SOIL SOLARIZATION FOR NEMATODE CONTROL

Nematodes can be one cause of poor growth of garden plants. Root knot nematodes are microscopic, worm-like animals that cause root swelling and galls on many broad-leaved species (Fig. 1). The surest way to identify the presence of this nematode is to examine the roots. A soil test done by a plant disease diagnostic laboratory can confirm the problem. There is no “over-the-counter” pesticide available to treat for nematodes because all the effective materials are highly toxic to humans and therefore require a pesticide license for application. However, soil solarization is a safe, inexpensive method that can be used to treat for nematodes.

Fig. 1. Galling symptoms of root knot nematode on tomato root.

Soil solarization works by using the sun to heat up the soil in the presence of moisture. In addition to nematodes, some soil-inhabiting fungal pathogens and weed seeds are killed by this method.

Procedure:

Leave a clear plastic tarp on the soil surface for 4-6 weeks during the hottest part of the year (Fig. 2). Use transparent plastic because black or colored plastic will not allow the soil to heat to the highest possible temperature. Polyethylene plastic 1 mil thick is recommended, but 1.5 to 2 mil thickness could be used in windy areas. Thicker plastic (4 to 6 mil) is not recommended because it reflects too much heat.

Before laying down the plastic, level the area and remove all weeds, plants, debris and large clods of soil. Rototill and rake smooth, so that when the plastic is laid, there will be close contact with the soil.

Soak the soil before laying down the plastic. This is important for ensuring retention and deep penetration of heat.

Place the plastic on soil and push out air pockets to ensure close contact. If one piece of plastic is not enough to cover the whole area, be sure to have about six inches of overlap with different pieces. Use clear tape to fix the pieces together and use rocks or bricks to hold the joined pieces close to the soil and prevent the wind from blowing them apart.

Weigh down the outer edges of the plastic with rocks or bricks. Alternatively, the edges can be sealed with soil. However, when the solarization is finished, this soil must be carefully placed outside the treated area to prevent recontamination.

The effectiveness of the treatment will depend upon whether high enough soil temperatures were maintained for long enough. If problems are seen in a soil which was previously solarized for 4 weeks, then a longer period will be necessary. Additionally, the soil may become recontaminated with soil from outside the treated area. However, for nematode control, this may not be noticeable until 1-2 years after treatment.


Fig. 2. Garden set up for soil solarization.