

CROP TALK

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Table of Contents

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Payback From Good Soil Management

by Adam Hayes, Soil Management Specialist, Field Crops, OMAFRA, Ridgetown

Do you know the benefits or payback from managing your soil well? It is often difficult to compare the benefits of your good soil management of a field to a neighbouring property with poorer soil management. There can be a lot of variables between the two fields and yield comparisons may not always be reliable.

Reduced Impact From Adverse Weather
The goal of good soil management is to develop a healthy soil. Good soil quality will help “even out” the seasons. This means that adverse weather or other crop stresses will not have as great an impact on yield as on soils with poor soil quality.

Organic Matter
A big part of what makes a soil healthy is the amount of organic matter. Organic matter plays a role in soil structure, nutrient cycling and water holding capacity. Research has found that as soil organic matter level increases from one to four percent, there is a significant increase in biological activity in the soil, and an even greater improvement in soil structure. That additional organic matter will also cut the soil erosion potential by about one-third. It is hard to put an actual dollar figure on these, but they do contribute to increased yields.

Improved Nutrient Recycling
Research shows that on a degraded sandy loam soil, a 0.5% increase in the soil organic matter will result in a 15% increase in nutrient holding ability. Increases in organic

matter will also increase the availability of many essential micronutrients. As the cost of fertilizer continues to climb, holding on to nutrients can reduce the amount of fertilizer applied, saving input costs. Higher soil organic matter levels can also increase the amount of available nitrogen. A good example of this is the reduction of nitrogen rates for corn on well managed soils. Some growers are able to reduce their nitrogen rate to 100 lbs/ac or less. With a crop removal of 240 lbs/ac for a 150 bu/ac crop, the soil (largely from the organic matter) is providing 140 lbs N/ac or more for the crop. With increasing nitrogen prices, that can be a significant payback.

Water Holding Capacity

Research also shows that on a sandy loam soil, a 0.5% increase in organic matter will provide a 12% increase in the water holding capacity of the soil. This means that a crop would go a week longer before it would suffer moisture stress. For those irrigating crops, it would add a day or two before irrigation would be required. This can translate into real dollars in yield or fuel savings for those using irrigation.

Water Infiltration & Pore Space

A good quality healthy soil will have improved water infiltration and more pores for air exchange. This is the result of good soil structure and a wealth of soil life, including the activity of the large earthworms. Good pore space can lead to improved root growth. Improved infiltration can make the soil fit to plant earlier in the spring. An abundance of soil life can assist in root and plant health by keeping diseases and pests in check.

Yield, Yield, Yield

The final good news story is that good soil management can pay off directly in increased yield. Studies have shown that soils that have adequate organic matter and fertility levels will yield 10% more than soils with low organic matter and adequate fertility. The yield benefit was even higher if the low organic matter levels made the soils more prone to moisture stress or reduced emergence due to crusting.

The payback from good soil management due to increased yields, earlier planting, potential improvements in nutrient use and better drainage can be significant.

Soil Test Categories Have Changed to Probability of Response

by Keith Reid, Soil Fertility Specialist, OMAFRA, Stratford

The soil test categories have changed to reflect the probabilities of response to added nutrients, rather than the amount of nutrient extracted. Note that this change does not affect the fertilizer recommendations for each crop.

The rating based on probability of response will be specific to each crop (or group of crops), because there are differences in the way these crops respond to added fertilizer. For soil test reports where the crop to be grown has been indicated, the response category shown in Table 1 will be displayed on the report beside the numeric value for the soil test.

Table 1: Probability of response to applied nutrients at different soil test levels

Response Category	Probability of profitable response to applied nutrients
High Response (HR)	High (most of the cases)
Medium Response (MR)	Medium (about half the cases)
Low Response (LR)	Low (few of the cases)
Rare Response (RR)	Rare (very few of the cases)
No or Negative Response (NR)*	Not profitable to apply nutrients*

*adding nutrients to soils with these levels of nutrients may reduce crop yields or quality by interfering with the uptake of other nutrients.

Response to added fertilizer is not exactly the same in each field or each year. As a general rule, with low soil tests the crop will usually respond to added fertilizer, and the difference between the fertilized and unfertilized yields will be large. As the soil test values increase, the probability of a profitable response to fertilizer declines, as does the size of the expected yield or quality response. In the Low Response category, most crop responses would be improvement to the early growth of the crop from a starter effect. Fertilizer application to soils in the Rare Response category may cause an improvement in early growth, but is more commonly done to replace nutrients removed by the crop, or to provide nutrients to pockets within variable fields that are lower in fertility. Any yield response is unlikely to be large enough to pay for the added fertilizer.

