

FIELD INCIDENCE AND DESCRIPTION OF BRONZE WILT SYMPTOMS

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Abstract

Bronze wilt of cotton (also referred to as Sudden Wilt and coppertop) has been reported in U.S. cotton during recent cropping seasons. The reports of this anomaly have come from south and central Texas, Louisiana, Missouri, and Georgia although scattered reports from the Mississippi Delta region have also occurred. The fields with reports of Bronze wilt were typically from clay or "heavy" soils in Texas and Louisiana, however, bronze wilt has also occurred on sandy soils in the Southeast U.S. and the north MS Delta. The occurrences of bronze wilt in fields appears to be closely related to severe stress periods of heat and/or drought, sometimes followed by periods of rain or over-irrigation.

Symptoms / Identification

Bronze wilt of cotton is identified by the sporadic occurrence of plants across a field, (affecting some plants, but not others) showing the following symptoms: rapid wilting, collapse of the youngest leaves in the terminal of the plant, "bronzing" of the leaves, increase in leaf temperature (relative to "normal" adjacent plants), reddening of the stem, and fruit shed.

The level of incidence in a field (% of plants with symptoms) appears to be associated with the level of heat and drought stress the plants have encountered. Plants most severely affected will experience fruit shed of squares and small bolls, depending on when the symptoms begin, relative to the fruiting period. Some plants may become necrotic and die, particularly if symptoms begin when cotton is young (8 to 12 nodes). More typical onset of symptoms occur after plants begin to bloom, followed by the wilting, bronzing, and fruit shed symptoms. With mid-season onset individual plants have been noted to experience the early symptoms of wilt and bronzing, followed by recovery of the plant without any measurable fruit shed.

Late-season bronze wilt symptoms near "cutout" (NAWF=5) can be very similar to potash deficiency and leaf senescence. In cases of potash deficiency, plants across entire areas of a field (based on soil types) will show near-uniform changes in leaf color, reddening and leaf aging. These uniform symptoms near cutout are in contrast to symptoms on sporadically occurring plants typical of Bronze wilt.

Stress and Environmental Interactions

Conditions that appear to favor the occurrence of Bronze wilt include high temperatures, periods of drought stress followed by heavy rainfall or irrigation. Stress periods encountered on either clay or very sandy soils also appear to favor Bronze wilt. High temperatures at emergence (ultra-late planting) have been observed to result in early onset of symptoms. Bell (1998) has reported some of the conditions favoring the development of bronze wilt symptoms include: high soil temperature, excess nitrogen fertilizer or irrigation, and deficiencies of phosphorous, sulfur, or potassium.

Variety Interaction

Bell (1998) has reported that the most determinant cotton varieties are the most vulnerable to bronze wilt. He also noted that symptoms are more severe when bolls are set on lower nodes on the plant, and for heavier boll loads compared to fruit load distributed higher in the plant. Bronze wilt symptoms were reported in the following varieties by Creech and Fieber (2000) in the variety test at Stoneville, MS: Texas 141, PM 1215 BG, Stoneville 373, Dyna-Gro 205, PM 1210, PM 1218 BG/RR, PM 1220 BG/RR, PM 1244 RR, DPX8C27, PM 1266, PM 1560 BG, FiberMax 963, and PM 1330 BG. In addition, the authors have also observed Bronze Wilt in PM 1560 BG/RR, SG 125 B/R, and Stoneville 132. Creech and Fieber (2000) along with Phipps (2000) hypothesized that varieties with TAMCOT SP37 in its background were the most susceptible to Bronze wilt.

Crop Management Responses

Although no single factor has been shown to alleviate the incidence or severity of Bronze Wilt in the field, the following crop management inputs have been noted to reduce Bronze wilt in some cases.

1. **Irrigation** - use of timely irrigation to avoid plant stress. Also avoid over-irrigation (flooding) after a period of drought stress or delay between irrigations.
2. **Field selection** - when planting a variety that Bronze wilt has been observed in, select fields with medium textured soils, and good field drainage to avoid extremes in water availability to plants (leading to stress periods).
3. **Fertility balance** - avoid over-application of nitrogen fertilizer relative to phosphorous, potassium, and/or sulfur.
4. **Planting date windows** - avoid very late planting where high soil temperatures are common during early seedling development.

References

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