Walking Your Fields®

Welcome to the third issue of *Walking Your Fields*® newsletter for the 2015 growing season. On behalf of your DuPont Pioneer Agronomy team, we will be producing this newsletter on a monthly basis through to October. For more detailed agronomic information, please feel free to contact your local Pioneer Hi-Bred sales representative or check out ***www.pioneer.com***.

Be Your Own Corn Doctor

Have you had a 'corn check-up' this season? Every grower should learn to recognize the symptoms or signs that a corn crop is deficient in one or more of the nutrients that are essential for healthy plant growth and profitable yields. You can be your own corn doctor. It is an important part of crop management to look at fields regularly and identify signs that problems are developing. This is part 1 of 3 showing the symptoms of a corn plant responding to various deficiencies or stresses.

Leaves

Healthy corn leaves should have a rich, dark green color. That indicates high levels of chlorophyll, which is essential to trapping the sun's energy and producing sugars needed for plant growth and development. Any stress or nutrient shortage will alter the color and reduce sugar production.

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JUNE 2015 Volume 25 Issue 3

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A monthly newsletter containing timely agronomic information, produced by DuPont Pioneer and provided with compliments of your Pioneer Hi-Bred sales representative.

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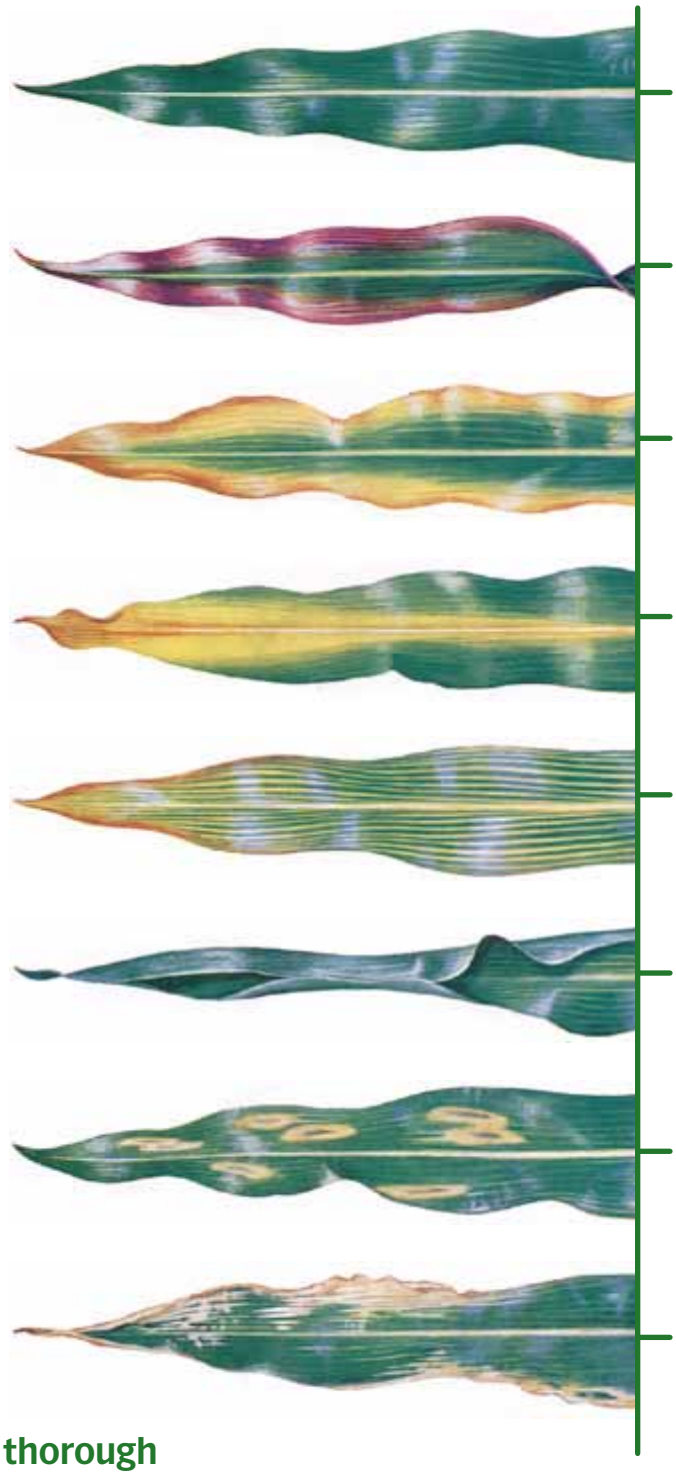


HEALTHY leaves shine with a rich, dark green color when adequately fed.

