Boron Improves Clover Production

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Recognizing deficiency symptoms may help diagnose boron (B) as a limiting factor in clover production. The descriptions and photos in this article represent conditions over a widespread area of the U.S.

BORON deficiencies occur throughout North America, and responses to B fertilization of alfalfa, soybeans and other crops have been documented in many areas. During the recent years, B deficiencies have been noted with greater frequency. There are several reasons why this may be occurring:

- Heavier than normal rainfall has occurred in many clover growing areas. Boron is a mobile nutrient which can be leached out of the root zone.
- Higher yielding forage crops have removed greater quantities of B.
- Organic matter is an important source of B. Spring temperatures have been cooler than normal when clover is at its maximum growth rate. Cool weather slows organic matter decomposition which, in turn, slows the release of B.
- Boron is a micronutrient that becomes less available as the soil pH is increased.
- Clover production is highest where soil pH is in the slightly acid to neutral range (6.0 to 7.0). Many farmers and ranchers on acid soils have used lime to increase production. Liming acid soils, however, can interfere with B availability. Research has shown that 1 to 2 lb/A B fertilization is required, depending on the grade and amount of limestone applied.

KENSTAR red clover shown here has leaf reddening and suppressed flower production from B deficiency in Missouri.

Figure 1 shows subterranean clover response to applied nutrients in Texas. The clover was most responsive to added phosphorus (P). Boron application up to 2 lb/A increased clover growth up to 65 percent over the untreated check. This study showed that P and B had the greatest potential to increase clover growth in many east Texas soils.

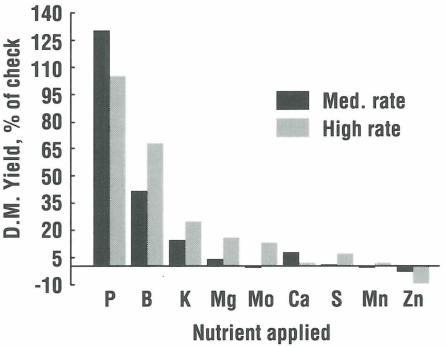

Figure 1. Nutrient effects on subterranean clover.

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BORON deficiency of arrowleaf clover may appear as poor root growth (at left) and reddish colored, thick, leathery leaves as shown at right (Texas).

Boron Deficiency Symptoms of Clover

Boron deficiencies are rarely exhibited over an entire field, with the exception of recently limed soils where the entire field may show symptoms. Some typical symptoms are described here.

Roots: Poor root growth, especially on acid soils

Leaves: Thick, leathery
Red margin can occur on newest growth
Entire leaf can turn orange-red and/or pale green
Symptoms usually exhibited at flowering stage when B demand is highest

Flowers: Uneven flowering
Reduced number and size of seed heads
Seed heads may be suppressed in newest foliage growth
Reduced seed viability and reseeding ability

Conclusions

Boron deficiency may be a limiting factor in forage legume yields in many areas. Be aware of B deficiency symptoms as a diagnostic tool, but use soil testing and plant analysis to predict where supplemental B is needed before symptoms appear . . . and production suffers. ■

WHITE CLOVER shown at left is exhibiting B deficiency symptoms in the form of orange-red and pale green leaves. White clover B deficiency symptoms also include red leaf margins, leather leaf texture and poor seed head development, shown at right (Kansas).