The No or Negative Response (NR) rating signifies that application of this nutrient in fertilizer or manure may lower crop yield or quality. Phosphate additions to these soils can induce zinc deficiency on soils low in zinc and can increase the risk of water pollution. Potash additions may induce magnesium deficiency on soils low in magnesium.

More information on Soil Test Categories refer to www.omafra.gov.on.ca/english/crops/soils/test-categories.htm

Price Ratios: What Are They, and Why Do We Care?

by Keith Reid, Soil Fertility Specialist, OMAFRA, Stratford

A number of fertilizer recommendations are adjusted according to the "Price Ratio". However, many growers don't really understand what is meant by the term, or why it is important. The calculation of the price ratio involves dividing the price of nitrogen (N) fertilizer by the value of the grain. Since we generally buy nitrogen fertilizer by the tonne and sell grains by the bushel, there is some additional math to get them into the same units (cents per pound of N divided by cents per pound of grain). The easiest way to understand price ratios is to think of them as the amount of yield you need to buy a pound of nitrogen fertilizer.

The reason this relationship is important is that crop response to nitrogen generally follows the "Law of Diminishing Returns". The first pound of added nitrogen produces the largest yield increase, and each additional pound of N generates a slightly smaller yield increase up to the point where a maximum yield is reached. After this point, adding more N has either no impact on yield or causes yield to decline. At some point below the maximum yield, the value of yield increase from the last pound of N that was applied is exactly equal to the cost of that N. This point is called the Maximum Economic Rate of N (MERN). Applying higher rates of N will generate more yield, but the value of that yield will be less than the cost of the fertilizer, so the net return to added fertilizer will be negative.

The fertilizer rate that corresponds to the MERN will depend on how many pounds of grain it takes to pay for a pound of fertilizer - in other words, the Price Ratio. At higher price ratios, you need more yield to pay for each pound of N, so the MERN will be less. This was the case in 2006, when N fertilizer prices were high but the price of corn was very low. In 2008, the prices of both corn and fertilizer have gone up, so the price ratio is much closer to normal. The practical challenge in calculating the price ratio is the uncertainty about the selling price of grain that should go into the equation. This will involve a combination of guesswork based on market trends, and fixed values based on crops that have been pre-sold.

Increasing Manure Value With Calibration

by Christine Brown, Nutrient Management Field Crops, OMAFRA, Woodstock

Knowing the nutrient content of manure isn't enough. It is important to know how to get the intended rate on the field with the equipment at hand and to ensure that manure is **uniformly applied**. Advances in technology such as guidance systems, GPS and flow meters can improve uniformity. However, just as most people wouldn't take a sprayer to the field to apply herbicides without calibrating, neither should manure application equipment be used without fine-tuning.

Solid Manure
Solid manure is often applied at higher rates than producers expect. Uniform application is difficult with solid application equipment due to variation in manure moisture content and composition. Dry pack manure is often "clumpy", while dry broiler litter is light and moves easily with the wind. With traditional box spreaders, driving wheel to wheel gives best uniformity. The following methods should be used to determine application rates and uniformity.

Solid Manure Method 1- Calibrating Application Using Scale (portable or elevator)

Application rate = [lbs (or kg) Loaded spreader weight – lbs (or kg) Empty spreader weight] ÷ acres (or ha) covered per load

Solid Manure Method 2 - Calibrating Application Using Plastic Sheet

Using a 48 inch (122 cm) x 40 inch (88 cm) sheet (plastic feedbag)		**Example: Extrapolating area of plastic sheet to acre equivalents** (1 ac = 0.405 ha)
lbs (kg) manure/sheet	**Application Rate tons/ac (tonnes/ha)**	
1 (0.45)	1.6 (3.6)	40" x 48" = 3.3' x 4' = 13.33 sq ft
2 (0.9)	3.3 (7.5)	
3 (1.4)	4.9 (11.1)	13.33 sq ft / 43,560 sq ft per acre = .0003061 acres
4 (1.8)	6.5 (14.7)	
5 (2.3)	8.2 (18.6)	
7 (3.2)	11.4 (25.9)	2 lbs / .0003061 = 6,536 lbs
10 (4.5)	16.3 (37.0)	
15 (6.8)	24.5 (55.6)	6,536 lbs / 2000 lbs/ton = 3.27 tons/acre
20 (9.1)	32.7 (74.1)	

Liquid Manure

It easy to calculate how much liquid manure was applied to a field by knowing the tank volume and dividing the number of loads by the acreage covered by those loads. Uniformity of application is a bigger issue with liquid manure. Type of tanker, tanker setup and speed all influence application rate. Something as simple as hitting a tree limb with a manure tanker splash plate can change the spread pattern and uniformity. Spread pattern uniformity is most easily seen when spreading part of a load on a small snow-covered area or cement pad. Calibrating uniformity at the time of application can be done with relative ease by placing straight-walled jars or cans (Photo 1) across the spread width of the tanker, and calculating the rate using the following methods.