PHOSPHORUS (phosphate) shortage marks leaves with reddish-purple, particularly on young plants.

POTASSIUM (potash) deficiency appears as a firing or drying along the tips and edges of lowest leaves.

NITROGEN hunger sign is yellowing that starts at tip and moves along middle of leaf

MAGNESIUM deficiency causes whitish stripes along the veins and often a purplish color on the underside of the lower leaves.

DROUGHT causes corn plants to have a grayish-green color; leaves may roll up to about the size of a pencil.

DISEASE, helminthosporium blight, starts in small spots, gradually spreads across leaf.

CHEMICALS may sometimes burn tips, edges of leaves and at other contacts. Tissue dies, leaf becomes whitecap.

Be thorough

As a corn doctor, be thorough in evaluating the 'patient'. Note the general appearance of the field and contrast problem areas with the appearance of 'normal' healthy areas. Pull or dig up some plants in 'normal' and 'problem' areas. Carefully inspect the roots, split the stalks, and examine ear development. Look for insect and disease problems, too. Plant samples collected from 'problem' and 'normal' areas during the growing season can provide useful diagnostic information through laboratory analysis.

Being a good corn doctor and learning to identify nutrient deficiencies and other plant health problems are important parts of responsible corn management. Proper fertilization, based on soil tests, coupled with other sound management practices is a key to efficient, economic yield production.

This publication was developed from an article by KC Berger, former Professor of Soils, University of Wisconsin - College of Agriculture; revised and updated by Dr. Harold F Reetz, Jr., Midwest Director, Potash & Phosphate Institute (PPI). Pictures were drawn by Maynard Reece.

NUTRIENT DEFICIENCIES IN SOYBEANS

To complete its life cycle, a soybean plant requires 13 essential nutrients. Some nutrients such as nitrogen (N), potassium (K), phosphorus (P), and sulfur (S) are required in relatively large quantities, while others such as iron (Fe), manganese (Mn), and zinc (Zn) are required in very small quantities. Fe deficiency is common in the region, though its causes are complex. Deficiencies of N, K, and P are observed occasionally. S, Zn, and Mn deficiencies are observed only rarely. Deficiencies of calcium (Ca), magnesium (Mg), boron (B), copper (Cu), chlorine (Cl), and molybdenum (Mo) are very rare. Here are some symptoms to look for and some factors that contribute to deficiencies of certain nutrients:

Nutrient (symbol)	Deficiency Symptom	Conditions which increase the Chance of Deficiency
Iron (Fe)	Interveinal chlorosis, starting with younger leaves	High soil pH, high soluble salts, high soil Nitrate levels, soybean varieties with low tolerance to iron chlorosis.
Potassium (K)	Chlorosis and then necrosis of the leaf margins. Older leaves affected first.	Low soil K, very sandy soils, soil compaction
Nitrogen (N)	Overall chlorosis, older leaves affected first	Poor nodulation, Low soil pH
Phosphorus (P)	Stunted growth, dark green coloration, purple color first on older leaves	Low soil pH, low soil P, cool wet conditions.
Sulfur (S)	Similar to N deficiency except symptoms first appear on younger leaves	Sandy, low organic matter soils.
Manganese (Mn)	Interveinal chlorosis that develops into brown spots. Younger leaves affected first.	High soil pH, organic soils, possible interaction with glyphosate application.

Iron deficiency may be the most commonly observed nutrient deficiency in soybeans. This problem is most effectively managed by selection of soybean varieties with tolerance to iron deficiency chlorosis.

Source: Jim Boersma, DuPont Pioneer Agronomist.

