# Comparison of Plastics for High Tunnel Soil Solarization

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## Objective:

To compare black and clear plastic (polyethylene mulch) for effectiveness of soil solarization to reduce weed seed germination in a high tunnel.

## Materials and methods:

Tunnel and ground preparation

- A 30' x 80' Quonset-style high tunnel was used.
- Weeds observed during the growing season: Crabgrass, pigweed sp., ground cherry, and spotted spurge.
- All plant debris was cleared in mid-July 2024.
- Ground was bedded with drip irrigation in place.
- Beds were irrigated two days prior to laying plastic mulch.

Plastic installation

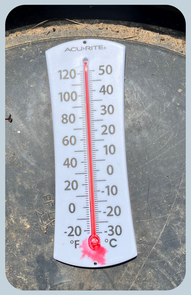
- 6 mil polyethylene sheeting was installed on August 2.
- Half of the beds were covered in black plastic and half in clear.
- Plastic edges were sealed with wooden planks as well as compost.
- Tunnel was closed by lowering side curtains and end curtains.

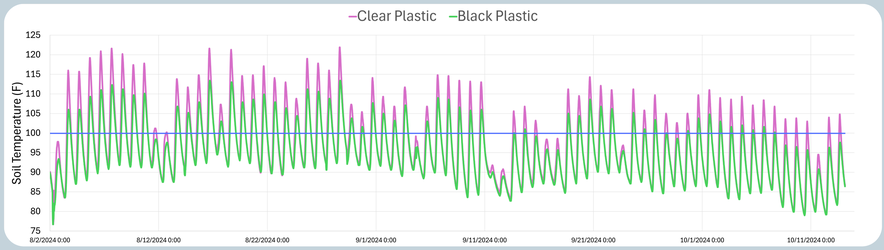
Data collection

- WatchDog temperature sensors were installed to monitor both covered areas.
- AgSense soil moisture sensor system was utilitzed to monitor both areas.
- Soil and air temperature data were collected for the duration of 10 weeks.

## Results:

- The soil under the clear plastic dried out more than the soil under the black plastic, with averages of 10 cb and 6 cb, respectively. However, both areas retained adequate moisture throughout the demonstration.
- Highest recorded air temperature: 151° F on August 28th.
- Highest recorded soil temperatures: black: 113° F; clear: 122° F
- Soil temperatures under both plastics remained above 100° F for 27 days in August, 25 days in September, and the first week in October.
- Soil temperatures under the clear plastic consistently stayed several degrees higher than temperatures under the black plastic.
- Components of pvc irrigation and a plastic outdoor thermometer melted, creating some repair and replacement expenses.
- By week 7, the clear plastic began to degrade causing large tears and cracks throughout the plastic.




Left image: A wall thermometer melted inside the high tunnel when air temps reached 150° F on August 16th.
Above image: Data from WatchDog soil sensor showing soil temperatures during the demonstration period.

Left image: Using compost to seal edges of each plastic covering.
Right image: Post-plastic removal, the area under clear plastic shows persisting weed pressure, black does not.

## Conclusion:

- Adequate temperatures were achieved for effective soil solarization under both plastics.
- The area covered by the black plastic had no weeds when the plastic was removed, and no weeds grew in the following weeks.
- Crabgrass could be seen growing under the clear plastic on the west end of the tunnel. Weed growth continued after the removal of the plastic.
- After removing the plastic, the area covered by the clear plastic was treated with an herbicide in order to control weed growth.
- Observations will continue as the spring growing season approaches.
- The degraded clear plastic was difficult to remove and had to be discarded at the conclusion of the project.
- The black plastic could be reused for subsequent solarization treatments.
- Producer's comments: "If noticeable improvements in weed pressure continue throughout the 2025 growing season, black plastic soil solarization will be a routine component of our weed control program."

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