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Important Physiological Disorders of Tomato and their Management

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Introduction:

Tomato (*Solanum lycopersicum*) is one of the most important vegetable plants in the world. It originated in western South America, and domestication is thought to have occurred in Central America. It is the third most important cultivated crop in India but it is adversely affected by various abiotic factors. Tomatoes are the major dietary source of the antioxidant lycopene, which has been linked to many health benefits, including reduced risk of heart disease and cancer. They are also a great source of vitamin C, potassium, folate, and vitamin K.

The tomato is the most popular vegetable in the home garden. Though widely grown, tomatoes are subject to a number of diseases and physiological disorders. Environmental stresses produce several common physiological disorders of tomatoes. The major physiological disorders which are affecting the crop are blossom end rot, fruit cracking (radial and concentric cracking), puffiness, sunscald, blotchy ripening etc. The important physiological disorder of tomato plants are given below:

Fig. 1: Tomato plant and fruits

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Blossom End Rot:

Causes:

- Blossom-end rot is caused by a lack of calcium in the tomato plants and developing fruit.
- Wide fluctuations in soil moisture levels impair calcium uptake by the root system.
- Excessive nitrogen fertilization may also contribute to blossom-end rot.

Symptoms:

The major symptoms characters are summarized as below:

- Affected fruit have a tan to black flattened spot at the blossom end of the fruit.
- Secondary fungi and bacteria can enter the blossom end rot area, resulting in further decay of the fruit.
- Blossom end rot can appear on fruit in any stage of development, but it is most common when fruit are one-third to one-half grown.
- The first fruit produced by the plant are often most severely affected.
- Larger slicer-type tomatoes are usually more prone to blossom end rot than cherry tomatoes.
- Fruit that develop later in the season on the same plant can be unaffected.

Management:

The disorder of tomato plants management is given below:

- Keep the soil moist through regular watering.
- Apply mulch to retain moisture between watering.
- Apply fertilizer according to the results of a soil test.
- Avoid injuring roots; don't cultivate within 1 foot of the base of the plant.
- If you notice that a variety is particularly affected, choose a different variety next year
- Remove fruit with blossom end rot immediately. They will not develop normally, and removing them allows the plant to put its energy into healthy fruit.

Fig. 2: Blossom-end rot affected tomato fruits

Sunscald or Sunburn:

Causes:

- The cause of this disorder is occurs when tomatoes are exposed to the direct rays of the sun during hot weather in the developing fruit.
- High fruit pericarp temperature 40˚C
- In bright sunlight, surface temperature may be more then 10˚C highest then the air temperature.

Symptoms:

The major symptoms characters are summarized as below:

- Appear the most common on green fruits.
- Sunscald results in a pale yellow to white spot on the side of the fruit facing the sun.
- This area may become a flattened, grayish-white spot.
- The surface may dry out to a paper-like texture.
- Green fruits exposed to direct sunlight ripen unevenly so that yellow patches appear on the side of the tomato fruit when it ripens.
- Later, the affected tissue dries out and collapses, forming slightly sunken, wrinkled areas.

Management:

The disorder of tomato plants management is given below:

- Cover exposed fruits.
- The best way to avoid sunscald is to maintain a healthy tomato plant by managing insects and diseases that destroy or eat tomato leaves.
- The best protection against sunscald is to utilize cultivars with enough foliage to cover the fruit and to provide enough water and pest protection to maintain the healthy foliage
- Crop are planted at higher densities are less susceptible
- Cultivation of indeterminate or semi-determinate varieties without staking

Fig. 3: Sunscald or Sunburn affected tomato fruits

Growth or Fruit Cracks:

Causes:

- Heavy rainfall or irrigation following a long, dry period promotes rapid growth during ripening.
- Deficiency of Boron (especially calcareous soil).
- High temperature and high light intensity

Symptoms:

The major symptoms characters are summarized as below:

- Radial and concentric cracks develop at the stem end of the fruit or may encircle the fruit.
- Some cracks may be deep, allowing decay organisms to enter the fruit and cause fruit rot.
- It is developed mostly in fully ripe fruit than in mature green or breaker stage.

Sudden water availability causes rapid fruit expansion leading to fruit cracking.

Management:

The disorder of tomato plants management is given below:

- Maintaining even moisture by watering regularly and mulching the soil around the tomato plant can help reduce growth cracks.
- Soil application Borax @ 15-20 kg/ha.
- Spraying of borax 0.25% 2-3 times fruiting stage to ripening stage.
- Also, plant crack-resistant varieties, such as Jetstar.

Catfacing:

Causes:

The causes of cat facing are not definitely known, but it may be caused by:

- Any disturbance to flowers or flower buds.
- Cloudy weather and Cold temperatures during fruit set.
- Contact with hormone-type herbicide sprays.

Fig. 4: Fruit cracking in tomato

Symptoms:

The major symptoms characters are summarized as below:

- The disorder characterized by gross deformity and scarred of tomato fruit, which usually renders them unmarketable.
- Affected fruit are often somewhat flat with a corky brown scar covering the base of the fruit.
- The fruit can have cavities extending deep into the flesh.
- Fruits that develop later in the season will not be affected.

Fig. 5: Catfacing disorder in tomato

Management:

The disorder of tomato plants management is given below:

- Large tomatoes are more susceptible to cat face than small tomatoes.
- Some varieties are particularly prone to cat face and should be avoided if it has been a problem in the past.
- Fruit with mild cat facing symptoms are still safe to eat if the fruit has not been infected with secondary pathogens.
- Maintenance of sufficient soil moisture balance
- Recommended cultural practices should be adopted

Puffiness:

Causes:

- Non fertilization of ovules
- Embryo abortion after normal fertilization
- High temperature and high soil moisture are predisposing factors.
- Excessive nitrogen fertilization

Symptoms:

The major symptoms characters are summarized as below:

- The outer wall of the fruit is normal, but the tomato is hollow inside.

- One of the seed cavities is usually empty or puffiness refers to the existence of open cavities between the outer walls.
- The locular content in one or more locules.
- Puffiness occurs most frequently on early fruit.

Fig. 6: Puffiness in tomato fruit

Management:

The disorder of tomato plants management is given below:

- Maintenance of normal temperature.
- Spraying of Borax or Solubor 10-15 ppm at the peak flowering time.
- Decline later in the summer.

Blotchy Ripening

Causes:

The cause of this disorder is occurs Potassium (K) deficiency the tomato plants and developing fruit.

Symptoms:

The major symptoms characters are summarized as below:

- This disorder also known as the gray wall is recognized as grayish appearance caused by partial collapse of the wall tissue hence the term gray wall.
- Blotchy ripening usually refers to the disorder when parts of the fruit surface remain green, yellow, or orange and do not ripen.
- The affected area remains green or yellow are usually found nearly at the stem end of the tomato fruit.

Fig. 7: Blotchy Ripening of tomato fruit

Management:

The disorder of tomato plants management is given below:

- Use of balanced fertilizer dose (after soil testing) in the crop prevents the occurrence of blotchy ripening
- Adjust planting date to achieve favorable light intensity for good fruit development.