

The Bean Report

Your source for soybean and pulse crop agronomy and research.

June 27, 2014

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- **Crop Heat Units and rainfall**
- **Why are soybeans turning yellow?**
- **Assessing nodulation is very important**
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- **Research—residue management**

Soybeans

Soybeans have been progressing slowly with the below average temperatures. Staging is from unifoliate to V-3. Second herbicide applications are taking place: cool, wet conditions have resulted in higher weed pressure.

Hail damage is present in some fields; mostly leaf tearing but some stems have been cut off above the cotyledons. Growth will resume from the axillary buds (at base of cotyledons) of these plants. It is best to take an accurate plant stand assessment about 10 days after the hail to see how many plants survived (new growth will be visible). Use the [MPGA Bean App](#) to assess plant population. Damage to leaves in the vegetative stage of soybean will not cause significant loss. Even if 50% stem breakage above the cotyledons occurs, only about 10% yield loss may occur (OMAFRA). Soybeans are most susceptible to yield loss from hail during flowering and reproductive stages.

Bacterial blight may be more prevalent in fields affected by hail. Symptoms of root rot are starting to appear. This is not surprising considering we are dealing with continuously saturated soil conditions.

Dry beans

Dry beans are at V-1 to V-3. Herbicide applications are underway for broadleaves and grasses. Iron chlorosis is also affecting dry beans for the same reason as soybeans. The US dry bean crop is looking good: crops in Idaho, Nebraska and Wyoming are rated 75-89% good to excellent.

MAY 20- JUNE 26	Crop Heat Units	% normal	Rainfall (mm)	% normal
Dugald	624	91	109	107
Carman	692	90	85	100
Morden	674	91	67	71
Portage	634	90	88	116
Melita	643	9	120	108
Brandon	590	90	160	218
Hamiota	497	88	95	138
Dauphin	566	89	101	112

Note to all producers: Dry bean acres in Manitoba are up this year: when spraying, don't assume the field next to you is RR soybeans. Get out and check to avoid spray drift and potential damage to dry beans.

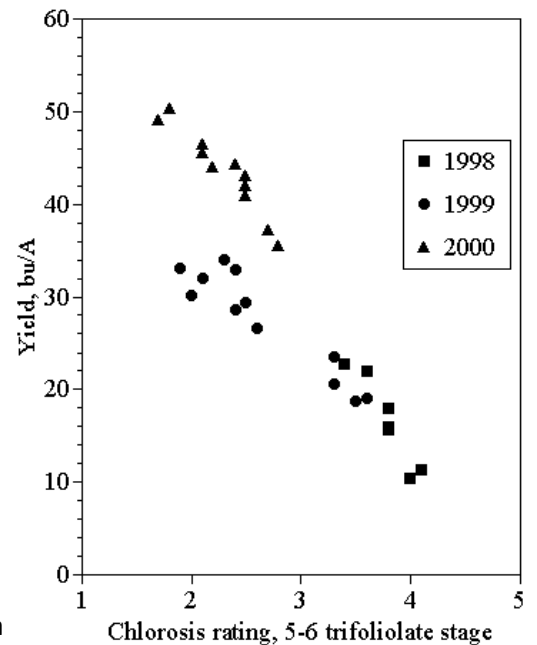
Soybeans appearing yellow

Soybean fields across the province are looking pale green/yellow. There are several contributing factors related to the cool, wet weather.

1. **Iron Deficiency Chlorosis (IDC).** Iron is an important micronutrient required for the production of chlorophyll. Chlorophyll gives plants their green color. In wet soils, the uptake of iron into soybean (and dry bean) plants is impaired. There is plenty of iron in the soil, however plants cannot take it up. This results in chlorosis, or yellowing of plant tissue. This is usually a temporary condition and plants will grow out of it when soil conditions dry up. However, in severe cases when symptoms persist, yield loss is possible. For example, if soybeans have chlorosis rating of 3 at the 5-6 trifoliolate stage, you may see yield loss of 50-60%. Iron chlorosis is often worse in saline areas and does often affect an entire field equally.