Photo # 1

Liquid Manure Method 1 - Calibrating Application by Jar Weight

Using a 3⅛" (7.9 cm) diameter jar (with lid) (ie lab sample jar)		**Example: Extrapolating area of jar to acre equivalents** 1 Imp gal/ac = 11.23 litres/ha
Manure Wt = Total weight - jar weight lbs (kg)	**Application Rate (Imp gal/acre) (litres/a)**	
0.025 (0.055)	2,050 (23,023	3⅛"= 3.125 inch diameter ÷ 2 = 1.56" radius
0.033 (0.073)	2,700 (30,323)	
0.04 (0.098)	3,275 (36,781)	1.56 inches ÷ 12 in./ft = 0.13 ft
0.05 (0.10)	4,100 (46,046)	
0.066 (0.15)	5,450 (61,207)	area of circle = πr^2 3.1417 x .13 x .13 = .053 ft^2 .053 ÷ 43560 ft^2/ac = .000001219 acre
0.075 (0.17)	6,150 (69,069)	
0.10 (0.22)	8,200 (92,092)	
0.125 (0.28)	10,250 (115,115)	One gallon weighs about 10 lbs If filled jar weight – weight of jar = .05 lb .05 lb ÷ 10 lb/gal = .005 gal
0.15 (0.33)	12,300 (138,138)	
0.20 (0.44)	16,400 (184,183)	
0.25 (0.55)	20,500 (230,229)	.005 gal ÷ 0.000001219 acre = 4,100 gal/ac
0.30 (0.66)	24,600 (276,275)	

Liquid Manure Method 2 - Calibration Using A Straight-Walled Pail

Depth of Manure In Pail		Application Rate	Application Rate
Inches	(mm)	(Imperial gallons/acre)	(litres/ha)
1/10	(2.5)	2,265	25,440
1/8	(3.2)	2,825	31,730
1/4	(6.4)	5,650	63,450
1/3	(8.5)	7,550	84,790
3/8	(9.5)	8,500	95,460
1/2	(12.7)	11,325	127,200
5/8	(15.9)	14,150	158,910
3/4	(19.1)	17,000	190,960
1 inch	(25.4)	22,650	254,440

1 Imp gallon = 4.545 litres, 1 US gallon = 3.785 litres, 1 Imp gallon = 1.20 US gallon

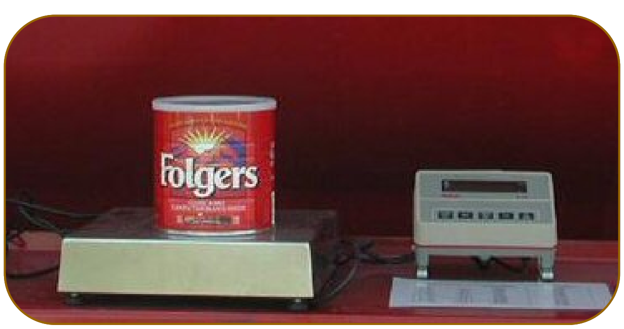
The owner's manual of many solid manure spreaders has often referred to spreader capacity in bushel weights. Table 1 below shows the approximate bushel weight comparison of different manure types. There is however a large difference between semi-solid cattle manure and dry poultry litter. Liquid manure is assumed to weigh close to 10 lbs/gal. To measure the actual density of manure being applied, follow the formula given for measuring manure density.

Table 1 - Approximate Densities of Different Types of Manure

Manure Type	lbs per Cubic Foot	lbs per Bushel	Kg per m^3
Liquid	62.4	80	1000
Simi-solid	60	76	961
Thick solid	50	64	801
Light solid	35	45	560
Dry poultry	25	31	400

1 bushel = 1.25 ft^3, 1 lb/ft^3 = 35.31 kg/m^3

Measuring Density Using Weight and Volume



Example:
Using a 1 kg coffee tin.
Container is .52 ft diameter (.26 ft radius); height is .53 ft
Volume = πr^2 x height = 3.1416 x $.26^2$ x .53 = .1126 ft^3

Container filled with compost weighs 3.31 lbs

If: $\frac{3.31 \text{ lbs}}{.1126 \text{ ft}^3} = \frac{x}{1 \text{ ft}^3}$ then x = **29.4 lbs per ft^3**

Pasture Boosters and Supporters

by Jack Kyle, Grazier Specialist, OMAFRA, Lindsay

Frost Seeding

Late winter and early spring is the ideal time to frost seed pastures. Broadcasting 1-3 lbs of legume seed in March will provide several benefits to the pasture productivity. A pasture that has 35% or greater legume content should provide sufficient nitrogen to meet the needs of the grasses. This nitrogen will promote increased grass growth and improved feed quality. The clover or trefoil provides excellent quality feed that compliments the grass species in the pasture.

