Soybean Leaf Yellowing

KEY POINTS

- Nutrient deficiencies are the most common cause of yellowing in soybean leaves.
- Temporary nutrient deficiencies can occur when root growth is restricted because the roots cannot reach sufficient levels of nutrients in the soil to sustain normal growth and development.

Figure 1. Soybean yellowing due to soil compaction.

Figure 2. Soybean plants with yellow leaves due to a temporary nitrogen deficiency caused by wet soil conditions and a lack of nodule formation.

Causes of Leaf Yellowing

Nutrient deficiencies are the most common cause of yellowing in soybean leaves. Many nutrient deficiencies can be corrected or prevented with proper fertility planning, which includes maintaining the optimal soil pH for plant growth.

Restricted root growth (caused by cool weather, saturated or extremely dry soils, soil compaction, root damage from diseases, insects, or herbicides) can lead to temporary nutrient deficiencies in the plant because the roots cannot reach sufficient levels of nutrients in the soil to sustain normal growth and development (Figure 1). Many nutrient deficiency symptoms will disappear once environmental conditions improve and root growth resumes, provided that soil fertility levels are adequate.

Nitrogen Deficiency

Causes and symptoms:

The primary symptom appears as yellowing of the lower leaves of the canopy.

Yellowing is common during nodule formation (Figure 2); symptoms should disappear once the nodules begin producing adequate amounts of nitrogen.

Nitrogen deficiency can also occur in soybeans when fields are extremely dry or wet as these conditions can slow root development and inhibit nodulation.

Iron Deficiency

Causes and symptoms:

The symptom is interveinal chlorosis (yellowing of the leaves while the veins remain dark green, Figure 3) on the youngest, uppermost leaves between the first and third trifoliate growth stages, referred to as Iron Deficiency Chlorosis (IDC).

IDC commonly occurs when iron in the soil is tied up due to high soil pH and is common in shallow depressions in a field or low-lying areas.

Management options:

The most important management option is the use of soybean products with tolerance to IDC.

In-furrow application of iron chelate products in the ortho-ortho form in affected areas of the field can help to improve the plant's access to iron in the soil.

For additional information on IDC, click here.

Soybean Leaf Yellowing

Manganese Deficiency

Causes and symptoms:

Symptoms are interveinal chlorosis on the younger leaves (Figure 3).

Figure 3. Interveinal chlorosis is a symptom of iron and manganese deficiencies.

Manganese deficiency is most common on poorly-drained soils, especially clay and silt loam soils with high pH.

Management options:

An in-crop application or a banded application in a 2-by-2 band at planting of manganese sulfate may improve deficiency symptoms.

Potassium Deficiency

Causes and symptoms:

Symptoms first appear as yellowing along the edges of the oldest leaves (Figure 4). With severe deficiencies, yellowing can spread to newer leaves, leaf edges may become brown, and affected plants will appear stunted.

Figure 4. Symptoms of potassium deficiency. Photo courtesy of Daren Mueller, Iowa State University, Buggwood.org.

Management options:

A rescue application by broadcasting potassium chloride (potash, 0-0-60) with sufficient irrigation to move the fertilizer into the soil may help protect yield potential.

Yellow Flash

Causes and symptoms:

A phenomenon called "Yellow Flash" can sometimes occur after a post-emergence application of a high rate of glyphosate under dry conditions.

Figure 5. "Yellow Flash" in soybeans following a post-emergent application of glyphosate.

The symptom is a temporary yellowing of the uppermost, newly expanding leaves and can sometimes look similar to manganese deficiency (Figure 5).

Yellow flash generally occurs when plants were stressed when the glyphosate was applied and may be more common at the edges of fields and/or in spray-overlapped areas where application rates of glyphosate were higher.

Management options:

This condition generally does not affect yield potential and affected soybean leaves return to their normal color within a week after the application. However, if soybean growth was hindered due to stressful conditions when glyphosate was applied, yellowing may not occur until 10 to 21 days later. If it remains dry, these leaves may remain yellow until the crop resumes growth after rain or irrigation.

Soybean Cyst Nematode

Causes and symptoms:

Serious infestations of soybean cyst nematodes (SCN) can cause yellowing in soybean leaves and stunting, often in circular patches of the infested areas.

SCN infestations reduce the plant's ability to access nutrients and water or to tolerate stress, so symptoms of nutrient deficiencies or drought stress may be amplified in SCN-infested fields.

For additional information on SCN, click here.

Sources:
Pedersen, P. 2007. Soybean nutrient requirements. Iowa State University Extension. http://extension.agron.iastate.edu/. Franzen, D.W. 2013. Soybean soil fertility. SF1164. North Dakota State University Extension. www.ag.ndsu.edu/. Mallarino, A.P. 2006. Potassium deficiency symptoms in corn and soybean: What can we do about them? Iowa State University www.ipm.iastate.edu/ Staton, M. 2014. Identifying and correcting manganese deficiency in soybeans. Michigan State University Extension. http://msue.anr.msu.edu/Kaiser, D.E., Lamb, J.A., and Bloom, P.R. 2011. Managing iron deficiency chlorosis in soybean. University of Minnesota Extension. www.extension.umn.edu/. Rosenbloom, K. 2012. Possible causes of yellow soybeans. http://www.agprofessional.com/.
Web sources verified 2/15/2018 130325060141