

Walking Your Fields®

Welcome to the fourth 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.

Using inoculants will protect your investment by reduced dry matter loss and improved forage quality

Feed shrink or dry matter loss represents the amount of feed produced or delivered on farm that is never consumed by the animals. Many producers harvest more tons than they feed out and the difference represents dry matter loss, which is a very costly forfeiture. Some of these dry matter losses are visible to the producer, while others such as silage shrink from ensiling processes are not visible and may go unnoticed on the operation. There are five types of dry matter loss that can occur in your silage operation. It is important to know the difference and how to reduce loss of each kind.

Inside this issue:

1 Using inoculants will protect your investment

3 Canola Swath Timing

4 Sudden Death Syndrome of Soybeans

6 Corn Growth and Development

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Filling Loss. Physical loss of forage material at time of filling. This loss can vary depending on the type of silo used.

Loss from leaching “Seepage”. Seepage losses are very unsightly; they generally represent a minor loss less than 1%, providing that the crop is ensiled below 70-% moisture. This juice carries a high concentration of soluble carbohydrate, which represents the loss of valuable feed energy.

Fermentation/Gaseous loss. These shrink losses are primarily associated with continued plant cell and aerobic (oxygen consuming) microbial respiration. This loss will normally vary depending on silo type and will depend on how long it takes the silo to achieve anaerobic (oxygen free) conditions.

Surface spoilage loss. Top spoilage loss is the most visible. Research suggests that surface shrink loss will vary depending on the type of cover used and cover practices.

Feedout loss (1-15%). Research suggests that feedout shrink losses can range from 1-15%. Pioneer research has demonstrated that aerobic losses during feedout can be 4-5 times greater than fermentation losses.

Forage inoculants are one tool a producer can use to reduce the amount of dry matter loss in their silage. Forage inoculants are live, viable strains of bacteria. These bacteria are introduced to freshly harvested forage (inoculated), similar to when live yeasts are used to inoculate alcohol fermentations or bread. These bacteria grow in the forage, producing acids and driving fermentation, converting sugars to acids. Overall, they convert fresh forage from a neutral to low terminal pH, resulting in a preserved and stable acidic end product (silage).

Inoculants are used for three primary reasons:

1. Stimulate rapid fermentation (pH drop) which improves efficiency by reducing the amount of sugar needed to lower pH and stabilize the silage mass. This also reduces protein degradation and reduces dry matter shrink losses.

2. Inhibit aerobic spoilage which inhibits growth of spoilage organisms which will cause heating and nutrient loss. It also reduces heating and extends bunk life of the silage.

3. Improve fiber digestibility allows producers to feed more forage and reduce ration cost.

Estimated Dry Matter (DM) Loss in Corn Silage (60-70% moisture)

Silo type	Filling	Seepage	Gaseous	Surface	Feedout	Total
Bunker (uncovered)	2-6%	0-1%	9-10%	9-12%	3-15%	24-43%
Bunker (covered)	2-6%	0-1%	6-7%	3-4%	3-15%	16-31%
Stack - Pile (uncovered)	3-7%	0-1%	11-12%	19-24%	3-15%	37-58%
Stack - Pile (covered)	3-7%	0-1%	6-7%	4-6%	3-15%	17-34%
Bags	1-2%	0%	5%	2%	1-5%	9-14%

Source: Holmes and Muck, Univ. of WI

Talk to your local Pioneer representative to determine the inoculant that is the right choice for your operation.

Canola Swath Timing

Staging Canola for Swathing

- Canola plants mature from the bottom of the main stem upwards and from the center of the plant outwards through the branches. Color change can range from a yellow band to a mottled effect.



- As canola begins to mature, both the exterior color of the plant and the seed will change. The exterior color change will vary based on canola hybrid and environmental conditions. It is more important in determining the maturity to evaluate color change in the seed to determine swath timing.
- The optimum stage for swathing canola is up to an average of 60% seed color change on the main stem. If a field has lower plant stands and multiple branching, one may want to consider swathing later as the majority of the yield may be on the branches and not on the main stem of the plant.
- Seed color change typically advances about 10% every three days under normal conditions. Under hot conditions, seed color change can occur more rapidly. Seed color change can occur slower when cooler conditions persist. General guidelines indicate seeds on the lower pods will have ripened 35-40 days after flowering.



