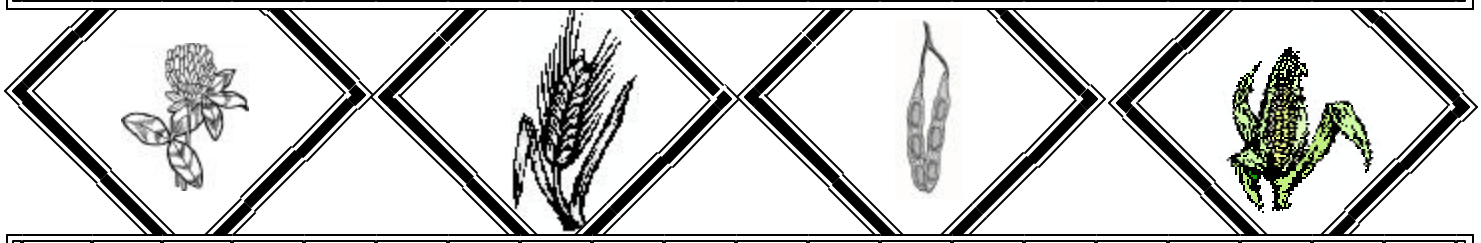
Volume 2, Issue 1 January, 2002

CROP TALK



OMAFRA Field Crop Specialists—Your Crop Info Source

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Are Your Grain Bins Ready for Winter?

by Helmut Spieser, OMAFRA Ridgetown

Winter is again making its mark with above average temperatures and a fair number of sunny days. These conditions are great for travelling, but may cause serious problems with grain stored in bins. Check your grain bins! If you don't, you may be in for a nasty surprise.

Cold temperatures are good for long term storage of grains. The problem is that the grain does not cool by merely sitting in the bin in winter. The only way of changing grain temperature is by moving air through the grain mass, a process called aeration. Dry grain sitting in a bin insulates itself from outside air temperatures because of the many air spaces between the individual kernels, and the fact that the kernels are only making point contact with adjacent kernels. Just a thin layer of kernels against the bin wall will actually mimic outside air temperatures.

For successful long-term storage of grain in bins, the grain mass temperature must be kept within 5 C^o of the average outside air temperature. The grain should be cooled every month until about March, then slowly warmed up to match average April air temperatures. If you do not keep grain temperatures within $\pm$ 5C^o of average outside air temperatures, spoilage problems can result. When temperature differences exceed 5C^o convective air movement will occur, pick up moisture and cause spoilage. Timely and thorough aeration of the bin contents will prevent convective air movement.

Cropline 1-888-449-0937

Ontario Ministry of Agriculture, Food and Rural Affairs, Crop Technology Branch

Agricultural Information Contact Centre: 1-877-424-1300
Publication Order Centre: 1-888-466-2372
Northern Ontario Regional Office: 1-800-461-6132
OMAFRA Web Site: www.gov.on.ca/omafra/english/crops

The length of time required to completely aerate and cool the grain mass will depend on the airflow rate of your system. This airflow rate, described in cubic feet per minute per bushel (CFM/bushel), is dependent on the bushels of grain in the bin, the depth of grain and the size of fan and motor. See Table 1. Remember, you have to carefully choose when to operate the fan, so that you don't add moisture to the stored grain but do effectively change the temperature.

Table 1

Airflow Rate (CFM/bushel)	Fan Operation for Winter Cooling (hours)
1/20	400
1/10	200
1/5	100
1/4	80
1/3	61
1/2	40

Bin Check List

1. Turn on the aeration fan.
2. Climb up and look inside the bin. Look for signs of moisture on the underside of the roof. If water droplets or ice are present, you need to aerate your bin. Moisture from the grain has been carried into the attic space and condensed on the roof metal.
3. Sometimes snow can be driven into the top of a storage bin. If there is a light dusting, don't worry. When you run the aeration fan this snow will sublimate and be discharged as harmless water vapour. If much greater amounts of snow are found, shoveling may be required to remove it from the bin.
4. Take a big sniff. Do you notice any off-odours? Your nose will pick up strange odours at very low concentrations. The air should smell like clean grain.
5. Look at the grain surface. Does it look the same as the last time? If it looks dull or off-colour, investigate further.
6. Check the static pressure, or the working pressure of the fan, in the plenum under the aeration floor. Has this pressure changed from last month? If it has gone down, no cause for concern. If the static pressure has gone up, something has increased the resistance of the air as it moves through the grain mass. Investigate deeper into the grain mass.
7. Look for any signs of insect activity.
8. Record your notes in a monitoring logbook. This helps keep track if things have changed in the various bins.

Agrotain?

by Scott Banks, Emerging Crop Specialist, Kemptville OMAFRA

2001 was the 2nd year of a 3-year project by the Ottawa-Rideau Regional Soil & Crop Improvement Association to assess the economic benefit of Agrotain treated urea-based fertilizer in spring wheat. Agrotain is a urease enzyme inhibitor designed to reduce the potential loss of nitrogen (N) from urea-based fertilizers broadcast on the soil surface.

In 2000, the Ottawa-Rideau Regional Soil & Crop Improvement Association ran strip trials in corn and spring wheat and the Durham East Soil & Crop Improvement ran strip trials in winter wheat. On the winter wheat and corn, there was no significant difference in yield between the Agrotain treated urea and the non-treated urea. However, with an average increase of 8 bu/ac of spring wheat from the two reps. at Cornerview Farms, the agrotain treatment looked promising. The weather conditions in 2000 were wetter and cooler than normal.

The spring of 2001 was extremely dry. This allowed for early seeding of the spring wheat. At most of the farm locations, there was no rainfall for 20-25 days after the fertilizer was applied, and the soil surface remained dry.

In 2001, the average response to applied nitrogen fertilizer was **11 bu/acre.** The average response to Agrotain treated urea-based fertilizer as compared the Non-Agrotain treated fertilizer, was only **1.3 bu/acre,** with a range from **-1.8 to 8.6** bushels per acre. Depending on the rate of urea fertilizer applied, the additional cost of the Agrotain is about $10.00 per acre, therefore the **break-even is 2.0 bushel per acre** at $5.00 per bushel for Hard Red Spring Wheat.

2001 Agrotain project on spring wheat:

TREATMENT	0 NITROGEN FERTILIZER (bu/ac)	NO AGROTAIN FERTILIZER (bu/ac)	AGROTAIN TREATED FERTILIZER (bu/ac)	DIFFERENCE 0 Nitrogen vs No Agrotain Fertilizer (bu/ac)	DIFFERENCE Agrotain vs No Agrotain (bu/ac)
	71.6	83.2	81.4	**11.7**	**-1.8**
	41.0	63.8	63.0	**22.8**	**-0.8**
	n/a	55.7	64.4	**n/a**	**8.6**
	75.2	77.0	80.8	**1.8**	**3.8**
Minimum	41.0	46.2	46.4	**1.8**	**-1.8**
Maximum	75.2	83.2	81.6	**22.8**	**8.6**
Average	**60.3**	**68.4**	**69.6**	**10.9**	**1.2**
# of Reps.	9	11	11		

Project Co-operators: John Droogh, Kevin & Calvin Ferguson - Ferguson Farms, Jack MacLaren, Orlin Pelton & Rick Schouten – Cornerview Farms.

New Alfalfa? Weed Control!

by Gilles Quesnel, Field Crop IPM Specialist, OMAFRA, Kemptville

Forage seedlings grow slowly and are easily overpowered by rapidly growing weeds. Weeds compete for water, sunlight and nutrients, and reduce yields in newly seeded stands. Some broadleaf weed seedlings can grow up to five times faster than alfalfa seedlings. Costs of establishment are high, and alfalfa stands decline with age. The importance of weed control in new forage stands cannot be overlooked!

Broadleaf weed control is usually required in direct-seeded alfalfa. Alfalfa seeded with a cereal companion crop often does not require a herbicide treatment, especially if the small grain is harvested as silage. The cereal companion crop will act as a biological control, crowding out the weeds.

The following points should be considered for managing weeds in newly seeded alfalfa:

1. Weeds emerging with the crop are the most competitive.
2. Newly seeded alfalfa should be kept relatively weed-free for the first 60 days.
3. Weeds emerging after 60 days will not influence that year's forage yield.
4. In new alfalfa stands, broadleaf weeds are more competitive than grassy weeds.
5. When broadleaf weed pressure is low, clipping or early harvest can be effective in controlling broadleaf weeds in alfalfa stands.