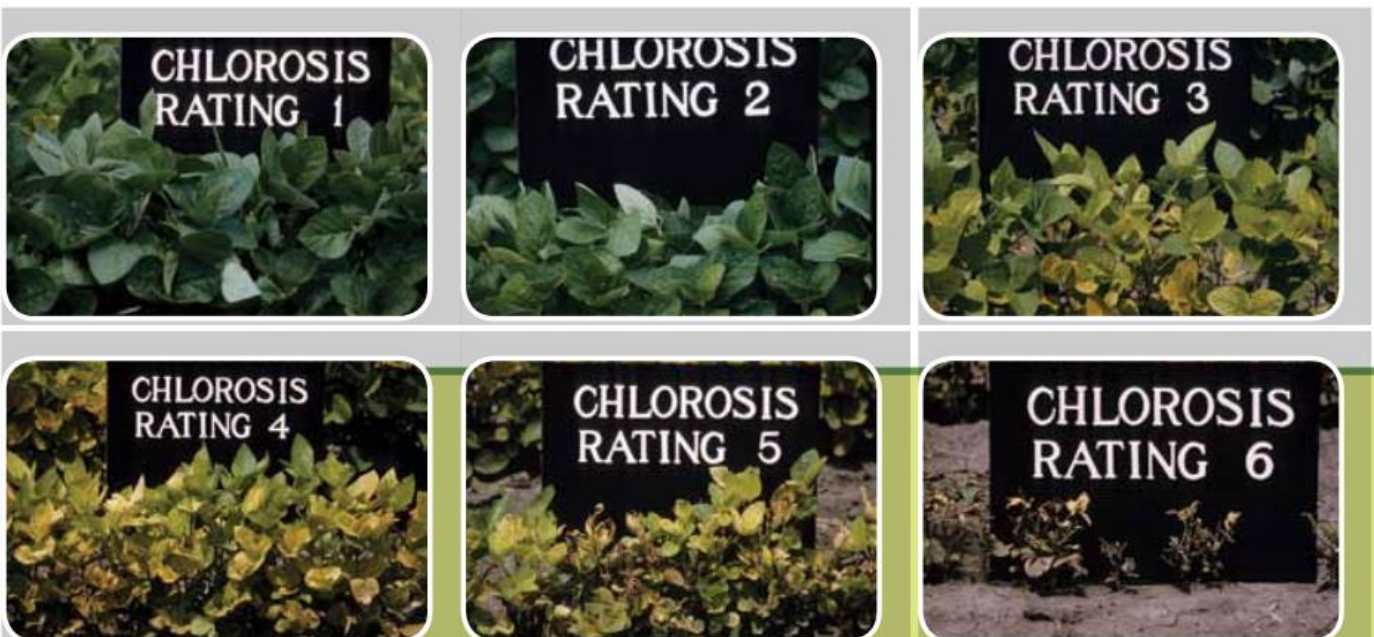
Other factors that lead to IDC include saline soil, high concentration of carbonates and soluble salts, and high nitrate levels. If IDC is a problem in your soybean fields this year, take a look at your soil test and see if salinity and soluble salts are a problem. You should also look at the IDC rating of the soybean variety you are growing. Soybean varieties differ in their susceptibility to IDC— ratings for each variety are provided in [MPGA's Variety Trial Data](#).

2. **Temporary nitrogen shortage.** Inoculant was applied to soybean seed and/or with soybean seed at planting to provide the proper soil bacteria for nodulation to occur on soybean roots. Development of nitrogen fixing nodules will begin shortly after emergence and will become visible and active around the 2nd and 3rd trifoliolate stage. Before the nodules start fixing nitrogen, soybean plants may appear pale green but will 'green up' once the nodules start providing nitrogen.



