



2019 Update: Molybdenum in Ag Production

Molybdenum (moly) is required in small quantities by plants to produce proteins and, while required in greater quantities by legumes and vegetables, all plants need moly. Plant tissue samples indicate widespread low levels and deficiencies.

Plants with low moly levels have fewer pods, fewer bolls, smaller grain heads and are usually shorter or much taller than “normal”. They have more disease and insect pressure. Since moly is more available at soil pH 6.4 or higher, acid soils will reduce the amount of soil moly available to all plants.

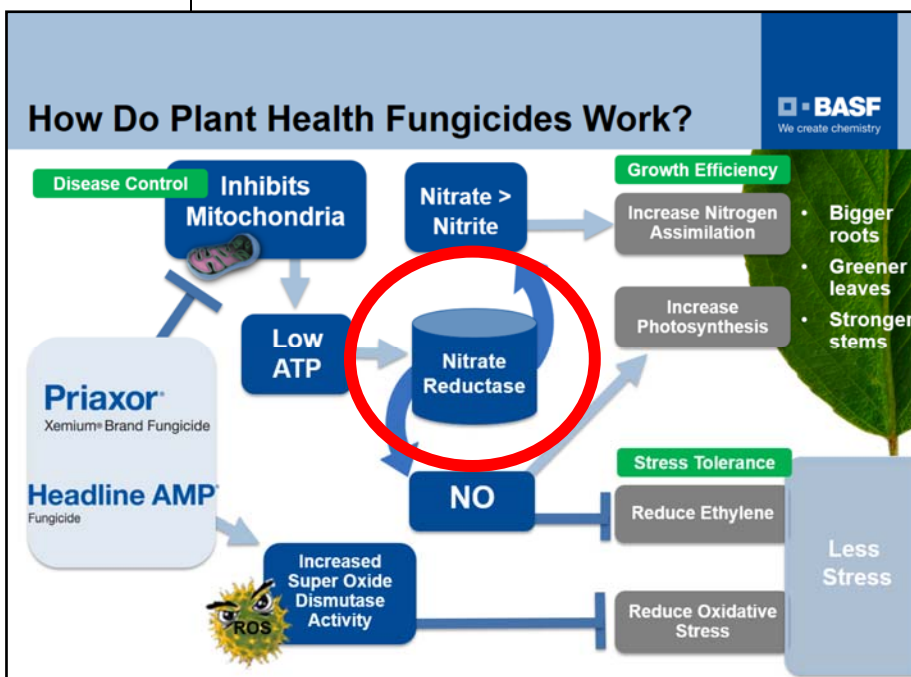
Critical functions of moly:

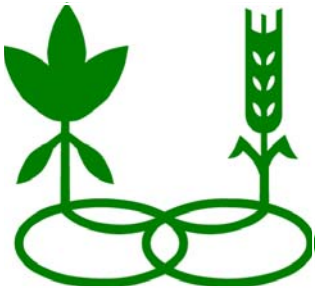
- * The most widely discussed role of moly in plant nutrition is its role in nitrate reductase activity, the process of nitrate conversion to ammonium,
- * Legume *Rhizobia* bacteria require moly for N fixation (taking nitrogen out of the air and providing to the plant)
- * Moly applications with fungicides increased disease suppression, increased leaf photosynthesis and yields
- * Moly is essential in it's role of iron absorption and translocation (iron is key to plant disease resistance)
- * Low plant moly levels increase plant nitrate (not ammonium) levels leading to pod loss, boll shed and increased disease pressure from leaf spot in cotton and soybeans
- * Soil applications of moly has a suppressive effect on **nematodes**
- * Moly increases spout resistance in wheat: in 2017, applying Molyron™ increased test weight by 3 lbs. /bu. and improved falling numbers.
- * Moly is linked with more efficient utilization of potassium and phosphorous inside the plant
- * In a five-year study, NCSU found a 3.2 bu./acre yield increase in soybeans when a foliar application of .08 ozs. /acre of moly was applied to soybeans at R2 but got NO response when applied at .032 ozs./acre. The amount makes a difference.



Above: cotton on left sprayed with Molyron™ twice with boron compared to boron alone (right). Molyron™ reduced cotton target spot severity by 50% and produced over 200 lbs. /acre more cotton.

Below: graphic from BASF. For any fungicide to work well, all processes go through the nitrate reductase mechanism. Moly (and iron) are key components of nitrate reductase. Low plant moly reduces the amount of nitrate reductase available which limits the ability of the fungicide to fight fungal diseases. Fungicides work best with nutritionally-balanced plants.





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* In ag.systems' plots, foliar applications of moly increased soybeans yields by 8 bu./acre when applied twice, the first at early flowering.

Moly levels are difficult to build in soils. Moly leaches so it needs to be "spoon-fed" throughout the course of the crop cycle. Moly levels need to be between 2-3 ppm in plant tissue samples for most crops.

Renwood Farms now carries two molybdenum products for growers to improve moly nutrition to soybeans, cotton, wheat, barley, tobacco and vegetables:

10% Molybdenum – for soil and post-emergence chemical applications, especially with Roundup.

Molyron™ - a moly and iron combination to be used as a foliar feed with fungicides and insecticides. After several attempts, we found that foliar iron is needed for foliar moly to work more consistently.

Soybeans: Apply 3–6 ozs. /acre of 10% Moly with burn-down or post-emergence chemicals. At early flowering, apply 1 qt. /acre of Molyron™ with fungicide. Apply a 2nd application of Molyron™ with fungicide between 2-3 weeks later. Use 2 qts./acre if only one application is to be made.

The bottom photo at right shows double-cropped soybean with molybdenum seed treatment and two foliar applications : the first at early flowering and the second about 17 days later. Note the six pods per node and three and four-bean pods.

Cotton: Apply 3– 6ozs. /acre of 10% Moly with burn-down or post-emergence chemicals. At early flowering, apply 1 qt. /acre of Molyron™. Apply a 2nd application of Molyron™ between 2-3 weeks later. Keep to lower rates of nitrogen fertilizer to reduce losses from square/ boll shed, target spot and boll lock.

Wheat and Barley: apply 3-6 ozs. in fall with burndown or early weed control. Apply 1 qt. /acre of Molyron™ with spring topdress and again with the last fungicide application.



Molybdenum deficiency in soybeans



Soybeans with a moly seed treatment and two foliar applications of Molyron™. Note 6 pods at this node with three and four bean pods.