2,4-DB is the broadleaf herbicide of choice. While application rate varies for the various 2,4-DB formulations, the lower rate of the product usually offers a good compromise between weed control and crop safety. Apply the herbicide in at least 60 L/acre (13 gal/acre) of water when the legumes are in the 1st to 4th trifoliate stage. The application of 2,4-DB suppresses legume growth for 2-3 weeks. Legume susceptibility to 2,4-DB increases significantly beyond the 4th trifoliate stage. When crop emergence is uneven, it is less damaging to the crop to apply the herbicide on the early side than on the late side. Under heavy wild mustard infestations, the addition of 28 ml per acre of MCPA to the 2,4-DB spray mix will provide superior mustard control.

Great Lakes International Grazing Conference

by Jack Kyle. Grazier Specialist, OMAFRA, Lindsay

The 10th Annual Great Lakes International Grazing Conference is being held Feb 11 & 12, 2002 at McCamly Plaza Hotel in Battle Creek, Michigan.

This conference has sessions for Beef, Dairy, Sheep, and Poultry on Feb 11. Feb 12 sessions include a Kura Clover Symposium, Mastering the Art (of grazing) and Getting Started in Grazing.

There is a trade show in conjunction with the conference. If you have an interest in pasturing livestock of any type, the Great Lakes International Grazing Conference is an excellent opportunity to gain new information and meet producers and researchers with grazing interests in an environment similar to Ontario.

The Great Lakes Grazing Network sponsors this conference. GLGN is an affiliation of people with grazing interests in the 9 Great Lake States and Ontario. There is more information on the web site at www.msue.msu.edu/jackson/GLGC.htm Registration is $US85 and accommodation reservations should be made at the McCamly Plaza Hotel www.mccamlyplazahotel.com by Jan 30, 2002.

Running Out of Pasture?

by Jack Kyle, Grazier Specialist, OMAFRA Lindsay

When the feed bin gets low, you call and order more fed. If you run low on pasture, the answer isn't so easy. Knowing how much grass is available in your pasture, and how much your livestock requires, is critical to good pasture management.

The first step is to calculate the requirements of your pastured animals. Livestock require 2% to 4% of body weight in dry matter intake. The amount is dependent on the type of livestock and your performance goals. A dry cow on a maintenance ration will require dry matter equivalent of 2% of body weight. A high producing animal such as finishing cattle or lambs, or lactating dairy cows will require about 4% of body weight. For example purposes I will use 3%. Take the number of animals times average body weight to get total number of lbs. of livestock on the pasture. Multiply this total body weight by 3% to get daily dry matter requirements. Example: 50 steers @ 500 lbs. X 3% = 25000 X .03 = 750 lbs. of DM/day.

The second part of this exercise is to estimate the amount of forage that is available in the paddock or field that is going to be pastured. One way of doing this is to estimate how many bales of hay you would expect from the field and use this as the basis for your calculations. There are a number of different measuring devices for determining the amount of forage that is available. One method is to use a grazing stick that assists in calculating the sward density and height to get the available forage dry matter.

A very dense stand of forage will have up to 300 lbs of dry matter per acre-inch of height. (An acre-inch is one inch of height across an acre). A very thin stand will have 50 to 75 lbs of dry matter per acre-inch. An average stand will likely have 100-200 lbs. of DM per acre-inch. To measure height, take the average height across the field. You then subtract 3 inches from the height, as grazing should not be lower than 3-4 inches, this leaves enough leaf area for rapid plant re-growth.

Example – forage is 12 inches tall, minus 3 inches, leaves 9 inches of usable forage in the field. If this was a dense stand this could represent up to 2700 (9x300) lbs. of dry matter per acre. With this number we can go back to the livestock requirement number and determine how many days feed are in the paddock or how big we need to make the paddock for the number of days grazing that are planned. The ideal, from a forage re-growth standpoint, would be only 1 day grazing per paddock. From a practical management standpoint 4 to 5 days is more common. If livestock are in a field for more than 5 days they will start picking off the new leaves of the re-growth. There will also be more tramping loss and damage to the plants if the grazing period is greater than 5 days.

With experience, you will improve your forage estimating skills. These calculations will allow you to optimize the production from your pastures, and better plan for any forage shortfall on the horizon!

Reed Canarygrass

by Joel Bagg, Forage Specialist, OMAFRA, Lindsay

There is growing interest in reed canarygrass for both forage mixtures and as pure stands in Ontario. Reed canarygrass is high yielding and widely adapted, with good tolerance to both poor drainage and drought conditions. Properly managed, reed canarygrass quality and palatability can be excellent. Once it heads, course stems and leaves develop, rapidly reducing palatability and digestibility. Timely harvest management is critical!

The early maturing reed canarygrass varieties and late harvest schedules used by our grandfathers are responsible for a reputation of poor palatability and animal performance. This is no longer necessarily the case. Glyphosate enables us to control this persistent species, when rotating back to other crops.

Characteristics

Reed canarygrass spreads by rhizomes and forms a solid sod. It is best known for its ability to tolerate poorly drained soils and prolonged flooding. Because of its deep-root system, reed canarygrass is more drought resistant than other grasses, and can provide high yields on well-drained or even droughty soils.

Reed canarygrass has excellent winterhardiness, persistence, disease resistance, and can tolerate low pH. It's spreading root system allows it to fill in gaps in hay stands (unlike orchardgrass, ryegrass and timothy). Reed canarygrass responds well to adequate fertility, particularly nitrogen, and can be a useful tool in nutrient management. Pure stands respond well to split nitrogen applications, resulting in increased yield and protein.

Prior to the full head stage, feed quality, including crude protein and digestibility, is similar to other grasses at the same stage of maturity. Regrowth is excellent and occurs faster than most other grass species. Normally, regrowth will be leafy and result in stem elongation, but with no infloresence (seed heads).

Use Low Alkaloid Varieties

In the past, livestock have performed poorly on reed canarygrass pastures because it contained unpalatable alkaloids. Recommended reed canarygrass varieties are free of the tryptomine and carboline alkaloids, which cause scours and poor performance. Some varieties (Marathon, Palaton & Venture) are also lower in the gramine alkaloids that reduce palatability. Variety performance data is available at www.plant.uoguelph.ca/performance_recommendations/ofcc/ofcc.htm and in Table 1 below. The newer varieties are less aggressive and invasive than the older varieties. “Common” reed canarygrass seed should be considered high in alkaloids and should be avoided.

Establishment

Reed canarygrass is slower and more difficult to establish than other grasses. It is not very competitive in the year of seeding, but once established reed canarygrass is very aggressive. In legume mixtures, a strong reed canarygrass presence may not occur until the third year, but will eventually predominate. This slow establishment means reed canarygrass, it is not well suited to short, 3 year alfalfa mixture rotations, but it can work well in longer rotations.

REED CANARYGRASS (% Palaton)[1]

	Yield		Heading Date		
Cultivar	**South**	**North**	**Guelph**	**Kapuskasing**	**Distributor**
Marathon[2]	96	104	28/05	-	Quality Seeds Ltd.
Palaton[2]	100	100	26/05	25/06	Mapleseed
Vantage	101	103	27/05	24/06	Pickseed Canada Inc., Mapleseed
Venture[2]	101	98	25/05	24/06	Speare Seeds

[1] Average yield of Palaton, Southern Ontario trials 9.5 t/ha; in Northern Ontario trials 8.0 t/ha.
[2] Varieties with significantly lower levels of gramine alkaloid. High levels of gramine alkaloid reduces palatability and intake.

Seedling vigour is poor. Frost seeding, interseeding into established stands, and fall seeding are not recommended.

Seed is more expensive than most other grass species. Seeding is most successful with conventional tillage, but can work in no-till systems as well. A firm, well prepared, packed seedbed is important. Seed at a depth of ¼ - ½ inch. Seeding rates are usually 9 – 11 lbs/acre in a pure stand, or at least 4 - 6 lbs/acre if included with a legume. Weed control is important to minimize competition.

Harvest Management

Heading of reed canarygrass occurs later than orchardgrass and bromegrass, but before timothy. First cut should be harvested at the boot stage for highest quality, or at the heading stage for optimum yield.

Pasture

Reed canarygrass has traditionally been seeded on poorly drained pastures, where it is difficult to grow other species. Poor animal performance has resulted on wet pastures where animals could not graze until the grass was well past heading.

