

Observations and treatment of iron deficiency and chlorosis

June 7, 2018

Iron (Fe) chlorosis of Kentucky bluegrass and creeping bentgrass can be a perennial summer problem. The symptoms usually include light yellow or lime-green leaves in July and August (Fig. 1). Iron chlorosis may appear earlier this year because of the hot weather last May. Application of nitrogen fertilizer make the yellowing more severe; a very atypical response to nitrogen fertilization.



Figure 1. Typical iron deficiency symptoms (chlorosis) in Kentucky bluegrass turf.

Turf scientists believe that iron chlorosis is a root-dysfunction that occurs when soils are hot and or wet. Grasses make natural chelating molecules, phytosiderophores, that help extract micronutrients like iron and zinc from high pH soils. It's likely that this nutrient mining system slows or stops when the soils are hot and wet. That causes the turf to become deficient for those micronutrients and the leaves yellow. Some nutrient deficiencies, like phosphorus, will limit clipping yield despite application of nitrogen fertilizer. It appears that iron deficiencies do not limit clipping yield and increasing nitrogen application actually intensifies the deficiency symptoms as growth rate increases.

Last year we tested different “man-made” iron chelates on a Kentucky bluegrass stand at Heritage Hills Golf Course in McCook, NE. We applied iron fertilizer as iron sulfate or with common chelates like EDTA, DTPA, citric acid, and less common turf chelate, EDDHA. The EDDHA is much more expensive but is by far a superior iron chelate when soil pH is above 7.0 (others usually drop iron and grab calcium at high soil pH). All treatments were watered in after the first application to limit foliar uptake.

After several weeks, there was no improvement for all the iron treatments tested. The turf around the study area was treated with foliar iron, however, and did not have iron deficiency symptoms. One month after the first treatments, we re-applied the iron treatments but didn't water them in. The differences were remarkable (Figure 2). Our three conclusions were:

- 1) Only foliar iron fertilizer applications reduced deficiency symptoms. Don't water in Fe.
- 2) Deficiency symptoms improved with increased iron fertilizer rate (1.6 oz Fe/M max tested).
- 3) The chelated products did not outperform the cheaper iron sulfate (aka ferrous sulfate).

If iron deficiency is a perennial problem for your Kentucky bluegrass, avoid excessive irrigation and make foliar applications of iron fertilizer. All products worked equally well when applied at the same iron fertilizer rate (vs product rate). Application rates of 0.75-1.5 oz Fe per 1000 ft² (4-8 oz of ferrous sulfate fertilizer) corrected deficiency symptoms for several weeks. Follow up applications will likely be required, however, because the iron fertilizer is going to be removed during mowing. Lower application rates fertilizer can likely be used on a preventative basis and may reduce the potential for burn.

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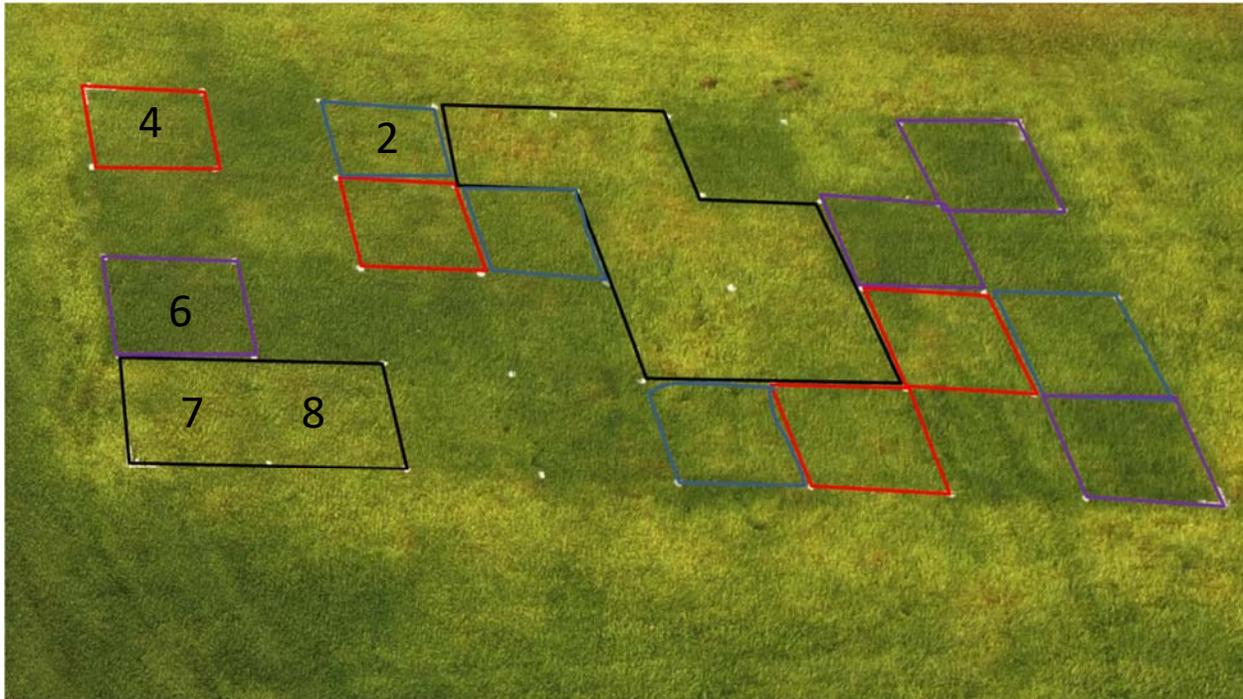


Figure 2. The response to foliar iron fertilizer applications. Plots outlined in black received zero iron fertilizer. Red plots received 0.4 oz of iron per 1000 ft² (2 oz product) and purple plots received 1.6 oz of iron 1000 ft² (8 oz product) from iron sulfate (Extreme Green 20, 20% iron by weight). The red boxes were treated with 0.4 oz of iron per 1000 ft² plus citrate and EDTA chelates (2 oz product) from Iron Chelate 20. Other treatments can be identified with the plot map below.

4	3	2	8	7	5	1	6
5	1	4	2	7	8	6	3
6	3	5	1	8	7	4	2
7	8	1	5	2	4	3	6

TMT	Label Rates	Chelate	% FE	%N	Rate	oz Fe/M	oz N/M
1	Sprint 138	EDDHA	6%	4%	2.0	0.12	0.08
2	Iron Chelate 20	Citrate/EDTA	20%	0%	2.0	0.40	0.00
3	Sprint 330	DTPA	10%	0%	4.0	0.40	0.00
4	Extreme Green 20	None	20%	0%	2.0	0.40	0.00
5	Extreme Green 20	None	20%	0%	4.0	0.80	0.00
6	Extreme Green 20	None	20%	0%	8.0	1.60	0.00
7	N Alone	None	0%	46%	0.17	0.00	0.08
8	Control	None	0%	0%	0.0	0.00	0.00

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