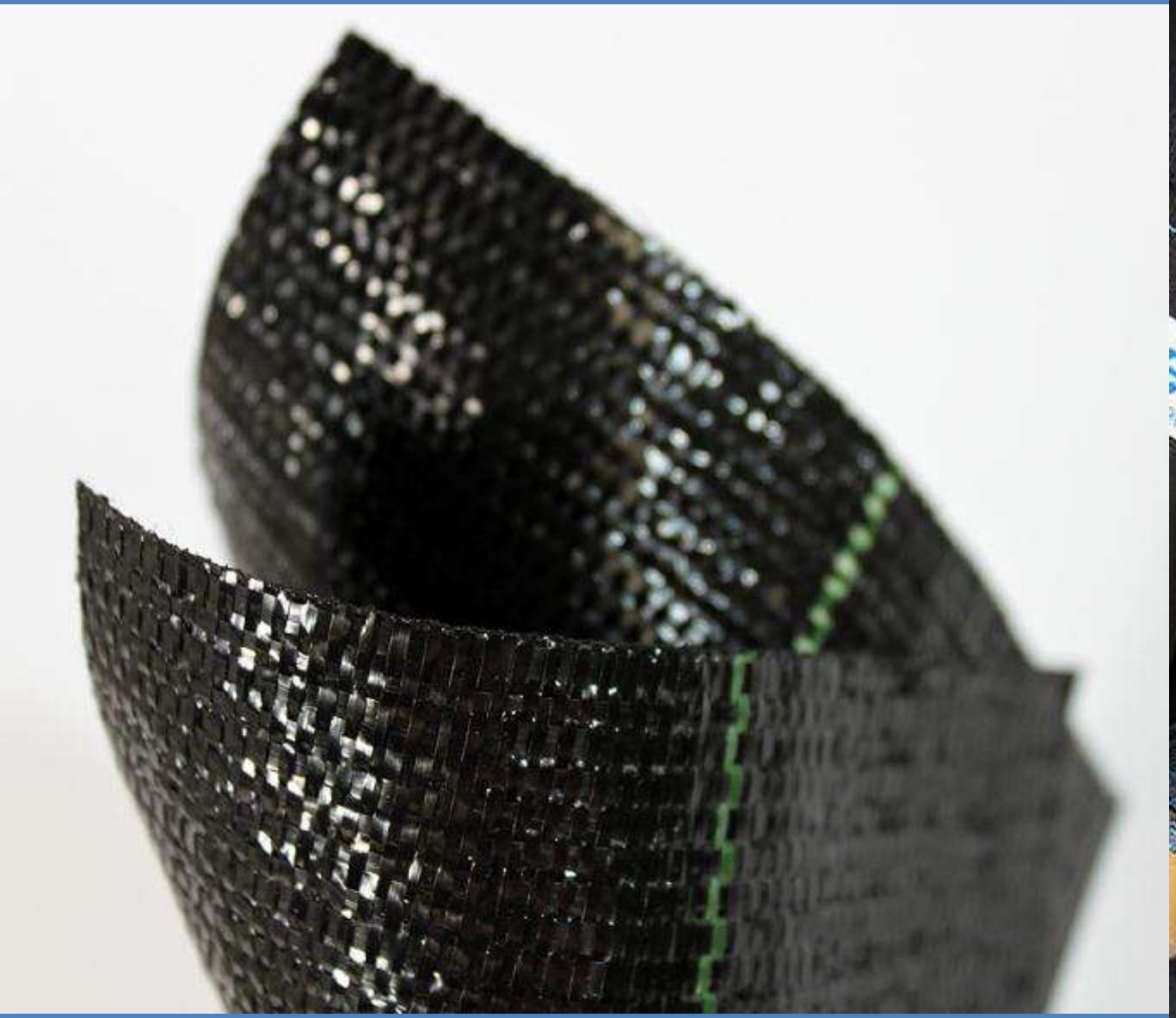
Key words: Biological invasion, heating, management, persistent seed bank; physical dormancy.

Prevention of plant invasion processes following restoration of invaded ecosystems is a major task for both agroecosystem and natural conservation managers (D'Antonio and Meyerson 2002; Williams and West 2000). Most of the world's worst weeds have a large persistent seed bank (Holm et al. 1977). Thus, enhancing the deterioration of persistent seed bank to reduce seedling re-establishment might be a potential means for controlling invasive plant infestations. Physically dormant seeds are commonly involved in persistent seed-bank strategy (Bibbery 1947; Bradbeer 1988; Quilivan 1971; Rolston 1978), although according to Thompson et al. (2003) there is not a close correlation between seed dormancy and seed persistence in the soil. Physical dormancy (PY), which occurs

composition, structure, and function (French and Major 2001; Holmes and Cowling 1997a,b; Manor et al. 2008; Musil 1993; Yelenik et al. 2004). These ecological alterations are manifested in the loss of landscape values and biodiversity.

Most of the studies dealing with management and restoration of *A. saligna*–invaded habitats were conducted in South Africa by Holmes and her colleagues (Holmes 1988, 1989a; Holmes et al. 1987; Holmes and Newton 2004; Holmes et al. 2000). These studies analyzed the impact of various mechanical methods, such as clearing and fire, on regeneration of both *A. saligna* and the natural vegetation from persistent seed bank. Morris (1997) reported that

Tarping
Plastic Mulching

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Tarping


Seeding


SPECIAL PURCHASE
SPORTS

Biological Control

Cactoblastis larvae