Reed canarygrass can be the basis of a productive, drought-resistant pasture if it can be rotationally grazed with rest periods to allow regrowth. Because of its deep-rooted nature, it can be used to provide grazing during the "summer slump" of other species.

Grazing should be timed to keep the plants vegetative. This is particularly important in May and June, when the rapid spring growth should be limited. Machine harvest if necessary. With low stocking rates, clipping may be required. Reed canarygrass does not tolerate close, continuous grazing, where the constant removal of growing points damages regrowth. Rotational grazing with a residual height of 4 inches will improve productivity.

Management!

Reed canarygrass does not fit every forage production system. When managed properly, reed canarygrass has the potential to be an excellent cool-season grass species for haylage, hay and pasture. Careful attention must be paid to timely harvest management, variety selection and establishment practices. Established, well managed reed canarygrass can be an excellent addition to many forage systems.

Sulfur?

by Keith Reid, Soil Fertility Specialist

Sulfur is one of the essential elements for crop growth and reproduction. Its most important role is in the production of protein, as part of two amino acids: cysteine and methionine. Further, sulfur is associated with the assimilation of nitrogen into protein, so sulfur deficient plants have low protein contents despite an adequate supply of nitrogen. Sulfur deficiency symptoms in plants often appear similar to nitrogen deficiency, with stunting and yellowing of the plant, although nitrogen deficiency shows most strongly in the new growth while sulfur deficiency will usually affect the whole plant.

The crops with the highest requirement for sulfur are those with the highest protein contents, and particularly proteins containing high levels of cysteine and methionine. Among commonly grown crops in Ontario, canola has by far the highest requirement, followed by hard red wheat, and alfalfa. The question is whether these crops require extra sulfur, above what is already available from the environment, for maximum yield and quality.

The largest source of sulfur to crops is the breakdown of organic matter. A secondary, but very significant source, is from atmospheric deposition. Sulfate is released by the burning of fossil fuel, either by industry or automobiles, and this is returned to the earth as acid rain, or by dry deposition as ammonium sulfate. Sulfur deficiency is common in the prairies, where dry conditions slow the breakdown of organic matter and there is little heavy industry. It is much rarer in Ontario, unless you are west of Lake Superior.

There is some concern that sulfur deficiencies will develop in Ontario because of the reduction in acid rain. Several trials have been carried out with canola over the past 3 years, which should show deficiencies sooner than any other field crop. There have been some plots that showed a yield response to sulfur, but the average response over all the trials was zero. For the moment, it is unlikely that adding sulfur will improve your bottom line.

If you do want to apply some sulfur, the most economical form is ammonium sulfate. This material is available in different grades, and the price varies accordingly. The raw product from the steel mills is a flaky powder, which is hard to handle but is competitively priced with urea. A granular form of ammonium sulfate has superior handling characteristics, but can cost twice as much or more per pound of nitrogen. In either form, it has the advantage over urea that it will not volatilize if left on the surface of the soil.

In any trial with ammonium sulfate, it is difficult to sort out whether yield effects are from the sulfur, or from more available nitrogen for the crop. If both urea and ammonium sulfate are surface applied, volatilization losses from the urea could result in a nitrogen deficiency in the urea treatment. Another common error is to ignore the nitrogen in the ammonium sulfate, and apply it over and above the regular nitrogen program. Is the yield effect from the 24 pounds of sulfur, or the extra 21 pounds of nitrogen? Even when the nitrogen effects are considered, careful measurement will be required to pick up any yield responses. They will be small and inconsistent, if previous trials are correct!I

Maximizing Manure Value!

by Christine Brown, Nutrient Management Program Lead

Manure is rich in nutrients and organic matter. It is also rich in odour and pathogens, making it a product that requires "good" management. Our mindset and management needs to focus on manure as a "resource" to maximize its value!

Ontario has a strong livestock base. A strong livestock base means that Ontario crops have a local market. A local market for crops, especially corn, means better crop prices for Ontario producers. The by-product of a strong livestock base though, is manure.

With no livestock on a farm, there are no costs for manure handling. This means that for livestock farm, the cost of storing and handling manure should be totally associated with the livestock business. When manure is handled so that nutrients are utilized to their maximum potential, the cost of manure handling decreases. This improves the bottom line of the livestock business. The organic matter of manure helps improve soil structure (especially with solid manure) and the resulting increase in soil productivity also increases the value of manure.

On the downside, manure application takes time and labour. Application at the time when the crop needs the nutrients is ideal. Manure nutrients benefit a corn crop most when applied in spring, just before planting. Yet soil compaction or delayed planting due to spring manure application can result in reduced yields. A real "catch 22"!

It all comes down to management! Manure management varies from farm to farm based on manure type, acreage base, crop rotation, soil type, equipment availability, labour availability, amount of manure that has to be handled, and distance to neighbours, just to name a few. Every livestock producer must decide how to best utilize manure as a resource, and sometimes this requires a compromise. A producer may have to compromise between nutrient loss and labour efficiency. Manure applied after wheat harvest onto red clover, rather than being applied before a corn crop, when time is too valuable, is one common compromise.

Here is an example: a 1000 hog finisher operation has to handle approximately half a million gallons of liquid manure per year. The typical nutrient analysis would give about 33 lbs of available nitrogen (when immediately incorporated); 14 lbs P_20_5 and 21 lbs K_20 per 1000 gallons. Based on 2001 fertilizer prices, the manure could be worth as much as $24.00 per 1000 gallons. Assume it costs 1 cent per gallon to spread the manure.

At 5000 gallons per acre applied to a corn crop, there is almost a $100 range in manure value, depending on how it is managed. The manure could be worth as much as $70 per acre, or it could cost the producer $28 per acre to apply the manure.

To get $70 nutrient value from the manure (after spreading costs have been subtracted) the manure would be spring applied and incorporated immediately. The nutrients would need to be applied to a field that had medium to high soil test levels where the nutrients from manure were taking the place of commercial fertilizer.

In the opposite extreme; to cost a producer $28/ac to spread the manure, the manure would be handled as a waste product. Nutrients are applied where they aren't needed, with high soil test levels or additional commercial fertilizer. Manure is surface applied and not incorporated, so that much of the nitrogen is lost. The manure will cost money to apply!

Applying nutrients to fields with already excessive soil test levels will "build the bank" of soil nutrients, but the "account" won't contribute toward crop needs for over 20 years; it only increases the potential risk of environmental contamination.

I'll say it again. Management has the biggest impact on manure value!

Average Application Cost of Commercial Fertilizer

Fertilizer Application Method	# of Quotes	Cost ($/Acre)
Custom Spread Dry Fertilizer	119	$ 6.00
Rental of Dry Bulk Applicator	13	$ 8.50
Anhydrous Application	54	$11.50
Liquid Sidedress Application	30	$ 8.50

Source: OMAFRA 1997 and 2000 Custom Farmwork Rates in Ontario

- Custom rates of manure application used in the nutrient management software work out to 1 cent/gallon or $10 per 1000 gallons for irrigation of liquid manure and $3/ton for solid manure.
- Approximate fertilizer costs: Nitrogen $0.33/lb; Phosphorus $0.35/lb; Potash $0.16/lb

Average Cost of Manure application

Spreader Type	Number of Quotes	Average Cost
Loader only – solid manure	28	$ 44 per hour
Spreading only – solid manure	59	$ 57per hour
Spreading & loading – solid manure	34	$ 82/hour
Liquid manure - Surface irrigated	16	$ 7.90/1000 gal
Liquid manure - Surface irrigated	3	$167/hour
Drag hose -liquid injection	2	$ 8/1000 gal
Drag hose -liquid injection	1	$145/hour
Liquid Tanker – surface applied	9	$ 8/1000 gal
Liquid Tanker – surface applied	34	$102/hour
Liquid Tanker - injection	1	$165/hour
Trucking Manure	3	$ 62/hour
Manure Spreader - Rental	3	$150/day

Source: 1997 and 2000 Custom Farmwork Rates Charged in Ontario

Resistant Weeds!

by Gilles Quesnel, Field Crop IPM Specialist, OMAFRA, Kemptville

The list of herbicide resistant weeds, and counties where they can be found, continues to grow! Since 1997, redroot pigweed, green pigweed, common ragweed and Eastern-black nightshade resistant to Group 2 herbicides (such as Pursuit, Pinnacle, Classic, Ultim, etc) have been positively identified in Ontario soybean fields. Are your fields part of this dilemma?