Frost seeding is most successful when the existing stand has been grazed short in the fall, providing an opportunity for the seedling legumes to establish with minimal competition. The seeding year will see minimal or limited growth. If germination is successful, it will be the second year (possibly the third) before you will see many plants. Patience is a requirement.

Grass species do not usually establish well with frost seeding. The light seed and rough seed coat prevent the grass seed from getting good seed-to-soil contact. Under ideal conditions, some limited success has been achieved with rye grass and orchard grass.

Annual Pasture Crops

Annuals can be an important part of a grazing program. Cereals, turnips, sorghum-sudan and corn are ideal crops for grazing. These annual crops can provide feed from mid-July through to the end of the year. Sorghum-sudan or corn should be planted in late-May. The sorghum-sudan should be ready to graze by mid-July and the corn can be grazed anytime from mid-August through the winter. The turnips and cereals are best planted in late-July or very early-August to begin grazing in late-September.

Do you have a suitable field with fencing or one that can be fenced? Can you provide water to that field? Grazing an annual crop will take pressure off your permanent pastures and prevent over-grazing in the late-summer and early-fall. A few weeks of feed from one of these crops can make a significant impact on stretching your pastures with out causing undue stress.

For further information refer to:
Annual Forages for Grazing or Stored Feed
www.omafra.gov.on.ca/english/crops/field/news/croptalk/2005/ct_0305a11.htm
Frost Seeding a Cheaper Alternative
www.omafra.gov.on.ca/english/crops/facts/98-071.htm
Forage Production from Spring Cereals and Cereal Pea Mixtures
www.omafra.gov.on.ca/english/crops/facts/98-041.htm

Soybean Fungicide and Insecticide Seed Treatments

by Horst Bohner, Soybean Specialist, OMAFRA

The majority of soybeans planted in Ontario do not receive a fungicide seed treatment. The rationale is that since soybeans tend to be planted later than corn, soil conditions are generally more favourable for rapid germination and emergence. However, when conditions are wet and cool, soil borne diseases cause considerable seed and seedling damage. The extent of the damage depends on moisture, temperature, overall plant health, and soil type. Cold wet soils, crusting, heavy rains, compaction, and even post-emergent herbicides can all cause plant stresses, that make the seedlings more susceptible to disease.

Early season soybean insect feeding has become more of a problem during the past few years. In the spring of 2007, growers experienced very high over-wintering bean leaf beetle populations and the earliest ever appearance of soybean aphid populations. The introduction of thiamethoxam (Cruiser) by Syngenta Crop Protection offers growers a new tool for controlling early season soybean insects.

A project was initiated in 2004 by University of Guelph and Ontario Ministry of Agriculture, Food and Rural Affairs to evaluate the efficacy of soybean seed treatments on new and expanding pests such as aphids, bean leaf beetles and early season root rot.

Methods

Plots were established in 35 fields across southern Ontario from 2004 to 2007. Multiple locations across a wide area increased the potential for fields with varied insect and disease levels. Treatments were in a strip plot design, 10 by 410 feet, with 3 replications per treatment. Check plots were monitored twice a week from soybean emergence to the V2 stage for the presence of root disease and soil pest insects, such as European chafer, wireworm, and seed corn maggot. Plant populations were determined 21 days after emergence. Vigour ratings were determined subjectively on a scale of 0-100%. The plots were monitored weekly from late-June until mid-August for additional insect pests, such as bean leaf beetle, potato leafhoppers, and soybean aphids. When aphids were detected, counts were recorded. Seed yields and harvest moistures were recorded.

Treatments:

1. UNTREATED CHECK (no fungicide or insecticide seed treatment)
2. MAXIM APRON
3. MAXIM APRON + CRUISER @ 50 g per 100 kg of seed
4. MAXIM APRON + GAUCHO @ 120 g per 100 kg of seed

Results and Summary

Plant stand counts were taken 21 days after seeding. Averaged across all sites, counts were higher by approximately 3% (4,300 plants/acre) for the Maxim Apron, 7.5% (10,500 plants/acre) for the Maxim Apron + Cruiser and 6.7% (9,400) for the Maxim Apron + Gaucho compared to the untreated check. Refer to Table 1.

