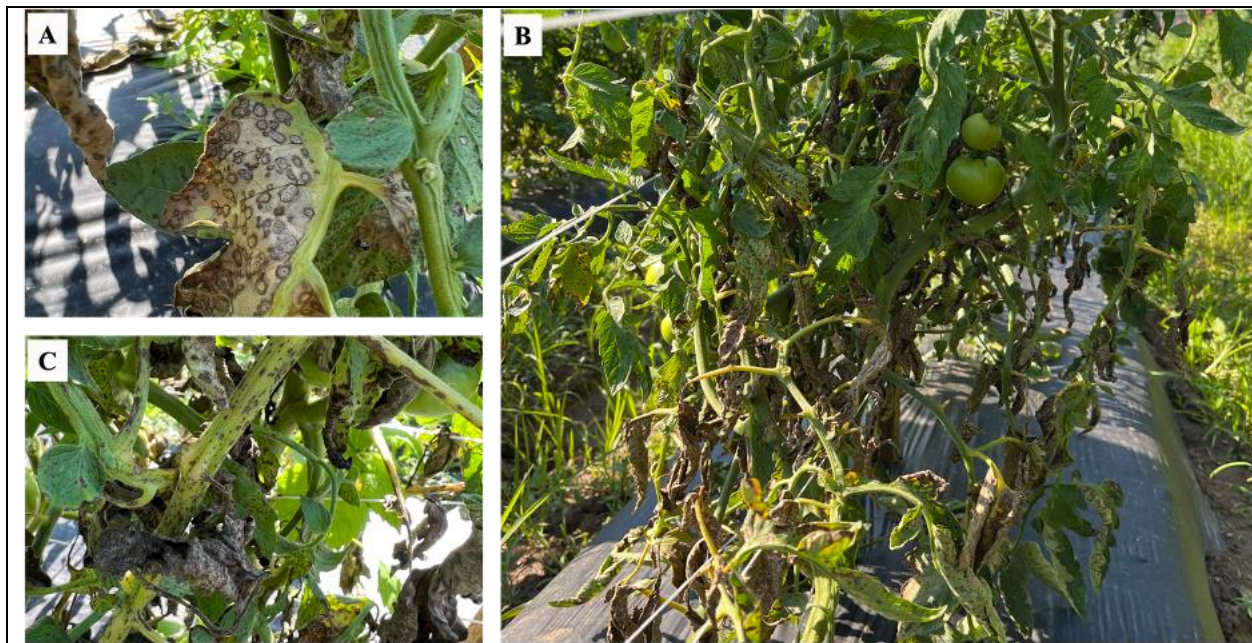


## Identification and control of Septoria Leaf Spot in Tomato Plants.

**Name of Disease:** Septoria leaf spot of tomato

**Pathogen:** *Septoria lycopersici* (Ascomycetes Fungi)

**Host Plants:** *Solanum lycopersicum* (tomato) with several alternate hosts *Capsicum annuum* (bell pepper), *Cyphomandra* spp. (tree tomato), *Lycopersicon* spp. (wild tomatoes), *Datura stramonium* (Jimsonweed), *Petunia* spp. (Petunia), *Physalis* spp. (Gooseberry), *Solanum carolinense* (horsenettle), *S. floridanum* (Florida Maple), *S. mammosum* (Nipplefruit), *Solanum melongena* (eggplant), *S. tuberosum* (potato), *S. nigrum* (black nightshade), *S. viarum* (tropical soda apple), *S. paludosum* (creeping daisy), *S. sessiliflorum* (Longleaf wood oats), *D. metel* (Devil's trumpet) and *S. athiopicum* (African eggplant)



Tomato plants infected with *Septoria lycopersici*. Symptoms can be seen on leaves, stems and whole aerial parts.

### How to identify the disease:

This fungus can infect tomatoes at any growth stage, with the first signs typically appearing as small spots on the lower leaves of the plant. These spots initially appear as small, round, or oval water-soaked lesions on the undersides of lower leaves. Over time, they darken and develop into necrotic lesions with tan or light gray centers. Symptoms usually become noticeable around the time the fruit set begins under field conditions.

As the disease progresses, individual lesions may merge into larger spots. Mature lesions often exhibit numerous dark brown, pepper-like structures in their centers. These structures, known as pycnidia, are the fruiting bodies of the fungus and are visible to the naked eye. The fungus rarely infects the fruit. The fruits from infected plants are edible. In severe cases, excessive leaf loss can expose fruit to direct sunlight, leading to sunscald. Severely infected lower leaves may turn yellow,

dry out, and eventually drop off the plant. The disease can spread upward to younger leaves through splashing water, particularly during rainfall or overhead irrigation.