If you had weed escapes, which should have been controlled by your herbicide program, and you cannot find a good reason for the lack of

control, the possibility of herbicide resistance should be explored. The most common sign of resistance is when all the weed species are controlled except for one, a weed that should have been easily controlled by the herbicide program. Resistant weeds often begin in patches or streaks corresponding to the harvest pattern of the combine. Over time, resistant weeds will spread across the entire field.

Before declaring a weed resistant, make sure that other explanations for weed escapes and misses are investigated. Weeds that emerge after application with non-residual herbicides can confuse the diagnosis. Some species are naturally more tolerant to some herbicides. Improper equipment setup, missed adjuvants, poor spray pattern, poor canopy penetration, improper weed stage at time of spraying or weather issues can all lead to misses that can be misdiagnosed as weed resistance.

The following guidelines will help manage and/or prevent weed resistance:

- Use crop rotation. Rotate crops and herbicides.
- Avoid the using the same herbicide or herbicides from the same grouping in the same field, in consecutive years.
- Avoid using herbicides with the same mode of action more than once per season.
- Use tank mixes where 2 or more products give effective control against the target weed, and the products are from different mode of action groupings.
- Keep accurate records of crop rotations and weed control programs used in all your fields, including weather conditions at time of application. Map the location of resistant weeds so they can be found in future years.
- Use clean seed and clean equipment when moving field to field.
- Scout your fields after herbicide application to detect weed escapes or weed shifts. If a potentially resistant weed or weed population is detected, use available control methods to avoid weed seed production in the field. Rescue sprays must be from a different herbicide group.

Organic Weed Control:
Many Little Hammers!

by Hugh Martin
Organic Crop Production Program Lead

How can you control weeds without using herbicides? This is a fundamental question on farms considering the switch to organic, and one of the biggest challenges for the organic farmer.

Have a plan. Integrated weed management involves using "many little hammers" to control weeds. There is no one control tool, but many different strategies that work together to manage weeds to a level where they do not impact yield. Weed control does not have to be perfect.

Crop Rotation

The use of different crops reduces the buildup of weeds that flourish in specific crops. Organic farmers have found that growing continuous soybeans does not work. Annual weed populations build up in a crop that offers low levels of crop competition. Cereal and forage crops are much more competitive to reduce many of the row crop weeds.

Cover Crops

Using cover crops to fill in the after harvest periods helps to smother out weeds that may grow on bare soil. Weed seeds germinate and wither from competition, reducing the seed bank. Late season weeds are not allowed to replenish the seed bank. Some cover crops such as rye produce allelopathic chemicals that impede the growth of weeds.

Compost

Non-composted manure can have weed seeds and higher levels of available nitrogen that stimulates the germination of weeds. On organic farms only composted manure is used in the spring planting season.

Clean Seed

One of the best ways to get new weeds is to buy them from other farmers with the seed and then plant them in your own field. When using your own seed always clean it at a reputable seed-cleaning establishment. That seed in the bin may look clean … but it isn't!

Planting Date
Planting cereals early allows a cool season spring crop to get ahead of the weeds. Delayed planting of warm season crops such as beans allows for an extra spring tillage to kill one flush of weeds and helps the crop to emerge quickly to establish a quick crop canopy.

Varieties
Studies have shown that cereal varieties with less erect leaves (more parallel to the ground) Decrease weed growth. Some have suggested broader leaf types. These principles of less erect plant types and dense leaf canopies apply to all crops. Select varieties that are able to quickly establish a dense canopy, to reduce the light getting through to the weeds at the soil surface.

Row Width and Plant Population
The trick is to get a good stand of healthy plants as quickly as possible and with narrower row widths the crop canopy fills in quickly. On organic farms this has to be balanced with wide rows enough for inter-row cultivation.

Harrowing or Rotary Hoeing
Most crops can withstand light harrowing or rotary hoeing both before and after emergence. Care should be taken at emergence, and depending on the crop and the implement, avoid this time period. Seeding rates should be about 10-15% higher to allow for some plant loss when using these implements. Success is best when done before the weeds emerge, with each pass killing 40-60% of the non-emerged weeds. Frequently growers will combine passes to harrow/hoe twice over in opposite directions to enhance the weed control. Weeds rooted deeper than 23 cm are tough to kill. These techniques are not appropriate for crops planted less than 2 cm.

Inter-Row Cultivation
The number of passes depends on the need. Use overlapping shovel arrangements that can cover the full width of the inter-row area. The first pass should go as close to the plants in the row as possible, without pruning roots or injuring plants. Throw some soil in the row to cover weeds, but be careful not to cover crop plants. In some cases you may wish to use fenders or shields to keep the dirt from landing on the crop plants. On the second pass, use more speed to throw more dirt into the crop row to aggressively cover weeds while protecting plants. Never cultivate too deep or when the soil is wet enough to create large clods or curls that rise up from the shovels.

New Weeds
Watch for new weeds that are just starting in the field during the summer. Walk through fields to manually control problem weeds. When necessary change the crop rotation to enhance the control of these special weed challenges.

Sanitation
Clean combines and tillage equipment on a regular basis. Inspect field boundaries for potential sources of weeds that do not need to spread into your field. Stop weeds before they spread.

None of these strategies are really new. Most of them were learned from our grandparents in the 60's. It was usually followed by a comment from my grandmother that "one year of seeding means 7 years of weeding". Hopefully, all the little hammers will work well for you!

Poor Herbicide Performance?

Reasons for Poor Weed Control

By Peter Sikkema
Ridgetown College, University of Guelph

Many factors determine the success of your weed control program. A lack of success translates into weed escapes and crop losses. Now is the time to analyze the weaknesses in your weed control program.

Weather
- Too little rainfall will reduce the activation of preemergence herbicides and reduce postemergence herbicide absorption into the leaf.
- Too much rain can cause leaching below the weed seed germination zone (soluble herbicides, example Banvel).
- Rainfall too soon after postemergence applications can wash the herbicide off the leaf before it can injure the weeds. Labels give more information on the appropriate rain-free period, or check table 4, pg. 67, 2002 Guide to Weed Control (pub. 75).

Soil

- Soils high in organic matter can tie up some herbicides such as Dual/Frontier/Axiom and Lexone/Sencor. Herbicide rate is dependent on soil type.
- Soil pH affects the ionization properties of some herbicides. At low pH Sencor/Lexone can be more tightly bound by the soil and Broadstrike Dual Magnum can form a less active metabolite which may result in poorer weed control.
- Cloddy soils can reduce weed control since herbicides must come in contact with the developing weed seedling.

Herbicide Timing

- Too early - Spraying soil applied herbicides too early will result in a shorter residual period for weed control and weed escapes in the crop. Spraying postemerge non-residual herbicides too early will not control late emerging weeds.
- Too late - Applying preemergence herbicides after the weeds have emerged reduces the level of weed control (examples Dual, Frontier, Axiom and Prowl).
- Mid summer applications of glyphosate for quackgrass control result in poor translocation during hot summer months, as opposed to the spring or fall when growth is more active (example glyphosate).
- Poor weed control of perennial broadleaf weeds will result when sprayed too early. Prior to flowering photosynthate translocation is to support reproductive growth and flowering (up) but at flowering the plant switches to increase photosynthate translocation to the root system (down), taking the herbicide into the root system with it.

Application

- Poor incorporation or delayed incorporation of Eptam or Treflan/Rival/Bonanza.
- Most annual weeds germinate in the top 2.5 cm (1 inch) of soil. For some species deep placement of the herbicide is required (nutsedge) while for other species (Eastern black nightshade) surface placement is optimum (example Dual/Frontier).
- Tank-mixes can sometime result in poorer weed control due to antagonism. Basagran antagonizes the grass control with Poast or Select. Classic and FirstRate can antagonize the weed control with Assure II. Clay based herbicides such as atrazine and metribuzin can antagonize the activity with glyphosate.
- Herbicide rate is species dependent.
- Thorough spray coverage is required with contact herbicides such as Blazer, Reflex, Basagran, Pardner, Liberty and Gramoxone.
- Sunlight can affect some herbicides. Gramoxone and Raglone usually work better when sprayed late in the day. Poorer weed control has been documented with Liberty applications made late in the day.
- Wheel tracks can reduce weed control due to emergence pattern, dust, plant injury, etc.
- Heavy weed pressure and poor weed control in the previous year can lead to more weed escapes.