Table 1: Soybean Seed Treatment Effect on Plant Stands

	Plants/ac	Seed Treatment Advantage Over Check
Untreated	139,700	
Maxim/Apron (M/A)	144,000	4,300
Cruiser + M/A	150,200	10,500
Gaucho + M/A	149,100	9,400

(2004 = 10 fields x 3 reps, 2005 = 12 fields x 3 reps, 2006 = 8 fields x 3 reps, 2007 = 10 fields x 3 reps)

Yields were higher for Maxim-Apron in 21 of 35 trials compared to the untreated check, but this yield increase was "statistically significant" in only 3 of the trials. ($p < 0.10$). Maxim Apron plus an insecticide seed treatment yielded higher at 28 of 35 sites, but only 6 of these were statistically significant (p=0.10). Refer to Table 2.

Table 2: Soybean Seed Treatment Effect on Yield

	Bu/ac	Seed Treatment Advantage Over Check
Untreated	49.2	
Maxim/Apron (M/A)	50.4	1.2**
Cruiser + M/A	51.1	1.9***
Gaucho + M/A	51.3	2.1***

, * = statistically significant from untreated at p=0.01 and p=0.001 respectively

(2004 = 10 fields x 3 reps, 2005 = 12 fields x 3 reps, 2006 = 8 fields x 3 reps, 2007 = 5 fields x 3 reps)

The magnitude of soybean response to seed treatments depended mainly on the presence of root rot diseases, insect pressure, soil type, and weather. The greatest yield response was on clay and clay loam soils. Fields that suffered from soil crusting after planting had a greater response than those with little or no emergence problems. At one site where crusting was evident, Maxim-Apron increased plant stands by 38%. At the sites with a statistically significant yield response, rhizoctonia and pythium root rot were the main disease problems. At two sites where pythium reduced plant stands, yields were increased by an average of 32% or 11 bu/ac. Averaged across sites, Maxim Apron + Cruiser increased plant stands by 10,500 plants/acre and increased yields by 1.9 bu/ac. Maxim-Apron + Gaucho increased plant stands by 9,400 plants/acre and increased yields by 2.1 bu/acre. Seed treatments containing insecticides significantly reduced early populations of bean leaf beetle when they were present (up to a 60% reduction).

Significant aphid populations were only observed in these trials during 2005. Insecticide seed treatments kept aphid levels lower than the untreated check for the first 40-60 days after planting, but they had little affect on aphids after that point.

In this set of experiments, the fungicide Maxim-Apron increased yields by up to 32% when high levels of root rot were present and when fields suffered from crusting. This occurred in 3 out of 35 fields. When conditions were excellent for emergence and early growth, no yield benefit was realized. The use of an insecticide was only beneficial when early season bean leaf beetle, aphids or seed corn maggots were a problem.

Figure 1: Bean leaf beetle - overwintering generation significantly reduced with Crusier Max

Fowl Meadow Grass (*Poa Palustris*) Control in an Established Alfalfa and Timothy Crop

by Mike Cowbrough, OMAFRA, Guelph and Dr. François Tardif and Peter Smith, Department of Plant Agriculture – University of Guelph

Other names: Fowl bluegrass, June grass

The Weed: Perennial, with a membranous ligule and rough textured, folded leaves. Mature plants are yellowish in colour. The stems are round and purplish at the base.

The Impact: Fowl meadow grass grows incredibly fast and has usually headed by the third to fourth week in May. As the species gets older it turns a yellowish colour and the stems become very coarse and wirey, this usually occurs before the alfalfa and timothy is ready for its first cut. This weed affects forage value as palatability can be decreased and often clients purchasing feed for the horse market do not like the appearance of this grass (See Figure 1).

Control Options (Preliminary Research). A field trial was conducted in the spring of 2007 to evaluate efficacy of Fowl meadow grass, tolerance of alfalfa and timothy with 15 herbicide treatments. While there were many products that controlled Fowl meadow grass only 1 treatment, Achieve + Turbocharge (Figure 2), provided both adequate crop safety and weed efficacy (Table 1).

Table 1 - Percent visual control of Fowl meadow grass and percent visual injury of alfalfa and timothy at 3 weeks after application of 3 herbicide treatments.