Potassium deficiency can be prevented by soil testing and applying recommended amounts of potassium fertilizer.

Source: Donald Specker, DuPont Pioneer Agronomist.

Manganese deficiency is very rare. There have been research reports indicating that glyphosate may interact with Mn in the plant or near the roots, causing a Mn deficiency.

Source: Tony Halter, DuPont Pioneer Account Manager.

Soybean cyst nematode (SCN) can cause stunting and yellowing symptoms similar to symptoms of certain nutrient deficiencies. Roots of affected plants should be inspected for the presence of cysts. Soil samples can also be analyzed for the presence of SCN.

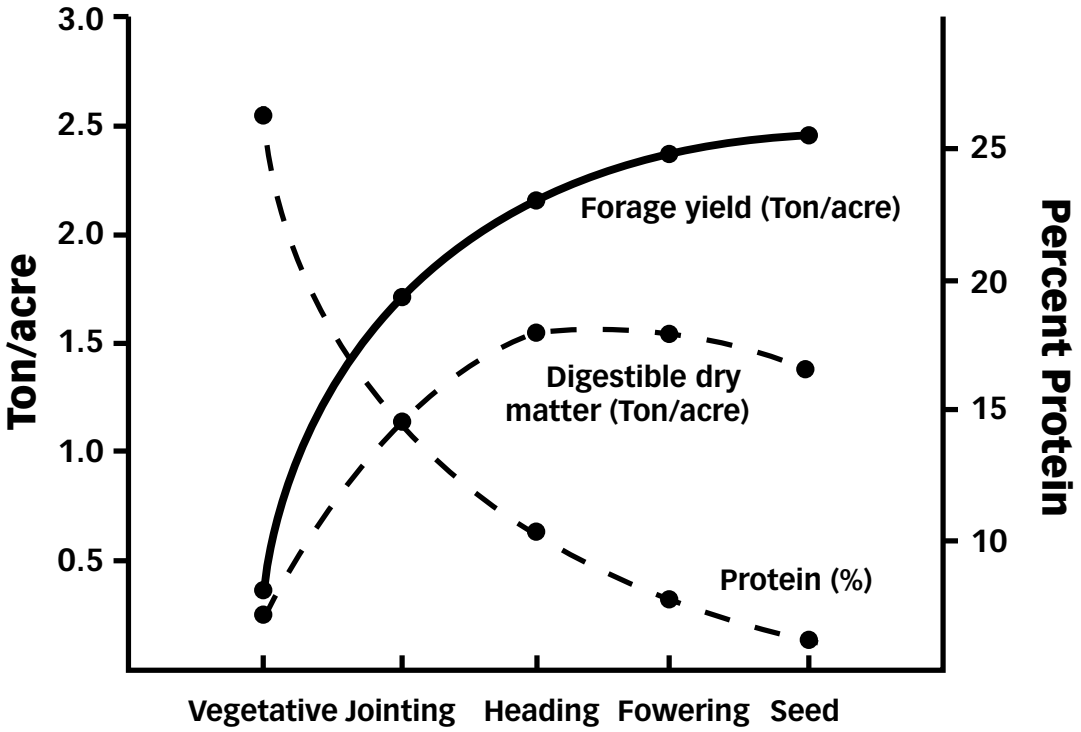
Source: Jim Boersma, DuPont Pioneer Agronomist.

Harvesting Alfalfa in a Dry Year

Deciding when to cut your alfalfa will likely be based on three elements: desired harvest quality (or end-use), how many cuts you want and the weather. In many areas across Western Canada, moisture has been limited this spring, so this may take a toll on alfalfa crops. Managing through this inclement weather and timing your alfalfa harvest appropriately will ensure you have a successful alfalfa harvest this year and in the future.

As you can see in the picture below, the quality of the alfalfa is highest before flowering, but tons and quality are inversely related. For producers wanting to maximize forage yield such as a cow-calf producer, they may choose to delay harvest to 10-25% flowering to maximize protein and forage yield. For a producer wanting to maximize forage quality, such as a dairy, they will likely choose to harvest just before flowering. Keep in mind that the weather will impact the harvest quality and negate the perfect harvest timing window if drying conditions are not favourable and a rain is received.