Herbicide Choice

- Herbicide residues begin to break down as soon as they are applied. The trick is to have a high enough concentration available to kill the weeds when they germinate. Short lived herbicides may not provide full season weed control (example: Banvel II, Afesin, Lorox/ Afesin/linuron, Eptam and Eradicane).
- The herbicide must be selected to match the weed spectrum in the field. Know your herbicides weaknesses. Banvel II (mustards), Pardner (pigweed), Dual/Frontier/Axiom (proso millet), Accent/Elim (yellow foxtail and crabgrass), Basagran Forte (ragweed), Blazer and Reflex (lamb's-quarters), Pursuit (stinkgrass), Pinnacle, Classic, Reliance and FirstRate (Eastern black nightshade), glyphosate (black medic, common mallow, wild buckwheat).

As adapted by Hugh Martin from Presentation by Peter Sikkema at SW Ag Conference Jan 2002

Soybean Seed Quality

It's Not in the Bag!

by Brian Hall, Alternative Cropping Systems Specialist

Germination and vigour tests of soybean seed tested to date is very mixed. Seed quality from last year's crop is one of the poorest in history. Quality problems developed from last year's hot, dry conditions during flowering and seed development in late July and early August. Thrown into the mix was the soybean aphid explosion, followed by tarnished plant bugs that resulted in 'sting' marks on the seed. The end result is poor quality!

Seed companies are reporting high levels of cleanout on this seed. These conditions resulted in rapid seed maturation that was sometimes incomplete, and the seed went from green to brown without ripening properly. This results in fragile seed coats with higher levels of oval and misshapen seed that are much more susceptible to mechanical injury during handling. If seed became overdry (less than 13% moisture) during harvest, mechanical damage is increased. In a few cases, harvest was delayed last fall, due to wet October weather, resulting in further deterioration in seed quality.

Suggestions

- Select high-yielding varieties with good disease resistance/tolerance.
- Handle seed with care.. Minimize the drop distance when handling seed. Bulk transfer systems that use belts for moving seed are least damaging, followed by brush augers, plastic cup augers, steel auger and vacuum systems. Reduce seed damage by running systems full and slow.
- **Vigour test !** In talking to several seed labs, most samples coming in are requesting only a germination test. **UNBELIEVABLE !** The vigour (or stress or cold germ) test is a much better measure of "weak seed" that may fail to emerge under stress conditions. As seed deterioration increases, germination drops slowly, while vigour drops very rapidly. Diagram 1 shows the relationship between germination and vigour on two seedlots. With lot A, deterioration is minimal and germination and vigour are similar. Lot B has acceptable germination (near 85%) but extremely low vigour (only 40%)!

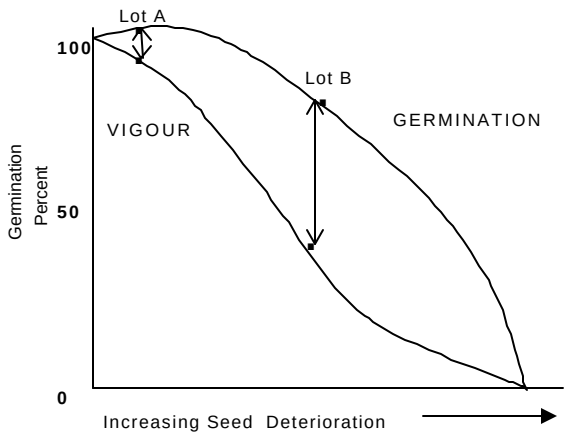

Diagram 1. The Relationship between seed vigor, viability, and deterioration. (Delouche and Caldwell, 1960)

- Avoid planting soybeans at soil temperatures below 7 degrees C (45 F). There is a 2 hour delay between air temperature and tilled soil temperature at a depth of 2.5 cm(1 inch). Imbibition of cold water can cause death or reduced vigour of soybeans. This is particularly important when seedlots have reduced vigour.
- Seed treatments help to protect germination and vigour of seed, and can improve emergence of seed with good germination but reduced vigour. Fungicide seed treatment helps to protect seedlings from early season diseases. (Vitaflo 280, Maxim/Apron, B-3 or DLC).

ACCREDITED SEED LABORATORIES

Jan.2002

Lab Name and Address	Analyst	Phone/Fax
AgReliant Genetics Inc. Seed Testing Laboratory P.O. Box 1088 Chatham, ON N7M 5L6	Ernestine Demers	Ph: 519-354-3210 Fax: 519-354-8155
Canadian Seed Laboratories Ltd. P.O. Box 217 Lindsay, ON K9V 5Z4	Catharine Breadner	Ph: 705-328-1648 Fax: 705-324-2550
Hardy Seed Ltd. R.R. # 1 Inkerman, ON K0E 1J0	Grahame Hardy	Ph: 613-989-2054 Fax: 613-989-3849
Kent Agri Laboratory R.R. # 2 Tupperville, ON N0P 2M0	Dianne Gilhuly	Ph: 519-627-3737 Fax: 519-627-3737
Lang Germination Lab 6 Clarinda St., Box 419 Teeswater, ON N0G 2S0	Shelley Lang	Ph: 519-392-8203 Fax: 519-392-8203
Livingstone Seed Laboratory P.O. Box 27050, Postal Outlet 500 Rexdale Blvd. Etobicoke, ON M9W 6L0	Gail Livingstone	Ph: 416-743-7191 Fax: 416-743-7191
Miller Seed Farm R.R. # 2 Bath, ON K0H 1G0	Michael MacKinnon	Ph: 613-352-7453 Fax: 613-352-5022
Perth Seed Laboratory R.R. # 5 Mitchell, ON N0K 1N0	Bernadine Wolfe	Ph: 519-348-9057 Fax: 519-348-8165
Vogel Seed Lab 3995 Lafleur Road Apple Hill, ON K0C 1B0	Linda Vogel	Ph: 613-528-4045 Fax: 613-528-1048

IP Soys Checklist!

Markets continue to move towards quality assurance through IP production whether for IP soybeans or other crops. There is no standard contract for IP or non-GMO production. Each contract reflects the requirements of the end user. Premiums vary with level of management, cost or production risk. Just as "no one shoe fits all", producing for any one market may or may not fit into your farming operation.

1. Field Selection:
   - ☐ Previous crop restrictions eg. Bt corn, RR soys?
   - ☐ Can GMO crops be grown elsewhere on farm?
   - ☐ Tillage - conventional / no-till
   - ☐ Problem weeds, eg. Pokeweed, nightshade, ragweed
   - ☐ Beans after beans – grow specialty types first
   - ☐ Isolation strip

2. Variety Selection:
   - ☐ Maturity - allows timely harvest in fall for quality, or to plant wheat
   - ☐ Yield potential
   - ☐ Lodging score
   - ☐ Disease resistance
   - ☐ Soil type suitability
   - ☐ hilum colour – soybean varieties rated as having Imperfect Yellow hilum are not true clear hilum and may 'bleed' or go off colour with delayed harvest or cold/wet weather at harvest.

3. Crop Insurance:
   - ☐ Yield adjustment factor is available on some food grade soybean types

4. During The Growing Season:
   - ☐ Planting equipment cleaned, eg. Planter used for specialty beans, drill for conventional
   - ☐ Weed control - problem weeds. Tolerance to corn is zero !
   - ☐ Seeding rate - adjust for seed size, vigour, tolerance to white mold
   - ☐ Field walks - required?, cost
     - 1st walk - check stand
       - weed control / volunteer corn
     - 2nd walk - weed escapes
       - insects / disease
       - metal & glass!
       - pre-harvest spray required to maintain quality?
       - off types

5. Harvesting:
   - ☐ Combines, gravity wagons, trucks clean. If custom combine, inspect equipment yourself. Combine outside round as separate load to be sure
   - ☐ No staining - no dirt tag
   - ☐ Mechanical damage - adjust combine to crop conditions throughout day. Use 'quick soak' test to check level of damaged seed in the field
   - ☐ Large seeded bean types - gentle handling, belts, brush augers preferred. Minimize seed drop
   - ☐ Run augers slow and full to minimize damage

