

## Improving Sunn hemp benefits by integrating with Solarization

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If your crop land has been farmed continuously for a long period of time, you might want to give the soil a rest and plant a green manure cover crop to revitalize your soil.

### Sunn hemp

We are working on cover cropping systems that can help to improve soil fertility, enhance beneficial soil organisms, while suppressing plant-parasitic nematodes. We have identified **sunn hemp** (*Crotalaria juncea*) as an ideal cover crop that can generate great amounts of organic biomass within 2 1/2 months of growth during spring to summer in Hawaii. It is a poor host of several key nematode pests, and releases toxic compounds against many plant-parasitic nematodes.



It is important that sunn hemp be incorporated into the soil at its vegetative (or early flowering) stage so as its tissues will not become too fibrous. Fully bloomed sunn hemp will result in a high carbon content that can tie up soil nutrients for the subsequent crop's uptake.

When incorporated into the soil, sunn hemp enhances beneficial organisms that are natural enemies of nematode pests, and increases free-living nematodes involved in soil nutrient cycling.



*Fig. 1. Soil solarization is using solar energy to heat up soil by covering soil with low-density (25- $\mu$ m-thick), uv-stabilized, polyethylene mulch.*

### Solarization

Growers in Hawaii can take advantage of solar heat to suppress various soil-borne pests. Currently we are studying different methods to improve sunn hemp cover cropping systems. Recently, we integrated sunn hemp cover cropping followed by **soil solarization** to improve weed suppression. Soil solarization is using solar energy to heat up soil by

covering the soil with low-density (25- $\mu$ m-thick), uv-stabilized polyethylene mulch to suppress heat-sensitive pests and pathogens in the soil such as nematodes, weeds, and other soil-borne pathogens. Please note that this is not regular clear plastic mulch that you can find from home garden stores. It is much thinner so that UV lights can pass through easily.

We found that in fields where sunn hemp established vigorously, incorporation of sunn hemp materials followed by soil solarization (6 weeks during the summer in Hawaii) heat up the topsoil layer (0-10 cm) more efficiently than solarization alone. However, soil solarization alone also heats up soil significantly as compared to non-solarized conditions. Weeds flushed out about 3 weeks after removing solarization mulch were significantly reduced in solarized vs. non-solarized plots (Fig. 2).



*Fig. 2. Weed coverage in solarized vs non-solarized plots about 3 weeks after removing solarization mulch.*

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