Treatment	Rate/acre	Fowl meadow grass control (%)	Alfalfa Injury (%)	Timothy Injury (%)
Achieve + Turbocharge	200 ml/ac + 0.5% v/v	76	0	0
Venture	240 ml/ac	99	0	64
Poast Ultra + Merge	133 ml/ac + 0.5% v/v	97	0	93

Source: Swanton and Tardif, 2007 Weed Research Report – Trial #07POAPA31JN

Registration Status: Achieve is not registered for use on alfalfa or timothy for forage production. Crop residue data is required before a registration can be pursued however collection of residue data is very expensive and unlikely to be initiated by the manufacturer based on a limited number of acres being affected with this grassy weed. Growers who would find value in controlling Fowl meadow grass in forage crops should send letters of support for this project to the Ontario Forage Council c/o Agricultural Services Centre, Box 463, 206 Toronto Street South, Markdale, Ontario NOC 1HO.

Limitations: This is a preliminary study and more trials are needed to gain confidence that these results can be duplicated under various environmental conditions.

Figure 1. Fowl meadow grass infestation in an alfalfa/ timothy stand

Figure 2. Fowl meadow grass control with Achieve + Turbocharge. Note the presence of timothy in the treated area.

Figure 3. Fowl meadow grass control with Poast Ultra. Note the absence of any timothy in the treated area

Starting Canola Off Right

by Brian Hall, Canola & Edible Beans Specialist, OMAFRA

There is an old adage that the two most important days for a crop are the day you plant and the day you harvest. Establishment is the greatest challenge in growing canola, because it is sown shallow where the soil that is most subject to rapid drying. Consider these tips for quick, even emergence, rapid canopy closure, and higher yields.

- Don't let **soil compaction** squeeze your profits. Roots care about how deep they go. Most soil compaction and damage is done by the first trip over the field in the spring. The push to plant more acres and seed earlier can push you to go into fields when soils are marginally fit and compact the most. Yield losses of 15% to over 30% have been documented. Check soil conditions at tillage depth. Soil should crumble easily and not form a ball or ribbon when rolled in your hand.
- Be aware of **residual herbicides** used in the previous crop. Carry over can be greater following a dry year. Refer to OMAFRA Publication 75, *Guide to Weed Control* and product labels for more information.
- **Seeding rates** are usually given in lb/acre, but a preferred method is to begin with the desired final plant stand. The optimum plant stand is 7 – 10 healthy plants/sq foot. In 7.5 inch (19.5 cm) rows this is equivalent to 4.5 to 6 plants per foot (14.8 - 19.7 per m) of row. Target seeding rates need to account for large differences in seed size between varieties.

1000 Seed Weight gm	Target Seeding Rate (lb/acre)	Seeds/ foot	Grams of Seed per Opener per 100 feet of travel
3.5	3.3 (3.63)	5.7 (18.7)	2
4	3.7 (4.07)	5.7 (18.7)	2.3
4.5	4.2 (4.7)	5.7 (18.7)	2.6
5	4.7 (5.2)	5.7 (18.7)	2.8
5.5	5.1 (5.7)	5.7 (18.7)	3.4
6.0	5.6 (6.2)	5.7 (18.7)	3.4

Note: seeding rate is based on 72% final stand and target population of 7 plants/sq foot (75 plants/sq m). Seeding rates should be adjusted 5 % - 10% higher on soils prone to crusting, when seeding very early, or very late. A seeding rate calculator is on the Alberta Agriculture website: http://www.agric.gov.ab.ca/app19/calc/crop/otherseedcalculator.jsp

- **Calibrate** seeding equipment before heading to the field! Bulking of seed with MAP (11-52-0), pelletized sulphur, or corn cob grits are options for improving seeding rate accuracy. Seeding through the grass seed box with the seed tubes inserted into the disc openers is another option.
- **Speed kills.** Even emergence is more important than plant spacing. Drill bounce is more of a problem at speeds over 5.0 mph. A speed of 5.5 mph required an extra 1.5 lb/ac (1.7 kg/ha) more seed to achieve the same plant population compared to 5.0 mph.
- The ideal target seeding date is when **soil temperatures** are 5^0 C or higher, but let soil conditions guide you on when to seed.
- **Seed 1/2" to 1" deep** into a firm and slightly cloddy seedbed, keeping moisture near the surface. Deeper seeding reduces emergence and vigour, decreases seedling and root growth, and increases risk of crusting. Pack before and after planting in a dry year. If moisture is more than five cm (2 inches) deep, it is advisable to wait for moisture. Avoid having the seed start to germinate and run out of moisture.
- **Soil test before you invest!** Build a precision fertility program for each canola field by soil testing, and potentially save fertilizer dollars.
- The optimum **nitrogen rate** is 90 – 100 lbs/acre (102-114 kg/ha).
- The recommended **maximum rate of phosphorus fertilizer with the seed is 18 lb/ac (20 kg/ha)**. **Nitrogen (except as MAP) or potash should not be applied with the seed**. Canola is very sensitive to fertilizer placed near the seed. Canola takes up 3 lbs/ac of phosphorus by the 5 leaf stage. In comparison, corn takes up 4 lb/ac and wheat 15 lb/ac in the first 30 days. Crops planted under early, cool conditions benefit the greatest from starter applied phosphorus. Western research has shown an economic response with an initial 10-15 lbs/ac (11 – 17 kg/ha) of phosphorus at planting time.
- Apply **20 – 30 lbs/ac (23-34 kg/ha) of sulphur** as 'insurance' against deficiency. A least cost approach for providing sulphur is to replace part of the spring urea application with ammonium sulphate (21-0-0-24). Replacing 50 pounds (22.7 kg) of urea with 100 pounds (45.4 kg) of ammonium sulfate will supply the same amount of nitrogen and 24 lbs (10.9 kg) of sulphate –S. Broadcasting is as effective as through the drill. Ammonium thiosulphate (liquid 12-0-0-26S) is another common source of sulphate-S.