6. Quality Standards: "Bright & clean"
   - ☐ free of stain and adhered soil
   - ☐ Purity - off types (eg. 1 bean in 1,000 - 0.1%)
     - other crops (no corn?)
   - ☐ Marketing alternatives - grade standard not met, what alternative market is there
   - ☐ Moisture standard (up to 14.5% but no artificial drying?)
   - ☐ Sizing
   - ☐ Dockage - maximum allowed
     - deducted from final weight

7. Marketing:
   - ☐ Price = premium + basics and futures price or + forward contract price
   - ☐ Crop to be priced by _____
   - ☐ Delivery point
   - ☐ Storage requirement

8. Liability:
   - ☐ What liability do you assume for contamination through the system

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2001 Soybean Regression Charts

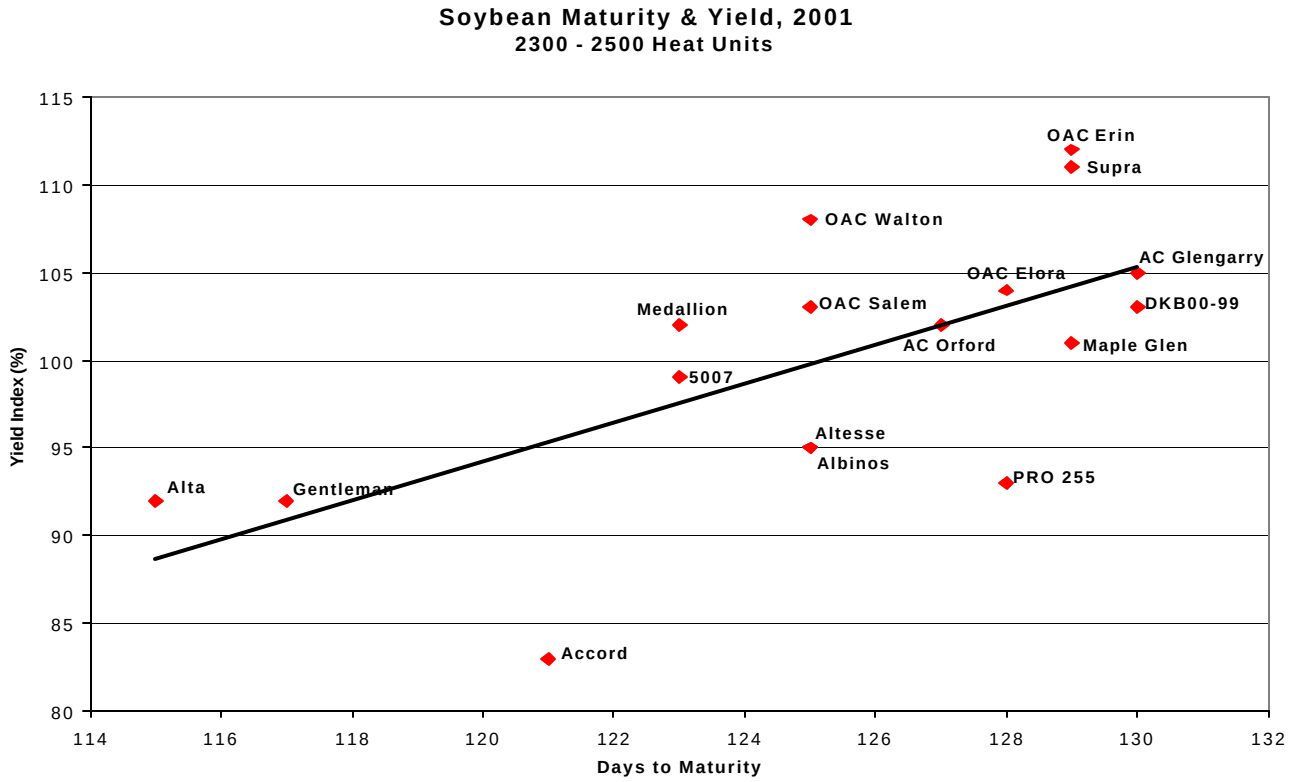
Editor's Note:

The soybean regression charts appeared earlier in the Ontario Farmer. The following charts contain corrections and improvements.

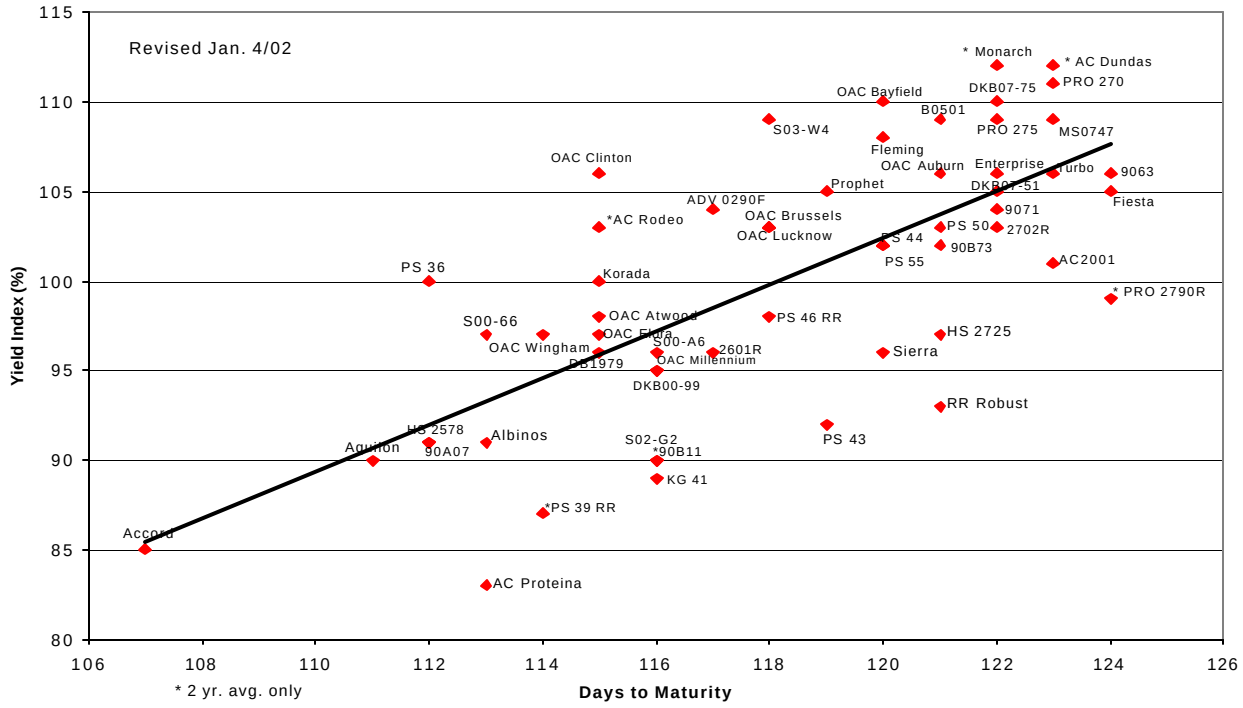
(1) The 2500-2800 and 2700-2900 charts are corrected for erroneous data from the Winchester locations. In both charts, the Winchester data has been dropped.

(2) The two year data and varieties have been added to all charts. While not exact comparisons, results are generally consistent. 2-year data is denoted by varieties with an asterisk (*).