Above: Yield (bu/ac) relative to chlorosis rating at 5-6 trifoliolate stage (Goos, 2000)

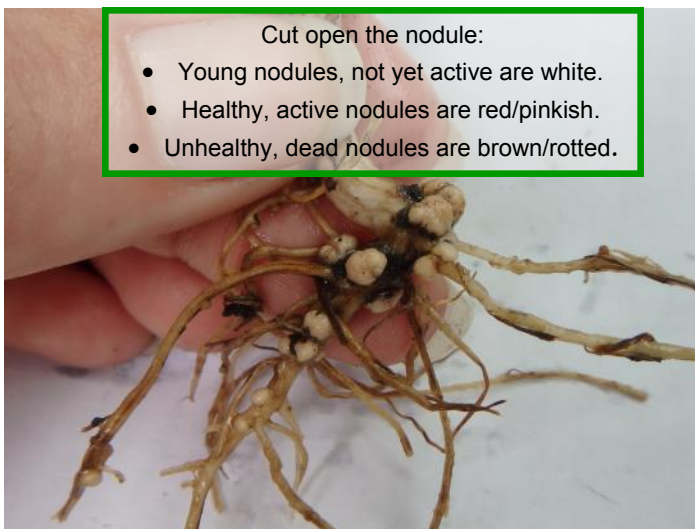
Below: Iron Chlorosis rating scale (Wiese and Penas)



It is time well spent to scout your fields in the next week or two to **ensure that nodules are present**. Take a shovel and bucket of water out to the field and dig up the plant roots. Pulling the roots out of the soil may break the nodules.

In some cases, nodulation failure may occur and a rescue application of nitrogen may be required. Nodules are formed from living bacteria and require oxygen to survive. In soils that are waterlogged (anaerobic) for more than 3 days, nodules may die. Similarly cool, compacted soils may negatively affect nodulation due to low oxygen supply. Hail damage and IDC can also negatively affect nodulation.

In fields with nodulation failure, rescue N applications have been shown to increase yield. It is best to apply rescue nitrogen between R-2 (full flower) and R-3 (early pod). These stages will occur 46-56 days after planting—2nd-3rd week in July. In North Dakota a replicated field study in soybeans with nodulation failure, showed that soybean yield improved significantly with 100 lbs-N (urea), 50 lbs-N (UAN) and 100 lbs-N (UAN) compared to the untreated check (Endres et al. 2002). To wash the nitrogen into the soil to the roots, application before a rainfall is important. In fields with good nodulation, additional N is not beneficial.



3. Excess moisture—moisture stress overall will result in yellowing of plant tissue and plant death if flooded for more than 3 days. Overall, there is no need to panic yet. But scout your soybeans to figure out what is going on:

Soybean Scouting Checklist for late June/early July

- ⇒ Look for iron chlorosis symptoms (yellowing of new growth, especially between the veins). Take notes for next year—check soil tests and variety rating
- ⇒ Check for nodulation at V-3 to V-4 - Dig up plants with a shovel, clean roots with water and check for nodules near the base of the plant and/or on secondary roots.
- ⇒ Take an accurate plant stand count: optimum plant population is 140-160,000 plants/ac.
- ⇒ Check for insects (grasshoppers) and diseases (root rot).














Focus on Research

A University of Manitoba study is investigating residue management techniques for wheat prior to soybeans. The pictures below show the soybean test crop planted into strip till, short stubble and tilled soil. We are looking forward to seeing the results on soybean productivity. This study is funded by soybean check-off through MPGA.



SOYBEAN GROWTH STAGING GUIDE

V-E Emergence	V-C	V-1	V-2 to V-12	R-1 Beginning bloom	R-2 Full bloom
Cotyledons have been pulled through the soil	Unrolled unifoliate leaves	First unrolled trifoliate leaf	Second unrolled trifoliate leaf, third unrolled trifoliate leaf... fourth... etc.	Plants have at least one open flower at any node (can be purple or white)	Plants have an open flower at one of the two uppermost nodes on the main stem
					
R-3 Beginning pod	R-4 Full pod	R-5 Beginning seed	R-6 Full seed	R-7 Beginning maturity	R-8 Full maturity
Pods are 1/4-inch long at one of four uppermost nodes on main stem	Pods are 3/4-inch long at one of four uppermost nodes on main stem	Seeds are 1/8-inch long in the pod at one of the four uppermost nodes on main stem	Pods contain green seeds that fill the pod to capacity at one of the four uppermost nodes on main stem	One pod on the main stem has reached its mature colour (tan/brown)	95% of the pods have reached their mature colour
			 R-6.5	 at least one pod is brown	