- In assessing swath timing, you need to determine if the crop is uniform and if the plant population is normal (6-10 plants/ft²). Color variation in plants across the field can provide an indicator of maturity and different areas to sample to assess seed color change.

Assess Seed Color Change

- Sample at least 5-10 plants from various locations throughout the field. Include samples from different topographies and areas that show visual differences.



Illustration of ideal seed color change for swath timing (Photo courtesy of Canola Council of Canada)

- For each plant, strip branches away from the main stem and set aside. Using the main stem, begin to look for seed color change in the pods.
- Begin by opening middle pods on the main stem and looking for seeds that have changed color. Open pods below the middle pod and again assess. If you see seed color change throughout these pods, you are at or above 50% seed color change.
- Take seed from the upper pods and roll them between your thumb and forefinger to see if they are firm.

- Once you have an estimate of percentage change on the main stem, examine the seeds in the pods on the side branches. Seed from the side branches should be firm to roll. Seed color change may also be started in the lower pods on the side branches.
- When all areas have been sampled and assessed, determine the average percent seed color change for the field.

Swathing a Multi-Stage Crop

- If the field is uneven or contains variable plant populations, it is important to determine the percentage of the field that contains the most yield and what stage those parts of the field are in vs. the stage in other areas. Swath when the majority of the yield is within ideal stages. This may result in pod shatter in some spots and early swathing in other areas.

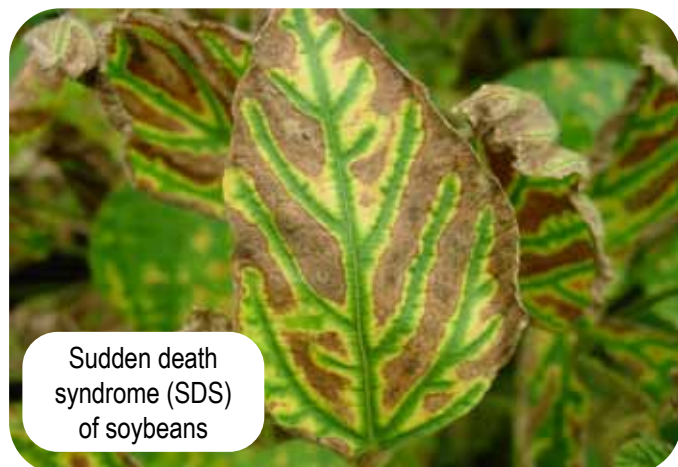
Consider the Weather

- Swathing during hot dry weather (>25°C) can contribute to higher green seed. Under hot conditions, consider swathing at night.
- If frost is in the forecast, you need 3 good drying days after swathing, prior to frost, to minimize the risk of green seed.

Sudden Death Syndrome of Soybeans

Disease Facts

- Fungal disease caused by *Fusarium virguliforme*
- Has spread to most soybean-growing states and Ontario, Canada
- Continues to spread to new fields and larger areas of infected fields
- Ranked second only to soybean cyst nematode (SCN) in damage to soybean crop
- Fungus colonizes only crown and roots of the plant
- Above-ground symptoms are caused by a toxin produced by the fungus and translocated throughout the plant
- Severity varies from area to area and field to field



Conditions Favouring Disease Development

- Cool, moist conditions early in the growing season often result in higher disease incidence
- Favourable disease conditions may result from early planting, high rainfall and/or low-lying, poorly drained or compacted field areas
- If SCN is also a problem in the field, disease may be more severe
- Infection occurs early in the season, but symptoms usually do not appear until mid-summer
- Appearance of symptoms often associated with weather patterns of cooler temperatures and high rainfall during flowering or pod-fill

Fusarium virguliforme Disease Cycle

- Fungus survives in crop debris and as mycelia in the soil
- Survives best in wet areas such as poorly drained or compacted field areas
- Fungus enters roots early in the growing season
- Infection may be facilitated by wounds from SCN, insects or mechanical injury
- Fungus colonizes the root system
- Fungus overwinters in diseased soybean residue