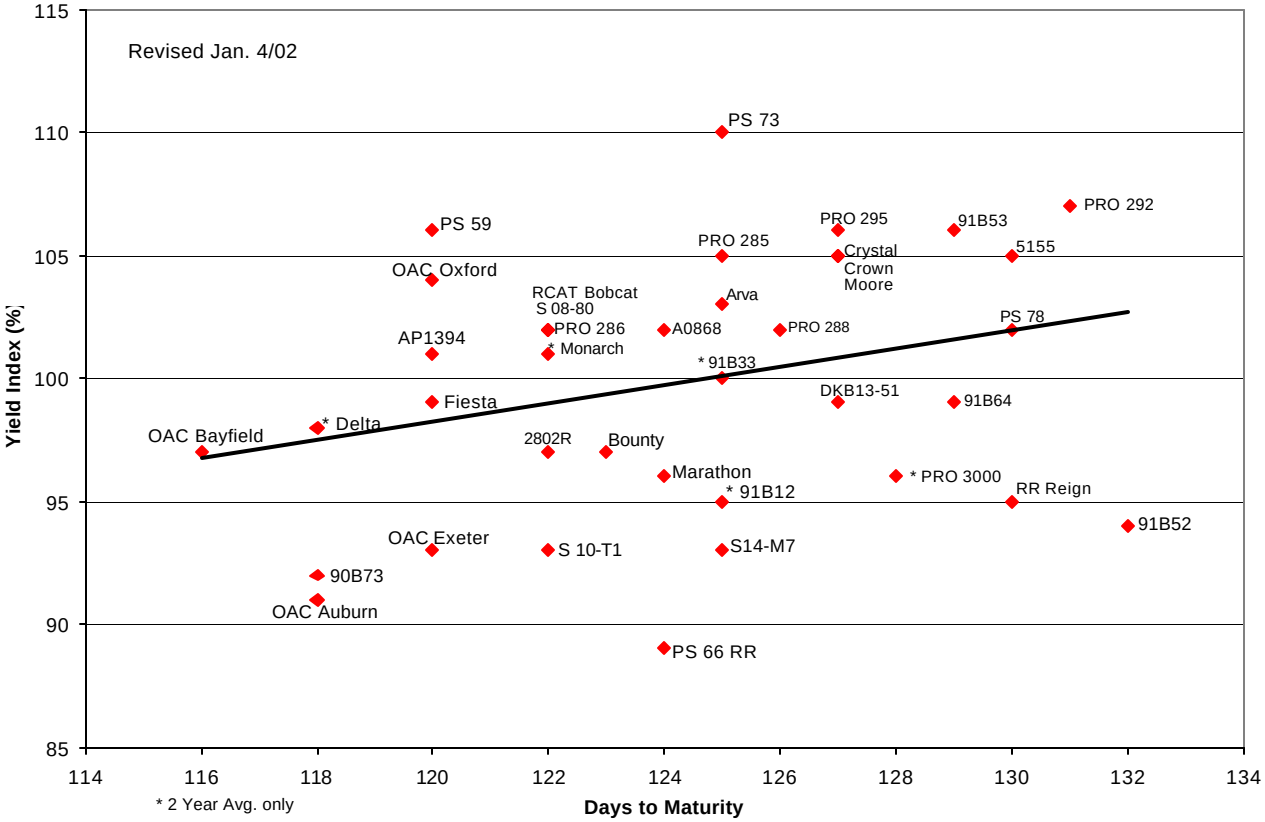
Happy sleuthing! *Peter Johnson*



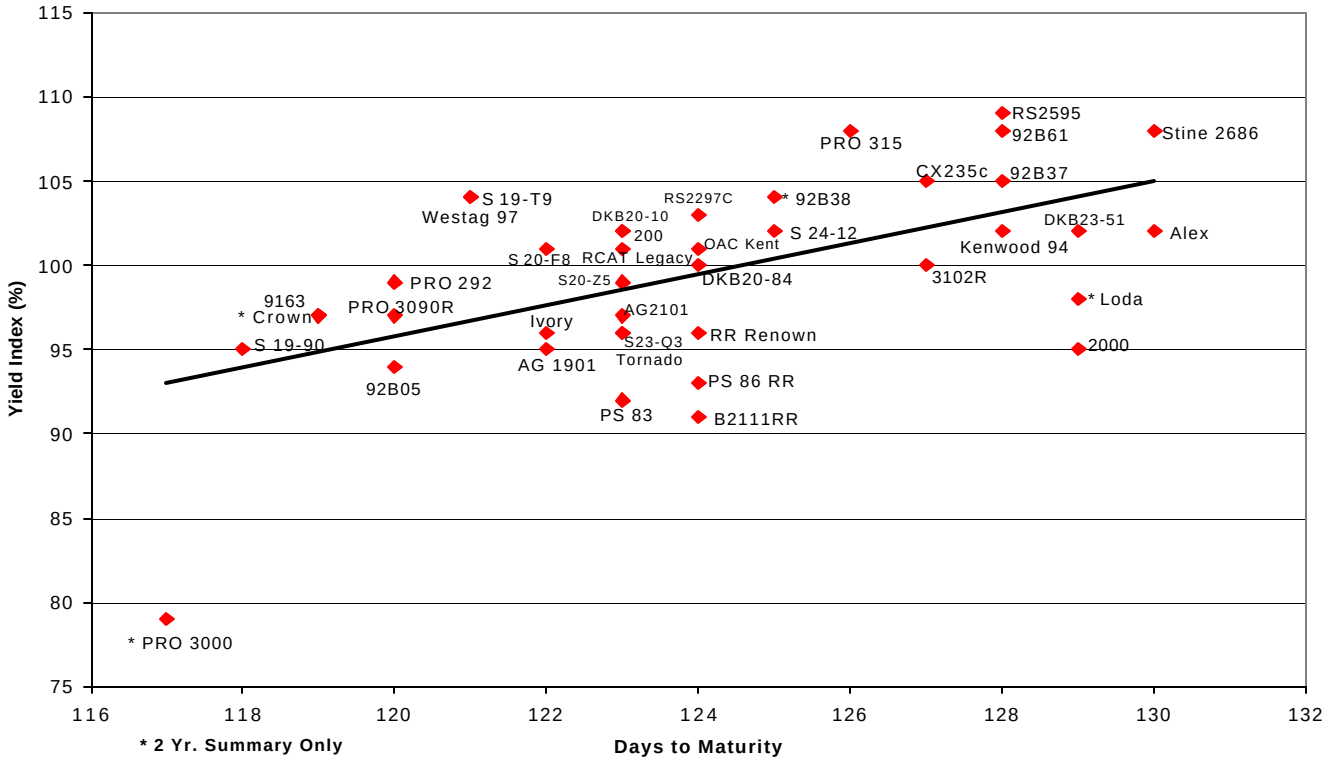
Soybean Maturity & Yield, 2001
2500-2800 Heat Units - 3 Year Average (1999-2001)



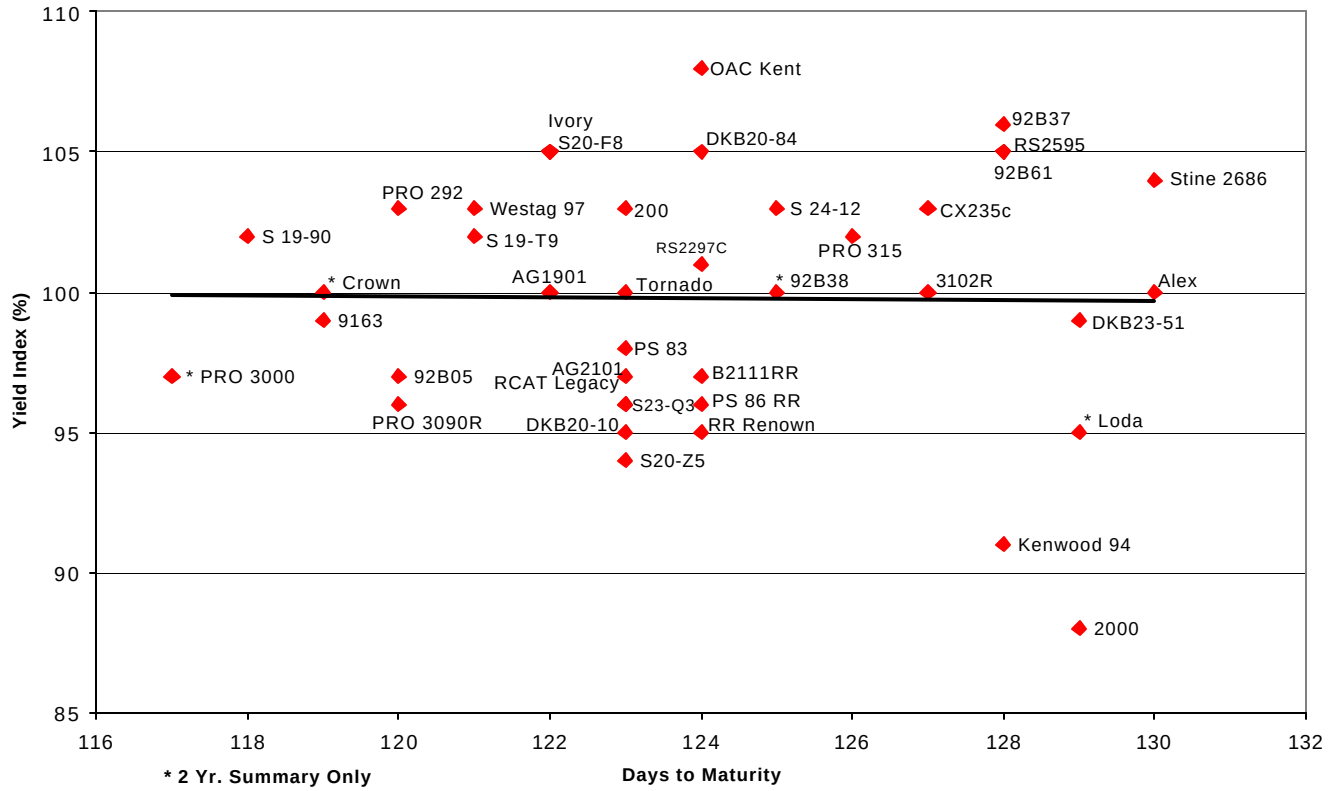
Soybean Maturity & Yield, 2001
2700-2900 Heat Units - 3 Year Average (1999-2001)



