Symptoms and Management of Iron Deficiency Chlorosis

Iron deficiency chlorosis (IDC) can be a serious concern for soybean producers. Reduced plant growth due to IDC symptoms can have a negative impact on yield potential.

What to Consider

Iron (Fe) is one of the essential micronutrients for soybean plant growth and development. It is needed for the development of chlorophyll, which is the green pigment in the plant and is critical for photosynthesis. If soybean plants cannot absorb enough Fe, chlorosis (yellowing) can develop, which can lead to a potential reduction in yield. Iron deficiency does not affect whole soybean fields at a time, but the areas where IDC is present could show a 20 to 30% yield loss (Figure 1).[1]

Figure 1. Iron deficiency chlorosis field pattern.

Scouting

IDC symptoms typically occur between the first and third trifoliate stage. The initial, most common IDC symptom in new leaves is interveinal chlorosis (yellowing between veins), while the veins remain dark green (Figure 2). Under severe IDC stress, leaf edges may become necrotic (turn brown). Necrosis may progress and eventually leaves may die. In severe cases, leaf growing points may be killed as well.

Because IDC symptoms are similar to that of manganese (Mn), only soil and tissue analysis can confirm the deficiency. If the deficiency is not too severe, plants may recover from IDC symptoms and if soil and environmental conditions improve and root system is able to absorb sufficient Fe.

Figure 2. Symptoms of iron deficiency chlorosis.

Management Options

It is difficult to correct IDC, but there are several management options to consider. The most important management consideration is product selection. Select soybean products with a relatively higher degree of tolerance to IDC, especially for fields with a history of iron chlorosis. Product selection can also be an important factor in minimizing plant stress, such as disease or nematode issues.

Using a seed placement of iron chelate product. Maximum return on investment has been found to occur when these products are used in areas moderately to severely affected by IDC.[4] Other management options to consider include planting cover crops, minimizing compaction, and reducing operations that may damage soybean roots.

Sources: [1] Arp, A. 2017. Improving soil health through the experiences of others. Iowa Soybean Association. http://www.iasoybeans.com.; Franzen, D. 2012. Iron deficiency chlorosis in soybeans. Crop and Pest Report. North Dakota State University. http://www.ag.ndsu.edu.; Kaiser, D., Lamb, J. and Bloom, P. 2011. Managing iron deficiency chlorosis in soybean. University of Minnesota Extension. http://www.extension.umn.edu.; Kandel, H. and Goos, J. 2011. Iron deficiency chlorosis in soybean. Crop and Pest Report. North Dakota State University. http://www.ag.ndsu.edu.; Goos, J. and Johnson, B. 2006. Seed treatment, seeding rate, and cultivar effects on iron deficiency chlorosis of soybean. Journal of Plant Nutrition 24: 255-268; Franzen, D., O'Barr, J. and Zollinger, R. 2004. Influence of certain postemergence broadleaf herbicides on soybeans stressed from iron deficiency chlorosis. Agronomy Journal 96: 1357-1363. Web sources verified 05/24/18.