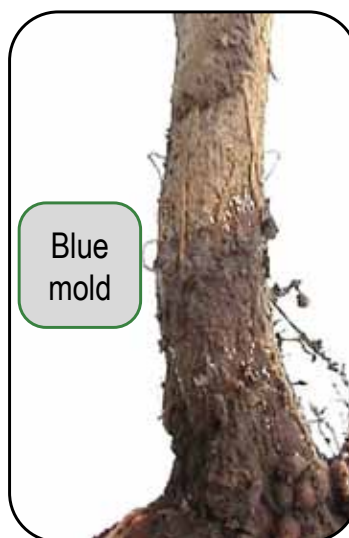
Impact on Crop

Soybean seed yield is reduced as:

- Plants lose leaf area and leaves drop prematurely
- Roots deteriorate, reducing water/nutrient uptake
- Flowers and pods abort, resulting in fewer pods and seeds
- Seeds may be smaller, and late-forming pods may not fill or mature

Root Symptoms

- A blue coloration may be found on the outer surface of taproots due to the large number of spores produced
- These fungal colonies may not appear if the soil is too dry or too wet



- Splitting the root reveals cortical cells have turned a milky gray-brown color while the inner core, or pith, remains white
- General discoloration of the outer cortex can extend several nodes into the stem, but its pith also remains white



Leaf and Plant Symptoms

- Leaf symptoms first appear as yellow spots (usually on the upper leaves) in a mosaic pattern
- Yellow spots coalesce to form chlorotic blotches between the leaf veins
- As chlorotic areas die, leaves show yellow and brown areas contrasted against green veins
- Affected leaves twist and curl and fall from plants prematurely
- Flowers and pods abort, and seeds are smaller
- Later-developing pods may not fill, and seeds may not mature



Management

Use a combination of practices:

- Select SDS-resistant varieties
- Pioneer has developed elite soybean varieties with improved SDS resistance
- Soybean breeders have selected for genetic resistance in multiple environments with high levels of natural SDS infection
- Pioneer rates its varieties and makes ratings available to customers
- Ratings range from 4 to 8 (9 = resistant), indicating very good resistance is available in elite soybean varieties
- Your Pioneer representative can help you select suitable varieties
- Manage soybean cyst nematode (SCN)
- Plant varieties resistant to both SDS and SCN
- Improve field drainage and reduce compaction
- Evaluate tillage systems
- Where possible, some tillage may be needed to bury infected residue
- Reduce other stresses on the crop
- Plant the most problematic fields last in your planting sequence
- Foliar fungicide cannot protect plants from SDS



Corn Growth and Development

It is important to understand what stage the corn crop is, so that you can determine the time needed to reach physiological maturity (black-layer).

Growth stages of corn are divided into vegetative stages (V) and reproductive stages (R) as outlined in Table 1. Subdivisions of the V stages are designated numerically as V1, V2, V3, etc. through V(n), where (n) represents the last leaf stage before VT for the specific hybrid under consideration. The first and last V stages are designated as VE (emergence) and VT (tasseling). The number of leaves (n) will fluctuate with hybrid and environment differences. The vegetative stages and six subdivisions of the reproductive stages are designated numerically with their common names in Table 1.

Vegetative Stages	Reproductive Stages
VE = emergence	R1 = silking
V1= first leaf collar	R2 = blister
V2 = second leaf collar	R3 = milk
V3 = third leaf collar	R4 = dough
V(n) = nth leaf collar	R5 = dent
VT = tasseling	R6 = maturity

Table 1. Growth and Development Stages

Staging a corn seedling. Each leaf stage is defined according to the uppermost leaf whose leaf collar is visible. The first part of the collar that is visible is the back, which appears as a discolored line between the leaf blade and leaf sheath. The characteristically oval-shaped first leaf is a reference point for counting upward to the top visible leaf collar as demonstrated in Figure 1.