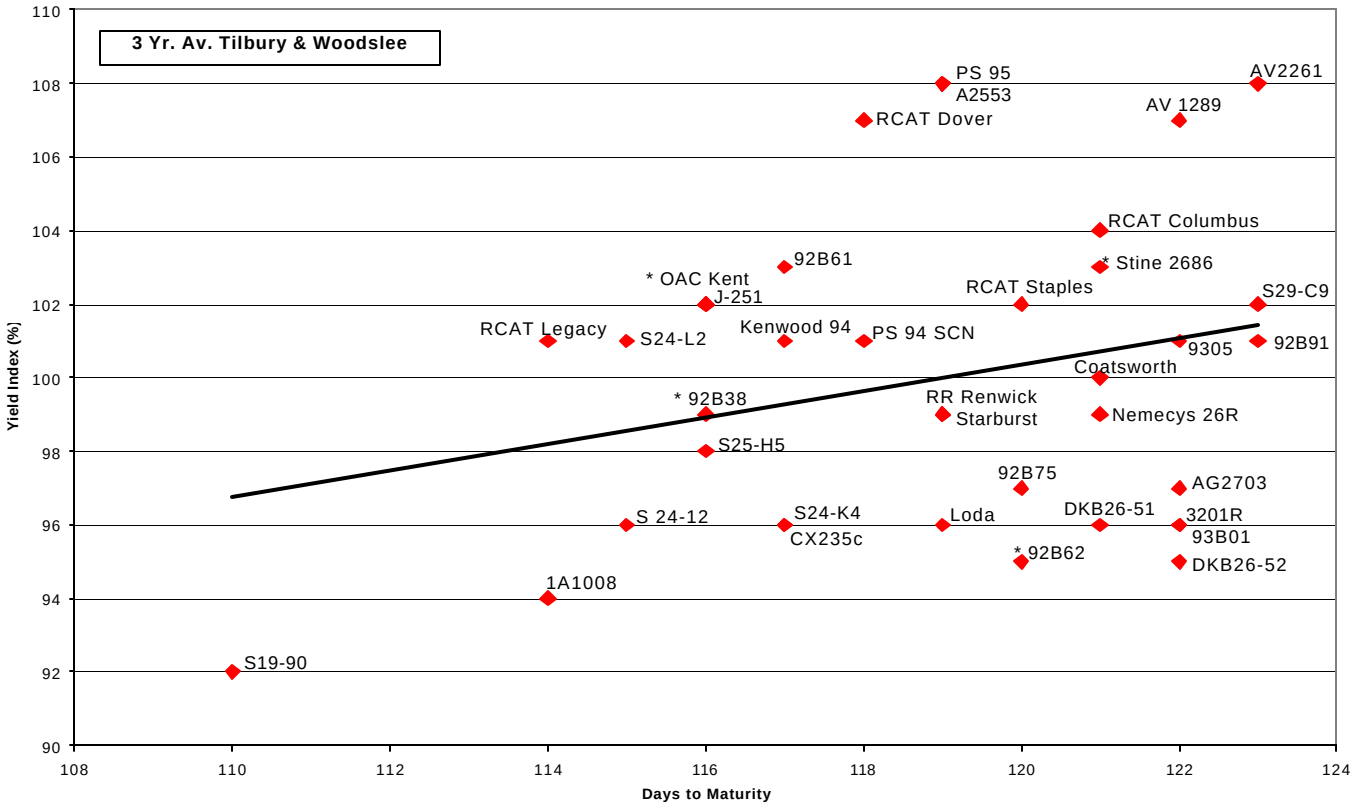
Soybean Maturity & Yield, 2001
2900-3300 Heat Units - Clay Summary (1999-2001)



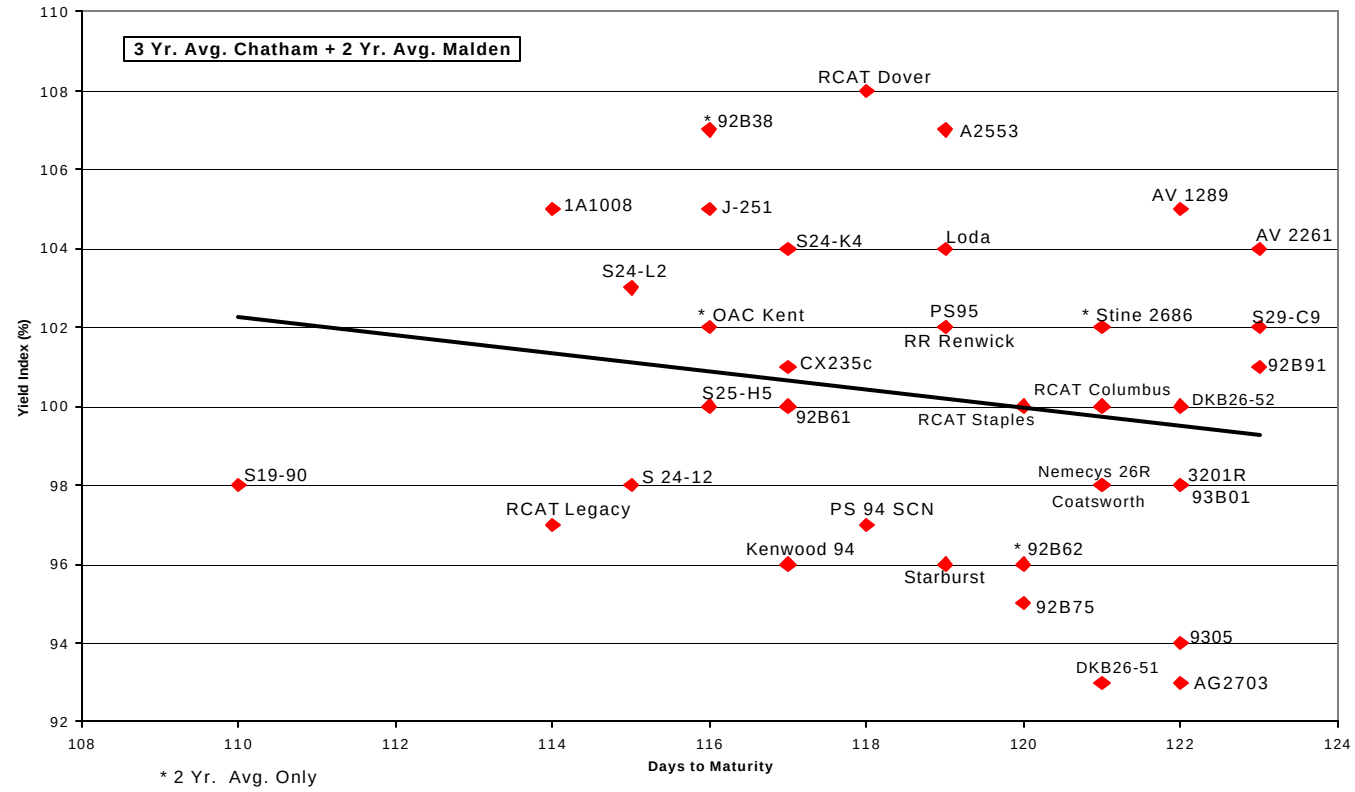
Soybean Maturity & Yield, 2001
2900-3300 Heat Units - Loam Summary (1999-2001)



Soybean Maturity & Yield, 2001
3300-3500 Heat Units - Clay Summary (1999-2001)



Soybean Maturity & Yield, 2001
3300 - 3500 Heat Units - Loam Summary (1999-2001)



* 2 Yr. Avg. Only