

Corn Nutrition, Physiological, and Weed Management:

Physiological Disorders

Water logging

To get good crop production, correct water management is essential. Equal importance should be given to both drainage and irrigation. Maize will not grow under the conditions of water logging, so adequate drainage is absolutely necessary to have a satisfactory production.

Symptoms of plants under water logging are:

- At the early stage, the plant becomes pale yellow,
- At a slightly later stage, root growth is retarded,
- Under severe water logging conditions, the roots and base of the plant start rotting,
- The leaves start curling since there is no uptake of nutrients, and
- The plant dies

Adequate field drainage must be provided. If there are bunds around the field, these should be cut in several places to allow quick surface drainage after heavy rainfall. In addition to surface drainage, a trench up to three feet should be dug to further assist in drainage.

Drought

Maize cannot withstand low moisture stress.

Symptoms of drought or low moisture stress are:

- Germination will not be uniform,
- At the early stage of growth, leaves start withering,
- In severe cases, leaves start curling and do not open and plant becomes pale green,
- In prolonged drought, plant turns pale yellow and dies, and
- If the crop is at the flowering stage, the tassels will emerge earlier and silks will be delayed resulting in a poor seed set.



Effects of Drought in Maize

To avoid this, the crucial times to irrigate are:

- During initial establishment to ensure rapid and uniform germination and seedling development.
- At flower initiation. Moisture stress at this stage limits yield potential.
- At start of flowering. Moisture stress can reduce pollen flow, delay silk emergence, interfere with silk receptivity and reduce seed set.
- During seed filling. Moisture stress will reduce grain size and yield.

Generally Maize requires 12-14 irrigations during the crop life cycle depending upon soil type.

Mitten Ear

Mitten Ear is the occurrence of two to three cobs from the same internode.

Causes of Mitten Ear

- Some hybrids have genetic makeup leading to this peculiarity.
- In some cases, mitten ear occurs when there is a very poor seed set on the main crop. This seed set from the main crop can be a result of poor pollen availability or poor synchronization of male female during flower. This usually occurs under severe drought and conditions during pre to post flowering stage.
- This condition may also result due to tassel and silk damage caused by insects and pests. As a result, the main cob produces a poor seed set which again leads to mitten ear.



Bare Tip

Bare tip is a problem resulting in cob with no grains or with immature grains for approximately one inch at the cob tip.

Causes of Bare Tip

- Generally, this is caused due to poor pollen availability towards the end of pollination. This may be a result of severe moisture stress or drought conditions during boot leaf to flowering stage.
- Sometimes, due to excess rain, pollen wash takes place, thus depriving the silk of required pollen.
- Very low potassium availability at flowering
- High plant population under improper agronomy
- Corrective Measures
- An optimum irrigation schedule needs to be maintained.



Cold Tolerance

Low Temperature Injury

Maize is very sensitive to frost and moderately sensitive to chilling. In the North-West Plain region and the North-East Plain region, December and January are the coldest months and the average temperature sometimes falls below 10°C; especially in the North-West Plains, the temperature goes down as low as 4°C. There is a chance of high frost damage during December and January in most of these areas. Also, the winter is severe and is of long duration. Therefore, the genotypes to be developed for this zone should have a high degree of cold tolerance over a long span of vegetative plant growth. The cold stress coincides during vegetative growth stages and causes a variety of symptoms as given below:

Low Temperature Injury

When average temperatures range between 11-15°C and minimum 0-4°C, plant injury has been observed resulting in physiological disorders like chlorosis, chlorotic bands, graying and drying.

Chlorosis

It has been observed during coldest months, especially in December-January, resulting in pale green and yellow leaves. However, chlorotic seedlings normally recover with the rise in temperature, but their growth is somewhat inhibited in comparison to non-chlorotic plants. Albino plants have also been observed, but with a low frequency.

Chlorotic bands

Transverse light yellow bands have been observed about a week after severe chilling and mild frost. The bands appeared on the leaves forming whorl at the time of exposure. Most of the injuries disappear after a rise in temperature.

Graying and Drying

Graying of leaves has also been observed especially under low chilling environments. Extreme leaf yellowing or graying is also sometimes observed followed by partial drying. Mild frost results in such necrotic leaf lesions. The degree of injury depends upon the lower temperature and duration of exposure.

Frost Injury

Frost incidence is quite frequent in the North-Western Plain Region. Generally, it results in chlorotic bands and drying of leaf margins as well as the tips. In extreme cases, the field may give a burnt look. the affected leaves show varying degree of injury but the growing points, protected in the whorl, escape. In extreme cases, when leaf sheaths are damaged, recovery is very slow, but the plants remain weak. However, recovery in such cases is better in young plants.

Purpling

Many genotypes show leaf purpling during winter, but generally, such purpling is mild and does not affect growth and grain yield. However, in some cases purpling is followed by leaf drying, thereby, adversely affecting grain yield. Purple bands on leaves in some genotypes have also been observed. Perhaps, the purpling phenomenon due to anthocyanin may accumulation might be stress-induced response by the plant to increase plant temperature.

Sources and Links

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