- Heavy **flea beetle pressures** can thin stands, even where a seed treatment is used. Populations can explode under warm, sunny conditions. Flea beetles migrate in from overwintering sites, so scout the margins of fields first. Control is warranted when more than 10% of leaf area is lost. If caught early, only field margins requires a foliar spray.
- **Spray weeds early for higher yields!** Trials have shown a 10% yield improvement (i.e. $59.00/acre @ $650/t canola price) by spraying at 1-2 leaf stage versus the 5–leaf stage. Concentrate on controlling weeds that emerge with the canola, and less on weeds that come up after the 4-6 leaf stage.

No Holds Barred!!

by Peter Johnson, Provincial Cereal Specialist, OMAFRA

About time! After years of limiting crop inputs with the economics just not quite good enough, we can throw those old ideas out the window. We have hit the mother lode! With most of the winter wheat planted on time last fall, or even a few days early, we have the yield potential to take advantage of more inputs. With wheat prices at record levels, and our inputs still at last year's prices, it's time to GO FOR BROKE!

Nitrogen - add 10 pounds to your normal application.
Dr. Dave Hooker, University of Guelph, is currently working on a "Wheat Nitrogen Calculator", similar to the corn nitrogen calculator. While it is not yet available for growers, when Dave runs through this year's numbers using wheat at a 100 bu/ac yield potential, a $8.00/bu price, and urea at $550/ tonne, the optimum N rate is 100 lbs per acre. Subtract 10 lbs/ac for 80 bushel yields, and add 15 for 120 bushel yields. For most growers, that equates to an additional 10 pounds over the normal N application. However, watch your standability on varieties with lodging concerns. Refer to www.gocereals.ca for variety information.

Early fungicides will pay!
Over the years, early fungicide application has returned 2 or 3 bushels in additional yield, just barely enough to cover the cost of the fungicide. With current wheat prices nearly double what they were a year ago and with fungicide prices a bit lower, suddenly you can easily double your money. Table 1 summarizes the yield advantage of Stratego in 6 Thames Valley Soil & Crop trials. With early wheat, the potential for lots of early disease, and a three or four bushel yield increase very possible, put that fungicide in the tank with the herbicide!

Table 1: 2007 Fungicide With Herbicide Winter Wheat Trials - 6 sites

	Check	Stratego	Yield Advantage
Bu/ac (tonnes/ha)	77.8 (5.23)	82.0 (5.51)	+ 4.2 (+ 0.28)

Thames Valley Soil & Crop Improvement Association

Fusarium control will pay!
In the past, fusarium fungicides were a break-even proposition. The fusarium protection was like free insurance, but often you didn't put many dollars in your pocket. Double wheat prices, and the story changes. Which product should you use? If the risk of fusarium is high, spray Proline. If the risk of fusarium is low, spray Folicur. Proline is much better on fusarium, Folicur is better on rust. Table 2, 3 and 4 summarize some winter wheat fungicide Soil & Crop trial data.