### **How to separate Septoria leaf spot from Early blight:**

People often confuse Septoria leaf spot with another significant tomato disease known as Early Blight, caused by *Alternaria linariae*. While Early Blight typically appears earlier in the growing season and Septoria leaf spots usually appear later during the time of fruit sets. These two diseases can be differentiated based on their symptoms. Septoria leaf spot lesions feature visible pycnidia (small, dark fruiting bodies), which are absent in Early Blight. Conversely, Early Blight lesions display characteristic bullseye-like patterns, which are not present in Septoria leaf spot.

### **Disease Spread and Favorable Conditions:**

Importantly, the fungus cannot overwinter in soil alone and relies on plant debris or live solanaceous weeds for survival. These weeds often persist through winter, providing a reservoir for the pathogen to re-infect tomatoes when favorable conditions return.

Temperatures between 59°F and 80°F favors the spread of the disease. During this time, its pycnidia release numerous spores, which are primarily dispersed by splashing water. However, spores can also be spread through tools, insects like beetles, and contact with hands or clothing.

If conditions are moist, infection can occur rapidly. Spores can germinate within 48 hours, leaf spots may develop within five days, and pycnidia become visible in 7–10 days. The fungus can produce a new generation of spores within 10–13 days. However, infection requires free moisture, making wet conditions like rain or prolonged dew ideal for disease development. The warm and wet conditions of Western NC are most favorable for disease development.

The pathogen is not limited to tomatoes. Many plants in the nightshade family, including potatoes, eggplants, and common weeds like nightshade, jimsonweed, horse nettle, and smooth ground cherry, serve as alternative hosts. These plants can support spore production, increasing the risk of spread to tomato crops.

### **Disease management options for Septoria leaf spot in tomato:**

Effective cultural management practices can significantly reduce the severity of Septoria leaf spot by minimizing initial spore sources and reducing conditions favorable for disease development. Here are key strategies:

#### **1. Field sanitation:**

- Regularly inspect plants for early signs of infection, particularly on lower leaves.
- Remove and destroy infected leaves immediately by burning them or discarding them in sealed bags. Avoid composting infected plant material, as this can spread the pathogen.
- Eliminate weeds, especially solanaceous species that can serve as alternative hosts for *Septoria lycopersici*.
- Keep the surrounding area clean and debris-free to reduce potential spore reservoirs.

- Mulch around the base of tomato plants to prevent soil splashing, which can transfer spores to leaves. Wait until the soil temperature reaches 70°F (21°C) before applying mulch to avoid inhibiting root development in cooler conditions.
- At the end of the growing season, remove and destroy all plant debris. In fields, deeply plow the residue to encourage complete decomposition.

Sterilize containers, stakes, and cages before reuse to prevent carryover of the fungus.

## 2. **Avoid Overhead Watering**

- Use drip irrigation or soaker hoses to water plants at the base.
- If overhead watering is unavoidable, water early in the day to allow leaves to dry quickly.
- Prune lower and crowded foliage to enhance airflow and reduce leaf wetness.
- Stake or cage plants to lift them off the ground, improving air circulation around the canopy.

## 3. **Crop Rotation**

- Rotate crops, avoiding solanaceous plants (e.g., peppers, eggplants, and potatoes) in the same location for at least 2–3 years. This practice reduces soil-borne inoculum and interrupts the pathogen life cycle.

## 4. **Plant Resistant Varieties**

- While no fully resistant cultivars exist, consider using partially resistant varieties such as ‘Iron Lady.’
- Pair resistant cultivars with good cultural practices for best results.

## 5. **Monitor and Act Early**

- Regularly scout plants for symptoms. Early detection allows timely intervention, limiting disease spread.
- Combine cultural control measures with fungicide applications if necessary for integrated management.

**Organic fungicides:** Apply Bonide Copper Fungicide Dust or Carb-O-Nator (potassium bicarbonate) regularly at 7-10 days intervals starting with the first symptoms.

By implementing these management practices, gardeners and farmers can significantly reduce the impact of Septoria leaf spot while promoting healthier and more productive tomato plants.

## **Further reading:**

- Panthee, D. R., Pandey, A., & Paudel, R. (2024). Multiple Foliar Fungal Disease Management in Tomatoes: A Comprehensive Approach. *International Journal of Plant Biology*, 15(1), 69-93. <https://doi.org/10.3390/ijpb15010007>

- Pandey, A., Paudel, R., Adhikari, T. B., Panthee, D. R., & Louws, F. J. (2024). Septoria Leaf Spot of Tomatoes: Historical Insights, Present Challenges, and Future Prospects. *Horticulturae*, 10(12), 1299. <https://doi.org/10.3390/horticulturae10121299>

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