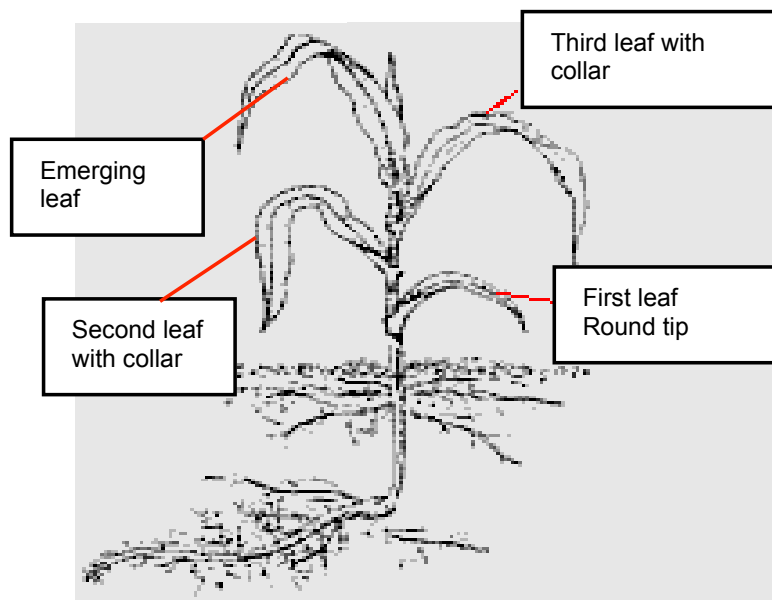


Figure 1. V3 Plant

Staging larger plants. Beginning at about V6 increasing stalk and nodal root growth combine to tear the small lowest leaves from the plant. Degeneration and eventual loss of the lowest leaves results. To determine the leaf stage after lower leaf loss, split the lower stalk lengthwise (Figure 2) and inspect for the internode elongation. The first node above the first elongated stalk internode generally is the fifth leaf node. This internode is usually a little less than ½ inch in length. This fifth leaf node may be used as a replacement reference point for counting to the top leaf collar.

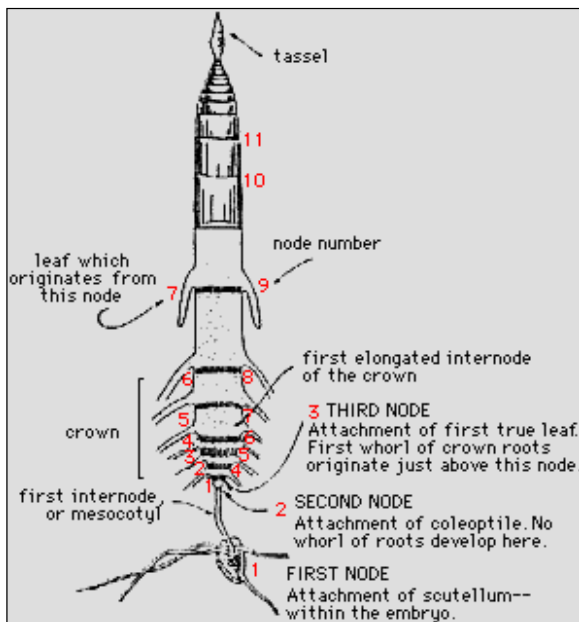


Figure 2. Staging after V6

Reproductive Growth Stages

Tassel (VT) – bottom-most branch of tassel completely visible and silk has not emerged

Silking (R1) – silks visible outside the husks

Blister (R2) – kernels white on outside, clear liquid inside

Milk (R3) – kernel yellow outside, milky white fluid inside

Dough (R4) – kernel fluid thick/pasty, cob pink or red

Dent (R5) – most kernels at least partially dented

Physiological Maturity (R6) – milk line no longer evident, black layer formed. Maximum dry weight is attained

Rate of development

Emergence may occur as rapidly as 4 or 5 days after planting in warm moist soil, or may take 3 weeks or more in cool soils. A new leaf will appear about every 3 days during early growth, while later leaves developing during warmer conditions may appear in 1 to 2 days. However, early development can vary depending on temperature. Western Canadian hybrids generally produce 16 to 18 leaves. The rate of development after pollination is given in Table 2. Bear in mind that development may be faster than suggested here under higher than normal temperatures or slower under lower than normal temperatures.

Kernel Growth Stage	Days After Silking
Pre-blister	9
Blister	13
Early Milk	17
Milk	21
Late Milk	25
Soft Dough	30
Early Dent	35
Dented	40
Late Dent	45
Half Milk Line	50
Physiological Maturity	55

Table 2. Days After Pollination for Reproductive Growth Stages

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