If deciding whether to take a second or third cut of alfalfa, remember that alfalfa needs about six weeks of good growing conditions before a second cut can be taken. This recovery window may be longer if growing conditions are unfavourable. On a year where moisture may be limited, make sure the alfalfa has been allowed to successfully recover before taking a second cut. Also keep in mind the date of first killing frost in your area. Alfalfa needs to regrow with favourable growing conditions for six weeks before a killing frost to ensure no winter kill. This means that if the first killing frost is the end of September in your area, your last cut of alfalfa should occur early to middle of August.

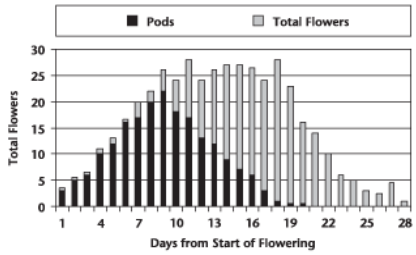


Sources: http://www.agriculture.gov.sk.ca/Default.aspx?DN=9c0709c2-4b24-426d-b483-0b166d7e69f7

Diagnosing Pod Abortion in Canola

- Canola will typically flower from 14-21 days beginning with the lowest buds on the main stem of the plant. Branches will begin flowering 2-3 days later.
- Fertilization of the pistol in the flower occurs within 24 hours from time of pollen release. 70-80% seed pods produced are from self pollinated flowers.
- Abortion of flowers and pods in canola is normal. Typically only 40-55% of flowers will develop into seed producing pods.
- Additional abortion of pods can be observed in canola if the right stress conditions occur. Knowing what the cause of the yield loss was, can help prevent loss in future years.
- Stress or physical factors that can result in pod abortion in canola include:
  - Environmental stress on the plant
  - Stress related to pesticide application
  - Stress related to fertility deficiency
  - Physical Damage to the flower

Total Flowers Produced and Productive Pods Formed in *B. napus* Plants (Courtesy of the Canola Council of Canada)



Environmental Stress

- Heat and draught stress are two of the most common environmental causes of stress. The stress causes a hormone reaction that can result in flower / pod loss and can inhibit proper fertilization
- Inhibition of fertilization due to stress can be a result of:
  - sterile flowers (identified as the pistal (female part) being taller in the flower than the stamens (male parts)
  - Flowers not opening
  - Reduced pollen production
- Heat stress can occur both at flowering as well as at pod filling. Early flower is the most sensitive stage.
- Heat stress is most often observed when daytime temperatures exceed 25°C during flowering. Impact of heat stress on yield can be increased when drought conditions occur at the same time.
- Too much moisture, resulting in waterlogged soils for more than two days at flower can also reduce the number of pods.

Fertile flower

Sterile flower (pistal taller than stamens)

- Drought stress can cause reduced flower development and a compacted raceme.

Expected pod production

Pod abortion following 2 days of heat stress

Pesticide Application Stress

- Application of herbicides beyond the recommended staging can result in visual injury visible as aborted or abnormal flowers. When additional stress is placed on the plant its ability to recover may be reduced.

Expected flower color

Pale color of flowers due to late glyphosate application

Fertility Stress

- Sulphur deficiency is the most likely deficiency to result in pod abortion or loss of flowers. Sulphur deficiency symptoms can result when the soil has sufficient sulphur but the plant is unable to extract the sulphate due to dry soil conditions.
- Boron deficiency is very uncommon in Western Canada, but symptoms, if boron is deficient, will look very similar to sulphur deficiency.

Physical Damage

- Flowers can be damaged or lost as a result of heavy rain / irrigation or as a result of insect feeding.
- Thrips can feed on flowers and buds. Resulting pods appear curled and drop prematurely
- Diamondback larvae, lygus and cabbage seedpod weevils can all feed on flowers and pods resulting in reduced pod formation or yield loss
- Lost flowers can result in blanks areas on the stem, however later flowers may develop and result in productive pods

Cabage seedpod weevils

Diamondback Moth Larvae*

Pod with thrip damage*

*Photos courtesy of Canola Council of Canada

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