Table 2: Effect of Folicur on Winter Wheat Yield – Summary of 2003-2006 Trials

		Yield bu/ac (tonnes/ha)		
Year	# Trials	Check	Folicur	Difference
2003	27	93.8 (6.31)	101.4 (6.82)	+8.1 (+0.54)
2004	29	83.0 (5.58)	89.6 (6.03)	+6.6 (+0.44)
2005	23	85.4 (5.74)	88.2 (5.93)	+2.8 (+0.19)
2006	24	99.7 (6.70)	103.9 (6.99)	+4.2 (+0.28)
Avg. 03-06	103	90.3 (6.07)	95.7 (6.44)	+5.4 (+0.36)

Ontario Wheat Board, OMAFRA

Table 3: 2007 Trial Summary - Proline vs Folicur

	Yield bu/ac (tonnes/ha)		
# Trials	Check	Folicur	Proline
6	85.2 (5.73)	90.0 (6.05)	93.2 (6.27)
9	-	88.5 (5.95)	91.6 (6.16)

Oxford Soil & Crop Improvement Association

Table 4: 2007 Stratego Plus Fusarium Fungicide Trials

		Yield bu/ac (tonnes/ha)		
	# Reps	**Folicur**	**Stratego/ Folicur**	**Stratego/ Proline**
Melbourne 1	4	61.0 (4.10)	67.4 (4.53)	
Melbourne 2	3	90.3 (6.07)	92.0 (6.19)	
Bryanston	2	104.4 (7.02)	104.9 (7.05)	
Parkhill	5	95.0 (6.39)	99.1 (6.66)	109.6 (7.37)
Arva	2	83.6 (5.62)	86.8 (5.84)	90.3 (6.07)
Average - 5 trials		86.9 (5.84)	90.0 (6.05)	
Average - 2 trials			90.9 (6.11)	96.7 (6.50)

Middlesex Soil & Crop Improvement Association

Tramp loss

Wheat is worth a LOT! Tramp loss will cost you double what it used to. Use the absolute widest boom and most narrow tires on the sprayer that you can. Otherwise, you are simply throwing money away!

Plots!

So all this is lots of fun. It is the first time in memory that I have been able to say **GO FULL OUT!** Next year is unlikely to be quite this good. We need more data to help make the decisions regarding what will pay as economics return to more normal levels. **Leave two strips** untreated. Weigh them off, and **send me the data** at harvest. That way, I can write another article next spring, and make you even more money!!

Organic Field Crops in 2008

by Hugh Martin, Organic Crop Production Program Lead, OMAFRA, Guelph

There has been a lot of excitement lately about the increased prices that are available to conventional field crops. What a difference a year or two can make! Over the last six months, organic crops have also been in short supply and those prices have also gone up. Prices for organic crops are up because:

- demand for organic products continues to grow;
- the organic livestock industry is booming in North America and that is using organic grains for feed;
- China is expanding their organic livestock production and they are importing instead of exporting their grains.

Financial & Non-financial Reasons To Go Organic

Two years ago there were some conventional producers frustrated with low grain prices and they were looking to organic to "save them" financially. That financial need is not as great now, but there are many other reasons to convert to organic. Surveys among organic growers usually list economic benefits as being fairly low among the reasons they switch to organic. The leading reasons to be organic as stated by organic farmers are:

- concerns about the environment
- soil health
- the safety of the farm family; and
- a higher level of personal satisfaction.

The transition to organic takes 2 to 3 crop seasons when you have to use organic production methods but are unable to get an organic price for your crop. Organic and transition yields are often slightly lower than conventional. The lower price and lower yield is a hardship during transition. One strategy is to transition the farm gradually. Some people argue that now is a good time to transition to organic since current conventional prices are excellent for this transition period.

Organic prices have gone up 25-50% for most crops during the past 6 months. These prices are expected to remain high for some time. The volume of retail organic sales are growing 20 - 25% per year. The livestock industry is the fastest growing, with some sectors growing at over 50% per year. Organic livestock must be fed 100% organic feeds.

Gross Margins Compared

Table 1 compares estimated gross margins for various organic and conventionally grown crops, based on expenses from the 2008 OMAFRA Crop Budgets and estimated crop prices as expected at harvest in 2008. Gross margin is the returns over direct costs to cover the cost of land, labour and management. In the current volatile markets, these assumptions are of course subject to change. Organic yields are assumed to be about 75 - 80% of non-organic yields.

The Table 1 shows that organic corn and soybeans are well above non-organic for profitability based on these assumptions. Organic wheat has not kept up with the current very hot non-organic wheat markets.

Table 1 - Estimated 2008 Gross Margins For Organic and Non-Organic Field Crops

Organic Crop Returns			
Crop	Assumed Yield	Assumed Price	Estimated Gross Margin
Soybeans	30 bu/ac	$20/bu	$382
Corn	100 bu/ac	$9.50/bu	$601
Winter wheat	60 bu/ac	$11.00/bu	$402
Spelt	1.1 tonne/ac	$500/tonne	$283
Non-Organic Crop Returns			
Soybeans	40 bu/ac	$12.00/bu	$281/ac
Corn	133 bu/ac	$4.50/bu	$177/ac
Winter Wheat	80 bu/ac	$8.00/bu	$435